

# UNITED STATES PATENT OFFICE

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SOLENOID

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This invention pertains to solenoids, especially those adapted for use with alternating current.

As is well known, alternating current solenoids are inclined to be noisy on account of the failure of the alternating current to hold the plunger in fixed position, the vibrations of the current being imparted to the plunger whereby sound vibrations are set up and amplified in the solenoid structure.

The present invention provides an improved solenoid which prevents the generation of the above described vibrations, whereby alternating current solenoids may be used in locations where noise must be avoided, as for instance in theatres.

The invention is illustrated in connection with a theatre spot light, Fig. 1 showing the front view of a spot light with a color screen and a solenoid for operating the screen, and Fig. 2 showing an enlarged detail cross-section of the solenoid.

The spot light is designated 10, and the screen frame 12. Stretched across frame 12 is a color screen 14. Screen 12 is fast to shaft 16 which passes rearwardly along the side of the light.

Fast to shaft 16 is a crank arm 18 to which is operatively connected solenoid plunger 20 through the instrumentality of link 22. When the solenoid is energized plunger 20 is drawn down into the bore of the coil and the screen is carried from the inoperative position in Fig. 1 to the operative position indicated in Fig. 2, in which position it is held so long as coil 24 is energized. When the solenoid is deenergized screen 12 is returned to inoperative position by spring 26 connected to crank arm 28 on shaft 16. The above arrangement is described in detail in copending application of Herbert A. Kliegl, Serial No. 246,932, filed January 16, 1928. In that application the solenoids are shown bolted solidly to a bracket such as 30 secured to the side of the spot light, but in the present

arrangement a cushioned resilient method is provided for attaching the solenoid to the bracket, as will be understood from Fig. 2.

The lower end of the solenoid structure comprises a metallic head 32 having a center plug-like portion 34 which enters the bore of the solenoid from below.

Head 32 rests on a cushion 36 of leather or rubber, and is held in place by a screw 38 tapped into head 32 and passing upwardly through bracket 30. Surrounding screw 38 as shown is a coil spring 40. The above means that the solenoid is resiliently connected to bracket 30 instead of being rigidly bolted thereto. A downwardly opening cup-shaped member 42 is provided surrounding the screw and spring.

In the operation of the above described device, when the solenoid is energized plunger 20 is drawn down to contact with plug 34 as in Fig. 2. When the circuit is first closed the solenoid rises slightly against the resistance of spring 42, but immediately settles down again to normal position on cushion 36 in which position it is resiliently held by spring 42.

It has been found in practice that the above described device is completely successful in eliminating noise under the conditions set forth.

It is to be understood that the invention is not limited to the construction herein specifically illustrated but can be embodied in other forms without departure from its spirit as defined by the following claims.

I claim—

1. In a device of the class described, in combination, a solenoid having a fixed plug in the bore thereof, a plunger adapted to be drawn into the bore of said solenoid into contact with said plug when said solenoid is energized by an alternating current, and a resilient support for said solenoid whereby the generation of sound in said device is avoided while the solenoid is energized.