No. 633,210. Patented Sept. 19, 1899.

E. H. MURDOCK.

CANCELING PUNCH.

(Application filed Jan. 7, 1898.)

(No Model.) 2 Sheets—Sheet 1.

FIG. 1.

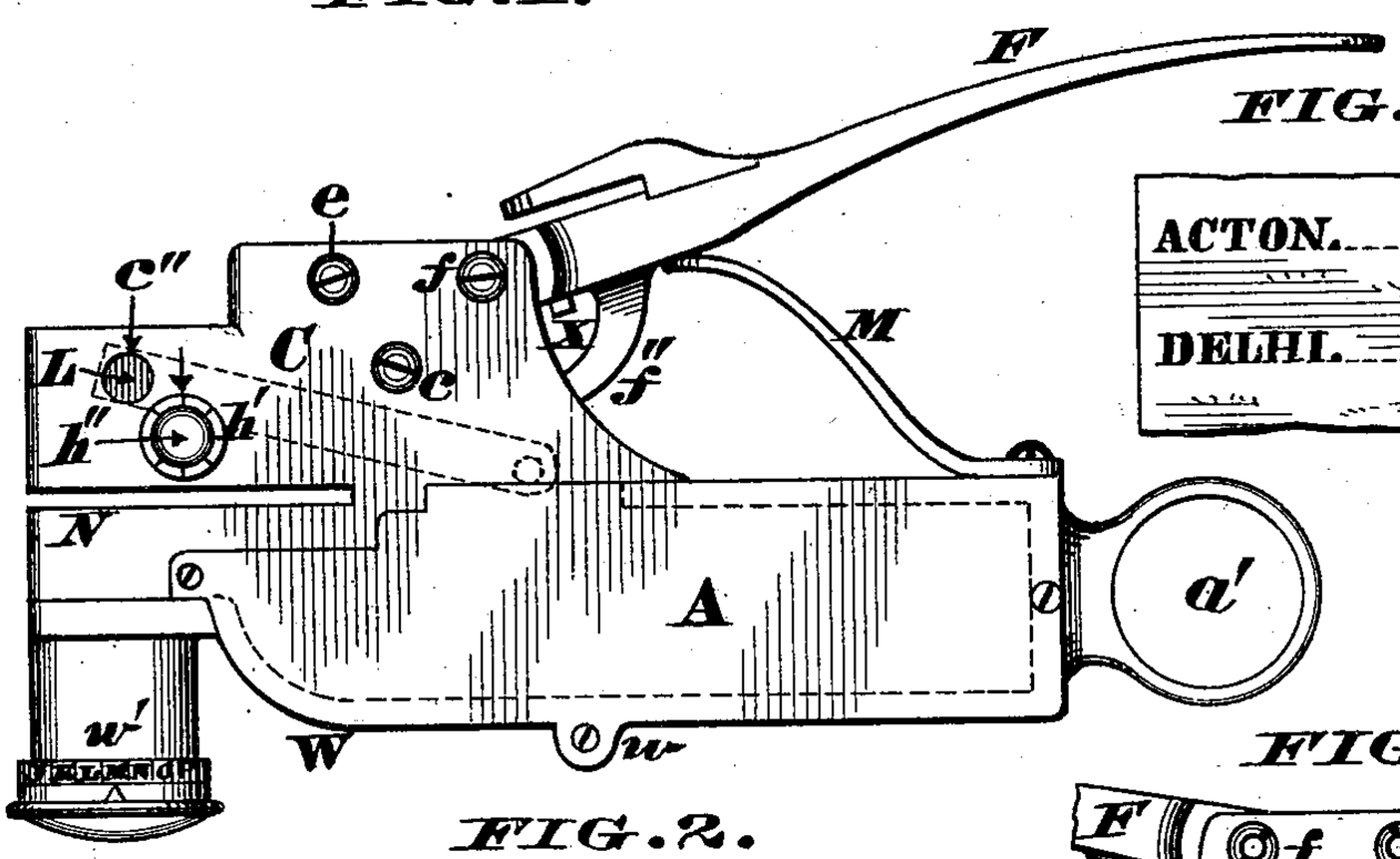


FIG. 17.

FIG. 2.

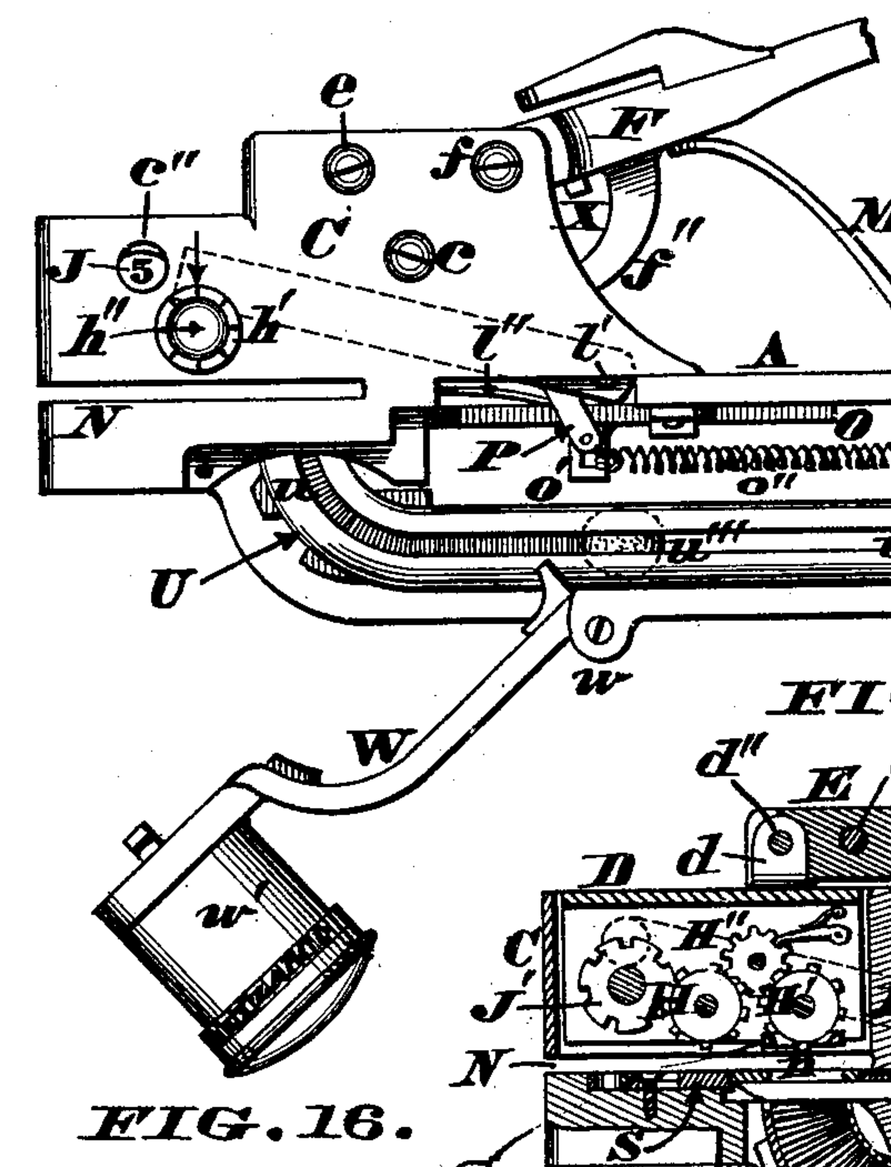


FIG. 4.

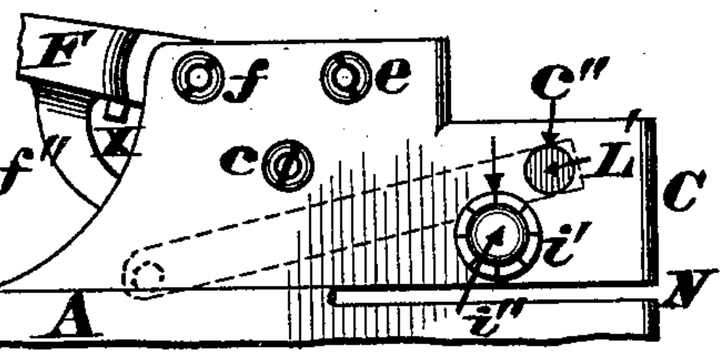


FIG. 5.

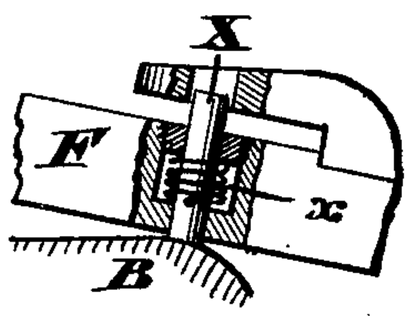


FIG. 3.

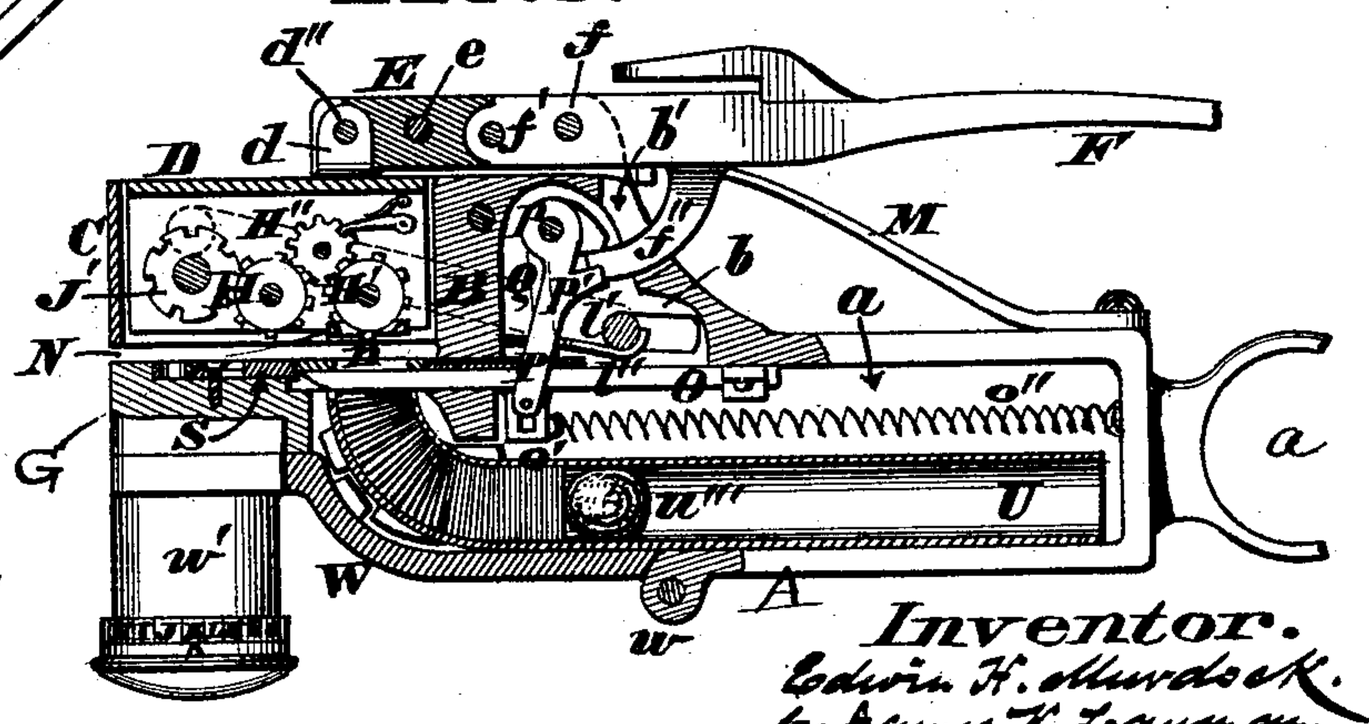
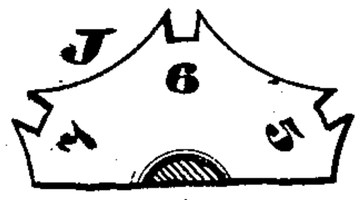


FIG. 16.



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Atty

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(No Model.) 2 Sheets—Sheet 2.

FIG. 6.

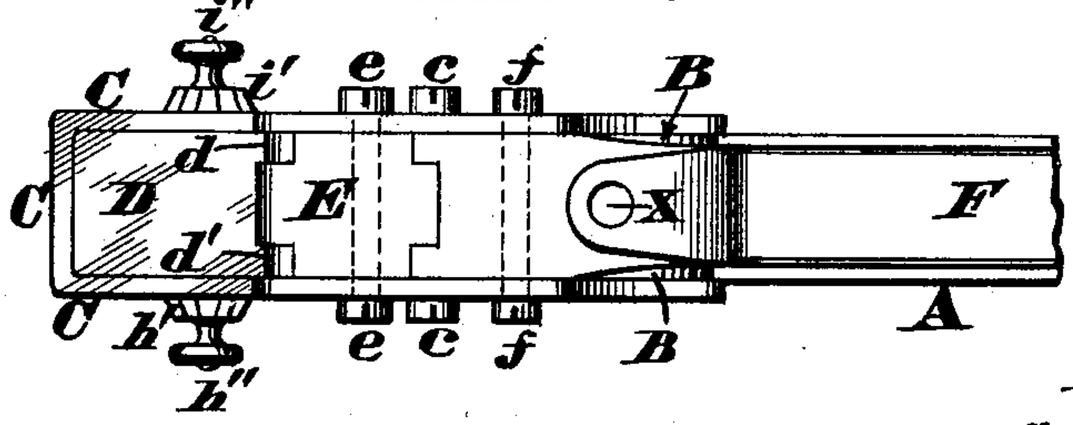


FIG. 7.

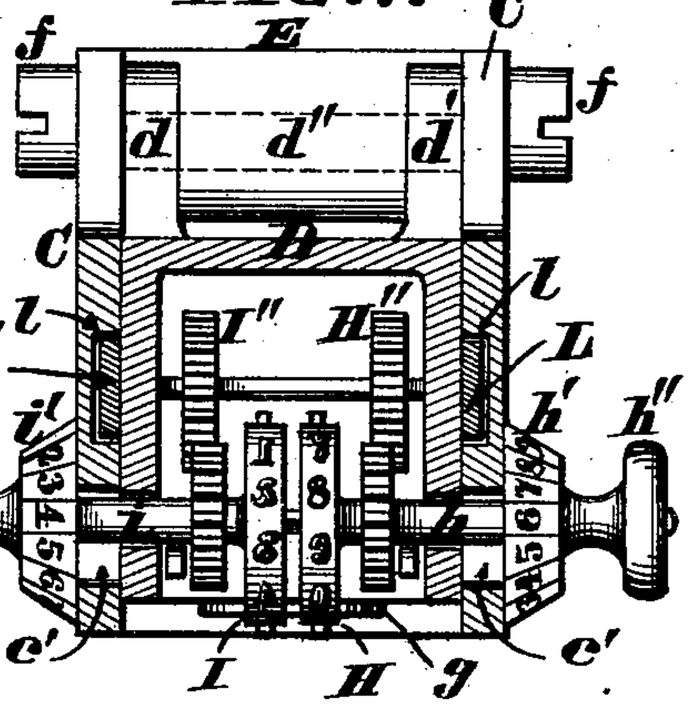


FIG. 8.

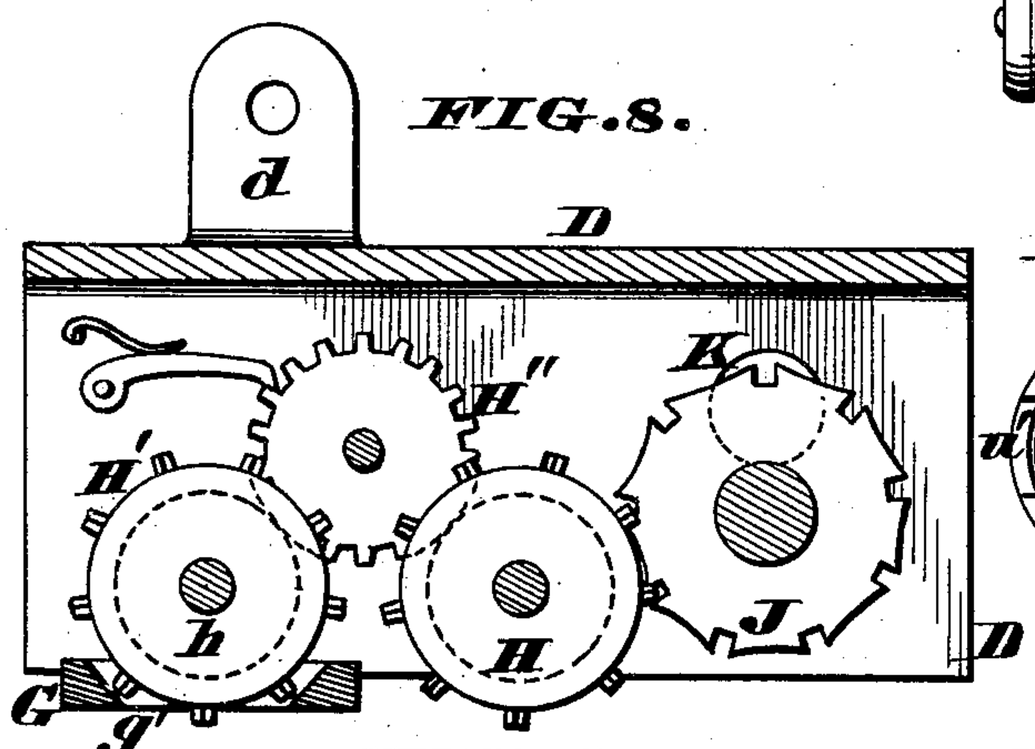


FIG. 12. FIG. 13.

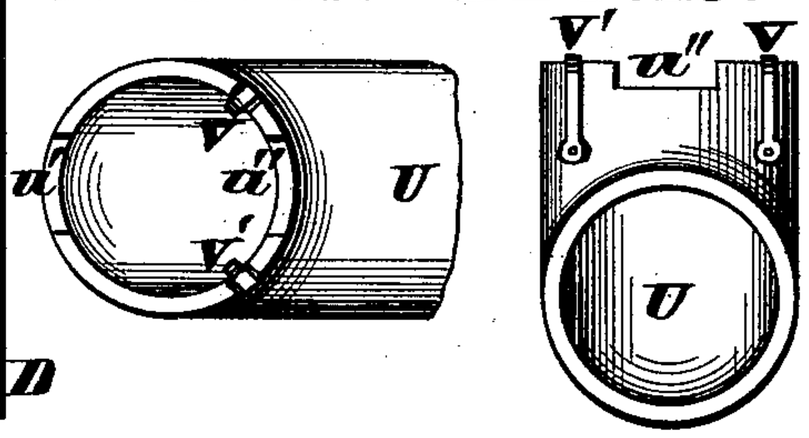


FIG. 9.

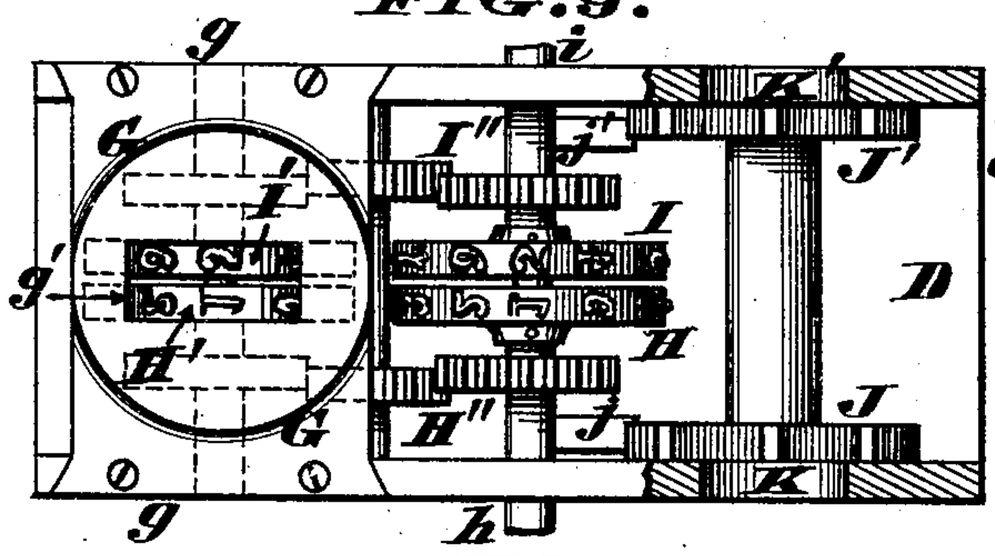


FIG. 14. FIG. 15.

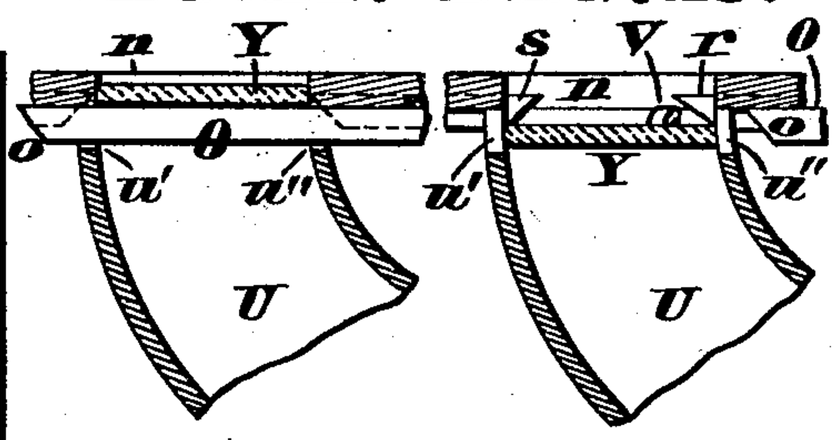


FIG. 10.

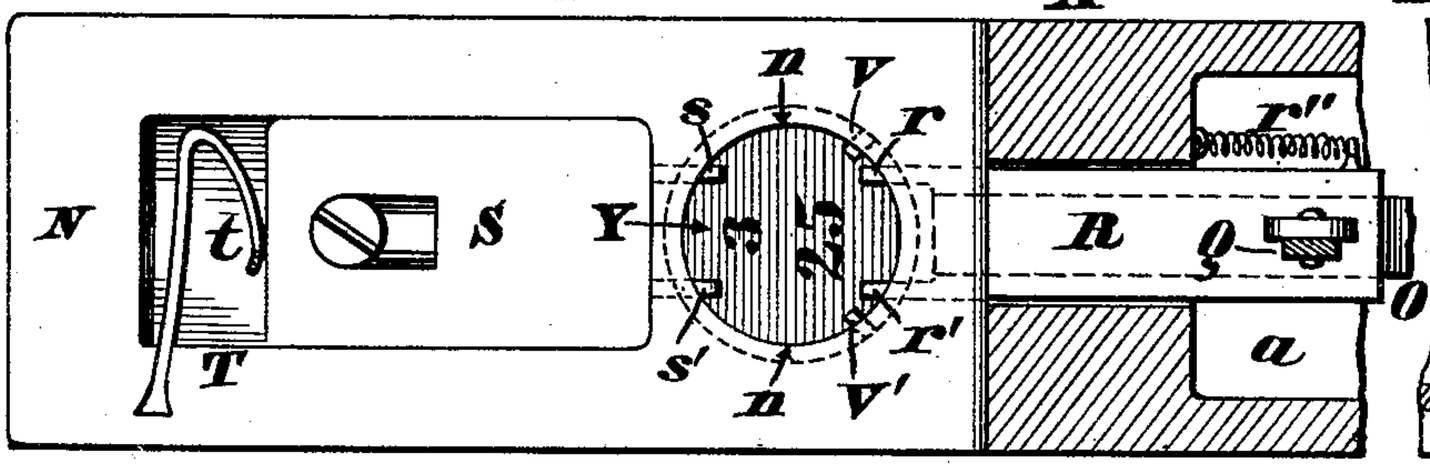
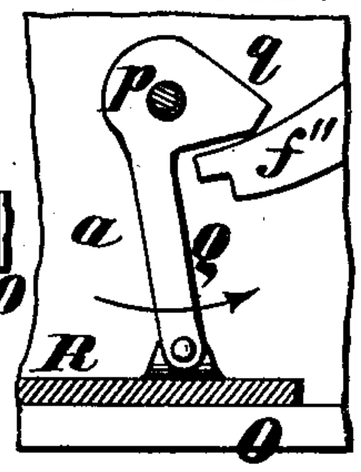


FIG. 11.



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UNITED STATES PATENT OFFICE.

EDWIN H. MURDOCK, OF CINCINNATI, OHIO.

CANCELING-PUNCH.

SPECIFICATION forming part of Letters Patent No. 633,210, dated September 19, 1899.

Application filed January 7, 1898. Serial No. 665,931. (No model.)

To all whom it may concern:

Be it known that I, EDWIN H. MURDOCK, a citizen of the United States, residing at Cincinnati, in the county of Hamilton and State of Ohio, have invented certain new and useful Improvements in Canceling-Punches; and I do hereby declare the following to be a full, clear, and exact description of the invention, reference being had to the annexed drawings, which form a part of this specification.

My invention comprises a conductor's punch provided with a single lever, the closing of which indents or impresses a pair of corresponding numbers or other suitable characters on a passenger's ticket and cuts out of the latter a small piece containing one of said numbers. As soon, however, as this lever is liberated and permitted to assume its normal or open position the cutting is automatically fed into a holder concealed within the stock or body of the implement. The second cutting next forces the first one back a limited distance, and so on, step by step, until the holder is more or less filled with them. Consequently by detaching this holder from the punch-stock and then examining the collected cuttings an exposition is at once had of a conductor's receipts for a single trip, provided he has used the punch according to instructions, as hereinafter more fully described.

In the annexed drawings, Figure 1 is a side elevation of my improved punch, the lever thereof being seen in its normal or open position. Fig. 2 is a similar view of the punch, a hinged flap of the same being swung open and a side plate of the stock removed. Fig. 3 is a longitudinal section of the instrument, the operating-lever being almost closed, but not quite far enough to cause a descent of the punch proper. Fig. 4 is a side elevation of a portion of the punch. Fig. 5 shows, on an enlarged scale, the action of a secondary punch fitted within the lever. Fig. 6 is a plan of the front portion of the punch. Fig. 7 is an enlarged vertical section of a portion of the punch, taken in the plane of the dial-shafts of the implement. Fig. 8 is an enlarged longitudinal section through the carrier, within which the numbering-wheels are journaled. Fig. 9 is a plan of the under side of said carrier, portions of its side plates being sectioned. Fig. 10 is an enlarged horizontal section through the mouth of the punch, a pair of depressors of the same being advanced so as to force a cutting into the holder. Fig. 11 shows a lever that operates the rear pair of these depressors. Fig. 12 is a plan of a portion of the receiving end of the cuttings-holder. Fig. 13 is an end elevation of said holder. Figs. 14 and 15 are sections showing two successive steps in feeding a cutting into the receiving end of the holder. Fig. 16 is a side elevation of a portion of one of a pair of registering-disks of the punch. Fig. 17 shows a portion of a passenger-ticket after being mutilated or canceled by the punch.

The stock or body A of my punch is chambered out at *a* to receive certain operative parts and has at one end a ring *a'* to admit a finger of the operator. Projecting from the upper side of this stock is a head B, chambered out at *b* and having secured to it by screws *c* a casing C, the latter being closed at each side and at its front end, but open at top, bottom, and rear end, the front portion of said casing serving as a guide for a carrier or frame D, having a limited up-and-down motion, which movement is effected by the following means:

d d' in Fig. 7 are lugs projecting from the top of this carrier and pivoted at *d''* to a short counter-lever E, the latter being pivoted at *e* to the upper part of the side plates of the casing C.

F is the main lever of the punch, and *f* is a pivot wherewith said lever is coupled to the side plates of the casing. *f'* is another pivot that couples this lever to the counter-lever E, as seen in Fig. 3.

From the above description it is evident any depression or closing down of the main lever F will cause a descent of the carrier D within the casing, the carrier being provided on its under side with the punch proper, G, which may be of any desired shape, although as a matter of convenience it is so arranged as to cut a small disk from a ticket. Again, this punch is arranged near the rear end of the carrier and is usually integral with a plate *g*, secured to said carrier by screws and dovetail connections, as represented in Fig. 9. Furthermore, this punch is slotted at *g'*

to permit a portion of the peripheries of the second units-wheel H′ and the second tens-wheel I′ passing through it.

H is the first units-wheel, and I the first tens-wheel, *h* and *i*, as seen in Fig. 7, being respectively the shafts of said wheels or disks. *h′ i′* are numbered dials on said shafts, and *h″ i″* are knobs wherewith said shafts are turned until said dials indicate what numbers on the wheels H I are in proper operative positions.

c′ c′ are slots in the casing C to permit an up-and-down movement of shafts *h i* when the carrier D is raised and lowered.

The first units-wheel H is armed around its periphery with a series of numbers arranged consecutively from "1" to "9," these projecting numbers being made of any hard material capable of deeply indenting or making a plain impression in an ordinary ticket. The second units-wheel H′ is constructed precisely like this first wheel H and is driven from the shaft *h* by a train of gear-wheels H″, (seen in Fig. 9,) said gearing being so arranged as to cause said wheels to turn in unison, and thereby bring corresponding numbers in a proper position before the punch is operated. To be more explicit, if the wheel H is so turned as to bring its number "7" in position for making an impression on a ticket the number "7" of the other wheel H′ must be in a similar position. The first tens-wheel I is numbered consecutively from "1" to "9," and then comes a "0" or cipher, and after the latter a blank space, which arrangement of numbers is exactly duplicated on the second tens-wheel I′. I″ is a train of gearing that drives the wheel I′ from the shaft *i* in the same manner as wheel H′ is operated from shaft *h*. In Figs. 7 and 9 small connections are shown between the disks H I and H′ I′; but these connections are mere steady-pins that enable said disks to run true and do not in the least interfere with their independent rotation.

J is a register-wheel, one side of which is numbered consecutively from "1" to "9," as suggested in Fig. 16, one peripheral notch being made in said wheel for each of its numbers. This wheel is turned by a pin *j* of shaft *h* engaging with one of said notches at every complete revolution of said shaft in order that said wheel may indicate how often the shaft has been turned around. The exposure of the register-number is made through an opening K of frame D and a similar opening *c″* of the casing. As seen in Fig. 2, the number "5" exposed through the opening *c″* shows that the shaft *h* has made five complete revolutions. J′ is another register-wheel driven by a pin *j′* of the shaft *i* and having its numbers exposed at an opening K′. It is to be understood, however, that the numbers of the register-wheels are always concealed, except when a certain part of the punch is opened by an examiner who counts the cuttings and sees that they agree with the registration, and in order to prevent a conductor tampering with said wheels inclined guards L L′ are provided. These guards traverse grooves *l l* on the inner sides of the casing C, as represented in Fig. 7, and the rear ends of said guards are united by a cross-bar *l′*, as seen in Fig. 3. *l″* is a plate-spring having at its free end a hook that grasps said cross-bar, and thus prevents the guards being forced back by the insertion of a pry through the casing-openings *c″*, said bar and spring being located within the chamber *b* of the punch-head B and the latter being slotted at *b′* to permit free play of a curved spur *f‴*, projecting from the under side of lever F. M is a spring that maintains this lever in its normal or open position.

N is the mouth of the punch, and near the rear end of this mouth is a die *n* for the passage of the punch proper, G, and adapted to play back and forth directly under this die is a bar O, the front end of which is chamfered off at *o*, as more clearly seen in Figs. 14 and 15. Projecting from the under side of this bar is a slotted lug *o′*, to which is attached one end of a coiled spring *o″*, which constantly tends to retract said bar, the slot of said lug being traversed by a pin projecting laterally from the free end of a lever P, hung upon a small shaft *p*, secured across the chamber *b*. *p′* is a short projection from the rear edge of lever P, which projection at the proper moment is struck by the end of the lever-spur *f‴*. Shaft *p* carries also another lever *q*, having a heel, adapted to be operated by contact with the upper edge of this spur, as seen in Fig. 11. The object of this lever is to retract a slide R, the automatic advance of which is effected by a coiled spring *r″*. (Seen only in Fig. 10.) This slide is quite thin, rests flatly upon the bar O, and has at its front and side extensions *r r*, whose effective ends are beveled off, one of said beveled ends *r* being seen in Fig. 15, for the purpose of having a wedging action on the cutting driven into the die *n* by the punch. These extensions *r r′* are supplemented by another pair of similar devices *s s′* on the opposite side of the die, the extensions *s s′* being integral with a horizontally-reciprocating slide S, fitted within a mortise T of the stock and normally driven toward the die by a spring *t*.

U is a tubular holder fitted within the hollow stock and having its front end bent to about a quarter of a circle, one side of said tube being slotted longitudinally, as at *u*. Furthermore, the front or upper end of this tube is adapted to fit up quite snugly against the under side of the die *n* and is notched on its opposite sides, as at *u′ u″* in Figs. 12, 13, 14, and 15, to permit free play of the rod O. Again, this upper end of the tube is provided with spring-claws V V′, that grasp a cutting as soon as it is driven through the die. Adapted to traverse this tube is a retarder or plug *u‴*, made of leather, rubber, or cork, although the latter material is preferred, the object of

this plug being to offer some slight resistance to the cuttings as they are forced back within said tube, the latter being circular in cross-section and corresponding in diameter with the die *n*, as more clearly shown in Figs. 14 and 15.

W is a flap hinged to the stock at *w* and capable of being opened, as seen in Fig. 2, as soon as the combination of a lock *w'* is restored.

X in Fig. 5 is a secondary punch fitted vertically within the lever F and maintained in its normal position by a spring *x*. This punch is used only for special purposes, such as excursions, &c., and is operated by closing the lever much tighter than usual, at which time the lower end of said punch contacts with the head B.

Y in Figs. 10, 14, and 15 represents a disk-shaped cutting made by punching a ticket or other similar article of value.

My canceling-punch is operated in the following manner, the normal position of all its working parts being represented in Figs. 1 and 2, reference to which illustrations show that the spring M opens or throws up the free end of lever F and in so doing relieves the levers P Q from the pressure of the spur *f''*. Consequently the spring *o''* retracts the bar O, while the other springs *r'' t* advance the slides R S toward opposite sides of the die *n*. Again, in this normal position of the punch the carrier D is so elevated as to prevent any obstruction of the mouth or slotted entrance N.

The punch is used to the greatest advantage with a ticket or trip-slip printed as seen in Fig. 17, which illustration shows that the names of stations are arranged near the left edge of said ticket, while near its opposite edge appear consecutive numbers showing the number of each station from the starting-place. To be more explicit, this ticket shows that Delhi is the twenty-fifth station from the starting-place—Cincinnati, for instance. Now suppose a passenger boards a train at the third station from Cincinnati and pays his fare to Delhi, and as soon as he has done so the conductor sets his dial *h'* to the number "3," which act turns the two wheels H and H' until their numbers "3" are vertically under their respective shafts. He then inserts the numbered side of the slip within the mouth N as far as said slip will go and at once forces down the lever F, and as this lever swings on its pivot *f* the upper edge of the curved spur *f''* so bears against the heel *q* of lever Q as to swing the latter back, as indicated by an arrow in Fig. 11. Therefore the slide R is retracted and its extensions *r r'* no longer project within the die *n*. A little further depression of the lever causes the end of its spur to bear against the projection *p'* of lever P, the result being to swing said lever in such a manner as to completely advance the rod O until its front end strikes the slide S and drives it so far forward as to withdraw its projections *s s'* from the die *n* and leave the latter clear of any obstruction, so as to permit a free descent within it of the punch G. The relative positions of the various parts of the instrument the instant said rod contacts with said slide and just previous to the descending or effective stroke of said punch are shown in Fig. 3. The final depression of the lever causes the wheels H H' to impress or indent their numerals "3 3" on the ticket, and immediately thereafter the punch G cuts out or separates a disk Y from said ticket. Therefore the ticket will have one number "3" impressed on it directly in line with the station Delhi, while another number "3" will be impressed on the cutting Y. During these impressing and punching operations the rod O serves as a support for that portion of the ticket driven through the die *n*, and for this reason the disk Y can not now enter the mouth of the tubular holder U. (See Fig. 14.) As soon, however, as the conductor has thus mutilated the ticket it is handed to the passenger, who now has proof that his fare is paid from the third station on the line to the twenty-fifth station. After mutilating the ticket the conductor relaxes his grasp of the lever F, and it is at once opened or thrown up by the action of spring M, and as the levers P Q are now relieved from the pressure of spur *f''* the following automatic movements take place: First, the rod O is withdrawn from under the cutting Y, and, second, the slides R S move toward each other by the action of their springs *r''* and *t*, and in so doing the inclined ends of the side pieces *r r' s s'* of said plates act as depressors or wedges that force the cutting down a limited distance into the mouth of tube U, as seen in Fig. 15; but when the rod O is again advanced in the act of punching the next ticket the beveled end of said rod forces said punching still farther down into the holder, it being understood as a matter of course that the plug *u'''* has first been set so far up in said holder as to necessitate some slight exertion of force in driving said plug back toward the rear of the stock. Consequently all the punchings are packed so snugly within the holder as to render it impossible for them to lose their proper places. Neither can they be bent up and pried out of the punch-mouth N, because they are held in place by the combined action of the spring-claws V V' and depressors *r r' s s'*. Fig. 15 shows the engagement over a cutting of a claw V and two depressors *r s*. At the end of a trip the conductor delivers his punch to some one appointed to examine its contents, and after the flap W is opened the holder U is taken bodily out of the stock, the plug *u'''* removed, and the cuttings inspected carefully one by one. Evidently such an inspection shows not only how many fares the conductor has collected, but it also reveals where each passenger boarded the train and where

he should have gotten off. In addition to such a revelation the cuttings show the exact order in which the tickets were taken up by the conductor, and in many cases this knowledge will assist in his detection if he has not performed his duties correctly. Half-fare or excursion tickets may be perforated with the secondary punch X to indicate that a full rate has not been paid.

The above describes the operation of my punch when a ticket is to be indented with a pair of single numbers; but when a pair of double numbers is necessary the two tens-wheels I I′ must be brought into service, which is readily done by properly setting the dial *i′*. Evidently the use of two units-wheels and two tens-wheels will enable the punch to impress duplicate numbers running from "1" to "99," which range is more than sufficient to include all way-stations on ordinary roads. Finally, a coiled spring might be substituted for the plug *u‴*; but the objection to a spring is its increased stiffness as the cuttings accumulate within the holder, while the plug on the contrary offers no more resistance when the holder is full that when it is first charged.

I claim as my invention—

1. A hand-punch provided with a pair of independently-rotating wheels or disks having peripheral numbers, means for turning said wheels or disks, so as to bring them to a proper position for transferring corresponding numbers to a ticket; and a punch that severs one of these canceled parts from said ticket, substantially as herein described.

2. A hand-punch provided with a pair of independently-rotating units wheels or disks, having peripheral numbers; a pair of independently-rotating tens wheels or disks, having peripheral numbers; means for turning said wheels or disks, so as to bring them to a proper position for transferring corresponding numbers to a ticket; and a punch that severs one of these canceled parts from said ticket, substantially as herein described.

3. A hand-punch provided with a pair of independently-rotating wheels or disks having pheripheral numbers; means for turning said wheels or disks to a proper position for transferring corresponding numbers to a ticket; a punch that severs one of these canceled parts from said ticket, and a single lever that operates said wheels and punch, in the manner described.

4. A hand-punch provided with a pair of independently-rotating wheels or disks having peripheral numbers, and capable of being so set as to transfer corresponding numbers to a ticket; a punch that severs one of these canceled parts from said ticket; a holder into which said cuttings are automatically and successively fed; and a retarder that traverses said holder, longitudinally, and is gradually forced back by said cuttings, in the manner described, and for the purpose stated.

5. A hand-punch provided with a die; a cuttings-holder communicating therewith, and having at its upper end a pair of spring-claws; and a reciprocating rod having a beveled advancing end that forces the cuttings into said holder, in the manner described.

6. A hand-punch provided with a die, a cuttings-holder communicating therewith, a reciprocating rod having a beveled advancing end that forces the cuttings into said holder, and a reciprocating slide arranged on one side of said die, said slide being provided with a pair of side extensions having beveled ends, for the purpose described.

7. A hand-punch provided with a side opening *c″*, and internal groove *l*; a reciprocating carrier D fitted within said punch, and having a side opening K; a wheel H, journaled in said carrier and having peripheral numbers; a register-wheel J, also journaled in said carrier, driven from the shaft of said wheel H, and having numbers on its outer side; and a slide L, that traverses said groove *l*, and is capable of being retracted so as to expose a number on said register-wheel, in the manner described.

8. A hand-punch provided with a reciprocating carrier, ticket-indenting wheels journaled in said carrier, a pivoted main lever, and a pivoted counter-lever jointed to said carrier and main lever, for the purpose described.

9. A hand-punch having a main punch, a lever for operating it, and a secondary punch operated by said lever, for the purpose described.

10. The combination, in a hand-punch, of the pivoted lever F, having a curved spur *f‴*, a lever P having a rear extension *p′*, and operating the rod O, and another lever Q, having a heel *q*, and operating the slide R *r*, *r′*, in the manner described.

11. A hand-punch provided with a pair of units and tens wheels having numbers on their peripheries, a pair of register-wheels having numbers on their outer surfaces, openings in the sides of the punch, to expose said register-numbers, a pair of slides for closing these openings, a cross-bar connecting the rear end of said slides, and a retainer that engages with said rod, for the purpose stated.

12. In a hand-punch, a punch proper having a slot in it; a printing-wheel adapted to operate through said slot; a register-wheel for indicating the rotations of said printing-wheel; and means for driving said register-wheel from the same shaft that turns said printing-wheel, in the manner described.

13. In a canceling-punch, the holder U, provided with spring-claws V, V′, at its receiving end.

14. In a canceling-punch, a die; a tubular cuttings-holder of practically the same diameter as said die, and having its receiving end in close contact with the delivery side of said die; and a retarder that fits snugly within

said holder, and is automatically forced along, step by step, by the accumulating cuttings, as herein described.

15. The combination, in a canceling-punch, of the die *n;* the reciprocating bar O, situated under said die, and having its front end chamfered off at *o;* the lever P, for advancing said bar, and the spring *o''*, for retracting it; the slide R resting upon said bar, and having side extensions *r*, *r'*, whose ends are beveled off, and enter the rear side of said die; the lever Q for retracting said slide, and the spring *r''*, for advancing it; another slide S, having side extensions *s*, *s'*, whose ends are beveled off, and enter the front side of said die; and a spring *t* that retains said slide in its normal position, all as herein described, and for the purpose stated.

16. A canceling-punch including a die; slides with beveled extensions on the opposite sides of said die, a reciprocating rod passing under said die and serving to retract one of said slides, and a lever that operates the other slide, for the purpose described.

17. The combination, in a canceling-punch, of the circular die *n;* the cylindrical cuttings-holder U, of practically the same diameter as said die, and having its rear portion housed within the punch-handle, the front portion of said holder being bent up and brought in contact with the under side of said die; and the friction-plug *u'''*, traversing said holder, and automatically driven back, step by step, by the accumulating cuttings, whereby they are preserved in the exact order they were made by the punch, all as herein described.

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

EDWIN H. MURDOCK.

Attest:

JAMES H. LAYMAN,

JESSE M. SIMON.