

G. H. DAVIS.
 CONTACT DEVICE FOR SELF PLAYING MUSICAL INSTRUMENTS AND OTHER APPARATUS.
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942,550.

Patented Dec. 7, 1909.

Fig. 1.

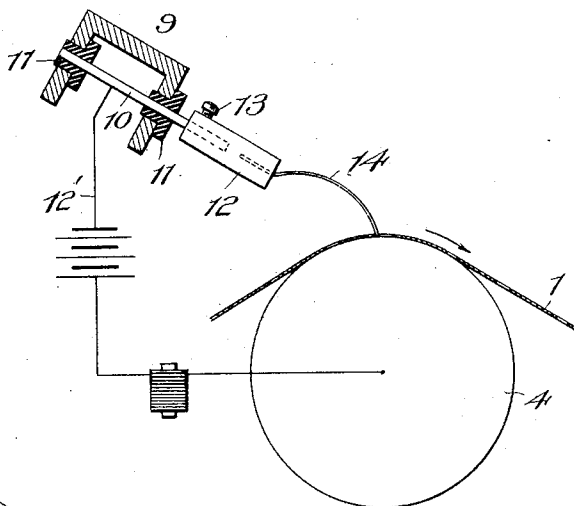


Fig. 3.

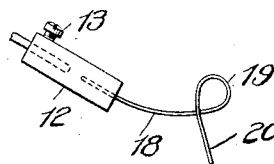


Fig. 4.



Fig. 2.

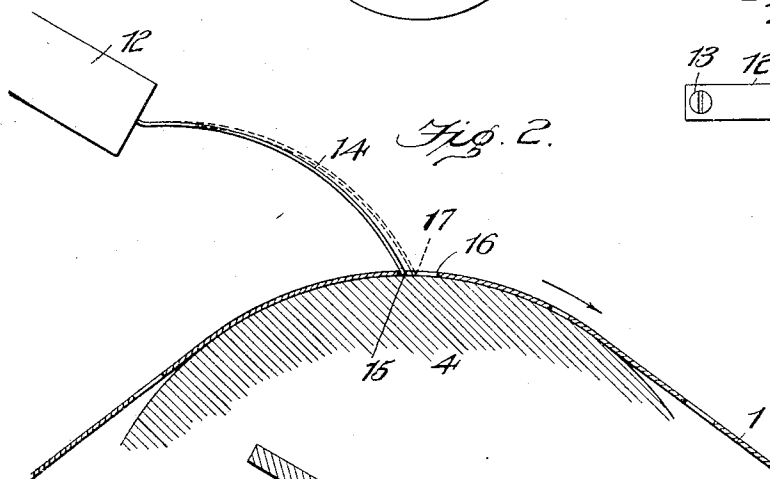
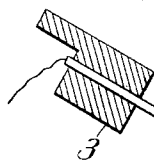


Fig. 5.



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CONTACT DEVICE FOR SELF-PLAYING MUSICAL INSTRUMENTS AND OTHER APPARATUS.

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Specification of Letters Patent.

Patented Dec. 7, 1909.

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To all whom it may concern:

Be it known that I, GEORGE HOWLETT DAVIS, a citizen of the United States, residing at West Orange, in the county of Essex and State of New Jersey, have invented new and useful Improvements in Contact Devices for Self-Playing Musical Instruments and other Apparatus, of which the following is a specification.

My present invention relates to and has for its object to provide an improved form of contact for electric self-playing musical instruments and other devices which are controlled by a perforated web or sheet.

Heretofore it has been the general practice to secure three straight wires forming selectors, in a wood bar and solder them all to a single lead wire in the rear, the tracker range being made up of a series of such multiple form selectors (see Fig. 5). The main disadvantage of such form of contact is that when the wire fingers wear out or become damaged, they cannot be replaced without great trouble and expense; and further, because the duration of the contact is not sufficient, especially where single or small perforations occur, to cause the mechanism controlled by the magnet, to actuate positively or very rapidly. My present invention entirely overcomes both of these objections by the means shown in the accompanying drawings, in which:—

Figure 1 is a transverse sectional view of my improved tracker range; Fig. 2 is an enlarged detail view of the same; Fig. 3 shows a modified form of selector wire; Fig. 4 is a top view of my detachable selector; and Fig. 5 is a transverse sectional view of the old form of selector now commonly in use.

The perforated paper 1, in its operative movement, travels in the direction of the arrows and the continual rubbing of the free ends of the selector wires 2 against the top surface of the moving paper, wears them away quite rapidly and their replacement has heretofore proved a serious problem and required the shipment of the entire apparatus embodying the contacts, to the factory, as it is quite obvious that no unskilled person can do the soldering and unsoldering required in the replacement of the selector wires under the old method shown in Fig. 5. In this latter form the selector wires must be comparatively long and thick in order that the wood bar 3, may be sufficiently re-

moved from the paper 1, contact roller 4, and other parts. In all cases the ends of the selector wires, after a very short time, become ground slightly concave so they rest flat upon the curved surface of the paper 1, or roller 4, as more clearly shown in Fig. 5. In this latter case the selector 2, leaves the roller at almost a tangent therefrom and in the relative positions shown the rear edge 5 of the perforations 6, is just acting to move the selector upward and out of contact with the roller 4. Now the selector was not allowed to drop into the perforation 6 until after the toe 7, had cleared the forward edge 8 of said perforation and therefore actual duration of contact was equal to the time or distance between the two parts 7 and 8, or less than one-third the diameter of the small perforation 6, which is in practice, about .111 diameter. The fastest travel of the paper is about thirteen (13) feet per minute and if the contact under this old method holds in the shorter perforations not over .004 of an inch, then the magnets are allowed but 1/3000 part of a minute in which to become energized and raise a piano key and hammer or perform some other function. The perforation being round, when the selectors fail to track directly across the center, this time is reduced greatly. In order to secure central tracking, three selectors are generally provided, as shown in Fig. 4.

Proceeding to describe my improvements and the manner in which they overcome the objections named, attention is invited to the construction and arrangement of parts shown in Fig. 1, in which a metal U-shaped bar 9, of a length equal to the width of the tracker range is provided. Disposed about one-sixth of an inch apart are a series of pins 10, resting in insulating bushings 11, and having soldered to each a lead wire 12', having in its circuit one of a series of actuating magnets (not shown). The recess in said U-shaped bar forms an excellent conduit in which to run the cable or wires 12'.

On the projecting end of the pin 10, is set a ferrule or sleeve 12, having the set screw 13 for the purpose of adjusting, securing and instantly removing the same from the pins 10. Soldered or otherwise secured in ferrule or body 12, are the three (more or less) curved selector wires 14, which wires are only one-half the length and diameter of those shown at 2, in Fig. 5, this reduction of

length and diameter being possible because the ferrule 12, acts as an extension in removing the free ends of the selectors 14, sufficiently far away from the bar 9. At this point it seems well to explain that a selector wire must not be too thin in proportion to its length, otherwise its free end will wobble about in tracking over the paper, and this is particularly true if the wire be curved, as shown in my new form. My selector wires are preferably but one-half the length and diameter of the old form shown in Fig. 5. The purposes subserved by bending the wires as shown are two fold; first, to cause the free end of the selector to enter the perforation at a more abrupt angle and thus reduce the diameter of the concave contacting face over what it would be if the same wire entered the perforation at the angle shown in Fig. 5, and second, to cause the free end to follow the rear edge 5 of the perforation forward for a short distance, as shown by dotted lines in Fig. 2. In the improved form, therefore, the time of duration of contact can be estimated by adding the distance between 15 and 16 to that between 15 and 17, either of which distances is greater than that between 7 and 8 in the form shown in Fig. 5.

It has been found that the improved form of contact device makes a contact in the smallest holes of a duration four times as long as is the contact duration of the old form. Of course the increase in the duration of the contact is the same for large holes as it is for the smallest holes.

In Fig. 3 I have shown a slightly modified form of selector finger which is designed to permit a greater range of movement with the travel of the perforated web. In this figure the numeral 18 designates the wire finger which is provided with a loop or turn 19, and has its free end 20, extending downward toward and making contact with the bar or roll 4.

It has been attempted to accomplish the increased contact duration, as shown in a recently issued patent, by having each selector formed of a double set of wires, one tracking behind the other, adopting the general form shown in Fig. 5, without any of the convenient means of repairing or replacing herein shown. Under such system each selector would be composed of six wires and a standard range would require 390 selector wires; it would be impossible to maintain the extremely accurate adjustment between the two sets of wires and the slightest impairment by accidental bending, would necessitate the return of the instrument to the factory, particularly in the absence of some means of replacing any or all of the selector sets without resorting to a soldering iron. The doubling of the number of selector wires increases the friction upon the perforated

paper and increases the tendency to wrinkle it and cause the sheet to track imperfectly.

While I have shown herein the best form of my invention now known to me I desire it understood that many modifications within the scope of my invention will suggest themselves to the skilled mechanic or engineer, and I desire to cover all such modifications in the claims annexed hereto.

What I claim is:—

1. In an electrical selecting device adapted to cooperate with a moving perforated web, a contact roll or bar over which the web is adapted to pass, a normally fixed support, and a plurality of elastic selector fingers rigidly secured to said support and cooperating with the bar or roll, each finger being freely capable of appreciable elongation, the free end of each finger meeting the surface of the bar or roll at an angle greater than 45° and not greater than 90°.

2. In an electrical selecting device adapted to cooperate with a moving perforated web, a contact roll or bar over which the web is adapted to pass, a fixed support, and a plurality of selector fingers rigidly fastened to said support and cooperating with the bar or roll, each finger being without support between the point where it is affixed to the said normally fixed support and the point where it contacts with the bar or roll, and being freely capable of appreciable elongation, the said finger meeting the surface of the bar or roll at an angle greater than 45° and not greater than 90°.

3. In an electrical apparatus, the combination with a perforated web, of a contact bar or roll over which said web travels, and a wire selector finger cooperating with said bar or roll said finger having a loop intermediate its ends whereby its free end may yield in the direction of travel of the web.

4. In an electrical selecting device adapted to cooperate with a moving perforated web, a contact roll or bar over which the web is adapted to pass, a normally fixed support, and a plurality of elastic selector fingers cooperating with the bar or roll, each finger being bowed throughout its length between the point of attachment to the said fixed support and the point of contact with the bar or roll, and the free end of each finger meeting the surface of the bar or roll at an angle between 45° and 90°.

5. In a contact device of the character described, a channeled supporting rail 9, a plurality of insulated bushings 11 carried by said rail, pins 10 passing through said bushings, a sleeve 12 detachably connected to each of said pins, a contact-finger carried by each sleeve, and a contact bar or roll with which the fingers cooperate.

6. In a contact device, a supporting bar or rail U-shape in cross-section, a plurality

of pins carried by the parallel webs of said bar or rail and insulated therefrom, a contact finger supporting element adjustably connected to each pin, and a contact finger
5 carried by each of said supporting elements.

7. In a contact device, a supporting bar or rail U-shape in cross section, a plurality of selector finger supporting elements carried by said bar or rail, and a selector finger

detachably connected to each of said ele- 10
ments.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

GEORGE HOWLETT DAVIS.

Witnesses:

J. GRANVILLE MEYERS,
GERTRUDE M. STUCKER.