

Aug. 31, 1926.

1,597,916

H. DE F. MADDEN ET AL

LAMP MAKING MACHINERY

Filed June 1, 1922

3 Sheets-Sheet 2

FIG. 6.

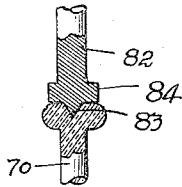


FIG. 2.

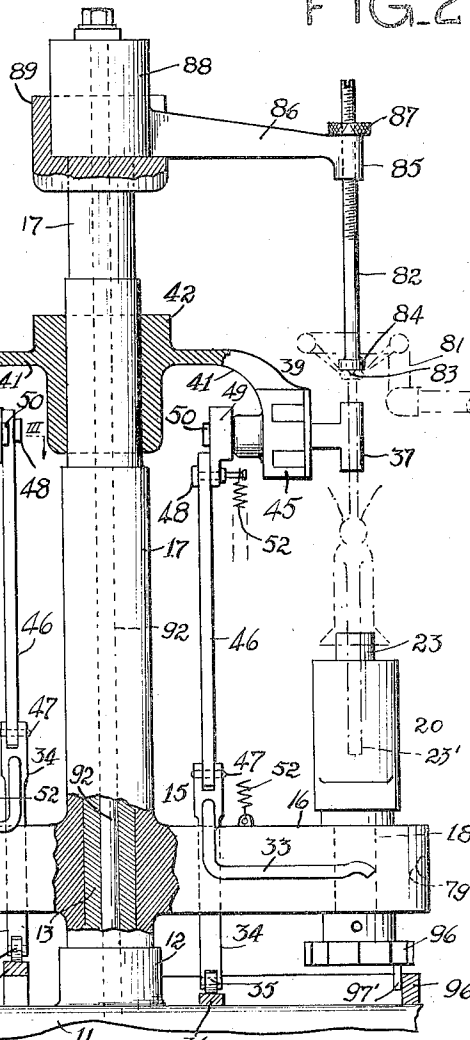


FIG. 7.

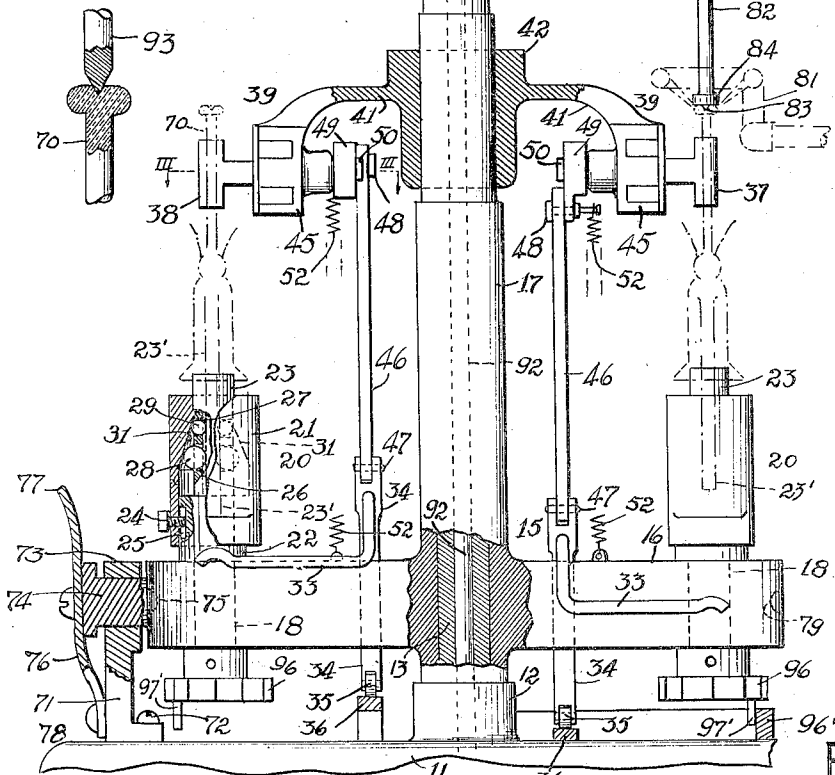


FIG. 5.

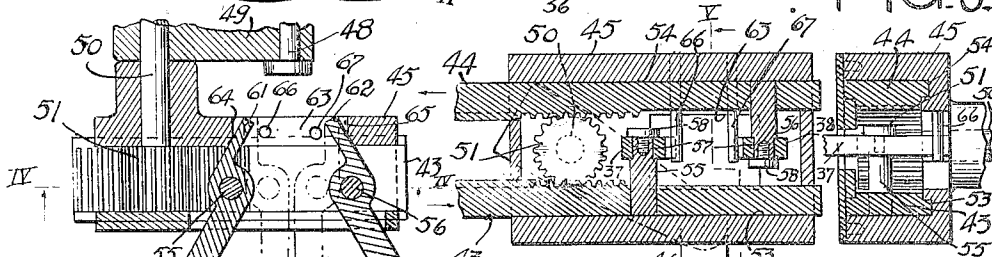


FIG. 3.

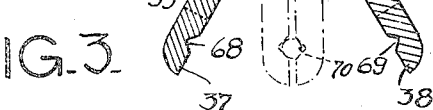


FIG. 4.



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3 Sheets-Sheet 3

FIG. 9.

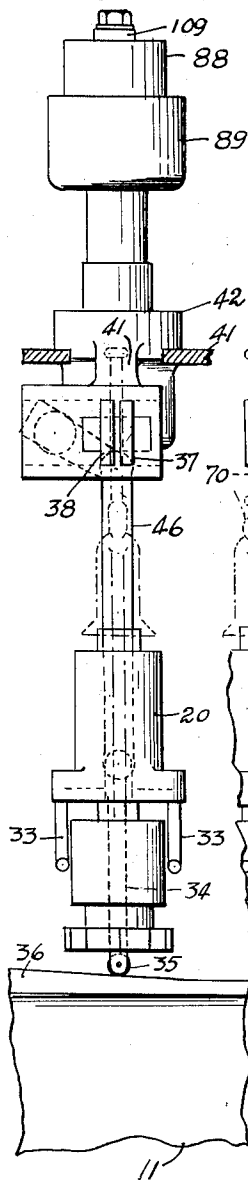
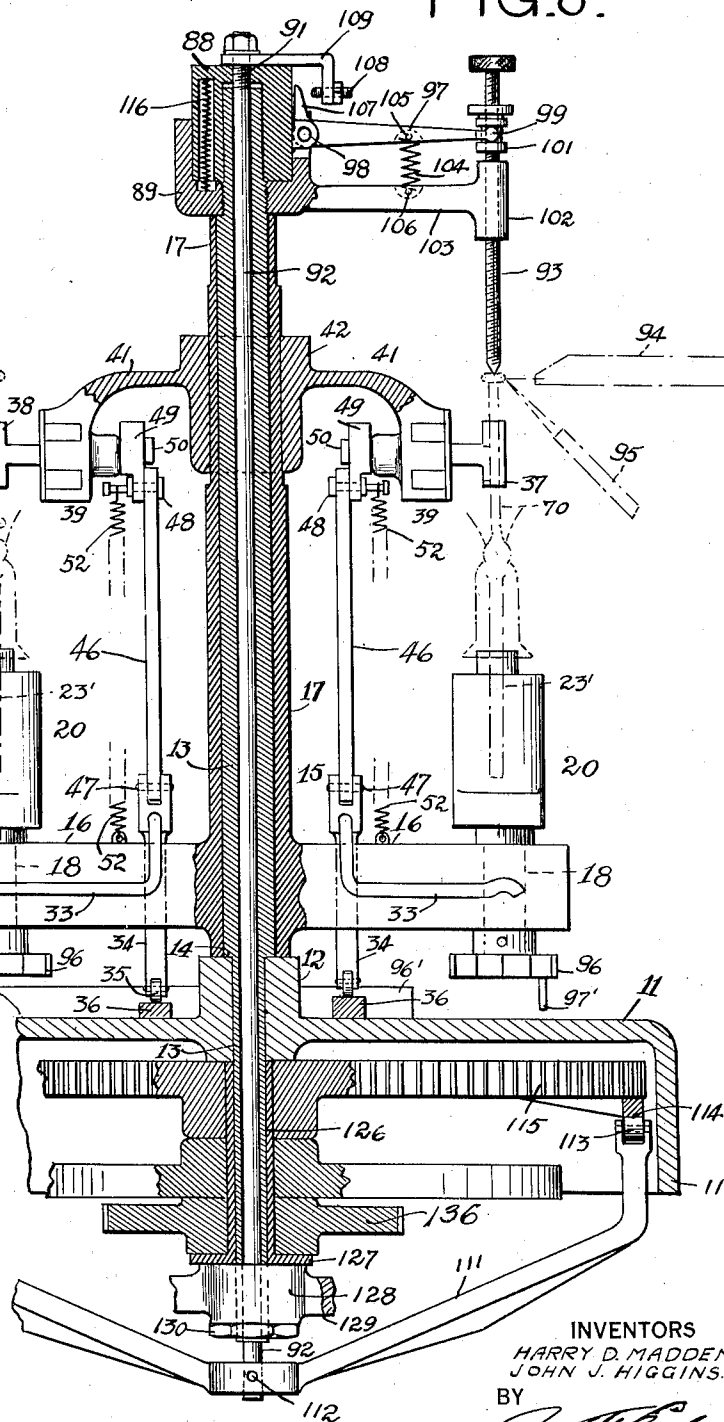


FIG. 8.



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LAMP-MAKING MACHINERY.

Application filed June 1, 1922. Serial No. 565,126.

This invention relates to the manufacture of incandescent lamp stems and to machines for performing certain operations required in the production of such stems.

5 An object of the invention is to provide a machine for expeditiously executing a button-forming operation on a lamp stem.

Another object of the invention is to provide a machine for forming upon a rod a button which is indented or is formed with an excrescence.

10 Another object of the invention is to provide a mechanism for simultaneously forming an upper indented and a lower button on a rod.

15 Another object of the invention is the provision of coordinating machine elements for moving work parts into heat zones to render said work parts or portions thereof plastic and to form a plurality of enlargements thereon, one of which is provided with an indenture.

20 A further object of the invention is the provision of an apparatus in which a rod may be moved intermittently from one position to another for successive operations to produce an indented button thereon and adapted subsequently to move the rod in operative relation with suitable mechanism for the insertion of wires into the button.

30 A still further object of the invention is to shape one end of a lamp stem to receive a mechanical element for centering the stem during subsequent operations thereon.

35 The present invention provides a machine of the type described and claimed in our copending application Serial No. 556,957, filed April 27, 1922, and aims to improve certain operative parts of such machine or of other machines of the same general character employed for the production of incandescent-lamp stems.

40 It will be understood that machines of the type to which this invention relates perform certain final steps in the manufacture of a stem or spider. The earlier steps in the formation of a stem are well known and consist in fusing or otherwise consolidating a flare tube, exhaust tube and arbor together with the usual leading-in wires; this unfinished stem may be termed a work-part.

50 To complete the stem it is then necessary to provide a machine for producing enlargements at certain points throughout the

length of the arbor of the work-part. These 55 enlarged portions are termed the buttons and the work-part is then moved into operative relation with mechanism for inserting support wires radially about the buttons and subsequently shaping the exposed ends of 60 the wires into loops or hooks.

During this wire-inserting operation it is necessary to rotate the stem in a series of intermittent movements, and the present invention particularly relates to improved 65 means for supporting the stem and maintaining its axis coincident with a given vertical line during the rotary movement required for the inserting operation.

Heretofore, various means of securing the 70 work-part in a desired operative relation to an inserting machine have been resorted to, but difficulty has been encountered in aligning the work-part in proper relation to the inserting mechanism. The work-parts have 75 usually been held by jaws or clamps and it was difficult to prevent lost motion which resulted in an amount of play sufficient to be detrimental to the necessary precise alignment of the work-part. Furthermore, owing to the extremely hard, smooth surface of the object, certain mechanical difficulties had to be contended with in order to grip the work-part with sufficient force to prevent its lateral displacement at the same time avoiding the exertion of too much stress thereon. 85

This invention, therefore, provides a means which co-operates with other supporting jaws or clamps but which centers the work-part and maintains it in position, making it unnecessary to depend upon jaws for final alignment of the work-part. 90

To accomplish this desirable result, a properly positioned recess or indenture is formed in the button of the work-part during its production. The work-part thus recessed may be centered for rotation by any suitable means as by the insertion of a centering pin or guide member into the recess provided at one end thereof, the opposite 100 end of the work-part being suitably secured in jaws which may constitute a chuck. If desired, the indenture may be made in the centering pin and the button formed with an excrescence or teat.

105 Although the present machine may be operated to perform the entire series of final operations necessary to produce the indented

button upon a work-part and effect the insertion of support wires, it will be understood that a machine may be provided to perform one or more of these operations such as making the indented button. The work-parts so produced may be accumulated and applied to other machines for the insertion of support wires; such machines being provided with a centering pin or guide member to co-operate with the indenture of the button to maintain the work-part in the desired vertical position during the inserting operation.

Considerable advantage is derived from this form of stem, inasmuch as it greatly simplifies the machine and reduces the percentage of inaccurate work.

Other objects and advantages of the invention will be apparent from the following description and the accompanying drawings, in which:—

Fig. 1 is a plan view of the machine showing the relative positions of wire-inserting elements which are shown diagrammatically in dotted lines, the spindles which drive these elements being shown in cross section;

Fig. 2 is a fragmentary view in elevation of the machine, partly in section; viewed in the direction as indicated by the arrow X, Fig. 1;

Fig. 3 is a horizontal cross-section taken on line III—III in Fig. 2;

Fig. 4 is a sectional view taken on line IV—IV in Fig. 3;

Fig. 5 is a section taken on line V—V in Fig. 4;

Fig. 6 is a fragmentary view, partly in section, of the button-forming member and a rod after the button has been formed thereon;

Fig. 7 is a fragmentary view, partly in section, showing the guide member in operative relation with the button;

Fig. 8 is a vertical section of the machine taken on line VIII—VIII in Fig. 1; and,

Fig. 9 is an end view of the conveyor and shows a lower cam member.

A machine embodying our invention may comprise a base upon which is mounted a rotatable conveyor or spider. A plurality of work-holders may be carried by the conveyor and thus rotated or otherwise moved, either manually or automatically, in a series of intermittent steps. The conveyor may be temporarily stopped after each movement for a sufficient interval of time to permit certain operations to be performed upon work-parts supported upon the conveyor.

At the initial step or starting point, the operator may insert a work-part in the conveyor. The conveyor is then moved to dispose a portion of the arbor of the work-part in a heated zone to render it plastic. A push rod positioned above the heat zone is then caused to descend and make contact

with the softened portion of the arbor, to effect an upsetting action and produce a button. The push rod is provided with a projection or barb for the purpose of forming a depression or indentation in the button during its formation. A stem provided with a button having such indentation is then moved to another station and in operative relation to any suitable wire-inserting and hook-forming mechanism at which position a guide or centering member is caused to descend and enter the recess or indented portion of the button to provide a means for centering the button to position and maintain it on a given vertical axis during the intermittent rotary movement necessary for the insertion of support wires.

An embodiment of the invention may include a base 11 having a centrally disposed hub 12 in which is disposed a hollow shaft 13 having its lower portion of a reduced diameter to provide a shoulder 14 which affords a bearing surface for the upper end of the hub 12. Rotatably positioned upon this shaft is a spider 15 consisting of a plurality of radially projecting arms 16 integral with a central hub 17. The exposed ends of the arms terminate in bearings or guides in which shafts 18 of work-holders 20 are rotatably disposed. These work-holders 20 are disposed at the upper ends of the shafts 18 (see Fig. 2) and may comprise an outer tubular member 21, which is loosely fitted to a collar or enlarged portion 22 of the shaft 18, and an inner tubular member 23 is secured in the enlarged portion 22. The member 21 is movable vertically with respect to the shaft 18 and its movement is limited by means of a set screw 24, an end of which is disposed in a slot 25 provided in the collar 22. The member 23 is provided with apertures 26 and 27 in which spherical members 28 and 29, respectively, are disposed. The members 29 are positioned in apertures spaced at intervals disposed circumferentially of the member 23 and in a common plane, and the members 28 are similarly disposed but in a lower plane.

The apertures in which the spherical members are disposed are of sufficient dimensions to permit the spheres to project within the tubular member 23. Thus an exhaust tube 23' indicated in dotted lines of a work-part may be inserted into the member 23 to make contact with the spherical members 28 and 29 which are caused to make firm contact with the spherical members by reason of their engagement with a tapered interior wall 31 of the outer tubular member 21 which, owing to its potential energy, normally moves the spheres towards the axial line of the holder and consequently causes an engagement or firm grip upon an object disposed within the member 23. The upper end of the tubular member 23

projects above the member 21 upon which the lower end of a flare tube of a stem may be disposed when the exhaust tube thereof is inserted into the member 23.

Means for lifting the member 21 to release the spherical members 28 and 29 for the insertion of an exhaust tube, may comprise a pair of laterally disposed lifter-arms 33 secured to a cam follower 34 one end of which is provided with a roller 35 positioned in contact with a cam 36 secured to the base 11 of machine. This cam is so proportioned that when an arm of the spider is in a given position, the cam follower 34 will be raised thereby moving the arms 33 in contact with the member 21 causing a slight elevation thereof and a release of the spherical members upon any object positioned in the holder. The above described work-holder therefore may be operated to secure and release the exhaust tube portion of a stem. An additional pair of jaws, however, may be desirable to grip the arbor at any given portion throughout its length.

Above each of the jaw holders 20 and in operative relation thereto is disposed a pair of jaws 37 and 38 (see Fig. 3) which are mounted in jaw carriers 39 provided at the ends of arms 41 integral with a common hub 42 which is positioned upon and is secured to the hub 17 of the spider 15. Thus, the upper jaws and the lower work-holders are mounted in fixed relation constituting a conveyor and will be hereinafter so designated.

The jaws 37 and 38 are secured to racks 43 and 44, respectively, slidably mounted in a casing 45 and are associated by a link 46 with a cam follower 34 a movement of which effects an actuation of the tubular member 21 of the work-holder 20. This link is pivoted on a pin 47 mounted in the upper end of the cam follower 34 and is connected by a pin 48 to a lever arm 49 secured to a shaft 50 upon which is fastened a pinion 51 (see Figs. 3, 4 and 5). Each cam follower is maintained in engagement with the cam 36 by a spring 52 one end of which is secured to pin 48 and having its other end fastened to an arm 16.

The pinion 51 is disposed in mesh with the teeth of upper and lower racks 43 and 44, which are slidable in guides 53 and 54, respectively, in the casing 45. It will thus be evident that a rotation of the pinion 51 will produce an opposite reciprocative movement of the two racks and a consequent movement of the jaws 37 and 38 to open or close them.

The jaws 37 and 38 are, however, rotatably mounted on studs 55 and 56; the upper ends of the studs being formed with reduced portions 57 to provide a shoulder which affords a bearing surface for the jaws which are held in position on the studs by means of

tap bolts 58. The studs 55 and 56 are secured in the racks 43 and 44, respectively, and are so proportioned in length as to position the jaws 37 and 38 in a common plane. For the purpose of moving the jaws about the axis of the studs upon which they are mounted, the jaws are provided with extended portions or arms 61 and 62 disposed in an aperture 63 provided in a wall of the casing 45 (see Fig. 3). Thus when the jaws are moved away from each other, the arms 61 and 62 make contact with faces 64 and 65 of the aperture thus causing a spread of the jaws in addition to the travel produced by the opposite movement of the racks 43 and 44.

When the racks are moved to close the jaws and are positioned as indicated in dotted lines in Fig. 3, the opposite face of the arms 61 and 62 make contact with pins 66 and 67 which serve to produce a positive engagement between notched faces 68 and 69 of the jaws with a positioned object such as the arbor of a stem 70 indicated in dotted lines. Since the jaws 37 and 38 and the work-holder 20 are actuated by a movement of the cam follower 34, it will be readily understood that by suitably proportioning the undulations of the cam 36, the work-holder 20 and the jaws 37 and 38 may be actuated substantially simultaneously or sequentially.

The movement of the link 46 required to actuate the jaws 37 and 38 is considerably greater than the movement necessary to actuate the tubular member 20 of the work-holder 21 to release the stem, therefore, the position of the lifter-arms 33 may be so disposed that the cam 36 may have an undulation of the proper height to raise the cam follower 34 sufficiently to slightly open the jaws 37 and 38 for purposes to be hereinafter described. The distance of travel of the lifter-arms 33, previous to their engagement with the tubular member 21, is such that the arms lift the tubular member at the time the jaws 37 and 38 have been opened wide enough to permit the vertical movement of the stem necessary for the removal of the exhaust tube 23' from the holder 20.

During the insertion of a stem, in the conveyor, the conveyor may be secured from movement by any suitable stop device. One such device is shown in Fig. 2 and comprises a bearing post 71 secured by a tap bolt 72 to the base of the machine. At the upper end of the post and slidably positioned in a bearing 73 is a plunger 74 having a pin 75 at one end thereof and a spring 76 secured to the opposite end. One end of the spring is free to serve as a finger piece 77 and the other end may be secured to the post 71 by a tap bolt 78. The spring 76 serves to normally thrust the plunger 74 toward the conveyor and the spider arms of the conveyor are provided with sockets 79 which

receive the pins 75 when an arm of the spider is in a given position with respect to the said pin, thus a movement of the conveyor may be prevented until an operator releases the pin for an additional movement of the conveyor.

When a stem is positioned in the holder 20 and secured by the jaws 37 and 38, it is moved one stage and into a suitable heat zone which may be created by gas burners 81, as indicated in dotted lines in Fig. 2, and rendered plastic. Directly above a stem so positioned may be disposed a combined depression and button-forming tool or press rod 82, the lower end of which is provided with a barb or projection 83 and a collar 84. The upper end of the rod 82 is threaded and screwed into a hub 85 of an arm 86, a nut 87 being provided to lock the rod from accidental disarrangement. The opposite end of the arm 86 is integral with a vertically movable hub 88 (see Fig. 8) positioned in a socket 89 and secured by a thread 91 to a plunger 92, and is actuated therewith by means to be presently described.

When the arbor of the positioned stem has been made sufficiently plastic, the pressure rod 82 is caused to descend and press the end of the arbor to produce an enlargement or button thereon at the same time the barb will be pressed into the button to produce an indentation or recess of any given configuration depending upon the shape of the barb employed.

It will be understood that the jaws 37 and 38 may firmly secure and align the rod during the button forming operation to insure the proper disposition of the barb 83.

After the formation of a button, the pressure member 82 is raised and the conveyor is rotated another step of its movement to position a stem in operative relation to a centering or guide member 93 (see Fig. 8) and in operative relation to any suitable form of wire-inserting mechanism which may operate to insert wires about the button to produce a spider in the usual manner. Such mechanism is indicated in Fig. 8 by the diagrammatic representation of a ram 94 which may constitute part of a well known wire-inserting device. Such device may also have co-operating mechanism for forming a loop or hook at the ends of the wires after the inserting operation. Hook or loop-forming mechanism is also well known in the art and my machine is so arranged that a hook-forming and inserting mechanism may be readily adjusted in co-operative relation therewith. During the inserting of the support wires, it is necessary to locally heat the button for the insertion of each wire and a burner for this purpose is indicated in dotted lines and designated by the numeral 95.

When a stem reaches the position illus-

trated in Fig. 8 the indented button will have been formed thereon and the guide member 93 may therefore be moved downwardly so that its point becomes disposed in the recess at the top of the button for the purpose of securing the button accurately upon a given vertical axis. This accurate adjustment or support of the stem is important inasmuch as any lateral variation of the arbor will produce an inaccurate insertion of the support wires, some of which may be too near the upper or lower edge of the button with the result that insufficient material will surround the embedded portion of the wire causing unequal cooling and subsequent rupture or cracks.

During the insertion of the wires, the usual mechanism may be employed for rotating the work-part intermittently a given number of degrees after each wire is inserted. For this purpose a ratchet wheel 96 is provided at the lower end of the shaft 18 of the holder 20. When the conveyor is disposed in operative relation to a wire-inserting device, the ratchet wheel 96 is positioned in engagement with a pawl (not shown) and other mechanism of the inserting machine operates to intermittently rotate the holder 20 in the usual manner. For the purpose of maintaining the holder 20 in a given position during the insertion of work-parts therein, the usual cam face 96' is provided and fastened to the base 11. A pin 97' makes contact with the said surface during a given portion of travel of the conveyor, except at the position at which the support wires are inserted into the buttons. At this point no cam face is provided and the holder is free to be intermittently rotated.

The importance of the guide member 93 will be appreciated in view of the foregoing description and this member is carried upon an oscillatory arm 97 pivoted to the hub 88 by a pin 98 and the guide member 93 is movably connected to the arm 97 for the purposes to be hereinafter set forth.

The movable connection includes a forked end 99 of the arm 97 which embraces a threaded double collar 101 into which the member 93 is screwed and positioned in a guide 102 disposed at the end of an arm 103 integral with the socket 89. A spring 104 is mounted between the arm 97 and the arm 103 and secured thereto by pins 105 and 106, respectively. This spring normally tends to move the arm 97 downwardly, this movement of the arm is, however, limited by a finger 107 which makes contact with a set screw 108 carried on a bracket 109 fastened to the hub 88. It will thus be evident that when the end of the guide member 93 engages with the indented portion of the button, the hub 88 may move downwardly and the rod 93 will remain in contact with the

button during this movement at the end of which the finger 107 will engage with the hub 88 and maintain the guide member in a fixed position. Such movement of the guide member 93 is necessary in order that the pressure rod 82 which is secured to the hub 88 may be free to move downwardly to form the indented button as shown in Fig. 2. Therefore, upon the termination of the downward movement of the hub 88, a button will have been produced in a work-part positioned beneath the pressure rod 82 and the guide member 93 will have entered the indented portion of a previously formed button at which time the cam follower 34 has been moved up a suitably proportioned raised surface of the cam which effects a slight release of the jaws 37 and 38 and permits the rotation of the holder 20 producing a rotation of the stem which is centered by the guide member 93.

Mechanism for reciprocating the plunger 92 comprises a yoke 111 (see Fig. 8) secured by a pin 112 to the lower end of the plunger. Rollers 113 are provided at the ends of the arms of the yoke and so disposed as to make contact with a cam surface 114 carried upon the under side of a gear-wheel 115. Thus upon a rotation of the gear-wheel or partial rotation thereof, the plunger 92 will be moved downwardly and upon a disengagement between the cam surface and the roller 113, the plunger will be permitted to move upwardly under the action of helical springs 116 which may be disposed in suitable apertures in the hub 88 and having their upper ends in engagement with the hub and their other ends engaging the inner surface of the socket 89.

Any well known means may be employed for driving the button-forming mechanism as well as such wire-inserting and hook-forming mechanism as may be employed in co-operation therewith. A more or less diagrammatic representation of such driving mechanism is indicated in Fig. 1 and may comprise a pulley 117 connected to any suitable source of power (not shown) by a belt 118 indicated in dotted lines. The pulley 117 being suitably driven, effects a rotation of a shaft 119 at the end of which is secured a beveled gear 120. Interposed between the pulley 117 and the gear 120 is any suitable form of clutch 121 which may be a friction split cone type and operated by means of a hand lever 122 to cause a release of the shaft 119 from a shaft which is continuously driven by the pulley 117. The mechanism controlled by the lever 122 may be of any suitable type for actuating the clutch and is well known in machines of this type.

Motion necessary for operation of the gear-wheel 115 which actuates the plunger 92 is derived by means of a beveled gear 123 secured to a vertical shaft 124 to which

is secured a spur gear 125 disposed in mesh with the above mentioned gear-wheel 115. The gear-wheel 115 is secured to a sleeve 126 (see Fig. 8) rotatable about the hollow shaft 13 and provided with a collar 127 at its lower end movable upon a hub 128 of a bracket 129. This bracket is secured in any suitable manner to the sides of the base 11 and the hollow shaft 13 is secured thereto by a nut 130.

By means of sleeve 126, motion may be translated to several devices for inserting support wires into the stems. Wire-inserting mechanisms may be operated by a rotation of vertical shafts 131 or 131' to which motion may be translated through trains of gears 132, 133, 134, 135 and a centrally disposed gear 136 which is secured to the sleeve 126. In the manufacture of certain types of lamps in which the stem includes a single button, it will be evident that one wire inserting mechanism only may be employed, as for example, that driven by the shaft 131. The type of stem produced by the present embodiment of the invention employs two buttons and both wire inserting mechanisms are used.

In practice, an operator inserts a work-part into the conveyor at the position indicated by the letter "B" in Fig. 1. At this point, the cam 36 is so proportioned as to have moved the jaws 37 and 38 to their extreme open position and to actuate the holder 20 to permit the entrance of an exhaust tube 23' of a work-part between the spherical members 28 and 29. The operator then releases the conveyor from its engagement with the plunger 74 of the stop device and moves it one stage of its travel thereby positioning the end of the arbor or upper end of the work-part in a heat zone and actuates the lever 122 causing a movement of the gear-wheel 115 which is properly proportioned to cause a downward movement of the pressure rod 82 when the end of the arbor is in a sufficiently plastic state to have a button formed thereon.

The mechanism which drives the gear wheel 115 is automatically stopped in a manner common to this type of machine and set forth clearly in the above mentioned co-pending application. The pressure rod 82 being in a raised position and the operator having inserted another stem in a holder during the formation of the button on a previously inserted stem, the conveyor is again moved to position another stem in operative relation to the pressure rod 82. The stem upon which the indented button was previously formed is positioned in operative relation to wire-inserting mechanism and to a guide member 93. The lever 122 is again manipulated and the plunger 92 is moved downwardly bringing the pressure rod 82 in contact with the end of the rod to form a

button thereon and also bring the guide member 93 in contact with a previously formed button. The downward movement of the guide member 93 is then arrested by the button but the hub 88 is permitted to move downwardly to allow for the formation of a button at which time the finger 107 abuts with the hub 88 and maintains the guide member 93 in effective relation with a work-part or stem causing it to center and secure the stem for the wire-inserting operations.

It will thus be evident that a button is formed and the guide member positioned simultaneously. The next movement of the conveyor may position the arbor in a heat zone which may be created by a suitable burner 140 as indicated in dotted lines, so disposed as to render plastic a portion of the arbor intermediate the button already formed and the press of the work-part and another press rod 141 (see Fig. 1) may then be actuated to oppose or exert vertical pressure upon the arbor and cause an enlargement at the heated or plastic portion.

It will be appreciated that the press rod 141 need not be provided with a barb 83 unless found desirable. During the formation of the second button, the press rod 82 and the guide member 93 are also operated to form a button and secure a work-part in the manner above described. The next movement of the conveyor brings the lower button in operative relation with suitably positioned wire-inserting mechanism and in position to be secured by a guide member 93 which enters the indented upper button and secures the stem during the insertion of the lower support wires. The machine, when in operation, therefore, serves to simultaneously produce an upper button and a lower button upon an arbor of a work-part at which time the guide members will engage with other work-parts during the insertion of support wires and a completed stem or spider may therefore be produced and removed from the machine with each insertion of a new work-part for operations thereon.

Although a preferred embodiment of the invention is described and illustrated, it is obvious that other modifications may be made therein without departing from the spirit and scope of the invention as set forth in the appended claims.

What is claimed is:—

1. A stem-making machine comprising means for supporting a stem, means for forming a depression in said stem and means for removing said depressing means.

2. A stem-making machine comprising means for supporting a work part, means for producing a button upon said work part and means for forming a depression in said button to receive a centering member to

facilitate the alignment of said part during a subsequent rotation of the part for insertion of support wires.

3. A stem-making machine having means for forming a button on a rod and means associated with said button-forming means to produce a depression in said rod for facilitating the centering of said rod during subsequent operations thereon.

4. A stem-making machine having means for forming a button upon a rod and means associated with said button-forming means for simultaneously shaping said button to produce a depression to co-operate with a centering member to maintain the alignment of said rod during subsequent operations thereon.

5. A stem-making machine having means for supporting a buttonless stem, means for forming a button upon said stem, means for making a depression in said button and means for removing said depressing means.

6. A stem-making machine having means for holding a buttonless stem, means for producing a button on said stem and means for forming a recess in said button axially positioned with respect to said stem.

7. A stem-making machine having means for shaping a rod to produce a button having a recess disposed on the axial line of said rod.

8. A stem-making machine comprising means for forming a button on a rod, means for producing a depression in said button, a guide member, means for positioning said guide member in said recess and means for rotating said rod.

9. A stem-making machine comprising means for shaping a rod to produce a button having a recess disposed on the axial line thereof, a guide member and means for positioning said guide member in said recess to support said rod during subsequent operations thereon.

10. A stem-making machine comprising means for supporting a rod on a given vertical line a presser member for forming an indented button upon said rod and means for removing said member.

11. A stem-making machine comprising means for rotatably supporting a rod on a given vertical axis, means for forming a button upon said rod, a presser member for indenting said button and means for reciprocating said member.

12. A stem-making machine comprising means for forming an indented button upon a rod, means for moving said rod to position for the insertion of support wires and a member adapted to enter the indented portion of said rod during the inserting operation.

13. A stem-making machine comprising means for forming an indented button upon a rod, means for moving said rod in oper-

ative relation with mechanism for the insertion of wires into said button and a member engageable with the indented portion of said rod to align the same during the inserting operation.

14. In a stem-making machine comprising means for forming an indented button upon a rod and means for rotating said rod including a member positioned in said indenture.

15. A stem-making machine having a button-shaping member provided with a projection to produce an indenture during the formation of said button.

16. A stem-making machine comprising a button-shaping member having a projection to produce an indenture during the formation of a button on said rod, a guide member, means for positioning said guide member within said indenture and means for rotating said rod.

17. A stem-making machine comprising means for forming a button on a rod and simultaneously producing an indenture in said button, means for positioning said rod for the insertion of wires and means cooperating with the indenture in said button to align the rod during the inserting operation.

18. A stem-making machine comprising means for forming a button on a rod and simultaneously producing an indenture in said button substantially on the axial line of said rod.

19. A stem-making machine comprising means for forming a button on a rod, a guide member, means for indenting said button, a guide member to engage with said indenture in the button to align the rod for subsequent operations, means for moving said button in position for engagement with said guide member and means for moving said guide member to engage with said button.

20. A stem-making machine comprising means for forming a button upon a rod and simultaneously producing an indenture in said button, a guide member and means for positioning said guide member in engagement with said rod during subsequent operations on said rod.

21. A stem-making machine comprising means for supporting a plurality of rods, means for forming an indented button upon each of said rods and means for moving said rods intermittently to positions for the formation of other buttons thereon.

22. A stem-making machine comprising means for forming an indented button upon a rod, means for moving said rod to position for the insertion of wires and a guide member for centering said rod during the insertion of wires.

23. A stem-making machine comprising means for forming an indented button upon

a rod, means for moving said rod to position for the insertion of wires, a guide member adapted to engage said rod during the insertion of wires, means for removing said member from engagement with said rod and means for moving said rod to position for subsequent operations.

24. A stem-making machine comprising means for supporting a plurality of rods, means for forming an indented button on one of said rods and simultaneously forming buttons on remaining rods and means for engaging the indented portions of said buttons to align the same for subsequent stem-making operations.

25. A stem-making machine comprising a plurality of rods, means for forming an indented upper button upon one of said rods and a lower button on another rod and means for engaging the indentures of said upper buttons to align the rods for subsequent operations.

26. A stem-making machine comprising a conveyor for moving a plurality of rods in a given path, a plurality of button-forming mechanisms, disposed at intervals adjacent said path, one of said mechanism comprising means for producing an indenture in one of said buttons and means for engaging an indented button to align the same for subsequent operations.

27. A stem-making machine comprising a conveyor having means thereon for supporting a plurality of rods, means for forming upper indented buttons on said rods, means for forming lower buttons on said rods, means for positioning said rods successively in operative relation to said conveyor and means for engaging the indentures of said buttons to align the same during subsequent operations.

28. A stem-making machine comprising a conveyor having a plurality of means for supporting a plurality of rods, means for forming upper buttons on said rods disposed adjacent the path of said conveyor, a forming tool and means for moving said tool on the longitudinal axis of a rod to form an indenture therein.

29. A stem-making machine comprising a conveyor having a plurality of means for supporting a plurality of rods in vertical positions, a forming tool movable on the longitudinal axes of rods disposed adjacent the path of said conveyor for forming a depression in said rods, and means for moving said rods successively in operative relation to said forming tools.

In testimony whereof, we have hereunto subscribed our names this 31st day of May 1922.

HARRY DE FOREST MADDEN.
JOHN JOSEPH HIGGINS.