

UNITED STATES PATENT OFFICE

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DETECTION DEVICE

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My invention is a detection or inspection device for stems for incandescent lamps or similar articles.

The stems for so-called tipless lamps comprise a stem tube and an exhaust tube within the stem tube, portions of the said exhaust and stem tubes being fused together and an aperture or opening being formed either in the fused mass, as disclosed in Mitchell and White Patent No. 1,423,956, issued July 25, 1922, or in the wall of the stem tube, the said aperture communicating with the said exhaust tube. An end of the said stem is then fused to the neck or end of a bulb which is subsequently evacuated through the said exhaust tube which communicates with the interior of the bulb through the said aperture. The stems are made on automatic machinery and it sometimes happens that the machine fails to blow an aperture in the stem, in which case the subsequent operations of mounting a filament and support wires on the stem and sealing it to a bulb are uselessly performed.

An object of my invention is to provide a device for detecting the absence of an exhaust aperture in a stem and preventing the performance of any subsequent assembly or working operations upon the defective stem.

The various features and advantages of my device will appear from the following description of species thereof.

In the drawing Fig. 1 is a side elevation of a detecting device comprising my invention; and Fig. 2 is a vertical section through the end of the exhaust tube of the stem and the nozzle of an air supply line.

A detecting device comprising my invention is shown in the drawing in conjunction with a lamp stem 10 of the type disclosed in the Mitchell and White Patent 1,423,956 referred to above. The said stem may be carried by jaws 10' of a mounting machine of the type disclosed in my Patent 1,907,532, issued May 9, 1933, wherein the jaws 158 (Fig. 5) in said patent correspond to the said jaws 10'. When a lamp stem is indexed into position, the rubber tip or nozzle 11 of a tubular plunger 12 is brought down on the end of the exhaust tube 13 of the said stem. The said plunger 12 is slidably mounted in a horizontal bracket 14 and is lowered onto the exhaust tube in two steps. The first lowering step occurs when a pin 15 in a clamp 16 on the plunger 12 is lowered on a latch 17, by the turning of a lever 18. The lever 18 is mounted on a pin 19 in a vertical bracket 19' on bracket 14, and is

turned by rod 20 which is operated by mechanism not shown. The end of lever 18 engages the clamp 16 which is prevented from turning, by an extension of the pin 15 which engages ways 21 in a vertical bracket 21' on bracket 14. The second lowering step occurs when the latch 17 is withdrawn from under pin 15, thereby allowing the plunger 12 to be lowered by its weight until the tip 11 engages the exhaust tube. The latch 17 is mounted on a screw 22 in bracket 14 and is moved, by mechanism not shown, through a lever 23 and a rod 24. A spring 25, extending between posts in the latch 17 and bracket 14, takes up all slack and provides more positive movement.

Air is forced continuously through the plunger 12 and normally escapes through the exhaust aperture 26 of the stem. However, there is no means of escape if the stem does not have an aperture therein. The air is forced through a passage 27 in the plunger 12 and tip 11 from a pipe 28 through a flexible hose 29 connecting said plunger and pipe. The pipe 28 is connected through a T fitting 30 to a pipe 31 which is connected to a source of air pressure. In case the stem does not have an aperture 26 therein, the air circulation is stopped and a sufficient pressure is built up to expand the bellows 32 which is connected to the T fitting 30 by a pipe 33. The bellows 32 is supported by the pipe 33 and a rod 35 on a bracket 34, said rod 35 being slidably mounted in said bracket. When the latch 17 is in a vertical position under the pin 15, the lever 23 is moved to the right of the position shown in the drawing and the arm 37 thereon, engaging the arm 38 on the pendulum 36, which swings about a pin 39, holds the said pendulum 36 to the left. When the lever 23 swings to the left, the latch 17 is removed from its position under the pin 15, thereby allowing the plunger 12 to drop down. During this part of the movement, the arm 23 has not moved far enough to allow the pendulum 36 to resume the vertical position shown in the drawing, and in the meantime, if the stem 10 in the device does not have an exhaust aperture, the bellows 32 expands, thus moving the pin 35 to the right against the arm 38 of pendulum 36 and holding the pendulum in such a position that the extended portion thereof is directly above the rod 41.

During each cycle of operation, wheel 42 is turned one revolution and wheel 43, which is driven by said wheel 42, is normally moved therewith. The wheel 43 is provided with a notch 44 which is engaged by a roller 45 a lever 46 and

drives the cam shaft 47 of a support wire inserting mechanism (not shown) which may be of the type disclosed in my Patent No. 1,907,532, hereinbefore referred to, wherein the cam shaft 17 (Fig.

- 1) in said patent corresponds to said cam shaft 47. Lever 46 turns about pin 48 in wheel 42 and holds roller 45 in interlocking engagement with wheel 43 through the pull of spring 49 which is located between the said lever 46 and a post in wheel 42.
- As the wheel 42 is revolved, the roller 50 of the lever 46 strikes a cam 51 which pivots on a pin 52. If the stem being inspected has an aperture 26 therein, the cam 51 is raised, but if there is no aperture it is prevented from raising by the extension 40 of the pendulum 36 which is located directly above the rod 41, thereby causing roller 45 to be withdrawn from notch 44. There being no interlocking connection between the wheels 42 and 43 when the roller 45 is withdrawn, the support wire inserting mechanism which is driven by wheel 43, is not operated. The defective mounts are automatically removed from the machine at a subsequent position by mechanism which is not shown.
- What I claim as new and desire to secure by Letters Patent of the United States, is:
1. A device for detecting the absence of an exhaust aperture in a stem for electric lamps and similar articles comprising an air line which engages the exhaust tube of said stem, means for forcing air under pressure through said line, the air flowing normally through said exhaust tube and escaping through said exhaust aperture of said stem, a bellows inserted in said air line which is expanded by the increased pressure in said line when a stem is devoid of an exhaust aperture, driving means for subsequent mechanisms normally operating upon said stem and mechanism operated by the expansion of said bellows for rendering inoperative said driving means.
 2. A device for detecting the absence of an exhaust aperture in a stem for electric lamps and similar articles comprising an air line including a substantially vertically disposed tube, mechanism for causing said tube to be lowered until the lower end thereof engages the end of the exhaust tube of a vertically disposed stem, means for forcing air under pressure through said line, the air flowing normally through said exhaust tube and escaping through said exhaust aperture of said stem, a bellows inserted in said air line which is expanded by the increased pressure in said line when a stem is devoid of an exhaust aperture, driving means for subsequent mechanisms normally operating upon said stem and mechanism operated by the expansion of said bellows for rendering inoperative said driving means.
 3. A device for detecting the absence of an exhaust aperture in a stem for electric lamps and similar articles comprising an air line including a substantially vertically disposed metal tube having a resilient tip on the lower end thereof, mechanism for causing said tube to be low-

ered until the resilient tip thereof engages the end of the exhaust tube of a vertically disposed stem, means for forcing air under pressure through said line, the air flowing normally through said exhaust tube and escaping through said exhaust aperture of said stem, a bellows inserted in said air line which is expanded by the increased pressure in said line when a stem is devoid of an exhaust aperture, driving means for subsequent mechanisms normally operating upon said stem and mechanism operated by the expansion of said bellows for rendering inoperative said driving means.

4. A device for detecting the absence of an exhaust aperture in a stem for electric lamps and similar articles comprising an air line including a substantially vertically disposed tube having a laterally extending pin thereon, means for forcing air under pressure through said air line, a latch disposed below said pin, a bellows inserted in said air line, a pendulum disposed adjacent said bellows, a vertically reciprocating rod disposed below said pendulum, mechanism for allowing the said vertically disposed tube portion of said air line to be lowered until the pin thereon engages said latch, engagement elements holding said latch under said pin and holding said pendulum away from the line of movement of said vertically disposed rod, mechanism for actuating said engagement elements to pivot said latch and allow the end of said tube portion of said air line to engage with the end of an exhaust tube of a stem, the air in said line thereby normally passing through said exhaust tube and escaping through the exhaust aperture in said stem, but the absence of an exhaust aperture causing the said bellows to be expanded and thereby engage the said pendulum and hold it in the line of movement of said vertically disposed rod, thereby preventing said rod from reciprocating, and driving means for subsequent mechanisms normally operating upon said stem, said driving means being rendered inoperative by the failure of said rod to be reciprocated.

5. In a machine for manufacturing stems for electric lamps and similar articles, a carrier for said stems, a device for detecting the absence of exhaust apertures in said stems comprising a tube, mechanism for causing the end of said tube to be advanced toward and engage the end of an exhaust tube of a stem on said carrier, means for forcing air under pressure through said tube, the air flowing normally through said exhaust tube and escaping through said exhaust aperture of said stem, a bellows inserted in said air line which is expanded by the increased pressure in said line when a stem is devoid of an exhaust aperture, driving means for subsequent mechanisms normally operating upon said stem, and mechanism operated by the expansion of said bellows for rendering inoperative said driving means.

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