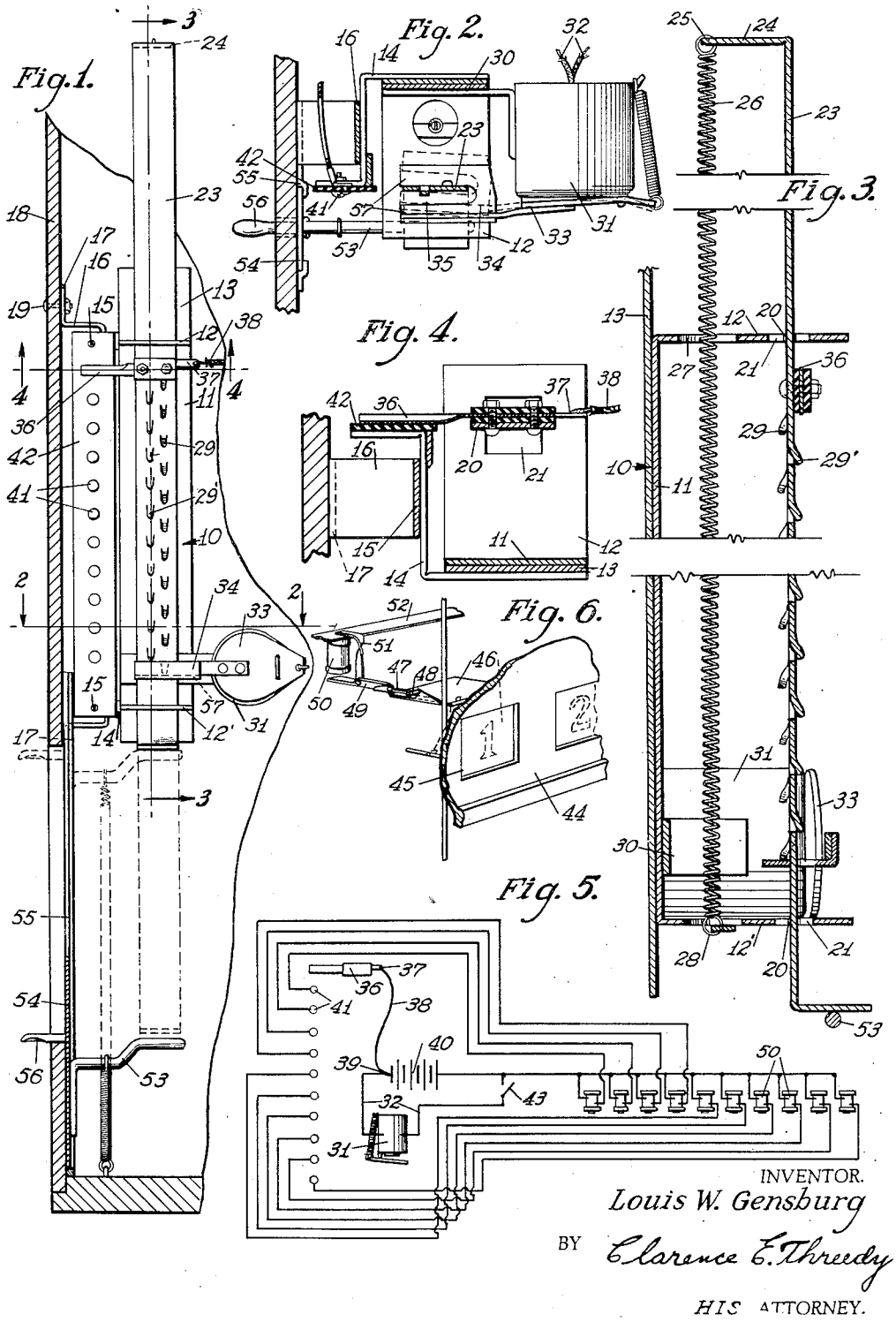
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ELECTRICAL STEP-UP DEVICE

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ELECTRICAL STEP-UP DEVICE

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6 Claims. (Cl. 200—105)

This invention relates to certain novel improvements in an electrical step-up device of a type employed to successively make and break electric circuits, and has for its principal object the provision of an improved construction of this character which will be highly efficient in use and economical in manufacture.

Among the several objects of this invention is to provide a device of the character hereinafter more fully described and claimed which is simple in structure consisting of the fewest number of parts, thereby assuring positive and accurate operation for whatever purpose the device is adapted.

Other objects will appear hereinafter.

The invention consists in the novel combination and arrangement of parts to be hereinafter described and claimed.

The invention will be best understood by reference to the accompanying drawing showing the preferred form of construction, and in which:

Fig. 1 is a sectional elevational view of the invention;

Fig. 2 is a sectional detail view of the same taken substantially on the line 2—2 of Fig. 1;

Fig. 3 is a sectional detail view of the same taken substantially on line 3—3 of Fig. 1;

Fig. 4 is a sectional detail view of the same taken substantially on line 4—4 of Fig. 1;

Fig. 5 is a diagrammatic view illustrating a typical circuit arrangement with which the invention is adapted to be associated; and

Fig. 6 is a perspective view of a device to illustrate the operation of the present invention therewith.

Referring more particularly to the drawing illustrating the preferred form of construction, a supporting structure is indicated at 10. This structure includes an elongated plate 11 having at opposite ends thereof angled end portions 12. This plate 11 is mounted upon a base plate 13, and associated with this base plate 13 at opposite ends thereof are bracket elements 14 to which is secured, as at 15, an attaching plate 16 bent to provide extended portions 17 for connection in a suitable stationary support or unit 18, as at 19.

The angled end portions 12 of the plate 11 adjacent their upper end portions are provided with aligned slots 20 communicating with enlarged openings 21. Slidably arranged through the enlarged openings 21, with the longitudinal edge portions 22 thereof riding in the slots 21, is a movable supporting bar 23, one end of which is angled, as at 24. Secured to this angled end 24, as at 25, is one end portion of a retraction spring 26, the said spring 26 projecting through openings 27 formed in the end portions 12 inwardly of the openings 21, and the opposite end portion of this spring 26 is connected, as at 28, to the adjacent end portion 12' of the end portions 12.

The bar 23 is provided with a plurality of alternately disposed teeth 29 and 29' preferably, though not necessarily provided by being struck from the body of the bar 23.

Mounted upon the plate 10, as at 30, is a bracket supporting a magnetic coil 31. This coil 31 is connected in circuit with a source of electric energy through the medium of conductors 32, and is controlled by a switch 43 which may be either manually or electrically operated. The magnetic coil 31 includes a spring-controlled armature 33, and this armature has secured thereto a keeper plate 34. This keeper plate is provided with an elongated slot 35 to provide oppositely disposed flanges 57 adapted to alternately engage the teeth 29 of the bar 23, whereby when the armature is actuated by the coil 31 by virtue of its alternate engagement with the teeth 29 will permit an intermediate movement of the bar 29 during the time that the coil 31 is energized to actuate the armature 33.

On this bar 23 is secured a contact finger 36 having means, as at 37, for connection with a conductor wire 38 leading from one side 39 of a source of electric energy 40. This finger 36 is adapted to successively engage contacts 41 secured to and supported by a non-conductive bar 42, in turn supported from the supporting structure 10 by means of the brackets 14.

The device thus described is capable of many usages, and therefore I do not desire to limit myself to any one particular use. For the purpose of explaining the present invention, I have illustrated one of the many usages to which the device constituting my invention may be applied.

In this instance, referring particularly to Figs. 5 and 6, 44 indicates a score board having sight openings 45 adapted to have displayed therein a score indicator 46 normally held from score indicating position by means of a latch structure including a keeper 47 and a pin 48. The keeper 47 is actuated through the medium of an armature 49 of a magnetic coil 50. This armature 49 is supported by a bracket 51 from a suitable stationary structure or unit 52.

The arrangement is such that when the coil 50 is energized, the armature is attracted thereby, and when thus attracted, the pivotal movement of this armature will pivot downwardly carrying therewith the keeper 47 from latched engagement with the pin 48, thus permitting the score indicator 46 to drop into position in the sight opening 45, it being understood that these score indicators are moved from position in the sight openings 45 by any approved or conventional means, the same not constituting a part of this invention.

The magnetic coils 50 are each connected to one side of the source of electric energy 40. The other side of these coils 50 are each connected to

one of the contact members **41**. The arrangement is such that movement of the contact finger **36** by the step-up action of the keeper plate **34** will successively energize the coils **50** to permit the score indicators **46** to move into score indicating position in the sight openings **45**.

After the bar **23** has been permitted by action of the magnetic coil **31** and keeper plate **34** to move in its extreme position by the action of the spring **26**, it is moved into retracting position, that is, its initial position, by suitable means, such as, for example, the hand manipulated finger **53** mounted on a slidable plate **54** slidably guided relative to the structure **18** by suitable guide channels **55**, there being associated with this plate **54** a finger gripping portion **56** for the purposes of manipulating the plate **54** to retract the bar **23** to its initial starting position.

While I have illustrated and described the preferred form of construction for carrying my invention into effect, this is capable of variation and modification without departing from the spirit of the invention. I, therefore, do not wish to be limited to the precise details of construction set forth, but desire to avail myself of such variations and modifications as come within the scope of the appended claims.

Having thus described my invention, what I claim as new and desire to protect by Letters Patent is:

1. In a device of the class described comprising a supporting structure, a member supported by the structure for movement relative thereto and comprising a plurality of teeth disposed on opposite sides thereof in alternate relation with respect to each other, a non-conductive member supported by said structure in parallel relation with respect to the movable member, a plurality of contact members carried by said non-conductive member, a contact finger carried by said movable member and adapted to successively engage the contact members of said non-conductive member, a keeper member adapted to alternately engage the said teeth, and means for actuating said keeper plate to permit a step by step movement of said movable member in one direction relative to the supporting member and relative to the non-conductive member.

2. In a device of the class described comprising a supporting structure, a member supported by the structure for movement relative thereto and comprising a plurality of teeth disposed on opposite sides thereof in alternate relation with respect to each other, a non-conductive member supported by said structure in parallel relation with respect to the movable member, a plurality of contact members carried by said non-conductive member, a keeper member adapted to alternately engage the said teeth, means for actuating said keeper plate to permit a step by step movement of said movable member in one direction relative to the supporting member and relative to the non-conductive member, and spring means for urging said movable member in its step by step movement relative to said supporting structure.

3. In a device of the class described comprising a supporting structure, a member supported by the structure for movement relative thereto and comprising a plurality of teeth disposed on opposite sides thereof in alternate relation with respect to each other, a non-conductive member supported by said structure in parallel relation with respect to the movable member, a plurality of contact members carried by said non-conductive member, a contact finger carried by said movable member and adapted to successively engage the contact members of said non-conductive member, a keeper member adapted to alternately engage the said teeth, means for actuating said keeper plate to permit a step by step movement of said movable member in one direction relative to the supporting member and relative to the non-conductive member, and means for urging said movable member in its step by step movement relative to the supporting structure.

4. In a device of the class described comprising a supporting structure, a member supported by the structure for movement relative thereto and comprising a plurality of teeth disposed on opposite sides thereof in alternate relation with respect to each other, a non-conductive member supported by said structure in parallel relation with respect to the movable member, a plurality of contact members carried by said non-conductive member, a contact finger carried by said movable member and adapted to successively engage the contact members of said non-conductive member, a keeper member adapted to alternately engage the said teeth, and means including an electro-magnetic element for actuating said keeper plate to permit a step by step movement of said movable member in one direction relative to the supporting member and relative to the non-conductive member.

5. In a device of the class described comprising a supporting structure, a member supported by the structure for movement relative thereto and comprising a plurality of teeth disposed on opposite sides thereof in alternate relation with respect to each other, a non-conductive member supported by said structure in parallel relation with respect to the movable member, a plurality of contact members carried by said non-conductive member, a keeper member adapted to alternately engage the said teeth, means including an electro-magnetic element for actuating said keeper plate to permit a step by step movement of said movable member in one direction relative to the supporting member and relative to the non-conductive member, and spring means for urging said movable member in its step by step movement relative to said supporting structure.

6. In a device of the class described comprising a supporting structure, a member carried by the structure for movement relative thereto and comprising a plurality of teeth disposed on opposite sides thereof in alternate relation with respect to each other, a non-conductive member supported by said structure in parallel relation with respect to the movable member, a plurality of contact members carried by said non-conductive member, a contact finger carried by said movable member and adapted to successively engage the contact members of said non-conductive member, a keeper member adapted to alternately engage the said teeth, means including an electro-magnetic element for actuating said keeper plate to permit a step by step movement of said movable member in one direction relative to the supporting member and relative to the non-conductive member, and means for urging said movable member in its step by step movement relative to the supporting structure.

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