William Painter

Genius That Succeeds

Foreword

The impetus for this work was completely accidental. I am a collector of antique and not-so-antique American patented corkscrews. I found one cork puller particularly interesting. It is known to collectors simply by the name marked on its handle, "U-NEEK." This corkscrew is certainly unique. Anyone who sees it for the first time most likely would call it a "whatzit," as it is not readily obvious that it could be used to draw a cork from a bottle.

I had very little information about the U-NEEK, but I did know that it was patented in 1917 by Wilson M. Brady of Baltimore, Maryland. I also knew that it was manufactured in the early twentieth century by The Unique Necessites Corporation at 316 St. Paul Street in downtown Baltimore. I live just a short drive from Baltimore, so I decided to see if I could go there and find out some more information about the U-Neek. My first idea was to locate 316 St. Paul Street to see if the original factory building was still there. When I arrived at St. Paul Street, my hopes were dashed when I saw a large modern office building occupying the entire 300 block. Not to be discouraged, I proceeded a few blocks more to the Enoch Pratt Free Library to search their Maryland Room for any information on Wilson Brady or The Unique Necessites Corporation. When that search turned up empty, I sensed my quest was over. But heck, since I was there I decided to just search through the archives to see if there was any information about corkscrew manufacturing in Maryland. Once again, I turned up nothing of interest.

Then I remembered that the inventor of the bottle cap, William Painter, was from Baltimore, that he had managed the Crown Cork and Seal Company in its early years, and that he had also patented the first bottle cap opener. Maybe some research on his bottle cap and opener would provide some link to my corkscrew research? I looked up "Painter, William" in the card catalog and found that the Pratt Library had several William Painter references in their archives. One by one, I pulled out these references – a newspaper clipping here, a brief biography there. Finally, I found a large old book - with that wonderful old book smell - entitled "William Painter and His Father, Dr. Edward Painter", written by William's son Orrin Painter in 1914. For hours, I sat and read about the life of William Painter as told by a son who had the utmost respect and admiration for his father. This was not only the story of a brilliant inventor and astute businessman, but of a reverent, kind and generous man, a loving husband and father, a man who was held in the highest esteem by everyone who knew him.

As I made the drive home that evening, I felt as if I had discovered a story that had been secreted away for nearly a century. I decided to learn more about William Painter and to retell the story to a twenty-first century audience. I knew that over the next several months it would take countless hours during my evenings and weekends to collect all the information I could find about William Painter and recount the information that you will read in this book, but I dove in wholeheartedly. It is my hope that you will find the story of William Painter as fascinating as I have.

I would like to thank all of the people who have helped me make this book what it is.

Thanks to Carrie Albert at the Baltimore Museum of Industry for providing archival information. Thanks to the staff at the Enoch Pratt Free Library for providing archival information. Thanks to the staff at the U.S. Patent & Trade Office for guiding me through the patent search process and for providing me access to their patent records.

Thanks to Mike Dunleavy of the Crown Cork & Seal Company for providing period photographs of the company. Thanks to Michael Deas who provided much useful information regarding Edgar Allan Poe and Maria Clemm. Thanks to Mike Milner for giving me an impromptu tour of the Guilford Avenue Crown Cork and Seal building.

I owe a special thanks to several colleagues who have all been the painstaking process of researching and publishing their own works, who were always willing to share their vast knowledge with me, and who provided invaluable assistance to me along the way. Thanks to Ron MacLean, John Stanley, David Graci, Fred O'Leary, Chris Vaught, and Donald Bull for graciously agreeing to review the draft manuscripts and providing invaluable comments. I was floored when David agreed to openly share documents from his personal archives with me, a complete stranger at the time, simply in response to an email request.

Many thanks to Don for assisting me from start to finish; sharing documents from his personal archives, reviewing the manuscript, and advising me in publication of the final product.

Most importantly, I must thank Orrin Chalfant Painter for his wisdom to tell his father's story before it was forever lost. Orrin provided accounts of his father as a devoted and loving family man and provided insights into his father's personality that only the closest of family members would have. Without Orrin Painter's biographical sketch of his father, this book would not exist.

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A Restless Young Mind (1838 – 1859)

Let Your Life Speak.
- George Fox

WILLIAM PAINTER was born November 20, 1838, in Triadelphia, Montgomery County, Maryland. He was the son of Edward Painter and Louisa Gilpin Painter. Edward's father was also named William. The younger William Painter had four surviving siblings; an older sister Clara, a younger sister Emilie, and younger brothers Joseph and Samuel.

The name Painter is of English origin, sometimes spelled as Paynter. The Painters in America belonged to the religious Society of Friends, commonly known as the Quakers. The first record of a Painter to immigrate to America is Samuel Painter. He was a Quaker and he came from the region of England bordering on Wales. In the late seventeenth century, the most famous American Quaker, William Penn, brought some twenty-three vessels from England to America and most of the passengers were Quakers. These ships landed near the town of Upland, which is now known as Chester, Pennsylvania. Samuel Painter made the ocean passage to America either on the ship "Welcome" in 1682 or the ship "Canterbury" in 1699 – probably the latter. William Painter was directly descended from Samuel Painter and was one of the seventh generation of Painters living in America.

George Fox founded the Society of Friends in England in 1652. The teachings of Fox were radically different from the two dominant religions of England at the time, the Anglican and Puritan churches. Unlike traditional Christian religions, Friends' Meetings were simple. There was no minister, no sermon, no ritual. The Friends would gather in small meeting houses and spend most of their time together in thoughtful silence. They believed in searching inward for one's own Inner Light which would lead them to feel God's presence inside of themselves. The Quakers firmly

believe that all persons are equal and this shapes their basic moral tenets - helping the oppressed and destitute, charity, pacifism, treating others fairly and justly.

As a youth, Edward Painter had apprenticed at a cotton mill on the banks of the Brandywine at Glenby, Delaware. In 1829, the sixteen year old Edward met Louisa Gilpin while traveling to Maryland by steamboat and stagecoach. They married in 1834 and settled in Glenby. In 1836, the elder William Painter gave Edward a 400 acre farm in the rolling hills of Triadelphia, Maryland. The Triadelphia Quaker community dates to 1809, when three brothers-in-law began purchasing tracts of land on the banks of the Patuxent River[1]. Water diverted from the river powered a saw mill, grist mill, and cotton mill. Traders hauled wagonloads of cotton bales from Baltimore to Triadelphia and returned with muslin and cotton duck (canvas). The cotton duck was likely used to make ships' sails. The mills at Triadelphia, along with a general store and blacksmith shop, were organized as the Triadelphia Company. Ownership of the company changed hands many times over the years. In September of 1836, Edward Painter purchased the company for $14,219. It appears that he was unable to turn a profit, as he sold the company in early 1840. The Painters left Triadelphia and moved to a farm at Herring Run, a few miles north of Baltimore.

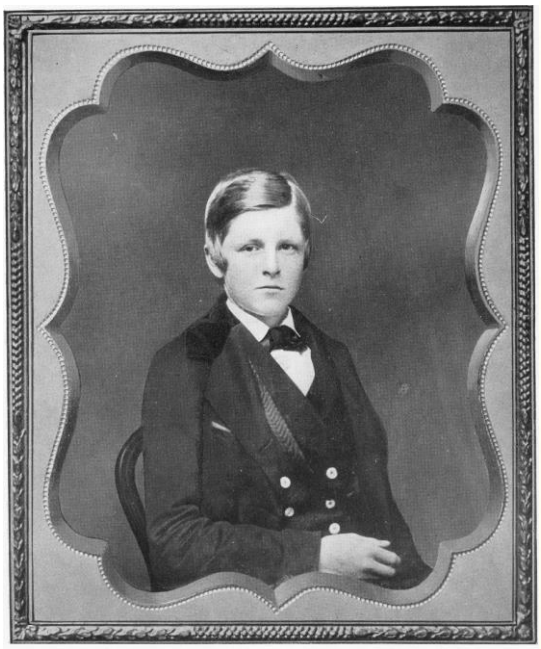
William Painter was an infant at the time and had no recollection of his time at Triadelphia. Life on the farm at Herring Run suited him well. He enjoyed the physical labor of the farm and it provided him with a robust physique. He was a hard worker, never idly whiling away his time. He was always trying to make things, but did not have any tools with which to work. One day, Edward Painter presented William with an opportunity. The asparagus bed was going to seed. "My son," he said, "if thee and thy sister will thresh that asparagus and get the seeds all ready to sell, I'll give thee what it amounts to." William and Clara set to the task, and each earned upwards of a dollar. On his next trip to Baltimore, William purchased a small set of carpentry tools.

In 1849, the Painters moved to a one hundred nine acre farm in the rustic green hills at Fallston, Maryland, some twenty miles northeast of Baltimore. During his four years at Fallston, William constructed "*various milling appliances of marked ingeniousness and merit.*" Even in his youth, William Painter displayed the qualities that would bring him great success later in life – a strong work ethic, constant attention to making improved mechanical devices, a belief that hard work brings reward, and most importantly a true gift for inventing.

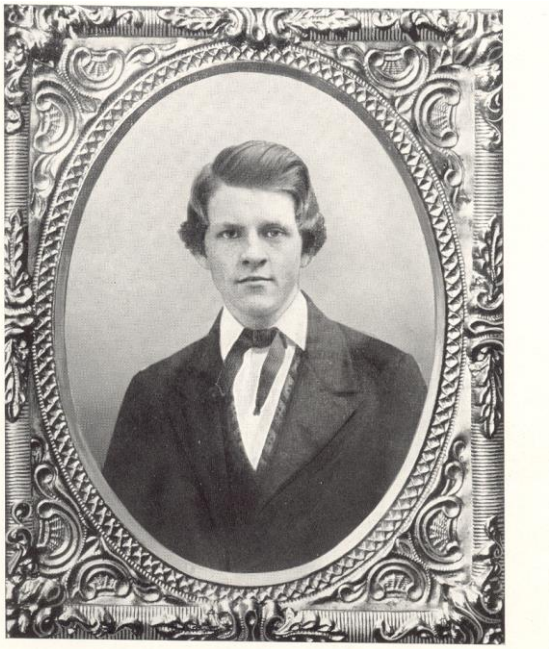
Throughout his lifetime, William Painter remained a devout Quaker. In 1853, young William moved to Wilmington, Delaware, to attend a year at Alsopp's School, then a year at the Clarkson Taylor School. There, he boarded with his grandfather, the elder William Painter, and with his uncle John Painter for a short time. In 1855, at age 16, the younger William finished his education and apprenticed for two years to Pyle, Wilson & Pyle, a manufacturer of patent leather. William Painter's uncle, William

[1] In 1943, the Brighton Dam was constructed just downstream of the area, creating the Triadelphia Reservoir. The original Triadelphia Quaker community and its buildings now lie beneath the water.

Pyle, was one of the principals of Pyle, Wilson, & Pyle. William Painter then served a two year apprenticeship with his uncle Joseph Pyle, a leather currier in Wilmington.



WILLIAM PAINTER,
WHILE GOING TO SCHOOL IN WILMINGTON.



WILLIAM PAINTER,
WHILE IN THE HIDE AND LEATHER BUSINESS IN WILMINGTON.

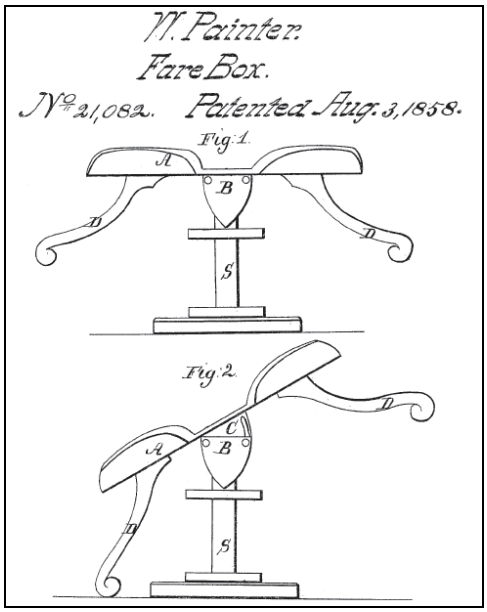
William Pyle had a son named Howard who was fourteen years younger than William Painter, and his first cousin. Howard Pyle would later in life become one of the most influential American illustrators and artists of the late nineteenth and early twentieth century. Pyle was instrumental in leading the Brandywine school of art.

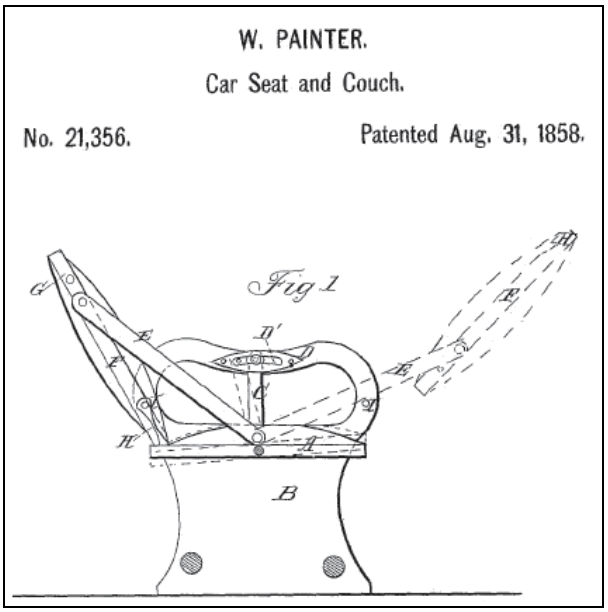
Howard Pyle and His Artwork

In Wilmington, William Painter found diversions that stimulated his ever active mind, including memberships in chess, debating, science, and literature clubs. He kept all of these interests throughout his adult life.

During his apprenticeship, William Painter took an interest in inventing. He devised a machine to fold sheets of paper for making books and showed a working model to his friend Jonathon Taylor. The prototype worked nearly to perfection and Taylor urged Painter to apply for a patent right away. Painter, however, was not completely satisfied with the prototype and decided to take some time to work out the imperfections. When he was finally ready to submit a patent, he discovered that Cyrus Chambers of nearby Chester County, Pennsylvania, had recently patented a similar machine (U.S. Patent 15,842). Chambers went on to make a considerable profit from his paper-folding machine. William Painter had learned a hard lesson by failing to heed Taylor's advice.

Painter's apprenticeship with Joseph Pyle ended on William's twenty-first birthday. He had recently been awarded two patents. The first was for a Fare Box (U.S. Patent 21,082) that facilitated the exchange of coins between a buyer and seller. The second patent was for a Car Seat and Couch (U.S. Patent 21,356) that a passenger could convert into positions for sitting or reclining. Like most patented ideas, these did not prove to be commercially successful.





William Painter's 1858 Patents

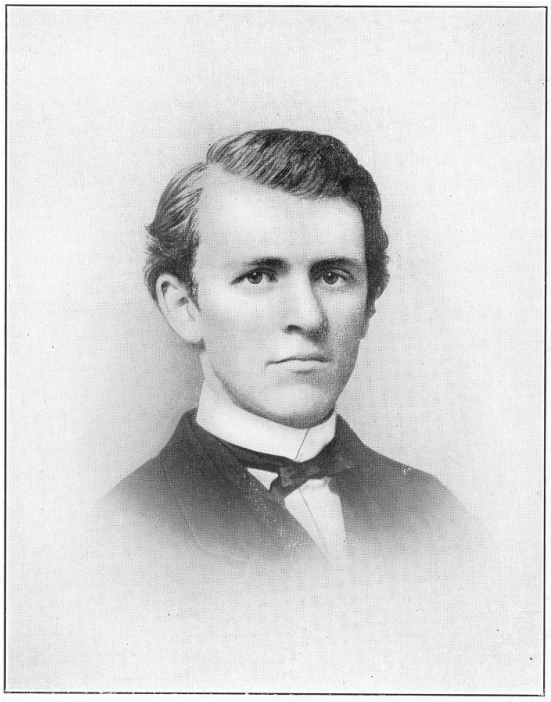
The Inventor and Small Businessman (1859 – 1881)

Seek not fame, Oh, it will never,
Banish from thy brow one care;
It will lure thee for a season
But still its impress will be there.
- Emilie Painter, *Twenty-First Birthday Anniversary Poem*

IN HIS twenty-first year, William Painter met his future wife, Miss Harriet Magee Deacon of Philadelphia. They met in the summer of 1859 at his great-uncle's farm in Chester County. A few months later, William's second apprenticeship ended and he returned alone to Fallston, Maryland. In that same year his father, Edward Painter, had bought a one hundred fifty acre farm and general store in Fallston that he operated with James Watson under the name "Painter & Watson". Edward was the postmaster and William became the assistant postmaster, learning the ways of the small businessman from his father.

William Painter married Harriet Magee Deacon on September 9, 1861 in Philadelphia. They settled in Fallston. Not much is written about Harriet Painter. The Deacons, like the Painters, had emigrated from England in the late seventeenth century and settled in and around the Philadelphia area. Harriet was the daughter of a Philadelphia hat and fur merchant. She was attractive, dark-haired and fair-skinned. She was pleasant in nature and shared the same Quaker values as her husband. Harriet was a supportive wife and a caring mother to her three children. In Baltimore society, she was "*noted far and wide for her admirable qualities of mind and heart and the amiability which made a thoroughly happy and contented home life."*

HARRIET MAGEE DEACON,
AT THE TIME OF HER MEETING WITH WILLIAM PAINTER,
IN 1859.



WILLIAM PAINTER, ABOUT 1866.

At this time, the Northern and Southern states were divided by the Civil War. Both Edward Painter and his son William were sympathetic with the Union, but they firmly believed in the Quaker peace principles. They abhorred war and would not bear arms or fight against others. William was in his mid-twenties during the Civil War but was never drafted by the Union. As a Quaker of strong principles, he certainly would have refused a draft order and faced the consequences of that refusal.

William Painter had been experimenting with an old lamp burner and was fond of the name of the patentee, Orrin Newton. William and Harriett's only son was born on April 6, 1864, and was named Orrin Chalfant Painter. The Painters later would add two daughters to the family - Helen Churchton Painter on June 2, 1866 and Ethel Gilpin Painter on November 15, 1880.

The Painter family moved to Baltimore in 1865. Hereafter, William Painter would call Baltimore home. He was quite fond of Baltimore and was optimistic about the future of the city as America was entering its great period of Industrial Revolution. He believed that Baltimore offered unparalleled opportunity for industrial expansion and once said that *"There is but one Baltimore, and there is no need of saying to anybody that it is in Maryland."*

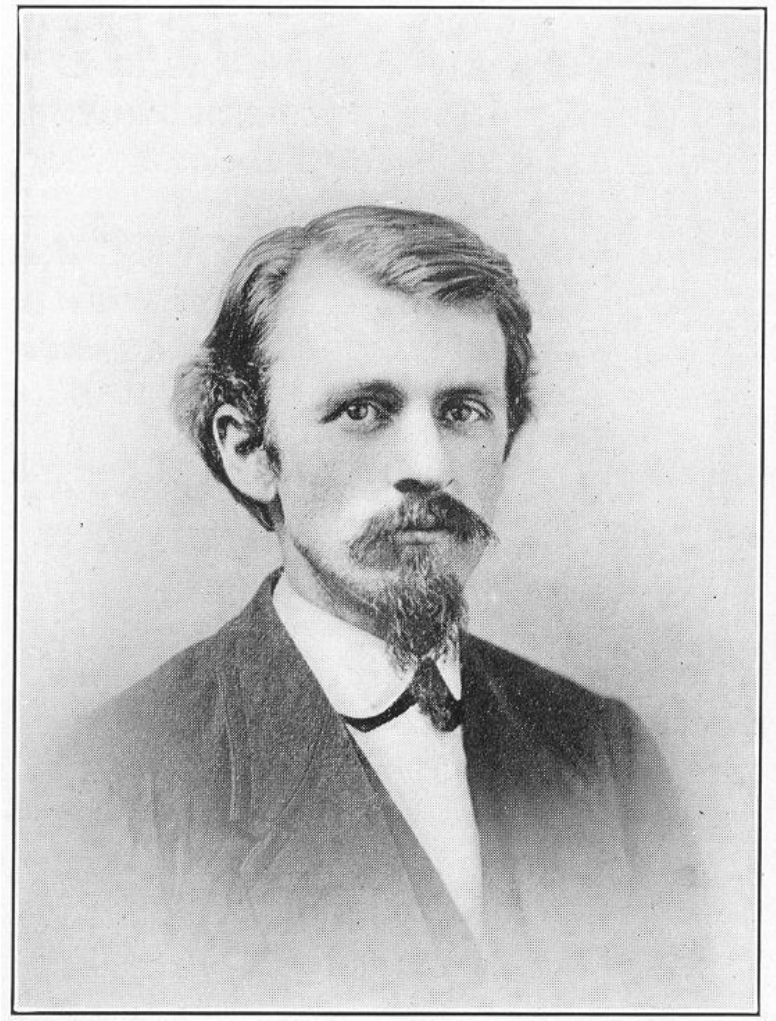
Painter continued inventing, focusing much of his effort on improving materials and joining techniques for blacking boxes. A few years later, Edward Painter sold the general store to his partner, James Watson, and also moved to Baltimore.

Edward took an interest in medicine, and at this late stage in his life he attended the University Of Maryland School Of Medicine in Baltimore. He graduated in 1867 at the age of 54, earning the title of Dr. Edward Painter. In 1869, Dr. Painter was appointed as the agent of the Omaha Indian Reservation in Nebraska. He lived on the reservation until 1873, when he returned to Baltimore. Dr. Edward Painter died on September 29, 1873 at age 62.

William Painter attended Baltimore City College and graduated in 1865 with a degree in Mechanical Engineering. In 1867, he accepted a position as foreman at Murrill & Keizer's machine shop on North Holliday Street. James Murrill died in 1870 and Keizer continued the business. In 1880, Keizer built a new factory just up the block at 202-204-206 North Holliday Street‡. Painter remained with Murrill & Keiser for nearly two decades, during which time he was awarded some forty patents and he assigned half of his patent rights to Lewis Keizer for roughly a dozen of them.

During the decade of the 1870's, Painter focused much of his inventive talents on new designs for pumps and valves. He was frequently seen in Murrill & Keizer's workshop, deep in thought, pondering some new idea or invention. He would silently walk up and down the shop floor in his shirt sleeves and no suspenders, pacing for a while, stopping momentarily to draw his ideas on the hard floor with a piece of chalk; then rising, hitching up his trousers, and returning to his solitary pacing. Outside of the workshop, he had a habit of drawing and writing his ideas on his starched white cuffs, creating extra work for his laundress. After leaving the workshop in the evenings, he would continue to ponder his ideas on his walk home and was known to have been so engrossed in his thoughts that he would on occasion pass right by his own house.

‡ This block is now the site the Abel Wolman Municipal Building, adjacent to Baltimore City Hall



WILLIAM PAINTER, SEPTEMBER 9, 1870.

William Painter was entertained by puzzles and problems and he usually solved them. His favorite pastime was a good game of chess. He often played chess with his uncle Charles Painter of Owings Mills. The two also enjoyed playing euchre, poker, and cribbage together. Charles Painter possessed a very practical mind, so he and William naturally found that they had many mutual interests. William Painter received his fourth patent (U.S. Patent 39,102) in 1863 for an "Improvement in Lamp Burners" and assigned the patent rights to his uncle. Charles' youngest son, Gwynne E. Painter, was of similar ilk as his older cousin William. In his later years, Gwynne Painter would become an electrical engineer and an inventor of note.

William Painter was a devoted husband and father who enjoyed reading short prose and poetry for pleasure, often reading aloud to his three young children. He was

never known to have invested the time to read a novel. His library included works by Mark Twain, William Shakespeare, George Byron, Robert Burns, Thomas Campbell, Thomas Moore, even Hans Christian Andersen. His favorite author was Baltimore's own Edgar Allan Poe. Painter was an avid collector of all articles and clippings pertaining to Poe. He never met Poe, who had died in 1849. Yet he would often visit Mrs. Maria Clemm at the Episcopal Church Home in her latter years, where she would tell Painter all about her "son" Eddie. In 1866, she wrote a note to Painter asking for his financial assistance and he generously obliged.

In 1868, Maria Clemm gave William Painter a daguerreotype of Edgar Allan Poe that she claimed was the last image ever taken of him, and she asked Painter to never part with it. He never did. The daguerreotype was bequeathed to Orrin Painter and remained in the Painter family for more than a century. To collectors of Poe artifacts, it is commonly known as the "Painter" daguerreotype. Research of the "Painter" daguerreotype has revealed that Maria Clemm's information about the portrait was not entirely accurate. The image dates from the early 1850's and is a copy of an original Poe daguerreotype[§] taken in either May or June of 1849.

Orrin Painter was also fascinated with Edgar Allan Poe and he continued his father's hobby of collecting anything related to Poe. Orrin was a key member of the Edgar Allan Poe Memorial Association, providing much needed financial support. In 1911, the association commissioned famed sculptor Sir Moses Ezekiel to create a bronze statue of Poe. On April 7, the association's President, Mrs. John C. Wrenshall, wrote a letter to Ezekiel informing him that *"The Fund has accumulated slowly, until now the realization of our hope appears to suddenly draw near, a gentleman of this City, my friend and neighbor, Mr. Orrin C. Painter coming forward and announcing his intention of materially advancing the cause."* She also noted that *"We would gladly furnish pictures, photographs, literature relating to Edgar Allan Poe, or any other possible facility that you might wish to secure for the desired likeness. Mr. Painter has a daguerreotype of the Poet, a rare and precious possession, and I have no doubt would have this copied for you."* After years of setbacks, the completed statue was finally dedicated in 1921 at a site in Baltimore's Wyman Park. The back of the pedestal was inscribed "Erected by The Poe Memorial Association of Baltimore and the Generosity of Mr. Orrin C. Painter." The statue was relocated to the University Of Baltimore Law Center Plaza in 1983.

William Painter was a firm believer in the Quaker principle of providing charity to those less fortunate than oneself. The generous gifts of both the Poe statue and the "Painter" daguerreotype to the city of Baltimore indicate that philanthropy was a value passed on to Painter's children and their children.

[§] In 1981, William Painter's granddaughter Mary Caroline Hood (Mrs. John Henry Lewin, Sr.) generously donated the Poe portrait to the Maryland Historical Society in Baltimore, where it is on public display. A similar Poe daguerreotype recently fetched $150,000 at a Sotheby's auction.

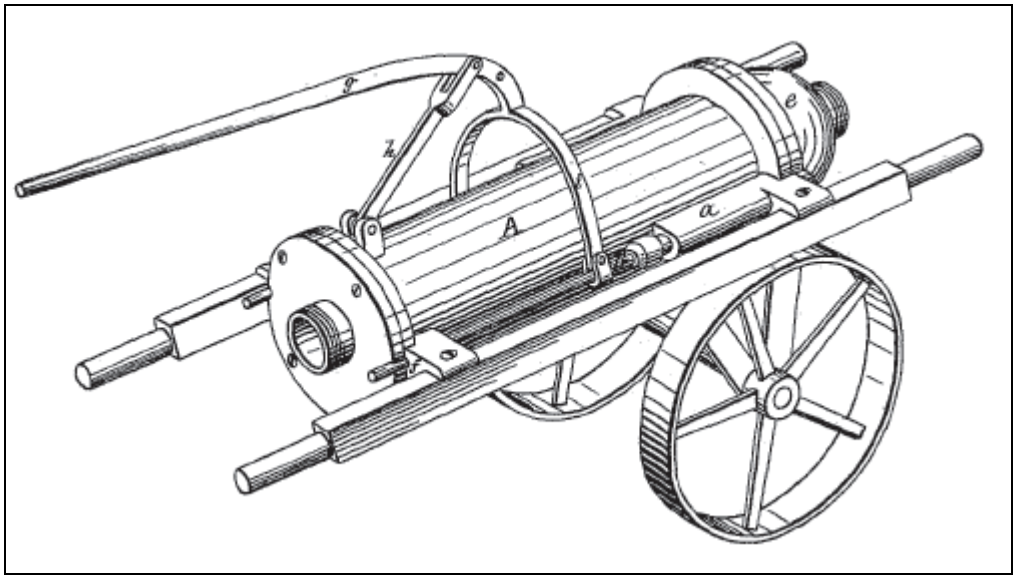
William and Harriet Painter enjoyed an occasional evening out. This might be a night at the theatre, the circus, a lecture, a minstrel show, or a divination show. In his earlier years, Painter had been quite fascinated with hypnotism and would frequently mesmerize the local men loitering at the Painter & Watson store, instructing them to act out unusual situations to the amusement of the others.

William Painter took a great interest in his childrens' development and tried to encourage their inventive natures. The children always had a workshop at their disposal wherever they lived and would spend many hours there. However, it seems that none of his children inherited his mechanical inclination. Orrin Painter apprenticed at Murrill & Keizer's machine shop when he was sixteen. William encouraged his son to study civil engineering, but Orrin was more inclined to art and literature than technical endeavors. Orrin was awarded one patent on September 9, 1902 for a "Label for Bottles, etc." (U.S. Patent 708,916). It was a clever idea for attaching an instruction booklet to medicine bottles and the like, but he admits that "*it never amounted to anything.*" Younger daughter Ethel once devised a mouse trap and showed her plans to her father. Upon seeing the plans, William was compelled to explain to her that "*it was so complicated and expensive to make, that it was better to let the mouse go.*"

William Painter belonged to the American Society of Mechanical Engineers (ASME), the American Institute of Mining Engineers (AIME), and the Maryland Academy of Sciences. As Painter advanced in both the business and social world, he would join the Merchants and Manufacturers' Association, the Athenaeum Club of Baltimore, the Baltimore Country Club, the Baltimore Yacht Club, and the Green Spring Valley Hunt Club.

In 1873, Painter met patent attorney William C. Wood and the two men began a lifelong professional relationship and personal friendship. Wood became one of Painter's most trusted friends. Their first documented professional endeavor together was in 1873, when the name "Wm. Wood" appears as the patent attorney on Painter's patent for "Pump-Valves" (U.S. Patent 141,587). The following year, Wood's name appeared as patent attorney on a group of four patents for pumps and valves for emptying cesspools awarded on October 6, 1874 (U.S. Patents 155,667 – 155,670). These patents provided an early glimpse of Painter's true inventive genius; his "Odorless Evacuating Apparatus" system became an immediate success. Decades later, Wood said of this system, "*it was a marvel when invented and built, and…it remains so to this day. When provided with a few feet of flexible suction pipe, and mounted on top of a long narrow tank filled with water, and operated for exhibition, it freely raised water and discharged it back into the tank. A long piece of rope, about an inch in diameter, was put into the water, with one end of it pushed within the suction pipe. Upon working the pump, this rope passed upward and out, step by step, with water in but little less than normal quantity. Then a straight, smooth clothes-pole, seven or eight feet long, was similarly carried through the pump with nearly a normal*

quantity of water. Afterwards, an old hoop-skirt, folded and knotted, took the same trip without delays. Such operations as those were impossible with any prior pump, and with none built since, unless it be an imitation, in essential features, of principles which were novel in the Painter pump."



Painter's Odorless Evacuating System

William Painter worked on new ideas for pumps, valves, and sewage transfer systems for a few years and was granted a total of eighteen applicable patents between 1872 and 1877, the last one being applied for on December 11, 1877. At this point, his interest in pumps and valves appears to have stopped abruptly as he never applied for another pump or valve patent. Perhaps the turning point was in 1876, when Philadelphia hosted the Centennial Exhibition. America was in its 100th year as a nation and the exhibition was the first major World's Fair held in the United States. It celebrated "A Century of Progress" and showcased America as a new industrial world power. There were over 250 pavilions showcasing state of the art industrial machines. Americans had never seen anything quite like it. During this six-month event, nearly 9 million people attended the exhibition at a time when the population of the United States was 46 million.

William Painter wouldn't have missed the Centennial Exhibition for all the tea in Baltimore Harbor. The fourteen acre Machinery Hall was the most popular attraction and was undoubtedly the place where Painter spent most of his time. Inside, the center of attention was the enormous Corliss Centennial Steam Engine which stood three stories high; its 56-ton flywheel supplied the equivalent power of 1400 horses to drive all of the other machines on exhibit within the Hall. Visitors marveled at these wondrous machines and inventions that would soon change American

lifestyles – ice makers, refrigerators, telegraphs, telephones, elevators, typewriters, gas stoves, mimeographs, internal combustion engines, locomotive engines, hydraulic power, electric circuits, and so on.

After attending the Centennial Exhibition, it was clear to William Painter that the next generation of revolutionary inventions would be labor-saving devices that improved people's everyday lives. Painter's new inventing philosophy was simple – make something that everyone needs, and make it better and cheaper than the competition can. At this point in his professional career, Painter's attention turned towards improving everyday items – lamps, tobacco cutters, telephone signals, fountain pitchers, and eventually bottle stoppers.

William Painter subscribed to Scientific American and the Patent Office Gazette. Painter would read them from cover to cover late at night. These magazines kept him abreast of the state of the art in various new technologies. He often sketched his own designs in the margins until he would fall asleep in his chair. His knowledge of the patent business was so extensive that he was often told that he could moonlight as a patent attorney. However, he preferred to devote his time to inventing, leaving the details of writing patent specifications and applications to his legal advisors.

As an inventor, William Painter was tireless and he would have indeed agreed with Thomas Edison that "*Genius is one percent inspiration and ninety-nine percent perspiration.*" Painter never grew discouraged when one of his ideas proved difficult to implement in the machine shop, and it is said that he never failed to see any of his ideas through to fruition. His success was attributed to "*his particular faculty of persistency, his genius being of that order which largely consists of taking infinite pains. Discouragement over initial failure to realize his conceptions is to him an unknown sensation, and it is to a great extent because of this peculiarity that he has been successful where so many fail.*" He always focused his attention on practical inventions and "*…he didn't chase visionary ideas. And when he fixed upon a rational idea he pursued it to completion. In a word, Mr. Painter never began any invention that he didn't finish, never devised anything that wasn't of practical use, and never created any appliance but has been of benefit to his race and has reflected pecuniary advantages to himself.*"

Painter's reputation as a first-class inventor kept him in demand as an expert advisor to inventors with lesser talents or less determination. He was consulted by "*inventors and manufacturers all over the United States to supply what many a half-hearted genius lacked, namely, the stability to carry out an idea to fruitful perfection. And there are hundreds of invaluable machines in use today which owe their utility wholly to Mr. Painter's perseverance, for he undertook to develop the crude idea of some spasmodic inventor, and brought out the one essential point which its inventor lacked – that is, the faculty of making the contrivance of some usefulness.*"

Corks, Stoppers, and Seals (1882 – 1891)

"The only way to do a thing is to do it."
- William Painter

IN THE mid-nineteenth century, the cork was the bottle stopper of choice and had been for hundreds of years prior. Cork as we commonly know it is the outer bark of the Cork Oak tree. The Cork Oak is indigenous to certain Mediterranean regions, primarily Portugal and to a lesser extent, Spain. Cork possesses several qualities that make it an ideal natural bottle stopper. Its elasticity and compressibility provide a tight seal. It is resistant to moisture. It is chemically inert and will not impart an unpleasant taste when it comes in contact with the contents of the bottle. A cork plug was the ideal low-tech solution to stoppering a bottle.

Of course, a tightly corked bottle calls for a special tool to remove the cork. Corkscrews had been in use for centuries, although the first patent was not awarded until 1795. The patentee was an Englishman, Reverend Samuel Henshall.

In the nineteenth century, hundreds of corkscrew patents were awarded in the United States, England, and the other leading European countries. As the Industrial Revolution rolled along, entrepreneurs patented and manufactured lots and lots of corkscrews. In America, corkscrew production was led by three manufacturing giants – William R. Clough, Cornelius T. Williamson, and Edwin Walker. Each of these three produced millions of corkscrews well into the early twentieth century, submitting new patents as technologies changed. Their initial enterprises presumed that most bottles were stoppered with a cork plug and they invented new and better tools to uncork those bottles.

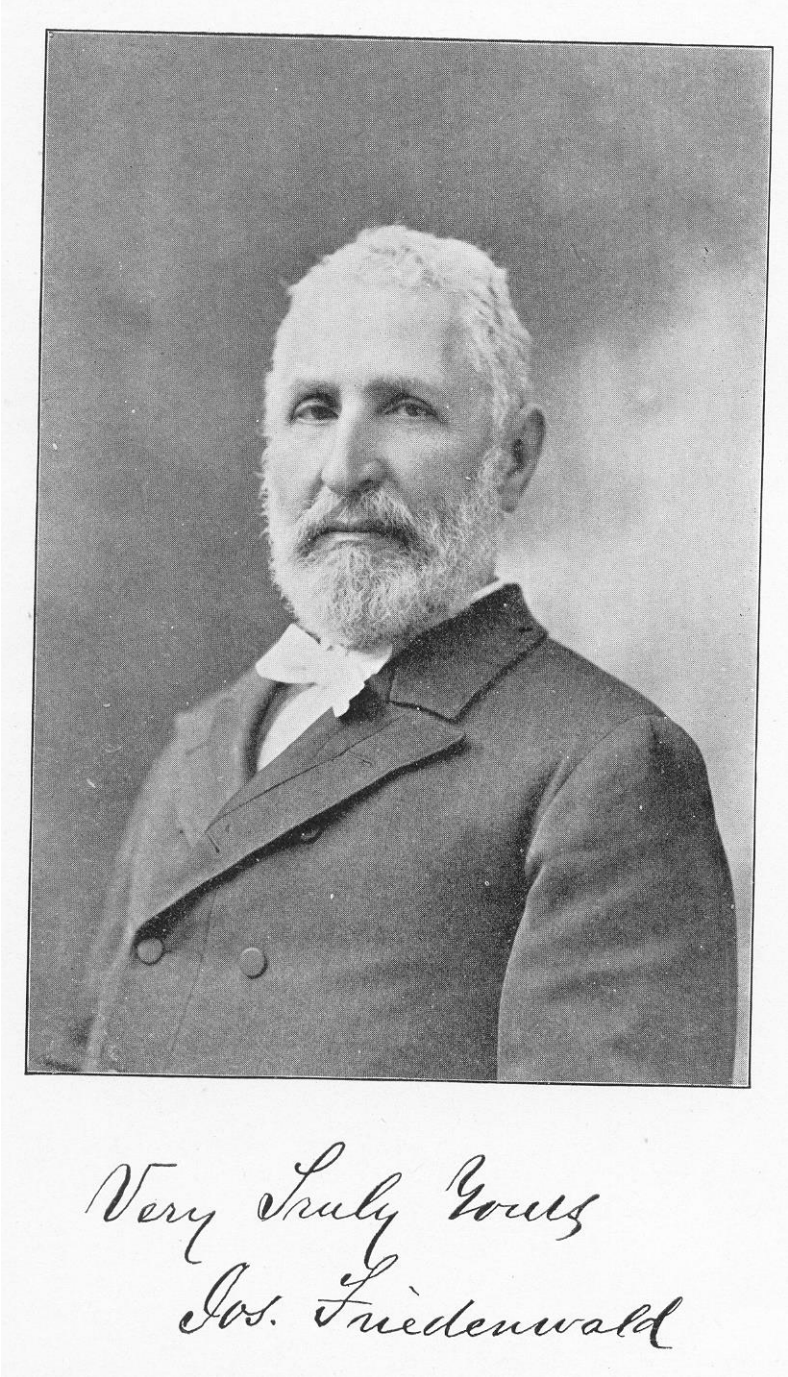
Cork stoppers remained popular throughout the nineteenth century, but in the 1850s American inventors began to devise alternative bottle stoppers. Many filed their inventions with the United States Patent and Trademark Office (USPTO). Very few of these patented ideas every realized significant commercial success. Some of the more

popular stoppers included the Lightning stopper, Hutter stopper, Hutchinson stopper, Mathews gravitating stopper, and the Codd bottle. Hundreds and hundreds of other bottle stopper patents never realized any success in the bottling industry.

WILLIAM PAINTER.

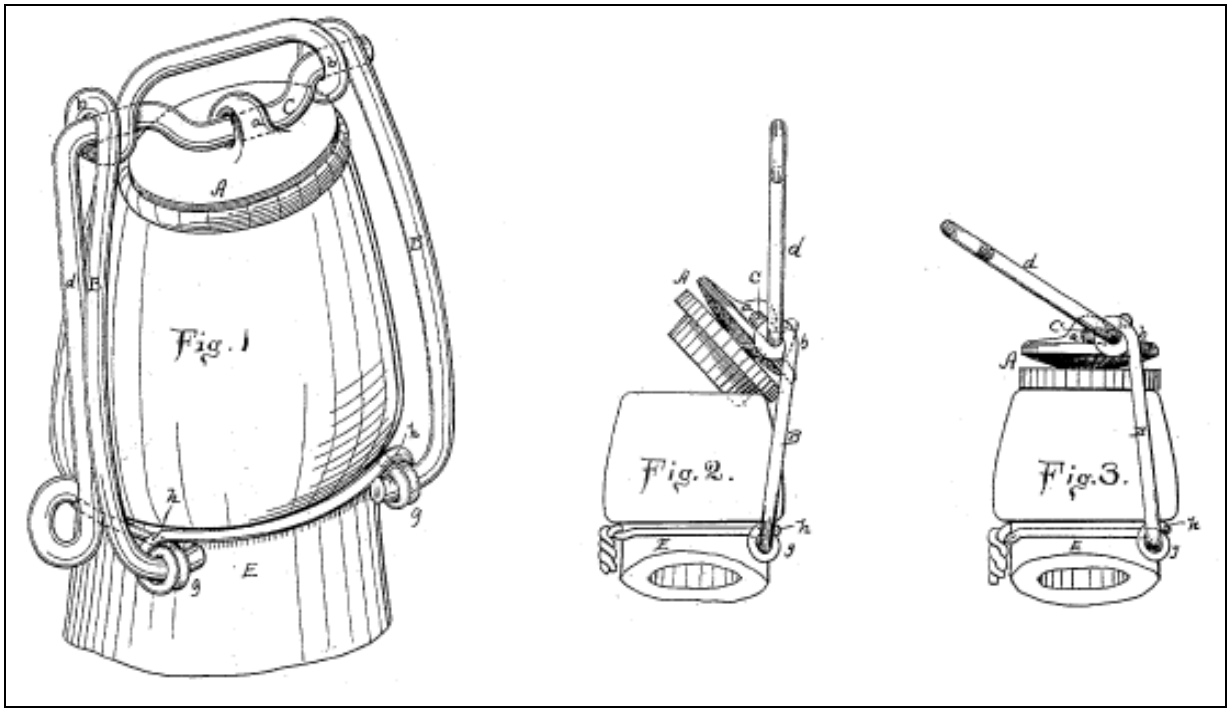
(ABOUT 1880.)

In the early 1880's, William Painter took a decided interest in the stoppering of bottles. He began a professional relationship with Baltimore business tycoon Joseph Friedenwald. Like Painter, Friedenwald was known for his honesty, fairness, and likeable disposition. There is no doubt that he and Painter held the highest mutual respect for one another. Friedenwald founded the Triumph Bottle Stopper Company in Baltimore in 1882 in partnership with Murrill & Keizer. William Painter spent many hours in the workshop working on new designs for bottle stoppers.



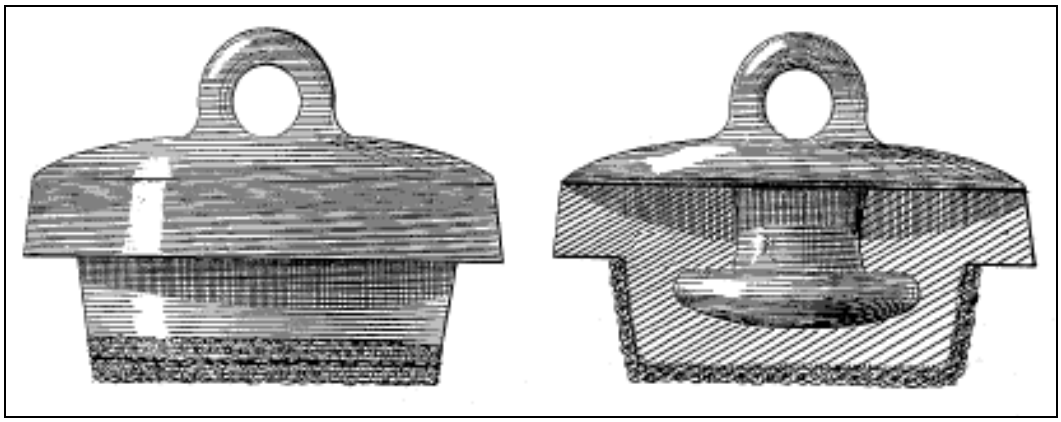
The Triumph Bottle Stopper Company was located at 44 North Holliday Street, in the same block as Murrill & Keizer's machine shop. William Painter, while still in the employ of Murrill & Keizer, assigned one half of the rights of his early

bottle stopper patents to Lewis Keizer. Painter received his first bottle stopper patent, simply entitled "Bottle Stopper Fastener" (U.S. Patent 315,655), on April 14, 1885. Painter's design improved on existing hinged fasteners, such as the popular "Lightning" stopper, as he states in the patent specification, "*requiring but a slight throw of the crank or cam and a short bail, so that the parts lie close and snug*", and also stating that "*I am not aware that a bail and stopper so arranged have ever been provided with a crank, cam, or other similar compressing device, whereby the stopper could be forced to its seat after being brought to position on the mouth of the bottle.*" Painter's new stopper facilitated opening the bottle with just one hand.



Painter's 1885 "Wizard" Stopper

On August 11 of the same year, Painter was awarded a patent for a "Bottle Stopper" (U.S. Patent 324,040). This patent entailed affixing a paraffin-coated cloth disc to the bottom of a rubber bottle stopper in order to prevent "*the disagreeable taste and odor imparted to the contents of the bottle by the rubber, and also of the corrosive and destructive action of the contents upon such stoppers.*"



Painter's 1885 Patent for a Paraffin-Cloth Stopper Cover

The combination of these two new patents gave the Triumph Bottle Stopper Company a new type of bottle stopper that the company marketed as the "Wizard". Painter and his partners knew that it would be a challenge to convince bottlers to choose the Wizard over the well-established Lightning stopper. They placed a full page advertisement in the October 1885 edition of the National Bottlers Gazette trade periodical. The advertisement heralded the Wizard as "*…a Perfect Bottle Stopper. It is the quickest, tightest, strongest, neatest, most secure, most durable, most easily opened, and in every way THE BEST ever produced, and the only one that is Non-Corrodible and Tasteless.*"

THE WIZARD

NON-CORRODIBLE

BOTTLE STOPPER

(Patented April 14, 1885. Other Patents Pending.)

MANUFACTURED BY THE

TRIUMPH BOTTLE STOPPER CO.,

No. 44 North Holliday Street, BALTIMORE, MD.

THE WIZARD

Combines all the requisites of a Perfect Bottle Stopper. It is the quickest, tightest, strongest, neatest, most secure, most durable, most easily opened, and in every way THE BEST ever produced, and the only one that is Non-Corrodible and Tasteless.

IT IS QUICK AND CONVENIENT,

Its construction permitting what has not yet been accomplished by any other bottle stopper, viz.: THE HOLDING AND OPENING OF THE BOTTLE WITH ONE HAND with the greatest ease. It is closed more quickly than any other, because the stopper is always in a fixed position and never gets tangled.

IT IS DURABLE,

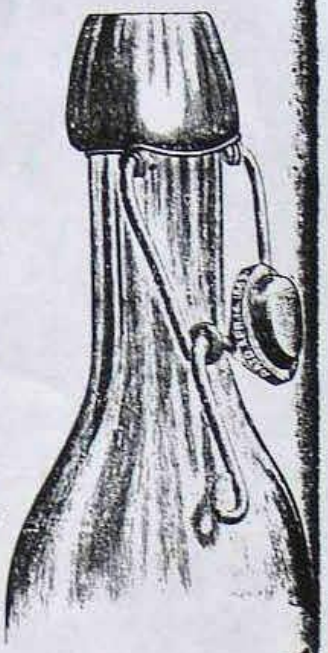
Because of its strength and compactness, and the permanent connection of its parts, thus avoiding their separation and loss; and because the stopper is perfectly protected from Corrosive action.

IT IS RELIABLE,

Because of the direct and powerful pressure exerted on the stopper, which is a self compensating one, adapting itself perfectly to the varying sizes of bottle mouths, always making a positively air-tight joint within as well as on the top of the mouth.

IT IS SECURE,

Because the Locking Lever is perfectly protected against accidental opening.



THE "WIZARD" HAS
A TASTELESS, NON-CORRODIBLE STOPPER.

By a combination entirely new, a NON-CORRODIBLE and INDESTRUCTIBLE STOPPER is produced. A compound of the purest and most cleanly substances known, perfectly devoid of taste or smell, is applied to the inner face of the stopper, separating it from the contents of the bottle, thus not only protecting the stopper from corrosive action, but also preserving Beer or other contents pure, wholesome and free from objectionable taste or smell.

It is well known that many beverages, such as Ale and Porter, are so injured by contact with the ordinary rubber stopper that its use is entirely inadmissible. The WIZARD STOPPER being tasteless and non corrodible, entirely obviates this difficulty, and consequently a new and very important field is opened.

Loss arising from flat, insipid or bad-tasting beer, is avoided by bottlers, dealers and consumers, when the Wizard Stopper is used.

IT COMMENDS ITSELF TO THE BOTTLE MANUFACTURER, because both the Stopper and Fastener readily adapt themselves to the usual varying sizes of bottle mouths and lengths of necks, and the non-corrodible properties of the Wizard Stopper fit it for use where the ordinary rubber stopper cannot be employed, hence greatly extending the business of the manufacturer.

Both the Fastener and the Non-Corrodible Stopper are fully covered by United States Patents, and parties using or dealing in them are guaranteed protection from any pretended conflicting fastener.

TRIUMPH BOTTLE STOPPER CO.,

JOSEPH FREIDENWALD, President.
SOLOMON STRAUS, Treasurer.

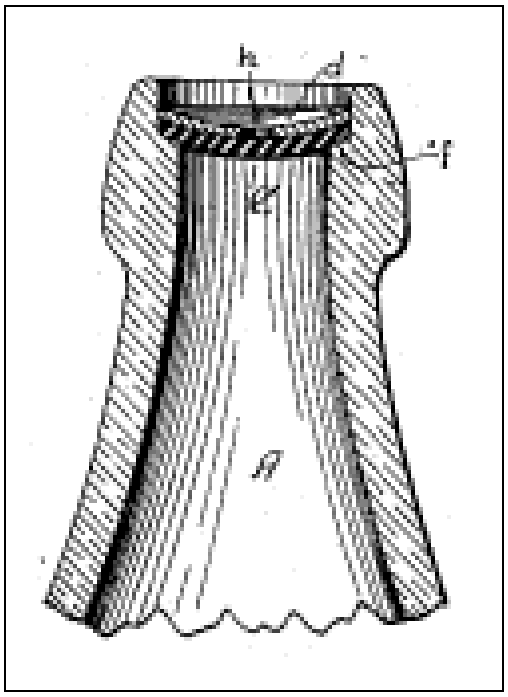
Office and Factory, No. 44 North Holliday St., Baltimore, Md.

☞ Fasteners for Bottles varying from the usual Beer Bottles can be furnished on receipt of sample Bottle. ☜

FOR SALE BY

CHAS. EHLERMAN & CO., St. Louis, Mo.
HEMINGRAY GLASS WORKS, Covington, Ky.
WISCONSIN GLASS WORKS, Milwaukee, Wis.
P. WIEDNER, Detroit, Mich.
H. MUELLER & CO., Cleveland, Ohio.
LEWIS BROS., 81 Wabash Av., Chicago.

That same year, William Painter received his third bottle stopper patent on September 29, 1885 (U.S. Patent 327,099). This stopper applied, on a much smaller scale, the basic principle that builders had been using for centuries to construct arches and domes. He described it as "*a disk of flexible material, cup-shaped, placed in the bottle-neck with its convex side inward and its concave side outward, and with its edge abutted against the bottle-neck, whereby internal pressure upon said stopper will be transmitted as lateral pressure against the bottleneck."* A thirsty patron could remove the stopper from the bottle in one of two ways. The public face of the stopper had a cavity in the center so that the stopper could be pried out with any pointed instrument. Alternatively, one could press down on the edge of the seal with a blunt instrument to dislodge the seal from the groove. This invention was indeed revolutionary as it was the first ever single-use disposable bottle stopper. It was simply named the "Bottle Seal."



Painter's 1885 "Bottle Seal"

The Bottle Seal had several clear advantages over the popular bail type stoppers and internal stoppers of the day. It was very inexpensive; Painter could manufacture his Bottle Seals for 25¢ per gross, versus $3.50 per gross for the Wizard stopper. It was completely separate from the bottle, so that bottles could be more

efficiently cleaned and sanitized. It was a thin rubber disk with an applied paraffin-cloth to protect the quality of the bottled goods.

The ancient Roman builders knew that a dome needs abutments for support. Likewise, Painter knew that his Bottle Seal needed a bottle that was specially formed with an internal groove near the top of the neck. Any pressure exerted by beer and carbonated beverages on the Bottle Seal would be transferred to the groove. This was easily accomplished by forming an interior groove near the mouth of a regular beer or soda bottle. Examples of late nineteenth century "blob top" bottles with a Bottle Seal groove are commonly known to today's bottle collectors. However, surviving examples of actual Bottle Seals are quite rare since these were disposable and nearly all have since deteriorated.

The Triumph Bottle Stopper Company was reorganized in 1885 by Samuel Cook as the Bottle Seal Company and the office was moved a few doors down to 28 North Holliday Street. The company wasted no time in promoting it's newest and best bottle stopper. It ran a full-page advertisement in the October 1885 National Bottlers' Gazette, unveiling the new Bottle Seal as "*…AN INVENTION OF STERLING MERIT, which is bound to place it beyond all competition,"* and proclaimed that, "*THE BOTTLE SEAL is far and away the Simplest, Cheapest, Tightest, Cleanest, Neatest, Handiest, and in every way the* ***Best Stopper in Existence***."

WHAT IS IT?

THE NEW IDEAL

BOTTLE SEAL!

NOT another device of the "Stopper Fiend," thrust into the face of the Bottler to harass and vex him, but

AN INVENTION OF STERLING MERIT,

which is bound to place it beyond all competition.

THE BOTTLE SEAL COMPANY

makes its bow to the Bottling Community, and presents a substitute for all the Corks, Bottle Stoppers and patented devices invented from Adam down to date, claiming to have effectually solved that most serious question to the Bottler, how to bottle his goods in the Cheapest and Best possible way, while securing Cleanliness, Purity, Convenience and absolute Tightness.

THE NEW BOTTLE SEAL

Is the very essence of simplicity, and is unique in being an External Stopper Held Tight by Internal Pressure. It is a Plain, Flat Disk of Rubber, having the appearance of a gun wad, and has a facing of pure, tasteless, non-corrodible material on its under side. It is forced, in convex shape, into the bottle mouth, and seats itself firmly in a shallow groove. "Only this, and nothing more."

It is Self-Fastening, requiring no wires or fixtures of any kind. Is clean and tasteless, used but once, and there is no obstruction to perfect and rapid bottle washing.

Perfectly adapted for every description of Carbonated and Malt Beverages, Mineral Spring Waters, Wines, &c., and for Export purposes.

Exceedingly neat in appearance, cannot be injured by rough handling, and yet, **can be opened by a child** with a simple pointed wire, made for the purpose, which pierces the seal and lifts it out. The piercing is made easy by the cavity in the centre. Readily opened, also, by anything at hand that will force down one edge of the seal and thus dislodge it from its seat.

It resists any required Internal Pressure, owing to its arched form, and is absolutely Air-Tight at high or low pressure, or no pressure at all, retaining the gases and preserving the beverage in good condition.

THE BOTTLE SEAL is far and away the Simplest, Cheapest, Tightest, Cleanest, Neatest, Handiest, and in every way the **Best Stopper in Existence;** and while possessing these extraordinary advantages, its use **Costs the Bottler less than half** that of Corks or any other form of Stopper whatever, internal or external. As compared with some stoppers in use, the cost is less than one-fifth. This sounds like big talk, but it is true.

Bottlers will consult their interests by examining fully the merits of the New Bottle Seal before ordering their supply of bottles and corks or other stoppers for the coming season.

THE BOTTLE SEAL CO.,

28 N. Holliday St., Baltimore.

Send for Circular.

The Bottle Seal Company now held the rights to Painter's first three bottle stopper patents. Over the next six years, Painter was granted seven additional patents for the company. The American bottling industry took notice that big things were happening on North Holliday Street in Baltimore in 1885, and a previously unknown inventor named William Painter was the brains behind it. With the invention of the first single-use disposable stopper, the bottling industry recognized William Painter as a pioneer inventor.

The Bottle Seal Company demonstrated its new bottle filling machine in Philadelphia on February 24, 1886. Several interested parties from New York attended as well. The demonstration showed how bottles were filled and sealed with Painter's new machine. It demonstrated Painter's many novel improvements, such as the snifter and overflow economizer, and the single foot-powered treadle to govern both filling and stoppering. In the March 1886 issue of *The National Bottlers' Gazette*, a writer described the machine as "*…an exceedingly simple, compact, rapid and apparently perfect bottling bench, and can be worked by any competent bottler. The tool for applying the seal to bottles containing beer is also an ingenious, simple and easily operated contrivance, is worked by hand, and, it is claimed, bottles can be sealed by it at the rate of 100 dozen or more per hour. All the parties present agreed that the bottle seal and the machinery for using it were capital inventions, and predicted a great future for it in the bottling trade.*"

The Bottle Seal Company eventually abandoned production of the Wizard stoppers and produced only seals. It grew into a large and profitable business. By 1888, the company had moved to a larger facility at 200-202-204-206 North Holliday Street. Shortly thereafter, the company moved to a larger facility in the 500 block of East Monument Street. William Painter's little Bottle Seal was a big success!

The company's president, Samuel Cook, held the rights to the production of Bottle Seals in the United States, Canada, and England. By 1888, the Bottle Seal Company was producing millions of Bottle Seals every month and supplying them to over 150 bottling companies in nearly two dozen states and Canadian provinces. Production remained strong for the next decade. By 1893, some seventy glass-blowing companies were making Seal bottles. Nearly 1,500 bottling machines across the United States and Canada were inserting millions of Bottle Seals into bottle necks every week. Estimated weekly production for the years 1896 to 1898 was is the range of 45,000 to 53,000 gross, or roughly seven million Bottle Seals a week.

To produce such an enormous quantity of bottle seals every week, William Painter developed enormous seal cutting machines. Each seal cutting press weighed nearly three tons and ran continuously on the floor of the Bottle Seal Company factory. First, large sheets of rubber were prepared, each measuring a yard wide, sixty feet long, and about one-fourth of an inch thick. One side of the rubber sheet was

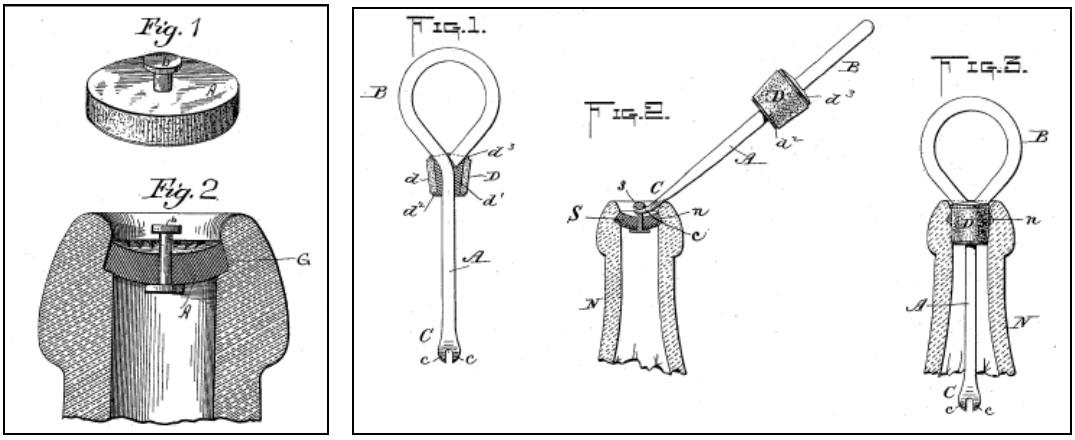
coated with a thin layer of paraffin wax. The wax would keep the bottled liquid from coming in direct contact with the rubber in order to prevent tainting the flavor of the beverage. Operators fed each large rubber sheet into the front end of the seal cutting press. Large rollers advanced the rubber sheet through the machine and circular disks were precisely cut from it. On each pass of the cutters, the machine would press out two rows of twenty-nine disks, with the second row laterally offset by one-half disk to minimize waste. The cutting proceeded at a rate of once per second and in just a matter of minutes the sixty foot sheet had yielded nearly 100 gross of seals. The punched rubber sheet coming out of the back end of the press had the look of delicate white lace and could barely support its own weight.

Painter's bottle stopper patents were all good ideas, but he was not alone in offering up newer and better ways to plug a bottle. Between 1882 and 1890, the bottling industry saw three hundred thirty-three new bottle stopper patents. For anyone in the fast growing bottling industry, the shear number of new patents was overwhelming to say the least. It was often hard to tell one stopper design from another. One trade editorial opined, "*The patent woods are full of bottle stoppers which bear such a strong resemblance to two or three well known inventions that the wonder is how the claims were allowed at all*" and censured the inventors' "*inability to produce something useful or original.*" The trade press concluded that, "*it is pretty hard to get up anything in the stopper line which is not already covered*", and that "*nothing new could be expected.*"

With his first three stopper patents in 1885, William Painter was not yet ready to revolutionize the bottling industry. While his mind was busily tackling the bottle stopper problem, it was also working a myriad of other ideas. Painter received several patents for other devices between 1882 and 1891 that had little to do with either bottles or stoppers – an automatic telephone signal, a machine for sheet roofing, a pulley covering, a fountain pitcher, an electric railway, a lamp wick and burner. With such a vast array of ideas, one wonders if Painter ever looked at any modern convenience without wondering how he could make it even better.

But there is no question that William Painter's primary preoccupation during this time was with bottle closures. From 1890 forward, he was to develop 40 more patents in his lifetime and every one of them was directly related to the problem of sealing bottles. During the five years between his last stopper patents and his next patents, he was not simply looking to build a better bottle stopper, but instead developing a complete bottling system. His next group of seven interrelated patents was filed on March 7, 1890 and the patent rights were assigned to the Bottle Seal Company. The first five of these seven patents were awarded on October 21, 1890. These included patents for a "Bottling Machine" (U.S. Patent 438,708), "Bottle Stopper" (U.S. Patent 438,709), "Bottle Stopper Extractor" (U.S. Patent 438,710), "Bottle Stopper Fastener" (U.S. Patent 438,711), and "Machine for Inserting Wire Loops in Seals" (U.S. Patent 438,712.) The new "Bottle Stopper" design was similar

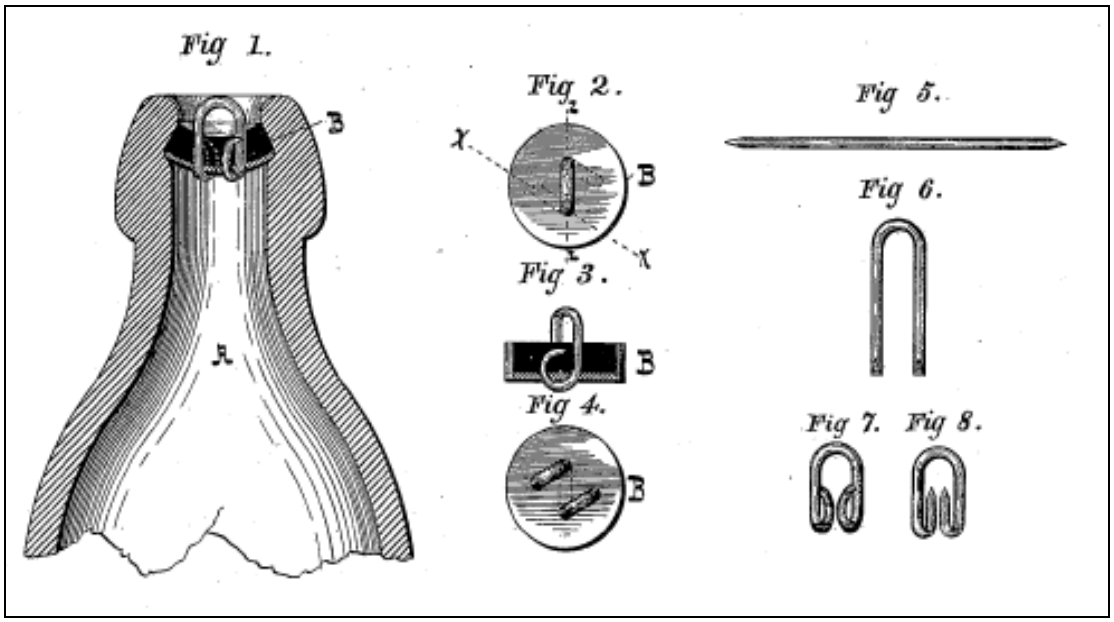
in form to the 1885 bottle seal but had a metal stud inserted through the center of the disk that allowed for easy removal using the new "Bottle Stopper Extractor." Ten weeks later, the sixth of the seven patents was awarded for a "Tool for Forming Necks for Bottles" (U.S. Patent 443,728.) Collectively, these patents provided a complete bottle sealing system that allowed the bottler to properly finish a molded bottle neck, insert the stopper into the bottle after filling, secure the stopper in place during pasteurization, and lastly gave the consumer a ready tool to pop open the bottled beverage. The Bottle Seal Company manufactured and supplied these new machines, tools, and stoppers to the bottling industry.



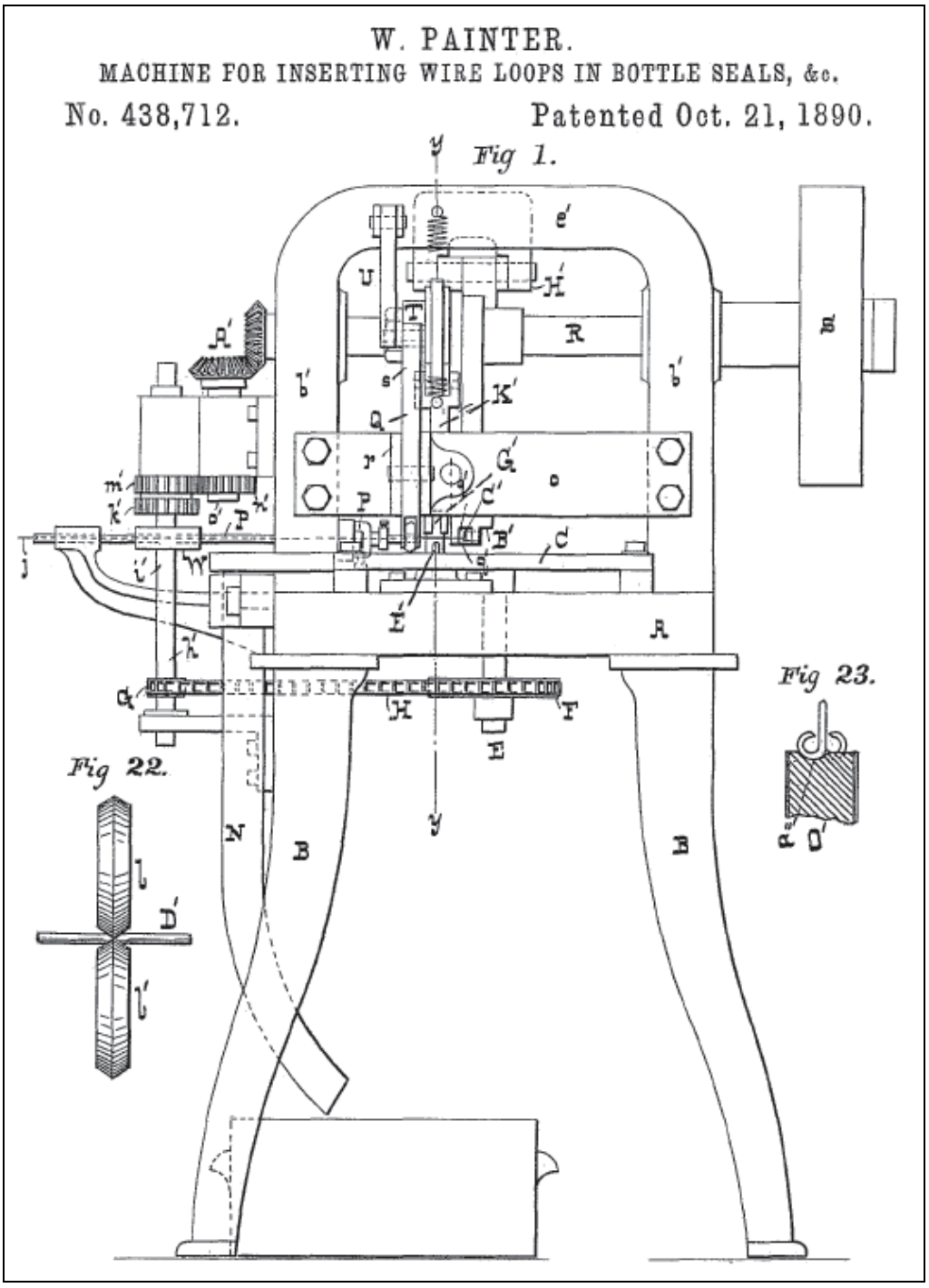
Painter's 1890 Bottle Stopper and Opener

The following year, Painter was awarded the last of the group of seven patents. His 1891 patent (U.S. Patent 449,822) for the closure commonly known as a "Loop Seal" or "Baltimore Loop Seal". It was similar in form to the 1890 stopper, but was less expensive to manufacture as the pull was made of wire instead of a metal stud. The Loop Seal was formed by inserting a short length of wire into a seal and concealing the ends of the wire into the underside of the seal to leave a small exposed wire loop on top. The aforementioned Wire Inserting Machine (U.S. Patent 438,712) accomplished this task with blazing speed. In the factory, boxes of seals were strewn upon a table where two women deftly turned them proper side up and fed them into the front end of the Wire Inserting Machine. The seals passed one at a time onto a horizontally rotating dial and under a device that looked much like the needle-bar of a sewing machine. Unlike a sewing machine, the spool feeding the needle was wound with wire instead of thread. In the blink of an eye, the wire loop was cut, bent, inserted into the seal, and clinched. The machine ejected finished loop seals at the astonishing rate of 225 per minute, allowing a team of workers to easily produce 750 gross of

Loop Seals in a ten hour day. At peak production, ten Wire Inserting Machines were in operation on the factory floor.



Painter's 1891 Loop Seal

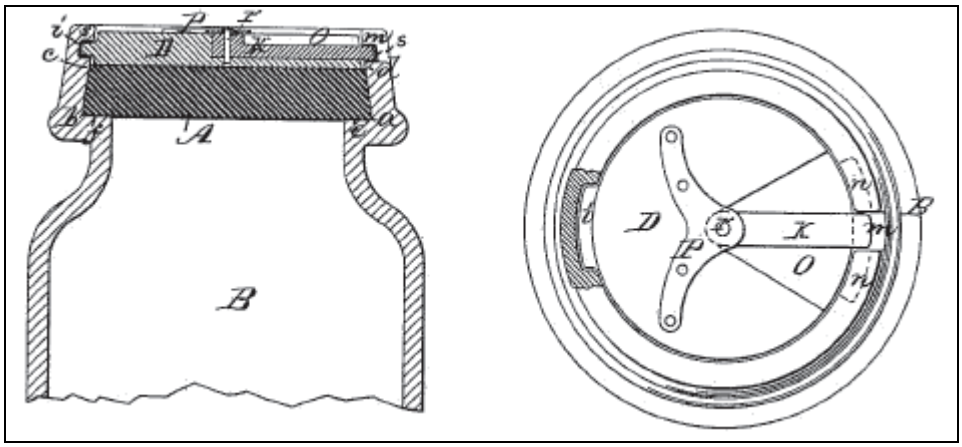


Painter's Wire Inserting Machine for making Loop Seals

To witness all of William Painter's marvelous machines in action at the Bottle Seal Company was surely a sight to behold. Here one could see raw materials being transformed into bottle stoppers with the utmost rapidity and efficiency. As America moved into the last decade of the nineteenth century, one could see a wave of Industrial Revolution beginning to crest in a small factory in Baltimore. William Painter had affected the wave. His business associates - Joseph Friedenwald, Samuel Cook, Lewis Keizer, William Wood, Orrin Painter, and others - were along for the ride. It would be a wild upward ride that would last well into the twentieth century.

William Painter had patented state of the art inventions to make the Bottle Seal Company an important and competitive supplier to the bottling industry. The business continued to grow in the years 1890 and 1891. The Painter family was certainly reaping the financial benefits of their patriarch's tireless work. On April 2, 1891 the family moved from Bolton Street into a larger town home at 1202 North Charles Street. It was the family's first house in downtown Baltimore and a fairly prestigious address.

As the company continually expanded its patent rights on its new inventions, William Wood soon needed an entire legal office to protect the company from patent infringements by its rivals. One notable rival was John C. De La Vergne of New York. De La Vergne claimed that his 1880 patent for a "Bottle and Stopper" (U.S. Patent 232,468) had laid the foundation for all rubber seals. This was a somewhat outrageous claim, since when his patent is compared to Painter's Bottle Seal, it is rather obvious that De La Vergne's stopper was neither disposable nor inexpensive.



De La Vergne's 1880 Bottle Stopper

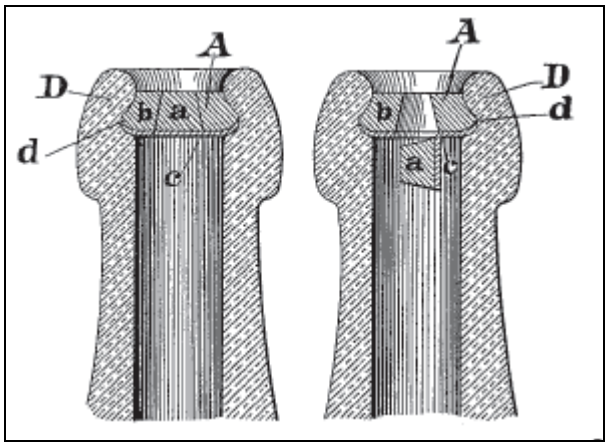
On November 10, 1890, De La Vergne launched the "De La Vergne Bottle and Seal Company" of New Jersey and began producing Bottle Seals. He explained that his 10-year delayed entry into the bottle stopper business was because his time, attention, and finances had been dedicated to establishing the De La Vergne

Refrigerating Machine Company. The Bottle Seal Company of Baltimore immediately began proceedings to defend its exclusive right to manufacture and sell Bottle Seals. On November 16, 1890, the Bottle Seal Company ran a full page advertisement in the trade journals that stated "*The Bottle Seal Company will protect and hold harmless all of its patrons, both present and future, in any Suit brought against them by The De La Vergne Bottle and Seal Co., or any other parties or persons claiming that the Seal system infringes any other patent.*" The De La Vergne took out a full page notice stating that it would prosecute anyone who infringed on its patent rights.

To defend its patent rights, the Bottle Seal Company filed suit in the Circuit Court of New Jersey against the De La Vergne Bottle and Seal Company, seeking injunction and relief from infringement. The complaint referenced the 1885 and 1890 Painter bottle stopper patents, declaring both as "…*new and useful improvements in bottle stoppers, not before known or used in this country*" and that the Bottle Seal Company was "…*the sole and exclusive owner thereof.*" De La Vergne responded to the court in a demurrer[†] admitting the facts stated in the complaint, yet attacking the validity of the Painter patents on the grounds that "…*the alleged improvements in bottle stoppers supposed to be secured by said letters patent are lacking in novelty, invention, and patentability*", and posing the analogies "*…it has been anticipated, almost since the memory of man ran not to the contrary, by numerous similar devices, such as the stoppers of stationary wash-basins, of bath-tubs, of ink-bottles, and many others…*" Circuit Court Judge J. Green overruled the demurrer, ruling in favor of the Bottle Seal Company without bringing the matter to trial. In his four page decision, Judge Green wrote that the demurrer was "*without the least scintilla of evidence…to hold letters of patent invalid upon a demurrer the judgment must be surely based upon certainty. Doubts must be resolved against the defendant. Unless the demurrant's contention forces absolute conviction, the demurrer must fall.*"

Following an injunction to cease and desist from manufacturing Bottle Seals, the De La Vergne Bottle and Seal Company found a way to stay in business. On October 13, 1891, it acquired the rights to two new patents. The first patent was issued to Ernest V. Clemens of New York for a "Bottle Seal Stopper" (U.S. Patents 461,258). The second patent was issued to Albert Siebert of New York for a "Corking Machine" (U.S. Patent 461,285). The Clemens stopper was essentially the same as Painter's Bottle Seal. Its novel claim was a displaceable tapered plug that allowed for release of internal pressure from the bottle during opening.

[†] A demurrer is a motion filed by a defendant in response to a complaint, attacking the legal sufficiency of the complaint without having to answer to its allegations.



Clemens' 1891 Bottle Seal

With the legal battle against De La Vergne settled, the Bottle Seal Company continued as the sole manufacturer of Bottle Seals. William Painter had built his reputation as a pioneer in bottle closures and his Bottle Seal Company was rapidly growing to meet the new demand. 1891 had been a very good year for William Painter. Little did he know that 1892 and beyond would be phenomenal.

The Inventor and Industrialist (1891 – 1903)

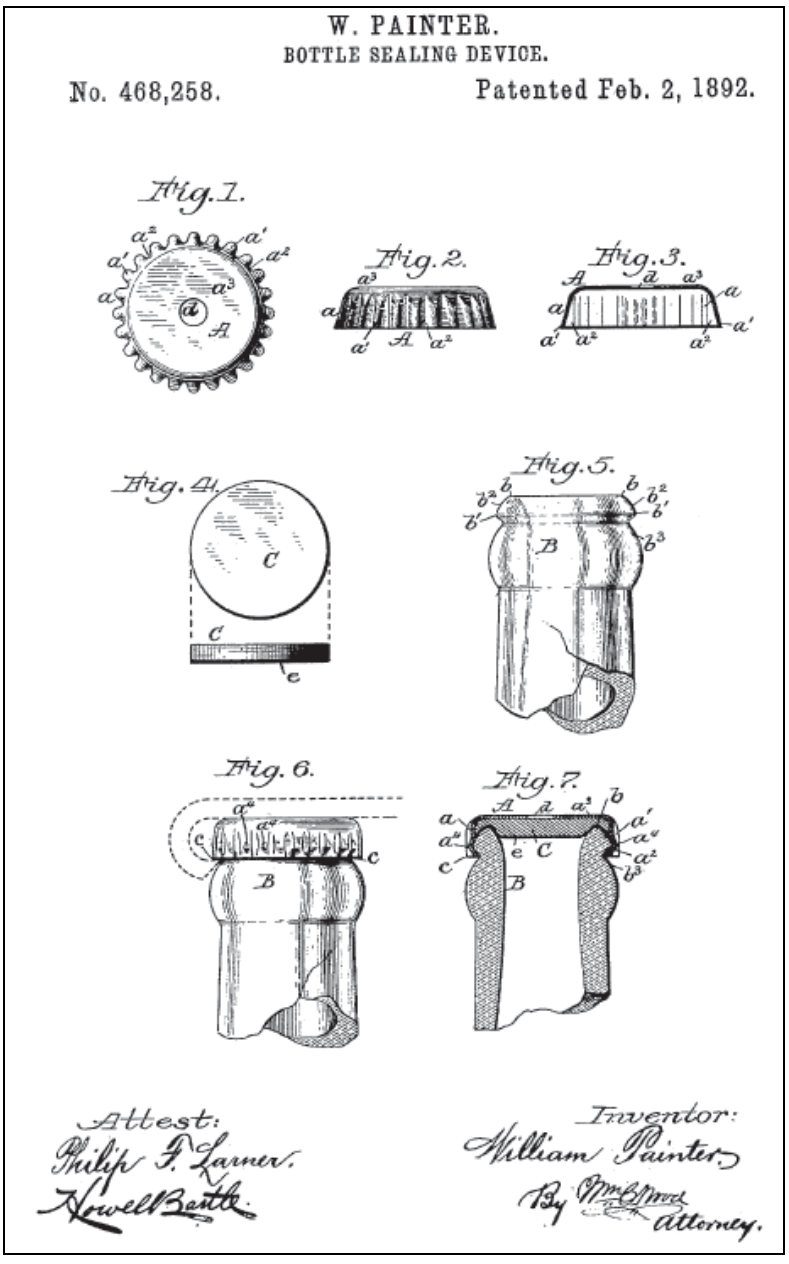
Let us hope in the year Ninety-five
Ev'ry country, city and town,
Will abolish both wire and cork,
And use the American "Crown."
- Colonel Herbert H. Roberts, *New Year's Eve, 1894*

IN HIS 1914 biography of William Painter, Orrin Painter wrote, "*It was in August, 1891, while on a visit to Narragansett Pier, with my mother and sister Helen, that his first conceptions of what is now the "Crown Cork" came to him. Upon his return in September, he told me that he had a new idea which he believed would revolutionize all then existing methods of bottling, and explained it to me and told me to say nothing about it until the proper time should arrive. He kept working on it and obtained a patent on the "Crown Cork" February 2, 1892."*

Orrin Painter's account is no doubt correct except for one important detail. The idea for the Crown Cork could not have come to Painter in August of 1891. It must have been in August of 1890. The patent records provide the evidence. William Painter applied for the Crown Cork patent (U.S. Patent 468,226) on May 19, 1891. The two witnesses for the patent were T. R. Alexander and *Orrin C. Painter*! Clearly, Painter had the idea for the Crown Cork several months before May 1891. We must conclude that the idea first came to Painter at Narragansett Pier in August of 1890.

In fact, we can trace the patent trail back a bit earlier. On June 16, 1890, Painter filed a patent application for a Bottle Sealing Device (U.S. Patent 468,258). This was essentially a precursor to the Crown Cork. However, the patent specification indicates that the metallic cap and the thick sealing disk beneath it were two separate pieces. Also, the metallic cap was specified as being formed from sheet metal with thick flanges. This patent application was in process at the USPTO when Painter vacationed at Narragansett Pier, Rhode Island in the summer of 1890. It was here that

Painter realized that his Bottle Sealing Device could be improved. This was the genesis of the Crown Cork.



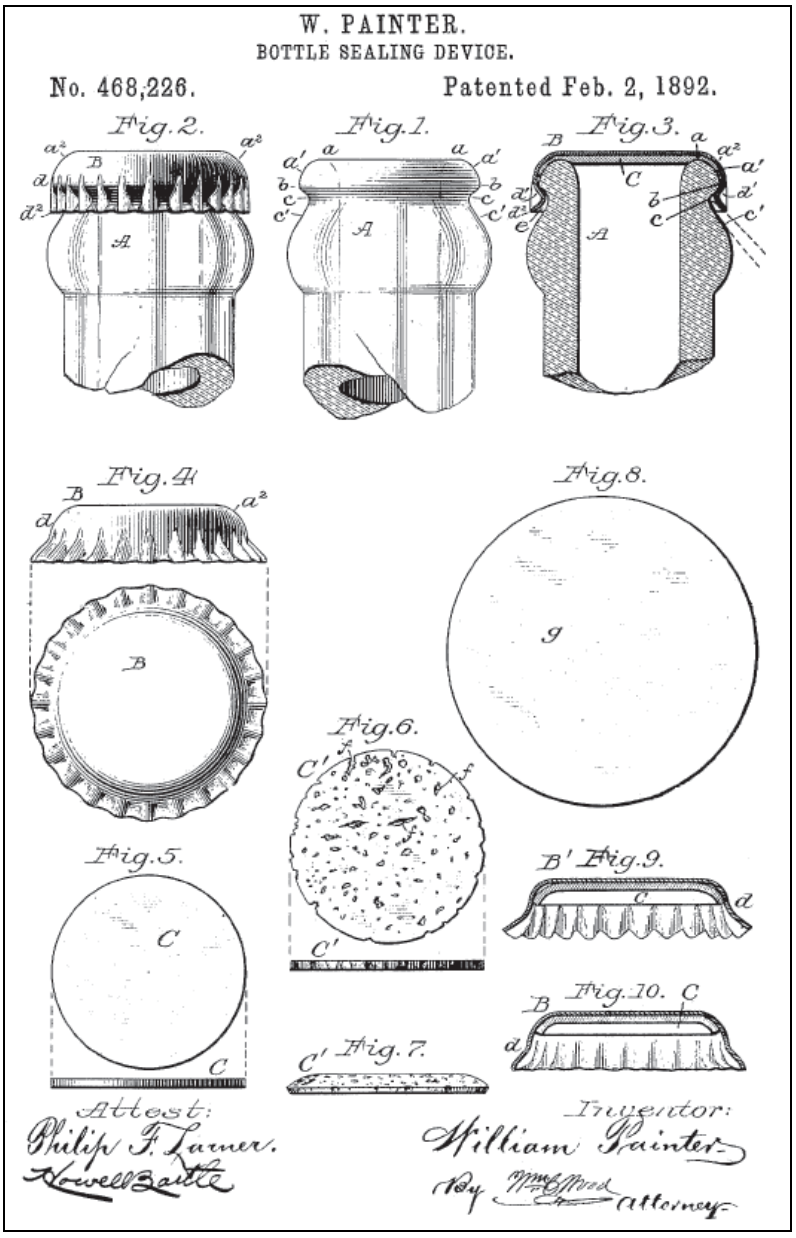
Painter's Patent Drawing for the Crown Cork Precursor

For the next few months, Painter's attention was focused on improving his bottle cap. Long hours were spent in the workshop and a few meals were missed. Sabbaths were spent at Friends' Meetings but there is no doubt what Painter was thinking about during the "quiet times."

With the concept of the Crown Cork in mind, Painter returned to the workshop to iron out the details. He found that cork was the best material for the inner disk. The cork could be as thin as $1/16^{th}$ of an inch and still provide a tight seal. By making the diameter of the cork disk a bit larger than the bottle neck and using a rounded shoulder on the bottle, there was no chance of leakage. He found it best to cut the cork along the grain such that any natural voids in the cork would vanish under compression when the Crown Cork was applied to the bottle.

Painter's experiments showed that the metallic caps could be made thinner as well. Thinner flanges around the outer edge of the cap meant that less force was required to apply or remove the cap from the bottle. Painter's bottle neck design left ample space between the lip and the flange of the cap. This allowed for any number of tools to be inserted to pry off the cap. The Crown Cork could be removed with a knife, screwdriver, nail, ice pick, or corkscrew. A thin layer of varnish on the inner side of the cap prevented any metallic taste from being imparted to the contents of the bottle.

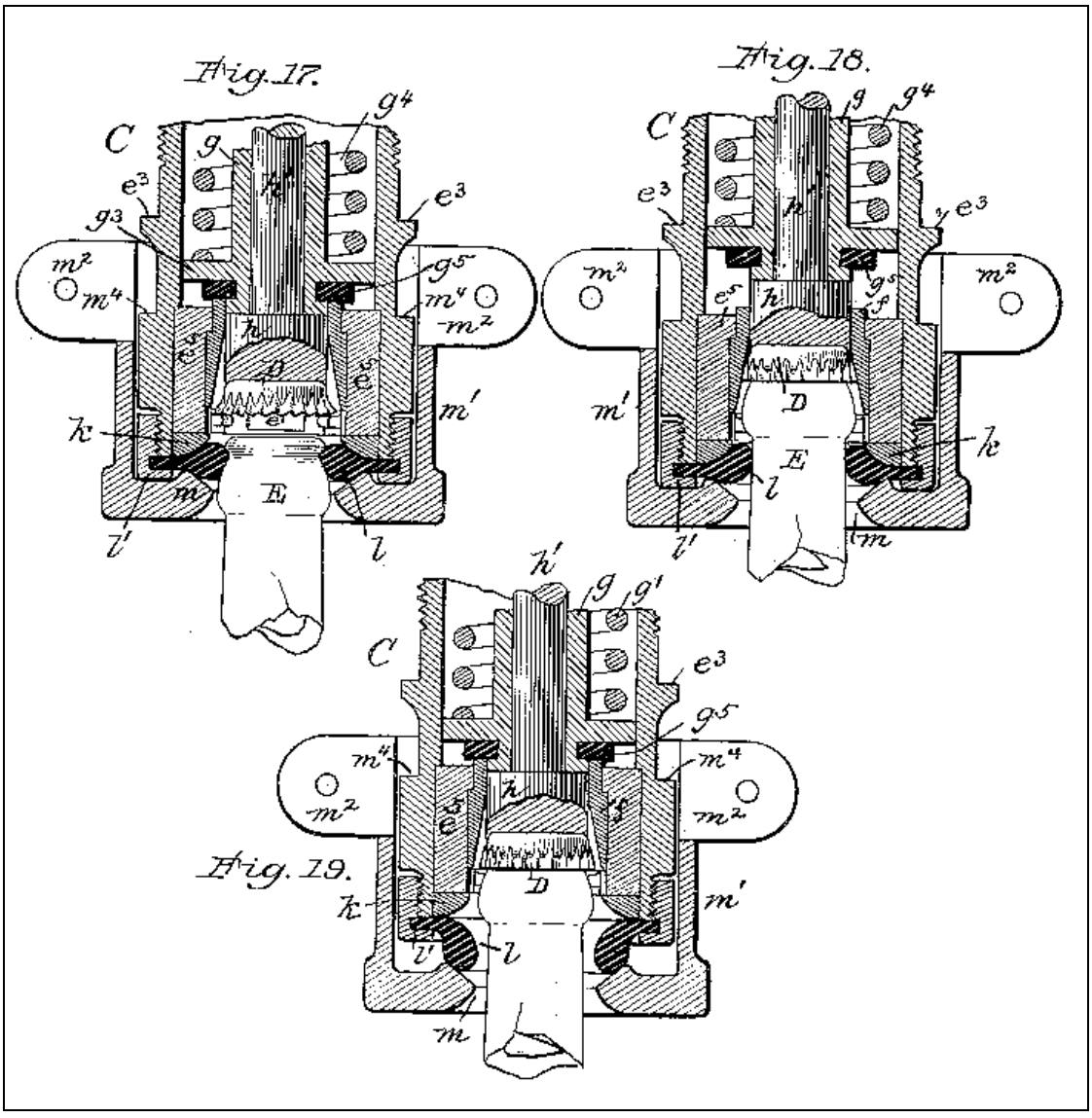
William Painter received the Crown Cork patent on February 2, 1892. In it he stated, "*So far as my knowledge extends, I am the first to seal bottles by means of sealing-disks each compressed into close solid contact with the lip of the bottle and maintained in that condition by means of a flanged metallic sealing-cap, the flange of which is bent or crimped into locking contact (while the disk is under pressure) with an appropriate annular locking-shoulder on the head of the bottle, as well as the first to devise methods and means by which in the use of such caps and disks liquids can be bottled under even the highest gaseous pressures employed in this art."* William Painter knew that he had invented the simplest, most reliable, most inexpensive bottle stopper in the world. He told his colleagues that it will "sweep the decks" of all the other patented stoppers on the market. It was a nearly perfect invention.



Painter's Patent Drawing for the Crown Cork

William Painter's invention had brought the past four decades of bottle closure improvements full circle. The tried and true cork was back in vogue as an integral component of the Crown Cork. All of the physical attributes that for centuries had made cork ideal for bottle stoppering – elasticity, compressibility, moisture resistance, chemical inertness – were carried over to the Crown Cork. Gone were the wires, bales, plugs, and mechanical gizmos that had plagued bottlers throughout the second half of the nineteenth century. The cork was back in a glorious new form. William Painter's inventive genius was in taking a simple material and simply making it better.

Painter's Crown Cork was revolutionary in design, but he faced an even bigger challenge. All existing bottling machines simply inserted a closure – such as a cork or seal – into the bottle neck using a plunger. Painter would need to invent a radically new bottling machine to apply Crown Corks externally to bottles. He achieved this with his April 26, 1892 patent (U.S. Patent 473,776). As he states in his patent specification, "*prior methods involve what may be termed 'inside' operations with respect to the bottle-head, while in my method an 'outside' operation is involved…I provide for a shifting packing-contact involving changes in the relative positions of the packing and the bottle-head, whereas in prior operations the bottle-neck or the head, having once been properly engaged with the packing, no changes in position need occur during the filling and corking operations.*" The key to the shifting packing-contact was "*an annular specially formed or molded packing-ring or funnel-shaped gasket of rubber, having a thick well-rounded pendent lip."* The design allowed for Crown bottles to be filled under high pressure with minimal product waste. It was equally suitable for bottling beer, soda, or other beverages.

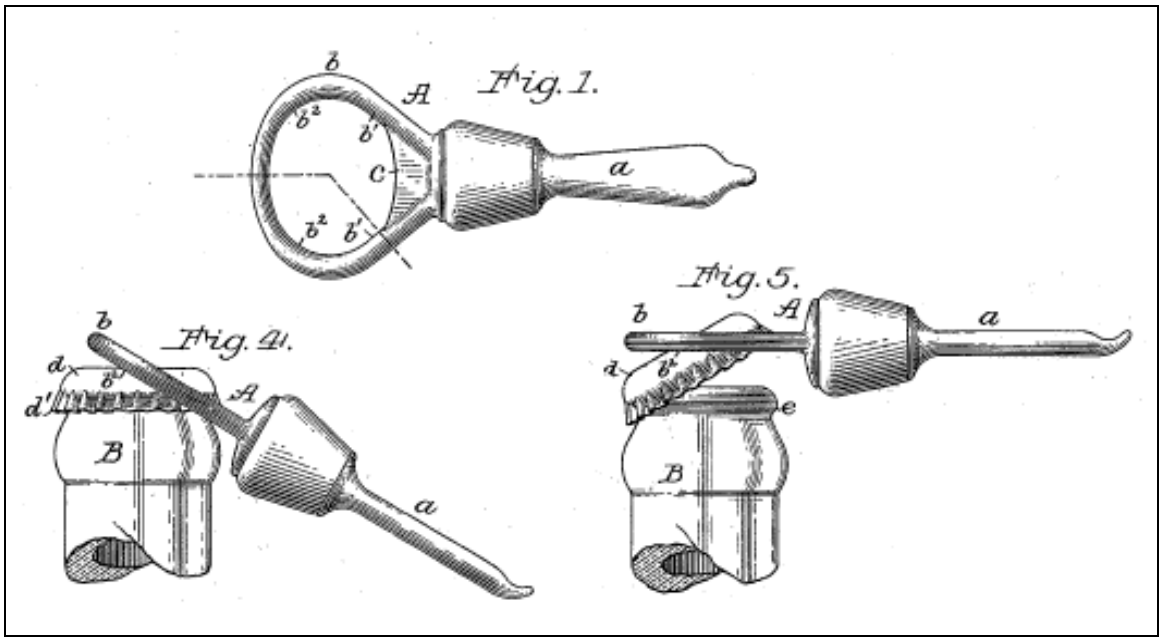


Painter's 1892 Bottling Machine Demonstrating the "Shifting Packing-Contact" in Operation

With the financial backing of Joseph Friedenwald, the Crown Cork and Seal Company invested roughly $100,000 in perfecting the Crown Cork and introducing it to the market. Friedenwald had been a silent partner in the Bay View Brewery of Baltimore from 1876 to 1887. In 1892, he persuaded Bay View to become the first brewery to adopt the new Crown Cork. Another Baltimore brewery – the American Brewing Company – was instrumental in demonstrating the reliability of the Crown

Cork. The American Brewing Company bottled several cases of beer using the new Crown Cork and loaded them into the hull of a ship bound for South America. After several weeks of being tossed about at sea, the cases of bottled beer made their way back to Baltimore. Upon return, not a single bottle had leaked and none of the contents had spoiled. The Crown Cork and Seal Company could boast to skeptical bottlers that its newest bottle closure matched or exceeded anything else on the market.

The Crown Cork was superior to every other stopper on the market in many aspects, including cost, speed of application, and integrity of the bottled product. One drawback was that it could not be opened simply by using one's fingers as could the Hutter and Hutchinson stoppers. The crown cap required a tool for leverage. Painter solved this problem by inventing a "Capped Bottle Opener" (U.S. Patent 514,200). The patent drawing shows three functions for this device. First, the rounded end employed a blade that could catch underneath the edge of a Crown for removal. Secondly, the other end provided a tool for removal of bottle seals. Lastly, the central body included a rubber gasket that could serve as a temporary stopper for opened bottles. The Crown Cork and Seal Company provided its customers with forty gross of "Stopper Openers" with the first 1,000 gross of Crowns ordered so that the bottlers could provide the openers liberally to consumers.



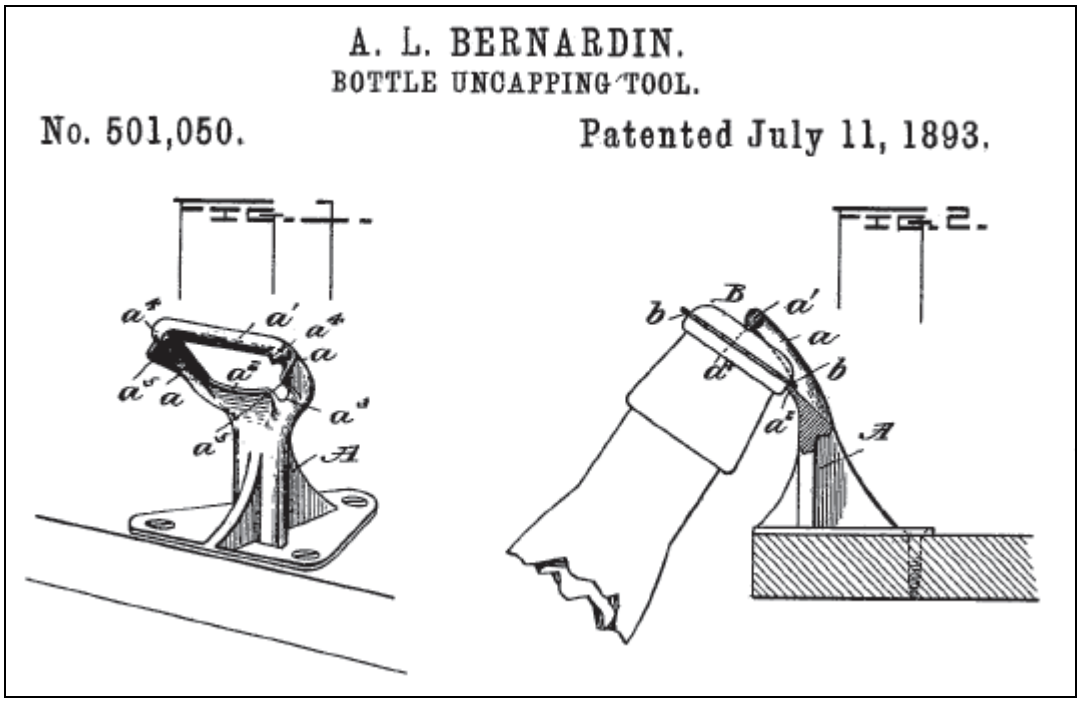
Painter's 1894 Capped Bottle Opener

A name that often comes up in the story of the Crown Cork is Alfred Louis Bernardin. He founded the Bernardin Bottle Cap Company of Evansville, Indiana in 1881. He also founded the Bernardin Metallic Cork Company about 1893. Alfred

Bernardin was granted at least nineteen patents between 1884 and 1923, the later ones being awarded posthumously. According to the grandson of Bernardin, "*Mr. Bernardin also claimed to be the inventor of the beer crown. When their factory superintendent disappeared for a month and turned up in Baltimore, Maryland, he had been hired by five men who, I am told, were the founders of Crown Cork and Seal Company. Patent applications were filed by both companies and a law suit resulted. Bernardin won the first appeal, which was reversed back and forth through several courts. The superintendent apparently claimed to have been instrumental in the development, which as the basis of the law suits*."

Is this account true? Again, we must look to the patent records for an answer. On March 14 1893, Bernardin filed a patent application for a Bottle Uncapping Tool (U.S. Patent 501,050) and it was awarded to him on July 11, 1893. The patent describes a tool for removing a bottle cap, and it states, "*This invention relates to bottle uncapping tools and has special reference to tools for removing bottle caps of the character illustrated in my application for bottle stopper and fastener combined, filed July 21, 1892.*" This "bottle stopper and fastener combined" must be Bernardin's "beer crown." Yet the patent application date is five months after the USPTO awarded the Crown Cork patent to Painter. The USPTO never awarded this patent to Bernardin, but it did award him the first patent for a bottle cap opener.

The patent records clearly show that William Painter was inventing exterior bottle caps as early as June of 1890, more than two years ahead of Bernardin. It is very likely that Bernardin's factory superintendent did move to Baltimore to work for the Bottle Seal Company is the early 1890's. But it is unlikely that he took the idea for the Crown Cork with him. If Bernardin were working on the idea for the Crown Cork in early 1890, why would it take him over two years to file a patent application? The evidence does not support Bernardin's claim.



Bernardin's 1893 Bottle Uncapping Tool and Bottle Cap

William Painter had built a reputation as a talented inventor, a practical businessman, and – with more than fifty patents to his credit – a layman as knowledgeable as many practicing patent attorneys. He had mentored many aspiring inventors over the years, often helping them turn their half-formed ideas into practical devices. One notable Painter protégée was a salesman and would-be entrepreneur named King C. Gillette. King was the youngest of three brothers. In 1879 and 1883, Mott Gillette received two patents for a combination bushing and valve for water taps. Mott, King, and George Gillette founded the Gillette Tap Valve and Faucet Company. In 1889, the brothers received two additional patents for electrical cables. However, the Gillette brothers did not realize much profit from any of these devices. In 1891, the brothers joined the Bottle Seal Company as its sales representatives in New York and New England. When the Crown Cork and Seal Company was founded a year later, the brothers stayed on with the new company. King and George remained in sales, while Mott Gillette took the position of Bottle Inspector. King Gillette never lost interest in inventing, but he spent much of his time on sales trips and had little time to devote to his inventions.

KING C. GILLETTE,
NEW ENGLAND REPRESENTATIVE.

King Gillette developed both a professional and personal relationship with William Painter. When Gillette traveled to the home office in Baltimore, he often stayed as a guest in Painter's home. The two men spent evenings talking of their inventions. Gillette had many ideas and was an ace salesman who could talk persuasively about them. But it Painter who gave Gillette sage words of advice. "*King,*" Painter said, "*you are always thinking and inventing something. Why don't you try to think of something like the Crown Cork which, when once used, is thrown away, and the customer keeps coming back for more – and with every additional customer you get, you are building a foundation for profit.*" The advice made sense to Gillette, but he asked, "*how many things are there like corks, pins, and needles?*"

Painter paused and said, "*You don't know. It is not probable that you will ever find anything that is like the Crown Cork, but it won't do any harm to think about it.*"

Gillette did think about it. The words that Painter had spoken became an obsession with Gillette. During the many long hours and days traveling from town to town selling Crown Corks, he thought about it. He began making lists of everyday items that might lend themselves to an inexpensive, disposable substitute. Finally one morning in 1895, he struck upon an idea while he was shaving. It occurred to him that no radical improvements had been made to razors or razor blades in centuries. The Victorian man was burdened with the morning routine of stropping his razor to sharpen it before shaving. Why, thought Gillette, couldn't he make a razor with a thin, inexpensive razor blade that could be replaced after it grew dull?

Gillette was intrigued by this new idea. He developed a model razor handle with a thin sheet metal blade. Yet it was only a model, as no one had developed a way to hold a sharp edge on sheet metal. During his travels, he visited with metallurgists in New York, Newark, and Boston. He asked them all the same question – is it possible to put a razor-sharp edge on sheet steel? The answer from all the experts was always the same – no. He met with businessmen to ask if any of them wanted to invest in his idea. Again, the answer was always no. Businessmen thought that his idea was impractical; engineers thought it was impossible. Yet Gillette found one voice that encouraged him. On a visit to Baltimore in 1901, Gillette showed his old and now frail friend William Painter his model razor. Painter looked at it and said, "*King, it looks like a real invention with great possibilities. I am sorry I cannot join you in its development, but my health will not permit it. But whatever you do, don't let it get away from you.*" Those words of endorsement to Gillette from the great inventor drowned out the voices of all the naysayers.

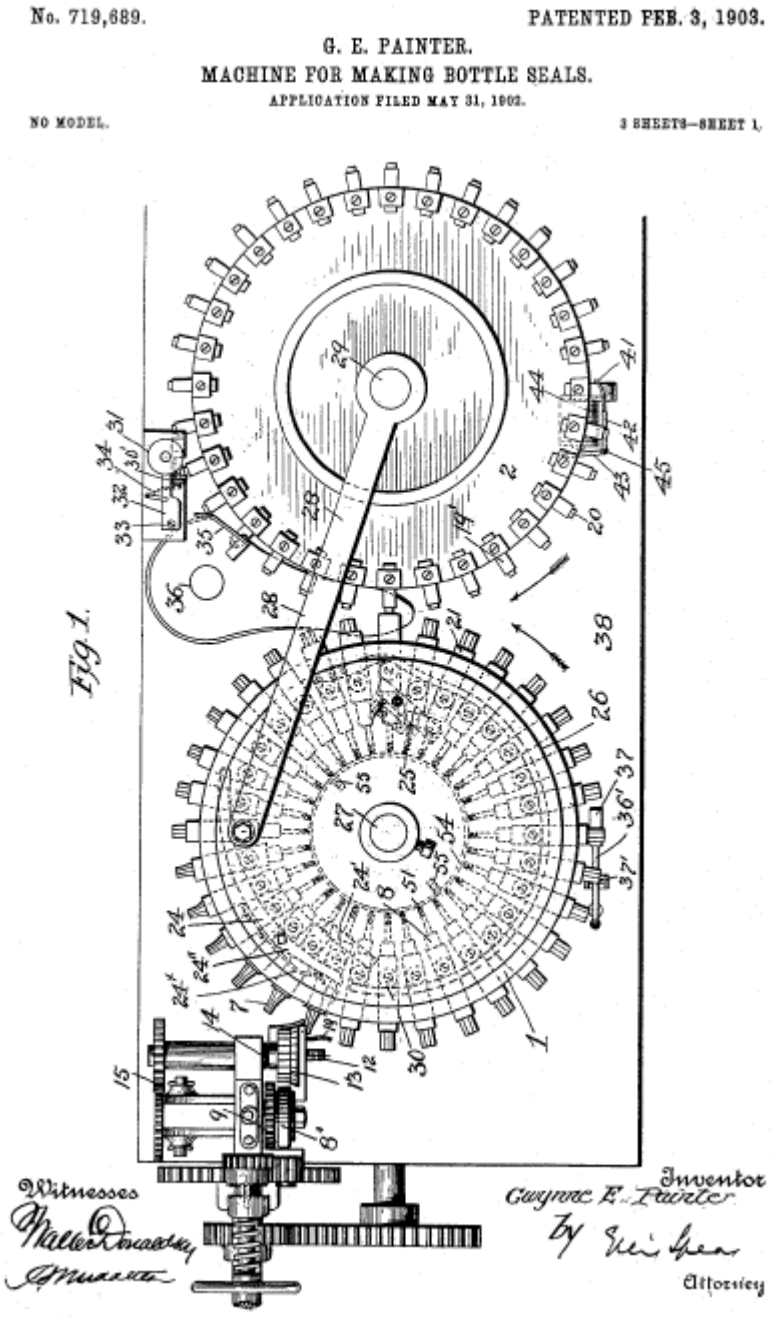
Gillette continued looking for a way to make his razor a reality. That same year, Gillette showed his razor model to Boston inventor William Nickerson and they formed a partnership. Nickerson developed a blade-grinding machine that could hone sheet metal blades razor sharp. Gillette filed for the patent for the razor. In September of 1901, a group of investors founded the American Safety Razor Company and appointed King Gillette as president. The board of directors agreed to print "King C. Gillette's Patents" on all print materials for the razor and blades. Soon after, Gillette persuaded the board of directors to rename the company the Gillette Safety Razor Company.

After six years of effort, Gillette's idea was now a reality. However, the product was not an immediate success. King Gillette still relied on his $5,000 annual salary from Crown Cork and Seal and could not devote much time in his role as president of his own razor company. The situation worsened as Gillette was reluctantly transferred to a sales position at Crown Cork Limited of London in January of 1904. Gillette now had virtually no control, leaving the operations of the Gillette Safety Razor Company in the hands of the board of directors. After several months,

Gillette decided that he could no longer be away from his own company. In August of 1904, he sailed back to America. He made a quick trip to Baltimore to resign from Crown Cork and Seal, then returned to Boston to take charge of his company. This bold move was the right one for Gillette, as the Gillette razor soon became a household staple for men around the world. Gillette went on to make a fortune by finding a way to follow William Painter's simple business model.

The Crown Cork and Seal Company was very much a home enterprise. Its capital stock of $1,000,000 was owned almost entirely in Baltimore. Joseph Friedenwald became the company's first president. Alexander H. Shultz was named as vice-president and John Black was treasurer. William Painter was elected as secretary and general manager. The Board of Directors included Jordan Stabler, Lewis S. Greensfelder, and Grafflin Cook.

William Painter found important roles for family members in the newly formed company. Orrin Painter was a natural fit as the head of the advertising department, overseeing the artwork and literature for print ads, catalogues, and such. William's cousin Gwynne E. Painter was responsible for the electrical systems in the factory. Gwynne Painter had built an impressive career as an electrical engineer and inventor; between the years 1886 and 1907, he was granted seventeen patents for various electrical devices. In 1903 he was granted his only patent for a mechanical device, a "Machine for Making Bottle Seals" (U.S. Patent 719,689). As of 1905, he was a consulting engineer and partner in the firm of Newton & Painter.


No. 719,689. PATENTED FEB. 3, 1903.

G. E. PAINTER.

MACHINE FOR MAKING BOTTLE SEALS.

APPLICATION FILED MAY 31, 1902.

NO MODEL. 3 SHEETS—SHEET 1.

Fig. 1.

Witnesses

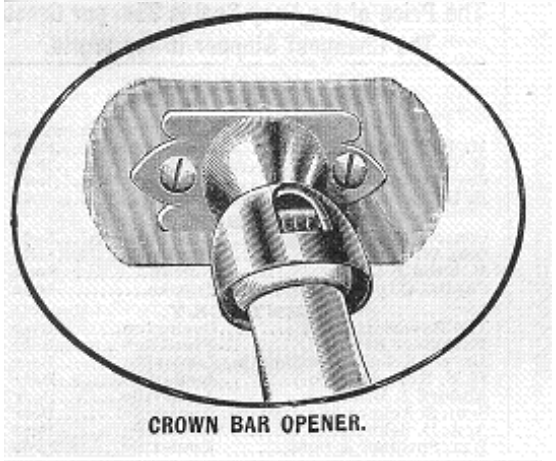
Inventor

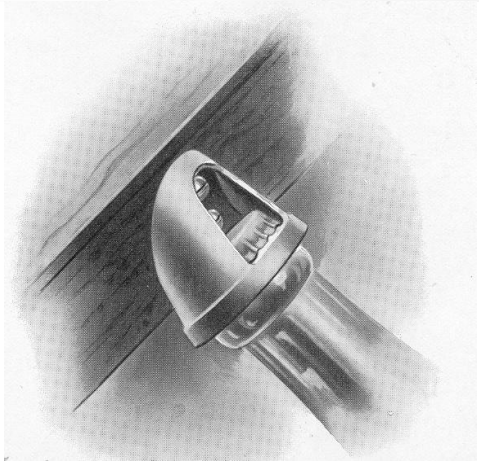
Both of William Painter's sons-in-law would hold important positions in the company. Richards Carson Meeker married Helen Painter in 1897 and served as the company's Assistant Secretary from 1901 to 1903. John Mifflin Hood, Jr. married

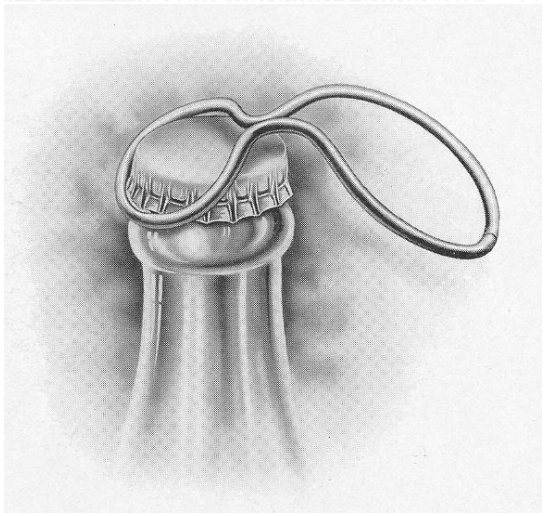
younger daughter Ethel Painter in 1903. Hood, the son of a railroad tycoon, had graduated from the Massachusetts Institute of Technology and Princeton and was a civil engineer *"of merit and ability."* Hood joined the Crown Cork and Seal Company Board of Directors in 1909. He served as company President - albeit ineffectively - from 1914 to 1923.

There is no perfect invention, but perhaps the most nearly perfect inventions are the ones that remain popular for more than a century, become so commonplace that we often take them for granted, and are so little changed from their patented design that we still readily recognize them in their original form – the safety match, the staple, the paper clip, the incandescent light bulb, and certainly the bottle cap.

William Painter held the patent rights to the Crown Cork, and its design was so unique that the Crown Cork and Seal Company had no competition. Any similar patent submission would surely be rejected by the Patent Office, and there would be no bottle closure that could rival the cost effectiveness of the Crown Cork until the advent of modern plastics. However, Painter's patent for the Crown Cork opener was not as revolutionary as the Crown Cork itself. Painter's opener was simply a tool that provided a means of leverage to remove its counterpart, an idea as old as Archimedes. Painter invented at least two Crown Cork openers that he did not patent. An 1898 company brochure mentions a formed wire opener and a bar-mounted opener, and these are depicted in Crown Cork and Seal catalogs a few years later. Both of these devices are very simple in design but work quite well – telltale features of many of Painter's inventions.





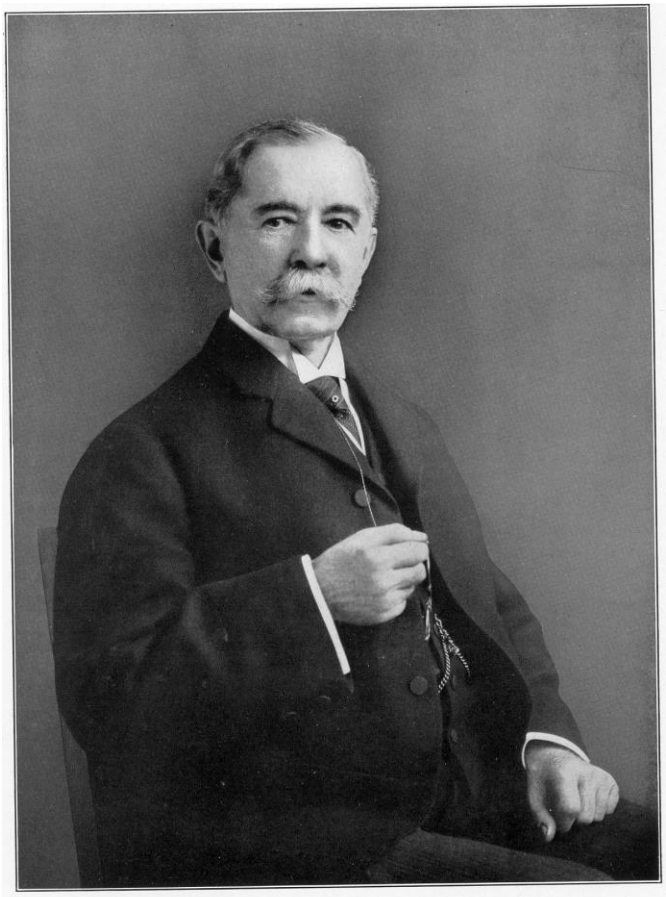


Painter's Unpatented Crown Cork Openers, 1896-1900

From 1894 forward, William Painter would receive twenty-seven additional patents and he assigned the patent rights for all but three to the Crown Cork and Seal Company, thereby strengthening the company's hold as the undisputed leader in the bottle sealing industry. In fact, Painter received only one patent that was unrelated to the bottling industry following his early days with the Bottle Seal Company in 1885. In 1898, he received a patent for an "Everpoint" mechanical pencil (U.S. Patent 602,355) that held forty graphite points so that the user would always have a sharp point at the ready.

Although the Crown Cork and Seal Company was flourishing in 1895, it was a stressful year for William Painter. Many of the patents that he had assigned to the company had been challenged by its competitors and he was drawn into the litigation to defend the company's interests. Colonel William C. Wood drew upon the best legal talent available to him to protect Painter's patents. In January of 1895, Painter suffered a nervous collapse in his office on East Monument Street. His doctor prescribed spending several weeks away from the office in order to recover from the stress. Unfortunately, things only got worse for Painter. On a cold February day, an overheated flue ignited a house fire in the Painter's residence at 1202 North Charles Street. The family was forced to relocate to the Stafford Hotel. Painter took some much needed vacations, including a trip to Florida and one to Europe with his family. In April of 1895, the Painters purchased a country estate known as "The Colonies" on Reisterstown Road near Pikesville. This was the family's permanent residence for some time and it became their summer home when, in September of 1897, they bought a large corner townhouse in Baltimore at 1129 North Calvert Street.

In 1894, Samuel G. Cook organized The Crown Cork Syndicate, Limited. A contract between Cook and Painter gave Cook the rights to make and sell crown corks and bottle seals in all countries except the United States and Canada. In May 1897, Cook reorganized the company as The Crown Cook Company, Limited, of London. Cook successfully introduced the crown cork system in over 30 countries in his time as company president between 1894 and 1908. Manufacturing plants were built in London, Hamburg (Germany), Paris, Yokohama (Japan), and Rio de Janeiro (Brazil). Cook was a frequently business traveler and made roughly sixty voyages across the Atlantic Ocean.



MR. SAMUEL G. B. COOK.
(PHOTOGRAPHED BY JANVIER.)
MR. COOK INTRODUCED THE CROWN CORK SYSTEM IN GREAT BRITAIN AND FOREIGN COUNTRIES.
(SEE THE CROWN CORK COMPANY, LIMITED, LONDON.)

A brief article in the May 5, 1897 issue of The National Bottlers' Gazette indicates that demand for crown corks, loop seals, and bottling machines was very high. There were now 3,000 Crown Cork and Seal bottling machines in operation around the country. For the fiscal year ending on March 31, 1897, the company had sold 468,850 gross of crowns and 1,316,250 gross of seals – over a quarter of a billion bottle stoppers, with seals outselling crowns nearly three to one.

Also in 1897, William Painter introduced his latest invention, the Automatic Crown Power Machine (U.S. Patent 638,354). This was Painter's last great invention and was commonly called the "Jumbo". It offered what every large-scale brewing and bottling company wanted – an automatic bottling machine that allowed bottles to be filled and capped in a continuous assembly line method. One worker could feed empty bottles into the front end of the Jumbo another could take away filled beverage bottles from the other side. At the core of the Jumbo was a rotating eight-head crowning mechanism that filled and capped bottles in a never-ending procession. The basic

design is still in use today. A worker dumped boxes of loose crowns into a hopper above the crowning mechanism and the Jumbo would feed them into the crowning mechanism one at a time, right side up. Everything worked together in a precisely timed symphony of suds and soda.

AUTOMATIC POWER CROWN MACHINE INVENTED BY WILLIAM PAINTER.

THE CROWNING CAPACITY OF THIS MACHINE IS FROM NINETY TO ONE HUNDRED BOTTLES PER MINUTE. OWING TO ITS ENORMOUS EFFICIENCY IT IS KNOWN BY THE BOTTLING TRADE AS THE "JUMBO."

The 1897 National Bottlers' Gazette article reports that the Pabst Brewing Company of Washington, D.C. was successfully using the Jumbo. Pabst was brewing the equivalent of 10,000 bottles of beer a day, and the Jumbo was able to fill and crown these bottles in less than three hours. With the Jumbo, it was clear that large-scale brewing operations were no longer limited by the speed of bottling and capping. The article concludes that "*…the business of the Crown Cork and Seal Co. was never better. It is really difficult to correctly estimate the great success which is attending the Crown Cork and Seal system of bottling.*"

Ironically, on the very same page of the Gazette was an article with the headline "De La Vergne Bottle & Seal Co. Defunct." The article reads, "*As has been known a long time, the De La Vergne Bottle & Seal Co. sometimes of New York City and sometimes of Newark, N.J., has been in hard financial lines. Struggle as would the sponsors of this concern, they have been unable to weather the fine success of their competitors and have gone down ingloriously, with nothing in sight to pay the creditors...All is gone, besides being two years in arrears for taxes due to the State of New Jersey. The creditors will get little or nothing.*" One can imagine the jokes and chuckles heard in the offices of Crown Cork and Seal by those who had battled De La Vergne in New Jersey's Circuit Court just six years earlier.

To match its growing success, the Crown Cork and Seal Company erected a large modern factory on Guilford Avenue in Baltimore and the building was dedicated in 1897. The Board of Directors issued a statement recognizing that *"its first meeting in the new home of the Crown Cork and Seal Co. should not be permitted to pass without recording its appreciation of the most potent factor of all the causes that have united to bring about the gratifying results achieved by this Company. We have in the Directory of The Crown Cork and Seal Co. a member who, by his phenomenal resources, tenacity of purpose, boundless zeal and untiring energy, has guarded the interests of this Company and contributed to its success, so that today standing pre-eminently the pivotal figure of its progressive career, and whose name is WILLIAM PAINTER."* The Board of Directors honored William Painter by commissioning artist Thomas C. Corner to execute a pair of life-size portraits of him. One was hung in the company board room; the second was given to the Painters to hang in their home. Several years later, Orrin Painter commissioned Thomas Corner to produce a third portrait which he donated to the William Painter Memorial Children's Hospital School to hang in the reception room.

The following year, the Crown Cork and Seal Company hosted a milestone event in Baltimore, the tenth annual convention of the American Bottlers' Protective Association. The ABPA represented the many individual Bottlers' Protective Associations that had been established in cities across America. These associations protected the investments of bottling companies in its region. In the late 19th century, bottles were molded and finished by hand. This was an expensive proposition, and bottling companies sought to reclaim and reuse their bottles as much as possible. Most

bottles were clearly embossed with the bottler's name so that empty bottles could be returned and refilled. Yet many unscrupulous bottlers would use any empty bottles that they could find and this created a black market for bottles. Each Bottlers' Protective Association held legal authority to prosecute and impose fines on black marketers. Delegates from the ABPA met every year in a major city to discuss and vote on matters of importance. In 1898, nearly 200 delegates and 700 of their associates convened in Baltimore during the week of October 10-14.

Both the Crown Cork and the Seal still faced stiff competition from the many other patented stoppers on the market. The managers of the Crown Cork and Seal Company saw this event as an opportunity to showcase its new state of the art factory and its products. No expense was spared to impress its visitors that week. Crown Cork representatives met their guests arriving at the train station on Monday and escorted them to their hotels. Once checked in and freshened up, they were shuttled over to Guilford Avenue. There, the five-story façade of the factory was gaily decorated with buntings and banners, welcoming them inside.

The tour began in a large room with working models of all of William Painter's bottling machines in operation. At the center was the Automatic Power Crown Machine – the Jumbo. The guests were wowed as they watched bottles being crowned with such rapidity as they had never seen. "Surprising!" "Wonderful!" "Marvelous!" One delegate from Boston said, "It is worth the cost of the journey from Massachusetts to Maryland to see that thing go."

The tour moved on to the large noisy room where the crowns were pressed from sheets of lithographed tin. Here, each of the four 3-ton crown cutting presses hammered out corrugated tin caps at a rate of 14 per second, altogether nearly 5 million pieces per day. In a quieter room, the observers saw the Crown Cork Inserting Machine that applies a thin disk of paper and then cork to the underside of the tin cap, thus providing a finished Crown Cork. Each finished bottle cap was passed through an electric "feeler", another of Painter's invention, to test for quality control. In fact, the tour guide explains, everything that you have seen so far is the product of Mr. Painter's years of tireless development, and there's more to see. But, the guests wonder, who is and where is this mysterious inventor?

On another floor of the factory visitors saw Loop Seals being made. The process was essentially the same as it was in the old Bottle Seal Company factory on East Monument Street. Next, the tour group moved to the areas where bottle openers are made. The simple wire openers were formed on a mandrel using a 9-inch length of one-eighth inch diameter steel wire, formed into an arched figure eight and stamped to produce a fret at the end. A second type of opener was formed from steel with a rubber plug placed around the midsection to serve as a temporary bottle stopper once the Crown Cork is removed. The visitors then saw the new Duplex Bar Crown Opener that could be conveniently mounted either to a wall or underneath the bar. These

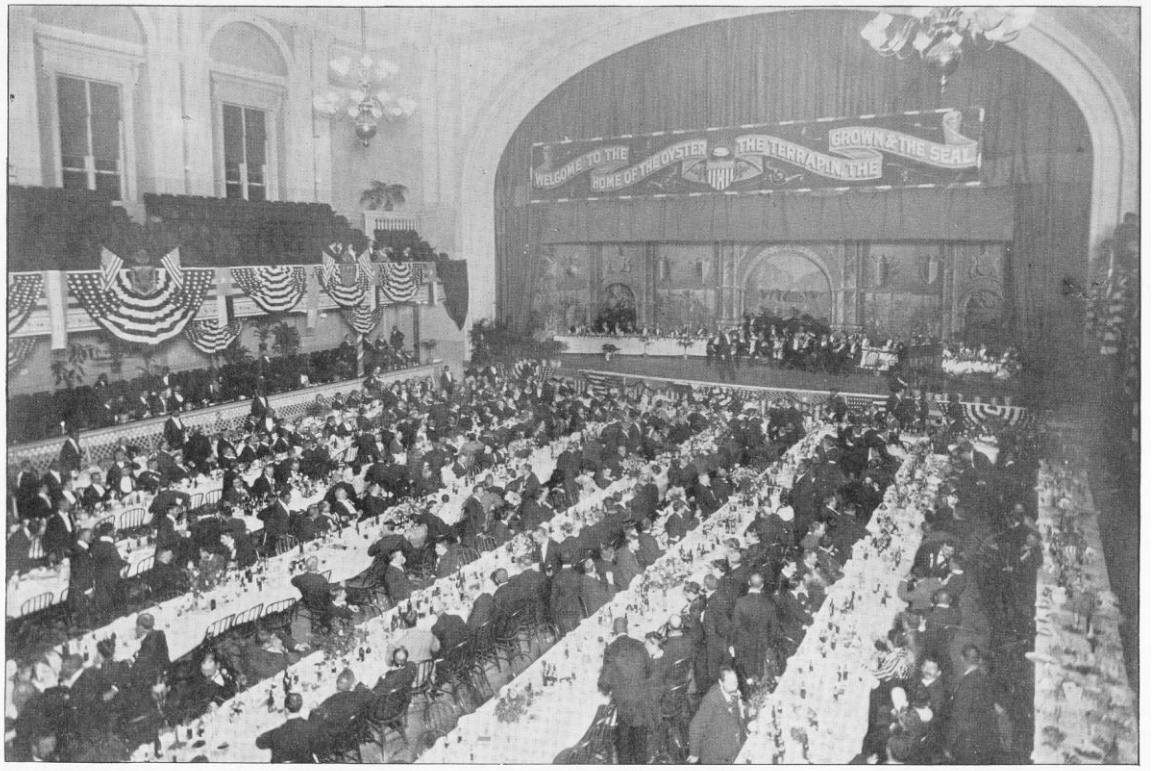
devices all worked quite well and were typical of William Painter's inventions. They were everything that they need to be without being more than they should be.

At the end of the tour a tall, well-dressed gentleman with a kind face and a firm handshake greeted the visitors at the entrance to his workshop. He showed them inside of the orderly space that served as a machine shop, chemical laboratory, and engineering office. Mr. Painter told them of a new composite cork material that he had developed. He described the process of mixing 2 parts gluten, 1 part granulated cork, and a bit of glycerin, then rolling or forming the mixture into the desired shape and heat-treating it to set the material. He expects the new material to be manufactured in large quantities and cut into discs to be used as the facing for Crown Corks.

As the tour concluded, the visitor knew that he had seen a truly modern factory unlike any other ever seen in the bottling industry. He knew that the Crown Cork was in every way the best stopper on the market. Tours continued every hour on the hour for the rest of the week. Many of the guests eagerly returned to the factory for another tour, this time bringing their friends with them.

On Tuesday morning, the ABPA delegates and other interested parties met in the Germania Maennerchor Hall on Lombard Street to report on progress during the past year and discuss matters of importance. The wives were treated to guided carriage tours of the Monumental City on a beautiful fall day. Tuesday evening brought the highlight of the week, the great banquet in the Music Hall. This much anticipated event had been previewed in the trade press as "…"

The banquet was the largest catered event that Baltimore had ever seen. Over 900 hungry people were seated and 100 waiters offered the finest foods that Maryland and the Chesapeake Bay had to offer. Diners feasted on oysters on the half shell, crab bisque, capon, terrapin, and an array of appetizers and desserts. Each course was served with potent potables showcasing the variety of beverages that could be bottled with the Crown Cork. Not only beer and soda but also wines, including sauterne, champagne, claret, and cognac. The guests were given small four-ounce souvenir Crown Cork bottles filled with ginger ale and cognac and silver plated openers to take home with them.



THE BANQUET HALL, OCTOBER 11, MIDNIGHT.

The festivities continued through the evening. An orchestral band provided the backdrop for a program of speakers and mirthful entertainment. The crowd enjoyed it thoroughly. None was more pleased than William Painter as his face beamed with pride. This event had been made possible only by his years of hard work and the success of the Crown Cork and Seal Company. Joseph Friedenwald addresses the audience and said, "*The master spirit of this great and wonderful enterprise, The Crown Cork and Seal Company, is largely attributed to the mechanical genius of Mr. William Painter. I point to him now. I propose three cheers from this association for Mr. William Painter."* The audience enthusiastically gave three cheers. Friedenwald continued, "*It is not only his great and wonderful genius as an expert mechanic that has brought this Company to the position which it occupies today, but his own honest self, a man among men, and I commend him to you as one of our best citizens in the City of Baltimore.*"

When the band played The Star Spangled Banner, the audience stood on its feet, patriotically singing and waving napkins high in the air. The banquet continued well past midnight and was an unqualified success. The principals of the Crown Cork and Seal Company basked in the success of the event that had been many months in

the planning. The evening would not soon be forgotten by anyone in attendance. One guest summarized the event as, "*The Crown Cork and Seal Company has not only established its claim to superiority in the manufacture of bottle stoppers, but has forced the truth of it home in such a manner by this entertainment that no one will dare contradict it in the future. They have bound their patrons to them by ties which cannot be broken.*"

After a good night's sleep, the conventioneers met again late Wednesday morning and expediently concluded their remaining business. Resolutions were passed, including one stating that "*The Crown Cork and Seal Company has won the heart of every delegate to the Convention by the superb supper and excellent entertainment that they provided for us last night, and that words fail to express our appreciation for the very able manner in which we have been entertained by all charged with the arduous task.*" At 2 P.M. that afternoon, a throng of more than 800 boarded the steamship Louise for an excursion to Annapolis. The men of commerce on board observed the bustle of activity in Baltimore's harbor as mercantile ships arrived with imported goods and were laden with goods for export. As the Louise passed Fort McHenry, the guides relayed the story of the famous battle fought there during the War of 1812 that inspired Francis Scott Key to pen the National Hymn. The Louise faced a strong headwind blowing up from the south and as such arrived late in Annapolis with only an hour of daylight remaining.

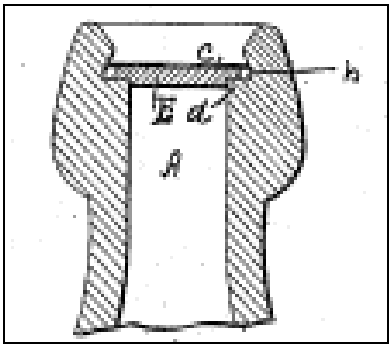
Once ashore in Maryland's capital, the group headed up the cobblestone streets to the State House. The Maryland Senate not in session at that time, so the conventioneers appointed their own "delegates" to call the mock assembly to order. The "President of the Senate" opened the session with a speech, and after a hearty round of applause, a dozen other "Senators" were clamoring to be heard. Across the hall, the "General Assembly" was in session, allowing some of the ladies to make speeches. As the sun was setting, a group made their way down to the Naval Academy for a quick self-guided tour, but they were denied entry by the sentinel on duty. As the Louise sounded her whistle, the crowd scampered back to the dock. As the ship steamed back towards Baltimore, the hungry crowd filled the ships' dining room for a hearty supper.

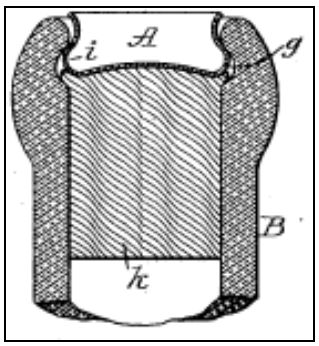
After a good night's sleep, some of the delegates prepared to travel home. Others took advantage of another planned excursion to Washington and a steamer trip down the Potomac to Mount Vernon. The weather was perfect that day and the group enjoyed seeing the golden tints of autumn foliage along the way. The Mount Vernon Ladies' Association had worked to ensure that the historic mansion and grounds would be preserved in perpetuity for all to come and see. It provided an early model for the preservation of historic national landmarks. The visitors from Baltimore toured the mansion filled with period furnishings, and the fixtures of daily colonial life. To the players in the Industrial Revolution, colonial life likely appeared as nostalgic as Victorian life is to us.

On Friday, the remaining conventioneers departed Baltimore. All left with a well-illustrated catalogue of Crown Cork and Seal products. In the following weeks, letters of thanks and congratulations poured in from the attendees. In January 1899, the Crown Cork and Seal Company published a 112-page detailed account of the week's activities. The company provided copies to its patrons in hopes that they would "*appreciate the effort to preserve for their personal use a graphic account of the banquet, which seemed to be the crowning event of the late Convention*."

William Painter suffered a second nervous breakdown in June of 1901. Again, the best therapy was time away from the office and the Painters took another vacation to Europe that year. Upon his return to the office, it appears that Painter spent fewer long hours in the workshop. His final four patents before his retirement were issued on October 15, 1901, and these were not mechanical in nature but simply a description of a process for producing a gluten compound.

The Aluminum Stopper Company produced a patented bottle closure that is attributed to Robert Allison Hall of Baltimore. Hall had been an assistant to William Painter in his machine shop. In February of 1894, Hall filed a patent application for a "Bottle Sealing Device"; the patent was granted (U.S. Patent 541,203) on June 18, 1895. Hall's stopper patent is remarkably similar to a metal "Bottle Sealing Device" patent that had been granted to Painter just three weeks earlier (U.S. Patent 540,072). Painter specified his stopper as being "*a cup shaped disk of malleable metal, commercial tin or other substantially inelastic metallic material*", whereas Hall specified his stopper as "*a hollow ductile metallic plug.*" Much like Painter's 1885 bottle seal, the 1895 stoppers fit into internal grooves in the bottle neck, yet it differed in two respects – it was made of aluminum, and it had a higher relief than the bottle seal, being shaped more like a hollow plug than a disk. Painter had bested Hall in the patent race by a mere three weeks. The significance of that would only be felt some eight years later.





Painter's 1895 Patent (left) and Hall's 1895 Patent (right)

Aluminum, which is a metal derived from the bauxite ore, had become commercially available by the end of the nineteenth century. Unlike steel, aluminum is resistant to corrosion and acidity and is lightweight, durable, and easy to form. These qualities made it a good choice as a bottle stopper. The Aluminum Stopper was offered to bottlers at a price of 25 cents per gross and they were shipped from Baltimore in boxes of 25, 50, 100, 200 or 500 gross. The Aluminum Stopper Company sold a variety of hand-held and wall-mounted openers designed specifically for its stopper, and the company's marketing literature suggested that *"almost any pointed instrument may be used to pierce and extract the Stopper, such as a corkscrew, a pair of scissors, a small screw-driver, or a nail. If desired, the soft metal bottom of the Stopper may be cut and removed with the blade of an ordinary pocket-knife."*

The Aluminum Stopper Company moved into the old digs of Murrill & Keizer and the original Bottle Stopper Company factory. Aluminum Stopper Company billheads and letterheads from 1900 and 1901 give the address as 200-202-204 North Holliday Street. The Aluminum Stopper was offered in two sizes; the smaller size was designed to fit into the standard Seal bottle and the larger size was designed for a bottle with a wider mouth. The company supplied bottle finishing tools to bottlers to ensure that each bottle neck was finished to within close tolerances of specifications. While the glass was still hot, the tool would be applied to the bottle neck and carefully rotated until the glass cooled and set. The company also sold bottling machines specifically designed for the Aluminum Stopper. For $10.00, the bottler could purchase a simple Hand-Power Aluminum Stopper Machine that would mount to either a wall or a countertop. For high volume bottling, two floor standing bottling machines were available – the Aluminum Stopper Foot Machine sold for $50.00 and the Aluminum Stopper Steam-Power Machine sold for $125.00. The latter required an external motor and belt to drive the pulley at a rotation rate of between 60 and 75 revolutions per minute.

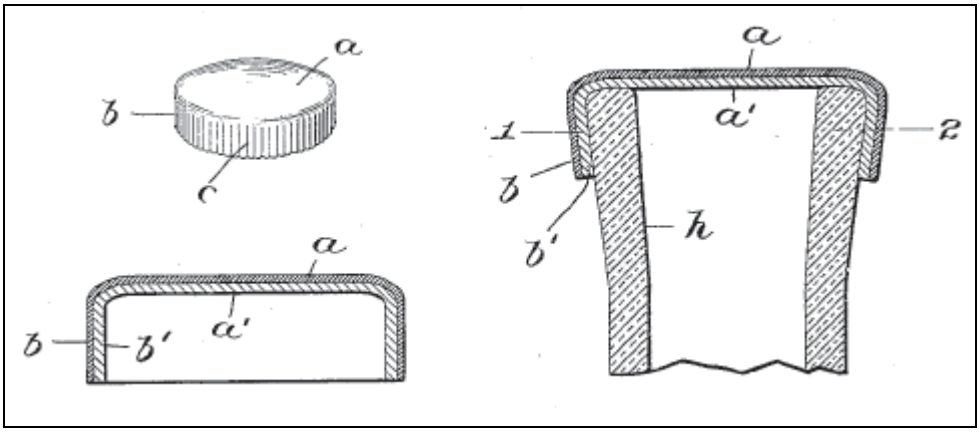
Insert Small & Large size pic here., tools, machines.

Robert Hall's Aluminum Stopper was fairly popular with many bottlers, including some well-known brewers including the Pabst Brewing Company and the Stroh Brewery Company. The Aluminum Stopper could withstand pressures in the range of 150 to 200 pounds per square inch (psi) and many bottlers preferred the performance of the Aluminum Stopper to either the Loop Seal or the Crown Cork, and the Aluminum Stoppers at 25 cents per gross were a better value than standard Crown Corks at 35 cents per gross. However, the Crown Cork had one important feature that both the Aluminum Stopper and the Seal lacked – a large flat surface for advertising.

For just 40 cents per gross, the Crown Cork and Seal Company offered its "Decorated Stock Crowns." These Crowns were lithographed in two colors and clearly identified the item in the bottle, such as "Root Beer", Mineral Water", Lager Beer", "Pale Ale", or "Nerve Tonic". More than two dozen Decorated Stock Crowns were offered. For the same 40 cents per gross, a bottler could have its own logo lithographed in two colors – three colors for 41 cents, four colors for 42 cents, or five colors for 43 cents. These eye-catching decorated Crowns were important to the bottler in that they allowed the consumer to quickly identify the product in the bottle. With the bottler's logo on every Crown, he could instill brand recognition with the customer. From a marketing standpoint, the Crown Cork was the clear stopper of choice – the Seal and the Aluminum Stopper just could not compete.

By the turn of the century, William Painter's prophecy that the Crown Cork would "sweep the decks" of all other patent stoppers was being realized. The Crown was King, and the exclusive patent rights to the Crown Cork were protected until 1909. Not surprisingly, several entrepreneurs tried to patent and manufacture its own stoppers that would compete in the marketplace. Crown Cork and Seal soon filed complaints in the Maryland Circuit Court against three other Baltimore companies – the Imperial Bottle Cap and Machine Company, the Ideal Stopper Company, and the Aluminum Stopper Company.

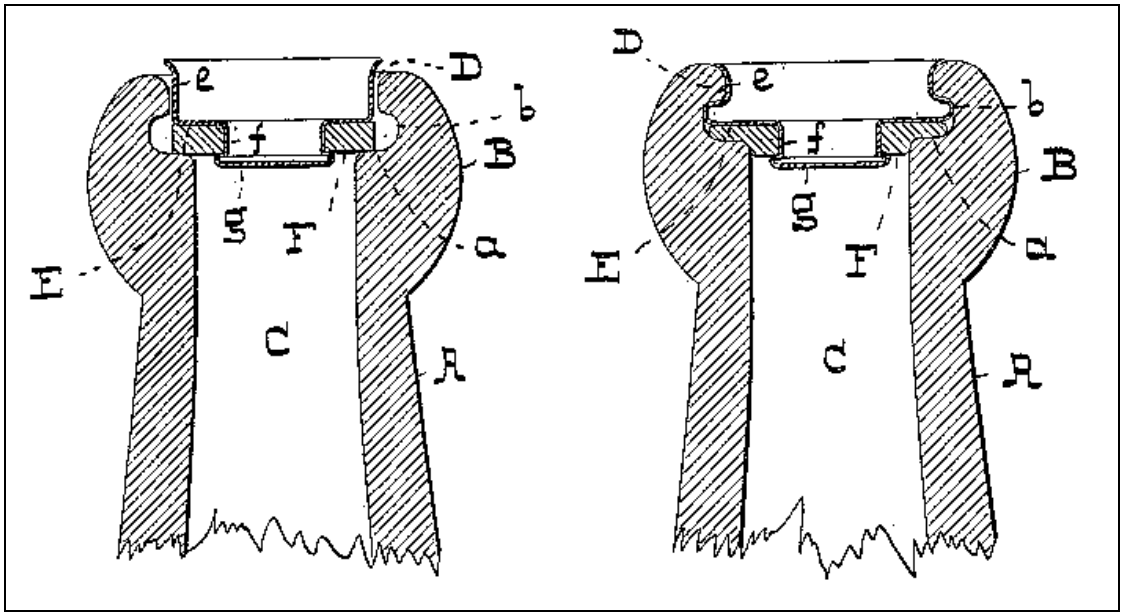
The Imperial Bottle Cap and Machine Company was incorporated in 1901 under the laws of Delaware. It acquired the rights to three bottle stopper patents. The first was an 1896 patent issued to Robert Brass of New York (U.S. Patent 552,742). The other two were patents issued in 1896 (U.S. Patent 521,752) and in 1902 (U.S. Patent 704,167) to Nathaniel B. Abbott of Baltimore. Each of these stoppers was an outer seal, similar to the Crown Cork. The Imperial Bottle Cap differed from the Crown Cork in two respects – The inner disk was paper in lieu of cork, and the cap was secured to an outwardly flared bottle neck instead of a neck tooled to receive a Crown Cork.



Abbott's 1902 Patent for the Imperial Bottle Cap

Circuit Court Judge Morris ruled in favor of Crown Cork and Seal in June of 1903. The directors of the Imperial Bottle Cap and Machine Company were held personally liable for all damages to Crown Cork and Seal. In his decision, Judge Morris wrote, "*The Crown Cork…in the eleven years it has been in use, has proved itself to be of the greatest utility and has in a great measure superseded all other bottle stoppers for beer and mineral waters, effervescent and other liquids but up in bottling establishments. The defendant's device consists of the same elements acting in the same manner, and has added nothing whatever to the art. It is a very apparent attempt to put on the market a device which can be used interchangeable with the complainant's Crown Cork. Both can be put by the same machine on the same bottle.*"

The second legal decision tendered by Judge Morris in June 1903 was in the case of the Crown Cork and Seal Company vs. the Ideal Stopper Company. Formed in 1900, the Ideal Stopper Company manufactured and sold an aluminum inner stopper called the "Ideal. The stopper was based on two patents granted in 1901 and 1902 to Herman T. Gay of Baltimore (U.S. Patents 662,263 and 669,254). Gay's aluminum stopper differed from Painter's aluminum stopper in two ways – it used a cork gasket in lieu of rubber, and the gasket was placed underneath the aluminum face instead of around the perimeter. In the latter part of 1901, the Ideal Stopper Company transferred its patents to the Aluminum Cork Seal Company of New Jersey. The company marketed the stopper under the name of the "Aluminum-Cork".



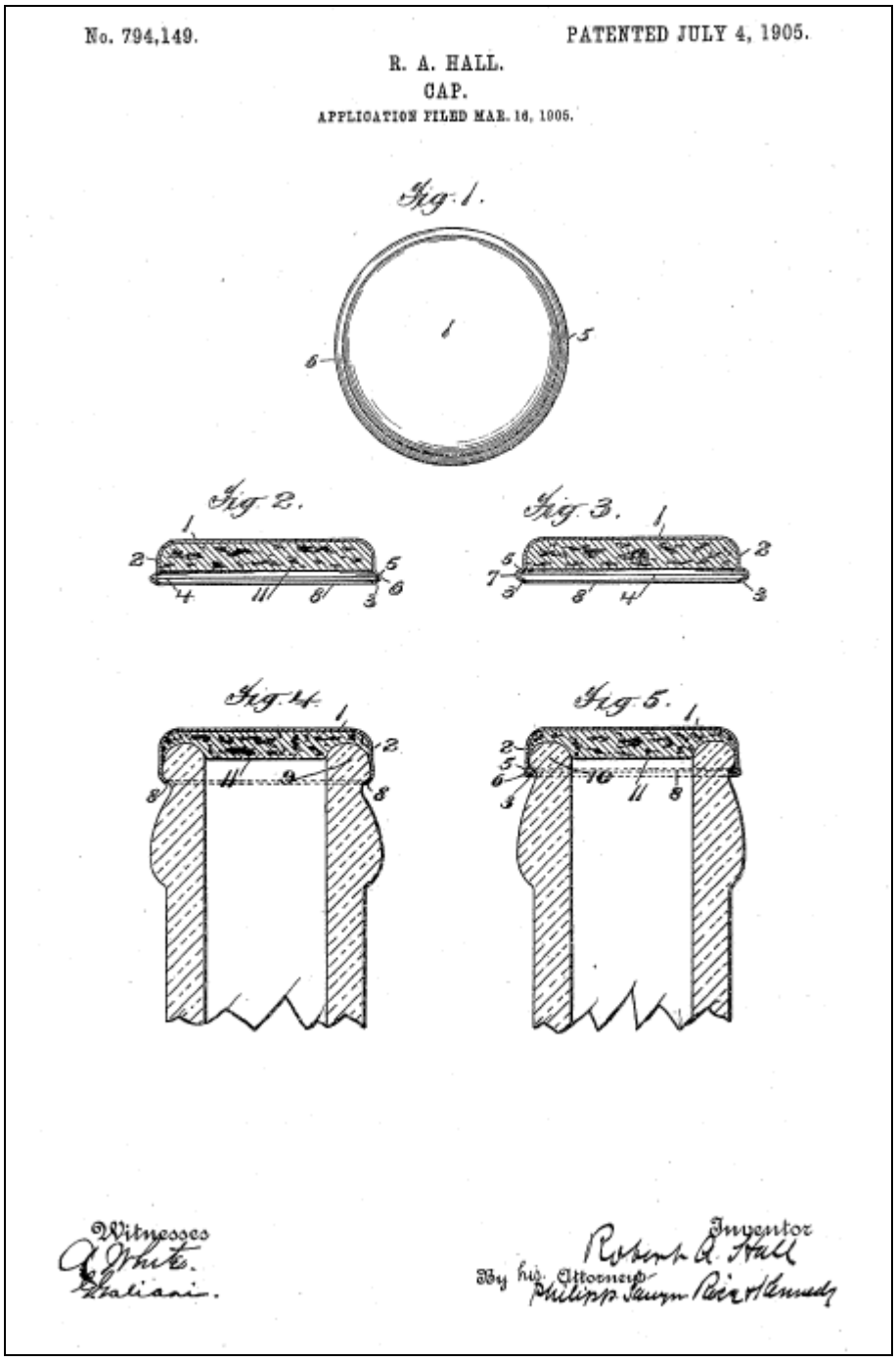
Gay's 1901 Patent for the Ideal (Aluminum Cork) Seal

The defendants included company president Robert E. France, Herman Gay, and five other directors. Defendant's counsel admitted in court that if the complainant's patent was valid, the defendants had infringed it. However, they attacked the validity of Painter's patent, alleging that the device was not new with Painter, but had been known for half a century. They referred specifically to William Young's British patent No. 12,247 granted in 1848. Young's patent specified a shoulder inside the neck of a bottle, a stopper made of cork or elastic material, and a disk of metal expanded in the groove. Yet the difference, argued the defense for the plaintiff, was that Painter's stopper was fundamentally different than Young's. Young's stopper was a cork plug that was restrained from inadvertently coming out of the bottle neck by a metal disk or cap. Painter's metal disk *was* the stopper and the cork disk simply provided a tight seal.

In his decision, Judge Morris wrote, "*Although in the present suit greater stress has been laid upon the British patent of 1848, to Young, and a fuller consideration of this patent has been urged upon this Court, I fail to find in it an anticipation of the invention of the patent in suit.*" The decision went against the defendants and the seven men were held liable for damages to Crown Cork and Seal.

The final law suit was the Crown Cork and Seal Company vs. the Aluminum Stopper Company. This case involved the two former business associates, Painter and Hall, each of whom had developed an aluminum stopper based on his 1895 patent. Judge Morris ruled that Hall's patent did not infringe upon Painter's patent. Crown Cork and Seal appealed the decision. On appeals, the court ruled that "…*the Painter patent was held to be entitled to liberal construction as for a distinctly original invention fundamentally differing from any preceding invention, and it was held to cover the device shown in Hall's patent, and made by the defendant in that case.*" With the whack of a gavel, the Aluminum Stopper Company was out of business.

Robert Hall was granted a final aluminum stopper patent (U.S. Patent 734,545) on July 28, 1903, with all rights being assigned to the Crown Cork and Seal Company. Hall moved north to New York and his name appears on three subsequent patents with rights assigned to the New York Standard Stopper Company. The first patent was issued in 1905 (U.S. Patent 794,149) and the patent drawing bears an uncanny resemblance to the Crown Cork. The two patents issued to Hall in 1906 include another Crown Cork variation (U.S. Patent 826,244) and a device for applying said stopper to a bottle (U.S. Patent 826,245). None of these devices were able to compete with the Crown Cork, and nothing more was heard of Robert Hall.



No. 794,149. PATENTED JULY 4, 1905.

R. A. HALL.

CAP.

APPLICATION FILED MAR. 16, 1905.

Fig. 1.

Fig. 2.

Fig. 3.

Fig. 4.

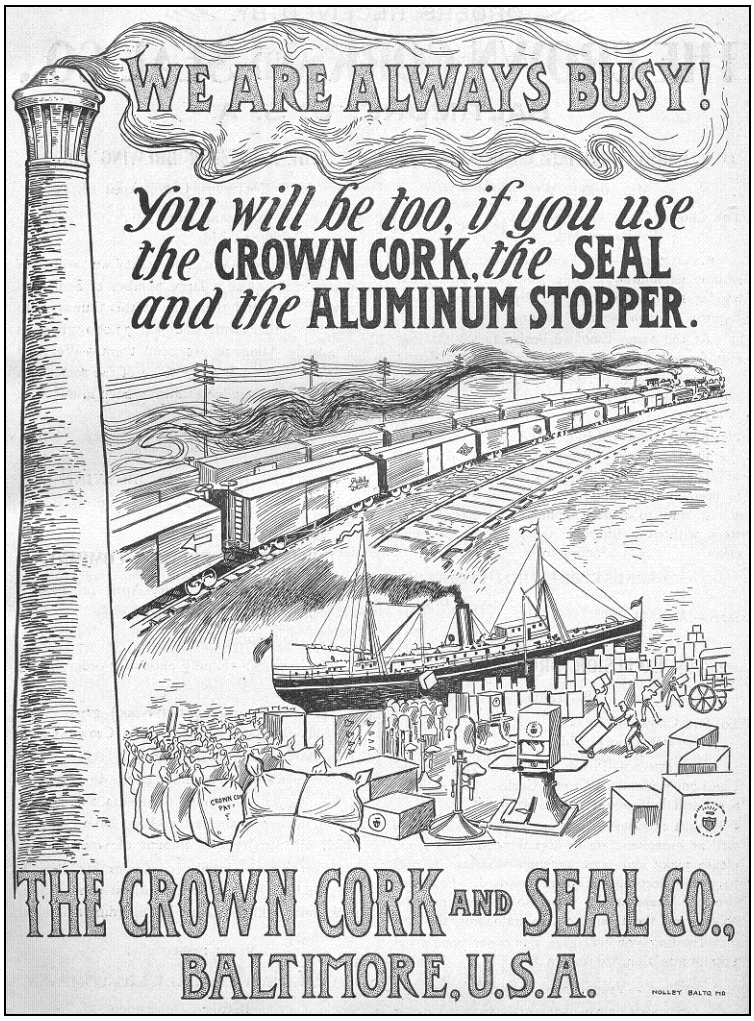
Fig. 5.

Witnesses
J. White.
Baliani.

Inventor
Robert A. Hall
By his Attorneys
Philipp, Sawyer, Rice & Kennedy

Robert Hall's 1905 Bottle Cap Patent

With the patents secured, the Crown Cork and Seal Company continued making Aluminum Stoppers for several years. The company's advertising literature from the period promotes the Crown Cork, the Loop Seal, and the Aluminum Stopper.



William Painter had spent a lifetime in the workshop and had patented an impressive array of mechanical devices that was unequaled by any of his countrymen. Over and over again, he had revolutionized American industries. From his Odorless Evacuating System in the 1870's, to his Bottle Seal system in the 1880's, to his Crown Cork system in the 1890's, and finally, his Jumbo bottling machine, William Painter had accomplished more in one career than most teams of mechanical engineers could boast. The founder of the Quaker movement, George Fox, once wrote, "Let your life speak." William Painter's life spoke volumes.

The Twilight Years (1903 – 1906)

We knew the time was drawing near
When thou shouldst put to sea,
And took thy hand ere thou didst hear
That one clear call for Thee.
- Orrin Painter, *To My Father*

WILLIAM PAINTER retired from the Crown Cork and Seal Company on January 23, 1903 at the age of sixty-four. He had served for nearly two decades as the Secretary and General Manager of first the Bottle Seal Company and then the Crown Cork and Seal Company. For several years his health had been failing and it was time for him to step down. The patent rights for the Crown Cork would belong exclusively to the company until 1909 and William Painter would continue to receive stock dividends and royalties from his many inventions. By one estimate, the Crown Cork brought William Painter $350,000[†] in royalties in a single year. Orrin Painter resigned as the Manager of the advertising department on the same day. He had always been very close to his father and did not want to continue working without him. As the sole male heir to the Painter fortune, Orrin had no need to seek further employment. He spent his remaining years traveling, supporting philanthropic causes, and publishing his own works of poetry and prose.

William Painter spent his retirement in the usual manner. He traveled extensively across America, usually to warmer climates. California, Arizona, and Florida were among his favorite destinations. He enjoyed long walks, automobile excursions, horseback riding, and an occasional round of golf. His body was weakened but his mind stayed active, as evidenced by the two patents he received in 1905 and even one received posthumously in 1908. Painter attended the 1904 St. Louis World's

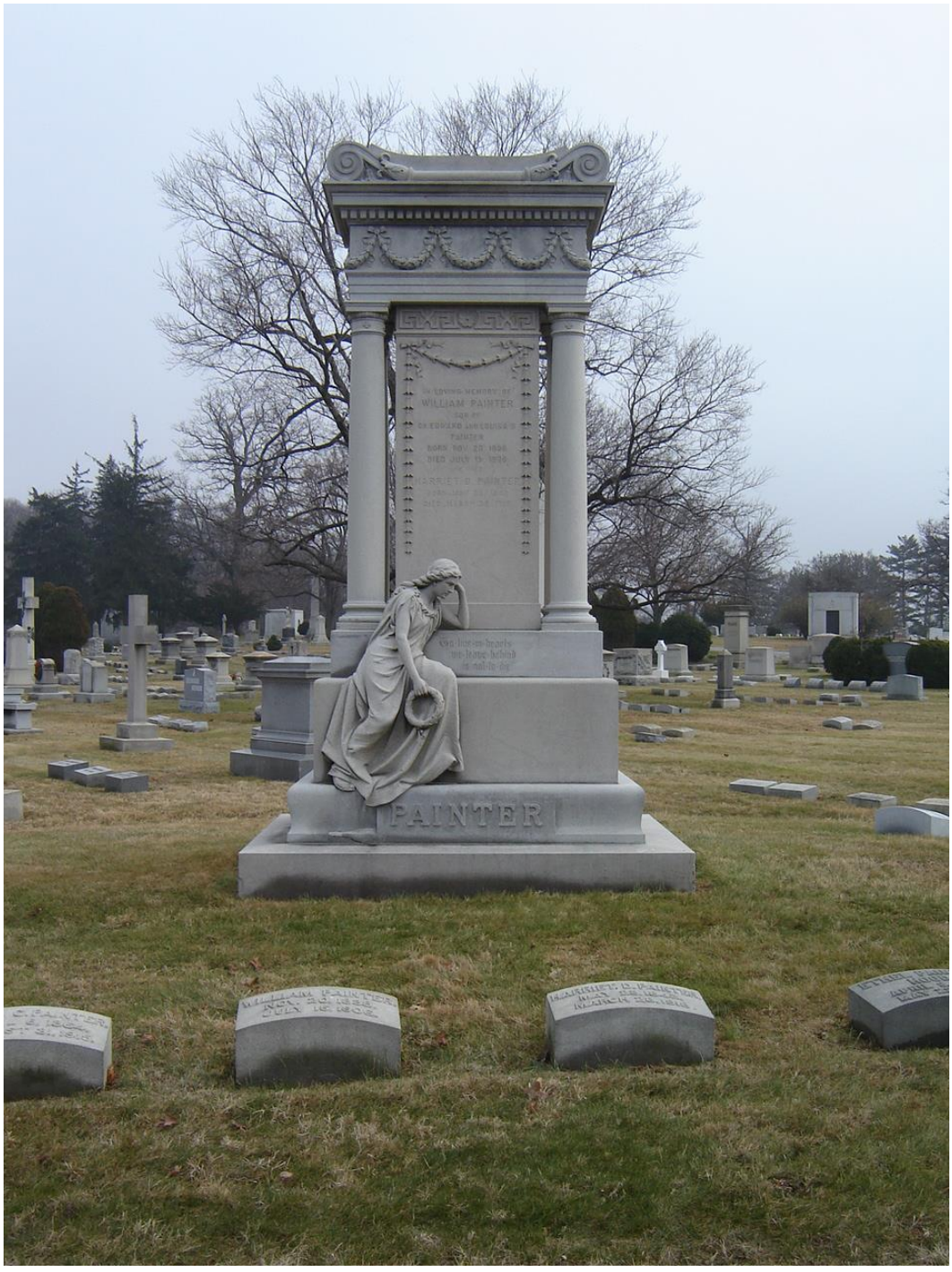
[†] Roughly seven million dollars by today's standards

Fair Exposition en route to California by automobile. In January 1904 he traveled to Florida and was there on February 7, 1904, the date of the great Baltimore fire that destroyed much of the downtown area. The Crown Cork and Seal Company factory, with its numerous bales of highly combustible cork wood, was fortuitously situated on the opposite bank of the Falls Creek and well out of range of the inferno. The factory suffered no damage. The threat of another large fire and the need to again expand its operations compelled the company to build an even larger facility in Highlandtown, which was at that time a suburb of Baltimore. The new factory opened in 1907 and all bottle closure production moved to Highlandtown. The Crown Cork and Seal Company main office and production of bottling machines, tools, and parts remained at the Guilford Avenue complex.

On June 1, 1906, Painter's health was quite poor and he was taken to the Johns Hopkins Hospital and remained on bed rest. His health did not improve this time and he underwent a surgical procedure on July 4. He never rallied from this final setback and he passed away on July 15, 1906 at age sixty-seven. His final words were from the Scriptures, *"I am the life."*

The Society of Friends conducted funeral services for William Painter at his Roland Park home on July 18. His dear friend, Colonel William C. Wood, performed a eulogy. William Painter was buried in Druid Ridge Cemetery near Pikesville. A large monument and headstone mark the gravesite. His obituary in the Baltimore Sun expressed "*regret that there are not more citizens like him in virtue and ability, and gratitude that there are some so worthy of honor and emulation*."

Orrin Painter died as a bachelor on August 31, 1915. Harriet Painter passed away on March 28, 1918. She was buried at her husband's side. Helen followed in 1945 and Ethel in 1952. All are interred at the Painter family gravesite. Orrin Painter once wrote, "*I can truthfully say that no parents could possibly be more loving and kind than father and mother were to my sisters and myself, and for their loving ministration we shall never cease to be grateful.*"



The Painter Family Gravesite, Druid Ridge Cemetery

His Legacy

To live in hearts we leave behind,
Is not to die.
- Thomas Campbell, *Hallowed Ground*

THE TANGIBLE evidence of William Painter's life work is still a part of our everyday life more than a century after his death. Although the bottling industry saw many technological advances in the twentieth century, such as the advent of cans and screw-off caps, the Crown Cork is still the closure of choice for high-quality bottled beer and soda and it probably will be for decades to come. Very few inventions of the nineteenth century have enjoyed the longevity and universal acceptance as the Crown Cork.

The intangible contributions of William Painter are difficult to quantify. Certainly his importance to the city of Baltimore can not be underestimated. He was the driving force behind one of Baltimore's most important industries at the turn of the century. The positive impact to Baltimore in terms of jobs for its citizens, taxable revenue, economic growth, and the boon to related industries was tremendous. Baltimore was - and still is - a great city. There is no doubt that this is in part attributable to the contributions of a modest Quaker family man with the vision, tenacity, and genius to succeed.

Of course, Painter's influence was not limited to The Charm City. The Crown Cork and Seal Company rapidly expanded to cities across the country and around the world. The Crown Cork allowed bottlers to operate at top efficiency and provide the highest quality beverages to their customers. *"Make something that everyone needs, and make it better and cheaper than the competition can"* – a simple philosophy with extraordinary results. To use the words "simple" and "extraordinary" at once to describe William Painter does not seem paradoxical.

After her husband's death, Harriet Painter was involved with many charitable efforts. On May 11, 1912, The William Painter Memorial Children's Hospital School on Greenspring Avenue in Baltimore was dedicated in memory of her late husband. The school served both as a hospital and a learning institution for crippled children. Orrin Painter also became involved with several charities. He was the treasurer of the Prisoners' Aid Fund; the treasury of that organization was primarily filled from Orrin's own pockets.

The earliest Painter houses in Baltimore – on North Central Avenue, North Exeter Street, and North Eutaw Street - have given way to urban development. The two Painter residences on Bolton Street still stand on a quiet tree-lined city street. A row house has been rebuilt at the 1202 North Charles Street that was destroyed in the 1895 fire. The 1129 North Calvert Street house is now the Inn at Government House and provides lodging for visitors to Baltimore.

The original Crown Cork and Seal factories in East Baltimore are still quite recognizable on the exterior. The East Monument Street building, encased in razor wire, now serves as a state prison. The Guilford Avenue complex has been converted to artists lofts. It is known to residents as The Cork Factory.

William Painter Timeline

1838 – William born November 20 in Triadelphia, Montgomery County, Maryland
1840 – Painter family moved from Triadelphia to Herring run, near Baltimore
1849 – Painter family moved to Fallston, Harford County, Maryland
1853 – William moved to Wilmington, Delaware
1855 – William finished his education and apprenticed to Pyle, Wilson, & Pyle
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1858 – William was issued his first patent on August 3 for a "Fare Box"
1859 – William returned to Fallston and joined his father at the Painter & Watson general store
1861 – William married Miss Harriet Magee Deacon on September 9
1864 – Orrin Chalfant Painter was born on April 6 in Fairville, Chester County, Pennsylvania
1865 – Painter family moved to Baltimore
1866 – Helen Churchton Painter was born on June 2
1867 – William became foreman of Murrill & Keizer's machine shop
1880 – Ethel Gilpin Painter was born on November 15
1874 – William began a lifelong professional and personal relationship with patent attorney William C. Wood
1875 – William's father, Dr. Edward Painter, died on September 29

1882 – William became general manager of the Bottle Seal Company
1885 – William was granted his 39th patent, but the first for a bottle closure, on April 14

1892 – William received a patent for a "Bottle Sealing Device" on February 2. This invention was commonly referred to as the "Crown Cork"
1892 – The Crown Cork & Seal Company was incorporated on April 1 and located its operations at 500-506 East Monument Street
1895 – William suffered his first attack of nervous prostration in his factory office
1895 – William purchased a summer country home in Pikesville, known as "The Colonies"
1896 – William's mother, Louisa Gilpin Painter, died on May 16
1897 – The Crown Cork & Seal Company moves operations to a larger facility at 1511-1523 Guilford Avenue
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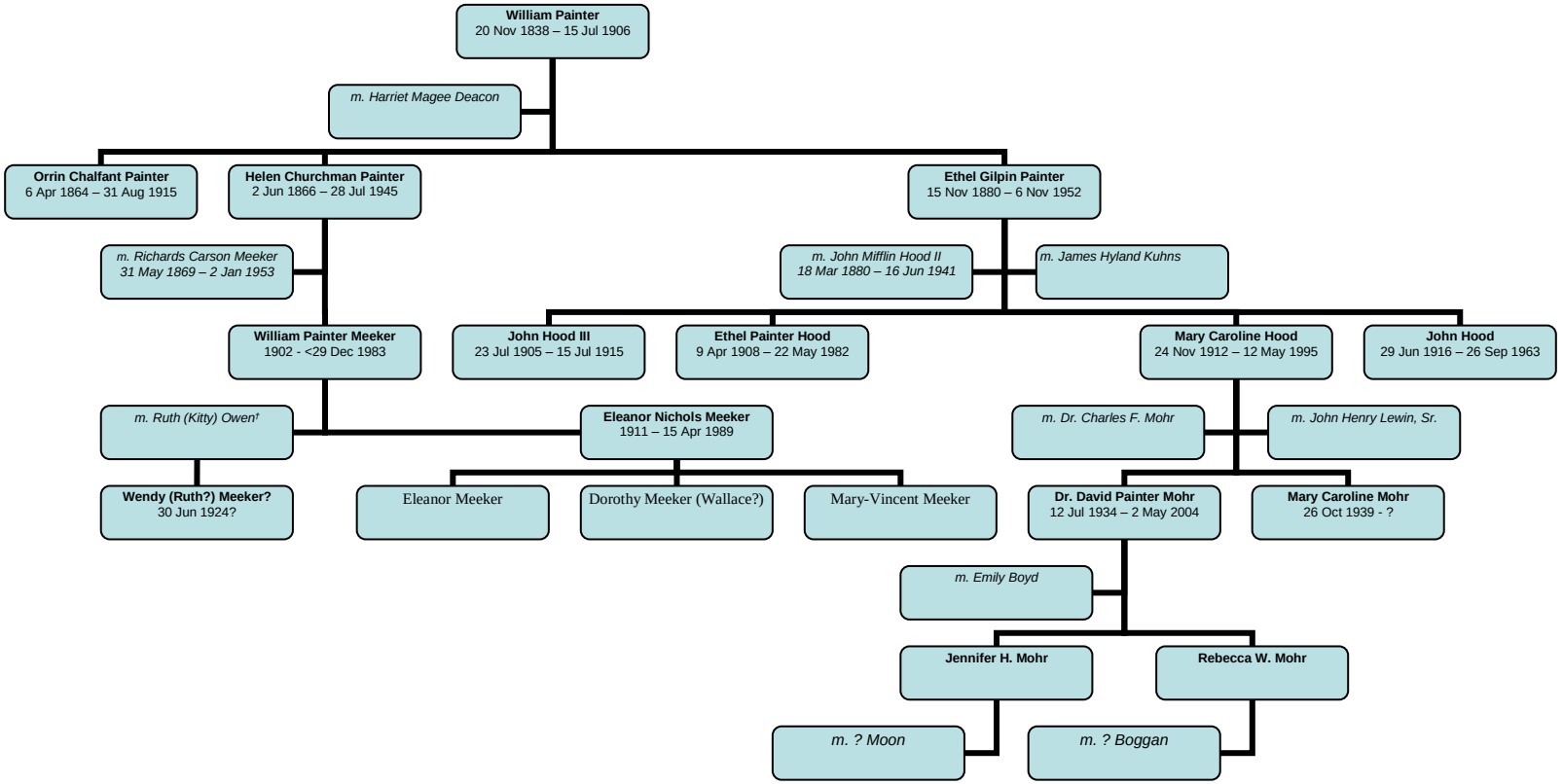
1903 – William retired from The Crown Cork & Seal Company
1904 – The Great Baltimore Fire raged through downtown on February 7-8

1904 – The Crown Cork & Seal Company moved its operations to Highlandtown
1906 – William taken to Johns Hopkins Hospital; died on Sunday, July 15
1908 – William was posthumously awarded his 86th and final patent
1912 – The William Painter Memorial Children's Hospital School was dedicated

Descendants of William Painter



†Ruth (Kitty) Owen was the granddaughter of notable American statesman William Jennings Bryan and the daughter of Florida's first Congresswoman, Ruth Bryan Owen. More notably, when Kitty was in her late teens she posed for illustrator Maxwell Parrish on several occasions and is the reclining figure seen in his most famous illustration, *Daybreak*.

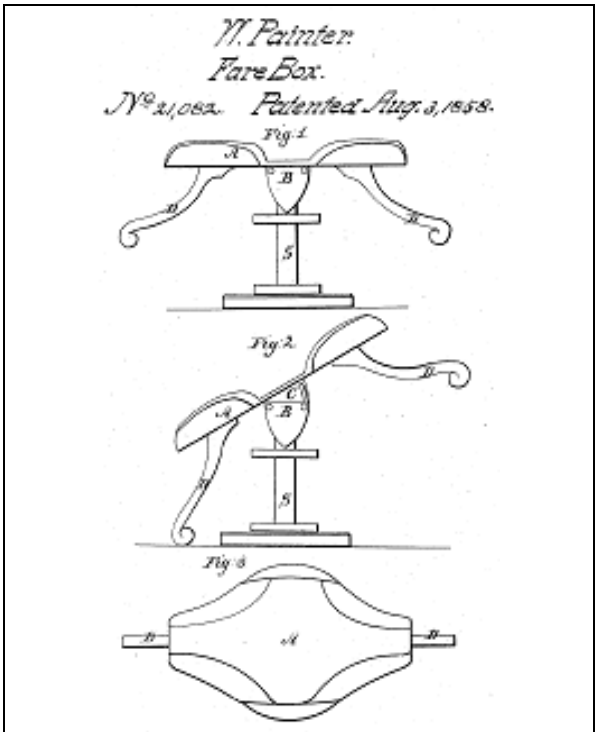
William Painter's Patents

The United States Patent and Trademark Office (USPTO) awarded William Painter with 86 patents over a span of 50 years. Three of these were reissue patents to append additional claims onto existing patents. Patent numbers and issue dates are given in the table below. On the subsequent pages are selected patent drawings for each patent.

Patent Number	Date of Issue	Title
21,082	1858, August 3	Fare Box
21,356	1858, August 31	Car Seat and Couch
35,834	1862, July 8	Counterfeit Coin Detector
39,102	1863, June 30	Lamp Burner
45,950	1865, January 17	Improved Material for Making Boxes, &c.
49,782	1865, September 5	Fastening Blacking-Box Rims
RE-2,854	1868, February 4	Improvement in Lamp Burners (reissue of 39,102)
104,992	1870, July 5	Seed Sower
122,847	1872, January 16	Gauge Cocks for Steam Boilers
125,841	1872, April 16	Lubricating Car Axles
127,917	1872, June 11	Improvement in Feed-Water Regulators and Low-Water Alarms for Steam-Boilers
133,048	1872, November 12	Oscillating-Pumps
141,587	1873, August 5	Pump-Valves
155,667	1874, October 6	Valves
155,668	1874, October 6	Valves
155,669	1874, October 6	Valves
155,670	1874, October 6	Pumps for Emptying Cess-Pools, &c.
160,700	1875, March 9	Hose-Coupling
160,701	1875, March 9	Apparatus for the Removal of Night-Soil
160,702	1875, March 9	Discharge-Gate for Night-Soil Tanks
160,703	1875, March 9	Measuring Indicator for Night-Soil Tanks
160,704	1875, March 9	Foot-Pipe for Suction-Hose
162,945	1875, May 4	Apparatus for Transferring Night-Soil from Transit-Tanks to Cars, Boats, &c.
163,238	1875, May 11	Transit-Tank for Night-Soil
168,775	1875, October 11	Valve
168,776	1875, October 11	Valve
175,144	1876, March 21	Valve
175,145	1876, March 21	Valve

Patent Number	Date of Issue	Title
181,535	1876, August 29	Flexible Pump-Valve
RE-7,620	1877, April 17	Counterfeit-Coin Detecters (reissue of 35,834)
187,411	1877, February 13	Pump Valve
193,029	1877, July 10	Plaiting-Machine
198,146	1877, December 11	Methods of Forming Joints is Gas and Water Mains
223,533	1880, January 13	Soldering-Tool
234,608	1880, November 16	Marking Plug Tobacco
247,270	1881, September 20	Lamp Burner and Wick Therefor
269,225	1882, December 19	Automatic Magneto Signal for Telephones
277,332	1883, May 8	Machine for Flattening the Seams of Sheet Metal Roofing
283,356	1883, August 14	Pulley Covering
315,655	1885, April 14	Bottle Stopper Fastener
316,646	1885, April 28	Fountain Pitcher
320,679	1885, June 23	Electrical Railway
324,040	1885, August 11	Bottle Stopper
327,099	1885, September 29	Bottle Stopper
329,589	1885, November 3	Lamp Wick and Burner
438,708	1890, October 21	Bottling Machine
438,709	1890, October 21	Bottle Stopper
438,710	1890, October 21	Bottle Stopper Extractor
438,711	1890, October 21	Bottle Stopper Fastener
438,712	1890, October 21	Machine for Inserting Wire Loops in Seals
443,728	1890, December 30	Tool for Forming the Necks of Bottles
449,822	1891, April 7	Bottle Stopper
468,226	1892, February 2	Bottle Sealing Device
468,258	1892, February 2	Bottle Sealing Device
468,259	1892, February 2	Bottle Sealing Device
473,776	1892, April 26	Method of and Means for Bottling Liquids and Sealing Bottles
514,200	1894, February 6	Capped Bottle Opener

Patent Number	Date of Issue	Title
528,485	1894, October 30	Bottle Seal or Stopper
528,486	1894, October 30	Bottle Seal or Stopper
528,487	1894, October 30	Bottle Seal or Stopper
540,072	1895, May 28	Bottle Stopper
582,762	1897, May 18	Bottle Sealing Device
602,355	1898, April 12	Pencil
605,334	1898, June 7	Sheet Feeding Mechanism for Punching Machines
608,157	1898, July 26	Bottle Sealing Device
608,158	1898, July 26	Bottling Machine
RE-11,685	1898, July 26	Bottle Stopper (reissue of 540,072)
609,209	1898, August 16	Machine for Applying Corks and Seals to Bottles
613,936	1898, November 8	Apparatus for Forming Corrugated Caps
615,099	1898, November 29	Bottle Closure
619,336	1899, February 14	Gluten Compound
619,337	1899, February 14	Gluten Compound
619,338	1899, February 14	Gluten Compound
625,055	1899, May 16	Closure for Sealing Bottles
638,354	1899, December 5	Machine for Automatically Sealing Bottles
643,973	1900, February 20	Automatic Apparatus for Feeding Crowns or Closures
671,228	1901, April 2	Process of Making Glutinous Compounds
671,229	1901, April 2	Process of Making Glutinous Compounds
671,230	1901, April 2	Composite Glutinous Article and Process of Making Same
684,521	1901, October 15	Composition of Matter
684,522	1901, October 15	Gluten Compound
684,523	1901, October 15	Gluten Compound
684,524	1901, October 15	Composition of Matter
792,284	1905, June 13	Method of Manufacturing Bottle Closures
792,285	1905, June 13	Bottle Sealing Cap or Closure
887,838	1908, May 19	Machine for Making Closures for Bottles and the Like



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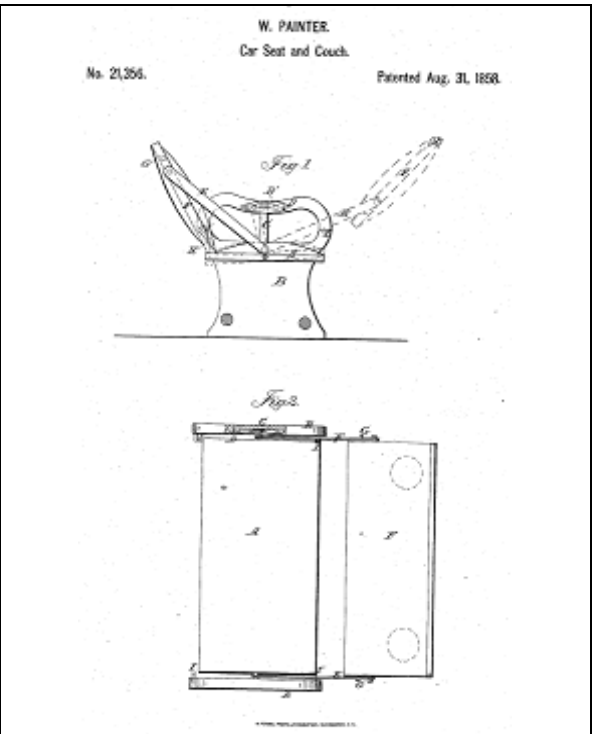

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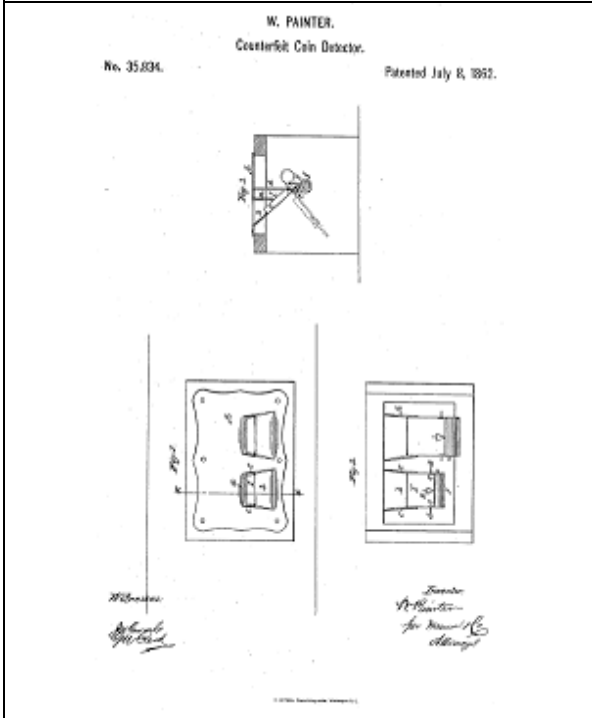
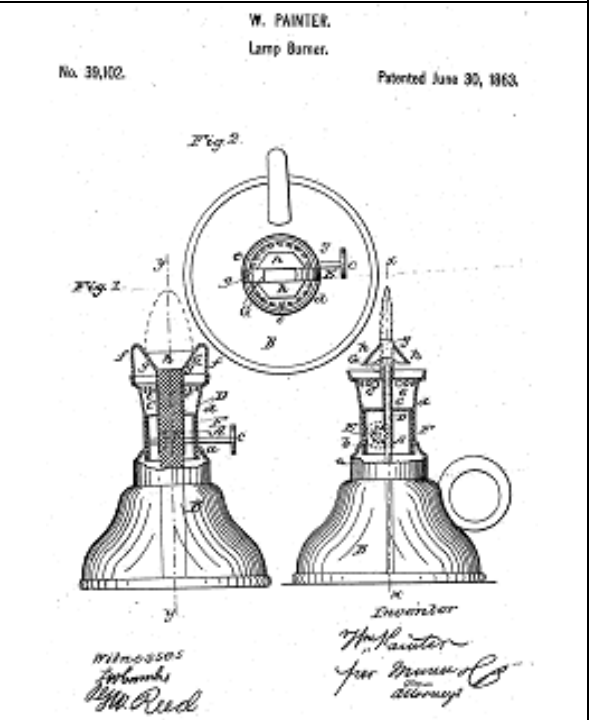


35,834



39,102

UNITED STATES PATENT OFFICE.

WM. PAINTER, OF BALTIMORE, ASSIGNOR TO HIMSELF AND CHARLES PAINTER, OF OWING'S MILLS, MARYLAND.

IMPROVED MATERIAL FOR MAKING BOXES, &c.

Specification forming part of Letters Patent No. 45,950, dated January 17, 1865.

To all whom it may concern:

Be it known that I, WILLIAM PAINTER, of Baltimore, in the county of Baltimore and State of Maryland, have invented a new and Improved Asphaltic Board for Making Boxes, Packages, and other Articles; and I do hereby declare that the following is a full and exact description thereof.

The nature of my invention consists in producing an economical substitute for tin in the manufacture of boxes, packages, and other articles by imparting to straw-board, pasteboard, and other similar fibrous material the properties of hardness, stiffness, solidity, elasticity, and imperviousness to oil or water by saturating the same with asphaltum or pitch made from coal-tar.

To enable others skilled in the art to make and use my invention, I will proceed to describe its preparation and use.

The substance best adapted to the purposes is the straw board of commerce, the sheets of which are dipped into the melted pitch or asphaltum and allowed to remain a sufficient time for them to become fully saturated, which requires from eight to ten minutes, according to the thickness of the sheets. They are then passed between heated rollers, which remove the superfluous pitch from the surface, leaving it smooth and finished. When cold they become hard, stiff, solid, elastic, and impervious to the action of oil or water, and otherwise qualified for use as an economical and efficient substitute for tin (possessing most of its requisite qualities) for making boxes and packages for blacking, tobacco, paints, axle-grease, concentrated lye, and other articles.

In making boxes for blacking the top and bottom are cut in proper form by dies, and each inclosed by a band or rim of tin having a swage or groove formed for receiving it.

Boxes of cylindrical form are made by cutting the asphaltic board into strips with beveled edges and bending the same into shape while heated and pliable, the edges being secured by glue or cement. This forms the body of the box. The bottom is confined thereto by glue or cement, or by a band of tin or other metal. The top is inclosed by a metallic band, as described, in boxes for blacking. The joint between the bottom and body is made tight, when necessary, by glue or cement.

Boxes made of this material and in the manner described are well adapted for containing semi-fluid substances.

I am aware that felt and cloth have been saturated with coal-tar for roofing purposes; but I claim the distinctive features produced by saturating sheets of straw board or pasteboard with asphaltum or pitch made from coal-tar, which becomes hard when cold, adapting the material to the purposes described.

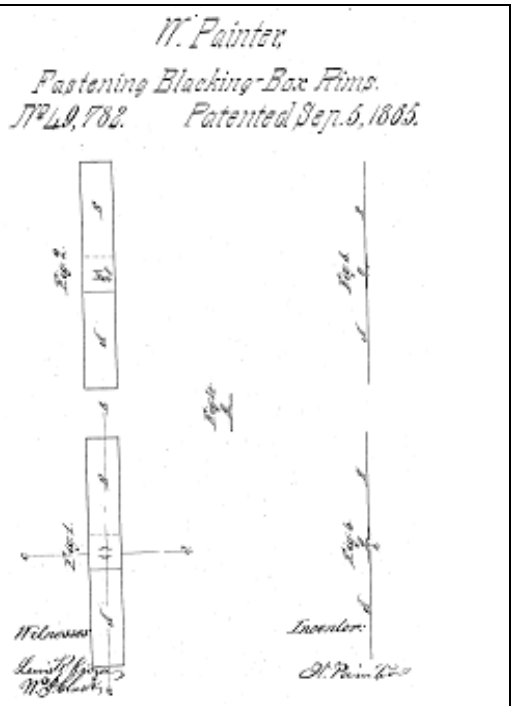
What I claim as my invention, and desire to secure by Letters Patent, is—

As a new article of manufacture, the asphaltic board, made substantially as described, for the manufacture of boxes, packages, and other articles.

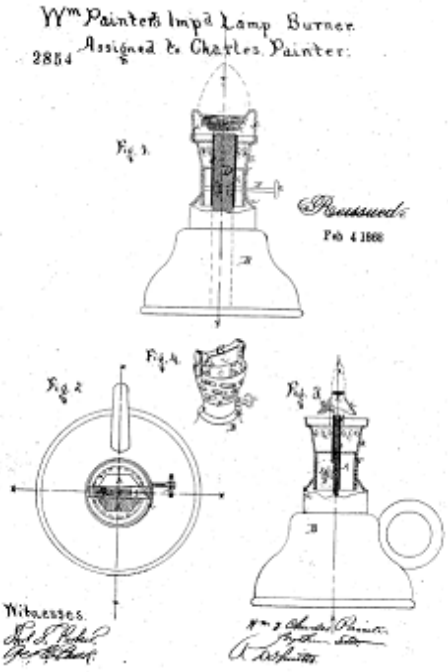
WILLIAM PAINTER.

Witnesses:
WM. P. HOOPER,
D. A. HOOPER.

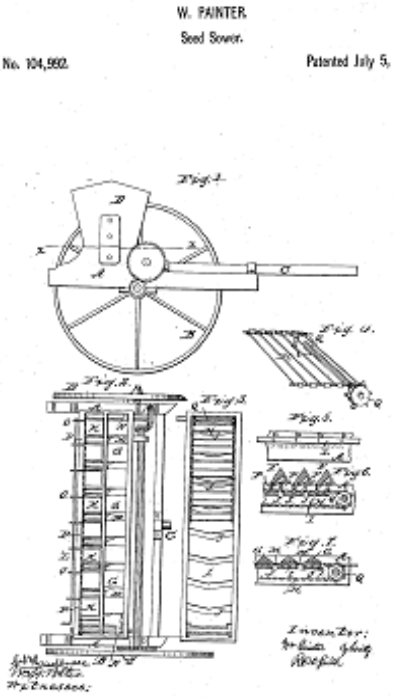
45,950



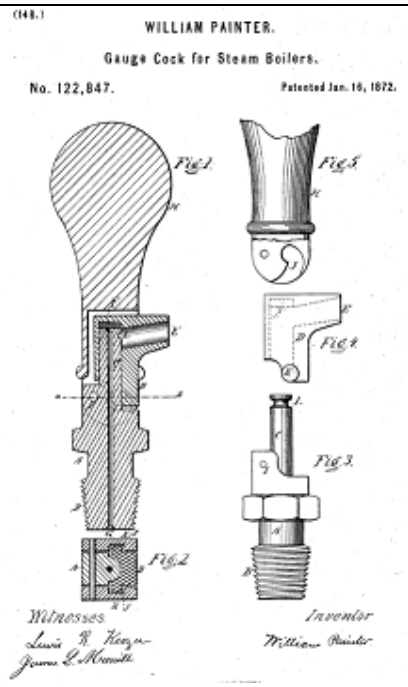
49,782



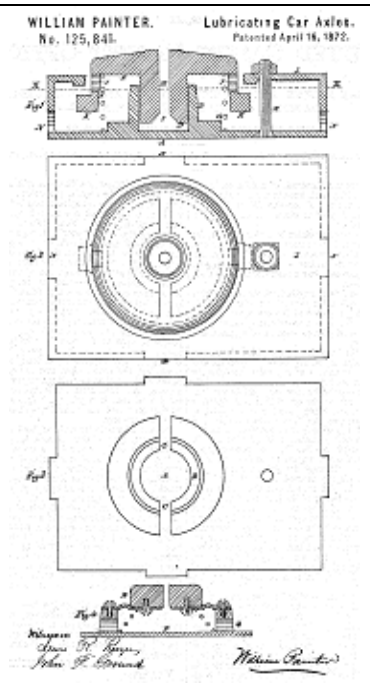
RE-2,854



104,992



122,847



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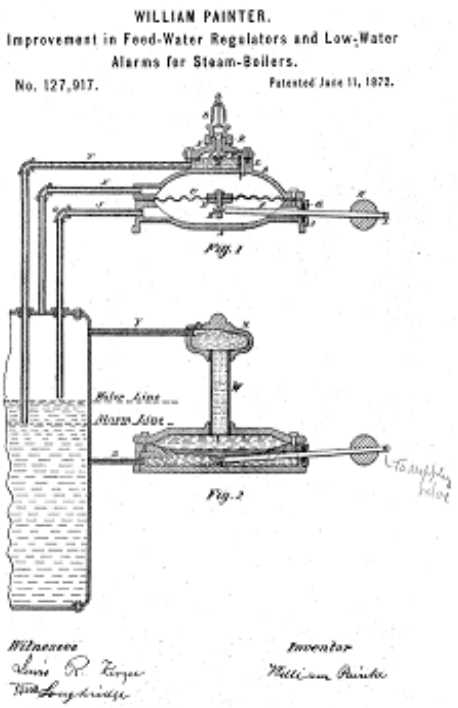

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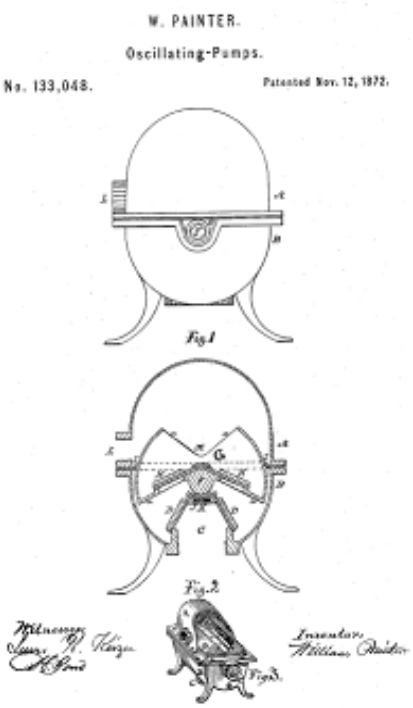

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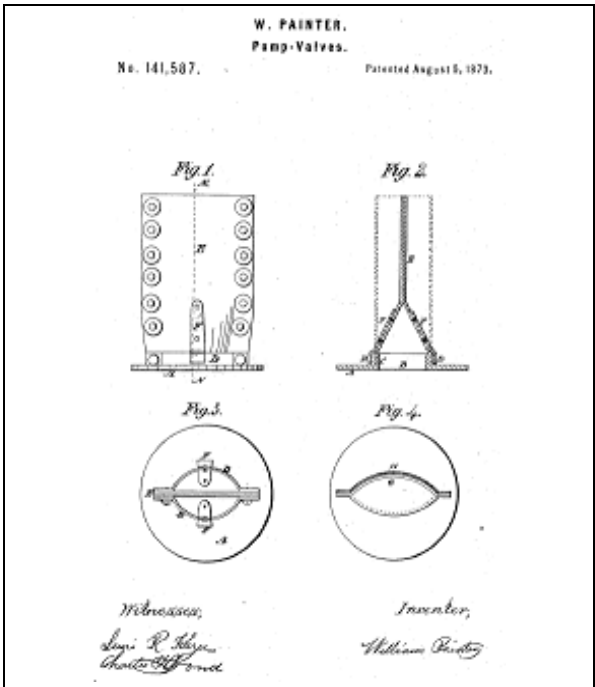
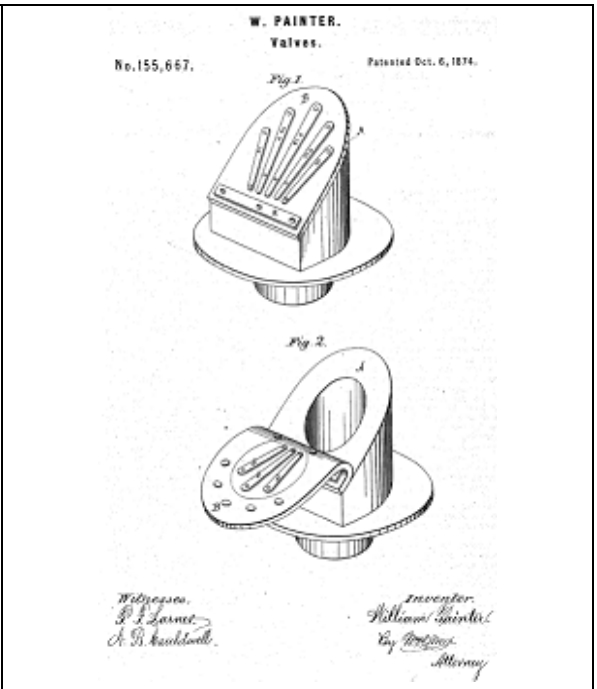
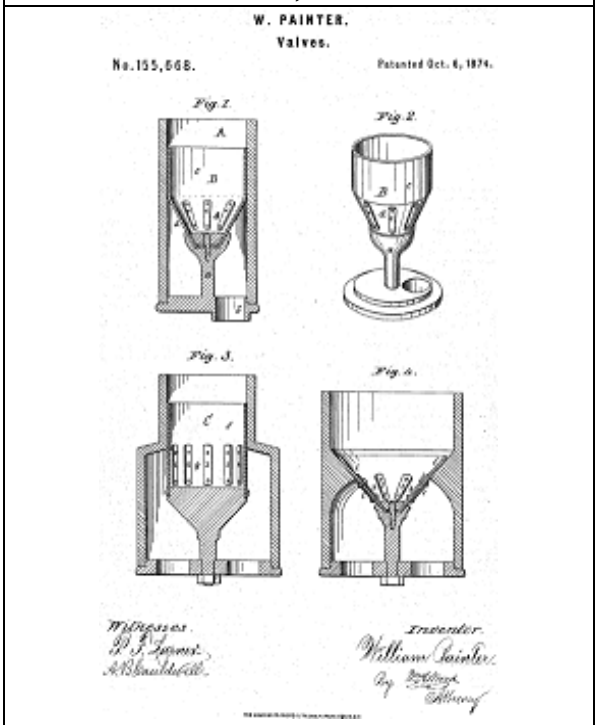


141,587



155,667



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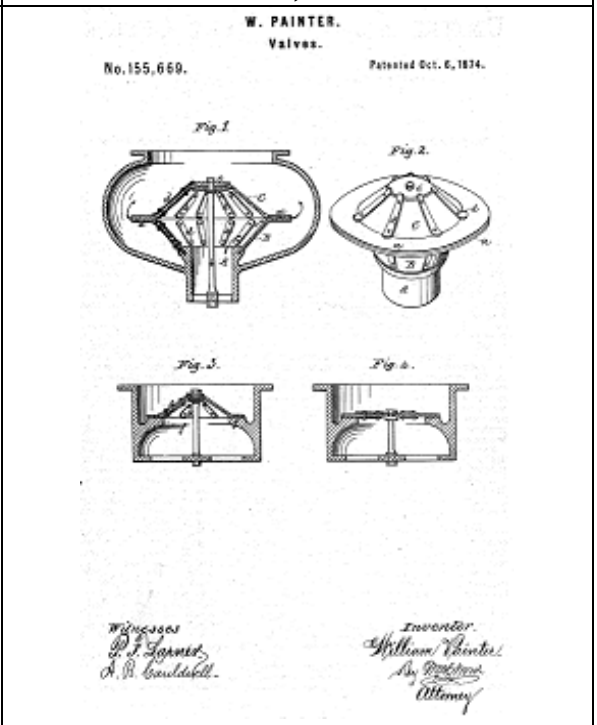

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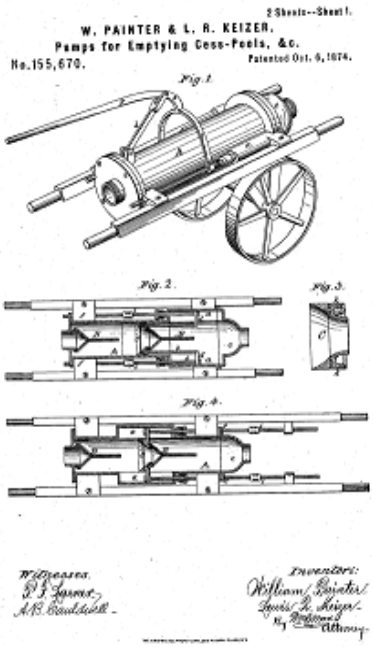
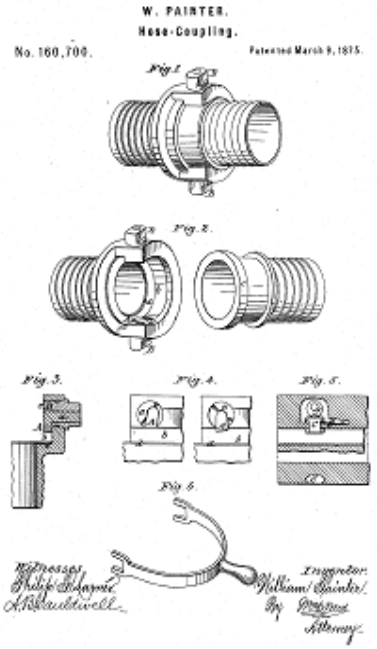
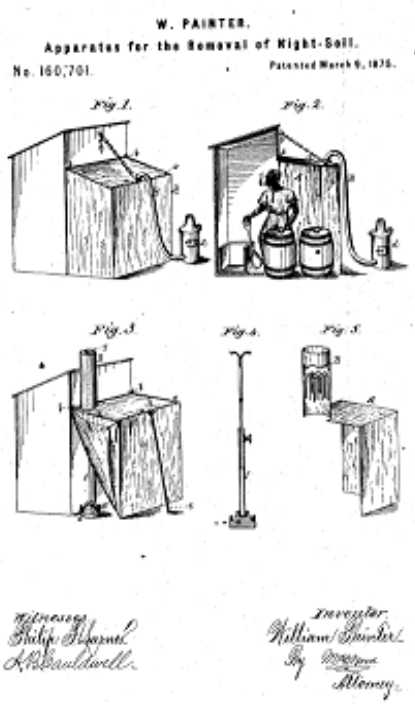

W. PAINTER & L. R. KEIZER.
Pumps for Emptying Cess-Pools, &c.
No. 155,670. Patented Oct. 5, 1874.

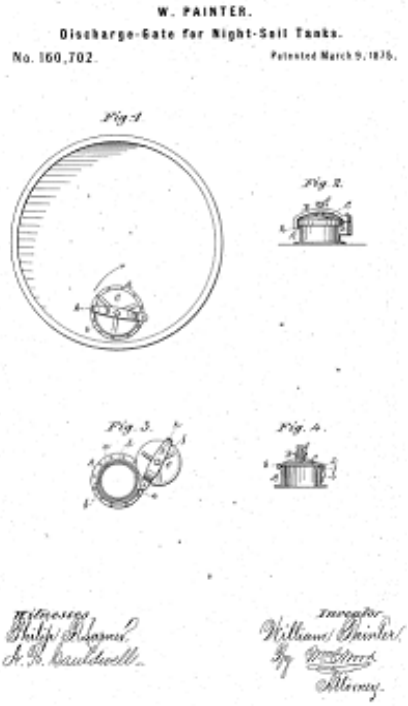
155,670


W. PAINTER.
Hose-Coupling.
No. 160,700. Patented March 9, 1875.

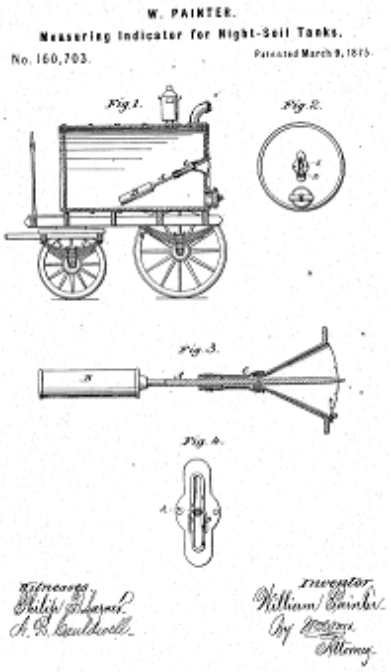
160,700


W. PAINTER.
Apparatus for the Removal of Night-Soil.
No. 160,701. Patented March 9, 1875.

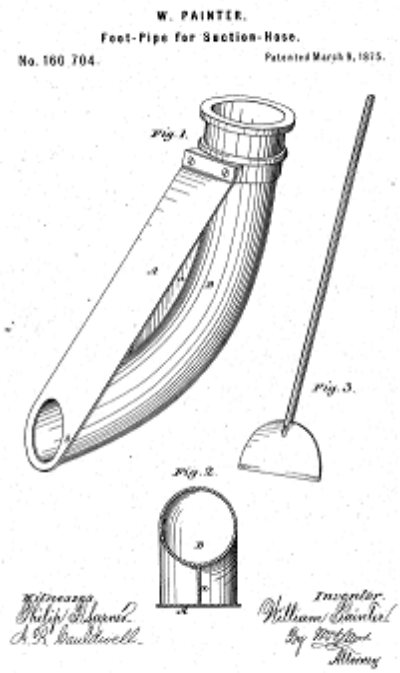
160,701


W. PAINTER.
Discharge-Gate for Night-Soil Tanks.
No. 160,702. Patented March 9, 1875.

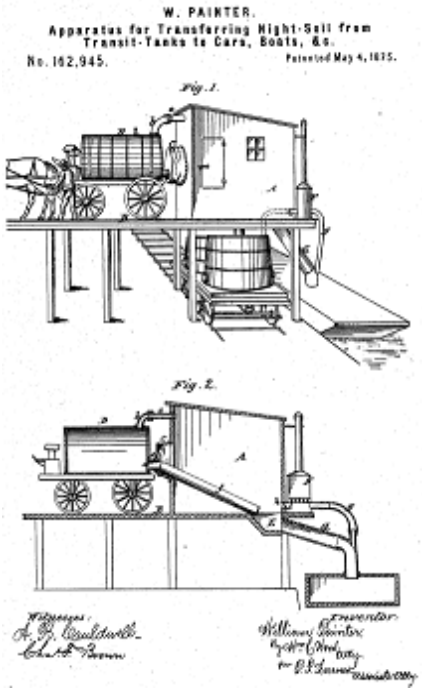
160,702


W. PAINTER.
Measuring Indicator for Night-Soil Tanks.
No. 160,703. Patented March 9, 1875.
Fig. 1. Fig. 2. Fig. 3. Fig. 4.
Witnesses
Philip C. Legrand
A. R. Cauldwell
Inventor
William Painter
By Wright Brown & Quinby
Attorneys

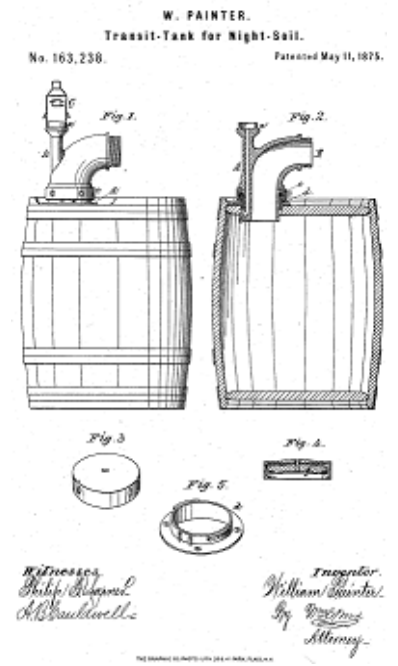
160,703


W. PAINTER.
Foot-Pipe for Suction-Hose.
No. 160,704. Patented March 9, 1875.
Fig. 1. Fig. 3. Fig. 2.
Witnesses
Philip C. Legrand
A. R. Cauldwell
Inventor
William Painter
By Wright Brown & Quinby
Attorneys

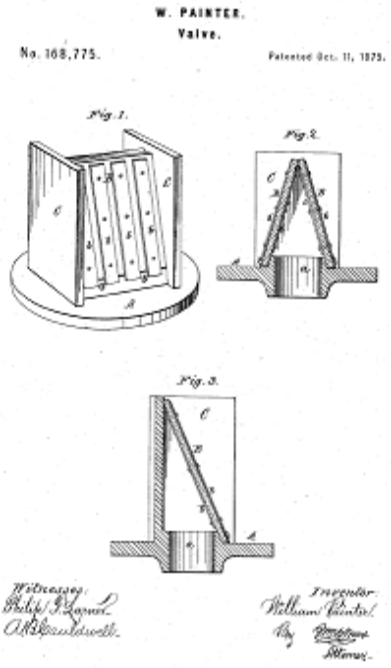
160,704


W. PAINTER.
Apparatus for Transferring Night-Soil from Transit-Tanks to Cars, Boats, &c.
No. 162,945. Patented May 4, 1875.
Fig. 1. Fig. 2.
Witnesses
A. R. Cauldwell
Chas. F. Brown
Inventor
William Painter
By Wright Brown & Quinby
for P. C. Dunnell
Attorneys

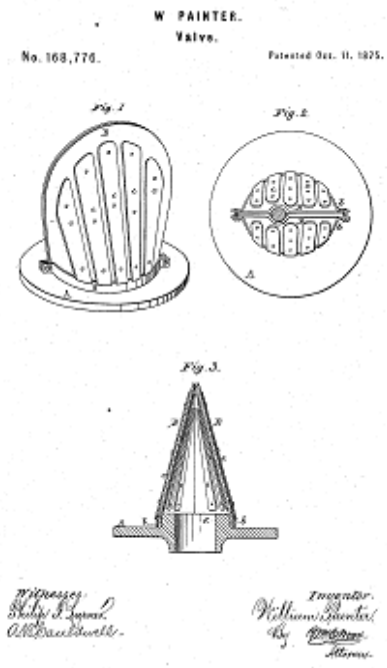
162,945


W. PAINTER.
Transit-Tank for Night-Soil.
No. 163,238. Patented May 11, 1875.
Fig. 1. Fig. 2. Fig. 3. Fig. 4. Fig. 5.
Witnesses
Philip C. Legrand
A. R. Cauldwell
Inventor
William Painter
By Wright Brown & Quinby
Attorneys

163,238



168,775



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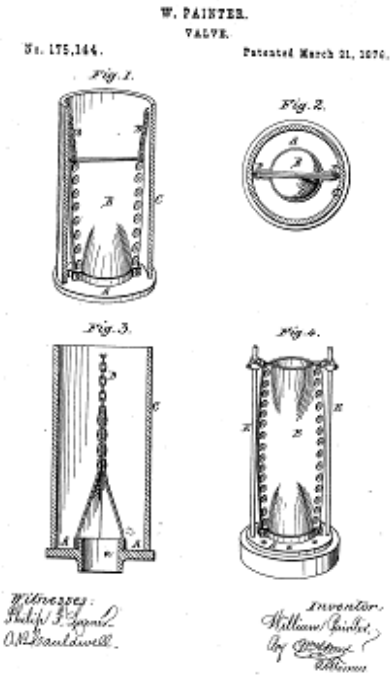

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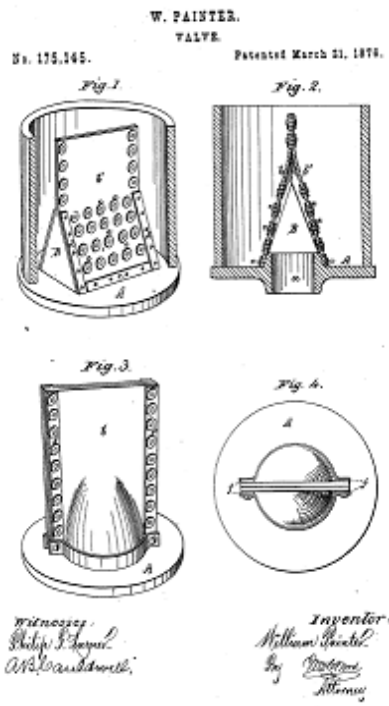

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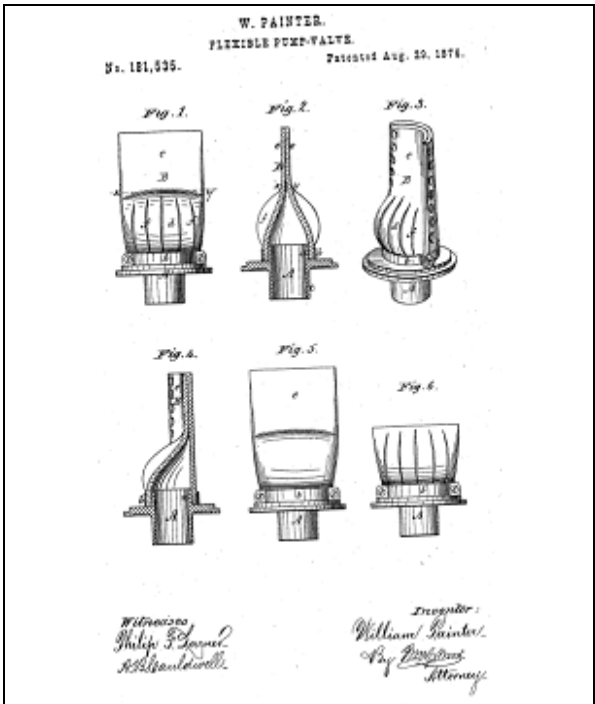

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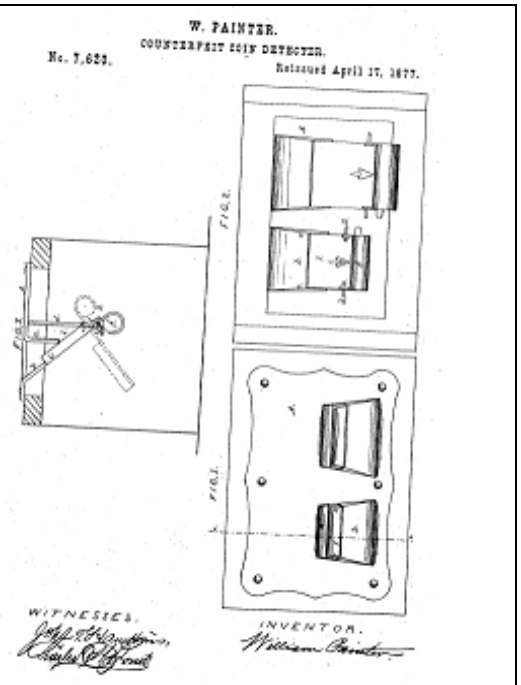
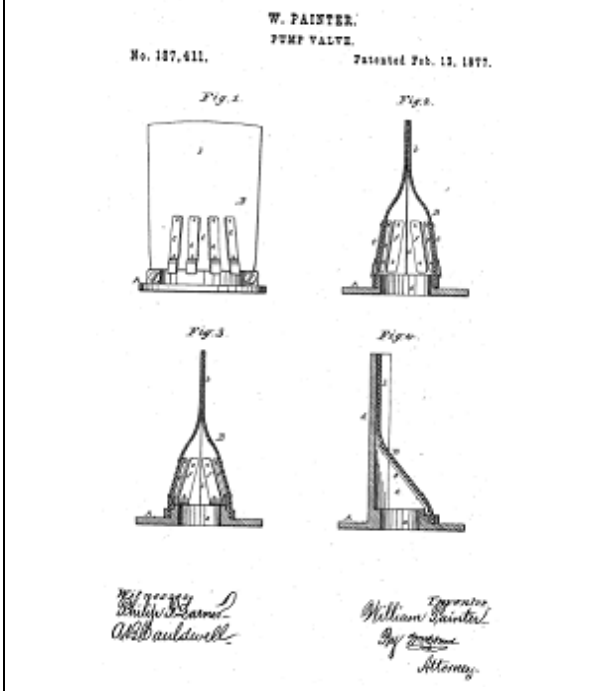


RE-7,620



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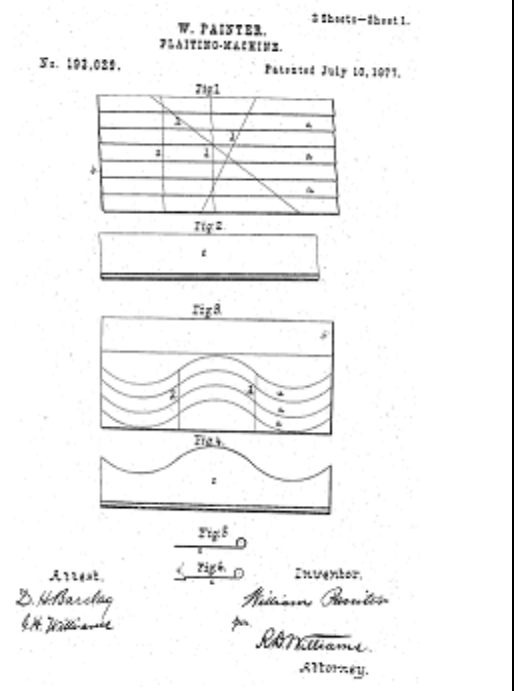
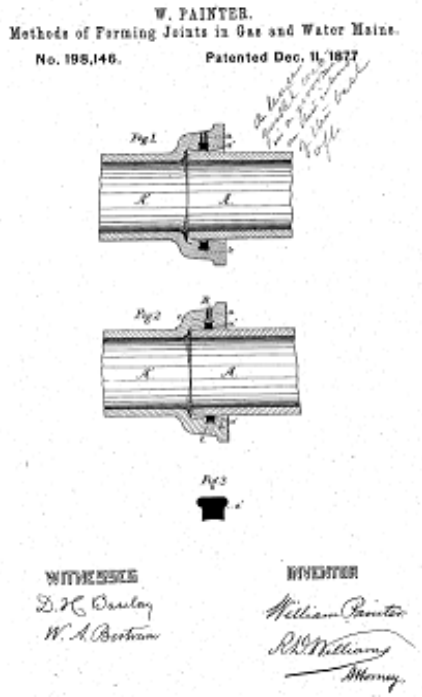
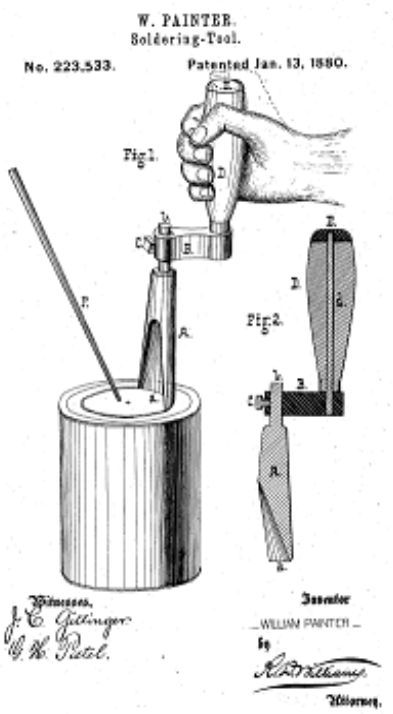


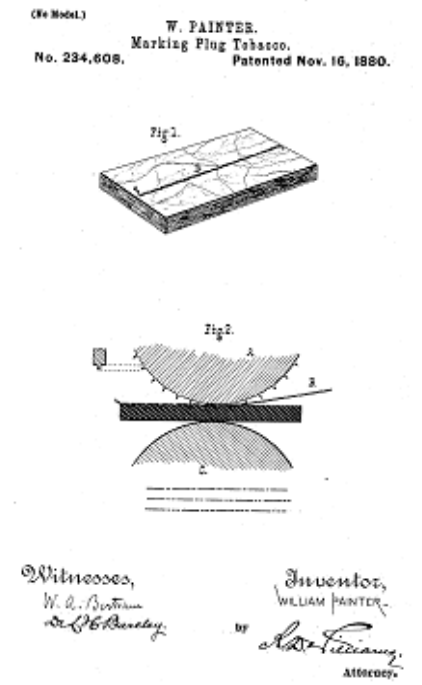
193,029


W. PAINTER.
Methods of Forming Joints in Gas and Water Mains.
No. 198,146. Patented Dec. 11, 1877.
WITNESSES
INVENTOR

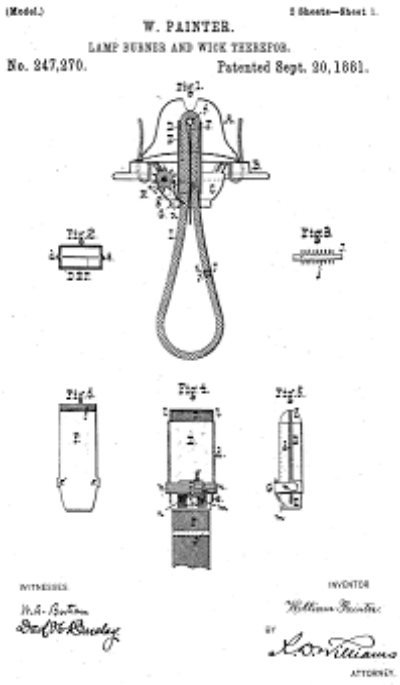
198,146


W. PAINTER.
Soldering-Tool.
No. 223,533. Patented Jan. 13, 1880.
Witnesses.
Inventor
WILLIAM PAINTER

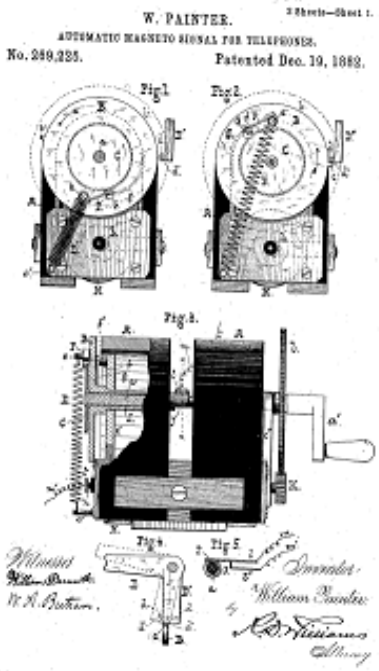
223,533


(No Model.)
W. PAINTER.
Marking Plug Tobacco.
No. 234,608. Patented Nov. 16, 1880.
Witnesses,
Inventor,
WILLIAM PAINTER

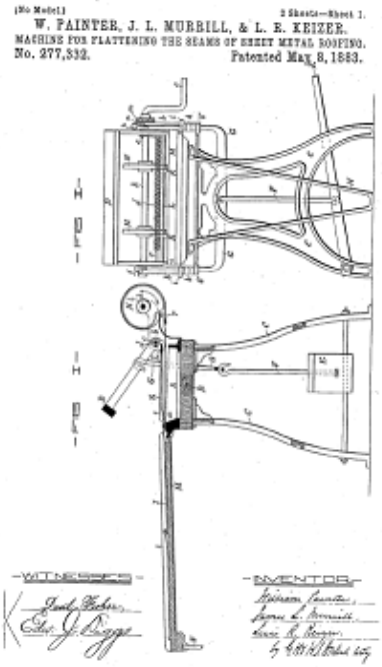
234,608


(Model.)
W. PAINTER.
LAMP BURNER AND WICK THEREFOR.
No. 247,270. Patented Sept. 20, 1881.

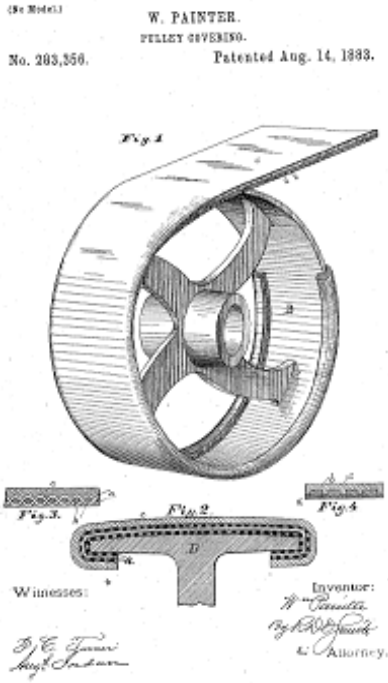
247,270


W. PAINTER.
AUTOMATIC MAGNETO SIGNAL FOR TELEPHONES.
No. 269,225. Patented Dec. 19, 1882.

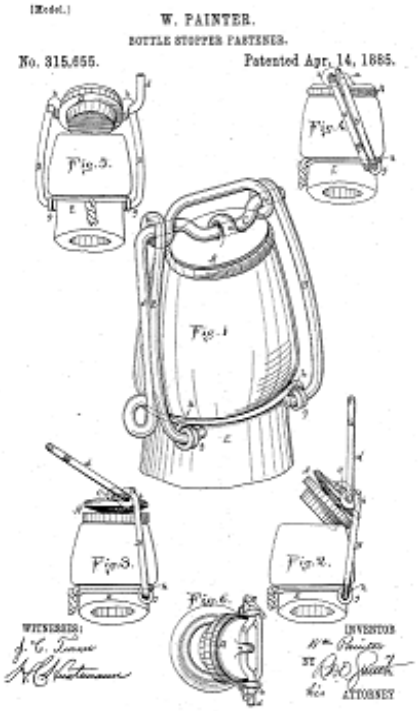
269,225


W. PAINTER, J. L. MURRILL, & L. R. KEIZER.
MACHINE FOR FLATTENING THE SEAMS OF SHEET METAL ROOFING.
No. 277,332. Patented May 8, 1883.

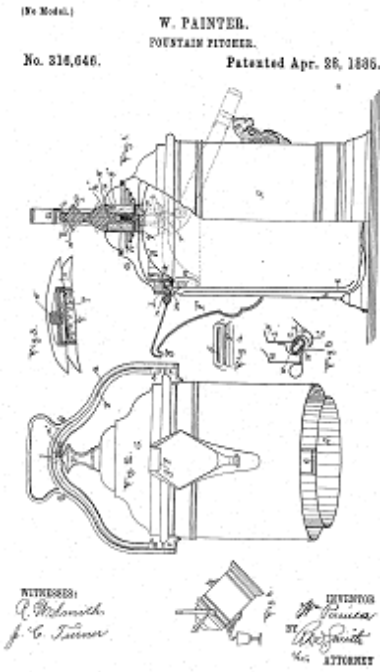
277,332


W. PAINTER.
PULLEY GOVERNOR.
No. 283,356. Patented Aug. 14, 1883.

283,356


W. PAINTER.
BOTTLE STOPPER FASTENER.
No. 315,655. Patented Apr. 14, 1885.

315,655



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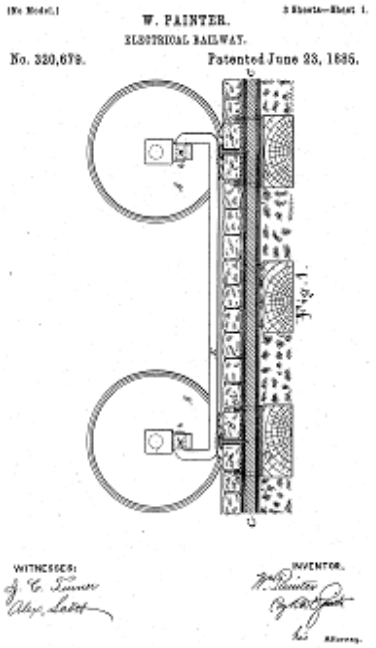

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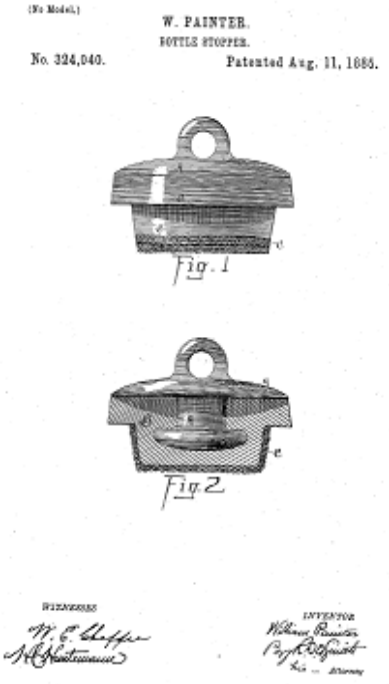

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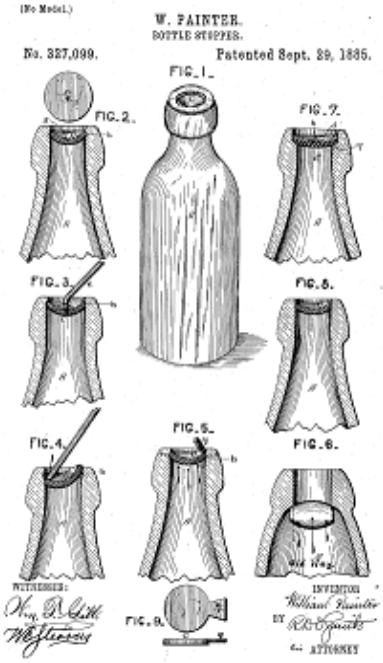

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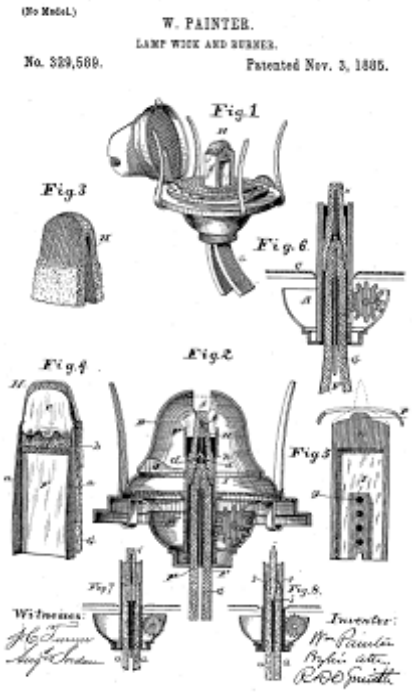

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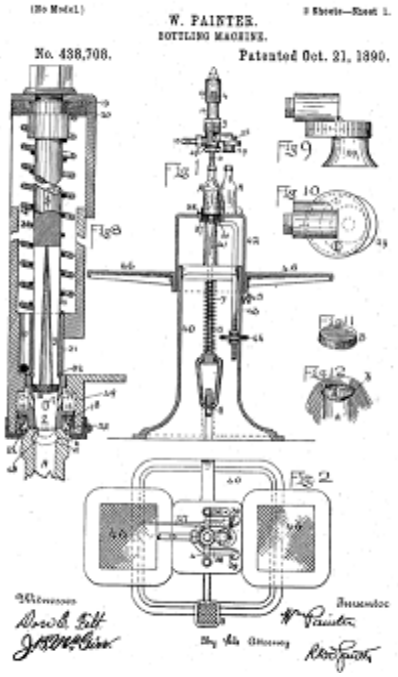

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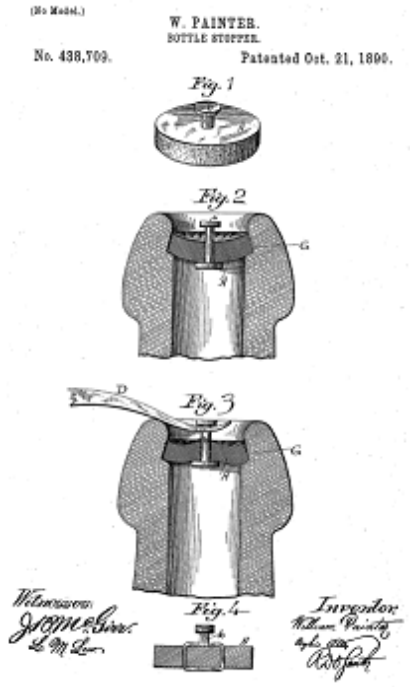

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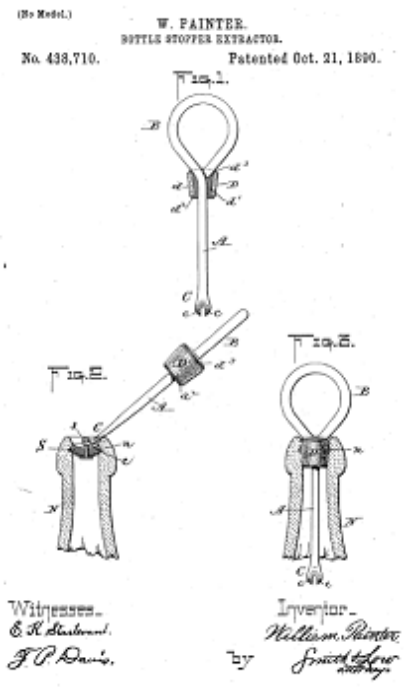

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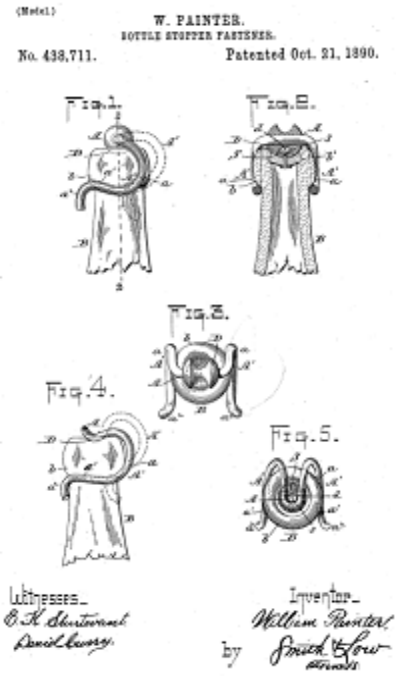

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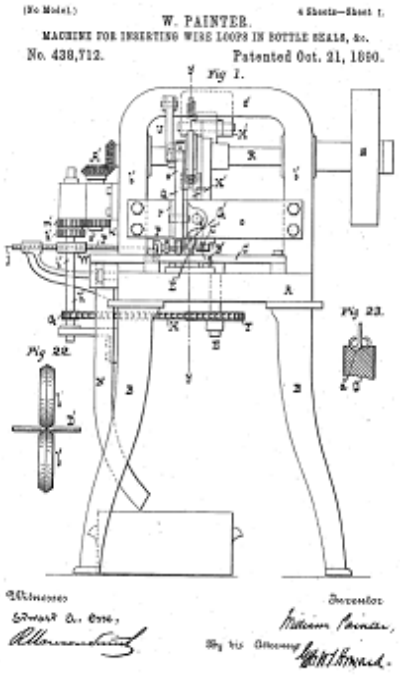

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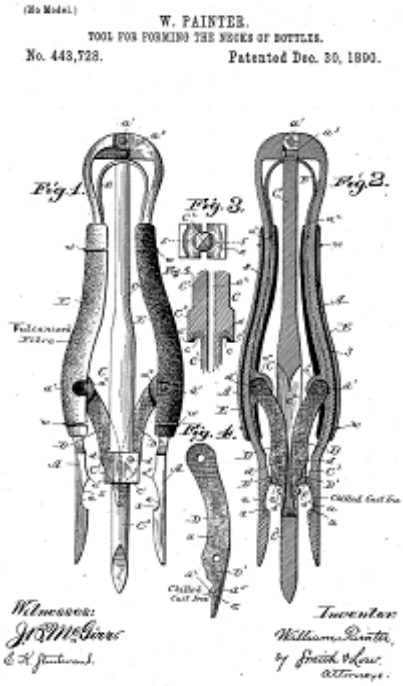

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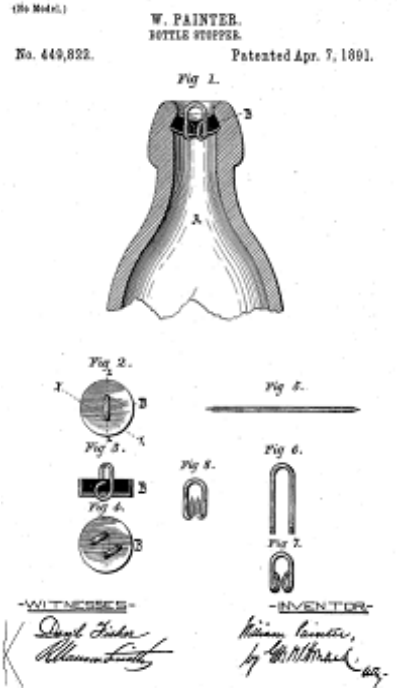

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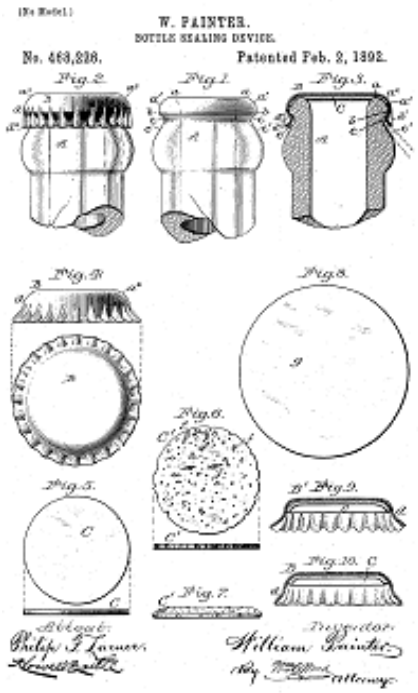

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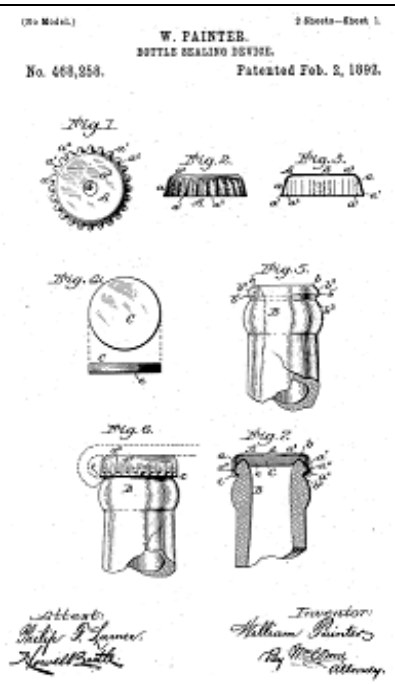

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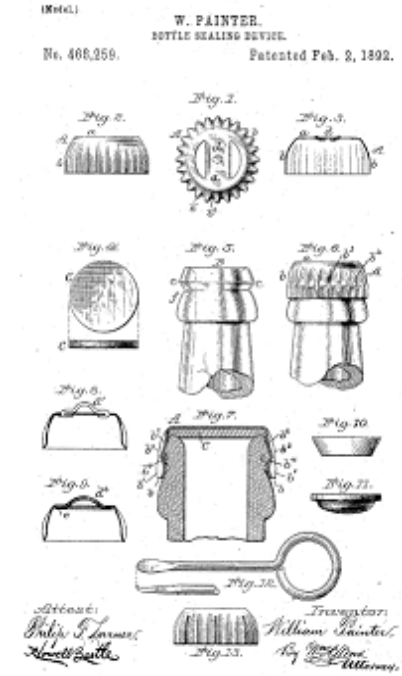

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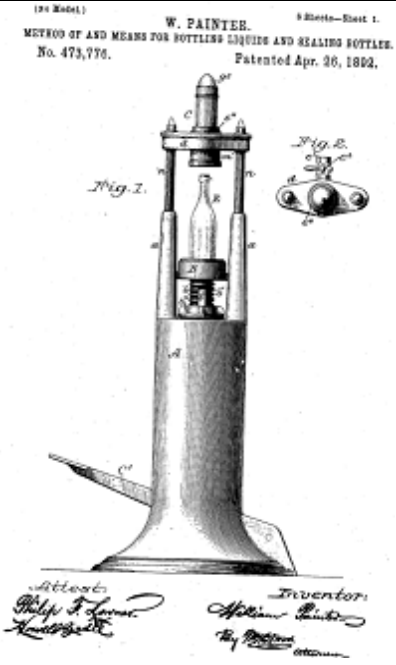

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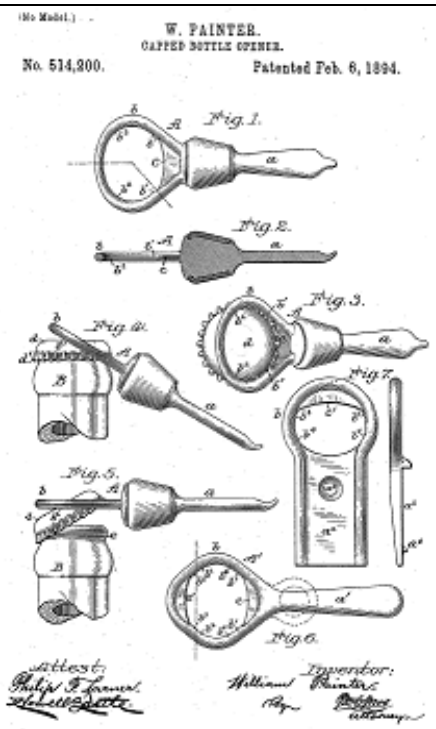
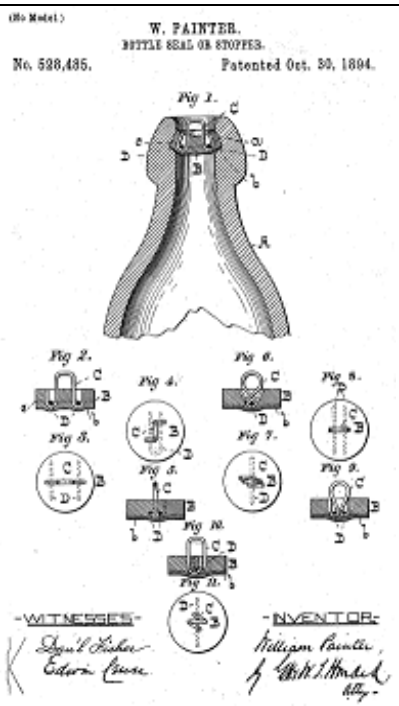

W. PAINTER.
CAPPED BOTTLE OPENER.
No. 514,200. Patented Feb. 6, 1894.
Fig. 1. Fig. 2. Fig. 3. Fig. 4. Fig. 5. Fig. 6. Fig. 7.
Witnesses: Philip F. Lemmel, H. Lee Sutro
Inventor: William Painter, by Attorney

514,200


W. PAINTER.
BOTTLE SEAL OR STOPPER.
No. 528,485. Patented Oct. 30, 1894.
Fig. 1. Fig. 2. Fig. 3. Fig. 4. Fig. 5. Fig. 6. Fig. 7. Fig. 8. Fig. 9. Fig. 10. Fig. 11.
-WITNESSES- Dan'l Fisher, Edwin Crowe
-INVENTOR- William Painter, by Attorney

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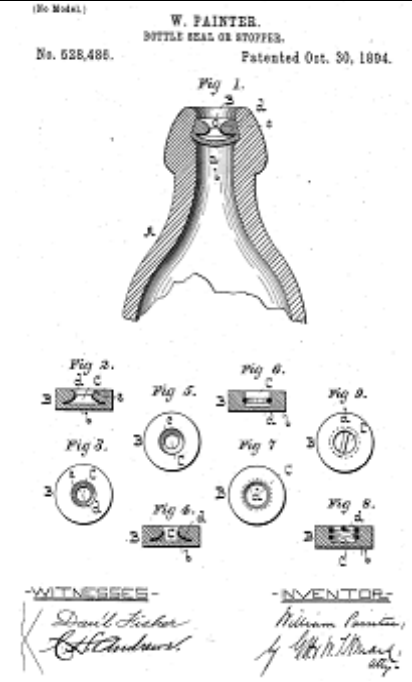
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-WITNESSES- Dan'l Fisher, Edwin Crowe
-INVENTOR- William Painter, by Attorney

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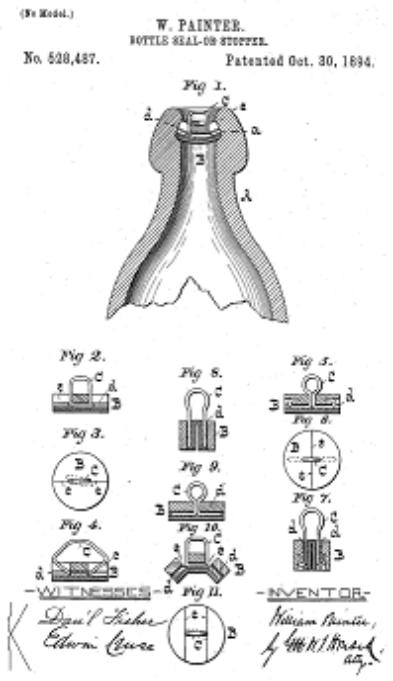
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-WITNESSES- Dan'l Fisher, Edwin Crowe
-INVENTOR- William Painter, by Attorney

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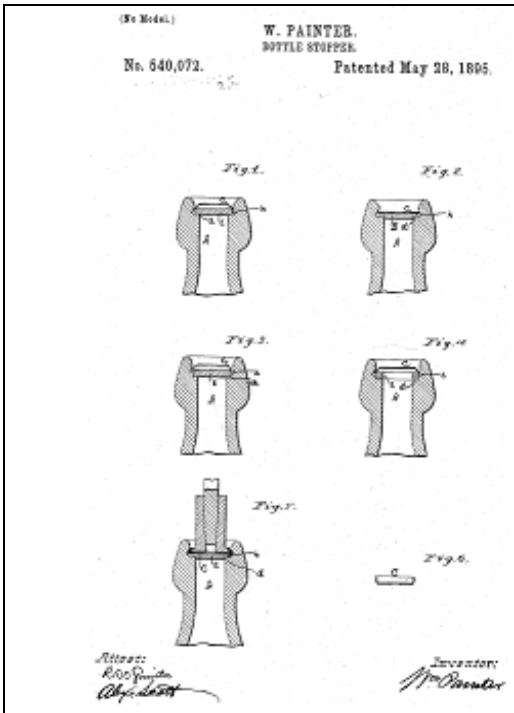

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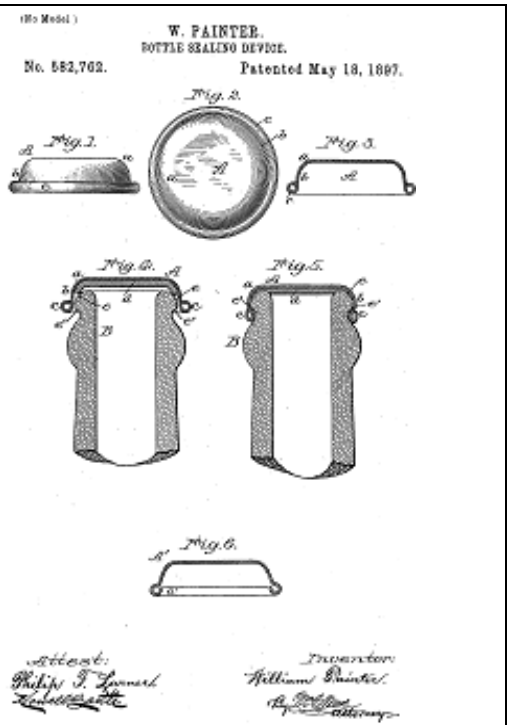

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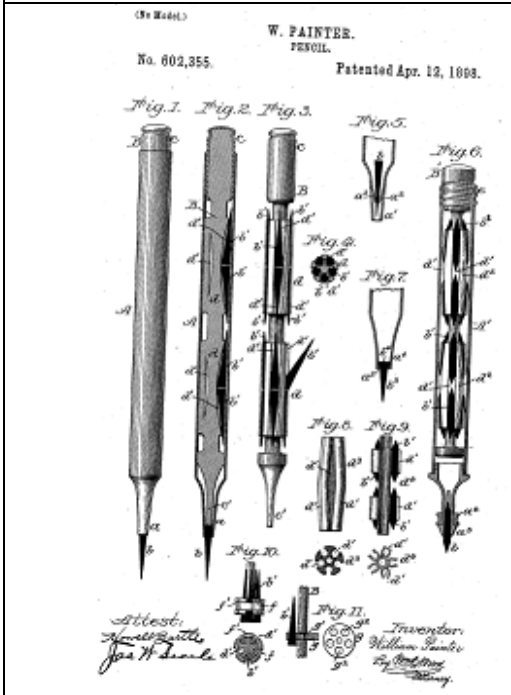

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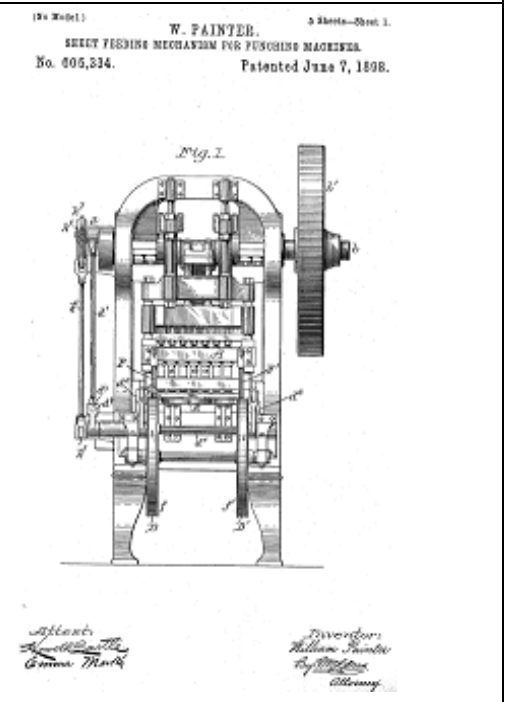

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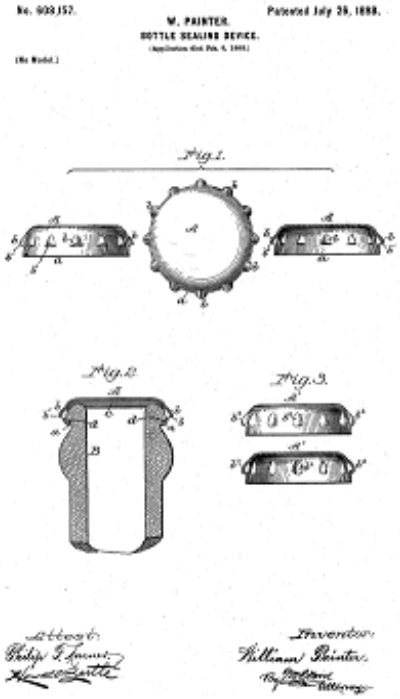

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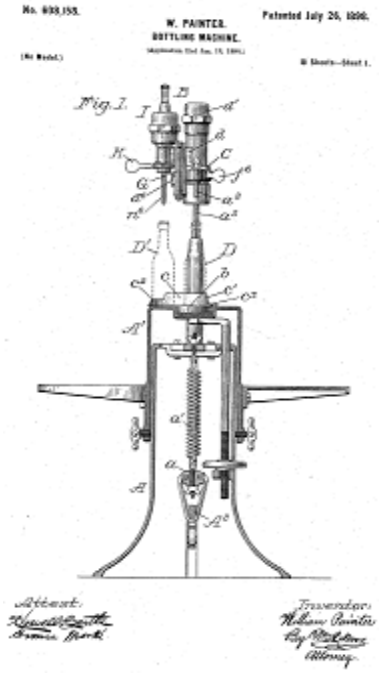

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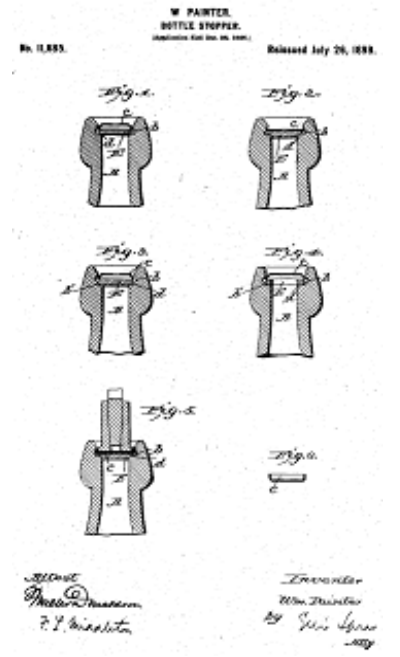

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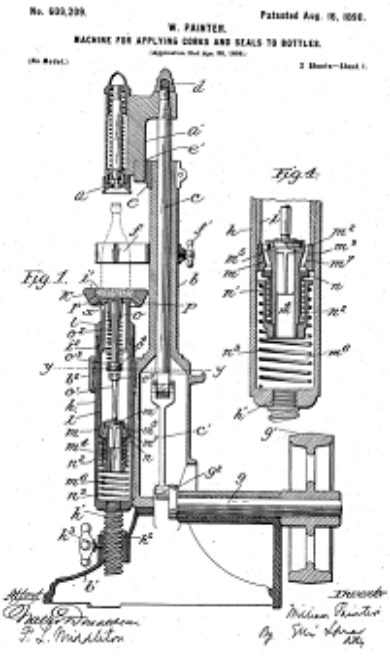

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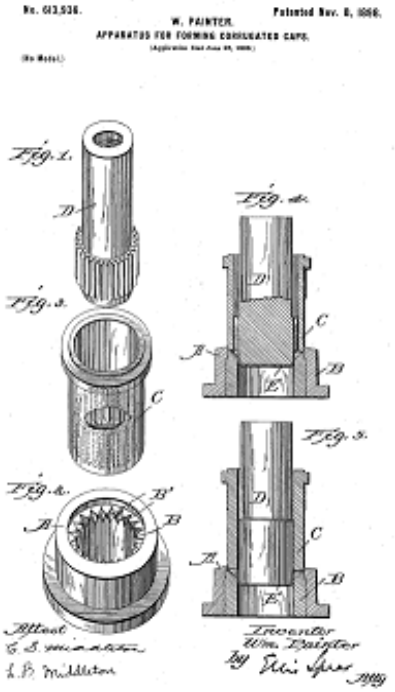

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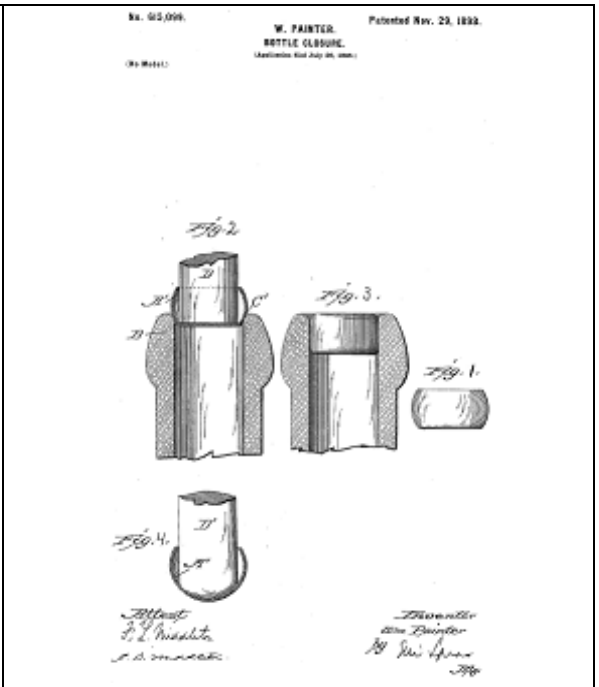


615,099

UNITED STATES PATENT OFFICE.

WILLIAM PAINTER, OF BALTIMORE, MARYLAND, ASSIGNOR TO THE CROWN CORK AND SEAL COMPANY, OF SAME PLACE.

GLUTEN COMPOUND.

SPECIFICATION forming part of Letters Patent No. 619,336, dated February 14, 1899.

Application filed January 18, 1898. Serial No. 667,037. (No specimens.)

To all whom it may concern:

Be it known that I, WILLIAM PAINTER, a citizen of the United States, residing at Baltimore, Maryland, have invented certain new and useful Improvements in Gluten Compounds, of which the following is a specification.

It is the object of my invention to produce a waterproofing compound particularly adapted to be used as a coating for fabrics in order to render the same practically waterproof.

My invention consists in a composition of matter including gluten and glycerin, the two ingredients being intimately stirred, as hereinafter necessary, to effect a complete solution of the gluten in the glycerin and their subsequent subjection to artificial heat.

In the production of gluten from wheat or other cereals the following properties of this substance are well known: First, as extracted in the wet state from substances containing it it is very tenacious and adhesive and in that state practically insoluble in water, and, second, in its wet plastic state it quickly ferments, loses its tenacious and adhesive qualities, and becomes partially soluble and valueless for any purpose requiring insolubility in water. If, however, it be subjected to a process of desiccation either at atmospheric or higher temperatures before fermentation begins, it loses all tendency to ferment, and if carried to absolute dryness becomes hardened into a translucent substance resembling horn and becomes incapable of being again brought to a plastic state by immersion in water. Its insolubility and the tenacious and adhesive qualities which it possesses in the plastic state render it a desirable substance for many uses in the arts, providing those qualities can be maintained in a product containing it.

I have found that not only does mere desiccation at ordinary temperatures up to a certain condition of dryness produce in it such a change as precludes, when brought into contact with water, its return to the plastic condition which it possesses as extracted from substances containing it, but that subjecting it to temperatures of from 200° Fahrenheit upward has the effect to indurate it and render it less permeable to watery liquids in proportion as the temperature employed is high, up to that at which carbonization or decomposition begins, and somewhat in proportion to the period for which a given temperature is maintained.

I have also found that in the drying of the gluten from the original wet state by manipulating it under temperatures of about 200° Fahrenheit before dissolving it in the glycerin, consequently the same indurating effect upon the gluten is produced as when subjected to heat after solution in fabrics, and for some purposes this method is employed.

I have found also that by combining gluten in the plastic state with glycerin and then subjecting it to the above-described desiccating or indurating processes I can first dispel the water which it contained in the wet plastic state and then more or less indurate it and render it less permeable to water, while retaining sufficient of the glycerin permanently combined therewith to impart its characteristic pliability or flexibility as may be essential to fabrics to which it may be applied or to compounds containing it.

In carrying out my invention in one application thereof I obtain the gluten in the wet plastic state which it assumes in extracting it from the cereal substance containing it and dissolve it in glycerin either before or after partial desiccation in the proportion of about one part of gluten to one and a half parts of glycerin, by weight. These proportions give the solution a viscous consistency, in which condition it is applied to various fabrics as a coating or made to permeate the interstices in certain kinds of fabric. The fabrics are then subjected to a temperature of about 200° Fahrenheit unless the gluten has been subjected to higher than atmospheric temperatures before solution, either of which treatments first dispels all the water contained in the gluten or in the compound and indurates it, and effects that change in the gluten which intensifies its subsequent repellent action upon water. The latter process, if continued at a sufficiently high temperature and for a sufficient time, would ultimately expel all the glycerin also, leaving the gluten friable and unsuited to fabrics which require to be flexible. I therefore arrest that process at a point which leaves sufficient of the glycerin in permanent combination with the gluten to give to the fabrics the pliability or flexibility required, and the retention of sufficient glycerin for this purpose does not detract from its waterproof quality.

I am aware that prior to my invention the adhesive nature of gluten has been known, and it has been proposed for this reason as a substitute for gelatin, animal glue, and other similar substances; but so far as I am aware it has never been used in connection with glycerin so as to form by being dissolved therein a mixture adapted to be applied to fabrics in a fluid or semifluid condition to render the same waterproof without requiring an additional coating of an astringent nature, as heretofore has been found necessary where the use of the gluten has been proposed as simply the equivalent of other adhesive substances.

What I claim is—

1. A composition of matter consisting of gluten in solution in glycerin.

2. The method herein described consisting in dissolving gluten in a plastic state in glycerin, applying the solution to fabrics and finally subjecting said fabrics to artificial heat, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

WILLIAM PAINTER.

Witnesses:
JOHN T. HAWKINS,
W. H. WHEELER.

619,336

UNITED STATES PATENT OFFICE.

WILLIAM PAINTER, OF BALTIMORE, MARYLAND, ASSIGNOR TO THE CROWN CORK AND SEAL COMPANY, OF SAME PLACE.

GLUTEN COMPOUND.

SPECIFICATION forming part of Letters Patent No. 619,337, dated February 14, 1899.

Application filed January 18, 1898. Serial No. 667,038. (No specimens.)

To all whom it may concern:

Be it known that I, WILLIAM PAINTER, a citizen of the United States, residing at Baltimore, Maryland, have invented certain new and useful Improvements in Gluten Compounds, of which the following is a specification.

It is the object of my invention to produce a compound adapted to be used for purposes similar to those for which hard rubber, ebonite, celluloid, indurated fiber, and similar compounds are now used.

My improved compound consists of gluten and ground slate or pulverized cork or other granular, granular, fibro-granular, or fibrous substances—such as the bran of wheat, asbestos, ground leather, wood-pulp, lampblack, ground straw, sulfur, or asphaltum—and any suitable coloring-matter may be added as may be found desirable.

In the production of gluten from wheat or other cereals the following properties of this substance are well known: First, as extracted in the wet state from substances containing it it is very tenacious and adhesive and in that state practically insoluble in water, and, second, in its wet plastic state it quickly ferments, loses its tenacious and adhesive qualities, and becomes partially soluble and valueless for any purpose requiring insolubility in water. If, however, it be subjected to a process of desiccation either at atmospheric or higher temperatures before fermentation begins, it loses all tendency to ferment, and if carried to absolute dryness becomes hardened into a translucent substance resembling horn and becomes incapable of being again brought to a plastic state by immersion in water. Its insolubility and the tenacious and adhesive qualities which it possesses in the plastic state render it a desirable substance for many uses in the arts, providing those qualities can be maintained in a product containing it.

I have found that not only does mere desiccation at ordinary temperatures up to a certain condition of dryness produces in it such a change as precludes, when brought into contact with water, its return to the plastic condition which it possesses as extracted from substances containing it, but that subjecting it to temperatures of from 200° Fahrenheit upward has the effect to indurate it and render it less permeable to watery liquids in proportion as the temperatures employed is high, up to that at which carbonization or decomposition begins, and somewhat in proportion to the period for which a given temperature is maintained.

I have also found that in drying the gluten from the original wet state by manipulating it under temperatures of about 200° Fahrenheit before incorporating with it the body material or during that process necessarily the same indurating effect upon the gluten is produced as when subjected to heat after incorporation, and for some purposes this method is employed.

As an example of one application of the invention I incorporate gluten in the plastic state with ground or pulverized cork in the proportion by weight of about two of gluten and one of cork. When thoroughly incorporated, I roll or mold it into the desired form and subject it for about ten hours to a temperature of about 350° Fahrenheit or similarly subject the gluten before so doing incorporation to similar temperatures, or both processes may be carried out, as may best suit the desired qualities in the product. The product may then be sawed, cut, or worked into any further form desired for various purposes. It may also be molded into the finished form before subjecting it to the artificial heat. For some purposes requiring a softer or more pliable product I find it advantageous to treat it after baking by soaking it in melted wax, paraffin, cereals, or other similar substances.

What I claim is—

1. A compound of gluten and a granular or pulverized body material, substantially as described.

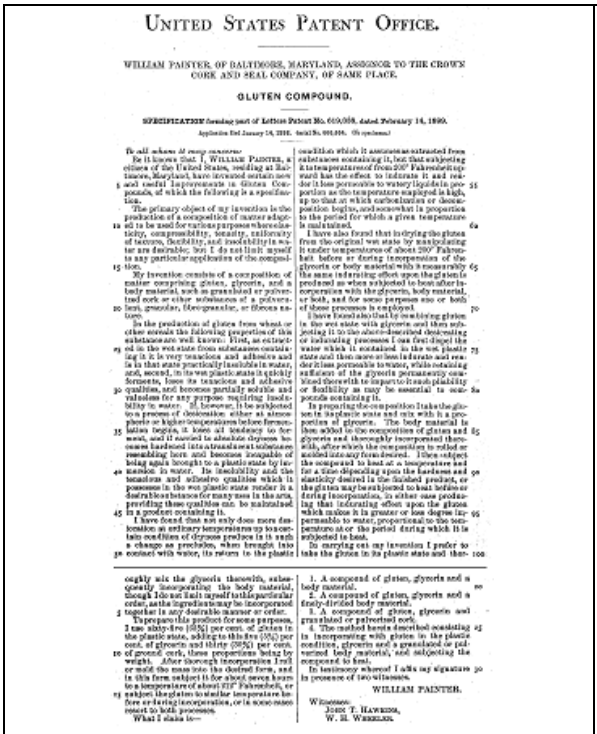
2. The method herein described, consisting in incorporating with gluten in the plastic condition, a granular, pulverized, fibro-granular or fibrous material, rolling or molding the compound into form and subjecting the material to heat, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

WILLIAM PAINTER.

Witnesses:
JOHN T. HAWKINS,
W. H. WHEELER.

619,337



UNITED STATES PATENT OFFICE.

WILLIAM PAINTER, OF BALTIMORE, MARYLAND, ASSIGNOR TO THE CROWN CORK AND SEAL COMPANY, OF SAME PLACE.

GLUTEN COMPOUND.

SPECIFICATION forming part of Letters Patent No. 619,338, dated February 14, 1899.

Application filed January 18, 1898. Serial No. 667,016. (No specimens.)

To all whom it may concern:

Be it known that I, WILLIAM PAINTER, a citizen of the United States, residing at Baltimore, Maryland, have invented certain new and useful Improvements in Gluten Compounds, of which the following is a specification.

The primary object of my invention is the production of a composition of matter adapted to be used for various purposes where elasticity, compressibility, tenacity, uniformity of texture, flexibility, and insolubility in water are desirable; but I do not limit myself to any particular applicability of the compound.

My invention consists of a composition of matter comprising gluten, glycerin, and a body material, such as granulated or pulverized cork or other substances of a pulverulent, granular, fiber-granular, or fibrous nature.

In the production of gluten from wheat or other cereals the following properties of the substances are well known: First, as extracted in the wet state from substances containing it it is very tenacious and adhesive and is in that state practically insoluble in water, and, second, in its wet plastic state it quickly ferments, loses its tenacious and adhesive qualities, and becomes partially soluble and valueless for any purpose requiring insolubility in water. If, however, it be subjected to a process of desiccation either at atmospheric or higher temperatures before fermentation begins, it loses all tendency to ferment, and if carried to absolute dryness becomes hardened into a translucent substance resembling horn and becomes incapable of being again brought to a plastic state by immersion in water. Its insolubility and the tenacious and adhesive qualities which it possesses in the wet plastic state render it a desirable substance for many uses in the arts, providing those qualities can be maintained in a product containing it.

I have found that not only does mere desiccation at ordinary temperatures up to certain conditions of dryness produce in it such a change as precludes, when brought into contact with water, its return to the plastic condition which it sustains as extracted from substances containing it, but that subjecting it to temperatures of from 200° Fahrenheit upward has the effect to indurate it and render it less permeable to watery liquids in proportion as the temperature employed is high, up to that at which carbonization or decomposition begins, and somewhat in proportion to the period for which a given temperature is maintained.

I have also found that in drying the gluten from the original wet state by manipulating it under temperatures of about 200° Fahrenheit before or during incorporation of the glycerin or body material with it reasonably the same indurating effect upon the gluten is produced as when subjected to heat after incorporation with the glycerin, body material, or both, and for some purposes one or both of these processes is employed.

I have found also that by combining gluten in the wet state with glycerin and then subjecting it to the above-described desiccating or indurating processes I can feel-dispel the water which it contained in the wet plastic state and then more or less indurate and render it less permeable to water, while retaining sufficient of the glycerin permanently combined therewith to impart to it such plasticity or flexibility as may be essential to make the compounds containing it.

In preparing the composition I take the gluten in its plastic state and mix with it a proportion of glycerin. The body material is then added to the composition of gluten and glycerin and thoroughly incorporated therewith, after which the composition is rolled or molded into any form desired. I then subject the compound to heat at a temperature and for a time depending upon the hardness and elasticity desired in the finished product, or the gluten may be subjected to heat before or during incorporation, in either case producing that indurating effect upon the gluten which makes it in greater or less degree impermeable to water, proportional to the temperature or the period during which it is subjected to heat.

In carrying out my invention I prefer to take the gluten in its plastic state and thoroughly mix the glycerin therewith, subsequently incorporating the body material, though I do not limit myself to this particular order, as the ingredients may be incorporated together in any desirable manner or order.

To prepare this product for some purposes, I use sixty-five (65%) per cent. of gluten in the plastic state, adding to this five (5%) per cent. of glycerin and thirty (30%) per cent. of ground cork, these proportions being by weight. After thorough incorporation I roll or mold the mass into the desired form, and in this form subject it for about seven hours to a temperature of about 212° Fahrenheit, or subject the gluten to similar temperature before ordering incorporation, or in some cases resort to both processes.

What I claim is—

1. A compound of gluten, glycerin and a body material.

2. A compound of gluten, glycerin and a finely-divided body material.

3. A compound of gluten, glycerin and granulated or pulverized cork.

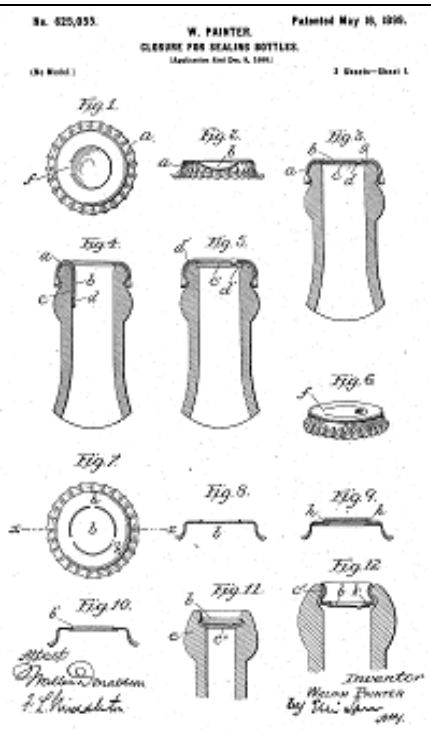
4. The method herein described consisting in incorporating with gluten in the plastic condition, glycerin and a granulated or pulverized body material, and subjecting the compound to heat.

In testimony whereof I affix my signature in presence of two witnesses.

WILLIAM PAINTER.

Witnesses:
JOHN T. HAWKINS,
W. H. WHEELER.

619,338



No. 625,055. Patented May 16, 1899.

W. PAINTER.

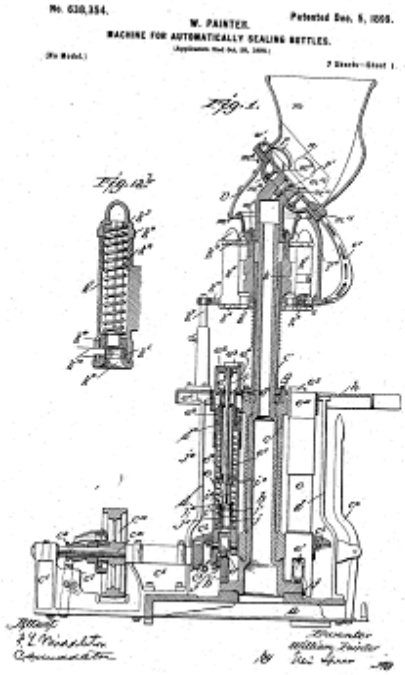
CLOSURE FOR SEALING BOTTLES.

(No Model.) 3 Sheets—Sheet 1.

Fig. 1. Fig. 2. Fig. 3. Fig. 4. Fig. 5. Fig. 6. Fig. 7. Fig. 8. Fig. 9. Fig. 10. Fig. 11. Fig. 12.

Witnesses: Inventor: William Painter by Wm. Spear Atty.

625,055



No. 638,354. Patented Dec. 5, 1899.

W. PAINTER.

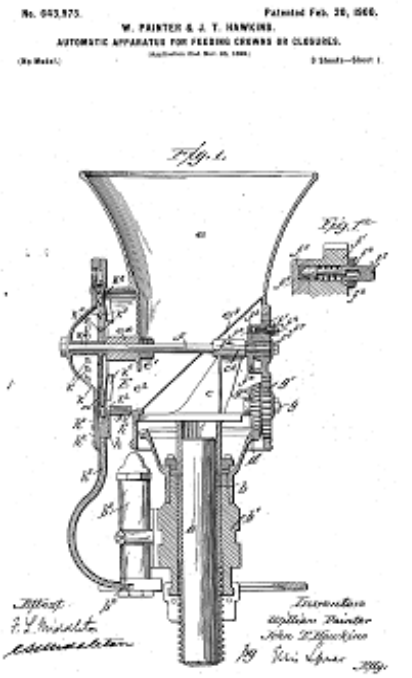
MACHINE FOR AUTOMATICALLY SEALING BOTTLES.

(No Model.) 7 Sheets—Sheet 1.

Fig. 1. Fig. 12.

Witnesses: Inventor: William Painter by Wm. Spear Atty.

638,354



No. 643,973. Patented Feb. 20, 1900.

W. PAINTER & J. T. HAWKINS.

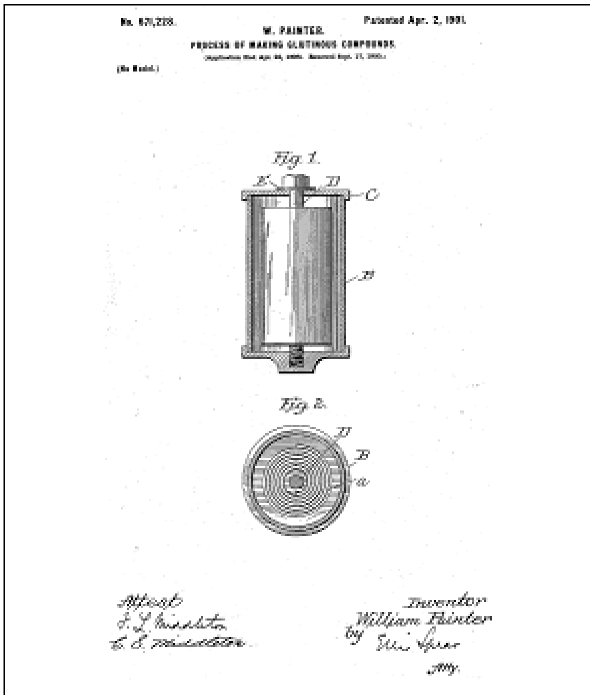
AUTOMATIC APPARATUS FOR FEEDING CROWNS OR CLOSURES.

(No Model.) 3 Sheets—Sheet 1.

Fig. 1. Fig. 7.

Witnesses: Inventors: William Painter John T. Hawkins by Wm. Spear Atty.

643,973



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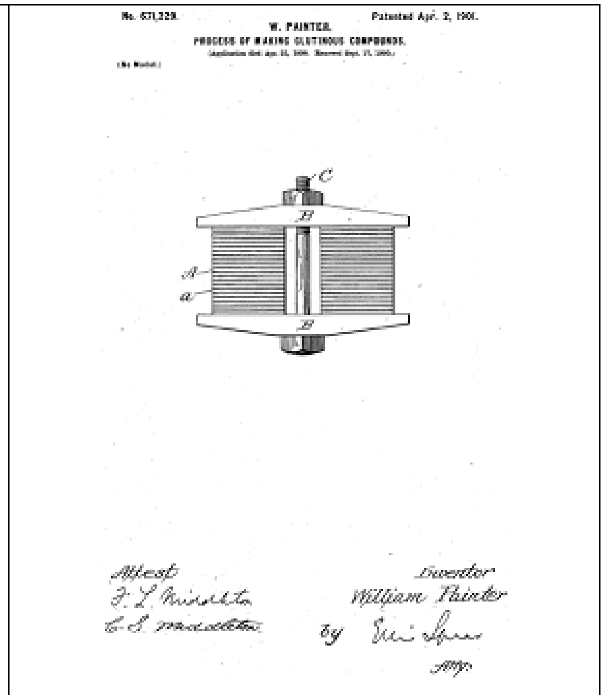

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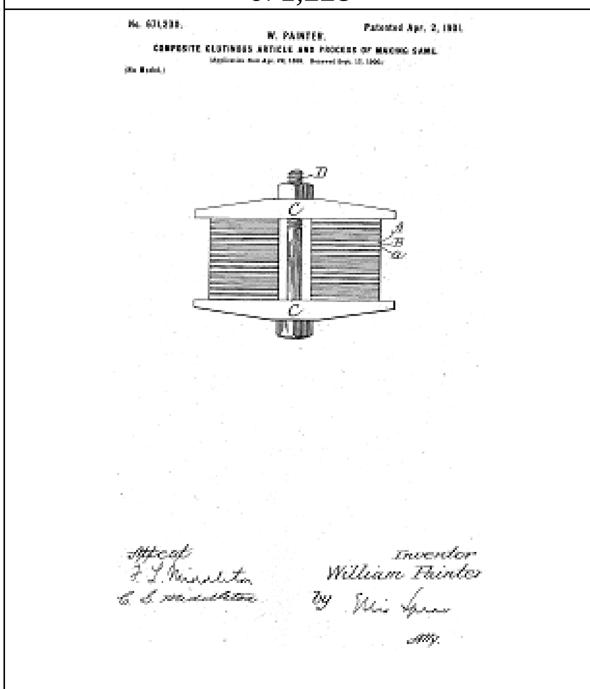

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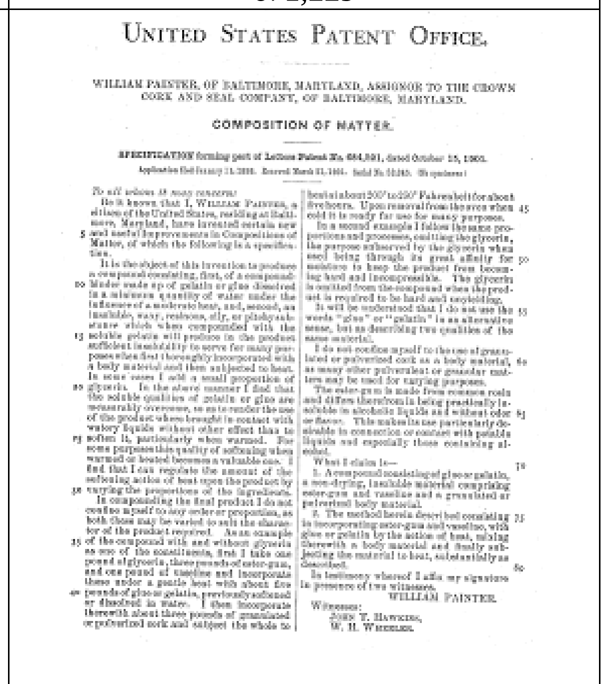


UNITED STATES PATENT OFFICE.

WILLIAM PAINTER, OF BALTIMORE, MARYLAND, ASSIGNOR TO THE CROWN CORK AND SEAL COMPANY, OF BALTIMORE, MARYLAND.

COMPOSITION OF MATTER.

SPECIFICATION forming part of Letters Patent No. 684,521, dated October 15, 1901.

Application filed January 11, 1900. Renewed March 21, 1901. Serial No. 52,243. (No specimens.)

To all whom it may concern:

Be it known that I, WILLIAM PAINTER, a citizen of the United States, residing at Baltimore, Maryland, have invented certain new and useful Improvements in Compositions of Matter, of which the following is a specification.

It is the object of this invention to produce a compound consisting, first, of a compound binder made up of gelatin or glue dissolved in a minimum quantity of water under the influence of a moderate heat, and, second, an insoluble, waxy, resinous, oily, or pitchy substance which when compounded with the soluble gelatin will produce in the product sufficient insolubility to serve for many purposes when first thoroughly incorporated with a body material and then subjected to heat. In some cases I add a small proportion of glycerin. In the above manner I find that the soluble qualities of gelatin or glue are measurably overcome, so as to render the use of the product when brought in contact with watery liquids without other effect than to soften it, particularly when warmed. For some purposes this quality of softening when warmed or heated becomes a valuable one. I find that I can regulate the amount of the softening action of heat upon the product by varying the proportions of the ingredients.

In compounding the final product I do not confine myself to any order or proportion, as both these may be varied to suit the character of the product required. As an example of the compound with and without glycerin as one of the constituents, first I take one pound of glycerin, three pounds of ester-gum, and one pound of vaseline and incorporate these under a gentle heat with about five pounds of glue or gelatin, previously softened or dissolved in water. I then incorporate therewith about three pounds of granulated or pulverized cork and subject the whole to heat at about 200° to 250° Fahrenheit for about five hours. Upon removal from the oven when cold it is ready for use for many purposes.

In a second example I follow the same proportions and processes, omitting the glycerin, the purpose subserved by the glycerin when used being through its great affinity for moisture to keep the product from becoming hard and incompressible. The glycerin is omitted from the compound when the product is required to be hard and unyielding.

It will be understood that I do not use the words "glue" or "gelatin" in an alternative sense, but as describing two qualities of the same material.

I do not confine myself to the use of granulated or pulverized cork as a body material, as many other pulverulent or granular matters may be used for varying purposes.

The ester-gum is made from common rosin and differs therefrom in being practically insoluble in alcoholic liquids and without odor or flavor. This makes its use particularly desirable in connection or contact with potable liquids and especially those containing alcohol.

What I claim is—

1. A compound consisting of glue or gelatin, a non-drying, insoluble material comprising ester-gum and vaseline and a granulated or pulverized body material.

2. The method herein described consisting in incorporating ester-gum and vaseline, with glue or gelatin by the action of heat, mixing therewith a body material and finally subjecting the material to heat, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

WILLIAM PAINTER.

Witnesses:
JOHN T. HAWKINS,
W. H. WHEELER.

684,521

UNITED STATES PATENT OFFICE.

WILLIAM PAINTER, OF BALTIMORE, MARYLAND, ASSIGNOR TO THE CROWN CORK AND SEAL COMPANY, OF BALTIMORE, MARYLAND.

GLUTEN COMPOUND.

SPECIFICATION forming part of Letters Patent No. 684,522, dated October 15, 1901.

Application filed February 20, 1899. Renewed March 21, 1901. Serial No. 51,545. (No specimens.)

To all whom it may concern:

Be it known that I, WILLIAM PAINTER, a citizen of the United States, residing at Baltimore, Maryland, have invented certain new and useful Improvements in Gluten Compounds, of which the following is a specification.

In a specification filed by me on the 9th of October, 1899, Serial No. 692,939, I have described and claimed a process of preparing a compound consisting of gluten, glycerin, and a body material, so as to cause the glycerin to so thoroughly permeate the granules of the body material as to prevent the glycerin from being dissolved out of the compound when a long-continued contact with watery liquids is had. The subject-matter of the case referred to relates to the process, while in the present case the compound is claimed. As stated in my former application, I aim to counteract the tendency of glycerin to dissolve out of the compound, and to this end instead of merely incorporating the glycerin with the gluten or with the body material, as described in an application filed by me January 14, 1898, Serial No. 666,954, I first mix the body material in a hot weak solution of glycerin in water, then evaporate it to dryness at a temperature below that at which glycerin vaporizes, then coming the glycerin the more completely to permeate the granules of said body material. I have found that in the more subtle incorporation of certain proportions of glycerin and a body material generally or of glycerin with gluten and these with a body material the glycerin in many cases does not to any extent permeate the granules of body material, but if these granules are subjected to a hot weak solution of glycerin in water the permeating action of the hot water carries with it mechanically the small proportion of glycerin required, and as the water vaporizes at a much lower temperature than glycerin it may afterward be eliminated by evaporation, leaving the glycerin as thoroughly permeating the granules of body material. I then add under a gentle heat and thoroughly incorporate with the gluten and the glycerin-permeated body material a melted compound of some suitable resinous or pitchy and an oily, fatty, or waxy substance, the proportions of which will largely determine the final hardness of the product, while being insoluble in watery liquids. The effect of this compound is first, to thoroughly permeate the granules of body material with glycerin, and then by the thorough incorporation of the melted mixture of resin or pitch and fat or wax with the plastic gluten envelop these granules of body material with an insoluble protecting film which prevents the dissolving out of the glycerin when the compound is brought into prolonged contact with watery liquids. For some purposes it is indispensable that the compound shall contain no ingredient having any perceptible odor or flavor, so that it may not impart such odor or flavor to liquids with which it may come in contact. In such cases, while any resinous or pitchy substance combined or melted with any oleaginous or waxy matter will subserve the purposes of protecting the glycerin in the body material from being dissolved out and will aid in producing the required softness in the compound, I prefer to use for the resinous ingredient the inert neutral resin manufactured from ordinary resin, known in the arts as "ester-gum," and for the oleaginous or waxy material vaseline, paraffin, mineral wax, or stearic acid, all of which are practically tasteless and odorless. When odor or flavor is of no consequence, I may use for the resinous or pitchy material ordinary resin, pitch, or asphaltum.

As an example of the compound, first I subject three pounds of granulated or pulverized cork to treatment in a hot solution of glycerin in water in the proportion of one pound of glycerin to ten of water for about thirty minutes, then evaporate the cork to dryness under a temperature of about 200° Fahrenheit. I then melt three pounds of ester-gum with one pound of vaseline. I then incorporate these two mixtures under gentle heat with about five pounds of gluten in the plastic state. After incorporation I roll or mold the product into the desired form and subject the whole to heat at about 200° to 250° Fahrenheit for several hours. Upon removal from the oven when cold it is ready for use.

In a second instance, taking the same proportions of all the ingredients, I first incorporate the glycerin with the gluten, then add the melted compound of ester-gum and vaseline, and finally incorporate the engineered granulated cork. In a third instance, with the same proportions, I first incorporate the glycerin with the melted compound of ester-gum and vaseline, then incorporate therewith the gluten, and finally incorporate with the whole the engineered granulated cork.

I claim—

1. A compound consisting of glycerin, gluten, a non-drying insoluble softening material and a body material.

2. A compound consisting of gluten, a glycerined body material and a non-drying insoluble softening material, substantially as described.

3. The herein-described process, consisting in mixing together gluten, a body material and a non-drying insoluble softening material, one of such materials being first intimately mixed with glycerin, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

WILLIAM PAINTER.

Witnesses:
JOHN T. HAWKINS,
W. H. WHEELER.

684,522

UNITED STATES PATENT OFFICE.

WILLIAM PAINTER, OF BALTIMORE, MARYLAND, ASSIGNOR TO THE CROWN CORK AND SEAL CO., OF BALTIMORE, MARYLAND.

GLUTEN COMPOUND.

SPECIFICATION forming part of Letters Patent No. 684,523, dated October 15, 1901.

Application filed February 20, 1899. Renewed March 21, 1901. Serial No. 51,547. (No specimens.)

To all whom it may concern:

Be it known that I, WILLIAM PAINTER, a citizen of the United States, residing at Baltimore, Maryland, have invented certain new and useful Improvements in Gluten Compounds, of which the following is a specification.

In an application filed by me January 31, 1899, and Serial No. 703,954, I have described a compound consisting of gluten, glycerin, and a body material and a process of preparing said compound. In the application of this compound to certain of the purposes for which it is designed I have found that where long-continued contact with watery liquids is had the great affinity of glycerin for water results to some extent in its being dissolved out of the compound. In an application filed by me on the 9th of October, 1899, Serial No. 692,939, I have described a process designed to counteract this tendency of the glycerin to dissolve out of the compound; but I have also discovered that in some cases or for some purposes the glycerin may be omitted, and instead of it an insoluble non-drying softening agent may be used. To this end I mix together the gluten and body material, and then under gentle heat add a melted compound of some suitable resinous or pitchy and an oily, fatty, or waxy substance, the proportions of which will largely determine the final hardness of the product, which will also be insoluble in watery liquids. For some purposes it is indispensable that the compound shall contain no ingredient having any perceptible odor or flavor, so that it may not impart such odor or flavor to liquids with which it may come in contact. In such cases I prefer to use for the resinous ingredient the inert neutral resin manufactured from ordinary resin, known in the arts as "ester-gum," and for the oleaginous or waxy material vaseline, paraffin, mineral wax, or stearic acid may be used, all of which are practically tasteless and odorless. When odor or flavor is of no consequence, I may use for the resinous or pitchy material ordinary resin, pitch, or asphaltum.

As I have stated above, I have found that for many purposes the addition of the resinous or pitchy and fatty or waxy materials imparts sufficient final softness to the compound, and in such cases I omit glycerin. As an example of the compound, I take three pounds of granulated or pulverized cork and incorporate therewith five pounds of gluten in the plastic state, adding three pounds of ester-gum with one pound of vaseline, melted together, making the final mixture under a gentle heat. After incorporating I roll or mold the product into the desired form and subject the whole to heat at about 200° to 250° Fahrenheit for several hours. Upon removal from the oven when cold it is ready for use.

What I claim is—

1. A compound consisting of gluten, a body material and a non-drying insoluble softening material.

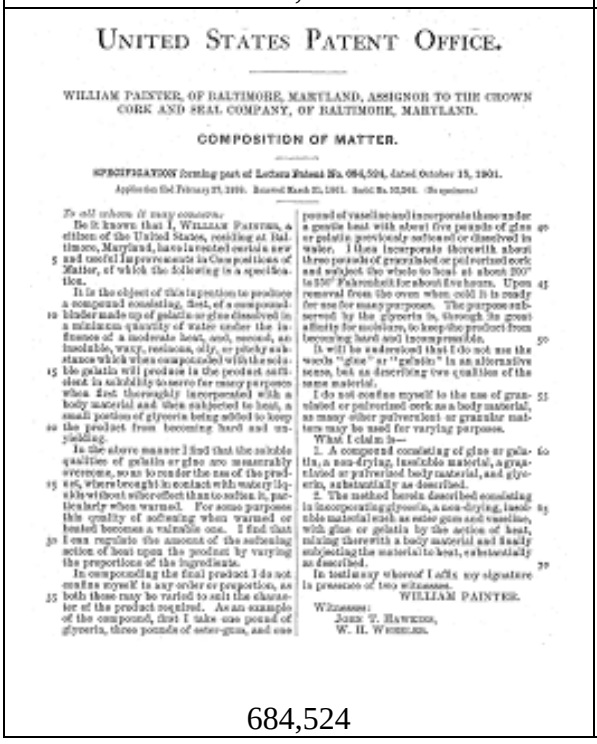
2. A compound consisting of gluten, a body material and a non-drying insoluble softening material comprising a mixture of resinous and fatty matter, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

WILLIAM PAINTER.

Witnesses:
JOHN T. HAWKINS,
W. H. WHEELER.

684,523



UNITED STATES PATENT OFFICE.

WILLIAM PAINTER, OF BALTIMORE, MARYLAND, ASSIGNOR TO THE CROWN CORK AND SEAL COMPANY, OF BALTIMORE, MARYLAND.

COMPOSITION OF MATTER.

SPECIFICATION forming part of Letters Patent No. 684,524, dated October 15, 1901.

Application filed February 27, 1899. Renewed March 21, 1901. Serial No. 51,546. (No specimens.)

To all whom it may concern:

Be it known that I, WILLIAM PAINTER, a citizen of the United States, residing at Baltimore, Maryland, have invented certain new and useful Improvements in Compositions of Matter, of which the following is a specification.

It is the object of this invention to produce a compound consisting, first, of a compound-binder made up of gelatin or glue dissolved in a minimum quantity of water under the influence of a moderate heat, and, second, an insoluble, waxy, resinous, oily, or pitchy substance which when compounded with the soluble gelatin will produce in the product sufficient insolubility to serve for many purposes when first thoroughly incorporated with a body material and then subjected to heat, a small portion of glycerin being added to keep the product from becoming hard and unyielding.

In the above manner I find that the soluble qualities of gelatin or glue are measurably overcome, so as to render the use of the product, where brought in contact with watery liquids without other effect than to soften it, particularly when warmed. For some purposes this quality of softening when warmed or heated becomes a valuable one. I find that I can regulate the amount of the softening action of heat upon the product by varying the proportions of the ingredients.

In compounding the final product I do not confine myself to any order or proportion, as both these may be varied to suit the character of the product required. As an example of the compound, first I take one pound of glycerin, three pounds of ester-gum, and one pound of vaseline and incorporate these under a gentle heat with about five pounds of glue or gelatin previously softened or dissolved in water. I then incorporate therewith about three pounds of granulated or pulverized cork and subject the whole to heat at about 200° to 250° Fahrenheit for about five hours. Upon removal from the oven when cold it is ready for use for many purposes. The purpose subserved by the glycerin is, through its great affinity for moisture, to keep the product from becoming hard and incompressible.

It will be understood that I do not use the words "glue" or "gelatin" in an alternative sense, but as describing two qualities of the same material.

I do not confine myself to the use of granulated or pulverized cork as a body material, as many other pulverulent or granular matters may be used for varying purposes.

What I claim is—

1. A compound consisting of glue or gelatin, a non-drying, insoluble material, agglutinated or pulverized body material, and glycerin, substantially as described.

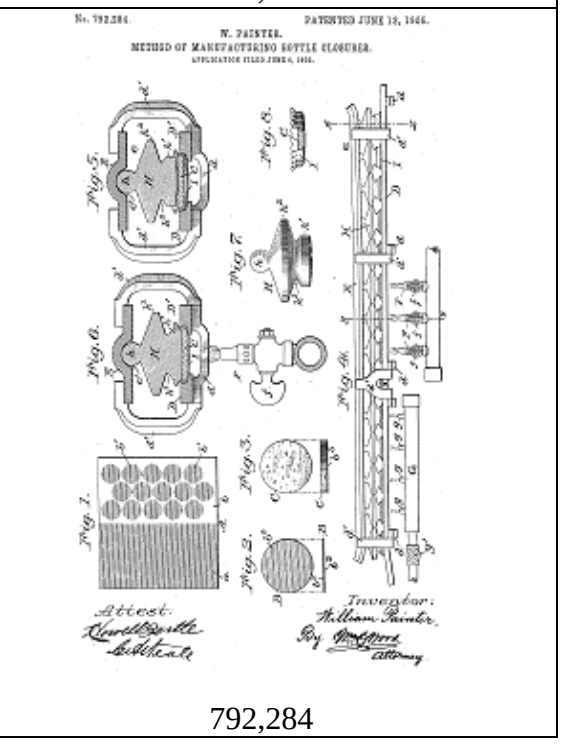
2. The method herein described consisting in incorporating glycerin, a non-drying, insoluble material which can be melted, glue and vaseline, with glue or gelatin by the action of heat, mixing therewith a body material and finally subjecting the material to heat, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

WILLIAM PAINTER.

Witnesses:
JOHN T. HAWKINS,
W. H. WHEELER.

684,524



No. 792,284. PATENTED JUNE 13, 1905.

W. PAINTER.

METHOD OF MANUFACTURING BOTTLE CLOSURES.

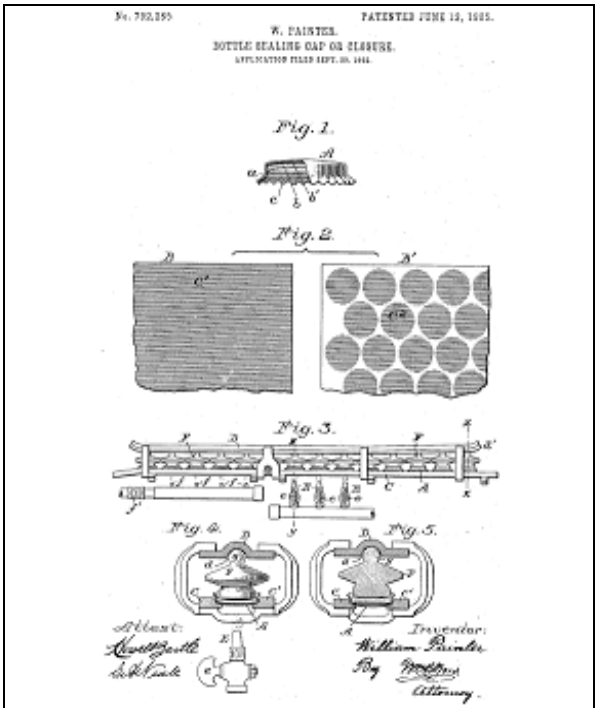
APPLICATION FILED JUNE 6, 1901.

Fig. 5. Fig. 8. Fig. 7. Fig. 6. Fig. 4. Fig. 1. Fig. 3. Fig. 2.

Attest:
Howard Huntington
Witness

Inventor:
William Painter
By Munn & Co.
Attorneys

792,284



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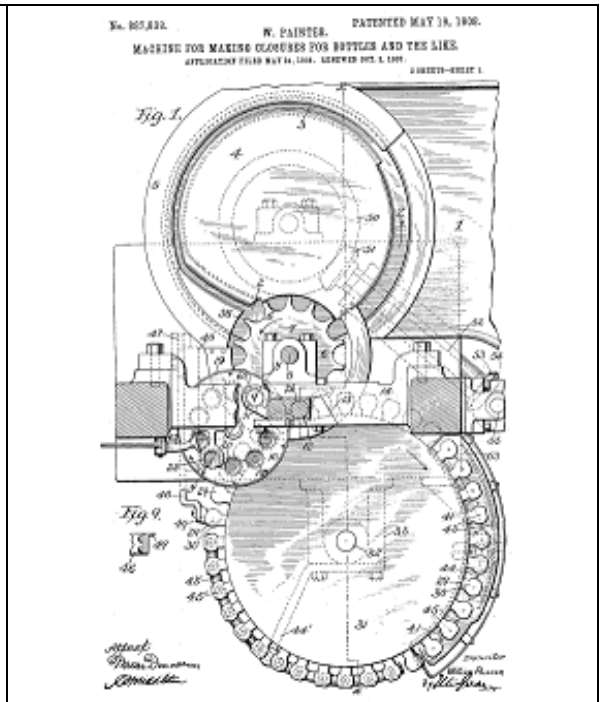

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