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MAGNETIC CONTROLLING MECHANISM.

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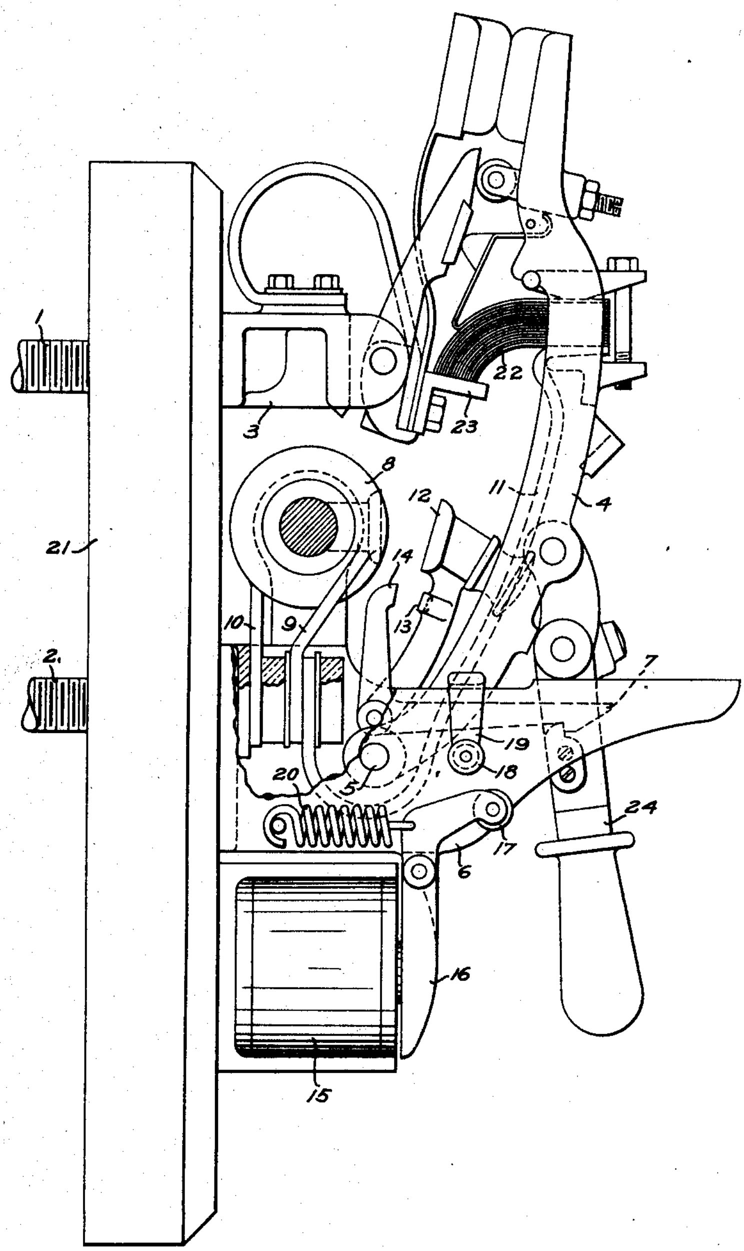
1,385,801. Patented July 26, 1921.



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by [signature]

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UNITED STATES PATENT OFFICE.

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MAGNETIC CONTROLLING MECHANISM.

1,385,801. Specification of Letters Patent. Patented July 26, 1921.

Original application filed June 19, 1911, Serial No. 634,149. Divided and this application filed August 21, 1918. Serial No. 251,344.

To all whom it may concern:

Be it known that I, HALFDAN A. STEEN, a subject of the King of Norway, residing at Christiania, in the Kingdom of Norway, have invented a certain new and useful Improvement in Magnetic Controlling Mechanisms, of which the following is a specification.

This invention relates to magnetic controlling mechanism and may be used, if desired, with any form of switching mechanism such as, for example, is shown in applicant's original application Serial No. 634,149, filed June 19, 1911, now Patent No. 1,279,779, issued Sept. 24, 1918, and of which this application is a division. It may, however, be stated that it will be obvious as the description proceeds that the particular form of switch mechanism used with the present invention is not material.

One of the objects of the invention is the production of a magnetic controlling mechanism of very compact form so that the same will take less space on switchboards or wherever the same may be mounted. It is highly desirable, for example, that circuit breaking and controlling devices shall take as little space, both vertically and horizontally on a switchboard, as possible.

Another object of the invention is the production of such magnetic controlling mechanisms in the most expeditious and cheapest way. Other objects will appear hereinafter as the description of the invention proceeds.

The novel features of the invention will appear from the specification and the accompanying drawing which forms a part thereof, and will be particularly pointed out in the claims.

The single figure of the accompanying drawing shows a side elevation, partly in section, of the magnetic controlling mechanism as it may be applied in a circuit breaker, the parts being shown in closed-circuit position.

Terminal studs, 1, 2, are mounted upon and pass through a switchboard 21, which latter may be of any usual suitable insulating material. The stud 1 may have any suitable contact, such as 23, mounted upon the end 3 thereof. A movable switch arm 4 is pivoted by means of pin 5 in a housing 6 which latter housing is mounted in any suitable manner on the board 21. The switch arm 4 may carry any suitable form of contact 22 for engagement with the relatively stationary contact 23. It is not necessary to describe in this application the particular form of operating mechanism for the movable switch member 4 as both this and the contact mechanism involving the contacts 22, 23, and the auxiliary contacts shown above them, have been fully described in the original application referred to above. It is sufficient to state here that 24 is the handle of that operating mechanism and 7 is a latch which serves the purpose of holding the operating mechanism, and consequently the switch member, in switch-closing position.

A coil 8, which may be wound of conducting material of any cross sectional form, but is conveniently wound of some form of flat strip material, is disposed between the upper and lower studs 1, 2 as shown. The coil 8 has two terminals 9, 10, one of which is electrically connected and preferably mounted on an extension of the contact stud 2. The terminal 9 of this coil is insulated in any suitable manner from the terminal 10 thereof, as indicated, and this terminal is further adapted to be connected in any suitable manner to the contact 22 carried by the switch arm 4, as by the flexible conducting member 11. It may be stated that the manner in which current passes from the terminal 9 of the coil 8 to the contact end of stud 1 is entirely immaterial.

An armature 12 is mounted in any suitable manner so that the flux produced by the coil 8 will attract the same and when so effectively attracted will cause the projection 13 on the armature 12 to strike the upwardly extending arm 14 on the latch 7 so that this latch will be disengaged and thus release the switch member 4 thereby permitting the circuit interrupter to open by gravity or spring means, or otherwise.

Another magnet 15, which may be of any desired form and is here shown as a no-voltage or shunt magnet, is mounted below the terminal stud 2 and is here shown as normally attracting an armature 16 against the tension of a spring 20. When the magnet 15 is deënergized the spring 20 will act to cause the roller 17, carried by the armature 16, to strike against the roller 18 carried by the extension 19 on the latch 7, thus, as in the

case of the armature 12, likewise lifting the latch 7 and permitting the movable contact member to assume its open position.

The operation of the magnetic controlling mechanism is thought to be apparent from the description of its parts, so that it is sufficient to state that when the contacts 22, 23 are in engagement current may pass from terminal stud 1 to its end 3, contact 23, contact 22, flexible conductor 11, through the coil 8 to terminal stud 2. If an overload takes place sufficient to lift the armature 12 or if the armature 16 is effectively moved, the latch 7 will be lifted and the switch arm 4 will swing in a clockwise direction thus separating contacts 22, 23 and thereby opening the circuit.

It will be observed that by reason of the fact that the series or overload coil 8 is mounted between the terminal studs 1, 2, it is possible to occupy the space which is ordinarily occupied by such a series coil, by any other auxiliary coil or device 15. Furthermore, the coil 8 is so disposed that it is possible to wind the same of flat material and connect it to the terminal stud without bending the flat material laterally or twisting it. This is by reason of the fact that the coil has its axis substantially at right angles to the axis of the terminal stud and is not disposed laterally thereto. In other words, the axis of the terminal is substantially parallel to and either in or between the end planes of the cylinder describing the outer contour of the coil. The compactness of this structure will be further comprehended when it is noted that substantially all portions of the 360° of arc around the terminal stud 2 are occupied by useful elements beginning with the coil 8, the latch 14—7, the armature 12, the switch arm 4, the armature 16, the coil 15 and the base 21. These elements are in effect clustered radially about the terminal stud.

It should be understood that it is not desired that the invention claimed be limited to the exact details shown and described, for obvious modifications will occur to a person skilled in the art.

It is claimed and desired to secure by Letters Patent:

1. In a magnetic controlling mechanism, stationary terminals, an overload coil disposed at one side of one of said terminals, means including a member for electrically bridging said terminals and for connecting said overload coil in series with said terminals and said bridging member, latch means operable by said overload coil for normally holding said member in bridging position, and an auxiliary coil disposed at the other side of the same terminal, all of said elements being in substantial alinement.

2. In a magnetic controlling mechanism, a conducting terminal, a coil having both the terminal ends thereof in juxtaposition and spaced apart and in alinement with the axis of said terminal, the axis of said coil being disposed in a plane substantially at right angles to the axis of said terminal and the coil being placed along its axis in such a position that a perpendicular to both the axis of the coil and the axis of the terminal will pass through some part of the coil.

3. In a magnetic controlling mechanism, a conducting terminal, a coil wound of flat conducting material and having both the terminal ends thereof in juxtaposition and spaced apart and in alinement with the axis of said terminal, the axis of said coil being disposed in a plane substantially at right angles to the axis of said terminal, one of the terminal ends of said coil being connected electrically to said terminal and the coil being placed along its axis in such a position that a perpendicular to both the axis of the coil and the axis of the terminal will pass through some part of the coil.

4. In a magnetic controlling mechanism, a conducting terminal, a coil having both the terminal ends thereof in juxtaposition and spaced apart and in alinement with the axis of said terminal, one of said terminal ends being connected to said conducting terminal, the coil being so disposed that the axis of the terminal passes approximately within the limits defined by the end planes of the coil.

5. In a circuit controlling device, stationary terminals, an overload coil disposed between said terminals, means extending from one of said terminals, over said coil to the other of said terminals for bridging said terminals and for connecting said overload coil in series with said terminals, and means whereby said connection is interrupted upon a predetermined current flow in said coil.

6. In a circuit controlling device having a plurality of stationary terminals and relatively stationary and movable contacts operatively related thereto, coils for causing effective operation of said movable contact disposed in alinement with said terminals and alternating therewith, and means whereby each of said coils may cause effective movement of said movable contact.

7. In a circuit controlling device, a stationary terminal, a contact-carrying element, two coils for controlling said contact-carrying element, said element and coils being clustered radially about said stationary terminal in the plane of movement of said element, and means whereby each of said coils may cause effective movement of said contact-carrying element.

8. In a circuit controlling device having stationary terminals, a relatively stationary contact operatively related to one of said terminals and a relatively movable contact operatively related to the other of said ter-

minals, a coil having its axis perpendicular to the plane of said terminals and connected in series between one of said terminals and one of said contacts, a second coil disposed on the side of one of said terminals opposite to that of said first coil, means for holding said movable contact in circuit-closing position and means operated by each of said coils for releasing said holding means.

9. In a circuit controlling device, a stationary terminal, a movable contact-carrying element, means for holding said element in circuit-closing position, an overload coil and an armature therefor, an auxiliary coil and an armature therefor, said armatures being operatively related to said holding means, the contact-carrying element, holding means, overload and auxiliary coils and armatures, being disposed in a cluster about said stationary terminal in substantially the same plane.

10. In a circuit controlling device, stationary conducting elements, a movable conducting element adapted to bridge said stationary conducting elements, a coil disposed between said stationary conducting elements and the ends of said bridge, and means for connecting said coil in series with said stationary and movable conducting elements.

In testimony whereof I affix my signature.

HALFDAN A. STEEN.