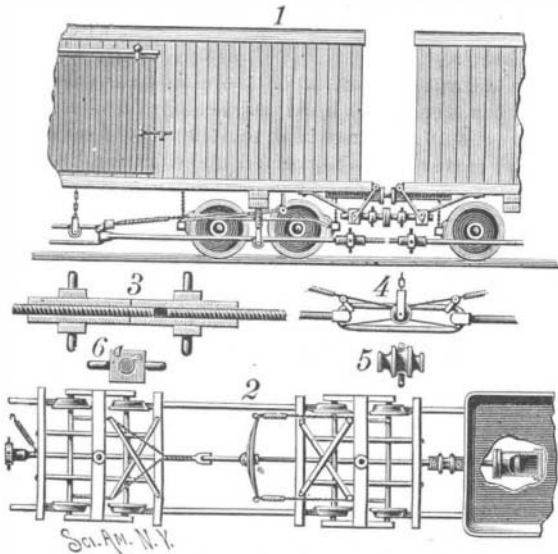


to become choked with soot, and thus rendered inoperative, and the construction is designed to afford a simple and effective means to utilize heat that would otherwise pass up the chimney.

**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.**

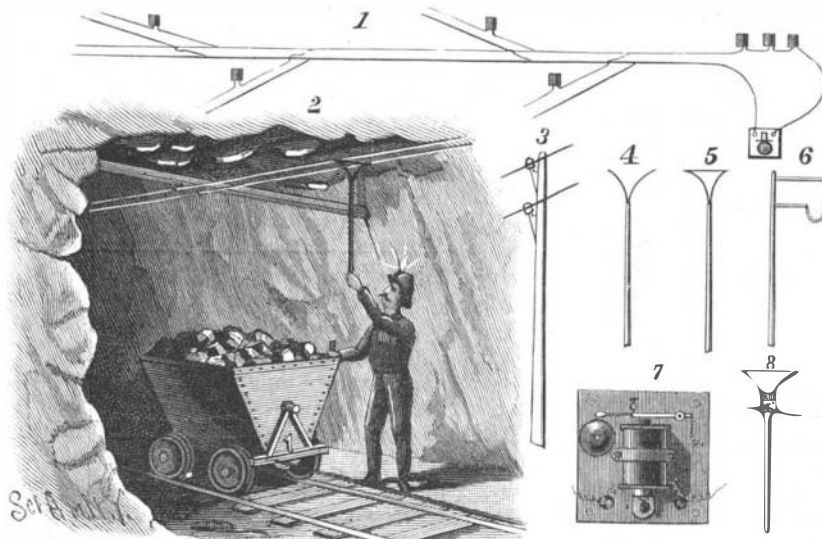
At the ordnance foundry of the South Boston Iron Works a large force of workmen is at present engaged in completing the third and last in the series of the three 12 in. cast iron rifled guns, with a steel tube and steel hoops. The work of putting in the steel tube, which is inserted at the rear of the 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

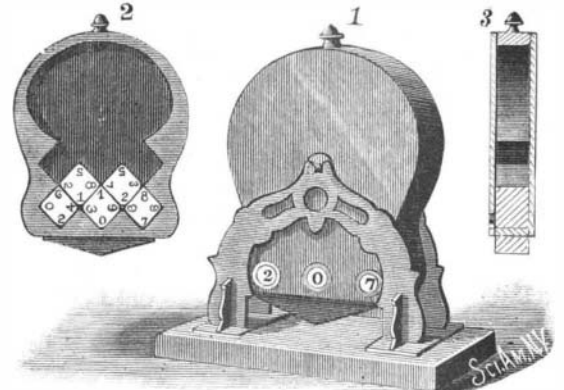


BULLITT'S ELECTRO-MAGNETIC SIGNALING DEVICE FOR MINES.

"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.