Sept. 6, 1955 H. F. LIVINGSTON 2,717,141

ADJUSTABLE SUPPORTS PROVIDING UNIVERSAL MOVEMENT

Filed May 17, 1951 2 Sheets-Sheet 1

Fig. 1.

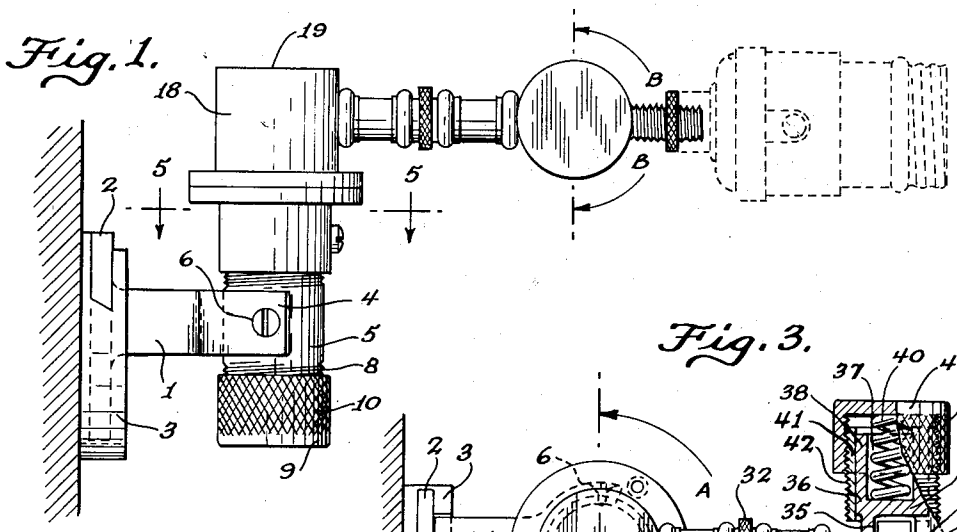


Fig. 3.

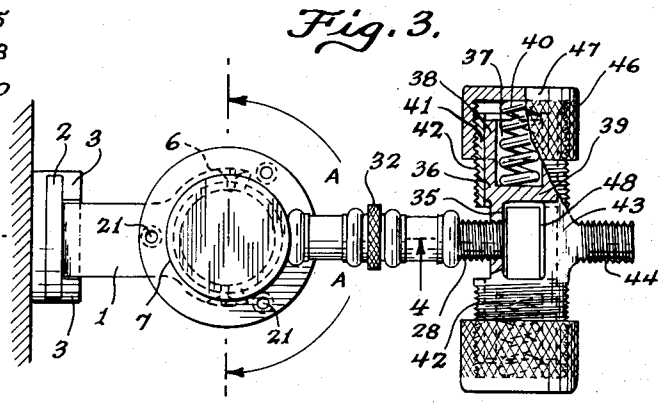


Fig. 2.

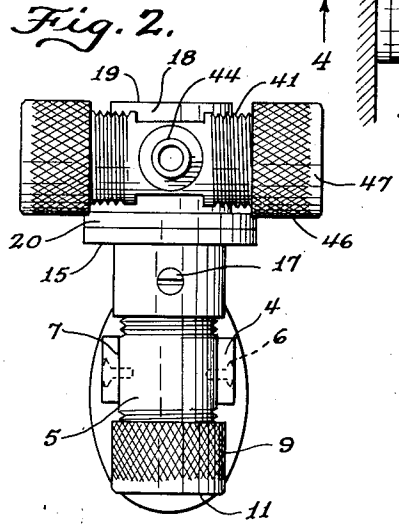


Fig. 4.

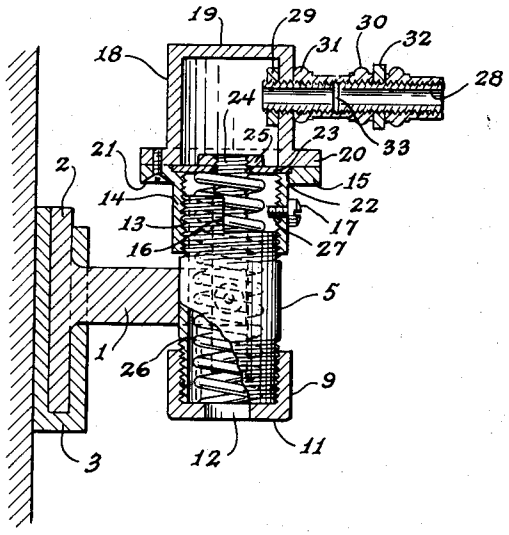
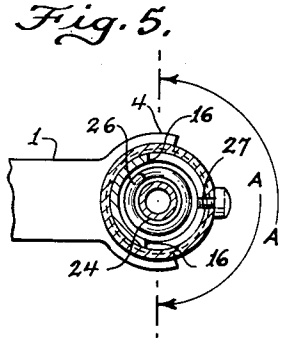


Fig. 5.



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Fig. 9.

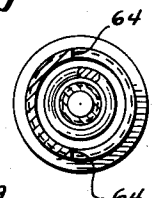


Fig. 7.

Fig. 6.

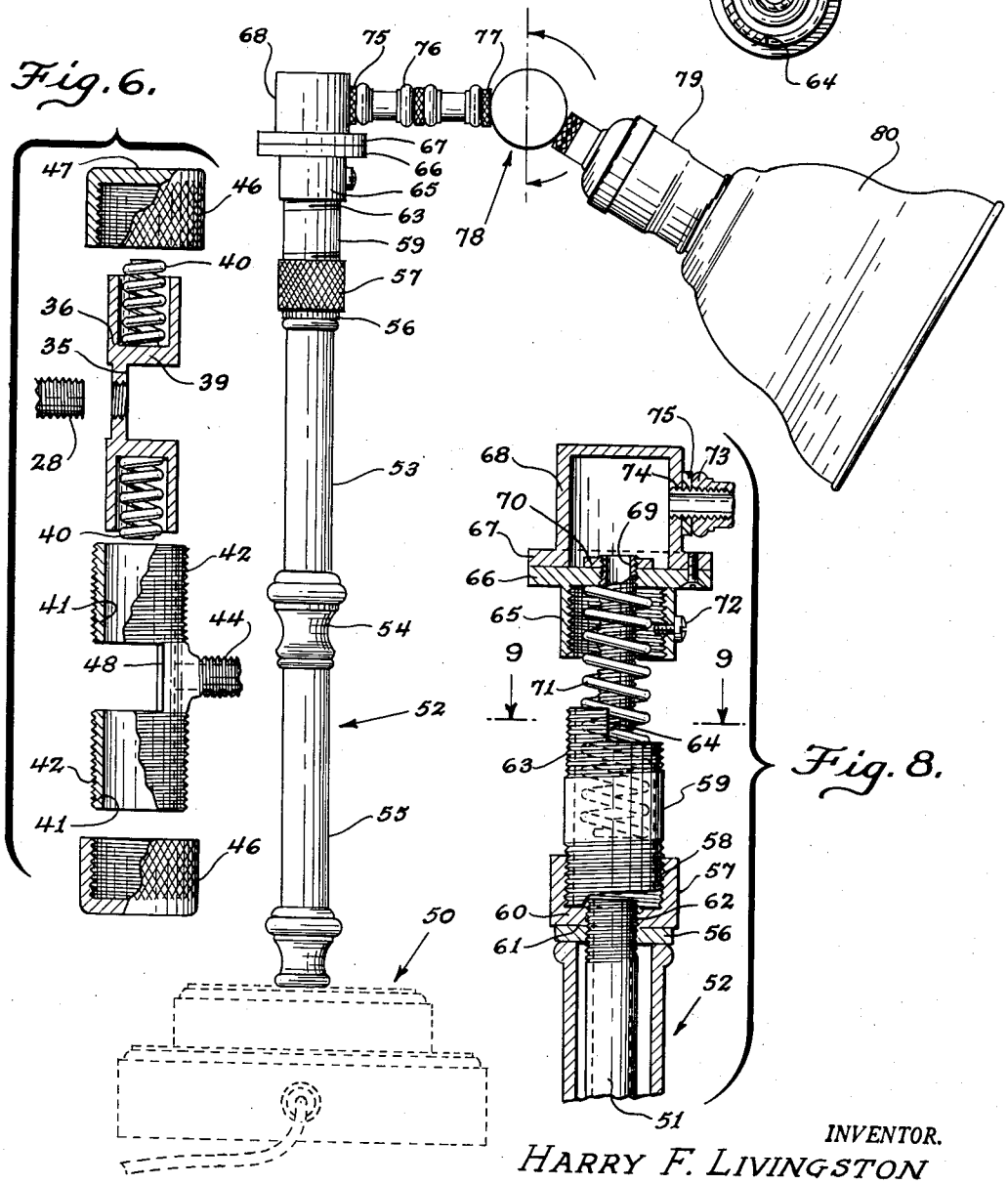


Fig. 8.

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ADJUSTABLE SUPPORTS PROVIDING UNIVERSAL MOVEMENT

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Application May 17, 1951, Serial No. 226,821

10 Claims. (Cl. 248—278)

This invention relates to adjustable supports providing universal movement and, in particular, to such supports wherein the movement is subject to tension.

In applicant's prior Patent No. 2,278,356 dated March 31, 1942, entitled Mounting for Electrical Connectors, there were disclosed manners of mounting electrical connectors for universal movement and for imposing control upon that movement. Experience has shown that the construction of said patent was effective to the extent expected of it. Under certain conditions, however, a more effective construction is needed.

One of those conditions is where relatively heavy objects or lighting fixtures, are to be supported. Another is where small smooth movements of the support elements are to be made even though the tensioning means is exerting substantial resistance. Further conditions and improvements are to further protect an electrical conduit by eliminating sharp bends in it and keeping it from being acted upon or worn by the tensioning means. Also, a more effective application of the tensioning force is provided for along with an increase in and a facilitating of the adjustability of the tensioning means.

It is, accordingly, a principal object of this invention to provide improved, universally operable, connector mountings.

Another object is to provide such mountings with improved tensioning means therefor.

Another object is to provide more effective adjustability of the tensioning means for such mountings.

A further object is to provide for increased variation in the tension control imposed on such mountings.

A still further object is to provide for even movement of the elements of such mountings regardless of the tension applied thereto.

Further and more detailed objects will in part be obvious and in part be pointed out as the description of the invention, taken in conjunction with the accompanying drawing proceeds.

In that drawing:

Figure 1 is a side elevation of a mounting in accordance with the invention carried by a wall bracket and showing in dotted lines the manner in which it supports a light socket.

Figure 2 is a front elevation thereof with the dotted line showing of the socket omitted.

Figure 3 is a top plan view of the mounting as shown in Figure 1, with part of one of the elements partly broken away to expose the interior section thereof.

Figure 4 is a vertical section, taken on line 4—4 of Figure 3, of the left hand element of the Figure 3 mounting with portions of that element broken away to show the interior thereof.

Figure 5 is a horizontal section taken on line 5—5 of Figure 1 and looking in the direction of the arrows.

Figure 6 is an exploded sectional view of the left hand element of the mounting of Figures 1, 2, and 3.

Figure 7 is a side elevation of a stand or table type of lamp incorporating the mounting of the invention.

Figure 8 is a sectional, partly exploded view, of the tensioning and pivoting element adjacent the head of the lamp in Figure 7, and

Figure 9 is a horizontal section taken on line 9—9 of Figure 8 and looking in the direction of the arrows.

The support or mounting device of my invention, as illustrated in Figures 1 through 6, is shown as carried by a wall by means of the carrying arm **1**, having a tongue **2** received in the slotted holder **3**. The arm **1** opens out into a yoke **4** whose arms embrace the barrel member **5** and are secured thereto by means of the screws **6**. The interior surface **7** of the yoke fits the exterior of the member **5**, so that when the screws **6** are in place, the barrel and the rest of the support extending from it will be firmly mounted in desired position.

The barrel member **5** as here shown is formed as a section of a piece of pipe whose lower end is screw-threaded, as shown at **8**, to receive the screw threaded cap **9**. The outer surface of that cap is knurled, or otherwise roughened, at **10** to enhance the gripping of it for turning. The bottom **11** of the cap **9**, as shown in Figure 4, is centrally perforated, as shown at **12**, in order to enable an electric conduit to be passed up therethrough.

The upper portion of the barrel member **5** is screw threaded at **13** for reception within a screw threaded bushing **14**, whose upper end is flanged outwardly at **15**. Part of the circumference of the screw threaded portion **13** of the barrel **5** extending down from the top of that barrel is removed in order to provide opposed stop shoulders **16**, a little more than 180° apart. Thus, when the barrel **5** is screwed into the bushing **14** to desired extent and the screw **17** is inserted through the wall of the bushing **14** to project inwardly thereof, the relative rotative movement of the barrel **5** and bushing **14** about their common axes will be limited to the extent shown by the arrows A—A in Figure 3.

A head **18**, in the form of a cylinder with a closed upper end **19**, is seated on the flange **15** by means of its flange **20** which mates therewith. These flanges are suitably secured together by some means such as the screws **21**, preferably inserted up from the underside of the flange **15**. The flange **15** is recessed downwardly at **22** adjacent its inner edge to provide a seat for a plate **23**. This plate is of proper thickness to be clamped in place on the seat **22** when the flanges **15** and **20** are secured together, inasmuch as a portion of the flange **20** will then overlie a peripheral portion of the plate **23**.

The plate **23** is provided with a center threaded opening therein for the reception of a screw threaded nipple **24**. This nipple, as shown, is locked in place by means of a nut **25** engaging an extending portion of the nipple and drawn down tightly against the upper surface of the plate **23**. Furthermore, the nipple **24**, as seen in Figure 4, extends part way down into the barrel **5** with that extending part being surrounded by several of the upper coils of a tensioning spring **26**. The spring **26** extends throughout the height of the barrel **5** having its upper end engaging the undersurface of the plate **23** and its lower end engaging the innersurface of the caphead **11** around the opening **12** therethrough.

From the foregoing, it will be apparent that, when this element is assembled, turning of the head **18** can be effected throughout an angle of 180° due to the threaded engagement of the upper end of the barrel **5** with the interior of the bushing **14**. It will also be apparent that turning action beyond 180° is precluded by the engagement of the inward extending portion **27** of the screw **17** with the stop shoulders **16** on the barrel **5**. It will further be apparent that the desired tension to be imposed upon that turning action, once the proper spring is selected, can be effected by compressing **26**, either by

means of the position of the cap 9 on the bushing 14, or both, on the barrel 5. Obviously, a spring of suitable strength would be chosen and when that is done, the range of variation in the action thereof can be substantial. Further, since both ends of the spring seat against substantially flat surfaces, the resistance to turning even though substantial will be even and smooth throughout. Finally, it is to be noted that should the support be used for a housing for an electrical conduit, such can be passed up through the opening 12, through the spring 26, and through the nipple 24 without any injury to the same regardless of the turning action.

This protection of an electrical conduit is further effected by the provision of a chamber of substantial size within the head 18. Thus, the conduit can follow a full smooth curve as it comes out of the nipple 24 and turns at a 90° angle to enter the pipe 28.

The pipe 28 is screw threadedly received in an opening in the cylindrical side wall of the head 18 and is clamped in place in that opening by a nut 29 engaged with the portion of the pipe extending within the chamber of the head. The portion of the pipe extending out beyond the head 18 has a screw threaded collar 30 applied thereover and turned up so that its inner end 31 engages the outer surface of the head 18. The collar 30 has a center knurled portion 32 to facilitate the turning of it and extends in symmetrical portions on either side of that center portion. Further, the collar 30 not only serves as a clamp and to provide an ornamental exterior but also serves as a joining element should the pipe 28 be made up of separate sections. This latter would normally be the case and the inner section would terminate at a position, such as 33, leaving the outer section of the pipe 28 somewhat spaced therefrom to facilitate the necessary adjustment for takeup when the parts are assembled. In any event, whether the pipe 28 is made up of one piece, or several, it will be apparent that it, along with the collar 30, not only serves as an element of the support, but, if desired, also serves as a protective housing for an electrical conduit.

The extending end of the pipe 28 is threadedly received in a center section 35 of a sleeve 36. This sleeve is of generally cylindrical form and has identical cylindrical pockets 37 extending into the ends thereof. Each of these pockets has a side wall 38 and a base 39 for the engagement of the inner end of a spring 40. The center section 35 of the sleeve extends throughout only a small portion of the circumference of the sleeve, as can be readily seen from the showings in Figures 3 and 6.

A collar 41 is seated over the sleeve 36 in rotatable relation with respect thereto, and, like the sleeve 36, is generally cylindrical in shape. The ends of the collar 41, besides having their inner surfaces in a slidable fit with the outer surface of the side walls 38, also have their exterior surfaces screw threaded as seen at 42. The intermediate joining section 43 between the ends 42 extends only part way round the circumference of the collar and receives an extending pipe, or other mounting member 44, within the body thereof. This pipe, or other member, is preferably permanently secured to and in an opening in the joining portion 43.

Identical cap members 46 are screw threadedly engaged with the threads of the collar end portions 42. This threaded interengagement of the members extends for several threads unless the cap is practically unscrewed. The base 47 of the cap provides a smooth surface for engaging the outer end of the spring 40 and the spring selected will, of course, be of proper strength so that when one is employed at each end of the element, adequate tensioning of the movement of the collar carrying the outlet 44 with respect to the sleeve mounted on the inlet 28 can be provided. It is also to be understood that the seating of the springs in their pockets and the tensioning of them in this manner with their ends engaging proper receiving flat surfaces, assures that an even, smooth action will be provided even though tension in sufficient extent to maintain a heavy element in desired position is applied. It is further to be noted that the bases 39 of the cylindrical pockets 37 isolate the springs 40 from any possible engagement with an electrical conduit passing through the element from the pipe 28 into the pipe 44. Thus, there is nothing to work on or chafe the conduit. Instead, it is protected from any such action.

In the assembly of this tensioning and connector element, it is first necessary to seat the sleeve 36 within the collar 41 and center it therewithin, so that the threaded perforation for the reception of the pipe 28 comes in the circumferentially removed section of the collar 41. When this is done, the pipe 28 is threaded into the opening provided for it in the engaging section 35, and the first step of the assembly is complete. Following this, the springs 40 are seated in the pockets 37 and the caps 46 are engaged with the ends 42 of the collar, and are turned down evenly until the right tension is reached. If an electrical conduit is passed through the pipe 28, and through the center of the sleeve and collar and out through the pipe 44, it will be obvious from the removed circumferential sections indicated, that a substantial swinging action of the collar on the sleeve can be effected without injury to such conduit. That swinging action, as indicated by the arrows B—B in Figure 1, can readily be throughout an angle of 180° before either of the opposite stop edges 48 of the center section 43 comes into engagement with the pipe 28.

The applicability of the construction of the invention to such as a table lamp is illustrated in Figures 7, 8, and 9. Here, a base, generally indicated at 50, is of the type normally used when the lamp would be mounted on a table. Obviously, however, the lamp could be extended to stand on a floor, or on any other surface desired. The construction here contemplated is that where the main upright member for the lamp is a pipe. As shown at 51 in Figure 8, this pipe would normally be enclosed within a tubular housing, generally indicated at 52, provided principally for the ornamental effect produced. This housing, whether made of one piece, or assembled of separate pieces such as 53, 54, and 55, is seated over the pipe 51 and is held in place and in assembled relation by being clamped between the upper surface of the base 50, and the nut or washer 56 immediately beneath the screw cap 57. The bottom end of the pipe 51 would be threadedly received in a suitable nut, or fitting, within the base 50, as well known in the art.

The cap 57 like the cap 9 is screw threadedly received at 58 on the lower end of a barrel member 59. The cap 57 differs, however, from the cap 9 in the respect that its base 60 has the aperture 61 therethrough screw threaded for the threaded reception of the upper end 62 of the pipe 51. This threaded portion of the pipe also receives the nut 56, heretofore referred to, which nut engages the upper end of the tubular housing 52, whereby that housing is clamped between the upper surface of the base 50 and the under surface of the nut 56. The barrel 59 has its upper end screw threaded at 63 and such end, like that of the barrel 5 in Figure 4, has a portion of its periphery removed in order to provide stop shoulders 64. The end 63 is screw threadedly received within the bushing 65, whose flange 66 is mated with and receives the flange 67 of the cylindrical head 68, substantially the same as that shown at 18 in Figures 1–4. Here, however, the flange 66 includes a base across the end of the bushing 65, instead of using a plate as at 23 in Figure 4. The base portion of the flange 66 has a screw threaded opening at its center for the reception of the screw threaded nipple 69, which latter preferably extends through the flange 66 and is locked in place by means of the flat nut 70.

A spring 71, like the spring 26, is received within the barrel 59 and compressed between the under surface of

the flange **66** and the inner surface of the base **60** of the cap **57**. Like the form of Figures 1–4, the selection of a spring **71** of suitable strength, and the adjustment of the compression of the same controls the resistance applied against the turning of the head **68** with respect to the pipe **51** and the base **50**. This structure differs from that of Figures 1–4, however, in the respect that the cap **57** cannot be turned as readily to vary the compression of the spring **71** as can the cap **9** in varying the compression of the spring **26**. In fact, the preferred condition would be to set the cap **57** up tight on the barrel **59** to make sure that any turning action were limited to that of the head **68**, with respect to the barrel **59**, otherwise, the lamp might become loose-jointed and, accordingly, undesirable. Thus adjustment of the compression of the spring would be made solely by backing up the stop screw **72** and turning the head **68** with respect to the barrel **59**. When the bushing **65** has been screwed up or down far enough, the screw **72** is reinserted and the range of turning movement of the head **68** is again limited to 180°.

Like the form of Figures 1–4, the form of Figures 7–9 is provided with a large chambered head **68**, so that an electrical conduit passed up through the pipe **51**, through the nipple **69** and turned at right angles to pass out through the pipe **73** will have freedom of movement within the head **68**. Thus, the wear or chafing of an electrical conduit within the head **68** will be kept at a minimum in spite of the turning, or adjusting of the head **68** with respect to the barrel **59**.

The pipe **73** is received within the side wall of the head **68**, in the screw threaded opening **74**. Besides being threaded into this opening, the pipe is locked in place therein by a threaded nut element **75** and the pipe **73** likewise receives screw threaded collar elements, such as **76**, like the collar elements **30** of Figure 4. In other words, again the threaded collar element **76** may be in one piece, or several pieces and the extent of the whole assembly or of the one-piece construction, may be determined by such factors as the length to be taken care of and the purpose to be served, such as the joining of separate pipe elements as against overlying a continuous pipe element.

The collar element **76** is here shown as terminated in another knurled nut element **77** prior to engagement of the pipe therewithin with the other adjustable element of the support here shown at **78**. This element **78** is in every respect the same as that shown at the right hand side of Figure 3, and in the exploded view of Figure 6. Thus, reference is made to the showing of those figures for the details of element **78**.

The pipe such as **4** which extends from the element **78** in this instance carries a conventional light socket **79** to which is applied a reflector **80**. It is believed to be apparent that the light emanating from the source within the reflector **80** can be directed throughout 180° with respect to the horizontal axis of the element **78** and throughout another 180° with respect to the vertical axis of the head **68**. All such movement, as previously fully described, is subjected to resistance by spring action of such a nature as to insure that a position once set will be maintained, though enabling the setting of the position throughout a substantial range to be effected with ease and uniformity. Also, adequate provision is made for effective adjustment of that resisting action whenever that may be desired.

Since certain changes may be made in the above article and different embodiments of the invention could be made without departing from the scope thereof, it is intended that all matter contained in the above description or shown in the accompanying drawing shall be interpreted as illustrative and not in a limiting sense.

Having described my invention, what I claim as new and desire to secure by Letters Patent is:

1. An angularly adjustable support for an electrical conduit which comprises, a pair of tubular members with open portions extending in opposition to each other and a closing wall extending therebetween and formed with an opening therethrough, said tubular members being interengaged for relative rotation, means in one of said tubular members for imposing a resilient resistance against said rotation, a conduit extending through a wall of said other tubular member and in a direction at right angles to said opening formed in said closing wall, a sleeve engaged with said conduit, a collar rotatably mounted on said sleeve, said sleeve and said collar forming end portions and an intermediate chamber, said conduit opening into said intermediate chamber said collar being formed with an opening therein extending out from said chamber, and resilient means carried by said end portions and isolated from said chamber by an end wall thereof for imposing resilient resistance to the relative rotative action of said sleeve and said collar.

2. An angularly adjustable support which comprises, a tubular member, a spring within said tubular member, means adjacent one end of said tubular member for engaging one end of said spring and retaining the same within said tubular member, means on the other end of said tubular member and mounted for longitudinal movement with respect thereto to engage the other end of said spring member, said last named means being provided with an opening therethrough axially aligned with respect to said tubular member, a second tubular member in alignment with said first tubular member and formed with a closed end and with an open mouth adjacent said first tubular member, said open mouth of said second tubular member overlying said axially aligned opening, said second tubular member being formed with a side opening in the wall thereof, said side opening extending at an angle with respect to said axially aligned opening.

3. An angularly adjustable support comprising, a barrel member formed with external screw threads adjacent the ends thereof, cylindrical cap type members in engagement with the threaded ends of said barrel member and closing the ends of said barrel member, a spring within said barrel member and engaging the inner surfaces of said closing members, a means limiting the turning movement of one of said closing members with respect to said barrel and a cylindrical chambered member formed with a side wall and bottom, said chambered member being secured to one of said end members with the open chamber thereof extending away from said end member in opposition thereto, said chamber overlying the opening in said end member and a conduit extending from said chamber at right angles to the axis of said opening.

4. An angularly adjustable connector construction of the character described comprising, a barrel member formed with screw threads on the exterior thereof adjacent the ends thereof, a cap type closing member screw threadedly received on one end of said barrel member, a flange formed with a base portion and a neck portion, said neck portion being screw threadedly engaged with the other end of said barrel member, a conduit within said barrel member and extending through the base of said flange, a spring within said barrel member and embracing said conduit member and a cylindrical cup like housing member overlying said flange on the side thereof opposite said barrel, said cylindrical cup like member being formed with a surrounding collar therearound mating with said base of said flange and means to secure said collar and said flange together.

5. An angularly adjustable support which comprises, a sleeve, a collar rotatably mounted on said sleeve, spring receiving pockets with closed bottom ends extending into said sleeve from each end thereof, adjustable cap type members engaging the ends of said collar and overlying the ends of said sleeve, springs within said pockets and compressed between the bottoms thereof and said ad-

justable cap type members, and an intermediate chamber between said spring receiving pockets, said chamber being formed partially from the wall of said sleeve and partially from the wall of said collar, said partial wall elements being formed with openings therethrough.

6. An angularly adjustable mounting member which comprises a sleeve, a collar overlying said sleeve and a cap type closing member engaging an end of said collar, said sleeve being formed with a cylindrical receiving pocket closed at one end and with an open mouth at the other end, an engaging web extending away from the closing end of said pocket, said collar being rotatably engaged with the exterior of said sleeve, the exterior of said collar being screw threaded, said cap type closing member being in screw threaded engagement with the exterior of said collar, and a spring within said cylindrical pocket, said spring extending between said closed end of said pocket and the interior of said cap type closing member.

7. In an angularly adjustable connector of the character described, a cylindrical sleeve, a substantial circumferential portion of said sleeve intermediate the ends thereof being removed, a closing wall extending across the interior of the cylindrical portion of said sleeve at a position spaced from one end thereof and forming with said sleeve a cylindrical pocket, a collar overlying said sleeve and formed for rotatable engagement therewith, said collar being formed with screw threads on the exterior surface thereof, a spring under compression within said cylindrical pocket, and a screw threaded cap type closure member engaged with the threads of said collar, the interior of said closure member engaging the outer end of said spring and compressing the same against said closing wall.

8. In angularly adjustable connectors of the character described, a sleeve member having hollow cylindrical ends terminating in open mouths, closing walls within said cylindrical ends inwardly spaced from said open mouths, forming cylindrical pocket members opening outwardly through said open mouths, a joining web securing said pocket members in cylindrical spaced relation, a conduit engaged with said joining web, a collar overlying said sleeve, said collar formed with cylindrical portions rotatably mounted with respect to said cylindrical ends of said sleeve, a second joining web forming a small portion of the circumference of the cylinder of said collar and extending intermediate said cylindrical collar portions, a conduit engaged with said second joining web, springs under compression within said cylindrical pocket members, and cap type closure members closing the ends of said cylindrical pockets and of said cylindrical collar portions and compressing said springs against said closing walls, said cap type closure members being in screw threaded engagement with said cylindrical collar portions.

9. In angularly adjustable connector construction, a substantially enclosed housing formed with openings in the opposite ends thereof, a spring within said housing engaging said ends around said openings, and means forming part of said housing for varying the compression of said springs, a chambered housing overlying one end of said first housing, with the interior thereof in communication with the opening in that end of the housing, a conduit received within the side wall of said chambered housing and extending therefrom at right angles to the direction of extent of said first housing, and an angularly adjustable mounting member secured to the remote end of said conduit, said angularly adjustable member including a pair of outwardly opening cylindrical cup-like members, a center web securing said cup-like members together in a portion of limited circumferential extent, a collar overlying said cylindrical cup-shaped portions and being formed for rotation with respect to the same, the ends of said collar being exteriorly screw threaded, cap type closure members screw threadedly engaged with said threaded ends of said collar, and spring members extending between the base of said cap members and the bottoms of said cylindrical cups.

10. An angularly adjustable support providing for controlled movement with axes angularly related with respect to each other which comprises, a barrel member formed with screw threaded portions adjacent the ends thereof, closing members, formed with openings through the bases thereof, mounted in screw threaded engagement with said screw threaded portions of said barrel, a spring extending throughout the length of said barrel and engaging the inner surfaces of said closing ends, coacting means between said barrel and one of said ends for limiting the relative rotation thereof, a chambered head member overlying one of said ends on the remote side thereof from said barrel, a conduit member secured within an opening in said chambered head member and extending away therefrom, a sleeve carried by said conduit member, said sleeve including a pair of cylindrical pockets at its ends, said cylindrical pockets being joined by a web portion of substantially less circumferential extent than the circumference of said sleeve, said conduit being engaged with said web portion, a collar overlying said sleeve, the center portion of said collar being recessed circumferentially for a substantial portion of the circumference thereof to embrace said conduit, spring members in said cylindrical pockets and screw threaded cap members engaged with the ends of said collar, the interiors of said cap members engaging said springs to press the same against the base of said pockets.

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