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DEVICE FOR THE ADJUSTMENT OF MEMBERS ESPECIALLY OF THE
TYPES IN MACHINES OPERATING WITH PUNCHED CARDS

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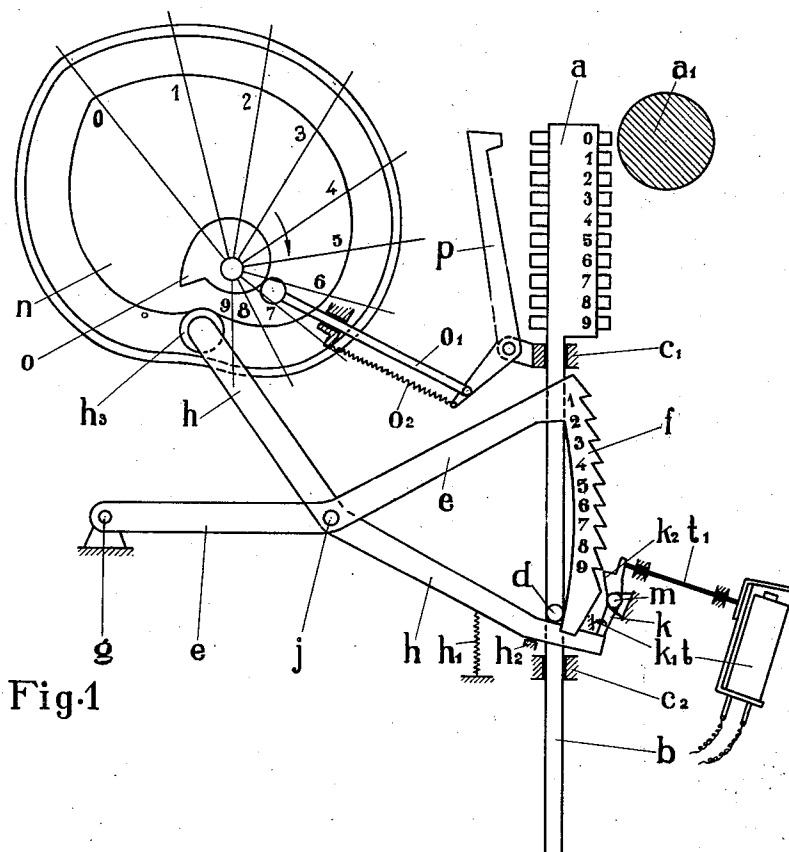


Fig.1

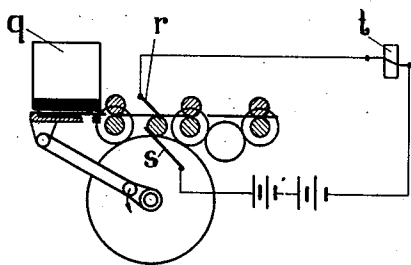


Fig.2

Inventor
Daniel H. Shuivenberg
By Karshickailis, C. H.

UNITED STATES PATENT OFFICE

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DEVICE FOR THE ADJUSTMENT OF MEMBERS ESPECIALLY OF THE TYPES IN MACHINES OPERATING WITH PUNCHED CARDS

Cornelis Hendricus Stuivenberg, Haarlem, Netherlands, assignor to Naamlouze Vennootschap "Kamatec", Amsterdam, Netherlands

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4 Claims. (Cl. 101—93)

The invention relates to an improvement in machines operated with perforated cards and more especially to the manner in which the movement of the members, and more especially the types, which are arranged on a rod or wheel, takes place.

In machines of this kind as hitherto designed the type supporting members are arranged in conformity with the perforations in the columns of the card, and by operating the hammers the printing of the signs (ciphers) arranged on the types is effected, whereupon the type supporting members are returned into zero position, where they were ready to be moved again by the next card in the same manner, i. e. in conformity with the perforations arranged therein. Each movement of the type supporting members must take place during one revolution of the main shaft of the machine and the period of time being at the disposal therefor must be sufficient to execute the operations in question.

Efforts have already been made to shorten this period of time and thereby to increase the speed of operation of the machine considerably by means of a device allowing the return movement of the type supporting members into zero position to be omitted, so that they can pass directly from the position imparted to them by a card into the position corresponding to the next following card.

In the drawing affixed to this specification and forming part thereof a device embodying my invention is illustrated diagrammatically by way of example. In the drawing Fig. 1 is a side elevation showing the parts in the position of rest, whilst Fig. 2 is a diagram of the electrical transmission of the feeler movements. In both figures so much of the device is illustrated as must be provided for each column of the cards.

Referring to the drawing, there is arranged in front of the printing roller a_1 a separate type carrier a for each column which carries the ten types for the ciphers 0-9 and which is fixed on a bar b , which is guided vertically in bearings c_1 and c_2 of the machine frame. To the bar b a pin d is fixed, which is situated between the double-armed levers e and h forming a pair of scissors. The lever e which is pivoted to the frame at g , carries a toothed segment f with nine teeth (1-9) and a journal j about which the second arm h can rotate. The lower arm of lever h is acted upon by a spring h_1 connected with the frame which always endeavours to draw this lever against a stop h_2 . The upper arm carries a roller h_3 , running in a groove of the cam disc

n , which during each rotation of the main shaft of the machine carries out one revolution in the direction of the arrow. The lower arm of lever h is held in its position of rest by a double-armed pawl k , pivoted to the frame at m and acted upon by a spring k_1 , its free end being formed with a tooth k_2 and abutting against the end of a bar t_1 , which is operatively connected to the armature of the electromagnet t .

This electromagnet t is connected in the circuit (Fig. 2), which whenever a card is fed from the card box q into the feeler device, is closed by the brushes r and s , when the brush r comes in contact through a perforation in the respective column of the card with the roller on which the brushes r and s do slide.

The form of the groove of the cam discs n , the illustrated position of which corresponds to the moment, at which the edge of the card arrives in the feeler device, is such, that as the card travels through the feeler device a progressive depression of the roller h_3 is brought about corresponding to the movement of the perforations in the columns for the ciphers 9, 8, 7 . . . 0. After having been farthest depressed by the section of the curve corresponding to the perforation 0 a short period of time, corresponding to the distance between this and the next following card is at disposal for the return movement of the roller h_3 into the illustrated position.

On the cam shaft is mounted another cam disc o governing the movement of the strikers p . Against the disc o is held applied by means of a spring o_2 the roller of the bar o_1 , which is pivoted to a lever mounted on the shaft carrying the strikers p . The form of the disc is such that a progressive oscillatory movement of the strikers towards the left is followed by a sudden movement in the opposite direction resulting in the operation of the strikers.

As appears from this description during the passage of a card through the feeler device each column first brings about a progressive depression of roller h_3 by means of the corresponding cam disc n . As long as the lever h remains locked by the pawl k , the lower end of the lever h , against which this pawl rests, serves as a center of rotation, the result of which is, that the arm e , which swings about the journal j , is lowered together with the toothed segment f fixed thereto, so that the teeth 9, 8, 7 . . . 1 move in succession past the tooth k_2 of the pawl. In case now that the perforation in the respective column (e. g. the one for the cipher 4) arrives under the brush r , at which moment the tooth 4 of the

rack *f* is located in front of the tooth *k*₂, the circuit of the magnet *t* is closed, whereby the bar *t*₁ turns the pawl *k* against the action of spring *k*₁. This brings about the locking of the toothed segment *f* and of the arm *e* and the release of the arm *h*, so that now the journal *j* becomes a fixed point and the progressive depression of the roller *h*₃ brings about the upward movement of the previously locked end of the arm *h*. By means of the pin *d* the arm *h* lifts the type carrier through the still remaining distance corresponding to the cipher 4 so that when the card leaves the feeler device, the type carrier *a* is in the position in which the type 4 has reached the printing position. At this moment the cam disc *o* has arrived in the position, in which takes place the sudden withdrawal of the bar *o*₁ by the spring *o*₂ whereby the strikers *p* are operated and for this column the cipher 4 is printed on the paper which moves along the printing roller *a*₁.

Owing to the movement derived from the cam disc *o* a short period of time (corresponding to the centric part of the disc) now follows for operating the strikers. During this period of time the return movement of the levers *h* and *e* into the position of rest is brought about, whilst directly thereafter follows a new although slight return movement of the strikers *p* whereby they are carried into the illustrated position so as to remove in time the pressure exerted on the operated types, so that under the influence of the springs arranged therein these types are lifted free from the paper which in the period of time between two adjustments must be shifted the distance between two lines.

As regards the movement derived from the cam disc *n* the following operation takes place: the roller *h*₃ is imparted a movement in the opposite direction, in the beginning of which the center of oscillation *j* is still fixed. For although the energization of the electromagnet *t* is only very short, the tooth *k*₂ nevertheless continues in locking the toothed segment *f* by the interlocking of its teeth with the tooth *k*₂ and by the tension of the spring *h*₁. The result is that the lower arm of lever *h* which turns around the journal *j* is lowered until the stop *h*₂ is reached. The spring *k*₁ can now withdraw the pawl *k*, whereby the toothed segment *f* is released and the arm *h* is locked again. The return of the roller *h*₃ into the illustrated position now brings about a similar return of the lever *e* and the toothed segment *f*, whereby the scissors formed by the levers *e* and *h* is opened again altogether.

This return movement of the levers is without influence on the pin *d*, so that the type carrier *a* retains its position, when the next card enters the feeling device.

As regards the next feeling operation three cases may occur:

1. If in the respective column the perforation is situated in the same place as in the previous card (indicating the cipher 4), the movements of both levers *e* and *h* forming scissors are repeated without any influence on the pin *d*, so that the type carrier *a* remains in position for the printing of the cipher 4 and this cipher is again printed.

2. If the cipher to be printed is less than 4, for instance 2, the lever *e* carries the pin along downwardly, after the tooth 4 of the toothed segment *f* has passed the tooth *k*₂ of the pawl *k* until according to the feeling operation, the locking of the toothed segment by the tooth 2 takes

place, whereby the type carrier has assumed the desired position for printing the cipher 2.

3. The cipher is higher than 4, for instance 7. The toothed segment is lowered until it is locked at the cipher 7 without coming into contact with the pin *d*, whereupon follows the remaining (upward) movement of the lever *h* through 7 type-distances, first through 4 type-distances without contact with the pin *d* and thereafter through 3 type-distances in contact with the pin *d* thereby bringing the type carrier into the position in which the feeling operation for the printing of the cipher 7 can take place.

In the cases 2 and 3 wherein a movement of the type carrier *a* must take place, this movement therefore takes place directly from the position already occupied into the required position, whilst the return movement of the scissor levers begins already during the period, in which the operation of the strikers takes place. As a result of this the speed of operation of the machine may be increased, because now there is no need, in order to avoid damage to the strikers, to wait until they have almost returned into their position of rest.

The invention may be applied also in the case where the types are arranged on a wheel, which may for instance be moved by means of a toothed segment by a bar such as *b* reciprocating in longitudinal direction, and it is evident that therefore the invention may also prove useful in the adjusting of other members, for instance counting discs.

I wish it to be understood that I do not desire to be limited to the exact details of construction shown and described for obvious modifications will occur to a person skilled in the art.

I claim:

1. In perforated-card operated mechanism in combination, a movable carrier, a row of printing members arranged on said carrier, a pair of double-armed levers pivotally connected like a pair of scissors, one end of one of said levers being pivoted to a fixed point, the opposite end of this and the other lever being arranged to engage said carrier, means arranged to disengageably lock the opposite end of said other lever, a cam member engaging the free end of said other lever, a card-controlled feeling device operatively connected with said locking means, means for unlocking said opposite lever end and means for limiting the movement of said carrier.

2. In perforated-card operated mechanism in combination, a movable carrier, a row of printing members arranged on said carrier, a pair of double-armed levers pivotally connected like a pair of scissors, one end of one of said levers being pivoted to a fixed point, the opposite end of this and the other lever being arranged to engage said carrier, a relay, means arranged to disengageably lock the opposite end of said other lever, a cam member engaging the free end of said other lever, a card-controlled feeling device operatively connected with said relay, and means under control of said relay for unlocking said opposite lever end and for limiting the movement of said carrier.

3. In perforated-card operated mechanism in combination, a movable carrier, a row of printing members arranged on said carrier, a pair of double-armed levers pivotally connected like a pair of scissors, one end of one of said levers being pivoted to a fixed point, a number of checks equalling the number of printing members formed on the free end of said lever, the opposite

ends of this and the other lever being arranged to engage said carrier, a double-armed lever arranged to disengageably lock said opposite lever end, a cam member engaging the free end of said other lever, a relay, a card-controlled feeling device operatively connected with said relay, and means inserted between said double-armed lever and said relay for unlocking said opposite lever end and for causing said double-armed lever to cooperate with said checks to set said carrier so as to bring a predetermined printing member into printing position.

4. In perforated-card operated mechanism in combination, a movable carrier, a row of printing members arranged on said carrier, a pair of double-armed levers pivotally connected like a pair of scissors, one end of one of said levers

being pivoted to a fixed point, a number of checks equalling the number of printing members formed on the free end of said lever, the opposite ends of this and the other lever being arranged to engage said carrier, a double-armed lever arranged to disengageably lock said opposite lever end, a cam member engaging the free end of said other lever, a relay arranged to control said double-armed lever, a card-controlled feeling device operatively connected with said relay, a striker arranged for the actuation of said printing members, another cam member mounted coaxially with said first cam member and means for establishing operative connection between said other cam member and said striker.

CORNELIS HENDRICUS STUIVENBERG.