April 13, 1926. 1,580,882

E. W. GENT

INTERRUPTER

Filed July 17, 1923

Fig. 1.

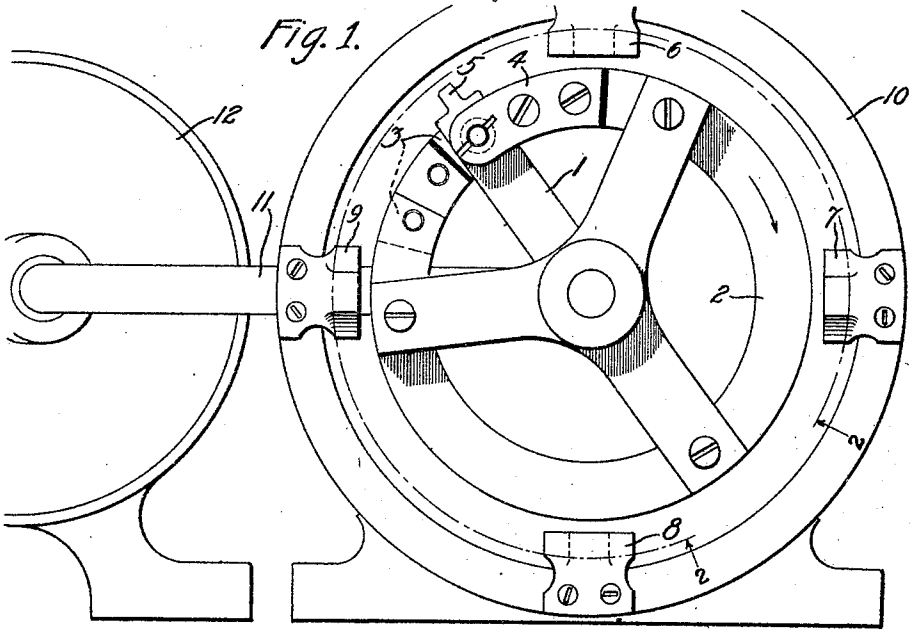


Fig. 2.

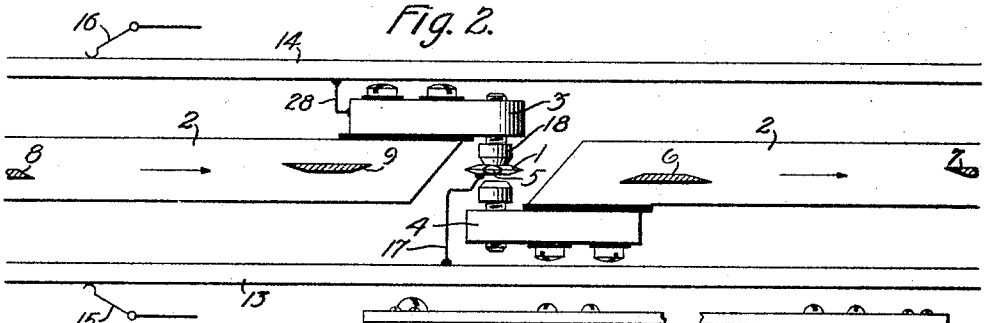


Fig. 3.

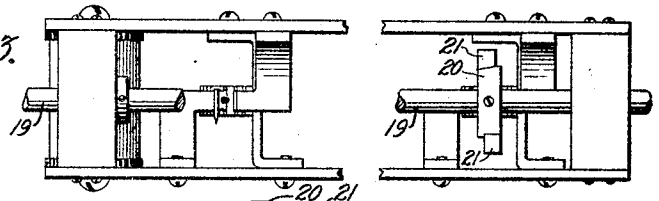
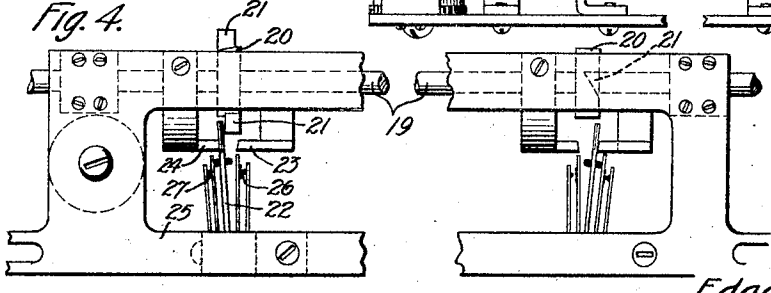


Fig. 4.



Inventor:
Edgar W. Gent
by E. W. Adams. Att'y.

Patented Apr. 13, 1926. 1,580,882

UNITED STATES PATENT OFFICE.

EDGAR W. GENT, OF MORRISTOWN, NEW JERSEY, ASSIGNOR TO WESTERN ELECTRIC COMPANY, INCORPORATED, OF NEW YORK, N. Y., A CORPORATION OF NEW YORK.

INTERRUPTER.

Application filed July 17, 1923. Serial No. 652,012.

To all whom it may concern:

Be it known that I, EDGAR W. GENT, a citizen of the United States of America, residing at Morristown, in the county of Morris and State of New Jersey, have invented certain new and useful Improvements in Interrupters, of which the following is a full, clear, concise, and exact description.

This invention relates to contact making and breaking systems and particularly to those systems in which a quick make and quick break is essential.

It is the object of this invention to produce an improved contact operating mechanism for use in connection with electrical circuits.

A feature of the invention is the provision of a contacting system which shall have clearly defined makes and breaks, and which shall eliminate the long drawn-out arcs which tend to wear out and pit contact surfaces.

Heretofore, in systems employing contacts, such as circuit interrupting systems, the circuit is made and broken by means of brushes which are designed to ride over continuously revolving segmented drums having alternate segments of insulating and conducting material. The disadvantage of this method is that the thickness of the brushes is constantly changing due to wear. For this reason the contact is not sharply broken or made as the brush passes from one segment to another. There exists also a tendency to arc over, the length of such arcing depending upon the amount of current in the circuit broken and the relative speed of brush and commutator. The use of sharply made and broken contacts is especially necessary in an impulse transmitting device arranged to simulate the action of a calling dial. In making tests of the operation of registers or relays in automatic telephone systems it is necessary to dial a series of digits into the apparatus, pause sufficiently long to allow the apparatus to function and then restore to normal, and repeat the process indefinitely. In order to determine the results of these tests it is necessary to know definitely and accurately the characteristic of the dial pulse as to percentage make and break. The object of this invention is to provide an improved contacting system which may be applied to an impulse sending device such as described in Patent No. 1,543,813, issued to G. F. Atwood, June 30, 1925, to effect a sharply defined make or break period.

A further feature of the invention is an arrangement in which contacts are mechanically operated and then held in actuated position by means of an electromagnet. The contacts are mechanically released and then magnetically held in non-actuated position.

This and other features of the invention can be better shown by a reference to the accompanying drawings in which Fig. 1 shows one embodiment of the invention in which a contact is rotated, continuously making and breaking an electric circuit while in motion. Fig. 2 is a diagrammatic arrangement of the apparatus in Fig. 1 to show more clearly the method of effecting contact. Figs. 3 and 4 are two views of a modification of the invention providing for an unlimited number of contact sets.

Referring now specifically to Fig. 1, a thin flexible steel reed 1 has one end securely fastened to the midpoint of a circular permanent magnet 2 having two soft iron pole-faces 3 and 4 positioned in parallel planes with respect to each other. These pole-faces are electrically insulated from the magnet and are arranged by means of suitable screws to be adjusted relatively to each other. Each pole-face carries a contact 18, which may be adjusted in and out by means of a slotted screw. The reed extends diametrically across the magnet, its free end resting against either pole-face 3 or pole-face 4. Reed 1 terminates in a projection 5 which causes the reed to be thrown over to the other pole-face when engaged by wedge like tripping members 6, 7, 8 or 9 mounted on the periphery of the supporting frame 10. The magnet 2 is mounted upon and rotates with shaft 11 which is driven constantly by motor 12. Magnet 2 and reed 1 thus rotate together.

For the purpose described, conductors are connected to reed 1 and pole-face 3 and lead out to collector rings 13 and 14, respectively as may be clearly seen in Fig. 2. The circuit to be interrupted is then connected to these rings by means of brushes 15 and 16. It will be assumed that the direction of rotation of the magnet and reed is as indicated by the

arrow. As the magnet carrying the reed rotates, tripping wedge member 9 engages projection 5 of reed 1 and the resultant cam action, as clearly shown in Fig. 2, forces the reed away from pole-face 3. The reed is then immediately attracted to and held against opposite pole-face 4 by virtue of the magnetic action of such pole-face. Projection 5 next is engaged by tripping member 8 whose blade is arranged to force the reed away from pole-face 4. The reed is then immediately magnetically attracted to pole-face 3. This alternate action continues as projection 5 is engaged by succeeding tripping members 7 and 6.

Tripping members 6 and 8 may be mounted diametrically opposite to each other on a common arm and the arm so pivoted that they may be adjusted and locked at any point on the pole-face. That is, tripping member 8 may be positioned anywhere to the right of members 7 and 9 and member 6 may be positioned in a corresponding position diametrically to the left.

Any number of tripping members may be employed mounted either fixedly or adjustably for effecting more or less contact closures without departing from the spirit of the invention.

Referring to Fig. 2, reed 1 is shown after its projection 5 has been engaged by tripping member 6 and forced into engagement with contact 18 of pole-face 3. A circuit is closed which may be traced from brush 16, collector ring 14, conductor 28, pole-face 3, contact 18, reed 1, conductor 17, collector ring 13, to brush 15. This circuit remains closed from the time reed 1 is forced into engagement with pole-face 3 by wedge member 6 until it is forced away from pole-face 3 by wedge member 9. The circuit is then broken until reed 1 engages wedge member 8 and so on, the circuit being alternately made and broken.

It is not the purpose to confine the invention to an impulse sending device but this method of making and breaking a circuit may be employed wherever it is necessary to open and close a circuit automatically. Fig. 3 represents a plan view and Fig. 4 a front elevation of a machine employing a modification of this invention wherein the reed is stationary and the wedge members are mounted on a shaft and caused to rotate therewith. Any number of units may be mounted on one shaft as indicated. In Figs. 3 and 4 a shaft 19 has mounted thereon drums 20. Projecting from the periphery of the drums are a number of wedge-shaped tripping members 21 similar to tripping members 6, 7, 8 and 9 in Figs. 1 and 2. These members may be so mounted as to be adjustable. A flexible steel rod 22 is mounted in the base 25 and positioned so that the free end projects upward between pole-faces 23 and 24 of a permanent magnet. On each side of the reed are mounted contacts 26 and 27 which are caused to be made and broken as the reed is forced by tripping wedge members 21 into engagement alternately with pole-faces 23 and 24. Any convenient number of contacts may be employed, suitably insulated, in one unit.

What is claimed is:

1. In an interrupter, a pair of contacts, continuously rotatable means for engaging said contacts and magnetic means for holding said contacts in engagement.

2. In an interrupter, a pair of contacts, continuously rotatable means for engaging and disengaging said contacts and magnetic means for holding said contacts in their engaged or disengaged positions.

3. In an interrupter, a pair of rotatable contacts, means for engaging and disengaging said contacts and magnetic means for holding said contacts in their engaged or disengaged positions.

4. In an interrupting system, a pair of contacts, an operating member associated with one of said contacts, a series of cam surfaces, means to operate said contact due to successive engagement of said operating member with said cam surfaces, and magnetic means for holding said contact member in the position to which it has been moved by said cam surfaces.

5. In an interrupter, a rotatable contact element comprising a magnet, electrically insulated pole pieces therefor and an armature for said magnet positioned between said pole pieces, said armature and one of said pole pieces serving as a pair of contacts and means mechanically cooperating with said armature for moving said armature alternately into engagement with said pole pieces, said magnet magnetically holding said armature in engagement with either of its pole pieces.

6. In an interrupter, a rotatable contact element comprising a magnet, electrically insulated pole pieces therefor and an armature for said magnet positioned between said pole pieces, said armature and one of said pole pieces serving as a pair of contacts, and fixed cams for cooperating with said armature during its rotation for moving said armature alternately into engagement with said pole pieces, said magnet magnetically holding said armature in engagement with either of its pole pieces.

7. In an interrupter, a plurality of contacts, a continuously rotatable member associated with one of said contacts, means cooperating with said member to operate said contacts and magnetic means for holding said contacts in engaged position.

8. In an interrupter system, a plurality of contacts, a continuously rotatable member associated with one of said contacts, means

cooperating with said member to disengage said contacts, and magnetic means for holding said contacts in the disengaged position.

9. In an interrupter system, a plurality of contacts, an operating member therefor, a plurality of cam faces for cooperation with said operating member and a magnet having pole pieces disposed on either side of said operating member, said operating member when moved into engagement with one of said pole pieces magnetically holding said contacts in their engaged or disengaged positions.

In witness whereof, I hereunto subscribe my name this 3 day of July A. D., 1923.

EDGAR W. GENT.