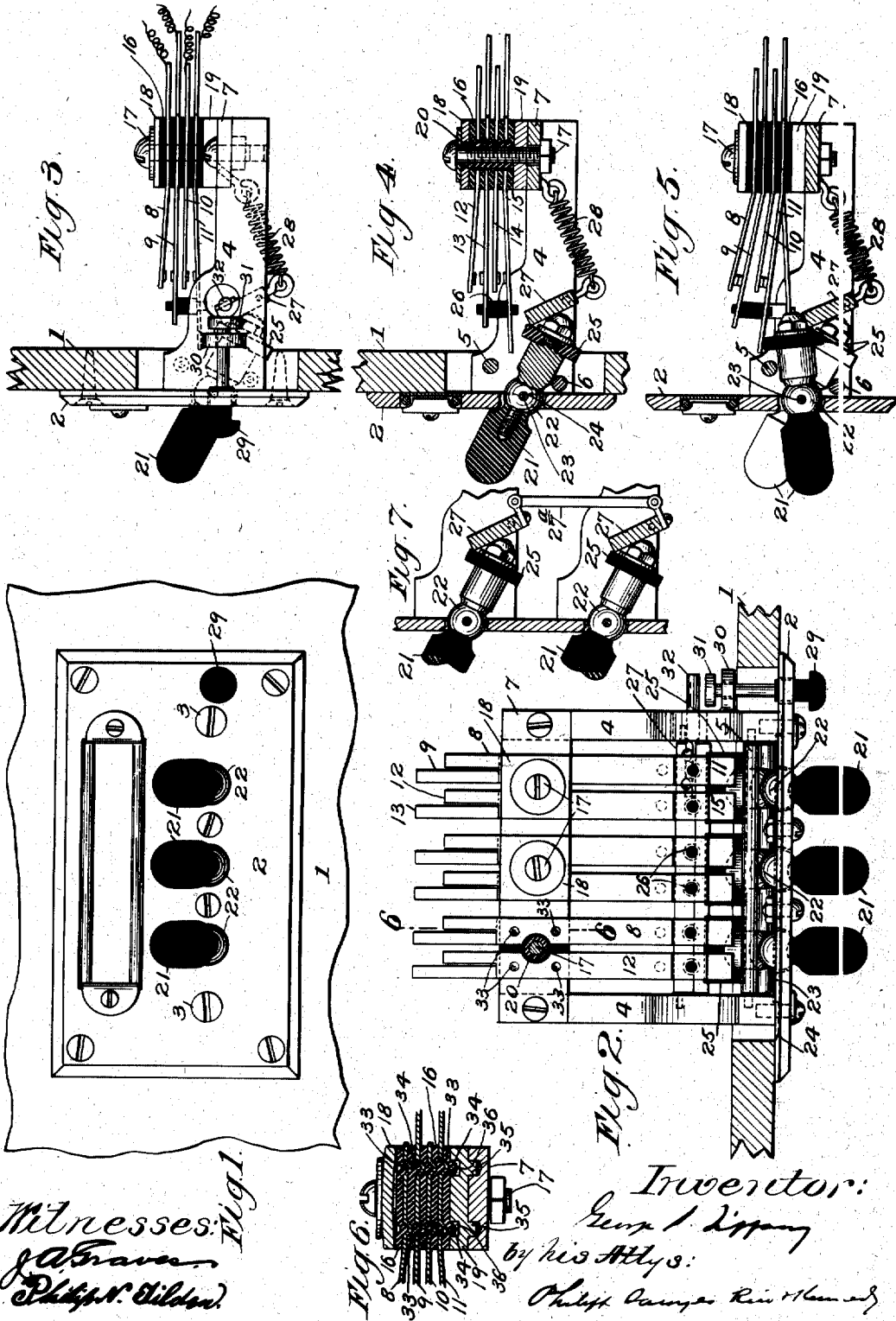


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ELECTRIC SWITCH MECHANISM.
APPLICATION FILED OCT. 28, 1907.

1,008,392.

Patented Nov. 14, 1911.



Witnesses:
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Fig. 6.
33 18 34 16 33 34 35 36 37 17 38 19 39 10 40 11 41 12 42 13 43 14 44 15 45 16 46 17 47 18 48 19 49 20 50 21 51 22 52 23 53 24 54 25 55 26 56 27 57 28 58 29 59 30 60 31 61 32 62 33 63 34 64 35 65 36 66 37 67 38 68 39 69 40 70 41 71 42 72 43 73 44 74 45 75 46 76 47 77 48 78 49 79 50 80 51 81 52 82 53 83 54 84 55 85 56 86 57 87 58 88 59 89 60 90 61 91 62 92 63 93 64 94 65 95 66 96 67 97 68 98 69 99 70 100

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UNITED STATES PATENT OFFICE.

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ELECTRIC SWITCH MECHANISM.

1,008,392.

Specification of Letters Patent. Patented Nov. 14, 1911.

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To all whom it may concern:

Be it known that I, GEORGE S. TIFFANY, a citizen of the United States, residing at Summit, county of Union, and State of New Jersey, have invented certain new and useful Improvements in Electric Switch Mechanism, fully described and represented in the following specification and the accompanying drawings, forming a part of the same.

This invention relates to improvements in switch mechanisms for electric circuits, and particularly to mechanisms designed for controlling, through a plurality of keys, a number of electrical circuits.

As a full understanding of the improvements of the present invention can best be had from a detailed description of an organization embodying the same, such description will now be given in connection with the accompanying drawings, in which—

Figure 1 is a front view of a switch-board provided with switch mechanism embodying the present invention. Fig. 2 is a plan view of the same, partly in section. Fig. 3 is a plan side view thereof, partly in section. Fig. 4 is a vertical section of the same. Fig. 5 is a similar view with some of the parts in a different position so as to illustrate the operation of the switch mechanism inclosing circuits. Fig. 6 is a section on the line 6 of Fig. 2 illustrating a detail of construction which will be hereinafter referred to; and Fig. 7 illustrates a modification which will be hereinafter described.

Referring to said drawings, 1 represents a switch-board, to which is secured a metal face plate 2, in which (as shown in the other figures of the drawing) are mounted the several parts of the switch mechanism embodying the present invention. Secured to this plate 2, by means of screws 3 passing therethrough, is a pair of inwardly projecting arms or brackets 4, connected at one end by rods 5, 6, and at the other or inner end by a plate 7 in which are mounted a plurality of groups of superposed spring contact plates, each group comprising two independent sets, one consisting of four plates 8, 9, 10, 11, and the other of four contact plates 12, 13, 14, 15. The two sets of plates are insulated from each other and the plates of each set are also insulated from each other and from the plate 7 by strips 16 of insulating material alternating with said plates and interposed between them and the plate 7 and

the head of the bolt 17 by which, and the metal clamping plates 18, 19, they are secured to said plate 7, and they are also insulated from said bolt 17 by a tube 20 of insulating material through which said bolt passes. Each set of contact plates 8, 9, 10, 11 and 12, 13, 14, 15 controls two circuits; for example, contact plates 8, 9 constitute the terminals of one circuit, contact plates 10, 11 the terminals of a second circuit, contact plates 12, 13 the terminals of a third circuit, and contact plates 14, 15 the terminals of a fourth circuit, and these several spring plates normally occupy the position in which they are illustrated in Fig. 3, that is to say, with their free ends out of contact with each other and their circuits therefore open. The closing of these circuits is controlled by a series of keys 21 pivotally mounted in openings in the face plate 2, one such key being provided for each two sets of contact plates 8, etc., and 12, etc.

The pivotal connection between each of the keys 21 and plate 2 consists of a ball 22 formed on the key intermediate its ends and closely fitting and substantially closing a correspondingly shaped opening in plate 2, and a pin 23 passing through the shank of the key and entering a groove 24 in the inner face of the plate 2. At its inner end each of the keys is provided with a block 25 of insulating material for engaging the lowermost plate of each set of contacts 8, etc., and 12, etc., and moving each pair of contacts into engagement with each other to close the circuit of which they are the terminals. In the position in which the key is shown in Fig. 3, which is its normal position, the several plates of the two sets of contact plates controlled by that key are out of engagement with each other and their circuits therefore open. When the handle of the key is depressed, however, the inner end thereof will, through its block 25 engaging the ends of the plates 11, 15 raise those plates to the position shown in Fig. 5, and, in so raising them, will force them into contact with the contact plates 10, 14, respectively, thus closing the circuits of which these plates constitute the terminals. At the same time the plates 11, 15 will, by reason of the interposition between them and the plates 9, 13, respectively, of plugs 26 of insulating material, raise the plates 9, 13 into engagement with the contact plates 8, 12, respectively,

thus closing the circuits of which the plates 8, 9 and 12, 13 constitute the terminals. Upon the depression of the inner end of the key 21, these several contact plates will resume the positions in which the plates are shown in Fig. 3.

For the purpose of retaining the several plates in their contacting position upon the depression of the handle of the key 21 controlling them, there is provided a wing 27 pivotally mounted in the arms 4 and the upper edge of which normally overlies the inner ends of the keys 21, as shown in Fig. 2, and when the outer end of a key is depressed it is swung rearwardly thereby and then passes under the inner end of that key and thus locks the key in such depressed position. The lower end of said wing 27 has connected with it one end of a spring 28, the other end of which is secured to plate 7, this spring normally tending to rock the wing inwardly toward the face plate, or, in other words, to the locking position in which it is shown in Fig. 5. As a result of this construction, upon the depression of the outer end of any key 21, the inner end thereof, engaging the upper edge of the wing 27, will rock the wing rearwardly and thus releasing all of the previously depressed keys 21, which are then restored to their normal position shown in Fig. 3. Means are also provided in the present case whereby should all the keys be depressed for the purpose of closing all the circuits they may be released when desired, the means provided for this purpose consisting of a supplemental push key 29 mounted in the plate 2 and in a projection 30 from one of the arms 4, the shank of this key being provided with a button 31 at its inner end for engagement with a pin 32 projecting from the wing 27. When key 29 is pushed inwardly, its button 31, engaging the pin 32 will rock the wing rearwardly and thereby release all of the keys 21 which are then returned to their normal position shown in Fig. 3. As shown in Fig. 7 two rows of keys 21 may have their wings 27 connected by links 27* in such way that on the movement rearwardly of the wing for one row by the depression of a key therein, or the supplemental key 29, the wing of the other row will be correspondingly moved and the previously operated keys in both rows thus released.

The contact plates in the switch mechanism comprise in their construction and assemblage certain features of novelty which will now be described.

As shown in the plan view Fig. 2, each contact plate consists of a strip of metal provided with an approximately semi-circular recess at one of its edges conforming substantially to the bolt 17 and its inclosing tube 20. It will be observed that in the

plates constituting the two sets of each group of contacts, these semi-circular recesses in the edges of the plates face each other so that when such two sets of plates are assembled together, the bolt 17 and its inclosing tube 20 are embraced thereby. It will also be observed on reference to Fig. 2 and also to Fig. 6 that the several contact plates are provided with teats or projections 33 which are formed therein by any suitable punching device, and that the sheets of insulating material alternating with these contact plates are provided with corresponding recesses or countersunk portions 34. The result of this construction is that the several contact plates of each set may be readily and quickly superposed and otherwise assembled in proper relation to each other, the teats 33 entering the depressions 34 and thus accurately centering or positioning the plates with reference to each other. It will also be observed that the clamping plate 19 is provided with teats 35 entering corresponding recesses in the upper face of the plate 7 and that in its upper face said clamping plate 19 is provided with recesses 36 for the reception of the teats on the under side of the adjacent insulating sheet, formed therein by the punching of its upper face to provide the recesses for the reception of the teats on the contact plate above it. From this construction it results, not only that the several contact plates are accurately positioned with relation to each other and to the interposed strips of insulating material, but because of the depressions and teats in the clamping plate 19 and the opposed semi-circular recesses in the edges of the contact plates of each two sets, the two sets of contact plates of each group are accurately positioned with relation to each other. Another advantage of this construction is that it entirely avoids the necessity for using bolts or screws for the purpose of centering the plates with relation to each other, only one bolt (17) being necessary, and that only for the purpose of clamping, by means of the plates 18, 19, the several plates together and to the plate 7.

A further feature of the invention consists in making the clamping plate 18 of spring sheet-metal and giving it an inverted disk-shape or set, as shown in Fig. 6 (where the bolt 17 is shown as slightly loosened), so that, when bolt 17 is tightened, plate 18 will bear firmly at all points against the uppermost contact plates and have no tendency to bend upwardly and thus fail to tightly clamp the several superposed contact plates together.

What I claim is:—

In a switch mechanism, the combination of a plurality of independent sets of contacts, a circuit closing key for each set, a

spring-pressed key-locking wing common to
all the keys and normally resting over the
ends thereof, whereby as a key is operated
said wing is moved rearwardly and takes
5 under and locks the operated key in the po-
sition to which it is moved and releases any
previously operated key, said keys being
pivotally mounted in a plate or support
having circular openings and said keys be-
10 ing provided intermediate their ends with

ball-shaped parts substantially filling said
openings, substantially as described.

In testimony whereof, I have hereunto set
my hand, in the presence of two subscrib-
ing witnesses.

GEORGE STEELE TIFFANY.

Witnesses:

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R. W. ARMSTRONG.