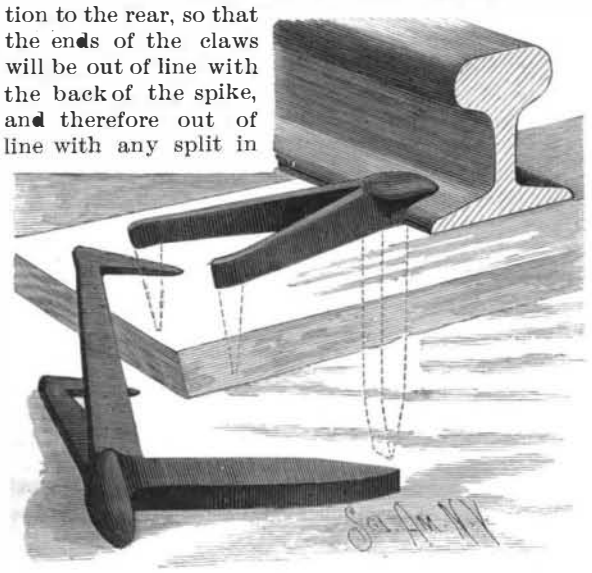
RAILROAD SPIKE.

The spike herewith shown is more securely held to the tie than the old form, and consequently holds the rail more firmly; it corrects that insecure hold of the old spike caused by the splitting of the tie by the shank. To accomplish this the spike is made with two claws or anchoring arms suitably pointed to enter the sleeper, and arranged not only to extend outwardly from the rear of the shank, but also laterally in relation to the rear, so that the ends of the claws will be out of line with the back of the spike, and therefore out of line with any split in



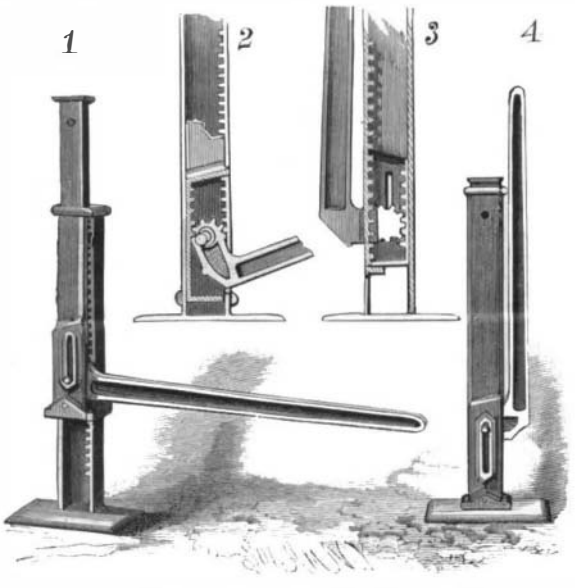
MORFORD'S RAILROAD SPIKE.

the tie which may be produced in driving. This will firmly anchor the spike, and securely hold the head on the rail in event of any looseness of the shank in its hole owing to the splitting of the wood. Such construction of the spike also provides far greater resistance to the lateral pressure of the rails and to any drawing action of the spikes. The engraving clearly shows, in the perspective view of the detached spike, the form of the shank, head, and diverging braces, and in the other view the position of the spike when applied to the tie and rail, the dotted lines representing the shank and sharpened points of the arms.

This invention has been patented by Mr. Abraham O. Morford, of Port Chester, N. Y.

IMPROVED LIFTING JACK.

Figures 1 and 4 are perspective views, and Figs. 2 and 3 are sectional elevations having the side removed to show the interior of a lifting jack recently patented by Mr. M. H. Ingalls, of North Granville, N. Y. A rack is formed on the inner surface of one of the side flanges of the standard. A flanged plate having a short rack formed on the lower part of the inner surface of one of the flanges slides between the flanges of the standard; a pinion formed on the end of the arm of an angular



INGALLS' IMPROVED LIFTING JACK.

lever engages with this rack. A part of this pinion is so made that it can engage with the rack on the standard. In one side of the arm of the lever is a groove containing a slide, from which a pin projects through a vertical slot in the lower part of the sliding plate, which is held to slide on the standard by two bands, one secured to the top of the standard and surrounding the plate, and the other secured to the bottom of the plate and surrounding the standard.

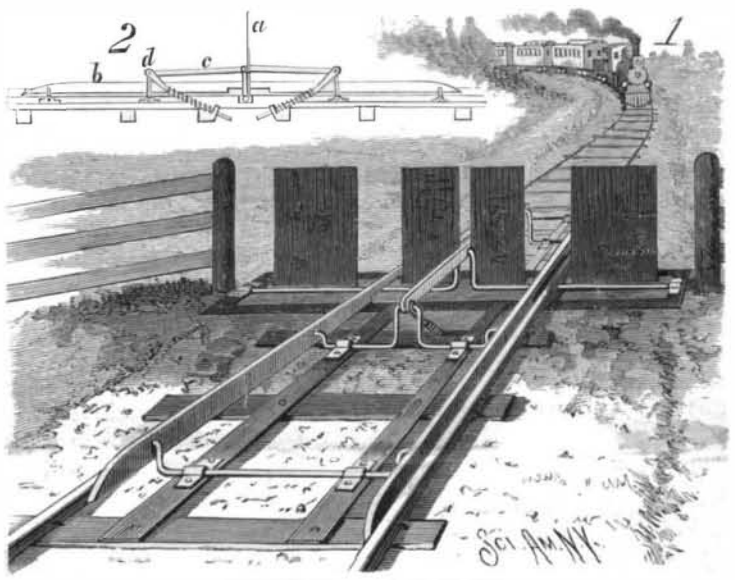
When the lever is swung up, as shown in Figs. 3 and and 4, a smooth or straight edge part of the pinion faces the rack in the standard, thus permitting the plate to be raised until its top rests against the body to be lifted. The lever is then swung down, when the pinion engages with both racks, the standard rack forming a fulcrum and the plate being raised; the slide then moves to the bottom of the groove. Fig. 1, and locks the parts in place. To lower the plate, the pin projecting from the slide through the vertical slot is raised, when the lever can be swung up to bring the straight edge part of the pinion opposite the standard rack. The jack thus constructed is easy to handle, strong and durable.

Card Board Enamel.

Take one pound of parchment cuttings, one-quarter pound of isinglass, and one-quarter pound of gum arabic in four gallons of water; boil in an iron kettle until the solution is reduced to twelve quarts; it is then removed from the fire and strained. The solution is divided into three parts of four quarts each; to the first portion is added six pounds of white lead, ground fine in water, to the second portion is added eight pounds of white lead, and to the third is added six pounds of white lead. The sheets of paper or card board are stretched out upon flat boards, and brushed over with a thin coat of the first mixture with an ordinary painter's brush; the paper is then hung up to dry for twenty-four hours. After this the paper is ready to receive a coat of the second mixture, and again hung up to dry for twenty-four hours; the paper is again treated in the same way with the third mixture, and dried for twenty-four hours. After this it receives a high gloss, which is obtained by laying the work face downward on a highly polished steel plate, and then passing both with great pressure between a pair of powerful rollers.

RAILROAD GATE.

This railroad gate—patented by Mr. Francis L. Bair, of East York, Pa.—is so constructed as to be opened by the wheels of the engine of an advancing train, and to close automatically after the passing of the train. To the ends of two of the ties, which are extended beyond the rails, are attached bearings for a central shaft carrying the plates or frames, *a*, forming the gate, which will be opened and closed by the rocking of the shaft. At the middle part of the shaft is a crank projecting in the plane of the frames; a bar, *c*, is pivoted to this crank, and also to cranks formed in shafts, *d*, journaled in bearings attached to bars secured to the ties, parallel with and at a little distance from the inner sides of the rails. Upon the ends of the shafts, *d*, are shorter cranks to which are pivoted bars, *b*, placed close to the inner sides of the rails, so that they will be in the paths of the flanges of the engine and car wheels. The ends of these bars are carried by cranks on the ends of shafts placed as shown in the engraving. The ends of the bars are beveled so that when struck by the engine wheels they will be pushed forward and downward, turning the shafts and causing the center bar, *c*, to open the gate. These bars are of such length that the gate will be opened before the engine can reach it, and that at least one pair of wheels will be always upon the bars until the entire train has passed. The gate is closed—raised—by the elasticity of springs attached to the cranks of the shafts, *d*, as shown in both figures.



BAIR'S RAILROAD GATE.

The Way Incandescent Lamps are Made and the Air Exhausted.

"The way that incandescent lamps are made is very simple," an electrician said recently. "There are different ways of preparing the filaments, which are shaped, carbonized, and treated at a white heat. They are then placed in platinum holders, which are embedded in glass, and next go into the hands of the glass blower. The glass bulbs have round openings at the bottoms and little tubes at the tops. The little tubes all connect with a big tube. This is called a fork, and resembles a cluster of blackberries. Two or three dozen bulbs may be on a fork. The glass blower places filaments in each bulb at the bottom, and welds the glass about the platinum holders to the edges of the opening. Then the air is drawn from the bulbs.

"The open end of the big tube is attached to an air pump, which has forty pounds of mercury at its top. As the mercury drops it carries all the air with it, and vacuums are created in the bulbs. The operator then takes a Bunsen burner, and directs its flame against the little tubes close to the bulbs. This closes the bulbs, which are then removed from the big tube. The glass blower finishes them off. The exhausting of the air from so many lamps at once makes the cost small. The bulbs can be made by any ordinary glass blower, but it requires a man of intelligence to make the filaments."—*Electrical Review.*

Common Soap.

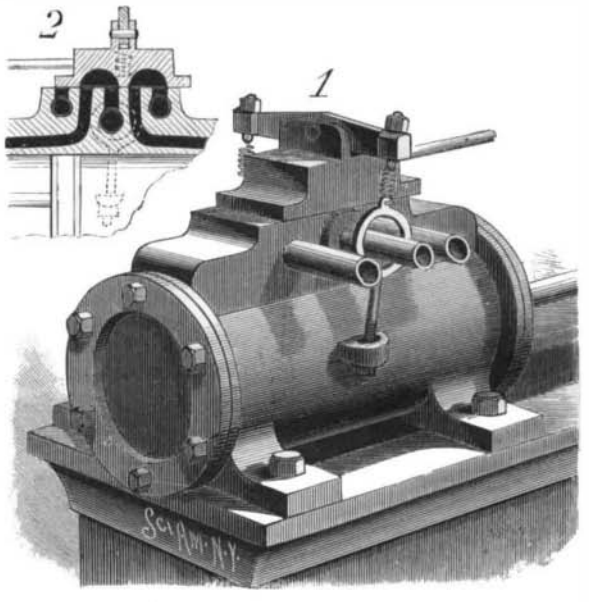
Manufacturers doing a large business have kettles holding several thousand pounds. The ingredients of ordinary family soap are, primarily, grease or tallow, rosin, soda ash, and salt. They are boiled for a couple of days, and then allowed to cool for about three days. The soap is then pumped from near the bottom of the kettle—this is because the soap in the bottom cools more quickly than at the top—and into a crutcher, nearly like a milk churn, where it is mixed thoroughly. In this crutcher most of the adulteration commonly used in soap is introduced. Among the materials put into the soap are marble dust, glucose, sal soda, which is not used so much to cheapen the soap as to improve its appearance, flour, and starch. From the crutcher the soap is run into boxes called frames, and is cut into bars when it becomes hard. It takes about two weeks from the time the material is put in the kettle to the time the bars are placed in boxes ready for the market. One-third of the weight of a bar of soap when boxed is water.

This will dry out in course of time, leaving a three pound bar weighing only two pounds. Rosin is used in almost all soap, but is absolutely without use except to make the cost less to the manufacturers. This is also true of all the ingredients in soap, except the fatty substance and the ash. Yet the wastefulness of the persons who do washing makes it an absolute saving to the consumer to have three-quarters of it adulteration.—*Laundry Gazette.*

BALANCED SLIDE VALVE.

The valve has two cavities in its face, arranged one in advance of the other, which as the valve is reciprocated alternately open the steam and exhaust passages leading from the opposite ends of the cylinder. The valve seat has five ports—a central port connecting with a steam pipe or inlet, one port at each side of the central one, and an exhaust port at each end. As the valve is moved backward and forward over these ports, the cavities in it will distribute steam to, and exhaust it from, opposite ends of the cylinder alternately; the routes of the live and exhaust steam during any position of the valve will be understood from Fig. 2, a longitudinal section through the cylinder and valve. The valve may be operated by an eccentric set as in ordinary engines.

The valve requires no steam chest, and is held to its seat by spiral springs arranged on opposite sides of the valve and connected at one end to the ends of a cross-bar pivoted at, and extending across, the center of the valve; the other end of each spring has an adjusting screw bolt connecting with the sides of the cylinder, as shown in Fig. 1. By this construction the valve



WETHERILL'S BALANCED SLIDE VALVE.

may be balanced, or nearly balanced, against varying steam pressure, and as there is no chest to conceal the valve, its condition as to tightness may always be seen.

This invention has been patented by Mr. C. P. Wetherill, of Woodville, Miss.