

Specification No. 111927. Filed 14th August 1967. Complete Specification left on 12th February, 1968. (Application accepted 17th January, 1969).

Index at acceptance—68A [LVII(3)], 126D [LVIII(6)]

### PROVISIONAL SPECIFICATION

IMPROVEMENTS IN OR RELATING TO AUTOMATIC BATTERY TESTING GADGETS  
COUNCIL OF SCIENTIFIC AND INDUSTRIAL RESEARCH, RAFI MARG, NEW DELHI-1, INDIA, AN  
INDIAN REGISTERED BODY INCORPORATED UNDER THE REGISTRATION OF SOCIETIES ACT (ACT XXI OF 1860)

*The following specification describes the nature of this invention*

This is an invention by MAHADEV GOVIND POTDAR, Scientist, Central Electrochemical Research Institute, Karaikudi-3, India, Indian Citizen.

This invention relates to improvements in or relating to "Automatic battery testing gadgets".

Hitherto it has been proposed to use various complicated devices operated on mains, batteries or mechanically for testing the performance of batteries, such as intermittent discharge tests on the primary or secondary batteries life cycle tests on storage batteries.

This is open to the objection that these are invariably costly and have to be imported. Otherwise the testing has to be carried out manually.

The object of this invention is to obviate these disadvantages by fabricating a simple gadget, using all indigenously available materials, and following a very simple circuit.

To these ends, the invention broadly consists in fabricating the gadget out of a time piece, telephone-relays, switches, suitable D.C. source like flash light cells, all arranged as per circuits shown in the attached sheets of drawings.

The relay works on a suitable D.C. source numbered '4' in circuits such as primary or secondary batteries, energy converters rectifiers.

The two switches '2, 3' on the dial of the clock '5' can be adjusted at suitable angles depending on time and frequency of test desired.

The minute hand actuates the relays '1, 6' through the first switch '2'. This puts on the test circuit.

When the minute hand touches the second switch '3' the relays '1, 6' are put on open circuit and the test circuit is put off.

This operation is repeated every hour.

If the duration or frequency of test desired is more than 55 minutes the two switches '2, 3' can be arranged suitably so as to be operated by the hour hand instead of the minute hand.

For life cycle test the working is as follows. Switch no. 2 puts on the discharge cycle and puts off charge circuit. Switch no. 3 puts off discharge circuit and puts on charge circuit.

For this purpose a suitable multipoint relay can be used in place of no. 1.

If only single point relays are used these can be arranged as per circuit shown in fig. 1 in the attached sheet.

If multipoint relay is used the unit can be arranged as per circuit in fig. 2.

In both the cases the working of the gadget is the same. Number of tapings can be increased by adding more relays

The following are among the main advantages of the invention :

1. All constituents are available in India.
2. All constituents are cheap.
3. Operates on cheap source.
4. Does not need maintenance.
5. Does not draw much current.
6. Works automatic.
7. Does not involve heavy investment for fabrication.
8. Very convenient for small battery manufacturer as a testing tool.
9. This can be conveniently used for intermittent tests on primary or secondary batteries.
10. It can be applied to serve as a gadget for life cycle test on secondary batteries.
11. In general this can be useful for any time controlled reaction or experiment.
12. This can be used as a time switch also.

Dated this 9th day of August, 1967.

Sd/-

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### COMPLETE SPECIFICATION

#### AN AUTOMATIC BATTERY TESTING DEVICE

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INDIAN REGISTERED BODY INCORPORATED UNDER THE REGISTRATION OF SOCIETIES ACT (ACT XXI OF 1860).

*The following Specification particularly describes and ascertains the nature of this invention and the manner in which it is to be performed :—*

This is an invention by MAHADEV GOVIND POTDAR, Scientist, of the Central Electrochemical Research Institute, Karaikudi-3, India, an Indian citizen.

This invention relates to an automatic battery testing device.

Hitherto it has been proposed to use various complicated devices under names such as "Master clocks" or "life cycle testing devices" operated on mains, batteries or mechanically for testing the performance of batteries, such as intermittent discharge tests on primary or secondary batteries, and life cycles tests on storage batteries.

These devices are invariably costly and have to be imported. Servicing and maintenance of such devices also needs a skilled expert involving extra expenditure. Otherwise the testing has to be carried out manually.

The main object of the invention is to overcome the above drawbacks of the existing devices by fabricating a simple device using all indigenously available components and following a very simple circuit.

Another object is to develop a device which does not depend on the mains source, hence the testing can proceed uninterruptedly (no fear of mains failure) especially in primary battery testing, and intermittent testing of dry cells can be carried out unattended to.

According to the present invention, the automatic battery testing device comprises a clock, two suitable switches are mounted on the dial of the clock, the minute hand of the said clock actuates telephone relay contacts through said one switch which is normally open and connected in series with the said switches and a power source which puts the circuit in on position, and when the minute hand

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touches the switch which is normally closed, the said relay contacts are put off.

The switches may be fixed on the dial or on the cover or lid or to the body of the clock.

The said clock may be either mechanically or electrically operated.

The telephone relays used may be either single point relays or multiple point relays.

The power source may be either a battery pack or D.C. or rectified A.C.

The clock may be replaced by an assemblage of gears powered mechanically or electrically.

The device is rigged up according to the circuit shown in the figures 1 and 2 of the attached drawings.

The new result flowing from the new finding :

The gadget is based on a very simple circuit and the components are quite cheap and easily available within the country. It works on low voltage low amperage D.C. power and does not need expert maintenance. Because of its inherent simplicity and cheapness even a small manufacturer can easily have this device as a testing tool. The gadget is very simple, sturdy and cheap.

The device can be conveniently used for any time controlled experiments ranging from a few seconds to hours and works on low voltage D.C. with low amperage.

Detailed description with reference to Figs. 1 and 2 of the accompanying drawings :

The device consists of the following components (i) timepiece, (ii) telephone relays, (iii) switches, (iv) power source, (v) connectors, (vi) wires and (vii) a container box.

The components are arranged as per circuit shown in Figs. 1 and 2 of the accompanying drawings.

The two telephone relays 1 and 6 in the sheet No. 1, a power source 4 and switches 2 and 3 are all connected in series. The two switches 2 and 3 are mounted suitably on the dial of a timepiece 5.

The minute hand actuates the relays 1 and 6 through the switch 2. This puts the test circuit in on position.

When the minute hand touches switch 3, the relays 1 and 6 are put on open circuit and the test circuit is put off.

The operation repeats every hour.

If the duration or frequency of test desired is more than 55 minutes, the two switches 2 and 3 can be suitably arranged on the dial so as to be operated by the hour hand instead of the minute hand. If the frequency is desired to be reduced to seconds, the switches 2 and 3 can be so arranged as to be actuated by seconds hand in which case the frequency will be of the order of one minute.

The same type of working can be achieved by using one multipoint relay 1 as shown in sheet No. 2 in the place of two single point relays 1 and 6 shown in the sheet No. 1.

For life cycle tests on secondary batteries the relays 1 and 6 can be replaced by multipoint relays. In this case the working will be as follows :

Switch 2 puts on the discharge circuit and puts off the charging circuit. Switch 3 puts off the discharge circuit and puts on the charge circuit.

Depending on the work load and type of service desired, the number of relays can be arranged as in sheet No. 1 or sheet No. 2 in either case the working of the device is the same.

The gadget can be put off completely by the use of the power switch 7 without interfering with the working of the timepiece.

The following are the main advantages of the invention :

- (a) All the constituents are available in India.
- (b) All constituents are cheap.
- (c) Operates on cheap source
- (d) Does not need maintenance.
- (e) Does not draw much current.
- (f) Works automatic.
- (g) Does not involve heavy investment for fabrication.
- (h) Very convenient for small battery manufacturer as a test tool.
- (i) Can be conveniently used for intermittent tests on primary or secondary batteries.
- (j) Can be applied to serve as a gadget for life cycle tests on secondary batteries.
- (k) Can be used for any time controlled reaction or experiment.
- (l) Does not occupy much space.
- (m) In general this can be used as a time switch.

**Summary :**

This invention has made it possible to fabricate a very simple and cheap gadget for testing batteries.

The gadgets available on market are invariably costly and have to be imported. These make use of complicated circuits leading to expert maintenance. The invented gadget uses a very simple circuit with minimum components all available within the country. The gadget is quite sturdy and does not need expert maintenance.

This can be owned by any smallest manufacturer of batteries as a testing tool.

**WE CLAIM :**

1. An automatic battery testing device which comprises a clock, two suitable switches (2, 3) are mounted on the dial of the clock, the minute hand of the said clock actuates telephone-relay contacts (1 & 6) through said switch (2) which is normally open and connected in series with the said switches (2 & 3) and a power source (4) which puts the circuit in on position, and when the minute hand touches the switch (3) which is normally closed, the said relay contacts (1 & 6) are put off.

2. A device as claimed under claim 1 wherein the switches are fixed on the dial or on the cover or lid or to the body of the clock.

3. A device as claimed in claim 1 or 2 wherein the said clock is either mechanically or electrically operated.

4. A device as claimed in any of the preceding claims wherein the telephone relays used either single point relays or multiple point relays.

5. A device as claimed in any of the preceding claims wherein the power source is either a battery pack or D.C. or rectified A.C.

6. A device as claimed in any of the preceding claims wherein the clock is replaced by an assemblage of gears powered mechanically or electrically.

7. A device as claimed in any of the preceding claims wherein the device is rigged up according to the circuit shown in the figures in the attached drawings.

Dated this 2nd day of February, 1968.

Sd/-

(R. BHASKAR PAI)

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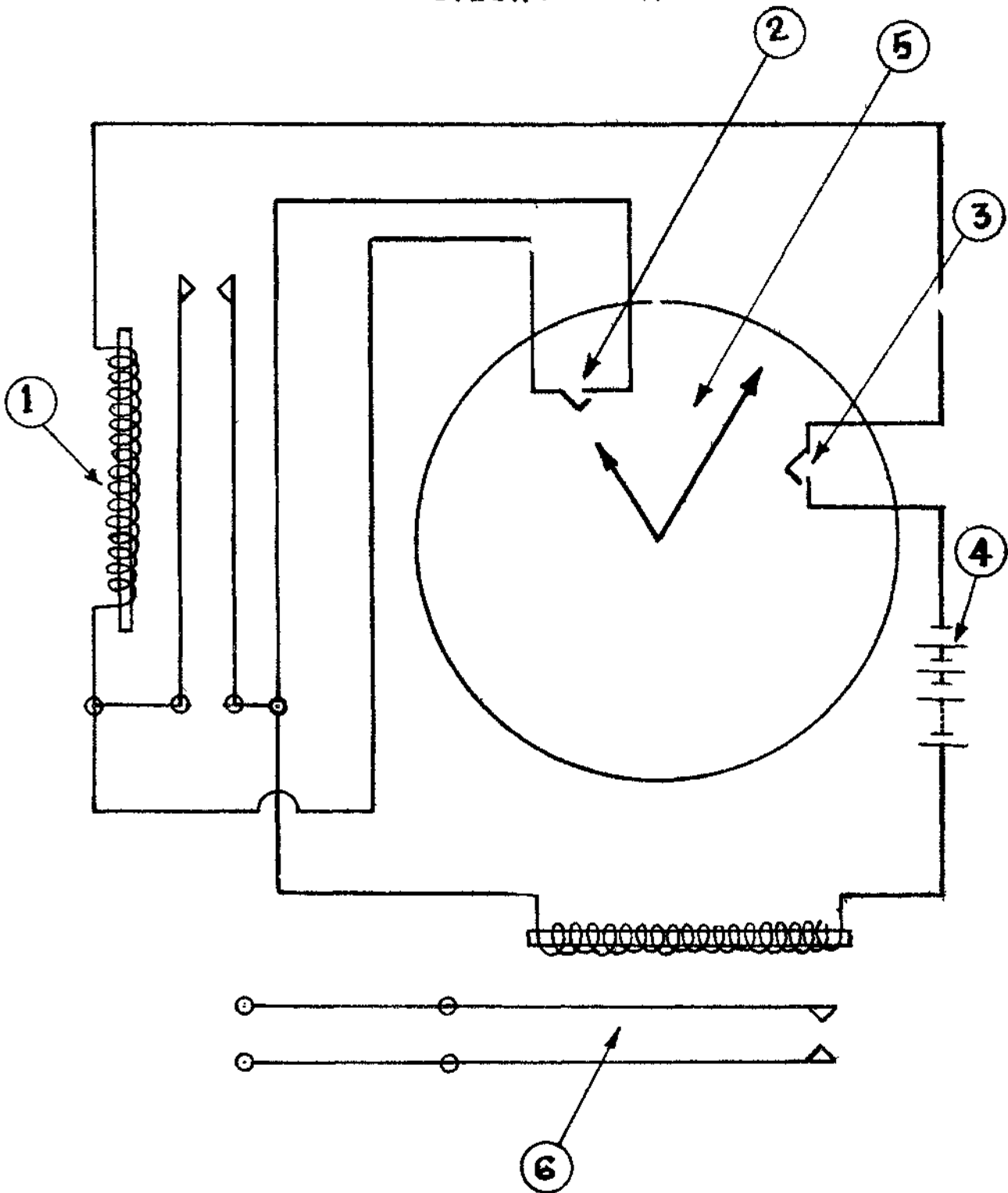


Fig. 1

*R. B. Pai*  
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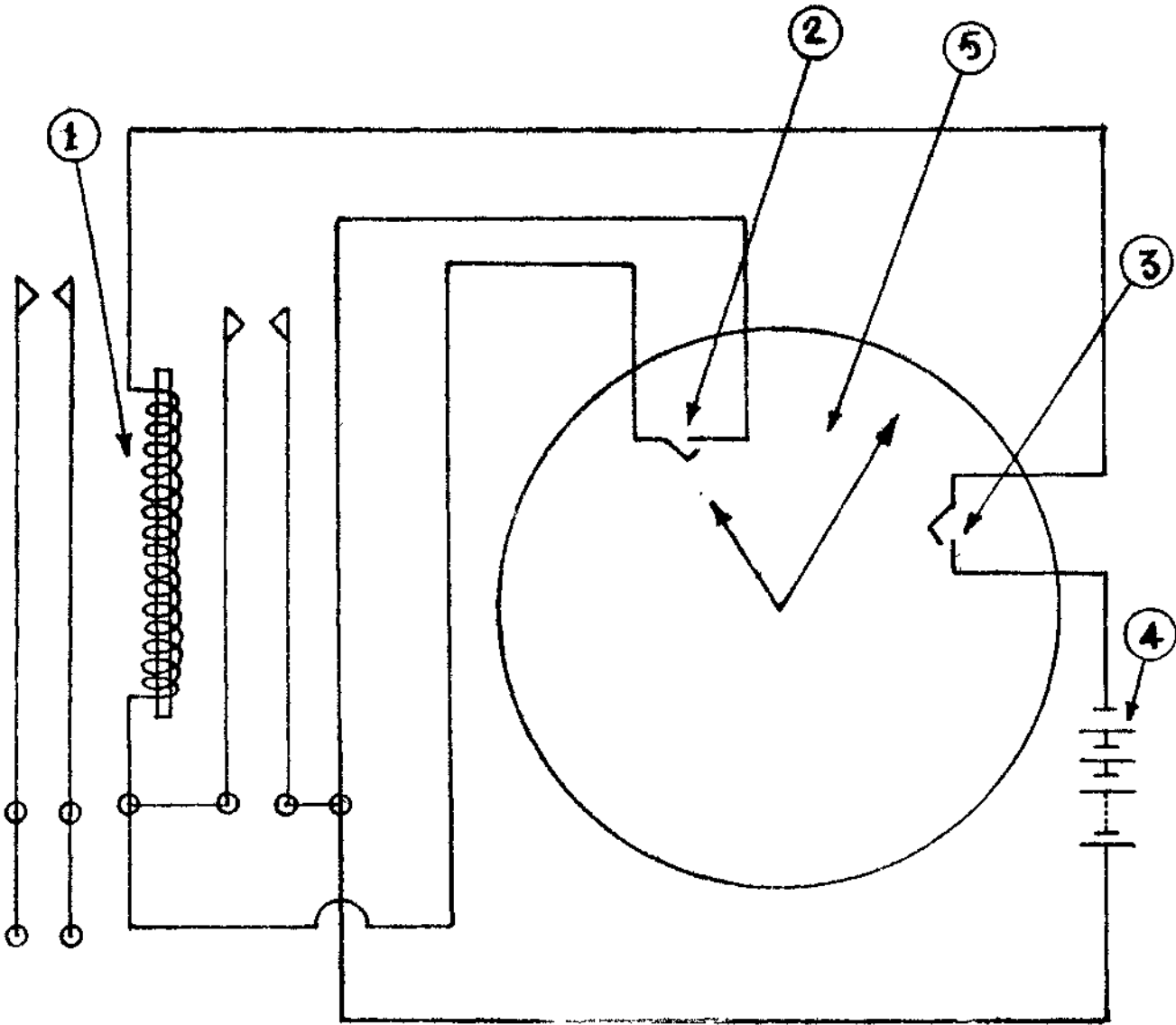


Fig. 2

*R. B. Pai*  
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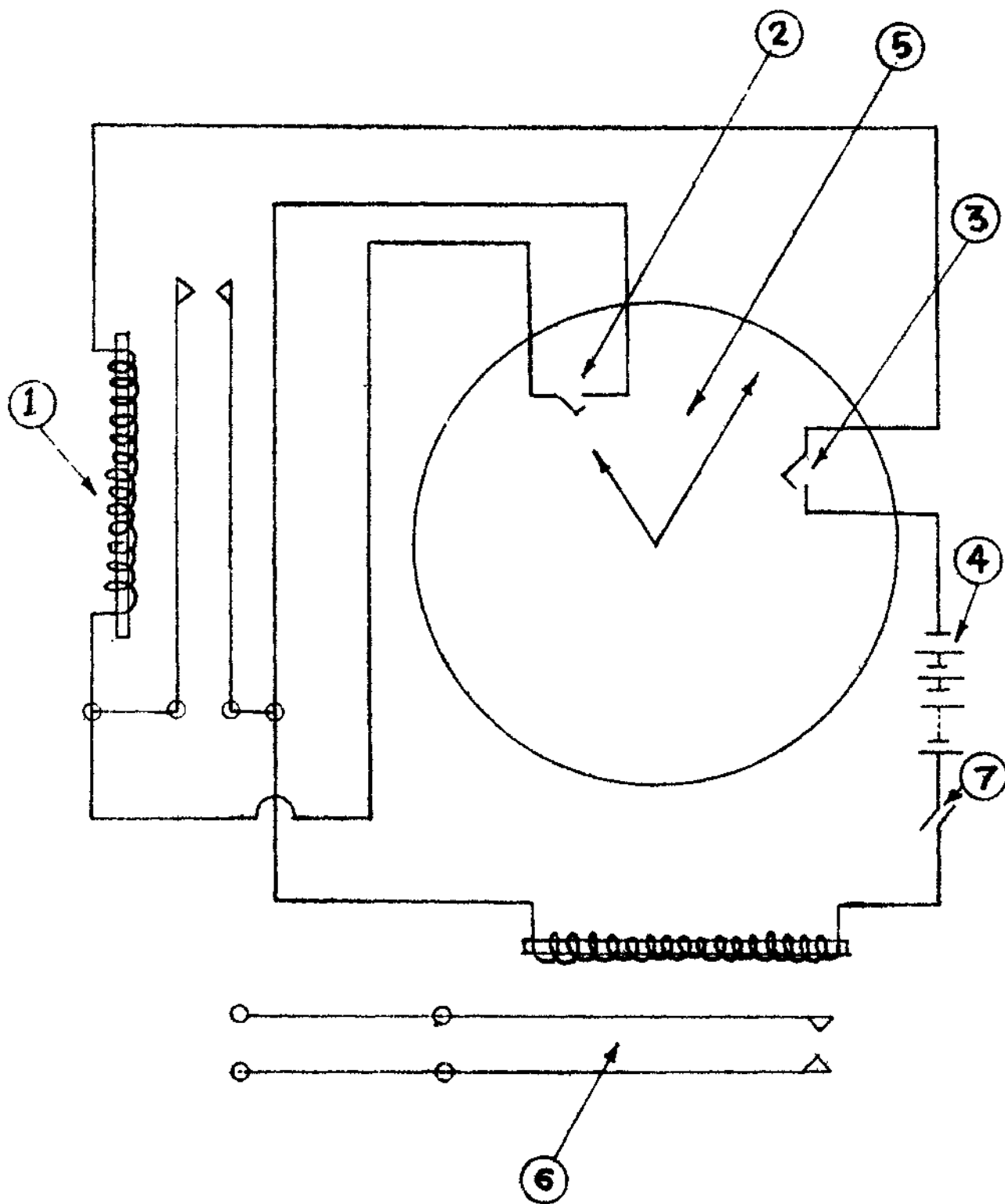


Fig. 1

*R. B. Pai*  
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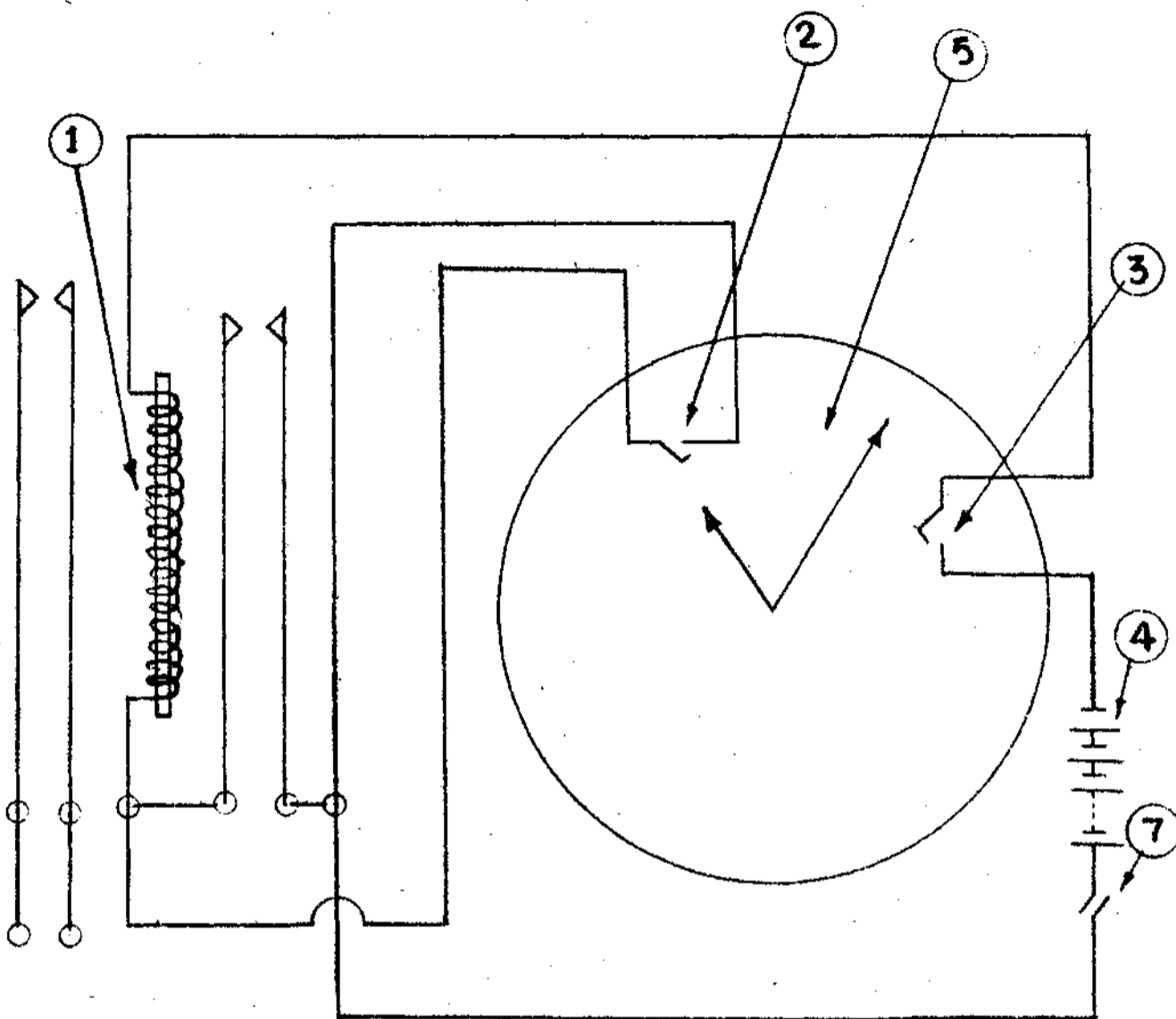


Fig. 2

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