groove near its reduced outer end, the disk receiving the end of the pin having a central recess, within which is a dog held by a shank passing out from the disk and having a knob, as shown in section in Figs. 2 and 3.

A spring bearing against the end walls of the recess retains the dog in position. The hank having been passed around the stay, and the pin entered the aperture of the second disk, the spring-actuated dog drops into the pin groove and constitutes a lock, the fastening being readily released by pulling on the knob.

CUTHBERT'S CAR HEATER.

AN IMPROVED SAFETY CAR HEATER.

A car-heating furnace, surrounded by a water tank mounted on wheels and adapted to revolve around the heater, is illustrated herewith, and has been patented by Mr. Robert B. Cuthbert, of Ten Mile Hill, S. C. The heater has the usual fireplace, ash pit, and door, and is mounted on a circular base, in the outside of which, on suitable brackets, are mounted wheels which support a tank surrounding the heater, with the exception of the front, the tank being filled with water or other fire-extinguishing fluid. To the upper end of the tank are secured upwardly and inwardly bent pipes, opening at their free ends into the top opening of the heater, and on the top is a dome-shaped shell with a smoke outlet, the interior of the top being protected by a spherical fire guard or deflector, preventing the smoke from passing directly upward, but causing it to travel under the lower edges of the deflector, and thence to the outer opening at the top. When the car meets with an accident whereby the heater and tank are upset, the fire-extinguishing fluid will flow by the pipes into the fire-box or on the burning fuel that may escape.

AN IMPROVED GATE.

A firmly constructed and inexpensive gate, designed principally for use with fences for lands, and which is so made that any tendency to sag can always be readily corrected, is shown in the accompanying illustration, and is covered by two patents granted to Mr. John B. Holton, of Washington, Ky. Between the uprights are stretched a series of longitudinally ranging stay rods, which have heads at one end and screw-threaded bolt ends and nuts at the other end, these rods passing through a diagonal brace of the gate, and also through a vertically ranging metal stay bar. The tops of the uprights, which project above the top rail, are connected by a truss rod, which passes through a hole or slot in the top of an angular metal plate held to the top gate rail partly by the same bolt which holds the diagonal brace to this rail. This angular plate is also held firmly by a nut which locks thereon the end of the vertical stay bar. A brace rod also extends from the hinge upright to the diagonal brace, and has adjusted nuts on its rear end. With this construction there is very little liability of disjointing the gate, either laterally or vertically, and the tendency of the gate to sag is reduced to a minimum. Fig. 2 shows the gate frame, from which the longitudinal stay rods and the base board are omitted, and also illustrates the construction and application of the hinge and latch. The hinge is a right-angular rod, with its longer arm passing down through two open eye bolts set in vertical alignment in the post, and its shorter arm passing through the hinge upright of the gate. This shorter arm of the hinge, being screw-threaded, combines with a screw plate thereon, which in position rests against the outer face of the upright, and through its upper end, just above the hinge rod, passes the brace rod of the gate. A nut is screwed on the end of the short arm of the hinge, which projects through the upright. The lower end of the long arm of the hinge rod enters the eye of a screw-threaded eye bolt, which passes through the hinge upright, and has two nuts applied to it on the respective sides of said upright. Any tendency of the gate to sag can always be readily corrected by the adjustment of the nuts on this bolt, and also by adjustment of the screw-plate and nut on the horizontal or shorter arm of the hinge rod, and the adjustment of the nuts on the outer end of the brace rod. The gate latch comprises a couple of bolts fitted to slide horizontally, within metal cups or bushings, in the outer upright, the bolts having springs to force them outward, and their inner ends being connected by links or chains with cranks formed as bends of a latch-operating bar journaled to the top and bottom rails of the gate. A double-inclined catch plate is fixed by bolts or screws to the latch post.

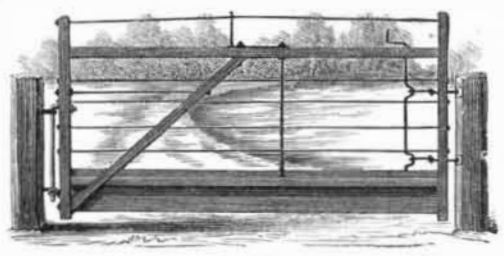
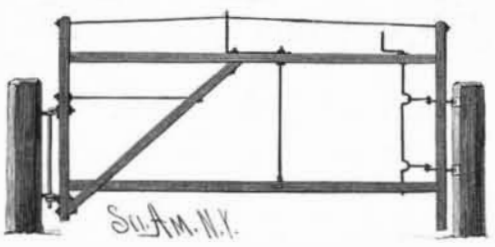


FIG. 1.

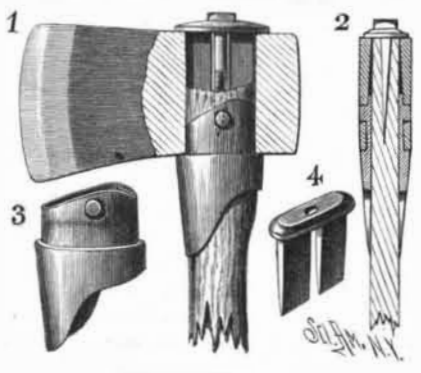


HOLTON'S GATE.

AN IMPROVEMENT IN ATTACHING AX HELVES.

An invention providing means whereby the helve may be quickly and readily attached to and detached from an ax, and the ax be greatly strengthened, is illustrated herewith, and has been patented by Mr. Calvin Maloney, of Lower Lake, Lake County, Cal.

The ax is made with aligning apertures in its sides, from the eye, as shown in Fig. 1, and a socket of malleable iron, with shoulder and lugs, is adapted to be fitted therein, as shown in Figs. 2 and 3. The helve is then inserted in the eye in the ordinary manner, the outer portion of the socket encircling the helve immediately below the ax, at the weakest point.

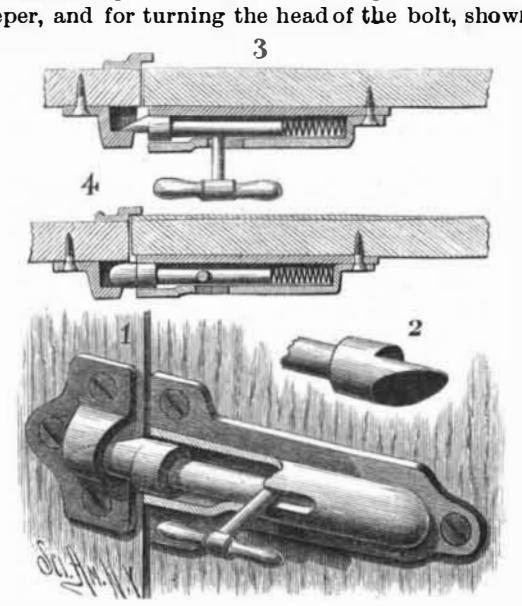


MALONEY'S AX.

In a vertical wedge-shaped slot at the top of the helve is inserted a centrally divided wedge, Fig. 4, and into a central aperture of this wedge is passed a screw, whereby the wedge is firmly fixed to hold the ax upon the helve, and by unscrewing which the wedge may be readily taken out and the ax detached from its helve.

AN IMPROVED DOOR BOLT.

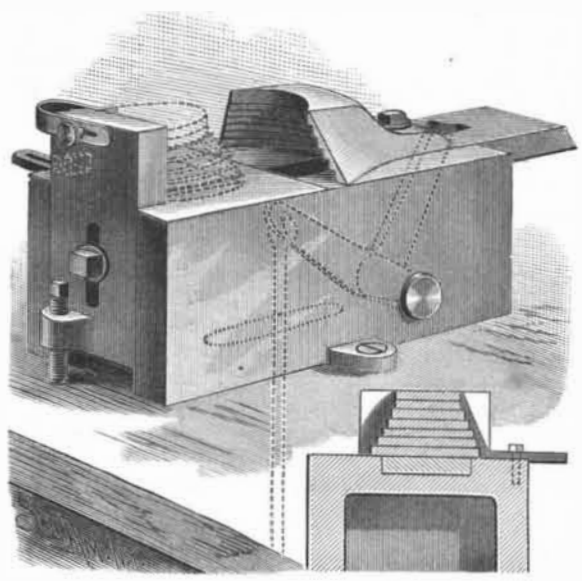
A door bolt especially applicable to refrigerator, ice-house, and similar doors, where it is desirable to close the doors very tightly, is shown herewith, and has been patented by Mr. Frank T. Cladek, of Rahway, N. J. The casing holds a coiled spring to constantly press the bolt forward, the handle of which projects through an opening with side notches to permit the turning of the handle up or down, for locking the bolt in the keeper, and for turning the head of the bolt, shown in Fig. 2, so that it will exert a cam action in the keeper for closing the door tightly. When the handle stands at right angles to the door, as shown in Figs. 1 and 3, the flat surface on one side of the extremity of the bolt will face outward, and in this position will hold the door and door frame flush with each other; but when the handle is turned up or down, as shown in Fig. 4, the cylindrical portion of the bolt will press the door inward tightly against the door jamb.



CLADEK'S DOOR BOLT.

A MACHINE FOR FORMING BOOT OR SHOE HEELS.

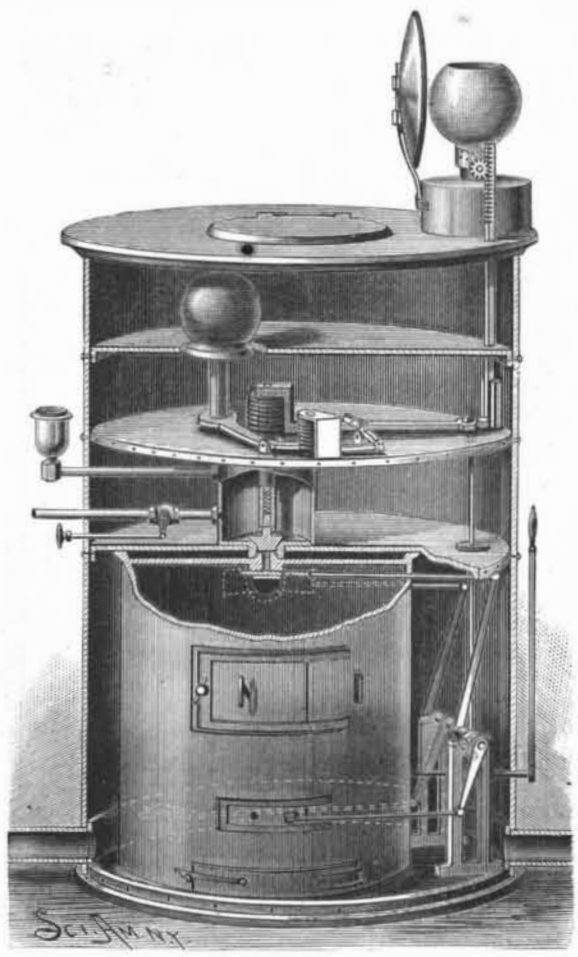
A machine with which a boot or shoe heel may be quickly built to nearly the desired shape, and which is designed to be operated by an inexperienced workman, is represented in the accompanying illustration, and has been patented by Mr. Edgar Jones, of No. 383 Hamilton Street, Albany, N. Y. A perpendicular plate slides vertically in a groove in one end of the base, the plate being adjustable by a screw at such height as desired, a gauge being attached to one edge of this end sliding plate to constitute a guide for the upper lifts, and another gauge being provided in the upper surface of the table as a guide in placing the lower lifts. Each gauge is slotted and held by a set screw to be readily adjustable to different sized lifts. In ways upon the upper longitudinal edges of the base slides a plate adapted to carry upon its forward part a die or former, the plate being moved forward by a treadle, and a separate die or former being used for different styles of heels. The lifts are placed in position one upon another, as shown in dotted lines, their front surfaces bearing against the end plate, when the die or former is brought firmly against them and the several lifts held in a fixed position until they are nailed.



JONES' BOOT OR SHOE HEEL FORMER.

AN IMPROVED FIREPROOF CAR HEATER.

A car heater which is designed, in case of accident, to extinguish the fire in the heater and the lights in the car, to shut off draught and prevent the escape of smoke and hot air, is illustrated herewith, and has been patented by Mr. Jerod Tyler, of St. Mary's, Pa. The casing is made of strong boiler iron, in which the furnace is braced with light curved braces, which, with the transverse plates, are designed to give the heater fully the strength of a locomotive boiler. The casing has three horizontal partitions, besides the top plate, and the partition which rests on the top of the heater proper supports a fuel-extinguishing device, with a vessel to contain an extinguishing fluid, and



TYLER'S CAR HEATER.