April 24, 1928. 1,667,601

L. A. MAURER

EXHAUST TUBE REMOVER

Filed Feb. 14, 1923

Fig. 1.

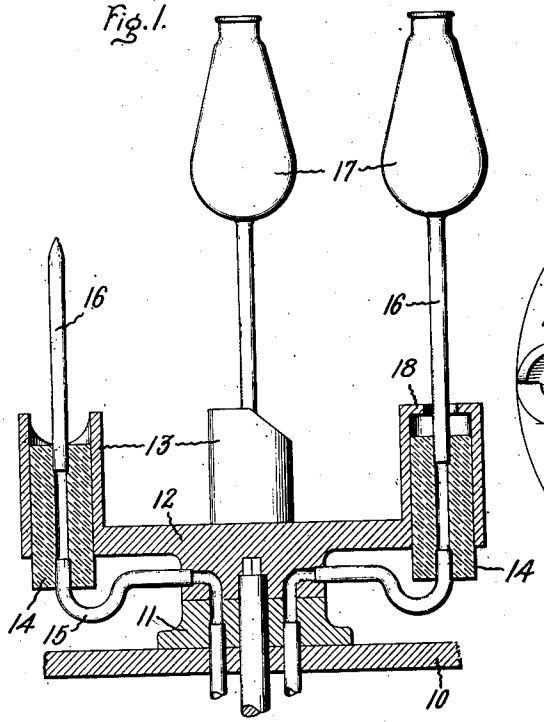


Fig. 2.

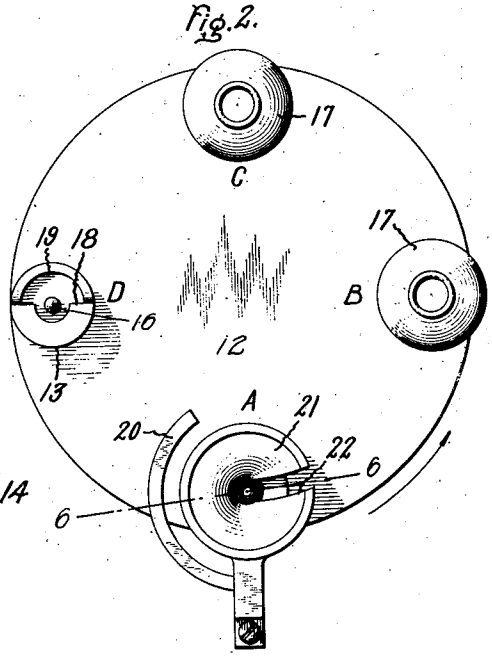


Fig. 3.

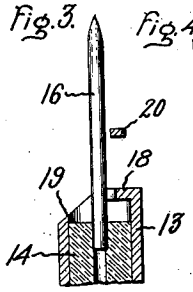


Fig. 4.

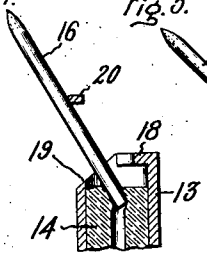


Fig. 5.

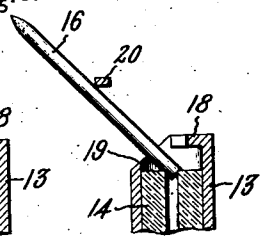


Fig. 6.

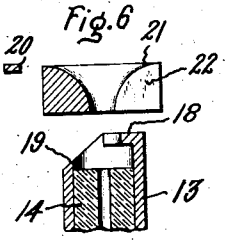


Fig. 7.

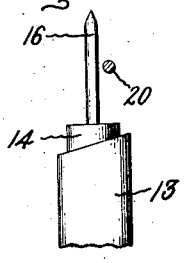


Fig. 8.

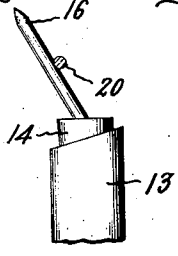
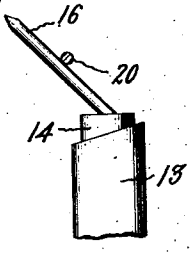


Fig. 9.



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by Alexander S. Lane
His Attorney

Patented Apr. 24, 1928. 1,667,601

UNITED STATES PATENT OFFICE.

LOUIS A. MAURER, OF IRVINGTON, NEW JERSEY, ASSIGNOR TO GENERAL ELECTRIC COMPANY, A CORPORATION OF NEW YORK.

EXHAUST-TUBE REMOVER.

Application filed February 14, 1923. Serial No. 619,028.

My invention relates to automatically removing small articles such as short pieces of glass tubing from elastic holders, and more particularly to means for automatically removing short pieces of exhaust tubing from exhaust machines used in making incandescent lamps and similar articles.

One object of my invention is to provide a simple means for automatically discharging articles from elastic holders in which the articles are temporarily mounted. Another object is to provide a simple and rugged device for automatically removing the waste ends of exhaust tubing from the tubular rubber sleeves or connectors used to connect the lamps to the pumps of the automatic exhaust machines commonly used in the manufacture of incandescent lamps and similar articles.

My invention will be best understood in connection with the accompanying drawings in which merely for purposes of illustration, I have shown some of the forms in which it may be embodied and in which Figure 1 is a transverse vertical section of an exhaust machine suitable for exhausting incandescent lamps and embodying one form of my invention; Figure 2 is a plan view of the machine shown in Figure 1; Figures 3, 4 and 5 are views showing the successive steps of ejecting the stub end of the exhaust tube from the machine in accordance with my invention; Figure 6 is a sectional view along the line 6, 6 of Figure 2; and Figures 7, 8 and 9 are views in elevation showing the successive steps of removing a stub end of an exhaust tube from a slightly different type of head or holder than that illustrated in the other figures of the drawing.

For purposes of illustration I have shown my invention as applied to an automatic exhaust machine of the general type disclosed in United States Patent 996,936, Massey, July 4, 1911. This machine comprises, as best shown in Fig. 1, a table 10 supporting a flat stationary valve seat 11, on which is mounted a rotary valve 12 provided with tubular exhaust heads 13, each containing a soft rubber holder 14, usually a section of thick walled rubber tubing. The exhaust heads are connected through nipples or pipes 15 to ports in the valve 12 which register with corresponding ports in the valve seat 11 as the valve rotates. The exhaust tube 16 of a lamp 17 fits snugly in the rubber holder 14, and as the valve 12 rotates each lamp is automatically carried from the loading position A through the exhaust positions B and C and connected in succession to the various exhaust pumps until finally at the sealing off position D the exhausted lamp is sealed off, leaving the stub end of the exhaust tube 16 in the holder 14.

In accordance with my invention the stub end of the exhaust tube 16 is automatically removed from the holder 14 by tilting it about its lower end until the lower end is released by the holder. The elastic holder 14 will stretch or distort enough to permit this tilting of the exhaust tube until, at an angle of from 30° to 45° with the axis of the holder, the lower end of the exhaust tube is released from the holder. The tubular heads 13 support the holders 14 and I prefer to provide them with an inwardly projecting flange 18 to keep the rubber holders in place, and also prefer to cut away part of the upper end of the head, as at 19, to facilitate the tilting or sidewise movement of the exhaust tube and its discharge from the holder.

The tilting of the exhaust tube necessary to discharge it from the elastic holder 14 may be brought about in various ways, but I prefer to use an ejector 20 so mounted that upon relative movement of the exhaust head 13 and the ejector it will engage the upper or free end of the exhaust tube and push it sidewise. I prefer to obtain this relative movement by mounting a stationary ejector 20 adjacent the path of the exhaust heads 13, so that as each head in succession passes under the ejector 20, the free end of the exhaust tube is caught by the ejector and the tube tilts until it is swept out of the holder. The action is best shown in Figs. 3, 4 and 5 showing the successive stages of the tilting and removal of the exhaust tube. In Fig. 3 the free end is just coming into contact with the ejector 20; in Fig. 4 the exhaust head has moved a sufficient distance to tilt the tube until its lower end is just on the point of being released by the elastic holder 4; and in Fig. 4 a slight further travel of the exhaust head has freed the lower end of the tube, which is beginning to fall out of the way. By the time the exhaust head reaches the loading position A the holder is ready to receive the exhaust tube of the next lamp. To facilitate the insertion of this exhaust tube into the holder 14 I may provide a

guide, such as a funnel 21, mounted immediately above the holder in the loading position A and provided with a slot 22 in one side to permit the exhaust tube 16 to move out of the funnel as the valve 12 rotates.

Figs. 7, 8 and 9 illustrate the removal of an exhaust tube in accordance with my invention from a type of holder in which the upper end of the tubular holder 14 is left sufficiently free to permit the necessary distortion of the holder as the stub end of the exhaust tube is tilted to one side until its lower end is released from the holder.

I have illustrated my invention as applied to an automatic exhaust machine for incandescent lamps for which purpose it is particularly adapted, but it is not restricted to such uses as it is capable of being used for automatically removing articles of many kinds from elastic holders.

Various changes and modifications may also be made without departing from my invention, and therefore I do not wish to be restricted to the particular form shown.

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 holder having a recess with elastic walls for gripping an article, an ejector mounted adjacent said holder, and means for producing relative movement between said holder and said ejector to cause said holder to pass adjacent said ejector and to bring said ejector into contact with an article in said holder, and thereby distort said elastic walls sufficiently to release the article.

2. In a machine of the character described the combination of a tubular holder of elastic rubber having a bore suitable for holding a cylindrical article therein, an ejector, and means for causing relative movement of said ejector and said holder in a direction transverse said holder for sweeping out of said holder an article held therein.

3. In a machine of the character described, a tubular holder of elastic rubber, a supporting shell for said holder constructed to permit sufficient yielding of a portion of said holder to allow the free end of an article in said holder to be moved out of alignment with it, an ejector, and means for producing relative movement of said holder and said ejector to bring said ejector and the article in said holder into contact and thereby move the free end of said article sufficiently out of alignment with said holder to distort a portion of it and thereby release said article.

4. In an automatic exhaust machine the combination of a rotatable valve having exhaust heads comprising tubular holders of elastic rubber, each having a bore suitable for holding an exhaust tube, and a stationary ejector mounted to project into the path of movement of exhaust tubes in said holders and thereby cause said exhaust tube in each holder to tilt and thereby distort the bore of said holder until said tube is swept out of said holder as each head moves past said ejector.

In witness whereof, I have hereunto set my hand this 8th day of February, 1923.

LOUIS A. MAURER.