July 2, 1929. S. N. BUCHANAN 1,719,318

BOX SUPPORT

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Fig.1.

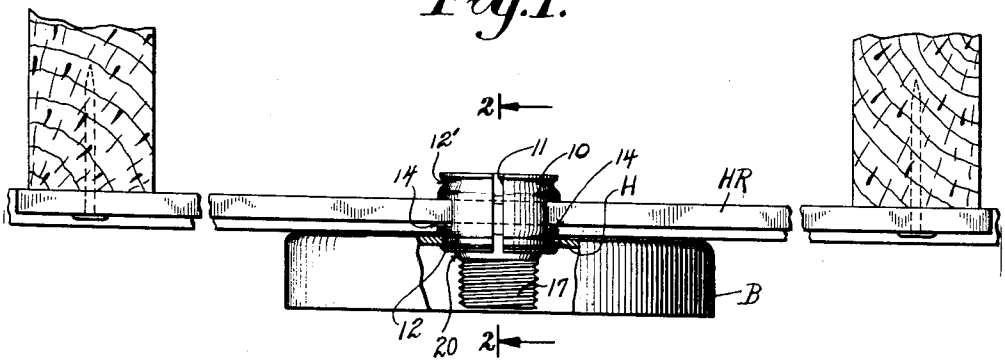


Fig.2.

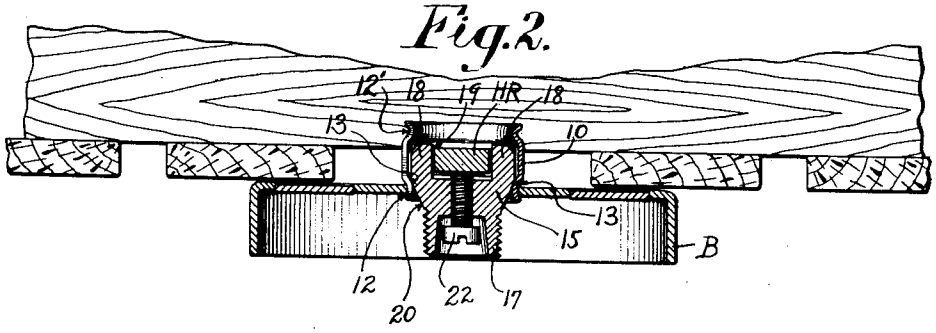


Fig.4.

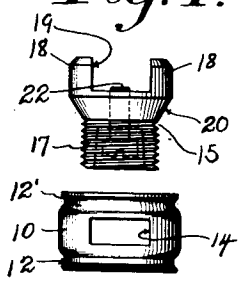
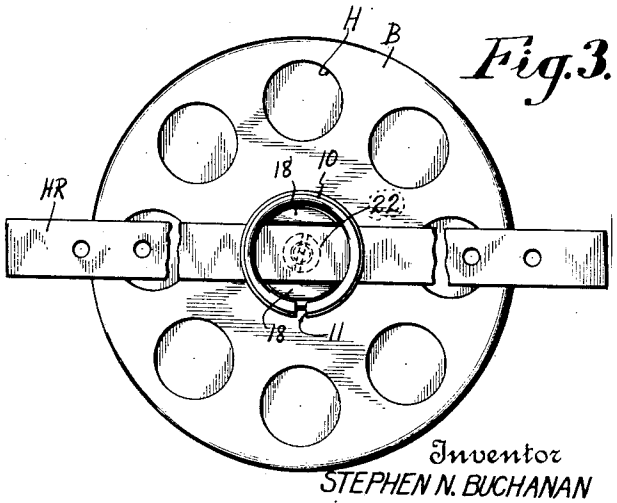


Fig.3.



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Fig.5.

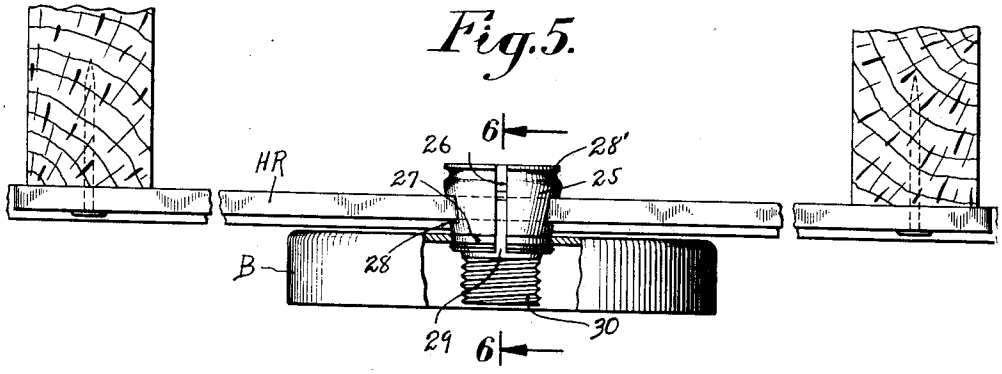


Fig.6.

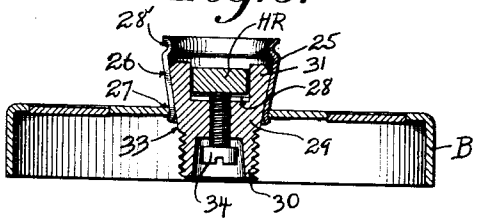


Fig.8.

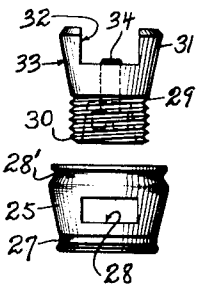


Fig.9.

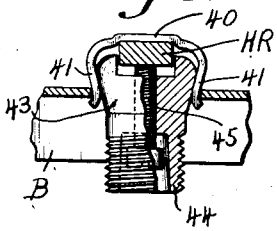


Fig.10.

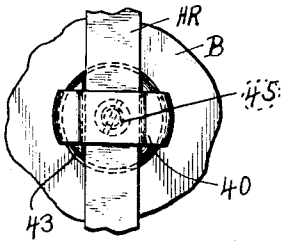
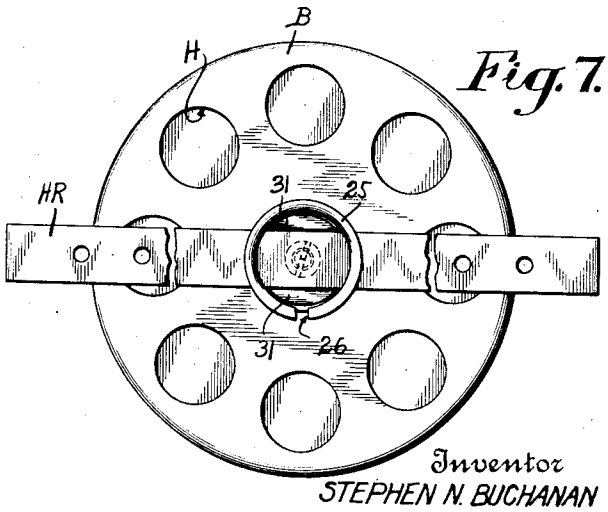


Fig.7.



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UNITED STATES PATENT OFFICE.

STEPHEN N. BUCHANAN, OF NEW YORK, N. Y., ASSIGNOR TO THE THOMAS & BETTS CO., OF ELIZABETH, NEW JERSEY, A CORPORATION OF NEW JERSEY.

BOX SUPPORT.

Application filed July 16, 1927. Serial No. 206,157.

This invention relates to box supports and hangers and a main object is to produce an improved box support by which outlet boxes and the like are attached to hanger rods in electric construction work so as to secure the box to the wall or ceiling of a building.

A further object of the invention is to produce a box support including one operating means, as for example a screw, by which the support member is anchored in the box and anchored to a hanger rod by one and the same operation.

Another object is to produce a box support including telescoping members, as for example a support member in the form of a sleeve, a strap, or other member together with a fixture stud therein, means being included in the novel construction by which the parts are held together in handling or transit so that the two members do not fall apart.

Further objects will be apparent from the following description taken in connection with the accompanying drawings illustrating various examples of the invention wherein is shown several forms of sleeve support members and a strap type support member.

Figure 1 is a side elevation of a box wall partly broken away showing the box anchored to the support and the box support itself being anchored to and suspended from a hanger rod, the ends of the latter being nailed to the studs of a building, this view showing a lengthwise edge of the hanger rod on which the support and box are carried.

Figure 2 is a cross section on the line 2—2 of Figure 1, showing the parts in further detail.

Figure 3 is a plan view of the box and the support attached thereto with the box suspended under the hanger rod.

Figure 4 is a view of the box support parts separated or removed one from the other to show their construction and how the device is put together.

Figures 5 to 8 inclusive show a modified form of the box support including a conic sleeve member which is similar in principle to the above described box support.

Figure 5 is a side elevation of a hanger rod fastened to building studs with the hanger and box suspended therefrom.

Figure 6 is a cross section on line 6—6 of Figure 5, but for simplicity the ceiling lath and other building members are eliminated.

Figure 7 is a plan view showing the box suspended under the hanger rod.

Figure 8 is a view of the conic sleeve member and stud form of box support with its parts in separated relation.

Figures 9 and 10 show a box support wherein the support member is not made in sleeve form but comprises an overhanging strap embracing the hanger rod and stud. Figure 9 is a partial side elevation and section, and Figure 10 is a plan view.

Referring further to the drawings for a more detailed description of examples of the invention, there is first shown a box support member made in sleeve form 10 which is split longitudinally at 11 to permit contraction and expansion thereof. Box hole anchorage means is included on the sleeve and may simply comprise an anchorage groove 12 formed on any convenient portion of the sleeve, as at one end thereof. This box anchorage groove 12 forms an internal inclined plane or conic shoulder 13 adapted to be engaged by a similar surface on a stud as will be explained. The support sleeve member 10 is designed to have its anchorage groove 12 snapped into the central knockout opening H of a box B, and the sleeve will yield and contract for this purpose by pressing together the slit 11.

The support sleeve may if desired be made uniformly at both ends, i. e. the ends have like grooves 12 and 12′. This makes for convenience in assembling the parts since the stud to be described may be snapped in the sleeve from either end. What is of further importance is that the double groove ended split sleeve construction prevents separation in handling or transit of the cooperating sleeve and stud parts once they are assembled as hereinafter described because the double ended groove construction 12—12′ confines the stud in the sleeve.

The sleeve 10 is also provided with opposite hanger rod openings 14 extending transversely to the axis of the sleeve and these openings are designed to receive the ordinary hanger rod HR used in work of this character. In this way the box support sleeve 10 is slidable and is therefore adjustable laterally along the hanger rod HR.

The box support is placed on the rod before the latter is nailed to the studs, and the opening 14 receives the rod by which it cooperates with and locks a stud against rotation as will be explained.

A fixture support stud 15 is mounted for free longitudinal motion within the sleeve 10 and comprises a lower screw threaded shank 17 and an upper cylindrical body which may be formed into separated upstanding or forked portions 18 by an opening or passage 19 similar in size and purpose to the opening 14 in the sleeve. The passage 19 through or defining the body portions 18 of the stud 15 registers with the openings 14 in the sleeve 10 so that the hanger rod HR passes through both openings 14 and 19. The stud is made with a conic or inclined wedging surface 20 adapted to slidably engage the inclined wedging surface 13 in the sleeve formed by the anchorage groove 12 being pressed into the sleeve. By forcing the stud 15 to slide downwardly through the sleeve 10, the two wedging surfaces 13 and 20 engage thereby spreading the sleeve 10 in the box hole H to thus anchor the box on the lower end of the support sleeve 10.

It is to be noted that the stud 15 is confined inside the sleeve 10 by the groove 12 and 12' the sleeve being sufficiently long and the two grooves being spaced far enough apart to permit full lengthwise movement of the stud inside the sleeve. The spring characteristics of the split sleeve admits of dilation to receive the stud thereinto when it is pressed into one end of the sleeve. Thereafter the grooves at the sleeve ends prevent the stud from dropping out of the sleeve.

A screw 22 is threaded through the stud 15 and is accessible from the lower end thereof by which the screw is turned up against the lower surface of the hanger rod HR. The reaction of the screw against the hanger rod enforces relative longitudinal motion between the sleeve 10 and stud 15, the stud being drawn downwardly through the sleeve, thereby moving the conic stud surface 20 along the surface 13 of the sleeve which expands the latter and anchors a box to the support, and simultaneously the box B and its support are also anchored on the hanger rod by reason of the screw 22 being set up tightly against the rod which tightly sets the upper surface of the rod against the upper edges of the sleeve opening 14.

It is observed that the forked body portions 18 of the stud are disposed on each side or mounted astride the hanger rod HR, and thus the stud is fixed against turning when screw threaded connections are made with an electric light fixture device by screwing the latter onto the shank 17. In other words the hanger rod fixes the support stud 17 against rotation so that once the box and support are installed, there is experienced no difficulty in making screw threaded connection of other parts not shown with the threaded shank 17. The transverse openings 14 in the sleeve 10 permit of adjustment of the sleeve on the rod so that the box is placed at any desired position, after which the screw 22 is tightened up to anchor all parts in rigid position.

It is seen that the upstanding parallel stud portions 18 may preferably extend above the hanger rod so that the stud 15 in moving lengthwise in the sleeve 10 will not be disengaged from the rod. In this way the stud 15 remains locked against turning motion. Furthermore the stud body portion which extends upwardly through the sleeve aids in holding the threaded shank 17 of the stud in straight position so that the shank hangs vertically after the installation is completed.

Referring to Figures 5 to 8 for a description of the modified form of the box support, there is shown a similar construction except that the support sleeve 25 is generally conic shaped and is split lengthwise at 26 to permit expansion in the box B by which an anchorage groove 27 is anchored in the central box hole H. The sleeve 25 is made with opposite hanger rod holes, passages or openings 28 by which the box support is slidably received upon the hanger rod HR.

A conic support stud 29 includes a threaded shank 30 on one end and a forked body 31 on the other end, the upstanding portion 31 being formed by the hanger rod passage 32 made transversely through the stud body portions 31. The upstanding stud body portions 31 are conic shaped as indicated at 33 and thus conforms to the conic shape of the sleeve. The conic stud and sleeve are fitted together and by moving the stud toward the smaller end of the sleeve, the latter is expanded. It is to be observed that the entire adjacent surfaces of the stud and sleeve are in contact and so remain as lengthwise motion of the stud in the sleeve occurs, and thus the stud 29 is held straight and its axis remains coincident with that of the sleeve and no wobbling or side motion of the stud may occur in the sleeve.

An operating screw 34 is screw threaded up through the shank 30 and through the stud body 29 to engage the hanger rod HR. Before tightening up the screw 34, the box support is adjusted to the proper position on the hanger rod, whereupon the box B may then be placed over the lower sleeve end 27, and the screw 34 is tightened up against the rod to draw the stud 29 downwardly through the sleeve thereby expanding the latter to rigidly anchor the box on the sleeve and simultaneously set the box support in fixed position on the rod.

I have therefore, in certain forms of my invention, produced a box support comprising a support sleeve and stud telescoped together and slidable along a hanger rod, the stud being locked against rotation by the rod, and the sleeve including means, such as a split, to permit expanding anchorage in a box hole, together with one screw to anchor all parts together. One or both parts are provided with means for receiving the hanger rod so the box support may be received thereon.

An important feature is the cooperation between the lower ends of the sleeve and stud. The conic engaging surfaces are effective at or proximate the box anchorage means 12 and 27 to expand the latter in a box hole. If desired, the conic engaging surfaces may be extended, i. e. the stud may be made long enough to reach upwardly by the hanger rod, but it is that portion of the stud under the hanger rod which carries the screw and wedging means and therefore is of primary importance.

The upper end of the conic sleeve 25 may to advantage be spun or punched over or grooved as indicated at 28′ after the stud 29 is placed within the sleeve so as to retain the parts together. The two sleeve ends 27 and 28′ are similar in function to the former grooved sleeve ends 12 and 12′ described. It is important to note that the stud is mounted for free movement between the grooved ends of the sleeve in both forms of the invention so that the stud is retained therein against loss. The tapered or wedging surface end of the stud is placed in the end of the sleeve, and by simply pressing the two parts longitudinally together, the sleeve opens to admit the stud, and then closes on it, whereon the stud is retained movably in the sleeve.

Figures 9 and 10 are now referred to as showing a similar box support of modified construction. A hanger member 40 is arched over the hanger rod HR with downwardly directed box hole anchorage arms 41 which embrace and engage the enlarged conic head 43 of a threaded stud 44. The lower free extremities of the arms 41 extend through and hook around the edges of the box hole knock-out. The overhanging support member 40 is here shown made in the form of a strap arched to embrace the hanger rod and stud. This support strap 40 retains itself in place on the conic stud head 43 by the natural spring contraction of the arms 41. The two parts 40 and 43 possess relative free motion one on the other so that sufficient looseness exists to permit of easy insertion of the box support in a box hole whereupon a screw 45 is tightened up against the hanger rod to draw the stud downwardly and force the strap upwardly, the result of which is to spread apart the lower free ends of the strap arms 41 causing them to immovably anchor the device in the box hole.

All forms of the box support are simple to install and comprises few parts and holds the box B in rigid position and at the same time affords a threaded fixture stud by which to suspend electric light fixtures and the like from the box. The two engaging relatively movable members include engaging surfaces extending at an angle to the axis of the stud. This is observed throughout the several forms. Reaction of the screw bearing on and seating against the hanger rod slides the angular surfaces one on the other and renders effective the box hole anchorage means in all forms of the device. The operating screw is reached from below and the device is set in final position by working inside of or below the box, the screw serving to enforce relative motion between the interfitting parts, whether sleeve or strap form, to effect anchorage to the hanger rod above and the box below, and both parts expansibly fit into the box hole.

What I claim is:—

1. A box support comprising, interfitting members movably free one within the other and both of which are adapted to fit into a box hole and being provided with means for the reception of a hanger rod, the outer member including box hole edge engaging means and means rendering it expansible within a box hole, the inner member including a conical engaging surface to act on the engaging means to expand the outer member in a box hole, and operating means to enforce relative motion between the members by which expansion occurs to fix the box support on a hanger rod and to anchor the box support in a box hole.

2. A box support comprising, interfitting members adapted to fit in a box hole including means to hold them together for free relative motion, one member including a screw threaded stud, the other member having means rendering it expansible and including box hole anchorage means, an engaging surface formed on each member extending at an angle to the axis of the stud, said other member including means to receive a hanger rod through the box support, and operating means to bear against a hanger rod and enforce relative movement between the members whereby the angular engaging surfaces causes one of the members to expand in a box hole.

3. A box support comprising, a stud including a conic head and a threaded shank, a hanger rod support member carried on the conic head and being provided with means on the upper end of the member to slidably engage a hanger rod, said member having means rendering it expansible, box hole anchorage means on the lower end of the member, engaging surfaces on each member

extending at an angle to the axis of the threaded shank, and a screw threaded through the shank adapted to bear on and set against and react from a hanger rod to slide the engaging surfaces and render effective the box hole anchorage means.

4. A box support comprising, a stud and sleeve part movably free one within the other and both of which are adapted to fit into a box hole, said parts being provided with registering passages disposed transversely to the longitudinal axis thereof for the reception of a hanger rod, the sleeve including a circumferential anchorage groove and being split lengthwise rendering it expansible in a box hole, the stud including an inclined engaging surface to act on the anchorage groove to expand and anchor the support in a box hole, and operating means to enforce relative motion between the parts by which expansion occurs and by which the support is fixed on a hanger rod.

5. A box support comprising, a sleeve split longitudinally and including box hole edge anchorage means, a stud mounted within the sleeve and free to move longitudinally therein and including a wedging surface which bears against and expands the anchorage means in a box hole, openings being provided through the sleeve and stud for the reception of a hanger rod, and a screw threaded through the stud into the opening thereof and adapted to engage the hanger rod.

6. A box support comprising, a sleeve longitudinally split and including a circumferential box anchorage groove and an inclined wedging surface, a stud mounted in the sleeve and including a similar inclined wedging surface to expand the sleeve, a hanger rod passage formed through the sleeve and stud, and a screw threaded through the stud to engage a hanger rod within the passage and enforce relative longitudinal movement between the sleeve and stud.

7. A box support comprising a split sleeve and cooperating stud carried therein, said stud and sleeve including cooperating surfaces by which the sleeve is expanded upon movement of the stud in the sleeve, anchorage means formed in the sleeve and rendered effective when the sleeve is expanded, said sleeve and stud including means by which the box support is mounted on a hanger rod and the stud is prevented from rotating in the sleeve, and operating means to move the stud in relation to the sleeve to actuate the cooperating surfaces.

8. A box support comprising, a split sleeve including oppositely disposed openings made therein and box anchorage means, a stud within the sleeve and including upstanding parallel portions defining a passage which registers with the opposite sleeve openings, the stud passage and sleeve openings being adapted to receive a hanger rod thereon which passes between the upstanding stud portions, wedging means included in the support cooperating with the split sleeve, and a screw carried with the support to move the stud longitudinally and actuate the wedging means to expand the sleeve and to engage the hanger rod.

9. A box suport comprising, a split sleeve including hanger rod openings thru the wall thereof and box hole anchorage means, a stud mounted for free longitudinal movement in the sleeve, said sleeve and stud including means by which the sleeve is expanded to render effective the box anchorage means when the stud is moved longitudinally in the sleeve, means to retain the stud in the sleeve, and said box support also including operating means to enforce relative movement between the sleeve and stud.

10. A box support comprising, a split sleeve including hanger rod openings thru the wall thereof and box hole anchorage means, a stud mounted for free longitudinal movement in the sleeve, said sleeve and stud including means by which the sleeve is expanded to render effective the box anchorage means when the stud is moved longitudinally in the sleeve, means formed on the sleeve ends to retain the stud within said sleeve, and said box support also including operating means to enforce relative movement between the sleeve and stud.

11. A box support comprising, a split sleeve including hanger rod openings thru the wall thereof and box hole anchorage means, a stud mounted for free longitudinal movement in the sleeve, said sleeve and stud including means by which the sleeve is expanded to render effective the box anchorage means when the stud is moved longitudinally in the sleeve, a groove formed in the sleeve proximate each end thereof to retain the stud therein, and said box support also including operating means to enforce relative movement between the sleeve and stud.

12. A box support comprising, a sleeve split lengthwise to permit expansion and including means to mount it on a hanger rod, a stud mounted for free lengthwise movement in the sleeve and including a wedging surface, a circumferential groove formed in the sleeve which expands in a box knock-out when the wedging surface aforesaid acts thereon, another groove formed in the sleeve spaced from the first named groove to retain the stud in the sleeve, and operating means to enforce relative lengthwise movement between the stud and sleeve.

13. A box support comprising, a split sleeve, and a circumferential groove at each end thereof, a stud mounted in the sleeve for lengthwise movement between the

grooves, including means formed on the support to attach it to a hanger rod, a screw threaded thru the stud to bear against the hanger rod, and wedging means to expand the sleeve when the screw is turned against the hanger rod.

14. A box support comprising, a split sleeve having a hanger rod opening formed therein, a circumferential groove formed at each end thereof; a stud mounted for lengthwise movement in the sleeve between the grooves and including a conic surface to engage one groove to expand the sleeve, and a passage therethru to admit a hanger rod; and a screw carried in the stud reaching into the passage to bear against a hanger rod.

15. A box support comprising a conic shaped split sleeve including box anchorage means, a conic shaped stud mounted therein, said support including a hanger rod receiving means by which the support is mounted on a hanger rod, and a screw mounted in the support adapted to bear against a hanger rod and slide the stud in the sleeve.

16. A box support comprising, a split sleeve shaped conically and including box hole anchorage means at the smaller end, a stud mounted therein and including wedging means to cooperate with the conic sleeve, a groove formed proximate the other end to retain the stud in the sleeve for free longitudinal movement therein, means included on the support by which a hanger rod is received thru the support, and a screw threaded thru the stud to bear against a hanger rod and force the stud to move in the sleeve to spread the box hole anchorage means.

17. A box support comprising, a split sleeve shaped conically and including a circumferential box hole anchorage groove, a stud mounted therein for free lengthwise movement and including a threaded shank on the lower end projecting from the sleeve and an upper conic end in the sleeve, a hanger rod passage formed thru the sleeve and thru the upper conic stud portion, and a screw threaded thru the stud to engage a hanger rod.

In testimony whereof I affix my signature.

STEPHEN N. BUCHANAN.