

April 18, 1939.

A. HAUSER

2,154,812

QUICK ATTACHABLE PLUG AND SOCKET CONNECTOR

Filed April 20, 1937

2 Sheets-Sheet 1

Fig. 1

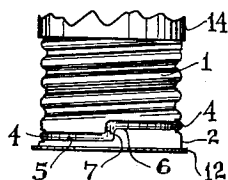


Fig. 2

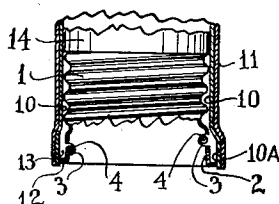


Fig. 3

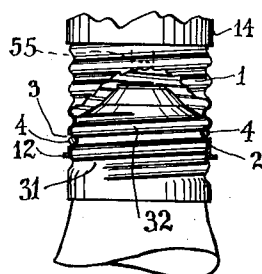


Fig. 4

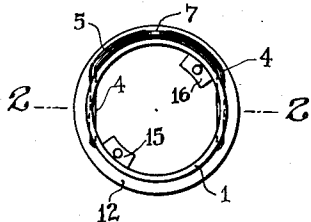


Fig. 5

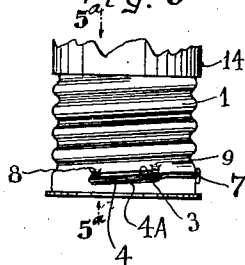


Fig. 5A

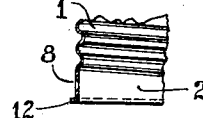


Fig. 6

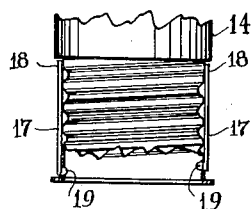


Fig. 7

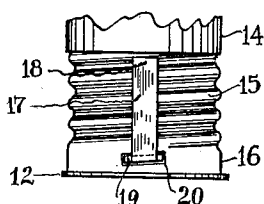


Fig. 8

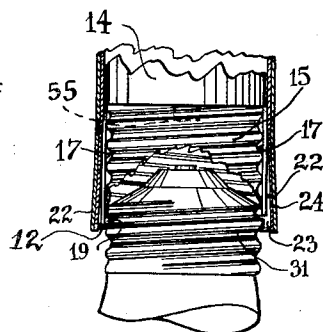
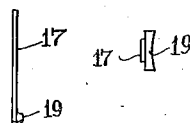


Fig. 9

Fig. 10



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Fig. 11

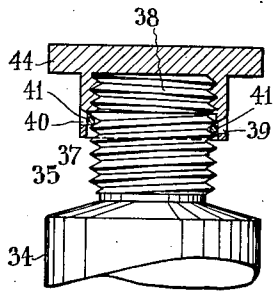


Fig. 12

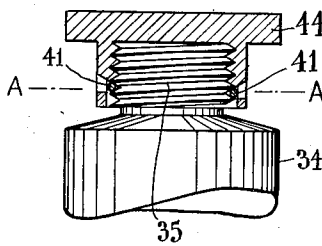


Fig. 13

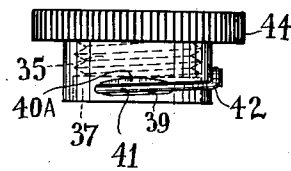


Fig. 14

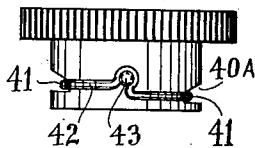


Fig. 15

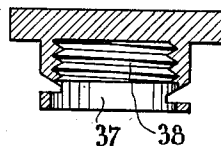


Fig. 16

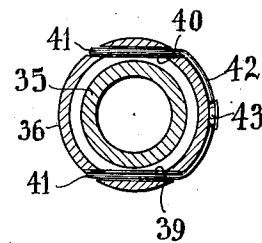


Fig. 17

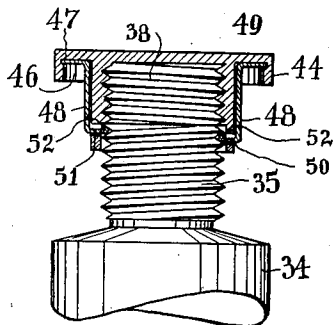


Fig. 18

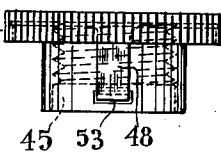


Fig. 19

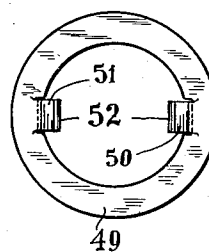
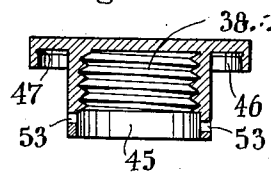


Fig. 20



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UNITED STATES PATENT OFFICE

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QUICK ATTACHABLE PLUG AND SOCKET
CONNECTOR

Adalbert Hauser, New York, N. Y.

Application April 20, 1937, Serial No. 138,014

11 Claims. (Cl. 221—60)

The invention relates to an improved connecting means for a threaded plug and socket and has for its purpose to effect a threaded connection effortless and without the need of seeking the exact position of the parts, so that after the parts are set in initial position the threads will be in alignment and upon applying a rotary movement, mate automatically.

It is necessary in the application of plugs, for instance such as paste tubes, electric lamps, fuses, etc., to exercise considerable care in finding the threads and to avoid clamping of the parts by exercise of undue force when the parts are not in proper relative position.

According to the present invention the plug is inserted into the socket with a thrust a short distance and after being so set in alignment with the threads of the socket, the connection is completed by a rotary movement; i. e., the operation consists of two stages: First, the plug is thrust into a preliminary holding position, and then the threads of both parts are advanced into each other, which constitutes the final holding or locking position, so that the advantage of quick attachment and firm holding through mating threads is combined.

For the removal of the plug it is turned in the reversed direction in the same manner as ordinary threaded connections.

According to the invention a flexible connection precedes the threads of the socket of such character that it will permit the plug to enter a short distance without the necessity of putting the parts together in a certain position, whilst the flexible connection will position or initiate the two parts relative to each other so that the threads will be in continuance and the parts substantially in axial alignment. This will permit the threads to smoothly grip and to establish an effortless connection when a rotary movement is applied.

According to the invention a U spring is preferably disposed with its legs in corresponding transversal slots of the unthreaded guide part of the socket, so located as to coincide with the travel of the threads of the socket and yielding in the attachment thrust to engage the threads of the plug. The spring is preferably so situated with respect to the threads that on diametrically opposite sides of the socket each leg extends nearly tangentially within the threads and of such diameter as to exert a slight pressure.

In another embodiment longitudinally disposed resilient members with protruding catch portions, which penetrate, preferably through correspond-

ing recesses of the guide part of the socket, are used to engage the threads of the plug and are so located as to put the plug into the proper position to meet the threads of the socket when rotary movement is applied.

Another object of the invention is that the shell of the socket is so shaped as to provide operating space for the catch member while the bottom end of the sleeve is provided with a rim to cover this space. Other objects will appear in the detailed specification.

In the accompanying drawings I have shown one or more possible utilizations of the invention as examples, wherein Fig. 1 is a side elevation of the threaded sleeve; Fig. 2 is a longitudinal section through 2—2 of Fig. 4 with parts broken away; Fig. 3 shows the plug entering the sleeve or socket, parts of the sleeve being broken away; Fig. 4 is top view of the sleeve omitting the upper parts of the socket; Fig. 5 is a side elevation showing the socket at right angles to Fig. 1; Fig. 5A is a fractional section through 5A—5A of Fig. 5; Fig. 6 is a side view in partial section of another embodiment, some parts being omitted; Fig. 7 is a side elevation at right angles to Fig. 6; Fig. 8 is a sectional view of the complete modification of Figs. 6, 7, parts being broken away and showing the plug in initial state of assembling; Fig. 9 is the catch member of Fig. 6 in side elevation and Fig. 10 is a top view thereof; Fig. 11 is a sectional view of another utilization of the embodiment shown in Figs. 1 to 5, showing the plug in the initial state of assembling; Fig. 12 is a sectional view of the parts at home position; Fig. 13 is a side view of the cap at right angles to Fig. 12; Fig. 14 is a back view thereof; Fig. 15 is a longitudinal section substantially through the cap; Fig. 16 is a section through A—A of Fig. 12; Fig. 17 is a sectional view of an embodiment similar to that shown in Figs. 6 to 8 but for the utilization for paste tubes, showing the plug in the initial state of assembling; Fig. 18 is a side view at right angles to Figs. 19 and 18; Fig. 19 is top view of the catch member, and Fig. 20 is a section through the cap. No attempt has been made to keep proper scale or proportions.

The socket or sleeve 1 is threaded in the usual manner and has at its lower end an unthreaded guide part 2 of such inside diameter that it can receive the plug. The length of this part is preferably subtracted from the length of the threaded sleeve, leaving the whole socket substantially of normal length. On diametrically opposite sides the guide part is provided with transverse slots 3 into which the legs 4 of the

- spring 5 are embedded so that they will enter the groove of the plug's threads. The spring 5 is of such a shape that it fits around the sleeve 2 and is offset at 6 so that it will fit the threads at the opposite side; this bend also serves to stabilize the spring on the sleeve. At 7 the spring is somewhat flattened and fastened to the sleeve by any suitable means such as spot welding, riveting or clamping. Of course, also other shapes are possible and the wire can have also an ear at its center to be fastened to the sleeve. The slots 3 are provided on one or both ends with slanted portions 8-9 by which the wires are guided outwardly when the plug 3 is thrust into the socket.
- 15 Around the socket the customary insulating sleeve 10 and metal shell 11 are placed, but are provided in the vicinity of the spring with a larger diameter or a bucket 10A to provide operating space 13 for the spring. At the bottom the sleeve 20 or socket is provided with a rim 12 which will give a greater stability to the sleeve and at the same time cover the operating space 13. The sleeve 1 is fastened to the porcelain body 14 of an electric socket in the usual manner, for instance, by projections 15-16.

- The operation of the device is substantially as follows. Normally, the spring rests with its legs 4 in the slots 3 contacting the slanted portions 8-9 to which position it is pressed by its resilience.
- 30 The location of the spring is so selected that it will coincide with the continuance of the threads of the socket. To apply, the plug 31 is first thrust onto the guide part 2 of the socket without the need for attempting first to register the lead. In operation the spring 4 will click over the first convolution 32 of the threads of the plug as the top slope of the thread will force the spring 4 out of its place, in which it will be assisted by the slanted portions 8. This motion will carry the plug nearly to the end of the guide part 2 and position it so that the threads of both parts are in continuance and the plug substantially in axial alignment with the socket. Now, when a rotary movement is applied, the threads will find each other automatically and the plug is screwed into its place without effort. The lamp, after being inserted into the receptacle, will be held by the catch member so that it need not be sustained by hand, and an interrupted rotary movement as natural for the hand can be applied, which will greatly facilitate the insertion of the lamp. To remove, the plug is turned in the reverse direction in the usual manner. The spring has not necessarily any considerable holding power for fastening the plug. Its purpose is to set or initiate the plug relative to the threads of the socket in proper position to eliminate the trouble of trying to register the thread, whilst the tightening of the plug is done by the threads of the socket. In case, however, the wire 4 in reaction to the tension exerted thereon by the bottom slope of the thread of the plug leans against the edge 4A of the guide part, there will be an additional resistance to assist in holding the plug in its position.
- 65 Ordinarily, the insertion of lamps, particularly in places hard to reach, is often tiresome and might result in jamming of the parts or even in short circuit, which is eliminated by the new device.

- 70 In the modification of Figs. 6, 7, 8, 9 and 10, the socket consists as in the former case of a threaded part 15 and an unthreaded guide portion 16. The sleeve 15 is fastened to a porcelain body 14 carrying the switch parts (not shown) and is covered by an insulating sleeve 22 which

is surrounded by a metal shell 24 in the customary manner. These parts are so shaped as to provide for an operating space 23 for the catch members 17 and 19. The sleeve 15 is provided as in the former embodiment with a rim 12 to cover the operating space 23 for the catch member. In this embodiment the catch member is longitudinally disposed and consists of a flat resilient part 17 which is fastened as at 18 to the socket in any suitable manner such as spot welding, riveting or clamping. At the lower end the spring 17 is provided with a protruding part 19 which penetrates thru the recess 20 of the guide part 16. There are two recesses provided for at diametrically opposite sides of the sleeve and so located, that they are in continuance with the threads. It serves to increase the precise operation of the device if more catch members are used, but for the sake of simpler illustration only two are shown. The resilient holders are shown singly attached to the socket, but of course, two or more of them can be united by a lateral strip so that they can be clamped over the socket or cap as a unit. The operation of this embodiment is similar to the foregoing one, but for holding power during the initial setting it is depending entirely on the strength of the spring. The parts 19 will click over the first thread of the plug 31 and hold it elastically but with sufficient strength, so that the screwing operation, which is the fastening of the parts can be done safely.

In the embodiment shown in Figs. 11-16 the construction described in Figs. 1 to 5 is employed as a closure for paste tubes and the like. The body member 34 has a threaded neck 35 over which a cap 36 is fitted. In front the cap has an unthreaded portion 37 of such diameter that the threaded neck 35 will fit in. Further up, the cap has threads 38 analogous to the threads of the plug. On diametrically opposite sides the cap is provided with recesses 39, 40 into which the legs 41 of the spring wire loop 42 are imbedded and which recesses and the spring legs are offset to meet the threads. The spring is fastened centrally as at 43 to the cap by riveting or clamping. The upper edge 40A of the recess is preferably slanted to allow free motion for the wire. The operation is similar to the embodiment of Figs. 1 to 5; the cap is thrust over the neck or plug until the thread of the cap is reached. Here the plug is held in a position so that the threads can mate and enter into each other without the need of seeking the exact position of the parts.

It is an advantage of this invention that the cap is held in position after it is thrust over the plug, so that for the subsequent rotary movement it need not be sustained by hand.

The construction shown in Figs. 17-20 corresponds to those of Figs. 6-8, but it is fitted as a closure for paste tubes and the like. The body member 34 has a neck or plug 35 over which a cap 44 fits. The front part is formed as a receptacle or guide part 45 for the plug. The upper end of the cap has a rim 44 which is hollowed out at 46 and has a slight groove 47. The catch members consist of longitudinally disposed resilient flat metal strips 48 which are stamped out of an annular piece 49. At the end the strips are bent at 51 to reach through a recess 53 of the cap to engage the threads of the plug. Both parts, the ends of the strips and the recesses, are offset to coincide with the threads of the cap. The annular piece 49 is pressed into the cavity 46 and snapped into the groove 47 where it is held

firmly. At the end 52 the spring is preferably rounded to avoid injuring the threads.

The operation of this embodiment is similar to that of Figs. 6 to 8. The guide part of the cap is thrust over the end of the plug until resistance is encountered; in this position it is held temporarily and the threads of the two parts are in alignment, so that upon exertion of a rotary movement the threads will advance into each other smoothly.

Electric contacts and other parts not essential for the understanding of the invention are omitted.

It will thus be seen that there is herein described apparatus in which the several features of the invention are embodied, and which apparatus in its action attains the various objects of the invention and is well suited to meet the requirements of practical use.

As many changes could be made without departing from the scope and spirit of this invention, it is intended that all matter contained in the above description or shown in the accompanying drawings shall be interpreted as illustrative and not in limiting sense.

I claim:

1. A screw connection comprising a screw plug, and a complementary socket provided with internal rigid threads to receive the plug, a unitary resilient preliminary setting piece affixed to one member located and arranged to be engaged by the threads of the complementary member prior to the mating of the threads and to retain the parts in position when thrust in place, thereby to establish preliminary engagement between the threads of said two members, so as to facilitate mating of the threads and the tightening thereof by a subsequent rotary movement.

2. The screw connection as claimed in claim 1 in which the unitary resilient preliminary setting piece is affixed to the socket.

3. A connection as claimed in claim 1 in which the resilient setting means has the form of a loop engaging through helically disposed slots located ahead of the rigid threaded part.

4. A connection as claimed in claim 1 in which the resilient setting means has the form of a longitudinally disposed leaf spring having an intumed end located ahead of the threaded part.

5. A connection as claimed in claim 1 in which the resilient setting means has the form of a longitudinally disposed leaf spring having an intumed end engaging through slots located ahead of the threaded part.

6. A connection as claimed in claim 1 in which the resilient setting means is shielded by a cover affording operating space therefor.

7. A connection as claimed in claim 1 in which the socket contains both the preliminary setting member and the final holding threads which operates in succession.

8. A connection as claimed in claim 1 applicable to paste tubes in which the socket is in the form of a cap and said cap, after the setting means thereof has engaged the plug, is screwed tight for establishing a fluid tight contact of the parts by means of the rigid threads.

9. A connection as claimed in claim 1 in which the resilient setting means has a plurality of longitudinally disposed leaf springs protruding from a carrying ring attached to the cap, each of said springs having an intumed end ahead of the threaded part.

10. A thrust screw connector comprising a screw plug and a complementary socket provided with internal rigid threads to receive said plug, a threadless chamber in front of said rigid threads, unitary resilient preliminary setting means adjacent said chamber, arranged to be engaged by the threads of the complementary member upon entering said chamber prior to the mating of the threads so as to retain the parts in position when thrust in place, thereby to establish preliminary engagement between the threads of the two members in order to facilitate mating of the threads and the tightening thereof by a subsequent rotary movement.

11. A thrust screw connector comprising a screw plug and a complementary socket or cap provided with internal rigid threads to receive the plug, a threadless chamber in front of said rigid threads, resilient pre-setting means having the form of a loop and engaging through laterally disposed slots of said chamber, the edges of said slots being adapted to locate the spring in a definite position in order to guide its motion and to assure a proper presetting of the plug.

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