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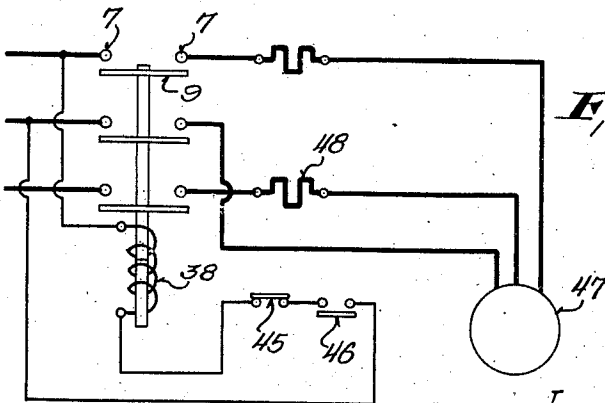
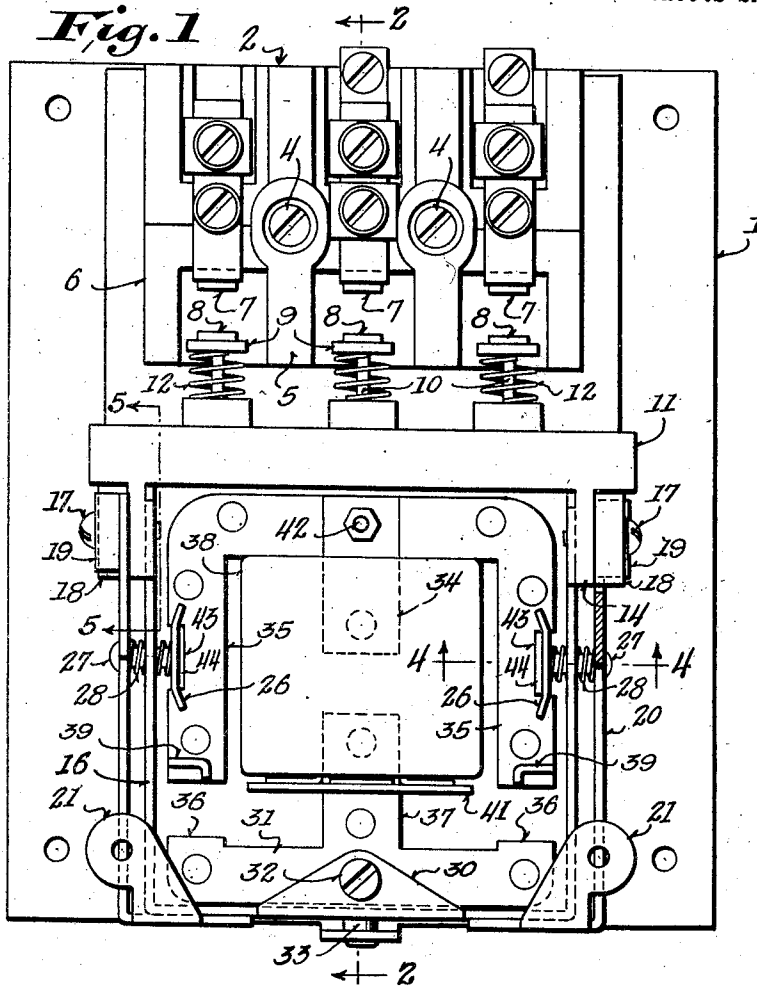
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MAGNET CONSTRUCTION FOR CONTACTORS

Filed July 16, 1934

2 Sheets-Sheet 1



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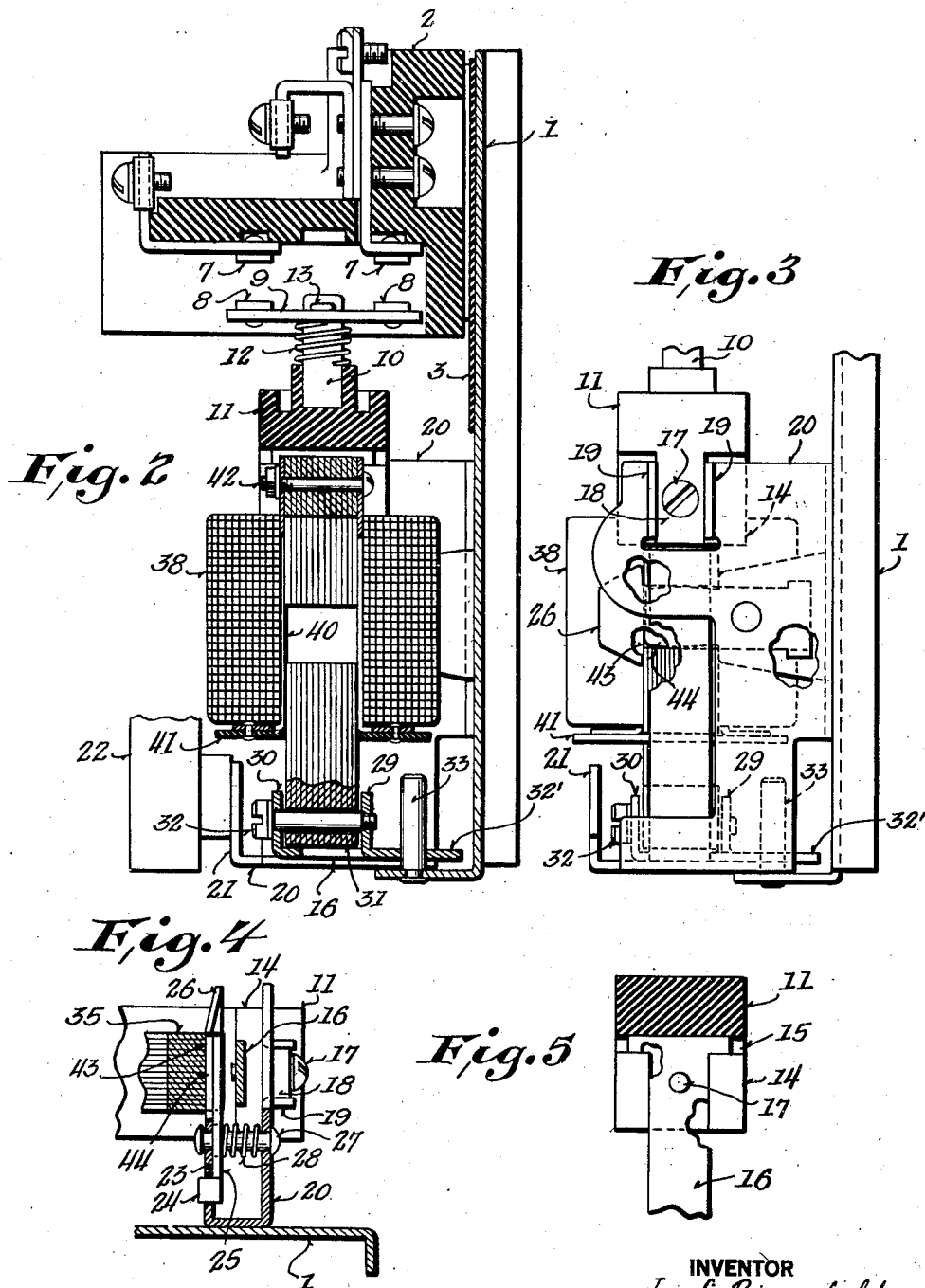
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MAGNET CONSTRUCTION FOR CONTACTORS

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2 Sheets-Sheet 2



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MAGNET CONSTRUCTION FOR CONTACTORS

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9 Claims. (Cl. 175—336)

This invention relates to a magnet construction for contactors, such, for instance, as that shown in the automatic starter disclosed in the application of Hermon L. Van Valkenburg, filed July 16, 1934, S. N. 735,440, for Automatic starters, which matured into Patent No. 2,013,013 on September 3, 1935.

Objects of this invention are to provide a novel form of magnet construction for contactors, such that the magnet is held locked in operative position with its armature operatively coupled in a floating manner to the contactor, and in which the locking means for locking the magnet body in operative position is readily detachable from the magnet body to permit the free and easy removal of the magnet without disturbing other portions of the mechanism, the construction providing access to the locking means directly from the front of the magnet.

In greater detail, objects of this invention are to provide a removably held magnet for contactors, in which the magnet body is held temporarily locked in operative position by spring urged locking means, the construction permitting the free lifting of the magnet from the remainder of the apparatus after moving the locking means against the action of their springs and after detaching the armature from a yoke, the locking means snapping back into locking position when the magnet is again inserted in the apparatus, the construction providing a somewhat floating support for the magnet body to thereby facilitate relative alignment of the magnet body and armature.

Further objects are to provide a construction of magnet and supporting means therefor which is very compact and permits the mounting of the magnet in a limited space, though, as stated, allowing the free removal of the magnet for inspection or repairs.

Further objects are to provide a magnet construction for contactors, in which the armature is carried in a floating manner by a slidable yoke actuated by the magnet, in which a three-point guiding means is provided for the yoke, and in which the magnet body is positioned within the yoke and held in a detachable manner, thereby securing a compact structure which is of simple and reliable construction.

An embodiment of the invention is shown in the accompanying drawings, in which:

Figure 1 is a view of the magnet construction showing it associated with a contactor.

Figure 2 is a longitudinal sectional view on the line 2—2 of Figure 1.

Figure 3 is a fragmentary side elevation, with parts broken away, of the structure shown in Figure 1.

Figure 4 is a sectional detail on the line 4—4 of Figure 1.

Figure 5 is a sectional detail on the line 5—5 of Figure 1.

Figure 6 is a diagrammatic view showing the electric circuits of the device.

Referring to the drawings, it will be seen that the device comprises a support or chassis 1, which may be of sheet metal, and which is adapted to be positioned within a housing, or box, not shown. This support carries a contactor block indicated generally by the reference character 2 and formed of insulating material. If desired, a fiber sheet 3 may be interposed between the contactor block 2 and the chassis 1, as shown in Figure 2. This contactor block may be secured to the chassis by means of inset screws 4, see Figure 1.

The contactor block may be provided with barriers 5 and end barriers 6, providing channel portions open at the top. Between these barriers, the stationary contacts 7 are positioned, as shown in Figures 1 and 2. The movable contacts 8 are carried by metal bars 9, which are slidably mounted upon rectangular pins 10 which readily are molded in place within the insulating transverse bar 11, see Figure 2. Helical springs 12 loosely surround the pins 10 and yieldingly urge the contact bars 9 outwardly against stops 13, see Figure 2.

The insulating bar 11 may be formed of a phenol condensate. It is provided with forwardly projecting extensions 14, see Figures 1 and 5, and such extensions are provided with a T-shaped slot 15 for the reception of the headed ends of the yoke 16, screws 17 passing through the extensions 14 and being threaded into the arms of the yoke 16.

The extensions 14 are also provided with rectangular slide portions 18, which slidably fit between outwardly turned guiding ears 19, see Figures 1, 3, and 4.

The guiding ears 19 are outwardly struck from supports 20 carried by the main support or chassis 1. These supports or frame members, see Figures 1 and 2, are also provided with ears 21 to which the control switch block 22 is secured in any suitable manner, a portion of such control switch block being shown in Figure 2. This control switch block forms no part of the present invention and is disclosed in the above noted co-pending application.

The supports 20 are provided with outwardly

turned inner portions provided with spaced apertures 23, see Figure 4, within which the feet 24 of spring-pressed latching members 25 are positioned. These latching members 25 are provided with T-shaped heads 26, see Figures 1, 3, and 4, for a purpose hereinafter to appear. Each latching member has a headed pin 27 associated therewith and loosely passing through the supporting member 20 and the latching member 25, see Figure 4. A helical spring 28 loosely surrounds the pin 27 and urges the latching member inwardly.

The yoke 16 is U-shaped, as previously stated and as may be seen from Figure 1. It is provided with inwardly turned spaced ears 29 and 30, see Figures 1 and 2, between which the laminated armature 31 is loosely pivotally carried. A headed pin or screw 32, see Figure 2, passes loosely through the armature 31 and is threaded into the ear 29, a shoulder being provided adjacent the threaded portion. The armature is thus pivotally and semi-floatingly carried by the transverse portion of the yoke.

The yoke is guided, as previously described, adjacent the free ends of the arms by means of the members 18 and 19, see Figure 3. The yoke is provided with an apertured tongue 32', see Figure 2, which is guided by a pin 33 carried by an outwardly turned portion of the main support 1, see Figure 2.

The magnet body may be of substantially E-shape, as shown in Figure 1, and is formed of laminated material. It has a central pole 34 and a pair of side poles 35. The armature is substantially T-shaped, having faces 36 opposite the ends of the poles 35 and having a central portion 37 which slides within the energizing winding 38 carried by the body portion of the magnet. The poles 35 are preferably provided with shading coils 39, as shown in Figure 1. It is also preferable to provide the interior of the magnet winding with non-magnetic guiding strips 40, as shown in Figure 2, and the outwardly angularly turned ends of these guiding strips may be riveted to an insulating ring or washer 41, see Figure 2, the rear ends of such strips being held by means of the bolt 42.

The magnet body is detachable or removably held in place by means of the spring-pressed latch members 25. These members fit within notches 43 formed in the sides of the poles 35, with the T-shaped head 26 located above the outer face of the pole members 35, see Figures 1 and 3. The side supports 20 are provided with upstanding shouldered projecting members 44, see Figures 3 and 4. The magnet body, therefore, is detachably locked to the support 1 by the construction just recited, and the magnet consequently is freely removable by merely spreading the latching members 25 apart, the fingers of the operator engaging such latching members.

In removing the magnet, the screw 32, see Figure 2, is removed and the armature is pushed into contact with the pole faces of the magnet, thus clearing the ear 30 and allowing the magnet with the armature to be freely lifted from the remainder of the apparatus.

It is preferable to provide a loose fit between the heads 26 and the outer face of the side poles 35 of the body portion of the magnet, so that the magnet is itself semifloating; consequently the magnet and armature can properly align themselves so the faces 36 of the armature, see Figure 1, can contact flatly with the end faces of the poles 35.

The contactor and magnet construction are

mounted, as shown in Figures 1 and 2, so that the contactor and magnet are biased by gravity towards open position, though obviously any other suitable biasing means could be employed.

The circuit above described is diagrammatically shown in Figure 6. The stationary contacts 7 are bridged by the movable contact bars 9 whenever the winding 38 is energized. This winding is controlled by the stop button 45 and the starter button 46, such latter button being held closed by means described in the above noted application and forming no portion of this invention. The motor or other translating device is indicated by the reference character 47, and thermal overload means by the reference character 48.

It will be seen that a novel form of magnet construction has been provided for a contactor in such a manner that the magnet is freely removable and is detachably locked to a supporting member. It will be seen further that this detachable locking means is very simple and is cheap to produce and is easy to operate.

Although this invention has been described in considerable detail, it is to be understood that such description is intended as illustrative rather than limiting, as the invention may be variously embodied and is to be interpreted as claimed.

I claim:

1. In a contactor construction, a support, a magnet body portion, a winding on said magnet body portion, an armature associated with said magnet body portion, said magnet body portion being bodily removably held to said support, and latch means for removably locking said magnet body portion to said support, said latch means remaining in place on said support when said magnet body is removed, said latch means engaging said body portion intermediate the ends of said body portion, said armature being slidably supported from said support independently of said magnet body portion.

2. In a device of the class described, a support, a magnet body portion, a winding on said magnet body portion, an armature cooperating with said magnet body portion, and latch means for removably locking said magnet body portion to said support, said magnet body portion bearing against and supported from said support immediately adjacent said latch means, and an armature movably supported from said support independently of said magnet body portion.

3. In a device of the class described, a support having side frames, a magnet body portion located between said side frames, a winding on said magnet body portion, an armature cooperating with said magnet body portion, and latch means on opposite sides of said magnet body portion for releasably holding said magnet body portion locked to said side frames.

4. In a device of the class described, a support having spaced, outwardly projecting supporting portions, a magnet body portion normally bearing against said supporting portions, a winding on said magnet body portion, an armature cooperating with said magnet body portion, and a latch positioned adjacent each of said supporting portions for removably locking said magnet body portion to said supporting portions.

5. In a device of the class described, a support having spaced, outwardly projecting supporting portions, a magnet body portion normally bearing against said supporting portions, a winding on said magnet body portion, an armature cooperating with said magnet body portion, and a spring

pressed latch positioned adjacent each of said supporting portions for removably locking said magnet body portion to said supporting portions, said magnet body portion having cut-outs on opposite sides for receiving said spring pressed latches.

6. In a device of the class described, a support having spaced side frame bars provided with outwardly projecting supporting portions located between said side frame bars, a magnet body portion located between said side frame bars and bearing against said supports, an armature cooperating with said magnet body portion, and spring pressed latches adjacent said supporting portions interlocking with said magnet body portion for holding said magnet body portion to said supporting portions.

7. In a device of the class described, a support having spaced side frame bars provided with outwardly projecting supporting portions located between said side frame bars, a magnet body portion located between said side frame bars and bearing against said supports, an armature cooperating with said magnet body portion, and spring pressed latches adjacent said supporting portions interlocking with said magnet body portion for holding said magnet body portion to said supporting portions, said supporting portions

having shoulders against which said magnet body portion bears and having reduced fingers projecting from said shoulders, and said magnet body portion having notches on opposite sides for receiving said fingers.

8. In a device of the class described, a support having spaced, outwardly projecting supporting portions, an E-shaped magnet body portion normally bearing against said supporting portions, a winding on said magnet body portion, an armature cooperating with said magnet body portion, and spring pressed latch means positioned adjacent each of said supporting portions for removably locking the outer arms of said E-shaped magnet body portion to said supporting portions.

9. In a device of the class described, a support, a removable magnet body portion, a winding on said magnet body portion, an armature cooperating with said magnet body portion, latch means normally engaging said magnet body portion for removably locking said magnet body portion to said support, said magnet body portion bearing against said support, said support having means spaced apart from each other for determining the position of said magnet body portion, and an armature movably supported from said support independently of said magnet body portion.

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