B. SOLDATENCOW.

ELECTROMAGNETIC DEVICE.

APPLICATION FILED MAR. 30, 1912.

1,034,397. **Patented July 30, 1912.**

2 SHEETS—SHEET 1.

Fig. 1

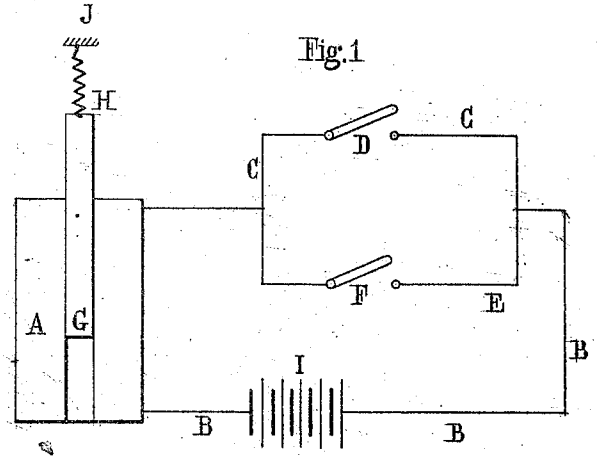
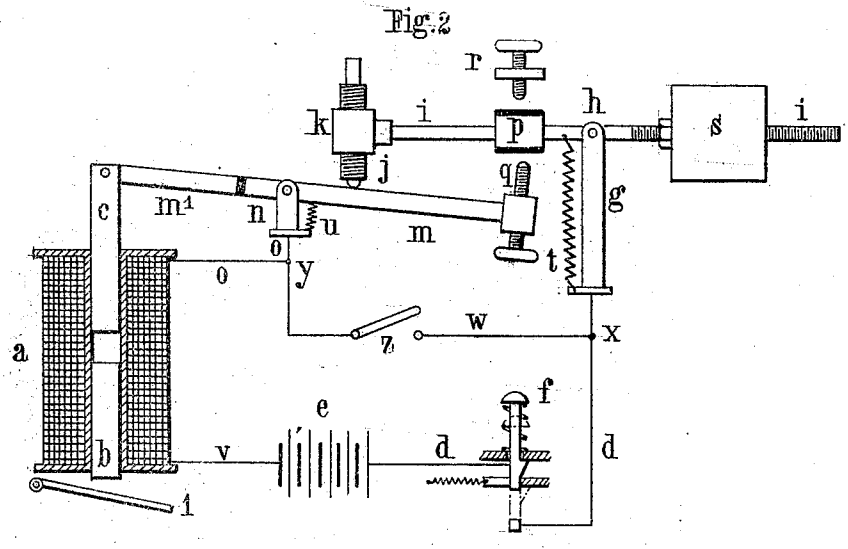


Fig. 2



WITNESSES

Sidney Brooks

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2 SHEETS—SHEET 2.

Fig. 3

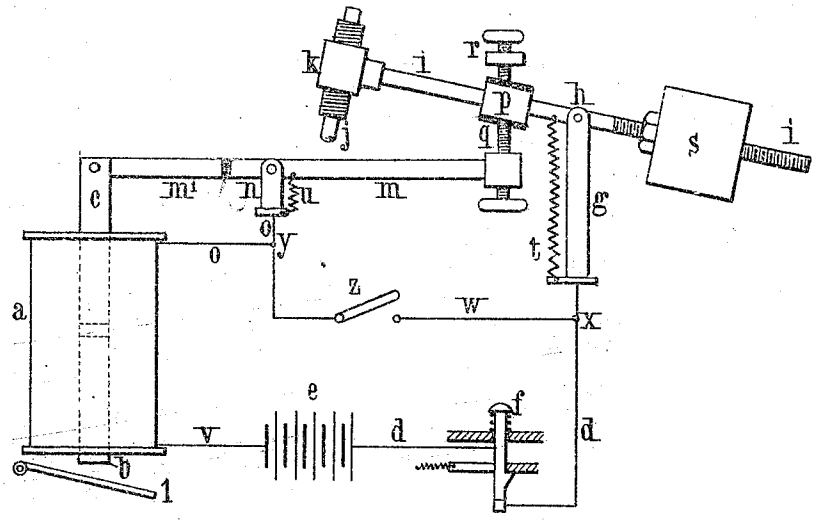
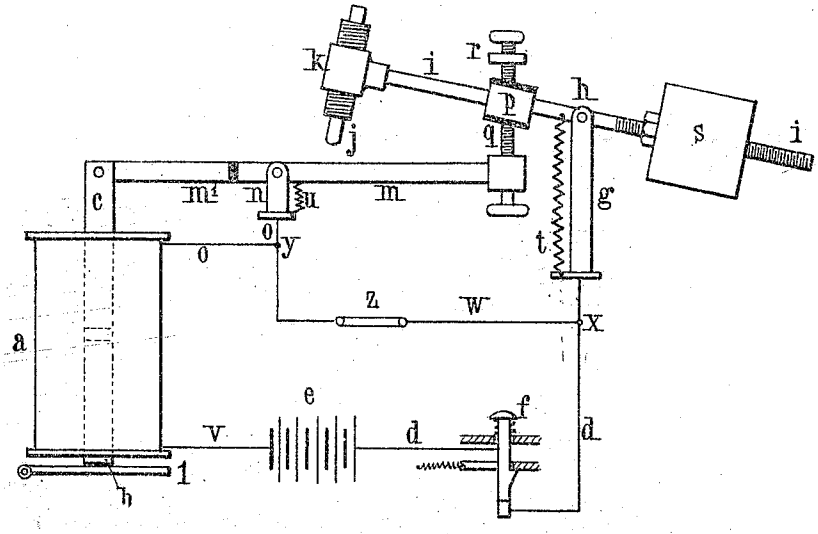


Fig. 4



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UNITED STATES PATENT OFFICE.

BASILE SOLDATENCOW, OF PARIS, FRANCE.

ELECTROMAGNETIC DEVICE.

1,034,394. Specification of Letters Patent. Patented July 30, 1912.

Original application filed February 5, 1912, Serial No. 675,400. Divided and this application filed March 30, 1912. Serial No. 687,494.

To all whom it may concern:

Be it known that I, BASILE SOLDATENCOW, of 37 Rue La Pérouse, Paris, France, have invented certain new and useful Improvements in and Relating to Improved Electromagnetic Devices, of which the following is a specification.

The present invention relates to an electro-magnetic device having a variable action, and it is intended to enable different and distinct effects to be obtained by the action of a single solenoid and a single electric circuit.

In the accompanying drawings which show an example of the way in which the invention may be carried into effect: Figure 1 is a diagrammatic view of the system; Figs. 2 to 4 illustrate an apparatus embodying the invention at different stages in its operation.

The apparatus according to the invention consists (Fig. 1) of a solenoid A to which current is supplied by an electric circuit B (the source of current being at I). The circuit B is divided outside the solenoid and includes in one of the divisions C a switch or other device D which only permits such current to pass that the magnetic field generated shall be sufficient to produce a given attraction or magnetization of the core G. In the other division of the circuit E is inserted a switch or other device F which only permits such current to pass that the magnetic field generated shall be sufficient to cause a stronger attraction or magnetization than the first, for the purpose of obtaining by means of a single solenoid and a single electric circuit different and distinct effects.

The apparatus acts as follows, supposing that the core G is attached to a fixed point J by means of a spring H whose tension is suitably adjusted: When closing the switch D a magnetic field is produced in the solenoid which attracts the core G and tensions the spring H. If switch D is opened the magnetic field disappears and the spring contracts and pulls up the core G. Effects of the same kind are obtained with the switch F. If the current is only allowed to pass for a very short time, the magnetic field produced will be very weak. If, on the contrary, the period during which the current passes is longer the magnetic field will be more intense. It will therefore be seen that by suitably acting upon the two switches either simultaneously or successively, magnetic fields of different intensities can be produced, and these magnetic fields will cause a greater or smaller magnetization of the core G, resulting in a succession of reciprocatory movements of the said core in combination with the spring H simultaneously by the attraction or release of organs whose weight and position are determined according as the magnetic field created is sufficient or not to influence them.

In practice the arrangements shown in Figs. 2 to 4 can be used. *a* represents a solenoid or electro-magnet having a stationary core *b* and a movable core *c*. One of the divisions of the electric circuit is constituted by wire *d*, starting from the source of current *e* and having a suitable switch *f*, a bracket *g* on which is pivoted, at *h*, a conducting lever *i* having a spring contact member *j*, which latter can contact with a conducting lever *m* mounted in a conducting bracket *n* connected by wire *o* to the solenoid which finally is connected to the source of current by the wire *v*. A non-conducting extension *m'* of lever *m* is pivoted at its extremity to the movable core *c*. The contact member *j* is mounted in a casing *k* which can be moved along the lever *i*. The latter carries an insulating piece *p* placed between an adjustable abutment *q*, mounted on the end of the lever *m*, and a second adjustable stop *r*. A counterweight *s* whose position can be adjusted is mounted on the other end of lever *i* and returning springs *t* and *u* are fitted on levers *i* and *m* respectively. The second division of the circuit is constituted by the wire *w* connecting the two points *x* and *v* of the circuit and including a switch *z*.

In Fig. 2, the switch *z* is open (the usual key *f* being depressed) and the circuit is the following; wire *d*, bracket *g*, lever *i*, spring contact *j*, lever *m*, bracket *n*, wire *o*, the winding of the solenoid *a* and wire *v*. The movable core is thereby attracted and together with lever *m*, *m'*, takes up the position shown in Fig. 3. The stop *q* raises the insulating block *p* and swings the lever *i* and thereby removes contact *j* from lever *m* and interrupts the current. The core *g* is now no longer attracted and the springs *t* and *u* return the corresponding levers *m* and *i* into the positions shown

in Fig. 2, thereby again closing the circuit, in that contact j makes contact with lever m. By this means the core c is again attracted, which attraction again breaks the circuit, and this cycle of operations continues indefinitely. In this way a rapid pulsatory movement of the movable core c is obtained by the rapid succession of opening and closing of the contact making and breaking device j—m. If the switch z is closed the following circuit is formed: wire d, branch w, switch z, wire o, solenoid a and wire v thereby producing in the solenoid a magnetic field whose intensity can be regulated (for instance by the time during which the current passes) so that it is greater than that of the field produced by the first branch. Therefore by closing the switch z during the operation of the contact making and breaking mechanism j m, the more intense field generated by z will cause the movable core c to be stopped or held, while at the same time magnetizing the core b more strongly. The extent and duration of the movements of the core c can be regulated by adjusting the stops q and r and the counterweight s.

The solenoid or electro-magnet can be replaced by any winding or coil capable of creating a magnetic field of feeding a core or armature.

The invention can be applied to the actuation of apparatus of all kinds, or to the production of electrical, electro-magnetic, or mechanical effects. In an application for patent of another date herewith, bearing Ser. No. 675,400, I have shown one of the uses to which the arrangement may be put.

What I claim is:

1. In an electro-magnet device having a variable action, a solenoid coil, stationary and movable cores within the coil, and the latter of which is actuated by the coil, means forming a circuit for feeding the coil, which circuit is divided outside the coil, means forming part of one of the branches of said circuit whereby to intensify the coil over periods of relatively short duration and thus cause limited actuation of the movable core, and a switch in the other branch of the circuit, all for the purpose of obtaining different and distinct effects by means of a single solenoid and a single electric circuit.

2. In an electro-magnet device having a variable action, a solenoid coil, stationary and movable cores within the coil, and the latter of which is actuated by the coil, means forming a circuit for feeding the coil, which circuit is divided outside the coil, make and break elements forming part of one of the branches of said circuit whereby to intensify the coil over periods of relatively short duration and thus cause limited actuation of the movable core, and a switch in the other branch of the circuit, all for the purpose of obtaining different and distinct effects by means of a single solenoid and a single electric circuit.

3. In an electro-magnetic device having a variable action, a solenoid coil, stationary and movable cores within the coil, the movable core being disposed adjacent the inner end of the stationary core and being actuated by the coil, means forming a circuit for feeding the coil, which circuit is divided outside of the coil, means forming part of one of the branches of said circuit whereby to intensify the coil over periods of relatively short duration and thus cause limited actuation of the movable core, a switch in the other branch of the circuit, and a movable armature arranged adjacent the outer end of the stationary core and adapted to be actuated thereby for the purpose described.

In testimony whereof I have hereunto placed my hand at Paris (France), this fifteenth day of March 1912.

B. SOLDATENCOW.

In the presence of two witnesses:
LOUIS COQUILLAT,
LUCIEN MEMMINGER.