Nov. 5, 1935. A. H. REIBER 2,019,505

KEYBOARD PERFORATOR

Filed June 4, 1932 3 Sheets-Sheet 1

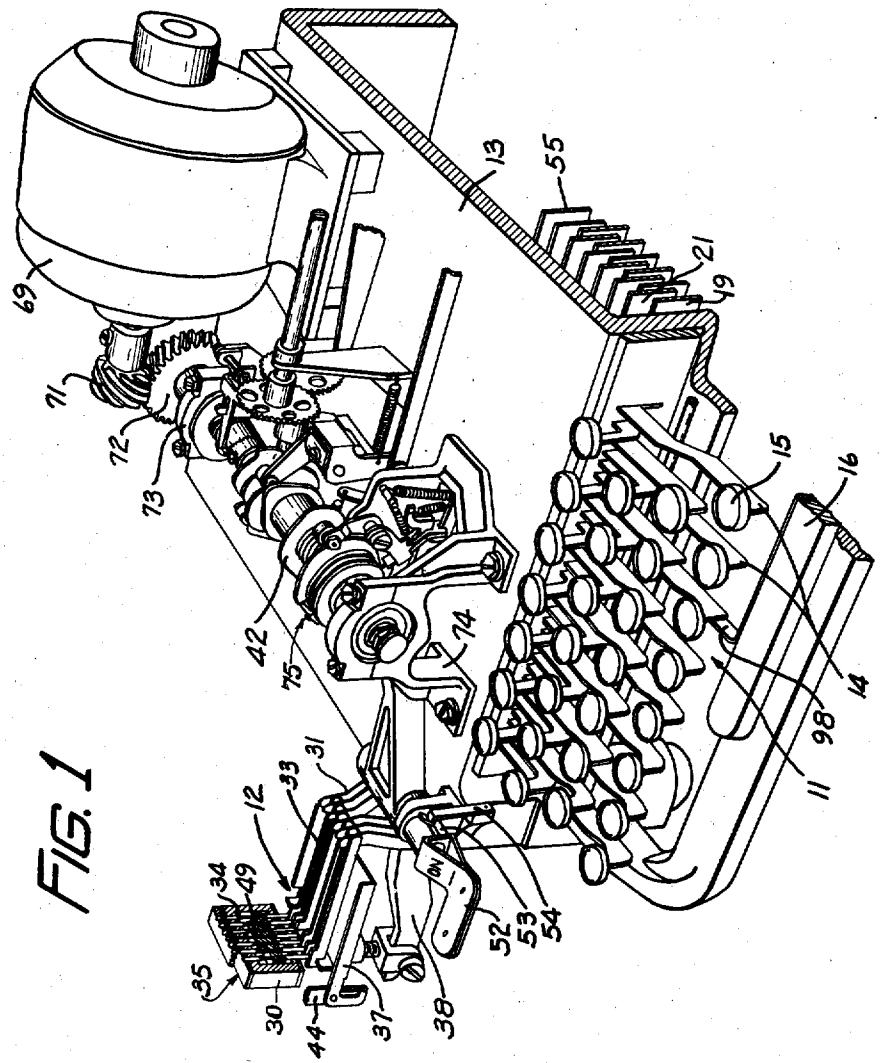


FIG. 1

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KEYBOARD PERFORATOR

Filed June 4, 1932 3 Sheets-Sheet 2

FIG. 5

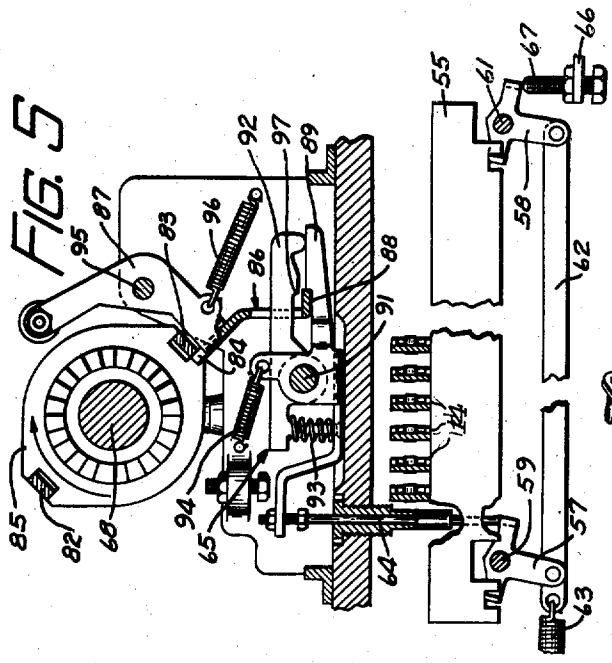


FIG. 3

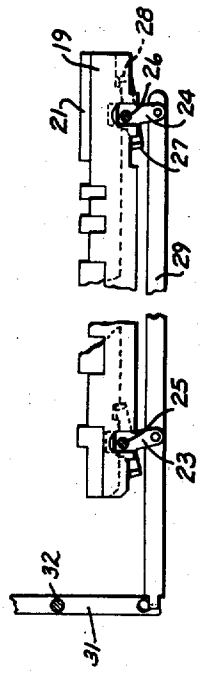
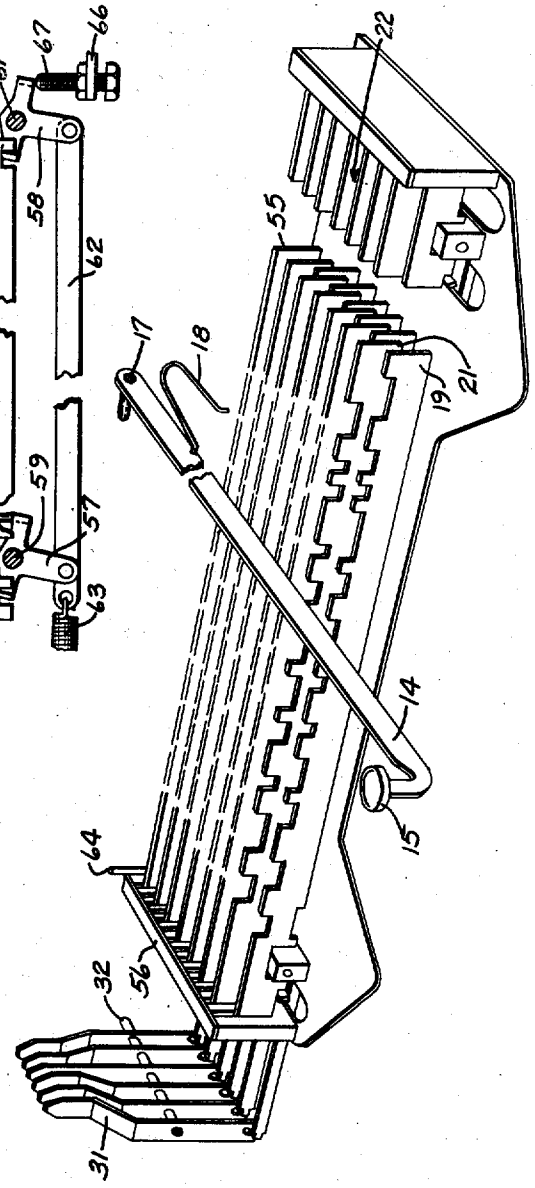


FIG. 2



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Nov. 5, 1935. A. H. REIBER 2,019,505

KEYBOARD PERFORATOR

Filed June 4, 1932 3 Sheets-Sheet 3

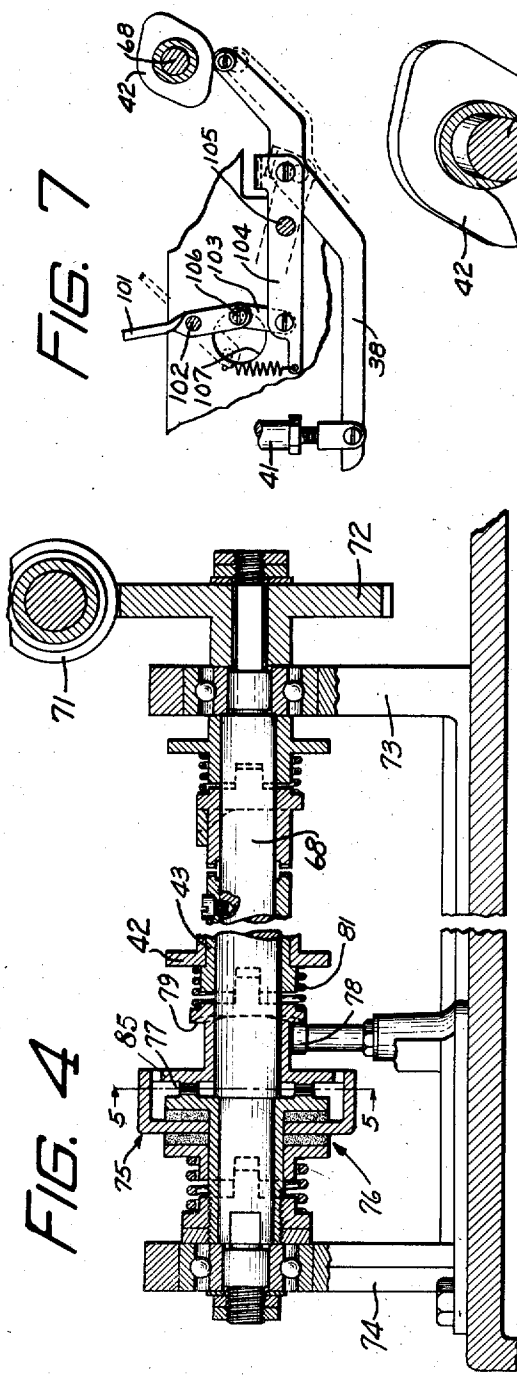


FIG. 4

FIG. 7

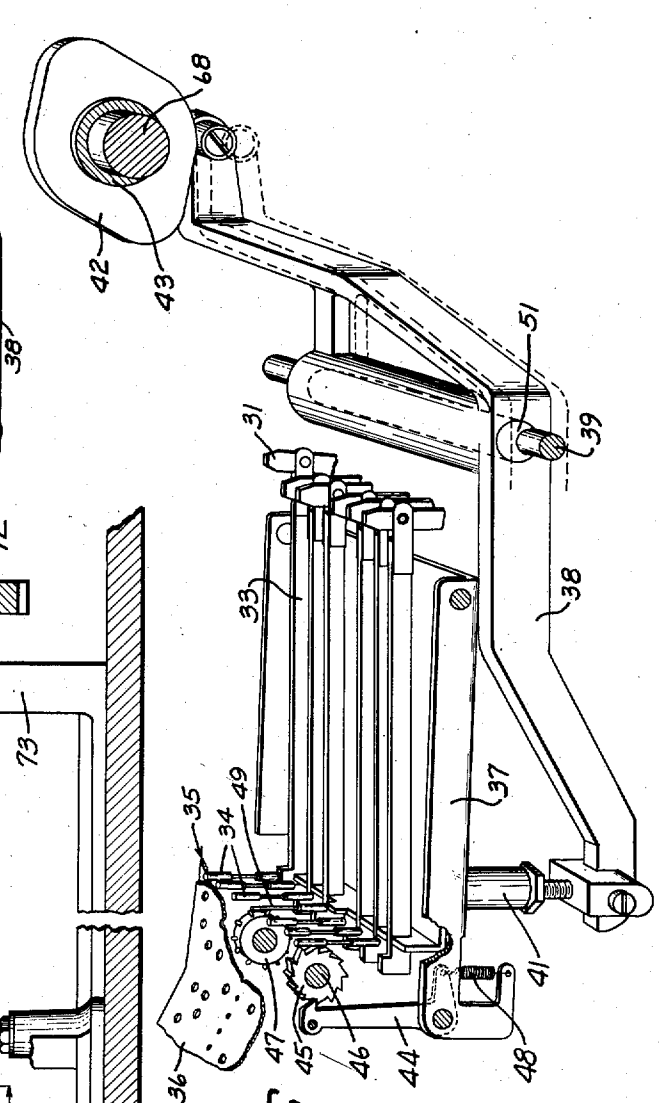


FIG. 6

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Patented Nov. 5, 1935 2,019,505

UNITED STATES PATENT OFFICE

2,019,505

KEYBOARD PERFORATOR

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Application June 4, 1932, Serial No. 615,329

14 Claims. (Cl. 164—112)

This invention relates generally to perforating apparatus and more particularly to keyboard perforators for the preparation of perforated strips which may be utilized for the automatic control of machines.

The present invention has for its main object the provision of a perforator, which is of entirely mechanical construction and which comprises a cyclically operable means for effecting invariably the single operation of the perforator upon each initiation thereof.

Specifically, the keyboard perforator includes keylevers arranged in a manner characteristic of typewriters and has positioned operatively with respect thereto a group of selector elements which are arranged in pairs so that the depression of one element of each pair of elements through the depression of a keylever causes the operation of the other element of that pair in a reverse direction. These elements control the position of interference members also operated in varying permutations to control the selective operation of the perforating punches. The depression of each keylever also invariably operates a universal member which controls the initiation mechanically of a power driven operating means which is provided with an automatic, mechanical device for preventing more than one cyclic operation of the perforating apparatus pursuant to each initiation of operations. Thus, the apparatus of the present invention, being of entirely mechanical construction, is conducive to positive operation at very high speeds with extreme accuracy.

A better understanding of the invention may be had from the following description, taken in conjunction with the accompanying drawings wherein:

Fig. 1 is a partial perspective view of a keyboard perforator embracing the features of the present invention.

Fig. 2 is a perspective view of the perforator selecting mechanism.

Fig. 3 is a longitudinal elevational view of the perforating selecting bar unit.

Fig. 4 is a longitudinal sectional view of the operating cam shaft.

Fig. 5 is a sectional view taken on the line 5—5 of Fig. 4 and shows the clutch release mechanism.

Fig. 6 is a view showing the control elements of the perforating mechanisms.

Fig. 7 shows an alternative arrangement of the perforating mechanism control means.

Referring now to the drawings wherein like reference characters indicate the same part throughout the several views and more particularly to Fig. 1, there is shown a keyboard unit and a perforating unit indicated generally by the numerals 11 and 12 which are mounted on a common base 13. The keyboard unit 11, mounted on the base 13, comprises a plurality of keylevers 14 extending from the rear of the base 13 to the front thereof and provided with keys 15. In addition to the keylevers 14, which may be referred to as character keylevers, there is also provided a space keylever 16 which extends in front of the other keylevers.

As is more clearly disclosed in Fig. 2, the keylevers 14 and 16 are pivoted on a rod 17 and are normally upheld by springs 18. These keylevers, as previously described, are provided with keys 15 and extend over a number of pairs of code bars 19 and 21 included in the perforator selecting unit indicated generally by the numeral 22. The bars 19 and 21 of each pair are supported, Fig. 3, by a pair of T-shaped rocker arms 23 and 24 mounted on pivot rods 25 and 26 and having oppositely off-set lugs 27 and 28, which uphold the code bars 19 and 21 respectively of the corresponding pair of code bars. The rocker arms of each pair of code bars are pivoted to and reciprocate a permutation bar 29, and these bars are connected to bars 31 pivoted on a rod 32.

Each keylever 14 is arranged to depress one of the code bars 19 or 21 of each pair of code bars and through the medium of the rocker arms 23 and 24 lifts the other code bars either to advance or retract the corresponding permutation bars 29 to impart corresponding movement to the associated pivoted member 31. The permutation bars 29 are set in characteristic combinations and for this purpose the code bars 19 and 21 are provided with notched upper edges, the bars of each pair being complements; that is, the high portions of one bar are opposite the low portions of the other bar of the same general pair. It is also noted that the code and permutation bars have no normal position and are moved back and forth by the keylevers. As is clearly apparent from Fig. 3, the bar 19 is raised and the bar 21 is depressed by certain keylevers. Also, since each key sets the code bar in its individual combinational position, two keys cannot be completely depressed at the same time and any attempt to do so will bring the code bars to their mid-positions, which is, of course, a non-selecting position.

The pivoted members 31, as more clearly shown in Fig. 6 which illustrates schematically the mechanism of the perforating unit 12, coact with punch interference elements 33, there being one

of these elements individual to each of the members 31. The tape perforating unit controlled by the keyboard also comprises a set of punches 34 movable through a guide plate 30 (Fig. 1) and coacting with a die plate 35 to perforate a tape 36. The punches 34 are selectively operated by a hammer 37 and the interference elements 33, one for each of the punches 34. The actuator or hammer 37 is connected to an arm 38 pivoted on a shaft 39 through an adjustable connection 41. The arm 38 is arranged to be operated periodically from a cam 42 mounted on a sleeve 43, as will be more fully described hereinafter. Cam 42 is provided with two similar cam surfaces since two complete operations are performed during one complete revolution of the cam; that is, for one complete cycle of operation the cam is permitted to rotate 180° or one-half revolution, thus enhancing the speed of operation of the apparatus. There is also secured to the actuator or hammer 37 a pawl 44 which cooperates with a ratchet wheel 45 secured to a shaft 46 which also carries a pin or feed wheel 47.

The pins of the wheel 47 cooperate with feed perforations in the tape for effecting its advancement to bring an unperforated area in alignment with the punches 34. When the actuator 37 is moved upwardly to perforate the tape in accordance with the selected punches 34, the pawl 44 is likewise moved vertically to a position where it engages the next succeeding tooth on the ratchet wheel 45. The pawl 44 is pivotally secured to actuator 37 and is connected thereto through a spring 48. Consequently, when the actuator 37 is returned to its normal position, or the position shown in Fig. 6, the pawl 44 will assume its normal position and in so doing will cause the advancement of the ratchet wheel 45 a distance of one tooth thereof and the corresponding advancement of the tape or strip 36. There is also associated with the punches 34 a punch 49, referred to as the feed hole punch, which is operated each time the actuator 37 is operated, and regardless of the selection of the punches 34 for perforating the feed holes in the tape.

The pivot shaft 39 as shown in Fig. 6 is provided with an eccentric portion 51 and has a handle 52 secured to its front extremity, Fig. 1; also cooperatively arranged on an integral collar of the shaft 39 are oppositely disposed notches 53 which cooperate with spring members 54 to hold the shaft in either of its set positions. By having the shaft 39 provided with an eccentric portion 51, the arm 38 may be moved through the medium of the handle 52 out of operative relation with cam 42 and thus prevent the operation of the actuator 37 upon the rotation of cam 42.

Each key lever 14 in addition to actuating the code bars 19 and 21 also operates a universal bar 55, which like the code bars 19 and 21 is guided in a comb bar 56 and is also supported on and operates a pair of rocker arms 57 and 58, Fig. 5; but the universal bar has no complementary bar, and the rocker arms 57 and 58 which are pivoted on rods 59 and 61, respectively, are connected to a longitudinally movable bar 62 which is held in its normal left-hand position by a spring 63. Operatively associated with the rocker arm 57 is a rod 64, slidable in a bushing, which cooperates with mechanism indicated generally by the numeral 65 to control the rotation of sleeve 43. Associated with rocker arm 58 and secured to a projecting portion 66 of the base or frame 13 is an adjustable stop screw 67. The purpose of this stop screw 67 is to determine definitely the initial movement of the keylevers 14 before the universal bar 55 is operated to effect the operation of the mechanism 65 and the rotation of the sleeve 43. Under the operating conditions of the mechanism covered by the present application, the stop screw 67 is adjusted so that the keylevers 14 must have covered at least 60% of their length of travel before the universal bar 55 is operated to effect the movement of the mechanism 65.

Having reference to Figs. 1, 4 and 5 it is noted that the operating cam shaft 68 is driven by power communicated from a continuously rotating motor 69. The motor 69 has a pinion gear 71 which cooperates with a gear 72 secured to shaft 68 journaled in anti-friction bearings and appropriately mounted in uprights 73 and 74.

The shaft 68, which is driven continuously due to the corresponding rotation of gear 72, has rotatively mounted therewith the sleeve 43 which carries cam 42 for accomplishing the perforating function. The rotation of the shaft 68 in its bearings is imparted to sleeve 43 through a combination friction and positive clutch 75. As shown in Fig. 4 the clutch 75 consists of a friction portion 76 and a positive or grab portion 77. Normally the positive or grab portion 77 is held out of engagement with its operative part by means of a vertically extending member 78 cooperating with a cam 79; that is, with the member 78 cooperating with cam 79, the right hand portion of the clutch section 77, as viewed in Fig. 4, will be moved out of engagement with the left hand portion thereof against the action of a spring 81. Also the friction portion 76 of the clutch 75 is normally rendered ineffective due to the engagement of diametrically oppositely disposed members 82 and 83 with a projection 84 which normally lies in the path of members 82 and 83 (Fig. 5). With this construction power from the shaft 68 is constantly and continuously applied to sleeve 43 through a collar 85 constituting a part of the friction clutch 76 and the members 82 and 83 which fit in slots formed in the periphery thereof. When the projection 84 is moved out of the path of the then engaged member 82 or 83, as will be described presently, the friction clutch 76 is effective for transmitting power to sleeve 43. Sleeve 43 then rotates through a relatively small angle, and cam 79 is rotated with respect to member 78 such that the right hand portion of the positive clutch 77 is allowed to move to the left, as viewed in Fig. 4, by the action of spring 81; whereupon the teeth thereof engage the teeth of the left hand portion of the positive clutch 77 which is integral with the shaft 68 and which consequently rotates continuously. With the construction just described, the sleeve 43 is driven initially through friction clutch 76 but, after it has rotated a few degrees, the positive clutch 77 is effective for transmitting the power from shaft 68 to sleeve 43 through a positive clutch connection.

The mechanism for controlling the release of clutch 75 is shown in Fig. 5 and comprises a projection 84 which is formed integral with a member 86 secured to one arm of a pivoted lever 87 whose other arm carries a roller and cooperates with a cam collar 85. The member 86 has a projection 88 which normally engages a shoulder formed on the upper surface of a member 89

which is pivoted on a rod 91 and which has an extension apertured to receive rod 64 operated by rocker 57 operatively associated with the universal bar 62. Also mounted on rod 91 is a member 92 which has its right hand end, as viewed in Fig. 5, normally held in engagement with the upper surface of member 89 by a spring 93 positioned between the members 89 and 92 to the left of the pivot rod 91. Consequently with the member 89 normally urged by a spring 94, the members 89 and 92 will be held firmly in contact with each other. When the universal bar 62 is operated, rod 64 is likewise operated and causes the movement of member 89 clockwise about pivot rod 91, thus moving the shoulder thereof free of the projection 88 of pivoted member 86. With member 89 moved, as described, member 86, as well as the pivoted lever 87, will be rotated about their pivot 95 by spring 96, so that the projection 84 is out of the path of the then engaged member 83. Consequently, and especially with power continuously imparted from shaft 68 to friction clutch 76, sleeve 43 will be rotated. As it rotates, the positive clutch 77 will be engaged as previously described. When the cam collar 85 nears the completion of its half cycle of rotation, the roller on pivoted lever 87 is operated by cam 85 for moving the member 86 and its projection 84 into the path of the next succeeding member 82.

After the universal bar 62 has moved to its normal position by the action of spring 63 which will occur when the key is released, the projection 88 will again engage the shoulder of member 89. However, if the keylever is held depressed, which will result in maintaining member 89 in its rotated position about pivot 91, the projecting portion 88 will engage shoulder 97 formed on the under side of member 92. Attention is directed to the fact that shoulder 97 is not in direct vertical alignment with the shoulder in member 89, but is disposed slightly to the left thereof (as viewed in Fig. 5), the purpose of which is to insure the operation of member 87 by its spring 96 to effect the withdrawal of projection 84 from the path of member 83 when projection 88 is disengaged from the shoulder on member 89. So, when a keylever is held depressed, member 89 will be held in its clockwise position and member 87 will be rotated in a clockwise direction by the collar cam 85 sufficiently to permit the engagement of shoulder 97 with projection 88 and also effect the engagement of projection 84 with a member 82 or 83; then, when the keylever is released the members 89 and 92 will be rotated counterclockwise by spring 94 and the projection 88 will slide off of shoulder 97 onto the shoulder on member 89. Whether the projection 88 engages the shoulder on member 89 or member 92, the projection 84 will be moved into the path of the next succeeding member 82. By the arrangement of the members 89 and 92 with their notches as described, thus forming a double trip-off latch, the repetition of the operation is prevented and a subsequent operation of the universal bar 62 is necessary to effect the release of the clutch mechanism. In other words, if a keylever is depressed for a period longer than a half cycle of rotation of sleeve 43, the sleeve 43 will be invariably arrested due to the arrangement of the members 89 and 92. Of course, as the sleeve 43 approaches the completion of its half cycle of rotation, cam 79 cooperates with projection 78 and effects the disengagement of the positive clutch 77 or moves it to the position shown in Fig. 4.

General operation

Inasmuch as the details of the apparatus have been described and since a further understanding of the structure constituting the present invention can be obtained from a detailed description of its operation, such a description follows:

Referring to Fig. 1, the tops 15 of the keylevers 14 carry indicia (not shown) analogous to the well known typewriter keyboards wherein two sets of designations are used, one for the lower case and the other for the upper case. However, in the operation of the perforator the same key is operated and the same code combination of perforations is obtained for both the letters or indicia carried on a keytop, and as is well known the general practice is to distinguish between upper and lower case characters by means of special code combinations for upper case and lower case, or "figures" or "letters" shift as it is also called.

Assuming that a character keylever 14 is operated, one of the bars 19 or 21 of each pair of such bars, depending upon which bar is in a vertical position, is actuated and causes the permuted operation of the selector bars 29. The selection of the bars 29 will effect the rotation of the pivoted members 31 and the movement of the punch interfering bars 33, Fig. 6, in corresponding permuted combinations. Likewise the operation of the code punch pins 34 and the feed punch pin 49, the former in accordance with the position of the punch interfering bars 33, is determined by cam 42 mounted on sleeve 43.

Sleeve 43, as previously referred to, is driven through a friction clutch 76 and a positive clutch 77 which are rendered effective upon the operation of universal bar 55, Fig. 5, operative on a spring pressed member 62. The universal bar 55 is operated simultaneously with the operation of any of the character keys, but has its movement adjusted or rather determined to control predeterminedly the operation of mechanism controlling the release of the clutch 76. This particular mechanism is more clearly disclosed in Fig. 5 and operates upon the vertical movement of rod 64 through its bushing to move member 89 sufficiently to release the projection 88 from its shoulder. Projection 88 will at this time escape shoulder 97, due to the aforementioned fact that shoulder 97 is not aligned with the shoulder on member 89. With projection 88 free of the shoulder of member 89, spring 96 rotates member 87 about its pivot 95 removing the projection 84 from the path of the member 83. Power, of course, is continuously applied to the friction clutch 76 through the shaft 68 from the motor 69 and the interconnecting gears, so that when the projection 84 is moved out of the path of member 83, the driven portion of the friction clutch will rotate. The sleeve 43 being secured to the driven portion of the friction clutch 76 will likewise rotate and carry with it cam 79 (Fig. 4) which normally effects the disengagement of the friction clutch 77, but after rotating a few degrees spring 81 is effective for causing the engagement of the clutch 77 and the transmission of power from the shaft 68 through the positive clutch 77 to effect a positive drive connection between the shaft 68 and the sleeve 43. Sleeve 43 carries with it the cam 42 which operates through arm 38 or hammer 37 and effects the perforation of the tape or strip 36 in accordance with the position of the punch interfering bars 33, as is well understood by those familiar with the operation of per-

forators, and the feed hole punch 49. The movement of the hammer 37 in a vertical direction causes the pawl 44 to engage the next succeeding tooth on the ratchet 45 so that upon the positive restoration of the arm 38, the ratchet 45 will be advanced a distance corresponding to one tooth thereof and will cause the corresponding rotation of the tape advancing wheel 47. The tape accordingly will be advanced to bring an unperforated area thereof in alignment with the punch pins 34 and 49.

As the driven member of the friction clutch 76 continues its rotation, cam 79 engages the vertical post 78 and causes the disengagement of the positive clutch 77 and the cam 85 operates bell crank lever 87 to move the projection 84 against the tension of spring 96 into the path of member 82. Cam 85 is designed to rotate lever 87 clockwise sufficiently to give it a slight overtravel to permit the projection 88 to clear both the shoulder 97 and the shoulder on member 89, the purpose of which has already been described. The previously depressed key being released, the universal bar 55 will be restored to its normal position by spring 63 and the member 89 will be moved to the position shown in Fig. 5. With the member 89 in a position shown in Fig. 5, the projection 88 will engage the shoulder thereof and the member 86 will be locked against accidental displacement and will be maintained in that position until a subsequent depression of the same or another key. However, should the keylever be held depressed at the time the bell crank lever 87 is operated by cam 85, the projection 88 will engage shoulder 97 of member 92 and will achieve the same result as if the projection 88 engaged the shoulder on member 89. Consequently, the sleeve 43 will be arrested invariably for each one-half cycle of rotation thereof. When the keylever is finally released and the universal bar 55 is restored to its normal position, the members 89 and 92 will assume their normal position by the action of the associated springs and the projection 88 will thereupon engage the shoulder of the member 89. By the arrangement of the structure in the manner disclosed the continued rotation of the sleeve 43 in the event of the prolonged depression of a keylever will be prevented, and, consequently, the false operation of the perforator will be avoided.

When the space key 16 is depressed the space keylever 98 is actuated and the pairs of code bars 19 and 21 are operated to set the bars 29 in different combinations whereby the punch interference bars 33 are set permutably to effect the corresponding perforation of the tape 36.

Modification

In Fig. 7 is illustrated an alternative arrangement for moving arm 38 of the perforating mechanism out of operative engagement with cam 42. The construction here shown is conductive to speedier operation since the operator need only swing the vertically extending thumb portion 101 to the right or left instead of operating handle 52 by a twist of the wrist. Lever 101 is pivoted at 102 and is a part of a toggle comprising also link 103 connecting lever 101 with a lever 104 fixedly pivoted at 105. The pivotal connection between lever 101 and link 103 comprises a pilot screw 106 the extended or stud portion of which operates in a hole 107 to define the limits of movement of the toggle. Lever 104 is provided with a rightwardly extending arm to which is pivotally carried the perforator operating arm 38. When the toggle assumes the extended position shown in solid lines, in Fig. 7, the arm 38 is operated vertically into engagement with cam 42, and when the toggle assumes its dotted line position arm 38 is lowered and thus removed from operative engagement with cam 42 which operation is analogous to that described in connection with the construction shown in Fig. 6.

Although the present invention has been disclosed and described with reference to keyboard tape perforators it is, of course, understood that the invention is capable of embodiment in many and widely varied forms other than that specifically disclosed without departing from the spirit and scope of the present invention.

What is claimed is:

1. In a keyboard perforator, a plurality of keylevers, a plurality of permutation bars, perforating elements, an interference member individual to each of said bars and set in varying combinations upon the operation of said permutation bars, means for operating said elements as selected by said members including a power driven element, and means comprising a double trip-off latch responsive to the operation of a keylever for releasing said power driven element and operated cyclically for rendering said power driven element ineffective.

2. In a keyboard perforator, a perforating device, a plurality of keys adapted to control the perforating device variably, power driven means for operating the perforating device, means to initiate the operation of said means, and means located between said keys, and the power driven means including a pair of latches severally coactive with said second recited means to insure the limitation of operation to a single cycle irrespective of the duration of operation of said keys.

3. In a keyboard device, a plurality of keys, a constantly rotating shaft, a perforating device, solely mechanical means carried on said shaft to operate said perforating device, means controlled by said keys to initiate the operation of said means, and means comprising a double trip-off latch to determine invariably the cyclical operation of said device.

4. In a keyboard device, a plurality of keys, a constantly rotating shaft, a perforating device, solely mechanical means carried by said shaft to operate said perforating device, release means controlled by said keys to initiate the operation of said means, and other means comprising a double trip-off latch effective independently of said means to define the limits of operation of said perforating device, each of said keys effective for initiating through the instrumentality of said other means solely a single cycle of operation of said perforating device for each effectiveness thereof.

5. In a keyboard device, a plurality of keys, a first element operable by each of the keys, a second element operable in cycles, means controlled by said first element to initiate the operation of said second element, and means comprising a pair of latches severally coactive with said first recited means to limit the operation of said second element to a single cycle.

6. In a keyboard device, a series of keys, a first element operable by each of the keys, a second element operable in cycles, means controlled by said first element to initiate the operation of said second element, said means including a first component and a second component, means

whereby said first component is normally operative to limit the operation of said second element, and means to render said second component operative upon the ineffectiveness of said first component to insure said limitation of operation.

7. In combination in a keyboard device, a perforating mechanism in a plurality of punch elements, a plurality of keys, a set of permutation bars adapted to be permutably operated by said keys to control the operation of said mechanism, a universal bar invariably operated by said keys, a constantly rotating shaft, means carried by said shaft to operate said mechanism, a friction clutch adapted to be operatively associated with said means during its complete cycle of operation, a positive clutch adapted to be operatively associated intermittently with said means, means operated by said universal bar to connect through the instrumentality of said clutches said mechanism to said shaft, means to render said positive clutch effective only during the effectual period of operation of said first mentioned means, and means independent of said elements and effective independently of, said first mentioned means to disable said perforating mechanism.

8. In a keyboard device, a series of keys, a universal element, a plunger operable by each of said keys through the instrumentality of said element, a bell crank lever, power driven cam means coacting with said bell crank lever, release means controlled by said plunger to effect through said bell crank lever the initiation of operation of said cam means, and automatic means comprising a double trip-off latch effective invariably to determine the cyclic operation of said cam means.

9. In a keyboard apparatus, a series of keys, a perforating device, means controlled by said keys to initiate the operation of said device, said means including a first component and a second component, latch means normally adapted to coact with said first component and to escape said second component, and means to render said latch means cooperative with either component to determine the cyclic operation of said device.

10. In a keyboard perforator, a plurality of keylevers, a plurality of permutation bars, perforating elements, an interference member individual to each of said bars and set in varying combinations upon the operation of said permutation bars, means for operating said elements as selected by said members including a power driven element, release means comprising a spring-biased bell crank lever, and a pair of latches responsive to the operation of a keylever for releasing said power driven element, said pair of latches adapted to be severally coactive with said bell crank lever to effect invariably a single cycle of operation of said first recited means.

11. In a keyboard device, a series of keys, a plurality of elements, means operative on said elements, and means controlled by said keys to initiate the operation of said means including a pair of pivoted members arranged with oppositely disposed irregular surfaces and a latch element positioned between said members and cooperating with the irregular surfaces thereof to hold initially said first recited means ineffective and subsequently if any of said keys are held operated.

12. In a keyboard apparatus, a plurality of keys, a device comprising a plurality of operable elements, means including a first component and a second component controlled by said keys to initiate the operation of said device, latch means normally coactive with said first component and non-coactive with said second component, and means to render said latch means coactive with either component to determine the cyclic operation of said device.

13. In a keyboard apparatus, a series of keys, a mechanism comprising a plurality of operable elements, means including a first component and a second component controlled by said keys to initiate the operation of said mechanism, latch means normally coactive with said first component and adapted normally to escape said second component, and means to render said latch means cooperative with either component to determine the cyclic operation of said mechanism.

14. In a keyboard apparatus, a series of keys, a device comprising a plurality of operable elements, means controlled by said keys to initiate the operation of said device, said means including a pair of pivoted members arranged with oppositely disposed stepped surfaces, means adapted normally to bias said members into contactual engagement whereby said surfaces are presented in offset relation to each other, a latch element positioned between said members, said element normally adapted to coact with one of said members and to escape the other of said members, and means to render said element cooperative with either of said members to determine the cyclic operation of said device.

ALBERT H. REIBER.

CERTIFICATE OF CORRECTION.

Patent No. 2,019,505. November 5, 1935.

ALBERT H. REIBER.

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction as follows: Page 4, first column, line 63, for the syllable "ductive" read ducive; and page 5, first column, line 7, claim 7, for "in" read including; and that the said Letters Patent should be read with these corrections therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 10th day of December, A. D. 1935.

Leslie Frazer
Acting Commissioner of Patents.

(Seal)

whereby said first component is normally operative to limit the operation of said second element, and means to render said second component operative upon the ineffectiveness of said first component to insure said limitation of operation.

7. In combination in a keyboard device, a perforating mechanism in a plurality of punch elements, a plurality of keys, a set of permutation bars adapted to be permutably operated by said keys to control the operation of said mechanism, a universal bar invariably operated by said keys, a constantly rotating shaft, means carried by said shaft to operate said mechanism, a friction clutch adapted to be operatively associated with said means during its complete cycle of operation, a positive clutch adapted to be operatively associated intermittently with said means, means operated by said universal bar to connect through the instrumentality of said clutches said mechanism to said shaft, means to render said positive clutch effective only during the effectual period of operation of said first mentioned means, and means independent of said elements and effective independently of, said first mentioned means to disable said perforating mechanism.

8. In a keyboard device, a series of keys, a universal element, a plunger operable by each of said keys through the instrumentality of said element, a bell crank lever, power driven cam means coacting with said bell crank lever, release means controlled by said plunger to effect through said bell crank lever the initiation of operation of said cam means, and automatic means comprising a double trip-off latch effective invariably to determine the cyclic operation of said cam means.

9. In a keyboard apparatus, a series of keys, a perforating device, means controlled by said keys to initiate the operation of said device, said means including a first component and a second component, latch means normally adapted to coact with said first component and to escape said second component, and means to render said latch means cooperative with either component to determine the cyclic operation of said device.

10. In a keyboard perforator, a plurality of keylevers, a plurality of permutation bars, perforating elements, an interference member individual to each of said bars and set in varying combinations upon the operation of said permutation bars, means for operating said elements as selected by said members including a power driven element, release means comprising a spring-biased bell crank lever, and a pair of latches responsive to the operation of a keylever for releasing said power driven element, said pair of latches adapted to be severally coactive with said bell crank lever to effect invariably a single cycle of operation of said first recited means.

11. In a keyboard device, a series of keys, a plurality of elements, means operative on said elements, and means controlled by said keys to initiate the operation of said means including a pair of pivoted members arranged with oppositely disposed irregular surfaces and a latch element positioned between said members and cooperating with the irregular surfaces thereof to hold initially said first recited means ineffective and subsequently if any of said keys are held operated.

12. In a keyboard apparatus, a plurality of keys, a device comprising a plurality of operable elements, means including a first component and a second component controlled by said keys to initiate the operation of said device, latch means normally coactive with said first component and non-coactive with said second component, and means to render said latch means coactive with either component to determine the cyclic operation of said device.

13. In a keyboard apparatus, a series of keys, a mechanism comprising a plurality of operable elements, means including a first component and a second component controlled by said keys to initiate the operation of said mechanism, latch means normally coactive with said first component and adapted normally to escape said second component, and means to render said latch means cooperative with either component to determine the cyclic operation of said mechanism.

14. In a keyboard apparatus, a series of keys, a device comprising a plurality of operable elements, means controlled by said keys to initiate the operation of said device, said means including a pair of pivoted members arranged with oppositely disposed stepped surfaces, means adapted normally to bias said members into contactual engagement whereby said surfaces are presented in offset relation to each other, a latch element positioned between said members, said element normally adapted to coact with one of said members and to escape the other of said members, and means to render said element cooperative with either of said members to determine the cyclic operation of said device.

ALBERT H. REIBER.

CERTIFICATE OF CORRECTION.

Patent No. 2,019,505. November 5, 1935.

ALBERT H. REIBER.

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction as follows: Page 4, first column, line 63, for the syllable "ductive" read ducive; and page 5, first column, line 7, claim 7, for "in" read including; and that the said Letters Patent should be read with these corrections therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 10th day of December, A. D. 1935.

Leslie Frazer
Acting Commissioner of Patents.

(Seal)