E. M. v. MARCHTHAL.

MACHINE FOR PRODUCING AND TRANSCRIBING PERFORATED SYMBOLS.

APPLICATION FILED JULY 23, 1912.

1,067,047.

Patented July 8, 1913.

3 SHEETS—SHEET 1.

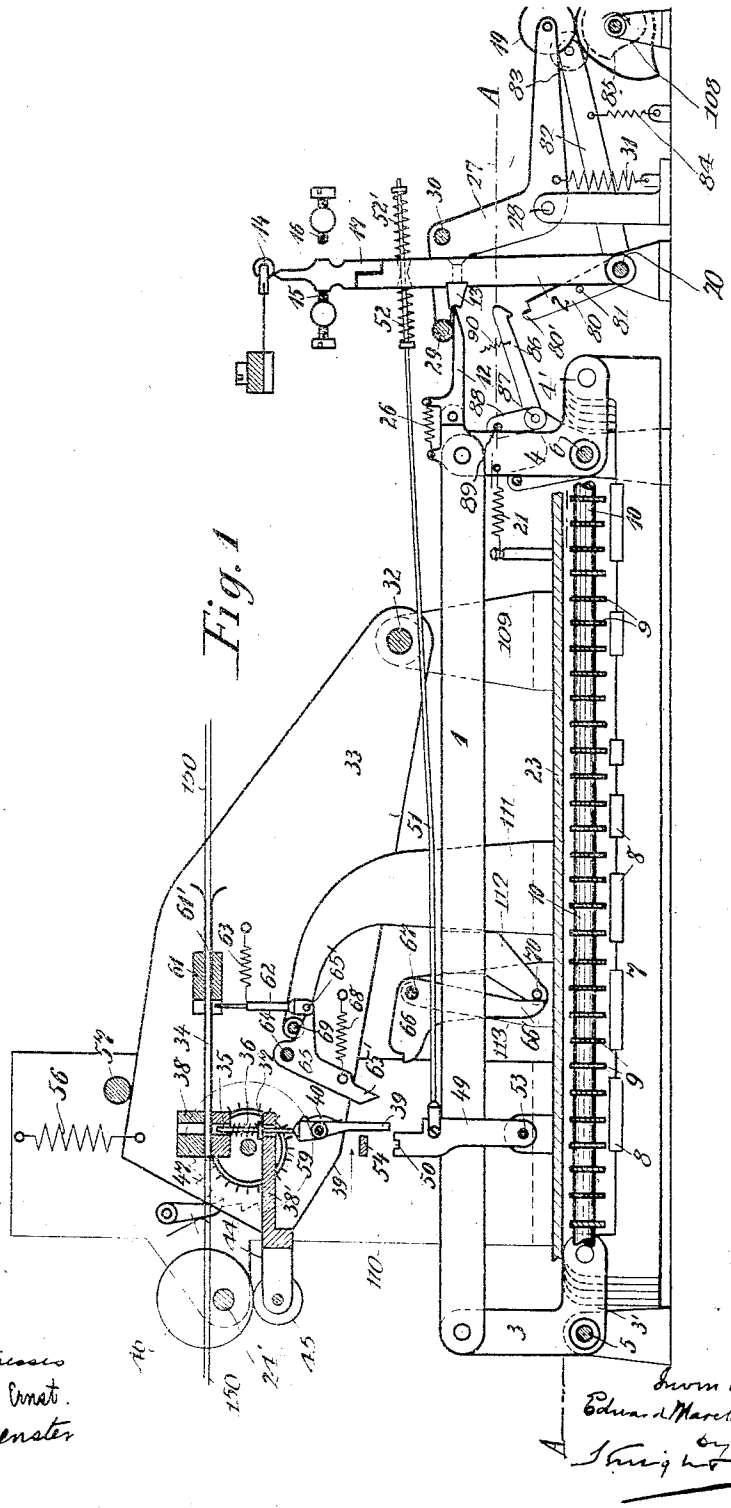


Fig. 1

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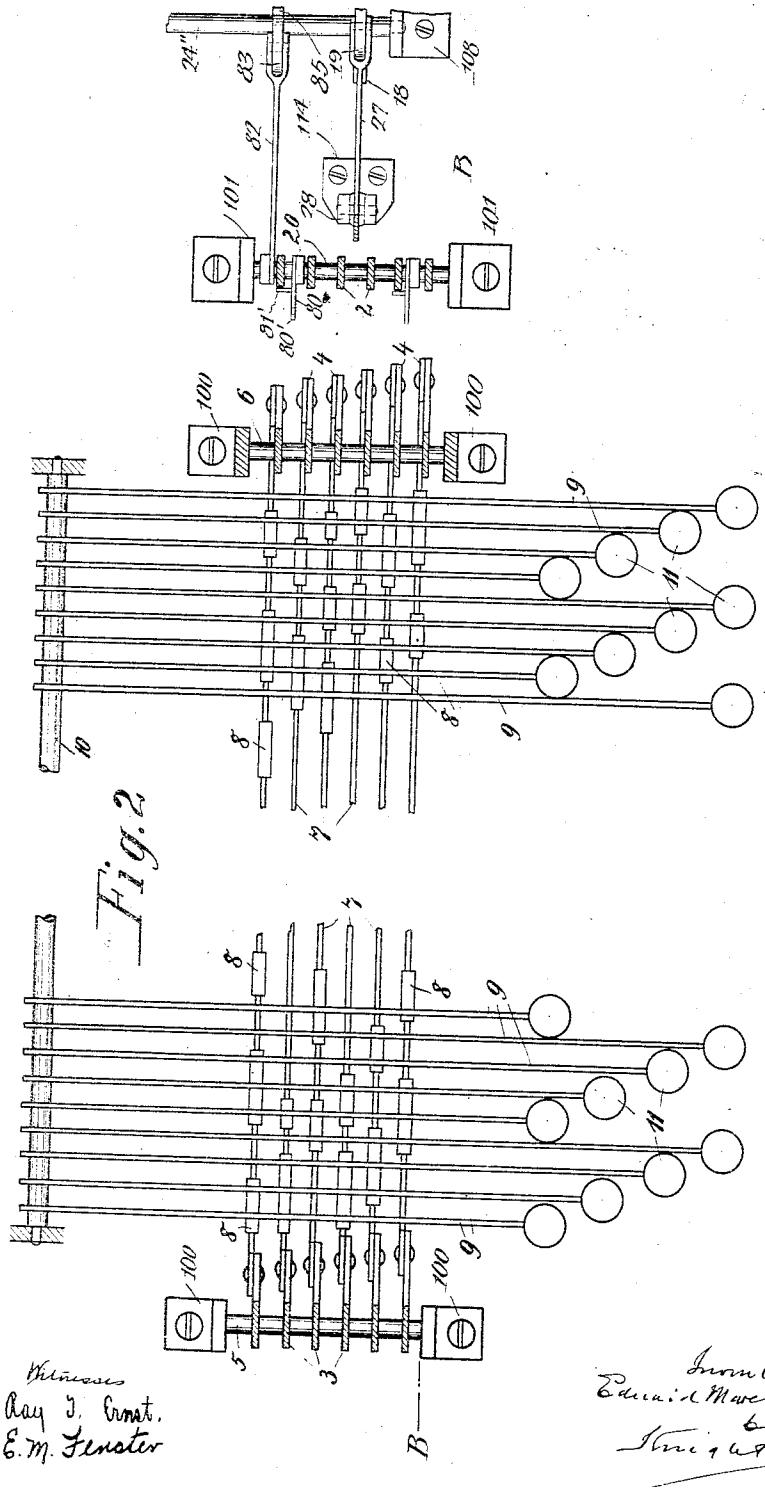
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3 SHEETS—SHEET 2.



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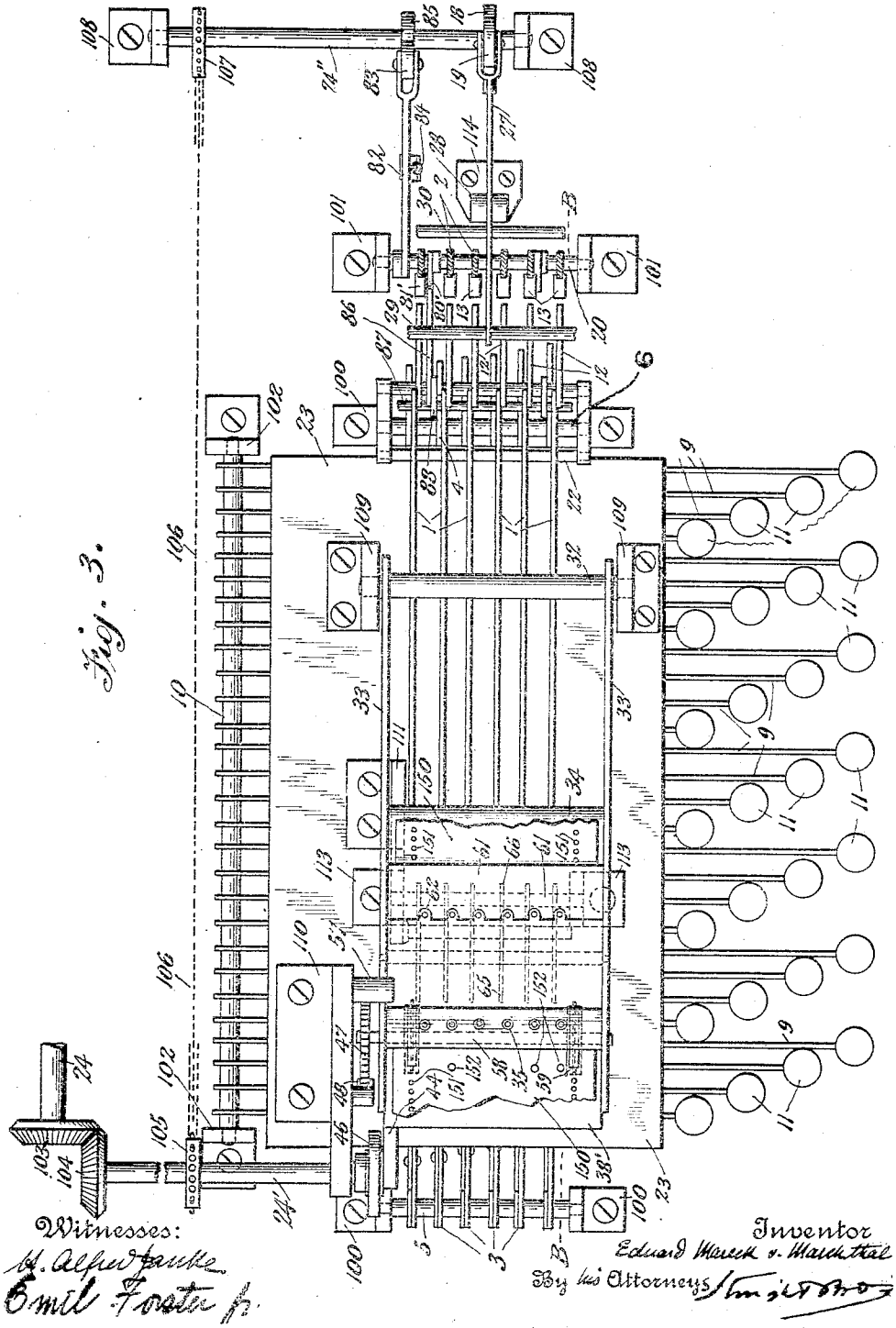
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3 SHEETS—SHEET 3.

Fig. 3.



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EDUARD MAREK v. MARCHTHAL, OF VIENNA, AUSTRIA-HUNGARY, ASSIGNOR TO SIEMENS & HALSKE, A. G., OF BERLIN, GERMANY, A CORPORATION OF GERMANY.

MACHINE FOR PRODUCING AND TRANSCRIBING PERFORATED SYMBOLS.

1,067,047. Specification of Letters Patent. Patented July 8, 1913.

Application filed July 23, 1912. Serial No. 711,046.

To all whom it may concern:

Be it known that I, EDUARD MAREK v. MARCHTHAL, a citizen of the Empire of Austria-Hungary, and residing at Vienna, Austria-Hungary, have invented certain new and useful Improvements in Machines for Producing and Transcribing Perforated Symbols, of which the following is a specification.

My invention relates to a device used on machines for producing printed matter, by which it is possible to control the printing of the several types as well by hand by means of a key-board as also by means of a perforated paper strip, on which perforations in rows transversely to the strip are arranged to represent symbols corresponding with the types to be printed. By means of my novel device it is also possible to provide a paper strip with such hole symbols at the same time when the operator produces the printed matter by means of the key-board, so that such perforated paper strip may subsequently be used in the same or in another machine for controlling the printing of type. The operations in a machine of this character are controlled principally by a number of change-over switches, and the Patent No. 1054582 granted to me on February 25, 1913 discloses an arrangement in a machine of this character and the manner how these switches, when tilted over or reversed in the manner described hereinafter with regard to the present mechanism, will bring about the closing of certain electric circuits by which in turn through energized electromagnets the operation of the several elements of the machine is controlled. The arrangement illustrated in the aforesaid patent, though in more or less diagrammatic form, forms a part of the machine, a portion of which is illustrated in the present application.

The principal object of my invention is to provide improved mechanism for performing the three operations above referred to, namely—reversing the desired switches by striking a key, reversing the desired switches by means of a predetermined perforated symbol in the register band, and producing a symbol consisting of a combination of perforations arranged in a transverse row on the register band by striking the key. In the following description of the device which accomplishes these results the electrical features of the machine of which the present arrangement forms a part, and which are described and shown in aforesaid patent, have been omitted here as they do not form a part of this particular invention, and since with the aid of said patent the present invention may be clearly understood by those skilled in the art.

The particular advantages attained by the invention with this mechanism are, firstly, as far as possible the same members are used for performing all three operations; secondly, the speed with which a key is struck and released does not impair the certainty with which the elements of written matter and the corresponding perforated symbols are produced; and, thirdly, no portion of the written matter together with the corresponding perforated symbol is produced twice even when the key is depressed longer than necessary.

One illustrative embodiment of my invention is represented as an example in the accompanying drawings, wherein:—

Figure 1 is a vertical section taken on the line B—B in Fig. 2; Fig. 2 is a horizontal section taken on the line A—A in Fig. 1, some parts being shown broken away; and Fig. 3 is a top plan view of the machine shown in Fig. 1, in which for clearness sake the upper portions of switches 2 and their contacts 15 and 16 as well as the pull rods 51 have been omitted.

The machine illustrated in the above mentioned patent is controlled principally by what has been termed in said patent as working shaft 24, (see Figs. 5 and 6 of said patent). The location of this working shaft relatively to the device illustrated in the present application is shown in Fig. 3 at its upper portion, and is denoted with the same reference character 24.

Referring to the drawings of the present application, the switches which control the machine, *i. e.* the combination switches, are designated 2. In the illustrative embodiment six such switches are provided; they are located in a row and can rock about an axle 20. They are tilted over through the medium of intermediate members here shown having the form of bars 1, to each of which are pivoted two bell-crank levers 3 and 4 respectively able to rock about the fixedly mounted axles 5 and 6. These axles

are fixedly mounted in brackets 100. The horizontal arms 3′ and 4′ of these levers are so connected with bars 7, herein termed combination bars, that these together with the bell-crank levers and the bars 1 constitute parallelograms. Springs 21 having one end attached to the frame 23 cause the bell cranks 4 normally to bear against the common stop 22. The key-levers 9 are located transversely above the combination bars 7; they are fulcrumed on a common axle 10 which is fixedly mounted in brackets 102. When one of the keys 11 (Fig. 2) is depressed, its key-lever 9 is rocked downward and drives those combination bars having a top piece or projection 8 in the path of the lever. The moved combination bars 7 impart to bars 1 a motion toward the right; the latter carry catches 12 which normally abut against the projections 13 of the switches 2 and rock the latter when their bars are shifted. The upper part 17 of each of these switches is insulated from the remainder and in its normal position bears against the contact-piece 15, while after the switch has been changed over it bears against the contact-piece 16. Current is supplied to these upper parts by the snap rollers 14 which simultaneously secure the switch-levers in their two end positions. The electric circuits in which the contacts 15 and 16 and the snap roller 14 are located are not shown in the drawings so as not to complicate the illustration of the present novel features. These circuits, however, appear clearly in Fig. 5 of aforesaid patent, wherein they are also clearly denoted. It may be stated with regard to said Fig. 5 that the paper strip 39 appearing therein is located in reality as shown and denoted with regard to Fig. 1 of the present application, and was illustrated in said Fig. 5 merely to show that operative connection exists between the levers and the strip. Likewise inasmuch as in said Fig. 5 the mechanical elements of the machine (such as for instance levers 47′–47′′′′′ and 48, which are the equivalents of levers 2 in the present application) are illustrated only diagrammatically, the circuits which are made and broken by levers 47′ . . . and 48 are led for sake of simplicity through the pivotal axes of the levers, whereas in reality as shown in Fig. 1 of the present machine the current is not supplied to the pivotal axis 20 of the levers 2 but to the separate snap roller 14 of each lever with which it permanently remains in contact and which electrically is thus of course the full equivalent of the connection at the pivotal axis of the levers shown in the patent. The arrow points in Fig. 5 of aforesaid patent, with which the ends of levers 47′ . . . 48 contact, are in reality the contacts 15, 16 shown in Fig. 1 of the present patent. The projections 8 are so distributed on the combination bars 7 that when any key is depressed the requisite switches 2 are thrown over. For the machine to work reliably it is important that all the switches thrown over by a key-lever simultaneously break the electric connection with their contact-pieces 15 and simultaneously make it with their contact-pieces 16. To this end, the bars must move equal distances although, when a key is depressed, the combination bars 7 located near the axle 10 of the key-levers move a smaller distance than those more removed therefrom. In order to equalize these differences I make the horizontal lever-arms 3′, 4′ of the bell cranks 3 and 4 longer, the farther they are removed from the axle 10 as shown in Figs. 1 and 2. As soon as one or more of the switches 2 have been reversed the shaft 24 rotates one revolution. Shaft 24 also shown for instance in Fig. 6 of aforesaid patent, drives as is shown in Fig. 3 of the present application shaft 24′ journaled in brackets 110 by means of cog wheels 103 and 104. On this shaft is mounted a sprocket wheel 105 (Fig. 3), which drives shaft 24′′ through the chain 106 and sprocket wheel 107 mounted on the latter shaft. Shaft 24′′ is journaled in bearings 108. Cog wheels 103 and 104 are of equal diameter as are also sprocket wheels 105 and 107, so that all three shafts 24, 24′ and 24′′ run at the same speed. When thus shaft 24′′ rotates, a cam 18 fast on it drives the antifriction roller 19 of a lever 27 influenced by a spring 31. This lever 27 rocks about the axle 28 and carries two rollers 29 and 30 extending across all six switch-levers 2. During the movement of the lever 27 caused by the rotation of the cam 18 the roller 29 presses the catches 12 downward so that they slide off the projections 13; the roller 30 subsequently return the rocked levers 2 into their normal position.

In order to punch a perforated symbol in the paper band simultaneously as the combination switches are rocked by depressing a key, I provide the following device: Two frame plates 33 are joined by means of cross bars 61, 38 and 38′ to form a frame, which is oscillatingly mounted on an axle 32 journaled in bearings 109. The cross members 38 and 38′ carry a set of six punches 35; these are arranged in a row like the switches 2 and whenever a switch is reversed the corresponding punch should punch a hole in the band 150. The punches are guided in the bars 38 and 38′, and each punch has a collar 37 pressed by a spring 36 against the bar 38′. One of the frame plates 33, owing to the action of a spring 56, normally bears against stop 57 which is attached to the upright 110. A rocking motion is imparted to it by the eccentric 46 keyed on the shaft 24′ and coacting with the antifriction roller 45. The roller 45 is journaled in an extension 44 of

bar 38'. The paper band 150 is passed through a guide 34 and a slot in the bar 38 in proximity to the punches 35. When the shaft 24' rotates and rocks the frame 33 downward the punches participate in this motion without entering into the paper band. The catches 39 pivotally connected to the punches move past the stop levers 49. These catches are connected by the pivots 39' with the punches 35 and can be rocked toward the right, but are normally held in their extended position by springs 40. The stop levers 49 can rock about the axle 53 and are connected by rods 51 with the switches 2. When a switch is rocked into its right-hand position it draws over to the right the lever 49 connected to it, so that the catch 39 immediately above the moved stop lever 49 bears on it when descending and prevents its punch 35 from moving farther. This punch then punches a hole in the band. In order that the rocked levers 2 can be returned by the cam 18 into their normal position before the termination of the punching operation, the connection of the rods 51 with the levers 2 is made flexible by the interposition of two springs 52 and 52'; in addition, the faces of the levers 49 which coact with the catches 39 are provided with notches 50 for receiving the ends of the catches. In this manner I prevent the levers 2 from returning the levers 49 when they themselves are returned into their normal position. The levers 49 are released only when the frame 33 has returned into its top position.

At both sides of the set of punches a sprocket wheel 59 is fast on the common shaft 58; the sprockets enter into holes 151 (see Fig. 3) with which the paper band 150 is provided at both edges. The shaft 58 is journaled in the rocking frame plates 33 and carries a ratchet 47 which coacts in such manner with a fixedly pivoted pawl 48 that the ratchet is fed one tooth whenever the frame 33 returns into its normal position.

I will now describe the mechanism for actuating the switches 2 by means of a perforated band 150, instead of by keys 11 as previously described, in case such band, already provided with perforations is fed through the machine. Fast on the rocking frame 33 is an axle 64 on which six bell-crank levers 65 are fulcrumed corresponding in number with the switch levers 2. These levers have noses 65' and carry the band-reading pins 62 pivoted to their right hand arms at 62'. These pins are lightly pressed on the one hand by springs 63 against cross bar 61 which is provided with recesses for guiding the pins, and on the other hand by the bell cranks 65, under the influence of springs 68, gently upward against the paper band 150 which is drawn along over them through a slot 61'. In the uppermost position of the frame 33 a rod 69, fixedly mounted in the upright 111 integral with the machine frame 23, prevents the pins 62 of the levers 65 from contacting with the register band. When the frame 33 descends the right-hand arms of the levers 65 are removed from the stationary rod 69, and the reading pins 62 can enter the band under the influence of the springs 68 on such places where a perforations 152 (Fig. 3) occurs. When the frame 33 together with the axle 64 descend, as previously described, the lower ends 65' of the bell cranks 65 approach a group of six driving levers 66. These levers 66 can rock about an axle 67 fixed to the brackets 113 and their lower ends 66' are opposite the stop pins 70 fastened on arms 112 of bars 1. Those bell cranks 65 whose reading pins 62 have entered into holes 152 in the register band have been rocked far enough thereby to bring their lower arms 66' into alinement with the left hand arms of the driving levers 66 so that they abut against the latter and by moving bell cranks 66 push the bars 1 to the right. The corresponding switches 2 are thereby reversed. On the other hand, so long as one of the reading pins 62 bears against a non-perforated part of the band it does not allow its bell crank 65 to rock far enough to contact with the corresponding driving lever 66 and the corresponding bar 1 and switch 2 remain in their normal positions. The cam 18 and the eccentric 46 are so designed that the switch levers 2 which are still reversed are returned into their normal position and released before the bars 1 are shifted anew by the bell cranks 66. When the frame 33 rises the pins are removed from the register band as soon as the levers 65 again abut against the rod 69; only then is the register band fed by the pawl 48 as previously described.

The manner in which the working shaft 24 is controlled, so far as its stopping and starting through electro-magnetic means, controlled by the switches 2 is concerned, has been clearly described in my aforesaid patent, where the shaft is denoted with the same reference numeral 24, whereas as already mentioned the switches 2 of the present application are denoted 47' . . . 47'''''' and 48.

It is preferable to construct the machine so that the working shaft 24 does not operate when all the switches are in the rest position shown in Fig. 1 of the present application. The consequence is, however that the machine also stops when a non-perforated portion of the band 150 passes the reading feelers 62. The device embodied in the right hand portion of the machine shown in Figs. 1, 2 and 3 is used for avoiding such an undesired interruption.

Two levers 80 are fast side by side on the shaft 20 about which the switch levers 2 can rock. These levers 80 are so arranged that

their pins 81 are opposite, for example, the sixth and the second switch lever. Fast on the same shaft 20 is also a lever 82, in whose end is fulcrumed the antifriction roller 83. A spring 84 causes this roller to bear against a cam 85 keyed on the working shaft 24. In the course of the rotation of the cam 85 it leaves the lever 82 to the influence of the spring 84, so that this lever drives the shaft 20 and with it the two levers 80. This movement can, however, be prevented. To this end, the end of one of the levers 80 is formed as a nose 80′ which can be held by the hook or catch 86. This catch is fast on a shaft 87 carrying at its ends two levers 88 (only one shown in Fig. 1). These levers are connected together by a rod 89 which runs across the six bell cranks 4 and is pressed lightly against the bell cranks by a spring 90 attached at one end to the catch 86. When any one of the bell cranks 4 is rocked to the right the hook of the catch 86 engages the nose 80′ and thereby prevents the two levers 80 from being moved by the spring 84 and from reversing the two switch levers. The cam 85 is keyed in such a position on the shaft 24 and in such timed relation to the other elements controlled by this shaft that the lever 82 is moved by its spring 84 directly after the displacement of the bars 1 through the medium of the bell cranks 65 as previously described. When there is no perforated symbol present in the band the bars 1 remain at rest and so would normally the switches 2; however the two levers 80 then operate and reverse their two switch levers 2 so that the machine starts again and feeds the register band. This will occur as many times, once for each revolution of shaft 24 until perforations in the strip arrive again under the feelers 62. The machine is so arranged that neither printing or any other operation is brought about by reversing these two switch levers.

Adjacent to the catches 39 (Fig. 1) is a bar 54 which is shown in the drawing in the position it occupies when the machine is operated from the keyboard. If it is to be controlled by the register band, on the contrary, the bar 54 is shifted so far to the right that the catches 39 cannot contact with the stop levers 49 and consequently the punches 35 cannot operate.

I claim:—

1. In a machine of the character described, the combination with a plurality of guided bars adapted to operate punching mechanism, of keys adapted to mechanically actuate the bars, band-operated mechanism also adapted to mechanically actuate the bars, and switches for controlling the machine and adapted to be actuated by the bars and means for preventing the bars from actuating the punching mechanism when they are controlled by the band operated mechanism.

2. In a machine of the character described, the combination with a plurality of guided bars, of keys adapted to mechanically actuate the bars, band-operated mechanism also adapted to mechanically actuate the bars, switches for controlling the machine and adapted to be actuated by the bars, and punching mechanism comprising a plurality of punches, each punch being adapted to be mechanically controlled by a switch in the reversed position thereof, when said bars are actuated by said keys.

3. In a machine of the character described, the combination with a plurality of guided bars, of keys adapted to actuate the same, band-operated mechanism also adapted to actuate the bars, and switches for controlling the machine and adapted to be connected with and actuated by the bars; a cam controlled by the closing of said switches, and means controlled by the cam for disconnecting the guided bars from the switches and returning the latter into their normal position.

4. In a machine of the character described, the combination with a plurality of guided bars, of keys adapted to actuate the same, band-operated mechanism also adapted to actuate the bars, and switches for controlling the machine and adapted to be actuated by the bars; a plurality of combination bars 7 guided parallel to themselves and each connected with one of said guided bars, and key-levers each adapted to actuate one or more combination bars.

5. In a machine of the character described, the combination with a plurality of guided bars, of keys adapted to actuate the same, band-operated mechanism also adapted to actuate the bars, and switches for controlling the machine and adapted to be actuated by the bars; a plurality of combination bars 7 each connected with one of said guided bars, guide levers connected with the combination bars for guiding the same parallel to themselves, and key-levers each adapted to actuate one or more combination bars, the lengths of the arms of the guide levers carrying the combination bars varying in proportion to their distances from the fulcrum of the key-levers.

6. In a machine of the character described, the combination with a plurality of guided bars, of keys adapted to actuate the same, band-operated mechanism also adapted to actuate the bars, and switches for controlling the machine, and adapted to be connected with and actuated by the bars; a working shaft controlled by the closing of said switches, a cam fast on the shaft, means controlled by the cam for disconnecting the guided bars from the switches and returning the latter into their normal position, a frame

mounted to rock, an eccentric operatively connected with the working shaft for rocking the frame, a plurality of punches movable vertically in the frame, a plurality of stop levers each controlled by one of the switches and adapted to arrest the downward movement of the punches, a guide for a paper band to be perforated by said punches, said guide mounted on the frame in operative relation with the punches, and feed mechanism comprising a fixedly pivoted pawl, a roller for feeding the band mounted on the frame, and a ratchet connected to the roller and coacting with the pawl.

7. In a machine of the character described, the combination with a plurality of guided bars, of keys adapted to actuate the same, band-operated mechanism also adapted to actuate the bars, and switches for controlling the machine, and adapted to be connected with and actuated by the bars; a working shaft controlled by the closing of said switches, a cam fast on the shaft, means controlled by the cam for disconnecting the guided bars from the switches and returning the latter into their normal position, a frame mounted to rock, an eccentric fast on the working shaft for rocking the frame, and a guide mounted on the frame and adapted to guide a perforated paper band, feelers adapted to pass through the guide into the perforations of said band, spring-pressed bell cranks mounted to rock on the frame and adapted to drive the feelers through the guide into said perforations, a fixed stop for preventing the bell cranks pressing the feelers through the guide in the top position of the frame, each bell crank being adapted to drive one of the guided bars when the frame rocks and the corresponding feeler has passed through a perforation.

8. In a machine of the character described, the combination with a plurality of guided bars, of keys adapted to actuate the same, band-operated mechanism also adapted to actuate the bars, and switches for controlling the machine, and adapted to be connected with and actuated by the bars; a working shaft controlled by the closing of said switches, a cam fast on the shaft, means controlled by the cam for disconnecting the guided bars from the switches and returning the latter into their normal position, a frame mounted to rock, an eccentric fast on the working shaft for rocking the frame, a plurality of punches movable vertically in the frame, a plurality of stop levers each yieldingly controlled by one of the switches and adapted to arrest the downward movement of the punches, each stop having a notch, and each punch being adapted to enter a notch in a stop and arrest the same; a band guide mounted on the frame in operative relation with the punches, and feed mechanism comprising a fixedly pivoted pawl, a roller for feeding the band mounted on the frame, and a ratchet connected to the roller and coacting with the pawl.

9. In a machine of the character described, the combination with a plurality of guided bars, of keys adapted to actuate the same, band-operated mechanism also adapted to actuate the bars, and switches for controlling the machine and adapted to be actuated by the bars; a cam controlled by the closing of said switches, means controlled by the cam for reversing some of the switches, and a catch adapted to be actuated by any one of the guided bars for arresting said means and thereby rendering the same inoperative.

In testimony whereof I have signed my name to this specification in the presence of two witnesses.

EDUARD MAREK T. MARCHTHAL.

Witnesses:

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ANA MARIA BERGES.