G. GRIFFITH.

ELECTRIC SWITCH.

APPLICATION FILED AUG. 9, 1915.

1,173,260.

Patented Feb. 29, 1916.

2 SHEETS—SHEET 1.

Fig. 1.

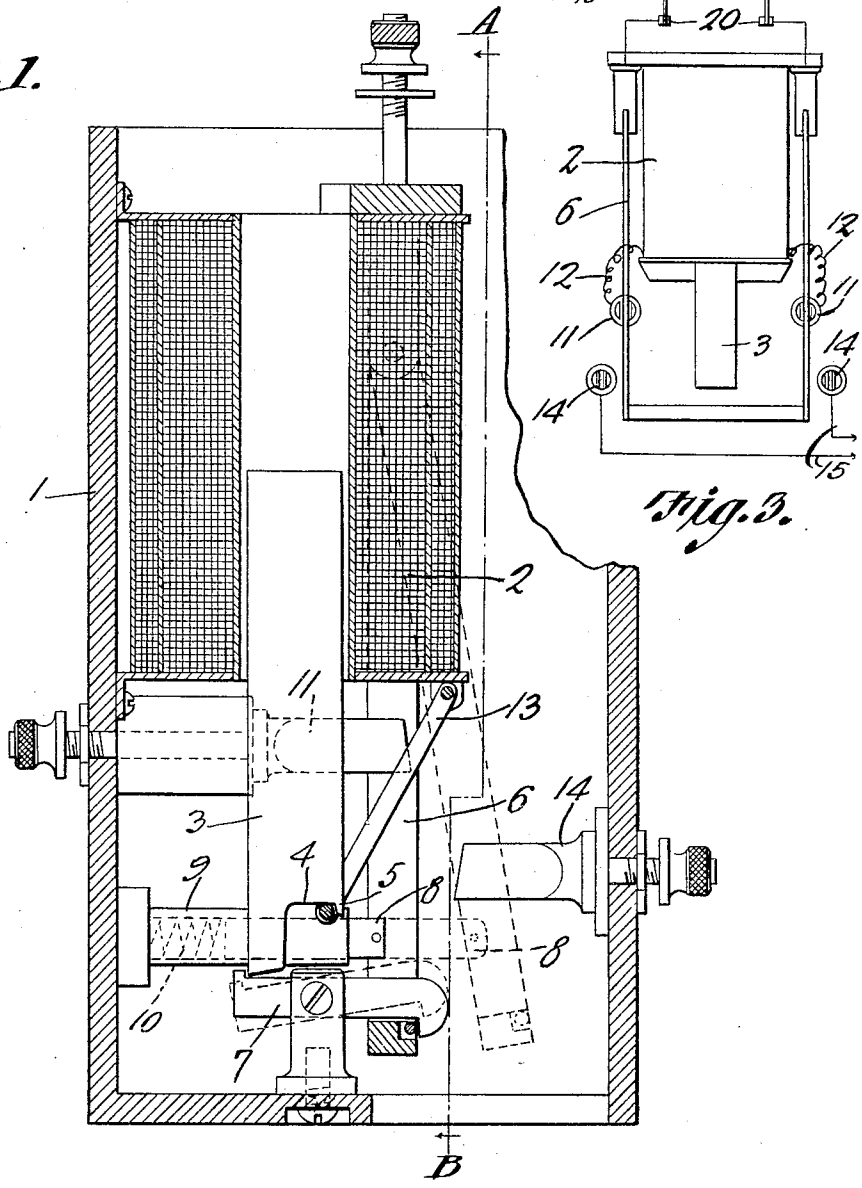


Fig. 3.

Witnesses

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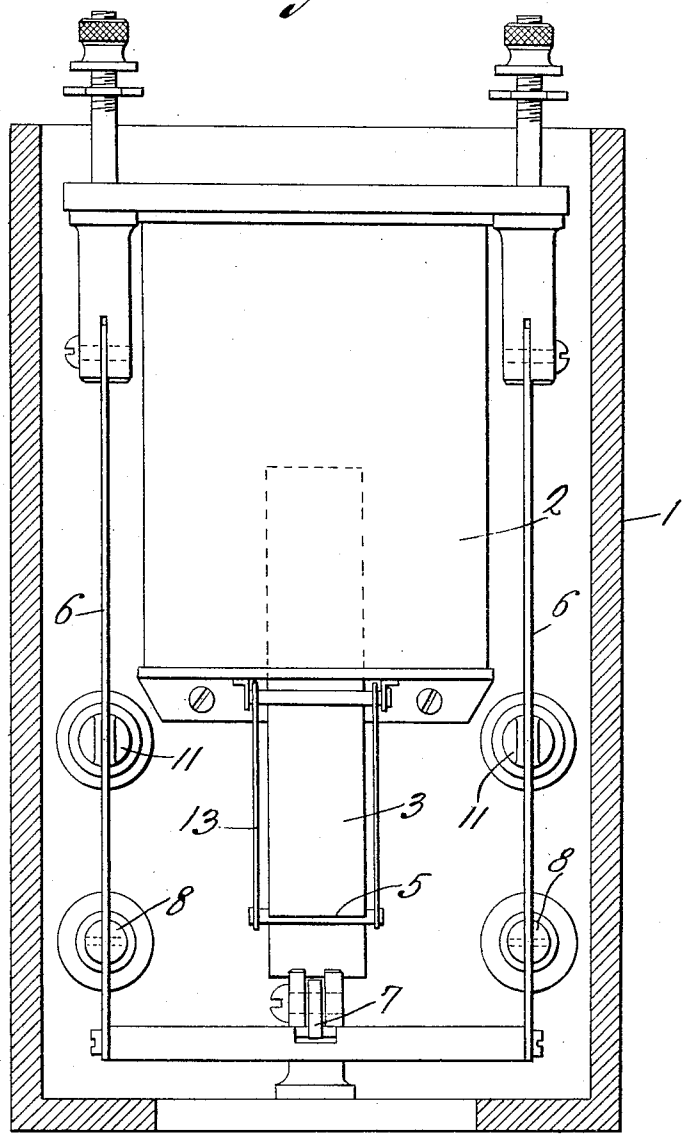
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2 SHEETS—SHEET 2.

Fig. 2.



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UNITED STATES PATENT OFFICE.

GEORGE GRIFFITH, OF PARSONS, KANSAS.

ELECTRIC SWITCH.

1,173,260. Specification of Letters Patent. Patented Feb. 29, 1916.

Application filed August 9, 1915. Serial No. 44,530.

To all whom it may concern:

Be it known that I, GEORGE GRIFFITH, a citizen of the United States, residing at Parsons, in the county of Labette and State of Kansas, have invented a new and useful Electric Switch, of which the following is a specification.

This invention relates to electric switches especially designed for use in successively igniting charges such as used for blasting purposes, each of the switches, when operated, serving to connect the main line wires to the next machine of the series and at the same time to disconnect the first machine from the main line.

With the foregoing and other objects in view which will appear as the description proceeds, the invention resides in the combination and arrangement of parts and in the details of construction hereinafter described and claimed, it being understood that changes in the precise embodiment of the invention herein disclosed, can be made within the scope of what is claimed, without departing from the spirit of the invention.

In the accompanying drawings the preferred form of the invention has been shown.

In said drawings: Figure 1 is a longitudinal section through a switch embodying the present improvements. Fig. 2 is a section on line A—B Fig. 1. Fig. 3 is a view showing diagrammatically the wiring used in connection with the switch.

Referring to the figures by characters of reference 1 designates a suitable casing or other supporting structure in which is arranged a solenoid 2 the core 3 of which is normally extended downwardly therefrom and is provided with a shoulder 4 adjacent its lower or free end and which shoulder has depending nose 5. A double knife switch 6 straddles the solenoid and is adapted to be engaged by a pivoted latch 7 mounted below the core 3. Pins 8 are pivotally connected to the switch and are slidably mounted within tubular housings 9 in which are arranged springs 10 normally under compression. When the latch 7 is in engagement with the switch, it holds the pins 8 pressed back against the springs 10, as shown in Fig. 1 and at the same time holds the switch in engagement with separate contacts 11 electrically connected, as at 12, to the solenoid. A bail 13 is pivotally mounted in any suitable manner, preferably close to the lower end of the solenoid and is adapted to be engaged by shoulder 4 and nose 5, thus to support the core 3 close to but out of contact with the latch 7.

Spaced contacts 14 are mounted at points where they will be engaged by the switch 6 when said switch is released and permitted to swing outwardly under the action of the springs 10, as shown by dotted lines in Fig. 1. These contacts 14 are connected to wires 15 leading to the next machine making up the apparatus.

The main line wires 16 extending from the source 17 of electrical energy are connected to contacts 18 which, in turn are connected by a master switch 19 to contacts 20. These contacts 20 are electrically connected to the respective sides of the switch 6.

In a complete apparatus any desired number of switches such as shown can be employed, one being provided for each unit of the blasting apparatus, and the wires 15 from the first switch being extended to the respective sides of the switch 6 of the next succeeding machine. Under normal conditions the bail 13 of the switch is engaged by core 3, as shown in Fig. 1 and the switch 19 is out of engagement with the contacts 18.

When it is desired to explode the first charge controlled by the apparatus, the master switch 19 is moved against the contacts 18, thus completing a circuit through switch 6 and connection 12 to the solenoid with the result that the core 3 is drawn upwardly out of engagement with the supporting bail 13 and said bail is therefore permitted to swing by gravity to a vertical position where it will not be engaged by the core when said core returns to its lowermost position. By now again shifting the master switch 19 so as to break the circuit to the solenoid, the deëneregized solenoid will release core 3 and said core will drop in contact with latch 7 to disengage the latch from the switch 6. Consequently springs 10, which are under compression, will throw the switch 6 away from the contacts 11 and against contacts 14. By now shifting the master switch 19 against the contacts 18, a circuit will be established from the main wires 16 through the first switch 6 and contacts 14 and wires 15 to the second solenoid of the apparatus and at the same time the first charge will be exploded. When the switch is again shifted

away from contacts 18, the elevated core of the second solenoid will be released, thus releasing the second switch 6 of the apparatus and thus coupling the third solenoid of the apparatus to the wires 16. Obviously by using switches such as herein described, any desired number of them when assembled in the manner set forth, can be employed and by manipulating the single master switch 19, the several switches 6 of the system can be successively released to place the next succeeding solenoid in position to be energized.

What is claimed is:—

1. A device of the class described, including a solenoid, means for holding the core of the solenoid slightly removed from the outer limit of its movement, said means being movable away from the core when the solenoid is energized, a double knife switch, means for connecting the knife switch to a source of energy, opposed contacts adapted to be successively engaged by the knife switch, electrical connections between the solenoid and one pair of contacts, means for holding the knife switch in engagement with said pair of contacts, said core when released by its deënergized solenoid and from its holding means, being movable against the switch supporting means to release the switch, and means for automatically shifting the released switch from one pair of contacts to the other pair of contacts.

2. A device of the class described, including a solenoid having a downwardly extending core, means for holding the core partly elevated, said means being movable away from the core when the solenoid is energized, a double knife switch, means, including a master switch, for connecting said knife switch to a source of energy, opposed pairs of contacts adapted to be successively engaged by said knife switch, electrical connections between the solenoid and one pair of contacts, means for holding the knife switch in engagement with said pair of contacts, said core, when released by its deënergized solenoid and from its holding means, being movable against the switch holding means to release the switch, and means for automatically shifting the released switch from one pair of contacts to the other pair of contacts.

3. The combination with a solenoid having a downwardly extending core, and pivoted means for engaging the core to hold the same partly elevated, said means when in engaging position being extended out of normal position, of a double knife switch, means for connecting said switch to a source of electrical energy, said means including a master switch, a latch adapted to engage the knife switch, said latch being supported in the path of the core, opposed pairs of contacts in the path of the double knife switch, electrical connections between the contacts of one pair and the solenoids, said last mentioned contacts being engaged by the knife switch when said knife switch is held by the latch, the solenoid, when energized, constituting means for shifting the core out of engagement with its supporting means and away from the latch and, when deënergized constituting means for releasing the core into engagement with the latch to disengage the double knife switch, and means for automatically shifting the disengaged knife switch into engagement with the other pair of contacts.

In testimony that I claim the foregoing as my own, I have hereto affixed my signature in the presence of two witnesses.

GEORGE GRIFFITH.

Witnesses:
MARK GILLIN,
MARY MANGUM.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."