

Feb. 15, 1938.

L. C. STRINGER
RARE GAS SALVAGING DEVICE

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Filed April 29, 1937

2 Sheets-Sheet 1

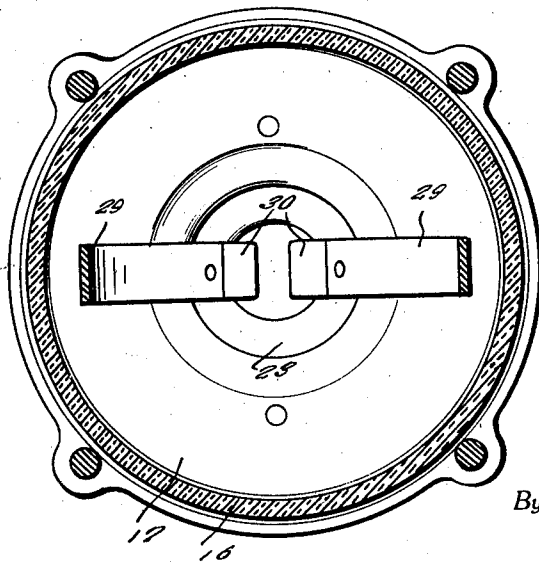
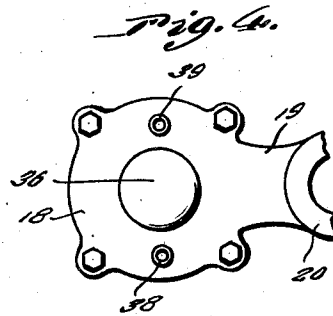
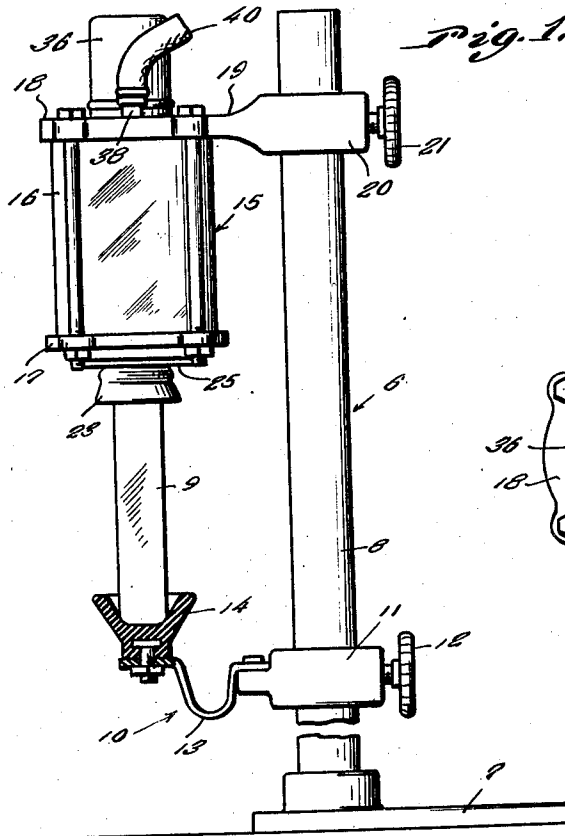


Fig. 5.

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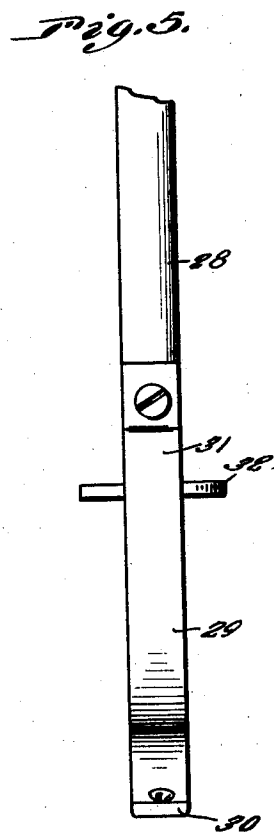
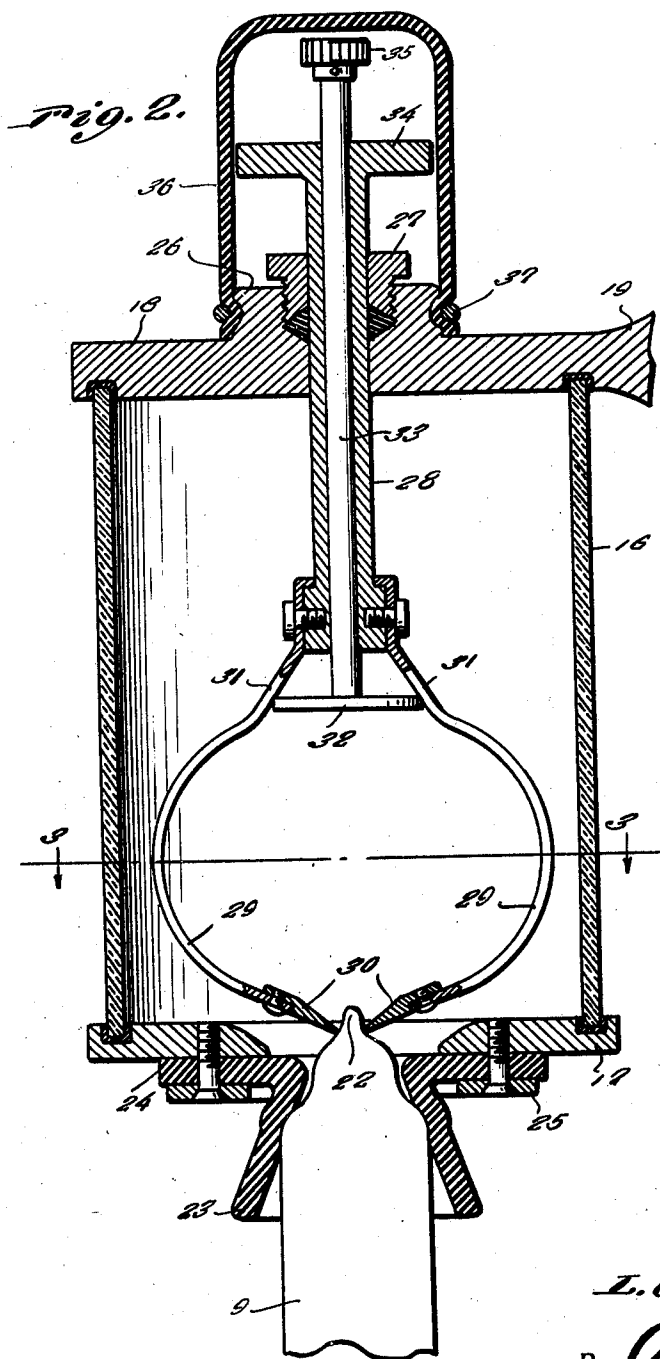
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UNITED STATES PATENT OFFICE

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RARE GAS SALVAGING DEVICE

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12 Claims. (Cl. 176—2)

The present invention relates to a mechanical manually regulated and controlled device expressly designed for salvaging and temporarily storing rare gas collected from certain incandescent bulbs and especially neon tubes.

It has been my experience to ascertain that there is a dire need in industrial trades for a feasible method and means to salvage and reclaim highly expensive rare gases utilized in the manufacture of certain gas charged incandescent bulbs and tubes. Thus, the cardinal objective with which I am here concerned is the actual reduction to practice of practicable structural means for accomplishing this result with requisite efficiency and satisfaction.

In carrying out the principles of the present inventive conception, I have evolved and produced what I believe to be an ingenious device aptly fitted for this particular purpose. An outstanding object of the invention is, therefore, to perfect and provide a structure characterized by practical mechanical expedients appropriately coordinated to accommodate the conventional tube and to act upon it in such a way as to properly extract the gas and thereafter transmit the collected gas to a suitable storage tank for subsequent usage.

Other objects, features and advantages of the invention will become more readily apparent from the following description and accompanying illustrative drawings.

In the drawings, wherein like numerals are employed to designate like parts throughout the views:

Figure 1 is an elevational view, partly in section, of the preferred embodiment of the invention constructed in accordance with the principles and ideas herein explicitly described.

Figure 2 is an enlarged central vertical sectional view through the essential unit or gas trapping device illustrating to advantage how the desired result is attained.

Figure 3 is a horizontal section on the line 3—3 of Figure 2.

Figure 4 is a top plan view of the rare gas trapping unit seen at the left in Figure 1.

Figure 5 is a detail elevational view of the tube nipping means.

Referring now to the drawings by distinguishing reference numerals, attention is first invited to Figure 1. As shown here, the desired result may be attained through the instrumentality of the assembly depicted. To begin with, the numeral 6 designates an appropriate stand. This includes a base 7 having a vertical standard 8.

The tube from which the gas is to be extracted and salvaged is denoted by the numeral 9, and a holding unit 10 is employed to accommodate this. The unit 10 comprises a collar 11 slidable on the standard and held in adjusted position by a set screw having a hand-wheel 12. The collar is equipped with a resilient spring 13 forming a supporting arm for a rubber cup 14 appropriately fashioned to provide a reliable seat for the lower end of the neon tube 9.

The gas trapping unit, which is supported adjustably above the tube holder, is denoted as a general assembly by the numeral 15. As illustrated to advantage in Figure 2, said trapping unit comprises a glass cylinder 16 supported at its bottom on an annulus 17 located directly beneath the closing disk or head 18 resting on the upper end of the glass cylinder. The head 18 is formed integral with a supporting arm 19 terminating in a collar 20 slidably mounted on the standard and adjustably held in place by hand-wheel or the like 21. It will be noted that the tip of the tube 22 extends into the gas trapping chamber by way of the annulus 17. A gas tight connection is afforded here through the instrumentality of a rubber adapter 23. The adapter is preferably tapered and includes an attaching flange 24 held in place by a clamping ring 25. This provides the variable means to locate the tube 9 in gas discharging position with respect to the trapping unit. Incidentally, this unit might also be referred to as the rare gas collector cylinder.

On the top closing plate or disk 18 is a projection 26 having a suitable packing gland 27. The packing gland serves to accommodate the reciprocatory and rotary tube fracturing instrument. This instrument is characterized by a slidably mounted sleeve 28, that is, the sleeve slidably mounted in the packing gland 27. The inner end of the sleeve extends into the gas trapping cylinder where it is provided with normally contractible spring fingers 29. The free ends of the fingers are disposed in opposed relation and provided with detachable cutting blades 30 forming the nipping elements for the test 22. It will also be observed that the diverging portions 31 of the spring fingers, adjoined to the sleeve 28, function as cams for coaction with the spreading disk 32. The disk is carried on a stem or rod 33 slidably mounted in the sleeve. The upper end of the rod projects beyond the finger grip 34 on the sleeve where it is provided with a gripping knob 35. These features 27, 34 and 35 are housed within an inclosing rubber jacket 36 forming a sort of

a dome on the top of the glass cylinder. The jacket is securely wired or otherwise attached, as indicated at 37, to the projection 26. The rubber jacket coats with the packing flange in providing a gas proof joint and at the same time permits the features 34 and 35 to be selectively actuated.

Attention is now invited to Figure 4, wherein the numerals 38 and 39 designate nipples to accommodate suitable hoses. One hose is indicated by the numeral 40 in Figure 1. It may well be assumed that the nipple 38 is designed through the instrumentality of a suction pump (not shown) to create a vacuum in the cylinder 16. The other nipple 39 and its hose (not shown) is joined with pump means (not shown) to extract the salvaged gas and to reclaim it by storing it in a tank (not shown) for subsequent use. Naturally, the pump means and storage means may be considered as no specific part of the present invention.

In operation it is understood that the tube 9 is placed in the retention cup 14. Here it is in a perpendicular position so that the upper fragile end may be lodged in the adapter ring 23. With the machine thus set, that is, the parts 10 and 15 in proper position with the tube 9 in place, a vacuum is created in the cylinder 16 by way of the nipple 38 and its connecting hose 40. Then, the nipping tool is brought into play to release the rare gas for collection in the cylinder. This means that the jaws or blades 30 are normally elevated within the cylinder clear of the tube. It also means that the operator then catches hold of the knob 39 and lifts up on the rod or stem 33 to expand the fingers 29. This operation is clearly visible through the glass cylinder 16. Then the tool is lowered to bring the nipping blades on opposite sides of the teat 22. By releasing the spreader means the blades are held tightly against the teat and then the entire tool is rotated by way of the handle 34 to cut off said teat and to release the gas for collection in the trapping cylinder 16. The gas is then drawn off by way of the outlet 39, where it is suitably stored for re-use.

It is thought that the description taken in connection with the drawings will enable a clear understanding of the invention to be had. Therefore, a more lengthy description is thought unnecessary.

While the preferred embodiment of the invention has been shown and described, it is to be understood that minor changes coming within the field of invention claimed may be resorted to if desired.

I claim:

1. In a structure of the class described, a rare gas collecting unit having means to accommodate a gas containing tube, and mechanical manually regulated means in said unit to tap the tube and to release the gas.

2. In a rare gas salvaging device of the class described, a transparent cylinder having means to accommodate and hold in place the end of the tube to be tapped, and a manually controlled nipping tool mounted in said cylinder.

3. In a rare gas salvaging device of the class described, a transparent cylinder having means to accommodate and hold in place the end of the tube to be tapped, a manually controlled nipping tool mounted in said cylinder, together with a nipple on said cylinder adapted to accommodate

a hose leading to a pump for extracting the collected gas and storing it for subsequent use.

4. In a rare gas salvaging structure of the class described, a transparent cylinder having tube adapter means at one end, having hose connecting nipples to accommodate pump means to successively create a vacuum, and to extract the salvaged gas, and a nipping tool supported in said cylinder.

5. In a structure of the class described, a stand, a tube holder adjustably mounted on said stand, a gas trapping unit adjustably mounted on said stand, said trapping unit including gas tight adapter means for a tube, and a tube tapping tool of a manually controllable type.

6. In a rare gas salvaging construction of the class described, a stand including a base, a standard on said base, a collar adjustably mounted on said standard, a resilient arm carried by said collar, a resilient cup on said arm adapted to accommodate a gas charged tube, a second collar mounted on said standard, and a gas trapping unit carried by said second collar and located directly above said first-named collar.

7. As a component part of an assemblage of the class described, a transparent gas trapping cylinder, a gas-tight adapter ring attached to the bottom of said cylinder and adapted to accommodate the tube to be acted on, and rotary and reciprocatory tool means mounted in said cylinder for breaking the glass to release the gas.

8. As a component part of a rare gas collector of the class described, a glass cylinder having an annulus at its bottom, a rubber adapter ring attached to and depending from said annulus and designed to accommodate an end of the tube to be tapped, a packing gland at the opposite end of said cylinder, a sleeve mounted for sliding and rotation in said packing gland, a rod slidable in said sleeve, the sleeve and rod having operating means located on the exterior of the cylinder, a pair of spring fingers mounted on the inner end of the sleeve, a disk mounted on the inner end of the rod cooperable with said spring fingers for spreading the fingers, and cutting blades on the free ends of said fingers.

9. In a rare gas salvaging structure of the class described, means for penetrating an incandescent or equivalent bulb, and additional means cooperable with said first-named means to trap the gas for re-use.

10. In a structural assemblage of the class described, gas trapping and salvaging means constructed to accommodate a frangible gas filled envelope, and complementary means coordinated with the first-named means to puncture the envelope to release the gas to be trapped.

11. In a rare gas collecting and salvaging device of the class described, gas trapping and salvaging means constructed to facilitate attachment thereto of a gas containing glass tube, means contained within the first-named means for puncturing the tube to release the gas for accumulation in said first-named means, and conduit means operatively connected with said first-named means to facilitate collecting and storing the trapped gas for subsequent usage.

12. In a rare gas salvaging device of the class described, a container having means to accommodate and hold in place the end of a tube to be tapped, and a tube nipping tool mounted in said container to tap said tube.

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