To all whom it may concern:

Be it known that I, George B. Thomas, a citizen of the United States of America, residing at Bridgeport, in the county of Fairfield and State of Connecticut, have invented certain new and useful Improvements in Bolt-Retaining Devices, of which the following is a specification.

My invention relates to retaining devices, and particularly to a retaining washer device by which a screw bolt may be freely held assembled with an associated member through which it passes. The object of my invention is to provide a simple, inexpensive and efficient device for this purpose, which is not only of improved construction per se, but also affords greater longitudinal play for the bolt than has heretofore been provided.

In the accompanying drawings—

Fig. 1 is a perspective of an electrical fitting of a type to which the invention is applicable;

Fig. 2 is a vertical section therethrough illustrating the invention applied to the bolts which secure the cap and body of the fitting together;

Figs. 3 and 4 are vertical sections through portion of the fitting showing the manner of application of the retaining device to the bolt;

Figs. 5 and 6 are similar views showing a modified form of retaining device;

Fig. 7 is a broken perspective of one form of retaining device;

Fig. 8 is a perspective of a second form of retaining device; and

Fig. 9 is a vertical section illustrating the usual type of retaining device now commonly employed.

While the invention provides a device which is applicable to many different utilities, I have illustrated it in a form designed particularly for electrical devices. As an example of the latter I have shown a receptacle having a two part casing of insulating material and comprising a body 10 and cap 11 united by screw bolts 12. In a device of this type, the lead wires are 15 carried by the cap, and into which also the binding screws 14 take. Consequently when so separated, the bolts 12 are loose in the holes 16 in the body through which they pass, and would fall out were not some retaining device provided to hold them assembled in the body and to prevent their escape.

The usual manner of accomplishing this is shown in Fig. 9, that is to say by slipping over the end of the bolt a split spring washer 17 which engages the threaded end 18 of the bolt. While this prevents the escape of the bolt, there is an objection to its use. In order to insure the security of the washer on the threaded end of the bolt, it must be arranged so far up on the shank that the end of the latter projects beyond the bearing face 19 of the body piece, even when the bolt is pushed out as far as the washer 17 will permit. As a result, the projecting threaded end 18 of the bolt forms a strut or prop which, as one bolt is screwed down ahead of the other, lifts the body 10 with respect to the cap 11, and thus not only throws the bolts out of alignment with the taps in the plates 15, but imposes strains upon the porcelain which it is not designed to bear. The latter feature is one of particular danger, since the porcelain is apt to be cracked or completely ruptured and the fitting rendered unfit for service. The only way in which this objectional strain can be avoided is by screwing up one bolt partially, then the other, and repeating this alternate tightening of the bolts until both are screwed home—

a tedious and inconvenient practice not customarily followed by the average workman.

The present invention obviates this difficulty by providing a retaining device which permits the projecting end of the bolt to rise freely in the hole 16, through which it passes, so that not only may the body and cap be freely seated against each other, and the bolts and taps brought into alignment before either bolt is applied, but one bolt 10 may be freely screwed home without imposing any undesirable strains on the porcelain or disturbing the alignment of the bolts and their taps.

In the particular embodiment of my invention illustrated in Figs. 2, 3, 4 and 7, the device comprises a washer having a peripheral bearing flange 20 and an engaging web 21 perforated at 22 to accommodate the shank of the bolt. As here shown, the 110
throned area of the bolt is of slightly greater diameter than the shank, and thus forms a shoulder which, with the bolt head 24, limits the play of the bolt with relation to the retaining washer. To arrange the washer on the bolt and secure it in the well 25 which accommodates the head 24 of the bolt, the washer is made in the form shown in Fig. 7, that is to say, with its engaging web 21 dished or coned and its bearing flange 20 inclined. The normal diameter of the hole 22 is large enough to permit the washer to be passed over the threaded end of the bolt. The bolt is then inserted into the hole 16 until the washer, lying beneath the bolt head, rests against the bottom of the well 25, as shown in Fig. 3. The body 10 being supported upon a table 26, a press plunger 27 descends upon the head of the bolt and forces the latter downward, with the result that the coned web 21 is flattened out, the hole 22 reduced to a diameter less than that of the shoulder 23, and the flange 20 pressed into frictional engagement with the wall of the well 25. Insasmuch as the diameter of the well is predetermined, as well as the diameter of the retaining washer with relation thereto, frictional engagement of sufficient strength to meet the demands on the device may be readily obtained. Still greater latitude is possible if the washer is split, and this is desirable when variations in the porcelain are considerable.

It is obvious that by arranging the washer in the bottom of the well 25 for the bolt head the shank of the bolt may rise freely within the body 10 until the threaded end is completely housed, with the attendant advantages above mentioned.

In Figs. 5, 6 and 8 I have shown a modified construction for the washer, which is adapted for use when the well 25 in the porcelain body has an undercut wall, or when the body is made of an insulating material which the edge of the washer can penetrate. In this form the washer 28 is merely dished, and when the press plunger 27 descends and the washer expands, its edges dig into the relatively soft insulating material as shown in Fig. 6. Simultaneously, the diameter of the hole 22 is decreased sufficiently to engage the shoulder 23 on the bolt and prevent its escape.

Various modifications of construction will readily occur to those dealing with the problem. The underlying thought of my invention is to provide some bolt retaining device adapted to be secured to the body through which the bolt passes, and of such character that the projecting threaded end of the bolt may rise into the body for the purpose described. While particularly desirable in electrical fittings of various types, it is equally applicable to devices in other fields of art.

I claim—

1. A body pierced to accommodate a securing bolt, a bolt passing therethrough, and means in gripping engagement with the wall of the hole through which the bolt passes and engaging said bolt to retain the same assembled with limited freedom of displacement of the bolt with relation to said body.

2. A body pierced to accommodate a securing bolt, a bolt passing therethrough, shoulder means on said bolt spaced from the head of the bolt, a retaining device freely engaged between the head and shoulder on the bolt, and said retaining device having a self-sustained engagement with said body to maintain said parts assembled.

3. A body pierced to accommodate a securing bolt, a bolt passing therethrough, shoulder means on said bolt spaced from the head of the bolt, a retaining device freely engaged between the head and shoulder on the bolt, said retaining device having a direct mechanical engagement with the wall of the hole through said body to maintain the parts assembled.

4. A body pierced to accommodate a securing bolt, a bolt passing therethrough and having a head and a threaded area spaced therefrom by a shank of less diameter than the over-all diameter of the threaded area, and a bolt retaining device arranged on said shank and expanded into direct mechanical engagement with the wall of the hole in said body through which the bolt passes.

5. A body pierced to accommodate a bolt in combination with a bolt retaining member insertable with the bolt into the hole in said body and deformable into self-sustaining engagement with the wall of said hole, said member in inserted position having a lost motion retaining engagement with the bolt for the purpose described.

6. For use with a body pierced to accommodate a bolt having an abutment spaced from its head, a bolt retaining device normally passing freely upon the bolt shank, but deformable into retaining engagement between the bolt head and the abutment on its shank, and also into gripping engagement with the wall of the hole through which the bolt passes.

In testimony whereof I have signed my name to this specification.

GEORGE B. THOMAS.