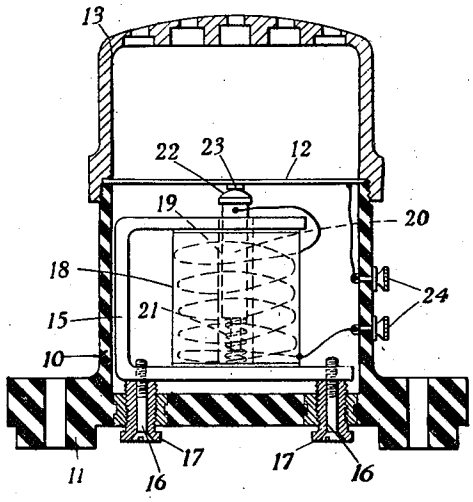
Jan. 4, 1944. W. H. M. HELLIER 2,338,640

SOLENOID OPERATED ELECTRIC VIBRATOR

Filed July 10, 1941



INVENTOR
W. H. M. Hellier
BY
ATTORNEY

Patented Jan. 4, 1944 2,338,640

UNITED STATES PATENT OFFICE

2,338,640

SOLENOID OPERATED ELECTRIC VIBRATOR

William Herbert Morgan Hellier, London, England, assignor to International Standard Electric Corporation, New York, N. Y.

Application July 10, 1941, Serial No. 401,799
In Great Britain June 11, 1940

1 Claim. (Cl. 177—7)

This invention relates to solenoid operated electric vibrator or audible signal devices and has for its object to provide such a vibrator which is rugged in construction and reliable in operation.

According to one feature of the present invention the contact members through which current is conveyed to the winding of the solenoid comprise a member mounted on the diaphragm and a member mounted on the plunger of the solenoid.

The invention will be better understood from the following description of one embodiment thereof taken in conjunction with the accompanying drawing.

The vibrator is contained within a water tight casing 10, of any suitable insulating material, formed with a flange 11 by means of which it may be clamped to a base plate. One side of the casing 10 is closed by a diaphragm 12 clamped between the casing 10 and a screw threaded cover 13. The cover 13 is dome shaped and perforated to emit the sound. The U-shaped solenoid yoke 15 is mounted by means of screws 16 on bushings 17 which are themselves screw threaded in the flanged base of the casing 10. This arrangement makes it possible to regulate the pressure contact 22 on contact 23 in an axial direction by adjusting bushings 17. Contact 22 also may be moved slightly from side to side by changing the relative position of these bushings. The coil 18 of the solenoid is wound on a hollow brass core 19 within which slides the solenoid plunger 20. The plunger 20 is urged towards the diaphragm 12 by a spring 21 and carries a contact piece 22 which is normally held by the spring 21 against a contact piece 23 on the diaphragm 12. Terminals 24 passing through the wall of the casing 10 in a water-tight manner are connected within the casing 10 to the diaphragm 12 and one end of the coil 18 respectively, the other end of the coil 18 being connected to the plunger 20. Thus when a source of direct current is connected to terminals 24 the plunger 20 is drawn within the solenoid against the spring 21 and separates the contact pieces 22 and 23. As the spring 21 is supported on the yoke 15, adjustment of the position of the yoke by means of bushings 17 serves to adjust the pressure between contact pieces 22 and 23.

The diaphragm may be made of insulating material, such as laminated synthetic resin, bonded sheet, synthetic resin mouldings, ebonite, vulcanised fibre or other similar materials; in the preferred embodiment use is made of synthetic resin bonded paper board. A diaphragm of such material may be made relatively light, and is less subject to corrosive action when the sounder is used in sea water. Furthermore in order to provide the necessary electrical connection to the solenoid, the diaphragm may be coated with metal. This metal may be applied by hot metal spray and the surface of the material may be prepared for the application of the metal by abrasive blasting with sand, grit or shot, sanded by abrasive or other mechanical means, or by lacquering or varnishing.

The insulating material may be coated with metal on one or both sides.

What is claimed is:

An electric vibrator comprising a solenoid having a U-shaped pole piece, an energizing coil and a spring pressed armature supported by the pole piece, a casing provided with a diaphragm having a contact positioned for engagement with a contact portion of the armature and said armature having a convexly curved contact portion and adjustable means for supporting the pole piece within the casing comprising a pair of adjustable bushings threaded to the casing in spaced relation to each other and screws extending through the bushings and threaded to a leg of the pole piece for securing the latter to the pole piece and circuit connections respectively to the diaphragm and the coil.

WILLIAM HERBERT MORGAN HELLIER.