March 7, 1939. G. W. PACKER 2,149,865

INTERLOCKING MEANS FOR A GROUP OF ELECTRICAL CONTACTORS

Filed June 23, 1937

Fig. 2

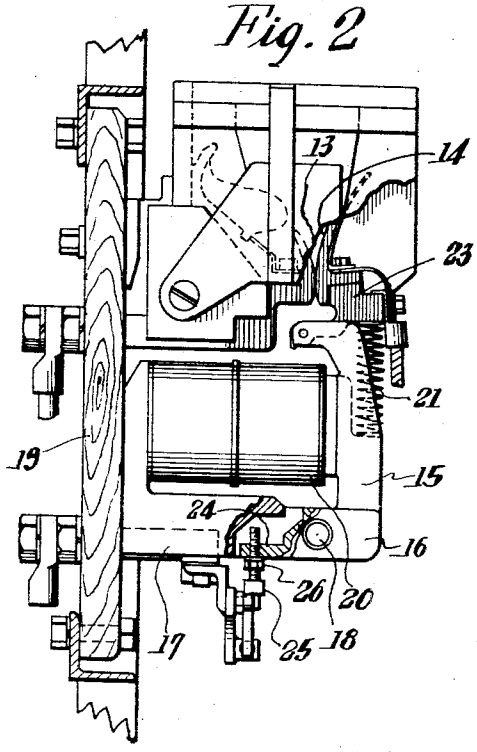


Fig. 1

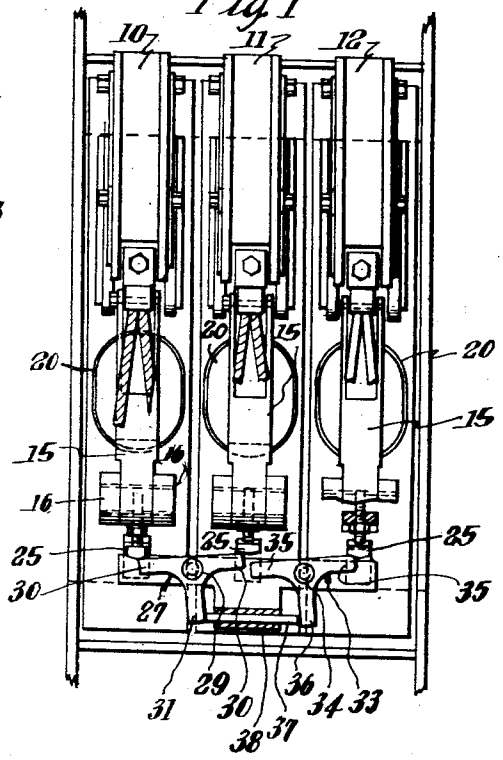


Fig. 3

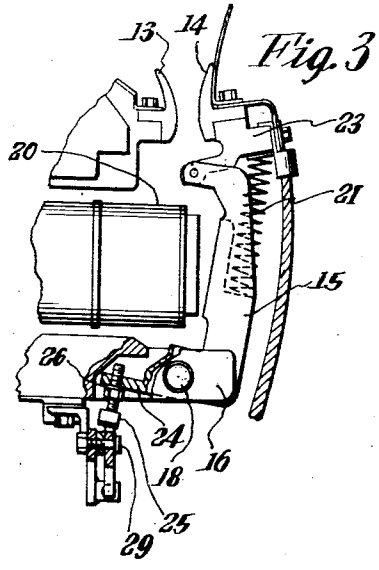
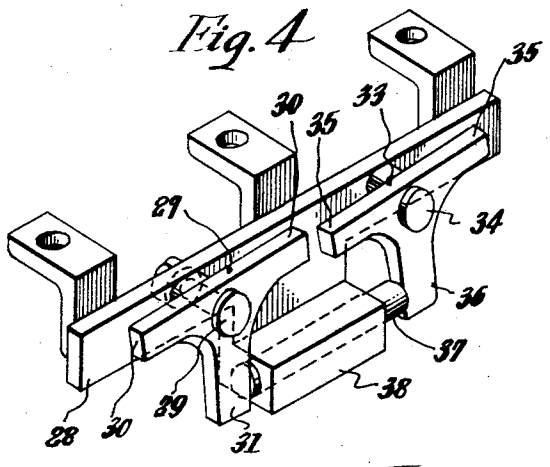


Fig. 4



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UNITED STATES PATENT OFFICE

2,149,865

INTERLOCKING MEANS FOR A GROUP OF ELECTRICAL CONTACTORS

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Application June 23, 1937, Serial No. 149,944

4 Claims. (Cl. 200—50)

This invention relates to improvements in an interlocking means for a group of electrical contactors of the type which may be used in connection with mine locomotives or other electrical devices for transferring electrical power to the locomotive through one power inlet or another and locking the circuit to prevent the flow of power through the other inlet.

The principal objects of my invention are to provide a new and improved interlocking means of a simplified construction for interlocking a group of contactors so that several of said contactors may be locked in an inoperative position while other of said contactors are in an operative position.

My invention may be more clearly understood with reference to the accompanying drawing wherein:

Figure 1 is a front end view of a group of electrical contactors illustrating one form in which my invention may be embodied;

Figure 2 is an enlarged detail side elevation of one of the contactors with certain parts broken away and shown in section;

Figure 3 is a view somewhat similar to Figure 2 but drawn to a larger scale and showing the contactor in another position than is shown by Figure 2; and

Figure 4 is an enlarged detail isometric view of the interlocking mechanism.

Referring now to the drawing, the embodiment of my invention illustrated shows a plurality of electrical contactors 10, 11, and 12. Each of said contactors is of a similar construction well known to those skilled in the art and includes a stationary contact 13 adapted to be engaged by a movable contact 14 pivoted on the upper end of a swinging arm 15.

The swinging arm 15 is pivotally mounted between projecting portions 16, 16 of a frame 17 on a pin 18 and is movable about a horizontal axis extending transversely of the contact face of the contacts 13 and 14. Said frame is of an L-shaped formation and its short leg is secured to a base 19 for said contactors and its longest leg projects outwardly from said base. A suitable electric magnet 20 is mounted on the short leg of said frame and extends outwardly therefrom and is adapted to attract the swinging arm 15 and thus move the movable contact 14 into engagement with the stationary contact 13 to close the circuit through said contacts. Said swinging arm is so mounted with respect to the contact 13, that the contacts will disengage by gravity when current is cut off from the magnet 20. Disengagement of said contacts is also aided by a compression spring 21 to take care of instances where there is a tendency for the contacts to stick. Said spring is interposed between the swinging arm 15 and a support member 23 for said movable contact, and acts against the magnet 20.

With reference now in particular to the novel interlocking connection between the contactors 10, 11, and 12, which holds two of said contactors in an open position when the third is in a closed position, and vice versa, each of the swinging arms 15 has a portion 24 which extends inwardly from the pivotal axis thereof. The portion 24, as herein shown, has a depending square-headed machine screw 25 threaded therein which is adapted to be locked in position by means of a lock nut 26. A rocking member 27 is pivoted on a frame 28 which is secured to and depends from the horizontal legs of the frame members 17, 17. Said rocking member is pivoted midway between the contactors 10 and 11 on a pivotal pin 29 secured to and extending from said frame, and as herein shown, is pivotally movable in a vertical plane, and in a direction disposed transversely of said contactors. The rocking member 27 has a pair of arms 30, 30 extending laterally in opposite directions from the pivotal axis thereof, and an arm 31 depending from said pivotal axis. The arms 30, 30 are adapted to engage the heads of the machine screws 25, 25 depending from the contactors 10 and 11. In a like manner a rocking member 33 is pivoted intermediate the contactors 11 and 12 on a pivotal pin 34 projecting outwardly from the frame member 28. Said rocking member has a pair of arms 35, 35 extending laterally in opposite directions from the pivotal axis thereof, and an arm 36 depending therefrom. The arms 35, 35 are adapted to engage the underside of the respective heads of the machine screws 25, 25 depending from the arms 15 of the contactors 11 and 12.

The rocking members 27 and 33 are interconnected, so that movement of one of said rocking members will cause movement of the other, by means of a plunger 37. Said plunger is slidably mounted in a guide 38 for rectilinear movement in a horizontal plane disposed transversely of the contactors 10, 11, and 12. Opposite ends of said plunger are adapted to engage the inner sides of the depending arms 31 and 36 so that movement of the rocking member 27 in a clockwise direction will move the rocking member 33 in a similar direction, and vice versa.

It will be seen from the foregoing that when the contactor 10 is in an engaged position the

machine screw 25 will be in a downward position which will rock the rocking member 27 in a counterclockwise direction and hold the contactor 11 in an open position. At the same time, the depending arm 31 will engage one end of the plunger 37 which will move the rocking member 33 in a counterclockwise direction and engage the arm 35 of said rocking member with the head of the machine screw 25 depending from the contactor 12, to hold said contactor in an open position. In case the contactors 10 and 12 are open and the contactor 11 is closed, the arms 30 and 35 will be engaged by the depending head of the machine screw 25 associated with the contactor 11, to lock the other two contactors in an open position in the manner just described.

It will accordingly be seen that a new and improved mechanical interlocking connection between a plurality of contactors has been provided for locking certain of said contactors in an open position while other of said contactors are in a closed position, and that this interlocking connection is of a simple and novel construction and is particularly adapted for use with transfer switches for mine locomotives wherein current is conducted to the locomotive by means of either a reel or trolley, but which may be used for other purposes where it is desired that an interlocking connection be provided between the contactors which control the flow of power to an electrical system. It may also be seen that the interlocking mechanism may be extended to take care of any desired number of contactors by increasing the number of rocking members in the system.

While I have herein shown and described one form in which my invention may be embodied, it will be understood that the construction thereof and the arrangement of the various parts may be altered without departing from the spirit and scope thereof. Furthermore, I do not wish to be construed as limiting myself to the specific embodiment illustrated, excepting as it may be limited in the appended claims.

I claim as my invention:

1. An interlock for an electrical circuit including a plurality of electrical contactors, and means for interlocking said contactors to operate in a predetermined order comprising a rocking member pivoted midway between the first two of said contactors and having a pair of arms extending laterally in opposite directions from its pivotal axis for engagement with said contactors, to pivot said rocking member upon movement of one of said contactors, a third arm depending from said rocking member, another rocking member pivoted midway between the second two of said contactors and having a pair of arms extending laterally in opposite directions from its pivotal axis for engagement with said contactors, a third arm depending from said rocking member, and a plunger movable transversely of said contactors and having engagement with said depending arms at its opposite ends.

2. In a mechanical interlock for an electrical circuit, a plurality of electrical contactors arranged side by side, each of said contactors including a stationary contact, a movable contact engageable therewith, a rocking arm on which said movable contact is mounted, said arm being rockable about an axis extending parallel to the engaging faces of said contacts and having a portion extending inwardly from the pivotal axis of said rocking arm, and means for locking two of said contactors in one position while the other of said contactors is in another position comprising a pair of rocking members, each of said rocking members being pivoted for movement in a vertical plane about an axis disposed intermediate each pair of said contactors and perpendicular to the axes of said swinging arms, and having engagement with said inwardly extending portions of said rocking arms, and a plunger having engagement with each of said rocking members at its opposite ends for pivotally moving one of said rocking members upon pivotal movement of the other.

3. In a mechanical interlock for an electrical circuit, a plurality of electrical contactors arranged side by side, each of said contactors including a stationary contact and a movable contact engageable therewith, a rocking arm on which said movable contact is mounted, said arm being rockable about an axis extending parallel to the engaging faces of said contacts, and having a portion extending inwardly from its pivotal axis, and means for locking two of said contactors in one position while the other of said contactors is in another position comprising a pair of rocking members, each of said rocking members being pivoted for movement in a vertical plane about an axis disposed intermediate each pair of said contactors and perpendicular to the axes of said swinging arms, and said rocking members having a pair of arms extending laterally from the pivotal axes thereof for engagement with said inwardly extending portions of said rocking arms, and each of said rocking members having a depending arm, and means interposed between said rocking members and engaging said depending arms for pivotally moving one of said rocking members on pivotal movement of the other.

4. In a mechanical interlock for an electrical circuit, a plurality of electrical contactors arranged side by side, each of said contactors including a stationary contact and a movable contact engageable therewith, a rocking arm on which said movable contact is mounted, said arm being rockable about an axis extending parallel to the engaging faces of said contacts and having a portion extending inwardly from its pivotal axis, and means for locking two of said contactors in one position when the other of said contactors is in another position comprising a pair of rocking members, each of said rocking members being pivoted for movement in a vertical plane about an axis disposed intermediate each pair of said contactors and perpendicular to the axes of said swinging arms, and said rocking members having a pair of arms extending laterally in opposite directions from the pivotal axes thereof and adapted to engage said inwardly extending portions of said rocking arms, a third arm depending from each of said rocking members, and means interposed between said rocking members and engaging said depending arms for pivotally moving one of said rocking members on pivotal movement of the other comprising a rectilinearly movable member guided for movement laterally of said contactors.

GLENN W. PACKER.