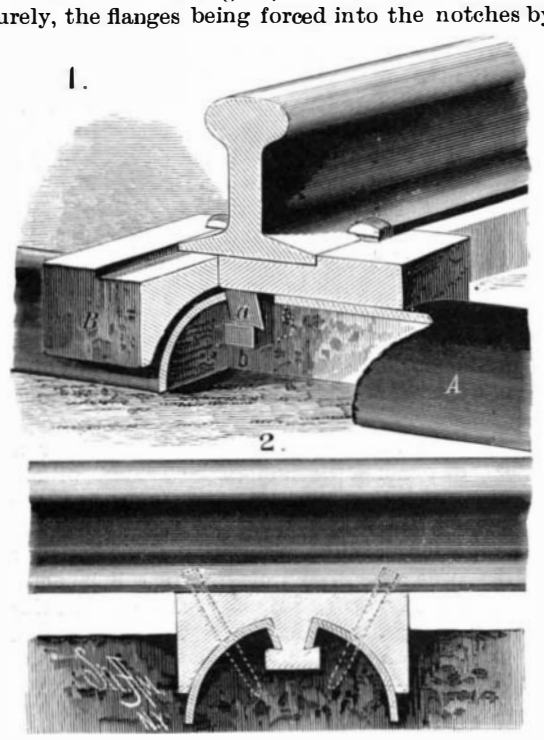
### METALLIC RAILWAY TIE.

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



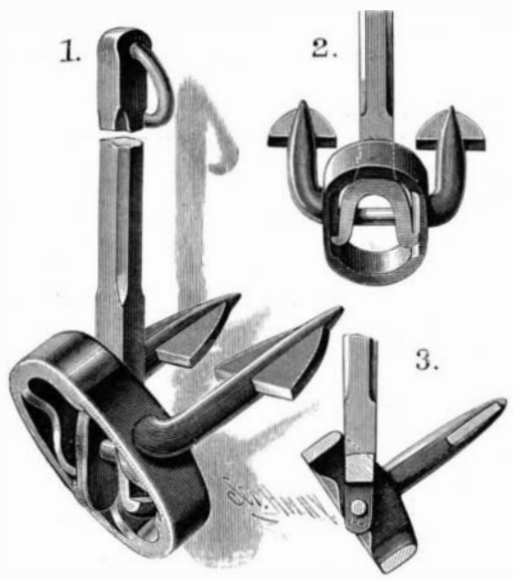

VAN ORMAN'S METALLIC RAILWAY TIE.

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.

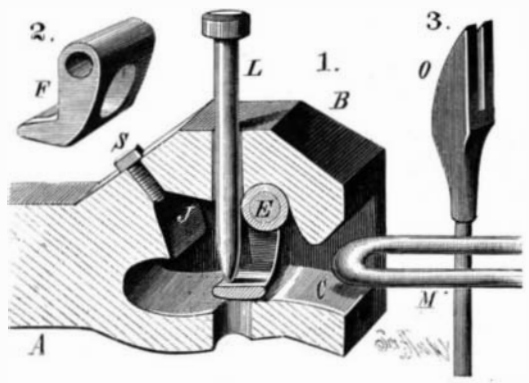
### Dust Explosions.

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.

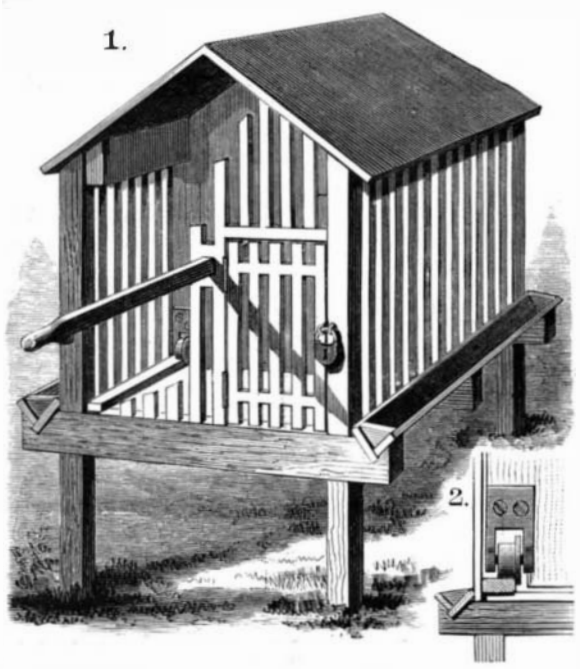
Particulars regarding this car coupling can be obtained by addressing the inventor, Mr. Thomas Nicholas, of Calumet, Mich.

### 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.

### Infringement of Patents.—Street Cars.

The case of Stephenson *vs.* the Brooklyn Crosstown Railroad Company, decided by the Supreme Court of the United States on the 23d of March, was a suit for the alleged infringement of three patents, upon improvements in what are commonly called "bobtailed" or one-horse street cars. The improvements set forth in the specifications of the patents were, first, the lever and bar enabling the driver to open the rear door of the car; second, the bell cords running along the sides of the car over the windows; and, third, the mirror over the driver's head to enable him to see the interior of the car without turning around. The court holds that these improvements, so far as they embodied any patentable device, had all been anticipated by other persons before the patents here in controversy were issued, and that such patents were consequently void.

### A New Use for Asbestos.

In the processes connected with dyeing and printing of cotton cloth it is frequently necessary to hang the fabric in loops from parallel rods for the purposes of exposure to steam, air, or ammonia. In order that the cloth should hold upon the rods without slipping or being strained, it is necessary to wind rope or strips of cloth around the rods, but this only mitigates the difficulty without accomplishing its removal, for the heat and corrosive action of the vapors rot any covering in a few weeks, and the first notice of any deterioration is generally the appearance of small pieces of roll covering among the cloth in process of finishing. Recently asbestos rope and asbestos cloth has been used for this purpose, and proves to be very durable. Larger ropes of this refractory material have been used for the transmission of power over places exposed to heat.

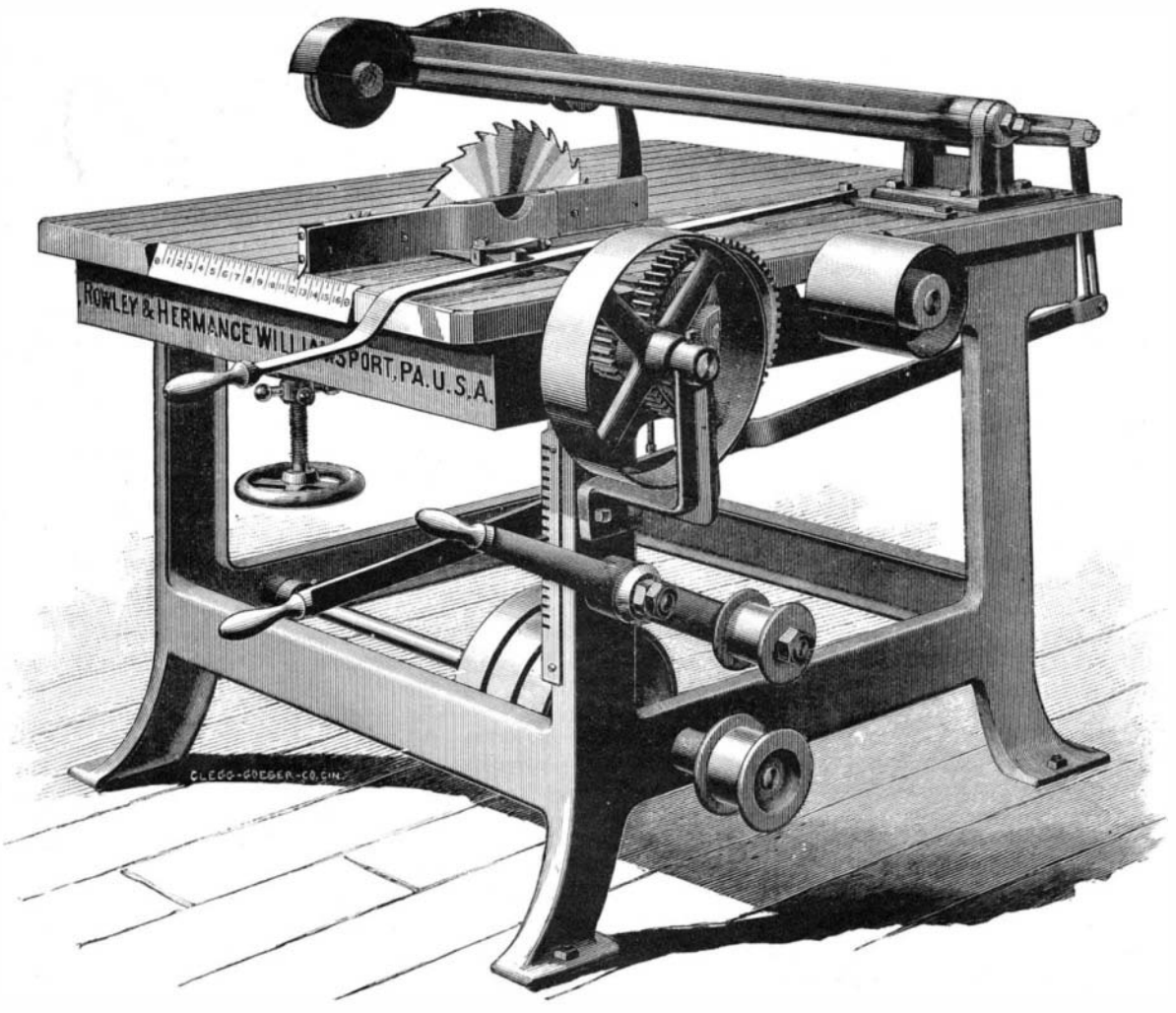
### SELF-FEEDING RIP SAW TABLE.

The self-feeding rip saw table shown in the accompanying illustration is intended to take the place of the ordinary hand feed rip saw, and is designed for ripping lumber into strips of any width up to 16 inches wide and 6 inches thick. The frame is very heavy and strong, and is made entirely of iron cast in one piece; the table is of hard, well seasoned wood, glued up of narrow strips. The table is hinged at the back end, and can be raised or lowered by means of a hand wheel screw at the front end, as shown in the engraving. This admits of the table being raised above the feed saw, and by throwing the pressure arm out of position the machine can be used as an ordinary hand rip saw table.

There are three rates of feed, slow, medium, and fast, being at the rate of 45, 100, and 160 feet per minute, respectively. The feed works, being very powerful, are capable of ripping 3 inch plank at the same speed as 1 inch boards; the feed roll marks are taken out by the saw, leaving no mark on the lumber. Starting and stopping are accomplished by means of a tightener.

A new and valuable feature is the setting device. The gauge can be set at any mark of the index plate, or at any fraction of an inch, and by a slight movement of a lever can be held rigidly in position. The arm, with pressure roll, presses the lumber down on the feeding saw sufficiently to insure a strong and reliable feed. The pressure arm can be instantly adjusted to different heights by the lever running under the machine, the handle being within convenient reach of the operator. When in operation the saw is covered by a shield and the table is provided with a spreader, making it impossible for a board or short pieces to be caught and thrown over the saw thus avoiding accidents arising from this cause. The saw is run at a speed of from 2,800 to 3,000 revolutions per minute.

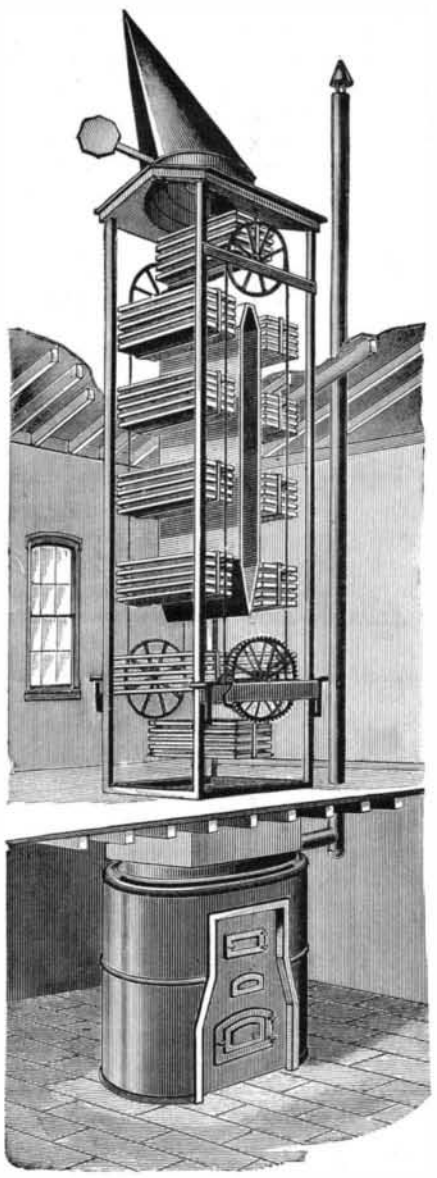
The machine is well-proportioned and strong in all its parts, and the makers, Messrs. Rowley & Hermance, of Williamsport, Pa., state that by replacing hand rip saws with it the capacity may be doubled with less hard work, and the liability of accidents be lessened.




ROWLEY & HERMANCE'S SELF-FEEDING RIP SAW TABLE.

### EVAPORATOR FOR DRYING FRUIT, ETC.

The Williams evaporator, herewith illustrated, is designed for the drying of fruit, vegetables, etc., and while being simple in construction, easy to handle, and



WILLIAMS' EVAPORATOR FOR DRYING FRUITS, ETC.

continuous in operation, there is no danger of overdrying or burning the fruit.

The evaporator consists of a vertical trunk about 32 feet high, 5 feet 1 inch wide, and 5 feet 8 inches deep, divided by a partial partition into two evaporating flues, through which the fruit to be dried is slowly passed. At the top and bottom of the trunk are shafts, each of which carries two wheels; the upper and lower wheels are connected with endless chains formed with projecting pins, from which light frames are suspended.

Between the frames filled with trays are spaces of about 15 inches, forming a number of air chambers at certain intervals in the flues. On two sides of the trunk are doors conveniently located for putting in and taking out the trays. The heaters require no masonry, and either wood or coal may be used as fuel. By means of a damper the heat may be thrown into either or both flues at will, and the operator is enabled to control the heat as occasion may require.

The trays containing the green fruit are inserted through a small door, about 4 feet above the furnace, and passed downwardly directly over it, thus heating the fruit rapidly to as great a degree as it will bear without materially changing its color. When first put in, the degree of heat may be very high without danger, since the fruit is cool and contains all its original moisture, and the hot air surrounding it is free from vapor, and will not penetrate and scald the fruit as moist air would. It then rises gradually through the hottest flue, the hot air being thrown under the trays by deflectors on the inside of the walls of the flue; the heated air and vapor pass off at the top. While rising, the greater degree of heat the outside of the fruit received while passing over the heater diffuses itself through the fruit; and while descending the other flue to the operator, the drier fruit, preceding the moist, enters the increasing heat, and arriving at the door is removed by the operator, who inserts another tray of green in its place, thus making the operation continuous. The fruit, having been dried in the least possible time, and having been uninjured by scorching or cooking, retains its original color and flavor. The construction of this apparatus enables the operator to evaporate, at the same time, different kinds of fruit which require more or less time and heat.

The principle governing the construction and operation of this evaporator is sound; by first exposing the green fruit to a high, dry heat and passing it slowly to a lower temperature, and then in its downward passage through the second flue subjecting it to a dry, heated current moving upward, the fruit is not so apt to be injured as in the case of its exposure in a moist atmosphere from which it passes into an intense heat.

The capacity of the evaporator described above is 150 bushels of apples or 200 baskets of peeled peaches in 24 hours. Letters of recommendation received by the manufacturer, Mr. S. E. Sprout, of Muncy, Pa., who should be addressed for further particulars, while highly indorsing the evaporator, state that it will appreciably exceed the guaranteed capacity if properly run.

### Improvement in Chimneys.

The *Building Times* (London) says the best chimneys are made by inclosing hard baked glazed pipes in a thin wall of bricks. Such chimneys will not only draw better than those made in the usual way, but there will be less danger from "defective flues." A four inch wall of brick between us and destruction by fire is a frail barrier, especially if the work is carelessly done, or the mortar has crumbled from the joints. To build the chimneys with double, or eight inch, walls makes them very large, more expensive, and still not as good as when they contain the smooth round flues. To leave an air chamber between them for ventilating is better than to open directly into the smoke flue, because it will not impair the draught for the fire, and there will be no danger of a sooty odor in the room when the circulation happens to be downward, as it will be occasionally. The outside chimney, if there is one, should have an extra air chamber between the very outer walls and the back of the fireplace to save heat, a precaution that removes, to a great extent, the common objection to such chimneys. A very large per cent of fires comes from defective chimneys.