

**THE LOUISVILLE WATER WORKS.**

The large pumping engines of the city water works of Louisville, Ky., are on the Cornish plan. They are exactly alike, each working a single-acting lift and force plunger pump. The dimensions of the principal parts of the engines and pumps are as follows, namely: Steam cylinder, *a*, 70 inches diameter, stroke of steam piston 10 feet. The beam, *b*, for each engine is double; the two members, 3 feet 5 inches apart from center to center, are each 31 feet 10 inches long between end centers, 6 feet 9 inches deep in the middle, with 3 inch thickness of web, and 9 inches width of center rib and outside flanges; the cylinder and pump ends of the beam are equal in length; each pair of beams weighs 42 tons. The beam vibrates on a main center or shaft, *c*, 20 inches diameter, 9 feet 8 inches long, with journals 15 inches diameter, and 19½ inches bearing. The plunger blocks, for the beam center of both engines, rest in pedestals bolted to a massive cast iron entablature, which (extending transversely across the house and into the brick walls) is supported by four Tuscan columns, *d*, of cast iron, standing on and anchored to the beam wall, by means of arched cast iron bedplates, built in the masonry. The piston rods are guided by parallel motions, and the pump connecting rods by cross-heads and slides; piston rods, *e*, 6¼ inches diameter and 16 feet long each; pump connecting rods, *f*, 8 inches diameter and 28 feet long each.

The pump barrels are 36 inches in diameter each, plungers 36 inches diameter, with stroke same as steam piston, 10 feet. The extreme lift of the pumps, when the river is at its lowest stage, is 21 feet 10 inches. The pumps are connected with the standpipe by two lines of 40 inch, flanged pipes, provided each with a stop gate near the standpipe. The pump valves, *h h*, are of the kind known as Harvey and West's double belt valve. The pumps and pump mains to the standpipe have a circular water way of 40 inches diameter throughout, thus admitting the introduction of pump barrels 40 inches in diameter, and increasing the present pump capacity 23 per cent whenever the consumption of water will demand a greater supply than at present provided for.

The metal (cast iron) of the pumps and pump mains is from 2 to 3 inches in thickness, varying as the forms vary from the cylindrical to the oval or rectangular. All the joints are made with lead by means of flanges and bolts; the flanges are from 2½ to 3 inches thick, and from 4 to 6 inches wide, with 1¼ inch bolts.

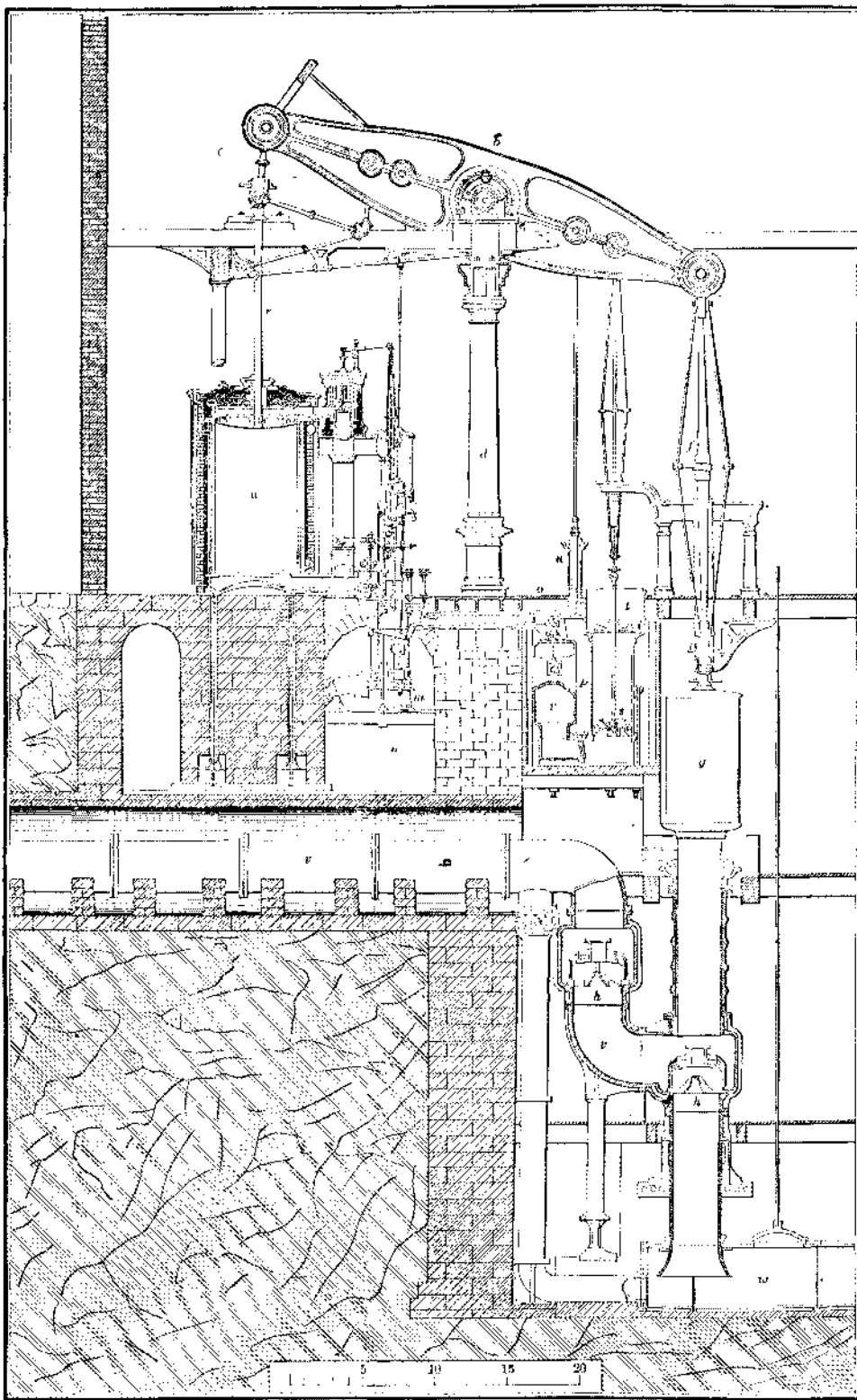
Each engine is provided with a battery of three single flue Cornish boilers. The performance of the engines has been very satisfactory. The highest daily duty (calculated by the Cornish method) was 48,363,344 lbs. of water raised 1 foot high per 100 lbs. coal; the highest monthly average was 35,957,629 lbs., and the yearly average duty 30,217,865 lbs. Cost of the engines and connections complete, \$117,753.64.

The cataract, *m*, is in the vault, *n*; the condenser and air pump are in the well below the main floor, *o*, of the engine house, *p* is the cistern, *r* condenser, *s* bucket of air pump, *t* hot well. *w* is the induction waterpipe at the foot of the pump stock, *v* the eduction main, *u* the feed pump.

**Constructive Use of Wood.**

The main stay of constructive woodwork is the mortise and tenon. A piece of woodwork which can be put together without glue, nails, or screws, and serves its purpose, is an ideal work of construction; but this is not always possible. Another principle of construction is that every piece of wood should be so placed that it can swell or shrink without injuring itself, or displacing any other piece. This is maintained in an ordinary panelled door, provided no mouldings are inserted. Still another principle is that mitre-joints should be avoided, whether for moulded work or not, for the reason that shrinkage causes all mitres to open. No piece of wood should be used unless the straight grain of the wood can be seen through its full length in one place. Inserted mouldings should be avoided as far as possible; and all mouldings for panel-work should be worked on the styles and rails. It is a general principle, observed in the best mediæval joinery, that all mouldings on rails which are horizontal should butt against the styles; and that styles should

be either plain, or should have mouldings stopped before reaching the joints with the rails. In practice all rail mouldings may be worked the whole length of the stuff used; and, if muntins (which are the middle styles) are used, the mouldings may be cut away to the square wood before the mortise is cut which is to receive the tenon of the muntin. Thus the mouldings will butt against the square sides of the muntin. All the parts for a door thus made can now be got out by machinery, and the door will be fully constructive in every sense of the word. There is no obstacle to this in the way of cost. The dovetail is a constructive device; and the dowel is admissible in places as a substitute for the mortise and tenon. Tongue and grooving is a legitimate device, both for ends and sides of boards. Beveling the edges of the pieces thus joined is better than beading. The best way to construct large panels is to make them of narrow strips, tongue and grooved, and bevelled at the joining edges. Such panels will never "draw." The shrinkage will be divided



PUMPING-ENGINE, LOUISVILLE WATER-WORKS.  
(Theodore R. Scowden, Engineer.)

between all the joints. Solid table-tops should never be fastened with glue or screws, but should be secured with buttons fastened to the under side of the top, which travel in grooves cut in the framework to allow for expansion and shrinkage. These are but few of the principles to be observed in doing the best woodwork.

In all kinds of lumber, the heart should be rejected. All boards cut on a radius from the center to the periphery of a tree will remain true, while all others have a tendency to warp or check. The first are called "quarter-sawn." It is a peculiarity of oak that the best grain is found in quarter-sawn boards. It is only in these that the "silver-grain" is seen. This consists of a ribbon of very hard substance which grows out from the center of the tree. It is for this reason that oak is the most enduring wood: it has a grain two ways. All woods check in the direction of a radius from the center. Quarter-sawn oak cannot check.—*Andrews' Guide to Church-Furnishing.*

To MAKE a good varnish for gun barrels, take shellac 1 1-2 ozs., dragon's blood 3 drachms, rectified spirit 1 quart. Apply after the barrels are browned.

**NEW YORK ACADEMY OF SCIENCES.**

The regular monthly meeting of the chemical section of this society was held at their rooms, 64 Madison avenue, on December 11, Dr. J. S. Newberry, President, in the chair. Professor A. R. Leeds, of the Stevens Institute of Technology, read a paper entitled

**A NEW TEST REACTION OF ZINC.**

While testing before the blowpipe a new mineral from the Franklin zinc mines of New Jersey, Professor Leeds discovered that the reaction for zinc, when this metal is present in silicates in minute quantities, is much more easily obtained by the use of fused sodic chloride of sodium than with sodic carbonate. This is due to the greater volatility of zinc chloride over the oxide. The green color with cobalt was not readily obtained unless the assay itself were moistened with cobalt instead of the coating. It will be noticed that the number of blowpipe reagents is gradually increasing, and the tests are becoming more satisfactory and delicate.

**NOTES ON THE ULTIMATE ANALYSIS OF CRUDE PETROLEUM**

was the title of a paper by Professor S. F. Peckham, read by Professor Leeds, Chairman of the chemical section. The author stated his troubles in obtaining satisfactory results by combustion of crude petroleum with oxygen and oxide of copper, and how he overcame them. Instead of using the ordinary bulb for holding and weighing the liquid, he used a glass tube drawn out into capillary tubes at both ends, so that the liquid could be drawn up into it without being heated. The oil was placed in a platinum boat, and over it a brush of asbestos, which had been soaked in nitrate of copper and ignited, and thus covered with oxide of copper. Oxygen gas was employed in the combustion. Care is necessary to avoid violent explosions.

**INDIUM IN AMERICAN BLENDES.**

A paper on this subject, by Professor H. B. Cornwall, of Princeton, was also read by the Chairman of the section. The author has devoted much attention to the spectroscopic examination of American blendes for indium, and in several cases his labors have been crowned with success. In the *American Chemist* for January, 1873, he mentions several blendes then examined, in one of which, that from Roxbury, he found a considerable quantity of this new metal. In the present paper, he mentions several others in which traces of it have been detected, especially some from the far west.

Professor A. R. Leeds read a paper on the

**CHEMICAL LITHOLOGY OF THE ADIRONDACKS,**

and exhibited polished specimens of rock brought from the summit of Mount Marcy. The chemical study of the composition of rocks is a tedious and laborious one and Dr. Leeds and his assistants deserve great credit for their persevering labors, although the details are not such as to be of popular interest. Among other analyses reported was a quantitative one of basalt, in which eleven constituents were determined, including titanium.

The following papers were read by title: "Descriptions of New Noctuae, with remarks on the varia-

tions of larval forms in the group," by A. R. Grote, of Buffalo, and "An Index to the Literature of Titanium, from 1789 to 1876," by E. J. Hallock, of Columbia College.

The section on mineralogy met at the School of Mines, in 49th street, on December 18. Professor T. Egleston read a paper on the

**SMELTING OF NATIVE COPPER**

at Lake Superior. Dr. Bolton and Mr. Julian gave a sketch of a mineralogical tour in Western North Carolina, accompanied by the exhibition of a great number of specimens.

On December 29 ult., a terrible accident happened on the Lake Shore and Michigan Southern Railroad. The train fell through an iron bridge near Ashtabula, Ohio, the cars falling 75 feet. There were 175 persons on the train, of whom between 30 and 40 were killed outright. The wrecked train, as usual, caught fire, and the cars, etc., were totally destroyed.

FOR a cement for fixing metal letters to glass windows, take copal varnish 15, drying oil 5, turpentine 3, oil of turpentine 2, liquefied glue 5 parts. Melt in a water bath, and add dry slaked lime 10 parts.

**Salicylic Acid in the Household.**

Dr. Von Heyden gives the following directions for using this newly introduced antiseptic in the preservation of food, and for other purposes in domestic economy:

1. Raw meat: It frequently happens, especially in the warm season, that meat which is otherwise faultless emits an unpleasant smell on boiling. This is often the case with certain kinds of meat, like tongues, etc., which contain readily decomposing particles of fat and blood. This is easily remedied by laying the meat, before cooking, in warm water which contains from half to one teaspoonful of salicylic acid to the quart; or by putting a little acid in the water in which it is boiled.

To protect meat from spoiling for a few days either of the following methods may be employed: Place it in water containing from  $\frac{1}{2}$  to 1 teaspoonful of acid in a quart of water; or rub it with dry salicylic acid, especially near the bone and fat. The manner of keeping it, as well as the previous cleansing, is as usual. Although raw meat, when treated with salicylic acid, loses its fine red color on the surface, it suffers no change within. The meat also cooks soft in a short time. It is also advantageous to add  $\frac{1}{2}$  teaspoonful of the acid to a quart of brine used in pickling meats.

2. Pure cow's milk: The addition of  $\frac{1}{2}$  to 1 teaspoonful to a quart (or about  $\frac{1}{2}$  to 1 gramme *per liter*) of dry crystallized acid—not in aqueous solution—prevents curdling for 36 hours longer than otherwise, and yet it retains the property of yielding cream and butter perfectly.

3. Butter: If butter be worked with water containing one teaspoonful of acid to the quart, and kept in such water, or packed in cloths soaked in an aqueous solution of the acid, it keeps much longer. Even butter which has begun to be rancid can be improved by carefully washing with salicylic water, 2 or 3 teaspoonfuls to the quart, and washing in clean water.

4. Preserved fruits: Cherries, currants, raspberries, plums, apricots, and peaches may, as experience has proved, be very advantageously treated in the following manner: The fruit is placed in a preserve jar, with not a very wide mouth, layers of fruit alternating with layers of sugar, but no water; and strewing over it a pinch of salicylic acid ( $\frac{1}{2}$  gramme to the kilogramme, or  $3\frac{1}{2}$  grains to the lb.), and covering the jar with parchment paper which has been softened in salicylic acid solution, and then boiling as usual in a water bath. Bilberries, or blueberries, are better boiled without sugar, allowed to cool, and put into narrow-mouthed bottles (some crystals of salicylic acid being strewed over them), corked and sealed. Fruit preserved in this way has kept well for two seasons. Others have recommended covering the fruit in the jar with a close-fitting strip of blotting paper, which has been saturated with a solution of salicylic acid in rum.

For cucumber pickles, and those put up with vinegar and sugar, a corresponding process is recommended; the acid being boiled in the vinegar, and when cold poured over the pickles. For salted cucumbers, salicylic acid is put in the water during the boiling ( $\frac{1}{2}$  to 1 teaspoonful to 1 quart), and otherwise treated as usual. It is also recommended to sprinkle salicylic acid in the barrel on the surface of the pickles.

5. Boiled vegetables: An equally small amount of dry salicylic acid may be added to these to prevent their spoiling.

6. For disinfecting and purifying the air and walls of closed rooms, salicylic acid may be evaporated on a hot sheet of iron or tin.

7. Vessels, corks, etc., which have a disagreeable odor or taste, will be rendered perfectly sweet by washing with a solution of salicylic acid, a fact that deserves special attention.

The best method of preparing these salicylic acid solutions is to put 2 or 3 teaspoonfuls of acid in a quart of water, heat rapidly to boiling, and let cool. What separates on cooling is an excess of pure acid, which may be kept for subsequent use, or it may be well stirred up and used in suspension when more of the acid is wanted than will go into solution.

In this connection we may add that the purest form of salicylic acid is that obtained by dialysis, as it is impossible to remove all the tarry and resinous matter by recrystallization.

**What's in a Name?**

We recently published a description of an ingenious lantern improvement by President Henry Morton, of the Stevens Institute, which was reproduced by the *English Mechanic* as the discovery of Mr. Henry Norton. We also described the new resonant alloy invented by Professor Silliman, of Yale College, which our cotemporary also publishes, but credits the invention to Mr. Lilliman, of New Haven, Conn.

**An Improved Indian Ink.**

Most of the black Indian ink met with in commerce possess this disadvantage, that it blots when a damp is brush passed over it; or, as draughtsmen say, "it does not stand." The addition of alum does but little good; but G. Reisenbichler states that bichromate of potash accomplishes the object by rendering insoluble the glue which the ink contains, and thus making the ink permanent. Such an ink Reisenbichler calls "Harttusche," or "hard Indian ink." The bichromate of potash is not colorless; on the contrary, it possesses a deep yellow (almost red) color, but does not at all injure the shade of the ink, as 1 per cent. of it in a very fine powder, intimately mixed with the ink, which has already been mixed with glue and dried again, is sufficient. The salt must always

be mixed with the ink in a dry state; otherwise the ink might lose its friability in water.

A drawing which has been made with this ink in the dark, or by artificial light, must be exposed to sunlight for a few minutes, which renders the bichromated glue insoluble in water. Draughtsmen who cannot provide themselves with such ink make use of a dilute solution of bichromate of potash in rubbing up the ink. There is no danger of the yellow salt penetrating the paper, if the ink is thick enough.

**DYEING DEEP ROSE.**—This color is dyed in the beck in which cochineal reds have been dyed, adding, for 23 lbs. material,  $10\frac{1}{2}$  ozs. oxalic acid,  $5\frac{1}{2}$  ozs. tin crystals, and  $3\frac{1}{2}$  ozs. cochineal. Boil up, cool, and dye boiling for 30 minutes.

**Inventions Patented in England by Americans.**

From October 24 to November 20, 1876, inclusive.

ATTACHING GEAR WHEELS.—B. T. Taylor *et al.*, Fall River, Mass.  
BALE TIE, ETC.—W. B. Hayden, Columbus, Ohio.  
CAR COUPLING.—G. H. Aves, Adrian, Mich.  
CAR LAMP.—A. H. Phillippi *et al.*, Reading, Pa.  
CASTOR.—L. P. Lawrence, Port Morris, N. J.  
EGG BOX.—A. H. Lucas *et al.*, St. Louis, Mo.  
ELECTRIC LIGHT BUOY.—P. E. Smith, Scotland Neck, N. C.  
ELEVATOR.—B. H. Davis, Foxcroft, Me.  
FEEDING PAPER TO PRESSES, ETC.—H. W. Covert, New York city.  
FIRE EXTINGUISHER.—H. Conant, Pawtucket, R. I.  
GRAIN SCOURER.—The Barnard and Leas Company, Moline, Ill.  
IRONING TABLE.—L. P. Lawrence, Port Morris, N. J.  
JAB, ETC.—A. Montgomery, New York city.  
LAYING PIPES, ETC.—A. O'Neill, Baltimore, Md.  
MAGNETIC ENGINE.—E. Weston, Newark, N. J.  
MAKING GAS, ETC.—I. D. Bradley, Preston, Md.  
MATCH FRAME.—E. B. Beecher, New Haven, Conn.  
MOWER AND REAPER.—S. Sweet, Dansville, N. Y.  
NAIL FEEDING MACHINE.—J. C. Gould, N. J.  
OPENING CANS, ETC.—Meyer *et al.*, New York city.  
OPENING CANS, ETC.—S. Poole, Boston, Mass.  
PACKING BAGS, ETC.—H. L. Mattison, Oswego, N. Y.  
PAPER BAG MACHINE.—E. Stanley *et al.*, Brooklyn.  
PERFORATING PAPER.—W. Braidwood *et al.*, Mount Vernon, N. Y.  
PIPE JOINT.—A. O'Neill, Baltimore, Md.  
PIPE MACHINERY.—J. B. Root, New York city. Three patents.  
POTATO DIGGER.—L. A. Aspinwall (of Albany, N. Y.), London, England.  
PREPARING WOOD.—N. Wheeler, Bridgeport, Conn.  
PRESSING SUGAR.—T. L. Wadsworth, San Francisco, Cal.  
PULLEY, ETC.—A. A. Hall *et al.*, Nashville, Tenn.  
RAILWAY RAIL.—J. T. Clark, Augusta, Ga.  
RAISING WATER.—J. A. Ayres, Hartford, Conn.  
RIBBON WIRE, ETC.—J. Fettes, New York city.  
SCREW CUTTING.—S. W. Martin, Springfield, Ohio.  
SETTING SPRINGS, ETC.—J. S. Passenger *et al.*, Birmingham, Conn.  
SHEET METAL PIPES, ETC.—F. Heltge *et al.*, Cincinnati, Ohio.  
SHOVEL.—H. W. Shepard *et al.*, Brooklyn, N. Y.  
SMOKE CONSUMING FURNACE.—C. B. Bryant, *et al.*, Stoneham, Mass.  
SPEED GOVERNOR.—G. Westnighouse, Jr., Pittsburgh, Pa.  
SPRAY APPARATUS.—M. A. Lake *et al.*, Chicago, Ill.  
STEAM BOILER, ETC.—J. B. Herreshoff *et al.*, Bristol, R. I.  
STORING FUEL, ETC.—E. R. Kerr, Kewanee, Ill.  
SUGAR MAKING, ETC.—E. A. Corbin *et al.*, Philadelphia, Pa.  
TREATING EXTRACTS, ETC.—W. Adamson, Philadelphia, Pa.  
WIRE FENCE, ETC.—W. D. Hunt, Scott, N. Y.  
WORKING HIDES, ETC.—A. Fitzhenry, Somerville, Mass.

**Recent American and Foreign Patents.****NEW MECHANICAL AND ENGINEERING INVENTIONS.****IMPROVED COTTON GIN FEEDER AND PICKER.**

William T. Adams, Rienzi, Miss.—Cotton to be operated upon is placed on an apron, when it is carried forward to the picker, the apron being moved by a crank. The picker being revolved by a belt from the gin, acts upon the cotton as it comes over the roller and delivers it to the gin. The rapidity with which the cotton is fed into the machine may be varied. The picker cylinder has forked and curved teeth.

**IMPROVED TIRE UPSETTER.**

Morris W. Griffiths, Middle Granville, N. Y.—In using the machine the part of the tire to be upset is heated and is bent inward over the horn of an anvil, more or less, according as the tire is to be shortened. The bent part is then placed upon a plate, and is clamped by rough faced eccentrics. The bend is then hammered out of the tire, when the latter will be shortened.

**PULVERIZED FUEL FEEDER FOR SMELTING FURNACES.**

William West, of Golden City, assignor of one half his right to Ira S. Elkins, of Denver, Col. Ter.—This is a contrivance for feeding smelting furnaces with coal dust by means of the air blast. A screw conveyor feeds the dust into tubes, from which it drops through the funnel-mouthed pipes into the large blast pipes upon nozzles through which the blasts escape and force it into the furnace.

**IMPROVED BOOT AND SHOE CRIMPING APPARATUS.**

Henry Lampus, Enon Valley, Pa.—The leather to be crimped is placed under a plate, and it is forced down between other plates by a screw, the distance between the plates being adjustable. The form of the plates not only causes the leather to crimp smoothly and evenly without wrinkles, but the boot made of an upper crimped on this machine is claimed to be not liable to wrinkle in the instep, and is more comfortable to wear than those crimped in the usual way.

**IMPROVED LABELING MACHINE.**

Jonathan Bigelow, Boston, Mass.—This invention is an improvement in that class of labelling machines or apparatus in which the paste and label are applied to the can as it rolls down an inclined plane, of which the paste bed and label holder form a part. The invention relates to several features for improvement, for which reference must be made to the patent.

**NEW MISCELLANEOUS INVENTIONS.****IMPROVED FIRE EXTINGUISHER.**

Amzi S. Dodd and Isaac C. Andrews, New York city, assignors to Home Fire Extinguisher Company, of same place.—A bottle containing part of the gas generating ingredients is held in a cage in the upper part of the can, and so disposed that, by screwing down a stem which is attached to a bell which rests above the bottle, the latter is forced down on a projection on the bottom of the cage and broken. The construction is such that it is impossible to break a charged bottle when adjusting it, from forgetting to raise the breaking devices. The second invention consists in ribs formed upon the inner sides of the bars of the cage to receive the ring rib formed upon the outer surface of the bottle, and support said bottle; and in the combination of a stopper with the stem and the bell in such a way that the bottle may drop away from said stopper when forced down through the cage.

**IMPROVED PACKAGE BAND.**

Owen I. Taylor and Thomas H. Patterson, Saginaw, Mich.—This package band consists of a connecting plate, with two elastic bands attached to

it at right angles to each other. The bands hook to the connecting plate after passing around the package in opposite directions.

**IMPROVED APPARATUS FOR HANDLING HORSES.**

William W. Winegar, Chambersburg, Ill.—This consists of a couple of upright crotches, together with cords and a tightening device therefor, mounted on a cranked axle of a pair of wheels, in such manner that, by adjusting the axle fore and aft under the body and between the legs of the animal, the cords may be arranged so as to confine him in a web in which he can be turned over on side or back, and can be moved about readily on the wheels.

**IMPROVED PEW HAT HOLDER.**

William H. Hampton, Luray, Va.—This invention consists in applying to the back of pews a wire holder that is capable, by a rotary movement, of placing a gentleman's hat under the seat in front, the hat being thus both out of the way and not at all liable to become soiled or injured. Patented April 18, 1876. See advertisement on another page.

**IMPROVED PEA-NUT HEATER.**

Jean Espito, New York city.—This consists of a top receptacle with a hinged cover, surrounded at the sides and bottom with a water chamber that is heated by a charcoal furnace in the base or supporting chamber. The charcoal furnace provides the steady heat required for heating the water bath, which again imparts the required heat to the pea-nuts without wilting, browning, or parching the same. They may thereby be kept in the heater for considerable time, and be sold at any moment in a fresh and heated state.

**IMPROVED PROCESS OF MAKING BIRCH BEER.**

Harvey Decker, Jersey City, N. J.—This process is for making beer from ground birch bark, and it consists in first extracting the strength thereof in hops and water without boiling; secondly, fermenting the liquor obtained with yeast; and, thirdly, in adding malt and sugar, the latter having been previously made to absorb oil of wintergreen.

**IMPROVED LIQUID FILTER.**

William Maynard, New York city.—This is a combination of the partitions and the screens with each other, and with a case to form a series of filtering and conducting spaces for the passage of the liquid. The construction is such as to enable the apparatus to be quickly and thoroughly cleaned.

**IMPROVED STONE PAVEMENT.**

John Murphy, Columbus, O.—This consists in laying blocks of stone with interspaces, filled with a composition consisting of pulverized slag, coal tar, fresh lime, sand, and pitch. A pavement laid in this manner is said to be impervious to water and is not acted upon by frost. The composition, being in a measure elastic, renders the pavement easy to travel on, and it also deadens the sound of vehicles passing over it.

**COMBINED PENCIL SHARPENER, PROTECTOR AND ERASER.**

Andrew Wilson, Providence, R. I.—This is a casting which resembles a human hand grasping a cone, and having the index finger extended. The cone is hollow, and has a section removed from one side. In one edge a knife is secured, for the purpose of sharpening the pencil. The lower end of the cone holds a rounded rubber eraser. The index finger is widened, and in it is secured a knife. The portion of the blade near the cone is made concave for cutting twine. The outer end is intended for cutting paper of different thicknesses. The arm of the casting is bored and threaded for receiving the point of the pencil, which it protects.

**NEW WOODWORKING AND HOUSE AND CARRIAGE BUILDING INVENTIONS.****IMPROVED SPRING HINGE.**

Lorenz Bommer, Brooklyn, N. Y.—A flange or wing plate is cast in one piece with the ornamental top and bottom buttons of the hinge, and has a fixed pintle socket and detachable top socket, both provided with annular recesses. This dispenses with the separate casting, finishing, and attaching of the buttons, and imparts, by the greater bearing surface on the pintle, a more rigid connection with less friction on the faces or bearings of the seats.

**IMPROVED WAGON BRAKE LEVER.**

David McGuire, New Gordon, Mo.—This consists in the arrangement of a jointed lever for operating the brake connected with a pawl, that engages with rounded ratchet teeth on a curved bar attached to the side of the wagon. The pull of the brake rod on one part of the lever locks the pawl in the curved bar. The lever automatically unlocks the pawl when it is moved to relieve the brakes.

**NEW AGRICULTURAL INVENTIONS.****IMPROVED GATE.**

William G. Hughes, Columbia City, Ind.—When the gate is closed its forward end enters the space between the two posts. The latch is placed across this space so that it may engage upon a catch and fasten the gate. By operating a lever a latch may be raised to unfasten the gate.

**IMPROVED FEED TROUGH.**

James H. Grundy and Thomas H. Carter, Bremen, Ky.—This trough is so constructed as to prevent fowls or other animals than those being fed from having access to the grain, and to prevent the animals being fed from wasting their food by throwing it out of the trough. It is provided with a cover sliding longitudinally, in which is a hole to receive the animal's nose. The cover is provided with suitable stops to limit its movements.

**NEW HOUSEHOLD INVENTIONS.****IMPROVED WEATHER STRIP.**

John C. Fiester, Reading, Pa., assignor to himself and Jacob Schaeber, of same place.—This weather strip is made from two pieces of wood, one of which is fixed to the door and the other joined to it by a rule joint. Hinge plates are provided at each end and also springs for throwing the removable part down on the door sill. A spring bolt catches and retains the strip as it is raised by passing over the threshold, and is tripped by contact with the door casing as the door is closed.

**IMPROVED PADLOCK.**

Anthony O. Kruger, Rock Harbor, Mich.—This consists of a pawl connected to the bolt and so held by a spring that it must be pushed by a thumb piece into the path of the key before the latter will engage it, so as to throw back the bolt. The thumb piece is locked by a spring pin inside of the lock, so that it cannot be moved until the spring pin is drawn out by the key. The invention also consists of a secondary bolt, to be worked by a key hole plate and a stud on it, which engages the bolt by a pawl, so as to swing into and out of the position to be engaged with the keyhole plate stud, which must itself be adjusted to a certain position to receive the pawl.

**IMPROVED SCREW TAP.**

Josiah W. Melvin, Houston, Texas.—This is an expanding tap or reamer having cutters placed in slots in the tapering portion of a mandrel, in which they are capable of being moved longitudinally. They are clamped by a thimble and nut upon the outer side, and a clamping bolt running through the mandrel.

**IMPROVED SCREW PROPELLER.**

Frank Maynard, North Dorset, Vt.—This is a motor for the propulsion of canal boats. It consists in arranging upon radial arms screw blades that extend inward from the circumference of the wheel through one half or less of the distance from the periphery of the shaft, and in making them of the same pitch at the inner and outer edges. The hoop that surrounds the wheel, as well as the peculiar construction of the hull, it is claimed to throw the water in a line parallel with the shaft.