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MERCURY DISPENSING STATION

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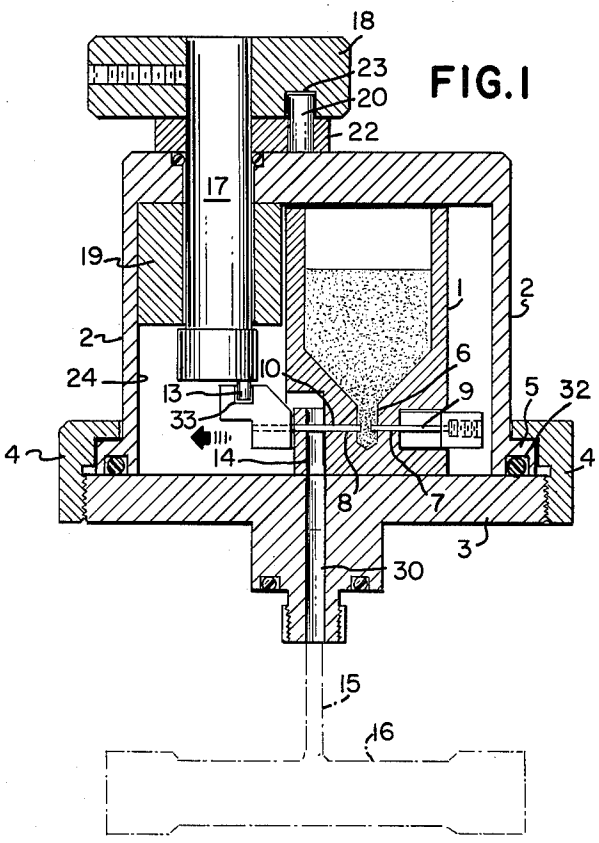


FIG.1

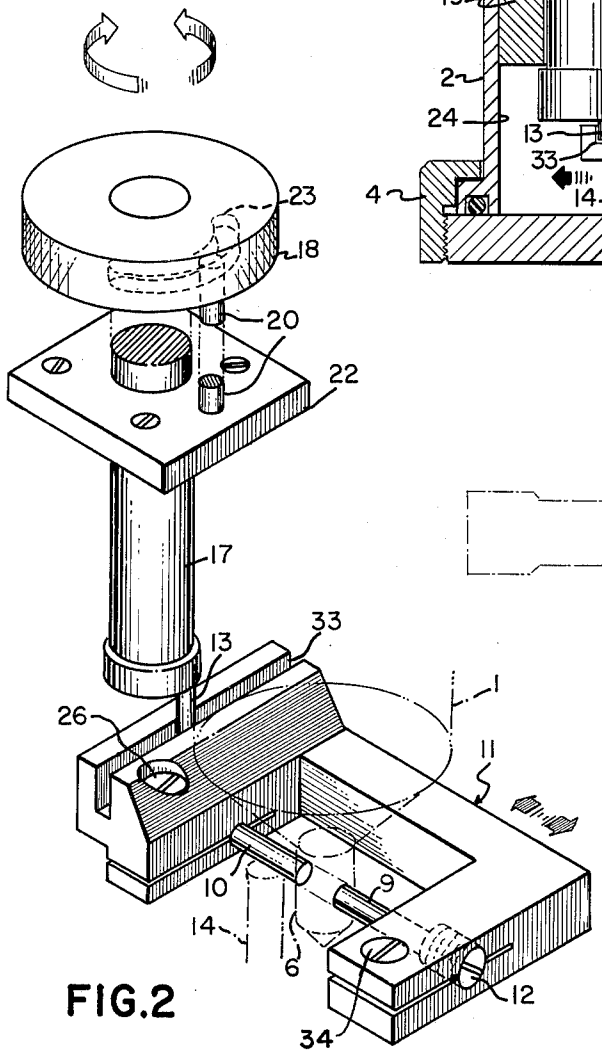


FIG.2

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MERCURY DISPENSING STATION

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This invention relates to mercury dispensing stations which can be used in the manufacture of high pressure discharge devices containing mercury and halogens and particularly to stations which can dispense very small, uniform and easily varied quantities of mercury.

Mercury dispensing stations are well known to the art, however, before the introduction of high pressure discharge devices containing mercury-halogen fills, precision in the quantities of mercury introduced into the arc tube of the device was not always important. In the older high pressure electric discharge devices containing mercury alone, fairly wide tolerances were allowed and hence, the equipment did not have to be designed to dispense critical dosages. And furthermore, because the light emission and color rendition of the mercury-halogen containing high pressure electric discharge devices can be modified by changing the quantity of mercury relative to the halogen, it has become desirable to use dispensing stations in which these critical dosages may be easily varied. Additionally, the stations of the art dispensed only relatively large quantities of mercury whereas our device can dispense small and critical dosages.

The primary object of our invention is dispensing uniform, critical quantities of mercury into high pressure electric discharge devices.

Another object of our invention is the provision of equipment in which small quantities of mercury are dispensed into discharge devices and which can be easily varied when desired.

A feature of our invention is transferring mercury from a reservoir into the arc tube of a discharge device with the inner ends of a pair of opposing slide rods, the distance between which is adjustable.

An advantage of our invention is that a small volume of mercury can be transferred quantitatively from a reservoir to an arc tube.

The many other objects, features and advantages of our invention will become manifest to those conversant with the art upon reading the following specification when taken in conjunction with the accompanying drawings wherein preferred embodiments of our mercury dispensing station are shown and described by way of illustrative examples and wherein the principles of our invention are explained.

Of these figures:

FIGURE 1 is a cross-sectional view of the mercury dispenser according to our invention.

FIGURE 2 is a perspective view particularly illustrating the disposition of the slide rods which control the quantity of mercury added to the arc tube.

Referring now to FIGURE 1 of the drawings, the mercury reservoir 1 is disposed within pressure tight casing 2 which is secured to the base plate 3 by means of clamping ring 4 butting against shoulder 5. An O-ring gasket 32 is placed in a groove formed in shoulder 5 to maintain the desired pressure and keep the dispenser free of contamination by atmospheric gases.

The reservoir 1 preferably is funnel shaped at the bottom extending into a closed-end, column portion 6 of reduced diameter. A longitudinally extending bore having sections 7 and 8 is disposed through the lower portion of the reservoir into the column 6. A pair of opposed slide rods 9 and 10 are fitted into the bore and adapted to slide therein. Preferably, the spacing of the slide rods and the bore is quite close so that mercury leakage therebetween can be eliminated. The internal ends of the rods 9 and 10 are spaced from each other by a distance which determines the quantity of mercury which will be transferred to the arc tube. Preferably the distal end of slide rod 9 is welded to a screw head 12 fitted into a U-shaped yoke 11 so that the distance between the internal ends of the rods can be adjusted in fine increments when desired. A rough adjustment in the mercury dosage can be obtained by moving rod 10 with a screw tightened clamp formed in the end of the yoke 11. When the screw 26 is loosened, the rod 10 can be easily moved within the clamp.

In order to transfer very small quantities of mercury from a reservoir to an arc tube, we have discovered that the diameter of the rods should be less than the spacing between the opposing inner ends. In this way when the mercury from the reservoir 1 is moved to a position over the transfer conduit 14, the mercury must fall because of its own weight. Immediately upon movement of the mercury load to a position over the transfer conduit 14, a mercury sphere forms. Since the diameter of the sphere is less than the spacing between the rods 9 and 10, the mercury will touch the equipment at one point only.

Disposed at the side of the column 6 is a reservoir transfer conduit 14 which extends downwardly in a straight line to base plate transfer conduit 30. An exhaust tube 15 of an arc tube 16 can be disposed at the end of the transfer conduits by conventional means.

Hence when yoke 11 is laterally drawn, the rods 9 and 10 will move within bores 7 and 8 respectively to a point where they eventually will be disposed over transfer conduit 14 and the dosage of mercury will then fall out and drop by gravity. The freely falling mercury will fall into the arc tube 16 through exhaust tube 15.

If it is desired to impel the mercury into the arc tube with greater velocities, a blast of gas may be downwardly directed into the transfer column.

Movement of the yoke 11 may be accomplished by many different means such as a draw bar in the side of the casing 2, an electromagnetic force or sometimes attaching a solenoid. The preferred arrangement, however, which we have shown includes a crankshaft 17 at the end of which we mount an eccentrically disposed pin 13. Pin 13 is loosely fitted in a groove 33 cut into yoke 11 so that when the knob 18 is rotated, yoke 11 will be drawn in the direction of the arrow. Preferably shaft 17 is mounted in guide block 19 through the top of the casing 2. In order to prevent the pin 13 from falling out of the yoke groove 33, we prefer to mount a stop pin 20 in the O-ring cap 22. Pin 20 can then fit into a cooperating groove 23 and prevent the knob 18 from being rotated too far. To automate the dispenser, a cam can be easily substituted for knob 18.

Chamber 24 is used to convey flush gases to and from the arc tube 16 through the upper section of the transfer conduit. The upper section of the transfer conduit is in a gas flow relationship with the chamber 24 which in turn is attached to external gas lines (not shown).

The perspective view of our mercury dispenser is shown in FIGURE 2. The reservoir and the closed-end rod conduit 6 is shown in phantom lines. U-shaped yoke 11 carries the adjustable rod 9 which has a threaded screw 34 mounted at the outer end. Preferably the adjustable rod 9 and the screw are mounted within a screw biased slot within the yoke 11. Slide rod 10 is similarly mounted within a biased slot formed on the other side of yoke 11 and tightened by screw 26. If a gross adjustment has to

be made in the mercury dosage, screw **26** can be loosened and slide rod **10** moved manually. Following the rough adjustment, a more precise modification of the dosage can be made by turning screw **12** within its slot.

Movement of crank shaft **17** by turning knob **18** will move the yoke **11** and in turn carry the opposed ends of a slide rod **9** and **10** from their original position in the closed end of column **6** to a new position over the transfer conduit **14**.

In operation, we prefer to fill the reservoir **1** with a large quantity of mercury. An arc tube **16** with an exhaust tube **15** is fitted into the end of the transfer conduit **14**. Knob **18** is then turned and the yoke **11** is drawn in the direction of the arrow so that rods **9** and **10** will be moved to a position over transfer conduit **14**. When the opposed ends of slide rods **9** and **10** move through the bore **8** they will carry with them the requisite dosage of mercury which in turn will fall into transfer conduit **14** by gravity and thence into arc tube **16**. The yoke **11** is then returned to its original position with the rods **9** and **10** in the conduit **6**.

It is apparent that modifications and changes may be made within the spirit and scope of the instant invention but it is our intention, however, only to be limited by the scope of the appended claims.

As our invention we claim:

1. A mercury dispenser comprising: a mercury reservoir; a closed end column extending from said reservoir; a transfer conduit disposed alongside of said column; a bore extending through said reservoir and into said column and thence into said transfer conduit; a pair of opposed rods having their inner ends spaced from each other, slidably disposed within said bore; means to move the spaced ends of said rods from a position within said column to a new position over said transfer conduit, said means being a U-shaped yoke disposed about said reservoir and the outer ends of said rods being held by said yoke.

2. The dispenser according to claim **1** wherein at least one of said rods is adjustably positioned within said yoke.

3. A mercury dispenser comprising: a housing formed by a cover cap mounted upon a base plate; a mercury reservoir disposed within said housing; a transfer conduit disposed alongside of said reservoir and through said base plate; a bore extending through said reservoir and into said transfer conduit; a pair of opposed rods having their inner ends spaced from each other slidably disposed within said bore; means to move the spaced ends of said rods from a position within said reservoir to a new position over said transfer conduit.

4. A mercury dispenser comprising: a housing formed by a cover cap mounted upon a base plate, a mercury reservoir disposed within said housing; a closed end column extending from said reservoir; a transfer conduit disposed alongside of said reservoir and through said base plate; a bore extending through said reservoir and into said column and thence into said transfer conduit; a pair of opposed slide rods having their inner ends spaced from each other slidably disposed within said bore; means to move the spaced ends of said rods from a position within said reservoir to a new position over said transfer conduit.

5. The dispenser according to claim **4** wherein said means is a U-shaped yoke disposed about said reservoir and the outer ends of said rods are held by said yoke.

6. The dispenser according to claim **5** wherein at least one of said rods is adjustably positioned within said yoke.

7. A mercury dispenser comprising: a mercury reservoir; a transfer conduit extending from said dispenser; a bore extending through said reservoir and into said transfer conduit; a pair of opposed rods having their inner ends spaced from each other slidably disposed within said bore; a U-shaped yoke disposed about said reservoir and the outer ends of said rods being held by said yoke; a channel formed in one leg of said yoke; a pin eccentrically mounted upon an end of a crankshaft, sildably engaged within the channel of said yoke; means to turn said crankshaft and thus rotate said pin thereby moving said yoke and hence the inner ends of said rods from a position within said reservoir to a new position over said transfer conduit.

8. The dispenser according to claim **7** wherein at least one of said rods is adjustably held by said yoke.

9. A mercury dispenser comprising: a mercury reservoir; a closed end column extending from said reservoir; a transfer conduit extending from said dispenser; a bore extending through said reservoir and into said column and thence into said transfer conduit; a pair of opposed rods having their inner ends spaced from each other slidably disposed within said bore; a U-shaped yoke disposed about said reservoir and the outer ends of said rods being held by said yoke; a channel formed in one leg of said yoke; a pin eccentrically mounted upon an end of a crankshaft, slidably engaged within the channel of said yoke; means to turn said crankshaft and thus rotate said pin thereby moving said yoke and hence the inner ends of said rods from a position within said reservoir to a new position over said transfer conduit.

10. The dispenser according to claim **9** wherein at least one of said rods is adjustably held by said yoke.

11. A mercury dispenser comprising: a mercury reservoir; a closed end column extending from said reservoir; a transfer conduit extending from said dispenser; a bore extending from said reservoir and into said column and thence into said transfer conduit; a pair of opposed rods having their inner ends spaced from each other, slidably disposed with said bore, the spacing between the inner ends of said rods being greater than their diameters; means to move the spaced ends of said rods from a position within said column to a new position over said transfer conduit, said means being a U-shaped yoke disposed about said reservoir and the outer ends of said rods being held by said yoke.

12. The dispenser according to claim **11** wherein at least one of said rods is adjustably positioned within said yoke.

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