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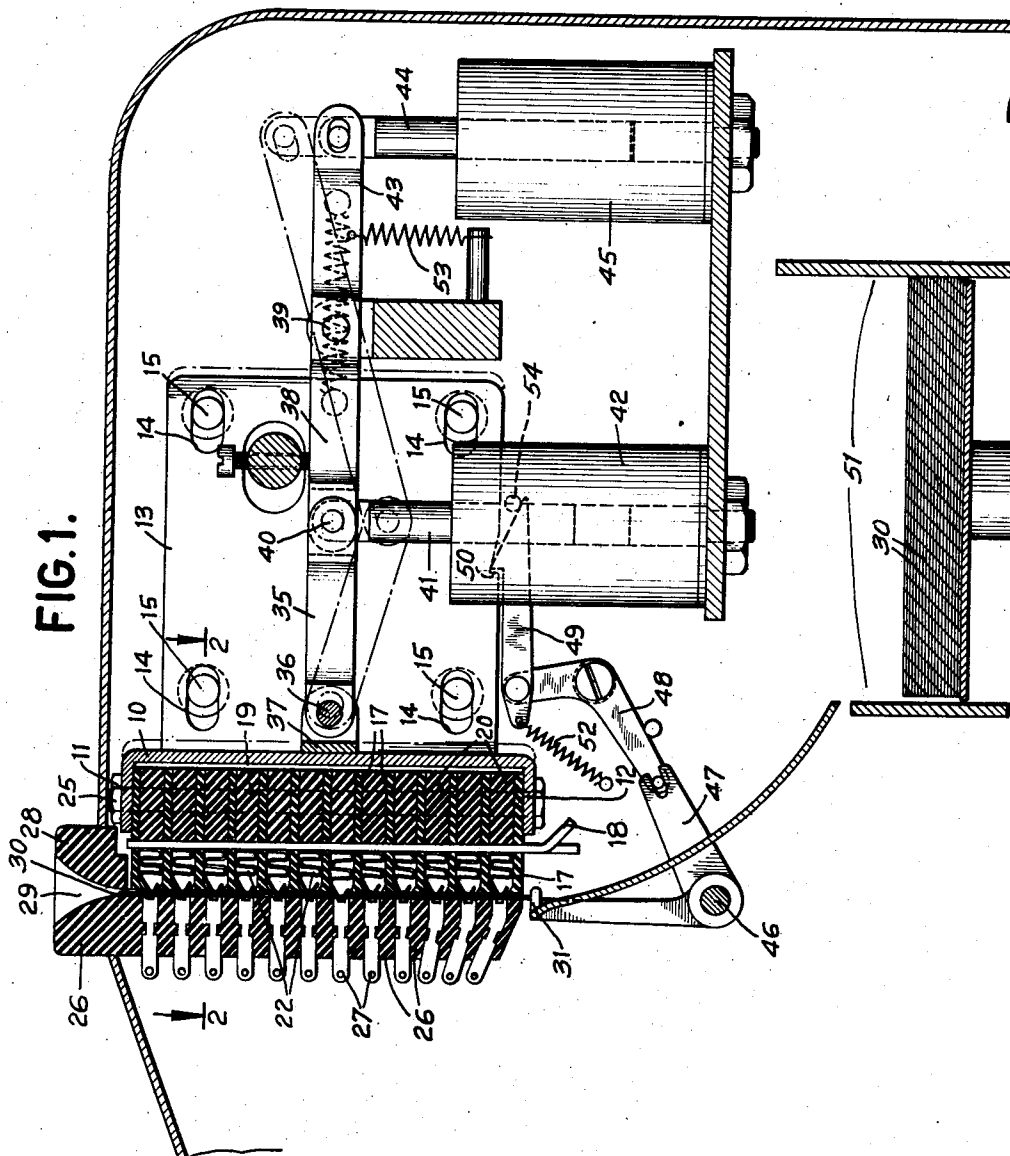
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CARD SENSING DEVICE

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CARD SENSING DEVICE

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The invention relates to electrical contact making means and more particularly to the type adapted to sense perforations in cards or other members to determine the pattern thereof.

The main object of the invention is to devise an improved construction of contact making means that will operate more efficiently than prior art constructions and which will not be affected by the presence of foreign matter such as dirt, dust, card chips, etc.

A still further object of the invention is to devise an improved assembly for the contact carrying frame by means of which one or more units may be easily duplicated to form a contact-making frame of a predetermined capacity.

A still further object of the invention is to avoid the use of flush contact surfaces between contact-making parts between which foreign matter may lodge and devise and arrange an improved construction of means adapted to make a firm electrical contact and which will not be affected by the presence of foreign matter.

A still further object relates to an improved means for making a common contact with a series of spring contact elements carried by the contact-making frame.

Another object of the invention is to devise an electromagnetically operated means for moving the contact-making frame by the energization of a magnet and which will be maintained irrespective of the deenergization of the magnet.

A still further object of the invention relates to an improved electromagnetically controlled means for positively returning the contact making frame to normal position.

Further and other objects and advantages will be hereinafter set forth in the accompanying specification and claims, and shown in the drawings, which by way of illustration show what is now considered to be the preferred embodiment of the invention.

In the drawings:

Fig. 1 is a cross-sectional view of the improved apparatus.

Fig. 2 is a sectional view on an enlarged scale with respect to Fig. 1 and is taken on the line 2—2 of Fig. 1.

Fig. 3 is a view showing parts which are intended to be assembled together widely detached from each other in order to show the form and construction of the various parts.

Fig. 4 is a view on an enlarged scale of assembled parts, showing the action of the sensing devices on a card to be sensed.

The improved contact making mechanism includes a U-shaped plate comprising a back plate 10, an upper integral plate 11, and a lower integral plate 12. The back plate 11 has a pair of integral guide plates, one of which is identified by numeral 13 in Figs. 1 and 2 and which is pro-

vided with guide slots 14 receiving guide studs 15 carried by a side frame 16, (Fig. 2). By the aforesaid guiding means the U-shaped plate which carries the contact making devices is guided for reciprocal movement for effecting the sensing operation.

The contact devices are preferably carried by parts described as follows: Upon the base plate 12 there is assembled a bottom plate 17 of insulating material which is apertured to receive a common contact bar 18 and a bolt 19. Overlying the bottom plate 17 there is assembled a contact carrying comb-plate 20 preferably of insulating material in order that a horizontal line of contact elements can be insulated from each other. The plate 20 is also apertured to receive the bolt 19 and is provided with a horizontal series of slots 21. Each slot 21 receives a contact-making spring 22 and the slot 21 is formed in the plate 20 back far enough to receive the contact bar 18 so that the rear end 22a of the contact-making spring 22 bears against the contact bar 18 by a normal compression in the contact-making spring 22 which is maintained by means now to be described. As best shown in Fig. 2 the slot 21 is just wide enough to receive the width of the spring 22 and the bar 18 and the slots 21 are covered by the plates 17 which are adjacent the plate 20 so as to form an aperture to receive the spring 22.

The contact-making portion of the contact spring comprises portions 22b and 22c which are bent to form the apex of a triangle, as shown in Figs. 3 and 4. The bottom plate 17 has an integral spring confining portion 17a cooperating with the portion 22c of the spring 22 while the portion 22b of the spring 22 is confined in the slot 21 by the integral spring confining portion 17b of the plate 17 above the plate 20. Thus it will be seen that each intermediate plate 17 of the assembly has two confining portions 17a and 17b and the top and bottom plates 17 of the assembly have preferably only one of the spring-confining portions 17b and 17a respectively. If so desired the top and bottom plates 17 may be constructed similar to the intermediate plates 17 if the ineffective spring-confining portions do not interfere with the rest of the apparatus.

It will be obvious that the contact springs 22 may have a movement in the slots 21 inwardly, but their outward movements are limited by the portions 17a and 17b of the plates 17. In the assembly springs 22 are compressed to maintain an initial compression to make firm contact with the contact bar 18. In assembling the apparatus the bottom plate 17 and plate 20 are held by the bolt 19, then the springs 22 are inserted in the slots 21, the bar 18 not having been inserted at this time. Next the intermediate plate is assembled over the plate 20 and bolt 19 slightly

raised to hold this plate 17. Next the bar 18 is inserted which will cause the springs 22 to be compressed to secure the initial compression.

The above described assembly is duplicated so as to provide a vertical column of contact springs 22 of a predetermined number with the bar 18 making a common contact with a vertical column of springs 22. As best shown in Fig. 3 the forward ends of the plates 20 are formed or machined to provide relief edges 23 and 24 to receive the spring-confining portions 17a and 17b of the plates 17. Obviously, the threaded bolt 19 and nut 25 (Fig. 1) retain the parts in assembled position.

The other portion of the contact making apparatus comprises a plate 26 of insulating material in which is embedded contact bars 27, one for each contact making spring 22. The plate 26 and adjacent guide member 28 are flared to provide a card receiving slot 29 so that a card 30 to be analyzed may be inserted therein downwardly between the sets of contacts to rest upon a card stop 31. The card 30 is provided with apertures 32 (Fig. 4) of a form suitable to receive the triangular extremity 22b, 22c of the spring 22 and thus to make contact with a related contact bar 27.

A relatively important feature of the invention consists in providing each bar 27 with a notch or slot 33 so that the triangular portions 22b and 22c of a related spring make firm contact with edges 33b and 33c, respectively, of the slot 33 before the extremity of the spring 22 touches the bottom of the slot 33. In prior constructions, dust, dirt, or specks of paper prevented contact between flush surfaces of contact engaging elements whereas in the present construction foreign matter could not prevent contact in view of the peculiar triangular shape of the extremity of the springs 22 and the slots 33.

The preferred means for causing the frame carrying the contact springs 22 to be moved to the left to analyze the card will now be described: A toggle lever 35 (Fig. 1) is pivoted at 36 to a bracket 37 attached to back plate 10 and a companion toggle lever 38 is pivoted to a fixed rod 39. The mid-connection 40 connects the toggle levers 35 and 38 and also to the core 41 of a magnet 42. The toggle lever 38 has an extension 43 pivotally connected to a core of a magnet 44. When the latter is energized by suitable control means the toggle levers are rocked from the dotted line position in Fig. 1 to the full line position with the mid connection 40 beyond the center line of the toggle thereby causing the sensing operation and holding the frame in moved position by means of a spring 53 irrespective of the deenergization of magnet 45. After the sensing operation the retracting magnet 42 is energized by any suitable control means and its core 41 which was previously elevated is now depressed, thus positively rocking the contact carrying frame back to normal position.

The card stop 31 is pivoted to a rock shaft 46 and to said shaft there is secured an arm 47 having a connection to a bell crank 48, and on the latter there is pivoted a hook 49 engaging a shoulder 50 of a notch in the side plate 13.

After a sensing operation the movement of plate 13 to the right will cause its shoulder 50 to engage the hook 49 and move the latter to the right, rocking bell crank 48 clockwise, arm 47 and shaft 46 counterclockwise, thus moving card stop 31 to the left. The card is now free to drop by gravity to a storage hopper 51. As the hook

49 is moved to the right a stationary pin 54 will ultimately cause the hook 49 to be disengaged from the shoulder 50 so that a spring 52 will move the hook 49 to the left, rock the bell crank 48 counterclockwise, the arm 47 and shaft 46 clockwise, thus moving the card stop 31 in position to stop the card next fed or manually placed into a sensing position.

The common contact bar 18 may be connected to one side of a source of electrical power supply while the correlated vertical column of contact springs 22 may be connected individually to the electrical devices they are to control, and the other side of the electrical power supply is connected to a common connection for the electrical devices. Thus the contact making devices may selectively control any desired electrical devices, and none are shown herein as they will vary with the use of the preferred embodiment.

I claim:

1. A contact making mechanism comprising an intermediate plate of insulating material formed in a comb-shape by a plurality of recesses formed at one extremity of said plate, spring contact making elements fitting in each of said recesses, and a plurality of plates of insulating material separate from said intermediate plate and positioned at each side of the intermediate plate for covering said recesses and having integral portions overlying part of the aforesaid recesses and engaging extremities of said spring contact making elements for confining the latter in said recesses.

2. A contact making mechanism comprising an intermediate plate of insulating material formed in a comb-shape by a plurality of recesses formed at one extremity of said plate, individual spring contact elements fitting in each of said recesses, a plurality of plates of insulating material positioned at each side of the intermediate plate for covering said recesses and having integral portions overlying part of the aforesaid recesses for confining the spring contact elements in said recesses, and an electrical conducting bar for each of said spring contact elements passing through a related recess whereby said bar makes electrical contact with a related spring contact element and causes an initial tension of said spring contact element.

3. A contact making mechanism for a perforated sheet comprising a row of individual contacts each comprising a bar provided with a notch forming contact making edges, a coordinated contact making mechanism comprising an intermediate plate of insulating material formed at one extremity with a plurality of recesses to form a comb-like extremity, said plate having bevelled edges at the extremity of the plate formed with the recesses, individual spring contact elements fitting in each of said recesses, a plurality of plates of insulating material positioned at each side of the intermediate plate for covering said recesses and having integral portions fitting the bevelled edges of the intermediate plate for confining the spring elements in said recesses, each of said contact elements being bent at its extremity to form the apex of a triangle which makes contact through a perforation of the sheet with the edges of a notch of a related bar and with said edges prior to the contact of the extremity of the contact element with the bottom of the notch.

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