April 18, 1950 R. M. GARDNER 2,504,925

ROTARY GAS MIXING VALVE FOR LAMP SEALING APPARATUS

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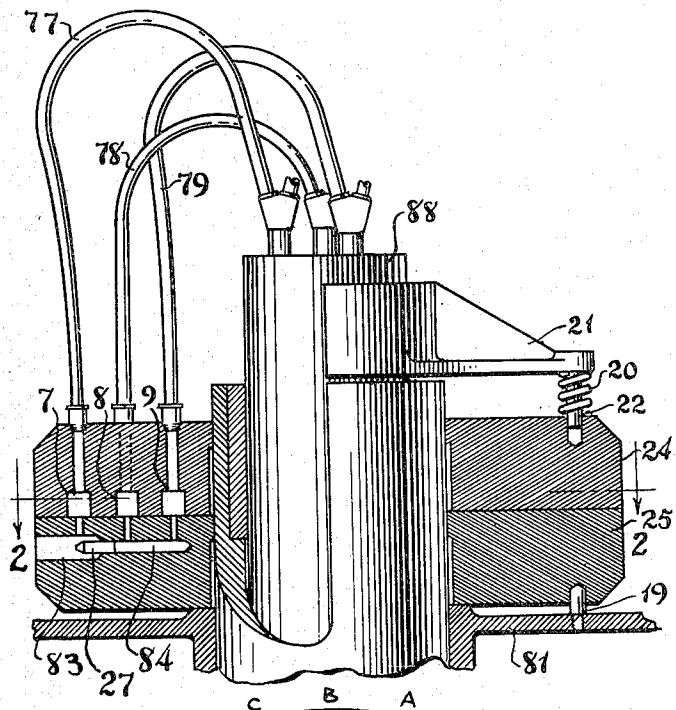


Fig. 1

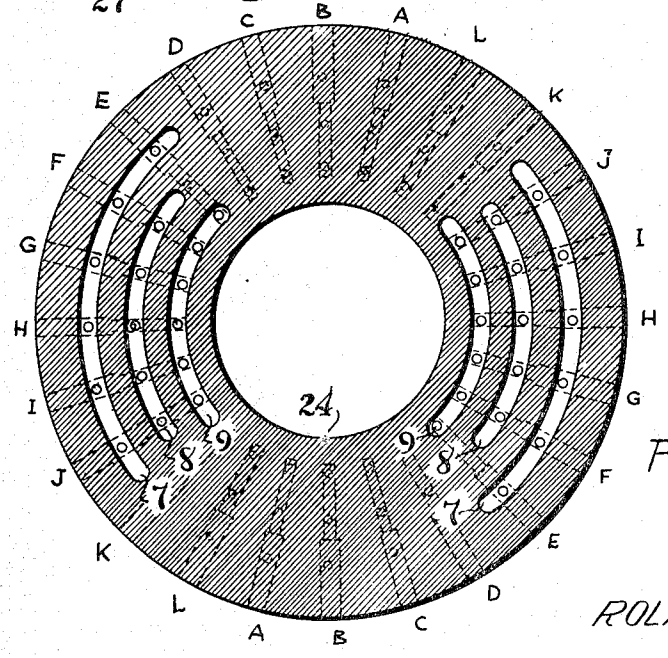


Fig. 2

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ROTARY GAS MIXING VALVE FOR LAMP SEALING APPARATUS

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Continuation of application Serial No. 422,245, December 9, 1941. This application December 17, 1946, Serial No. 716,803

4 Claims. (Cl. 158—118)

1

This invention relates to lamp sealing apparatus and more particularly to machinery for sealing elongated tubular glass envelopes such as fluorescent lamps.

An object of this invention is to provide a rotary gas mixing valve for lamp sealing apparatus.

Further objects, advantages and features will be apparent from the following specification taken in conjunction with the accompanying drawing in which:

Figure 1 is a revolved section of the lamp sealing machine valve.

Figure 2 is a section of the valve taken along the line 2—2 of Figure 1.

The machine of this application offers certain modifications and improvements over that shown in the co-pending application Serial Number 390,312 filed April 25, 1941, now Patent Number 2,349,822.

As pointed out in U. S. Patent 2,349,822, and as shown in Figures 1 and 2, the valve of this invention comprises a fixed lower valve plate 25 locked to a lamp sealing machine turntable 81 by a pin 19, and a movable upper valve plate 24. The gas, oxygen and air are conducted to their respective chambers 7, 8 and 9 in the upper valve plate 24 through the lines 77, 78 and 79 respectively from a controlled source. From these chambers the gas, oxygen and air are piped into the lower valve plate 25 where the oxygen and air is mixed separately in the chamber 84 and jetted through the mixing nozzle 27 into the final mixing chamber 83 where the gas is introduced to the air and oxygen mixture.

Figure 2 which is a section of the upper valve shows the gas, oxygen and air chambers 7, 8 and 9. As was pointed out in U. S. Patent 2,349,822 referred to above, as an individual head moves through its sealing cycle, the movable lower valve plate to which it is connected first, places the burner on that particular head in communication with the gas chamber 7. As the head moves further in its counterclockwise movement the burner is put in communication with the air chamber 9. As the head moves still further, a mixture of gas, air and oxygen is obtained when the burner is put in communication with the oxygen chamber 8. Thus the burner first has a soft gas fire, then a gas and air fire and finally a gas, air and oxygen fire.

After the sealing operation has been completed on a particular head, the burner thereon first becomes disassociated from the oxygen chamber 8, then the gas chamber 7 and finally the air chamber 9. By having the air chamber the last to be

2

disassociated, a short blast of air through the mixing chambers 83 and 84 proves highly advantageous in cleaning them out after each sealing operation.

Although the chambers 7, 8 and 9 are disposed in such a manner, both in relation to each other and in relation to the plurality of heads with which they are continuously being associated and disassociated, that a smoothly operating valve is insured, the valve holder assembly shown in Figure 1 serves as a safety feature to prevent any harmful effects to the valve mechanism or its related parts as a result of back-firing or some similar phenomena which might take place as a result of improper control being exercised over the flow of the gas, air and oxygen. The valve holder 21 is fixed to the upper extremity of the fixed inner shaft 88. The guide shaft 22 extends downwardly from the ends thereof and extends into a recess provided therefor in the top valve plate 24. This shaft 22 extends into the recess with relatively small tolerance in order that the horizontal alignment of the top valve plate 24 may be maintained. The valve holding spring concentric with the shaft 22 will be compressed by the upward movement of the plate 24 caused by trapped gases. When these trapped gases have been freed the contracted spring will exert sufficient pressure to return the plate 24 to its proper position in register with plate 25.

The machines with which this valve may be employed are of the type which carry a plurality of lamp sealing heads through 360 degrees. At certain stations in this cycle, the chambers in the stationary top plate of the valve of Figure 2 are in communication with the chambers in the movable lower plate. Since two distinct sealing operations are completed in one cycle, the top valve plate has two portions of substantially the same structure. Thus reading these two figures together, stations A, B, C and D are loading and unloading positions. As the machine indexes and carries a head from station D to station E, the chambers in the lower valve plate associated with that particular head are moved thereby into association with first the gas and then the air supply chambers 7 and 9 in the top valve plate. Thus at station E, the glass elements to be sealed are heated by a gas and air fire. This serves to gradually heat the glass elements before they are subjected to a fire of greater intensity at station F. Here oxygen is added to the combustion mixture by reason of the chambers in the lower valve plate, associated with that particular head, being placed in communication with the arcuate

oxygen supply chamber 8 in the fixed top valve plate by the movement of the head from station E to station F.

Thus the glass elements are gradually heated. After the two glass elements have been fused together, the oxygen gas and air chambers are sequentially disassociated from the head as it moves from station J to station K. The advantages of this have been pointed out above. Thus by a pre-determined spacing of the arcuate gas, air and oxygen supply chambers in relationship to the plurality of chambers in the movable valve plate associated with the plurality of heads spaced about the periphery of the turret, a gradual pre-heating on one end and annealing on the other end may be attained.

Although I have shown a specific embodiment of the valve structure in Figure 2, it may be readily understood that the elongated arcuate gas, air and oxygen supply chambers 7, 9 and 8 may be extended to provide a greater number of heating stations if desired. So also one or more of these chambers may be extended to provide a longer pre-heating or a longer annealing period without departing from the spirit of the invention.

This application is a continuation of my copending application Serial Number 422,245, filed December 9, 1941, now abandoned.

What I claim is:

1. A valve for a lamp sealing machine comprising a stationary circular valve plate and a movable circular valve plate the adjacent faces of which are in gas-sealing engagement with one another, said stationary circular valve plate being provided with elongated gas-supplying chambers on concentric arcs formed in the engaging face thereof, the major portions of which are located in the same sector of the plate, and said movable circular valve plate being provided with a plurality of gas-mixing chambers disposed radially therein and extending to the periphery thereof, each of said gas-mixing chambers being provided with ports extending to the engaging face of the movable circular valve plate to connect it to the gas-supplying chambers in the stationary valve plate upon the rotation of the movable valve plate.

2. A valve for a lamp sealing machine comprising a stationary circular valve plate and a movable circular valve plate the adjacent faces of which are in gas-sealing engagement with one another, said stationary circular valve plate being provided with elongated gas-supplying chambers on concentric arcs formed in the engaging face thereof, the major portions of which are located in the same sector of the plate, with an end of at least one of said gas-supplying chambers being located on a different radial line than the radial line on which the corresponding end of another of said gas-supplying chambers is located, and said movable circular valve plate being provided with a plurality of gas-mixing chambers disposed radially therein and extending to the periphery thereof, each of said gas-mixing chambers being provided with ports extending to the engaging face of the movable circular valve plate to connect it to the gas-supplying chambers in the stationary valve plate upon the rotation of the movable valve plate.

3. A valve for a lamp sealing machine comprising a stationary circular valve plate and a movable circular valve plate the adjacent faces of which are in gas-sealing engagement with one another, said stationary circular valve plate being provided with three elongated gas-supplying chambers on concentric arcs formed in the engaging face thereof, the major portions of these chambers being located in the same sector of the circular plate, with each end of each chamber disposed on a different radial line than the radial line on which the corresponding end of each of the other gas-supplying chambers is located, and said movable circular valve plate being provided with a plurality of gas-mixing chambers disposed radially therein and extending to the periphery thereof, each of said gas-mixing chambers being provided with ports extending to the engaging face of the movable circular valve plate and adapted, upon the rotation of the movable valve plate, to connect it sequentially to first one, then two and then all three of the gas-supplying chambers, and then disconnect it sequentially from first one, then two, and then all three of the gas-supplying chambers.

4. A valve for a lamp sealing machine comprising a stationary circular valve plate and a movable circular valve plate the adjacent faces of which are in gas-sealing engagement with one another, said stationary circular valve plate being provided with at least three elongated gas-supplying chambers on concentric arcs formed in the engaging face thereof, the major portions of which are located in the same sector of the plate, with an end of at least one of said gas-supplying chambers being located on a different radial line than the radial line on which the corresponding end of another of said gas-supplying chambers is located, and said movable circular valve plate being provided with a plurality of gas-mixing chambers disposed radially therein and extending to the periphery thereof, each of said gas-mixing chambers being provided with ports extending to the engaging face of the movable circular valve plate to connect it to the gas-supplying chambers in the stationary valve plate upon the rotation of the movable valve plate, and a gas-mixing nozzle disposed in each gas-mixing chamber intermediate the ends thereof and dividing said gas-mixing chamber into two compartments.

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