

No. 676,433.

Patented June 18, 1901.

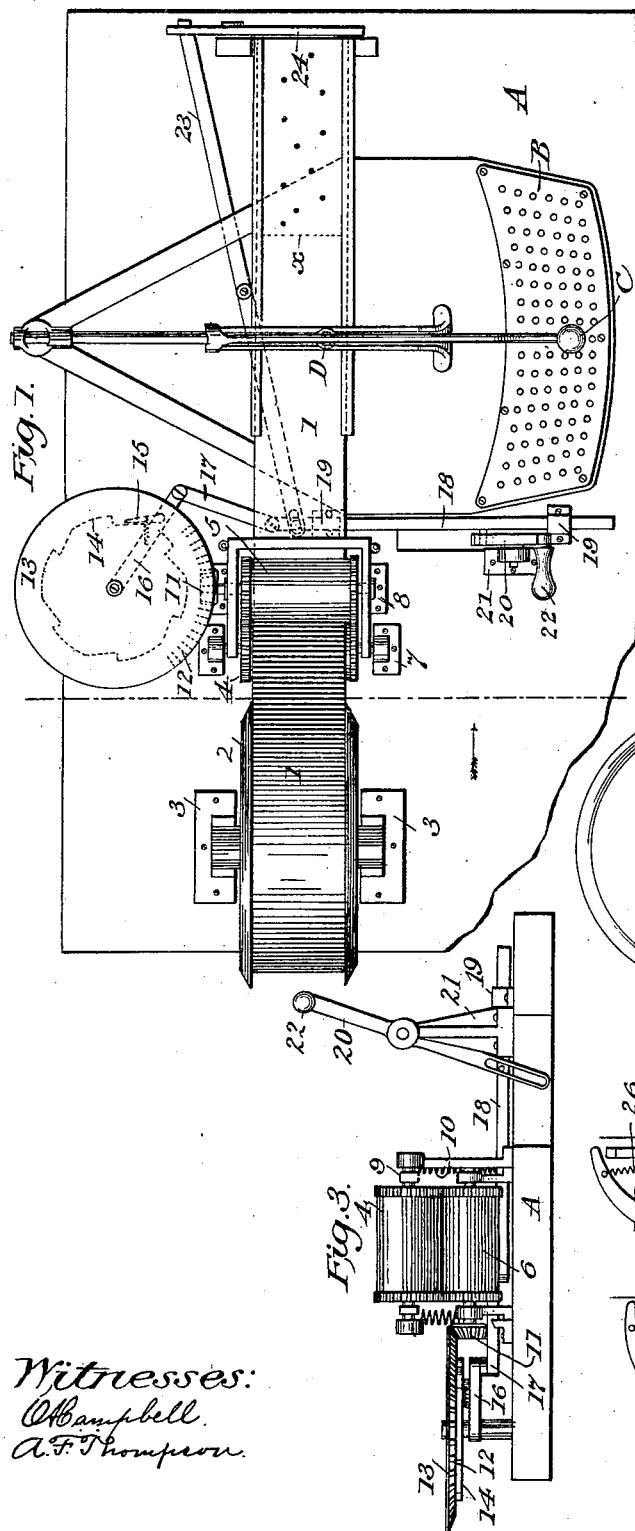
H. HOLLERITH.

PERFORATING MACHINE.

(Application filed Aug. 20, 1898.)

(No Model.)

2 Sheets—Sheet 1.



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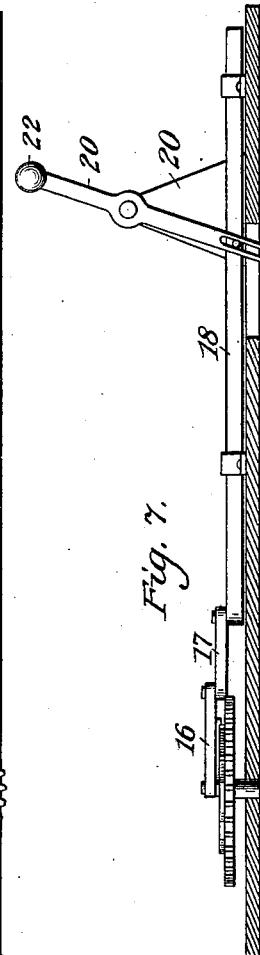
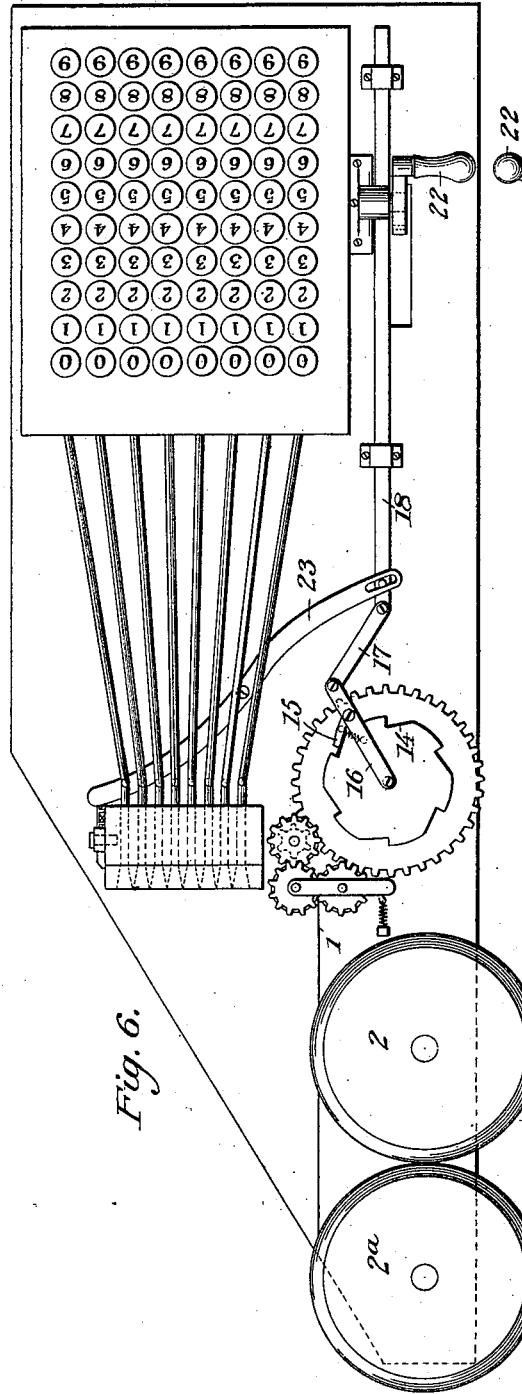
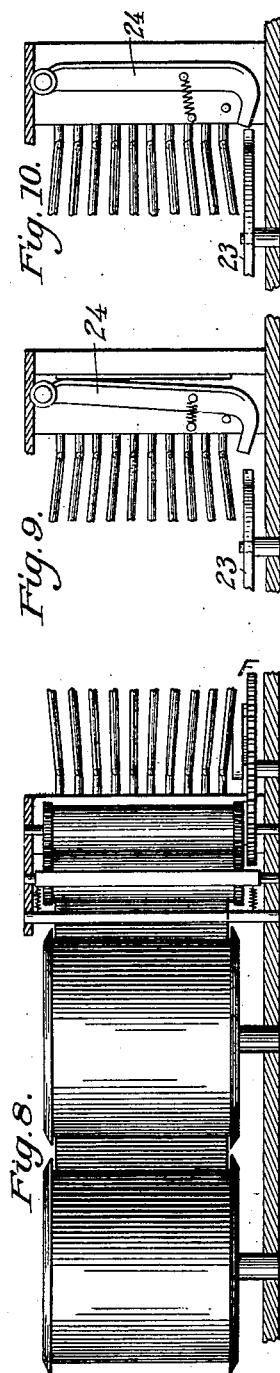
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2 Sheets—Sheet 2.



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UNITED STATES PATENT OFFICE.

HERMAN HOLLERITH, OF GARRET PARK, MARYLAND.

PERFORATING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 676,433, dated June 18, 1901.

Application filed August 20, 1898. Serial No. 689,155. (No model.)

To all whom it may concern:

Be it known that I, HERMAN HOLLERITH, a citizen of the United States, and a resident of Garret Park, Maryland, have invented certain 5 new and useful Improvements in Perforating-Machines, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification.

10 My invention relates to improvements in machines of the character used for perforating record and similar cards, in which provision must be made for forming the perforations at different points in the cards, their 15 number and location varying, possibly, with each card. This requirement necessitates the employment of apparatus completely under the control and will of the operator, by which a perforation may be produced at any one of 20 numerous predetermined points or locations on the card.

Perforating-machines of the type above referred to are described in my United States Letters Patent No. 487,737 and the United 25 States Letters Patent to J. K. Gore, No. 516,199; and one object of my invention is the production of a completely-organized machine in which the material to be perforated is carried and presented to the action of the 30 mechanism in strip form by apparatus operating entirely independently of the perforating devices, so that the strip will remain in position without being advanced while the desired number of perforations, whether one 35 or many, are produced.

A further object of my invention is the provision of means for dividing said strip into predetermined lengths which shall represent or form the card, as more fully set forth 40 hereinafter.

In the drawings, Figure 1 is a plan view illustrating my invention as applied to the form of perforating apparatus described in my said patent. Figs. 2 and 3 are side and 45 end elevations thereof, respectively. Figs. 4 and 5 are detail views showing the knife in different positions. Fig. 6 is a plan view showing the invention applied to the class of perforating-machines described in the said 50 Gore patent. Figs. 7 and 8 are partial side and end elevations thereof, respectively; and Figs. 9 and 10 are detail views of the knife in different positions.

Similar reference characters are employed to designate corresponding parts throughout. 55

Referring to the particular form of apparatus shown in Figs. 1 to 5, inclusive, the material 1 to be punched, usually of heavy paper or cardboard, is preferably carried on a drum 2, journaled in suitable supports 3 on 60 or adjacent to the perforating-machine. A series of feed-rollers 4, 5, and 6 are arranged in the path of the strip 1. The rollers 4 and 6 are journaled in stationary supports 7 and 8, and the roller 5 is yieldingly supported in 65 a frame 9, which is pivoted at one end to the supports 7 and at its opposite end is connected with the spring 10. The ends of the rollers 4, 5, and 6 are provided with intermeshing gears, so that motion will be uniformly 70 imparted to all of them when any one is rotated. On the end of the shaft which supports the roller 5 is mounted a pinion 11, which gears with the rack 12 on the rotating disk 13. A ratchet 14 is secured to the 75 said disk, and a pawl 15, carried by the pivoted arm 16, engages with said ratchet. The arm 16 is connected by the link 17 with the bar 18, arranged to slide in guides 19, secured to the base A. A lever 20 is pivoted 80 to the support 21, and its upper end is provided with a handle 22. A pin on the bar 18 projects into a slot in the lower end of the lever 20. A lever 23 is pivoted intermediate its end to the base A. One end of said lever 85 is arranged to engage with the depending handle of the knife 24, which is pivotally secured to the frame of the punch at the end of the bed-plate of the punch 25. The opposite end of the lever 23 is provided with a 90 slot, into which a pin on the sliding bar 18 projects. Spring 26 normally holds the edge of the knife 24 above the end of the bed of the punch 25, along which the strip is fed. The punching mechanism, (shown in Figs. 1 95 and 2,) the construction of which is fully described in the specification of my said Letters Patent No. 487,737, comprises a keyboard B, an index-finger C, having a universal movement over the keyboard, and a punch D, the 100 position of which over the strip to be punched is determined by the position of the index-finger on the keyboard and which is actuated to punch the strip by pressure on the lever carrying the index-finger. The length of the 105 strip to be spaced or severed at each opera-

tion of the apparatus having been determined, the various parts of the mechanism described are proportioned and arranged so that one movement of the feeding mechanism will advance the strip that distance. As shown in the drawings, this is represented by the distance between the dotted line X and the knife 24.

The operation of the form of mechanism 10 which I have just described is as follows: The strip 1 having been wound upon the drum 2, the end of the strip is fed through the rollers 4 5 6 and is advanced to the dotted line X. The strip is then in position for 15 punching, and the punching operation having been completed the handle 22 is drawn toward the operator, moving the bar 18, link 16, and pawl 15, to advance the ratchet 14 and disk 13 one tooth and rotate the feed- 20 drums 4, 5, and 6, thereby feeding the strip 1 forward the length of one card. The handle 22 is then pushed back to its initial position, the next card is then punched, and the feeding mechanism manipulated as before. 25 The movement of the bar 18 is imparted to the lever 23, carrying its free end out of engagement with the handle of the knife 24, which under the action of spring 26 is lifted above the feeding-platform, as shown in Fig. 30 4, sufficiently to permit the end of the strip 1 to pass under it. The pawl 15 and ratchet 14 are so arranged and proportioned that this lifting of the knife will occur before the movement of the pawl brings it into contact 35 with the ratchet-tooth, so that when the forward movement of the strip commences the knife will be entirely clear of its path. The strip is thus fed forward one more length, bringing the dotted line X under the knife. 40 The handle 22 is then pulled back, and the reverse movement of the bar 23 brings it again into engagement with the handle of the knife 24, forcing the knife down and severing the card from the strip. The punching, feeding, and cutting operations are thus 45 continued until the strip is exhausted.

The particular form of apparatus just described permits the operator to examine the punched card after it is punched and before 50 it is severed from the strip. This is in some instances an advantage, but is not at all essential, and in Figs. 6, 7, and 8 I show an apparatus in which the card is cut from the strip as soon as the next succeeding card is 55 in punching position. I also show in the last-mentioned apparatus two feeding-drums instead of one, arranged so that two strips are fed simultaneously. This arrangement is adapted for the production of duplicate 60 punched cards, which are necessary under certain circumstances. If more than two cards are desired, as many more strips and feeding-drums may be employed as are needed.

65 The construction and operation of the apparatus shown in Figs. 6, 7, and 8 will be read-

ily understood from the description already given. The punch is of the type shown in the said Gore patent, No. 516,199, and the strip is fed vertically to the punches instead of horizontally, thus necessitating a corresponding change in the position of the drums, feed-rolls, and knife and permitting the employment of a spur-gear in place of the disk 13 and rack 12; but the principle of operation 70 is the same in both forms of apparatus, and many modifications may be made in the form, location, and arrangement of the apparatus without any departure from such principle. For instance, a toothed sector and rack may 75 be substituted for the slot in the lever 20 and its co-operating pin, and for certain classes of work it may be desirable that the cards should only be partially severed or that the line of severance should only be indicated by perforations or otherwise, in which case suitable 80 mechanism should be substituted for the knife, and such marking or perforating devices could be carried on the feed-rollers, if 85 desired.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. The combination with a perforating apparatus, of a support for a strip of the material to be perforated, mechanism operating independently of the punch-operating mechanism and free from control thereby for advancing said strip to the perforating mechanism and means for dividing said strip into predetermined lengths, substantially as shown and described. 90

2. The combination in an apparatus of the character described of a support for a strip of material to be perforated, mechanism under the control of the operator for determining the location of the perforation in the strip and for producing said perforation, mechanism operating independently of the perforating actuating mechanism and free from control by the latter for advancing said strip to the perforating mechanism and means for dividing said strip into predetermined lengths, substantially as shown and described. 105

3. The combination in an apparatus of the character described of a support for a strip of material to be perforated, mechanism under the control of the operator for determining the location of the perforation in the strip and for producing said perforation, mechanism operating independently of the perforating actuating mechanism and free from control by the latter for advancing said strip to the perforating mechanism and means for severing a predetermined length from said 110 strip after it has been perforated, substantially as shown and described. 115

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