Feb. 10, 1953 J. B. HALL 2,628,036

DEACTIVATING LAMP DISPOSAL PLANT

Filed Dec. 22, 1950 2 SHEETS—SHEET 1

Fig. 1.

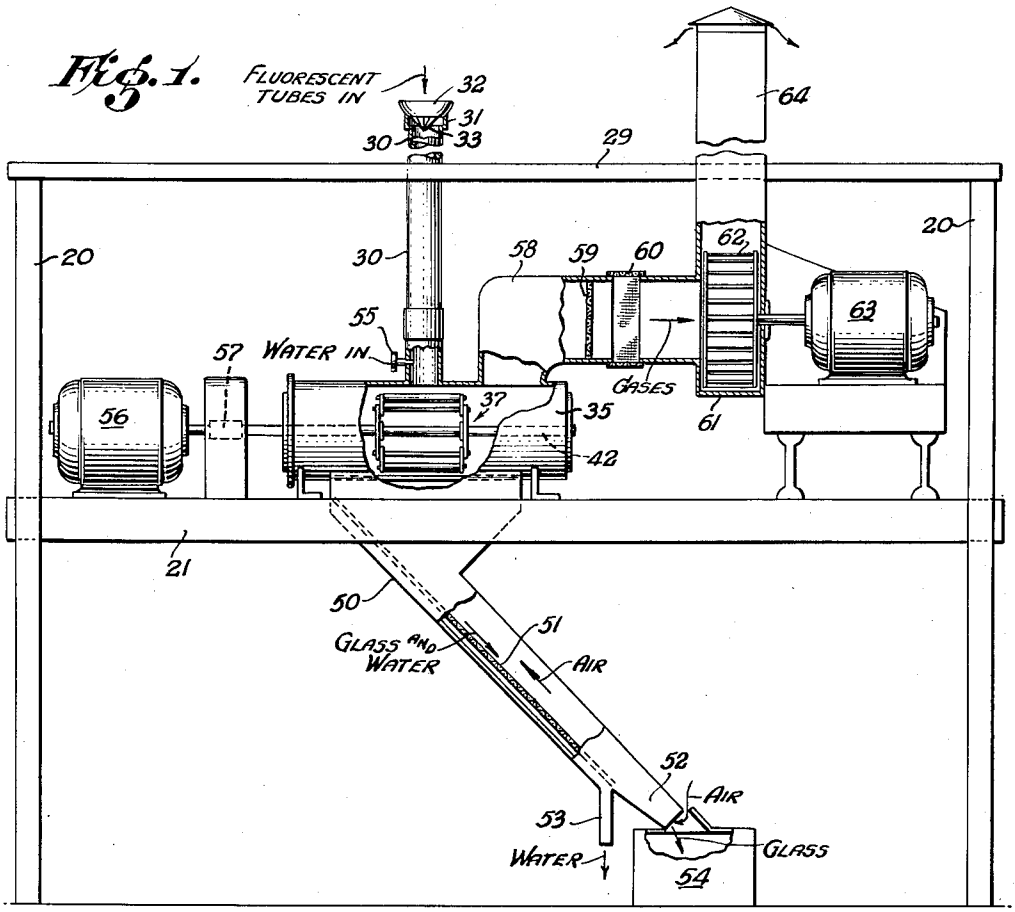

Fig. 2.

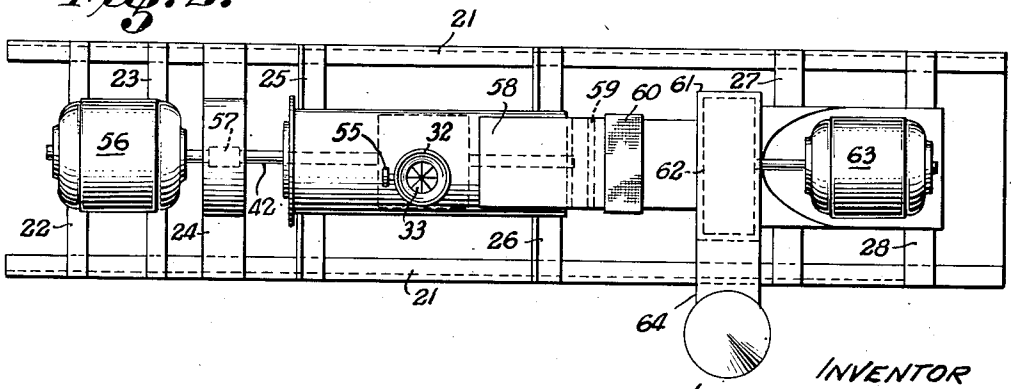

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Fig. 3.

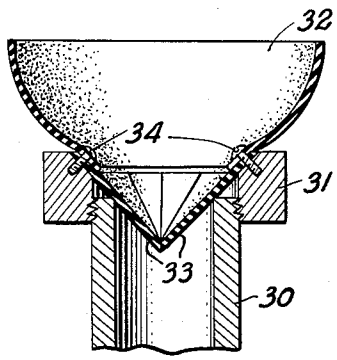


Fig. 4

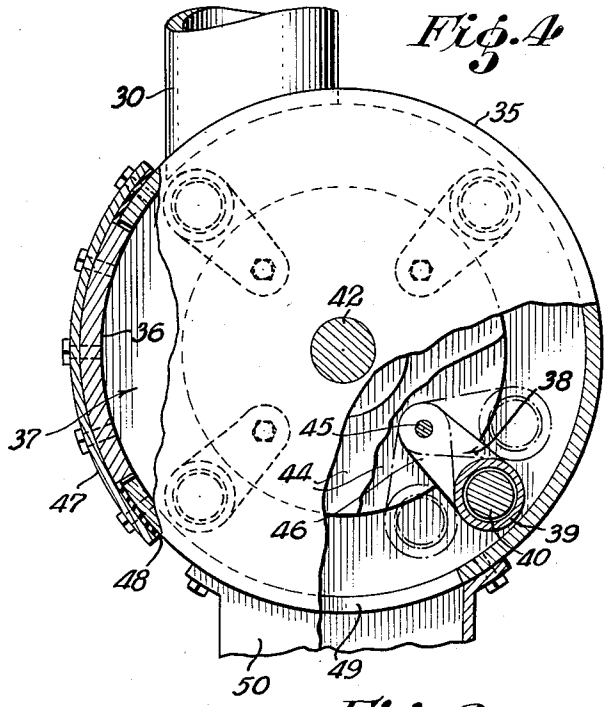


Fig. 5.

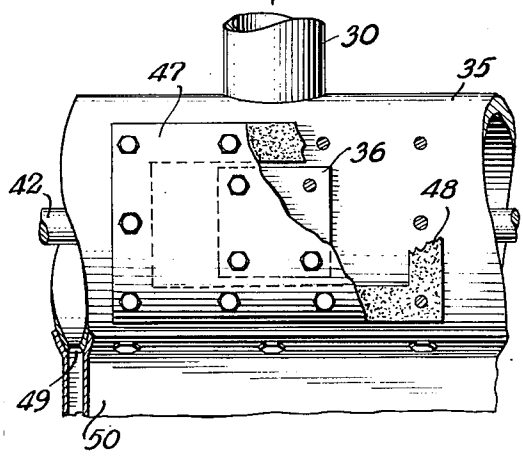
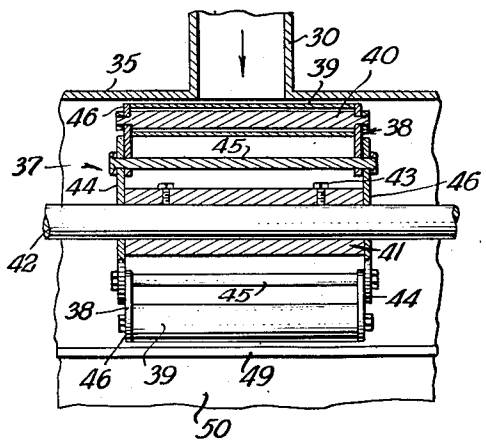


Fig. 6.



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UNITED STATES PATENT OFFICE

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DEACTIVATING LAMP DISPOSAL PLANT

Jesse B. Hall, Berwind, W. Va.

Application December 22, 1950, Serial No. 202,281

2 Claims. (Cl. 241—47)

(Granted under Title 35, U. S. Code (1952), sec. 266)

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The invention described herein may be manufactured and used by or for the Government of the United States for governmental purposes without the payment to me of any royalty thereon in accordance with the provisions of the act of April 30, 1928 (Ch. 460, 45 Stat. L. 467).

My invention comprises a plant for the harmless disposal of fluorescent and incandescent electric lamps after such lamps have ceased to be operative and, therefore, have to be destroyed. The fluorescent tubes contain poisonous beryllium powder and/or poisonous gas and must, therefore, be confined within a housing when crushed or broken, with adequate provision for the harmless disposal of the powder and gas.

In the accompanying drawings which illustrate a preferred embodiment of my invention:

Figure 1 is an elevation, partly in section of my disposal plant.

Figure 2 is a plan view.

Figure 3 is a detail section of the inlet pipe.

Figure 4 is a detail of the tube breaker, partly in section.

Figure 5 is an elevation of the tube breaker casing, showing a replaceable wear plate.

Figure 6 is a vertical section of the tube breaker, the casing and the inlet tube.

My plant is supported at a convenient height above the ground level on a plurality of columns 20 and a plurality of horizontal beams 21, with supporting cross members 22 to 28 inclusive. The columns 20 are extended upwardly to support a working platform 29 upon which the discarded tubes and bulbs are unloaded. Extending above the platform 29, there is an inlet feed pipe 30 provided with external threads for a collar 31 within which is supported a resilient closure and silencer 32 which is slitted to form a plurality of resilient closure tongues 33 and is fastened within the collar 31 by a plurality of screws 34.

The feed pipe 30 extends through a hole cut in the platform 29 to a hollow casing 35 and replaceable filler breaker plate 36, within which there is mounted a rotary breaker 37 which comprises four U-shaped breaker elements 38, each of which may be provided with a wear distributing sleeve 39, each loosely mounted on a shoulder bolt 40, a hub 41 which is fastened to a supporting drive shaft 42 by bolts 43, two perforated end plates 44 which are rigidly fastened to the hub 41 by welding or by bolts, a plurality of terminally threaded bolts 45 and a pair of links 46, revolubly mounted upon each of said bolts 45. The filler plate 36 is bolted to a larger patch plate 47 which in turn is bolted to the casing 35,

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with a gasket 48, preferably of rubber, between the patch plate 47 and casing 35.

The casing 35 has a slot 49 which discharges into an inclined discharge chute 50, within which there is a screen 51 supported above the lower wall of the chute. The screen 51 terminates at a reduced section 52 of the chute 50 and a water outlet pipe 53 discharges into a suitable drain, not shown. Crushed glass and crushed metal terminals fall into a bin 54. The metal terminals may be screened from the glass before the latter falls into the bin 54 or a magnet may be used to deflect into a separate bin, not shown, any terminals containing steel. Water spray is discharged into the feed pipe 30 through a water supply pipe 55.

The rotary breaker 37 is driven by an electric motor 56 through a flexible coupling 57. The rotor casing 35 is provided with an air outlet through an elbow 58 within which is mounted a screen 59 and a flexible pipe coupling 60 connects the elbow 58 with a casing 61 of an exhaust fan 62 which is driven by an electric motor 63. Air from the exhaust fan 62 is discharged at a distant point, preferably above roof top level, through a suitable duct 64.

Operation

With both the drive motor 56 and the fan motor 63 simultaneously operating and the water spray turned on, one or more attendants standing on the platform 29 grasp, in succession, the fluorescent tubes and quickly shove them through the closure 32 into the feed pipe 30, the closure promptly closing between successive tubes. The rotary breaker quickly reduces each tube to small fragments of glass and crushed terminals which pass into the chute 50 with water from the supply pipe 55 which entrains the powdered beryllium and absorbs some of any gas. The screen 51 separates the glass and metal fragments from the water with its load of powder and gas, the glass and metal falling by gravity into the bin 54 while the polluted water may be treated to remove its poisonous load before discharging the water into a sewer. Access to the tube breaker for replacing worn parts is provided through the discharge slot 49 in the casing by detaching the discharge chute 50 and also by removing the patch plate 47.

The exhaust fan 62 creates suction in the inlet feed pipe 30 and in the section 52 of the discharge chute 50 then blows the gas-laden air out through the discharge duct 64.

My device serves to reduce fluorescent lamp tubes to a mass of small glass fragments and crushed terminals while eliminating the hazards

to operators and others from poisonous dust, powder, gas and flying particles of glass. I prefer to connect the circuits of both motors with a switch on the operator's platform and thereby eliminate a possible failure to start the fan motor simultaneously with the tube breaker.

The funnel-shaped rubber closure **32** eliminates a possible hazard to an operator should a tube be broken while entering the inlet feed pipe **30**.

The water spray serves to wash away the beryllium powder and absorbed poisonous gases which contaminated water is separated by the screen **51** from the crushed glass, which may be used in a sand blast, a tumbling mill, for remelting or other use or disposal.

It should be understood that the present disclosure is for the purpose of illustration only, and that the invention includes all modifications and equivalents which fall within the scope of the appended claims.

What I claim is:

1. A device for harmlessly destroying fluorescent tubes including the combination of a tube breaker which comprises a rotor casing, a drive shaft, a hub mounted on said shaft, two end plates secured to the ends of said hub, a plurality of pairs of spaced links pivotally mounted on said hub, a shouldered bolt coupling the free ends of each pair of links and a sleeve loosely mounted on each shouldered bolt, a downwardly discharging inlet pipe provided with an upper resilient closure coupled with and discharging into said rotor casing adjacent the sleeves, a downwardly extending discharge chute operatively coupled with said rotor casing provided with a screening bottom, means for spraying water into said inlet pipe adjacent to said rotor casing, an air discharge duct operably connected with said rotor casing and a power driven exhaust fan operably connected with said duct.

2. A device for harmlessly destroying fluorescent tubes, including a tube breaker which comprises a rotor casing, a rotor drive shaft within said casing, two spaced end plates mounted on said shaft, a plurality of pairs of links, each pair being mounted on and between said two end plates, a threaded bolt detachably connecting each pair of links, spacing means resisting relative movement of said plates, and a sleeve loosely mounted on each bolt, a downwardly discharging tube receiving duct provided with an upper resilient closure discharging into said rotor casing adjacent the sleeves, a discharge chute from said rotor casing provided with a screening bottom, a water spraying means within said inlet adjacent to said rotor casing, an air discharge duct operably connected with said rotor casing and an air exhausting means operably connected with said rotor casing.

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