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ASSEMBLY MECHANISM FOR METAL SLEEVE BASE

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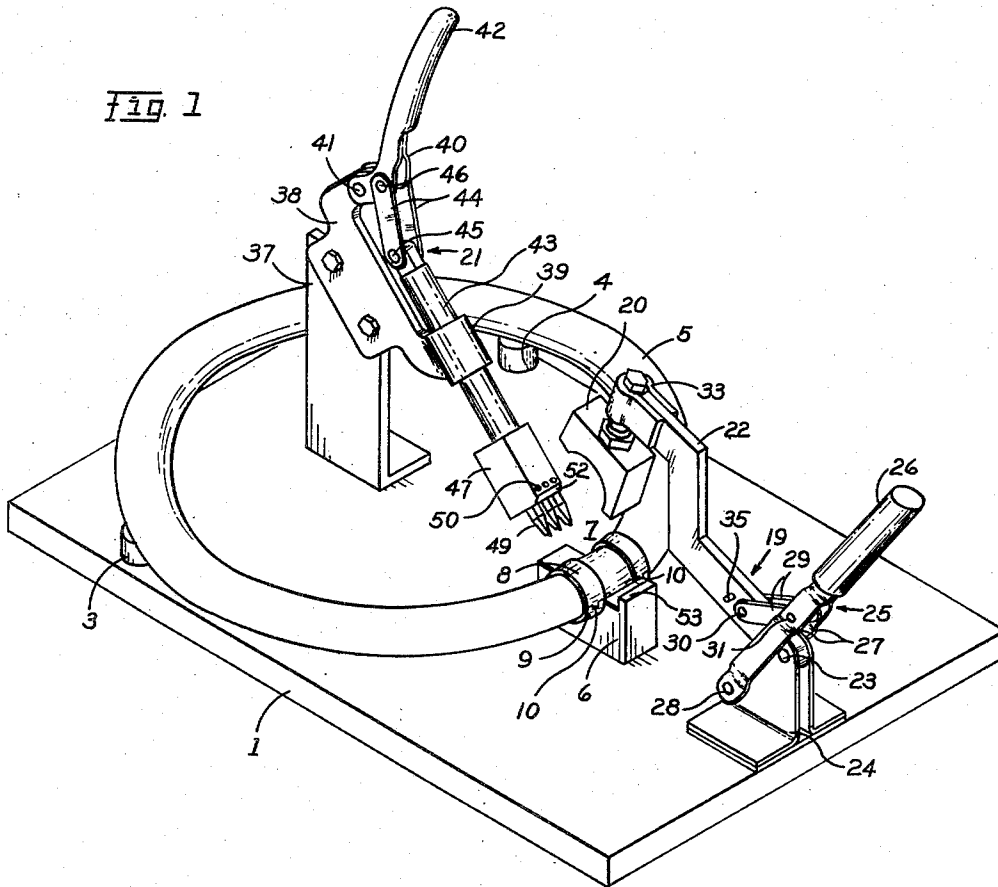
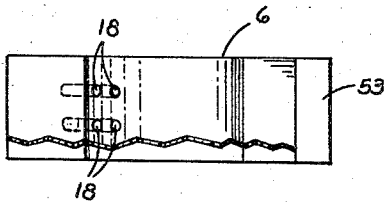


Fig 2



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1

2,813,330

ASSEMBLY MECHANISM FOR METAL SLEEVE
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2 Claims. (Cl. 29—282)

The present invention relates to an assembly mechanism for a metal sleeve base of the type disclosed and claimed in the copending application of Donald D. Hinman and the present applicant, Serial No. 317,674, filed October 30, 1952, now Patent No. 2,733,417, patented January 31, 1956, and assigned to the assignee of the present application.

As disclosed and claimed in the copending application, the metal sleeve base to be assembled by the mechanism of the present invention is for an electric lamp having a double-ended tubular glass envelope of substantially closed configuration with its ends juxtaposed and directed toward one another, such as the present commercial circular fluorescent discharge lamps. The base comprises a sheet metal sleeve having the same degree of curvature as the end portions of the lamp envelope and open ends to receive the juxtaposed ends of the lamp envelope. It is composed of two longitudinally extending, interlocking sleeve sections of flexible metal having corresponding overlapping longitudinal edges at least two of which are interlocking at their center portions only. The center portion of the assembled sleeve base is held in an inwardly flexed position by the interlocked edges of the sleeve sections, so that the base thus exerts a firm but yielding grip on the envelope ends embraced by the end portions of the sleeve to hold the base firmly and antiturningly on the envelope ends.

The principal object of the present invention is to provide an assembly mechanism of simple structure and operation for mounting and fastening such a metal sleeve base on the juxtaposed ends of a tubular lamp envelope of substantially closed configuration.

Another object of the invention is to provide a mechanism capable of holding an assembled base in a predetermined position on the ends of such a lamp envelope, inwardly flexing the center portion of the base sleeve sections and permanently interlocking overlapping portions of corresponding edges of said sleeve sections while the said center portions thereof are inwardly flexed to firmly attach the base on the lamp.

Still further objects and advantages of the invention will appear from the accompanying drawings, the appended claims and the following detailed description of a species thereof.

A feature of the assembly mechanism embodying the present invention is a support for holding the lamp envelope and the base sleeve sections in properly assembled relation, a locking toggle clamp for inwardly flexing the center portion of the assembled sleeve and a multiple punch movable into and out of the locked clamp at an angle suitable for punching through and locking together the wall of overlapping portions of the corresponding edges of the sleeve sections to secure the base on the ends of the lamp envelope.

In the accompanying drawings,

Fig. 1 is a perspective view of the assembly mechanism as seen from above with a circular tubular lamp envelope mounted thereon and a base positioned on the ends of

2

said envelope and in the base holding member of said mechanism;

Fig. 2 is a top plan view of the base holding member of said mechanism;

Fig. 3 is a side elevational, partly sectional view of the base engaging members of the mechanism and a metal base mounted therein, and

Fig. 4 is an elevational view on an enlarged scale of a base attached to the ends of a lamp envelope.

Referring to Figs. 1, 2 and 3 of the drawings, the assembly mechanism, herein illustrated in the form of a jig, comprises a flat support 1 provided with lamp positioning and support members including two studs 3 and 4 for supporting the circular tubular glass envelope 5 of a fluorescent lamp and a block member 6 for engaging and supporting the lamp base 7.

The base 7 shown in Figs. 1, 3 and 4 is of the type disclosed and claimed in the aforesaid copending application and described generally above. The base 7 comprises two longitudinal thin sheet metal sections 8 and 9 each extending, at least in part, slightly more than 180 degrees of the cross section of the base to make up a tubular sleeve which is slightly smaller in diameter at its center portion than at its open ends which engage the juxtaposed ends of the lamp envelope. The axis of the metal sleeve has substantially the same degree of curvature as the axis of the juxtaposed end portions of the circular tubular envelope. The corresponding longitudinal edges of the sleeve sections 8 and 9 overlap and lie generally in plane including the circular longitudinal axis of the tubular envelope 5.

The outer longitudinal edge of the curved sleeve section 8 is provided at its end and middle portions with tabs 10 and the corresponding edge of the section 9 is provided with slots 11 (Figs. 1 and 3). The tabs 10 fit into the slots 11 and are interlocked therewith by indents 12 provided in the tabs 10. Thus the sections 8 and 9 may be hinged together at said edges to facilitate assembly of the sleeve on the ends of the lamp envelope 1 and are locked together at said edges when the base is fastened to the lamp envelope as described below.

The inner longitudinal edges of the sleeve sections 8 and 9 also overlap but are adapted to be interlocked at their center portions only. Thus, as shown in Fig. 4, the sleeve section 9 has a center tab 13 which is positioned behind the center portion of section 8 when the base is assembled on the lamp envelope and is interlocked therewith by indents 14 punched therethrough as described below in fastening the base on the lamp envelope by the assembly jig.

The assembly jig is constructed and arranged as described hereinafter to apply inward pressure on the center portion only of the assembled sleeve to flex this portion inwardly before the tab 13 is affixed to the sleeve section 8. The ends of the lamp envelope terminate in the end portions of the assembled sleeve 8 and 9 as shown in broken lines in Fig. 4 so that the center portion thereof may be flexed inwardly without crushing the ends of the envelope. The end portions of the sleeve thus exert a firm but yielding grip on the ends of the lamp envelope embraced thereby to firmly hold the base on the envelope.

The base comprises also an insulating body 15 which is dimensioned to extend into the gap between the ends of the envelope 5 to limit relative longitudinal movement between the base and the envelope to less than that which would allow either end of the base to slip off either end of the envelope. Four spaced contact pins 16 are affixed to body 15 as shown in Figs. 3 and 4, and the insulating body is attached to section 9 of the base by straps (not shown) and completely covers an opening 17 in the side wall thereof. The usual externally extending insulated electric inlead wires for filamentary electrodes (not shown)

mounted in the ends of the sealed glass envelope 1 are connected to the contact pins in assembling the base on the lamp envelope.

After the base has been assembled on the ends of the lamp envelope as described above, and the lamp is complete except for the fastening of the tab 13 of the sleeve section 9 to the center portion of section 8, the lamp is mounted on the assembly jig with the base 7 positioned in the block 6 and the lamp envelope 1 resting on the studs 3 and 4 (Figs. 1 and 3). The block 6 engages the center portion only of the sleeve section 9 of the assembled base 7 and is provided with four spaced cavities 18 (Figs. 2 and 3) which receive the ends of the spaced contact pins 16 of the base. The studs 3 and 4, the block 6 and the cavities 18 in the block are so spaced and dimensioned with respect to the lamp parts supported and engaged thereby and with respect to each other that the assembled base 7 is so positioned around the ends of the lamp envelope 5 that, after the base has been clamped to the envelope by the jig, the curved longitudinal axis of the base 7 coincides with the projection of the curved longitudinal axis of envelope 5 and the overlapping longitudinal edges of the sleeve sections 8 and 9 lie generally in a plane including the circular longitudinal axis of the envelope.

The locking toggle clamp 19 of the assembly jig is provided with a jaw 20 which is shaped and dimensioned to engage the center portion only of the sleeve section 8 of the assembled base 7. The jaw 20 also engages the block 6 as shown in Fig. 3. The jaw 20 and the block 6 even in the closed position of the clamp do not extend completely around the circumference of the assembled base 7 but on the contrary define a gap (Fig. 3) giving access to the overlapping portions of the center tab 13 of the sleeve section 9 and the center portion of sleeve section 8 so that these portions may be permanently fastened together by the multiple punch 21 mounted on the support 1.

The jaw 20 of the toggle clamp 19 is mounted on an end of the lever arm 22 which has its opposite end pivoted at 23 on the stand 24 permanently fastened to the support 1. The movements of lever 22 and therewith jaw 20 are controlled by the forked lever arm 25 provided with a handle 26 at its free end and having its forks 27 pivoted at 28 on the stand 24. The lever arms 22 and 25 are connected by links 29 pivoted at 30 and 31 to the levers 22 and 25, respectively.

The pivot points of the levers 22 and 25 on the stand 1 and the links 29 on the levers 22 and 25 are arranged in such manner as shown in the drawing that as the handle 26 is moved inward of the jig from the position shown in Fig. 1 the jaw 20 is moved in the direction of the block 6. As the handle 26 is moved inward to bring the jaw 20 into engagement with the block 6 and the base 7 in the block, the pivot points 30 and 31 are moved relative to each other and relative to pivot 28 of lever 25 until the three pivots are aligned with each other and the free end of lever 22 is depressed fully. Further inward movement of the handle 26 tends to lift the free end of lever 22.

In the clamp 19 illustrated it is desirable to move the handle 26 inward beyond the point at which the free end of arm 22 is fully depressed, because the jaw 20 is secured to the arm by the bolt 32 (Fig. 3) slidable in the strap 33 welded to the arm 22 and is biased outwardly of the arm by the coiled metal spring 34 around the bolt and pressing against the arm 22 and the block 20. The spring 34 is compressed when the free end of arm 22 is fully depressed and remains under compression even when the said end of arm 22 is lifted slightly from its fully depressed position. Thus, the force of the spring 34 tending to lift the said end of arm 22 is made effective for locking the toggle clamp 19 in holding position when the pivot points 28 and 31 are on the side of pivot point 30 toward the free end of lever 22 by providing a stop in

the form of a fixed pin 15 extending through lever 22 and into the path of movement of the links 29 to limit the inward movement of lever 25 under the force exerted by spring 34.

The spring 34 is not completely compressed even when the free end of lever 22 is completely depressed. The force exerted by the clamp 19 on the assembled base 7 is determined solely by the stiffness of the spring 34. The spring 34 is stiff enough to flex the thin sheet metal of the center portions of sleeve sections 8 and 9 inward without imparting a permanent bend thereto. The surfaces of block 6 and jaw 20 engaging base 7 are preferably covered with a resilient sheet material 36 (Fig. 4), such as rubberized cloth, to assist in avoiding bends or kinks in the metal of the base, which is preferably sheet aluminum.

With the base 7 held as described above, the base sections 8 and 9 are permanently fastened together by the multiple punch 21 shown in Figs. 1 and 3 which comprises a metal stand 37 fastened to the flat support 1 and to which is bolted a metal yoke-shaped member 38. The member 38 has a sleeve 39 integral with one of its arms and a lever 40 pivoted at 41 on the other of said arms. The lever 40 has a handle 42 at its free end. The punch 21 also includes a shaft 43 extending through the sleeve 39 and reciprocal longitudinally therein. The shaft 43 is connected to the lever 40 by the links 44 pivoted at 45 to the end of the shaft and at 46 to the lever 40 at a point between the ends of the lever. A square chuck 47 is secured to the end of the shaft 43 and is held thereon by the set screw 48 (Fig. 3). Three nail punches 49 are set into cavities in the chuck 47 and are held therein by the set screws 50.

The nail punches 49 are dimensioned to move into and out of the gap between the block 6 and the jaw 20 and to pierce and thus fasten together the overlapped portions of the tab 13 and the sleeve section 8. The insulating member 15 of the base 7 has notches 51 therein, one of which is shown in Fig. 3, behind the overlapping areas of the tab 13 and the sleeve section 8 to be pierced by the respective nail punches 49.

Force applied to the handle 42 of the lever 40 to move it in a circular arc inward of the jig from the position shown in Fig. 1 is translated into a straight line motion by the links 44 and the shaft 43 to move the ends of the nail punches 49 inward through the gap between the block 6 and the jaw 20 a sufficient distance to pierce through the overlapping portions of the tab 13 and the sleeve section 8. The inward movement of the nail punches is limited by the bevelled edge 52 of the chuck 47 which engages jaw 20 to stop punches 49 after the piercing through of these base members. A shoulder 53 is provided on block 6 to hold jaw 20 stationary against the force of the impact of chuck 47.

As a result of the above-described combined operations of the assembly jig, the base 7 is permanently fastened on the ends of the lamp envelope 5 with the center portion thereof inwardly flexed and the end portions thereof exerting a firm but yielding grip on the embraced ends of the lamp envelope.

The based lamp is removed from the jig by first moving outward the handle 42 of the punch 21 to pull the ends of the nail punches 49 out of the base 7 and then moving outward the handle 26 of the clamp 19 to release the base 7. The based lamp then may be lifted from the assembly jig and another assembled base and lamp envelope mounted thereon for fastening the base to the envelope ends as described above.

What I claim as new and desire to secure by Letters Patent of the United States is:

1. An assembly mechanism for an electric lamp having a double-ended tubular glass envelope of substantially closed configuration with its ends juxtaposed and directed toward one another and a tubular base overlapping said envelope ends, enclosing the gap therebetween and com-

5

prising a metal sleeve having longitudinally extending interlocking sections of thin flexible metal having corresponding over-lapping longitudinal edges two of which are adapted to be interlocked at their center portions only, said mechanism comprising lamp support means including a base sleeve engaging block, clamp means mounted in operative relation to said block and having a movable jaw and including actuating means for moving said jaw into and out of pressing engagement with said block, said clamp means comprising also a compression spring mounted between said jaw and said actuating means, said jaw and said block being shaped and dimensioned to receive and press therebetween the center portion only of said base sleeve and said spring being of sufficient strength to flex said sleeve portion inwardly, the walls of said block and said jaw in the closed position of said jaw defining an outwardly opening gap opposite the center portions of the edges of the sleeve sections adapted to be interlocked at said portions only, said mechanism comprising also piercing punch means positioned and dimensioned to pass through said gap into piercing engagement with said overlapping edge portions of the base sleeve to interlock said portions.

2. An assembly mechanism for an electric lamp having a double-ended tubular glass envelope of substantially closed configuration with its ends juxtaposed and directed toward one another and a tubular base overlapping said envelope ends, enclosing the gap therebetween and comprising a metal sleeve having longitudinally extending interlocking sections of thin flexible metal having corresponding overlapping longitudinal edges two of which are

6

adapted to be interlocked at their center portions only, said mechanism comprising lamp support means including a base sleeve engaging block, clamp means mounted in operative relation to said block and having a movable jaw and including actuating means for moving said jaw into and out of pressing engagement with said block, said clamp means comprising also a compression spring mounted between said jaw and said actuating means, said jaw and said block being shaped and dimensioned to receive and press therebetween the center portion only of said base sleeve and said spring being of sufficient strength to flex said sleeve portion inwardly, the walls of said block and said jaw in the closed position of said jaw defining an outwardly opening gap opposite the center portions of the edges of the sleeve sections adapted to be interlocked at said portions only, said mechanism comprising also piercing punch means positioned and dimensioned to pass through said gap into piercing engagement with said overlapping edge portions of the base sleeve to interlock said portion, said punch means including a chuck engageable with said jaw to limit the inward movement of said punch on piercing of the said base edge portions.

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