Dec. 23, 1941. N. BLOUNT 2,267,364

SEAL FOR CIRCUIT CONTROLLING DEVICES

Filed Oct. 14, 1939

FIG. 1

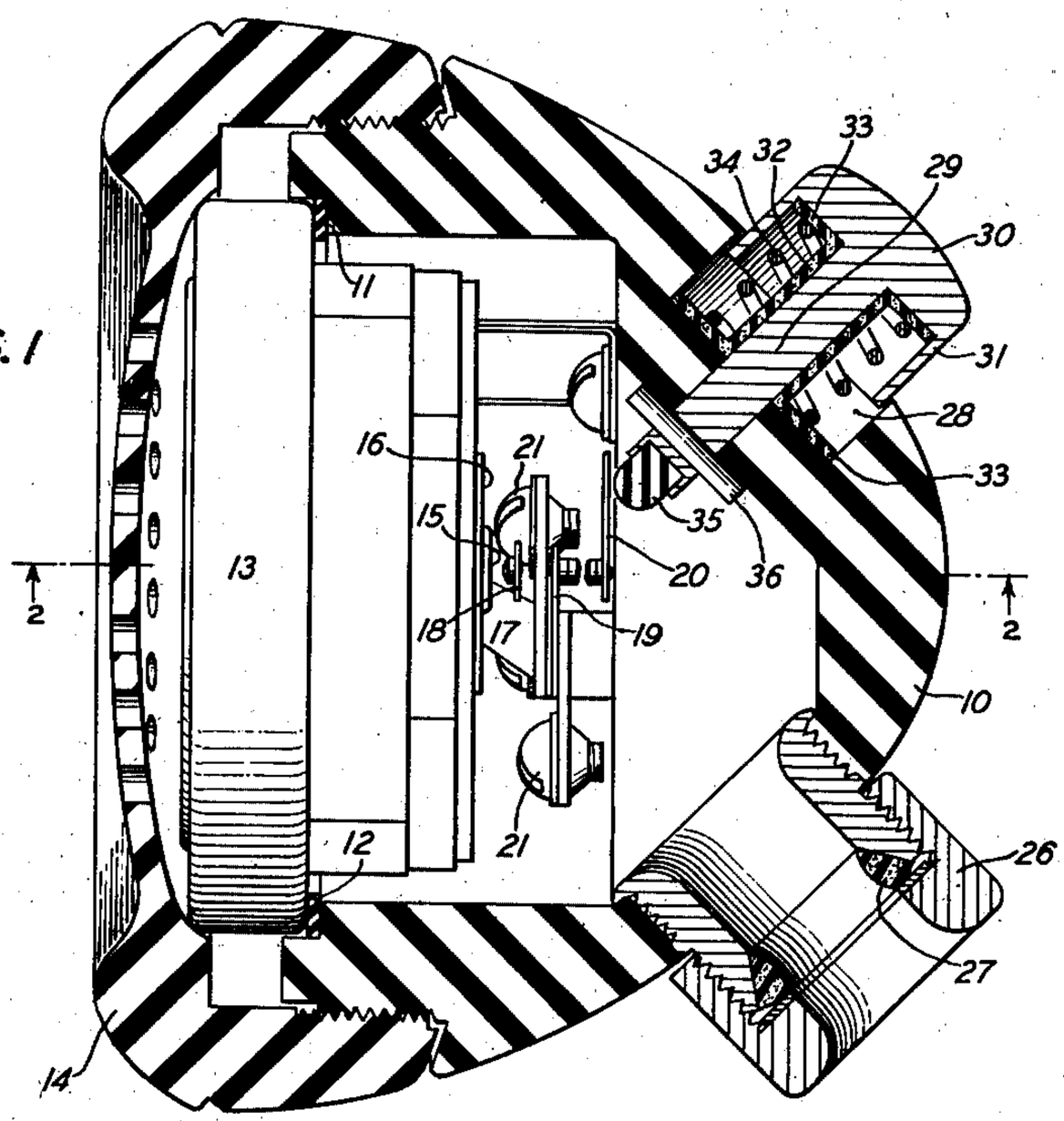
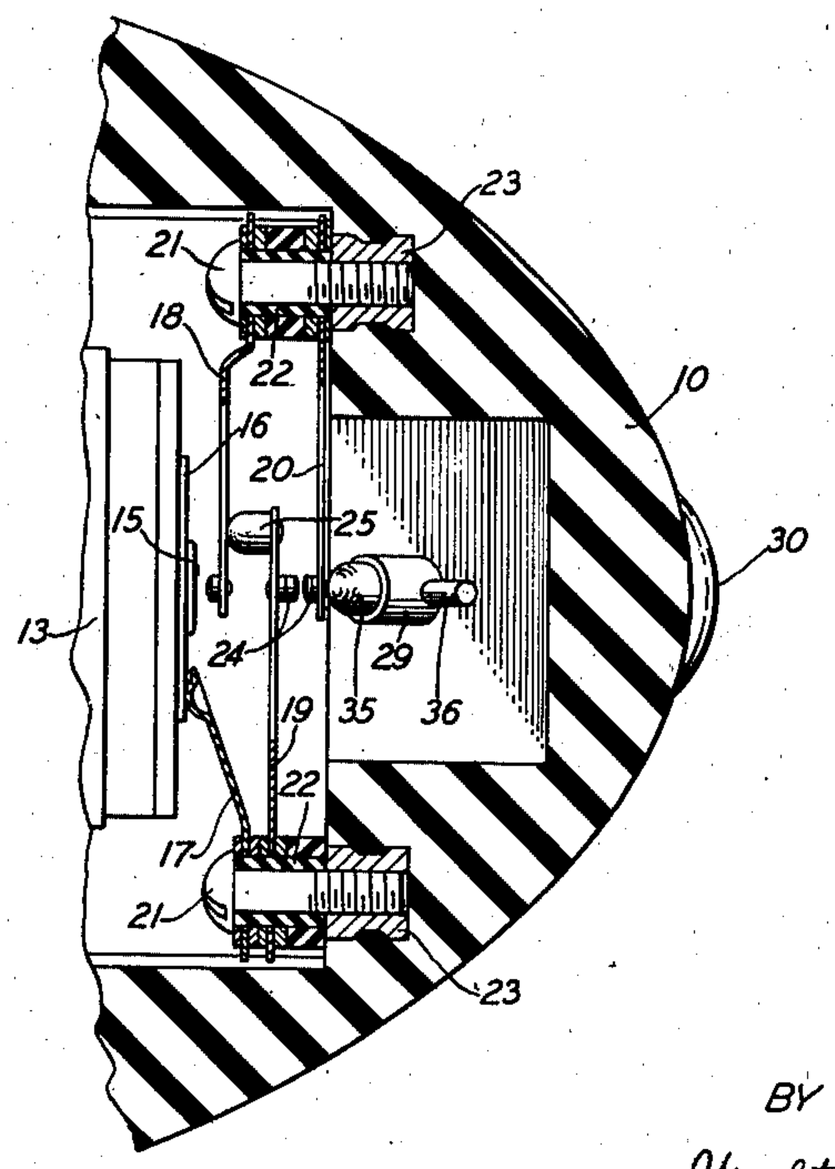


FIG. 2



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SEAL FOR CIRCUIT CONTROLLING DEVICES

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2 Claims. (Cl. 286—29)

This invention relates to circuit controlling devices and more particularly to push button switches especially suitable for use in telephone instruments, such as receivers, transmitters and hand telephones.

In a variety of installations of telephone instruments, a switch is provided upon or in the immediate vicinity of the instrument for controlling the association or disassociation of the instrument with a telephone line. In a number of instances the instrument is used in exposed locations, as, for example, on ships, where it is exposed to high moisture content atmospheres, may be subjected to spray, or may even be immersed in water, whereby the elements of the switch itself and especially the contacts or springs become corroded and the proper operation of the switch is impaired or prevented.

One object of this invention is to prevent impairment of the operation of circuit controlling devices used in exposed locations.

Another object of this invention is to simplify the construction of push button switches for telephone instruments.

In one illustrative embodiment of this invention, a push button switch comprises a housing, wherein contact springs are mounted, having a restricted aperture in one wall, and a reciprocable plunger or push button having a shank extending through the aperture for actuating the contact springs. A spring may be provided for returning the plunger or push button to its original position after it has been depressed.

In accordance with one feature of this invention, the shank is encompassed by a resilient spool, for example, of rubber, which has a tubular portion fitted about the shank, and flanged end portions, one of which abuts the head of the push button or plunger and the other of which abuts the outer wall of the casing. The resilient spool may be slightly compressed initially and forms a water-tight and moistureproof seal between the casing and the push button or plunger.

The invention and the foregoing and other features thereof will be understood more clearly and fully from the following detailed description with reference to the accompanying drawing wherein:

Fig. 1 is a side view mainly in section of a telephone instrument including a push button switch constructed in accordance with this invention, and

Fig. 2 is a partial cross-sectional view along line 2—2 of Fig. 1.

Referring now to the drawing, the telephone instrument comprises a cup-shaped casing 10, for example, of insulating material, having in the face thereof an annular seat 11 in which a resilient sealing washer 12 is fitted. Seated upon the sealing washer 12 is a telephone unit 13 which is securely clamped in position by an apertured cap 14 threaded to the casing 10. The telephone unit may be a transmitter or receiver, for example, of the construction disclosed in the application, Serial No. 93,792, filed August 1, 1936, of Louis A. Morrison and Edward E. Mott, now Patent No. 2,220,942, issued November 12, 1940, and comprises a pair of spaced or coaxial terminals 15 and 16.

Mounted within the casing 10 are a plurality of contact springs 17, 18, 19 and 20, which are insulated from one another and are fixed in position as by screws 21 extending through insulating sleeves 22 and threaded into nuts 23 embedded in the casing 10. As shown clearly on Fig. 2, the spring 17 engages the terminal 16, the spring 18 is adapted to engage the terminal 15 and the springs 19 and 20 are adapted to engage each other at contact points 24. The spring 19 carries an insulating button 25 engaging the spring 18. Electrical connection to the several contact springs may be established through a multiconductor cord, not shown, which extends through a coupling 26, a moisture and water-tight seal between the cord and coupling being formed by a compressible sealing member 27, for example, a rubber ring.

The casing 10 is provided in its outer surface with a recess 28 and with an aperture or bore extending from the recess 28 to the inner wall of the casing. Extending through this bore or aperture is the shank 29 of a reciprocable plunger or push button having a head portion 30 provided with a depending portion 31 telescopically fitted in the recess 28. The shank 29 is encompassed by the tubular sleeve portion 32 of a resilient, for example, rubber, spool having end flange portions 33 abutting the base wall of the recess 28 and the head portion 30 of the push button, the sleeve portion 32 preferably being fitted on the shank 29. If desired, the flanges 33 may be secured, as by cement, to the base wall of the recess 28 and the head portion 30 of the push button. The sleeve portion 32 of the spool is encompassed by a coiled spring 34, opposite ends of which bear against the flanges 33.

The push button, as shown, may be of metal and provided at its inner end with an insulating button 35 adapted to engage the contact spring 20.

The normal position of the push button may be fixed by a suitable stop, such as a pin **36**, extending through the shaft **29**, adapted to engage the inner wall of the casing **10**. Preferably, the pin **36** is so located that the spring **34** and spool **32**, **33** are under an initial compression whereby the flanges **33** are firmly pressed against the base wall of the recess **28** and the head **30** of the push button and the sleeve portion **32** is compressed about the shank **29**. When the push button is depressed, the firmness of the engagement between the elements of the push button and casing and the associated parts of the spool will be increased.

It will be noted that at all times the sleeve **32** is in firm engagement with the shank **29** and the flanges **33** are in firm engagement with the base wall of the recess **28** and the head **30** of the push button so that water-tight and moisture-proof seals are formed between these elements. Consequently, entrance of moisture into the casing and attendant deterioration of the contact springs and other internal elements is prevented.

Although a specific embodiment of this invention has been shown and described, it will be understood, of course, that it is but illustrative and that various modifications may be made therein without departing from the scope and spirit of this invention as defined in the appended claims.

What is claimed is:

1. In combination, a casing having an aperture therein and having a seating surface on an outer surface portion thereof adjacent said aperture, a reciprocable plunger member having a shank extending through said aperture and slidable therein, said plunger member having also a portion provided with a seating surface facing said first surface, and means defining a moisture-proof seal between said casing and reciprocable member including a resilient member having a sleeve portion encompassing and firmly engaging said shank of said reciprocable member and having also flange portions at opposite ends of said sleeve portion and in sealing engagement with said seating surfaces.

2. In combination, a casing having an aperture in one wall thereof and having also a recess in the outer portion thereof and in communication with said aperture, a reciprocable plunger having a shank slidably fitted in said aperture and having also an enlarged head portion telescopically fitted in said recess, a resilient spool having a sleeve portion fitted on said shank and having also end flange portions, one of which is in face to face engagement with the base wall of said recess and the other of which is in face to face engagement with the surface of said head portion toward the base wall of said recess, a helical spring encompassing said sleeve portion and having its ends bearing against said flange portions, and means in cooperative relation with said casing and said reciprocable member for maintaining said spool and spring under compression.

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