Oct. 19, 1954 M. EBER ET AL 2,691,850

HEAT BAFFLE FOR AUTOMATIC SEALING MACHINES

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Fig. 1.

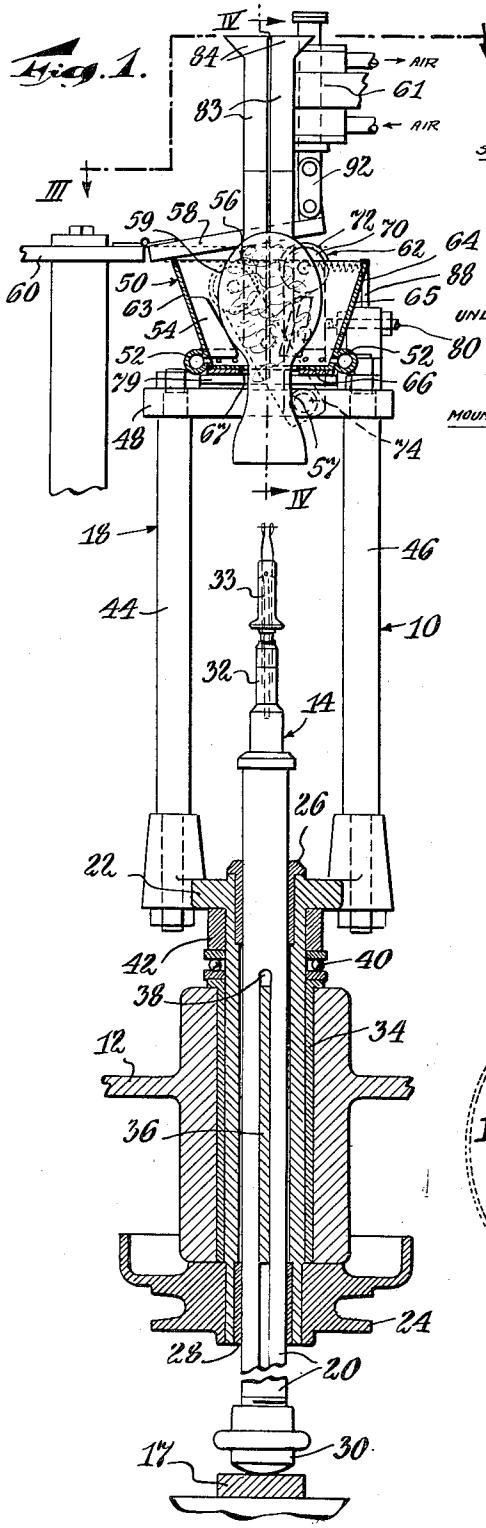



Fig. 2.

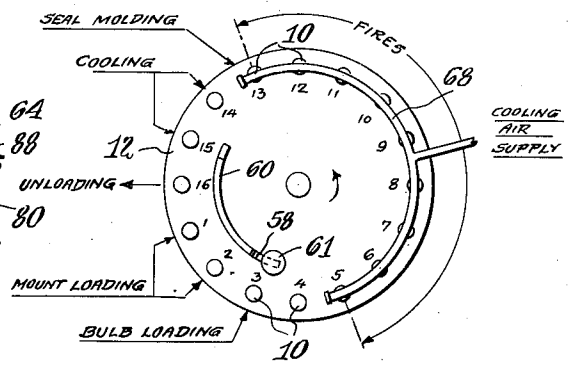
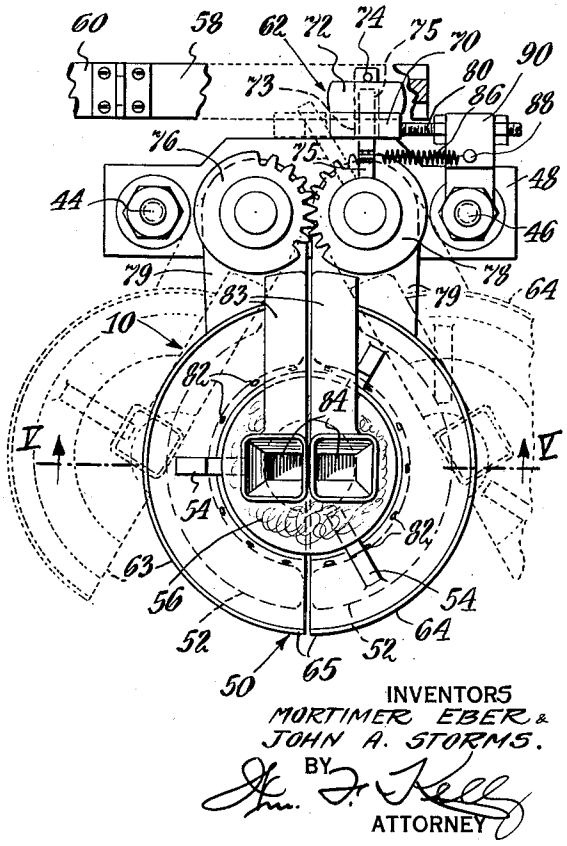



Fig. 3.




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Fig. 4.

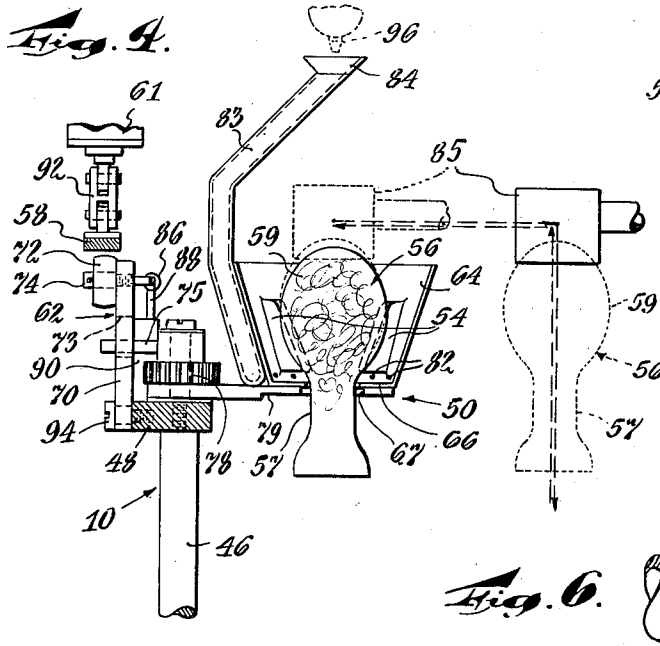



Fig. 7.

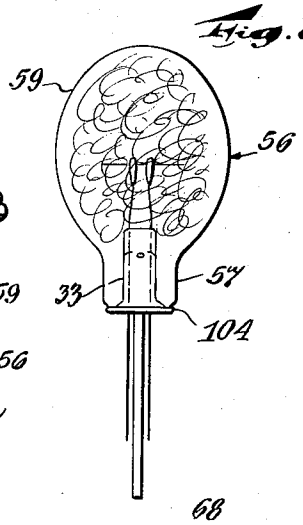



Fig. 6.

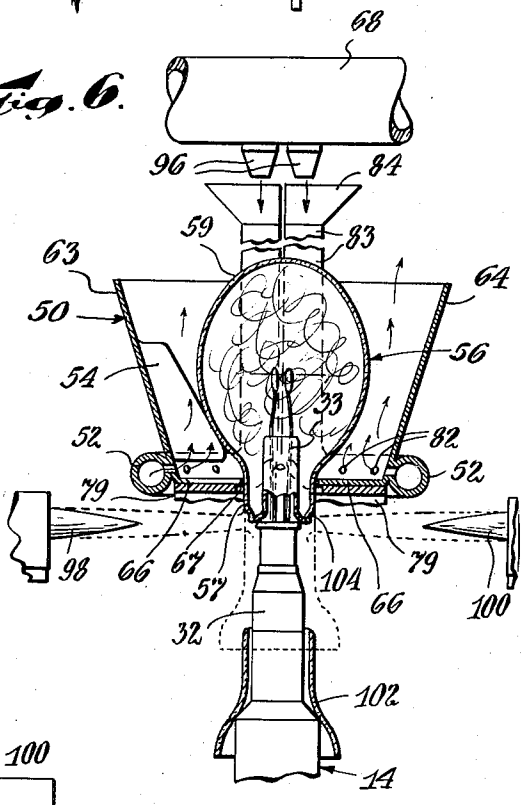
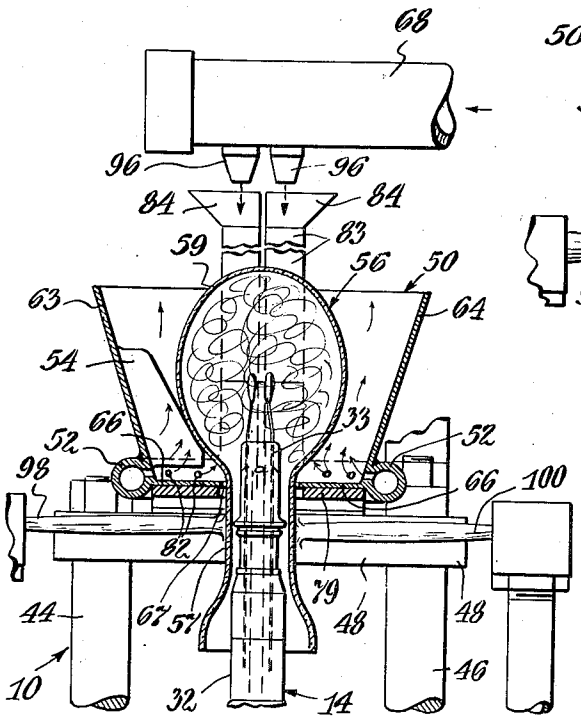



Fig. 5.




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## HEAT BAFFLE FOR AUTOMATIC SEALING MACHINES

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Application February 27 1953, Serial No. 339,376

6 Claims. (Cl. 49—2)

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This invention relates to a heat baffle and, more particularly, to a heat baffle for use in sealing the mount of a photoflash lamp to the bulb of the lamp.

Photoflash lamp bulbs are generally internally coated with an organic lacquer to prevent shattering of the vitreous bulbs when the lamps are fired, as is well-known in the art. These lacquers tend to burn and turn brown when heated by the sealing fires which are used to seal the bulb to the mount of the photoflush lamp.

Heretofore baffles and air cooling have been used to prevent the foregoing lacquers from heating excessively, burning and turning brown during the sealing operation, but only a limited amount of success has been obtained. Difficulties were mainly encountered because the baffles did not completely encircle the bulb above the seal with the result that great care was necessary to isolate sealing fire splash and prevent excess heating of the bulb above the seal.

In order to have a baffle which will perform satisfactorily, it must fit snugly around the neck of the bulb, rotate with the sealing head or spindle, and yet be so designed as to allow initial insertion of the bulb. In addition, the cooling air supply should be primarily directed at the base of the bulb next to the seal, and yet not distort the sealing fires.

It is the general object of our invention to overcome and avoid the foregoing difficulties and objections to prior art practices by providing a new and more efficient baffle which permits cooling air to flow against the entire bulb, and especially in the region where darkening is likely to be the most severe, namely that portion of the bulb near the seal.

Another object of our invention is to provide a baffle which will shield the cooling air from the sealing fires and thus prevent distortion of the sealing fires.

Still another object of our invention is to provide a baffle which will rotate with the sealing head, fit snugly around the neck of the bulb, and yet be capable of opening or separating as to allow the bulb to be inserted into the baffle.

A further object of our invention is to provide a simple means for supplying cooling air to the neck and envelope of a bulb while the bulb is being sealed to a mount, which means is adapted to production line techniques.

The aforesaid objects of our invention, and other objects which will become apparent as the description proceeds, are achieved by providing a baffle which will rotate with the sealing head or spindle of an automatic sealing machine, and which will receive an air blast for cooling purposes from a stationary air discharge nozzle. The novel baffle is designed to provide a maximum shielding effect of the sealing fires from the cooling air and vice versa, while providing a path for the cooling air which will effect a maximum of cooling where it is most needed. Automatic sealing machines are common in the art, and a typical automatic sealing machine is generally described in copending application of Frank Reciniello, Serial No. 283,507, filed April 21, 1952, and assigned to the same assignee as the present invention.

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For a better understanding of our invention reference should be had to the accompanying drawings, wherein:

Fig. 1 is an elevational view, partly in section, of a sealing head or spindle of an automatic sealing machine, the sealing head as shown being located at station No. 3 in Fig. 2;

Fig. 2 is a diagrammatic plan view of an automatic sealing machine showing the relative stations of the various steps of the sealing-in process and the location of the cooling air supply and the releasing cam track;

Fig. 3 is a plan view, partly in section, of the automatic bulb centering and retaining device of the sealing head or spindle of Fig. 1 taken along line III—III in the direction of the arrows. This shows the location of one of the baffle assemblies and the air lines or conduits which supply cooling air to the baffle;

Fig. 4 is a fragmentary side elevational view of the automatic bulb centering and retaining device which is part of the sealing head or spindle shown in Fig. 1, taken along lines IV—IV in the direction of the arrows. This shows details of the baffle, the air line or conduit supplying the baffle, and air supply manifold discharge nozzle. Also shown is the side loading technique employed at bulb loading station 3 of Fig. 2;

Fig. 5 is a fragmentary elevation, partly in section, of the automatic bulb centering and retaining device shown in Fig. 3, taken along lines V—V in the direction of the arrows. In this figure the sealing head or spindle is located at station 5 of Fig. 2, the first station in the sealing operation;

Fig. 6 is a fragmentary elevation of the automatic bulb centering and retaining device at station 13 of Fig. 2, the last station in the sealing operation;

Fig. 7 is an elevation of the sealed photoflash bulb, after unloading from the automatic sealing machine at station 16 of Fig. 2.

Although the principles of our invention are broadly applicable for use with sealing machines other than automatic sealing machines, the invention is usually employed with an automatic sealing machine and hence it has been so illuserated and will be so described.

Referring to the drawing in detail, and particularly to Fig. 1, the sealing head or spindle 10 is representative of one of the 16 sealing heads or

spindles 10 of the sealing machine. Each of the sealing heads 10 (as shown in Fig. 2, 16 in number) is mounted on an indexing table or conveyor 12, moved thereby, and indexed through the 16 stations by conventional automatic indexing means (not shown). Each head comprises a sealing pin shaft assembly 14, rotatably mounted with respect to the table 12, and vertically reciprocated with respect thereto by means of a sealing pin shaft assembly cam track 17 (complete cam track not shown), and a bulb holder assembly 18.

This sealing pin shaft assembly 14, as shown in Fig. 1, comprises a rotatably slidable sealing shaft 20, and means for rotating the head 10, such as a pulley 24 affixed to the lower end of the bulb holder journal 22. This hollow shaft 20 is slidable within an upper bushing 26 and a lower bushing 28 in the journal 22. Affixed to the bottom extremity of the shaft 20 is a hardened cap 30 slidable on the cam track 17. On the upper extremity of the shaft 20 is mounted a hollow sealing pin 32, for receiving the leads and tabulation of a mount 33 for the photoflash lamp.

The journal 22, as shown in Fig. 1, rotates in a bushing 34, in the table 12. A vertical key 36 extends from the journal 22 into the keyway 38 of the shaft 20, so that the shaft rotates as a unit with the journal 22. Vertical motion of the journal 22 is prevented by a thrust ball bearing 40 thereabout between table 12 and a collar 42 thereof, and the pulley 24 in the bottom portion of the journal 22.

The bulb holder assembly 18 comprises a pair of rods 44 and 46 the lower ends of which extend from sockets at the top of the journal 22. A yoke 48 is secured to the upper extremity of these rods. To this yoke 48 is secured the baffle assembly 50, which baffle assembly includes the baffle manifold 52 circumferentially disposed around the base of the baffle. The baffle manifold, as shown, is of toroidal configuration, but may take any desired shape. Bulb holder fingers 54 are mounted within the baffle assembly 50 and consist of three or more fingers disposed in circumferentially-spaced arrangement and shaped to supportingly engage a bulb 56 having a neck portion 57 and an envelope 59. The hinged swingable releasing cam 58 is a part of releasing cam track 60 and is secured to the automatic sealing mechine at station No. 3 apart from the table 12, and serves to release the bulb holding fingers 54 and the baffle assembly 50 as hereinafter explained.

The actuator 61 for hinged releasing cam 58 is also firmly secured to the automatic sealing machine at station No. 3 apart from the table 12, and serves to actuate the hinged releasing cam 58 as hereinafter explained. Actuator 61 may be pneumatic, as is shown in the drawing, or a solenoid or other suitable actuating means.

A roller arm assembly 62 acts to transmit the motion of the hinged releasing cam 58 to release the baffle assembly 50 and bulb holding fingers 54, as hereinafter explained.

The two baffle halves 63 and 64 of the baffle assembly 50, when placed together in closed or bulb retaining position, form a hollow inverted frustum of a right circular cone 65, having an annular base 66, located at the smaller end of the cone, whose inner diameter 67 contiguously encircles the lamp neck 57. This hollow inverted frustum of a right circular cone 65 and annular base 66 may take any desired shape depending on the shape of the neck 57 and envelope 59, and the cooling requirements, but the preferred embodiment has been illustrated and described, in which the envelope 59 is partially enclosed by the baffle when closed.



In Fig. 2 is shown the cooling air supply manifold 68 and the relative location of releasing cam track 60 of which hinged releasing cam 58 is a part.

In Fig. 3, a baffle assembly 50 and bulb holding fingers 54 are shown in the two positions which they occupy while in station 3 of Fig. 2, as hereinafter explained. The roller arm assembly 62 consists of a pivoted lever 70, which lever has a roller 72 secured at its end by means of a pin 74. A slot 73 is provided in pivoted lever 70 intermediate its ends and one end of an arm 75 extends through slot 73 to loosely connect the end of arm 75 to pivoted lever 70. The other end of arm 75 is secured to gear 78 which is meshed with gear 76, which gears are in turn secured to the two baffle halves 63 and 64 of the baffle assembly 50 through connecting arms 79. The arm 75 and pivoted lever 70 must simultaneously rotate in planes which are perpendicular to one another, and the connection between arm 75 and pivoted lever 70 consists of a loose fitting arm and slot in order to permit this simultaneous rotation.

Positioning set screw 80 may be adjusted as desired to regulate the amount of closure of the two baffle halves 63 and 64 in the released or engaging position, as shown in the solid lines. The forward end of positioning set screw 80 thus constitutes an arresting stop to limit pivotal rotation of pivoted lever 70. The two baffle halves 63 and 64 which carry the bulb holder fingers 54 are shown as adapted to receive a bulb, that is, in their open or receiving position, in dotted lines.

The baffle manifold 52 which as before mentioned is circumferentially disposed around the base of the baffle assembly 50 serves to admit cooling air to cool the bulb 56. This baffle manifold 52 is perforated as necessary with a plurality of apertures 82, as are needed to admit the air to cool the bulb 56 during sealing. Such baffle manifold 52 is supplied with cooling air through air lines 83, the ends 84 of which flare out into a funnel shape in order to better receive air while rotating. These air lines are secured to the baffle halves 63 and 64 and move with them. A spring 86 is placed under tension between pin 74 and an arm 88 extending from set screw retainer 90, so that the normal position for the gears 76 and 78 will be such as to place the baffle halves 63 and 64 together, that is, in the released or bulb engaging position.

Yoke 48 serves as a base on which the roller arm assembly 62, baffle assembly 50, and the gears 76 and 78 are mounted.

In Fig. 4 is shown the details of the roller arm assembly 62. The actuator 61 transmits its motion to roller arm assembly 62 through connector 92 and hinged swingable releasing cam 58. The hinged releasing cam 58 in turn contacts roller 72 which is connected to pivoted lever 70 at its pivoting end. One end of arm 75 is in turn loosely connected to pivoted lever 70 through a slot 73, intermediate its ends, as heretofore noted, and the pivoted end of pivoted lever 70 is secured by a pivot 94 to the yoke 48. As hereinbefore explained, pin 74 serves to secure roller 72 to one end of pivoted lever 70 and spring 86 is secured to the other end of pin 74.

The end of arm 75 opposite the end extending through the slot 73 in pivoted lever 70 is secured to gear 78 so that when pivoted lever 70 is released by hinged releasing cam 58, the arm 75 will move with a circular motion rotating the gear 78, which in turn will rotate the meshed gear 76. Thus it can be seen that arm 75 and pivoted lever 70 constitute a means for translating circular motion from one plane to another.

The air lines 83 are bent so as not to interfere with the insertion of the bulb 56 by a suction side loading means 85, as is common in the art. At the same time it is necessary for the air lines 83 to be able to rotate with the sealing head or spindle 10 and yet always have the funnel-shaped ends 84 of air lines 83 in receptive proximity to stationary air nozzles 96 to receive cooling air. This is achieved by locating the funnel-shaped ends 84 of the air lines 83 near the center of rotation of the sealing head or spindle 10. Similar stationary air nozzles 96 are located at each of the individual sealing stations 5 to 13, shown in Fig. 2.

As shown in Fig. 5, each of the sealing stations from 5 to 13 has two air supply nozzles 96 which supply cooling air while the sealing fires are applied. The air is forced from each stationary air nozzle 96, through the funnel-shaped ends 84 of air lines 83 into the baffle manifold 52 of each baffle half 63 and 64 of the baffle assembly 50. The manifold 52 distributes the air flow around the neck 57 of the bulb 56 at the point where cooling is most needed, such as shown by the direction-of-flow arrows in Fig. 5. From this point the air is forced upward by the other incoming air to cool the rest of the bulb. The directed sealing fires 98 and 100 are stationary with respect to the rotating sealing head or spindle 10, and with respect to table 12. As shown, the fires 98 and 100 are gas burners, but any conventional heating means may be adapted. Similar sealing fires are located at each firing station 5 to 13 of Fig. 2.

In Fig. 6, the bulb is shown at station 13, the last of the firing stations. As there illustrated, the sealing fires 98 and 100 have been cut back. The cullet 102 has dropped off at one of the intermediate firing stations, and the seal 104 has been completed.

*Operation*

At stations 1 and 2, as is shown in Fig. 2, the mount 33 is loaded, as is common in the art. At station 3, the bulb 56 is loaded as is indicated in Fig. 2. Side loading is necessary, as is shown in Fig. 4. When the bulb is loaded, the baffle halves 63 and 64 are in the open or receiving position, as indicated by the dotted line baffle halves in Fig. 3. These baffle halves are held in the open or receiving position by the hinged swingable portion 58 of actuating cam track 60 which acts upon roller 72 forcing pivoted lever 70 to the left, or dotted position, as is shown in Figs. 1 and 3. The swingable cam 58 is held in this actuating position by actuator 61. The open or bulb receiving position of baffle halves 63 and 64 allows the bulb 56 to be freely inserted between the two halves and the bulb is retained at the proper vertical position by a suction loading means 85, as is common in the art. After the bulb has been positioned by the bulb loading mechanism 85 (shown only in part) actuator 61 raises hinged swingable releasing cam 58 from the dotted line or actuating position of Fig. 1 to the solid line or releasing position shown in Fig. 1. As hinged swingable releasing cam 58 is raised, spring 86 pulls arm 75



to the right toward the solid line or closed position, as shown in Fig. 3. This rotates gear 78 in a clockwise direction and meshed gear 76 in a counterclockwise direction, as seen from above, and serves to close the baffle halves 63 and 64 around the bulb. Bulb positioning fingers 54, disposed inside baffle assembly 50, support the bulb in this position. Suction side loading means 85 then automatically releases bulb 56, as is common in the art (automatic releasing mechanism not shown).

The sealing head or spindle 10 is then rotated by driving means (not shown) through pulley 24 and indexed to station 5 where the sealing operation commences and the cooling air is applied. The bulb is then indexed from station to station until the sealing operation is completed (indexing means not shown). After the sealing operation is completed, the still hot bulb seal 104 may be molded, if desired. Each of the sealing fires at stations 5 to 13 have an individual function to perform, such as pre-heating, shaping, shaping and sealing, sealing, seal cooling, and annealing. This is common in the art and the individual steps may be modified as dictated by the type of bulb being sealed, as shown in copending application of Frank Reciniello, previously referred to. As shown in Fig. 2, as the sealing head or spindle 10 is indexed toward station 16, the unloading station, it will contact a releasing cam track 60 of which hinged releasing cam 58 is a part. The sealing head or spindle 10 has stopped rotating upon leaving station 15 and is so oriented that roller 72 will contact releasing cam track 60. This forces lever arm 70 to the left, as shown in Figs. 1 and 3 (dotted position), which spreads the two baffle halves 63 and 64 and allows the bulb to automatically drop into a receiving chute (not shown).

It will be recognized from the foregoing that the present invention provides a new and novel baffle assembly which shields the bulb from the sealing fires. This baffle also permits the forced cooling air to be continuously applied at the point where it is most needed, that is, the base of the bulb next to the seal. Further, the sealing fires have been shielded by the new and novel baffle from the cooling air, thus preventing sealing fire distortion. In addition, the cooling air may be continuously applied, even though the baffle and bulb are rapidly rotated during the sealing operation.

It is, of course, obvious that our new and novel baffle may be incorporated on any machine where its advantages may be utilized. The automatic sealing machine to which our new and novel baffle is adapted in the foregoing description is only one of the better applications for the use of our baffle.

While in accordance with the patent statutes, one best form of embodiment of the invention has been illustrated and described in detail, it is to be particularly understood that the invention is not limited thereto or thereby.

We claim:

1. In combination with an automatic sealing machine, a rotatable baffle for a lamp having an envelope and a neck, a portion of which neck is to be sealed to a lamp mount, said baffle having two halves, a portion of which cooperate when placed together to encircle the neck of said lamp between the envelope and said neck portion to be sealed, said baffle halves each having a base disposed around the said baffle half

portion encircling the lamp neck, a baffle manifold circumferentially disposed around each of said baffle halves, said baffle manifold being provided with apertures opening inwardly toward said neck between said base and said envelope, a stationary air supply manifold provided with air discharge means, and said baffle manifold having means in receptive proximity to the air discharge means of said air supply manifold forming an air conduit from the air discharge means of said air supply manifold to said baffle manifold.

2. In combination with an automatic sealing machine, a rotatable heat baffle for a photoflash lamp having an envelope and a neck, a portion of which neck is to be sealed to a lamp mount, said baffle having two halves, a portion of which cooperate when placed together to contiguously encircle the neck of said lamp lamp between the envelope and said neck portion to be sealed, said baffle halves each having a base disposed around the said baffle half portion contiguously encircling the lamp neck, a baffle manifold circumferentially disposed around each of said bases, said baffle manifold being provided with a plurality of apertures opening inwardly toward said neck between said base and said envelope, a stationary air supply manifold provided with air discharge means, said baffle manifold having means in receptive proximity to the air discharge means of said air supply manifold forming an air conduit from the air discharge means of said air supply manifold to said baffle manifold, and means for opening and closing said baffle halves.

3. In combination with an automatic sealing machine, a rotatable baffle for a photoflash lamp having an envelope and a neck, a portion of which neck is to be sealed to a lamp mount, said baffle having two halves, a portion of which cooperate when placed together to contiguously encircle the neck of said lamp between the envelope and said neck portion to be sealed, a plurality of lamp retaining fingers circumferentially disposed within said baffle halves, a base circumferentially disposed around each of the said baffle half portions contiguously encircling the lamp neck, a baffle manifold circumferentially disposed around said bases, said baffle manifold being provided with a plurality of apertures opening inwardly toward said neck between said base and said envelope, a stationary air supply manifold provided with air discharge means, said baffle manifold having means in receptive proximity to the air discharge means of said air supply manifold forming an air conduit from the air discharge means of said air supply manifold to said baffle manifold, and means for opening and closing said baffle halves.

4. In combination with an automatic sealing machine, a rotatable baffle for a photoflash lamp having an envelope and a neck, a portion of which neck is to be sealed to a lamp mount, said baffle having two halves, a portion of which cooperate when placed together to contiguously encircle the neck of said lamp between the envelope and said neck portion to be sealed, a plurality of lamp retaining fingers circumferentially disposed within said baffle halves, said baffle halves each having a base disposed around the said baffle half portion contiguously encircling the lamp neck, a baffle manifold circumferentially disposed around each of said baffle half bases, said baffle manifold being provided with a plurality of apertures opening inwardly toward said neck between said base and said envelope, air conduits forming a part of said baffle halves and having an intake end and a discharge end, an air supply manifold provided with air discharge means, a discharge end of each of said air conduits being connected to said baffle manifold and the intake ends of said air conduits being located about the center of rotation of said baffle and in receptive proximity to the discharge means of said air supply manifold, and means for opening and closing said baffle halves.



5. In combination with an automatic sealing machine, a rotatable baffle for a photoflash lamp having an envelope and a neck, a portion of which neck is to be sealed to a lamp mount, said baffle having two halves, a portion of which cooperate when placed together to contiguously encircle the neck of said lamp between the envelope and said neck portion to be sealed, another portion of which cooperates when placed together to partially enclose said lamp envelope, a plurality of lamp retaining fingers circumferentially disposed within said baffle halves, said baffle halves each having a base disposed around the said baffle half portion contiguously encircling the lamp neck, a baffle manifold circumferentially disposed around each of said baffle half bases, said baffle manifold being provided with a plurality of apertures opening inwardly toward said neck between said base and said envelope, an air conduit having an intake end and a discharge end, an air supply manifold provided with air discharge means, a discharge end of said air conduit being connected to said baffle manifold and the intake end of said air conduit being located about the center of rotation of said baffle and in receptive proximity to the discharge means of said air supply manifold, and means for opening and closing said baffle halves.

6. In combination with an automatic sealing machine, a rotatable baffle for a photoflash lamp having an envelope and a neck, a portion of which neck is to be sealed to a lamp mount, said baffle having two halves, a portion of which cooperate when placed together to contiguously encircle the neck of said lamp between the envelope and said neck portion to be sealed, a plurality of lamp retaining fingers circumferentially disposed within said baffle halves, said baffle halves each having a base disposed around the said baffle half portion contiguously encircling the lamp neck, a baffle manifold circumferentially disposed around each of said baffle half bases, said baffle manifold being provided with a plurality of apertures opening inwardly toward said neck between said base and said envelope, an air conduit having an intake end and a discharge end, an air supply manifold provided with air discharge means, a discharge end of said air conduit being connected to said baffle manifold and the intake end of said air conduit being located about the center of rotation of said baffle and in receptive proximity to the discharge means of said air supply manifold.

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