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LAMP MAKING MACHINE

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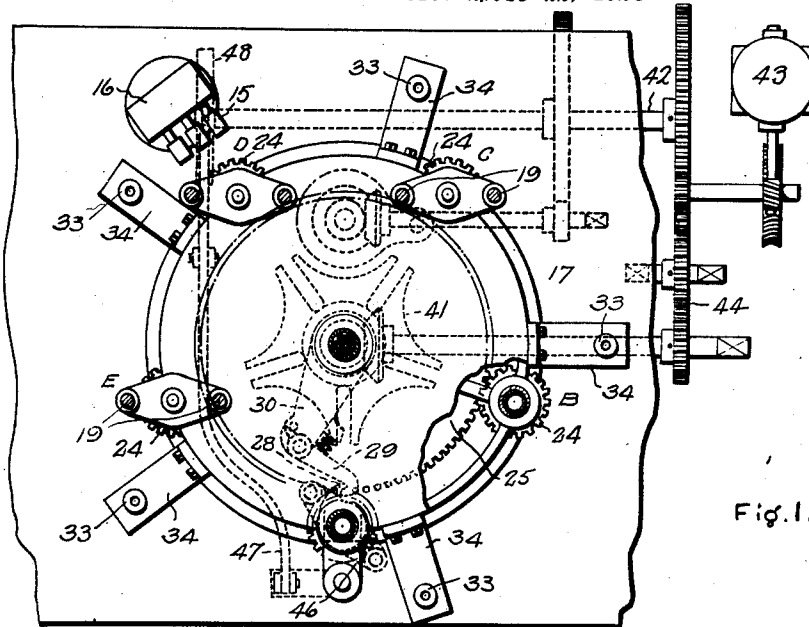


Fig. 1.

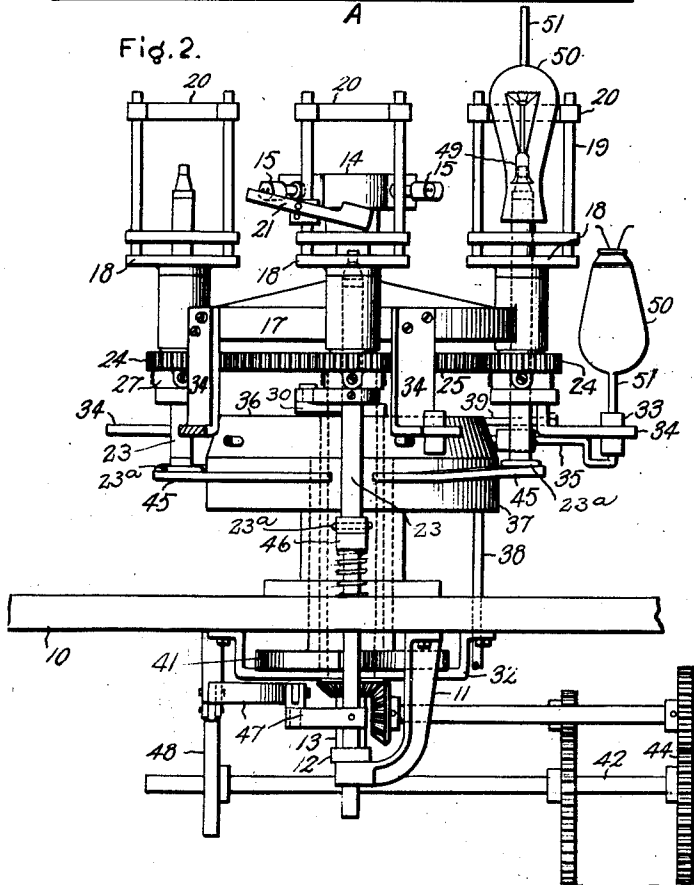
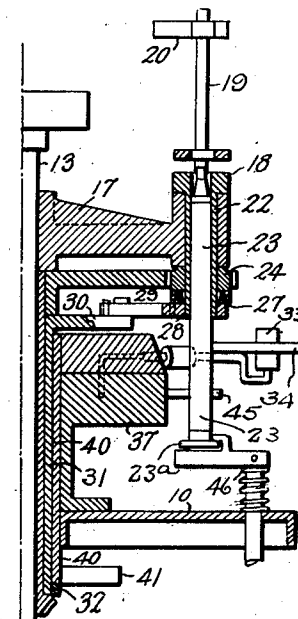


Fig. 2.

Fig. 3.



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# UNITED STATES PATENT OFFICE.

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## LAMP-MAKING MACHINE.

Application filed April 22, 1924. Serial No. 708,240.

My invention relates to the manufacture of incandescent lamps and similar articles comprising an exhausted glass bulb, and more particularly to apparatus for use in assembling and exhausting such articles.

In making an incandescent lamp a glass stem or mount which carried the filament is fused into the neck of the glass bulb usually on a sealing-in machine such as that shown in United States patent to Mitchell and White, No. 1,453,594, May 1, 1923. The sealed in lamp is subsequently exhausted on an exhaust machine such as that shown in United States patent to Massey No. 996,936, July 4, 1911. The sealed in lamp is handled by the operator when it is removed from the sealing-in machine and again when it is placed in the exhaust machine. There is additional handling in many cases where the sealed in lamps are conveyed in trays from one machine to the next.

One object of my invention is to provide a simple and compact machine for sealing-in and exhausting the lamp and so constructed that the operator transfers the hot lamp from the sealing-in machine directly to the exhaust machine by a movement which is practically no greater or different than that necessary merely to remove the lamp from the sealing-in machine.

Another object is to provide such a machine which occupies practically no more floor space than either the sealing-in machine or the exhaust machine heretofore used. A further object is to provide such a machine by means of which one operator can seal in and exhaust a lamp or similar device in practically the same time as has heretofore been required merely for sealing-in.

Other objects and advantages of my invention will be apparent from the following description taken in connection with the accompanying drawings in which merely for purposes of illustration, I have shown one of the many forms in which my invention may be embodied and in which Fig. 1 is a top plan view of a lamp making machine with certain parts broken away; Fig. 2 is a side elevation of the machine shown in Fig. 1 and Fig. 3 is a longitudinal section of a part of the machine shown in Fig. 2, this section being taken through the mechanism at position A of Figure 1.

The particular form of lamp making machine illustrated in the drawing comprises a table 10 with brackets 11 on the underside to carry a cross bar 12 for supporting a vertical tubular post 13 which projects some distance above the top of the table. On the upper end of the post 13 a manifold 14, supplied with gas and air through pipes inside the post, has sealing-in burners 15, and other sealing-in burners 15 on a manifold 16, shown in Fig. 1, assist in producing a hot sealing-in fire which will thoroughly fuse the neck of the bulb to the mount.

The lamp bulb and the mount to be sealed into it can be held in various ways and while held brought within range of the sealing-in burners by various means, but I prefer to use a rotatable carrier, such as the spider 17, which rotates about the post 13 as an axis and carries on its rim sealing-in heads 18 constructed to hold the lamp bulb and the mount in proper relation during the sealing-in operation and to carry the lamp parts into and out of range of the sealing-in burners 15 as the spider 17 rotates. I have shown a machine having five heads, each of which passes through the various positions A to E in succession, and remains in each position a short time.

The particular form of sealing-in head 18 illustrated in the drawings has uprights 19 and a bulb yoke 20 to hold the bulb neck down so that the fires of the burners 15 will strike it at the proper place. It is desirable, though not necessary, to provide the sealing-in head with a pull down fork 21, such as shown in the U. S. patent to Van Keuren No. 1,326,121 Dec. 23, 1919. Each sealing-in head is rotatably journaled in the spider 17 by a vertical tubular shaft 22 best shown in Figure 3, and the mount for the lamp is held in position inside the bulb by a mount holder, such as the vertically movable rod 23 slidably mounted in the tubular shaft 22 so as to be raised and lowered at will.

I prefer to rotate the sealing-in heads 18 while they are within range of the sealing-in burners, and a convenient mechanism is that shown in the drawings. A pinion 24 loosely mounted on the vertical shaft 22 of the sealing-in head is driven from a continuously running gear 25 mounted on the upper end of a tubular shaft 26 concentric with the post 13. The sealing-in head is driven from the pinion 24 through a friction clutch

27 which grips the shaft 22 firmly enough to drive it while the head is free but which will slip if the head is forcibly held. The sealing-in head should be stationary while  
 5 at position A to enable the operator to remove the sealed in lamp from it and load it with a bulb and mount. To this end I provide a locking mechanism such as a hook 28 on the lower end of the shaft 22 in position to be engaged, as shown in dotted lines  
 10 in Figure 1, as the head comes into the loading position A by a yielding catch 29 pivoted on a stationary arm 30 mounted on the upper end of a tube 31 which in turn  
 15 is supported and held at the lower end by a bracket 32 on the lower side of the tables.

This tube 31 also acts as a bearing for the gear 25 and through it for the spider 17. The sealing-in head remains stationary  
 20 as long as it is in the loading position, but as it is carried toward position B by the movement of the spider 17 the hook is disengaged from the catch, whereupon the sealing-in head begins to revolve being driven  
 25 through the friction clutch.

The sealed in lamp produced on the mechanism above described comes back to the loading position A and is immediately transferred, while still hot from the sealing-in  
 30 fires, to an exhaust mechanism so positioned that the operator can place the sealed in lamp in the exhaust mechanism by practically the same movement used to remove the lamp from the sealing-in head. The particular exhaust mechanism shown in the  
 35 drawing comprises exhaust heads 33, one for each sealing-in head, and each comprising a thick walled rubber tubing such as is commonly used for this purpose. Each exhaust head is mounted immediately adjacent a sealing-in head 18, as shown in Figure 1, but below it, as shown in Figure 2, so that a lamp in the exhaust head is below and out of the range of the sealing-in  
 45 fires. In the particular machine shown the exhaust heads are mounted on the spider 17 by means of brackets 34 secured to the spider and are connected through pipes 35 to ports in a flat rotary exhaust valve 36 of the general type shown in said U. S. patent  
 50 to Massey 996,936 and mounted upon a flat valve seat 37 which is secured to the top of the table 10. This flat valve seat is provided with one or more exhaust ports positioned to register with the ports in the valve, and connected through suitable connections such as a pipe 38, to exhaust pumps not shown. As  
 55 the valve 36 rotates on its seat 37 each exhaust head 33 is in turn connected to the exhaust pumps.

The spider 17 and the exhaust valve 36 constitute a rotatable frame or carrier for the sealing-in heads 18 and the exhaust heads 33. To insure that the valve and the  
 65 spider will rotate as a unit they are tied

together in some suitable way, for example by a bolt or projection 39 extending from the valve 36 through a bracket 34 on the spider.

The frame or carrier composed of the valve 36 and spider 17 is rotated step by step through a tubular valve shaft 40 connected at its upper end to the valve 36 and having on its lower end the driven member 41 of intermittent gearing such as that  
 75 shown in U. S. patent to Swan No. 796,470 August 8, 1905. This gearing is actuated from a countershaft 42 driven by a motor 43 which also through a train of gearing 44 drives the continuously running gear 25 for  
 80 rotating the sealing-in heads 18.

The mount rods 23 can be raised and lowered by hand if desired, but I prefer to control them automatically by some means, such as stationary cams 45 made in the form of  
 85 ribs projecting from the rim of the valve seat 37 and positioned to maintain the mount rods at the proper elevation during travel of the sealing-in heads. At the loading position the mount rod should be lowered while  
 90 the sealed in lamp is removed and then raised again to receive another mount. To raise and lower the mount rod automatically I provide a vertically movable control fork 46 into which a flange on the lower end of  
 95 the mount rod enters as the sealing-in head comes into the loading position A. The control fork is then raised and lowered automatically through links 47 from a cam 48 on the countershaft 42. The mechanism is  
 100 so timed that the raising and lowering of the control fork and the mount rod in the fork occurs while the sealing-in head is stationary. As the head moves to the next position the flange on the lower end of the  
 105 mount rod moves out of the control fork onto the cam 45.

In the operation of the machine the bulb and the mount are placed in a sealing-in head at the loading position "A". For simplicity I have illustrated a lamp in which  
 110 the exhaust tube is on the tip of the bulb, but the machine is equally useful for manufacturing tipless lamps of the type shown in Mitchell and White Patent No. 1,423,956  
 115 July 25, 1922. At the loading position the mount 49 is placed on the upper end of the mount rod 23 and then the tubulated bulb 50 is placed in the bulb yoke so that the parts are in the relative position best shown in  
 120 Figure 2. The intermittent gearing then moves the frame step by step and thereby carries the sealing-in head in succession through the various positions B, C, D and E in each of which the head remains for a  
 125 definite period while it is rotating. At position D it is within range of sealing-in fires on the manifolds 14 and 16, and here the sealing-in of the mount into the bulb is completed. When the head containing the sealed  
 130

in lamp returns to the loading position A the operator removes the lamp from the head and places the exhaust tube 51 in the exhaust head 33, whereupon the sealed lamp is in the position illustrated in Figure 2 and is ready to be exhausted. This transfer of the lamp from the sealing-in head to the exhaust head is accomplished very easily and quickly, and the lamp is still so hot from the sealing-in fires that it can usually be exhausted without further heating although it may be further heated during exhaust if desired. The operator then reloads the sealing-in head and as the rotatable carrier makes another revolution the lamp in the exhaust head is automatically connected through the exhaust valve 36 to the exhaust pump so that by the time it returns to position A it is ready to be sealed off. The operator may use a hand torch for melting the exhaust tube 51 close to the bulb and thereby sealing off the lamp in the usual manner or the sealing off may be done automatically by an automatic device such as that shown in U. S. patent to Burrows No. 1,013,124, January 2, 1912. The machine is so timed that each sealing-in head remains in the loading position A long enough to enable the operator to transfer the sealed in lamp from the sealing-in head to the exhaust head, and reload the sealing-in head.

The exhaust head 33 may be placed in any convenient relation to the sealing-in head 18, but I prefer to place it as shown in the drawing, somewhat to the right of the corresponding sealing-in head and at a greater distance from the axis of the machine than the sealing-in head so that the ring of sealing-in heads is concentric with the ring of exhaust heads. I find that this arrangement is very convenient and enables the operator to transfer the lamp from the sealing-in head to the exhaust head with great ease. It will be noted that the floor space required by the machine is no greater than that for a sealing-in machine or an exhaust machine of an equal number of heads, and therefore, my invention effects a marked saving in floor space.

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

1. In a machine of the character described, the combination of a stationary valve seat provided with an exhaust port, a rotatable carrier comprising a valve and mounted to cause said valve to rotate on said valve seat, said valve having a port to cooperate with said exhaust port, an exhaust head mounted on said carrier and connected to said port in said valve, a sealing-in head constructed to hold a mount and a bulb and mounted on said carrier adjacent said exhaust head, sealing-in burners mounted adjacent said carrier to direct a flame across the path of said sealing-in head, and actuating mecha-

nism for rotating said carrier to move said sealing-in head into and out of range of said burners.

2. In a machine of the character described, the combination of a stationary valve seat 70 having an exhaust port, a movable carrier comprising a valve mounted to slide on said valve seat and having a plurality of ports positioned to cooperate with said exhaust port, a plurality of exhaust heads mounted 75 on said carrier and each connected to a port in said valve, a plurality of sealing-in heads mounted on said carrier to travel in the same path parallel to the path of said exhaust heads, each sealing-in head being 80 mounted adjacent to and above a corresponding exhaust head, sealing-in burners mounted to direct a flame across the path of said sealing-in heads and above the path of said exhaust heads, and actuating mechanism for 85 moving said carrier to bring said sealing-in heads into and out of range of said burners.

3. In a machine of the character described, the combination of a rotatable carrier having a valve provided with a plurality of 90 ports, a stationary valve seat on which said valve rotates and having an exhaust port to cooperate with the ports in said valve, a plurality of exhaust heads mounted to travel in a circular path and each connected to a 95 corresponding port in said valve, a plurality of sealing-in heads for holding a bulb and mount and mounted on said carrier to travel in a circular path concentric with and inside of the path of said exhaust heads, each of 100 said sealing-in heads being immediately adjacent and above one of said exhaust heads, sealing-in burners mounted to direct a flame across the path of said sealing-in heads and above the path of said exhaust heads, and actuating mechanism for rotating said carrier. 105

4. A machine of the character described, the combination of a stationary valve seat having an exhaust port, a carrier comprising a valve provided with a port positioned to 110 cooperate with said exhaust port and mounted to rotate on said valve seat, a sealing-in head on said carrier comprising means for holding a bulb and means for holding a mount inside a bulb in said bulb holder, heating means for fusing together the bulb and 115 mount in said sealing-in head, an exhaust head mounted on said carrier adjacent said sealing-in head to hold the exhaust tube of a lamp and connected to a port in said valve, 120 and actuating means for moving said carrier step by step.

5. In a machine of the character described, the combination of a rotatable carrier comprising a spider having a shaft, a gear wheel 125 having a tubular spindle rotatably mounted on said shaft, a sleeve concentric with said spindle, and a flat exhaust valve having a tubular spindle perpendicular to its plane and concentric with said sleeve and 130

provided with ports, and tie members between said spider and said valve to rigidly connect them, a support for said carrier comprising a journal for said exhaust valve spindle having on one end a valve seat with a port to cooperate with the ports in said valve, exhaust heads on said carrier, each connected to a corresponding port in said valve, sealing-in heads mounted on said spider between said exhaust heads and the axis of said spider and above said heads, each sealing-in head comprising a bulb holder, a mount holder, and a pinion in mesh with said gear wheel, heaters for fusing together the bulb and the mount in said head, and actuating means for driving said gear wheel continuously and said exhaust valve spindle step by step.

In witness whereof, I have hereunto set my hand this 19th day of April 1924.

FRANK W. PATTERSON.