

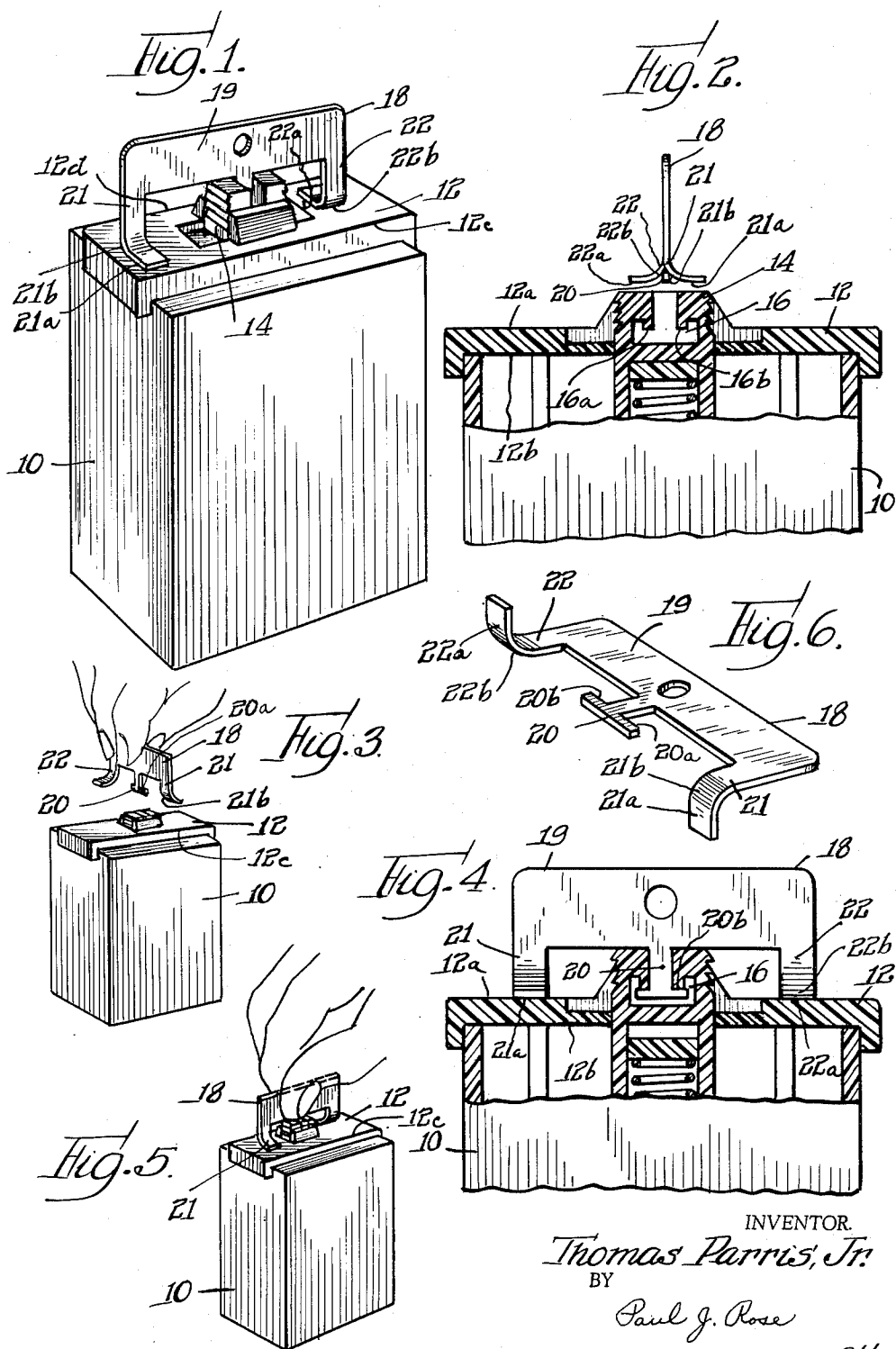
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LOCKING MEANS FOR ELECTROMAGNETIC RELAYS

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LOCKING MEANS FOR ELECTROMAGNETIC RELAYS

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1 Claim. (Cl. 317-187)

This invention relates generally to electromagnetic relays, and more particularly to a means for locking the movable parts of an enclosed electromagnetic relay in a fixed position.

After electromagnetic relays are mounted on panels and electrically interconnected into a control system, it often becomes necessary, in order to test the circuitry, to lock the movable parts of one or more of the relays in their energized positions while their operating coils are not energized. In relays of the open type, it has been common to merely insert wedges or other blocking means to hold the movable parts in a desired position. With the advent of enclosed relays, this simple procedure is not possible, and other means have had to be devised to hold the movable parts of an enclosed relay in their energized position.

It is an object of this invention to provide an improved means for locking the movable parts of an enclosed electromagnetic relay.

Another object is to provide an electromagnetic relay in which a movable part projecting from a housing has improved means cooperable with a locking device to lock the movable parts of the relay.

A further object of the invention is to provide simple, inexpensive, and convenient means for locking the movable parts of an enclosed electromagnetic relay in their energized position.

In accordance with this invention, the outer end of a reciprocable member of an enclosed electromagnetic relay has a shoulder portion which cooperates with a hook portion at the extremity of a central leg of a generally E-shaped locking device which has a pair of outer legs adapted to engage a housing of the relay to maintain the reciprocable member in an outer position with respect to the housing.

Other objects and advantages will become apparent when the following specification is considered along with the accompanying drawings in which:

FIG. 1 is a perspective schematic view of an electromagnetic relay having a locking device constructed in accordance with this invention mounted thereon and cooperating with a reciprocable member and a housing of the relay to hold the reciprocable member in an outer position with respect to the housing;

FIG. 2 is a fragmentary, partially sectional view of the relay of FIG. 1 and an end view of the locking device of FIG. 1 in position for mounting on the relay;

FIG. 3 is a perspective view of the relay and locking device of FIG. 1 showing the locking device in position for mounting on the relay;

FIG. 4 is a view similar to FIG. 2 but showing the locking device in mounted position;

FIG. 5 is a perspective view similar to FIG. 3 but showing the completion of the mounting of the locking device; and

FIG. 6 is a perspective view of the locking device.

Although useable with other relays, the locking device of this invention is designed particularly for use with the relay disclosed in copending application, Serial No. 206,624, filed on July 2, 1962, and assigned to the assignee of this invention. A more complete description of the relay may be found in the co-pending application.

The drawings show a relay 10 having a cover 12 and an electromagnetically operable reciprocally-mounted con-

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tact carrier having a handle portion 14 projecting through an opening in the cover 12. The outer end portion of the handle 14 is provided with a slot 16 opening to an end face and to two opposite side faces of the handle 14. The slot 16 is enlarged at its inner end and is preferably generally T-shaped to provide a pair of inwardly facing shoulder portions 16a and 16b.

A locking device 18 constructed in accordance with the invention is provided to cooperate with the shoulder portions 16a and 16b and the cover 12 for locking the handle 14 in its outer position. In the relay illustrated, the energized position of the movable parts of the relay corresponds with the outer position of the handle 14. It will be readily apparent that the locking device 18 can be used with a relay having a deenergized position of its movable parts corresponding with the outer position of the handle. The locking device 18 is in the form of a generally E-shaped member having a body portion 19, a middle leg 20, and a pair of outer legs 21 and 22. The middle leg 20 is preferably generally T-shaped and adapted to mate with the T-shaped slot 16 in the handle 14 so that a pair of latch surfaces 20a and 20b thereon may respectively engage the shoulder portions 16a and 16b. The outer legs 21 and 22 are curved in opposite directions from the main body portion 19 substantially through ninety degrees to provide a pair of respective bearing surfaces 21a and 22a and a pair of respective camming surfaces 21b and 22b curving away from the bearing surfaces 21a and 22a toward the main body portion 19.

To lock the handle 14 of the movable contact carrier of the relay 10 in its energized or outer position, the locking device 18 is first positioned relative to the handle 14 as shown in FIGS. 2 and 3. In this beginning position, the outer legs 21 and 22 straddle the cover 12 and the head of the T-shaped middle leg 20 extends at right angles to the head of the T-shaped slot 16.

The locking device 18 is then moved toward the handle 14 into an intermediate position to place the head of the T-shaped middle leg 20 within the slot 16 but still at right angles to the head of the T-shaped slot 16. In this intermediate position, the outer legs 21 and 22 straddle the cover 12 and the bearing surfaces 21a and 22a are disposed inwardly of the outer surface 12a and outwardly of the inner surface 12b of the cover.

The locking device 18 is then turned substantially ninety degrees, clockwise when looking at the outer surface 12a of the cover, from the intermediate position described above to the final mounted position of FIGS. 1, 4, and 5. In the movement of the locking device to final mounted position, the head of the T-shaped middle leg 20 mates with the head of the T-shaped slot 16 so that the latching surfaces 20a and 20b may respectively engage the shoulder portions 16a and 16b, and the camming surfaces 21b and 22b of the outer legs 21 and 22 respectively engage a pair of opposite edges 12c and 12d of the cover 12. The camming action which occurs upon continued turning of the locking device 18 after engagement of the camming surfaces 21b and 22b with the edges 12c and 12d of the cover 12 causes the locking device to climb the cover 12 and pull the handle 14 outwardly until the bearing surfaces 21a and 22a engage the outer surface 12a of the cover.

Release of the handle 14 from its locked position may be effected by turning the locking device another ninety degrees from its mounted position so that the outer legs 21 and 22 again straddle the cover 12 and the bearing surfaces 21a and 22a are out of contact with the surface 12a and the head of the T-shaped middle leg 20 again extends at right angles to the head of the T-shaped slot 16.

It is within the scope of the invention to reverse the curvature of the legs 21 and 22 and turn the locking device counterclockwise instead of clockwise. Various

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other modifications may be made without departing from the spirit and scope of the invention.

I claim:

For use in pulling an inwardly biased reciprocable member having an inwardly facing shoulder portion to an outer position with respect to a housing therefor having a portion defined by a generally flat, elongated outer surface and a pair of opposed side surfaces extending generally perpendicularly to said outer surface and spaced a predetermined distance apart, said outer surface having an aperture therethrough for receiving said reciprocable member, and for use in locking said reciprocable member in said outer position, a camming and locking device comprising a reusable, rigid, one-piece, generally E-shaped member having a generally flat, elongated body portion, a middle leg extending centrally from a longer edge of said body portion and provided with an enlarged free end portion having a latch surface spaced from and facing said body portion, and a pair of outer legs extending from said longer edge of said body portion respectively adjacent opposite ends thereof and respectively disposed on opposite sides of said middle leg entirely outwardly of said enlarged free end portion of said middle leg in the direction of the length of said elongated body portion, said outer legs being spaced farther apart from each other than said predetermined distance and being capable of receiving said housing portion therebetween in partially overlapping relationship with said side surfaces, said outer legs being flatwise curved from said body portion in opposite directions through substantially ninety degrees to

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provide a pair of curved cam surfaces respectively on said outer legs and a pair of bearing surfaces respectively on the outer end portions of said outer legs adjacent said cam surfaces, said device being positionable to dispose said latch surface on said middle leg inwardly of said shoulder portion of said reciprocable member in outwardly facing relationship to said housing and to dispose said bearing surfaces inwardly of said outer surface of said housing portion with said outer legs straddling and partially overlapping said side surfaces of said housing portion and being rotatable about an axis parallel to the direction of reciprocation of said reciprocable member to operatively engage said latch surface on said middle leg with said shoulder portion of said reciprocable member and to pull said reciprocable member outwardly by engagement of said cam surfaces on said outer legs with said housing portion and to lock said reciprocable member in said outer position by engagement of said bearing surfaces on said outer legs with said outer surface of said housing portion.

References Cited by the Examiner

UNITED STATES PATENTS

227,929	5/1880	Smith	24—221
2,077,604	4/1937	Wiley	85—5
2,355,922	8/1944	Minero	287—20
2,584,813	2/1952	Poupitch	85—5
2,722,625	11/1955	Bingeman et al.	287—20.5

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