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

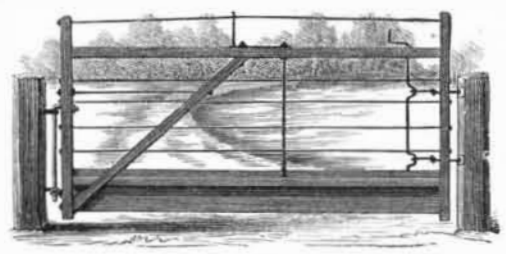
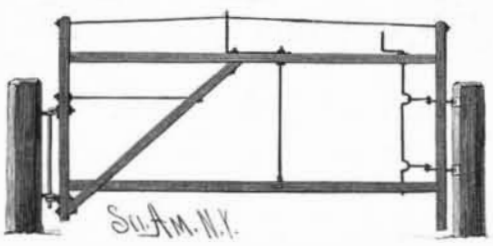


FIG. 1.



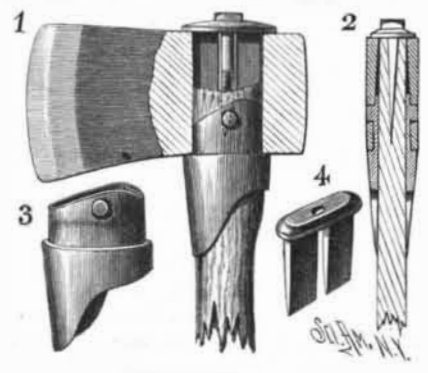
HOLTON'S GATE.

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.

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



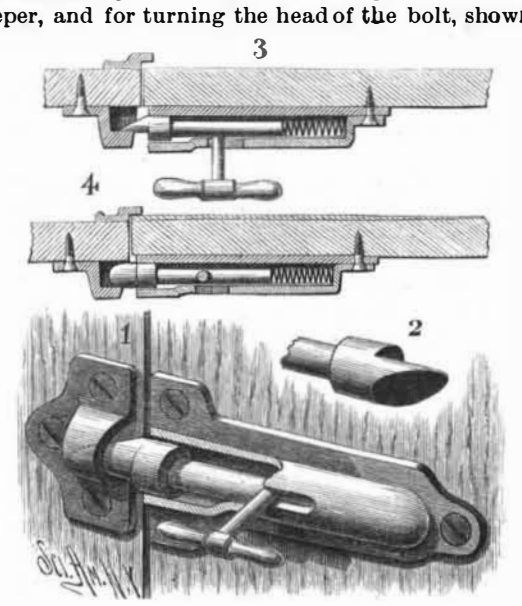
MALONEY'S AX.

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.

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

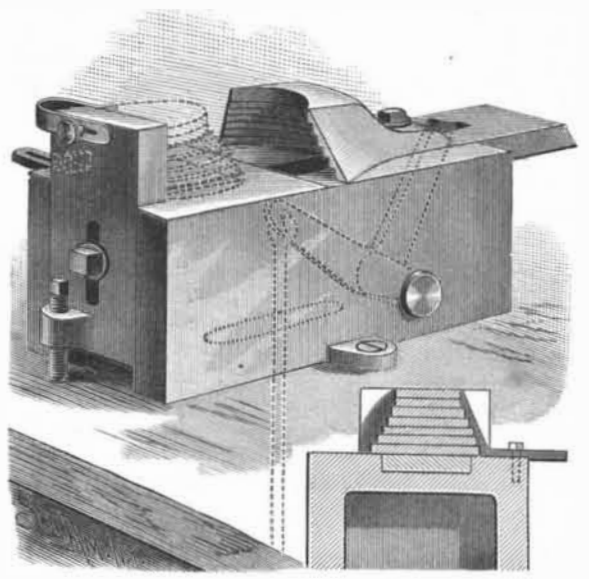


CLADEK'S DOOR BOLT.

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.

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

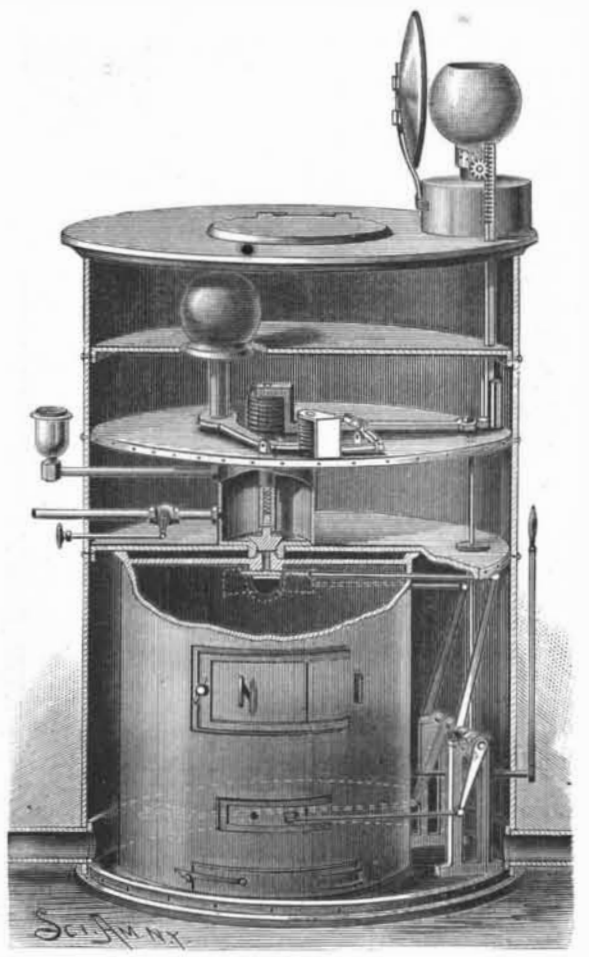


JONES' BOOT OR SHOE HEEL FORMER.

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.

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.

having an aperture leading to the interior of the heater. A rod passing through the top of this vessel, and above the next partition, has on its upper part a coiled spring which presses against an arm actuating a lever which extends upward through the next partition, carrying in its upper end a cup supporting a heavy ball. Another arm of this lever is connected with a rod which turns the wick rod, to extinguish the light in the lamp or lamps connected therewith, and other connections provide for closing the heat apertures, shutting off the draught and closing the smoke flue, and opening the valve by which the fire-extinguishing fluid is permitted to fall through into the interior of the heater. This action is only set in motion by a shock of sufficient severity to displace the heavy ball which rests in the cup above the upper partition.

Spectacles for Horses.

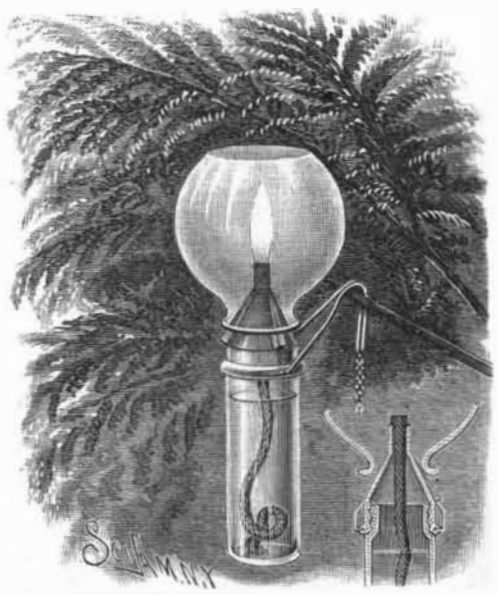
A correspondent of the Manchester *Sporting Chronicle* tells the readers of that paper some interesting circumstances in connection with a "good grey steed in his own possession." He came to the conclusion that this equine friend of his was short-sighted. He "couldn't see a carrot two yards off," he tells us. So he took the quadruped to an oculist living in the neighborhood, who made the necessary inspection and certified that the horse had a No. 7 eye, and required concave glasses. The concave glasses thus indicated were obtained and buckled on to the head stall. "The horse seemed a little bit surprised," he says, "when I first put them on him, but his amazement rapidly gave way to demonstrations of the keenest pleasure. He now stands all the morning looking over the half-door of his stable with his spectacles on, gazing around him with an air of sedate enjoyment. . . . When I take him out for a drive," continues the veracious narrator, "he capers about as frisky as a kitten; his manner is altogether changed from his former timidity, and he has got over a bad habit of shying which once troubled him." A week or two ago, however, he turned the animal out to pasture for a few days, of course without his specs, and he at once appeared to be uneasy and uncomfortable. All day he hung about the gate leading into the meadow, whinnying in a plaintive minor key, until his master, seeing what was the trouble, sent up to the stable for the head stall. As soon as the spectacles were placed upon his nose, he was so glad that he rubbed his master's shoulder with his nose, then kicked up his heels and danced down to the pasture in a very vein of delight. Staffordshire was the scene of this history. We do not know the locality more definitely.

Articles found in an Etruscan Tomb.

A fine glass vase, just discovered in an Etruscan tomb at Bologna, is of a sea-green color, like a soda water bottle, thick and of a unique form, with two handles. It is nine inches high and without ornamentation. There is not a single defect, flaw, crack, or chip about it. With it was found an ivory chair, made after the fashion of a modern camp stool, having all its screws and rivets still in perfect condition, and a small casket containing beads and some very elegant articles in bronze. The articles are supposed to date from the fifth century. The tomb in which they were found was closed at the top by an enormous globular mass of stone as fresh as if it had only been fashioned yesterday.

A LAMP FOR CHRISTMAS TREES.

A candle-like lamp, with special means for its suspension and attachment, applicable to various decorating and illuminating purposes, and particularly designed to take the place of candles on Christmas trees in churches, schools, etc., is represented herewith, and has been patented by Mr. John H. Barth, of No. 612 East Market Street, Louisville, Ky. The body may be a simple glass vial having an exterior screw thread on its neck, while the burner is conical, made in a single piece, with a central wick passage, a suspension wire

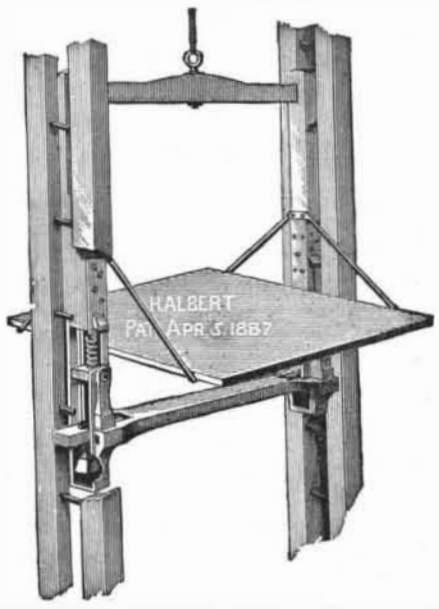


BARTH'S CHRISTMAS-TREE LAMP.

formed with a hook being pivotally connected at its ends to opposite sides of the burner. The burner has exterior tapering ridges over which may be slipped, and which will securely hold, a globe, the spaces between the ridges or ribs serving to supply air to the wick. The hook provides for readily hanging the lamp as desired, and, in connection with the suspension wire, the lamp may be secured in any position almost instantaneously.

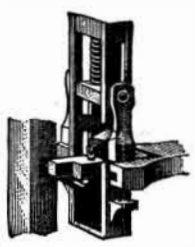
AUTOMATIC SAFETY ELEVATOR.

The vertical side sections of the elevator car travel in guides consisting of twin vertical uprights, built into the wall on each side of the elevator shaft. These guides are provided with pins or bars arranged within the guides at regular intervals. The side sections of the frame slide up and down within the guides, and are connected with one another by a horizontal cross section, which carries at its extremities the safety catches. This catch is under the car, and is a lever pivoted at the center and so arranged as to strike freely the bars within the guides. It is brought back to its horizontal position by a small weight. This lever strikes the rack bars successively, but is simply swung out of the way and performs no function. If, however, the descent becomes too rapid, the lever bar is thrown over a half revolution, and the other end of the lever comes in contact with the rack pin between the guides, and as the pivoted bar can only make a half revolution, it serves as a stop and prevents further descent of the car.



AUTOMATIC SAFETY CATCH FOR ELEVATORS.

By the same movement the weight, which is hung to the bottom of the swinging bar, is thrown over and prevents the same from rebounding before it is caught upon the rack bar. There is very little jar, as the shock is taken up by springs, which are mounted in the frame between the safety catch and the car body. The large engraving represents the catch in its normal position, and the small cut shows it in position to stop the car. In order to return the stops to their normal position, it is only necessary to raise the cage until the first bar of the rack above is reached, which turns over the lever and permits the cage to descend. Since the catch is arranged under the cage, the operation of the safety appliance is not dependent upon the hoisting rope, machinery, nor dogs, nor cam, but simply on its own action, so that when the movement is too fast the stops turn over and the cage is arrested.



This device has been patented by Mr. Henry Albert, of Crescent City, California.

Manchester Mill Operatives.

The Saint James's Budget of November 19 says:

"There have been fewer spindles running this year in Manchester than at any time since the cotton famine, and the published balance sheets of the joint stock spinning companies show scarcely a margin of profit where they do not show a loss. It can hardly be said that private firms have fared any better. Of course for this melancholy state of affairs foreign competition is largely accountable. Concurrently with the decay of prosperity, we note the decline in character and physique. The graybeards who made Lancashire rich and famous were reare on porridge and potato pie, and are robust old men, hard-headed, upright, open-handed, adventurous, and not over-educated. The sons are weaker both in physique and character. Among the operatives the deterioration is still more marked. The mill operative is stunted, pale and pinched, restless and irritable, and generally has some disorder of the digestive organs. Nature may have given to his dwelling place green bank and field and tree and flower, but factories and chemical works have made its fields into cinder wastes, its streams into sewers, and have killed with their poisonous exhalations both flower and tree. He earns the wages of a skilled artisan, but the trick of his occupation learned, he is a mere attendant on a machine of which he knows little or nothing. He leads a weary, poisoned life, and his womankind are like himself. They work with him in the mill, and are stinted and pinched. Next to the women of the collieries, they are the most unwomanlike of their sex—as flat and narrow of figure as the men, and it is understood by some, who are not very sorry for it, that they find it difficult to become mothers. Large families are rare. It really seems as if in the fifty years of driving work and industrial ascendency, Lancashire has almost spent the pith of her people. But if we are ever threatened with civil strife, and if Lancashire has sunk meanwhile into deeper poverty than now, her mill operatives will be the most dangerous of revolutionaries."—*John Fretwell.*

Electric Street Cars.

In a recent issue our Berlin correspondent gave a description of the new electric tram car tried on the Cologne railways by Messrs. Herbrand & Co., of Ehrenfeld. The whole electrical installation on this car has been designed by Mr. Huber, of Hamburg, who had two cars on the same system running in that town from the 1st of May to the 25th of December, 1886, but which were withdrawn at that date, as it was found that they were not sufficiently powerful to overcome the resistance of the track when the groove in the rails was filled with snow or ice. We have received a letter from Mr. Huber referring to the question as to what power should be provided for electrically propelled cars, and as he has had a large experience in this subject, his figures will probably be of interest to our readers. Mr. Huber estimates that on an average road, with gradients not exceeding 25 per 1,000, the energy which must be stored in the cells is 7·6 watt hours for every 100 kilo of rolling load moved a distance of one kilometer. Reduced to English measure, this works out to 125 watt hours per ton mile. Allowing an efficiency of 80 per cent from the indicated power of the engine to the electric output of the dynamo, we require 0·21 i. h. p. hours for every ton mile. Thus in a tram service employing fifteen cars, each weighing 8 tons when full, and where every car runs 70 miles, the daily charging power required would be 1,760 i. h. p. hours. If the time of charging is 15 hours daily, steam power to the amount of 117 i. h. p. would have to be provided. The power naturally varies with the condition of the road. In warm, rainy weather, less than the amount here given will be required; but when the road is clogged with dirt, ice, or snow, something more should be allowed.—*Industries.*

IMPROVED ROCKER FOR ORDINARY CHAIRS.

A simple, efficient, and adjustable rocker, adapted for use with ordinary chairs, is represented herewith, and has been patented by Mr. Daniel Smith, of Santa Rosa, Sonoma County, Cal. It consists of a base frame having sockets to receive the rear legs of a chair, with springs supported at one end by standards fixed to the base frame, the other ends of the springs being secured to the front legs of the chair. These springs can be placed on any common chair, to make a rocker of it, and, being placed under the chair, are entirely out of the way of the feet or ladies' dresses, the springs giving an easy rocking motion under the tension which comes on them with a person sitting in the chair, and preventing any excessive movement either forward or backward.

SMITH'S ROCKER FOR CHAIRS.