

Nov. 26, 1957

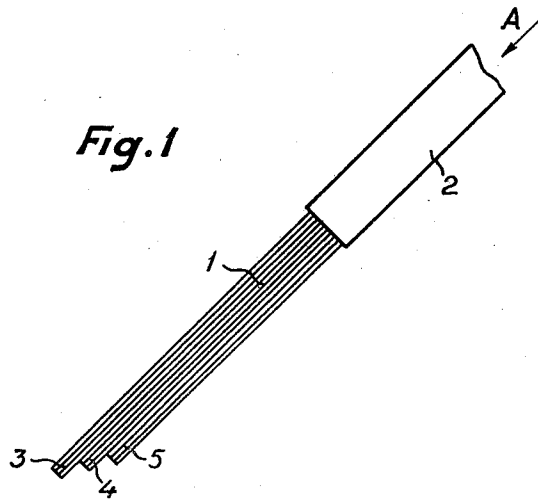
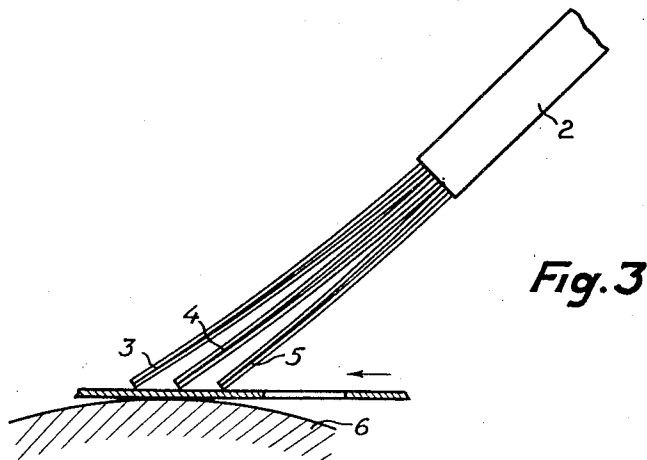
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BRUSH FOR SENSING PERFORATED RECORDS

Filed July 12, 1954

2 Sheets-Sheet 1



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*Fig. 4*

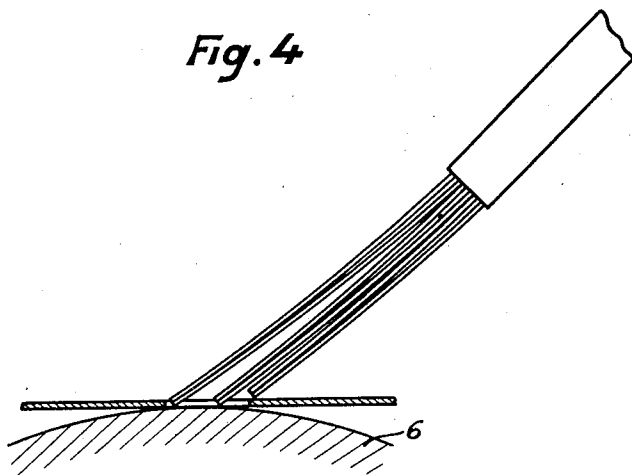
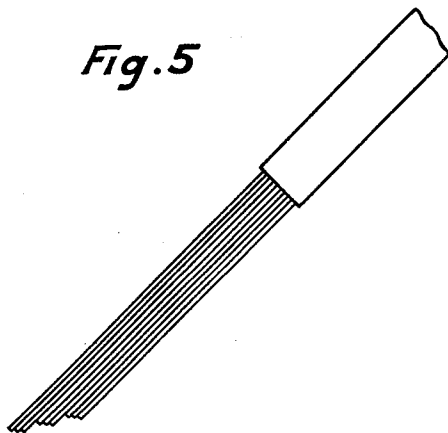


*Fig. 5*



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## BRUSH FOR SENSING PERFORATED RECORDS

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Application July 12, 1954, Serial No. 442,650

Claims priority, application France July 16, 1953

7 Claims. (Cl. 200—166)

The invention relates to sensing brushes used to sense perforated cards in perforated card or perforated strip machines.

The said brushes are generally formed of a certain number of metal wires held at one end in a metal sleeve, while the other end of the wires forms a flexible bundle adapted to make electrical contact with a contact plate or roller by way of the perforations in the cards.

In perforated card machines wherein the said cards are sensed while moving, one or more brushes are fixed to a brush-holder which is so fixed to the machine that the wire bundle of each brush senses one column on the card and closes an electrical circuit each time that a perforation passes below the brush.

The perforations in the cards conventionally used in machines of this type are of a shape which is elongated in the direction of card movement in order to increase the time during which the brushes are in contact with the contact plate or roller. In order to increase still further the time during which the brushes are in contact with the said plate or roller, the brushes have also been made with a shape elongated in the direction of card movement, the cross-section of the bundle of wires being of elongated or rectangular shape. Furthermore, the free end of the brushes is bevelled in order that the wires may all be applied simultaneously to the card and make contact seriatim, by way of the perforation, with the contact plate or roller. The electrical contact thus obtained was often not very satisfactory, since when the wires making contact through the perforation encountered the rearward edge of the perforation, the said wires were lifted by the said edge as they emerged from the perforation, and this would often raise the other wires then making contact through the perforation, the contact thus being interrupted or rendered unsatisfactory.

To obviate this disadvantage, it has been proposed to use two brushes not having extended bundles and to place the said two brushes one behind another with such a distance therebetween that the wires of the first brush, when emerging from the perforation, did not by their movements disturb the wires of the second brush then in contact by way of the perforation. To the same end, it has likewise been proposed to combine two or three brushes by sweating or fixing the holders thereof together, or to combine a plurality of separate wire bundles in a moulded sheathing to form a brush of elongated or rectangular cross-section and consisting of two or three wire bundles, each of which was separated from the adjacent bundle by a small unobstructed space.

However, it was difficult and relatively expensive to manufacture this type of brush having two or three bundles, and contact was not always as satisfactory as had been hoped.

It is another object of the present invention to obviate these disadvantages, and the invention provides a brush which gives very reliable contact while being easier to manufacture.

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In accordance with the invention, the brush is formed by a certain number of metal wires forming a single bundle held at one end by a sheathing, the said bundle being of elongated or rectangular cross-section, the said brush being characterised in that, at the other end, that part of the bundle which is applied to the card is stepped or saw-toothed. This special shape of the free end of the bundle causes, when the brush is applied to the card at the pressure normally exerted to obtain satisfactory contact, a space to be formed between the wires associated with one step and the wires associated with the following step. The last-mentioned space is further increased by reason of the fact that the end of the wires which in each pack are furthest apart in the direction of card movement are placed laterally relatively to the ends of the wires of the same pack which are nearest to the card arrival side. Thus, the wires are applied to the card as shown in Figure 3, so that when the wires associated with one pack or step emerge from the perforation by being lifted by the rear edge thereof, the last-mentioned wires do not raise the wires of the following stage by reason of the said space between the wires of each step.

In the drawings:

Figure 1 is an elevation of a brush according to the invention,

Figure 2 is a view as seen in the direction of the arrow A in Figure 1, this view being to an enlarged scale as compared with Figure 1,

Figure 3 illustrates the brush of Figure 1 as applied to a card,

Figure 4 illustrates the brush as shown in Figure 1 in a position wherein the wires of one stage are emerging from the card perforation, and

Figure 5 illustrates a brush according to the invention wherein the wires of each stage are of slightly different lengths.

Figure 1 illustrates a brush according to the invention wherein the bundle 1 of metal wires is fixed in a metal sheathing 2. The bundle is formed of wires which are so interconnected that the left-hand end of the bundle is of stepped or saw-tooth form.

The brush bundle illustrated in Figure 1 comprises three such steps or stages which are indicated by 3, 4 and 5. When the said brush is applied to the card at the pressure normally exerted for sensing cards in perforated card machines, the wires of one stage separate from the wires of the following stage so that a space is formed between each stage or sawtooth. This is due to the shape of the bundle and has the effect of preventing the wires of one stage, when the last-mentioned wires are raised by the edge of the perforation, from interfering with or raising the wires of the following stage while the last-mentioned wires are in contact with the contact roller 6. This effect is illustrated in Figure 4. The assembly of the wires in packs and the assembly of a number of packs in one sheathing is a relatively easy operation and resembles the operation carried out for manufacturing brushes with an unstepped bevelled edge. However, the brushes according to the invention can, after assembly, be used just as they are and need not have their ends bevelled as was necessary after the assembly of the wires of unstepped brushes. This feature makes the manufacture of brushes according to the invention easier than the manufacture of bevelled brushes.

It should be noted that the effect produced of obtaining satisfactory contact does not vary greatly if the wires of a single stage are not absolutely the same length as measured from the sheathing in the manner shown in Figure 1. The said length can vary slightly as between the wires of a single stage, as shown in Figure 5, but this does not prejudice the result obtained. The same effect

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of ensuring satisfactory contact could of course be produced by combining the wires in the sheathing without previously assembling the said wires in packs in the manner hereinbefore described, the bundle then being given a stepped shape by grinding the end of the bundle to the desired shape.

I claim:

1. A brush for sensing perforated cards or strips comprising a plurality of flexible metallic wires of essentially straight form and bound together at one end to form a single bundle of essentially straight form and of elongated or rectangular cross-section, the other end adapted to be applied against the card or strip to be sensed having a stepped form, each step comprising a plurality of wires in the direction of the length of said elongated or rectangular cross-section.

2. An electric conductive brush for sensing the perforations of perforated cards or strips in motion in record card or record strip controlled machines said brush being constituted by flexible wires of essentially straight form secured together at one end by appropriate means to constitute a single bundle of essentially straight form, said wires being at their free ends of different lengths to form with said ends a determined number of steps or saw teeth, each step or saw tooth comprising several wires of substantially the same length, the distance between adjacent wires, at their free ends, being the same for adjacent wires belonging to one same step as for adjacent wires belonging to two different steps, the outlines of said steps being such that when said brush is in sensing position with said steps or saw teeth applying against a card, the free end of a wire belonging to a step will be spaced from an immediately adjacent wire of an adjoining step a distance greater than the distance between adjacent wires belonging to one same step so as to prevent the wires of one step to interfere with the wires of another step during the sensing of said perforations.

3. A brush for electrically sensing the perforations of perforated records during their motion in record controlled machines, comprising a plurality of conductive wires fixed together at one end to form a single bundle of essentially straight form, the outline of which, at the other end and seen in a direction perpendicular to a plane perpendicular to the surface of the record and comprising the longitudinal axis of a wire, is of a stepped form, each step comprising in said plane at least 2 wires and being so adapted that they may be in contact with a record to be sensed when said brush is in sensing position.

4. A brush for sensing perforated records comprising a row or a plurality of identical rows of flexible wires bound together at one end to form a single bundle of essentially straight form, the wires in the or each row having their other ends free and arranged to form steps or saw

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teeth, each step or saw tooth of the or each row comprising a plurality of wires and having such an outline that all said steps may be in contact with a record to be sensed when said brush is in sensing position.

5. A brush for sensing perforated cards or strips comprising a plurality of flexible metallic wires bound together at one end to form a single bundle of elongated or rectangular cross-section, the other end adapted to be applied against the card having a stepped form, the extremities of two consecutive steps being on a line forming one side of a triangle delimiting an open space, a second side of said triangle being formed by the leg of a wire belonging to a first one of said steps, the third side being formed by the extremities of several wires belonging to the second of said steps.

6. In a record analyzing device for sensing perforated cards (or strips), in combination, a brush comprising a plurality of straight flexible metallic wires bound together to form a single bundle of straight wires composed of several adjacent groups of said wires, the wires of a group substantially having the same length, the wires of different groups having different lengths, so that the free end of the brush presents a staggered outline, and one contact member normally engaged by the free end of the brush, the latter being applied and held against said contact member in such a position, involving a curvature of the brush wires, that the different groups of said straight brush wires move apart from each other.

7. A brush for sensing perforated cards or strips, comprising a plurality of flexible metallic wires of essentially straight form bound together at one end to form a single bundle of essentially straight form and of elongated or rectangular cross-section, the other end adapted to be applied against the card or strip to be sensed having a stepped form, each step comprising, measured in the direction of the length of said elongated or rectangular cross-section, a plurality of wires, the free ends of which having such a length that, when the brush is applied in sensing position against a card to be sensed, the wires of said plurality of wires may apply on the card or strip to be sensed with their ends one besides the other measured in a direction perpendicular to the direction of movement of said card or strip.

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