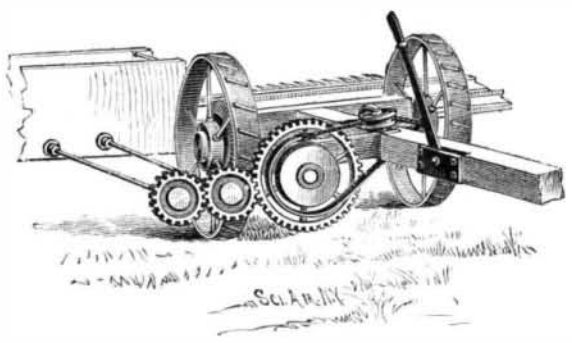
AN IMPROVED HEADER BRAKE.

This is a device patented by Messrs. Charles N. Hinchcliff and Horace E. Hall, of Spangle, Washington, to control the main driving shaft. A wooden disk is secured to the main spur or gear wheel, and a spring strap is arranged for connection with the header frame, a cord or chain being connected to the strap, the cord passing about a sheave and being secured to a pivotally mounted lever. By throwing the lever the strap is



HINCHCLIFF & HALL'S HEADER BRAKE.

brought to bear upon the peripheral face of the disk, and the momentum of the driving shaft will be checked.

AN IMPROVED STONE POLISHING MACHINE.

The illustration represents a machine for polishing granite or other stone, or for finishing or dressing the surfaces of other material, which has been patented by Mr. Willis A. Lane, of Barre, Vt. The machine is substantially built of iron throughout, and hangs on the boxes to the back shaft, which is supported by two brackets that can be bolted to any convenient place, leaving the back shaft to run free and enabling the machine to work over a large surface. The bottom bracket is made so that the machine can be plumbed in a few minutes, and thus readily made at all times to give an even pressure on all parts of the surface of the stone. The machine can be set up to work around the whole circle, so that several beds of stone can be set under the same machine at the same time. A mechanical arrangement attached to a screw provides for raising and lowering the machine by power, from the place where the workman stands, by means of a lever, without stopping the machine. Another attachment provides for raising and lowering the machine by hand. It is claimed that this is the only machine yet made by which this raising and lowering can be effected with such facility. The machine has steel-rimmed pulleys and steel shafting, with change of speed on front shaft, which is independent of the pulleys, and can be raised and lowered without raising the pulleys. The boxes are so made that they can be replaced at small expense when worn out, and the machine altogether is designed to be a most substantial, efficient, and time-saving mechanical construction. It is said to be already in use by some of the largest granite dealers in New England and the Middle States.

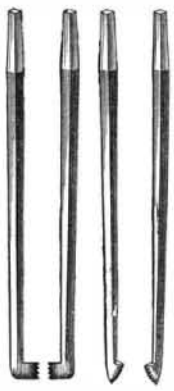
Peach Gum.

W. E. Stone, of Perdue University, Lafayette, Ind., gives, in a recent number of the *American Chemical Journal*, the results of his examination upon the carbohydrates of peach gum. He says:

The gummy substance secreted from the tissues of the peach tree contains those bodies which by hydrolysis yield arabinose and galactose. The occurrence of these bodies together under these circumstances is the more noteworthy from the fact that arabinose and galactose represent two distinct classes of carbohydrates, the true glucoses and the pentaglucoses, and are not usually found in such intimate connection with each other. The gum arabic is, I believe, the only other instance where such occurrence has been recognized, and in no previous case has the isolation and recognition of both these carbohydrates from a single homogeneous substance been accomplished.

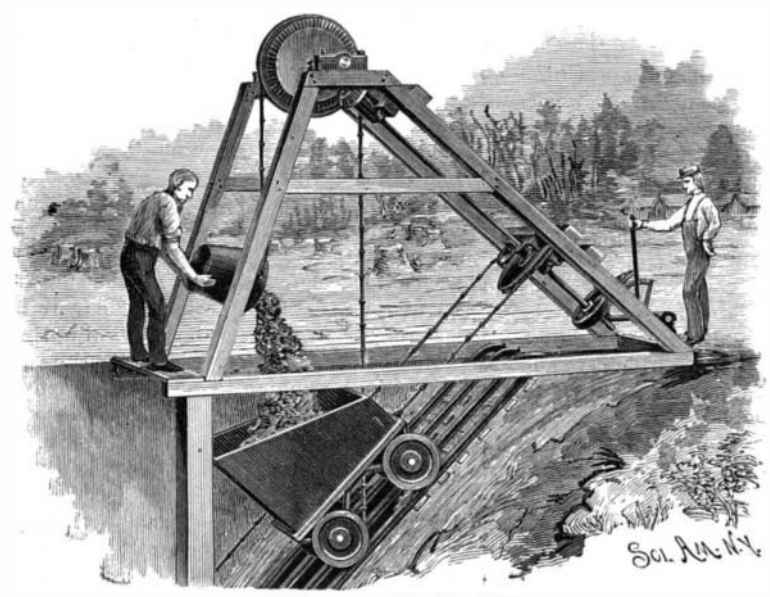
AN IMPROVED DENTAL TOOL.

The illustration represents another view of the "dental elevators" or "stump extractors" patented by Mr. Daniel Siddall, of The Dalles, Oregon, and recently noticed in these columns. The shank of the elevator, shown on the left, has a laterally extending end, one side of which is flat and the other side oval and convex, the outside edge having serrated teeth to engage the root of the tooth to be extracted and raise it entirely free from the gum, or sufficiently for it to be extracted by the forceps. The instruments are made rights and lefts, that the operator may choose one which will bring the proper bearing surface next the gum of the patient. In the elevator shown at the right the end pieces, instead of being rectangular, are fan shaped, and have a curved edge, so that the broad part of the edge or a corner of it may be brought in contact with the root.

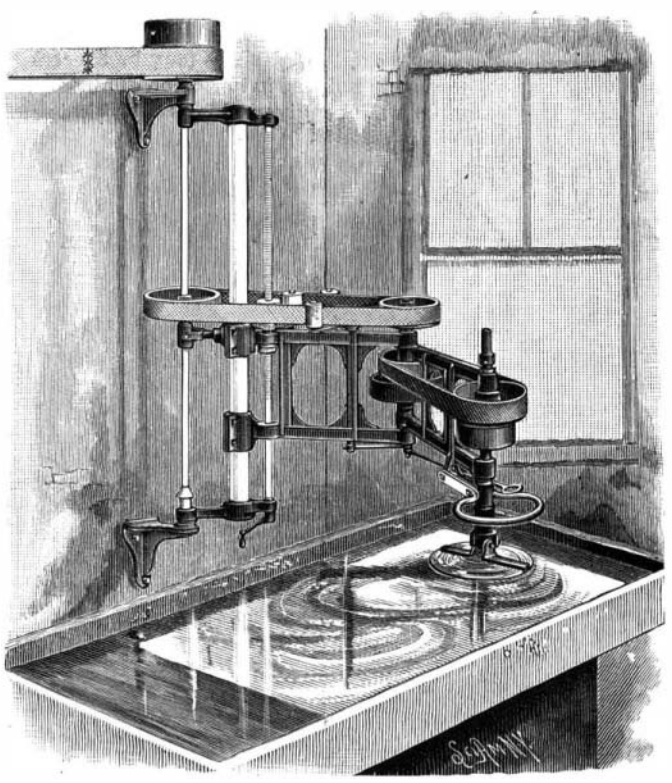


AN IMPROVED GRAVITY HOIST.

The invention herewith illustrated is designed to utilize the force of gravity in raising filled buckets from the bottom of a pit or shaft. It has been patented by Mr. William J. C. Doyle, of Aspen, Col. In the main frame of the machine a shaft is mounted at right angles to the line of two inclined tracks or ways, and on this shaft is a large sheave, about which and over a guide sheave is passed a cable, whose ends are connected to car trucks on the inclined tracks. The upper end of the shaft carries a small gear that engages a larger gear mounted on a horizontal shaft extending over the pit or shaft from which it is desired to hoist material. On the latter shaft, and directly over the pit, is a sheave supporting a bucket-carrying cable with a bucket on each end. The large sheaves are preferably about four feet in diameter, one of the gears then being one foot and the other two feet in diameter, although these proportions may be varied, while in connection with one of the shafts is arranged a brake mechanism. In operation, as the raised bucket is dumped into the car at its side, and the brake mechanism is released, the filled car will move down the track and the empty bucket descend in the pit, and in so doing will draw up the other empty car and a filled bucket from the bottom of the shaft, the hoisting being thus continuously carried on. To prevent slipping of the cables they are provided with stops adapted to be received in depressions in the peripheral faces of the sheaves.



DOYLE'S GRAVITY HOIST

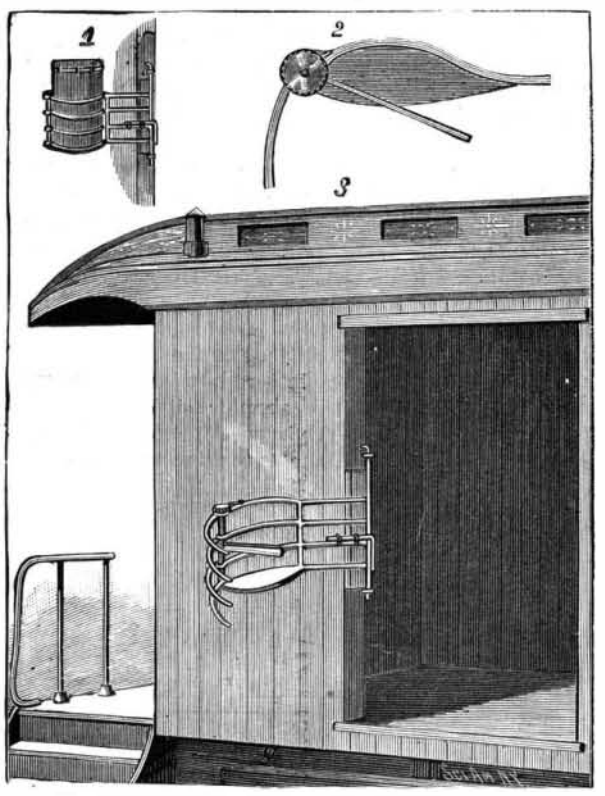


THE "GRANITE CITY" POLISHING MACHINE.

FURNITURE polish.—1 lb. olive oil, 1 lb. oil amber, 1 oz. tinct. henna.

AN IMPROVED MAIL POUCH CATCHER.

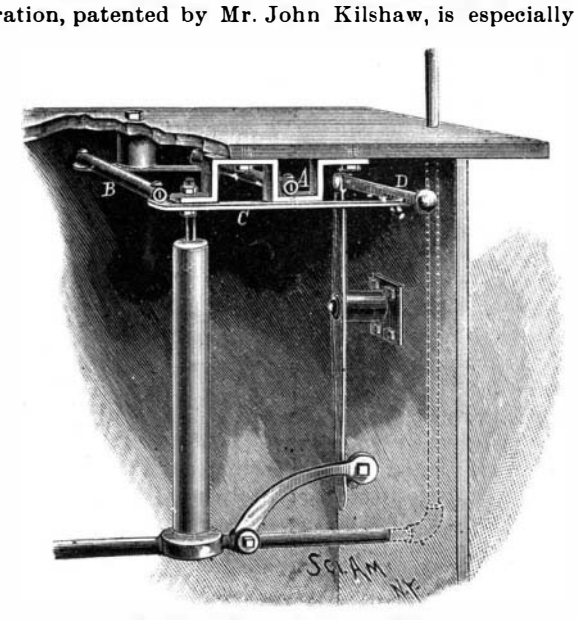
A device capable of attachment to any mail car, and designed to certainly catch and securely hold a pouch until the latter is released by the mail clerk or other person in the car, is shown in the cut, and has been patented by Mr. John A. Hatlestad, of Moss Point, Miss. A series of horizontal bars, curved for a portion of their length, are connected by an intermediate and a rear vertical bar, the latter extending above and below, and its extremities being utilized to hinge the device in a car door. The outer ends of the horizontal bars each have an eye, and the lower one is flattened in its curved portion. An outer gripping arm consists of another series of curved bars, united at their inner ends by a vertical bar held to turn in the eyes at the ends of the other bars. Upon the upper end of this pivotal bar is a ratchet wheel, the teeth of which are engaged by a spring-pressed pawl, as shown in Fig. 2, the ratchet wheel being free to turn as the gripping arm is thrown outward to receive and clamp the mail, but preventing it from opening when closed until the pawl is detached from the ratchet by the clerk in the car. At or near the center of the upright of the gripping arm is secured a plate, which extends midway diagonally across the front of the gripping arm when the latter is open, but passes between the bars as the arm is closed. In operation, as the car advances, the mail pouch strikes this plate, forcing it to the rear, and thus swings the gripping arm in upon the body around the pouch. Should the force of the blow be very great, the body of the device will be forced to a contact with an elastic strip, secured upon the door jamb in its rear, when the rebound is likely to throw the device, without the assistance of the clerk, into the car, although, upon one of the bars of the body, at its inner end, is a handle to enable the mail clerk to readily draw in the device when desired. There is an angular beveled stop block on the lower end of the pivot rod of the gripping arm, fitting in a recess in the lower bar, to hold the gripping arm in proper position until the pouch strikes the diagonally extending plate.



HATLESTAD'S MAIL POUCH CATCHER.

AN IMPROVED AUTOMATIC REGULATOR.

The device represented in the accompanying illustration, patented by Mr. John Kilshaw, is especially



KILSHAW'S AUTOMATIC REGULATOR.

designed for automatically shutting off gas steam, or a liquid used in heating or lighting, or in driving machinery. An expansion tube, A, of brass, copper or other suitable metal, is secured at one end to a bracket permanently fixed in the immediate neighborhood of the device on which it is to be used, which is in this case the under side of the top plate of a gas stove, and the other end of the tube is pivotally connected with a lever fulcrumed on an inner bracket. The opposite end of this lever is pivotally connected with the inner end of another expansion tube, B, the latter being pivotally connected at its front end with a lever, C, having on its outer end a lug adapted to engage one of the teeth on the under side of a weighted arm, D. This arm is pivotally connected with a vertical lever on the lower end of which is a shoulder supporting a weighted lever secured on the stem of a valve held in the supply pipe by which gas or fuel is furnished to the burner. When the burner is lighted, the latter lever is swung upward and placed at rest on the shoulder, as shown in the illustration, but when the burner is extinguished, accidentally or otherwise, the expansion tubes contract,

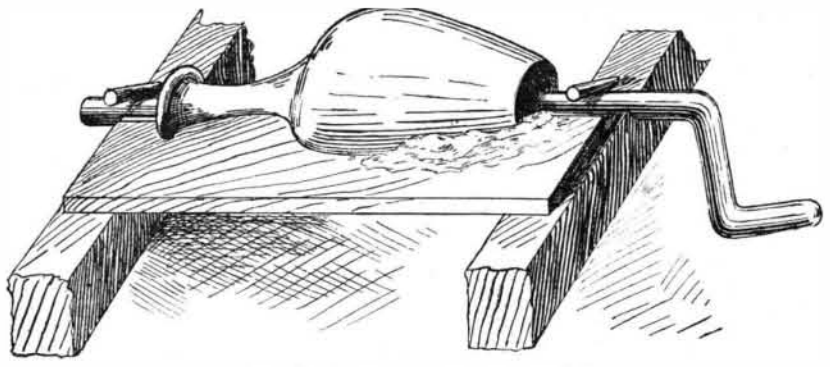


Fig. 1.—FORMING PLASTER OBJECTS.

causing the lever, C, to exert an outward pull on the arm, D, whereby the shoulder on the lower end of the vertical lever is withdrawn from under the weighted lever on the stem of the valve, allowing the latter to drop and cut off the supply of gas or other fuel. For further information in relation to this invention address Mr. G. H. Blanchard, No. 556 State St., St. Paul, Minn.

Abridgments of Industrial Liberty.

That the members of a particular profession should have laws passed in their special interest, and should be empowered to decide who may and who may not enter into competition with them, is, we think, a violation at once of justice and of liberty. The worst of these things is that a public motive is always alleged for what is in the main, if not exclusively, the outcome of private greed or jealousy. It would scarcely be too much to say that the most offensive forms of trade-unionism are found in connection with the so-called learned professions. Time was when it was supposed that the state had to look after the spiritual health of individuals; and for that purpose to prescribe their theological beliefs and religious observances. That belief has for the most part been exploded in the modern world, but its place has been taken by the notion that the state is responsible for the intellectual health of its members; and in lieu of the state church we have state schools. As regards the physical health of the community, the general method is to legalize one or two—possibly quite conflicting—schools of medicine, and to empower them to rule out, and if necessary to prosecute and punish, all others. Nobody, broadly speaking, seems to believe that, in the absence of all legislation of this character, people could in any adequate manner preserve their health or protect themselves against gross imposture. *We* believe it—believe it most heartily; and we believe that the science of medicine would advance far more rapidly, and that, on the whole, the public health would be far better, if every man were left perfectly free to employ any one he chose to attend him in sickness. At present every licensed practitioner feels himself authorized to call every unlicensed practitioner a quack. We should prefer a system under which, to a quickened public intelligence in questions of health and disease, the quack should stand revealed by his quackery. How much of real quackery is now concealed by the license to practice it might distress a confiding public to know.—*Popular Science Monthly.*

Why Crabs and Lobsters Become Red when Boiled.

The shell of the crab and lobster owes its bluish-gray color to the superposition of two pigments or coloring matters, which have been isolated—a red pigment and a blue one

As long as these two pigments exist simultaneously, the crustaceans remain gray. But the blue pigment is very fugitive, and sometimes, under the influence of a disease, it is destroyed, and crabs are found with portions of their shell more or less reddish. When the crustaceans are immersed in boiling water, the blue pigment is entirely destroyed, and the red pigment, which is very stable, appears alone in all its brilliancy. —*La Science en Famille.*

HOME MADE ORNAMENTS.

It is sometimes convenient to form objects of circular section from plaster of Paris. This is a very simple operation, requiring only very simple tools and apparatus. An iron rod, bent at one end to form a crank, and carrying a conical wooden roller, two notched bars of wood for supporting the iron rod, and a pattern made from a thin piece of hard wood, comprise the outfit for making these articles. The rod is held in its bearings in the bars by pins inserted obliquely in holes in the wood, so as to project over the rod. The pattern is cut so that its edge is a profile of one side of the article to be made. The wood should be made thin on the working edge. The patterns may be made to advantage of metal backed by wood.

The conical wooden roller should be flattened on three or four sides to prevent the plaster from turning around on it. The roller is oiled or smeared over with grease, and a batter of plaster of Paris is prepared by mixing the dry plaster with water to the consistency of cream. As soon as the plaster begins to set it is applied plenteously to the roller, and while the rod is turned by means of the crank, the pattern is moved forward toward the rod, and the surplus plaster is removed by the pattern, which acts as a scraper. Any deficiencies are supplied by a new application of the batter. When the object is of the right size and form, the pattern is removed and cleaned, and again applied to the object, the latter having been brushed over freely with water. This gives the finishing touch.

The principal difficulty in making wooden imitations of pottery lies in the liability of wood to a change of form by shrinking or by the absorption of moisture. This can be avoided, however, by selecting very dry wood to begin with, and allowing it to further season after being turned or otherwise shaped.

Although a great variety of articles may be successfully made of wood and finished in imitation of pottery, only one example will be given (Fig. 2). This is a

Fig. 2.—WOODEN PITCHER, FINISHED IN IMITATION OF POTTERY.

pitcher having an annular body with moulded base and top. These parts are made of well seasoned pine glued together, and further secured by screws. A hard wood handle is firmly attached, and the whole is varnished with shellac varnish and allowed to dry thoroughly. A design is drawn on the pitcher and filled in a portion at a time with shellac varnish, slightly colored with some pigment. Before the varnish becomes entirely dry the surface is covered with bird shot No. 6, which adheres and forms a nodular surface. When all the varnish-coated surfaces are covered with shot, the varnish is allowed to dry, after which the entire vase is painted with white or cream-colored oil paint.

After the first coat is perfectly dry it is smoothed with fine sandpaper. A second coat of the same kind is applied, and when dry, smoothed as before. The paint for the final coat is mixed with varnish to give the vase a gloss. As soon as this coat becomes tacky, the parts covered with shot are brushed over with a piece of chamois skin sparingly charged with gold bronze powder. This gilds the projecting convex surface of the shot, leaving the rest of the original color.

The effect is fine. This vase, if made 20 or 24 inches high, may be placed on the floor in any suitable nook or corner.

Suggestions by a Photographer.

A prominent photographer, interviewed recently by a representative of the New York *Sun*, has given a number of valuable hints. This photographer says, what has been said many times, that few people stand before a camera without the expression, "I am having my picture taken," defeating their own object. The second difficulty is that materials having a gloss never produce good effects in a picture; but the majority of women, though they may own any number of dresses that fall in soft, clinging lines, persist in wearing new glossy materials that have not become adjusted to the figure.

There is nearly always the possibility of producing an attractive if not a beautiful picture of a child, if the child is left for direction to the photographer. In reply to the question, "What is the most annoying thing about your work?" the answer was:

"Oh, the fond mothers who insist on dressing children in garments heavy with frills, instead of the soft, fine little dresses that fall in pleasing lines. Then, too, they insist sometimes on having a foot or shoulder, or more often a sash or shoulder knot, show, to confusion of art and the destruction of unities. Or they will dart out and twitch a little skirt or mantle that has fallen into natural curves of beauty, or a wandering curl, that falls in exquisitely careless grace, back into order and awkwardness again. That happened the other day when I was photographing a bride. She walked up to the chair, and as she turned to face me the silk train and thin veil fell in wonderful folds of graceful outline. I told her not to stir, but while I stepped back to get the effect, her friend darted out and straightened the whole thing out like a flag in a head wind."

The same lack of artistic sense that placed the furniture in a room at right angles still thinks the straight line the line of beauty, curves representing disorder.

Pilot Search Light.

The steamer Connecticut, of the Providence and Stonington Steamship line, has been equipped with a new Huntington search light. Men have been employed on the big boat for the last few months constructing the light and getting it in running order. They accomplished their task only a few days ago, and now the big Connecticut can forge its way through Long Island Sound during nights when fog dims the eyes of the ever-watchful pilot, without much fear of collision. The wonder is how the Long Island steamers ever managed to do without the search light.

It is located on top of the pilot house, and is played on any quarter desired by the pilot within. At his will he can throw the powerful light toward the sky or water, and all by the means of a little wheel with a switch. On a very dark night objects at a distance of two miles away can be seen quite plainly. When fog is dense, the light is thrown a distance of half a mile. By means of a weight that may be operated by a magnet, the steam fog horn of the vessel is also brought under the control of the electric current.

In the pilot house there are four switches controlling the current that runs to the search light and the fog horn, and by means of these switches the pilot can start the search light so that it will flash at regular intervals automatically; or it may be made to burn steadily; or it may be made to flash automatically at the instant the fog horn begins to bellow, and cease to flash when the bellow ceases; or the horn may autotomatically bellow alternately with the flash of the light; or the flashing and bellowing may be done alternately or simultaneously by hand. No such use of electricity was ever made before.—*Providence Journal.*

Accident on the Alliance.

On the U. S. steamer Alliance, now on her way to China, on the morning of the 9th ult., while the ship was cruising in the Mediterranean and the crew were at target practice, Boatswain's Mate J. McGowan was instantly killed by the premature explosion of a sixty-pounder breech-loading rifle. He was captain of the gun, and was in the act of locking the breech mechanism when the cartridge exploded, blowing the plug entirely through his body.

Commodore Taylor ordered a board of officers to investigate the cause of the explosion. Their report only deepened the mystery. They could find nothing to show that the primer had been placed in the vent, as ordinarily its shell remains in the vent when exploded, and there was none to be found on this occasion. McGowan was known to be a careful gunner, well acquainted with ordnance, and he had taken every precaution.

The board came to the conclusion that in the turning of the breech plug into place the metal must have struck a spark and ignited the cartridge. No blame was attached to any one for the accident.