March 23, 1943. B. E. SHAW 2,314,464

LINE STARTER SWITCH

Filed May 22, 1939

Fig. 1.

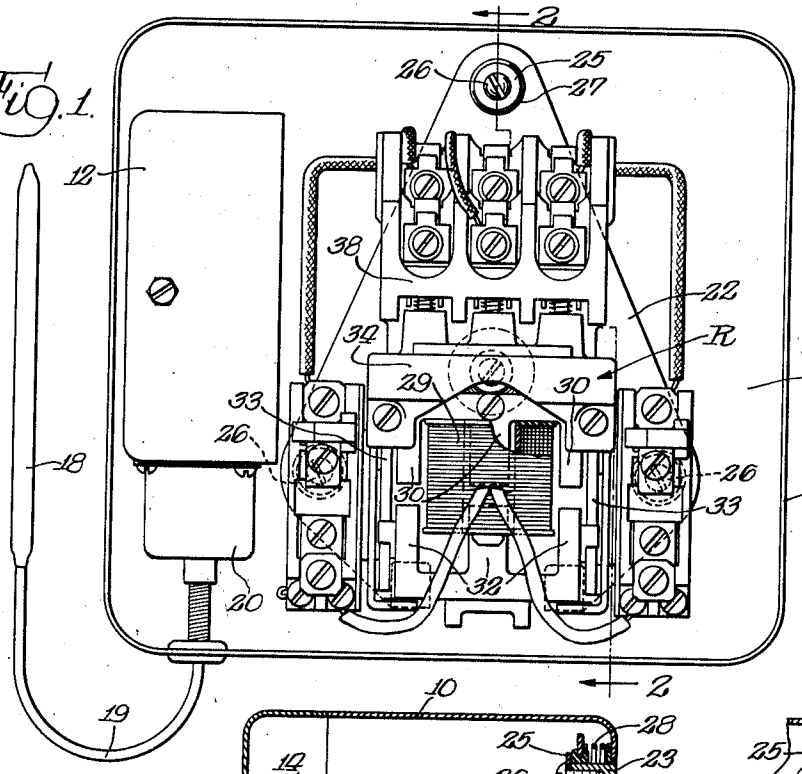



Fig. 2.

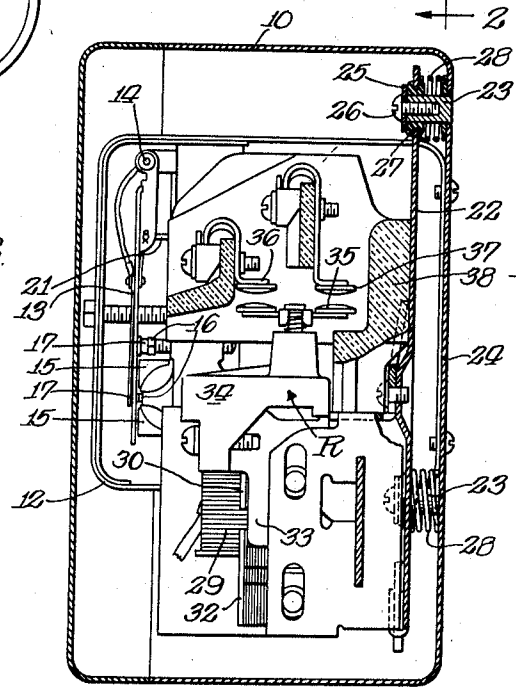
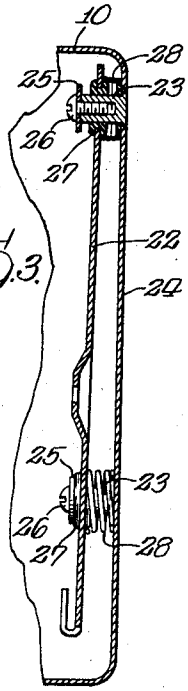



Fig. 3.




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Patented Mar. 23, 1943 2,314,464

# UNITED STATES PATENT OFFICE

2,314,464

## LINE STARTER SWITCH

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Application May 22, 1939, Serial No. 275,061

1 Claim. (Cl. 248—358)

An object of my present invention is to provide a line starter switch including a housing and a starting assembly mounted therein consisting of a relay and a switch for operating the relay, means being provided to prevent the jarring of the housing as a result of operation of the relay which ordinarily results in erratic action of the relay switch, my structure being so designed as to eliminate such undesired action.

A further object is to provide a starter switch or the like in which the relatively heavy mass of the relay armature required to operate contacts for motors or the like of greater than fractional horse power, is so mounted that its operation does not produce undesired bouncing of the contacts of a relay operating switch also mounted in the same housing with the relay.

More particularly, it is my object to provide a mounting plate for a relay within a housing in which a relay operating switch is also mounted, the plate being so suspended relative to the switch housing that the forces of momentum and inertia acting upon the relay armature are minimized in effect as to their being transmitted to the relay switch.

With the foregoing and other contemplated as well as obvious objects in view, the invention comprises the combination of elements and arrangement of parts so combined as to coact and cooperate with each other in the performance of the functions and the accomplishment of the results herein contemplated, and comprises in one of its adaptations the species or preferred form illustrated in the accompanying drawing, wherein

Figure 1 is a front elevation of a line starter switch embodying my invention, the cover of the switch being removed to illustrate internal details of construction;

Figure 2 is a sectional view on the line 2—2 of Figure 1, and

Figure 3 is a view similar to a portion of Figure 2 showing the parts in a different position, as just after the relay has been energized.

On the accompanying drawing, I have used the reference numeral 10 to indicate a housing. Within the housing 10 is a switch casing 12 and a relay indicated generally by the reference character R. The switch casing 12 contains an armature 13 pivoted at 14 and coacting with the poles 15 of a permanent magnet to provide snap action for the armature 13. Stationary contacts 16 and movable contacts 17 are controlled by the movements of the armature 13.

The movements of the armature in turn are automatically controlled as by temperature changes affecting a capillary bulb 18 connected by a capillary tube 19 to a bellows housing 20. The bellows within the housing 20 is operatively connected to the armature 13 by a link 21, as fully shown and described for instance in my Patent No. 2,116,002, of May 3, 1938.

The relay R includes a mounting plate 22 mounted on three posts 23. The posts 23 extend forwardly from the back 24 of the housing 10 and are provided with heads consisting of washers 25 retained in position by screws 26.

The plate 22 is provided with enlarged perforations to loosely receive the posts 23 and these are bushed with bushings 27 of rubber or the like. Interposed between the mounting plate 22 and the housing back 24 are springs 28. The springs 28 normally keep the bushings 27 engaged with the washers 25, as shown in Figure 2.

The relay R further includes a solenoid 29 for energizing stationary poles 30 which thereupon attract movable poles 32 which constitute a relay armature. The poles 32 are connected by links 33 to a cross member 34, preferably of insulation and adapted to carry bridging contacts 35, one for each line wire. Each bridging contact 35 is adapted to coact with stationary contacts 36 and 37 for bridging them and thereby establishing a motor circuit or the like through the contacts 35, 36 and 37. Contacts 36 and 37 are mounted in a block 38 which also is preferably of insulating material and which together with the stationary poles 30 and the coil 29 are mounted on the mounting plate 22.

The relay R, it will be noted, is of rather rugged and heavy character. Accordingly, considerable forces of inertia and momentum are developed during the operation of the relay. The relay is necessarily of heavy construction to carry relatively heavy currents for controlling high horse power motors such as those used for commercial refrigeration and other compressor work. Heretofore, when relays of this character have been mounted in a housing such as 10 together with a switch housing such as 12 for convenience of providing a unitary installation, trouble has been experienced due to the relay jarring the housing 10 to such extent that the contacts 16 and 17 are jarred thereby and consequently make and break the circuit of the coil 29 several times upon engagement occurring. This obviously is hard on the contacts of both the relay switch within the casing 12 and the relay contacts 35, 36 and 37. It also produces considerable noise and increases wear and tear on the compressor motor. I have

found that with a resilient mounting such as provided by the mounting plate **22**, posts **23**, bushings **27** and springs **28**, this undesirable jarring of the housing **10** and consequently of the contacts **16** and **17** is entirely eliminated. Also, the noise of operation of the relay is greatly reduced and in operation both the relay and the control switch mechanism within the housing **12** give more satisfactory results and many more operations during the life of these structures.

From the foregoing description of the means for accomplishing the enumerated ends, it is apparent that I have devised a practical and efficient construction for carrying out the objects of the invention as regards a simple and economical unit of the character described, and while the foregoing represents one of the preferred forms of embodiment of the invention, I desire to reserve the right to make whatever changes or modifications may fairly fall within the scope of the appended claim.

What I claim as new and desire to secure by Letters Patent of the United States is:

In a supporting means of the kind disclosed, a main support, an auxiliary support, and means to prevent said auxiliary support from jarring said main support comprising a plurality of headed posts extending from said main support, said auxiliary support having a perforation loosely receiving each of said posts, a bushing of rubber or the like lining each of said perforations, said bushings being carried by and movable with said auxiliary support and being of less length than said posts, and resilient means at each of said posts and interposed between said auxiliary support and said main support.

BURTON E. SHAW.