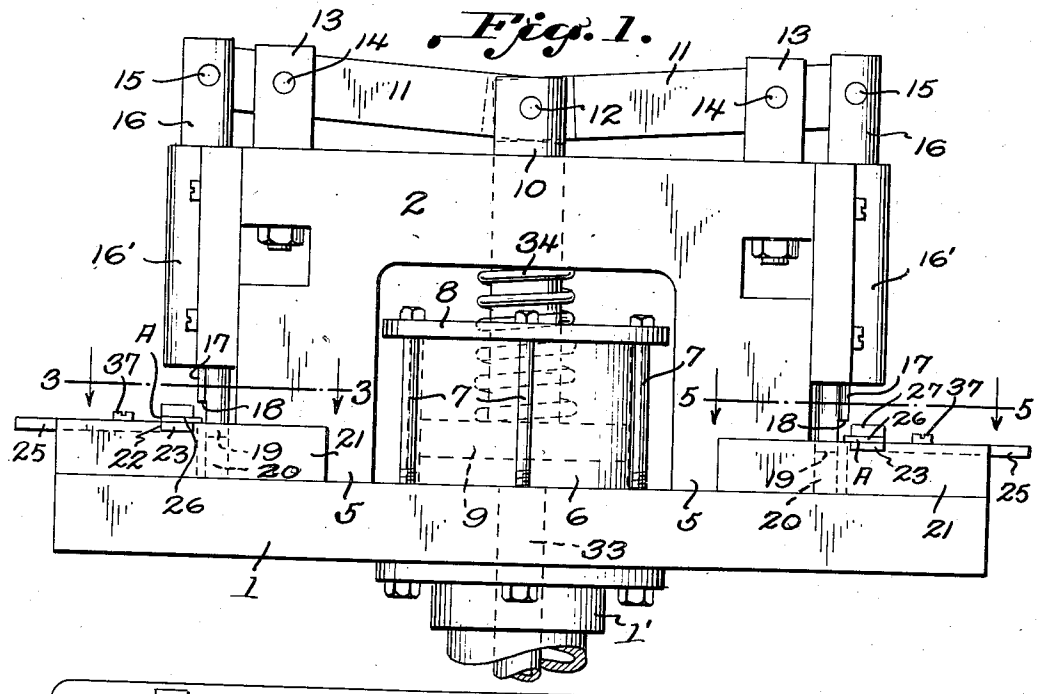
March 5, 1940. B. GRADY 2,192,531

PUNCH PRESS

Filed Dec. 26, 1939 2 Sheets-Sheet 1

Fig. 1.



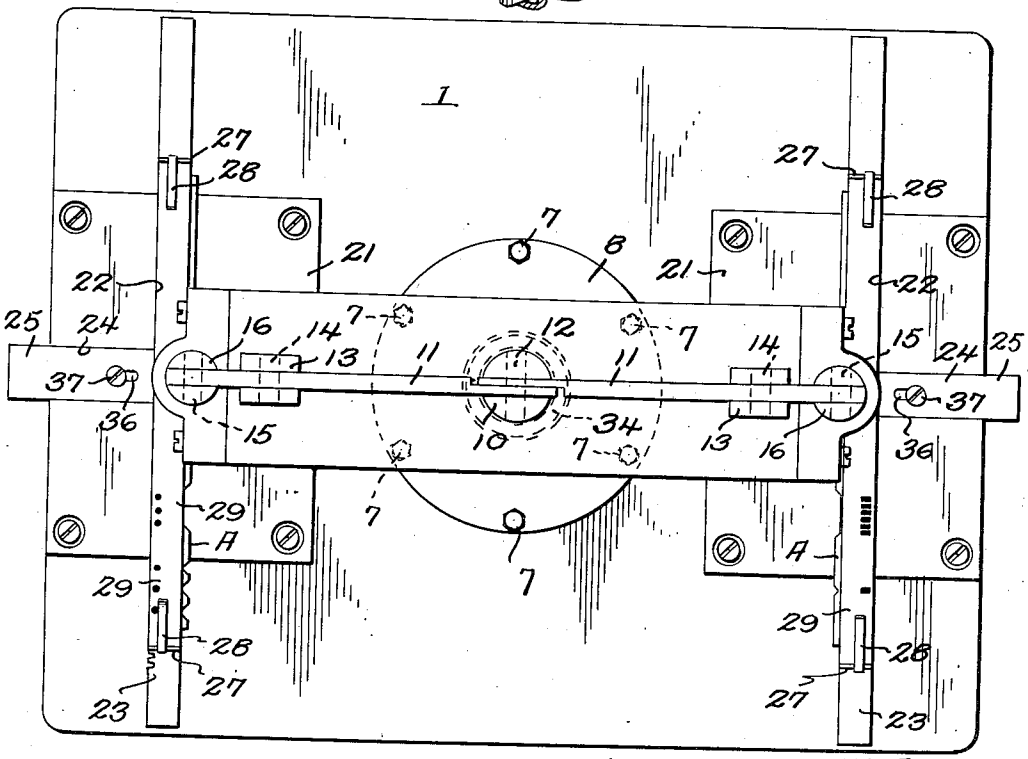


Fig. 2.

INVENTOR
BENJAMIN GRADY
By J. J. Mothershead
ATTORNEY

March 5, 1940. B. GRADY 2,192,531

PUNCH PRESS

Filed Dec. 26, 1939 2 Sheets-Sheet 2

Fig. 3.

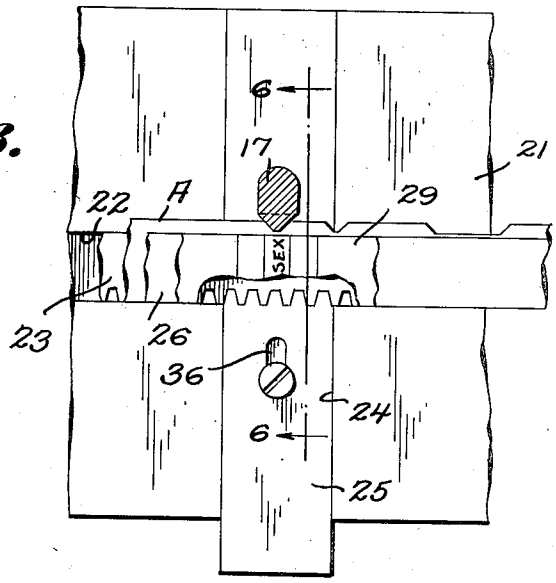


Fig. 4.

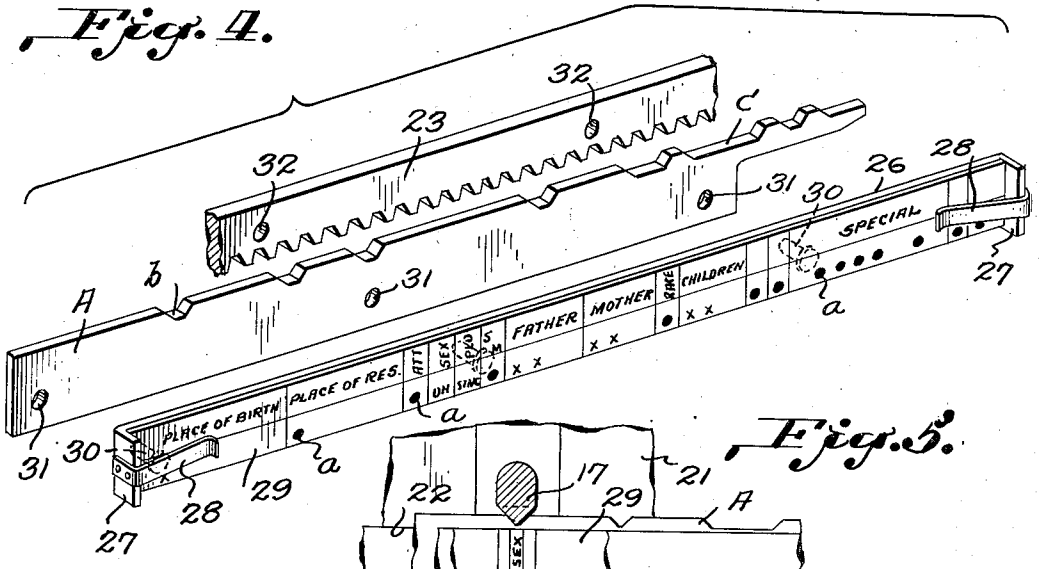


Fig. 5.

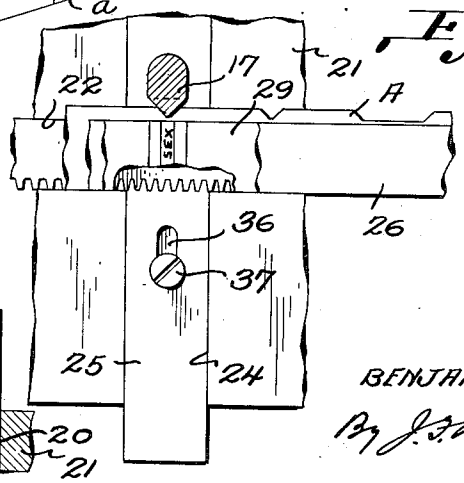
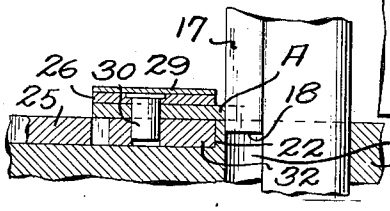


Fig. 6.



INVENTOR
BENJAMIN GRADY
By J. S. Mothershead
ATTORNEY

Patented Mar. 5, 1940

2,192,531

UNITED STATES PATENT OFFICE

2,192,531

PUNCH PRESS

Benjamin Grady, Washington, D. C.

Application December 26, 1939, Serial No. 311,032

5 Claims. (Cl. 164—50)

(Granted under the act of March 3, 1883, as amended April 30, 1928; 370 O. G. 757)

This invention relates to a punch press for punching notches in skip bars used in connection with escapement mechanisms.

The invention, if patented, may be manufactured and used by or for the Government of the United States for governmental purposes without the payment to me of any royalty thereon, in accordance with the provisions of the act of April 30, 1928 (ch. 460, 45 Stat. L. 467).

The skip bars referred to are those commonly used in punching and verifying machines employed in statistical work.

The object of the invention is to quickly and accurately position such bars for punching them in places corresponding to the location of certain columns in a record or card in which there is data desired to be skipped during the operation of the machine operating on said card or record.

In carrying out my invention I employ a pneumatically operated punch, a rack or gauge having teeth thereon corresponding to the teeth on the rack of the escapement mechanism appropriate to the machine on which the escapement rack is used, and a guide holder for holding temporarily the guide from which the positions of the notches in the strip are determined. The guide referred to in the present instance is the upper end of a record card of 45 columns.

In the drawings—

Figure 1 is a side elevation of the machine.

Figure 2 is a top plan view.

Figure 3 is a horizontal sectional view taken on lines 3—3 of Figure 1, parts being broken away.

Figure 4 is a view in perspective of a guide holder, skip bar and gauge rack, the parts being separated.

Figure 5 is a view similar to Figure 3 taken on line 5—5 of Figure 1, the guide rack and associated parts adapted for punching the skip bar used on a machine designed to operate upon a record card of eighty columns.

Figure 6 is a sectional view taken on line 6—6 of Figure 3.

Referring to the drawings, the numeral 1 designates the base plate of the machine which is mounted upon the flanged upper end of the tubular support 1'. A yoke 2 is mounted on the plate and between the legs 5 of which is mounted a cylindrical air chamber 6 held in air-tight fashion against the top of the plate 1 by bolts 7 whose lower ends are threaded into the plate. the bolts extending through the cylinder head 8. There is a piston 9 in the cylinder that normally rests near the bottom of the cylinder and has a piston rod 10 which extends through the top of the cylinder and through an aperture centrally located in the yoke 2. This rod is bifurcated at its upper end to receive the overlapping ends of levers 11 pivoted to said rod as indicated at 12. On each side of the yoke is located a standard 13, and to these are pivoted, as indicated at 14, the levers 11 whose outer ends are extended beyond their pivot points where they are pivoted as at 15 to the upper ends of the punch-carrying rods 16 slidable in bearing sleeves 16' bolted to the yoke 2. The lower ends of these rods are shaped to form the punches 17, each formed with a V-shaped portion 18 that does the actual punching. Below the portion 18 each rod has an extension 19 that is received by and works in a guide recess 20, one of which is in each guide block 21 on each side of the machine and beneath the punches.

The guide blocks are identical and the description of one will serve for both.

The block is provided with a comparatively long longitudinal guide groove 22 for the reception of the gauge rack bar 23 and a shorter transverse guide groove 24 for the reception of the tooth-locking member 25.

The numeral 26 designates a guide holder which is in the form of a flat metallic strip having upturned ends 27 to each of which is attached a leaf spring 28 whose inner ends are arranged to bear upon a portion 29 of a record card to stabilize said portion during the punching operation. Preferably, the space between the upturned end of the strip 26 is exactly the length of the card portion to prevent lateral movement of said portion. On the rear side of the strip are a number of pins 30 preferably three, which correspond to the holes 31 made in the skip bar A, and the guide rack bar 23 is also provided with the same number of holes 32, the pins of the strip 26 being adapted to extend through both the skip bar to be punched and the guide rack. The pins and holes mentioned are spaced the same distance apart so that when the three elements are put together, as shown in Figure 6, they are temporarily virtually a unit, there being no possibility of the independent movement of one part relative to another.

Referring particularly to Figure 4, it will be noted there are a number of dots *a*, which in the sample card portion shown are intended to be guide marks which are placed in the columns for the purpose of showing the operator where to punch the skip bar in order to skip the column or columns of the card according to the location of the dot. It will be understood, of course,

that any designation other than dots may be employed.

In the arrangement of parts as shown in Figure 4, is a skip bar that has already been punched and had in its original form a perfectly straight upper edge. In the illustrated form the dot *a* under the heading "Place of residence" has been brought in line with the V-shaped portion of the punch, and there will, when the punch is operated, be punched from the skip bar A a notch *b* which will cause the escapement of the machine in which the skip bar is used to skip the column or space indicated by the dot on the card. It will be noted that the card 29 which is the guide, has other dots *a* under various headings, and wherever they appear the operator will move the card-holding strip and skip bar and guide rack A along the groove 22 until each dot, or whatever mark may be employed, has been brought successively opposite the V-shaped portion of the punch, and at each point of stoppage a notch will be made in the skip bar. Four dots *a* and another remote one appear under the heading "Special". Where the four dots appear, the punch is operated four times, which punches out a long notch *c*. The position of the notches on the skip bar and their distances apart will be varied according to the column or space to be skipped. For instance, the long notch *c* will mean that four card columns represented by the four closely positioned dots under the heading "Special" will be skipped by the escapement of the machine in which said escapement is employed.

The numeral 33 (Figure 1) designates an air line whose upper end opens into the bottom of the cylinder 6, the line serving both as an intake and exhaust. A three-way conventional treadle-operated air valve (not shown) is employed to control the flow of air to the cylinder and its exhaust.

When the piston moves upward to operate the punches it moves against the tension of spring 34, interposed between the top of the piston and the under side of the yoke, the spring operating to return the piston to normal position after each operation.

The teeth 25' on the locking member are inclined on both sides, as shown best in Figures 3 and 5, with an inclination corresponding to the inclination of the teeth on the guide rack 23. With this arrangement, even if the person marking the guide card should mark it off center in a card column, the wedging engagement between the teeth of the guide rack 23 and the teeth of the locking member 25 will, when the guide mark is brought opposite the inclined portion of the punch, automatically center the card column, so that the punch will invariably make a notch in the skip bar whose center will be exactly that of the center of the card column.

The locking member 25 is provided with an elongated slot 36 that embraces the shank of a headed stud 37, the stud and slot arrangement being for the purpose of keeping the member in its groove 24 and to limit its movement to and from the guide rack 23. Obviously, when the rack and the parts that move with it are to be moved with relation to the punch, the locking member will be pulled away from the rack far enough to clear their teeth, and when the punch registers with a guide mark on the card the locking member is pushed into engagement with the rack, in which position the machine is operated to notch the skip bar. The holes 31 in the skip bar are in practice utilized for the passage of screws for attaching the bars to a rack bar commonly used in the types of machine mentioned, and the arrangement and spacing of the pins on the guide strip 26, holes in skip bar A, and those in the guide rack 23 being predetermined at the outset.

In the form of the invention illustrated I have preferred to provide a punch on each side of the machine, the V-shaped portion of one being somewhat sharper than the other, the sharper punch being for punching skip bars that are appropriate for machines in which the cards used have a large number of columns, as for instance an 80-column card.

I claim:

1. In a device for punching notches in skip bars used in escapement mechanisms, comprising a punch and means for operating the same, visual means for locating the position of the notches to be made in the bar, a guide rack corresponding to the rack used in an escapement mechanism, locating means for the guide rack comprising a movable rack movable to and from the guide rack to lock said rack in position relative to the punch.

2. In a machine for punching notches in skip bars used in escapement mechanisms, a guide holder for holding the guide by which the location of the notches in a skip bar is determined, a guide rack corresponding with respect to spaces to the rack used in an escapement mechanism, means carried by the guide holder cooperating with means carried by the guide rack and with means carried by the skip bar to be punched, whereby the guide rack, guide holder and skip bar are held temporarily in fixed relation to each other for movement together, a punch and means for operating it, means adjacent the punch for guiding the guide rack and consequently the skip bar and guide holder relative to the punch, and means for temporarily locking the guide rack relative to the punch.

3. The invention as claimed in claim 2 characterized in that the means for guiding the guide rack relative to the punch is a transverse groove in a member adjacent the punch, in which the guide rack is held and guided.

4. In a machine of the character described, in combination, a punch and means for actuating it, a die member adjacent the punch and provided with means for holding and guiding a guide rack, a guide rack movable on said die member transversely of the punch, means on the die member for holding and guiding a locking member, a locking member movable to and from the guide rack for engagement with the guide rack to lock the same in position relative to the punch.

5. The invention as claimed in claim 4 characterized in that the rack teeth of the guide rack and the teeth of the locking member have sides of corresponding inclination, for the purpose set forth.

BENJAMIN GRADY.