

S. BRAND ET AL
SKIP BAR FOR PUNCHING MACHINES

2 Sheets-Sheet 1

Fig. 1.

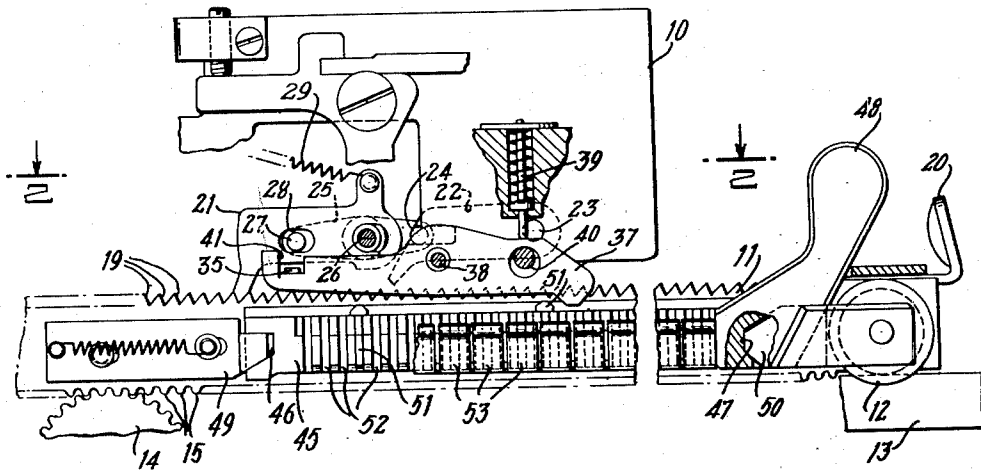
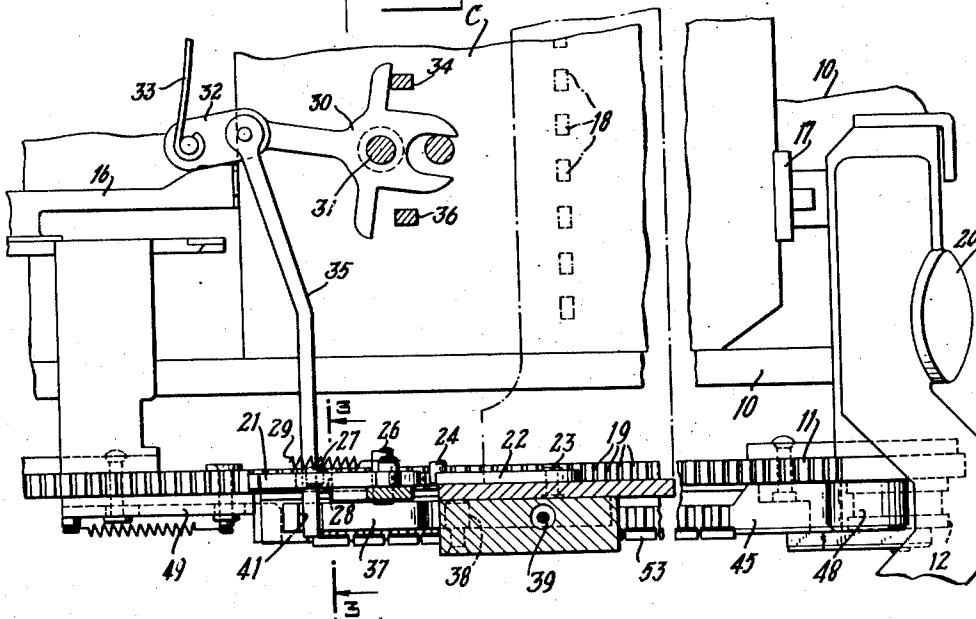


Fig. 2.



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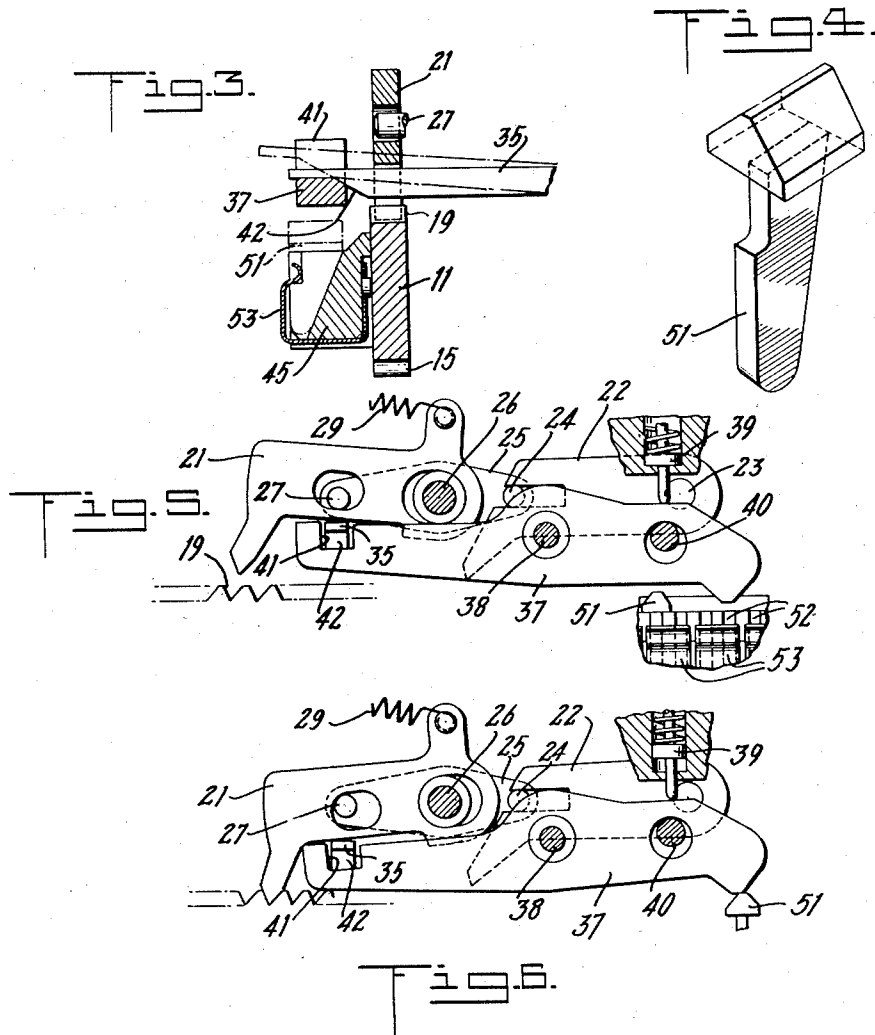
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SKIP BAR FOR PUNCHING MACHINES

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2 Sheets-Sheet 2



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SKIP BAR FOR PUNCHING MACHINES

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This invention concerns punching machines and more particularly record card punching machines in which data is punched in a series of card columns, column by column.

The principal object of the invention is to provide an improved carriage escapement mechanism for controlling the advance and escape-
ment of a record card carriage such as the card carriage of a tabulating card punching or like machine, wherein there is a shiftable carriage requiring a device to control the escapement movement of the carriage across the machine.

A well known form of tabulating card has a series of evenly spaced columns to be provided with data by a punching machine, such as is disclosed in the Brand and Cunningham Patent 2,333,461, granted November 2, 1943. Such machine has a carriage for advancing a card to position the individual card columns opposite the machine punching dies, the card carriage being advanced under control of an escapement device. Heretofore, the escapement device has comprised an escapement rack and a so-called skip bar. The skip bar was carried by the escapement rack, and it so controlled the carriage operation that certain card fields or columns would skip the punching dies and, therefore, would not be punched. This skip bar heretofore has been provided in the form of a solid bar having notches in its lower edge for temporary mounting on headed pins projecting from the escapement rack and the upper edge has been configured to provide depressed portions opposite the escapement teeth of the rack for the card fields to be punched and raised portions opposite the escapement teeth for card fields to be skipped.

For each new or different escapement pattern, a separate skip bar is required and this may involve a considerable number of differently configured skip bars.

It is an object of the present invention to provide a universal skip bar which may be readily adjustable to accommodate any escapement pattern whereby a single bar will serve in place of the plurality heretofore required. In addition, this universal skip bar is arranged for ready removal so that another similar bar with a different adjustment may be quickly substituted therefor. The arrangement has the advantage of requiring only a single skip bar whose escapement pattern may be readily modified in cases where such pattern is utilized for a brief period, and it has the further advantage in that as for the prior skip bars, when an escapement pattern

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is frequently employed, such pattern may be retained on a bar and the entire bar placed on the rack when needed.

Other objects of the invention will be pointed out in the following description and claims and illustrated in the accompanying drawings, which disclose, by way of example, the principle of the invention and the best mode, which has been contemplated, of applying that principle.

In the drawings:

Fig. 1 is a view showing the escapement dogs and rack of a well known card punching machine, with the universal skip bar mounted thereon.

Fig. 2 is a plan section taken on lines 2—2 of Fig. 1 showing the relative locations of the punches, card carriage and escapement devices.

Fig. 3 is a sectional elevation taken on lines 3—3 of Fig. 2.

Fig. 4 is a perspective view of one of the insertible "skip stop" pins.

Fig. 5 is a detail showing the escapement mechanism in position to release the rack for skipping.

Fig. 6 is a detail showing the action of a "skip stop" pin to interrupt the skipping operation.

Referring to Figs. 1 and 2, the punching machine which is of the type shown in Patent 2,333,461 referred to has a stationary framework identified generally at 10, upon which a rack 11 is mounted for horizontal reciprocation in suitable supports. Specifically, rollers 12 carried by the rack ride along a guide rail 13 and are biased toward the right by a gear 14 in mesh with teeth 15 on the under edge of the rack. Gear 14 is connected in the usual manner to a suitable spring drum, not shown.

The rack 11 has secured thereto a card pusher 16 and a card guide 17 between which a card C is placed and supported on a flat portion of the framework 10. The card C and the rack 11 then move together relative to a fixed column of punches indicated at 18.

The upper edge of rack 11 is formed with the usual escapement teeth 19 spaced to correspond to the columnar spacing of the data columns of the card. A handle or finger piece 20 connected to the rack 11 enables the operator to manually slide the rack and supported card C to the left as seen in Fig. 1 to prepare the machine for a card punching operation by presenting a selected card column to the row of punches. This leftward movement of the rack and card will, of course, rotate gear 14 to wind up the driving spring, and escapement teeth 19 will click past the usual escapement dog 21, which when the finger piece 20 is released, will hold the rack

in the position to which it has been shifted, as shown in Fig. 1.

The usual holding dog 22 pivoted at 23 to the framework is normally in the position shown and a bifurcation therein embraces a pin 24 of a lever 25 on rod 26. Lever 25 has a second pin 27 extending into an enlarged opening 28 in dog 21. The normally column-by-column escapement action which is more fully set forth in the patent referred to is, briefly, as follows. Whenever a punch or space operation is performed, there is effected a clockwise rocking of lever 25 on rod 26, with the result that pin 24 rocks dog 22 counterclockwise into engagement with a tooth 19, and at the same time pin 27 rocks dog 21 clockwise to disengage it from the escapement teeth. This allows a very slight movement of the rack as a tooth 19 seats against dog 22.

When dog 21 is rocked as stated, its spring 29 shifts it to the left being permitted to do so by the enlarged pivot opening therein on rod 26. Thus, when lever 25 is rocked back to the position of Fig. 1, dog 21 will engage the next tooth 19 as dog 22 is lifted out of its holding position. Briefly, then, repeated oscillation of lever 25, as an incident to repeated punching or spacing operations, will effect a step-by-step advance or escapement of rack 11.

Referring to Fig. 2, the punching machine is provided as usual with a so-called T lever 30 pivoted at 31, which with a link 32 forms a toggle normally biased in the position shown in Fig. 2 by a leaf spring 33. Whenever the well known skip key is operated, lever 30 is rocked counterclockwise by an element 34 so that the toggle snaps to its alternate position to shift the so-called skip lifter 35 articulated thereto downward as viewed in Fig. 2. Subsequent operation of any other punch or space key of the machine will actuate an element 36 to rock the toggle back to its initial position and retract the skip lifter 35.

In accordance with the present invention, there is added to the apparatus just described a lever 37 pivoted at 38 to the fixed framework and biased clockwise as viewed in Fig. 1 by a spring pressed plunger 39. An opening in the lever cooperates with a fixed pin 40 to serve as a limit stop for the lever. The left hand end of lever 37 is notched as at 41, to receive the free end of the skip lifter 35 (see Fig. 3). This free end of the skip lifter 35 has the usual incline 42 and passes beneath dog 21 so that, when the skip lifter is shifted to the left, the free end thereof will ride up to the dotted line position shown and raise dog 21 out of rack teeth 19. Fig. 5 shows the relative positions of the parts with the skip lifter 35 in its outer position. In this position dog 21 is rocked without disturbing the normal position of lever 25 and the spring on plunger 39 has enough force to overcome any tendency to rock lever 37, which remains in its normal position.

With dog 21 thus raised, the rack 11 is freed for movement to the right and skip lifter 35 will remain in its projected position to continue holding the dog as viewed in Fig. 5. This movement of rack 11 will proceed until lever 37 is rocked counterclockwise to the position of Fig. 6, wherein its left end lowers skip lifter 35 and dog 21 under the influence of spring 29 to interrupt the rack.

The devices for rocking lever 37 comprise a bar 45 having recesses 46 and 47 at opposite ends and a handle 48. This bar is removably mounted

on the rack 11 by positioning it between a spring urged detent 49 and a lug 50 on the rack. To remove the bar 45, handle 48 is gripped and the bar shifted to the left to slide detent 49 sidewise. This frees recess 47 from lug 50 and the bar is then tilted counterclockwise and lifted out. To insert, the procedure of removal is reversed.

Along the bar 45 are a plurality of angular slots 52 spaced to correspond to the spacing of escapement teeth 19. A "skip stop" pin 51 may be inserted into any one of the slots 52 and U-shaped spring blades 53 serve to retain the pin in inserted position. Pins 51 are inserted in bar 45 in positions in which it is desired to have a skipping action stop or terminate and for this reason they are called "skip stop" pins.

To illustrate the action, assume that the rack 11 has been released in response to projection of skip lifter 35 and the parts assume the position of Fig. 5, as explained. Now the first pin 51 to the left of the right end or nose of lever 37 will, when the pin reaches such right end of lever 37, engage and rock it to the position of Fig. 6, wherein dog 21 is lowered into engagement with a tooth 19 and the rack is stopped, with pin 51 continuing to hold the lever 37 in rocked position until the next punching operation advances the rack. As already explained, a subsequent punching operation will retract skip lifter 35, so that during the next punching operation lever 37 will rock back to its position of Fig. 1.

While there have been shown and described and pointed out the fundamental novel features of the invention as applied to a single modification, it will be understood that various omissions and substitutions and changes in the form and details of the device illustrated and in its operation may be made by those skilled in the art without departing from the spirit of the invention. It is the intention therefore to be limited only as indicated by the scope of the following claims.

What is claimed is:

1. A carriage escapement device for a record punching machine comprising an escapement rack, a skip bar detachably secured to said rack, a dog normally engaging said rack to hold it against movement, a lever having a camming edge, a skip lifter cooperable with said camming edge to raise and hold the dog out of engagement with the rack to free the rack for a skipping movement, and an element carried by the skip bar for moving the said lever away from the skip lifter whereby the skip lifter will be released to enable the dog to drop back into engagement with the rack.

2. A carriage escapement device for a record punching machine comprising an escapement rack, a dog normally engaging said rack to hold it against movement, a spring holding the dog in rack-engaging position, a lever adjacent to said dog, a spring normally holding the lever against movement, a skip lifter having a camming surface operable to cam against the lever and raise the dog out of the rack to free the rack for a skipping movement, an element carried by the rack for rocking the lever against its spring and moving it away from the skip lifter whereby the spring on the dog will cause the dog to reengage the rack.

3. A carriage escapement device comprising an escapement rack, a bar, a spring latching device for detachably mounting said bar on the rack, said bar having a row of transverse open-sided

slots therein, a skip-stop pin having a cam head and a shouldered shank insertible in any of said slots, and a leaf spring engageable with the shouldered notch through said open side of the seat to yieldably hold the pin within the slot.

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