Oct. 9, 1945. D. S. SMALL 2,386,361

RADIO TUBE TONGS

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Fig. 1

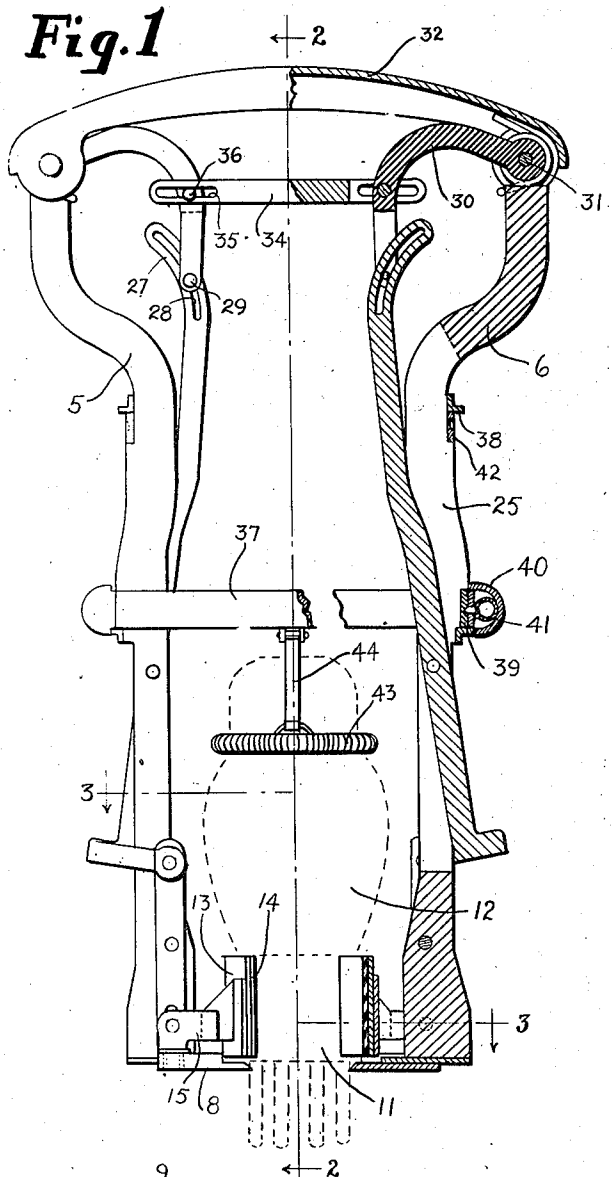
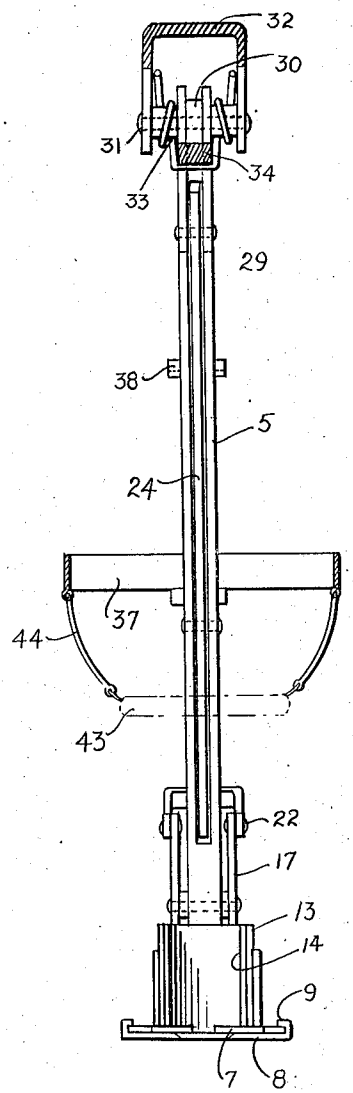


Fig. 2



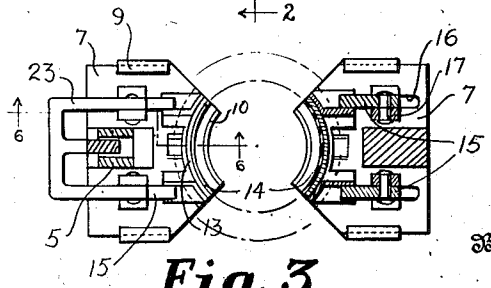


Fig. 3

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RADIO TUBE TONGS

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Fig. 4

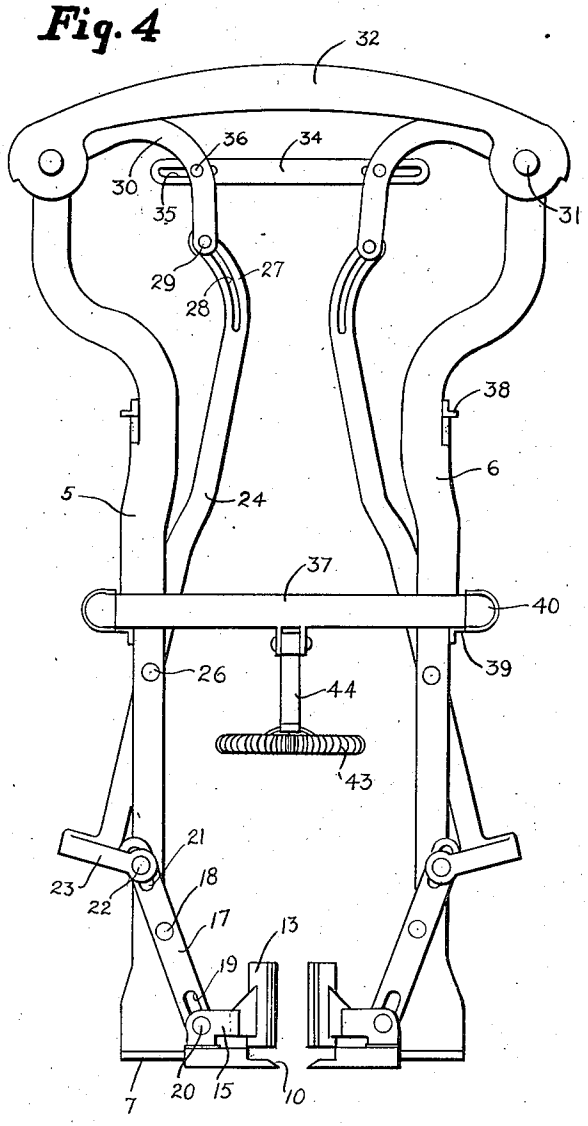


Fig. 5

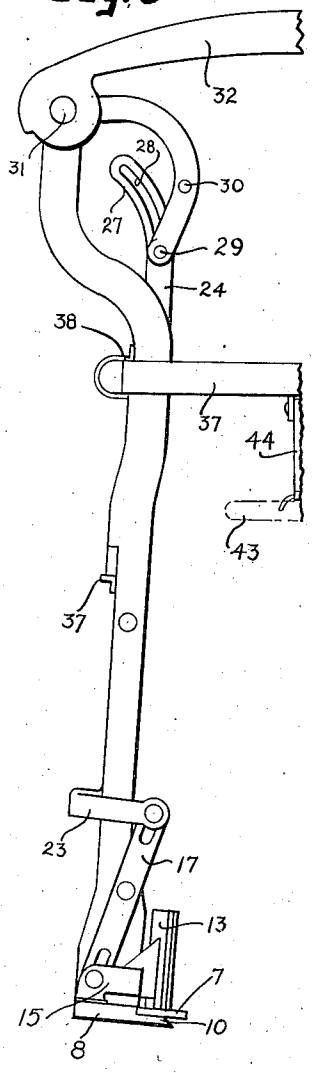
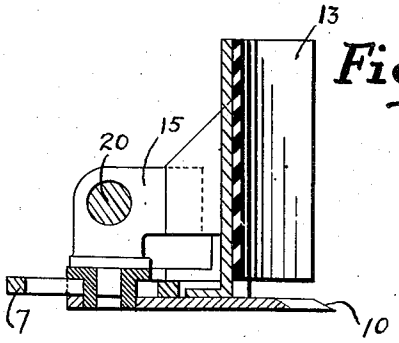


Fig. 6



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RADIO TUBE TONGS

David S. Small, Philadelphia, Pa.

Application February 2, 1945, Serial No. 575,790

5 Claims. (Cl. 294—115)

The present invention relates to new and useful improvements in radio tube tongs and has for its primary object to provide convenient, dependable and safe means for inserting radio tubes into their sockets and removing the tubes therefrom.

An important object of the present invention is to provide a device of this character which may be applied with equal facility to either glass bulb or metal type radio tubes and adaptable for use upon a relatively wide range of sizes of tubes.

A further important object of the invention is to provide means for gripping the tube adjacent its base as well as adjacent its upper portion to firmly hold the tube in an upright position while inserting or removing the same.

More specifically, the invention embodies a pair of laterally slidable cooperating jaws for gripping the base of the tube together with a pair of legs pivotally connecting a handle to the jaws and operating means for the jaws extending to a position under the handle and adapted for engagement by the fingers of a person whereby the action of gripping the handle will result in a closing movement of the jaws to firmly grip the base of the tube.

Another object of the invention is to provide means for moving the lower ends of the legs toward each other in a direction to close the jaws independently of the jaw actuating means carried by the handle.

A still further object is to provide a device of this character of simple and practical construction, which is efficient and dependable in opera tion, relatively inexpensive to manufacture and otherwise well adapted for the purposes to which the same is intended.

Other objects and advantages reside in the details of construction and operation as more fully hereinafter described and claimed, reference being had to the accompanying drawings forming part hereof, wherein like numerals refer to like parts throughout, and in which:

Figure 1 is a view in elevation with parts broken away and shown in section and showing the device in position for grippng a radio tube.

Figure 2 is a vertical sectional view taken substantially on a line 2—2 of Figure 1.

Figure 3 is a fragmentary sectional view taken substantially on a line 3—3 of Figure 1.

Figure 4 is a view in elevation showing the tube gripping jaws in closed position.

Figure 5 is a fragmentary elevational view showing one of the jaws in open position.

Figure 6 is an enlarged vertical sectional view taken substantially on a line 6—6 of Figure 3.

Referring now to the drawings in detail wherein for the purpose of illustration I have disclosed a preferred embodiment of the invention, the numerals 5 and 6 designate a pair of legs each having a flange 7 at its lower end. A foot plate 8 is slidably mounted under each of the flanges 7, the opposite edges of the foot plate 8 having inwardly projecting flanges 9 overlying the side edges of the flanges 7 to slidably connect the foot plate on the flanges 7 on the lower ends of the legs.

The inner edges of the plates 8 are curved and beveled as shown at 10 for riding under the base 11 of a radio tube 12.

To the upper surface of the plate 8 adjacent its inner edge is an upstanding arcuate plate 13 having a resilient lining 14 for contacting the base of the tube to prevent injury thereto. The arcuate plates 13 are connected to the plates 8 by means of brackets 15 slidable in slots 16 of the flanges 7.

A pair of links 17 are positioned at opposite sides of each of the legs 5 and 6 and pivoted intermediate the ends of the links to the legs by pins 18, the lower ends of the links having vertically extending slots 19 therein in which pins 20 carried by the brackets 15 are slidably received.

The upper ends of the links 17 likewise are formed with longitudinally extending slots 21 slidably receiving pins 22 carried at the inwardly projecting ends of lateral extensions 23 formed at the lower ends of levers 24 which extend upwardly through vertical slots 25 in the legs and pivoted thereto by means of pins 26.

The upper ends of the levers 24 are curved outwardly as shown at 27 and formed with arcuate slots 28 in which a pin 29 is slidably received, the pin being formed on the lower end of an arcuate link 30 having its upper end projecting outwardly and pivoted on a pin 31 carried at the upper end of the leg.

A handle 32 also has its end pivoted on the pins 31 of the respective legs 5 and 6 and coil springs 33 are mounted on each of the pins 31 and have their ends bearing respectively against the handle 32 and the inner edge of an adjacent leg to yieldably urge the lower ends of the legs outwardly.

A manipulating bar 34 is positioned beneath the handle 32 and is formed with longitudinally extending slots 35 adjacent each end slidably re-

ceiving pins 36 carried by an intermediate portion of each of the links 30.

An annular member 37 extends around the intermediate portion of the legs 5 and 6 and is slidable vertically thereon, the vertical sliding movement of the member 37 being limited by upper and lower stops 38 and 39 secured to the respective legs.

The annular member 37 is provided with housings 40 at diametrically opposite sides thereof and in each of which is positioned a spring projected pin 41 slidably mounted in an opening in the annular member and adapted for seating in recesses 42 in the edges of the respective legs 5 and 6 immediately adjacent the stops 38 and 39 whereby to secure the annular member in either its raised or lowered position.

An endless coil spring 43 is supported beneath the annular member 37 by means of a pair of flexible straps 44, the coil spring being adapted to receive the upper end of the tube 12 to secure the tube in its upright position against tilting movement as indicated in Figure 1 of the drawings during the insertion and removal of the tube.

In the operation of the device the legs 5 and 6 may be moved into open or closed position by sliding the annular member 37 vertically on the legs, the springs 33 serving to move the lower ends of the legs away from each other into their open position upon an upward movement of the annular member 37. The downward movement of the annular member 37 will close the legs and at the same time position the coil spring 43 over the top of the tube 12.

The sliding jaws composed of the upstanding arcuate plates 13 may be closed or opened as desired through the medium of the cross bar 34 and handle 32 which connect the jaws by means of the links 17, levers 24 and links 30 carried by each of the legs. To close the jaws the operator first applies his hand to the handle 32, passing his fingers under the cross bar 34. Then by merely closing his hand upon the handle and the cross bar the cross bar is drawn upwardly toward the handle, thus causing the links 30 to swing inwardly and upwardly and moving the upper ends of the levers 24 inwardly into the position as shown in Figure 4 of the drawings. This inward movement of the upper ends of the levers 24 will move the lower ends of the levers outwardly thereby pivoting the links 17 to move the upper ends of the latter outwardly and move the lower ends thereof inwardly in a direction to cause the jaws to engage the tube and to slide the bevel ends 10 of the plate 8 under the base of the tube to assist in raising the tube and withdrawing the prongs of the tube from the tube socket.

The jaws 13 are moved outwardly with respect to the tube by releasing the grip on the cross bar 34.

In view of the foregoing description taken in conjunction with the accompanying drawings it is believed that a clear understanding of the construction, operation and advantages of the device will be quite apparent to those skilled in this art. A more detailed description thereof is accordingly deemed unnecessary.

It is to be understood, however, that even though I have herein shown and described a preferred embodiment of my invention that the same is susceptible to certain changes fully comprehended by the spirit of the invention as herein described, and the scope of the appended claims.

Having thus described the invention, what I claim is:

1. A radio tube applying and removing tool comprising a handle, a pair of legs pivoted at their upper ends to the ends of the handle, a pair of jaws slidably carried at the lower ends of the legs and adapted for movement toward and away from the opposite sides of a tube, a cross bar positioned beneath the handle and mechanism operatively connecting the cross bar to said jaws for actuating the jaws upon a raising and lowering movement of said cross bar.

2. A radio tube applying and removing tool comprising a handle, a pair of legs pivoted at their upper ends to the ends of the handle, a pair of jaws slidably carried at the lower ends of the legs and adapted for movement toward and away from the opposite sides of a tube, a cross bar positioned beneath the handle, a pair of links pivotally attached at the ends of the handle, means pivotally and slidably connecting the ends of the cross bar to intermediate portions of said links, levers pivotally and slidably connected at their upper ends to the lower ends of said links, means pivotally connecting the intermediate portions of the levers to the respective legs and links pivotally connecting the lower ends of the levers to the respective jaws for operating the jaws upon a raising and lowering movement of said cross bar.

3. A radio tube applying and removing tool comprising a handle, a pair of legs pivoted at their upper ends to the ends of the handle, spring means urging the lower ends of the legs into open position, a ring surrounding the legs and slidable thereon to open and close the legs, a pair of jaws slidably mounted on the lower ends of the legs and adapted for movement toward and away from opposite sides of a tube, and means attached at the ends of the handle and operatively connected to the jaws for actuating the jaws independently of the movement of the legs.

4. A radio tube applying and removing tool comprising a handle, a pair of legs pivoted at their upper ends to the ends of the handle, spring means urging the lower ends of the legs into open position, a ring surrounding the legs and slidable thereon to open and close the legs, a pair of jaws slidably mounted on the lower ends of the legs and adapted for movement toward and away from opposite sides of a tube, a knife edge on the opposed edges of the jaws adapted for riding under the base of the tube, and means attached to the ends of the handle and operatively connected to the jaws for actuating the jaws independently of the movement of the legs.

5. A radio tube applying and removing tool comprising a handle, a pair of legs pivoted at their upper ends to the ends of the handle, spring means urging the lower ends of the legs into open position, a ring surrounding the legs and slidable thereon to open and close the legs, a member carried by the ring and adapted for placing over the upper portion of a tube, a pair of jaws slidably mounted on the lower ends of the legs and adapted for gripping the base of the tube, and means attached at the ends of the handle and operatively connected to the jaws for actuating the jaws independently of the movement of the legs.

DAVID S. SMALL.