

lichens and fucus, and, in particular, of *fucus crispus*, glycerin, gelatin and animal jellies; but those which offer the results the most advantageous and the most practical are decoctions of the bark known in commerce under the name of *panama* (*Quillaia saponaria*) and the root of saponaire of Egypt (*Gypsophila struthium*). *Saponaria officinalis* may also be employed, but it acts less energetically. All these substances have the common character of thickening the water and making it froth. The solution of the coloring products is easily effected by pouring on their powder the boiling solutions, agitating, decanting, and, if a portion remains undissolved, recommencing the operation. These liquors may be evaporated to extracts; but a long ebullition—above all, if the water contains sulphate or carbonate of lime—may modify the colors. But it is preferable to use extract of saponaire of Egypt, for example, with which the color in fine powder is triturated; the water added afterward successively dissolves, with suitable care, the whole of the product; but in this case, as in the preceding, the first liquors remove the more soluble reds, while the blues are dissolved with more difficulty, so that it is necessary to thoroughly mingle all the liquors.

The same modes of operating and the same precautions are necessary, when the operation is on blue colors formed also of divers products unequally soluble. No particular precaution is required in using these solutions, and tints perfectly united are obtained with the greatest facility. If it is desired to continue the use of alcohol, a much smaller quantity will be necessary; the coloring product may be first infused in a small quantity of alcohol, finishing the solution with the saponaire extract; or the extract may be first employed, and the solution completed with a little alcohol."

[We find this article in *L'Invention*, credited to *Comptes rendus de l'Academie des Sciences*, and we make our translation as literal as possible.—Eds. Sci. Am.]

How to Cast Sugar Candies.

We extract the following from a very interesting article on the subject, in a recent number of *Once a Week*:—

"What an atmosphere of dust meets us as we enter the manufactory! The shop we are in is powdered from rafter to floor with a fine impalpable powder, that reminds us of the interior of a flour mill, and the workmen are moving ghosts, even the fringes of their eyelashes are whitened to their tips, just as the hoar frost whitens every tiny filament it can lay hold of. The dust is that of fine starch, the substance used as a matrix for a certain class of cast sugar goods. We are in that part of the factory now where those 'sweets' are made which are demi-opaque—like snow water frozen. The sugar is not boiled to a great heat, but is allowed gently to simmer on the fire, while the molds in which it is to be cast are being prepared. This is done by spreading the fine starch over boards, quite evenly, and then inverting another board over it, studded with the forms it is intended to cast. The man we are looking at is about making annulets, or sugar rings, and as he lifts the inverted board from the smooth starch, we see that it is covered with molds of these indented rings placed at regular intervals, and as close together as they can go. Another workman now approaches with a tin receptacle filled with sugar, fitted with six spouts. With great skill and knack he pours out the sugar, and fills ring after ring indented in the starch, as fast as his arm can conveniently travel from left to right. Not a drop is spilt, the sugar standing in each ring with a slightly curved surface, just as a drop of water would do that had fallen upon dust. These starch molds are used for all those sweetmeats which contain fluid or liquor in the interior. The liquor is mixed with the melted sugar indiscriminately, and both enter the mold together, but, curiously enough, the latter instantly crystallizes on the outside of the former, and thus, by a natural law, the liquid, flavoring essence becomes imprisoned. It was thought very foolish of George III. to ask how the apples got into the dumplings, but we have little doubt that the manner in which these liquors get inside the sugar plums has puzzled many a head wiser than his. The casting of these liquor sweets employs a large number of persons, and the most extraordi-

nary molds are obliged to be invented to meet the requirements of the trade. Balmoral boots, Tyrolese hats, scissors, knives, fish, and all kind of things, animate and inanimate, are thus produced, the only limit to the design being the size and weight of each article."



Effects of the Earth's Rotation.

MESSRS. EDITORS:—In the "Annual of Scientific Discovery," for 1864, page 82, article, "Effects of the Earth's Rotation," it is stated that the effect of the earth's rotation on a projectile pointed north will cause a variation toward the east, but when pointed toward the south the variation will be toward the west. It is also stated, as a result of the same cause, that the right hand wheels of carriages on railroads running north and south will be most worn. Can it be that these statements are correct? Would not the force of rotation be in some measure lost during the passage of the projectile? and, the earth continuing to move, would not the projectile strike the earth, whether it was projected toward either the north or the south, with a variation from its intended object toward the west? C. M.

South Boston, Sept. 19, 1865.

[The earth's rotation carries bodies at the equator from west to east at the rate of about seventeen statute miles per minute, while in this latitude, the distance round the earth on a parallel of latitude being less, the motion is at the rate of not more than twelve miles per minute. Consequently, if a cannon ball were fired from the equator to New York, when it reached this city it would be going eastward five miles per minute more rapidly than bodies here; its deviation, therefore, in relation to these bodies, from a north course, would be to the eastward. On the contrary, if the ball were fired from New York to the equator, it would there find the surface of the earth running around toward the east five miles an hour more rapidly than itself, and its duration in relation to this surface would be westward. This principle has been cited to explain the westward course of winds approaching the equator—the northeast and the southeast trades—and the eastward deviation of the Gulf stream as it runs toward the north.—Eds.]

Fresh Water Apparatus.

MESSRS. EDITORS:—In your issue of 23d inst. I notice an article in relation to an improvement on my "Fresh Water Apparatus," patented by Thomas Callan, of Philadelphia, which is so erroneous in detail that I ask leave of you to correct the same, as the description of my invention, as therein set forth, is so entirely wrong that it may work to my injury among the parties that require such an apparatus.

I suppose, from the wording of your article, that Mr. Callan's improvement relates to my patent "refrigerator," instead of a "condenser," as set forth in his claim as patented.

My refrigerator is intended to cool the injection water from a condensing steam engine—the engine having the ordinary jet condenser, air pump and hot well—the water of condensation and the condensing water being brought by the air pump to the hot well, the amount of water of condensation (being the water produced by the steam exhausted from the cylinder) is returned back to the boiler, the amount of condensing water is taken into the refrigerator to be cooled, to be taken back to the jet condenser, to subserve its purpose anew of condensing the exhaust steam. As both these quantities are constant (minus leakages), the first requires to be taken back to the boiler to preserve the proper head of water there, and the other to be taken to the refrigerator to supply the amount of water taken from it to the jet condenser.

The exhaust steam from the cylinder does not reach the refrigerator—the water produced by the condensation of that steam being mingled with the injection water, and the amount thereof being taken off from the hot well to the boiler.

—It would be a matter of utter impossibility to use this water for the injection, for the reason that it is

too limited in quantity, as the water of injection requires to be from fifteen to thirty times the quantity of the water of condensation—dependent upon the pressure of the steam used in the cylinder—and for the further reason that all the water of condensation, or the amount thereof, requires to be returned back to the boiler.

My apparatus does not require to be made very "long and expensive" to produce its proper effect. It occupies less space, and costs less, than any other apparatus heretofore devised for the purpose, in proof of which I can furnish you, or any party interested, abundant testimonials.

As my only object in this communication is to be set right before the readers of your journal in relation to my invention, I trust that you will favor me with its insertion.

WILLIAM A. LIGHTHALL.

No. 5 Bowling Green, N. Y., Sept. 23, 1865.

Machinery Wanted for Texas.

MESSRS. EDITORS:—We are about raising a company to go to Texas for the purpose of raising sugar on a large scale, and would like to have you inform us which is the best firm to procure engine and boilers of—say, 150 horse-power, smoke-consuming apparatus with the best method of saving fuel, as wood is of great scarcity, and coal not procurable at any price. We will want vacuum pans and the very best of purifying apparatus; in short, a modern first-class sugar house, capable of manufacturing from 1,200 to 1,800 hogsheads of common sugar. We want a horizontal and roller mill. If you can inform us where to procure such machinery you will confer a great favor.

W. R. ATHERTON.

Stenben, Huron Co., Ohio.

[By publishing Mr. Atherton's letter we make his wants known to the great mass of the manufacturers of machinery throughout the country. The communication is evidence of a movement southward, which we have other evidence is going forward on a large scale. There was never a time when manufacturers of machinery of all kinds found it so profitable to advertise their business.—Eds.]

FOREIGN SUMMARY.

NEW ROTARY STEAM ENGINE.—Mr. R. W. Thompson, F.R.S., described a new rotary steam engine, in which the difficulties arising out of the use of the stop or abutment are got rid of, by dispensing with the steam stop entirely; and in which the inconvenience connected with keeping the packing steam tight is obviated by giving the packing straps the same curvature as the inside of the cylinder, causing them to bear equally and steadily against the steam, as in the packing of an ordinary piston. Mr. Thompson exhibited diagrams and wooden models of the engine. He said, from the experience he had in connection with the new engine, he believed that for many purposes it would supersede the ordinary form of steam engine. The engine, when manufactured under the same advantages as those under which the common engine was now produced, would be turned out at a cost less than half that of an ordinary engine. Gas exhaustives, constructed on this principle, acted with an efficiency exceeding that of any of the machines hitherto in use. One had been in operation at the Edinburgh and Leith Gas Works for some time, and it went with much less power, and discharged a much greater percentage of gas than any of the machines hitherto in use. A few remarks from several members followed the reading of the paper, after which Mr. Thompson received the cordial thanks of the section.

SILICUM IN IRON.—In a recent paper, Dr. Phipson of England, said it was well known that silicium existed in cast iron, not only in the free but also in the combined state. Dr. Phipson had been led to examine the subject of silicium in iron from the fact that he found several samples of iron which were reported as yielding very different qualities of Bessemer steel, to be of precisely similar chemical composition, and following up the subject, he came to the conclusion that the difference in the quality of steel arose, not from differences in the total quantity of silicium, but from the manner in which it occurred, as free or combined. This matter was of great importance, as the author was now enabled to determine, by ascertaining the amount of combined silicium, as to the snitableness

of an iron for the manufacture of Bessemer steel, that iron which yielded the smallest quantity of combined silicium being most suitable for this purpose.

Mr. Abel said that had Dr. Phipson been present, he would have been glad to have heard in what manner that gentleman distinguished between combined and uncombined silicium.

Capt. Noble stated that no iron was so deficient in tensile strength as hematite iron, but he had determined that this weakness was not due to the silicium the metal contained.

In reply to a question by Dr. De la Rue, Mr. Bell stated that borax—an element very closely allied to silicium—had not been found in any analysis of iron, and that the character of an iron would vary very much, although precisely similar materials were used in its production.

Dr. Miller suggested that the spectroscope should be used, in order to determine the presence of barium, the lines given by this element being very characteristic.

A DWARF ENGINE.—One of the most curious articles of the Wakefield Exhibition is, perhaps, a steam engine and boiler in miniature, and described as the "smallest steam engine in the world." It stands scarcely 2 inches in height, and is covered with a glass shade. The fly-wheel is made of gold, with steel arms, and makes 7,000 revolutions per minute. The whole engine and boiler is fastened together with 38 screws and bolts, the whole weighing 14 grains, or under $\frac{1}{4}$ ounce. The manufacturer says of it that the evaporation of 6 drops of water will drive the engine 8 minutes. This piece of mechanism is designed and made by a clock manufacturer at Horsforth.—*London Mining Journal*.

[This is much larger than the steam pump, consisting of a steam and water cylinder, made by Charles Fichtel, of Philadelphia, in 1860. This pump was auxiliary to a model of a steam fire-engine. The steam cylinder was one eighth of an inch in diameter, and the whole affair would go into a common thimble.—EDS. SCI. AM.]

RECENT AMERICAN PATENTS.

The following are some of the most important improvements for which Letters Patent were issued from the United States Patent Office last week; the claims may be found in the official list:—

Artificial Dentures.—The object of this invention is to facilitate the operation of securing or fastening artificial teeth to a base of vulcanite or other plastic or fusible material. In order to effect this purpose the teeth are provided on their inside or back part with a rim, which is perforated with round, square or oblong holes, and furnished with dovetailed cavities, extending from the inside of the gum back to the extreme edge of the rim; the bottom of said cavities grading down from the rim to the gum. The extreme edge of the gum is also perforated with holes similar to those in the rim, and pins which are straight, bent or headed are inserted into the dovetailed cavities in such a manner that, by the combined actions of the perforations, dovetailed cavities and pins, the base is firmly united with the teeth and the gum, and the danger of cutting through and exposing pins in finishing up is entirely avoided. S. C. Taylor, Monroe, Mich., is the inventor.

Machine for Finishing Hats.—This invention consists in new and improved machinery and devices for finishing hats, whereby much of the manual labor now required is performed by mechanical means. The hat blocks are set on spindles, arranged around a common center with the irons, the arms of the irons being hollow. The hat blocks have a pulley set centrally in their bases, to operate the cord which binds the hat on the block. The cord is double, and passes from the pulley through one side of the block at its base, and the hat is perforated near its brim, to let the cord pass through—the cord being then divided or opened into a loop, which is stretched over the hat—and the pulley is then wound up by a wrench, a ratchet in the hub of the pulley being engaged by a detent, in order to keep the pulley from running back. The arms on which the irons are mounted all belong to one system, and are capable of vertical motion on their axes; and they are so mounted on their axes as to be capable of yielding upward when passing over an uneven surface below them, as when

going over a crooked brim. Each iron is hollow, and is capable of revolving on its arm. Beyond the irons, on each arm, is a "lurer," capable of turning on the arms, and which has at one side a sponge for wetting the hat, and at the other an elastic or flexible rubbing surface. Roche & Stewart, Williamsburgh, N. Y., are the inventors.

Surgical Apparatus for Exsections.—The object of this invention is to provide an apparatus to be worn by those who have suffered exsections of the shoulder joint, os humeri, elbow joint and radius, or either of them, or of portions thereof, whereby the functions of the arm, are, in a main degree, restored, and the patient is enabled to perform most offices of usefulness and convenience to himself and others. It has been common hitherto, whenever a patient has suffered the loss of any of the bones or joints of the arm, or of the shoulder joint, or whenever it has been thought necessary that any of them be removed, to amputate the arm, for the reason that the foundation and support of the muscles having been removed, they were, thenceforth, not able to fulfill their functions, and, therefore, the better course, was to remove the arm itself below the place of exsection or destruction of the bone, as being a useless appendage. This invention is meant to save the patient from amputation, and to provide an artificial substitute, so to speak, for the bones and joints destroyed or exsected. E. D. Hudson, M. D., Clinton Hall, Astor place, New York City, is the inventor.

Fruit Jars.—This invention consists in using upon the mouth of the jar, can or other article in which the preserved fruit is placed, a secondary vessel or receiver, the joint being made air-tight, in any proper manner, into which receiver when so attached a sufficient quantity of the fruit from the jar is placed, by opening its cover—the air first having been exhausted from the receiver by any suitable mode, so as to produce a vacuum in it, whereby the receiver can be charged with the fruit without the air coming in contact with it, after which the cover of the jar is closed, and the receiver with the fruit then detached from the preserve jar; the fruit remaining in the jar, thus being kept as pure and sweet as if none of it had been removed. Allen Sherwood, Auburn, N. Y., is the inventor.

Smoking Pipe.—This invention consists in the use in a tobacco pipe of a perforated disk or diaphragm arranged below the smoke passage leading from the bowl to the stem, and in such manner that the smoke will come in contact with the said disk or diaphragm (which is made of metal) before entering the stem, and thus be cooled and caused to deposit the nicotine and other poisonous matter it may contain upon the said plate, the same running through the apertures therein, to be caught and retained in a nicotine chamber below the bowl of the pipe, from which it can be removed at pleasure. This pipe possesses the advantage of extracting the nicotine, etc., from the smoke without compelling it to pass through a nicotine chamber, which latter is often so foul that it infects the smoke instead of purifying it. The draught of the pipe is in no wise interfered with, and all the metallic parts can be readily removed from the pipe in order to clean them. The inventor of this improvement is Edwin Hoyt, of Stamford, Conn.

Hand Spinning Machine.—This invention has for its object the improvement of the hand spinning machine commonly called the railroad wheel, in which the spindle is mounted on a carriage that travels to and fro on the frame. It consists, among other things, in shortening the bench, changing the position of a portion of the gearing, placing the treadle so that it is operated from the end of the frame instead of from the side, providing a box to receive the carriage, etc. Jesse Byrkit, Fairfield, Iowa, is the inventor.

Paddle Wheel.—This invention relates to a new and improved paddle wheel, or that class which are provided with feathering buckets, and it consists in a novel and improved means for operating the buckets, and in an improved construction and arrangement of certain parts pertaining thereto, whereby several advantages are obtained over other paddle wheels of the same kind. James Burson, of Yates City, Ill., is the inventor.

Ruffler and Gatherer.—The object of this invention is to produce an apparatus, to be used upon a sewing machine, for the purpose of making ruffles and

gathers in cloth. It consists in an upper and lower spring plate, which tend constantly toward each other, and which come in contact with spur wheels that are geared together by means of an intermediary wheel. When two pieces of cloth, one of which is to be gathered, are to be united by sewing, one of them is placed between the lower spring plate and its wheel, and the other between the upper plate and its wheel, and when the cloth is fed along, the upper gear is made to rotate by reason of the pressure produced on the cloth by the upper spring plate, and the lower gear, by reason of the small intermediate gear, is made to revolve at a higher speed, and thereby ruffle and produce gathers in the cloth which is held against it by the lower spring. Leonard C. Riggs, Florence, Mass., is the inventor.

Clamp for Boot-crimping Devices.—The object of this invention is to obtain a clamp for boot-crimping devices which will not injure or tear the leather while the same is being stretched or drawn over the tree. To this end the invention consists in inserting in the sides of the clamp which grasp the leather pieces of wood, gutta percha, or other material, which, on account of its softness, will not injure the grain of the leather, and still be firm enough to grasp it securely. Edward Simmons, of South Providence, R. I., is the inventor.

Thill Coupling for Vehicles.—This invention relates to a new and useful improvement in couplings for attaching thills to the axles of wheel vehicles, and it consists in attaching a spring catch or fastening to the pin of the ordinary thill coupling, and having a recess made in one of the ears, between which the thill iron is fitted to receive the spring catch; all being arranged in such a manner that the pin, which passes through the eye of the thill iron and the ears on the axle, will be held in position or prevented from casually passing out of place, and also prevented from turning. H. K. Waterhouse, Factory Point, Vt., is the inventor.

Brick Press.—This invention relates to a new and improved brick press, of that class in which a screw or auger is employed for forcing the clay into the molds. The invention consists in constructing the screw or auger with a concave flange, the concave surface being at the face side of the flange, whereby the clay, as the screw or auger rotates, is gathered toward the center of the box in which the screw or auger works, and the latter rendered far more efficient in its operation than those hitherto used. The invention also consists in arranging the screw or auger directly under the mud mill or clay-tempering box, whereby the machine is greatly simplified. The invention further consists in the employment or use of a jointer, arranged with a spring, and in connection with the mold cylinder, in such a manner as to face or smooth off the clay in the molds in a perfect manner. John J. Alvord, Tecumseh, Mich., is the inventor.

Oil Can.—This invention relates to a new and useful improvement in oil cans, such as are used for lubricating machinery and for like or similar purposes, and are provided with an elastic bottom for ejecting the oil from the can. The invention consists in the employment or use of a wire or rod attached to the elastic bottom, and extending through the spout or nozzle, for the purpose of preventing the clogging or choking up of the same. The invention also consists in the application of a valve to the rod to regulate the flow or discharge from the can; and in a bell-shaped terminus for the spout or nozzle to prevent the drip of oil from the same from running down the outer side of the can. Henry E. Stager, Milwaukee, Wis., is the inventor.

STEAM JETS.—It may be interesting to know that the application of the steam jet can be traced back to the time of the ancient Romans. Ewbank, in his work on "Hydraulics," gives some interesting particulars on the subject, and shows that blowing fires by a jet of steam, either into the fire or up the chimney (like the modern (?) steam jet), is of very ancient application.

ALL applications for admission to the Paris Exposition of 1867 must be made before the 31st of October, 1865. The application must be accompanied by a description of the articles to be presented.