2 Sheets--Sheet 1.

H. JOHNSON.

Conductors' Punch.

No. 162,289. Patented April 20, 1875.

Fig 1

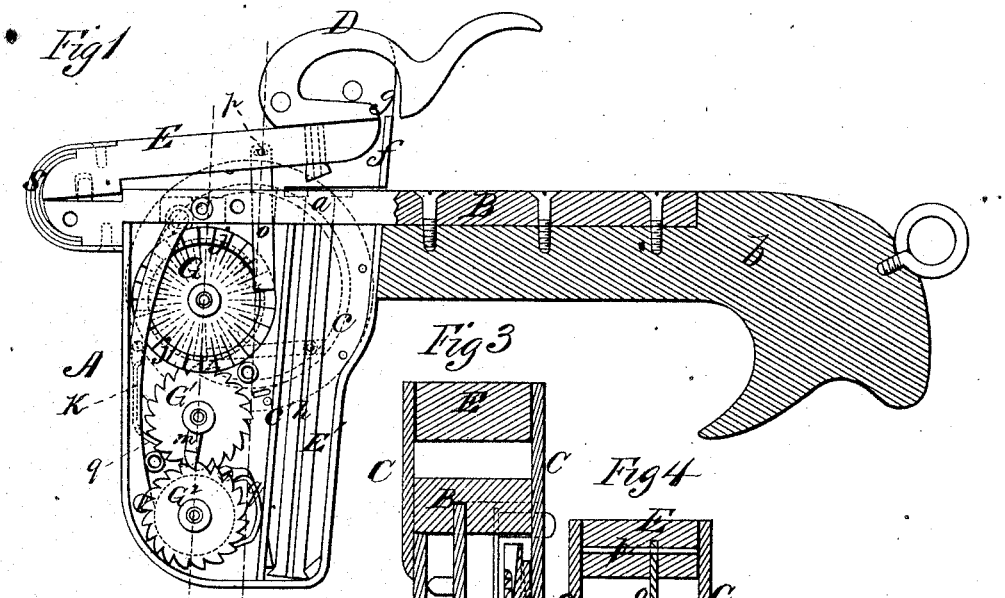


Fig 3

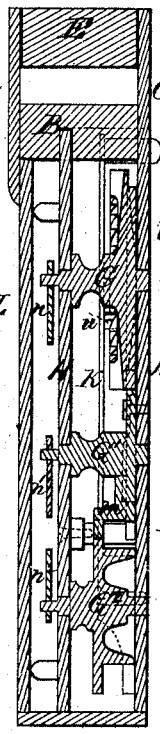


Fig 4

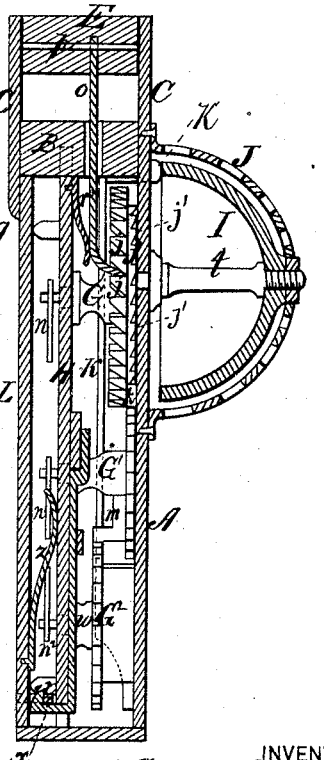


Fig 2

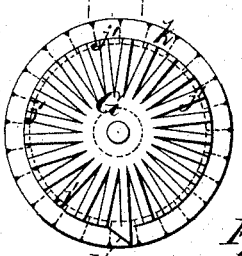
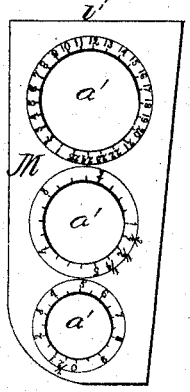


Fig 6

Fig 5



WITNESSES

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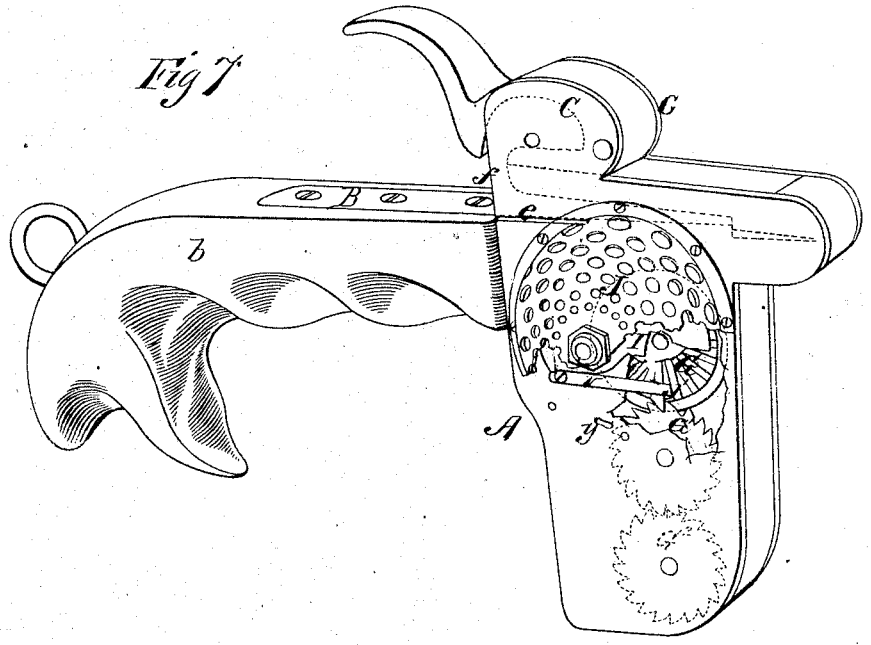
2 Sheets--Sheet 2.

H. JOHNSON.

Conductors' Punch.

No. 162,289. Patented April 20, 1875.

Fig 1.



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UNITED STATES PATENT OFFICE.

HENRY JOHNSON, OF WASHINGTON, DISTRICT OF COLUMBIA.

IMPROVEMENT IN CONDUCTORS' PUNCHES.

Specification forming part of Letters Patent No. **162,289**, dated April 20, 1875; application filed March 16, 1875.

To all whom it may concern:

Be it known that I, HENRY JOHNSON, of Washington, in the county of Washington and District of Columbia, have invented a new and valuable Improvement in Conductors' Punches; and I do hereby declare that the following is a full, clear, and exact description of the construction and operation of the same, reference being had to the annexed drawings, making a part of this specification, and to the letters and figures of reference marked thereon.

Figure 1 of the drawings is a representation of a side view, part sectional, of my punch, and Fig. 2 is a detail view of the same. Figs. 3 and 4 are vertical sectional views, and Figs. 5 and 6 are detail views. Fig. 7 is a perspective view of my punch.

This invention has relation to improvements in conductors' punches, wherein are used a bell for indicating the depositing of a clipping into a suitable receptacle therefor, and a register for recording independently the number of fares; and the nature of the invention consists in the novel construction and arrangement, in connection with a punch-frame, of a double-crown ratchet-wheel, adapted to rotate in its bearings at each actuation of the punch, whereby the said wheel, by means of suitable connections, is made to sound an alarm, register a fare taken, and prevent an alarm from being sounded unless the clipping is deposited in the receptacle. It also consists in a detachable dial-plate fitting snugly into the punch-frame, and adapted to be removed and retained in the office when the punch is turned over to the conductor, whereby the latter is prevented from discovering in how many fares he is indebted to the company, and a single plate may be used to read off the numbers indicated by the needles in any number of punches. It also consists in a peculiarly-constructed metallic storing device, as described, arranged in the clipping-box under the punch, in or on which the clippings are deposited as they are cut out of the tickets, whereby a means is provided for conveniently counting the same. It furthermore consists in combining, with an independent actuating-lever for the punch, an immovable wooden holder rigidly secured to the punch-frame, whereby a convenient hold is obtained for holding the punch and actuating the punch-bar, and the hand of the conductor is protected from the chill of the metal, as will be hereinafter more fully explained.

In the annexed drawings, A designates the frame or casing of my improved punch, the same being of oblong form, and having a shank, B, secured thereto, on which is rigidly secured a wooden handle, *b*. Shank B has a preferably circular opening, *a*, leading into a clipping-box, *c*, formed by a partition, *c'*, out of the body or hollow of the frame. Frame A has upon its upper edges two flanges, C, which afford bearings for a thumb-lever cam, D, which actuates a vibrating metallic arm, E, to which punch-bar *d* is rigidly secured. Arm E is adapted to fit snugly between flanges C, completely filling up such space, and it is secured to the frame by means of a spring or springs, *s*, as shown in Fig. 1. Springs *s* are compressed when the lever-cam D is actuated to cut a clipping out of a ticket, and, after the depositing of the same, its reaction will cause arm E to be retracted, and to spring outward into a position flush with the edges of the said flanges, as shown in Fig. 7.

By this means the punch-bar is completely inclosed, the tickets to be operated on being placed beneath the same through a slit, *e*, cut in flanges C, and in a wall, *f*, closing the rear ends of the said flanges.

In order that the cam may be allowed free downward vibration, it is made in the shape of an arch, and an aperture or slit, *g*, is cut between its weight end and power-arm, in which rear wall *f* will enter when the punch-bar is actuated.

This punch may be of any desired shape to cut out a clipping of any desired form. I may even, in practice, substitute in lieu of the punch a knife, in order to adapt my improved device for use with coupon tickets. I sometimes use a storing-tube, E, in the length of which a slot, *h*, is cut, which tube is detachably secured in an upright position under aperture *a* in clipping-box *c*, and is designed to receive and hold the clippings as they are cut; or I may use a needle, F, having a slightly-enlarged pointed end, *i*, in lieu thereof, and in a like position, upon which the said clippings will be strung as they are successively cut.

In this latter case the punch will be tubular, and of a suitable bore for allowing the enlarged head to be received within it.

G indicates a double-crown ratchet-wheel, having teeth *j* on one side, and teeth *j'* on the other, which teeth are so arranged in relation to each other that the depressions of the one are directly under the elevations of the other. The circles upon which teeth *j j'* are described are concentric with each other—that of the former being within that of the latter—so that a ledge, *k*, is formed, overhanging the periphery of the circle of teeth *j'*, under which ledge a tooth, *l*, is rigidly secured, as shown in Fig. 2. This tooth is adapted to engage, at each complete revolution of ratchet-wheel G, with a tooth of a rack-wheel, G^1, giving it a partial rotation, the degree of this rotation being in proportion to the number of teeth cut therein. Wheel G^1 is adapted to actuate a third cog-wheel, G^2, by means of an arm, *m*, rigidly secured to the former, and engaging with the teeth of the latter, as shown in Fig. 1, this actuation occurring only when the wheel G^1 makes a complete rotation. Wheels G G^1 G^2 have their bearings in the sides of the punch-frame, and in a detachable plate, H, and the spindles thereof project through the said plate, and are provided with needles or hands *n* n^1 n^2.

Motion is communicated to crown-ratchet G by the actuation of lever-cam D, through the medium of a push-bar, *o*, the hooked end of which engages with its upper teeth *j*, the other end thereof passing through a slot in shank B, and being detachably secured to spring-bar E by means of a pin, *p*. In practice, wheel G will have twenty-five teeth, wheel G^1 twenty, and wheel G^2 an equal number, so that when crown-ratchet G has made a complete revolution, thereby registering twenty-five fares, wheel G^1 will have made one-twentieth of a revolution, so that it will require twenty revolutions of the former to effect a single one of the latter, which will consequently occur when five hundred fares have been registered. At the five-hundredth fare, arm *m* of wheel G^1 will cause wheel G^2 to make one-twentieth of a revolution, the latter wheel making a complete revolution when the ten-thousandth fare is taken. Wheels G^1 G^2 are held against backward rotation by means of springs *q*, (shown in Fig. 1,) and these wheels, as well as the wheel G, are provided with broad flat bases, which rest upon the side of the casing. They are thus held against vibration, whereby their accuracy would be impaired. Push-bar *o* is in its nature rigid or inelastic, and it is held to its engagement with teeth *j* of wheel G by means of a spring, *r*, rigidly secured to plate H. It may thus be very strong, and all danger of casual breakage effectually prevented.

I designates an alarm-bell, detachably secured to a standard, *t*, on the punch-frame, which is covered by a perforated screen, J, the latter being also rigidly attached to the said frame. Bell I is sounded each time a fare is taken, by means of a hammer-spring, K, rigidly secured in the dial-case, in a position such that it will overlie ratchet-wheel G, and extend with its striking end under the edge of the bell. Spring K, where it overlies ratchet-wheel G, is provided with a tooth, *u*, engaging with teeth *j*, so that when the said wheel is actuated the said spring will be thrust upward, causing it to react strongly, and sound an alarm when the said tooth falls into the space between the next two teeth.

The registration of the fare and the sounding of the alarm are thus made simultaneous, a complete stroke of the punch-bar being necessary to effect the former; but, as a semi-actuation of ratchet G would cause spring K to react with sufficient strength to sound an alarm without registering a fare, it becomes necessary to devise a means whereby the sounding of the alarm and the registration of a fare will inevitably concur. This I accomplish in the following manner, to wit: A spring-pawl, *v*, is rigidly secured in any suitable manner to the dial-case, with its hooked end engaged in the teeth *j'* on the under side of crown-ratchet G. These teeth are intermediate to those *j* on the upper side of the said ratchet-wheel, as was above described, so that when the punch is actuated to an extent sufficient to cause a semi-actuation of ratchet-wheel G, pawl *v* will hold it against backward rotation, thus preventing spring-hammer K from reacting and sounding an alarm. The dial-case and the clipping-box are accurately closed by means of a detachable metallic plate, L, which is inserted under the overhanging edge of flange C, is then pressed down, and is rigidly but removably secured in place by means of a bolt, *w*, arranged in guides under plate H, actuated by a suitable spring, and adapted to engage, after the manner of a catch, with a staple, *x*, upon the under side of the said plate, as shown in Fig. 4. When it becomes necessary to remove plate L, for a purpose hereinafter explained, a key is passed through a perforation in screen J into a key-hole, *y*, (shown in Fig. 7,) which is hidden from sight when the said screen is in position, and a slight turn imparted thereto, when bolt *w* will be retracted and cover L thrown up above the edges of the casing by the reaction of a suitable spring, *z*, which is rigidly secured to the under side of the said plate, and which was previously compressed when the cover-plate was placed in position. M designates a detached dial-plate, having a number of circular openings, *a'*, which plate is of such a form as to be snugly received in a constant position over the dial-case when plate L has been removed, hands *n* n^1 n^2 being clearly visible through the said apertures. The edges of these apertures are each provided with a series of numbers in an ascending scale, corresponding to the number of teeth on the ratchet-wheels below, and these numbers are preferably of such a size as to be with difficulty

read with the unassisted eye. When the punch is turned over to the conductor, dial-plate M is kept in the office in charge of a responsible officer, the hands being concealed from view by plate L. Upon his return this plate is removed and dial-plate M substituted therefor, when the number of fares may be readily read off by the officer.

The advantages of this arrangement of dial-plate are, that a single plate may be used to read off the position of the hand in any number of instruments, and that the conductor, being ignorant as to how his punch registered at the close of his day's work, can never run out the punch and exhaust the powers of registration, and then, commencing anew at the initial number of the dial, run up the register to a point short of the amount of fares actually taken, thus enabling him to pocket the amount of money represented by the difference in number of the fares fraudulently registered and those actually collected; and, the figures being of very small size, no bystander could advise him of the position of the needles in relation to the various dials, and thus enable him to carry out a fraudulent intent.

The peculiar arrangement and construction of ratchet-wheel G, pawl *v*, and push-bar *o* has also the effect of producing a sharp snap or click before the sounding of the alarm and subsequent thereto, the first click being produced by the fall of pawl-spring *v* into a depression between teeth *j'* of the said wheel, and the second by that of push-bar *o* into a similar depression between teeth *j* on the upper side thereof, consequent upon the retraction of spring-arm E and the reaction of spring *r*, which latter forces the said push-bar to a re-engagement with the said wheel. By this means the fraudulent practice called "punch-beating" is rendered almost impossible, for the reason that, while an independent alarm can be and is well known to have been used, a snap or snaps preceding or following the sounding of an alarm, or both, would be very difficult to imitate or counterfeit.

I claim—

1. In a conductor's punch, the double-crown ratchet-wheel G, having teeth *j j'*, adapted to sound an alarm, prevent a premature or fraudulent alarm, and actuate the dial mechanism of a registering device, substantially as specified.

2. The combination, with a registering device in a bell-punch, of the separate and detached dial-plate M, substantially as specified.

3. The slotted storing-tube E' for receiving the clippings, and adapted to be placed in and removed from the clipping-box, in combination with a punch and its actuating mechanism, substantially as specified.

4. The combination of a vibrating thumb-lever cam, D, metallic arm E, and a wooden handle, *b*, rigidly secured to the punch-frame, substantially as specified.

5. The detachable lid or cover L, in combination with a dial-case, a clipping-box, and a detachable dial-plate, H, substantially as specified.

6. The ejector-spring *z*, in combination with a detachable cover, L, and plate H of the dial-case, substantially as specified.

7. The spring-pawl *v*, in combination with a ratchet-wheel, G, adapted to be intermittently rotated by suitable mechanism, and a spring-hammer, K, for the purpose of preventing a premature or fraudulent alarm, substantially as specified.

8. The intermittently-rotated crown-ratchet G, in combination with an overlying hammer-spring, K, having a beveled tooth, *u*, engaging with the teeth of the said wheel, substantially as specified.

9. The combination of a needle, F, having an enlarged pointed head, *i*, for perforating the clippings and allowing them to slide down the shank of the needle, in combination with a mechanically-actuated punch, substantially as specified.

10. The spring-secured arm E, having a punch bar or blade, in combination with a thumb-lever cam, D, for actuating the alarm and the registering mechanism, substantially as specified.

11. A double-crown ratchet, adapted to be intermittently rotated, and a pawl, in combination with an alarm mechanism, a push-bar for operating the said ratchet, and a spring for holding the push-bar to its engagement therewith, whereby a sharp clicking sound is produced both before and after the alarm, substantially as specified.

In testimony that I claim the above I have hereunto subscribed my name in the presence of two witnesses.

HENRY JOHNSON.

Witnesses:
GEORGE E. UPHAM,
M. CARROLL.