

No. 759,596.

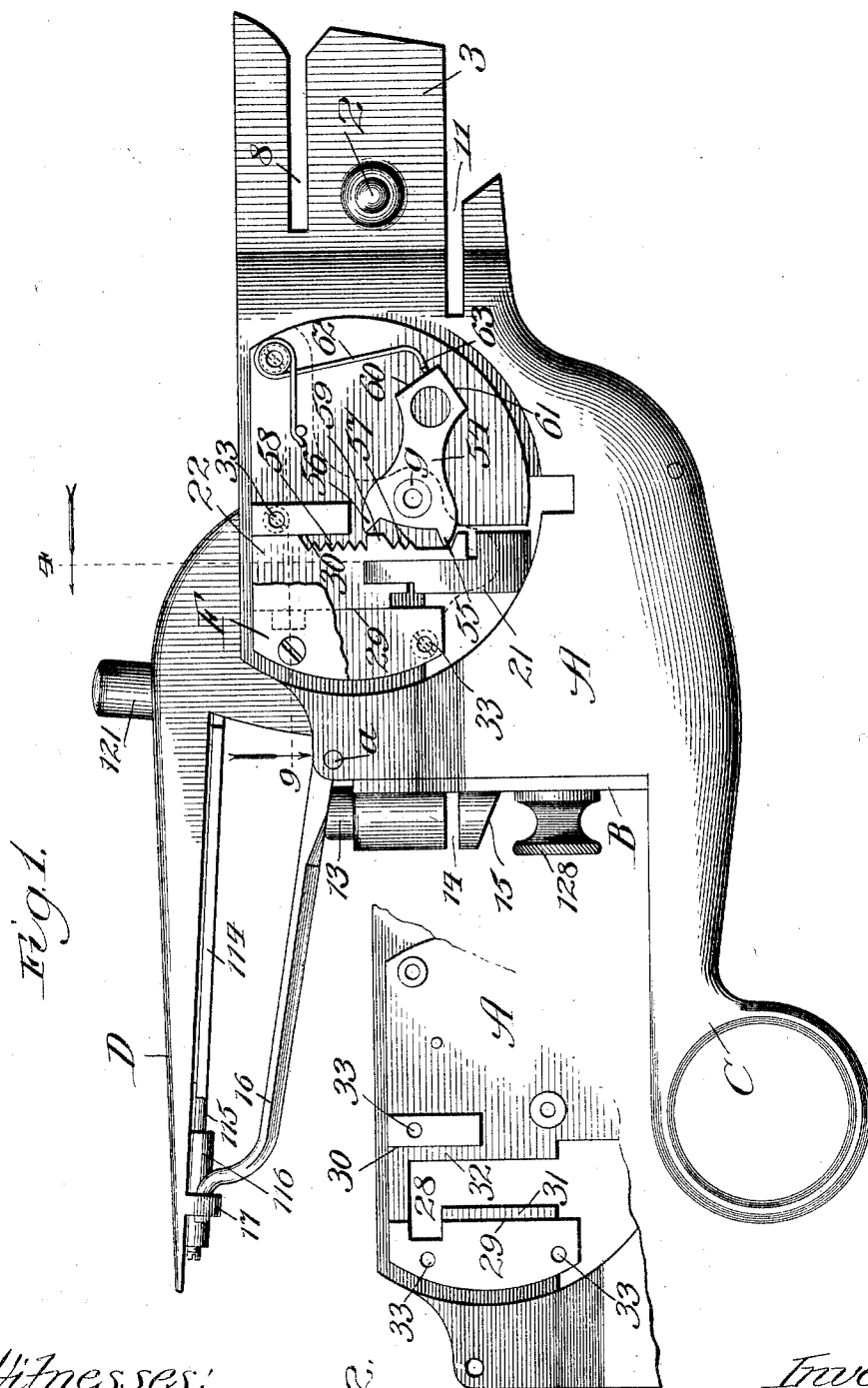
PATENTED MAY 10, 1904.

W. C. DOWNING.
COMBINATION TICKET PUNCH.

APPLICATION FILED APR. 8, 1903.

NO MODEL.

8 SHEETS—SHEET 1.



Witnesses:
Ed. C. Chas. J. &
John Enders &

Fig. 2.

Inventor:
William C. Downing
By L. B. Coupland.
Att'y

No. 759,596.

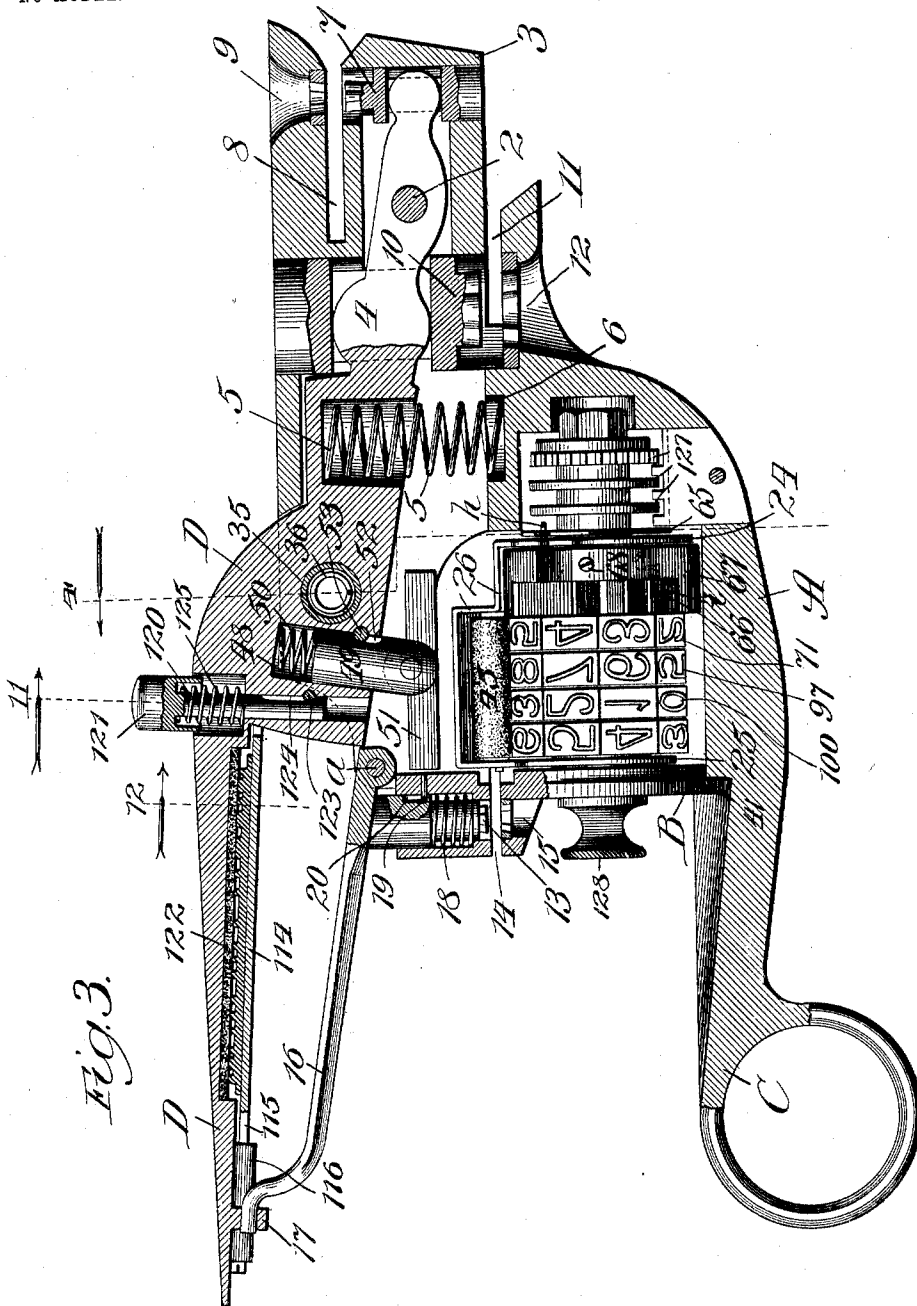
PATENTED MAY 10, 1904.

W. C. DOWNING.
COMBINATION TICKET PUNCH.

APPLICATION FILED APR. 8, 1903.

NO MODEL.

8 SHEETS—SHEET 2.



Witnesses:
E. C. Gaylor,
John Enders Jr.

Inventor:
William C. Downing,
By L. B. Coupland
ATTY.

No. 759,596.

PATENTED MAY 10, 1904.

W. C. DOWNING.
COMBINATION TICKET PUNCH.

APPLICATION FILED APR. 8, 1903.

NO MODEL.

8 SHEETS—SHEET 3.

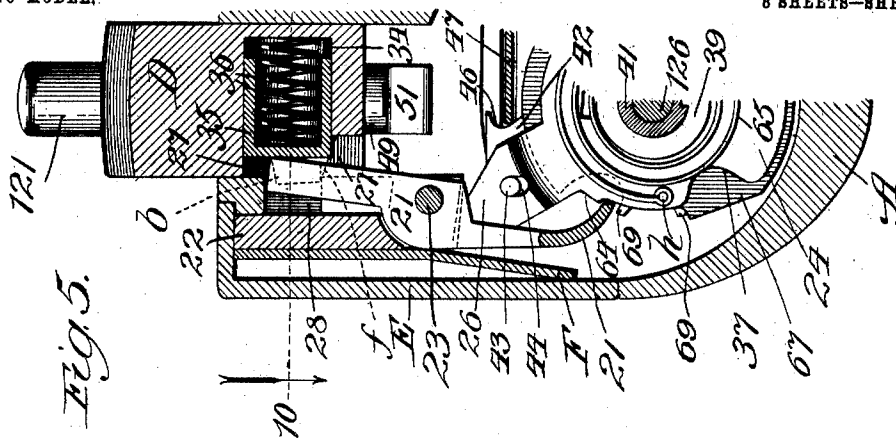


Fig. 5.

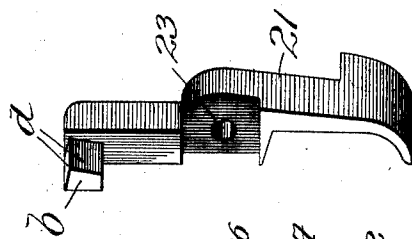


Fig. 7.

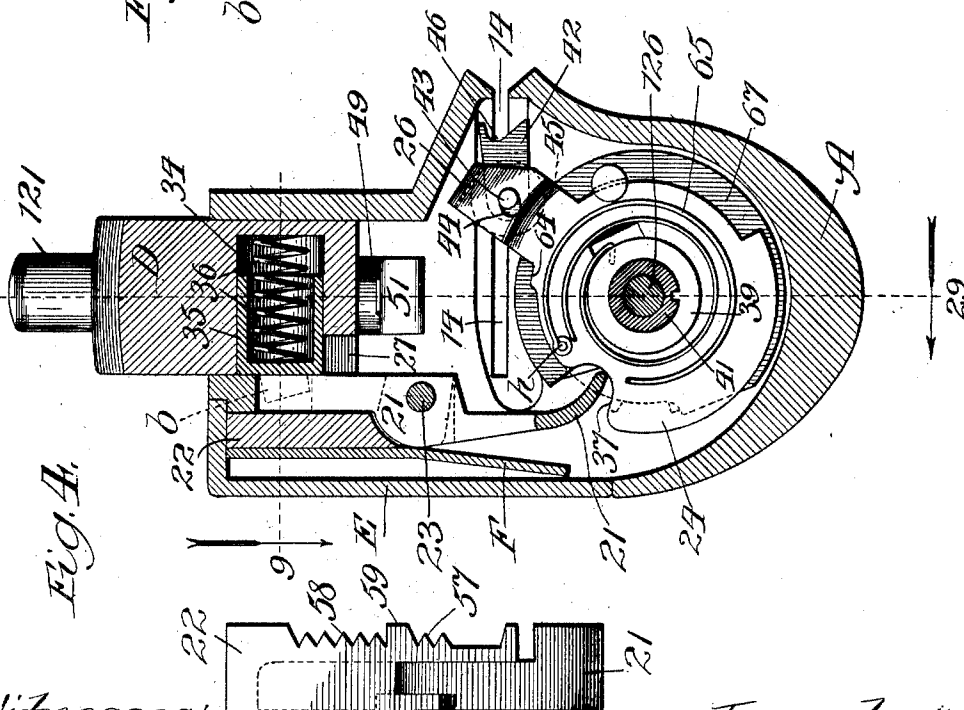


Fig. 4.

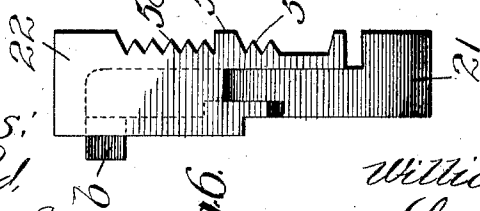


Fig. 6.

Witnesses:
Ed. Chyba,
John Enders Jr.

Inventor:
William C. Downing
By L. B. Coupland,
Attorney

W. C. DOWNING.
COMBINATION TICKET PUNCH.

APPLICATION FILED APR. 8, 1903.

NO MODEL.

8 SHEETS—SHEET 5.

Fig. 16.

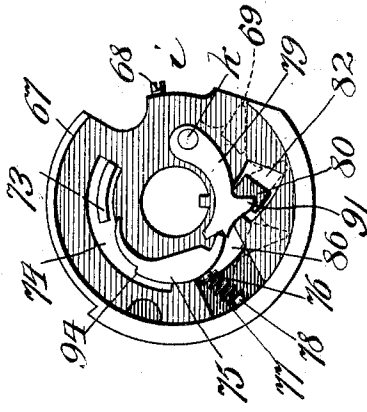


Fig. 17.

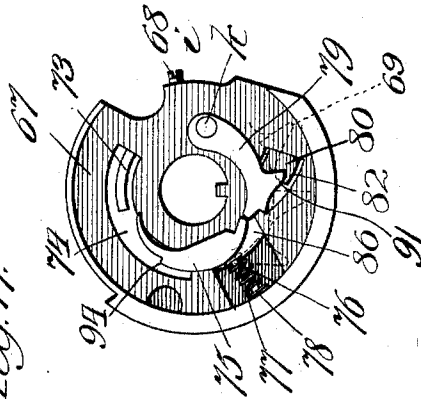


Fig. 15.

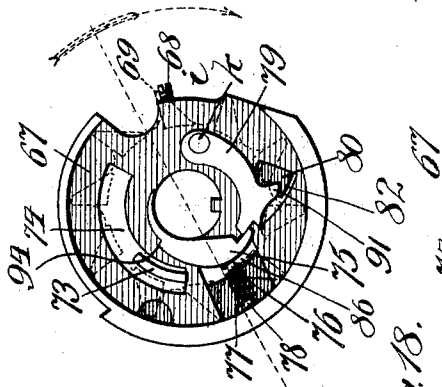


Fig. 18.

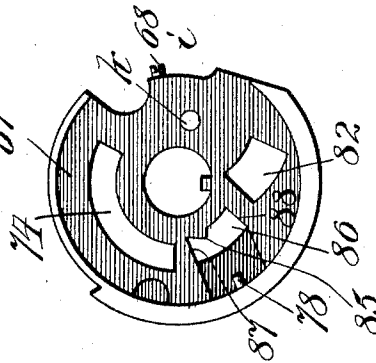


Fig. 14.

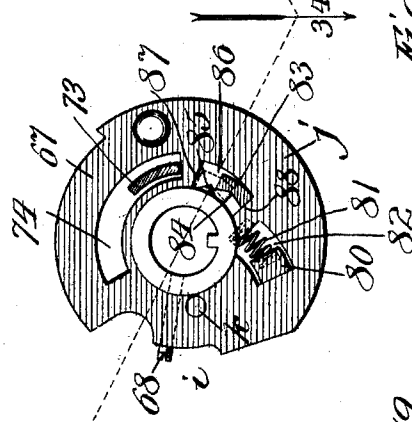
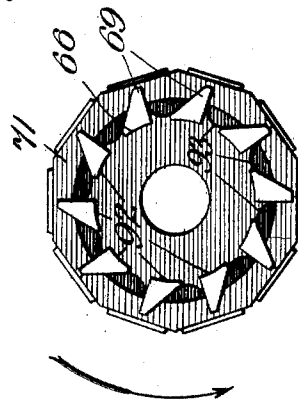


Fig. 19.



Witnesses:
E. S. Gaylord,
John Enders Jr.

Inventor:
William C. Downing,
By L. B. Coupland,
Att'y

W. C. DOWNING.
COMBINATION TICKET PUNCH.

APPLICATION FILED APR. 8, 1903.

NO MODEL.

8 SHEETS—SHEET 6.

Fig. 23.

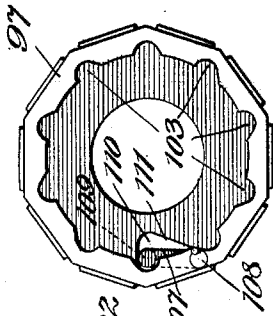


Fig. 28.

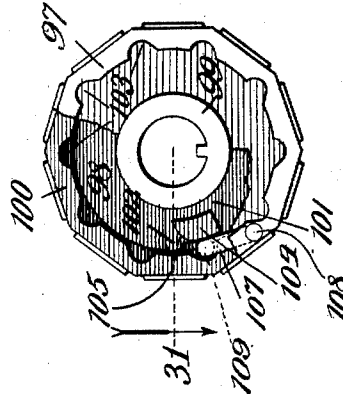


Fig. 22.

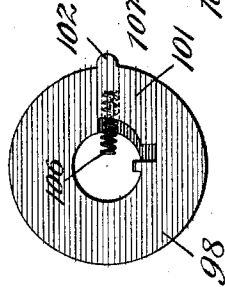


Fig. 27.

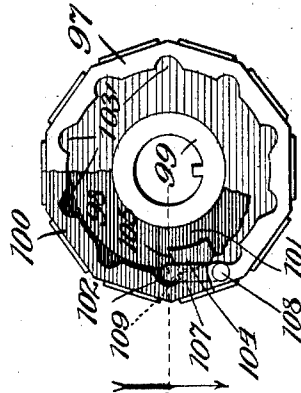


Fig. 21.

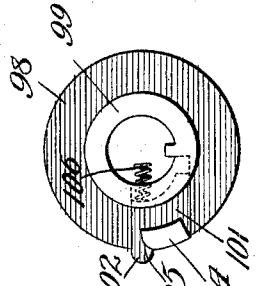


Fig. 24.

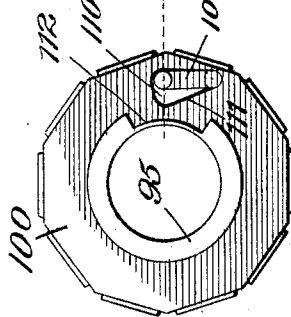
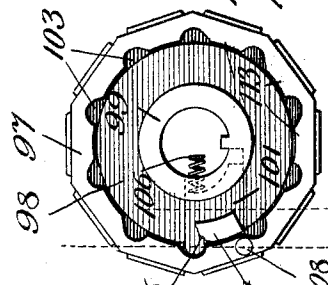


Fig. 20.



Witnesses:
L. B. Coupland
John Enders &

Fig. 25.

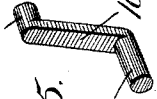


Fig. 26.



Inventor:
William C. Downing
By L. B. Coupland
Att'y -

No. 759,596.

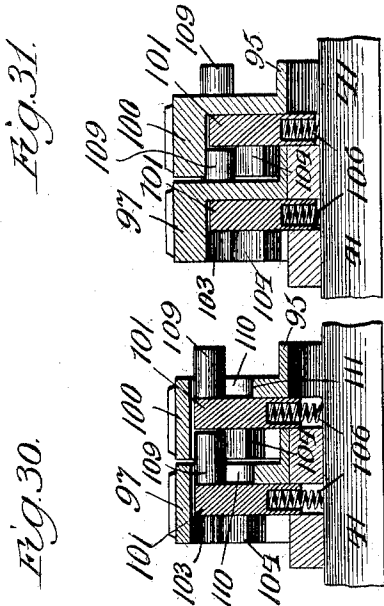
PATENTED MAY 10, 1904.

W. C. DOWNING.
COMBINATION TICKET PUNCH.

APPLICATION FILED APR. 8, 1903.

NO MODEL.

8 SHEETS—SHEET 7.



Witnesses:
E. Gaybird.
John Enders Jr.

Fig. 32.
Inventor:
William C. Downing,
By L. B. Coupland
Atty

No. 759,596.

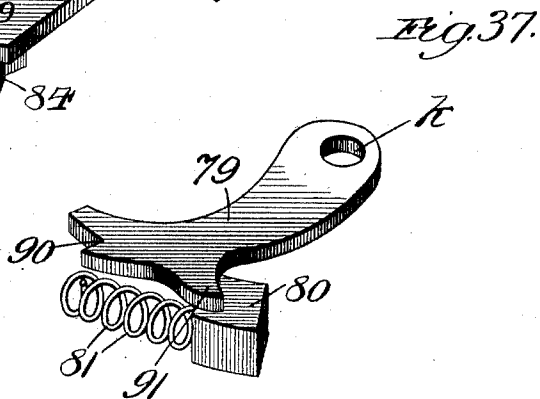
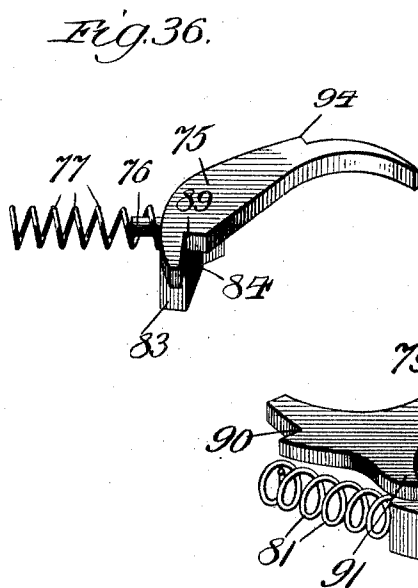
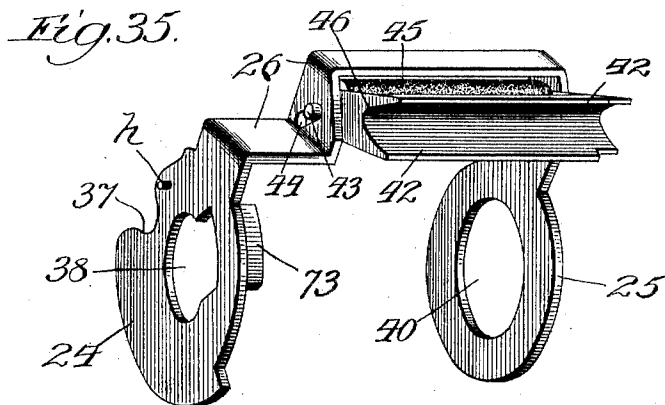
PATENTED MAY 10, 1904.

W. C. DOWNING.
COMBINATION TICKET PUNCH.

APPLICATION FILED APR. 8, 1903.

NO MODEL.

8 SHEETS—SHEET 8.



Witnesses:
Edw. J. Coupland
John Enders Jr.

Inventor:
William C. Downing
By *L. B. Coupland*
Atty.

UNITED STATES PATENT OFFICE.

WILLIAM C. DOWNING, OF CHICAGO, ILLINOIS.

COMBINATION TICKET-PUNCH.

SPECIFICATION forming part of Letters Patent No. 759,596, dated May 10, 1904.

Application filed April 8, 1903. Serial No. 151,610. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM C. DOWNING, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Combination Ticket-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 relates to improvements in that class of devices which is the subject-matter of Letters Patent No. 588,322, dated August 17, 1897, and No. 652,954, dated July 3, 1900, heretofore granted to me, and has for its object to present certain improved features not provided for in the patents referred to and which will greatly facilitate the work of canceling tickets and at the same time guard against the possibility of fraudulent practices, as will be hereinafter set forth in detail.

In the drawings, Figure 1 is a rear side elevation, a removable cap-plate being broken away, exposing certain parts of the mechanism covered thereby. Fig. 2 is a broken-away portion of the casing in elevation. Fig. 3 is a vertical longitudinal section and part elevation looking from the rear side. Fig. 4 is a transverse section on line 4, Figs. 1 and 3, looking in the direction indicated by the arrow. Fig. 5 is a similar view to that of Fig. 4, some parts of the mechanism being in a different position. Fig. 6 is a detached elevation of a combined movement-pawl and ratchet-plate. Fig. 7 is a detached view in perspective of a movement-pawl. Fig. 8 is a detached elevation of the manipulating lever-handle and minor parts directly attached thereto. Fig. 9 is a horizontal section on line 9, Figs. 1, 4, and 8. Fig. 10 is a horizontal section on line 10, Fig. 5. Fig. 11 is a vertical section on line 11, Figs. 3 and 8. Fig. 12 is a vertical section on line 12, Figs. 3 and 8. Fig. 13 is a similar view with a part thereof in a different position. Fig. 14 is an outside end view of a ratchet-wheel case inclosing certain elements. Fig. 15 is a view looking at the opposite or inner side thereof with the working parts attached thereto and in their

normal position. Fig. 16 is a similar view with the working parts in a position between normal and abnormal. Fig. 17 is a similar view with the working parts shown in their extreme opposite position from that of normal. Fig. 18 is an inside view of the inclosing case with the working parts removed. Fig. 19 is an elevation of a ratchet-wheel and a units-disk, the ratchet forming a part of the disk. Fig. 20 is an elevation of the tens-disk and a washer, showing the side adjacent to the units-disk. Fig. 21 is an elevation of the washer interposed between the units and tens disk. Fig. 22 is the reverse of the washer shown in Fig. 21. Fig. 23 is an elevation of the tens-disk shown in Fig. 20 with the washer-plate removed. Fig. 24 is the reverse side of Fig. 23. Fig. 25 is a view in perspective of a double-movement crank located in the numbering-disks in transmitting motion from one to the next higher denomination throughout the series. Fig. 26 is a view in perspective of a pawl located in the washer-plates between the respective numbering-disks, as shown in Figs. 21 and 22, and operating in conjunction with the movement-crank. Fig. 27 is an elevation showing a part of two numbering-disks, that of the tens-disk, Fig. 23, and the next higher disk thereto, a portion of the latter being broken away to expose the tens-disk and the interposed washer-plate. Fig. 28 is a similar view, the crank movement-arm being in a different position. Fig. 29 is a broken-away vertical longitudinal section on line 29, Fig. 4. Fig. 30 is a longitudinal section on line 30, Fig. 27. Fig. 31 is a longitudinal section on line 31, Fig. 28. Fig. 32 is a longitudinal section on line 32, Fig. 20. Fig. 33 is a longitudinal section on line 33, Fig. 20. Fig. 34 is a longitudinal section on line 34, Figs. 14, 19, and 15. Fig. 35 is a view in perspective of a bridge, supporting-disk, and cap ends, carrying a ticket-bar and inking-roller; and Figs. 36 and 37 are enlarged detached views in perspective of companion movement-dogs shown in their working position in Figs. 15, 16, 17, and 34.

The casing or body A incloses and supports the different working parts and may be of any desired contour best adapted for the pur-

pose. Access to the principal part is had from the rear end only and which is closed by a locking-cap B. The under side of the case is provided with a rigid handle C, a manipulating lever-handle D being properly mounted in the upper side.

The lever-handle D is secured in its working position by a pivot-pin 2, inserted through the hollow-head end extension 3 of the casing. This pivot-pin 2 is located about midway between the head end 3 of the casing and the enlarged bearing part 4 of the lever, as shown in Fig. 3. The lever-handle is returned to its upper normal position when the downward pressure on the same is relaxed by a coil-spring 5, the upper end of which is recessed in the under side of the lever-handle and the lower end seated in the casing, as at 6. A ticket-canceling punch 7 is mounted in the head end 3 and is adapted to traverse a ticket-slot 8 by an upward movement in operation, the cut-out portion escaping through a die-aperture 9. A second punch 10 is mounted on the enlarged part 4 of the lever-handle and traverses the ticket-slot 11 by a downward movement, the cut-out matter escaping through an aperture 12. A third canceling-punch 13, Figs. 1 and 3, is properly mounted in the rear end of the casing and is carried by the lock-cap B. This punch traverses ticket-slot 14 by a downward movement, the canceled matter dropping out through an aperture 15. This third punch is actuated by an inclined supplemental lever 16, located underneath the main lever-handle. The outer end of lever 16 is loosely supported in a lug 17, formed on the corresponding end of the lever-handle and provides for a slight endwise movement thereof in conforming to the change of position when being worked. The inner end of lever 16 is pivoted to the casing, as at *a*, and bears on the upper end of punch 13. This punch is positioned to traverse the ticket-slot through which the numbering or printing mechanism is reached and is intended for the class of tickets that are to be both canceled and numbered, this dual operation being simultaneously effected by one down movement of the lever-handle, which imparts a corresponding movement to the outer end of lever 16, and the inner end having a fulcrum bearing on the punch 13 forces the same down across ticket-slot 14. A spring 18 returns this punch to its normal position when the pressure on the main lever-handle is relaxed. This punch is prevented from turning around in its position by a pin 19, fixed in the casing and projecting into a vertical slot 20, formed in the adjacent side of the punch-stem, Fig. 3.

A combined movement-pawl 21 and a ratchet-plate 22 are shown in Figs. 1, 4, 5, 6, 9, and 10. In Fig. 7 the "main" pawl, as it will be termed to distinguish from similar elements, is shown without its component part, the ratchet-plate. This pawl and plate are

loosely joined together by a pivot-pin 23 to provide for slight rocking movement of the pawl in conforming to the change of position required in the performance of its particular functions. The pawl and plate are loosely retained in their working position in the casing and together have a vertical movement therein in addition to the rocking action of the pawl. The lower curved end of this main pawl rests normally on the adjacent rim edge of an end plate 24, having an irregular periphery. This plate is shown in Figs. 3, 4, 5, and 29 and in the perspective detail view, Fig. 35. The end plate 24 and the end plate 25 are connected by a bridge 26. (Best shown in Fig. 35.) The main pawl and its ratchet-plate 22 are shown in their normal position in Fig. 4, as are all the other parts. In this position the lever-handle may be freely manipulated, all the working parts remaining stationary except the three punch-dies.

The upper end of the main pawl has a lug *b* formed thereon, Figs. 6, 7, 9, and 10, and the relative position of the same indicated by dotted lines in Figs. 4 and 5. The handle-lever is provided, Fig. 8, with an angular recess 27 for the reception and engagement of the lug *b* when the main pawl is moved from its normal position. The casing-wall opposite to the position of the main pawl is provided with an opening 28. (Best shown in Fig. 2.) The outer side of the wall at this point is provided with a guide-shoulder 29 on one side of the opening 28 and a guide 30 on the opposite side. The pawl and ratchet-plate are placed in position from the outside of the casing, the inner face of the plate resting on the ledges 31 and 32 and the edges contacting the guide-shoulder 29 and guide 30, Figs. 1 and 2, leaving the pawl free to have a rocking movement on its pivot in the opening 28. The lug *b* is beveled on the upper and vertical side, as at *d*, Fig. 7, and the wall-surfaces in the lever-handle correspondingly beveled, as at *f*, so that the upper end of the pawl will have a free in-and-out movement and lessen the friction of the engaging parts and especially the frictional contact of the lower end of the pawl on the up movement in dragging over the exposed tooth in the ratchet-wheel. In their working position the main pawl and plate have an up-and-down movement together, the plate always being held vertically, while the pawl has the independent rocking movement. An inside cap-plate F, broken away in Fig. 1, and shown in Figs. 4, 5, 9, and 10, is secured in place, covering the main pawl and ratchet-plate, by screws inserted through apertures 33, Fig. 2. It will be understood that both the upper and lower ends of the main pawl are free and have an alternate inward and outward movement at the proper time on the pivotal connection joining the pawl and ratchet-plate, as will be explained more fully farther along. E is an outside cap-plate.

The lever-handle is provided transversely with a chamber 34, which opens out on the side adjacent to and in line with the upper part of the main pawl. A sleeve 35, having the outer end closed and the inner end open, is loosely inserted in the chamber 34. A coil-spring 36 is located in the sleeve, one end bearing against the inside closed end thereof and the other end resting on the bottom of the sleeve-chamber. The main pawl is raised to its highest position after each down movement by the up movement of the lever-handle and then forced out of engagement with the handle by the lateral pressure of the spring-pressed sleeve 35, which returns and holds the same in the normal position. (Shown in Figs. 4 and 9.) The lower end of the main pawl rests normally in a low curved-out notch 37, formed in the edge of end plate 24, Figs. 4 and 35. The end plate 24 is provided with a central opening 38 and is loosely mounted on a hub 39 of a ratchet-wheel case which will be hereinafter referred to. The end plate 25 is provided with an opening 40 and is loosely mounted on a stationary sleeve 41, which allows for a free turning movement of the bridge and supporting end plates.

The respective ends of a ticket-bar 42 are each provided with a pivot-pin 43, (but one being shown,) which are loosely inserted in elongated slot-openings 44, located in opposite ends of the bridge 26 and run at an oblique angle with reference to the center of axis. An inking-roller 45 is revolvably supported in connection with the ticket-bar and moves therewith, the slot-openings 44 providing for a slight downward movement of the ticket-bar on the in movement of the same and insures a proper contact of the inking-roller with the printing-surfaces. The ticket-bar is provided in its outer edge with a groove 46 to receive the impact of the entering ticket 47, Fig. 5, and prevent the same from slipping over the top of the bar.

The lever-handle is provided with a vertical chamber 48, Fig. 3, just back of chamber 34, in which a plunger 49 is loosely inserted and backed by a cushioning-spring 50.

An impression-plate 51 is pivotally secured to the lower end of the plunger and in position to come in contact with and press the ticket onto the printing-surface when the handle-lever is compressed in the operation of canceling and numbering a ticket, the spring 50 easing the impression of plate 51. The plunger 49 is provided on one side with a recess 52, into which extends a part of a locking-pin 53, the other part being embedded in the lever-handle and held rigidly in place and confining the endwise movement of the plunger within certain limits.

Now to return to ratchet-plate 22, forming a companion part of the main pawl. This plate is provided on one edge with a number of teeth, as shown in Figs. 1 and 6. A dog 54

is pivoted to the casing as *g*, and positioned to engage the toothed edge of the ratchet-plate. This dog is provided with two engaging jaws 55 and 56. The lower series of teeth 57 in the ratchet-plate is acted upon by the jaw 55 and the upper series of teeth 58 by the jaw 56. The upper and lower series of teeth are of a uniform length and divided by a longer tripping-tooth 59. The outer end of dog 54 has two angle sides 60 and 61, converging from a common point. A spring 62 is properly mounted in its working position, the actuating end 63 thereof being always in contact with either one or the other angle sides 60 and 61, in accordance with which series of teeth the dog engages. The dog 54 is shown in its normal position, Fig. 1, which corresponds to the normal position of all the other working parts. The operation of these parts is as follows: Supposing a ticket is inserted in slot 14, it contacts the ticket-bar and moves the bridge and its loosely-mounted end plates over to their opposite or abnormal position. Reference to Fig. 5 shows these parts as stopping a little short of this opposite position, the end plate 24 having rolled far enough to carry the low curved-out notch 37 away from contact with the other end of the main pawl and bring a higher part in contact therewith, which has the effect of moving the lower end of the pawl outward and imparting a corresponding inward movement to the upper end. It will be noted that these parts, Fig. 5, have not quite reached the abnormal position. The ticket not being clear in, the upper lug end of the pawl has not entirely cleared the line of the casing and wholly entered the angular recess 27 in the lever-handle. When the end plate 24 has rolled to its limit, the high part 64 thereof contacts the lower end of the pawl and pushes the same to the full outward limit and at the same time throws the upper end wholly within the lever-handle. It will be understood that when this movement is initiated by the insertion of a ticket the lever-handle is locked in its normal position the moment the upper end of the pawl passes the line of the casing and begins to enter the recess in the handle and remains so locked until the lug end of the pawl has cleared the casing and is wholly within the angle-recess. The lever-handle may now be pressed inward, which movement carries the pawl-and-ratchet plate downward. As this movement progresses the lower jaw on dog 54 engages the lower series of teeth in the ratchet-plate at the proper time and locks the lever-handle against return to normal until it has been forced downward to its limit and the ticket canceled and numbered. Before the return movement begins, when the pressure has been relaxed on the lever-handle the long tooth 59 has caught the lower jaw on dog 54 and thrown the outer end upward, so that the actuating end of spring 62 is shifted around the pointed end of the dog and bears on the angle side 60

and forces the upper jaw to engage the corresponding series of teeth in the ratchet-plate, which has the effect of locking the lever against being pressed downward a second time until it has first been returned to its full normal position, so that a full movement of the lever-handle must be made in either direction and each ticket numbered in consecutive order. The spring-pressed sleeve 35 returns the upper end of the main pawl to its normal position and frees the same from its temporary engagement with the lever-handle. On the return to normal the long tooth 59 on the ratchet-plate in turn contacts the upper jaw of dog 54 and throws the outer end downward and shifts the end of spring 62 to its normal position. (Shown in Fig. 1.) It will be understood that the pawl 55 engages with the projection 59 only at the extreme limit of the downward movement of the ratchet-plate 22. When the ticket is withdrawn, the bridge and end disk plates are automatically returned to normal by a spring 65, one end of which is secured in hub 39 and the other end to a pin *h*, fixed in the bridge end plate 24.

The main pawl 21 is adapted at each downward movement to engage a ratchet-wheel 66. (Shown in Figs. 3, 19, and 29 and indicated by dotted lines in Figs. 15, 16, and 17.) This wheel is loosely mounted on the stationary sleeve 41 and is inclosed by a case 67, mounted on said sleeve and rigidly secured thereto by a set-screw 68. A portion of the periphery of this case is cut away at one side, as at *i*, for the purpose of exposing the teeth 69 on ratchet-wheel 66 for the engagement tooth by tooth in regular order of the lower end of the main pawl 21 in advancing the units-disk step by step. The ratchet-wheel 66 is provided with a hub 70, Fig. 29, which is recessed in the first or units disk 71. This disk and the ratchet-wheel are rigidly joined together and rotate simultaneously. The teeth on ratchet-wheel 66 overhang the hub 70 on the case side and provide an annular space or chamber 72 on the inner side of the overhanging part of the ratchet-teeth and the adjacent side of hub 70. In this space and the chambered portion of case 67 is located the locking mechanism illustrated in detail in Figs. 14, 15, 16, 17, and 18 and will be next described.

The outer side or end *j* of case 67 is shown in Fig. 14. The other views on the same sheet, except Fig. 19, show the inner side of the same with the locking mechanism in different positions. The outer end of case 67 is positioned adjacent to the end plate 24 of bridge 26, as shown best in Figs. 3 and 29. The end plate 24, Fig. 35, is provided on its inner side with a segmental lug 73, which projects into case 67 through a correspondingly-curved slot-opening 74. The lug 73 is shown in section in Fig. 14 and in full lines in the three next succeeding views. A dog 75 is loosely

held in its working position and located adjacent to the hub-surface of ratchet-wheel 66. This dog is of the curved shape shown and has a pin 76 projecting from the outer rounded edges thereof for the engagement of one end of a coil-spring 77, as best shown in Fig. 36. The opposite end of this spring is retained in place by a pin 78, fixed in the inner circumferential surface of the ratchet-wheel case 67, Figs. 15, 16, and 17. A second dog 79, Fig. 37, having a coöperative action with dog 75, is provided at one end with a pivotal pin bearing, as at *k*, the opposite end extending into position to engage the adjacent end of dog 75. The dog 79 is provided on the inner side with a part 80, to which one end of a spring 81 is attached, the other end being recessed in the case 67, as indicated by dotted lines in Fig. 14. This spring and part 81 move in an opening 82 in the inclosing case. The dog 75 is provided on the under side with a part 83, having a recess 84, Figs. 14 and 36, which in one of its positions engages a ridge 85, formed in the case and projecting into an opening 86 therein, as best shown in Figs. 14 and 18. The part 83 is in engagement with ridge 85 when dog 75 is in the positions indicated in Figs. 16 and 17 and bears against wall 87 of the opening 86. When dog 75 is in its normal position, Figs. 14 and 15, the part 83 has passed over the ridge and rests against the opposite wall 88 of opening 86.

In connection with Figs. 14 and 15 attention is called to Fig. 34, which is a section through these two figures on the line indicated, showing the case 67, the dog 75 in section and dog 79 in full lines, the ratchet-wheel being omitted, also sleeve 41; but the relative position of the same can be easily read. In Fig. 15 the ratchet-wheel is dotted in, the dotted arrow indicating the direction in which it turns. In Fig. 19 you are looking at the ratchet-wheel and units-disk from the opposite direction.

It will be understood, of course, that all the parts in the different views are greatly exaggerated, and especially so in Fig. 29. In a full-sized working device the numbering-disks are less than a twenty-five-cent piece in diameter, and the other relative parts in proportion. It will also be noted that the parts in Fig. 29 are shown in a reversed position from the proper working position shown in Fig. 3.

In their normal position, Fig. 15, the joining ends of dogs 75 and 79 overlap each other, as shown, the dog 75 being provided with a shoulder 89 on the inner edge and dog 79 with a shoulder 90 on the outer edge. The dog 79 is also provided on the outer edge with a heel 91, which rests in the curved-out recesses formed in the ratchet-wheel hub between the teeth, both in its normal and locking positions. When an impulse is given to the ratchet-wheel, the heel 91 rides on the inner surface 92, Fig. 19, of the overhanging part of the ratchet-

teeth and moves the dog 79 inward and brings the shoulder 90 against the end of dog 75 and moves the latter outward and slightly endwise, as shown in Fig. 16. In this position the lever-handle has not quite reached the limit of its downward movement, and a full impulse has not been transmitted to the ratchet-wheel. When the lever-handle has been pressed clear in and the main pawl imparted a full impulse to the ratchet-wheel, the part 83 of dog 75 is thrown over into its locking engagement with the ridge 85 and the adjacent ends of the dogs caused to abut, as shown in Fig. 17. In this locking position the curved outer end of dog 75, provided with a shoulder 94, is thrown out into the path of the segmental lug 73, the spring 77 assisting in holding the dog in this position. In the meantime as the ratchet-wheel has been turning the heel on dog 79 has passed on out of contact with the inner surface 92 of the ratchet-teeth and rests in one of the curved-out recesses 93 in the ratchet-wheel hub 70. This is the normal as well as the locking position of dog 79 with reference to abutting the end of dog 75 and is returned thereto by means of its spring 81. In this end-to-end locking position of the dogs 75 and 79 the ratchet-wheel is locked against rotation and the lever-handle supposed to be in its normal position, the upper end of the main pawl 21 being, however, still in its recess engagement therewith. Now if the lever-handle was depressed the lower end of the main pawl would come to a stop on the tooth of the ratchet-wheel in position so that another impression cannot be made until the ticket is entirely withdrawn and another ticket inserted. When the ticket is withdrawn, the bridge carrying the ticket-bar and the end plates is returned to normal by the action of its spring. On this return movement as the ticket is drawn out the segmental lug 73 comes in contact with the curved outer end and shoulder 94 on dog 75 and forces the same into its normal position and disengages the opposite end from its locking engagement with dog 79. The ratchet-wheel is now free to be rotated again. This feature prevents any fraudulent practice, such as working the lever-handle and rotating the numbering-disks until the highest enumeration is run out and then beginning over again with a lower number.

The means employed for transmitting motion to the numbering or printing disks and locking the same at regular intervals will be next described.

The units-disk 71 is provided with a hub 95, which extends into an annular chamber 96 in the tens-disk 97, as shown in Fig. 29. A locking-washer 98 is also located in the chamber 96 and has a hub 99, on which the hub 95 of the units-disk is mounted. This washer is in turn rigidly mounted on the sleeve 41. Each of the numbering-disks after the units-disk throughout the series are chambered and have

one of the washers 98 located therein, so that a description of one will apply to all. A detail of one of these washers is shown in Figs. 21 and 22, Fig. 21 being the obverse and Fig. 22 the reverse. These features of the numbering-disks and washers are illustrated in pairs, as shown in Figs. 27, 28, 30, 31, 32, and 33, the tens-disk 97 and the hundreds-disk 100 being the subject of illustration.

The washers 98 each carry a locking-pawl 101, which is in the form of a plate recessed therein flush with the surface. This pawl is provided with a stud 102 and is capable of an automatic sliding movement both away from and toward the center of axis at predetermined intervals. Each of the series of numbering-disks from and including the tens-disk are provided around the inner circumferential surface at intervals with recesses 103, which are spaced apart to indicate the distance the disks are to travel with each advance movement in bringing the numbers thereon into position in regular order for the printing-impression. The contacting surface of stud 102 is made spherical and the recesses 103 correspondingly rounded out, so that the stud will be easily and smoothly retracted from its locking engagement. The pawl or pawls 101 are provided on one side with a high part 104, Fig. 26, having a rounded or beveled end 105. One end of a spring 106 is in the sleeve 41 and the other end in the pawl 101 and serves to hold the pawl in its outer engaged position. (Shown in Figs. 20, 21, and 22.) A movement-crank, Fig. 25, comprising a bar 107, an arm 108, and an arm 109, extend at right angles and in opposite directions from the respective ends of the connecting-bar part. The bar and its longer arm 108 are loosely seated in the tens-disk, Fig. 33, while the shorter arm 109 extends over in position to engage the one-hundreds disk at the proper time and advance the same one step toward a higher number. The longer arm forms the pivot end of the crank for the shorter-arm end to swing on when moving into and out of engagement with the next succeeding disk. Each disk is provided with a space 110, in which the shorter arm may move in changing from one position to the other. It will be understood that the crank when in its normal position will rest against the inner wall 111 of the space 110 and the shorter arm out of engagement with reference to the next disk. The shorter arm is of a length corresponding to the thickness of the raised part 104 of the pawl 101 and is in line therewith on the same side to contact the same once in each complete revolution of the tens-disk. It will be understood that the crank rides around with the particular disk in which it is seated, while the washer and the pawl held thereby remain stationary. Supposing the tens-disk to have made a revolution and a single impulse is to be transmitted to the hundreds or next succeeding disk, now as the tens-

disk is completing a revolution the shorter arm of the double crank carried thereby will at the proper time come in contact, Figs. 27 and 30, with the rounded or beveled end 105 of the pawl part 104, which contact has the effect of moving the shorter arm of the crank over into one of the recesses 103 of the next succeeding disk and remains long enough in this engaged position, Figs. 28 and 31, to impart a single impulse thereto. It will be understood that the rotation of the numbering-disk 100 and the inward movement of pawl 102 are simultaneous, and at the proper time the pawl is forced out gradually by the contacting curved surface of the recess 103. A portion of the hub of each disk in line with the position of the movement or impulse crank is cut out to form a low place 112, Fig. 24. This low place in the hub provides a recess-space for the reception of the high part 104 of the pawl 101 when the latter is forced inward against the pressure of its spring at the time of contact with the double crank and the stud 102 retracted from its locking engagement with one of the recesses 103 and made to ride the higher surface 113 between each of the locking-recesses 103. When the crank has passed on out of contact with pawl 101, the pressure on the latter is relaxed and it is forced back into its locking position by the action of its spring 106 and the short-arm end of the crank returned to its inner position by contact with the curved wall of recesses 103, as it is disengaged therefrom. By this arrangement motion may be transmitted from one to the next succeeding numbering-disk throughout the series, no matter as to the number of disks in series, and the same securely locked against any attempt at fraudulent manipulation.

A conductor's or individual name-plate 114 is pivotally mounted on the under side of the outer end of the lever-handle, as shown in Figs. 1, 3, and 8. The pivotal end 115 is loosely inserted in a socket 116 and bears against a spring located therein, but not shown. A pinion 117 is mounted on the inner spindle end 118 of the name-plate and engages rack-bar teeth 119, formed on a plunger-stem 120, having a vertical movement in the lever-handle and provided with a manipulating-head end 121, projecting above the upper side of the same. An inking-pad 122 is recessed in the under side of the handle and when the name-plate is in its closed position the letter side rests normally in contact with the inking-pad, Figs. 3 and 12. A hand-pressure on the plunger-head will have the effect of turning the name-plate downward to the open printing position. (Shown in Fig. 13.) Now by inserting a ticket or other object between the name-plate and the supplemental lever 16 and pressing down on the lever-handle the adjacent surfaces are brought together and the desired impression made. A pin 123 halved in the lever-handle and a recess 124 in

the plunger 121 prevents the latter from turning in its working position, but allows for a free endwise movement. A spring 125 returns the plunger to its normal position when the pressure on the head end thereof is relaxed.

A detail description of the locking mechanism will be omitted, as this feature is fully set forth in my Patent No. 652,954. It will, however, be referred to incidentally, as it is necessarily shown in the drawings. A spindle 126 is loosely and longitudinally inserted through the stationary sleeve 41 and has the locking mechanism 127 properly mounted on the inner end thereof, as shown in Figs. 3 and 29. A knob 128 is mounted on the outer end of the spindle for manually rotating the same in manipulating the locking mechanism.

The working of the different parts having been fully set forth in their order throughout the description, it is not considered necessary to add a general statement of the operation of the device.

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

1. In a combination ticket-punch, a lever-handle having a recess formed in the under side thereof, a plunger movably retained therein, a spring interposed between the inner end of the plunger and the bottom of said recess, and the impression-plate pivoted to the lower end of said plunger, substantially as set forth.

2. In a combination ticket-punch, a casing provided in the back end with a ticket-slot, the printing-disks reached through said slot, an impression-plate adapted to contact and momentarily hold a ticket against said printing-disks, a punch-die positioned to traverse said slot and cancel the ticket simultaneously with the operation of numbering the same, a lever contacting and actuating said punch-die and means for returning the die to its normal position when the pressure of said lever is relaxed, substantially as set forth.

3. In a combination ticket-punch, a casing having a ticket-slot in the back end thereof, a manipulating lever-handle, a punch-die traversing said slot with a downward movement, means interposed between the lever-handle and punch for imparting such downward movement, a plunger movably recessed in the under side of the lever-handle, an impression-plate pivoted to said plunger, and the printing-disks, whereby an object, such as a ticket, inserted through said ticket-slot is canceled and impressed on the printing-surfaces at one operation, substantially as set forth.

4. In a combination ticket-punch, a casing, a handle-lever provided on one side with an angular recess, a combined pawl and ratchet-plate pivotally joined together and having a joint vertical movement and the pawl an independent rocking movement in engaging with and disengaging from said angular re-

cess, and means for engaging and locking said ratchet-plate step by step on either its up or down movement and locking said lever-handle between its normal and abnormal positions and always compelling a full movement thereof when operating the printing mechanism, substantially as set forth.

5. In a combination ticket-punch, a casing, a handle-lever having an angular recess formed in one side thereof, a pawl and ratchet-plate pivotally joined together and loosely retained in their working position and both having a joint vertical movement, the upper end of the pawl being provided with a lug, a rotatable end plate having an irregular rim edge contacting and forcing the lower end of said pawl outward and the upper end inward in engagement with the lever-handle, and the actuating means between said pawl and printing-disks, substantially as set forth.

6. In a combination ticket-punch, a casing, a lever-handle, a combined pawl and ratchet-plate loosely mounted in their working position and normally held in said casing, means for working said pawl on its pivot in throwing the upper end thereof into engagement with said lever when the printing mechanism is to be operated, means for returning the pawl to its normal position when the printing mechanism is at rest, and means for locking said lever against manipulation unless it has been first moved to its full limit on each movement, substantially as set forth.

7. In a combination ticket-punch, a casing, a lever-handle, a combined pawl and ratchet-plate, the pawl having both a vertical and a rocking movement, the ratchet-plate a vertical movement only and provided on one edge with an upper and lower series of teeth, a dog having double jaws, means for alternately shifting the position of said dog in first engaging one series of teeth and then the other series, and means for holding said dog in engagement with either series of ratchet-teeth in accordance with the direction in which the lever-handle is moving, substantially as set forth.

8. In a combination ticket-punch, a casing, a lever-handle, a combined pawl and ratchet-plate, the pawl being pivoted to said plate and having a rocking movement with reference thereto, means carried by said casing for preventing the ratchet-plate from following the rocking movement of said pawl but allowing a joint up and down movement thereof, means for throwing the upper end of said pawl into engagement with the lever-handle and the means carried by the latter for returning and holding said pawl in its normal position in the casing in manipulating the lever-handle without moving said pawl and ratchet-plate, substantially as set forth.

9. In a combination ticket-punch, a casing, a lever-handle, a combined pawl and ratchet-plate loosely inserted in said casing, means for

engaging the ratchet-plate and locking said lever-handle against any movement but a full one in either direction, a bridge provided with supporting end plates, and loosely mounted in a revoluble position, one of said end plates being provided with a low and high part having a rolling contact with the lower end of said pawl and imparting a rocking movement thereto in one direction, a ticket-bar mounted on said bridge, a ratchet-wheel positioned to be engaged by the lower end of said pawl and the units-disk carried by the ratchet-wheel, whereby when a ticket is inserted to be numbered a single impulse is transmitted to the ratchet-wheel and units-disk by the down movement of the lever-handle, substantially as set forth.

10. In a combination ticket-punch, a bridge provided with end plates and movably mounted in its working position and having slot-openings in the ends thereof which run at an oblique angle, a ticket-bar provided on its respective ends with pivot-pins loosely engaging the slot-openings and the inking-roller carried by said bridge, whereby said ticket-bar is made to conform to the change of position, the printing-disks, and the inking-roller held in contact therewith, substantially as set forth.

11. In a combination ticket-punch, a ratchet-wheel and its inclosing case, said case being open at one side, a dog loosely mounted in the inclosing case, means for retaining said dog in either of its two positions, a second dog pivoted at one end and loose at the other, the loose end being positioned to contact the adjacent end of the first-named dog, means for moving said dogs into their interlocked engagement in locking said ratchet-wheel against rotation, and means for releasing said dogs from their interlocked position and freeing the ratchet-wheel, substantially as set forth.

12. In a combination ticket-punch, a ratchet-wheel and its inclosing case, a dog loosely mounted on the case and free at both ends, a spring interposed between the dog and case, a second dog having a pivotal movement from one end and free at the other, a spring interposed between said second dog and case, means for moving the joining ends of said dogs into an interlocked position and locking the ratchet-wheel against rotation and means for throwing said dogs out of their locked engagement, substantially as set forth.

13. In a combination ticket-punch, a ratchet-wheel and inclosing case, a ticket-bar, a movable bridge carrying an end plate provided with a segmental lug extending into said case, a dog loosely mounted in its working position and free at both ends, a second dog pivoted at one end the free end engaging the adjacent end of the first dog, means for moving said dogs from normal into an interlocked po-

sition from which they are disengaged by the contact of said lug with the first-named dog, substantially as set forth.

14. In a combination ticket-punch, a printing-disk provided interiorly with an annular chamber, a stationary washer located in said chamber, a locking-pawl positioned to engage and periodically lock said disk after each advanced step, and a movement-crank loosely inserted between the printing-disk and washer, substantially as set forth.

15. In a combination ticket-punch, a rotatable printing-disk having an interior annular chamber and provided on the inner circumferential surface with a number of recesses disposed at intervals and of a uniform depth, a stationary washer inclosed in said chamber, a locking-pawl carried by said washer and having a sliding movement therein and adapted to lock the printing-disk against rotation at predetermined intervals and a movement-crank inserted between said disk and washer, substantially as set forth.

16. In a combination ticket-punch, a rotatable printing-disk provided in its inner circumferential surface with a number of recesses of a uniform depth and disposed at regular intervals, a stationary washer located in said disk, a reciprocating pawl carried by said washer and positioned to engage said recesses and lock the printing-disk after each impulse and a movement-crank having two arms and loosely inserted in its working position, substantially as set forth.

17. In a combination ticket-punch, the combination with companion printing-disks, of a double movement-crank, having the pivot-arm inserted in one disk and the other swing-

ing arm positioned to engage the next succeeding disk and impart an impulse thereto, and means for moving said crank into its engaged position, substantially as set forth.

18. In a combination ticket-punch, a printing-disk having an annular chamber and provided around the inner circumferential surface with a number of recesses disposed at intervals, a locking-washer on which said disk is revolubly mounted, a pawl carried by said washer, means for retaining said pawl in its locked engagement with said disk, a double crank having one end pivoted in said disk and the other end swinging free in the path of and contacting said pawl once in each revolution, whereby said pawl is forced back out of its locking engagement and the free end of the crank made to engage and turn the next disk, substantially as set forth.

19. In a combination ticket-punch, the combination with the lever-handle, of a name-plate pivotally mounted in the under side thereof, a pinion mounted on the inner spindle end of said plate, a plunger provided with rack-teeth with which said pinion engages, whereby a downward pressure on said plunger has the effect of opening said name-plate to its printing position and means for returning the plunger and plate to their normal position when the pressure is relaxed, substantially as set forth.

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

WILLIAM C. DOWNING.

Witnesses:

EDWARD I. BUCKLIN,
L. B. COUPLAND.