H. T. DEPUE.

KEY COUPLER FOR ORGANS.

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1,376,682.

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Fig. 1.

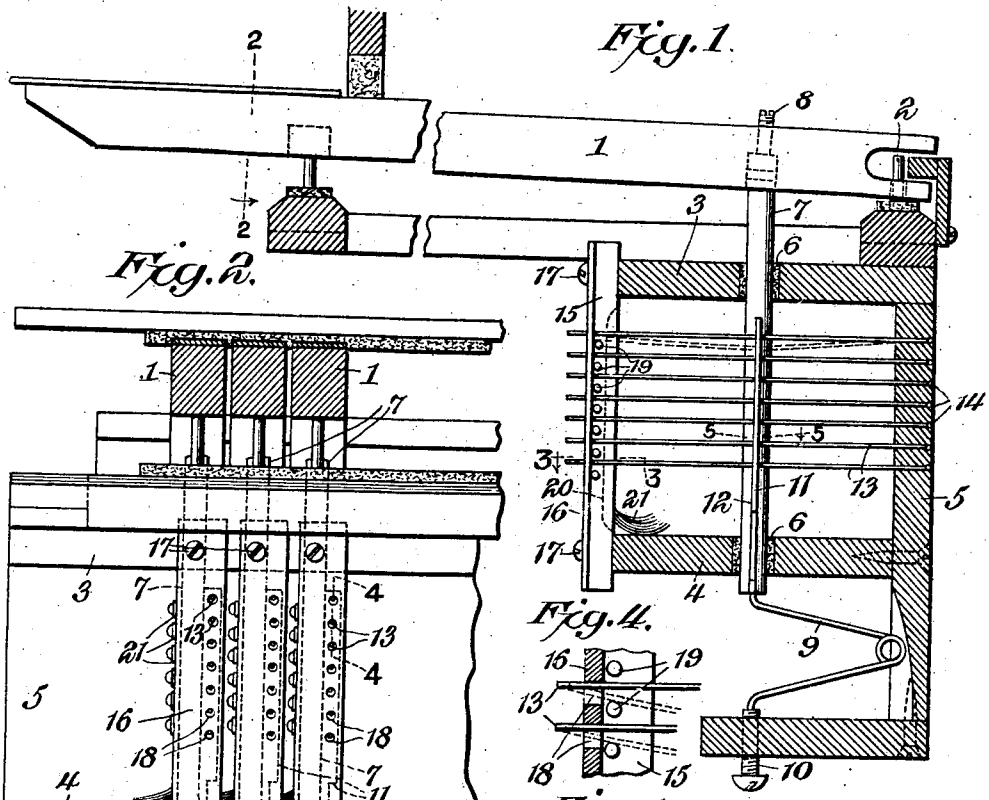


Fig. 2.

Fig. 4.

Fig. 5.

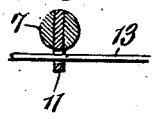


Fig. 3.

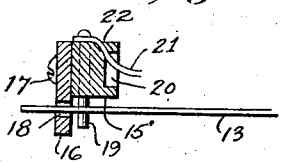
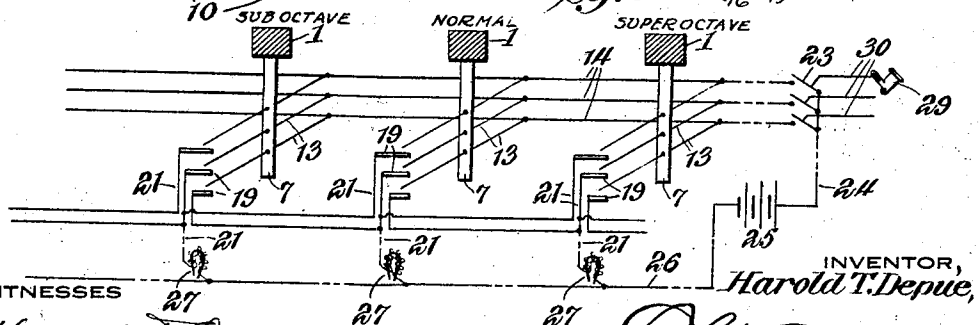


Fig. 6.



WITNESSES

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KEY-COUPLER FOR ORGANS.

1,376,682. Specification of Letters Patent. Patented May 3, 1921.

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To all whom it may concern:

Be it known that I, HAROLD T. DEPUE, a citizen of the United States, residing at Kensington, in the county of Montgomery and State of Maryland, have invented certain new and useful Improvements in Key-Couplers for Organs, of which the following is a specification.

This invention has reference to key couplers for organs, and its object is to provide a simplified coupler construction for electric organ actions, whereby the wiring is greatly simplified and liability of trouble is correspondingly reduced.

In accordance with the invention each organ key included in the coupler system is provided with a suitable number of electric contacts all positively actuated by the key and all the contacts on the key, when the latter is depressed, engage and move or rub on other contacts on a fixed part of the organ structure, wherefore the contacting surfaces are always kept bright.

In order that choice of coupler actions may be provided, coupler stops are used, but all such stops are of extremely light action, since the only work they have to do is the closing and opening of simple electric switches, a single switch for each coupler, with the switch closing and opening a circuit through a single conductor, which conductor is the common or return conductor for all the key contacts under the control of a single stop.

The invention therefore has the advantage of extreme simplicity and ease of movement with the parts particularly sturdy and reliable in action.

The invention will be best understood from a consideration of the following detailed description, taken in connection with the accompanying drawings forming part of this specification, with the further understanding that while the drawings show a practical form of the invention, the latter is not confined to any strict conformity with the showing of the drawings, but may be changed and modified, so long as such changes and modifications come within the scope of the appended claims.

In the drawings:—

Figure 1 is a section lengthwise of an organ key taken through the console, or so much thereof as is necessary, at one side of a key, the switch devices controlled by the key being shown in elevation.

Fig. 2 is a front elevation of the structure of Fig. 1 and extended to show three adjacent keys with the latter in section on the line 2—2 of Fig. 1.

Fig. 3 is a section on the line 3—3 of Fig. 1 but drawn on a larger scale.

Fig. 4 is a section on the line 4—4 of Fig. 2 but drawn on a larger scale.

Fig. 5 is a section on the line 5—5 of Fig. 1 but drawn on a larger scale.

Fig. 6 is a diagram showing electric circuits.

Referring to the drawings there are shown organ keys 1 which may be considered as constructed in accordance with the usual practice in organ building, and hence needing no particular description. Each key is assumed to be pivotally mounted on a pin 2 at its rear end, but this is a matter of organ construction familiar to organ builders, and may or may not follow the particular showing of the drawings.

Underneath the rear portions of the keys are boards 3, 4 in superposed spaced order joined by a rear upright board 5, the boards 3 and 4 being considered as horizontal or approximately so.

Extending through felt or other suitable bearings 6 in alined relation in the boards 3 and 4 are slidable pins 7, one for each key and engaged at the upper end by a set screw 8 in each key. At the lower ends the pins 7, which may be of metal and are upright, are engaged by springs 9 which also may be of a construction commonly employed in organs. Each spring 9 is sustained at the end remote from the pin 7 and below the lower end thereof by an adjusting screw 10, whereby the tension of the springs 9 may be varied as desired.

Each pin or rod 7 carries a longitudinally extended web 11 of vulcanized fiber or other suitable insulating material, which in the particular showing of the drawings projects radially from the pin and is set in a slot 12 formed lengthwise of the pin.

Carried by the board 5 are series of wires, strips or other elongated flexible members 13, the wires being arranged in upright series in the particular showing of the drawings, and the wires are held firmly at their rear ends in the board 5. The wires 13 extend to the rear face of the board 5 where each wire is connected to a respective one of a suitable number of conductors 14.

At the front ends of the wires 3 and 4 are

upright posts 15 equal in number to the series of wires 13 and each post 15 is provided with a face plate 16 which may be secured thereto by screws 17 or otherwise. The face plates 16 are wider in the direction of the length of the organ manual than the posts 15 and each face plate is pierced by an upright series of spaced holes or passages 18 through which the front ends of the wires 13 extend.

Each post 15 carries an upright series of contacts 19 which may be in the form of round metal pins, or may be of other shape.

The posts 15 are of insulating material, and the face plates 16 are also of insulating material, but as the current usually employed in electric organs is of low voltage, say, about ten volts, experience has shown that wood has sufficient insulating qualities to answer the purpose.

Each post 15 has a longitudinal groove 20 on its rear face, and this groove is entered by a group of insulated conductors 21 extending through passages 22 in the post each to a respective contact pin 19 to which it may be soldered or otherwise electrically united.

Each conductor 14 is at one end connected through a switch 23 to another conductor 24 in turn connected to one side of a source 25 of electric current, which source is diagrammatically indicated in Fig. 6 as a battery. It is, however quite customary in electric organ practice to employ a direct-current dynamo-electric generator with an output of about thirty amperes at ten volts, but, of course, it will be understood that any suitable source of current of any desirable output may be used.

The other side of the current source 25 is connected by a conductor 26 to one side of each of a series of electromagnets 27 which may be considered as controlling suitable organ pipes or other sounding parts. Each electromagnet 27 is connected on the side remote from the conductor 26 by a conductor 21 to an appropriate one of the contact pins 19.

Each of the switches 23 may be assumed to be under the control of a manually operable stop member 29 connected to the respective switch 23 by a link 30 or in any other suitable manner. The stops 29 may be further assumed to be located within convenient reach of the organist, as is customary with the stops of organs.

One of the switches 23 may be assumed to be the separation coupler switch, whereby the notes normal to the keys will sound on the depression of the respective keys, another one of the switches 23 may be assumed to be the superoctave coupler switch, still another one of the switches 23 may be assumed to be the suboctave coupler switch, and other coupler switches may be employed as the size and character of the organ demand.

Under the assumption that the arrangement shown in Fig. 6 is for an octave coupler, the middle key 1 is designated by the word "normal," the right-hand key 1 is designated by the word "super-octave" and the left-hand key 1 is designated by the word "sub-octave."

A two manual organ could be provided with as many as fifteen coupler switches, and three, four and five manual organs with a great many more, but the number of switches is always relatively small per manual even with the largest organs, so that twelve coupler switches may be taken as about the maximum for each manual, and twelve contacts for each key.

Each key is provided with as many contact wires 13 and contact pins 19 as there are coupler switches, so that in the diagram of Fig. 6 with three coupler switches 23, each key is provided with three contact wires 13 and three contact pins 19. In the showing of Figs. 1 and 2 each key is provided with seven contact wires 13 and seven pins 19. These numbers, however, are to be taken merely as indicative and not as obligatory.

Ordinarily the organ key 1 is held elevated, that is, in the uppermost position, by the spring 9, and the spring may be adjused by the screw 10 to compensate for the number of wires 13 which elastically resist to a certain extent the lowering of the key by the player. By such means the touch may be readily adjusted to the proper amount, whether a greater or less number of elastic contact wires 13 be used.

When the key 1 is depressed all of the wires 13 connected with the key are moved simultaneously and to like distances, the wires bending from the board 5 to the web 11, and the free ends of the wires 13 are lowered in the openings 18, which are made large enough for the purpose, so that the free ends of the wires 13 adjacent to the pins 19 are ultimately brought into contact therewith, and then a further depression of the key bows the wires 13, as roughly indicated in Fig. 4, so that there is a wiping action when the wires 13 contact with the pins 19, and the contacting surfaces are therefore kept bright and good electrical conduction is insured.

While all the wires 13 make contact with all the pins 19 individual to a key at each depression of the key, it is only through those switches 23 which are closed that electrical circuits are established because of such contact, consequently the touch or mechanical resistance to the depression of the key is always the same whether one or all of the couplers are in operation.

When the organist prepares to use the

organ, the separation switch is closed, if previously open, so that on the depression of any key the particular note normal to the key is sounded. If it be desired to couple up the keys so as to not only cause the sounding of the normal notes, but the superoctave notes, then the appropriate one of the switches 23, if previously open, is also closed, whereupon not only the note controlled by the wire 13 and pin 19 included in the circuit by the separation switch 23, but the note an octave higher is sounded at the same time. If instead of the superoctave it be desired to sound the suboctave, then the appropriate switch 23, if previously open, is closed and the note normal to the key and also its suboctave are simultaneously sounded.

The same thing occurs with other coupler arrangements provided for by the invention.

It has heretofore been deemed necessary in electric organ construction to employ multiple contact switches in coupler actions, so that all the circuits to all the pipes or other sounding devices are closed individually but simultaneously at the multiple switches, thus greatly complicating the structure and requiring the moving of relatively heavy parts each time a coupler stop was moved.

The complexity of the prior structures has made electric organs not only difficult to adjust, but has greatly increased the up-keep because the parts where trouble is liable to occur are greatly multiplied.

The invention avoids the necessity of employment of heavy movable multiple switches for bringing coupler circuits into and out of action. This is because the heavy multiple switches are each replaced by a single-contact switch, thereby reducing the chances of imperfect contact or no contact at all just as many times as there are contacts in the multiple switch heretofore used. While each key in the structure of this invention has to control several circuit closing devices, such control is always constant for the particular key, so that the touch of the key, when once adjusted, is not varied at any time.

Moreover, the single-contact switch requires far less electrical energy to move and hold the contact when actuated electrically, and this is of especial advantage when a number of couplers are drawn into action simultaneously, as in combination actions. Under such circumstances the sudden pull on the source of current is light and the amount of current consumed is small in holding the switches in contact, while their respective couplers are in service, as compared with the demand upon the current source when it is necessary, as heretofore proposed, to move and hold heavy multiple switches in the closed position.

Since the coupler control switches of this invention have only small single contacts in place of bulky multiple ones, and all key-controlled contacts are actuated by and are situated directly under respective keys, the whole coupler mechanism is so simplified and small that no matter how large a number of couplers it embraces, it occupies but little more space than is now generally used by the regular key contacts alone in electric organs. Therefore, the whole structure is readily installed in the console directly under the manual keys and is accessible for attention without the necessity of any dismantling of the organ.

Each key carries as many contact members as there are coupler arrangements, and also is provided with a contact member for the sounding of the note normal to the key. The normal circuit and each coupler circuit is under the control of a single stop-actuated switch individual thereto, the switch being located in the common or return conductor of the circuit, so that a single point switch is sufficient for each circuit no matter how many different keys and actuating magnets are included in such particular circuit.

For instance, it has heretofore been deemed necessary in electric organs to provide each individual coupler with a switch having as many separate contacts as there are notes included in that particular coupler. Such a multipoint switch is necessarily a relatively heavy moving structure, and considerable energy must be consumed in the stop mechanism controlling it in order to move the switch. This is obviated by the invention, since the multipoint switch often including as many as sixty-one contacts is replaced by a single contact switch 23 which can be readily operated by a single stop tablet or knob represented in Fig. 6 at 29 or by other suitable means.

The actual number of contacts is reduced by almost half, as each coupler in systems previously suggested employs a multiple switch containing as many contacts as there are notes controlled by that particular coupler, the number of notes being either forty-nine or sixty-one.

The invention provides that all key controlled contacts are made by the motion of the key itself and are therefore positively acting and do not have to be actuated through magnetic relays operated from the key contact or contacts.

What is claimed is:—

1. An electric organ having keys, and couplers actuated by the keys and comprising a source of electric energy, as many return conductors to the source of energy as there are couplers, a switch in each return conductor, as many contact members under the control of each organ key as there are couplers, and as many other contact members in the path of and individual to the

first named contact members for engagement by the latter each time the key controlling said first named contact members, is depressed, whereby the touch of the key is always the same irrespective of the number of couplers in action and the number of couplers put into action is controlled solely by the number of switches in the return circuits that are closed.

2. In an electric organ, the combination with an organ key, of a substantially upright series of substantially horizontal contacts movable simultaneously by the key, other contacts also in upright series and in the path of the first named contacts for simultaneous engagement thereby, a source of electric energy, return conductors between each of the first named contacts and the source of electric energy, and an individually movable switch in each return conductor.

3. In an electric organ, the combination with an organ key, of a plurality of movable contacts arranged in an upright series and all under the control of the key for simultaneous movement to like distances, a rod actuated by the key and engaging each one of the contacts for moving the latter with the key, an upright series of other contacts in relatively fixed relation to the first named contacts and in the path of the latter to be engaged thereby when the key is depressed, a source of electric energy, conductors individual to the first named contacts and leading to the source of energy, and a switch in each of the conductors and individual thereto, whereby one or more of the first named contacts controlled by the key may be connected to the source of electric energy.

4. In an electric organ, the combination with a series of organ keys, of as many pairs of associated electric contact terminals for each key as there are couplers to be controlled by the key in addition to the note-producing means normal to the key, a source of electric energy, electric conductors each common to and connecting all like contacts of all the keys of a manual, and a single switch in and individual to each of the common conductors.

5. An electric organ having keys, and couplers actuated by the keys, said couplers comprising a series of pairs of associated electric contact terminals for each of the different keys, the number of pairs of contacts of a series being equal to the electric note-sounding means normal to the key plus the number of coupler organizations to be controlled by the key, a source of electric current, electric connections for including the contact terminals in circuit with the source of electric current, all like circuit terminals of a series of keys having a common connection, and a single switch for and individual to each of the common connections, for electrically connecting it to the source of current.

6. In an electric organ, a key coupler comprising, in combination, an organ key, an upright series of substantially horizontal elastic wires each supported at one end and free at the other end and underlying the key, a substantially upright rod traversed by the wires and movable by the key for the simultaneous actuation of the wires on the depression of the key, a spring engaging the lower end of the upright rod and normally opposing the depression of the key, an upright series of relatively fixed contacts in the paths of the free ends of the first named contacts and individual thereto, a source of electric energy, and means independent of the keys for connecting the key control contacts separately and at the will of an operator to the source of electrical energy.

In testimony whereof I affix my signature in the presence of two witnesses.

HAROLD T. DEPUE.

Witnesses:
MABEL M. HEITZ,
CHAS. E. DURNER.