March 11, 1969 H. HARTMANN 3,432,645

SENSING ARRANGEMENT FOR PERFORATED DATA CARDS

Filed April 15, 1965 Sheet 1 of 4

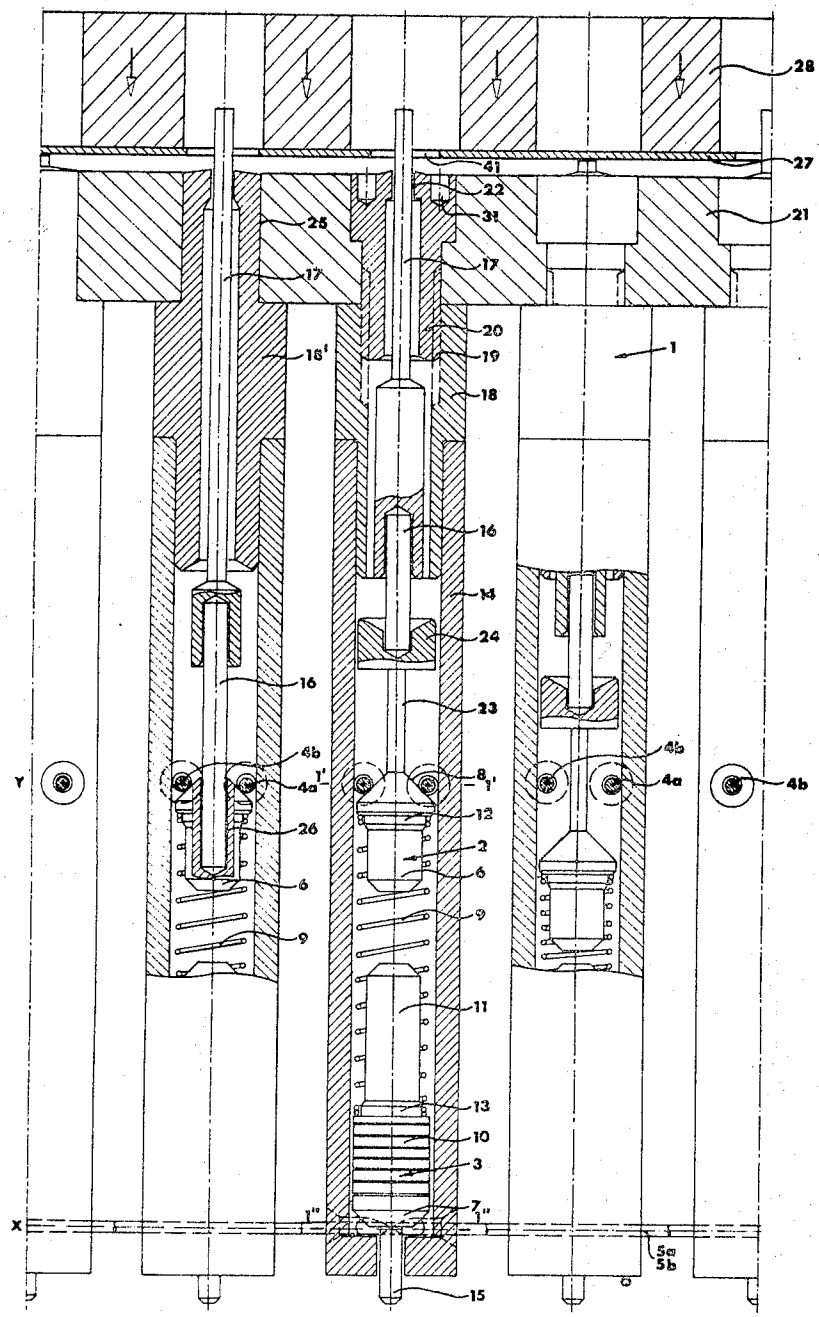


Fig. 1

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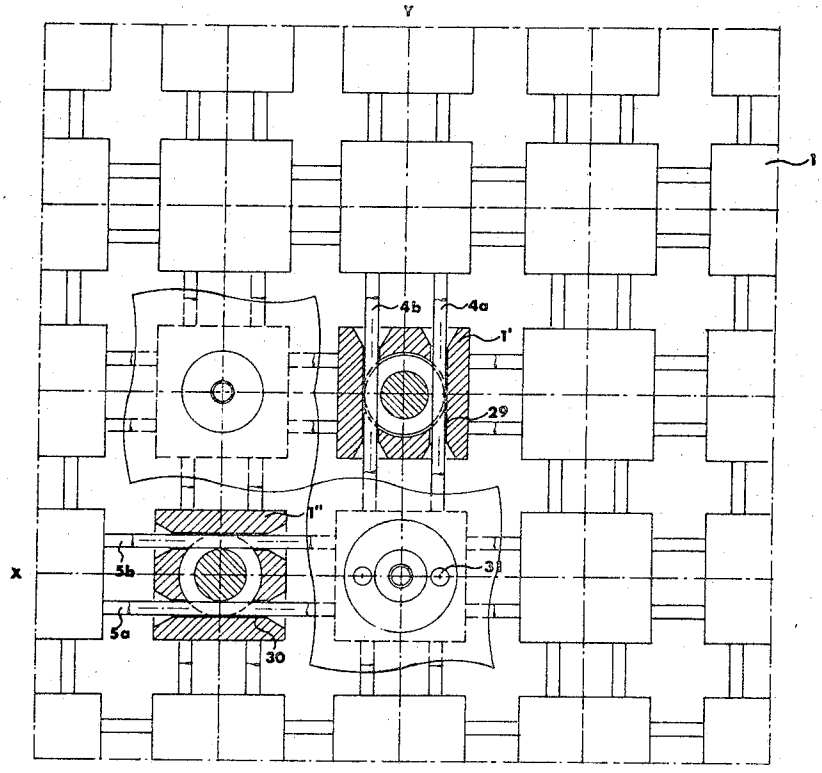
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SENSING ARRANGEMENT FOR PERFORATED DATA CARDS

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Fig.2



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SENSING ARRANGEMENT FOR PERFORATED DATA CARDS

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Fig.3

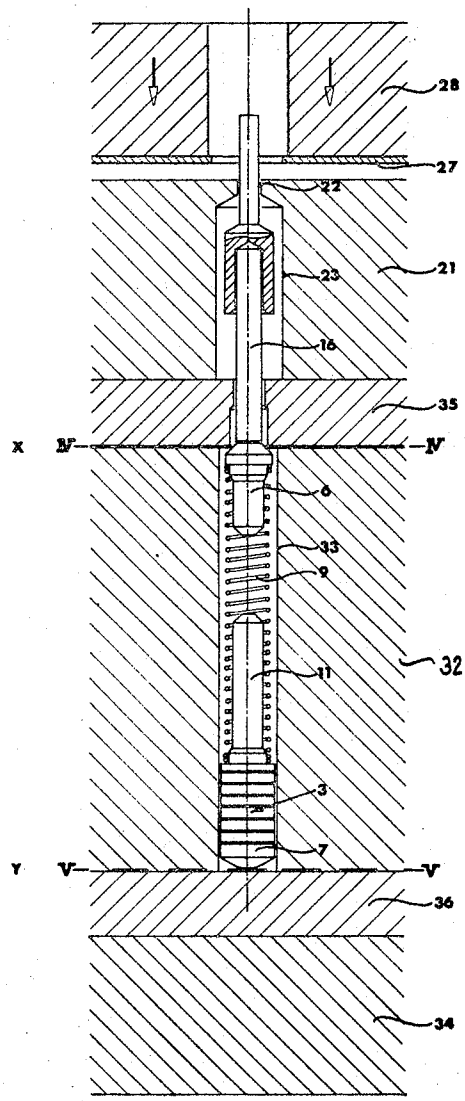


Fig.4

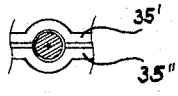
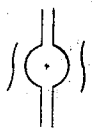


Fig.5



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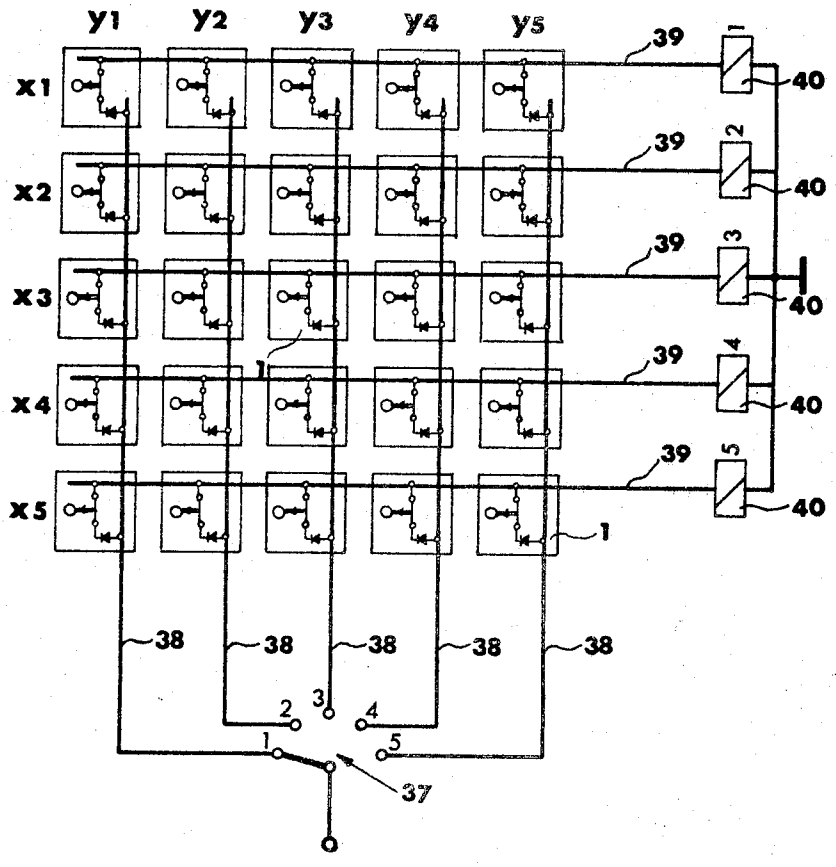
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SENSING ARRANGEMENT FOR PERFORATED DATA CARDS

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Fig.6



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3,432,645

SENSING ARRANGEMENT FOR PERFORATED DATA CARDS

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U.S. Cl. 235—61.11 20 Claims
Int. Cl. G06k 7/01; H01h 43/08

ABSTRACT OF THE DISCLOSURE

A sensing arrangement for perforated data cards in which a plurality of elongated feelers is carried by a support to form a sensing field. The feelers are mounted in the support movable between an active position projecting with end portions thereof beyond an end face of the support and an inactive position. The arrangement includes also springs cooperating with the feelers to bias the latter to the active position and means for indicating the positions of the respective feelers, so that when a perforated data card is pushed against the end face, some of the feelers will stay in the active position while others will be moved to the inactive position, whereby the position of the perforations in the data card may be ascertained.

The present invention relates to a sensing arrangement for perforated data cards.

Sensing arrangements for data cards and especially for perforated data cards are used to an ever-increasing extent in calculating machines, or for the control of tool machines and the like. Mechanical sensing arrangements for perforated data cards or photocells for scanning of perforated data cards are used for the control of complex machines, whereby extensive operating instructions are fed into the machine. The operating instructions for each operation of the machine is usually read line by line by the sensing or scanning device from the respective data cards and transmitted to a memory device and from there to the machine whereupon the data transmitted to the memory device is erased and subsequently thereto the information for the next working cycle is transmitted again to the memory device. Such arrangements are rather costly and are not suitable for the automatic operation of machines which have to perform a limited number of operations.

It is an object of the present invention to provide for a sensing arrangement for perforated data cards which is especially adapted for the automatic control of machines which have to carry out a limited number of operations.

It is an additional object of the present invention to provide for a sensing arrangement for perforated data cards adapted to transmit directly the data sensed by the arrangement to the respective machine elements without the interposition of a memory device.

It is a further object of the present invention to provide for a sensing arrangement in which perforated data cards can be used which are identical with data cards used for the necessary paper work concurrent with the operations carried out by the machine and which are based on a binary numerical system.

It is yet an object of the present invention to provide for a sensing arrangement of the type mentioned in which the components of the arrangement can easily be assembled and disassembled when necessary for instance, for repair purpose, and also in such a manner that the arrangement can be adapted quickly and efficiently for different purposes.

Finally, it is also an object of the present invention to provide for such a sensing arrangement which is composed of relatively few and simple parts so that the arrangement can be manufactured at reasonable cost and will perform trouble-free for an extended period of time.

With these objects in view, the sensing arrangement for perforated data cards, according to the present invention, mainly comprises support means having an end face, a plurality of sensing means carried by the support means to form a sensing field and wherein each of the sensing means includes elongated feeler means mounted in the support means movable between an active position in which an end portion of the feeler means projects a predetermined distance beyond the end face and an inactive position in which the aforementioned end portion is nearer to the end face than in the active position, a contact portion on the feeler means spaced from the end portion thereof, rectifier means arranged axially spaced from the feeler means and having a first and a second terminal end, and electrically conductive spring means between the feeler means and the rectifier means and electrically connected at opposite ends thereof to the contact portion of the feeler means and the first terminal end of the rectifier means. The spring means are biased so as to tend to keep the feeler means in the active position. The arrangement includes further first conductor means arranged so as to contact the contact portion of the feeler means of each sensing means, the feeler means of which is in the active position, and second conductor means electrically connected to the second terminal ends of the rectifier means of all of the sensing means, whereby when a perforated data card is pushed against the end face of the support means with some of the end portions of the feeler means protruding through the perforations of the data card and the end portions of other feeler means engaging the data card, said other feeler means will be moved from the active to the inactive position.

The plurality of sensing means are preferably mounted adjacent each other in the support means to form a sensing field in which the plurality of sensing means are arranged in adjacent rows extending in a first direction and in which the sensing means in adjacent rows are respectively arranged in groups respectively aligned in a second direction. In this arrangement the plurality of first conductor means, one for each row of sensing means, will extend in the first direction and respectively contact the contact portion of the feeler means of all sensing means of the respective row which are in the active position, whereas the plurality of second conductor means are arranged, one for each group of sensing means, extending in the aforementioned second direction to be respectively electrically connected to the second terminal ends of the rectifier means in the respective group of sensing means.

The conductor means are preferably in the form of integral conductors and preferably, each of the sensing means includes also an elongated, hollow housing of insulating material in which the feeler means, the rectifier means and the spring means of the sensing means are respectively housed and each housing is formed with axially spaced bores therethrough extending in direction transverse to the axis, respectively in the first and the second direction, and through which the integral conductor means are respectively threaded in such a position that the first conductor means are contacted by the contact portion of the feeler means when the feeler means is in the active position, whereas the second conductor means are arranged to make contact with the second terminal ends of the rectifier means in the respective housing. Each of the conductor means may be constituted by a pair of spaced and parallel conductors, and the contact portion of the feeler means as well as the second terminal

end of the rectifier means may have conical contact surfaces respectively arranged between and engaging at diametrically opposite sides thereof the pair of conductors forming the first and the second conductor means. In this arrangement there are no soldered connections between the contact portion of the feeler means or between the second terminal end of the rectifier means and the corresponding conductor means and the spring means between the feeler means and the rectifier means will assure a proper contact between the last mentioned elements and the corresponding conductor means.

The rectifier means is preferably in the form of a selenium rectifier in which a plurality of selenium plates are arranged between the terminal ends of the rectifier means, however, if a higher output is desired it is also possible to use silicon or germanium rectifiers.

The feeler means, the spring and the rectifier means are loosely housed, respectively guided in the respective insulating housing so that during movement of the feeler means a slight wiping action will be performed at the contacting surfaces which will lead to a self cleaning of the contacts.

The support means is one arrangement according to the present invention includes a supporting plate which has an upper surface constituting the aforementioned end face, and the plate is formed with a plurality of bores therethrough, whereas the housing means of each of the feeler means has an upper portion secured in the respective bore of the plate. This provides for an arrangement which can be assembled and disassembled in a very efficient manner and in which the housing of each sensing means protects the components arranged therein from mechanical damage and contact with dirt or dust.

When the whole sensing arrangement has to be provided in a very limited space, or when the sensing field has to be arranged with a spacing of adjacent sensing means in the order of 2.5 mm. and less, the support means are preferably constituted by a plurality of superimposed plates of insulating material which are formed with a plurality of bores therethrough in which the aforementioned components of the sensing means are respectively housed, whereas the conductor means are constituted by printed circuits provided on some of the plates forming the support means and which are arranged in such a manner so as to make electrical contact with the contact portion of the respective feeler means and the second terminal end of the respective rectifier means. The conductor carrying plates may be formed for instance from laminated paper on which a thin layer of copper is applied which is etched in a known manner to provide the circuit means thereon which are then protected by a very thin layer of silver or gold which may be applied by vapor deposition. One of the conductor carrying plates is sandwiched between a front plate and an intermediate plate and the other conductor carrying plate is sandwiched between the intermediate plate and a backing plate which is not perforated.

The novel features which are considered as characteristic for the invention are set forth in particular in the appended claims. The invention itself, however, both as to its construction and its method of operation, together with additional objects and advantages thereof, will be best understood from the following description of specific embodiments when read in connection with the accompanying drawings, in which:

FIG. 1 is a partial cross section through a sensing arrangement according to the present invention;

FIG. 2 is a schematic partially sectioned top view of the arrangement shown in FIG. 1;

FIG. 3 is a partial cross section similar to that shown in FIG. 1 and showing an arrangement in which the support means are constituted by a plurality of superimposed plates;

FIG. 4 is a cross section along the line IV—IV of FIG. 3;

FIG. 5 is a cross section taken along the line V—V of FIG. 3; and

FIG. 6 is a wiring diagram for an arrangement according to the present invention.

Referring now to the drawings and more particularly to FIG. 1 it will be seen that the sensing arrangement according to the present invention comprises a plurality of sensing means **1** each including an elongated feeler means **2** and a rectifier means **3**. As shown in FIG. 2, the plurality of sensing means **1** are arranged adjacent each other to form a sensing field in which the plurality of sensing means are arranged in adjacent rows extending in a first direction, indicated by the dash-dotted line Y, whereas the sensing means in adjacent rows are respectively arranged in groups respectively aligned in a second direction, indicated by the dash-dotted line X which extends normal to the first direction. Each of the feeler means **2** has a contact portion **6** having an upper substantially conical surface **8** arranged to make contact with a pair of conductors *4a* and *4b* in the manner as shown in FIG. 1. The rectifier means **3** has an upper terminal end **13** and a lower terminal end **7** which has preferably frustoconical contact surface to make contact with a pair of conductor means *5a* and *5b* extending in the direction X in the manner as best shown in FIG. 2. The conductor means **4** and **5** which connect the sensing means to each other are preferably formed from silver alloy which may be covered by a thin layer of gold applied thereon for instance by vapor deposition. A coil compression spring **9** of electrically conductive material is arranged between the contact portion **6** of each feeler means **2** and the upper terminal end **13** of the corresponding rectifier means **3** to press the contact surface **8** of the feeler means against the conductor means *4a* and *4b* and the contact surface **7** forming the lower terminal end of the respective rectifier means **3** against the conductor means *5a* and *5b*.

The rectifier means **3** may include a plurality of selenium plates **10** arranged superposed upon each other between the upper terminal end **13** and the lower terminal end **7** of the respective rectifier means **3**. A pin **11** fixedly connected to the upper terminal end **13** of each rectifier means projects through the interior of the coil spring **9** toward a corresponding pin portion of the contact portion **6** of the feeler means **2** and the end convolutions of the coil spring **9** are in tight contact with a cylindrical portion **12** on the contact portion **6** and with a corresponding cylindrical portion on the upper terminal end **13**, as shown in FIG. 1, to provide perfect contact between the opposite ends of the spring **9** and the contact portion **6** and the upper terminal end **13** of the rectifier means. The selenium plates **10** are pressed thus by the compression spring **9** and the upper terminal end **13** against the lower terminal end **7** of the rectifier means.

The feeler means **2** and the rectifier means **3** including the spring **9** sandwiched therebetween are arranged in a hollow preferably cylindrical housing **14** which is formed from insulating material, for instance nylon. A pin **15** fixed to the lower terminal end **7** of the rectifier means projects through an axial bore in the bottom of the housing **14** and beyond the bottom face thereof. The contact portion **6** of each feeler means is connected by an insulating pin **16** in the manner as shown in FIG. 1 with an axially aligned elongated feeler pin **17**.

The housings **14** of the plurality of sensing means **1** are supported on support means which include a support plate **21** having a top surface and being formed with a plurality of bores extending from the top surface substantially normal thereto through the plate, arranged spaced from each other according to the desired spacing of the sensing means **1** from each other.

To connect the respective housing with the plate **21** in axial alignment with the respective bore through the plate, the arrangement may include an insert member **20** tightly fitted in a stepped bore through the plate **21** and provided at its bottom end projecting beyond the bottom

surface of the plate with an outer screw thread, as shown in the central portion of FIG. 1. The bore in this case is preferably a stepped bore having a large diameter portion adjacent to the upper surface of the plate **21** and a small diameter portion ending at the bottom face of the plate to form a shoulder face between these portions against which a corresponding shoulder face of insert member **20** abuts. The insert member **20** is formed with an axial bore therethrough having at its upper end a small diameter portion **22** for guiding the feeler pin **17**. In this arrangement, a cylindrical member **18** formed with an axial bore therethrough is tightly fitted with its lower small diameter end into the upper end of the housing **14** and the bore of the member **18** is at an upper portion thereof provided with an inner screw thread **19** threadingly engaged with the outer screw thread on the bottom end portion of the insert member **20**. In this case the contact portion **6** of the feeler means **2** is preferably integrally connected by a rod **23** to an abutment member **24** having an axial blind bore in which the lower end of the insulating pin **16** is fitted, whereas the upper end is housed in a corresponding bore in the enlarged lower portion of the feeler pin **17**.

A slightly different arrangement is shown for the feeler means at the left side of FIG. 1 in which the plate **21** is formed with a straight cylindrical bore **25** therethrough and in which a cylindrical member **18'** having opposite end portions of reduced diameter is tightly fitted with one of its end portions in the bore **25** and with its other end portion in the bore of the housing **14**. The cylindrical member **18'** is formed with an axial bore therethrough having at its upper end a reduced diameter so as to guide the feeler pin **17**. In this arrangement the insulating pin **16** is preferably tightly fitted at its lower end thereof in a corresponding blind bore **26** through the contact portion **6** of the feeler means, whereas the upper end of the pin **16** is housed in a bore formed in an enlarged bottom end portion of the feeler pin **17**. The last mentioned arrangement has the advantage over the first mentioned arrangement that the sensing means can be placed closer to each other, whereas the first mentioned arrangement has the advantage that the housing means including the parts **14** and **18** can be more easily assembled with the plate **21** than in the second mentioned arrangement. It is also possible to make the feeler pin of insulating material and to connect it directly to the contact portion **6** of each feeler means.

As mentioned before, the individual sensing means are arranged aligned with each other in two directions, for instance arranged aligned along two coordinates X and Y including right angles with each other. Each of the housings **14** is provided with a pair of parallel bores **29** extending in a plane normal to the axis of the housing in the direction Y therethrough, as shown in FIG. 2 for the sectioned sensing means **1'** (which cross section is taken along the line **1'—1'** of FIG. 1), and at a lower elevation with a pair of second bores **30** extending parallel to each other and in the direction X, that is normal to the direction of the bores **29**, as shown in the sections sensing means **1''** (which cross section is taken along the line **1''—1''** of FIG. 1), so that the conductors *4a*, *4b* as well as the conductors *5a* or *5b* may be threaded through the bores **20** and **30**, respectively. To facilitate threading of the conductors through the bores, the latter are preferably counter-bored at opposite ends. The insert member **20** is preferably provided at its upper end with a pair of spaced blind holes **31** which may be engaged with a corresponding tool to facilitate threading of the member **18** onto the threaded lower end of the insert member.

The contact portion **6** of the feeler means, the pin **11**, and the upper and lower terminal ends **13** and **7** of the rectifier means are preferably likewise formed from silver alloy and may be covered at the outer surface thereof with a thin layer of gold which may be applied by vapor deposition.

The assembly of the arrangement described above is exceedingly simple. Rectifier means **3** are placed first in the bottom end of each housing **14** with the pin **15** projecting through the axial bore at the bottom end of the housing. The coil spring **9** is then placed with the lower end thereof against the upper terminal end **13** of the rectifier means **3** and afterwards, the cylindrical member **18** or **18'** with the feeler means **2** located therein is placed onto the top end of the housing **14** so that the cylindrical end of the contact portion **6** becomes located in the upper end of the coil spring **9**.

After the plurality of sensing means are assembled in the aforementioned manner, the upper ends of the cylindrical members **18** or **18'** are then connected in the aforementioned described manner to the supporting plate **21** respectively aligned with the bores therethrough. Subsequently thereto, the conductors *4a*, *4b* and *5a*, *5b* are threaded through the transverse bores **29** and **20** through each of the housings **14**. To facilitate threading of the conductors *4a* and *4b* through the bores **29** of consecutive housings, the upper ends of the feeler pins **17** are pressed downwardly toward the top face of the plate **21** so that the contact surface **8** of each feeler means will be located below the plane in which the bores **29** are arranged so that the conductors *4a* and *4b* may be easily threaded through the bores. Likewise, during threading of the conductors *5a* and *5b* through the bores **30**, the pins **15** projecting beyond the bottom ends of the housings **14** are pushed in upward direction so as to move the lower terminal ends **7** of the rectifier means **3** upwardly beyond the region of the bores **30**. The assembly of the sensing arrangement is thereby finished and afterwards the ends of the conductors *4a* and *4b* and the ends of the conductors *5a* and *5b* may be respectively connected to a source of electrical energy and to means or machine elements responsive to application of electrical energy in a manner as will be described later on in further detail.

The sensing arrangement above described will operate as follows:

A perforated data card **27** in which the perforations **41** are spaced according to the pattern of the sensing field of the sensing arrangement is pushed by means of a backing plate **28** against the top surface of the supporting plate **21** in such a manner that according to the pattern of the perforations **41** in the data card **27** the upper ends of some of the feeler pins **17** will upwardly protrude through the respective perforations of the data card **27**, while end portions of other feeler pins **17** will engage the data card and, during downward movement of the backing plate **28** in the direction of the arrows as indicated in FIG. 1, be moved from an upper active position in which the upper ends of the feeler pins **17** extend a predetermined distance beyond the top face of the plate **21** to an inactive position in which the upper end of the respective feeler pin is closer to the top face of plate **21** than in the active position and thereby the contact surface **8** of the respective feeler means will become downwardly spaced from the conductors *4a*, *4b*.

FIG. 3 shows a modification of a sensing arrangement according to the present invention, especially suitable for use in a very limited space or for use in connection with data cards in which the perforations are arranged very close to each other. In order to place the plurality of sensing means very close to each other, individual housings as described before are omitted, and the feeler means, the rectifier means and the compression springs between the aforementioned elements are housed in this case in bores of superimposed plates which not only support the individual sensing means but also form a housing for the same. As shown in FIG. 3, this arrangement may include a top plate **21'**,

an intermediate plate **32**, and a bottom plate **34**, as well as a first conductor carrying plate **35** sandwiched between the top plate **21'** and the intermediate plate **32**, and a second conductor carrying plate **36** sandwiched between the intermediate plate **32** and the bottom plate **34**. The top plate **21** is provided with a plurality of closely spaced bores **23** therethrough, only one of which is shown in FIG. 3, which has at the upper end a small diameter portion **22** for guiding the upper end portion of a feeler pin **17**. The intermediate plate **33** is formed with a plurality of bores **33** therethrough, only one is shown in FIG. 3, in which the rectifier means **3** with its upwardly projecting pin **11**, the coil spring **9**, and the contact portion **6** of the feeler means are housed. The intermediate plate **32** is preferably formed from plastic material, for instance nylon. The bottom plate **34** may be formed from metal, for instance brass. The first and second conductor means, respectively carried by the conductor carrying plates **35** and **36**, are preferably formed by extremely thin strips of metal and the conductor means may be formed in well known manner by printed and etched circuits. Preferably, the conductor means extending in the direction X and cooperating with the contact portion **6** of the feeler means are in the form of printed circuits **35'** and **35''**, as shown in FIG. 4, extending spaced from each other about the bore through the plate **35** so that the conical contact surface on the contact portion **6** of the feeler means will make a double contact with the conductor portions **35'** and **35''**. The conductor means extending in the direction Y have preferably the form as shown in FIG. 5 so as to provide for a circular portion beneath each of the lower terminal ends **7** of the respective rectifier means. The terminal end **7** has preferably a lower contact surface in the shape of a spherical segment as shown in FIG. 3. The conductor carrying plates **35** and **36** are of electrically insulating material.

FIG. 6 shows by way of an example a wiring diagram in which the above described sensing arrangement is incorporated. In this arrangement a multiposition selector switch **37** is provided in which the switch lever connected at one end to a source of electrical energy, not illustrated in the diagram of FIG. 6, may be selectively turned into engagement with the contact portions **1**, **2**, **3**, **4** and **5** of the switch. Conductors **38** corresponding to the conductors *4a*, *4b* extending in the direction Y, are respectively connected to the contact **1**, **2**, **3**, **4** and **5** of the selector switch **37** and lead from the connected ends through the sensing means **1** which are aligned with each other in the direction Y. A plurality of conductors **39** extending in the direction X and corresponding to the aforementioned described conductor means *5a*, and *5b* extend at right angles to the conductors **38** through the various sensing means **1** as shown in FIG. 6 and are respectively connected to means such as relays or similar electrical devices **40** responsive to application of electrical energy thereto. The contacts and the rectifier means of the various sensing means are dimensioned in such a manner that relays connected thereto may be directly controlled so that it is not necessary to provide electronic amplifiers.

If a perforated data card **27** is now pressed against the plate **27** of the above described arrangement by means of a backing plate **28** as shown in FIGS. 1 or 3, the end portions of some of the feeler means will project through the respective perforations **41** in the data card, while the end portions of other feeler means will abut against an unperforated portion of the part to be downwardly displaced thereby so that the contact portions of the feeler means which are moved from the active to the downwardly displaced inactive position will be moved out of contact with the conductors *4a*, *4b* or the conductors **35'**, **35''**, so that the corresponding circuit is opened, whereas at the sensing means which remain in the active position the corresponding circuits will remain closed. If for instance an opening **41** is aligned with the feeler pin of the sensing means located at the position X_2Y_1, the contact between the contact portion **6** of the respective feeler means and the conductors *4a*, *4b*, corresponding to the conductors **38** shown in FIG. 6, will remain closed so that when the switch **37** is in the position as shown in FIG. 1 current will flow through the contact **1** of the switch through the conductor **38** connected to the contact **1**, the contact portion **6**, the spring **9** and the rectifier means **3** of the sensing element at the position X_2Y_2 to the conductors *5a*, *5b*, corresponding to the conductor **39**, to the receiving element **40/2** to energize the latter.

Of course, instead of the selector switch **37** as shown in FIG. 6, different switches may be used, which may be constructed to connect a plurality of conductors **38** simultaneously to a source of electrical energy.

It will be understood that each of the elements described above, or two or more together, may also find a useful application in other types of sensing arrangements differing from the types described above.

While the invention has been illustrated and described as embodied in a sensing arrangement, it is not intended to be limited to the details shown, since various modifications and structural changes may be made without departing in any way from the spirit of the present invention.

Without further analysis, the foregoing will so fully reveal the gist of the present invention that others can by applying current knowledge readily adapt it for various applications without omitting features that, from the standpoint of prior art, fairly constitute essential characteristics of the generic or specific aspects of this invention and, therefore, such adaptations should and are intended to be comprehended within the meaning and range of equivalence of the following claims.

What is claimed as new and desired to be secured by Letters Patent is:

1. Sensing arrangement for perforated data cards comprising, in combination, support means having an end face; a plurality of sensing means carried by said support means to form a sensing field, each of said sensing means including elongated feeler means mounted in said support means movable between an active position in which an end portion of said feeler means projects a predetermined distance beyond said end face and an inactive position in which said end portion is nearer to said end face than in said active position, a contact portion on said feeler means spaced from said end portion thereof, rectifier means arranged axially spaced from said feeler means and having a first and a second terminal end, and electrically conductive spring means between said feeler means and said rectifier means and electrically connected at opposite ends thereof to said contact portion of said feeler means and said first terminal end of said rectifier means, said spring means being biased so as to tend to keep said feeler means in said active position; first conductor means arranged so as to contact the contact portion of the feeler means of each sensing means the feeler means of which is in said active position; and second conductor means electrically connected to said second terminal ends of said rectifier means of all of said sensing means, whereby when a perforated data card is pushed against said end face of said support means with some of said end portions of said feeler means protruding through the perforations of the data card and the end portions of other feeler means engaging the data card, said other feeler means will be moved from said active to said inactive position.

2. Sensing arrangement for perforated data cards comprising, in combination, support means having an end face; a plurality of sensing means carried by said support means to form a sensing field, each of said sensing means including elongated feeler means mounted in said support means movable between an active position in which an

end portion of said feeler means projects a predetermined distance beyond said end face and an inactive position in which said end portion is nearer to said end face than in said active position, a contact portion on said feeler means spaced from said end portion thereof, rectifier means arranged axially spaced from said feeler means and having a first and a second terminal end, and electrically conductive spring means between said feeler means and said rectifier means and electrically connected at opposite ends thereof to said contact portion of said feeler means and said first terminal end of said rectifier means, said spring means being biased so as to tend to keep said feeler means in said active position; first conductor means arranged so as to contact the contact portion of the feeler means of each sensing means the feeler means of which is in said active position; second conductor means electrically connected to said second terminal ends of said rectifier means of all of said sensing means; and means for pushing a perforated data card against said end face of said support means with some of said end portions of said feeler means protruding through the perforations of the data card and the end portions of other feeler means engaging the data card to move thereby said other feeler means from said active to said inactive position.

3. Sensing arrangement for perforated data cards comprising, in combination, support means having an end face; a plurality of sensing means carried adjacent each other by said support means to form a sensing field in which said plurality of sensing means are arranged in adjacent rows extending in a first direction and the sensing means in adjacent rows are respectively arranged in groups respectively aligned in a second direction, each of said sensing means including elongated feeler means mounted in said support means movable between an active position in which an end portion of said feeler means projects a predetermined distance beyond said end face and an inactive position in which said end portion is nearer to said end face than in said active position, a contact portion on said feeler means spaced from said end portion thereof, rectifier means arranged axially spaced from said feeler means and having a first and a second terminal end, and electrically conductive spring means between said feeler means and said rectifier means and electrically connected at opposite ends thereof to said contact portion of said feeler means and said first terminal end of said rectifier means, said spring means being biased so as to tend to keep said feeler means in said active position; a plurality of first conductor means, one for each of said rows of sensing means and extending in said first direction and respectively contacting the contact portions of the feeler means of all sensing means of the respective row which are in said active position; a plurality of second conductor means, one for each group of sensing means, extending in said second direction and respectively electrically connected to said second terminal ends of the rectifier means in the respective group of sensing means; and means for pushing a perforated data card against said end face of said support means with some of said end portions of said feeler means protruding through the perforations of the data card and the end portions of other feeler means engaging the data card to move thereby said other feeler means from said active to said inactive position.

4. A sensing arrangement as set forth in claim 3 wherein each of said first conductor means includes at least one integral member extending through the respective row of sensing means and each of said second conductor means includes at least one integral member extending through the respective group of sensing means.

5. Sensing arrangement for perforated data cards comprising, in combination, support means having an end face; a plurality of sensing means carried adjacent each other by said support means to form a sensing field in which said plurality of sensing means are arranged in adjacent rows extending in a first direction and the sensing means in adjacent rows are respectively arranged in groups respectively aligned in a second direction, each of said sensing means including elongated feeler means mounted in said support means movable between an active position in which an end portion of said feeler means projects a predetermined distance beyond said end face and an inactive position in which said end portion is nearer to said end face than in said active position, a contact portion on said feeler means spaced from said end portion thereof, rectifier means arranged axially spaced from said feeler means and having a first and a second terminal end, and electrically conductive spring means between said feeler means and said rectifier means and electrically connected at opposite ends thereof to said contact portion of said feeler means and said first terminal end of said rectifier means, said spring means being biased so as to tend to keep said feeler means in said active position; a plurality of first conductor means, one for each of said rows of sensing means and extending in said first direction and respectively contacting the contact portions of the feeler means of all sensing means of the respective row which are in said active position; a plurality of second conductor means, one for each group of sensing means, extending in said second direction and respectively electrically connected to said second terminal ends of the rectifier means in the respective group of sensing means; means for pushing a perforated data card against said end face of said support means with some of said end portions of said feeler means protruding through the perforations of the data card and the end portions of other feeler means engaging the data card to move thereby said other feeler means from said active to said inactive position; means for connecting said first plurality of conductor means to a source of electrical energy; and a plurality of means responsive to application of electrical energy respectively connected to said second plurality of conductor means.

6. A sensing arrangement as set forth in claim 5 and including an insulating member between said end portion and said contact portion of each feeler means.

7. A sensing arrangement as set forth in claim 5, wherein said end portion of each feeler means is formed from insulating material.

8. Sensing arrangement for perforated data cards comprising, in combination, support means having an end face; a plurality of sensing means carried by said support means to form a sensing field, each of said sensing means including elongated feeler means having a first end portion and being mounted in said support means movable between an active position in which said first end portion of said feeler means projects a predetermined distance beyond said end face and an inactive position in which said first end portion is nearer to said end face than in said active position, a contact portion on said feeler means spaced from said end portion thereof, and a second end portion of reduced diameter projecting from said contact portion in a direction opposite to said first end portion so as to form on said contact portion an annular shoulder face; rectifier means arranged axially spaced from said feeler means and having a first and a second terminal end, a pin portion of reduced diameter projecting from said first terminal end toward said second end portion of said feeler means so as to form on said first termnial end an annular shoulder face, and electrically conductive coil spring means engaging with opposite ends thereof said shoulder faces on said contact portion and on said first terminal end, respectively, and said second end portion of said feeler means and said pin portion of said rectifier means extending into the interior of said coil spring, said spring means being biased so as to tend to keep said feeler means in said active position; first conductor means ararnged so as to contact the contact portion of the feeler means of each sensing means the feeler means of which is in said active position; second conductor means electrically connected to said second

terminal ends of said rectifier means of all of said sensing means; and means for pushing a perforated data card against said end face of said support means with some of said first end portions of said feeler means protruding through the perforations of the data card and the first end portions of other feeler means engaging the data card for moving said other feeler means from said active to said inactive position.

9. Sensing arrangement for perforated data cards comprising, in combination, support means having an end face; a plurality of sensing means carried by said support means to form a sensing field, each of said sensing means including elongated feeler means having a first end portion and being mounted in said support means movable between an active position in which said first end portion of said feeler means projects a predetermined distance beyond said end face and an inactive position in which said first end portion is nearer to said end face than in said active position, a contact portion on said feeler means spaced from said end portion thereof, and a second end portion of reduced diameter projecting from said contact portion in a direction opposite to said first end portion so as to form on said contact portion an annular shoulder face, rectifier means arranged axially spaced from said feeler means and having a first and a second terminal end and a plurality of superimposed selenium plates sandwiched between said terminal ends, a pin portion of reduced diameter projecting from said first terminal end toward said second end portion of said feeler means so as to form on said first terminal end an annular shoulder face, and electrically conductive coil spring means engaging with opposite ends thereof said shoulder faces on said contact portion and on said first terminal end, respectively, and said second end portion of said feeler means and said pin portion of said rectifier means extending into the interior of said coil spring, said spring means being biased so as to tend to keep said feeler means in said active position; first conductor means arranged so as to contact the contact portion of the feeler means of each sensing means the feeler means of which is in said active position; second conductor means electrically connected to said second terminal ends of said rectifier means of all of said sensing means; and means for pushing a perforated data card against said end face of said support means with some of said first end portions of said feeler means protruding through the perforations of the data card and the first end portions of other feeler means engaging the data card for moving said other feeler means from said active to said inactive position.

10. Sensing arrangement for perforated data cards comprising, in combination, support means having an end face; a plurality of sensing means carried by said support means to form a sensing field, each of said sensing means including elongated feeler means having a first end portion and being mounted in said support means movable between an active position in which said first end portion of said feeler means projects a predetermined distance beyond said end face and an inactive position in which said first end portion is nearer to said end face than in said active position, a contact portion on said feeler means spaced from said end portion thereof having a contact surface directed toward said end face, and a second end portion of reduced diameter projecting from said contact portion in a direction opposite to said first end portion so as to form on said contact portion an annular shoulder face, rectifier means arranged axially spaced from said feeler means and having a first terminal end and a second terminal end having a contact surface facing away from said contact surface of said contact portion of said feeler means, a pin portion of reduced diameter projecting from said first terminal end toward said second end portion of said feeler means so as to form on said first terminal end an annular shoulder face, and electrically conductive coil spring means engaging with opposite ends thereof said shoulder faces on said contact portion and on said first terminal end, respectively, and said second end portion of said feeler means and said pin portion of said rectifier means extending into the interior of said coil spring, said spring means being biased so as to tend to keep said feeler means in said active position; first conductor means arranged so as to contact the contact surface of the contact portion of the feeler means of each sensing means the feeler means of which is in said active position; second conductor means electrically connected to the contact surfaces of said second terminal ends of said rectifier means of all of said sensing means; and means for pushing a perforated data card against said end face of said support means with some of said first end portions of said feeler means protruding through the perforations of the data card and the first end portions of other feeler means engaging the data card for moving said other feeler means from said active to said inactive position.

11. A sensing arrangement as set forth in claim 9, wherein said contact surfaces of said contact portion of said feeler means and said contact surface of said second terminal end of said rectifier means are conical and wherein said first and said second conductor means are each formed by a pair of conductors with said conical contact surfaces respectively arranged between said contacting the respective pair of conductors.

12. A sensing arrangement for perforated data cards comprising, in combination, support means having an end face; a plurality of sensing means carried adjacent each other by said support means to form a sensing field in which said plurality of sensing means are arranged in adjacent rows extending in a first direction and the sensing means in adjacent rows are respectively arranged in groups respectively aligned in a second direction, each of said sensing means including an elongated hollow housing means of insulating material fixed to said support means extending transversely of said end face, elongated feeler means mounted in said housing means movable between an active position in which an end portion of said feeler meas projects a predetermined distance beyond said end face and an inactive position in which said end portion is nearer to said end face than in said inactive posttion, a contact portion on said feeler means spaced from said end portion, rectifier means located in said housing means axially spaced from said feeler means and having a first and a second terminal end, and electrically conductive spring means between said feeler means and said rectifier means and engaging with opposite ends thereof said contact portion of said feeler means and said first terminal end of said rectifier means so as to make electrical contact therewith, said spring means being biased so as to tend to keep said feeler means in said active position; a plurality of first conductor means, one for each of said rows of sensing means and extending in said first direction through said housing means and respectively contacting the contact portions of the feeler means of all sensing means of the respective row which are in said active position; a plurality of second conductor means, one for each of said groups of sensing means, extending in said second direction through said housing means and respectively electrically connected to said second terminal ends of the rectifier means in the respective group of sensing means; and means for pushing a perforated data card against said end face with some of said end portions of said feeler means protruding through the perforations of the data card and the end portions of other feeler means engaging the data card to move thereby said other feeler means from said active to said inactive position.

13. A sensing arrangement as set forth in claim 12 and including selector switch means for selectively connecting said first conductor means one by one to a source of electrical energy, and a plurality of means responsive to application of electrical energy respectively connected to said second conductor means.

14. A sensing arrangement as set forth in claim 12, wherein each of said housing means is formed with at

least one pair of bores axially spaced from each other and respectively extending in said first and said second direction for threading said conductor means through said housing means.

15. A sensing arrangement as set forth in claim 14, wherein each of said housing means has a bottom portion formed with an axial bore therethrough, and wherein each of said rectifier means includes a pin projecting in axial direction from said second terminal end thereof through said axial bore permitting to lift said rectifier means against the force of said spring means so as to facilitate threading of said second conductor means through the respective bore in said housing means.

16. A sensing arrangement as set forth in claim 12, wherein said support means includes a plate having an upper face forming said end face, said plate being formed with a plurality of bores extending from said end face through said plate, and wherein each of said housing means has an upper cylindrical portion press-fitted in a respective one of said plurality of bores through said plate.

17. A sensing arrangement as set forth in claim 12, wherein said support means includes a plate having an upper face forming said end face, said plate being formed with a plurality of stepped bores extending from said end face through said plate and having each a wider diameter portion adjacent said end face and a smaller diameter portion at the opposite side of said plate, and including an insert member tightly fitted into each of said stepped bores and projecting with a portion thereof provided with an outer screw thread beyond the bottom face of said plate, and a cylindrical member forming an upper part of each housing means and provided with an inner screw thread threadingly engaged with said outer screw thread of said insert member.

18. A sensing arrangement as set forth in claim 1 wherein said support means includes a plurality of superimposed plates formed with a plurality of bores therethrough in which said feeler means, said rectifier means and said spring means of said plurality of sensing means are respectively housed and wherein said first and second conductor means are formed by strip portions of conductive material on the surfaces of some of said plates which are arranged to contact said contact portions of said feeler means when the latter are in said active position and to contact said second terminal ends of said rectifier means.

19. A sensing arrangement as set forth in claim 18 wherein said strip portions of conductive material are constituted by printed and etched layers of conductive material on the surface of the respective plates.

20. A sensing arrangement as set forth in claim 1 wherein said support means are constituted by a top plate having an upper surface forming said end face, an intermediate plate, a bottom plate, a first conductor carrying plate sandwiched between said top plate and said intermediate plate and being provided on the surface thereof facing away from said end face with printed circuit means constituting said first conductor means, and a second conductor carrying plate sandwiched between said intermediate plate and said bottom plate and being provided on the surface thereof directed toward said end face with printed circuit means constituting said second conductor means, said top plate, said first conductor carrying plate and said intermediate plate being formed with a plurality of bores therethrough respectively aligned along a common axis respectively intersecting said first and said second conductor means, said feeler means, said rectifier means and said spring means of said plurality of sensing means being respectively housed in said bores.

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