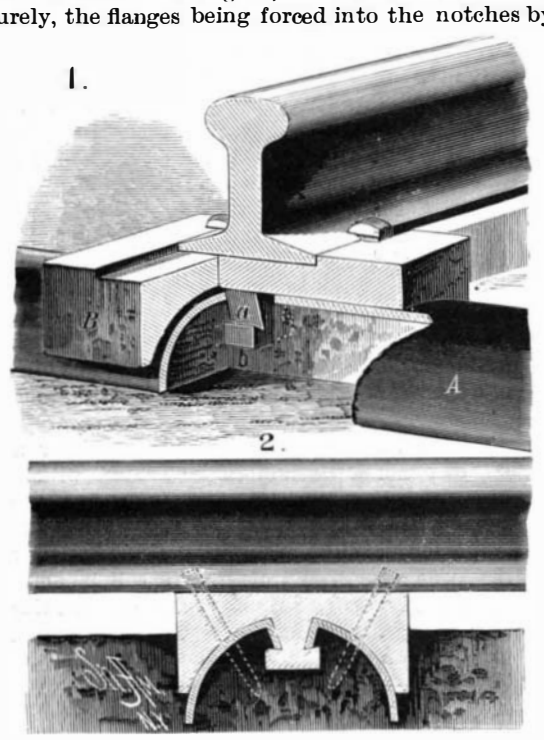
METALLIC RAILWAY TIE.

The tie, A, is formed of sheet metal of suitable thickness rolled into the semi-cylindrical or curved form shown in the engraving. The saddle, B, made preferably of cast metal, has its under surface concaved to set closely upon the tie. On each tie are two saddles, attached by means of dovetailed lugs, *a*, extending through holes cut in the crown of the tie. The metal is slit and bent down to form the holes, so that flanges are left which take into notches on two sides of the lug (this construction is shown in Fig. 2) to hold the saddles securely, the flanges being forced into the notches by a



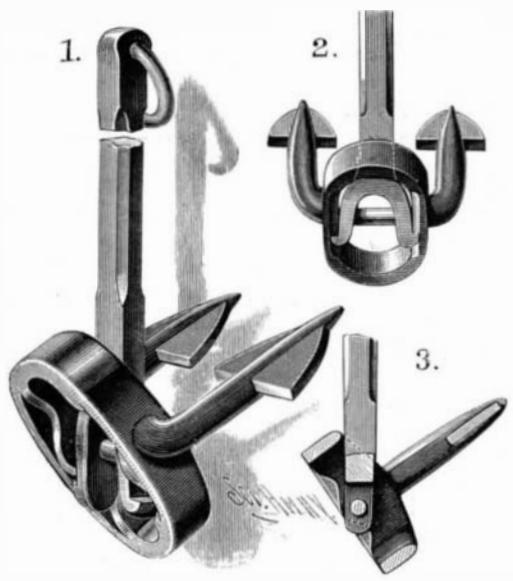
VAN ORMAN'S METALLIC RAILWAY TIE.

suitable tool. The other sides of the lugs are straight, and fit the holes snugly to prevent the rails spreading. The upper surfaces of the saddles are grooved or countersunk to receive the rail flanges, so as to prevent spreading and relieve the spikes of side pressure. The spike holes extend through the saddles, and incline in opposite directions and extend through the tie, so that tendency of the saddle to rise and the rails to rock is resisted by the clamping action of the spikes. The tie is self-tamping, since, as it settles, it gathers and compacts the dirt instead of spreading it as the ordinary tie does. Ballast takes good hold upon the rounded sides of the tie.

This invention has been patented by Mr. C. M. Van Orman, of Sherwood, Mich.

A NOVEL ANCHOR.

The anchor illustrated herewith is particularly adapted for government service for large buoys, lightships, or anything liable to foul anchor by lying a long time and swinging around; it is especially adapted for soft mud or sand, as both flukes hold at once, and the disk also holds as a mushroom anchor would. The arms carrying the flukes are rigidly attached to the head, which is pivoted to the shank by pins or rivets.



PETTES' NOVEL ANCHOR.

The head, made in the form of an elliptical ring, serves, primarily, as a double-acting stop acting against the shank to limit the pivotal movement of the arms and fluke of the anchor, upon both sides of the shank, so that they will always stand at the proper pitch.

The head also serves as a rolling surface to turn the anchor so that the flukes will enter the bottom no matter how the anchor may lie, and also as an additional hold, which is especially useful in a soft bottom, for as the flukes enter the mud the sharp curved edges of the head will hold in the mud at a point back of and between the flukes. The shank is preferably divided at its lower end to form arms, through which the rivets pass, these arms being extended past the rivets, and formed at their ends with outwardly projecting lugs; the head is recessed to form shoulders against which the lugs come, thereby relieving the rivets of excessive strain. Constructed in this manner, no stock is required upon the upper end of the shank to bring the flukes to position; this makes this anchor much lighter than the kind in common use. Again, there is no upper fluke to pierce through a vessel's bottom when anchored in shoal water and swinging over. Owing to the holding power of the anchor, a chain or rope may be secured to the head to break ground with. Besides being cheap, this anchor will occupy comparatively small space upon the deck or other part of the vessel.

This invention has been patented by Capt. James A. Pettes, of Grand Manan, New Brunswick, Canada.

The Electro-Deposition of Carbon.

Dr. Gore, F.R.S., has been making a large number of experiments on the deposition of carbon, boron, and silicon by means of the electric current. Most of these experiments, says *Engineering*, resulted in failure, or comparative failure, to deposit carbon; but several were successful. For example, he succeeded by electrolyzing in a platinum cup a fused mixture of 475·2 grains of 97·1 per cent of sodic carbonate and 217·4 grains of borofluoride of sodium. A sheet platinum anode and a thick platinum wire cathode were used. A black deposit of carbon, nearly pure, was formed on the platinum wire, and gas was given off at the anode. The current was supplied by ten Smee elements. With the same current he also electrolyzed in a platinum cup a fused mixture of 300 grains of 97·1 per cent pure potassic carbonate and 442 grains of silicofluoride of potassium, using similar electrodes. Gas rose from the anode, and at first gas only rose from the cathode too. After that streams of black matter poured down from the cathode, and the latter acquired a blackish film, but subsequently became alloyed and fused on the surface. The deposit was, therefore, partly or wholly silicon.

Again, a fused mixture of 200 grains of pure sodic hydrate, 170 grains of pure precipitated silica, and 610 grains of the mixed anhydrous carbonates of potassium and sodium was electrolyzed by a similar current employing similar electrodes. Much oxygen, relighting a red hot splint, was given off at the anode. Dark streams flowed from the cathode, sodium was set free, and if the cathode was only slightly immersed, bubbles of sodium vapor were emitted, and took fire at the surface of the liquid. After one hour's action the platinum anode had lost 0·37 grain in weight, and the cathode had a jet black deposit on it. This deposit was subsequently washed and dried; a portion of it burned with a glow when heated to redness on platinum, and left a minute residue of gray platinum. It also deflagrated with fused niter below red heat, and vividly by heating with potassic chlorate. It did not dissolve nor evolve any gas in a mixture of strong nitric acid and pure concentrated hydrofluoric acid. It was, therefore, not silicon, but carbon containing a minute quantity of platinum.

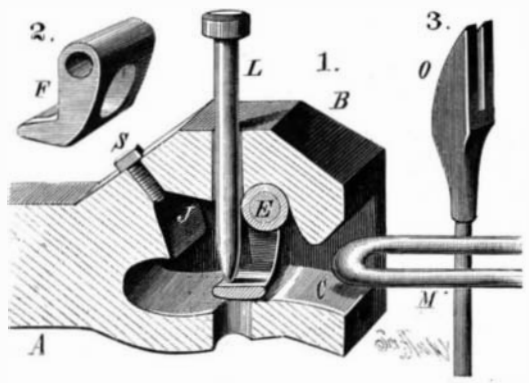
Dust Explosions.

Speaking about dust explosions, says the *Milling World*, a case from Germany is worthy of notice. A sack of flour, falling down stairs, opened and scattered the contents in a cloud through the lower room, where a burning gas flame set fire to the dust, causing an explosion which lifted a part of the roof of the mill and broke almost all the windows. There can be no doubt that the majority of dust explosions are, like mine disasters, due to open lights, and as this danger can be practically avoided by the use of the incandescent electric lights, there really seems to be no valid reason why it should not be introduced more generally, as those establishments which have used it express themselves in its favor. No matter how carefully other lights are guarded, an absolute safety, as long as the globes are intact, is offered only by the incandescent lamps, where the atmosphere or the dust has no access whatever to the flame. The above instance teaches also how little is necessary to start an explosion in the cleanest mill, so long as open lights are used; how much greater must the danger be in establishments where the air is constantly charged with dust, and where cleanliness is looked upon as of minor importance!

IN our issue of April 4, we published a description of a grain drier and cooler, patented by Mr. S. E. Worrell, of Hannibal, Mo. The machine is applicable to the drying of green coffee and substances containing a large percentage of water, which requires much time for its removal so as not to injure the berry. For this purpose return conveyers are used, the grain, after it has passed through the first drier and cooler, being returned to the head of the second set, and so on until it has passed through the whole gang. Its passage can be regulated by raising or lowering the discharging end.

IMPROVED CAR COUPLING.

The top of the drawhead has a transverse raised part formed with a vertical pin aperture. In the top of the link opening, C, is a recess in which the transverse shaft, E, is held; placed on the shaft in such a manner that it can swing within the opening is the tripping plate, F, shown detached in Fig. 2. This plate is formed with an aperture and with an inwardly projecting flange on its bottom edge, and is of such length that when hanging vertically its lower edge is near the bottom of the opening. In the top of the opening is the recess, J, into which the flanged portion of the plate can swing. Usually the plate hangs vertically, and the pin, L, rests on the flange, when the drawhead is ready for coupling. As the link, M, enters, it strikes the bottom of the plate and swings it inward and from under the pin, which is allowed to drop through the plate aperture and through the link. To uncouple the cars, the pin is raised by means of the



NICHOLAS' IMPROVED CAR COUPLING.

fork, O, Fig. 3. The swing of the tripping plate is regulated by the screw, S, which enters a diagonal hole formed in the rear part of the drawhead.

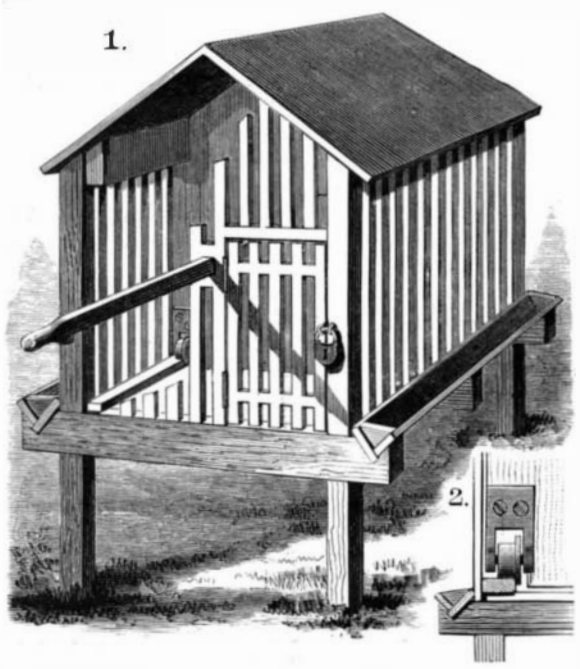
Particulars regarding this car coupling can be obtained by addressing the inventor, Mr. Thomas Nicholas, of Calumet, Mich.

Diluted Coal Gas.

Coal gas, well purified and mixed with six times its volume of air, has a heating power of 5,200 cal. per cubic meter at 0° and 760 mm. Before purification its heating power is 5,600 cal. The heating power of gas is increased by 5 per cent when it is mixed with 1·25 vols. of oxygen; but, on the contrary, it is diminished by 4·6 per cent when diluted with 11 vols. of oxygen. This rule does not hold good when the gas is mixed with common air.

FOWL COOP.

The fowl coop herewith illustrated, lately patented by Mr. R. W. Goddard, of Wellston, Ohio, is so constructed that it can be adjusted to form compartments of different sizes. It is made of slats, and is mounted upon legs. The transverse partition is provided at each lower corner with a forked clip (Fig. 2), in which a flanged wheel is pivoted. Projecting from the middle of the partition, and extending through one end of the coop, is a bar formed with a shoulder at a distance from



GODDARD'S FOWL COOP.

the partition, about equal to the length of the coop, which has a door at each end. At each side of the floor are tracks for the wheels to run upon, and a feed trough is placed at each side of the floor outside of the coop. The partition divides the coop into two compartments, one large and one small, or both of the same size. By means of the bar, the partition can be moved to any part of the coop according to the size of the compartments desired. The bar projecting through the end of the coop holds the partition in a vertical position, and also serves as a roost for fowls.