Aug. 8, 1950 J. M. CUNNINGHAM 2,517,984

PERFORATED RECORD SENSING DEVICE

Filed Aug. 25, 1947

Fig. 2.

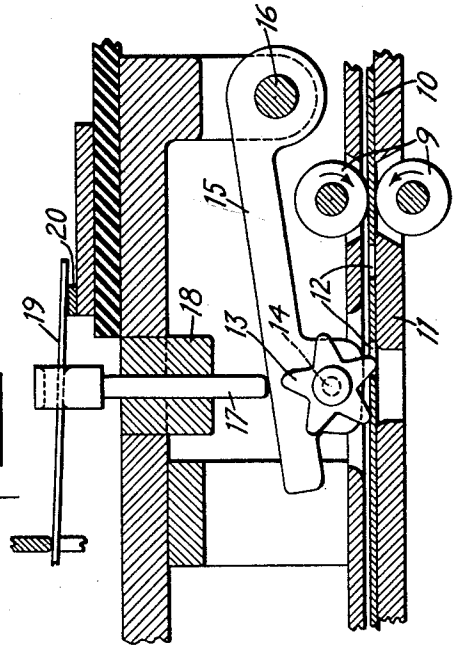


Fig. 4.

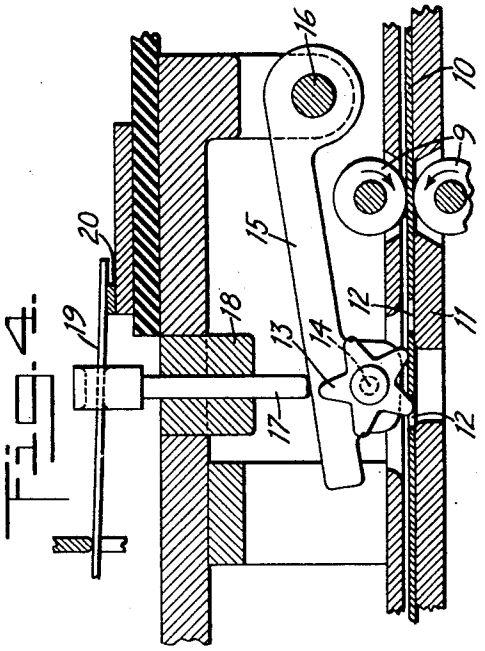


Fig. 1.

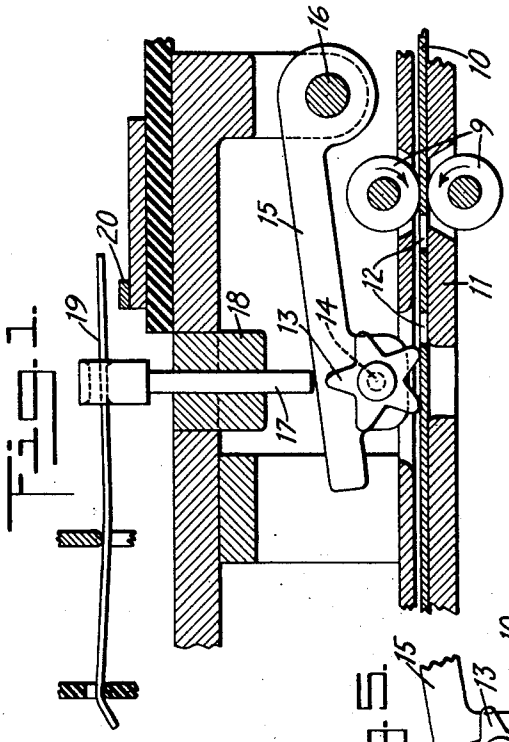


Fig. 3.

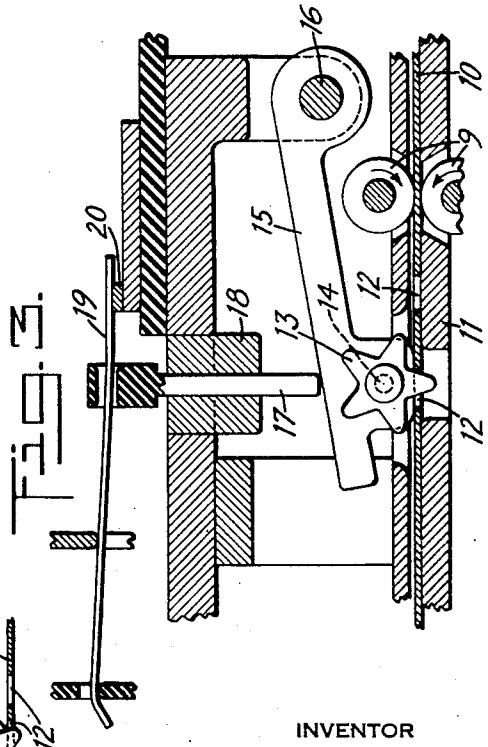
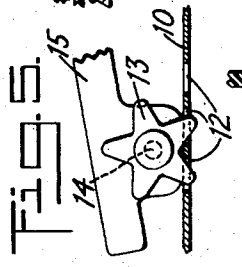


Fig. 5.



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PERFORATED RECORD SENSING DEVICE

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Application August 25, 1947, Serial No. 770,349

1 Claim. (Cl. 235—61.11)

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This invention relates to devices for sensing perforations in record cards and more particularly to devices for sensing such designations while the record cards are in motion through the card feeding mechanism of well known accounting and statistical machines.

The principal object of the invention is to provide an improved sensing device of the type wherein the sensing of a perforation effects closure of contacts for controlling machine operation. It is desirable to provide as long a contact closure period as possible in order to insure ample time for the operation of the controlled mechanism. Generally the period of such closure has been determined by the length of the perforation in the card and by the rate of movement of the card.

The present invention contemplates a structure in which a sensing element in the form of a star wheel is rotatably mounted on the end of a lever and rests upon a record to traverse a perforated column thereof. Normally, two points of the star wheel rest on the card surface and, as a hole arrives and passes beneath the near point, it will roll into the hole, allowing the center of the wheel to drop, thereby rocking the supporting lever and actuating a pair of contacts. Continued advance of the card will cause the trailing edges of the hole to engage the entered point and turn the star wheel and ultimately cam the point out of the hole leaving the wheel advance one point.

Where the holes sensed follow one another in close proximity, as where they are spaced a distance equal to the pitch of the teeth or points of the star wheel, the wheel will shift bodily upon sensing the first hole and will thereafter simply roll from such hole to the next without shifting the center of the wheel and the contacts will accordingly remain in their actuated position as long as the succession of closely spaced holes continues.

Other objects of the invention will be pointed out in the following description and claim 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 detail view of the improved sensing device shown in relation to a perforated record with the card sensing station wheel riding on the imperforate portion of the card.

Fig. 2 is a position view of the parts as a point of the wheel is entering a perforation.

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Fig. 3 is a further position view of the parts after a point of the wheel is fully entered in a perforation.

Fig. 4 is a still further position view of the parts as the entered point is engaged by the trailing edge of a perforation and cammed out of the perforation.

Fig. 5 is a detail showing the wheel being traversed by closely spaced holes.

Referring to the drawing, the record card feeding mechanism is diagrammatically represented by a pair of feeding rollers 9 which advance record card 10 toward the left with a continuous movement across a supporting plate 11. The card 10 which is the well known I. B. M. record card has perforations 12 arranged in the usual columns and rows according to the data their location represents.

In line with each column of perforations 12 is a sensing element in the form of a five pointed star wheel 13 which is freely rotatable on a pin 14 carried on the free end of a lever 15 freely fulcrumed at 16. An upper edge of lever 15 abuts a plunger 17 vertically slidable in a support 18 and a contact wire or blade 19 bears upon the upper end of plunger 17 to provide a slight spring bias urging wheel 13 against the surface of the card 10.

As rollers 9 propel the card beneath wheel 13, a pair of adjacent points slide along the surface in the position of Fig. 1 to hold plunger 17 in its upper position against the tension of contact spring wire 19. As a hole 12 moves under the nearer point of wheel 13, tension of spring wire 19 will cause the wheel to turn with the one point entering hole 12 as shown in Fig. 2 so that wire 19 makes contact with stationary contact element 20 to complete an electrical circuit to energize well known devices such as printing or accumulating magnets in accordance with the particular type of accounting or statistical machine to which the invention may be applied.

As the card continues to advance, the perforation as it traverses the entered point, enables further penetration until the lower edge of lever 15 contacts the card surface as shown in Fig. 3.

Thereafter, the trailing edge of the entered hole 12 will engage the edge of the entered point of wheel 13, cam it out of the hole as indicated in Fig. 4 where the point is partly ejected, and the parts are in position to open contacts 19, 20 upon further movement of the card which will return the elements to the position of Fig. 1.

With Fig. 2 representing the position of the card at the instant of closure of contacts 19, 20

and Fig. 4 representing the instant of reopening thereof, it is seen that the period of closure is measurable in terms of card travel by the distance a point on the card travels from the position of Fig. 2 to that of Fig. 4. For the proportions of the parts illustrated, this distance is a little less than one and a half times the length of hole 12.

Wheel 13 offers very slight resistance to rotation so that the frictional resistance between the edge of a part and the trailing edge of the card holes is only as much as is required to overcome the light tension of the contact wire 19.

In Fig. 5 is shown a section of a card in which holes 12 are more closely spaced than in Figs. 1 to 4 with the distance between like points being such that as a point of wheel 13 rolls out of one hole the following point will roll into the next and lever 15 will remain in its lower position. Thus for a succession of such closer spaced holes, contacts 19, 20 will close when the first hole is encountered and will not open until the last in the series passes the wheel so that the duration of contact closure is measured by the number of successive holes passing the wheel.

The construction of a record sensing device as disclosed has particular novelty in the fact that the record card 10 may move in either direction past wheel 13 and the points will coact with the holes in the same manner for either direction of movement.

While there have been shown and described and pointed out the fundamental novel features of the invention as applied to a preferred embodiment, 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 claim:

What is claimed is:

A sensing device for a perforated record card comprising a lever having a pivot, contacts operated by said lever, a star wheel freely rotatable on the lever at a point remote from said pivot, said wheel having five tapered teeth, means for moving a perforated record past said wheel, resilient means acting on the lever to urge the wheel into engagement with the record so that a pair of adjacent teeth of the star wheel contact the record, the movement of a perforation past said pair of teeth causing one of them to rock into the perforation and also causing rocking of the lever to operate the contacts, said perforation having a dimension in the direction of its travel, at least one and a half times the amount required to enable the tooth to rock therein, whereby continued movement of the card will be effected without accompanying movement of the tooth until the trailing edge of the perforation has advanced to engage the tooth whereupon said trailing edge will rotate the wheel and raise it out of the perforation with accompanying rocking of the lever to return the contacts to their initial unoperated condition, whereby the period of operation of the contacts is measured by the extent of movement of the card required to rotate the wheel one tooth space.

JAMES M. CUNNINGHAM.

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