J. B. S. BOOTH.

STRIP PERFORATING MECHANISM FOR COMPOSING MACHINES.

APPLICATION FILED APR. 24, 1915.

1,172,254.

Patented Feb. 22, 1916.

4 SHEETS—SHEET 1.

Fig. 3.

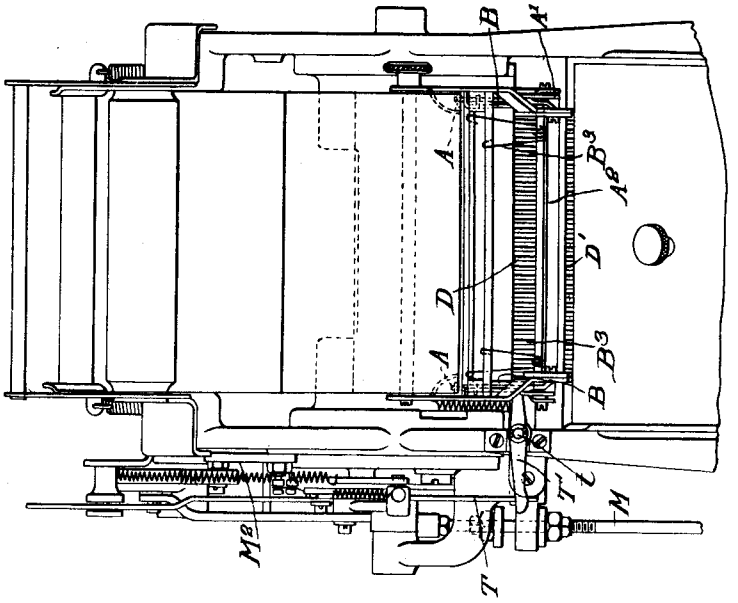
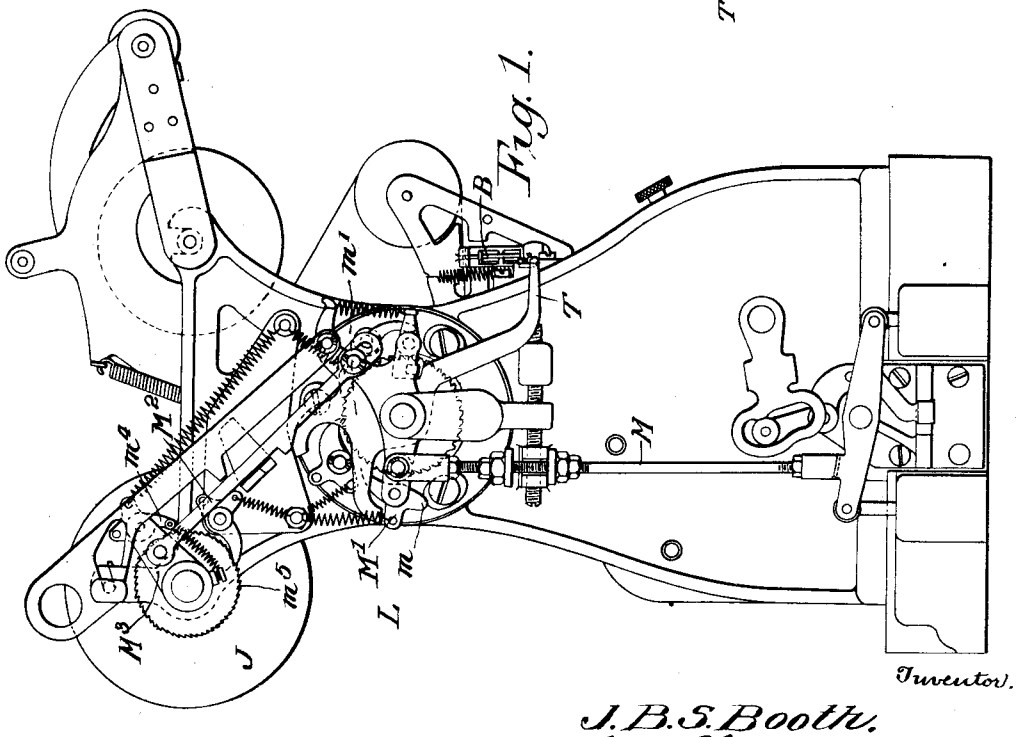


Fig. 1.



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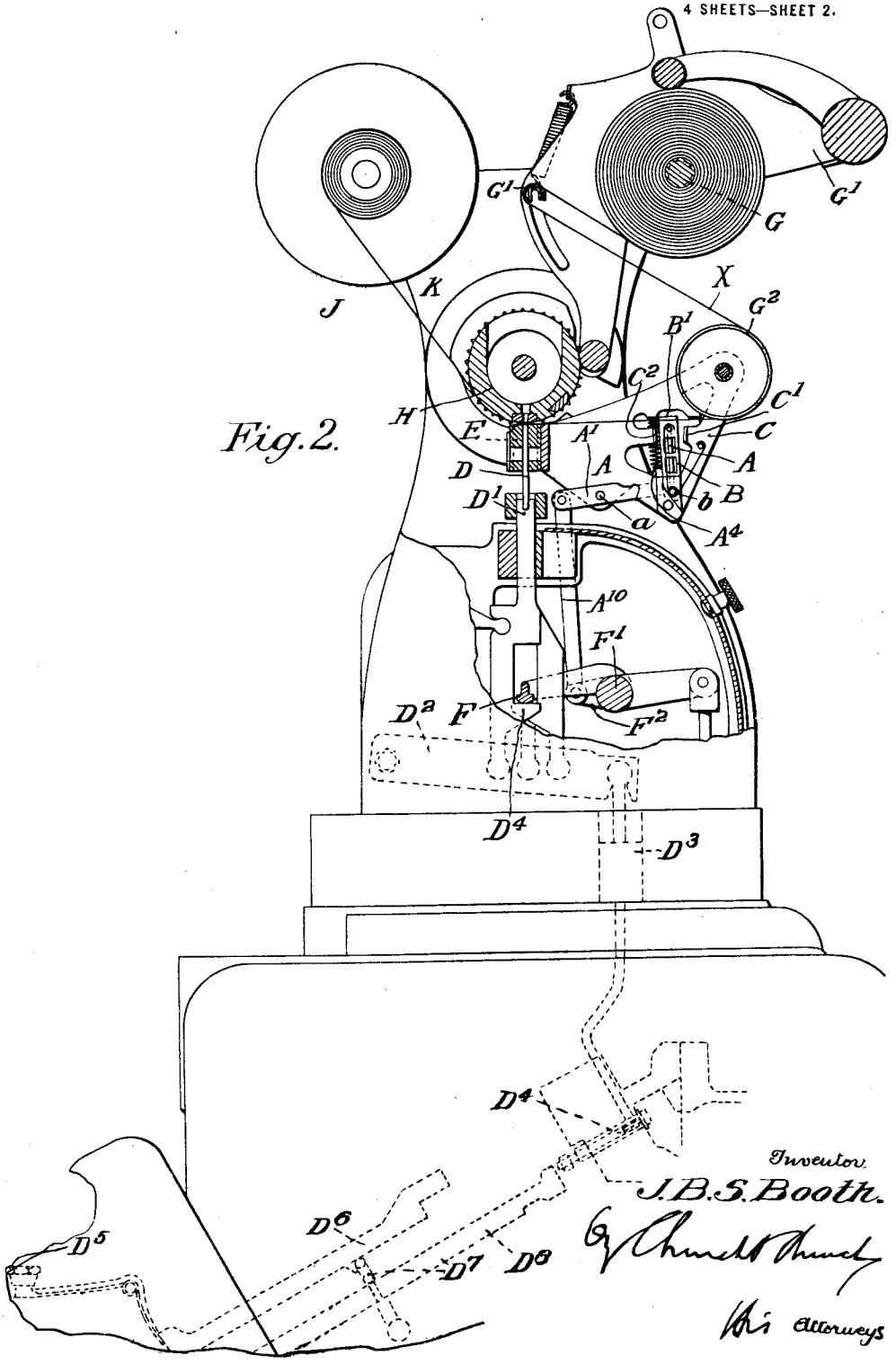
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4 SHEETS—SHEET 2.

Fig. 2.



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4 SHEETS—SHEET 3.

Fig. 4.

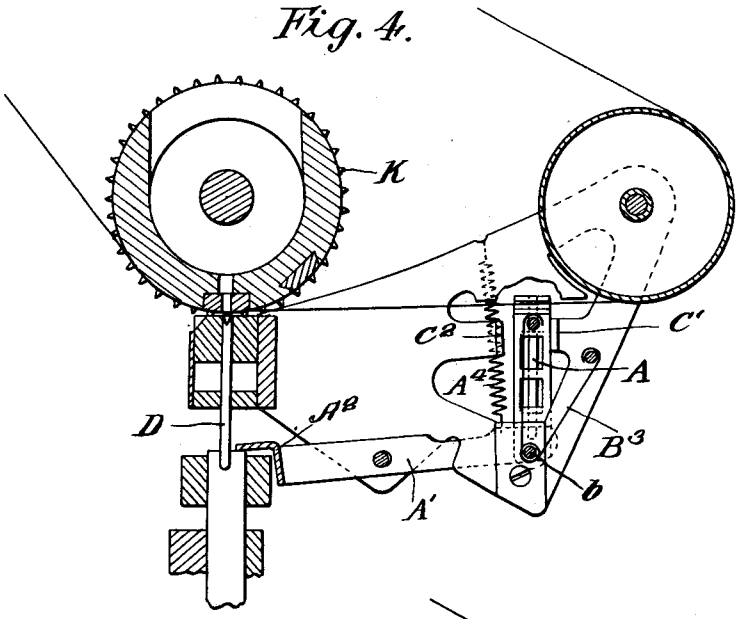
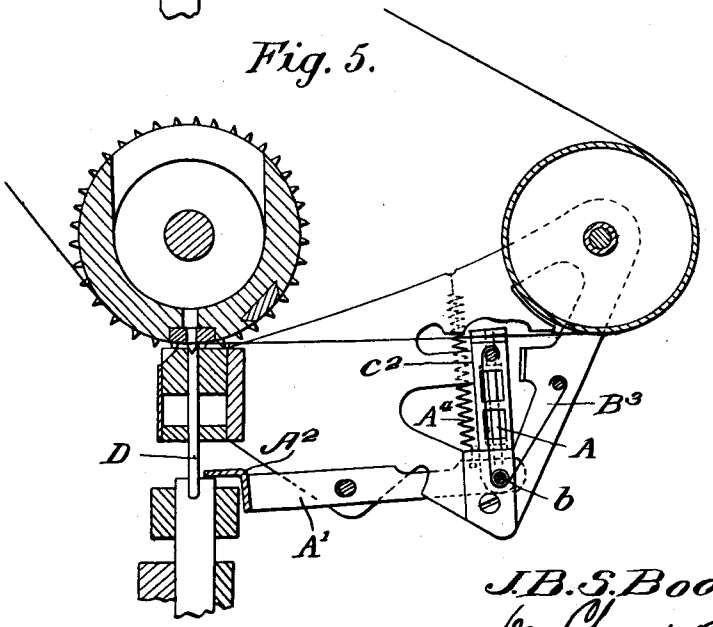


Fig. 5.



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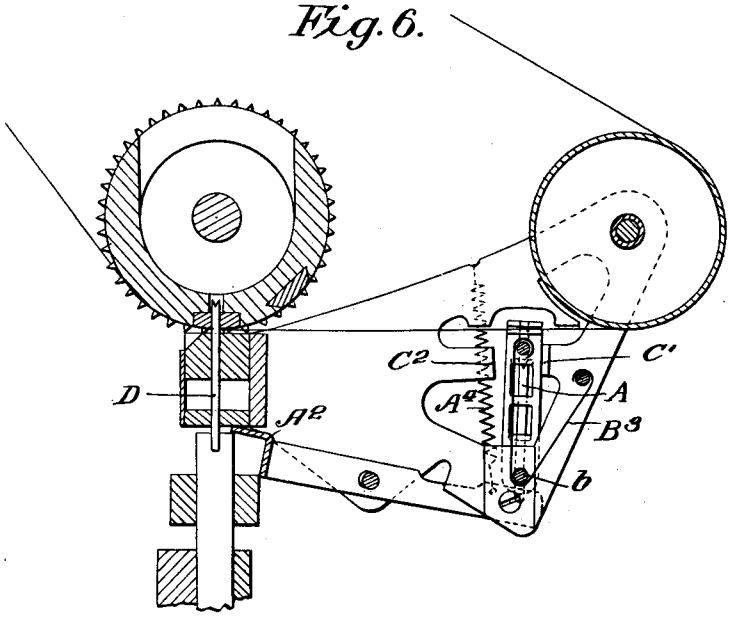
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4 SHEETS—SHEET 4.

Fig. 6.



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UNITED STATES PATENT OFFICE.

JOSEPH BOURDAS SMITH BOOTH, OF SIDCUP, ENGLAND, ASSIGNOR TO LANSTON MONOTYPE MACHINE COMPANY, OF PHILADELPHIA, PENNSYLVANIA, A CORPORATION OF VIRGINIA.

STRIP-PERFORATING MECHANISM FOR COMPOSING-MACHINES.

1,172,254. Specification of Letters Patent. Patented Feb. 22, 1916.

Application filed April 24, 1915. Serial No. 23,753.

To all whom it may concern:

Be it known that I, JOSEPH BOURDAS SMITH BOOTH, a subject of the King of Great Britain, residing at Shirley House, Main Road, Sidcup, in the county of Kent, England, have invented certain new and useful Improvements in Strip-Perforating Mechanism for Composing-Machines; and I do hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming part of this specification, and to the figures and letters of reference marked thereon.

This invention relates to mechanisms for perforating or punching webs or strips of paper or similar material such as are employed, for example, as patterns or record strips in typographical composing machines. These webs or strips are intermittently fed through a composing or preparing machine wherein the holes or perforations representing character and other symbols are punched or formed. In such machines the web or strip is fed forward regularly and accurately step by step, usually by means of sprocket or like wheels which engage feed perforations or holes, located usually at or near the margins of the web or strip. Whether or not these feed perforations are required to feed the strip through the composing or preparing machine, they are necessary in the automatic type casting or other machine which is controlled by the controller or web after it has been composed. Usually these marginal or feed holes have been preliminarily punched or produced in a separate machine or before the strip is placed on the composing machine. This separate punching and rewinding of the web increases the cost and consumes a considerable amount of time.

It has heretofore been proposed to provide composing machines with additional punches carried by a frame adjustable relatively to the strip feed mechanism, for producing the marginal holes, but such an arrangement provides no positive means for regulating the feed or insuring the formation of the feed holes correct to pitch until the part of the strip containing these marginal holes reaches the usual feeding-sprockets and somewhat complicated adjusting devices are therefore necessary.

According to the present invention, a feed hole punching attachment is mounted on the composing machine and the feed hole producing punches positively and accurately control the feed of the strips from its initial position onward said feed hole punches being operated alternately or successively with the character-signal punches. The feed hole punches, according to this invention, are mounted in a stationary frame in which, in addition to their punching movement, they have a movement or travel in company with the strip the extent of which movement is controllable or regulatable to insure the accurate feeding of the strip and the punching of the feed holes of accurate pitch at all times.

The feed-hole punches are preferably retained in their initial position at one end of their travel by springs, and after they are raised to pass through and punch the strip they move forward to a stop to determine the pitch after which they are withdrawn from the strip and returned to initial position by the spring ready for the next punching operation or cycle of movements. As these punches are withdrawn, the character punches are operated to perforate the strip, so that the latter is never free, being retained always against accidental movement or distortion either by the feed-hole punches or by the character punches. Conveniently the feed-hole producing punches are mounted in pivotally supported or movable frames or carriers in which they are appropriately guided. These frames or carriers are arranged to oscillate or move between stops which determine the position of the punches when entering the paper strip and the extent of the travel of the punches in company with the paper strip.

Referring to the accompanying drawings: Figure 1 is a side elevation of part of a well known typographical composing machine embodying the present invention. Fig. 2 is a sectional elevation of Fig. 1. Fig. 3 is a rear elevation of Fig. 1, and Figs. 4, 5 and 6 are detailed views of the mechanism of the present invention showing various stages in the complete cycle of operations.

Like reference characters indicate the same parts in all the drawings.

The punches furnished in accordance with this invention for producing the marginal feed-holes or perforations in the record strip are indicated by the reference character A.

B are the pivotally mounted frames upon which the punches A are carried.

C is a stationary carrier or frame detachably secured to the composing machine to support the frames B and part of the operating mechanism for the punches A.

The machine to which the invention in its present embodiment is shown applied is that forming the subject-matter of United States Patent No. 944,405, December 28, 1909, to the specification of which reference may be had for a full and detailed description of the machine. It is deemed sufficient for present purposes, to indicate merely the parts of the existing machine more particularly concerned with the mechanism of the present invention. These parts are, the character punches D mounted on punch bars D′, connected with levers D^2 which are operated by motors D^3. Valves D^4 are operated by the keys D^5 on the keyboard to control the motors D^3, a permutation system D^6, D^7, D^8 being interposed between the keys D^5 and the valves D^4 so that the keys selectively control the required motors D^3. E are guides through which the punches D pass to perforate the record-strip X with the required combination of perforations denoting the various characters and a universal bar F controlled by a motor and serves to return or aid in the return of the punches D to their initial position after being operated. The record strip X passes from a delivery roller G mounted on an arm G′, on the machine between a guide R and the punch guide E, and is wound up after perforation upon the take-up roll J. Sprocket wheels K are provided to feed forward the record-strip, the teeth of the sprockets engaging the marginal feed-holes made by the punches A. L (see Fig. 1) is the feed mechanism for the sprocket wheels and for the take-up roll of the record-strip; it comprises a system of levers and pawl and ratchet feed, a separate pawl and ratchet feed being employed for the sprocket wheels K and the take-up roll J. This feed mechanism is controlled by a rod M which is operated up and down each time a character punch or punches is or are operated, the said rod being connected with an arm M′ carrying the pawl *m* for a ratchet wheel *m′* on the shaft of the sprocket wheels K, and connected to the arm M′ is a link M^2 secured to an arm M^3 carrying the feed pawl m^4 for the ratchet wheel m^5 mounted on the shaft of the take-up roll J.

The carriers B are supported on pivots *b* in the frame C and can be oscillated within limits to correspond with the distance between adjacent feed holes, the amount of travel being limited by stops C′, C^2. The punches A are mounted in the carriers B so that they move in company with the carriers around their pivots, but are free to move longitudinally relatively to the carriers B in performing the punching operation. At their lower ends, the punches A are preferably connected to a bar A^2 (see Figs. 4 to 6) secured by its ends to levers A′ pivoted at *a* to the frame C. The bar A^2 lies in the path of the upper ends of character-punch bars D′ so that each time a character punch is operated the bar A^2 and levers A′ will be operated and a movement given to the punches A. In the example illustrated, the punches A are moved positively in one direction, *i. e.*, the direction to withdraw the punches from the record-strip, by the movement of the character-punch bars D′ and are moved, to perform the punching operation, by springs A^4. In this arrangement the marginal perforation punches A act alternately to or successively to the character punches D. The record-strip is therefore always positively held either by the punches D or the punches A. The record-strip X passes from the delivery roll G over a tensioning guide G′, and a guide roller G^2 before passing between guides B′ on the carriers B.

In the position shown in Fig. 4, the character punches D are just returning after having performed a punching operation and the punches A are being advanced to punch the strip X by the springs A^4. The feed mechanism in this position commences to turn the sprockets K which are in engagement with the marginal holes already made, to feed the record strip forward one step. The punches A being through and in engagement with the record strip must follow the paper and this they are permitted to do by the carriers B turning on their pivots *b*. As the distance between the stops C′ C^2 coincides with the distance between the teeth of the sprocket wheel K and the extent of feed movement given to the ratchet wheel *m*, the record strip is moved forward evenly and without being torn or having the feed-perforations mutilated.

In Fig. 1 the punches A and the carriers B are shown in position when the feed movement has been completed, and the parts remain in the position indicated in this figure until the character keys D^5 are again operated to produce another character in the fresh operation of the record strip. The position immediately after the operation of a character key is shown in Fig. 5 where the punches D are advancing and the punches A are being withdrawn by the movement of the levers A′ and bar A^2, and against the action of the springs A^4. The completion of this movement is indicated in Fig. 6

where the character punches D are shown in their fully advanced position and the punches A withdrawn from the strip. Immediately the punches A are withdrawn from the strip the carriers B are again turned on their pivots *b* and returned to the position indicated in Fig. 6 by the springs B^3.

As already stated, one of the chief difficulties existing hitherto in providing mechanism for forming the marginal feed-perforations, by an attachment on the composing machine, resides in the difficulty of controlling tne initial feed of the record-strip so that the initial feed-holes will be of correct pitch; this difficulty is overcome, in the present invention, by pivotally mounting the carriers B and determining the extent of their movement around their pivots to correspond or harmonize with the feed mechanism for the record-strip, and the distance between the teeth of the sprockets K.

According to the present invention, when the record strip is first fed forward by hand from the delivery roll G, the leading end of the record-strip can be taken by hand and gently drawn forward while a key on the keyboard is operated successively to actuate the punch mechanism so that the punches A commence to form feed-hole perforations. The pull by the hand on the record strip will only be sufficient to draw this strip forward, the extent of which forward movement is determined by the movement of the carrier B while the punches A are in engagement with the paper. When the record-strip has been perforated and drawn forward sufficiently to bring the leading end sufficiently forward to enable the teeth of the sprockets K to engage the marginal perforations, the further feed of the record-strip, during composition, takes place automatically under the action of the mechanism above described.

In place of the punches being withdrawn positively by the movement of the punch bars D′ and bars A^2, levers A′ and the forward movement of these punches being controlled by springs A^4, a positive movement of the punches A in both directions may be provided. For example, in place of the bar A^2 on the levers A′, this bar may be eliminated as also may springs A^4, and the free ends of levers A′ may be connected by a link or links A^{10} (Fig. 2) to an arm F^2 mounted upon the shaft F′ of the universal bar F. By this arrangement, each time the bar F which engages shoulders D^4 on the punch bars D′ is raised the lever A′ will be operated to withdraw the punches A and when the bar F is returned the punches A will be advanced to perforate the record-strip.

When it is required to remove a record-strip or insert a fresh one into the machine, it is necessary to provide means for withdrawing the punches A from the path of the strip while the punches D are also withdrawn. For this purpose there is provided on the paper-feed mechanism already existing on the composing machine, a lever T which, when the feed-mechanism is actuated in the known manner to render it inoperative, is turned so that its free end engages one end of a lever T′ (Fig. 3) which is pivoted at *t*, and this lever T′, in rocking, engages one of the levers A′ and rocks it to effect the withdrawal of the punches A.

It will be observed from the foregoing that the feed perforation producing punches are mounted in a carrier or carriers which may be made exceedingly light, thus overcoming any tendency to tear the paper during the starting and stopping of the feed movements. The oscillation of the said punches is toward and from the pin wheels in the direction of the paper feed and the coördination of the movements of the operating mechanism is such that the punches enter the strip while it is stationary and remain advanced and in engagement therewith while the strip is advancing. They are released from the strip after the latter has come to rest and again engage it before it starts to advance, the return to normal position taking place while the character or symbol forming punches are advanced and in engagement with the strip.

What I claim is,—

1. A machine for forming perforations in a record strip embodying means to feed the strip, punches spaced from each other in the line of feed and means for operating said punches alternately.

2. A machine for forming perforations in a record strip embodying means for feeding the strip intermittently, a set of punches supported against movement in the direction of the strip feed movements, punches mounted to move in unison with the strip during feed movements and means for operating said punches alternately.

3. A machine for forming perforations in a record strip embodying means for feeding a strip intermittently, strip perforating punches movable in the direction of paper feed and means for advancing the punches to perforate the strip while the latter is stationary and for holding the punches in engagement with the strip while the latter is advancing.

4. A machine for forming perforations in a record strip embodying means for intermittently feeding a strip including a pin wheel coöperating with feeding perforations in the strip, feed perforation forming punches located in advance of the pin wheel in the direction of the strip feed and movable toward and from the pin wheel, and means for advancing the punches to perfo-

rate the strip and for holding the punches advanced during the feeding movements of the strip.

5. A machine for forming perforations in a record strip embodying means for intermittently feeding the strip including pin wheels coöperating with feeding perforations in the strip, feed perforation forming punches located in advance of the pin wheels, a swinging frame in which the punches are mounted to swing toward and from the pin wheels and means for advancing the punches to perforate the strip and for holding the punches advanced during the feeding movements of the strip.

6. A typographical or like record-strip composing machine, having means for producing feed perforations in the strip embodying an oscillating carrier, punches mounted in the carrier to move in company therewith and also relatively thereto, a stationary frame for the carrier and means for advancing the punches intermittently, substantially as and for the purpose described.

7. In a typographical or like record-strip composing machine, the combination with a carrier pivotally mounted in a stationary frame, and punches mounted in the carrier, of stops for limiting the oscillations of the carrier and mechanism for moving the punches relatively to the carrier substantially as and for the purpose described.

8. In a typographical or like record-strip composing machine furnished with character or symbol-producing punches, the combination with feed-perforation producing and feed-regulating punches mounted in an oscillatory carrier, of stops between which the carrier oscillates and mechanism controlled by the mechanism operating the punches for moving the punches relatively to the carrier.

9. In a typographical or like record-strip composing machine furnished with character or other symbol-producing punches and a strip-feeding mechanism embodying a strip feed disengaging mechanism, such as described, the combination with the strip-feed mechanism and feed perforation producing punches, of mechanism controlled by the strip-feed disengaging mechanism and acting upon the feed perforation punches to withdraw them when the feed mechanism is thrown out of operation.

JOSEPH BOURDAS SMITH BOOTH.

Witnesses:

ALBERT SMITH,

CHAS. J. FALCONER.