April 1, 1930. H. D. GRINNELL 1,752,737

DEVICE FOR PLACING AND REMOVING LAMP BULBS

Filed March 13, 1928 2 Sheets-Sheet 1

Fig. 1.

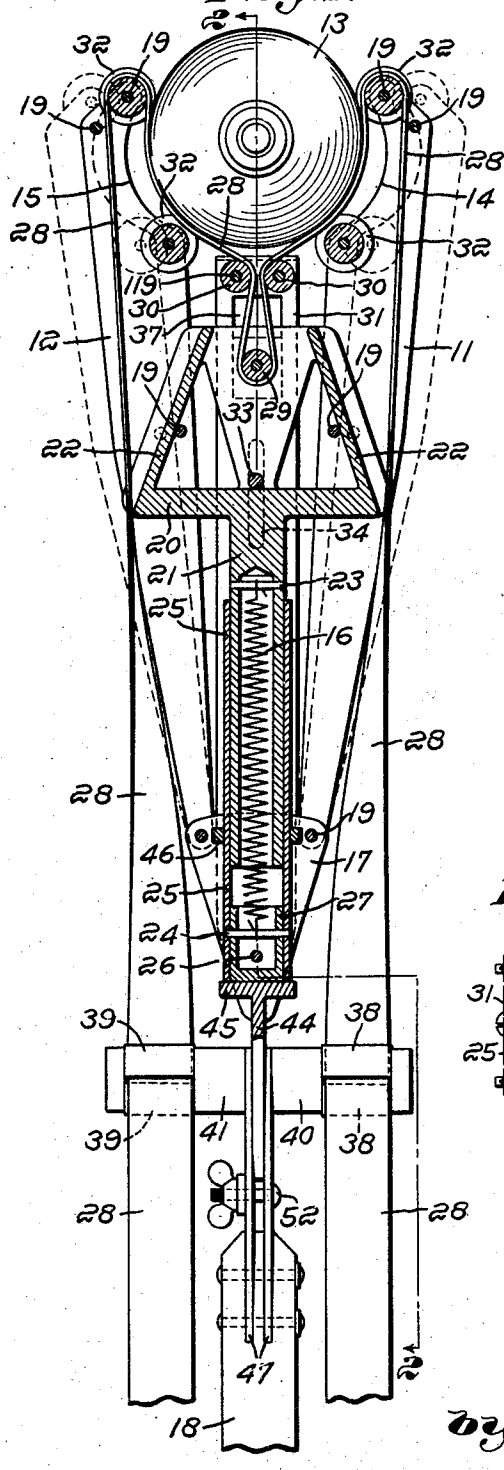


Fig. 2.

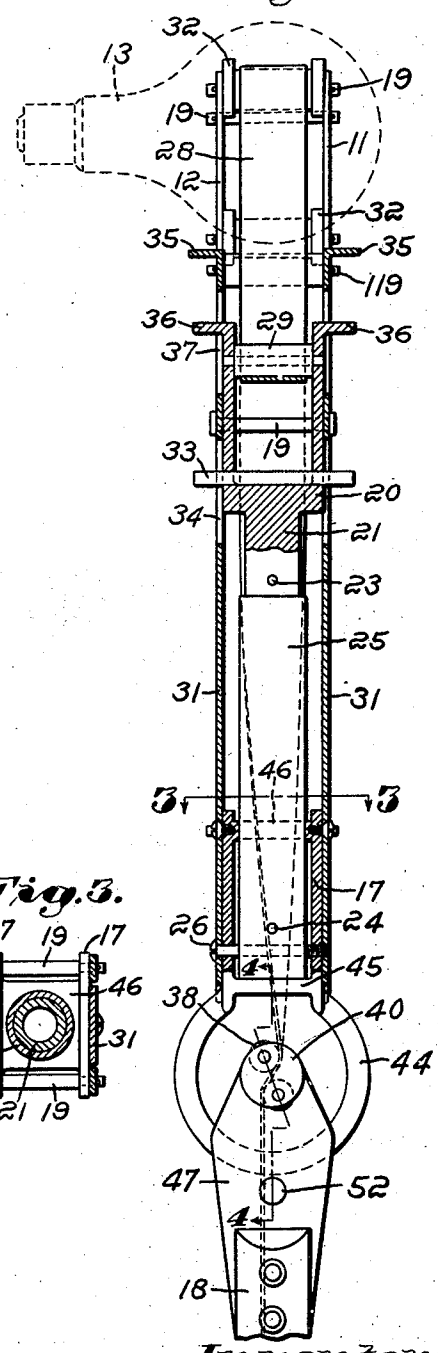


Fig. 3.

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Fig. 4.

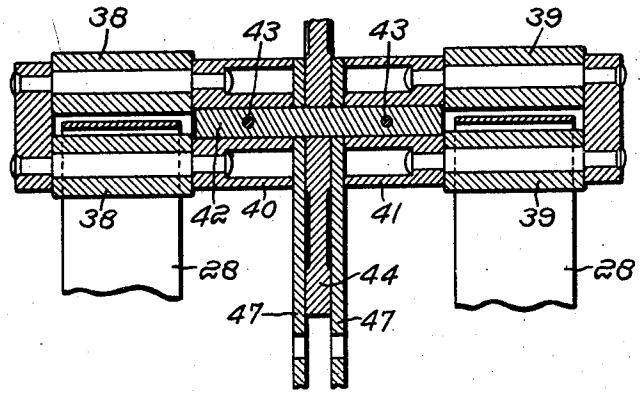
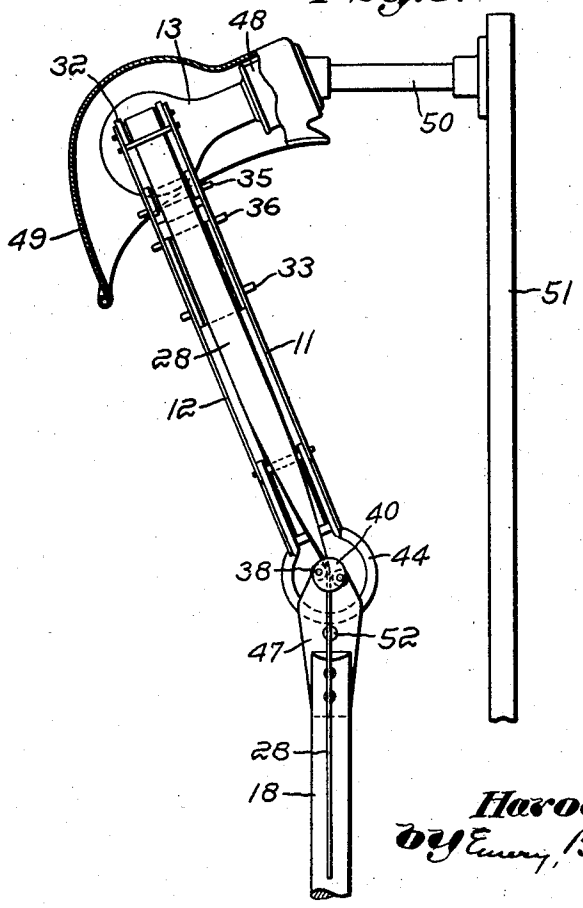


Fig. 5.



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UNITED STATES PATENT OFFICE

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DEVICE FOR PLACING AND REMOVING LAMP BULBS

Application filed March 13, 1928. Serial No. 261,236.

This invention relates to improvements in apparatus for placing and removing incandescent lamp bulbs, and aims to provide novel and improved means for manually performing these operations. Although not restricted thereto, my present invention is designed more particularly with respect to lamps mounted in elevated positions and associated with reflectors of such size and shape that removal of the lamp can be effected only by presentation of the gripping medium laterally thereto, and not endwise, as is the usual practice with respect to incandescent lamps generally.

The invention will best be understood from a description of a specific useful embodiment thereof, illustrated in the accompanying drawings, wherein,—

Fig. 1 is a side elevation, partly in longitudinal section, showing my device operatively assembled and applied to a lamp bulb;

Fig. 2, an edge view of the same, also partly in section, on the line 2—2 of Fig. 1;

Fig. 3, a detail cross section of the lower portion of the gripping mechanism on the line 3—3 of Fig. 2;

Fig. 4, a vertical section on the line 4—4 of Fig. 2, showing the construction and complementary relationship of the belt guides, and

Fig. 5, a side elevation of a lamp bulb, bracket and reflector of the type above referred to, with my device operatively applied to the lamp.

In the present embodiment of my invention, the gripping mechanism by which the lamp bulb is seized and manipulated comprises a pair of clamping arms 11, 12 moving in a plane to intersect, preferably at substantially a right angle, the axis of the bulb 13 and providing complementary jaws 14, 15, adapted to engage the lamp bulb about its middle, as shown in Figs. 2 and 5. Constant yielding pressure, supplied preferably by means of a coil contraction spring 16, hereinafter more particularly referred to, is exerted upon the jaws to actuate them toward each other and to assume the normally closed position for gripping the lamp bulb on opposite sides of its surface. The measurement of the jaws in cross section is designed to afford adequate lengthwise engagement of the bulb for gripping purposes and at the same time to allow sufficient clearance on both sides to avoid engagement with the lamp shade, particularly of the close fitting elliptical type shown in Fig. 5, and the like. The clamping arms 11, 12 are pivoted at their lower ends to a swivel head 17 carried on the upper end of a rod 18 of indeterminate length, each of said arms being preferably of open structure formed of metal plates held in parallel spaced relation by a plurality of spreader pins 19 disposed at convenient points in its length, those at the lower ends of the arms being supported on the swivel head 17 and adapted to serve as hinges for the respective arms.

The clamping arms are held in normally closed position by means of a wedge-shaped thrust member 20 of open structure disposed between the arms and operating lengthwise thereof and having a downwardly extending hollow shank 21 enclosing the spring 16. The converging side walls 22 of the thrust member are adapted to ride on respective spreader pins 19 whereby a downward movement of the thrust member will draw the clamping arms inward and hold them in gripping relation with respect to the lamp bulb, while release of the latter is effected by a reversal of the action of the thrust member, thus permitting the clamping arms to be spread apart. Downward movement of the thrust member and consequent closing of the clamping arms is obtained through the medium of the coil spring 16, above referred to, the upper end of the spring being secured by suitable means, such as the cross pin 23, to the corresponding end of the shank while the lower end of the spring which projects below the shank is secured in like manner and held under tension at all times by a pin 24 transversely secured through the walls of a tubular guide casing 25 mounted on the head 17 and closing said shank, said casing being suitably secured to said head, as by a separate cross pin 26. Within the casing 24 and enclosing the lower end of the spring 16, is preferably provided a casing reinforcing

member, herein shown in the form of a metallic socket 27.

The jaws 14, 15 of the clamping arms viewed laterally are suitably concaved in outline to roughly correspond to the convex surface of the lamp bulb and to afford proper receptivity therefor. Elevation of the thrust member 20 to permit spreading of the jaws for receiving or ejecting the lamp bulb is accomplished by means of a flexible belt 28 of indeterminate length looped at its middle about a cylindrical roller 29 transversely journaled in the upper end of the thrust member, the opposite ends of the belt being thereafter passed first between a pair of similar rollers 30, 30 supported in adjacent parallel relation between the upper extremities of upright side plates 31, 31, fixed at their lower ends to the swivel head 17 and interposed between the clamping arms on either side of the device, the upper ends of said side plates being secured together by spreader pins 119, similar to the pins 19, which support the rollers 30. The ends of the belt are then carried over a series of spools 32, herein shown as four in number, journaled in the clamping arms 11, 12, two on either side and in each of the jaws 14, 15, and extended downward from the topmost spools at the upper extremities of the clamping arms on either side of the device to points within reach of the operator, sufficient overplus being allowed for coursing the belt freely in either direction.

While the spools 32 serve as guides for the lamp bulb, tending to maintain the latter on its proper axis in rotation and to correct any wobbling tendencies due to improper initial insertion of the lamp, their primary function, is to carry the belt and to present for engagement with the lamp bulb as large a portion of its surface as practicable within the limits of the jaws.

The belt 28 is preferably constructed of woven fabric, leather, or other flexible material adapted to provide gripping surface which will not readily glaze nor tend to fracture the material of the bulb.

As before indicated, elevation of the thrust member to spread the clamping members is accomplished by a downward pull exerted by the operator on both ends of the belt simultaneously. This action tends to straighten and render taut the portions of the belt underlying the bulb and hence, when sufficiently vigorous, to eject the bulb from the holder. On the other hand to rotate the bulb in one direction or the other for the purpose of screwing in or out of its socket, the operator is required to pull the appropriate end of the belt continuously in one direction.

Guidance of the thrust member 20 in its movements is preferably facilitated by the provision of studs 33, one on either side, which are adapted to register with suitable vertical slots 34 provided in the side plates 31, while manipulation of the jaws 14, 15 independently of the belt 28, is accomplished by the provision of suitable means, such as the laterally projecting lips 35, 36 (Fig. 2) on either side of the holder, which are adapted to be compressed by the operator in opposition to the action of the spring 16, one of the lips being formed or secured to the side plate 31, and the other to the thrust member 20, the latter being extended through a suitable opening 37 in the respective side plate.

The belt ends extending down on opposite sides of the rod 18 are guided in their movements and supported in parallel relation preferably by four anti-friction rollers 38, 39 arranged in pairs and journaled in aligned stud members 40, 41 provided on opposite sides of the joint connecting the lamp holder and the rod, said stud members having registering axial recesses adapted to receive an axle 42, which is secured therein, as by transverse pins 43.

The swivel head 17, forming the connection between the rod 18 and the lamp holder, is herein shown as a casting having a vertically arranged dial base 44, suitably bored at its center to receive the axle 42, on which the head pivots for adjustment of the holder at any desired angle with respect to the rod 18. Integrally united to the base 44 is an open superstructure comprising a horizontal seat portion 45 supporting the casing 25, upright side members, specifically indicated at 17, for attachment of the clamping arms 11, 12 and a yoke 46 connecting the upper ends of the side members and having a bore to receive the casing 25.

Seated in vertically arranged slots in the upper end of the rod 18 and suitably secured in fixed position thereon are shown two clamping plates 47 arranged on opposite sides of the dial base 44 for gripping engagement therewith, the upper ends of these plates being apertured to receive the axle 42 and forming a bearing for the stud members 40, 41.

To insert or remove the lamp bulb from its socket 48 it is frequently necessary to first adjust the lamp holder at an angle to the rod, owing to the angular position assumed by the lamp itself. As illustrated in Fig. 5, the lamp 13 and elliptically formed shade 49 partially surrounding it, as well as the lamp socket, are arranged at a downwardly inclined angle with respect to the bracket 50, the light of the lamp being reflected upon the wall 51 or other vertical support. To accommodate the holder to these conditions and to present the clamping arms laterally to the lamp bulb, the holder is swung on its axis to assume an angular position with respect to the rod, being then secured in the desired position by suitable means, such as an adjustable clamp 52 transversely secured through the plates 47 somewhat below the

dial base 44 and operable to compress the plates firmly against the opposing faces of the base 44.

It will be understood that the embodiment of my invention herein shown is intended as illustrative and not restrictive, and that obvious changes may be made therein without departing from the generic purpose and principles of the invention.

I claim as my invention:

1. In a device for inserting and removing lamp bulbs in and from lamp sockets, in combination, means for gripping the lamp bulb, said means being disposed to receive the bulb by movement laterally toward it, means for actuating said gripping means, and means for rotating the lamp bulb in the gripped position, every part of said gripping means during application thereof to, engagement with, and withdrawal from, the lamp bulb being disposed wholly intermediate planes at opposite ends of the lamp bulb and transverse to the longitudinal axis of said bulb.

2. A device for inserting and removing lamp bulbs in and from lamp sockets comprising, in combination, gripping means, including arms having jaws for engaging the lamp bulb on opposite sides thereof and operating in a plane transverse to the longitudinal axis of the lamp bulb, means for actuating the gripping means, and means for rotating the lamp bulb while in the gripped position in either of opposite directions.

3. In a device of the class described, gripping mechanism for engaging a lamp bulb laterally, and actuating means therefor, said gripping means including arms having jaws movable toward and away from each other, said jaws when applied to the lamp bulb being disposed in the spaced position and moved toward the bulb in a plane transverse to the axis and intermediate the ends of the bulb, and means for rotating the bulb when engaged by said gripping mechanism in either of opposite directions without moving said arms.

4. In a device of the class described, in combination, jaw members, means for moving the jaws toward and away from each other and including a thrust member and a pull member cooperatively associated with the thrust member, said pull member being operable to engage with and to rotate a lamp bulb.

5. In a device of the class described, in combination, a pair of jaws adapted to be moved toward and away from each other and to receive a lamp bulb, and means operable to spread the jaws, including a circulatory belt within the jaws for seating and rotating the lamp bulb.

6. In a device of the class described, in combination, a rod, gripping mechanism pivotally mounted on one end of the rod and including clamping arms adapted to be moved toward and away from each other independently of the action of the gripping mechanism assembly, said clamping arms and said gripping mechanism assembly being operable in planes bisecting each other, spring actuated means for closing the clamping arms, and separate means cooperatively associated with said closing means, for spreading the clamping arms, and including a circulatory belt carried on the clamping arms and providing means for rotating a lamp bulb.

7. In a device of the class described, in combination, a rod, clamping arms pivotally secured to one end of the rod and having jaws to receive a lamp bulb, and means for opening and closing the jaws, including a circulatory belt carried on the clamping arms and providing a medium for seating and engaging the lamp bulb, said belt being operable in association with said clamping arms to rotate and eject the lamp bulb.

8. In a device of the class described, in combination, a rod, gripping mechanism mounted on one end of the rod and including clamping arms for receiving a lamp bulb, and means for opening and closing the clamping arms, including a circulatory belt carried on the clamping arms and adapted for seating and rotating the lamp bulb, said belt being extended downward along the rod to within reach of the operator and adapted to be operated by one hand while the rod is held by the other hand of the operator.

9. In a device of the class described, in combination a support, arms pivoted at one end to the support and having their opposite ends free to be moved toward and away from each other, self-acting means tending to actuate the arms into the closed position, a circulatory belt carried on the free ends of the arms and providing a medium for seating and rotating a lamp bulb, and rotary members journaled on said arms for supporting and maintaining the belt in position for engagement with the lamp bulb, said rotary members being effective to guide the movements of the lamp bulb.

10. In a device of the class described, in combination, a support, arms pivoted at one end to the support and having opposite ends adapted to be swung toward and away from each other, self-acting means including a reciprocating member tending to actuate the arms inward, and a circulatory belt carried on the free ends of the arms for rotating a lamp bulb, said belt being cooperatively associated with said reciprocating member to elevate the same when said arms are spread apart.

11. In a device of the class described, in combination, a rod, gripping mechanism pivotally secured to one end of the rod and including jaw members actuable toward and

away from each other, a circulatory belt carried on the jaw members and providing a medium for seating and rotating a lamp bulb, said belt being extended downward on opposite sides of the rod into position to be grasped by the operator, and anti-frictional means provided on opposite sides of the rod adjacent the point of connection with said gripping mechanism for supporting and guiding the downwardly extending portions of said belt.

12. In a device of the class described, in combination, a rod, gripping mechanism carried on one end of the rod and arranged to be swung in either of opposite directions, said mechanism including jaw members adapted to be moved toward and away from each other in a plane transverse to the longitudinal axis of a lamp bulb, means for actuating the gripping mechanism and a flexible circulatory medium operable from the opposite end of the rod for engaging and rotating the lamp bulb.

13. In a device of the class described, in combination, a rod, arms pivotally secured to one end of the rod and adapted to be moved toward and away from each other for gripping a lamp bulb, said arms being collectively adjustable on said rod and adapted to be swung as a unit in either of opposite directions in a plane transverse to the plane of their individual movement, and means for actuating the arms into and out of the gripping position, including a circulatory medium carried on the arms for engaging and rotating the lamp bulb, said arms being disposed and operated relatively to each other in a plane intermediate the ends of the lamp bulb and transverse to the longitudinal axis thereof.

In testimony whereof, I have signed my name to this specification.

HAROLD D. GRINNELL.