

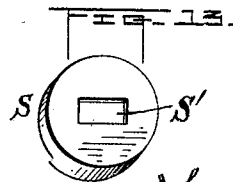
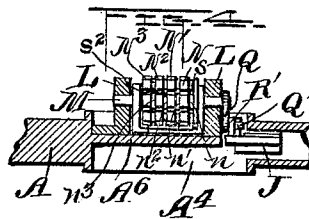
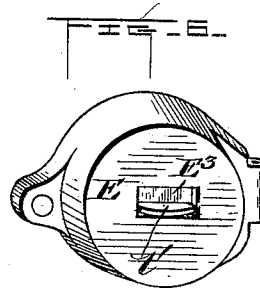
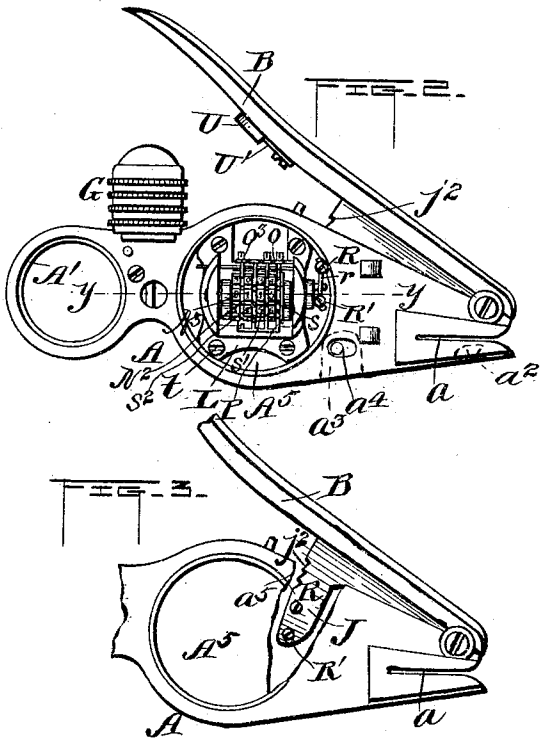
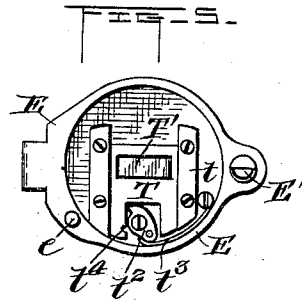
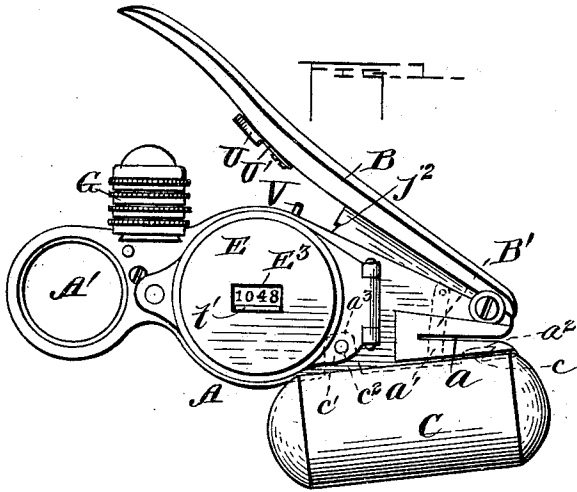
(No Model.)

2 Sheets—Sheet 1.

J. M. BLACK.
TICKET BELL PUNCH.

No. 509,287.

Patented Nov. 21, 1893.



Witnesses

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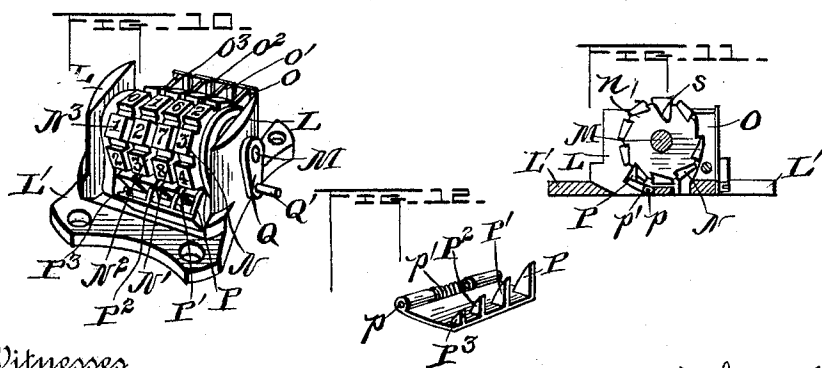
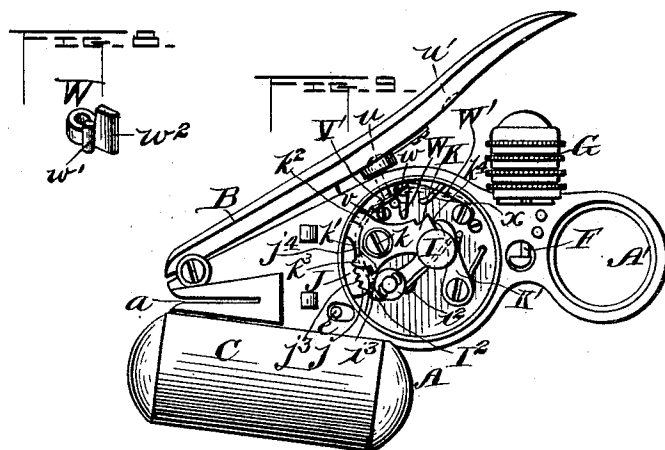
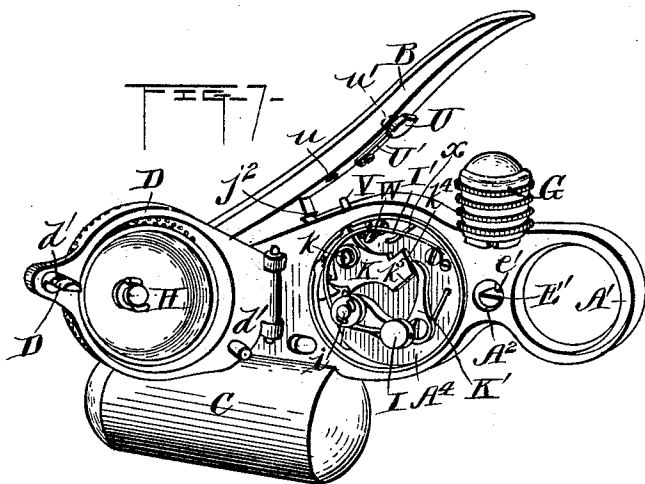
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2 Sheets—Sheet 2.

J. M. BLACK.
TICKET BELL PUNCH.

No. 509,287.

Patented Nov. 21, 1893.



Witnesses

Reverence.

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UNITED STATES PATENT OFFICE.

JOHN MELTON BLACK, OF LONDON, ENGLAND.

TICKET BELL-PUNCH.

SPECIFICATION forming part of Letters Patent No. 509,287, dated November 21, 1893.

Application filed August 16, 1892. Serial No. 443,250. (No model.) Patented in England April 17, 1889, No. 6,551.

To all whom it may concern:

Be it known that I, JOHN MELTON BLACK, a subject of the Queen of Great Britain, residing at London, England, have invented certain new and useful Improvements in Ticket Bell-Punches; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention has been patented in part in Great Britain, No. 6,551, and dated April 17, 1889.

This invention relates to ticket bell punches adapted to be used for registering fares in public vehicles; and more especially to punches of the kind shown and described in the patents to Small, No. 111,392, dated January 31, 1891, to Corbett, No. 152,081, dated June 16, 1874, and to myself, No. 374,288, dated December 6, 1887. These have a lever handle pivoted at one end of the frame above the slot which admits the tickets, the said lever being provided with a punch or cutter and also with a quadrant rack or rack arm for engaging a tumbler, the latter being so constructed as to prevent the lever from being opened until it has been entirely closed.

Reference is made to the above patents for a fuller disclosure of the operation of the aforesaid parts.

The chief objects of my present invention are to improve the registering mechanism and the devices for operating the same, securing a greater range of numbering or registry with equal or greater lightness and simplicity; to provide improved means for exposing the numbers on the numbering disks of a punch and then closing and locking it; and to prevent the opening of the punch handle by any one not having the key to the lock of the case and knowing the combination for opening it. To effect these ends, I make use of the construction and combination of parts hereinafter more particularly set forth and claimed.

In the accompanying drawings Figure 1 represents a side elevation of a bell-punch embodying my invention, the view being taken from the side of the registering mechanism, with the lever handle in its unlocked position. Fig. 2 represents a similar view, the

cover of the registering disks and the receptacle for the punched pieces of tickets having been removed. Fig. 3 represents a side elevation of a part of the punch, the casing being broken away to show the rack-arm of the lever. Fig. 4 represents a section on the line $y-y$ of Fig. 2 through the supporting devices of the registering disks, the latter and their actuating devices being in elevation. Fig. 5 represents a detail rear view of the cover of the registering disks, the number-exposing slide attached thereto and the spring catch for locking this slide. Fig. 6 represents a detail view in perspective of the said cover showing the thumb-piece on its front. Fig. 7 represents a perspective view of the said punch taken from the side opposite to that shown in Fig. 1, the bell-cover having been turned back and the lever being in the unlocked position. Fig. 8 represents a detail perspective view of the double armed pawl or dog hereinafter described. Fig. 9 represents a side elevation of the devices shown in Fig. 7, the lever being in the locked position. Fig. 10 represents a detail perspective view of the registering mechanism. Fig. 11 represents a transverse section through the same; and Fig. 12 represents in side elevation the ratchets thereof detached. Fig. 13 represents a detail view of the cap S hereinafter described.

A designates the frame of the punch having the usual finger-hold A' at one end, and the usual longitudinal slot a , with flaring mouth, for the insertion of tickets at the other end. The punch-lever B is pivoted to this latter end and provided with a cutter or punching tool B' , which works in a passage a' of the said frame through the said slot, so that each time the said lever and frame are closed together with the well-known scissors-like motion a piece will be punched from any ticket or slip which may be inserted in or passed through the said slot. The pieces, usually disks, which are thus cut out descend through the passage a' to a receptacle C, that is detachably fastened to the bottom of the said frame by a hook-shaped lug c and a perforated lug c' . The former lug enters a correspondingly shaped recess a^2 in the bottom of said frame, and the lug c' enters an opening or passage a^3 of the said frame extending up from its bottom, having a trans-

verse passage or pair of openings a^1 that register with the perforation or opening c^2 of the said lug c' . A pin d on the inner face of the bell-cover D and a corresponding pin e on the inner face of the cover E for the registering mechanism enter this perforation c^2 from opposite sides through the said openings a^1 , when the said covers are closed. Thus the locking of these covers after the said receptacle has been put in place locks this receptacle also, and the latter cannot be removed until the punch is unlocked and opened. These covers D E are hinged to the said frame and provided with lugs D' E' which enter a transverse opening A² in the handle end of the frame A when the said covers are closed, one lug then fitting above the other, so that a notch or recess d' of the one and a similar notch or recess e' of the other will register forming a continuous groove to receive the locking bolt F of a combination lock G. The latter being fastened on the said frame and the said bolt working down through a small passage or opening a^3 of the said frame across the said passage or opening A². This lock is manipulated in the usual way and may be of any suitable construction, the particular kind of lock used having nothing to do with my invention. The enlarged part of the frame A between these covers has a circular chamber A⁴ on one side for the reception of the bell-hammer and sundry other parts, and a corresponding chamber A⁵ on the opposite side, for the registering devices, a central partition A⁶, formed with or fixed in the said frame, serving to separate the said chambers. The bell H is fastened to the inner face of the bell-cover D and opens and closes therewith.

The bell-hammer I is mounted on a pivot-stud i of partition A⁶ and provided with a spring I' which tends, when under strain, to throw the said hammer against the said bell. On the same fixed pin or stud i is mounted a trip or tail-piece I² having a lip i^2 which overlaps the handle of the said hammer from below and also at its outer end a fish-tail-shaped extension i^3 that fits and receives a corresponding horn j , of a rigid rack-arm J formed with or attached to the lever B. This rack-arm works through a vertical passage a^5 in the interior of the said frame, communicating with the chambers A⁴ and A⁵, the partition A⁶ being cut away on one side for that purpose.

When the said lever is closed the horn j on the end of the said rack-arm causes the tail-piece I² and the hammer I to turn together on the said pivot stud i raising the said hammer from the said bell against the resistance of the spring I' until the said horn passes out of the notch of the said fish-tail, and the spring being free to act causes the hammer to strike the bell and restores the tail-piece to its first position. In this position it is not disturbed by the rebound of the hammer since the latter is not attached to the said tail-piece, nor overlapped by any part thereof on the upper

side, but is allowed a certain amount of independent upward motion resisted only by the said spring. The said tail-piece does not resist the upward movement of the said horn as the lever opens, the first or normal position of the said tail-piece being out of its path; but is turned into position to be acted on in the next descent by means of a horn k' on the under side of a tumbler pawl K, which is mounted on a pivot-stud k fixed to partition A⁶. The chief function of this tumbler pawl is to compel the completion of each opening movement and each closing movement of the bell-punch before another such movement is begun. To this end it has on its outer face two horns $k^2 k^3$ engaging alternately respectively with an upper series of teeth j^2 and a lower series of teeth j^3 on the proximate face of the said rack-arm J. Between these two series and standing in beyond them is a block or shoulder j^4 of the said rack-arm, beveled reversely above and below. The lower horn k^3 and lower series of teeth j^3 by their engagement prevent the bell-punch from opening until the act of closing is completed; when the shoulder j^4 strikes this horn and thereby turns the tumbler-pawl K so as to bring the upper horn k^2 similarly into engagement with the series of teeth j^2 , so that they will prevent any closing action until the lever is fully opened. A spring-finger K', mounted on the partition A⁶, bears against either the upper incline k^4 or the lower incline k^3 of the wedge-shaped inner end of the said tumbler pawl; according to the position temporarily taken by the latter. The office of the said finger is to hold the said tumbler pawl in such position against accidental dislodgment, though allowing the shifting of the said tumbler pawl from one of its positions to the other when the doubly inclined shoulder j^4 acts against the horn k^3 in descending or the horn k^2 in going up.

The parts thus far described are old, the description being for clearness only.

In my present improvement I do away with the registering mechanism of the patents aforesaid, and use instead the following simple and compact devices having a greater range of enumeration. L designates a pair of standards rigid with a base-plate L', which is secured to the partition A⁶ by screws l . In these standards a shaft M is journaled having four or more peripherally numbered disks or wheels N N' N² N³ mounted thereon and allowing the said shaft to turn within them. Each disk is provided with a ratchet wheel $n n' n^2$ or n^3 which is engaged by the corresponding spring pawl of a series of retaining pawls O O' O² O³ fixed to base plate L', so as to retain the said wheel or disk in each position to which it is moved step-by-step in the operation of registering. To effect this step-by-step motion a series of feeding pawls P P' P² P³ are connected together like comb-teeth, one being opposite each ratchet-wheel and mounted freely on a shaft

p which is fixed at its ends to arms q q' fast on the disk-shaft M. The said shaft M has another arm Q on its end outside of one of standards L and this is provided with a wrist-pin Q', extending between two studs R R' on the side of the rack-bar J, so that when the said rack-bar moves inward the upper stud R will come in contact with the said wrist-pin and give the feeding pawls a forward motion to the extent of one tooth of the ratchet wheels, the same corresponding to the interval from number to number on the periphery of any one of the registering disks or wheels. In the outward movement of the lever and rack arm the lower stud R' comes in contact with the said wrist-pin, and, ascending, lifts the same so as to return the feeding pawls to their first position. A short cross-rod r makes a bridge from one of the said studs to the other, so as to guard the said wrist-pin against accidental dislodgment. The said feeding-pawls are held by a small spring p' against turning back on their shaft p, and thereby are kept ready for work. The pawl or tooth P is the only one which acts on its ratchet at every forward movement; since the other pawls P' P² P³ are shorter, their length diminishing successively, and the said pawl P holds them out of action until one rotation of the shaft M and disks or wheels N N' N² N³ is complete. The ten numerals on the periphery of wheel N stand for units. When the rotation is complete, the pawl P drops into a notch s in the periphery of the said ratchet-wheel which is deep enough to permit the pawl P' to come into engagement with ratchet wheel n' and to move it and the wheel or disk N' representing tens one step forward. This ratchet N' is likewise provided with a single deep notch s' that allows the pawl P' to enter far enough to bring the pawl P² into position to engage the ratchet-wheel n² of the hundreds wheel N² and move it forward a step; the pawl P', except on this occasion, holding the pawl P² out of engagement. In like manner the ratchet wheel n² of the hundreds wheel N² has a single deep notch s² for allowing the operation of thousands wheel N. The number of wheels may be increased still further, with extension of the same system of feeding. But the four shown will almost always suffice. A cap S is fastened to one of the standards L by a screw so as to cover the wheels and has an opening or window S' in its face through which the row of numerals presented by the said wheels at any time may be seen.

On the inner side of the outer cover E of the registering mechanism are vertical guideways t for a slide T provided with a glass window T', which in the lowest position of the said slide is opposite the said opening S' of the cap S and a corresponding opening E³ in the center of the said cover. The row of numerals presented by the said wheels opposite these openings may then be seen through the case. But when the slide T is raised into its highest position

the solid part of the said slide is opposite the said openings and hides the said numerals. To facilitate the raising of the slide into this position, it is provided with a thumb-piece t' extending through the opening E³. A pivoted click t² on the inner face of cover E is then thrown by a spring t³ into engagement with a notch t⁴ of the said slide, so as to lock it in this position until the said cover can be turned back and the click freed by hand from such engagement. These devices make it possible to exhibit the numerals, showing the number of fares already registered, to the conductor or other temporary custodian of the bell punch after it has been locked, and then to hide the said numerals by moving up the thumb-piece, beyond the power of any one to inspect again until the punch is regularly unlocked.

In order to prevent any tampering with the punch lever after the close of the day's work, I provide the following means of securely locking the handle so that it can be released only by the person officially appointed for that purpose and in command of the key of the punch. There are two small recesses U U' in the under side of the punch-lever B, arranged some distance apart; each being adapted to receive a stud or boss U² on a plate U attached to a flat spring U' which is pivoted to the said lever midway between the said recesses. The plate and spring may be turned on their pivot, to bring the said stud or boss into either one of these, and the spring will hold it there until released by hand. When the said stud occupies the rearward recess U' the lever may be operated as usual. But when the said stud is in the recess u the plate U is immediately over and in proximity to the outer end of a sliding pin V which works in and out through the upper wall of chamber A⁴. A small plate V' is attached to the inner end of the said pin and a stop v, which may be a detachable screw as shown, by contact with the said plate, prevents the said pin from moving too far inward. A double-armed locking pawl or dog W is pivoted on a stud w of partition A⁵ and provided with a spring W' which holds one of its arms w' up against the plate V', the other arm w² extending lower. A fixed stop x attached to the wall of the chamber A⁴ prevents this double armed pawl or dog from being turned back too far. The lever B, when moved toward the frame A in the act of closing, forces in the pin V by means of the interposed plate U and so turns the double armed locking pawl far enough to prevent the tumbler pawl K from being turned on its pivot by the shoulder j⁴ of the said rack-bar in order to free the said tumbler-pawl from the latter as before described. To unlock the punch the double-armed locking dog is turned until its long lower arm is in position to enter a recess k⁵ in the upper and rear part of the tumbler-pawl K. This allows the latter to be turned by a suitable tool so as to

unlock the rack-arm J and the lever B. The plate U is then turned to its former position, out of the way of the pin V. But of course this unlocking cannot take place unless the cover D is first opened by unlocking the bell punch as described. In the position last described the plate V prevents the lever B from closing sufficiently to turn the tumbler pawl K by means of shoulder j^4 . The double armed pawl comes in contact with the tumbler pawl only at the moment of greatest closing or inward movement of the rack arm. The sliding pin and the spring bearing against it through the medium of the said double arm prevent the plate U from moving sufficiently to be disengaged from the lever and turned out of its way.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In combination with a punch frame and lever an arm attached to the said lever, working in the said frame and having two studs at a suitable interval on its side, a shaft journaled in bearings attached to the said frame and provided with an arm having a wrist-pin that extends into the space between the said studs, to be acted on thereby alternately in opposite directions, a set of pawls of different lengths rocking with the said shaft, a series of registering disks or wheels having numerals arranged on their peripheries, a series of ratchet wheels each of which is formed with or attached to one of the said registering wheels or disks and turns therewith, and a series of retaining pawls for the said ratchet wheels and registering wheels each ratchet wheel having a single notch deeper than its other notches arranged and operating with respect to the feeding pawls substantially as set forth.

2. In combination with the frame of a registering punch and locking devices, a cover for the registering mechanism which is locked by said devices and provided with an opening

opposite the said mechanism, a slide attached to the cover and adapted to be shifted over or away from the said opening to exhibit the said mechanism or hide it, a thumb-piece protruding from the said slide through the said opening and an automatic catch inside of the said cover for engaging and locking the said slide in one of its positions substantially as set forth.

3. In combination with the frame and lever of a punch a rack-arm attached to the said lever and provided with a shoulder a tumbler pawl engaging the said rack arm and preventing the opening of the said lever until the said tumbler pawl has been turned by the said shoulder, a movable plate attached to the said lever and adapted to occupy at will one of two positions, means for locking the said lever having a protruding part which is under the said plate when the latter occupies one of the positions mentioned in order to prevent the closing of the lever and means for holding the said plate in this position substantially as set forth.

4. In combination with the frame of a punch a punching lever provided with two recesses on its under side at different distances from its pivotal point, a plate mounted on a spring which is pivoted to said arm said plate having a stud which is adapted to enter one or the other of the said recesses at will, a pin working in and out of the said frame a double-armed locking dog or piece turned by pushing in the said pin, a tumbler pawl which is prevented by the said locking dog from turning and a rack arm attached to the said lever and engaging the said tumbler pawl substantially as set forth.

In testimony whereof I affix my signature in presence of two witnesses.

JOHN MELTON BLACK.

Witnesses:

WM. THOS. MARSHALL,
PERCY E. MATTOCKS.