NOVEL TICKET REEL AND RECEPTACLE.

The engraving shows a machine for tallying, recording, or indicating the numbers of fares collected upon cars or other public passenger vehicles. It is of the class employing, in connection with a locked box or receptacle carried by the conductor or collector, duplicate, double, or sectional tickets, one portion or section of which is given to the passengers when the fare is collected, while the other section or duplicate is deposited in the box, so that as the conductor is compelled to deposit a ticket or check in the locked box as each fare is collected, a tally or record is made of the amount to be accounted for, and fraud and cheating is prevented.

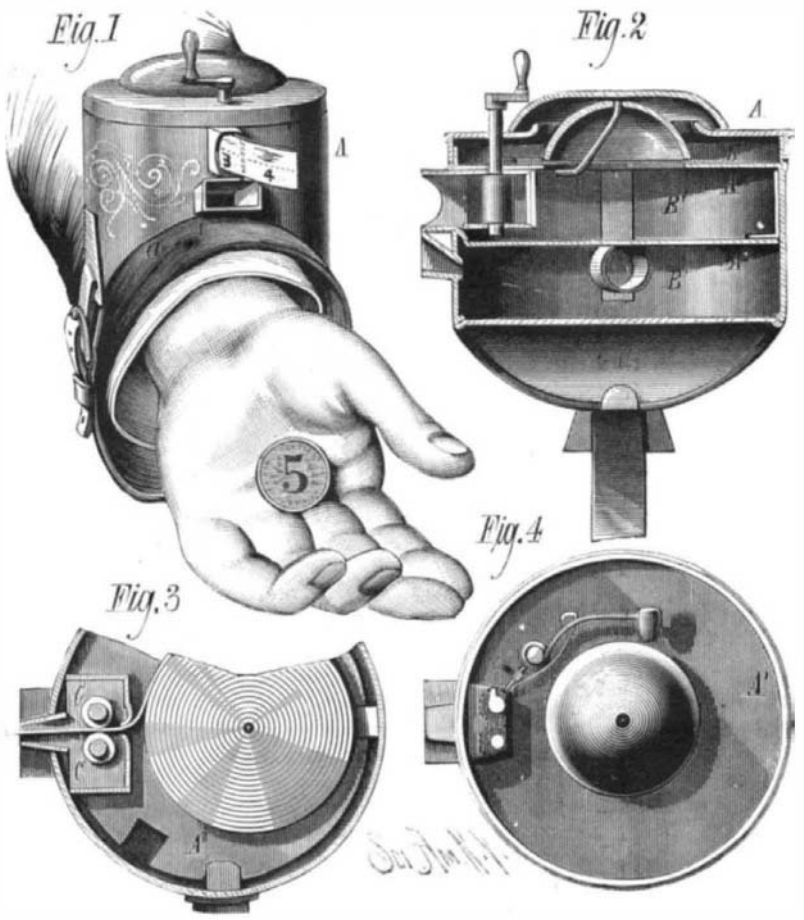
Fig. 1 shows the apparatus as fitted and secured to the conductor's arm in a convenient position for its operation and for the deposit of the tickets or checks by the hand of the opposite arm; Fig. 2 is a vertical section; Fig. 3 is a horizontal section showing the roll of tickets, and Fig. 4 is a top view with the cover removed showing the alarm bell.

The casing, A, is of the shape shown, having a curved bottom, *a*, to fit the arm. Near the top of the casing is a transverse partition plate, A′, which separates the casing into two compartments, the upper and smaller one, B, being for the reception of the alarm bell and its striking mechanism, while the lower compartment, B′, is for the checks or sections of the tickets, which are to be deposited in the receptacle, one for each fare as collected. The curved bottom, *a*, of the ticket or check receptacle is hinged at one side of the body of the casing.

The alarm bell is fastened in the center of its compartment, B, to the partition plate, A′, and is covered and protected from external blows by the cover of the casing, which fits upon the upper end of the cylindrical body. The striking mechanism consists of a hammer acted upon by a spring and tripped by a crank or handle outside of the case. Secured to or forming part of the shaft of the crank or handle inside a small compartment, there is a roller, C, which, in conjunction with another roller, C, constitutes feed rollers for the tickets. These tickets are formed in strips, or are in what is commonly known as "ribbon form," and wound into a compact roll, as shown in Fig. 3, the roll being then placed in the apparatus, just back of the feeding rolls, upon a removable partition plate, A, in the ticket compartment. Each ticket is joined to the contiguous one by a readily separable connection, the tickets being formed, for example, in a long strip, and separated partially by a series of transverse perforations. Each ticket is a double or two-part ticket readily separable.

The operation of the apparatus is as follows:

It having been fitted to one arm of the conductor and secured by a strap, and the tickets having been placed in the machine with the first one between the feed rolls, upon receiving a fare the conductor turns the crank to the extent of one revolution, which projects a ticket from the delivery spout and rings the bell. The ticket is then separated from the strip. The section or portion with the number upon it is then deposited by the conductor in the locked receptacle, and the other section handed to the passenger, to be retained as evidence of the payment of the fare. At the end of the trip the apparatus is handed to the proper person, who inspects the tickets that remain unfed from the apparatus, and also counts the checks deposited in the box. If the number of tickets fed from the machine does not correspond with the number of checks in the box the dereliction in duty of the conductor is made apparent, and dishonesty exposed; while if the checks and tickets disposed of correspond, the amount to be accounted for is ascertained. This invention was recently patented by Mr. C. S. Locke, of Chicago, Ill.



LOCKE'S TICKET REEL AND RECEPTACLE.

NOVEL GRATE-BAR.

We give an engraving of an improved device for improving combustion in a boiler furnace where it is most needed, that is, at or near the bridge wall.

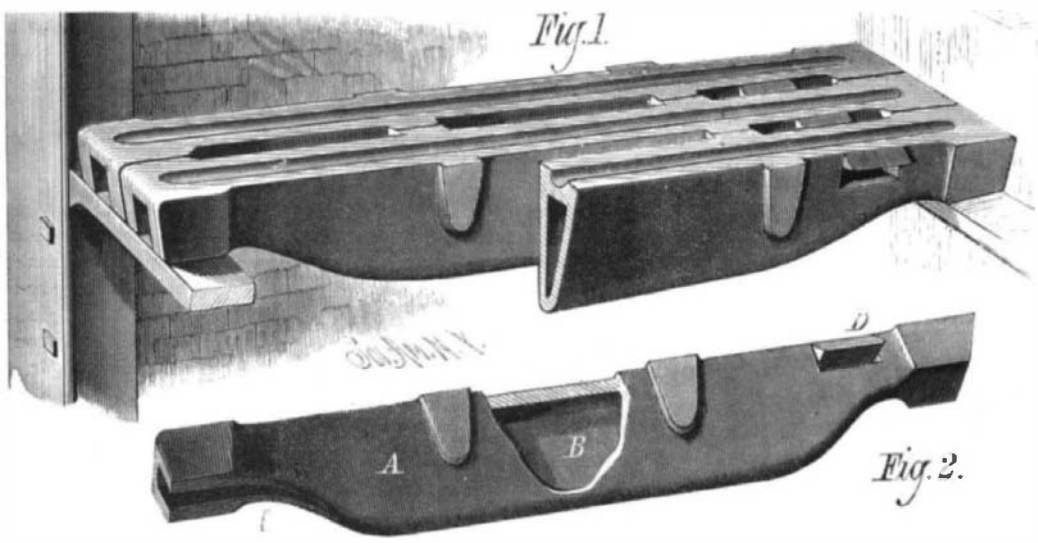
It is very essential, in order to maintain uniform combustion in a furnace, to supply the fuel with a uniform and sufficient quantity of air well distributed beneath it; and in furnaces as ordinarily constructed, having parallel grate-bars extending from the front backward, the air is taken up very largely by the front section of the fire, and the back part of the fire, or the part more remote from the draught, suffers in consequence, and an unequal combustion of the fuel and a consequent loss in the amount of heat developed therefrom result.

The engraving shows an invention, designed to provide the rear portion of the fuel with sufficient air to maintain a combustion equal to that of the front by introducing air thereto through a chamber or passage in each of the grate-bars; and in constructing this grate-bar to accomplish this purpose, the inventor has secured a lighter and stronger bar from the same amount of metal, and has provided means for keeping the bar cool enough to prevent its wearing, twisting, or warping under the influence of the heat.

It is well known among engineers that there is little real combustion at the rear end of the furnace, and that large amounts of unconsumed inflammable gases pass off without yielding their heat.

The Fairbairn grate-bar is proposed as a remedy for this defective combustion. It requires no changes of setting of boilers; no auxiliary draught; it needs no expensive alterations; it merely substitutes for the common grate-bar one that will allow the air to reach the entire surface of the fire-box; it carries the air to the furthest part of the furnace.

The bar, A, is cored in the casting so as to be hollow.



THE FAIRBAIRN GRATE-BAR.

with lateral or side apertures, D, at the rear end, or nearly so. As in ordinary grate-bars, the air passes up between the bars; as in ordinary grate-bars, the space occupied is the same; as in ordinary grate-bars, one, when defective, can be removed and another readily substituted.

Unlike other grate-bars, this one allows the air from the draught-hole in front of the furnace, and from the ash-pit, to traverse the length of the hollow bar, being heated in its passage, and emerging at or near the end of the bar, or the rear end of the furnace, giving out from the lateral openings a current of heated air that instantly inflames the escaping gases that might otherwise pass up the chimney without doing service, or performing work. It may be said that this hollow bar is a continuation of the draught-door, and gives as much a chance for perfect combustion to the coal at the rear end of the furnace as that at the front of the furnace. For further information address the Fairbairn Manufacturing Company, 272 Purchase street, Boston, Mass.

The East River Bridge.

When the contract was made for the steel work of the East River Bridge the amount named was 5,000 tons, which by mutual consent was agreed to cover 5,500 tons. This has been taken as the maximum weight of this portion of the superstructure. Naturally, therefore, there was not a little surprise when it was announced recently by the engineers that 1,200 tons more would be required, increasing the weight of steel in the superstructure to 6,700 tons. The principal reason given for this increase of weight is the need of strengthening the bridge to enable it to carry heavier loads than were contemplated at first. According to a statement by Assistant Engineer Martin, who has had charge of the practical work of construction from the first, the growth of the cities to be connected and the preparation of the elevated roads to carry freight trains have made it probable that direct railway connection will be made between the Long Island roads and the roads entering New York from the East, the North, and the West. At any rate, in anticipation of such traffic, the bridge plans have been modified to enable regular passenger and freight cars to run over the bridge, and the weight had to be correspondingly increased. As reported by the *Evening Post*, Mr. Martin said, in pointing out the chief instances in which increased weight had been made necessary to get increased strength:

The bridge will consist on each side of four massive steel beams, one on top of the other, into which are bolted the transverse beams upon which are laid the floor girders of the bridge itself. When it was decided to increase the strength of the bridge the method adopted was to run what are called "overfloor-stays"—wire cables which run down from the top of each tower at an angle of about 45°, and are fastened to the longitudinal steel beams which form the sides of the bridge. It follows that, when weight is put upon the bridge at the point where the overflow stays are fastened to the bridge, the strain falls upon the stays instead of the main cables and tends to press the bridge against the tower. In order that the bridge may resist this "back pressure" the steel girders between the tower and the point where the overflow stays reach the bridge have had to be stiffened and increased in size. This is the chief item of increase, and will reduce the weight upon the cables by about one-fifth. In the next place the Pullman cars are nearly three feet higher than the cars originally intended for bridge traffic, and that fact necessitated increasing the height of the 2,800 upright posts which divide off the steam tracks from the passenger and carriage roads. Thirdly, it may be assumed that all the castings used in the bridge are between two and three per cent heavier than the contract calls for, because the contractor prefers that to running the risk of having them rejected, as they are of no value except for bridge purposes. "There are other considerations," said Mr. Martin, "which have caused the engineers to alter different parts of the steel work in the bridge, but they would not be understood without long and technical explanations. I repeat that the 1,200 tons extra weight of steel have materially increased the strength of the bridge instead of weakening it, as the public seems to suppose."

Point Barrow Signal Station.

The chief signal officer has received from Lieutenant Ray, in command of the Arctic meteorological station at Point Barrow, a report of the successful planting of the station near the native village Ooglaamie, Alaska. The station is on the only high ground at Point Barrow, about eight miles from the extreme northern end of the Point, and on the northeast side of a small inlet which he has named Golden Fleece. The voyage was a long and very trying one, a heavy gale having been encountered off Cape Lisburne, driving the expedition out of its course to the north and west.

The landing was made September 8. The ground was covered with snow, and ice was forming rapidly at the date of the report, Sept. 15. Not having seen the sun since his arrival Lieutenant Ray had to depend on dead reckoning from his log-book in determining the position of the new station. He makes it latitude 71° 17′ 50″ north; longitude 156° 23′ 45″ west.