J. S FOSTER.

TICKET-PUNCHES.

No. 190,303. Patented May 1, 1877.

Fig. 1.

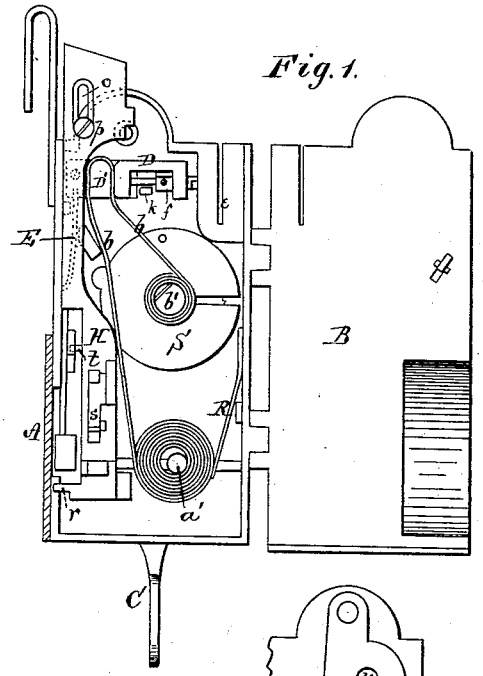


Fig. 2.

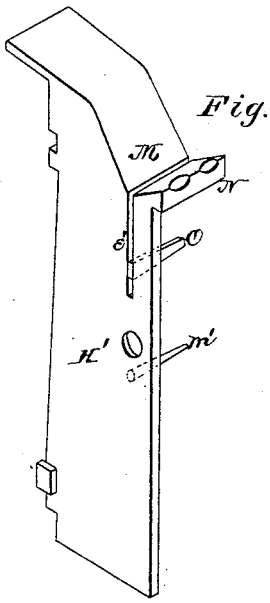
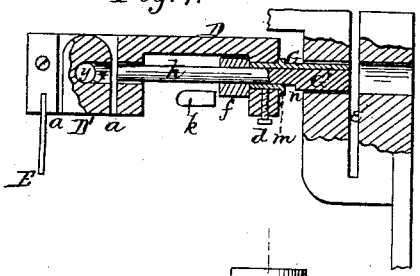


Fig. 4.



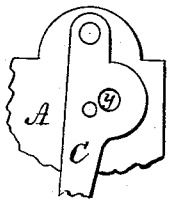


Fig. 3.

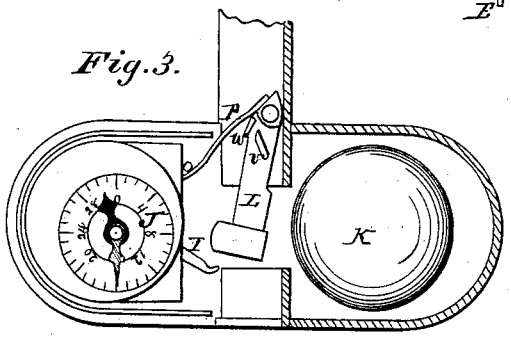
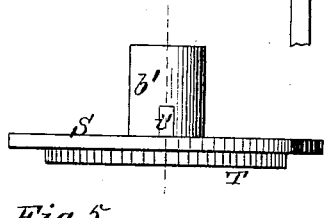
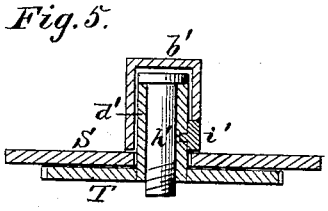


Fig. 5.





WITNESSES.

Henry N. Miller

C. L. Ewert

INVENTOR.

Joseph S. Foster.

By Attorney

T. H. Alexander & Co.

UNITED STATES PATENT OFFICE.

JOSEPH S. FOSTER, OF AUBURN, NEW YORK, ASSIGNOR TO HIMSELF AND DAVID M. DUNNING, OF SAME PLACE.

IMPROVEMENT IN TICKET-PUNCHES.

Specification forming part of Letters Patent No. **190,363**, dated May 1, 1877; application filed February 14, 1877.

To all whom it may concern:

Be it known that I, JOSEPH S. FOSTER, of Auburn, in the county of Cayuga and State of New York, have invented certain new and useful Improvements in Ticket-Punches; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form part of this specification.

The nature of my invention consists in certain improvements upon the ticket-punch for which Letters Patent, No. 183,916, were granted to me October 31, 1876, as will be hereinafter more fully set forth.

In order to enable others skilled in the art to which my invention appertains to make and use the same, I will now proceed to describe its construction and operation, referring to the annexed drawing, in which—

Figure 1 is a side elevation of the instrument with the case-door thrown open and the finger-piece removed. Fig. 2 is a perspective view of the finger-piece. Fig. 3 is a front view of the lower portion of the instrument with a part of the casing removed. Fig. 4 is an enlarged view of the punches and adjacent mechanism. Fig. 5 is an enlarged view of the paper-tape-winding mechanism.

A represents the case in which the entire mechanism is inclosed, and B is the door thereof. C represents the punch-handle, pivoted at its upper end to the outside of the case A, and connected by a pin passing through a slot in the case with the slide D, which carries the two punches, and is located within the case. E is the spring which returns the slide D to its normal position after it has been actuated by means of the handle C.

In the slide D are two slots, *a a*, for the passage of the paper tape *b*, which thus passes around a portion, D′, of said slide. In this part D′ is a passage, *x*, for the entrance of the punch that perforates the paper tape, and from the inner end of the passage *x* extends a passage, *y*, at right angles therewith, through the slide, the case, and the punch-handle, whereby an outlet is afforded for the pieces that are punched out of the paper tape, so that said pieces will not collect in the instrument, which would have a tendency to clog up the same, and prevent the proper working thereof. *e* is the slot in the case A, through which the ticket is inserted to be punched.

The main punch for punching the ticket is made in two parts, G and G′. The inner end of the part G is made tubular in form, and inserted in the slide D, where it is held firmly by a set-screw, *d*, while the outer or projecting portion of said part G is semi-tubular, as shown in Fig. 4. The outer end of the part G′ is constructed to fill up the concavity of the outer end of the part G, and to complete the circle, and the remainder of this part G′ forms a rod, *h*, which constitutes the auxiliary punch, and passes through the tubular portion of the part G, and inward through the slide D, nearly to the first slot *a*. The particular shape of the punch G G′ is, however, not material, only so that it is made in two separate and independent parts, and one of said parts extended to form the auxiliary punch. On the auxiliary punch *h*, within a recess in the slide D, is placed a collar, *f*, fastened by a set-screw, *i*, which collar can be adjusted on said punch, so as to cause the parts to operate properly, as hereinafter described.

The parts G G′ of the main punch are so constructed as to allow a certain amount of independent play of the two parts.

When the ticket to be punched is inserted in the slot *e*, the handle C is moved so as to force the slide D toward the ticket. The part G of the main punch at once passes through the ticket, making part of the hole therein, while the resistance of the ticket retains the part G′ stationary until a shoulder, *m*, on the part G strikes a shoulder, *n*, on the part G′, when this latter part of the main punch is also forced through the ticket, completing the hole in the same. While the part G′ of the main punch remains stationary, as above described, the paper tape *b* in the slot *a* is carried up against the auxiliary punch *h*, and the perforation made therein. When the punching of

the ticket is thus completed, the hand is removed from the handle C, and the spring E returns the slide D to its former position.

It will be understood that when this movement commences the shoulders *m* and *n* of the two parts G G′ are in contact, and the end of the part G is projected through the ticket beyond the end of the part G′; hence the part G of the punch will move first until the slide D strikes the collar *f* on the punch *h*, when the two parts will complete their backward movement together and resume their former positions, ready for punching another ticket. The paper tape *b* is, by the slide, drawn off from the end of the auxiliary punch *h;* but if, on account of the frictional contact of the parts, the part G′ should move with the part G at the beginning of said backward movement, the collar *f* will strike a stationary pin, *k*, projecting from the case, and thus stop the backward movement of the punch *h*, so that the paper tape will necessarily be drawn off from the end of the same, and there will be no liability of the punch *h* remaining in the tape, which would stop the advancement of the tape.

It will be seen that it is the resistance of the ticket inserted in the slot *e* against the part G′ of the main punch that causes the paper tape to be perforated by the auxiliary punch *h*, and hence, if no ticket were inserted, the paper tape would not be perforated, so that no matter how many times the handle *c* may be moved, if no ticket is being punched, there will be no perforations made in the paper tape.

The slide, by the operation of which the alarm is sounded, the register operated, and the paper tape advanced, was in my former patent, above referred to, made in one piece, and difficulty was experienced in removing and replacing the same, which had to be done every day. To obviate this difficulty I now construct said slide in two parts, H and H′. The part H is a narrow plate attached to the inside of the case by a screw, *p*, passing through a slot, *o*, in the plate, and this plate is held or forced upward by means of a spring arm or lever, I, operating against a lug, *r*, on the plate. The plate H carries the spring-pawl *s*, that operates the registering apparatus J, and also has the projecting pin *t*, that operates the hammer L for sounding the bell K.

The part H′ of the slide is also a metal plate, connected to the plate by suitable lugs or projections, and corresponding notches or recesses, as shown, and held in place by the closing of the door B. This plate H′ has a slot, *e′*, corresponding with the slot *e* in the case, and at its upper end is formed the finger-piece M, from which extends a finger projection, N, to facilitate the pressing down the entire slide upon the insertion of the ticket to be punched.

In the slot *e′* of the plate H′ is secured a sword, O, which extends horizontally through the slot *e* in the case. This sword holds the ticket level as it is passed down into place to be punched, and, as the slide moves upward again, the sword cleans the slot of all extraneous matter.

On the side of the hammer-arm L is an inclined flange, *v*, against which the pin *t* of the plate H works when the slide is pressed down to raise the hammer, and as soon as the pin *t* passes beyond the end of the flange the spring P forces the hammer down suddenly to strike the bell. If the slide is pushed down just far enough to raise the hammer a certain distance without the pin *t* passing beyond the flange *v*, and the slide then suddenly released, the hammer would sound the bell while the registering apparatus would not be operated. To obviate this difficulty I form or attach a cam, *w*, on the hammer-lever L, in such a position that under such circumstances this cam will be caught on the pin *t*, and thus hold the hammer so as not to strike the bell, while if the slide is pushed down the entire distance, so that the pin *t* passes beyond the flange *v*, the bell will be struck at the same time as the registering apparatus is operated, and the pin *t* at the upward movement of the slide passes between the flange *v* and cam *w*.

The paper tape *b* is in the shape of a roll, and placed upon a post or stud, *a′*, and against the outside of this roll bears a spring, R, which acts as a tension on the paper to prevent it unwinding too rapidly. The paper tape then passes through the slots *a a* in the slide D, and its end placed in a slit in a cap, *b′*.

S represents the rotating or rocking disk, by the operation of which the ratchet-wheel T is rotated to wind up the paper tape *b*, in the same manner as described in my former patent.

In this case the ratchet-wheel T is provided with an upwardly-extending hollow hub, *d′*, upon which the disk S is placed, and a screw, *h′*, is passed down through the hub *d′* into the case for pivoting the ratchet-wheel. The cap *b′* is placed over the hub *d′*, inclosing the head of the screw *h′*, and a lug, *i′*, on the side of the hub enters a slot in the cap, so that the cap *b′* will rotate with the ratchet-wheel.

The disk S is rotated by means of a pin, *m′*, attached rigidly to the plate H′, and having its end inserted in a radial slot in the disk.

In my former patent this pin was attached to a flexible arm, or an arm pivoted to the slide and actuated by a spring, which was found objectionable, as the tape would not be advanced with regularity. This is obviated by making the pin rigid or stationary in the plate H′, as then the movement will always be regular and equal.

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

1. In a ticket-punch having a main punch for perforating the ticket, and an auxiliary punch for perforating a paper tape, the main

punch made in two parts, G G′, and the part G′ also forming the auxiliary punch *h*, and the two parts having the shoulders *m n*, constructed and arranged as described, so that the resistance of the ticket against the part G′ of the main punch will cause the auxiliary punch *h* to perforate the tape, substantially as herein set forth.

2. The combination of the slide D, the main punch G G′, made in two parts, the part G being fastened in the slide, and the part G′ loosely passed through the same, and extended to form the auxiliary punch *h*, and the collar *f*, fastened on said auxiliary punch, substantially as and for the purposes herein set forth.

3. The stationary pin or stop *k*, in combination with the slide D, auxiliary punch *h*, and collar *f*, substantially as and for the purposes herein set forth.

4. The passages *x* and *y*, made through the part D′ of the slide D, and through the case A and handle C, substantially as and for the purposes herein set forth.

5. The cam *w* upon the hammer L, in combination with the inclined flange *v* thereon, and the pin *t*, for the purposes set forth.

6. The operating-slide made in two parts, H and H′, the plate H carrying the devices for sounding the alarm and operating the register, and the plate H′ carrying the device for winding the tape, substantially as herein set forth.

7. The plate H′, provided with the finger-piece M, having the finger projection N, for the purposes herein set forth.

8. The sword O, attached to the plate H′, and operating in the ticket-slot *e*, for the purposes herein set forth.

9. The pin *m′*, attached rigidly or stationary to the plate H′, for operating the tape-winding mechanism, as herein set forth.

10. The combination of the cap *b′*, slotted and slitted as described, with the ratchet-wheel T, having hollow hub *d′*, with lug *i′* on its side, and the disk S, substantially as and for the purposes herein set forth.

In testimony that I claim the foregoing as my own I affix my signature in presence of two witnesses.

JOSEPH S. FOSTER.

Witnesses:

W. R. HALLOCK,

JOHN A. MONTAGUE.