(No Model.) 3 Sheets—Sheet 1.

F. ANDERSON.

PERFORATING MACHINE.

No. 418,484. Patented Dec. 31, 1889.

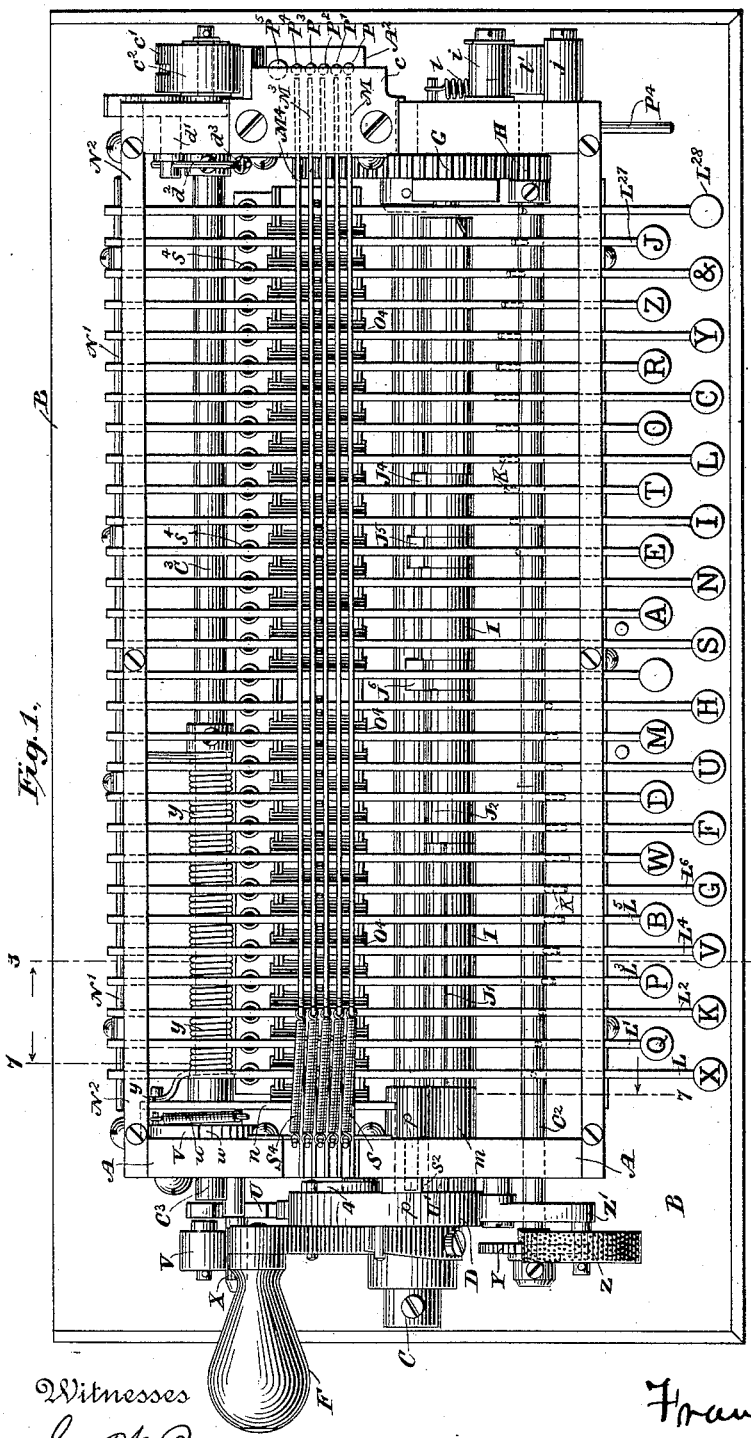

Fig. 1.

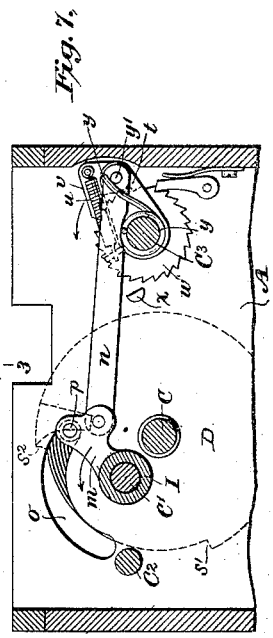

Fig. 2.

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(No Model.) 3 Sheets—Sheet 2.

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Fig. 2.

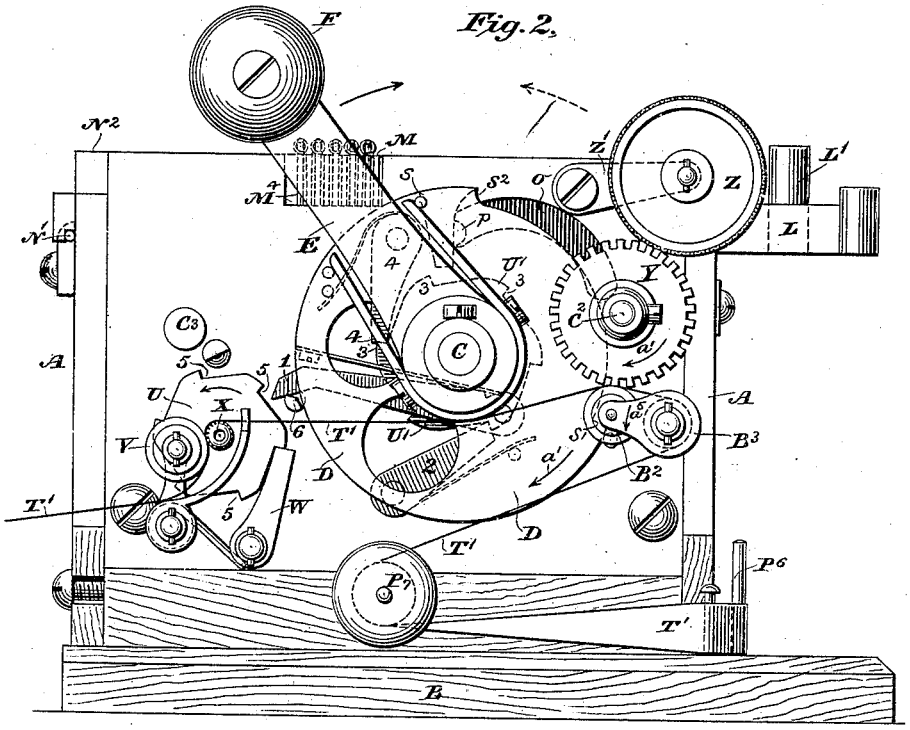
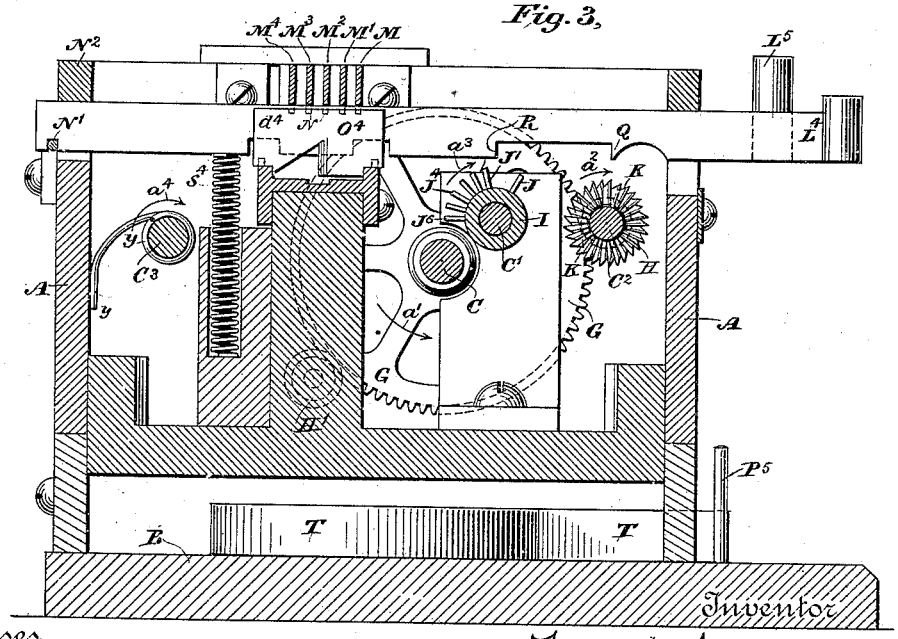


Fig. 3.



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(No Model.) 3 Sheets—Sheet 3.

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Fig. 4.

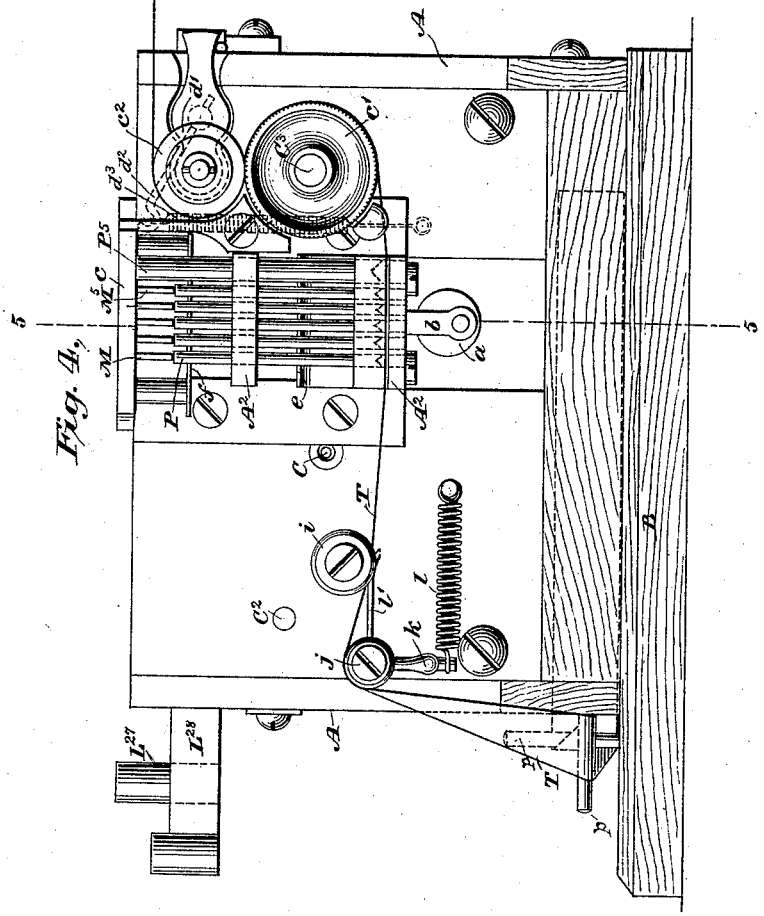


Fig. 5.

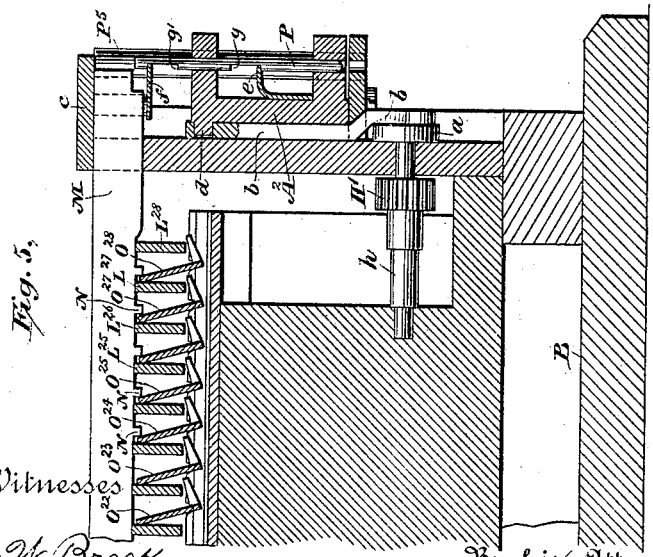
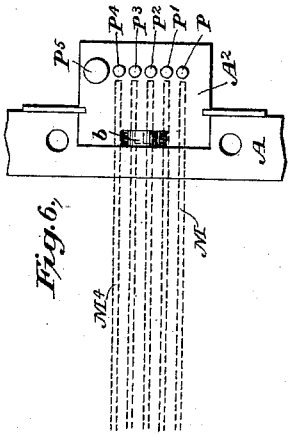


Fig. 6.



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UNITED STATES PATENT OFFICE.

FRANK ANDERSON, OF PEEKSKILL, NEW YORK.

PERFORATING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 418,484, dated December 31, 1889.

Application filed October 19, 1888. Serial No. 288,564. (No model.)

To all whom it may concern:

Be it known that I, FRANK ANDERSON, of Peekskill, in the county of Westchester and State of New York, have made a new and useful Invention in Perforators, of which the following is a specification.

My invention relates particularly to improvements in perforating-machines used in connection with automatic telegraphy, wherein the transmitting strips or fillets are perforated to represent the messages to be transmitted; and its objects are, first, to provide an apparatus for use by private individuals, business firms, &c., who desire to prepare their own message strips or fillets and to keep a printed record thereof; second, to render the operation of such apparatus more delicate, so that an operator can manipulate the keys with a minimum amount of exertion by causing said keys to control the operation of mechanically-applied power, instead of actuating the perforating apparatus and its associated parts directly or positively; third, to simplify the arrangement of the perforations in the fillet, so as to secure greater rapidity, both in the preparation thereof and in its use in transmitting the message so prepared. I accomplish these objects by the mechanism hereinafter described, and particularly pointed out in the claims which follow this specification.

My apparatus is particularly designed to be placed in the private offices of business firms or individuals, and is in general appearance not unlike a type-writer, the keys on the key-board being arranged, if preferred, in the order found on the well-known Remington or Caligraph type-writers, so that the stenographer of the firm or person employing it may be as familiar with its use as he is with his type-writer. This machine prepares simultaneously two separate message fillets or tapes, one of which is perforated with the code adopted by the telegraph company using it, and the other has printed upon its surface a printed Roman or analogous type-written copy of the message, constituting therefor an actual printed record of the message sent and acting as a check thereon, it to be retained in the letter-book of the firm or elsewhere as a matter of record. Its use also relieves the telegraph company of any danger of errors in transmitting, as is now liable by perforated fillets prepared by boys at the office of the company, who perforate written messages sent direct to the main or transmitting office.

My invention will be better understood by referring to the accompanying drawings, in which—

Figure 1 is a plan view of the apparatus entire as seen looking down upon it. Fig. 2 is an end view of the same as seen looking at Fig. 1 from left to right. Fig. 3 is a cross-sectional view of line 3 3, Fig. 1, as seen looking from left to right and showing parts in elevation. Fig. 4 is an end view of the entire apparatus as seen looking at Fig. 1 from the right-hand side. Fig. 5 is a partial sectional view taken on line 5 5, Fig. 4. Fig. 6 is a detail plan view of the punches and permutation-bars; and Fig. 7 is a sectional view on line 7 7, Fig. 1, as seen looking from right to left.

I will first refer to the parts of the apparatus in detail and then describe the operation.

A represents the frame, and B the base of the machine.

C, C^2, and C^3 are three shafts, journaled at the opposite ends of the frame-work, as clearly shown in Figs. 1, 3, and 7. The main shaft C extends through the left-hand end of the frame and carries a metallic disk D loosely journaled upon it, but adapted to be connected positively to it by a spring-pressed pawl 4, pivoted near the outer edge of the disk, and a toothed ratchet U′, having six teeth 3 3, said ratchet being keyed rigidly to the shaft C. (See Fig. 2, where the ratchet is shown in dotted lines.)

E F is an operating-handle secured to the disk D. The two shafts C^2 and C^3 are connected operatively to the main shaft C, at such times as become desirable, by mechanism I will now describe. Secured to the right-hand end of shaft C is a cog-wheel G, which meshes with two pinions H and H′, the former affixed to shaft C^2 and the latter to a small shaft *h*. (See Figs. 1, 3, and 5.) The shaft *h* is journaled in the frame and is operatively connected with the punch-head A^2 by a crank *a* and link *b*, the latter being pivoted to the punch-head at *d*. The shaft C^2 carries at its left-hand end a type-wheel Y, similar in all

respects to type-wheels found in printing-telegraphs and having a rotary inking-wheel Z, carried by an arm Z′. On a stationary shaft C′, which also extends from end to end of the machine, is a loose sleeve I, having seven radial arms J J′ J², &c., to J⁶, disposed at different angles, as shown in Figs. 1 and 3. This sleeve has on its left-hand end a crank-arm *m*, the free end of which is operatively connected through a link *n* with a pawl *v*, adapted to operate a ratchet-wheel *w*, fixed upon shaft C³. (See Figs. 1 and 7.)

The spiral spring *u* holds the pawl *v* in place against the teeth of the ratchet-wheel *w*, and an additional spiral spring *y*, wound around shaft C³ as a bearing and connected to the frame B at the extreme end, acts to hold the sleeve I by means of the described ratchet, pawl, and link in its extreme rear position, as shown in Fig. 1, holding, also, the handle E F in its retracted position through the agency of a pin *p* on link *m*, which extends through a slot *o* and contacts with the curved projecting shoulder *s*² on the inner face of disk D. On the right-hand end of shaft C³ is a milled wheel *c′*, of well-known form, for feeding the perforated strip or fillet T forward, the usual friction-wheel C² being held in contact with the strip or fillet by a spring *d*³, attached to the lever *d*² and connected with the carrying-lever *d′*.

The fillet T to be perforated is located in the usual way in the base of the machine and passes out over pins *p*⁵ and *p*⁴ to the guide-wheels *j i*, having the usual tension-regulator *k l′*, with adjusting-spring *l*, and thence through the slit in the punch-head A² to the feed-wheel *c′*. The punch-head A² and its punches P to P⁴, with the large punch P⁵, are arranged in a row or bank, the punches P to P⁴ sliding vertically when not held from above, as will be explained, and the punch P⁵ being stationary at all times in the reciprocating punch-head. At the left-hand end of the machine is located the printing apparatus, adapted to print a permanent printed record of the message placed upon the perforated fillet for transmission, and an independent fillet T′ for this record is also located in the base of the machine and passes therefrom around a pin P⁶, guide-wheel P⁷, wheel B³, presser-pad B², beneath the type-wheel Y, to the feeding apparatus consisting of the milled wheel X, connected by a shaft to the ratchet-wheel U, having six teeth 5 5, adapted to be acted upon by pawl 1, pivotally connected to the disk D, and hence to the propelling-crank E F. This ratchet-wheel U and disk D have the usual spring-pressed holding-pawls W and 2, fixed pivotally to the end of the machine.

V is an adjustable spring-pressed tension-pulley for insuring certainty of the fillet-feed. On the inner side of disk D is pivoted a spring-pressed propelling-pawl 4, adapted to take in the teeth 3 3 of ratchet U′ on shaft C. It will be noticed that pawl 4 drives shaft C forward while pawl 1 is being retracted, and, vice versa, pawl 1 drives the feed-ratchet U on reverse motion of lever E F.

This constitutes the description of the operative parts for perforating and printing the two fillets and for feeding them forward through the agency of power applied to handle E F.

I will now describe the mechanism for selecting the desired sequence of punches, and at the same time bringing the corresponding letter of the type-wheel over the fillet for printing.

L to L²⁸ is a series of key-levers representing the letters of the alphabet and other usual characters, said levers being pivoted on a rod N′, beneath a removable strip N² at the top and rear of the frame and resting each upon its own spring *s*⁴. (See Fig. 3.) These keys lie beneath a series of permutation-bars M to M⁴, of well known form, having selecting-teeth N N, &c., on their under surface, as is well known in the art.

O to O²⁸, &c., is a series of bell-crank or rocking levers, the longer arms of which have sufficient breadth to encompass the entire breadth or space occupied by the permutation-bars M to M⁴, and hence to contact with any of the teeth N, &c., which may by selection happen to lie in their respective paths, the short arms lying under the keys L to L²⁸, so that on depressing any key the corresponding bars to that key will be forced to the right against the retractile effect of their springs S to S⁴, and their free ends thus caused to be thrust beneath the fixed block *c* and over the particular punches P to P⁴ it is desired to render effective. The lower edges of the key-levers L to L²⁸ are provided with projecting notches Q and R, (see Fig. 3,) adapted when in the depressed position to come into the paths, respectively, of the radial pins or arms K K, &c., and flanges J J′, &c., thereby preventing further rotation of the type-wheel shaft C² and the sleeve I, which latter is operatively connected, as was described above, with the feeding mechanism of the perforating fillet.

There are as many radial pins K upon the type-wheel shaft C as there are characters on said wheel, and they are spirally disposed around this shaft, each pin lying in the plane of the lug or notch Q on the lever, which indicates the corresponding character found upon the type-wheel, so that when any notch Q on a depressed key-lever comes against its corresponding pin K K the corresponding character on the type-wheel at that instant is in position over the fillet T′ for printing, and similarly the particular radial flange or arm J to J⁶ on sleeve I is in position to limit the feed of the perforating mechanism, as will be indicated in the description of the mode of operation. It will be noticed that the key mechanism for controlling the operation of both the perforating and printing ap-

paratus is in a large measure independent of the power or actuating mechanism and serves the function solely of governing or controlling the action of both the power and its application, so that its operation is as free as possible from any laborious expenditure of power on the part of the operator, being largely in the nature of releasing apparatus, and hence capable of delicate action, and also that the feed of both fillets and the operation of perforating and printing, so far as any important expenditure of power is concerned, is made dependent upon the direct applied power through the agency of the handle E F.

I will now describe the mode of operation of this improved apparatus. Suppose both fillets T and T′ to be in position for action over their respective guide pins and pulleys, and the handle E F to be in its backward position, so that the pin *p* on arm *m* (see Fig. 7) is forced against the left-hand end of the curved slot or notch *o*. In this position the arm *m*, link *n*, and pin *y′* on the end of link *n* places the spiral spring *y* under stress, and the handle E F is held by the left hand preparatory to proceeding in the preparation of the message. The keys L to L^{28} are now depressed in any desired order, and I will describe the operation of one key—as, for instance, L^4, Fig. 3—the operation of the others being identically the same. On depressing L^4, then, and holding it down against the action of the spring S^4, the pivoted bell-crank lever O^4, Figs. 1 and 3, will be tilted to the right, and the upper edge d^4 will come in contact with teeth N on the under sides of such of the permutation-bars M to M^4 as are provided at this point with said teeth, thereby forcing them to the right. In this instance the three rear bars M^4, M^3, and M^2 will be thrust forward under the block *c* and in the rising path of the rising punches P^2, P^3, and P^4. The tooth R on the under side of L will then be thrown into the path of one of the radial flanges or ribs J to J^6 on the sleeve I, and at the same time tooth Q will be thrown into the path of that particular pin K on shaft C^2 which designates the radial position of that letter on the type-wheel Y corresponding to the key L^4, in this instance the letter "V." Now, carrying the lever E F in the direction of the dotted arrow its full stroke (see Fig. 2) one-sixth of a circle, limited by the curved notch *o*, Fig. 7, pin *p*, and shoulder s^2, type-wheel shaft C′ is rotated until the pin K stops it in the proper position, this shaft being in the nature of a sleeve frictionally connected to the pinion H, so that it will travel with it when not so held, as described. On making the full stroke of the lever E F the shoulder s^2 on the inner side of the disk D leaves the pin *p* as it advances, the sleeve I being held, as before described, by the particular radial flange or rib J to J^6, which comes in contact with notch R. As the lever goes forward the punch-head is raised, and such of punches as are held by the projecting ends of the permutation-bars are caused to perforate in the fillet T, the letter sought, in this instance "V." At the end of the stroke of lever E F the shoulder *s′* (see Figs. 2 and 7) comes against the end of the shaft which carries the presser-roller B^2, Fig. 2, and lifts it and also the fillet against the type-wheel Y, thereby printing the letter "V" thereon. Thus at one operation the letter "V" is perforated in strip T in a telegraphic code and printed on fillet T′ in a Roman character. On the backward stroke of lever E F the pawl 4 is retracted one-sixth of a revolution and into the next ratchet-tooth, while pawl 1 is advanced against ratchet U in one of the teeth 5, advancing said ratchet one-sixth of a revolution, and with it the feeding mechanism of the printed fillet T′. This return motion of arm E F also advances the feed mechanism of the perforated fillet T, and inasmuch as the difference in the length of the characters perforated necessitates a varying feed this variation is accomplished by the action of the retaining-teeth R and radial flanges or ribs J to J^6, as will be understood on inspection of Figs. 1 and 3. In the case of those letters requiring the greatest feed, or such as occupy the most space on the perforated fillet, the sleeve I is permitted to rotate almost one-sixth of a revolution, so that the arm *m*, link *l*, and pawl *v* are permitted to assume a position quite near the extreme stroke of crank E F, in order that on the return-stroke the feed-wheel *c′*, Fig. 4, may be rotated almost one-sixth of a revolution, while in the case of such letters as E, I, and T, which are short characters, the arm, link, and pawl are held early in the forward motion of the arm E F by the notch R on the particular key depressed. It will be understood of course that the type-wheel Y must first be set in unison with the character-punches—that is, so that it will print the letter on fillet T′ which corresponds to the perforated character on fillet T—and that afterward it will run in unison, being always positively locked by the particular key which actuates the permutation-bars for the letter to be perforated. Of course the arrangement or order in which the permutation-bars are placed over the punches beneath block *c* when the keys are depressed may be in accordance with any selected code.

I have constructed the apparatus to transmit a Morse code, the perforations being of such size and so spaced as to transmit by the interruptions made in the transmitting-circuit due to the spaces between said perforations, as described in a prior application for a patent, filed by me in the United States Patent Office, for an improved fillet and system of automatic telegraphy, on the 22d day of September, 1888, and bearing Serial No. 286,087, and to this end I have arranged the moving punches P to P^4, inclusive, in a bench in line with each other, and a fixed or stationary large punch P^5, which perforates the

large spaces between the letters and words, as shown in the fillet disclosed in said application. By this arrangement of punches I am enabled to make the space between letters of greater width than those between the elements of any individual letter, and by successively actuating the spacing-key located at the center of the key-board between H and S can make an oblong space of any desired length, the successive perforations of the large punch P^5 constituting a continuous space or opening in the fillet.

I have not described in detail the construction and operation of the punch-head and moving punches, as these features are old in perforating-machines described by me in Letters Patent heretofore granted, the novelty in the present case, so far as the punching apparatus is concerned, lying in the parallel bank of moving punches combined with a large stationary space-punch and moving punch-head, as shown and described.

I am aware that it is old to actuate a bank of punches located in a plane and to select certain of said punches to perforate a code-signal by causing permutation-bars to be placed in the vertical path of said punches in any desired sequence, and to control the operation of these permutation-bars by keys acting on lugs or teeth beneath the edges of said permutation-bars; but I believe it is new with me to connect such apparatus with an independent power, and to simply control the application of said power through the agency of the key-levers. I also know that it is old to perforate a fillet for use in the automatic transmission of telegraphic messages and to print simultaneously on the same fillet and alongside of the perforated characters or message a translated or printed record of said message, and I make no claim to these features; but

What I do claim, and desire to secure by Letters Patent of the United States, is—

1. In a perforating-machine for preparing message-fillets for use in automatic telegraphy, the combination of the following elements: a series of key-levers, one for each character, a bank of punches, a series of permutation-bars for bringing any desired order of punches into play, connections between the key-levers and the permutation-bars for bringing said bars into effective relation with the punches, operating mechanism connected through shafting and gearing to a punch-head and to a fillet-feeding wheel for operating the punches and advancing the fillet in succession, a printing or type wheel on a separate shaft operatively connected to the operating mechanism for printing a separate or printed copy of the message cut in the perforated fillet upon a separate fillet, and feeding-gear also operatively connected to the driving or operating mechanism for advancing the printed fillet as fast as the message is printed thereon, whereby a message is produced on one fillet in perforations for transmission and a companion record is printed on the second fillet for verification and record, substantially as described.

2. In a perforating-machine, the combination of a series of movable punches operatively connected with a power-impelled shaft and a series of permutation-bars, one for each movable punch, a series of key-levers each operatively connected with said permutation-bars in a prearranged order, a printing or type wheel borne by a shaft operatively connected with the impelling mechanism, and feeding mechanism for two independent fillets, the whole being operatively related, as shown, whereby two independent records are made of a message, one in perforated characters on one fillet and the other in printed characters on the record-fillet, substantially as described.

3. In a perforating-machine for use in automatic telegraphy, the combination of the key-levers, the permutation-bars operatively connected to said key-levers in a prearranged sequence, the reciprocating punch-head and punches, the feed-wheel and intermediate shafting, and gear-wheels operatively connected within a crank or handle, whereby the operation of punching the fillet is performed through the agency of applied power controlled by said key-levers, substantially as described.

4. In a perforating-machine for use in automatic telegraphy, the combination of punches for perforating a fillet, with a type-wheel for printing a record on an independent fillet, and intervening shafting and gearing for connecting the punches and type-wheel operatively with a power-impelled shaft, substantially as described.

5. In a perforator, the combination of a series of punches adapted to move with a reciprocating punch-head, with a fixed punch of larger diameter than any one of the moving punches, all of said punches being located in the same plane, substantially as described.

6. In a perforating-machine, the combination of a series of sliding punches with a reciprocating punch-head and a fixed punch of larger diameter than any one of the sliding punches, the large punch operating at every complete reciprocation of the punch-head to perforate a space-hole, and the sliding punches operating as selected to perforate characters, substantially as described.

7. In a perforating-machine, the combination of the following elements: a bank of sliding punches, a fixed space-punch, a series of permutation-bars for determining what order or sequence of sliding punches shall operate, a reciprocating punch-head, a series of key-levers operatively connected with the permutation-bars by rocking levers and teeth, the latter arranged in a prearranged order, a propelling device, as a crank, connected through shafting and gear to the punches, and also to feeding mechanism for advancing the fillet after any character has been perforated there-

in, a rotary sleeve or shaft connected to the fillet-feeding mechanism by a crank, a link, pawl and ratchet, and radial arms on said shaft, with teeth beneath the key-levers for taking against said radial arms when said keys are depressed and the propelling-crank is advanced, whereby the fillet is perforated with individual characters on the depression of each key and forward motion of the crank and the feed regulated in accordance with the space of the perforated letter on the backward motion of said crank, substantially as described.

8. In an apparatus for preparing messages for use in automatic telegraphy, the combination of the following elements: a series of keys, one for each character or letter used, a type-wheel having characters on its surface which correspond to those the keys are designed to represent, a shaft carrying said type-wheel, having a series of radial pins spirally disposed, each pin lying in the path of a tooth on the under side of one of the key-levers, shafting and gearing connecting the type-wheel shaft to a power-impelling device, as a crank with a fillet-feeding wheel operatively connected to the crank, and a press-pad adapted to be operated when the crank is thrown to its extreme position, all being connected and operating to print a record of the message, substantially as described.

9. In a perforating-machine, the combination of a reciprocating punch-head, a series of sliding punches arranged in a plane with a fixed spacing-punch, intermediate gearing between said punch-head, and a power-impelled shaft, with spacing mechanism operatively connected with a set of keys representing the characters to be perforated, said keys also being operatively connected with a series of permutation-bars for selecting the desired sequence of punches, substantially as described.

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