N° 27,445 A.D. 1906

Date of Application, 3rd Dec., 1906

Complete Specification Left, 3rd June, 1907—Accepted, 3rd Jan., 1908

PROVISIONAL SPECIFICATION.

Improvements in Electrical Contact Making and Breaking Devices.

We, ISAAC HARDY PARSONS of Kibworth Harcourt, Leicestershire, Electrical Engineer, and ALFRED ERNEST JOSEPH BALL of 38, St. Saviours' Road East, Leicester, Clockmaker, do hereby declare the nature of this invention to be as follows:—

This invention relates to improvements in electric contacts of an interlocking type, in which the contact is made at one part of an electric circuit, and is broken at another part of the circuit; the improved contacts being applicable chiefly to electrical apparatus of an automatic or semi-automatic type.

The object of this invention is to ensure that the circuit shall not be broken until the apparatus to which these our improved contacts are applied has operated or until the desired work has been performed.

In carrying this our invention into effect, we apply these our improved contacts to an apparatus generally in the following manner:—

In series with the coils of the operating magnet or magnets of the apparatus, we introduce the magnet coil or coils of a form of relay which we employ as the contact maker of the apparatus, the relay contacts being also disposed in series. We arrange that the magnet in the circuit which is the last to operate or the operation of which we desire to assure shall, by means of its armature or a part moving in connection therewith, separate two springs or levers or otherwise break the circuit.

We arrange the contact maker in accordance with this our invention, so that a moving part of the apparatus which may in some instances be one of the retreating armatures, shall depress the tongue of the relay and thus close the circuit. In order to ensure that the circuit shall be broken sufficiently long to permit the relay armature to fall back and so break the circuit at the relay contacts, we sometimes weight one of the two springs or levers or equivalents, so that its inertia shall delay its return. When employing such a lever (or levers) we further delay its return by disposing its returning spring so as to exert a diagonal pull, the spring thereby pulling less effectively as the forward movement of the weighted lever increases.

An apparatus to which these our improved contacts are applied operates as follows:—

On the tongue of the relay being depressed by a moving part of the apparatus, the circuit becomes closed by the relay contacts which then continue in contact by virtue of the current flowing through its magnet coils, notwithstanding that the moving part of the apparatus becomes drawn back or removed by one of the energised magnets in the circuit.

On the slowest armature in the circuit being pulled up, the circuit is broken by the contact breaker operating in connection therewith, and the relay magnets being no longer energised, the relay armature returns to its normal position, thus breaking the circuit also at this point.

The slowest armature of the apparatus on its return allows the contact breaker to again close the contacts at this point of the circuit, and the apparatus is again ready to operate as before.

Dated this 1st. day of December, 1906.

I. HARDY PARSONS.
ALFRED E. J. BALL.

[*Price 8d.*]

COMPLETE SPECIFICATION.

Improvements in Electrical Contact Making and Breaking Devices.

We, ISAAC HARDY PARSONS of Kibworth Harcourt, Leicestershire, Electrical Engineer, and ALFRED ERNEST JOSEPH BALL of 38, St. Saviours' Road, East, Leicester, Clockmaker, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

This invention relates to improvements in electric contacts of an interlocking type, in which the contact is made at one part of an electric circuit and is broken at another part of the circuit; the improved contacts being applicable chiefly to electrical apparatus of an automatic or semi-automatic type.

The object of this our invention is to ensure (and for the purposes of this specification the term interlocking implies) that the circuit shall not be broken until the apparatus to which these our improved contacts are applied has operated or until the desired work has been performed.

In carrying this our invention into effect, we apply these our improved contacts to an apparatus generally in the following manner:—

In series with the coils of the operating magnet or magnets of the apparatus, we introduce the magnet coil or coils of a form of relay which we employ as the contact maker of the apparatus, the relay contacts being also disposed in series. We arrange that the magnet in the circuit, which is the last to operate, or the operation of which we desire to ensure shall, by means of its armature, or a part moving in connection therewith, separate two springs or levers or otherwise break the circuit.

We arrange the contact maker in accordance with this our invention, so that a moving part of the apparatus which may in some instances be one of the retreating armatures, shall depress the tongue of the relay and thus close the circuit. In order to ensure that the circuit shall be broken sufficiently long to permit the relay armature to fall back and so break the circuit at the relay contacts, we sometimes weight one of the two springs or levers or equivalents so that its inertia shall delay its return. When employing such a lever or levers, we further delay its return by disposing its returning spring so as to exert a diagonal pull so that the spring is pulling less effectively as the forward movement of the weighted lever increases.

An apparatus to which these our improved contacts are applied operates as follows:—

On the tongue of the relay being depressed by a moving part of the apparatus, the circuit becomes closed by the relay contacts which then continue in contact by virtue of the current flowing through its magnet coils, notwithstanding that the moving part of the apparatus becomes drawn back or removed by one of the energising magnets in the circuit.

On the slowest armature in the circuit being pulled up, the circuit is broken by the contact breaker operating in connection therewith, and the relay magnet being no longer energised, the relay armature returns to its normal position thus breaking the circuit also at this point.

The slowest armature of the apparatus on its return allows the contact breaker to again close the contacts at this point of the circuit, and the apparatus is again ready to operate as before.

In the practical application of this our improved contact making and breaking device, we sometimes find it convenient to slightly increase the electrical energy of the working magnet and utilise such increase for the purpose of holding together the making contacts instead of employing an additional smaller magnet in the circuit for this purpose, as in the hereinbefore described example of its application.

Referring to the annexed drawings, in which the like letters indicate like or equivalent parts:—

Fig. 1, illustrates diagramatically our improved contact device in a form suitable for electric hour striking and quarter chiming apparatus.

Fig. 2. illustrates diagramatically our improved device in a form suitable for an electric impulse movement for turret clocks.

Fig. 3 illustrates diagramatically a number of such turret impulse movements connected in series and interlocked with each other, a relay being shown on one only.

Fig. 4 illustrates diagramatically our improved contact device in a form applicable to a master or self-winding clock which may or may not be used for the purpose of operating step by step dials.

Referring to Fig 1, A and A^1 show the relay contacts and B and B^1, the magnet, the operation of which it is desired to insure, C. being its armature and D. and D^1 the contact levers or springs or equivalent, which in this application of our improved contacts constitutes the contact breaker of the circuit. E shows the magnet operating the armature F (in opposition to the spring F.1) which by means of the pawl G drives the train of wheels or equivalent usually employed in hour strike and quarter chiming mechanism the drive of the armature F is limited by the adjusting screw H.

The magnet I I^1, serves by means of its armature I^2, to hold the contacts A and A^1, together, until the circuit is broken by the contacts D and D^1.

As will be seen this application of our improved contacts insures that the circuit shall not be broken until the armature C has caused the hammer J to strike the bell K.

Referring to Fig 2, A and A^1 show the relay contacts and B & B^1 the magnet, the operation of which it is desired to insure, C being its armature and D and D^1 the form of contacts which in this application of our device constitutes the contact breaker of the circuit. F is the moving part under tension from the spring F.1, which on being released (by the magnet M & M.1, the armature N and tripping rod O) depresses the contact A.1 against the contact A by means of its adjusting screw H. The magnet B and B.1 in this instance serves to hold the contacts A and A.1 together, until the circuit is broken by the contacts D and D.1.

This application of our improved contacts insure that the circuit shall not be broken until the armature C has enabled the click J to engage the next tooth of the wheel K. On the click J driving the wheel K forward under the tension of the spring L, the circuit is again completed at this point, just after the receding contact A has separated from the contact A.1; when also the moving lever F is left in its original position ready to again operate under the mechanical pressure of the spring F.1, its catch P being in engagement with and held by the stud R. The magnet M, M.1. is brought into operation at each half minute by current controlled by a master clock such as that described in our previous Patent No. 24620 of 1904.

The action of the click J, the stop S, the back stop click T and the click extension W is described in our previous Patent No. 19906 of 1905.

Referring to Fig 3, A and A.1. show the relay contacts which are in series with the magnets B.1., B.2., B.3., and B.4. the operation of which it is desired to insure; C.1., C.2., C.3., and C.4. being the armatures of their respective magnets and D 6 & D 7, D., & D.1., D.2., & D.3., D^4 & D^5, the contact breakers

of the circuit which are perforce connected in parallel. The contacts A and A¹ are brought together in the manner herein described with reference to Fig. 2.

If more than one such movement is provided with a relay, the relay contacts are arranged in series. This application of our improved contact device insures that the magnets B.1., to B.4 shall pull up their respective armatures before the circuit is broken, thus insuring their operation and the complete performance of the desired work each time the contact is made at the contacts A and A.1.

The utility of this our improved contact device may be further enhanced by inserting in the circuit therewith, a weak battery warning device as herein shown at X and described and illustrated in our previous Patent No. 17826 of 1905.

The instruments shown in Fig. 3, then operate as follows:—

On the battery V becoming weak and unable to pull up all the armatures in the circuit, the contacts remain closed until the inertia system of the warning device X moves sufficiently to cut out by means of its contacts Y, Y¹, the resistance *r* which is normally always in circuit and so boosts up the current, and at the same time give an audible warning of the fact that the battery is weak by striking a gong.

Referring to Fig. 4., A and A¹ show the relay contacts and B and B¹ the magnet, the operation of which it is desired to insure, C being its armature and D and D¹ the contact levers or springs or equivalent, which in this application of our improved contacts constitutes the contact breaker of the circuit.

The armature C impelled by the spring L drives by means of the pawl J the train of wheels terminating in a lever escapement as shown, or an escapement of any other type.

The drive of the armature C is limited by the adjusting screw H. The magnet I, I.1., serves by means of its armature I.2., to hold the contacts A and A¹ together until the circuit is broken by the contacts D and D¹, the inertia contact lever D insures by the prolongation of its motion that the "break" shall be of a definite character, the spring shown in spiral form exerting less pressure as its motion increases.

Having now particularly described and ascertained the nature of this our said invention and in what manner the same is to be performed, we declare that what we claim is:—

1. In an electric contact making and breaking device of an interlocking type, the employment of two contacts, one for the purpose of making and the other for the purpose of breaking the circuit, the establishment of the circuit by mechanical pressure on the making contacts, by a moving part of the device, the holding of the said making contacts in the closed position by an electro magnet in the circuit attracting a contact-carrying armature, notwithstanding the removal of the mechanical pressure, the separation of the breaking contacts after the required movement of an armature has been completed, the separation of the making contacts when the contact-carrying armature is no longer attracted by its magnet, substantially as described and shewn in Figs. 1 and 4 of the accompanying drawings.

2. In an electric contact making and breaking device of an interlocking type, the utilization of part of the pressure or energy of the armature C or C¹ while being attracted, for the purpose of maintaining the connection of the making contacts, so long as the current is flowing, the breaking of the circuit by the said armature on the completion of its stroke, by (independent) breaking contacts, and the separation of the making contacts before the said breaking contacts are again connected, substantially as herein described with reference to Figs. 2 or 3 of the accompanying drawings.

3. In an electric contact making and breaking device of an interlocking type, the employment of one contact for the purpose of making and another contact for the breaking of the circuit, the making contact being maintained in the

closed position by the flowing current, the breaking of the circuit by the slowest armature in the said circuit, such armature operating an inertia lever or equivalent, the prolonging of the break by a diagonally disposed returning spring operating the said inertia lever, and the automatic separation of the making contacts on the cessation of the flow of the current, substantially as described.

Dated this 1st day of June, 1907.

ISAAC HARDY PARSONS.
ALFRED E. J. BALL.

Redhill: Printed for His Majesty's Stationery Office, by Love & Malcomson, Ltd.—1908.

A.D. 1906. Dec. 3. N° 27,445.
PARSONS & *another's* Complete Specification.

(4 SHEETS)

SHEET 1

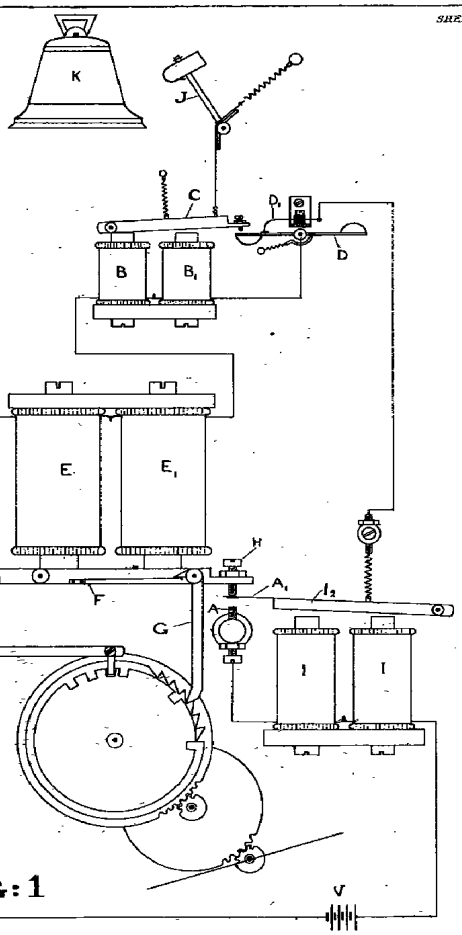

FIG: 1

SHEET 2

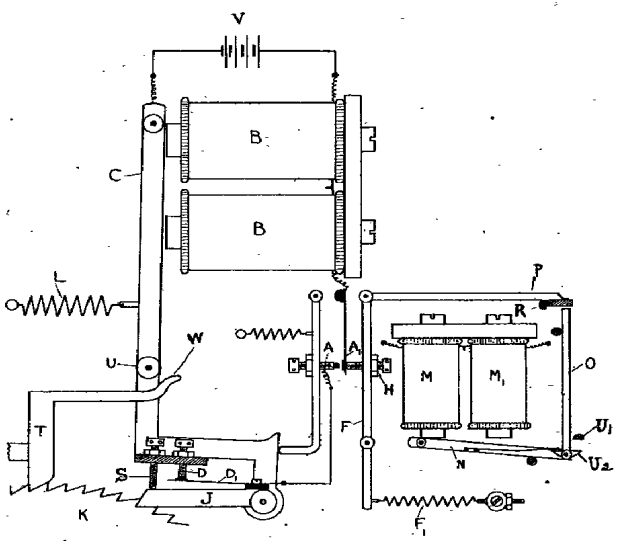

FIG: 2

[This Drawing is a reproduction of the Original on a reduced scale.]

Malby & Sons, Photo-Litho.

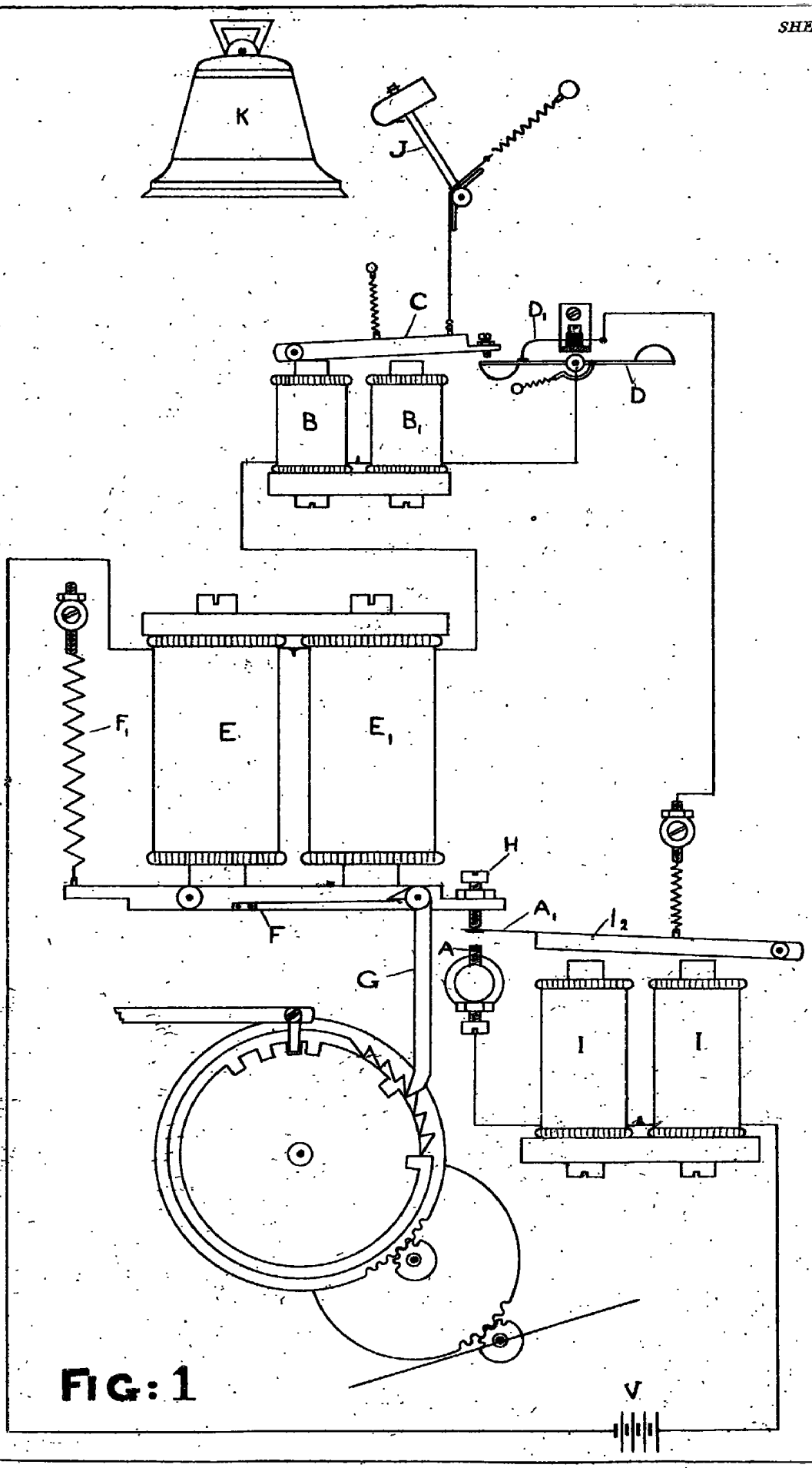

FIG: 1

[This Drawing is a reproduction of the Original on a reduced scale.]

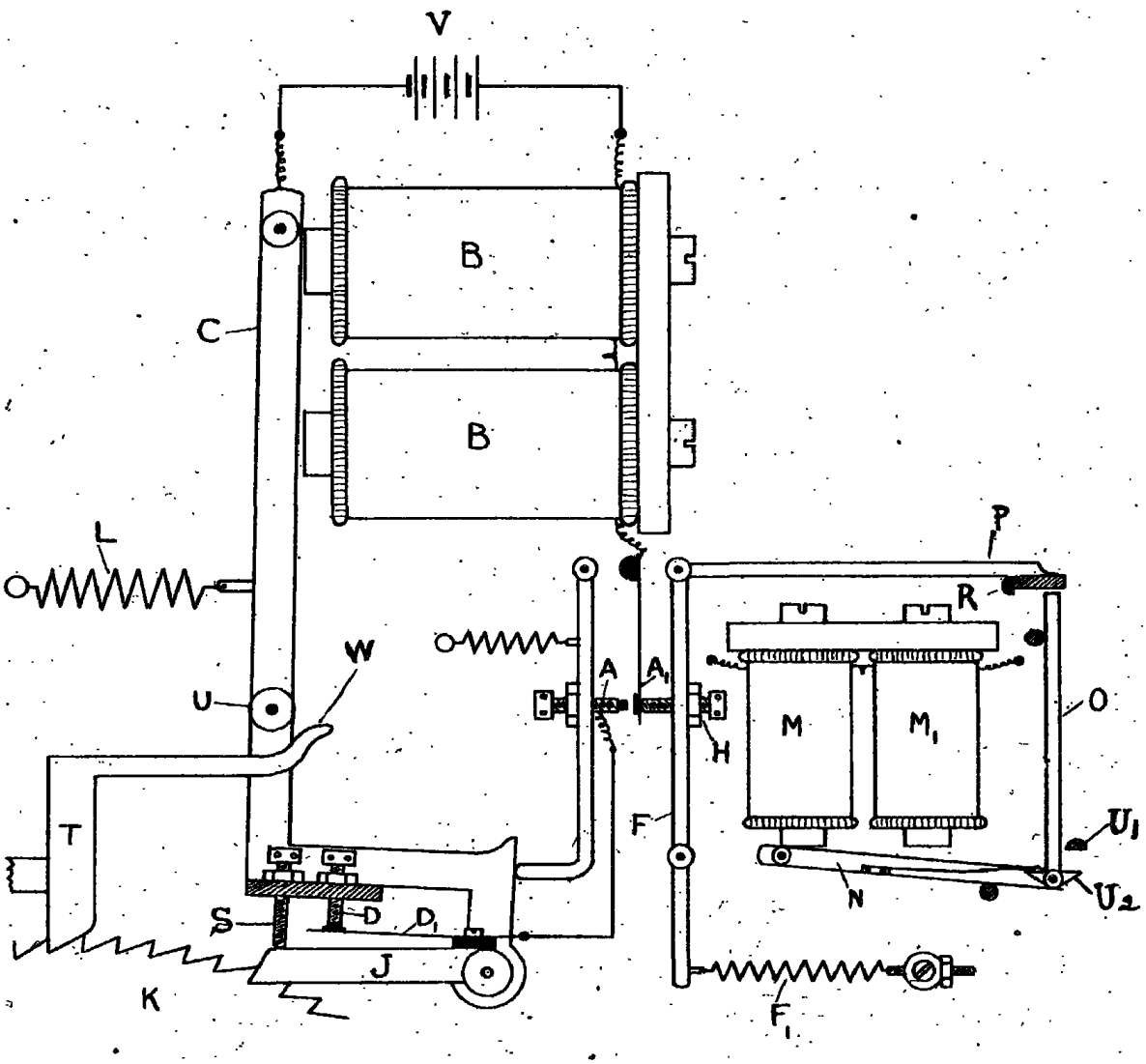

FIG: 2

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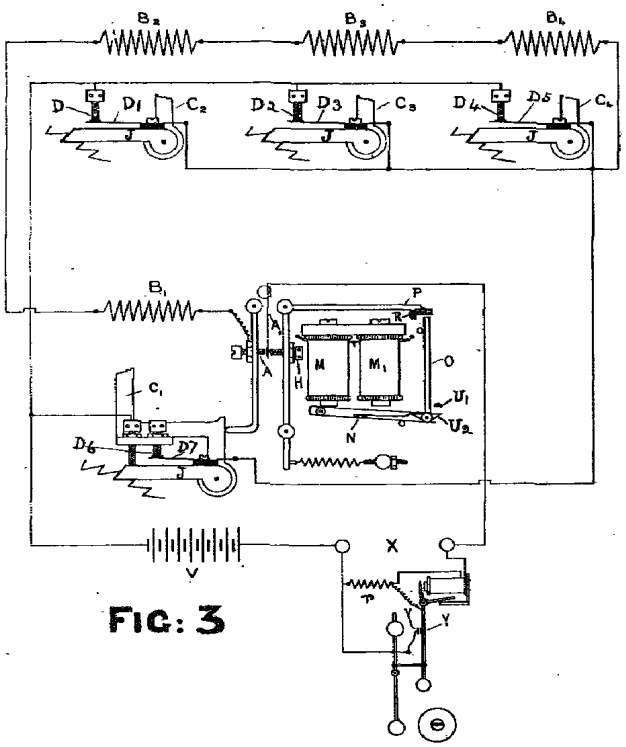

FIG: 3

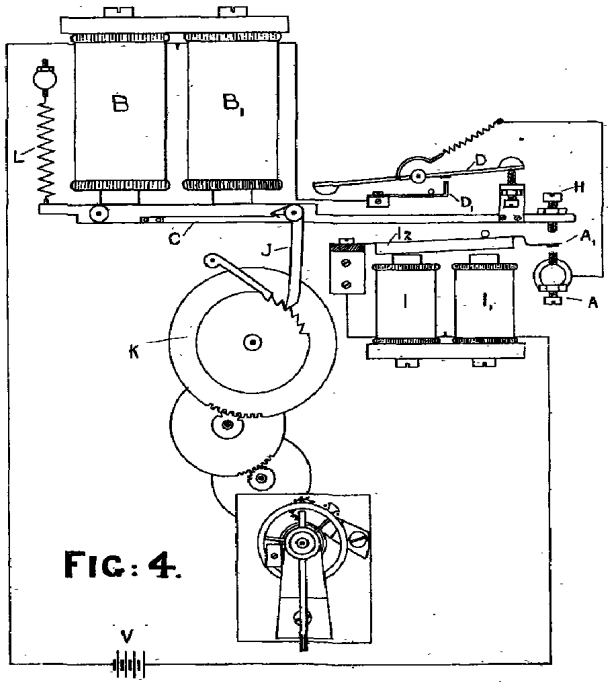

FIG: 4.

Malby&Sons, Photo-Litho.

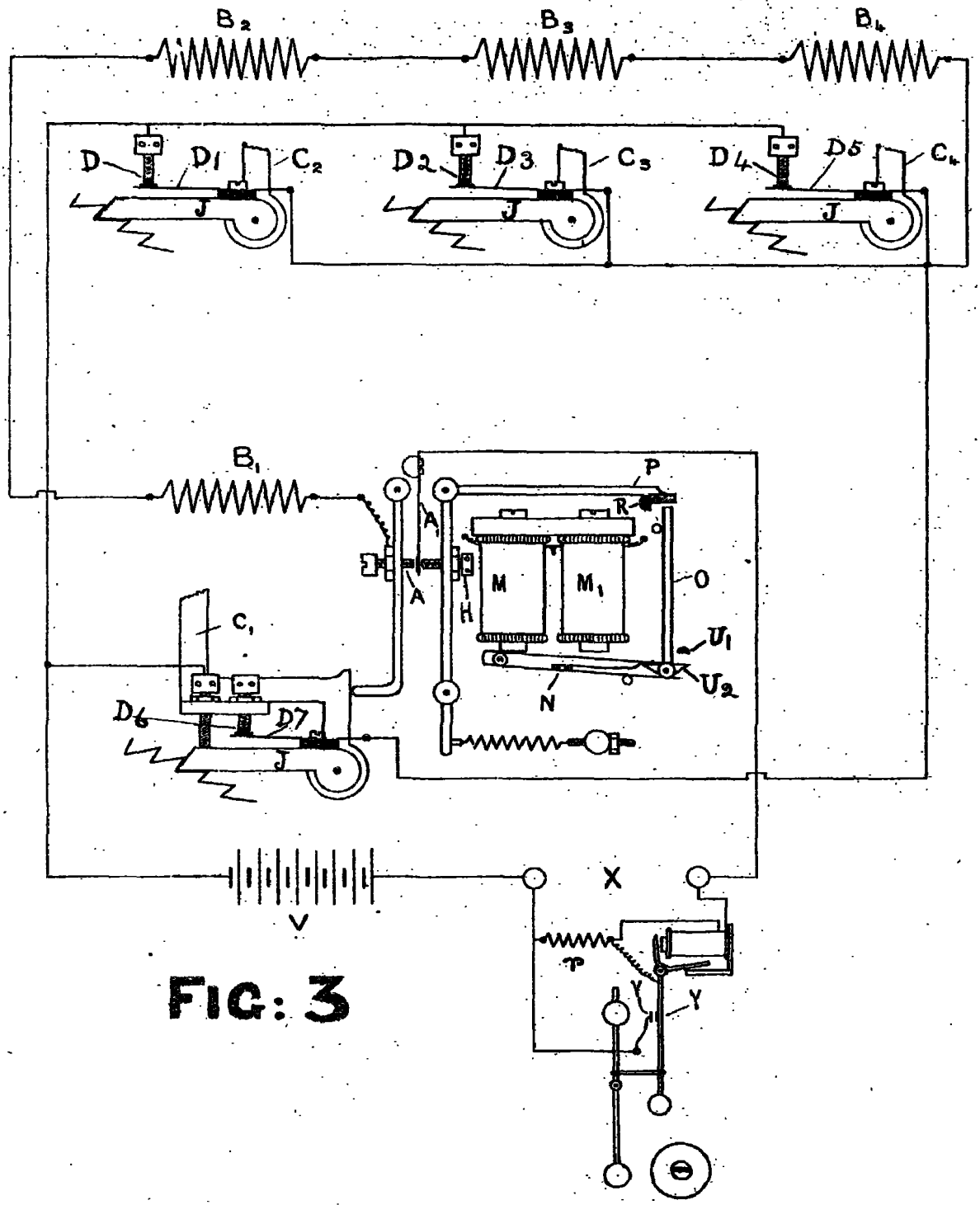

FIG: 3

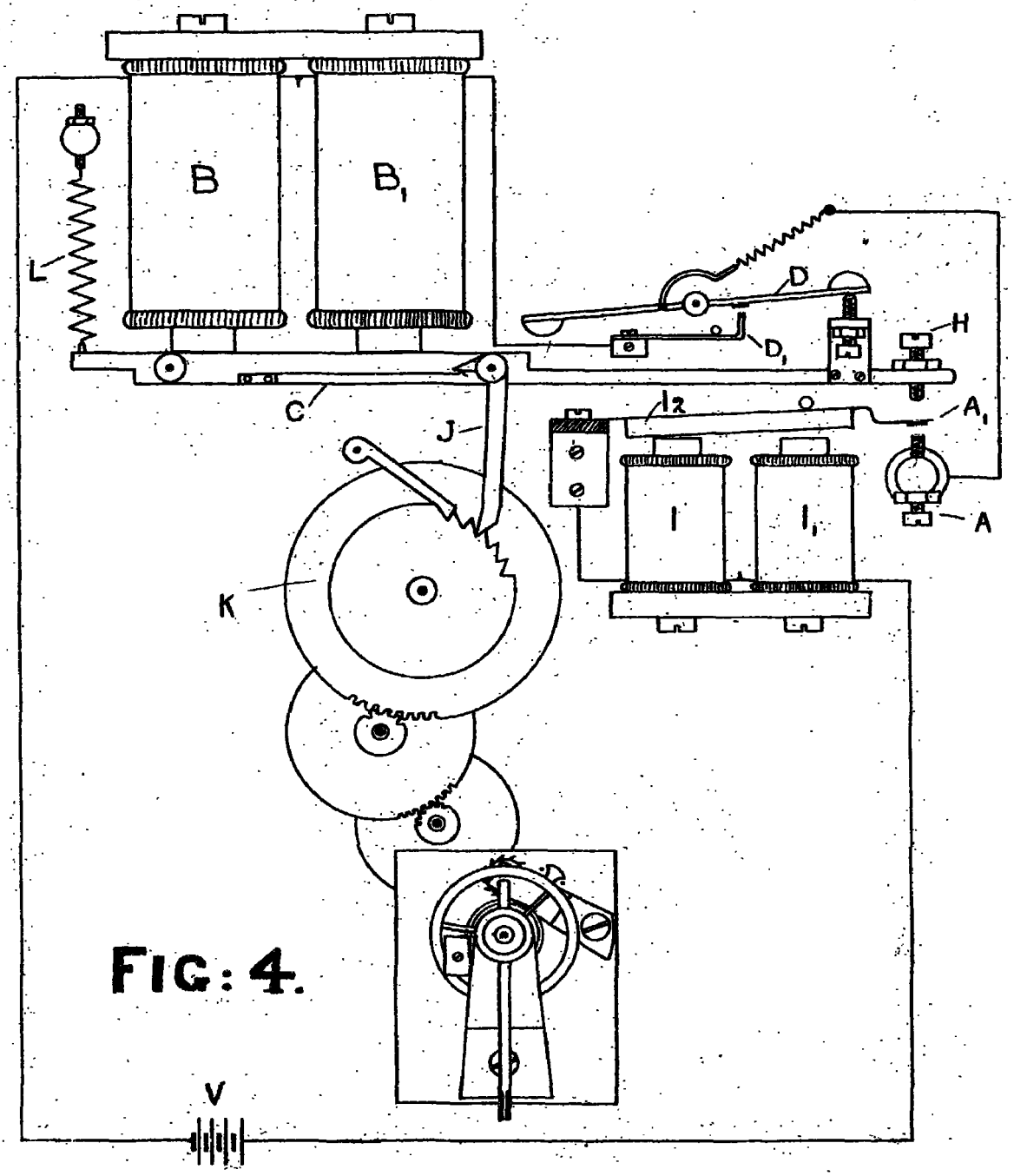

FIG: 4.

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