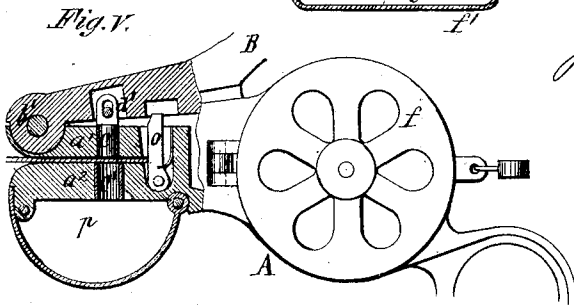
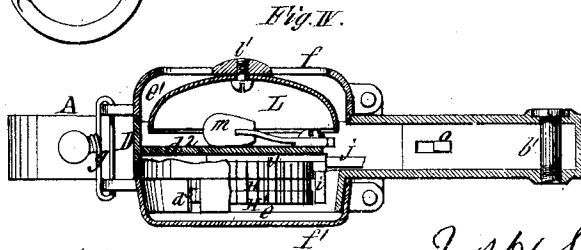
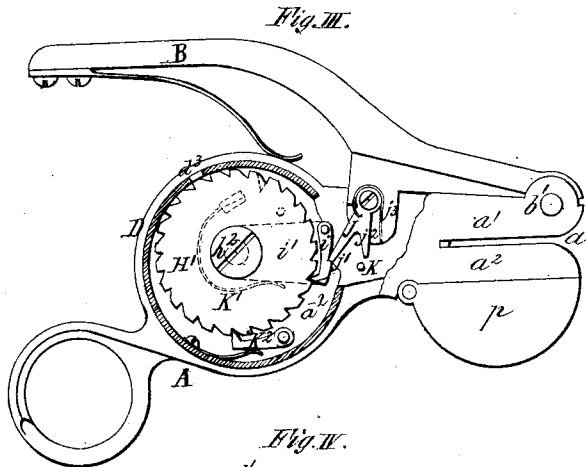
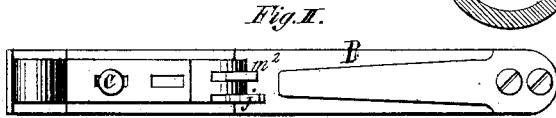
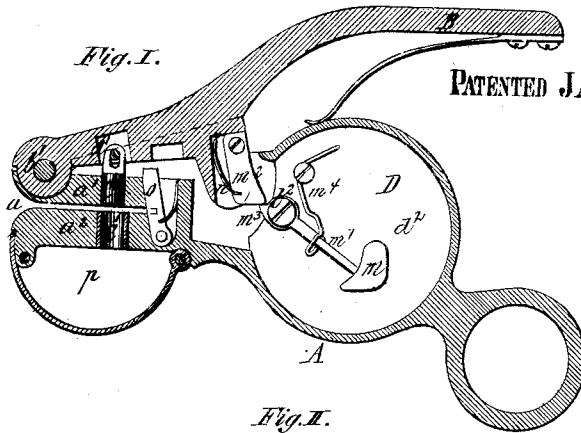


JAMES H. SMALL'S.
Ticket Punch for Rail Road Conductors.

111392

PATENTED JAN 31 1871



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UNITED STATES PATENT OFFICE.

JAMES H. SMALL, OF BUFFALO, NEW YORK.

IMPROVEMENT IN REGISTERING TICKET-PUNCHES.

Specification forming part of Letters Patent No. **111,392**, dated January 31, 1871.

To all whom it may concern:

Be it known that I, JAMES H. SMALL, of the city of Buffalo, in the county of Erie and State of New York, have invented certain Improvements in Conductors' Ticket-Punches, of which the following is a specification:

My improvements relate to a conductor's ticket-punch, which contains, in combination with the punch proper, an alarm-bell, a registering mechanism, and a receptacle for the cuttings, said combination being shown and described in the Letters Patent granted to A. D. Hoffman, February 22, 1870.

The main object which this combination is designed to accomplish is to prevent a fraudulent appropriation by the conductor of fares collected by him; and this object is sought to be attained, first, by requiring him to strike the bell and perforate a ticket each time he collects a fare, so that, his passengers and the public being advertised that it is his duty to perform such acts, a failure upon his part to perform will necessarily attract their notice, and expose his dishonesty; and, second, by causing such act or acts to operate the registry mechanism, and make an automatic record of their performance, which it is out of his power to change.

But, in order to render this combination effective, it is necessary to provide against the possibility of striking the bell without operating the register or of perforating a ticket without striking the bell. To so provide is the object of the first and second parts of my invention.

My invention consists, first, in attaching the punching-tool to the operating handle or jaw by a slotted connection, so that it may remain in the ticket after the same has been punched, and prevent its removal during such portion of the return movement of the handle as will suffice to bring the register and bell pawls into re-engagement with the register-wheels and bell-hammer, and thereby prevent the punching of a second ticket without a corresponding movement of the register-wheels and striking of the bell; second, in the combination, with the register-wheel pawl, of a secondary or trip pawl, so adjusted that the recording movement of the register-wheel or wheels will be completed before the sounding of the alarm, and before the termination of

the punching movement; third, in the arrangement of the bell side by side with the registering device, and both in an inclosing case located in the space between the handles of the punch, and attached to one of the handles, the object being to allow the use of a bell and registering-wheels of comparatively large diameter, and yet retain the center of gravity within the handles, and avoid making the instrument clumsy or unwieldy; fourth, in the construction of the inclosing case with a hinged lid or cover on each side, and a partition-plate in the center, to one side of which is attached the striking mechanism, and to the other the register-wheels, so as to make such striking mechanism easy of access and adjustment; fifth, in attaching the bell to the lid or cover, so that it will open with the cover, and at once expose the striking mechanism.

Figure I is a sectional elevation of my improved instrument on line *x x*, Fig. IV. Fig. II is a reversed plan of the operating handle detached from the other parts. Fig. III is an elevation and partial section, the reverse of Fig. I. Fig. IV is a horizontal section on line *y y* of Fig. III. Fig. V is an elevation and partial section from the same side as Fig. I.

A is the lower, and B the upper, handle of the instrument, the two being hinged together at *b'* in a common manner. The lower handle is bifurcated, as shown at *a*, forming an upper jaw, *a¹*, and lower jaw *a²*, the former receiving and guiding the punching-tool C, and the latter supporting the die *C'*. The punching-tool C is jointed to the upper handle B, as shown at *d'*, thus constituting said handle a lever of the second class, by which the required force may be applied to the punching-tool to perforate the ticket when the same is inserted between the jaws *a¹ a²*. D is the case for the reception of the register and alarm mechanism, and is located in the space between the handles A and B, and attached to the handle A by being cast in the same piece therewith; or, if preferred, it may be made separate, and attached thereto by screws. It is divided into two chambers, *e* and *e'*, by the partition-plate *d²*, the register-wheels being placed in the chamber *e* upon one side of said plate, and the bell and striking mechanism in the chamber *e'* upon the other.

The sides of the case D are formed by the hinged lids or covers f and f' , which, when closed, are secured by the single seal-rivet g . H H' are the register-wheels, supported and turning freely upon the arbor h^2 , projecting from the division-plate d^1 . i is the register-pawl, hinged to the end of the radius-arm v , which turns freely upon the arbor h^2 . This pawl engages with the ratchet-teeth cut in the periphery of the register-wheels, and communicates the requisite movements thereto. j is the trip-pawl, hinged to the handle B, and engaging with a shoulder on the back of the register-pawl, as shown at j^1 , so that a downward movement of the handle B will be communicated to the register-pawl, and by it to the register-wheel, until the wedge-arm j^2 of the trip-pawl strikes the stop K, which throws it out of engagement with the register-pawl, and allows the spring K^1 to return the radius-arm and the register-pawl to engage the next ratchet-tooth of the register-wheels. The detent-pawls K^2 prevent any return movement of the register-wheels, and retain them in place except when moved by the register-pawl. The ratchet-teeth are numbered consecutively, and the numbers engraved upon their faces, and an aperture, d^2 , is made through the side of the case, through which the numbers counted may be observed. The first wheel H has one deep notch, so that when it makes a complete revolution the pawl i drops in and engages the second wheel H' , so that the succeeding movement of the pawl moves both wheels one space. Therefore, the first wheel counts the movements of the punch and the second wheel the revolutions of the first, so that the product of the number shown by the second into the highest number on the first, plus the number indicated by the first, will give the number of movements of the punch which have been recorded. Ordinarily, numbering-wheels are divided into ten spaces, so that the first gives units and the second tens, and so on, but I prefer to use a higher number, so as to get the required range with a less number of wheels. The trip-pawl j is thrown against the register-pawl i and the latter into engagement with the wheels by the single spring j^1 applied to the trip-pawl. The object of the trip-pawl is to enable the movement of the wheels to be completed before the alarm is sounded, and before the ticket is punched, and thereby prevent the conductor from operating the instrument so as to strike the bell without operating the register. The bell-hammer, punch, and register being operated from the same source—*i. e.*, the movement of the handle B—this result evidently cannot be secured without said device of the trip-pawl or some equivalent therefor. L is the bell, fastened to the cover f by a screw, l . m is the hammer, and m^1 a lever pivoted to the

partition-plate d^2 , as shown at l^1 . To the longer arm of this lever the hammer is attached. m^2 is the hammer-pawl, hinged to the handle B, and engaging with the short arm m^3 of the hammer-lever, so that a downward movement of the handle B throws back the hammer until the pawl slips by the end of the short arm m^3 , and releases the same, when the spring m^4 , which has been strained by said movement of the hammer, returns the hammer, and causes it to strike a quick sharp blow upon the bell. The spring n throws the pawl out to engage the arm m^3 , but allows it to pass said arm on the return of the handle B. The end of the punching-tool C, which connects with the handle B, is slotted, as shown at d^1 , so as to allow the handle B to move a certain distance before it imparts motion to the tool C, both in its punching and return movements. The object of this is twofold: First, it gives sufficient movement to the handle B to cause it to operate the register, strike the bell, and punch the ticket in succession. Second, it allows the punch to remain in the ticket until the return movement of the handle brings the register and bell pawls into re-engagement with the register-wheels and hammer. o is a lock-pawl, which prevents the movement of the handle B except when it is thrown back by the insertion of a ticket to be punched. I do not claim this feature of the lock-pawl as a part of my invention. p is a receptacle for the punchings, the collection of which enables the number and kind of tickets punched to be determined.

I claim as my invention—

1. The slotted connection d^1 of the punching-tool C to the handle B, as and for the purpose hereinbefore set forth.
2. The combination of the trip-pawl j with the register-wheel pawl i , register-wheels H H' , and handle B, substantially as and for the purpose hereinbefore set forth.
3. The arrangement of the bell L and its striking mechanism, and the register-wheels H H' and concomitant parts, side by side, and within the inclosing-case D, located between the handles A B, substantially as and for the purpose hereinbefore set forth.
4. The arrangement, in a ticket-punch, of the partition-plate d^2 in the case D, in combination with the lids or covers f f' , substantially as and for the purpose hereinbefore specified.
5. The combination, in a ticket-punch, of the bell L with the lid f of the case D, substantially as and for the purpose hereinbefore set forth.

JAMES H. SMALL.

Witnesses:

JAY HYATT,

JNO. J. BONNER.