July 28, 1925.

1,547,706

J. B. WHITMORE ET AL

LAMP MAKING MACHINE

Filed Jan. 18, 1922

FIG. 1

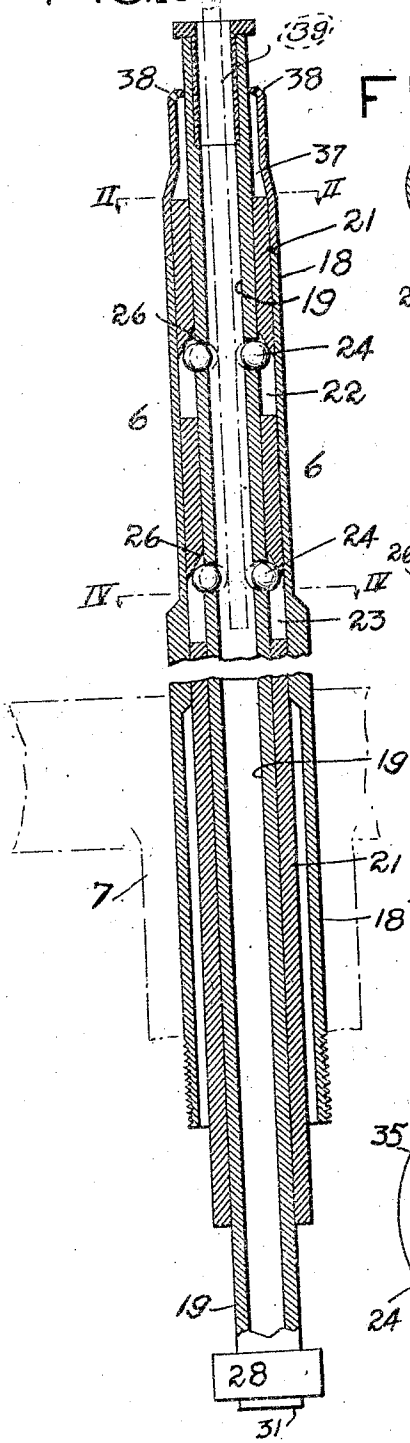
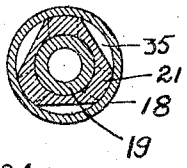


FIG. 2.



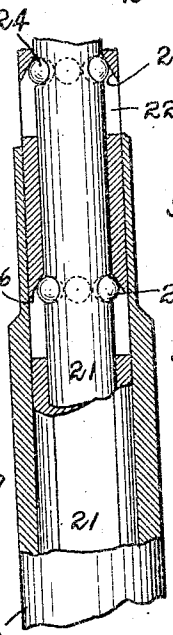


FIG. 3.

FIG. 4.

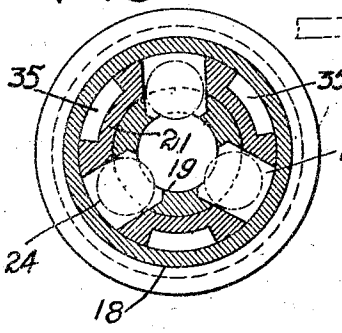
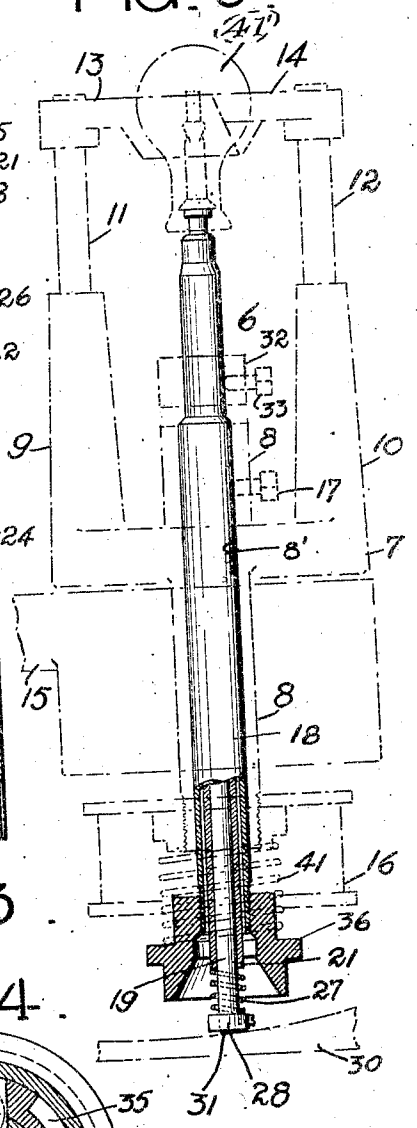


FIG. 5



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UNITED STATES PATENT OFFICE.

JAMES BRYANT WHITMORE AND JOHN EBLING FERGUSON, OF BLOOMFIELD, NEW JERSEY, ASSIGNORS TO WESTINGHOUSE LAMP COMPANY, A CORPORATION OF PENNSYLVANIA.

LAMP-MAKING MACHINE.

Application filed January 18, 1922. Serial No. 530,149.

To all whom it may concern:

Be it known that we, JAMES BRYANT WHITMORE, a citizen of the United States, and a resident of Bloomfield, in the county of Essex and State of New Jersey, and JOHN EBLING FERGUSON, a citizen of the United States, and a resident of Bloomfield, in the county of Essex and State of New Jersey, have invented a new and useful Improvement in Lamp-Making Machines, of which the following is a specification.

This invention relates to mechanism employed in the manufacture of incandescent electric lamps of the tipless type and more particularly to a holder for supporting the mount of such lamps during their consolidation with the bulbs thereof.

One object of the invention is to provide a support or chuck in which the exhaust tube of a mount may be quickly and conveniently inserted for disposition in a given relation to the bulb.

Another object is to provide a chuck which shall automatically align the axial line of a mount coincident with the axial line of a positioned bulb.

A further object is to provide a supporting device which shall support a mount in such manner as to avoid accidental movement thereof, during successive operations that are necessary to the manufacture of a lamp.

The manufacture of incandescent electric lamps demands a comparatively high degree of accuracy during the operation in which the lamp bulb is sealed to the mount, the latter including the internal structure of the lamp together with the filament. In the tipless type of incandescent electric lamps, the mount is provided with an exhaust tube for the purpose of affording communication to the interior of the bulb after the mount is sealed thereto, such communication being necessary for evacuating the lamp. It is common in lamp-making machinery to support the mount, while it is being sealed to the bulb, by means of the exhaust tube, a holder or chuck being employed for that purpose.

Owing to the required accuracy when juxtaposing the mount with respect to the bulb, the former must be positioned with its axial line coincident with the axial line of the bulb, which is supported by a part of the mechanism termed the sealing-in head. The head is provided with means for supporting the bulb with its axial line coincident with that of the head.

The present invention meets the above-mentioned requirements by providing a holder or chuck in which the exhaust tube of a mount may be inserted and quickly gripped, and centered with its axial line coincident with the axial line of the bulb, positioned in a sealing-in head. Furthermore, it provides a chuck which requires no manual adjustment for securing tubes of different diameters.

The invention will be more fully understood by reference to the accompanying drawing in which,

Fig. 1 is a vertical sectional view of the improved mount-holder;

Fig. 2 is a transverse section of the mount-holder, taken on line II—II, indicated in Fig. 1;

Fig. 3 is a fragmentary view of Fig. 1, partly in section, showing, more clearly, the member which carries the jaws;

Fig. 4 is an enlarged transverse section of the mount-holder taken on line IV—IV, indicated in Fig. 1; and

Fig. 5 shows the mount-holder in association with the sealing-in head of a lamp-making machine, the lower portion of the mount-holder being in section.

The mount-holder illustrated in the drawing comprises an outer casing having an internal tubular member for carrying a plurality of sets of gripping jaws, each set of jaws being so disposed as to provide a three-point contact for engaging an object inserted within the holder. The gripping jaws may be actuated by the vertical reciprocation of the tubular member, any suitable means being employed for this purpose.

In the drawing, my improved mount-holder is, as a whole, designated by the reference numeral 6, and in Fig. 5 it is shown associated with what is termed a sealing-in head, as commonly employed in semi-automatic machines for sealing electric lamp bulbs to the mounts. The sealing-in head is

indicated in dotted lines and may comprise a standard 7 having a central bearing or hollow shaft 8 and a pair of laterally disposed bearings 9 and 10 in which shafts 11 and 12, respectively, are mounted rotatably. The shafts are usually provided with arms 13 and 14 upon which any suitable form of jaws may be carried, one being secured to the end of each arm. A bulb may be supported by the jaws in a given relationship to a mount, that is, carried by the holder, and the arms 13 and 14 may be actuated by suitable mechanism to grip and release a bulb.

The sealing-in head is rotatably mounted in an arm of a conveyor or spider 15, which constitutes a part of a tipless lamp-making machine. The conveyor may be moved by any suitable means and during such movement the head or heads that are carried thereon may be independently rotated. This rotation of the heads is accomplished by the provision of a pulley 16, fastened to the lower end of the bearing 8, and the pulley may be either continuously or intermittently rotated by contact with a moving belt (not shown), thus imparting rotation to the sealing-in head. The sealing-in head and other mechanism, such as the conveyor and driving mechanism above described, is old and forms no part of the present invention; but is partly shown and described for a more complete understanding of my invention, which shows a mount-holder associated with the above described sealing-in head, in which the said mount-holder is supported in the bearing 8: thus the vertical axis of the head and the vertical axis of the holder are made to coincide. A machine of the above character embodying certain novel features not claimed herein is shown in our copending application, Serial No. 488,754, filed August 1, 1921.

The mount-holder 6, which has been perfected by us, is secured to the hollow shaft 8 by means of a set screw 17, which is threaded in the bearing 8 and engages a longitudinal slot 8′ that is provided in the holder. This construction permits the holder to be vertically reciprocated without rotation thereof.

Preferably the mount support 6 comprises a plurality of concentrically disposed tubular members including an outer casing 18, an inner tube 19 and an intermediate tube 21. The intermediate tube and the casing may be secured together to provide an increased thickness of wall between the outer casing and the inner tube. The thickened wall permits recesses 22 and 23 to be disposed about the tube 19 for the purpose of allowing for the movement of gripping members, more fully described hereinafter.

The gripping members in the present invention comprise two sets of balls or jaws 24, there being three balls to each set. The balls or jaws of each set of gripping members are positioned in a common plane that is disposed at right angles to the axial line of the holder and, when moved to grip an object, provide a three-point contact. The balls are seated in recesses 25 in the wall of the tube 19, the recesses being of suitable dimensions to permit free lateral movement of the balls therein. The aperture produced in the interior wall of the tube 19 by the recesses 25 may be peened over to prevent the admission of an entire ball into the tube, but permitting enough movement to give a desired variation in the distance between the balls, so that they may be positively moved toward the axial line of the holder and secure objects of different diameters.

The upper edges 26 of the recesses 22 and 23 are tapered or beveled and so disposed with relation to the balls that when the tubular member 19 is reciprocated by mechanism to be hereinafter described, each set of balls or jaws is simultaneously thrust toward the axial line of the holder to firmly secure an object, positioned in the tube 19, on the axial line thereof.

Figure 1 of the drawing shows the gripping members in contact with the tapered surfaces 26. The said members are, however, normally maintained out of contact with the said surfaces and consequently free from any gripping action. The normal position of the gripping members is attained through the agency of a helical spring 27, disposed between the lower end of the intermediate tube 21, and a collar 28 that is secured to the lower end of the inner tube 19. Hereinafter, the inner tube 19 which carries the gripping members or balls will be termed a ball-carrier.

When using the mount-holder in connection with a sealing-in machine, it is only necessary to secure a mount for a given interval during the rotation of the conveyor. Any suitable means may, therefore, be provided for actuating the ball-carrier at a given point in the path of travel of the head, a cam 30 being shown for this purpose. As the conveyor rotates, the lower end 31 of the ball-carrier 19 traverses the surface of the cam 30 and is gradually raised to bring the balls 25 into contact with the tapered surfaces 26, whereby the balls are moved into engagement with an object disposed in the holder. Sufficient force is exerted upon such objects to retain them in position for other operations.

Since the balls in the carrier have considerable lateral movement, they will accommodate and grip objects of varying diameters. When objects of the same diameter are being employed, the cam 30 may be adjusted to raise the ball carrier a given

that shown and described, and is not restricted to the precise form shown, but intends to cover all changes and modifications within the spirit and scope of the appended claims.

What is claimed is:

1. An incandescent electric lamp mount-holder comprising a casing, a plurality of sets of gripping members, each set being positioned in a different plane and a plurality of longitudinal air passages within said holder.

2. An incandescent electric lamp mount-holder comprising a casing, a plurality of sets of gripping members, each set being positioned in a different plane, an air passage within said holder and a plurality of air outlets therefrom.

3. An incandescent electric lamp mount-holder, comprising a casing, a plurality of sets of gripping members, a carrier for said members, a plurality of longitudinal air passages intermediate said casing and said carrier and means adjacent said carrier whereby a reciprocation thereof actuates said members to grip a lamp mount inserted in said holder.

4. An incandescent electric lamp mount-holder, comprising a casing, a plurality of sets of gripping members, a carrier for said members, a plurality of longitudinal air passages intermediate said casing and said carrier, means adjacent said carrier whereby a reciprocation thereof actuates said members to grip a lamp-mount inserted in said holder, and a plurality of air outlet orifices at an end of said holder whereby jets of air may be ejected from the air passages.

5. An incandescent electric lamp mount-holder, comprising a casing, a plurality of sets of spherical members, each set being disposed in a different plane, a carrier for said members slidable longitudinally of said casing and means adjacent said members whereby a unidirectional movement of said carrier effects a movement of said members to engage a body positioned therebetween.

6. An incandescent electric lamp mount-holder, comprising a casing normally secured from vertical movement, a plurality of sets of spherical members, each set being disposed in a different plane, a carrier for said members disposed axially within said casing and slidable longitudinally thereof, means adjacent said members whereby a movement of said carrier effects a movement of said members radially of said casing.

7. An incandescent electric lamp mount-holder, comprising a casing, a plurality of sets of spherical members, each set being positioned in a different plane, a tubular carrier for said members axially disposed within said casing, a tubular member intermediate the casing and the carrier, a plurality of sets of radially disposed recesses in said tubular member for the partial reception of said spherical members, tapered surfaces within said recesses whereby a movement of said carrier effects an engagement of said spherical members with said surfaces to move the members toward the axial line of the casing.

8. In a lamp-making machine having jaws for supporting a bulb, the combination with a holder for supporting a mount, said holder comprising a casing and a plurality of sets of gripping members, of a carrier for said members and means for actuating said carrier to juxtapose a mount in a given relation to said bulb.

9. In a lamp-making machine having jaws for supporting a bulb, the combination with a holder for supporting a mount, said holder comprising a casing and a plurality of sets of spherical gripping members, of means for actuating said members to grip and position a lamp-mount in a given relation to a bulb supported by said jaws.

10. In a sealing-in head having means for supporting a bulb with its axis coincident with the axial line of the head, a mount-holder associated with said head, said mount-holder having means for gripping a portion of a lamp mount at a plurality of points throughout its length to support said mount with its axial line substantially coincident with the axis of a bulb supported in said head.

11. In a sealing-in head having means for supporting a bulb with its axis coincident with the axial line of said head, a mount-holder associated with said head, said mount-holder having means for gripping a portion of a mount at a plurality of points throughout its length, and means for effecting the passage of air to given portions of said mount and bulb during the sealing-in operation.

12. An incandescent lamp-mount holder comprising an outer tubular member and an inner tubular member, said inner member being adapted to be moved vertically within said outer member and having a plurality of sets of recesses in different planes and spherical members disposed in said recesses and adapted to be moved toward the axial line of said inner tubular member, the inner wall of said outer tubular member having tapered surfaces so disposed with respect to said spherical members that a movement of said inner member will effect an engagement between said surfaces and said spherical members, causing said members to grip an object when positioned within said inner tubular member and a plurality of longitudinal air passages intermediate said outer and inner tubular members.

13. A head for a sealing-in machine comprising a lamp mount holder, means for sup-

distance in order to provide the necessary movement in the holder to grip such objects. However, in a sealing-in machine the entire holder is moved upwardly to position the mount with the filament slightly above its final position, to permit a downward movement of the mount after it has been consolidated with the bulb but while the glass at the point of union is in a plastic state. This downward movement of the mount is called the pull-down, and is provided to readjust the plastic junction between the parts and avoid strains that would otherwise be created when the parts cool. This pull-down operation may be effected in any suitable manner and is usually performed by the operator. The downward movement of the mount-holder may be limited by the engagement of an adjustable stop member with the upper end of the shaft 8. Any suitable stop member may be employed, the one shown comprising a collar 32 which is slidable upon the upper portion of the stem holder and is provided with a set screw 33 for maintaining it in a given position.

The operation of sealing the bulb to the mount requires that a plurality of air-jets be directed against the plastic portion of the bulb during the heating operation incident to consolidation of the mount to the bulb, and this invention provides air passages 35 into which air is guided through a funnel-shaped collar 36 that is secured to the lower end of the casing 18. Air nozzles are provided at suitable points in the path of rotation of the head, and a suitably operated valve causes a discharge of air when the collar registers over a nozzle. Thus the mount-holder not only supports the stem, but provides for the admission of air through the passages 35, which are disposed between the intermediate tube 21 and the outer casing 18 and are connected at the upper end of the holder with an annular chamber 37, from which the air passes through a plurality of apertures 38 to perform its required function. The holder is also capable of vertical movement while the mount is gripped therein, thus providing for a vertical adjustment of the mount during sealing-in operation.

In practicing the invention, the exhaust tube 39 of a mount is positioned within the holder when the gripping members are in their normal or retracted positions. A bulb 41' is then positioned over the mount and is secured by the jaws that are carried on the arms 13 and 14. The mount is then disposed in a temporary position with respect to the bulb and is ready to be moved upwardly. The conveyor then rotates and, at a suitable point, the cam surface 30 engages with the end 31 of the tube 19, whereby the balls are moved into contact with the beveled edges 26 and are, consequently, caused to grip the exhaust tube 39 that is disposed in the holder.

The cam 30 is, however, so constructed as to cause a further upward movement of the ball-carrier as the conveyor continues its movement, and the gripping members having made contact with the exhaust tube, are opposed. Further rotation of the conveyor causes the upward movement of the carrier 19 and, consequently, effects an upward movement of the entire mount-holder 6, in opposition to a helical spring 41 that is disposed between the collar 36 and the pulley 16. This spring 41 acts to normally maintain the holder 6 in a lower position, with the stop member 32 in contact with the upper end of the bearing 8.

The movement of the conveyor is terminated when the mount-holder is properly positioned and the proper relation exists between the mount and the bulb 42, as is indicated in dotted lines in Fig 5. Suitable gas flames are then caused to play upon the bulb and the sealing operation is performed, after which the conveyor is moved to position another head for the sealing-in operation. As the conveyor moves the head away from the position at which the sealing-in operation was performed, the end 31 of the carrier 19 rides on the cam 30, which inclines downwardly. Thus the holder moves downwardly through the action of the spring 41. During the early downward movement of the holder, the balls 24 maintain their grip upon the exhaust tube and the pulldown operation is performed. the stop member 32 then engages the upper end of the bearing 8, thereby limiting the downward movement of casing 18. As the conveyor continues to move the head, the downward slope of the cam permits the downward movement of the carrier 19 under the action of the spring 27, so that at a predetermined position the carrier has been moved sufficiently to release the balls 24 from engagement with the tapered surfaces 26, thereby releasing the exhaust tube and permitting the removal of the consolidated mount and bulb.

From the foregoing description, it will be appreciated that great advantage is derived by the use of this invention, that the mount may be quickly and conveniently centralized in a head of a sealing-in machine and that the provision of two three-point contacts in different planes along the length of the exhaust tube gives the necessary rigidity to the mount during the sealing-in operation and avoids the possibility of lateral movement, thereby insuring a finished lamp with a mount in the desired relation to the bulb.

It will be understood that this invention may be embodied in many other forms than

porting a bulb in a predetermined relation to said holder, said holder having means for gripping the tubular portion of the mount at a plurality of points at each of several places.

14. A head for a sealing-in machine comprising a lamp mount holder, means for supporting a bulb in a predetermined relation to said mount holder, said holder comprising an inner and an outer sleeve, a plurality of sets of gripping members positioned in the wall of the inner sleeve and in planes transverse thereto.

In testimony whereof, we have hereunto subscribed our names this 17 day of January 1922.

JAMES BRYANT WHITMORE.
JOHN EBLING FERGUSON.