

(No Model.)

F. W. HEDGELAND.

ELECTRIC DEVICE FOR CONTROLLING ACTIONS OF MUSICAL
INSTRUMENTS.

No. 547,072.

Patented Oct. 1, 1895.

FIG. 1.

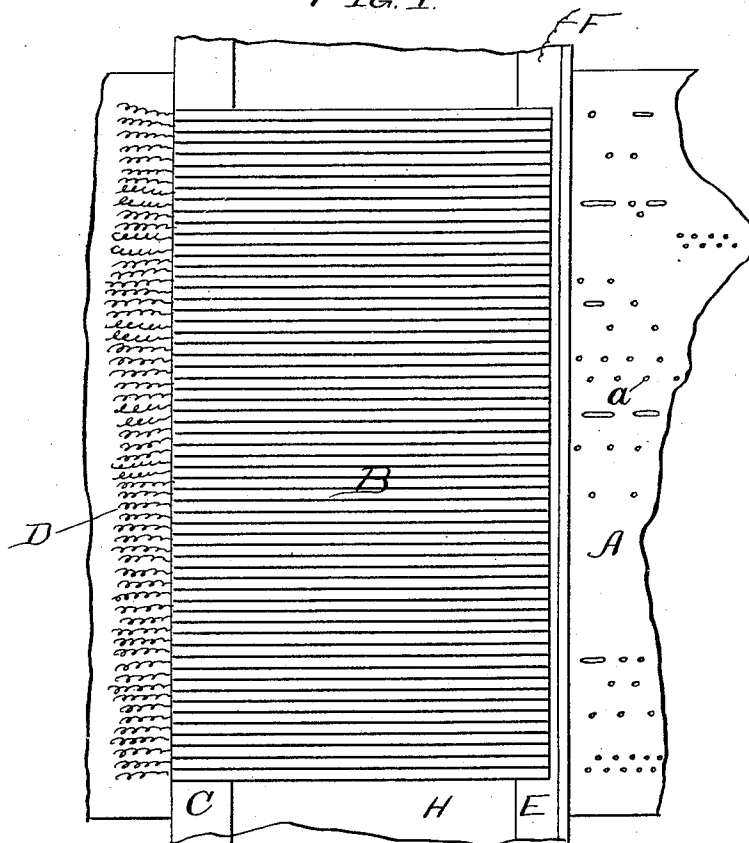


FIG. 2.

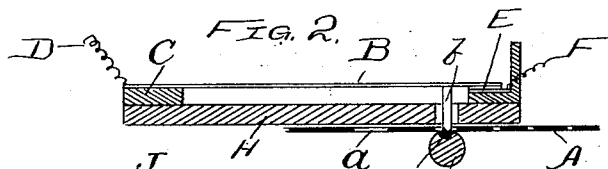
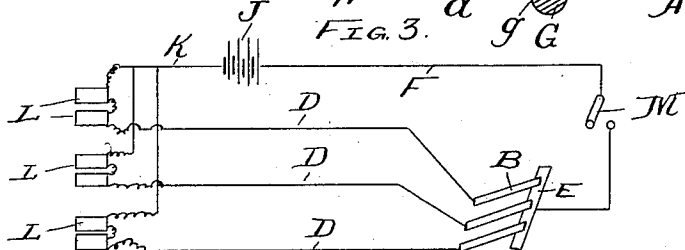


FIG. 3.



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UNITED STATES PATENT OFFICE.

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ELECTRIC DEVICE FOR CONTROLLING ACTIONS OF MUSICAL INSTRUMENTS.

SPECIFICATION forming part of Letters Patent No. 547,072, dated October 1, 1895.

Application filed February 23, 1894. Serial No. 501,151. (No model.)

To all whom it may concern:

Be it known that I, FREDERICK W. HEDGELAND, a citizen of the United States, residing in Chicago, in the county of Cook and State of Illinois, have invented a new and useful Improvement in Electric Devices for Controlling Actions of Musical Instruments, of which the following is a specification.

This invention relates to the construction of electrical devices for operating the actions of self-playing string and wind instruments.

The invention lies in the combination, with the moving perforated paper, strip, or belt commonly used in this class of instruments, of electrical devices, substantially such as are hereinafter described, for communicating impulses to the action of the instrument in accordance with the number, size, and location of the perforations in the strip. These electrical devices are fully set forth below and shown in the accompanying drawings, in which—

Figure 1 is a plan of the moving strip, showing also the closers for completing the various electric circuits. Fig. 2 is a vertical section of the parts shown in Fig. 1. Fig. 3 is a diagram of the electric circuits.

In said drawings, A represents the usual moving perforated paper strip or band, which may be located wherever convenient or desirable in the instrument and operated by any suitable mechanism. In its movement this strip is carried by or under a series of circuit-closers, one for each note or key of the instrument, and each located in its own individual electric circuit, so that the several closers may be individually operated without affecting any of the notes or keys of the instrument except the one to which it corresponds or belongs. The closers are controlled by the band A, the perforations therein allowing them to close their respective circuits and thus to sound their respective notes or keys and the imperforate portions of the band preventing such action. The circuit-closers consist of a series of springs B, provided with studs *b* and arranged side by side across the band A and mounted at one end upon a bar C, placed transversely of the path of the paper. The studs are located near the free ends of the springs and are each adapted to enter such

of the perforations *a* in the paper band or strip as lie in the same longitudinal plane with them, and they are also adapted to ride upon the surface of the paper between such perforations and to be lifted out of the perforations by the paper as it moves along, the points of the studs being beveled or rounded to facilitate this latter operation. When the studs drop into the perforations of the paper A, the free ends of their carrying-springs are brought into close contact, as shown, with a plate E, extending across the series of closers, and the studs themselves rest upon an insulating-strip *g* in a cross-bar G placed across the path of the moving paper.

The bar G is made of metal, so it may not warp or be easily bent or affected by the atmosphere, and its principal function is to maintain the moving strip always in the same plane at the point where it passes the studs and to sustain that portion of it which is required to lift the studs out of the perforations, so that the studs may never fail to be raised and the circuits be broken at the proper times. Of course an opposing surface, like the board H, should always be present to confine the strip at the side opposite the bar G. With this construction it is only necessary that the studs should enter the perforations a very slight distance. I have found in practice that if the movement is not greater than the thickness of the paper used for the strip A good results are obtained both in the working of the instrument and in the avoidance of wear upon and injury to the paper by the studs. The first of these advantages is due to the fact that the action is quickened over previous constructions, because in the latter the studs are required to move much greater distances, in some cases as much as an inch, and the second is due to the ease with which the studs are lifted by the paper, the points not being allowed to pass appreciably beyond the plane of the paper. Where the studs are allowed to pass through and beyond the paper, there is danger they may not get out of the way quickly enough to avoid tearing the paper, and as a matter of fact the paper strips used in such instruments are short lived and soon become useless; but with my invention they need never be torn and the wear upon them

is but slight. The insulating-strip *g* prevents any danger of the electric current being diverted or lost.

The springs and contact-plate *E* are electrically connected with a battery *J* or other source of electric energy, the plate being connected to one pole thereof by the wire *F* and the springs being individually connected thereto by wires *D* and a single wire *K*, to which all of said wires *D* are joined. In each of the individual wires *D*, I place magnets *L*, through the armatures of which the actions of the several keys or notes of the instrument are permitted to be set in motion—that is to say, these armatures control the actuating devices, whereby the actions are operated and allow those devices to perform their office whenever a current is received through the magnet by reason of the closing of the circuit by the springs *B* and the plate *E*. A switch *M* may be used to control all the action-circuits.

I claim—

1. The combination in a musical instrument of the perforated strip *A*, the series of springs *B* corresponding to the notes or keys of the instrument and each located in its own electric circuit and carrying a stud or pin *b*, and a stationary contact plate *E* electrically connected with the springs, the springs and contact plate being located at the same side of the perforated strip, substantially as specified.

2. The combination in a musical instru-

ment of the perforated strip *A*, the series of springs *B* carrying pins or studs adapted to enter the perforations of the strip and arranged side by side transversely of the moving strip, the springs corresponding to the notes or keys of the instrument, the stationary contact plate *E*, located upon the same side of the perforated strip with the springs, and the electric circuits in which the springs and plate are located, substantially as specified.

3. The combination of springs *B*, contact plate *E*, the electric circuits in which said springs and plate are located, the pins upon the springs, the moving perforated strip, and an insulated stop device adapted to prevent the pins from entering too far within the perforated strip, substantially as specified.

4. The combination with the pins *b* of the circuit closers and the perforated strip, of the cross bar *G* having an insulating strip *g*, substantially as specified.

5. The combination in a musical instrument and with the perforated strip of circuit closers having studs adapted to enter the perforations in the strip and also adapted to be lifted out of the perforations by the movement of the strip, of guides such as *G* and *H* for guiding and confining the strip at the point where it passes the studs, substantially as specified.

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Witnesses:

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