Nov. 6, 1934. K. K. NIELSEN 1,979,339

CANDLE SOCKET

Filed July 8, 1931 2 Sheets-Sheet 1

Fig. 1.

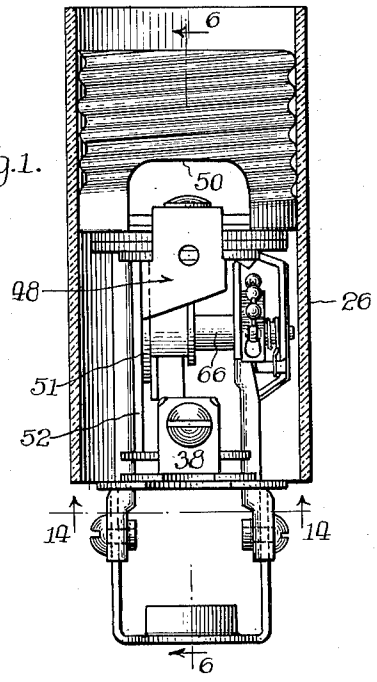


Fig. 2.

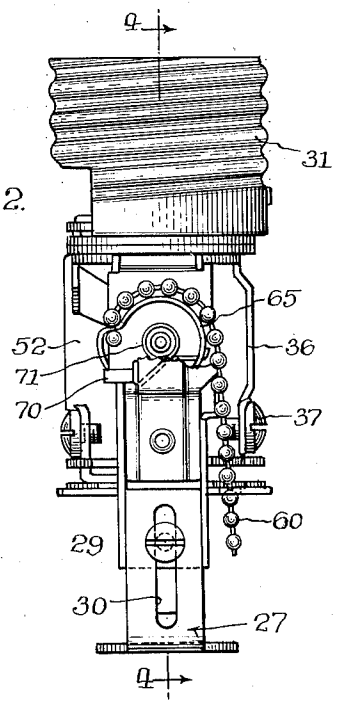


Fig. 3.

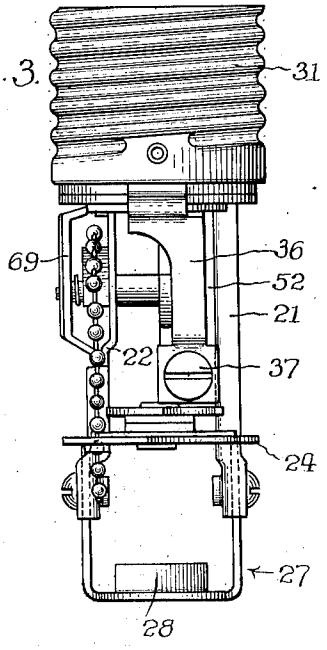
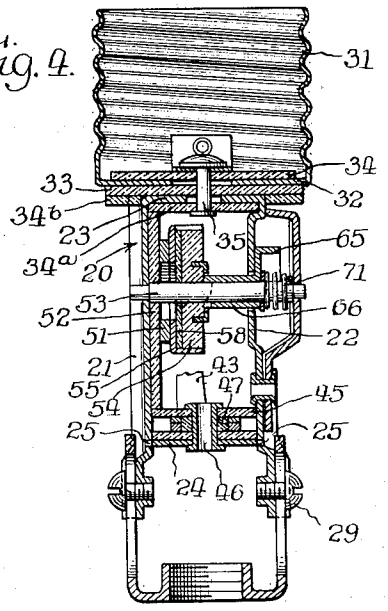


Fig. 4.



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CANDLE SOCKET

Filed July 8, 1931 2 Sheets-Sheet 2

Fig. 5.

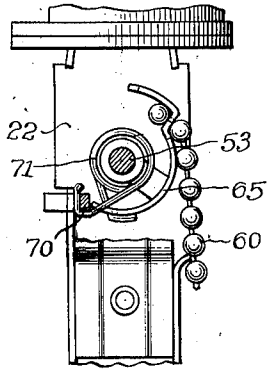


Fig. 6.

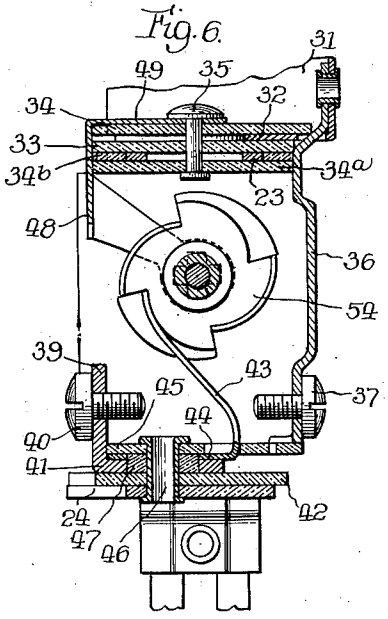


Fig. 7.

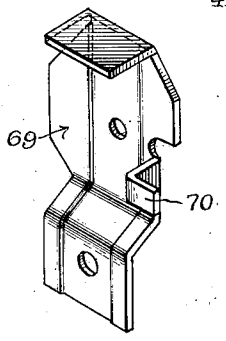


Fig. 13.

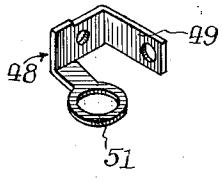


Fig. 8.

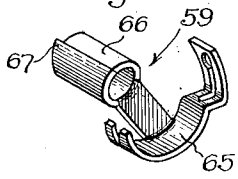


Fig. 10.

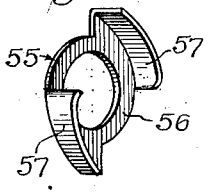


Fig. 11.

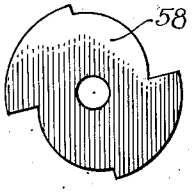


Fig. 9.

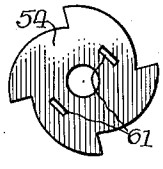


Fig. 12.

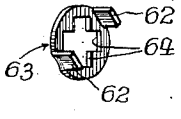
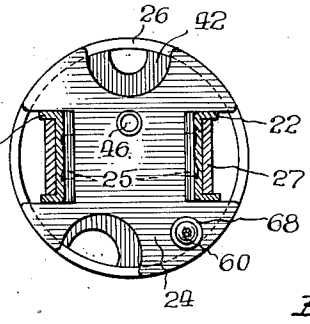


Fig. 14.



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UNITED STATES PATENT OFFICE

1,979,339

CANDLE SOCKET

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Application July 8, 1931, Serial No. 549,346

15 Claims. (Cl. 173—354)

This invention relates to electric lamp sockets and more particularly to the type known as candle sockets.

It is an object of the invention to provide a candle socket and switch mechanism therefor of improved and simplified construction and compact arrangement.

Another object of the invention is to provide a socket with a metallic frame having a switch and switch-actuating mechanism, and means forming with the switch an electric circuit independently of and totally insulated from the frame and the switch-actuating mechanism.

A further object of the invention is to provide a candle socket having an improved pull-chain switch wherein the parts are arranged so that the chain is at all times effectually insulated.

Still another object of the invention is to provide a switch socket wherein the parts are secured together simply and effectually and in a manner such as to facilitate assembly.

Other objects and advantages will become apparent from the following description and from the drawings in which:

Figure 1 is a vertical view in elevation of a switch socket embodying the features of this invention. A candle-simulating tube concealing the socket is shown in section.

Fig. 2 is an elevational view of the socket looking from the right in Fig. 1 with the bracket partially broken away.

Fig. 3 is an elevational view of the socket looking from the rear of Fig. 1.

Fig. 4 is a vertical sectional view taken in the plane of line 4—4 of Fig. 2.

Fig. 5 is a fragmental view showing the chain-supporting segment rotated and engaging its stop.

Fig. 6 is a fragmental vertical sectional view taken approximately in the plane of line 6—6 of Fig. 1.

Fig. 7 is a perspective view of the bracket.

Fig. 8 is a perspective view of the oscillatory actuating member.

Fig. 9 is a side elevational view of the toothed switch disk.

Fig. 10 is a perspective view of the conducting sheath for the toothed disk.

Fig. 11 is a side elevational view of an insulating washer.

Fig. 12 is a perspective view of a disk forming a part of the ratchet connection between the toothed disk and the oscillatory member.

Fig. 13 is a perspective view of a conductor constituting part of the circuit of the socket.

Fig. 14 is a view taken approximately in the plane of line 14—14 of Fig. 1.

For purposes of illustration, the invention is here shown as embodied in a candle socket of the pull-chain type generally disclosed in my pending application Serial No. 342,332, filed February 25, 1929 of which this application is a continuation in part.

The body of the socket is composed of a two-part extensible metallic frame, the upper portion of which is formed by an inverted U-shaped member 20 having a pair of substantially parallel legs 21 and 22. These legs are channel shaped in transverse cross-section (see Fig. 14) and are connected at their upper end by an integral web 23 centrally apertured. At their lower ends, the legs 21, 22 are made rigid by a web 24 having lugs 25 projecting through the legs and clinched on the outside thereof. The web 24 is circular in outline and is cut away at diametrically opposite portions to receive the legs. It is also cut away at the intermediate portions (see Fig. 14) to provide for the lead wires of the socket. The remaining projecting portions provide shoulders for supporting a candle simulating tube 26 encasing the socket.

Adjustably secured to the ends of the legs is the lower part of the frame which is formed by an upright U-shaped member 27 having a tubular intermediate portion 28 threaded internally to be screwed onto a fixture. The legs of the upright member 27 are slidable in the channels of the legs 21 and 22 and are held against withdrawal by means of bolts 29 projecting through longitudinal slots 30 formed in the legs of the upright member. It is thus apparent that the frame of the socket is a simple open structure easily made and assembled and wholly free of easily breakable material.

Supported at the upper end of the frame is a lamp-receiving shell 31, the base of which is formed by an inwardly projecting annular flange 32. Spacing the flange 32 from the web 23 to insulate the shell therefrom is a washer 33 of any suitable insulating material. Similar washers 34 and 34[a] are placed respectively on top of the flange 32 and below the web 23, and all are securely held together by a single rivet 35 projecting centrally through the base of the shell 31 and the aperture in the web 23. A washer 34[b] cut away centrally to receive the entire web 23 and made of a thickness corresponding to that of the web is placed between the washers 33 and 34[a] as is the web. The shell and the frame are

thus made rigid by clamping the flange 32 and the web 23 between the washers which in turn insulate the rivet, the shell and the frame from each other. The rivet also acts as the center contact of the socket, the other contact being formed by the shell 31.

With the frame constructed wholly of metal, grounding of the socket through the fixture is very possible, and precaution must be taken to avoid such an occurrence. To that end the electric circuit of the socket is here composed of means wholly independent of the frame which supports them but which is well insulated therefrom.

The shell 31, which as stated forms one contact of the socket and thus constitutes a part of the circuit, has riveted directly thereto a conducting strip 36 (Fig. 6) disposed at right angles to the frame legs 21, 22 (Fig. 3) said strip extending downwardly so as to terminate just short of the web 24. At its lower end, the strip 36 carries a wire-securing screw 37 constituting one terminal for the attachment of the lead wires which are brought into the socket through the tubular portion 28.

The other wire terminal of the socket is disposed directly opposite the terminal 37 and is supported by the web 24. This terminal comprises a right-angled strip 38 having an upright portion 39 carrying a wire securing screw 40, and a horizontal portion 41 extending parallel with the web 24 but spaced therefrom by a sheet 42 of insulation.

Forming part of the switch for the circuit is a spring contact 43 (Fig. 6) projecting upwardly into the space between the legs 21, 22. This contact has a horizontal portion 44 immediately overlying the terminal portion 41. To secure the spring contact 43 and the strip 41 in position, a sheet 45 of insulation is placed on top of the horizontal portion and the entire group fixed to the web 24 by a single rivet 46. In order that the rivet 46 may not come in contact with the horizontal portion of either the strip 38 or the spring contact 43, both are formed with an opening substantially larger than the diameter of the rivet 46 and a washer 47 of insulating material whose thickness is equal to the combined thickness of both horizontal portions is inserted between the rivet 46 and the horizontal portions. Here again the circuit is effectively insulated from the frame and a simple and unique mounting provided for the terminal.

Completing the stationary portion of the circuit between the center contact 35 and the terminal 39, 41 is a conductor 48 (see Figs. 1, 6 and 13) particularly shaped for use in a socket of the type here described. The conductor 48 is formed with a horizontal portion 49 adapted to be positioned within the shell 31 and secured by the rivet 35 which projects through one end of the portion 49 and is in electrical contact therewith. The portion 49 of the conductor within the shell 31 lies on top of the washer 34 and is thus insulated from the flange 32, while the shell 31 proper is cut away at 50 to permit the conductor to project outwardly of the shell. At the circumference of the shell 31, the conductor is bent downwardly and laterally to extend into the space defined by the frame members 21, 22. The free end of the conductor 48 terminates in an annular ring 51 lying in a plane parallel with the leg 21 and spaced therefrom by a sheet 52 of insulation. The sheet 52 of insulation is of a width approximately equal to the diameter of the socket, and of a length such as to extend between the washers 34a and 45 (Fig. 4).

Interposed between the annular ring 51 and the spring contact 43 is a rotary switch member mounted on a shaft 53 extending transversely of the legs 21, 22 of the frame. In the present instance, the switch member comprises a four-toothed disk 54 (Fig. 9) of insulating material carrying a sheath 55 (Fig. 10) of conducting material partially encasing the disk. The sheath 55 is composed of an annular ring 56, conforming in size to the ring 51 of the conductor, and arcuate flanges 57 covering the peripheral surface of alternate teeth of the disk. Both rings have an inner circumference large enough to be effectively insulated from the shaft.

The disk 54 is disposed with the ring 56 of the sheath and the ring 51 of the conductor concentric and in contact, while the periphery of the disk 54 is in contact with the spring contact 43.

With this construction, a switch having but a single point of make and break is provided, and all parts forming the switch may be conveniently grouped near one leg 21 of the frame, from which it is insulated by the sheet 52. At the same time the switch is spaced from the leg 22 a sufficient distance to obviate the necessity of special insulation.

It will be seen that when the spring contact 43 engages a tooth covered by the sheath 55 a circuit is completed from the terminal strip 39 through the contact 43, the sheath 55 and the conductor 48, then through the lamp turned into the socket, the shell 31 and the strip 36. A quarter of a turn of the disk 54 positions an uncovered tooth in engagement with the spring contact 43 and thus breaks the circuit.

To avoid accidental closing of the circuit by engagement of the ring 56 and the spring contact 43 when the latter is in engagement with an uncovered tooth, a specially shaped washer 58 (Fig. 11) is positioned between the disk 54 and the sheath 55. As may be seen from said figure, the washer is circular in outline and of a diameter larger than the maximum diameter of the disk 54. Two quarters of the washer 58 are cut to conform to the shape of the disk teeth, thus permitting the sheath 55 to be slipped over the washer and onto the disk, the washer being held thereby against rotation relative to the disk. The other two quarters, being normal, project radially well beyond the disk 54 and thus prevent contact between the ring and the spring contact.

The disk 54 is rotated in the present instance through a ratchet connection, by an oscillatory member 59 carrying a pull-chain 60. For this purpose, the disk is formed with a pair of diametrically opposite holes 61 which receive prongs 62 projecting from a metal disk 63 (Fig. 12) formed with a pair of diametrical slots 64 at right angles to each other. The metal disk 63 when assembled with the toothed disk 54 thus forms one part of a ratchet connection rotating the disk.

The other part of the ratchet connection is formed on the oscillatory member 59 which comprises a segment 65 which supports the pull-chain 60 and a tubular portion 66 rotatable on the shaft 53 and terminating in ratchet teeth 67 for engaging the slots in the disk 63.

To insure that the pull-chain will not contact with any part of the electric circuit, the tubular portion 66 of the oscillatory member is made longer than the distance between the disk 54

and the leg 22 thereby enabling the chain-supporting segment 65 to be positioned exteriorly of the space between the legs. The leg 22 is apertured to permit the tubular portion 66 to project therethrough and may, if desired, form a bearing for the oscillatory member. The pull-chain 60 is also guided by passing through an aperture 68 in the projecting portion of the web 24. With the electric circuit concentrated near the leg 21, and the chain mounted outside of the leg 22 all possibility of contact between the chain and the electric circuit is eliminated.

For convenience in assembling the pull-chain socket, the shaft 53, supporting the rotary switch member and the oscillatory member 59, is preferably a floating shaft having shouldered ends, one journaled in the leg 21 while the other projects through the leg 22 and is journaled in a bracket 69 riveted to the outside of the leg. By the use of a floating shaft all parts may first be positioned and the shaft then inserted and held against lateral movement by the bracket 69. It also provides for a simple construction resulting in a two bearing support for the shaft.

In addition to providing a bearing for the shaft 53, the bracket 69 serves as a shield for the segment 65 protecting it against any binding action on the part of the candle-simulating tube 26 slid over the socket, and also as an abutment for arresting the movements of the oscillating member 59. For this purpose the bracket 69 has a lug 70 projecting into the path of the oscillating segment 65 intermediate its ends. In the normal position of the oscillatory member 59 (see Fig. 2) the end to which the pull-chain is attached abuts the lugs 70 thereby limiting rotation in a counter-clockwise direction as viewed in that figure. The member 59 is urged to normal position by a torsion spring 71 attached at one end to the free end of the segment 65 (see Figs. 2 and 5) and anchored at the other end on the lug 70 of the bracket. This spring also acts in compression between the bracket 69 and the oscillating member 59 to yieldably retain the teeth 67 in engagement with the disk 63.

To advance the switch member to make or break the circuit, the member 59 is oscillated by means of the pull-chain to the position shown in Fig. 5 in which position the free end of the segment abuts the lug 70. The degree of rotation is determined by the size of the segment 65 which is here made slightly longer than a semicircle. The permissible rotation is thus less than 180° and permits the switch member to be advanced by one tooth only. This insures that each operation of the pull-chain will cause only a making or a breaking of the circuit and not both in the same operation.

I claim as my invention:

1. A pull-chain socket comprising, in combination, a lamp-receiving shell, a pair of spaced legs supporting said shell, a switch member rotatably mounted between said legs, and an oscillatory actuating member comprising an elongated tubular portion having a ratchet connection with said switch member and projecting through one of said legs, and a chain supporting segment rigid with the projecting end of said tubular portion.

2. A pull-chain socket comprising, in combination, a lamp-receiving shell, a pair of spaced legs supporting said shell, switch mechanism mounted between said legs, an oscillatory actuating means located outside of said legs and having a portion projecting through one of said legs into engagement with said mechanism, and a bracket secured to said last mentioned leg forming a shield for said actuating means.

3. A pull-chain socket comprising, in combination, a lamp-receiving shell, a pair of spaced legs supporting said shell, a rotary switch positioned between said legs, switch-actuating means positioned exteriorly of said legs and projecting through one of said legs into engagement with said switch, a bracket secured to said last mentioned leg forming a shield for said switch-actuating means, and a floating shaft supporting said switch and said actuating means journaled at one end in said bracket and at the other end in the remote leg.

4. A pull-chain socket comprising, in combination, a lamp-receiving shell, a pair of spaced legs supporting said shell, a bracket secured to the outside of one of said legs, a rotary switch mounted between said legs, an oscillating switch-actuating member having a segmental chain supporting portion positioned between said bracket and said leg and a tubular portion journaled in said leg having a ratchet engagement with said switch, a lug on said bracket limiting the rotational movement of said actuating member, and a torsion spring acting in compression between said bracket and said member to retain it in engagement with said switch, said spring having one end attached to said segmental portion and the other end anchored to said lug.

5. A switching electric lamp socket comprising, in combination, a lamp-receiving shell, a metallic frame supporting said shell, said frame and said shell being insulated from each other, a center contact for said shell insulated therefrom and having an arm extending within said frame, a conducting strip in contact with said shell but insulated from said frame and having at its terminus a wire receiving terminal, a second wire terminal having a spring contact projecting into the space within said frame, and a movable switch member insulated from said frame and interposed between said arm and said spring contact.

6. An electric lamp socket having a shell, an elongated metallic frame having the shell secured to one end in insulated relation thereto, said frame having a pair of spaced parallel legs, a shaft mounted in said legs parallel to the base of the shell, wire terminals one secured to the shell and the other mounted on the frame but insulated therefrom, a conductor forming the center contact of the shell, a second conductor secured to the terminal on the frame, and a rotary switch member on said shaft insulated therefrom and adapted to coact with said conductors.

7. An electric lamp socket comprising, in combination, a lamp-receiving shell, a metallic frame supporting said shell but insulated therefrom, conducting means including a switch insulated from the frame and mounted within the space defined by the frame and forming with said shell the electric circuit of said socket, and means for actuating said switch mounted in spaced relation to the conducting means.

8. A pull-chain socket comprising, in combination, a lamp-receiving shell, a pair of spaced legs supporting said shell, a web rigidly connecting the free ends of said legs, said web projecting outwardly beyond said legs, a wire terminal supported by said web, a rotary switch member coacting with said terminal, an oscillatory switch actuating member located exteriorly of the space between said legs and projecting through one of said legs into engagement with said rotary member, and a pull-chain attached to said actuating

member and guided by a portion of said web projecting beyond said legs.

9. A lamp socket comprising, in combination, a lamp-receiving shell, a pair of spaced metallic legs supporting said shell but insulated therefrom, a center contact for said shell having an arm projecting between said legs parallel with the plane thereof, a rotary switch member mounted on an axis extending transversely of said legs, said switch member being in continuous engagement with said arm, a wire terminal having a spring contact engaging the periphery of said switch member, and a sheet of insulation interposed between said arm and one of said legs.

10. A lamp socket of the shell contact type comprising, in combination, a lamp-receiving shell, a pair of spaced legs supporting said shell, a shaft supported between said legs, a toothed insulating disk on said shaft, a conducting sheath for said disk comprising an annular ring and flanged segments at right angles thereto covering the peripheral faces of alternate teeth, a spring contact in engagement with the periphery of said disk, and a center contact for said socket having an annular ring encircling the shaft in continuous engagement with said sheath, both of said rings being out of contact with said shaft.

11. An electric lamp socket comprising, in combination, a lamp-receiving shell, a frame supporting said shell, a toothed insulating disk rotatably mounted in said frame, a conducting sheath for said disk having portions covering the peripheral surfaces of alternate teeth, a spring contact engaging the periphery of said disk to form therewith a switch for the circuit of the socket, and an insulating washer interposed between said sheath and said disk having alternate portions corresponding in contour to the shape of the teeth, the other portions being positioned opposite the uncovered teeth and projecting radially beyond the teeth to prevent contact between said sheath and said spring contact.

12. An electric lamp socket comprising, in combination, a lamp-receiving shell, a frame supporting said shell, a toothed insulating disk rotatably mounted in said frame, a conducting sheath for said disk having an annular ring portion and segmental portions covering the peripheral surfaces of alternate teeth, a spring contact engaging the periphery of said disk to form therewith a switch for the circuit of the socket, and an insulating washer interposed between said annular ring and said disk having portions placed opposite the uncovered teeth, which portions project radially beyond the periphery of said disk to prevent contact between said ring and said spring contact.

13. An electric lamp socket comprising, in combination, a lamp-receiving shell, a metallic frame supporting said shell in insulated relation, an electric circuit for said socket wholly independent of said frame, said circuit including said shell, conducting strips and a movable conducting member forming with said strips a switch for the circuit, each of said strips and member being fully insulated from said frame, switch actuating means mounted on said frame and operatively connected with said movable member, and a member of insulating material interposed between said switch actuating means and said movable conducting member to complete the insulating of the electric circuit from said frame and said switch actuating means.

14. An electric lamp socket comprising, in combination, a lamp-receiving shell, a metallic frame supporting said shell in insulated relation, said frame being adapted to be mounted directly on a metallic supporting conduit or the like, an electric circuit for said socket wholly independent of said frame, said circuit including said shell, conducting strips and a movable conducting member forming with said strips a switch for the circuit, switch actuating means mounted on said frame including a metallic pull chain extending along said frame and having an operative connection with said member, and a member of insulating material interposed between said switch actuating means and said movable conducting member, said conducting strips and movable member being completely insulated from said metallic frame to form with said shell an electric circuit wholly independent of said frame.

15. A pull chain socket comprising, in combination, a lamp-receiving shell, a pair of laterally spaced legs supporting said shell, a rotary switch positioned between said legs, oscillatory actuating means for said switch positioned outside of said legs, a shaft supporting said actuating means and rotatably supporting said switch and having reduced end portions, the leg adjacent said oscillatory actuating means having an aperture permitting the endwise insertion of said shaft therethrough, and a bracket secured to the outside of said last mentioned leg receiving the reduced portion of one end of said shaft, the reduced portion of the other end of said shaft terminating in the remote leg.

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