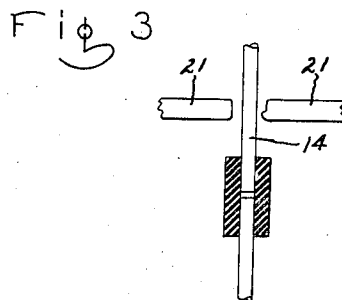
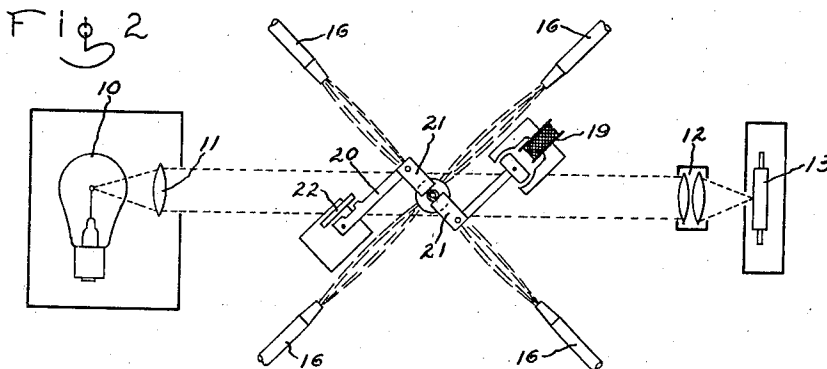
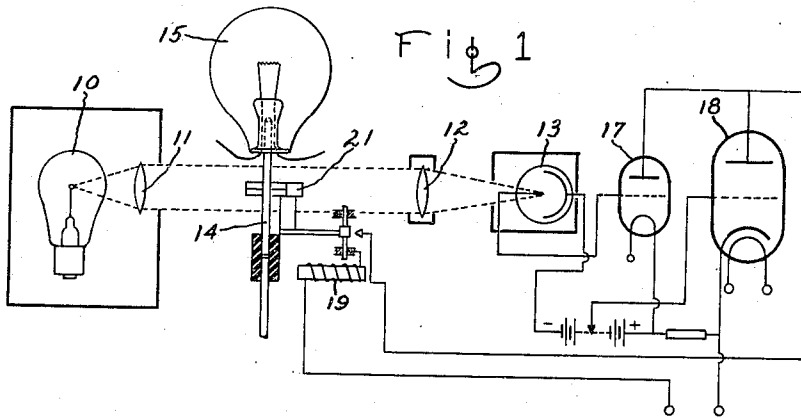


Dec. 7, 1937.

M. DE NEUMANN  
SEALING-OFF APPARATUS

2,101,673

Filed Dec. 16, 1935



INVENTOR  
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## UNITED STATES PATENT OFFICE

2,101,673

## SEALING-OFF APPARATUS

Michael de Neumann, Budapest, Hungary, assignor to General Electric Company, a corporation of New York

Application December 16, 1935, Serial No. 54,773  
In Germany December 24, 1934

## 3 Claims. (Cl. 48-2)

My invention relates to apparatus for hermetically closing or sealing-off vessels such as bulbs for electric lamps and the like containing gas under pressure greater than atmospheric, as disclosed in my U. S. Patent No. 2,014,471, granted September 17, 1935.

One of the objects of the present invention is to provide apparatus for closing or sealing-off the vessel at substantially the instant at which the heated portion of the tube through which the vessel is exhausted and filled with a gas becomes so softened or plastic that it would burst under the internal pressure if not closed off. Further features and advantages of my invention will appear from the following description of species thereof.

According to my invention, I make use of the incipient change of shape of the pump tube, caused by the heating thereof and the internal pressure, to cause a tool to be operated to close off the said pump tube.

In the drawing, Fig. 1 is a diagrammatic view of apparatus comprising my invention; Fig. 2 is a plan view; and Fig. 3 is an elevation showing the pinching or sealing-off jaws.

Referring to the drawing, the apparatus illustrated consists broadly of three parts, namely, a projector, an amplifier, and a closing-off device. The projection system consists of an electric lamp 10, and light concentrating lenses 11 and 12. The said projection system and a photo-electric cell 13 serve for the optical delineation and objective detection of the outline of the glass pump tube 14 of an incandescent lamp 15 which is to be sealed off. As soon as this outline changes, due to the swelling up of the pump tube 14 when it becomes plastic under the heat of burners 16, the photo-electric cell energizes an amplifier 17, which may be a vacuum amplifier tube and is coupled to a vapor discharge tube 18. When the current (or voltage) in the photo-electric cell is reduced below a predetermined value by the increased size of the shadow thereon due to the swelling of the pump tube 14, a discharge occurs in the vapor discharge tube 18, and an electro-magnet 19 of the closing-off device 20 is energized. Then the exhaust tube 14, which has become plastic and has just started to expand, is compressed, sealed off and separated, all at the same time, by the action of jaws 21 which are actuated by the electro-magnet 19. The anode current of the vapor discharge tube is then immediately cut off by an automatic switch 22 and thus the jaws 21 are separated by a spring (not shown) to release

the closed-off exhaust tube. After closing the switch 22 again, the apparatus is ready for closing another exhaust tube.

The amplification might be simplified by using an exhaust tube of colored or matte material so that the quantity of light falling on the light sensitive element when the exhaust tube changes shape is thereby increased.

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

1. An apparatus for sealing-off a vessel containing a gas under pressure greater than atmospheric and provided with a vitreous tube connected to said vessel which comprises a pair of jaws, means for heating a portion of said tube to cause it to become plastic and means actuated by the incipient change of shape of said tube due to the internal gas pressure for closing said jaws against the plastic tube to compress and close it.

2. An apparatus for sealing-off a vessel containing a gas under pressure greater than atmospheric and provided with a vitreous tube connected to said vessel which comprises a light source disposed at one side of said tube for projecting a light beam past said tube, a light-sensitive cell disposed on the opposite side of said tube in the path of said light beam so as to intercept the shadow of said tube, a pair of jaws, means for heating a portion of said tube to cause it to become plastic and means actuated by said light-sensitive cell for closing said jaws against the plastic tube to compress and close it when the shadow of the tube thereon is increased in size due to the incipient change of shape thereof because of internal gas pressure.

3. An apparatus for sealing-off a vessel containing a gas under pressure greater than atmospheric and provided with a vitreous tube connected to said vessel which comprises a light source disposed at one side of said tube for projecting a light beam past said tube, a light-sensitive cell disposed on the opposite side of said tube in the path of said light beam so as to intercept the shadow of said tube, a pair of jaws, means for heating a portion of said tube to cause it to become plastic and a solenoid disposed adjacent said jaws and actuated by said light-sensitive cell for closing said jaws against the plastic tube to compress and close it when the shadow of the tube thereon is increased in size due to the incipient change of shape thereof because of internal gas pressure.

MICHAEL DE NEUMANN.

## CERTIFICATE OF CORRECTION.

Patent No. 2,101,673.

December 7, 1937.

MICHAEL de NEUMANN.

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction as follows: Page 1, first column, line 45, for "enegized" read energized; same page, second column, lines 1, 3 and 7, for "exhaust" read pump; and line 5, for "an exhaust" read a pump; and that the said Letters Patent should be read with these corrections therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 8th day of February, A. D. 1938.

(Seal)

Henry Van Arsdale,  
Acting Commissioner of Patents.