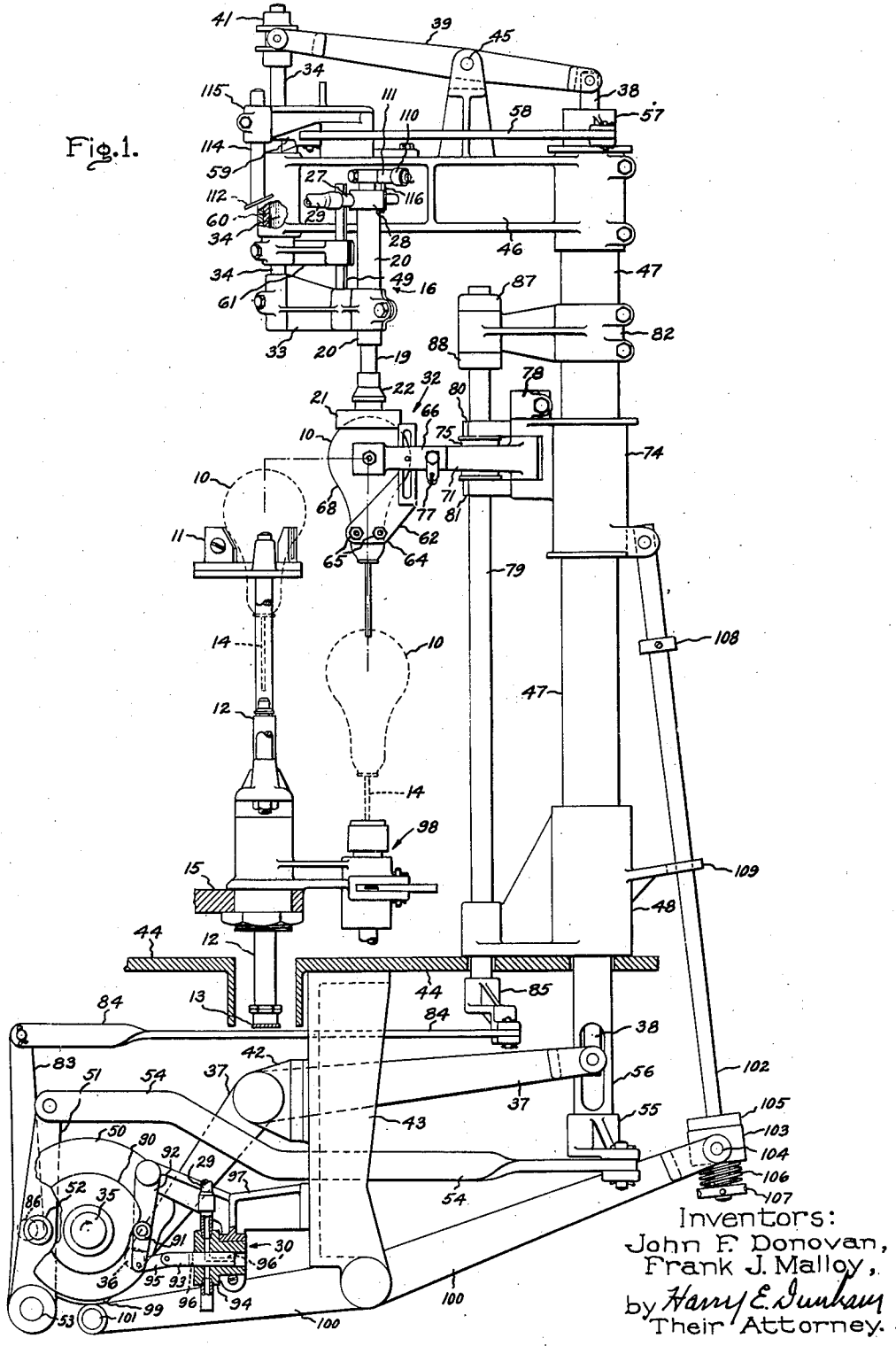
Jan. 26, 1937. J. F. DONOVAN ET AL 2,069,086

TRANSFERRING MECHANISM

Filed May 8, 1936 2 Sheets-Sheet 1

Fig. 1.



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Fig. 2.

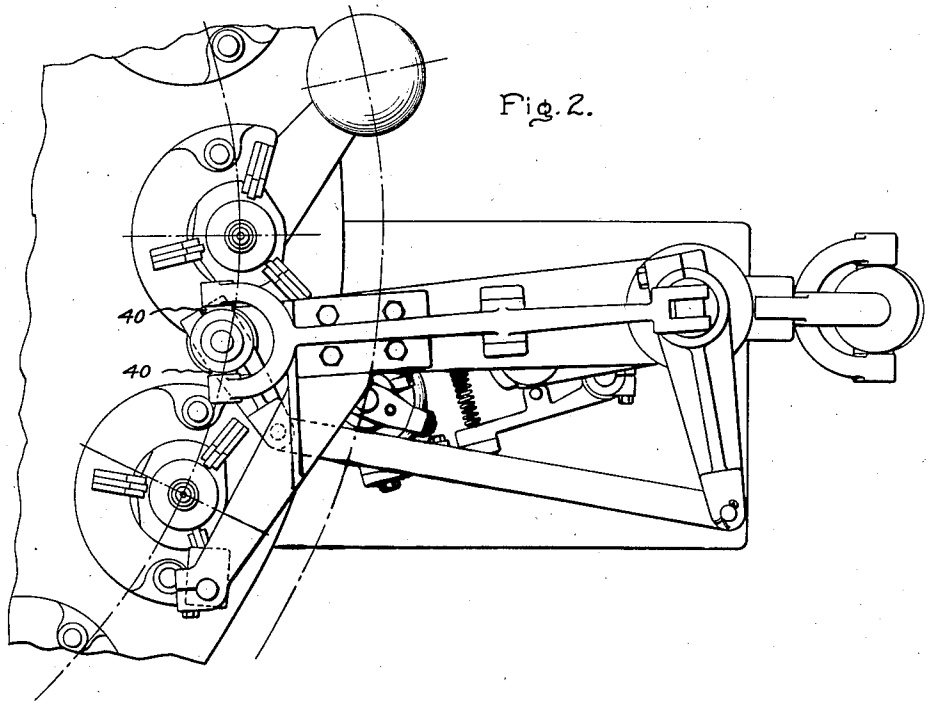


Fig. 3.

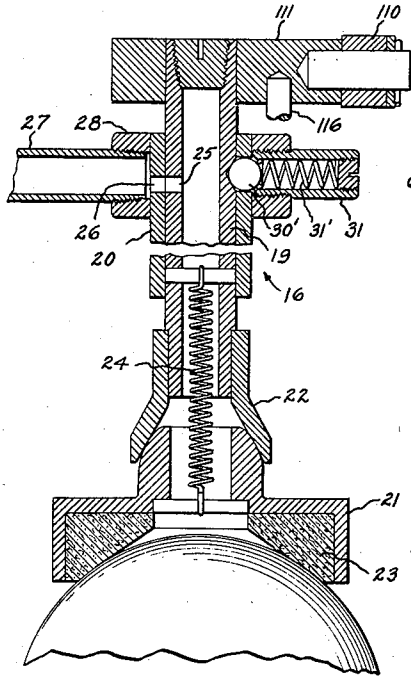
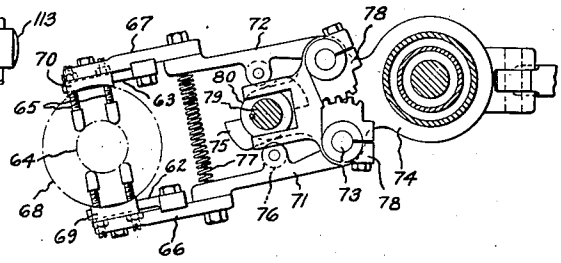


Fig. 4.



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UNITED STATES PATENT OFFICE

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TRANSFERRING MECHANISM

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Application May 8, 1936, Serial No. 78,618

5 Claims. (Cl. 176—3)

Our invention relates to the manufacture of electric devices such as electric lamps or similar devices which comprise bulbs or other sealed vitreous containers, and more particularly to apparatus for transferring such devices from sealing-in apparatus to exhausting apparatus. Heretofore the larger lamps have been transferred manually and the smaller miniature lamps have been transferred by apparatus which is unsuitable for larger lamps. The miniature lamp transfer is by means engaging the exhaust tube but the larger lamp being of greater weight and bulk as well as having a smaller exhaust tube cannot be transferred in this way at the speeds desired without breaking. Accordingly we provide a transferring mechanism which engages the bulbous portion of the lamps both for lifting the lamp and for positioning it correctly with respect to the exhausting apparatus.

According to our invention the lamp is taken from the sealing-in machine by one portion of our mechanism and is inserted into the exhausting machine by another portion thereof. This is of advantage as it is not necessary to delay the indexing of the machine for so long an interval of time as would be necessary if the transfer were performed by a single mechanism. In other words, the transferring operation is spread over two indexing periods instead of only one as with a single mechanism. We provide means for positioning the lamp correctly during the transferring operation to avoid any possibility of the lamp shifting and entering the exhausting machine improperly. Other features and advantages of our invention will be apparent from the description which follows of one species thereof and from the accompanying drawings.

In the drawings Fig. 1 is a side elevation of the transfer mechanism of our invention; Fig. 2 is a plan view thereof; Fig. 3 is a section through the transferring spindle; and Fig. 4 is a plan view of the transferring jaws.

The transferring mechanism of our invention is adapted to transfer a lamp from sealing apparatus to exhausting apparatus and is particularly adapted to transfer lamps from the sealing heads to the exhaust heads of a machine of the type shown in Patent 1,662,045, Patterson, which issued March 6, 1928. The lamp 10 which is to be transferred is shown in dotted lines of Fig. 1 and rests only on the bulb holder 11 of the sealing machine. The sealing spindle 12 on which the stem of the lamp has rested during the sealing operation has been moved downwardly and now rides on a low part of the track 13 leaving the exhaust tube 14 of the stem free. The sealing head is mounted on the turret 15 which is turned at intervals to index other sealing and exhaust heads into position before our device. The lamp 10 is first engaged by the vacuum transfer spindle 16 shown in Figs. 1 and 3 which comprises the hollow spindle 19 slidably mounted in tube 20 and the cup 21 which engages the collar 22 on the end of said spindle 19. In order that the washer 23 which is carried by said cup 21 and which is preferably made of asbestos will seat properly on the lamp 10, the cup 21 is provided with a ball section which permits the cup to tilt. The ball section is held against collar 22 by spring 24 which extends between pins in said cup 21 and said spindle 19. The lamp 10 is held tightly against washer 23 by the pull of vacuum in the hollow center of spindle 19 which enters through apertures 25 and 26 in said spindle 19 and tube 20 respectively from pipe 27 and collar 28. The pipe 27 is connected through flexible hose 29 and the valve 30 to a source of vacuum (not shown). The collar 28 is fastened to tube 20 and supports the tube 31 in which is located ball 30' and spring 31'. The spindle 19 is held in position with respect to the tube 20 by the ball 30' which is pushed through a hole in said tube 20 and into a depression in spindle 19 by spring 31'.

Having engaged the lamp 10, the spindle 16 is first raised to clear the bulb holder and then is swung sideward into the transferring jaws 32. The raising movement occurs as the arm 33 which is attached to tube 20 and shaft 34 are raised by mechanism operated by a cam (not shown) on shaft 35 (located below turret 15). The cam is engaged by the roller 36 on lever 37 which actuates rod 38 which in turn is connected through lever 39, rollers 40 and collar 41 to shaft 34. The lever 37 turns about a pin extending from bracket 42 which is mounted through the bracket 43 onto the stationary table 44. Lever 39 turns about a pin 45 extending from bracket 46 which is stationary and which is mounted on the table 44 through the hollow column 47 and bracket 48. The shaft 35 in this instance is operated by the sealing and exhaust machine and turns one complete revolution between indexing movements of the heads to and from a position before our device. The swinging movement of the spindle 16 is caused by mechanism engaging the rod 49 extending from arm 33 which is operated by cam 50 on shaft 35. This mechanism comprises lever 51 which engages said cam through roller 52 and which turns about the stationary pin 53 and the link 54 and lever 55 which turn tube 56 from

movements of said lever 51. The tube 6 passes vertically through column 47 and is connected through arm 57, link 58, arm 59, sleeve 60 and arm 61 to rod 49. The sleeve 60 turns in bracket 46 and surrounds shaft 34 which is free to turn and move vertically therein. The sideward movement of the lamp 10 carries it through the open side of the bulb holder 11 to the position shown in Fig. 1.

The transferring jaws 32 into which the lamp 10 is taken by the transferring spindle 16 comprises, as shown in Figs. 1 and 4, the lower jaws 62 and 63 which are adapted to engage the neck 64 of the lamp 10 through studs 65 and the upper jaws 66 and 67 which are adapted to engage the bulbous portion 68 of the lamp 10 through pads 69 and 70 respectively. The ends of the studs 65 which engage the lamp are preferably coated with rubber to protect the bulb from injury and the pads 69 and 70 are preferably made of asbestos for the same reason. The lower jaws 62 and 63 are attached to the upper jaws 66 and 67 respectively which are in turn attached to levers 71 and 72 respectively. Each of the levers 71 and 72 is mounted on a pin 73 carried by the slider 74 and is operated by cam 75 through roller 76. Once the lamp 10 is located between the transferring jaws 32 they are closed thereon by spring 77 since the cam 75 is turned so that the high parts thereof are no longer under rollers 76. Since it is essential that the jaws close to the same position each time so that the lamp is centered properly, each pin 73 is provided with a gear segment 78 which meshes with the corresponding gear segment 78 of the other pin. The cam 75 is slidably mounted on the vertical shaft 79 to which it is keyed as shown, and is located between the collars 80 and 81. The collars 80 and 81 are engaged by the slider 74 which is properly orientated thereby and are provided with shoulders which cause them and cam 75 to be moved with said slider 74. The shaft 79 is supported by bracket 48 and arm 82 and forms part of the jaw-actuating means. Said means is operated by a cam (not shown) on shaft 35 and comprises lever 83, link 84 and arm 85. The cam is engaged by the roller 86 on lever 83 which turns about pin 53 and actuates arm 85 through link 84. The shaft 79 is prevented from moving vertically by collars 87 and 88 which are mounted thereon above and below arm 82.

After the lamp 10 is gripped by the transferring jaws 32 the vacuum connection to the transferring spindle 16 is cut off so that the lamp is released by that mechanism. The cut-off is produced by the valve 30 which is connected in the vacuum line (hose 29) leading to the spindle 16 and which is actuated by cam 90 on shaft 35. The cam 90 is engaged by the roller 91 on lever 92 which is connected to the plug 93 in the body 94 of the valve 30 through link 95. The plug 93 is provided with a passage 96 therethrough which is aligned with the inlet and outlet passages in the body 94 when the valve is open. When the valve 30 is closed, the connecting passages to the lamp 10 are opened to the atmosphere through the passage 96' in the plug 93 which is then aligned with the outlet passage in the valve body 94. The valve body 94 is clamped in a portion of bracket 97 which extends from bracket 43 and which supports a pin (not shown) on which lever 92 is mounted. The spindle 16 remains in this position until the transferring jaws 32 move the lamp out of the way.

The lamp 10 is now moved down until the exhaust tube 14 thereof is properly inserted in the exhaust head 98 of the sealing and exhaust machine as shown in the dotted lines of Fig. 1. The downward movement of the transferring jaws 32 is produced by a similar movement of slider 74 on the column 47 caused by mechanism operated by cam 99 on shaft 35. The mechanism comprises lever 100 which engages the cam 99 through roller 101 and the rod 102 through collar 103. The lever 100 turns about a pin (not shown), extending from bracket 43 and engages the collar 103 through pins 104 in each of the legs of the U-shaped end thereof. The collar 103 is not fastened to the rod 102 directly but rests against collar 105 which is attached directly thereto and the spring 106 which rides on the fixed collar 107 on said rod 102. The spring 106 is compressed by the excess movement of the lever 100 after the stop collar 108 strikes the extending portion 109 of bracket 48.

The transferring jaws 32 are opened and raised to their former position by the reverse movements of parts already described. The return movement of the spindle 16 however, is caused by the same mechanisms but follows a slightly different path. The outward swing of the spindle 16 also includes a short downward movement which carries the roller 110 extending from the collar 111 on spindle 19 against plate 112 causing said spindle 19 to be moved down to another position in tube 20. As shown in Figs. 1 and 3, the roller 110 is mounted on the pin 113 of collar 111 and the plate 112 is attached to post 114 which is supported by the bracket 115 extending from bracket 46. In the lower position the apertures 25 and 26 in the spindle 19 and tube 20 are no longer aligned which breaks the vacuum connection from the spindle 16 to the valve 30. The spindle 19 retains this position until it is moved down onto another lamp 10 in the sealing head whereupon it strikes the lamp 10 and is pushed up to the position shown. This upward movement allows the vacuum to enter the spindle 19 to draw on the lamp 10 as the apertures 25 and 26 are then aligned and the valve 30 is open. The valve 30 opens during the downward movement of the spindle 19. The operating cycle from here on has already been described and it should be noted that the higher lifting movement of the spindle 19 before the inward swing carries the roller 110 above plate 112. A pin 116 which is mounted in collar 111 and slidably engages collar 28 keeps the spindle 16 properly orientated so apertures 25 and 26 are aligned. If the spindle 16 has not picked up a lamp 10 on the previous cycle of movement, the spindle 19 remains in the lower position and roller 110 does not strike plate 112.

What we claim as new and desire to secure by Letters Patent of the United States is:

1. In a machine of the class described, a transferring mechanism for carrying a lamp or similar device from sealing-in to exhaust heads which are indexed in and out of position before said mechanism comprising means for gripping the lamp supported by the sealing-in head, means for moving said first means and said lamp to a second position, means mounted at said second position of said first means and adjacent said exhaust head for gripping said lamp, for positioning it so that the exhaust tube is properly positioned with respect to said exhaust head and for mov-

ing said lamp to insert the exhaust tube in said head, and means for actuating said means in proper time relation to each other and to the indexing movements of the heads.

2. A transferring mechanism for carrying a lamp or similar device from sealing-in to exhausting apparatus which are indexed in and out of position before said mechanism comprising means for gripping the lamp supported by the sealing-in apparatus, means for moving said first means and said lamp to a second position, a pair of jaws mounted at said second position of said first means and adjacent the exhausting apparatus for gripping said lamp, a second pair of jaws mounted adjacent said first pair of jaws for engaging and positioning said lamp so that the exhaust tube extending therefrom is properly positioned with respect to said exhausting apparatus, means for moving said pairs of jaws to insert said exhaust tube therein and means for actuating all portions of the mechanism in proper time relation to each other and to the indexing movements of the sealing-in and exhausting apparatus.

3. A transferring mechanism for carrying a lamp or similar device from sealing-in to exhausting apparatus which are indexed in and out of position before said mechanism comprising a vacuum head adapted to engage the lamp supported by the sealing-in apparatus, means for moving said head to a second position, means for connecting and disconnecting a vacuum supply to said head so that the lamp is gripped thereby and after being carried to said second position is released, means mounted adjacent said head and said exhausting apparatus for removing the lamp therefrom, for positioning said lamp so that the exhaust tube extending therefrom is properly positioned with respect to said exhausting apparatus and for moving said lamp to insert said exhaust tube therein, and means for actuating all portions of the mechanism in proper time relation to each other and to the indexing movements of the sealing-in and exhausting apparatus.

4. A transferring mechanism for carrying a lamp or similar device from sealing-in to exhausting apparatus which are indexed in and out of position before said mechanism comprising a vacuum head adapted to engage the lamp supported by the sealing-in head a spindle extending from said head having an aperture in the side thereof and a passage connecting said aperture to said head, supporting means engaging said spindle having a passage therein connecting a vacuum supply and the side of said spindle means connected to said supporting means for pressing the head against the lamp and for causing the spindle to shift to another position in the supporting means so that the aperture and passage respectively thereof are aligned and the lamp is gripped by the head, means for moving said head to a second position, means connected to the head for disconnecting the vacuum supply therefrom to release the lamp thereat, means mounted adjacent said head and said exhausting apparatus for removing the lamp therefrom, for positioning said lamp so that the exhaust tube extending therefrom is properly positioned with respect to said exhausting apparatus and for moving said lamp to insert said exhaust tube therein, and means for actuating all portions of the mechanism in proper time relation to each other and to the indexing movements of the sealing-in and exhausting apparatus.

5. A transferring mechanism for carrying a lamp or similar device from sealing-in to exhausting apparatus which are indexed in and out of position before said mechanism comprising a vacuum head adapted to engage the lamp supported by the sealing-in apparatus, a spindle extending from said head having an aperture in the side thereof and a passage connecting said aperture to said head, supporting means engaging said spindle having a passage therein connecting a vacuum supply and the side of said spindle, means connected to said supporting means for pressing the head against the lamp and for causing the spindle to shift to another position in the supporting means so that the aperture and passage respectively thereof are aligned and the lamp is gripped by the head, means for moving said head to a second position, means connected to the head for disconnecting the vacuum supply therefrom to release the lamp, a pair of jaws mounted at said second position of said head and adjacent the exhausting apparatus for gripping said lamp, a second pair of jaws mounted adjacent said first pair of jaws for engaging and positioning said lamp so that the exhaust tube extending therefrom is properly positioned with respect to said exhausting apparatus, means for moving said pairs of jaws to insert said exhaust tube therein and means for actuating all portions of the mechanism in proper time relation to each other and to the indexing movements of the sealing-in and exhausting apparatus.

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