June 12, 1923. 1,458,620

G. FUSSNER

FLUID TIGHT APPARATUS

Filed Oct. 12, 1920

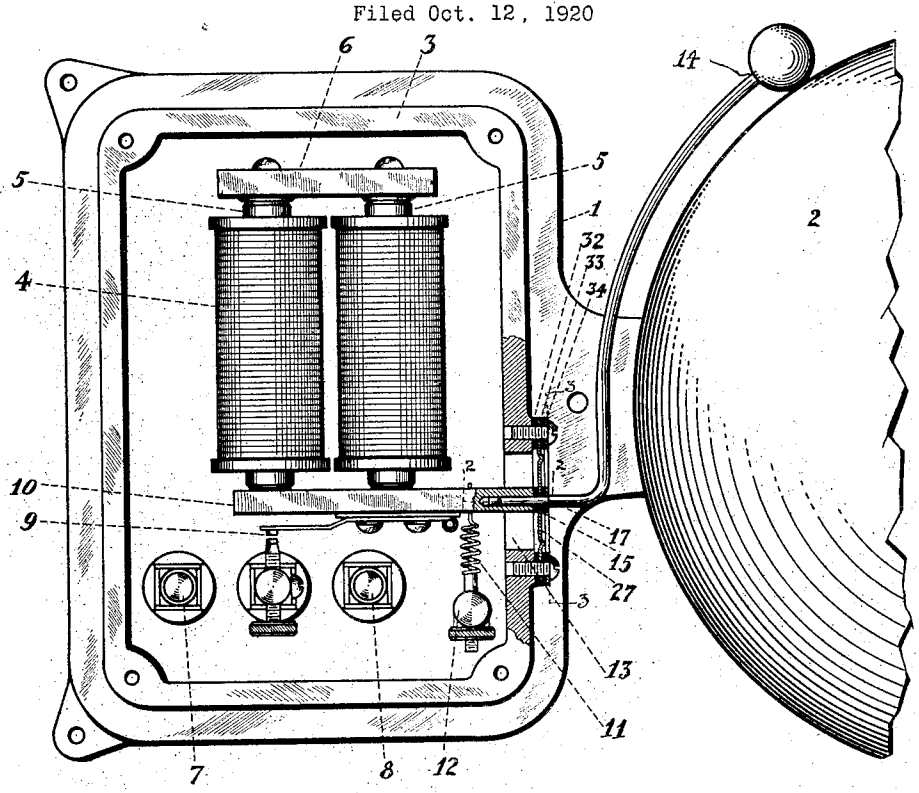


Fig. 1

Fig. 2

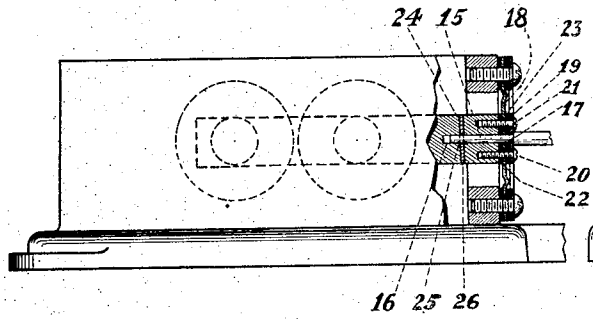
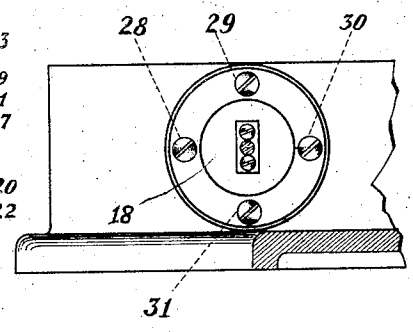


Fig. 3



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UNITED STATES PATENT OFFICE.

GEORGE FUSSNER, OF MENOMINEE, MICHIGAN, ASSIGNOR TO SIGNAL ELECTRIC MFG. CO., A CORPORATION OF MICHIGAN.

FLUID-TIGHT APPARATUS.

Application filed October 12, 1920. Serial No. 416,448.

To all whom it may concern:

Be it known that I, GEORGE FUSSNER, a citizen of the Republic of Germany, and resident of Menominee, in the county of Menominee and State of Michigan, have invented certain new and useful Improvements in Fluid-Tight Apparatus, of which the following is a specification.

My present invention relates primarily to electric apparatus and with regard to the more specific application thereof to electric bells.

One of the objects of the invention is to provide a simple and effective means for preventing passage of moisture or gas through the covering member in apparatus broadly of the type comprising movable parts, a covering member therefor and exterior parts extending through said covering member into mechanically operative connection with said movable parts.

According to one feature of the invention, particularly when applied to electric bells, the shank of the hammer projects through an opening in the casing which encloses the electromagnetic parts and into mechanical connection with the armature, the said opening being completely closed to prevent entry of foreign matter, the closing means being so constructed and arranged as not to impede the operation of the bell.

In the preferred embodiment, the closure is a metallic diaphragm clamped against preferably the rectangular end of the armature by a plate of corresponding dimensions, the length of which extends along a diameter of said diaphragm, thus effecting a relatively rigid axis of flexure therefor, and in view of the small width thereof leaving exposed a substantial area of the diaphragm for flexure.

In the accompanying drawings in which is shown one of various possible embodiments of the several features of the invention,

Fig. 1 is a plan view of the apparatus with the cover removed from the casing, part of the gong being shown broken away,

Fig. 2 is a sectional view taken along the line 2—2 of Fig. 1; and,

Fig. 3 is a sectional view taken along the line 3—3 of Fig. 1.

Similar reference characters refer to similar parts throughout the different views of the drawings.

Referring now to the drawings, there is shown at 1 the frame for the electromagnetic parts of the electric bell, the gong being mounted thereon as at 2. The frame includes an integral casing or box 3 to be sealed by a cover (not shown) within which is mounted the usual electromagnetic coil member 4 having magnetic cores 5 connected by a magnetic cross-piece 6. The terminals of the bell are shown at 7 and 8 and the usual interrupter at 9. The armature appears at 10 and is under control of a retractile spring 11, the tension of which may be adjusted by screw 12.

Through an opening 13 in the casing 3 extends the shank of the hammer 14 which is rigidly connected to the armature so that the former may be operated from the latter.

The shank of the hammer 14 has a reduced end 15 to fit into a corresponding socket 16 in the extreme end of the armature 10, a shoulder 17 being thus formed at the junction between the main length of the shank and the reduced end. A closing plate preferably in the form of a disk 18 is rigidly secured to the armature and hammer assembly by any suitable means but preferably by the means shown, comprising a metal clamping plate 19 fitted over reduced shank end 15 and soldered to the hammer shank at shoulder 17. The clamping plate is preferably rectangular in shape and of the dimensions of the cross-section of the armature. A pair of screws 20 and 21 are threaded through the plate 19 and into the adjacent end of the armature, rubber composition or lead gaskets 22 and 23 of the dimensions of the clamping plate being provided, one against each face of the closing plate. The screws 20 and 21 acting through the clamping plate thus serve to compress the gaskets to effect a liquid tight connection between the armature and hammer assembly and the closing plate.

It will be apparent that to assemble the device, the plate 19 is first slipped over the reduced end of the shank and soldered thereto at shoulder 17, then the gasket 22, disk 18 and the second gasket 23 are slipped over the reduced end in succession, whereupon the free reduced end 15 of the hammer shank is slipped into the corresponding socket 16 in the armature and screws 20 and 21 are passed through the clamping plate 19, gasket 22, disk 18, gasket 23

and threaded into the end of the armature to rigidly clamp the elements together.

By preference a transverse opening 24 extends through the width or larger dimension of the armature to intersect the socket 16, a corresponding transverse opening 25 through the shank end 15 being in alignment therewith, as shown in Fig. 2 when the said end is in place within socket 16. A quantity of solder 26 is preferably admitted into openings 24 and 25 to fill the same, to thereby combine the armature and the hammer into a unitary rigid structure, thereby removing some of the strain from screws 20 and 21. Obviously, a cross pin could be used instead of the solder, but I prefer the latter.

The combined armature, hammer and diaphragm are applied to the bell in a manner which will be apparent from Fig. 1. The disk 18 which is preferably a flexible diaphragm is fitted at its periphery over opening 13, four equidistant screws 28, 29, 30 and 31 or any other convenient number serving to secure it in place upon the casing. Annular gaskets 32 and 33 preferably of rubber composition are provided one between the diaphragm and the casing and the other between the diaphragm and a metallic annular washer 34, against which the heads of the screws are pressed. The metallic washer tends to transmit a uniform pressure at all parts of its periphery, to thereby clamp the diaphragm rim firmly between the gaskets 32 and 33 in order to effect a liquid tight connection.

Thus, I have provided a fluid tight connection between the center of the diaphragm and the armature and hammer assembly, and a further liquid tight connection between the opening 13 in the casing and the periphery of the diaphragm and it will, therefore, be apparent that no foreign matter can enter the casing at the opening 13. My apparatus is effective not only to prevent the entry of water but it will also keep gases or fumes out of the casing, so that the enclosed parts will not be subject to rust or corrosion.

In operation, the diaphragm acts as the pivot point about which the armature and hammer assembly will oscillate, the diaphragm flexing to permit such oscillation. It will be observed that the length of the clamping plate 19 extends along the diameter of flexure of the diaphragm and by reason of its small width, no substantial portion of the radius of the diaphragm at opposite sides of the axis of flexure is restrained against flexure, so that the flexibility is greater than where the clamping member extends for greater distances at opposite sides of the flexing axis. Even under severe endurance tests it has been found that the repeated flexure of the diaphragm will not impair its flexibility and it will not crystallize or break and that the gaskets will effectively keep out moisture and fumes. If desired the diaphragm may be provided with circular grooves 27 to provide increased flexibility.

Although the specific means shown and described for securing the diaphragm to the armature and hammer, and the means for securing the diaphragm to the casing are preferred, it will be understood that these connections or either of them may be effected in any of a variety of manners, as, for instance, by soldering, riveting or welding.

It is, of course, apparent that instead of a flexible diaphragm any plate might be employed and the gaskets 32 and 33 might be made of increased resiliency so as to allow the entire plate to oscillate as a substantially rigid unit between the two gaskets in response to the movement of the armature and hammer, but I prefer the specific construction shown and described.

Although the invention has its preferred application to electric bells and similar apparatus, it will be understood that it may be applied broadly to a great variety of installations whether for signalling or for other purposes, in which it is desirable to protect operative parts from moisture, fumes or the entry of foreign matter and in which an exposed or accessible element is in operative connection with the protected parts, and more particularly, where the operating parts are to oscillate about an axis transverse thereof.

I claim:

1. Electric apparatus comprising in combination, an electromagnet coil, an armature member therefor, a member connected to and controlled by said armature, an enclosure for one of said latter elements, the other of said elements projecting through an opening in said enclosure, a flexible diaphragm constituting a fluid-tight closure for said opening, means clamping said diaphragm against said armature, said clamping means extending lengthwise of the diaphragm along a diameter thereof to determine an axis of flexure thereof.

2. An electric bell comprising, in combination, an electromagnet coil, a pivoted member comprising an armature having a hammer rigid therewith, said armature cooperating with said electromagnet, an enclosure for said electromagnet and armature, the hammer portion of said member extending through an opening in said enclosure, a flexible diaphragm constituting a bearing for said armature and said hammer and a closure for said opening, said diaphragm being in clamping relation with respect to an end of said armature with the width of said armature extending along a diameter of said diaphragm, whereby the

diaphragm will afford a stiff axis of flexure for the armature and hammer and greater flexibility at opposite sides of said axis.

3. An electric bell comprising in combination, a casing, an electromagnet coil therein, a diaphragm closing an aperture in said casing, an armature for said electromagnet coil of substantial width and small thickness, a hammer member rigid with said armature and extending beyond said diaphragm, and a clamping plate securing said armature to said diaphragm, said clamping plate being substantially of the size and shape of the end of said armature and the length thereof extending along a diameter of said diaphragm.

4. In an electric bell, in combination, an armature, a hammer member having a reduced end to fit within a corresponding socket at one end of the armature, a circular diaphragm having an aperture fitted over said shank, and a plate of the size and shape of the end of said armature fitted over said shank and superposed over the end of said armature to clamp said armature to said diaphragm.

5. The combination set forth in claim 4 in which the armature and the reduced portion of the hammer are connected by a rigid element filling a transverse opening in the armature aligned with a corresponding opening in the shank.

6. In an electric bell, in combination, a casing, an electromagnet, an armature therefor, a diaphragm closing an aperture in said casing, means for securing said armature to said diaphragm to constitute a bearing for the former, a hammer element having a portion extending through a corresponding aperture in said diaphragm, and means for rigidly securing said hammer to said armature, said means being disposed at a portion of the length of said armature within said casing.

Signed at Menominee, in the county of Menominee and State of Michigan, this 8th day of October, A. D. 1920.

GEORGE FUSSNER.