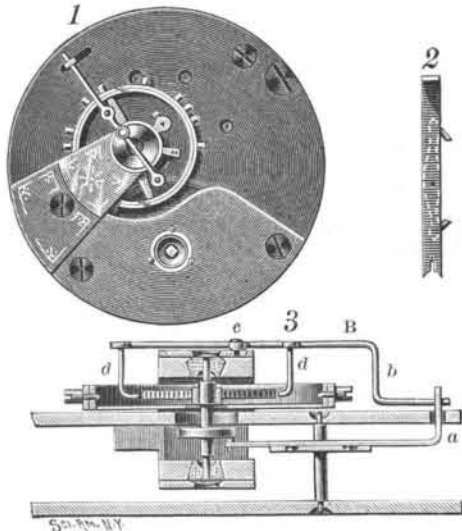


AN IMPROVED BALANCE ESCAPEMENT FOR WATCHES.

The application of a governor to the hair spring and balance wheel of a watch, in the form of a free curb actuated by the pallet or escapement lever, to lessen the effect upon the watch of jar or shock, is illustrated herewith, and has been patented by Mr. Sirius E. Kochenderfer, of Hollidaysburg, Pa. The escapement lever, shown in Fig. 2 (the escapement wheel not being shown), has a forked end in which works the pin on the balance staff roller, and the outer or back end of the



KOCHENDERFER'S BALANCE ESCAPEMENT FOR WATCHES.

lever is extended and bent to form a slotted arm, working through a slot in the top plate, as shown at *a*, in Fig. 3, this arm engaging with a bent arm, *b*, of a vibrating rod or wire, *B*, having its pivot, *c*, a little to one side of the axial line of the balance staff. This vibrating governor, *B*, has inwardly projecting curbs, *d d*, that serve to receive freely but moderately closely in between them the hair spring. This governor is vibrated in common with the escapement lever, by which it is driven, and serves to equalize the motion and adjust to equal motion in any position the watch may be turned. In case of shock or jar the balance wheel is restrained from making lost motion by the curbs of the governor, while the pin on the roller of the balance staff is not liable to work out of timely relation with the fork of the escapement lever, avoiding danger of locking the balance or producing breakage of the pin jewel.

THE AUTOMATIC RUBBER MIXER.

The accompanying illustrations represent a new appliance for the "compounding" of rubber which

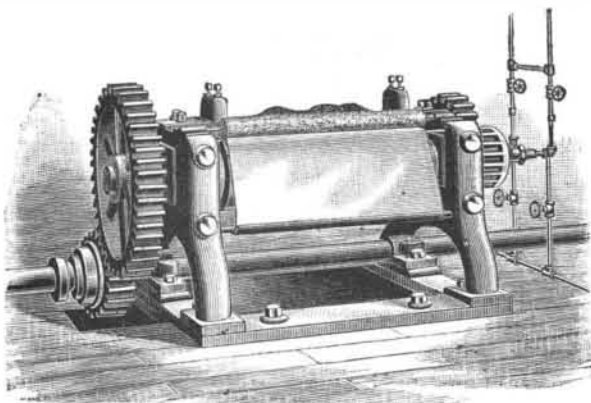


Fig. 1.—THE AUTOMATIC RUBBER MIXER.

promises much in the way of rapid and economical work. The automatic rubber mixer consists of a stout belt of duck covered with rubber, which runs horizontally beneath the mixing rolls, occupying the place usually filled by the "compound box." The upper surface of the belt when in use is drawn against the

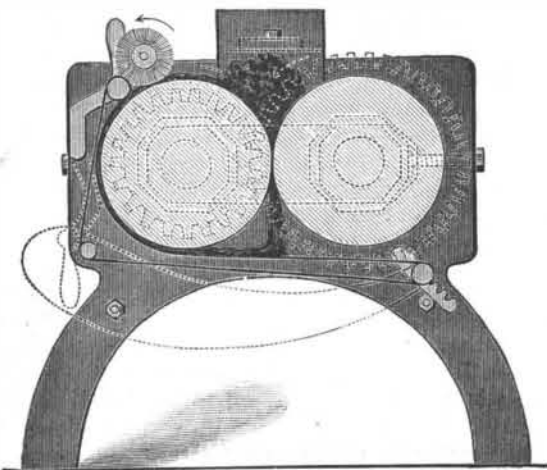


Fig. 2.—THE AUTOMATIC RUBBER MIXER.

face of the "back roll," as shown in black lines in Fig. 2, and is brought up even with its top, where it is held by two strong springs. The turning of the roll sets the belt in motion, which results in the constant and even feeding of anything that drops between the rolls, to the top, for further grinding. When a "batch" is thoroughly mixed the belt can be released and dropped out of the way, as shown in dotted lines, and the rubber refined with as much care as if no belt were there. If, during the mixing, the piece goes over the back roll, the belt springs immediately lengthen out, and the belt goes on with its work of carrying up the compound as easily as before. To prevent the working out of the compound between the ends of the rolls and its loss by dropping over the edge of the belt, a pair of metal guides are attached directly below the rolls, which serve to throw it in toward the center of the belt.

Practical tests with the automatic rubber mixer are said to show that one man can run three or more grinders with it, and deliver one-fourth more work from each. Aside from this, the product is far more homogeneous than when the compound is fed with a hand shovel, and there is less danger of burning sensitive stocks.

Fig. 1 is a perspective view of the mixer attached to a grinding mill, Fig. 2 showing an end view of the same, the belt being drawn up over the back roll and in the act of feeding the compound to the top of the rolls. Both American and foreign patents have been secured upon this invention and a company, known as the Automatic Rubber Mixer Company, No. 38 South Market Street, Boston, Mass., are now building the machines. Models of the mixer, as well as machines in actual use, may be seen, or any other information desired can be obtained by writing to Henry C. Pearson, general manager, at the above address.

Japanese Lacquer for Iron Ships.

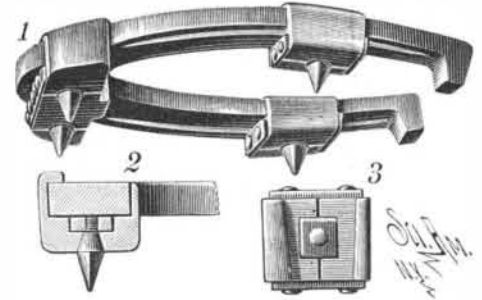
The Japanese Admiralty has finally decided upon coating the bottoms of all their ships with a material closely akin to the lacquer to which we are so much accustomed as a specialty of Japanese furniture work. Although the preparation differs somewhat from that commonly known as Japanese lacquer, the base of it is the same—viz., gum lac, as it is commonly termed. Experiments, which have been long continued by the imperial naval department have resulted in affording proof that the new coating material remains fully efficient for three years, and the report on the subject demonstrates that, although the first cost of the material is three times the amount of that hitherto employed, the number of dockings required will be reduced by its use to the proportion of one to six. A vessel of the Russian Pacific fleet has already been coated with the new preparation, which, the authorities say, completely withstands the fouling influences so common in tropical waters. It occupied the native inventor for many years to overcome the tendency of the lac to harden and crack, but having successfully accomplished this, the finely polished surface of the mixture resists in an almost perfect degree the liability of barnacles to adhere or weeds to grow, while presumably the same high polish must materially reduce the skin friction which is so important an element affecting the speed of iron ships. The dealers in gum lac express the fear lest the demand likely to follow on this novel application of it may rapidly exhaust existing sources of supply.

AN IMPROVED WIRE FENCE.

A wire fence in which the posts are braced and sustained in a novel way, and are laterally adjustable to accommodate the expansion and contraction of the wires, is illustrated herewith, and has been patented by Messrs. Thomas Griffin and William J. Mitchell, of Noblesville, Ind. Each post is anchored in place by a rod looped around a stone or other weight, and secured to the post by a nut, while upon the opposing face of the post is a rack having a central longitudinal aperture and aligning recess, adapted to receive a rack plate and lug secured to one end of a brace, as shown in the small figures, the lower end of the brace resting upon a stone or other suitable block. The brace is held in connection with the post by a lever pivoted to the post by a staple, a rod from one end of the lever extending through the brace, and having its end threaded to receive a nut, the tightening or loosening of which causes the post to incline slightly inward or outward, as may be desired, on account of the expansion or contraction of the wires. These post braces may be used in connection with as many of the intermediate posts as is found desirable, but are designed to be at all times employed in connection with the end posts. That the wires may be properly spaced, they are tied together by spaced vertical clamps or stays, consisting of metal bars pivoted one upon the other at their lower ends, as shown in a small figure, having slots at the desired distance apart, so arranged that when one bar is folded upon the other, the slots in each will register. This stay may be attached to all but the top wire, or may include that also, as shown in the illustration.

A REMOVABLE CALK FOR HORSESHOES.

A device whereby the calk may be securely held in place on a horseshoe, and readily removed therefrom for sharpening, is illustrated herewith, and has been patented by Mr. Thomas B. Mason, of 209 Warren Street, Trenton, N. J. A clamp is employed, shown in section in Fig. 2, having rocking portions connected together by straps and bolts, the toe clamp being formed with three rocking portions, the meeting edges of which are a slight distance apart, and have centrally beveled semicircular recesses, in which the calk is received. The

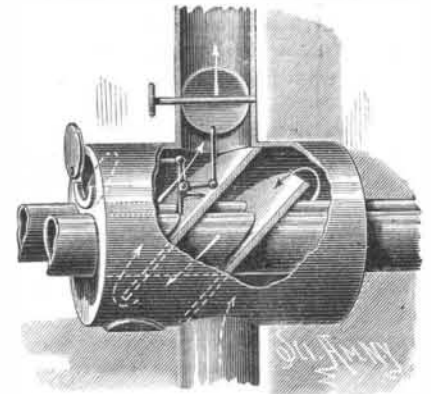


MASON'S REMOVABLE CALK FOR HORSESHOES.

calk has a shoulder which rests in these recesses, its inner end being screw-threaded, to engage a nut resting in an inside recess formed in the two adjacent rocking portions of the clamp, as shown in Fig. 3. As the calk is screwed into the nut, after the latter has been placed in its recess, the adjacent rocking portions of the clamp are forced apart, and cause the clips to be firmly pressed against the horseshoe. The clamps used in attaching the toe calks have a straight clip, which rests against the inner side of the horseshoe, with no projection to injure the horse's foot.

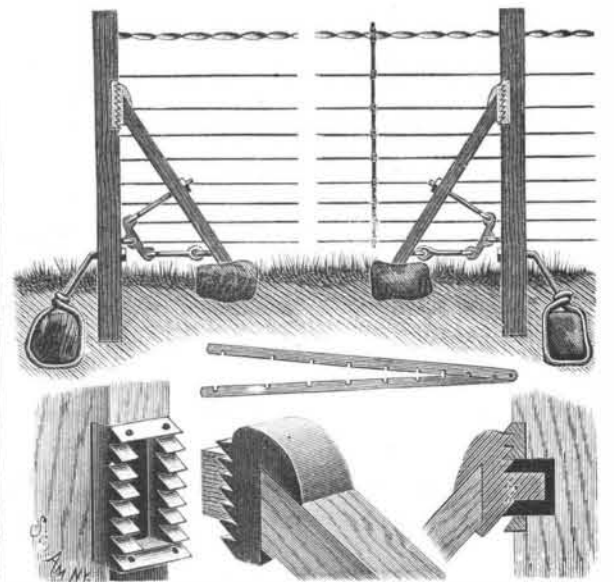
AN IMPROVED HEATING DRUM.

A drum for use in connection with stove pipes, either adjacent to the stove or distant therefrom, to retard the current of heated air in its passage to the chimney, and secure the best radiation of heat, is illustrated



GRAN'S HEATING DRUM.

herewith, and has been patented by Mr. Edward C. Gran, of Jordan, Minn. The heads of the drum have openings in which rest pipes through which the air of the room may freely circulate, the drum being secured to thimbles receiving the ends of sections of a stove pipe. The interior of the drum has inclined partitions, through which extend the lateral pipes, the partitions directing the current of heated air entering from the stove pipe in the lower opening of the drum, as shown by the arrows, around the lateral pipes, to the upper drum opening. There is an opening covered by a slide in the bottom of the drum, from which soot may be removed, and, in order to check the draught through the drum, it has an opening provided with a wire screen and pivoted cover, above the lateral pipes, this opening, which serves also as a ventilator for the room, being adapted to be closed on the inside by a valve connected with the damper. There is no opportunity for the drum

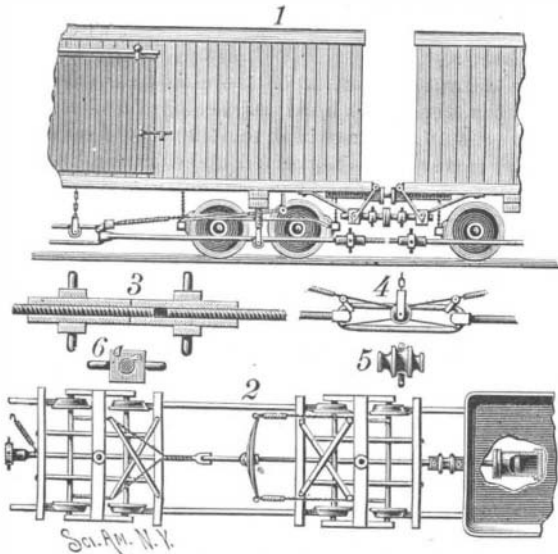


GRIFFIN & MITCHELL'S WIRE FENCE.

to become choked with soot, and thus rendered inoperative, and the construction is designed to afford a simple and effective means to utilize heat that would otherwise pass up the chimney.

AN IMPROVED AUTOMATIC CAR BRAKE.

A brake which is designed to be automatic, not affected by snow or ice, which adjusts itself to either direction in which the car is pulled, and which may be effectively operated when a train is moving at a high



TAYLOR'S CAR BRAKE.

rate of speed, has been patented by Mr. Frederick G. Taylor, of Cranston, R. I., and is illustrated herewith. A centrally hinged rod extends beneath the car from end to end, below the axles, supported by and reciprocating upon pulleys hung from the beams. The rods at the ends of the cars are threaded, and have couplings, as shown in Fig. 3, by which the several cars of a train are quickly united. A brake beam carrying brake shoes is suspended a proper distance in front of the wheels, and each end of one brake beam is connected to a lever fulcrumed to the extremity of a bar extended from the brake beam on the opposite side of the truck, the two levers crossing each other, and their free ends being each united to a spring secured to the bottom of the cars. A chain or rod is also connected to the free ends of the levers, the opposite end of the chain being secured to a spring fastened to a link in the center of the rod extending beneath the car. At each end of the car, below the drawhead, are brackets carrying fenders on their outer ends, the fenders being adapted to hold the cars at a given distance apart, whereby all strain is removed from the rods extending beneath the cars, allowing them to reciprocate freely at any time. These rods are reciprocated from the piston of a cylinder beneath the cab or tender, as shown in the plan view, Fig. 2, whereby the levers connected with the brake beams are drawn forward or back. Fig. 4 illustrates a construction whereby the brake shoes are put in operation on all the wheels simultaneously, no matter in which direction the brake rod is pulled.

AN IMPROVED SIGNALING DEVICE FOR MINES.

A reliable and inexpensive electro-magnetic signaling device, easily operated by any one of ordinary intelligence, and especially adapted for use in mines, is illustrated herewith, and has been patented by Messrs. Logan M. Bullitt and Oscar C. Greene. Fig. 1 represents the general arrangement of the conducting wires, batteries, and signal bell, Fig. 3 showing a side post by which the wires are supported, Figs. 4, 5, and 6 showing hand circuit closing devices, while Figs. 7 and 8 show a bell or sounder attached to a circuit closer. The bell or sounder actuated by the system is placed in proper position relative to the engine, near the mine entrance, and the incoming and outgoing electric current wires connected with it and the main battery, branch wires being employed for different chambers of the mine, extending from the main wires as required, so that the circuit is continuous to the signal bell along either of the main wires. The main wires and their branches are parallel with each other, and only a little distance apart, so that by connecting these adjacent wires anywhere along their length by a proper conductor the circuit will be closed and the signal bell sounded. Suitable hand instruments for so joining the wires and closing the circuit are shown in the small figures, Fig. 6 showing a circuit closer adapted especially to wires arranged one vertically over the other. The main battery may be made sufficiently powerful to supply the circuit on all the wires, or additional re-enforcing cups may be placed in the branch

wire extension circuits, as shown in Fig. 1. This system of mine signaling has been for some time in practical use in mines of the Northern Pacific Coal Co., in Washington Territory, and is said to have given entire satisfaction. The apparatus is designed to be put up at a cost of not more than \$50 per mile.

For further information relative to this invention address Mr. Logan M. Bullitt, No. 141 South Fourth Street, Philadelphia, Pa.

The New Cast Iron Guns.

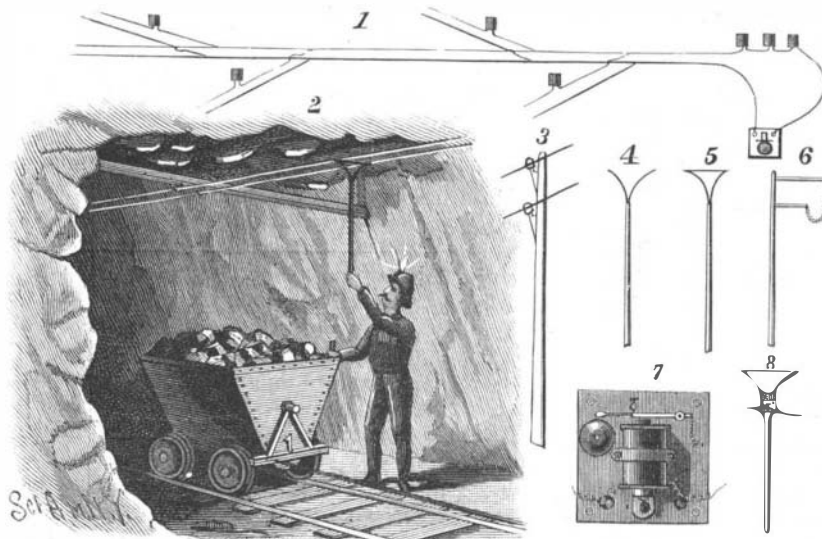
At the ordnance foundry of the South Boston Iron Works a large force of workmen is at present engaged in completing the third and last in the series of the three 12 in. cast iron rifled guns, with a steel tube and steel hoops. The work of putting in the steel tube, which is inserted at the rear of the barrel, extending through from the breech, has just been completed, after three trials, to insure getting a perfectly tight joint at the shoulder or casing of the gun. The gun was placed horizontally over a longitudinal pit, and was then covered in with boiler and sheet iron. A fire was built under it, extending from the breech of the gun to a point in front of the trunnions. The body of the gun was expanded by the heat, and the steel tube was inserted from the rear. A stream of cold water was kept circulating through the bore of the tube, to keep it cool, during the whole operation, which lasted about twenty-one hours. The gun was then cooled down at the breech to make it grip the tube, so that in contracting the front end of the tube was brought to a tight joint against the forward shoulders in the casing or body of the gun. An ingenious arrangement of bolts and set screws, together with a 100 ton jack, was used in inserting the tube and holding it in place until the cooling was completed. The gun will be transferred to the lathe in a few days to be finished, bored, and rifled, and will be delivered to the government early in the fall.

Artesian Wells in Sonoma.

A few weeks ago, according to the *Weekly Bulletin*, "a fine flow of excellent water was struck at a depth of ninety feet, on a lot a little to the east of the town of Sonoma, belonging to Mr. Gilbert. The next attempt was made at Mr. Winkle's vineyard, when at a depth of eighty-two feet a flow of 90,000 gallons per day was obtained. The tools were then moved about 150 feet south to the lands of J. Gundlach, where still greater success was met with. At a depth of one hundred and ten feet a flow of 100,000 gallons per day was reached. Both these wells are located in the foot hills, considerably above the level of the valley and supposedly in a very unlikely place to find such a result. The tools penetrated successive layers of sand, rock, and clay, the water being found below the latter. The water comes out with considerable force, and will overflow a pipe twenty feet above the surface. The fortunate owners of these wells consider them worth not less than \$10,000 apiece. The temperature of the water is constantly 72° F., and what is remarkable is that it is exactly the same as that of several springs on the other side of the valley, four or five miles away. Many of the farmers and fruit growers of the valley are arranging to put down wells."

Australian Mice.

The mouse pest in Australia is much worse than the rabbit pest. The climate is so soft that they have thrived enormously, and there is said to be

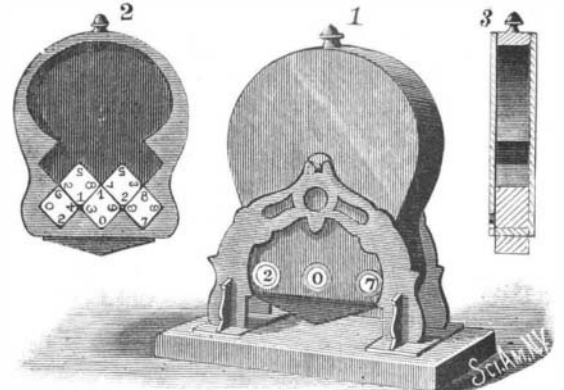


BULLITT'S ELECTRO-MAGNETIC SIGNALING DEVICE FOR MINES.

"hardly a residence or store that is not pestered by the plague. In some places they are so thick that, in order to get the stock properly fed, men have to watch while they are eating their provender. The week before the Coolah races the vermin got into the boxes at the station, and actually ate the bandages off the horses' legs, while from every side come tales of crops devoured so rapidly that many fields have had to be abandoned, what was left not being worth reaping."

AN IMPROVED DIE AND DICE BOX.

A closed dice box, mounted to be revolved on journals, the closed box having a chamber just the width of the dice, with recesses where the dice come to rest, so that the numbers on their sides may be read through holes in the sides of the box, is illustrated herewith, and has been patented by Mr. Reinhold F. De Grain, of No. 657 Pennsylvania Avenue, S. E., Washington, D. C. The central chamber is just enough wider than the dice to permit them to tumble freely without changing their planes, the bottom recesses being angular to correspond with the angles of the dice, as shown in the interior view, Fig. 2, the side recesses being designed to cause the dice to turn in tumbling, to show different faces. The box has a knob or thumb piece at the top, for convenience in revolving it, and a



DE GRAIN'S DIE AND DICE BOX.

weight fixed to the bottom to cause it always to gravitate to the proper position.

How Scarlet Fever Poison is Distributed.

Dr. J. Brooke, Surgeon U. S. Army, of Fort Monroe, Va., communicates the following case: "A girl aged about eight, living at this place, was some months ago attacked by scarlet fever, the disease running a typical course. For a long time no possible source of contagion could be discovered. The child had not been absent from home, had been with no one lately exposed, and no other case was known to exist anywhere in the vicinity. Subsequently I learned that one of the house servants had nursed a case of scarlet fever in a distant city just about a year before. After the case terminated she packed some of her things, including some clothing then worn, in a trunk, and left the place. A year later she had the trunk sent to her here, opened it, and took out the contents, the little girl being present and handling the things. Very soon after the latter was attacked, as stated."—*Medical Record*.

Biting the Finger Nails.

Dr. Jerome Tuthill, of Chicago, Ill., in the *Medical Record*, says: A novel accident, resulting from a habit of very common prevalence among nervous people, was brought to my notice recently. A young lady presented herself at my office complaining of a constant irritation in her throat. Two weeks previously she had been taken with a severe "sore throat," which was treated by a neighboring physician. Under his care, she says, the inflammation quickly subsided, but there still remained a sensation of irritation. Examination revealed a small fleshy-looking object, about the size of a kernel of wheat, adherent to the tissues posterior to the left tonsil, by one end. The other parts of the throat were normal. The little mass could not be detached by a cotton-covered probe, but by the use of forceps it was easily removed, and on examination proved to be a piece of finger nail, which had become covered by a cheesy deposit. A broken piece of the nail was also removed from under the mucous membrane at the same spot by a sharp-pointed probe. The patient then confessed to the habit of biting her finger nails, and, moreover, could remember that a day or two previous to the onset of her throat trouble a piece of nail which she had bitten off had become lost in her mouth, but after it had caused a fit of coughing she had forgotten about it until reminded by my discovery.

A GIGANTIC FOSSIL.—Professor F. W. Cragin, of Washburn College, recently discovered at Downs, Osborne County, Kansas, the petrified remains of a huge

fossil. Professor Cragin pronounces it the most remarkable specimen found since 1877. The animal complete was a little over 16 feet in length. The jaws measure 3 feet 8 inches, the neck between 4 and 5 feet long, and the body about 9 feet long, and 3 or 4 feet through. It had immense teeth, about 3 inches in length. It had flippers quite similar to a seal's, and its feet, two in number, were short. It is plain that it was an aquatic animal of the reptilian age.