Fig. 6.

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This invention relates to electric lamps and more particularly to a stem machine for fluorescent lamps.

An object of this invention is to provide a stem machine head which will provide for the admittance of air under controlled pressure to the inside of the exhaust tube to blow out the exhaust port.

Another object is to provide a stem machine head which will provide for the admittance of air under controlled pressure to the inside of the stem surrounding the exhaust tube in order to stretch the glass in the stem seal.

A further object is to provide a means for holding a flare, lead wires and exhaust tube.

Further objects, advantages and features will be apparent from the specification which follows when taken in conjunction with the accompanying drawings in which:

Figure 1 is a perspective view shown partly in section of the stem head assembly;

Figure 2 is a detail shown partly in section of the exhaust tubing chuck and the telescoping air channels;

Figure 3 is a detail, shown in section of the exhaust tubing chuck;

Figure 4 is a bottom plan view of the exhaust tubing chuck;

Figure 5 is a detail shown in section of the stem swelling nozzles and the exhaust tubing air channels;

Figure 6 is a plan view of the stem machine;

Figure 7 is a side elevational view shown partly in section of the stem head assembly.

Similar reference characters refer to similar parts through the several views of the drawings.

The stem usually used in fluorescent lamps is a distinct type. Although similar in diameter dimension to a regular 60 watt incandescent lamp stem, it is not as long, and it is preferably without a stem press because of the short throat of the flare. Standard incandescent methods of positioning the parts assembly, i.e., the flare, the exhaust tube and the lead wires may be employed. However, I have found that distinct advantages may be obtained by inverting these parts. Hence a special stem machine head is necessary.

In Figure 1, the head frame 1 is mounted on the pulley shaft 11 to which the head pulley 26 is attached. The head frame 1 serves as the frame on which the stem head assembly is mounted. This head frame 1 is substantially rectangular in shape and has the studs 50 projecting downwardly from the top portion thereof. The flare guide jaw assemblies 16 are pivotally mounted on the pins 28 through the studs 50 which project down from the top portion of the rectangular head frame 1. Thus when it is desired to cause these jaw assemblies to open in order to permit the insertion of the flare 13, the exhaust tubing 15 and the lead wires 14 into their respective positions, the operator of the machine presses the finger lever 24 in a downward direction. By pressing the finger lever 24 downward, the pivotal frame finger 23 attached thereto will push downward on the pivotal frame baffle 22 mounted on the pivotal frame 21. The connecting rods 20 join the flare guide jaw assemblies 16 and the pivotal frame baffle 22 mounted on the pivotal frame 21 which is firmly attached to the lower sleeve holder 6 through the setscrews 81. The connecting rods 20 join the flare guide jaw assemblies 16 and the pivotal frame 21 so that when the pivotal frame 21 moves downward, the jaw assemblies 16 pivoting on the pins 28, will be drawn downward by the connecting rods 20, thus opening the jaws for the insertion of the lead-in wires, the flare and the exhaust tube in their proper positions.

The lower sleeve 5 telescopes within the mount pin sleeve 3, and is attached at its lower extension to the lower sleeve holder 6 which in turn extends down through the pivotal frame 21 and through the bottom of the head frame 1 in a piston like manner. Thus the lower sleeve 5 is drawn downward when the jaw assemblies 16 are opened by reason of the fact that the lower sleeve holder 6 is attached to the downwardly moving pivotal frame 21. The pivotal frame spring 25 encircles the lower sleeve holder 6 between the bottom of the pivotal frame 21 and the lower extension of the head frame 1.

Mounted on top of the flare guide jaw assemblies 16 are the upper support rods 10 for the "W" guides 9 which hold the lead wires in position. Also mounted on top of the flare guide jaw assemblies 16 are the flare guides 7 and the heat deflectors 8. These baffles 7 and 8 encircle the flare and help to hold it in place.

As has been pointed out above, air pressure is employed not only to blow out a vent in the stem press but also to swell the stem. If it is desired to keep open at all times the end of the exhaust tube 15, located within the throat of the flare 13 as shown in Figure 1, then air must be caused to be blown up through the exhaust tube at substantially all of the positions to which the head indexes as shown in Figure 6. If on the other
hand, it is desired to first permit the throat of the flare 18 to become melted in as shown in Figure 7, and then blow a vent out through the molten glass, this may also be done by simply refraining from causing any air to be forced up through the exhaust tube 18 until the head of the flare is indexed to a position where the throat of the flare has been melted in to the desired extent.

The purpose of the admission of air to swell the throat of the flare is to prevent the glass from sagging downward when softened by the heat. If the throat of the flare were melted in and the softened glass permitted to take whatever form it desired, uniformity of contour of this mass of melted glass would be impossible. Not only does the stem swelling accomplish a control over the formation of the stem, but it also stretches and swells the stem while the glass is still in a molten state thus diminishing the strains and reducing the danger of having the glass crack. This "working" of the molten glass is thus entirely automatic in any stem machine head. The manner in which air pressure is obtained to accomplish this is illustrated in Figures 1, 5 and 7. The stem swelling air inlet pipe 17 extends down from the top of the head frame 1 and enters the bottom of the head frame at a point slightly above where the head frame joins the pulley shaft 11. The vent 66, located in the pulley shaft 11, provides the opening through which the stem swelling air inlet pipe is connected to the channel 46 in the machine turret 27. The chamber 47 formed by the turret 27 and the shaft 11 adjacent the vent 66 provides for the continuous flow of air through the channel 46 into the vent 66 even while the head is rotating. This air is introduced into the stem swelling air inlet pipe through the channel in the turret and the vent in the pulley shaft. The air line 30 for conducting air to be vented out a vent in the stem is shown in phantom in Figure 1 as running from the bottom of the head pulley 14 up through the pulley shaft 11, the lower sleeve holder 9 and the lower sleeve 5. Thus the air coming up the air line 30 passes through the shoulder 31 of the lower sleeve 5 and into the lower end of the exhaust tube 15 so that it may keep the upper end of the tube 15 open while the stem 46, as shown in Figure 7 is being formed.

Figure 6 shows in detail just how these air passages accomplish this. The air comes up through the inlet pipe 17 located in the head frame 1. The air is evenly distributed to the stem swelling air nozzles 18 through the annular air ring 28. The flare is positioned on the flare seat 12 through which the stem swelling air nozzles extend. This figure also shows the location of the slots 19 into which the lead-in wires are placed. These slots 19 are located in the mount pin 2 in the top of the head frame 1. The exhaust tube chuck 4 and the mount pin sleeve 3 are held within the mount pin 2.

Figure 2 shows the exhaust tube chuck and the telescoping air channels. It shows how the exhaust tube chuck 4, the lower sleeve 5 and the lower sleeve holder 6 cooperate with the flare guide jaw assemblies 16 when these jaws are opened for the passage of the lead-in wires and the flare. This figure shows the lower sleeve 5 and the lower sleeve holder 6 in their downward position, having been drawn down by reason of being attached to the pivot arm 21 which is pushed downward through the finger lever 24. The exhaust tube 15 is shown on its way down through the exhaust tube chuck 4. It will drop or may be pushed down still further until its lower extremity is resting on the shoulder 31 of the lower sleeve 5. When the various parts have been properly positioned, the finger lever is released and the jaw assemblies 16 will close in on the flare and the lead wires, holding them firmly in position as shown in Figure 1 while the lower sleeve 5 will slide up inside the mount pin sleeve 3 as shown in Figure 2, until the cone-like portion of the lower sleeve 5 has engaged the jaws of the exhaust tube chuck 4, thus causing the mount chuck to firmly grip the exhaust tube 15. These jaws on the mount chuck are flexible enough to be sensitive to the cone-like portion of the lower sleeve so that the gripping of the exhaust tubing may be accomplished. The exhaust tubing 15 rides up with the lower sleeve 9 until the cone-like portion of the sleeve 5 enters the jaws of the chuck 4. The length of the exhaust tubing and the distance which it rides up with the sleeve 5 is so calculated as to result in the location of the top part of the exhausted portion in the desired position in relation to the flare 13.

Figure 5 shows a stem machine on which a head of this type may be used. The machine turret 27 may be mounted on the table 33. The annealing jaws 36, the melting tubes 37 and the air cooling nozzles 38 are connected through the stationary turret bearing 39 about which the machine turret 27 indexes. The stem swelling air ducts 32 project from the pulley shafts 11 and are flexible so that they may establish connection with air inlets located beneath the melting fires 37, thus providing a source of air for the stem swelling air inlet pipe 17, as shown in Figure 1. The source of air for blowing out the exhaust vent in the stem may be located directly beneath the shaft 11, as is purposely shown in Figure 6 without the heads, described above, mounted in their positions for the sake of clarity in the drawing. Each head is kept continuously rotating, from the time the stem assembly parts have been loaded on the machine until it is time to remove the finished stem. This is accomplished by reason of the continuous motion of the belt 34 being guided about the belt idler pulleys 35 to a suitable drive and thus turning the head pulleys 46.

If it is desired to make a stem without an exhaust tube therein, it may be very readily made on this machine by merely closing off the air through the exhaust tube blowing-out channel 33.

What I claim is:

1. A head for an electric lamp stem making machine in which a flare, lead wires and an exhaust tube are sealed together, said head comprising: a seat for said flare; means for positioning said lead wires; means for positioning said exhaust tube; means for blowing out a vent from the exhaust tube through the throat of the flare; and separate means for swelling said stem.

2. A head for an electric lamp stem making machine in which a flare, lead wires and an exhaust tube are sealed together, said head comprising: a seat for said flare; means for positioning said lead wires; means for positioning said exhaust tube; means for blowing out a vent from the exhaust tube through the throat of the flare; and separate means for swelling said flare.
3. A head for an electric lamp stem making machine in which a flare, lead wires and an exhaust tube are sealed together by melting the glass flare and glass exhaust tube, said head comprising: a seat for said flare; means for locating the lead wires in their extension through the flare; jaws for locking said flare in said seat, said jaws being pivotally mounted to provide for the insertion and withdrawal of the flare from the locking position on said seat and having the means for locating the lead wires mounted thereon; means for holding the exhaust tube in a position to have one end within the throat of the flare; means for blowing out a vent from the exhaust tube through the throat of the flare, and separate means for swelling said flare through apertures in the seat for the flare.

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