

Jan. 2, 1940.

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2,185,444

LIQUID DRIPPING APPARATUS

Filed April 8, 1938

3 Sheets-Sheet 1

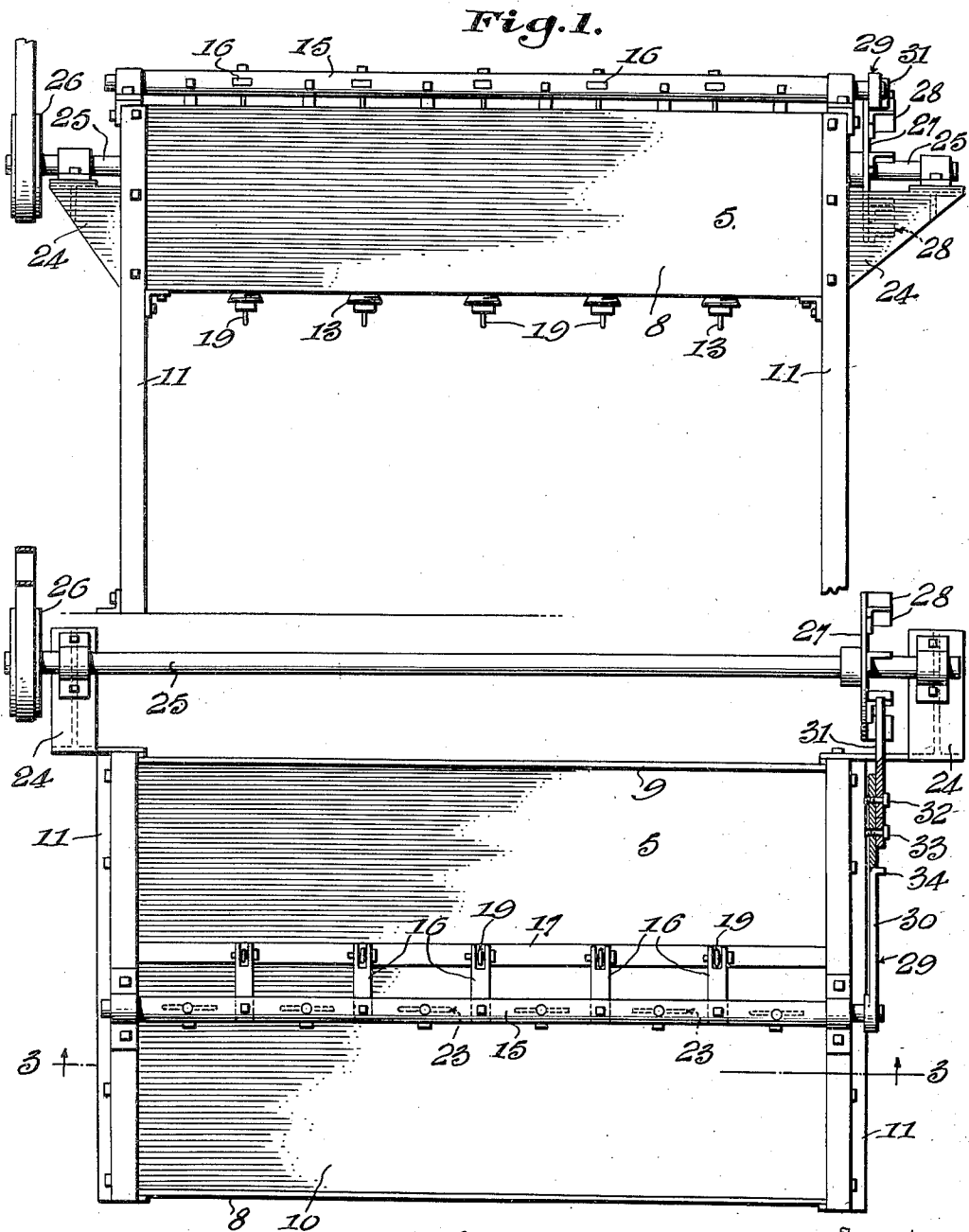


Fig. 2.

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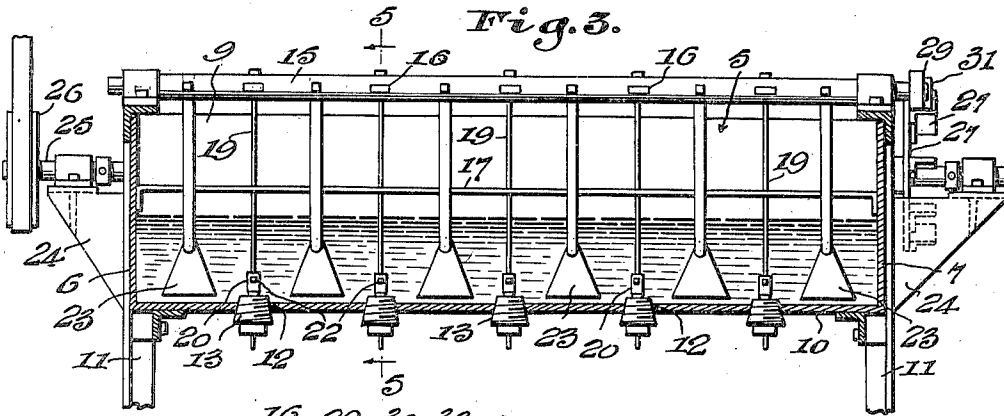


Fig. 3.

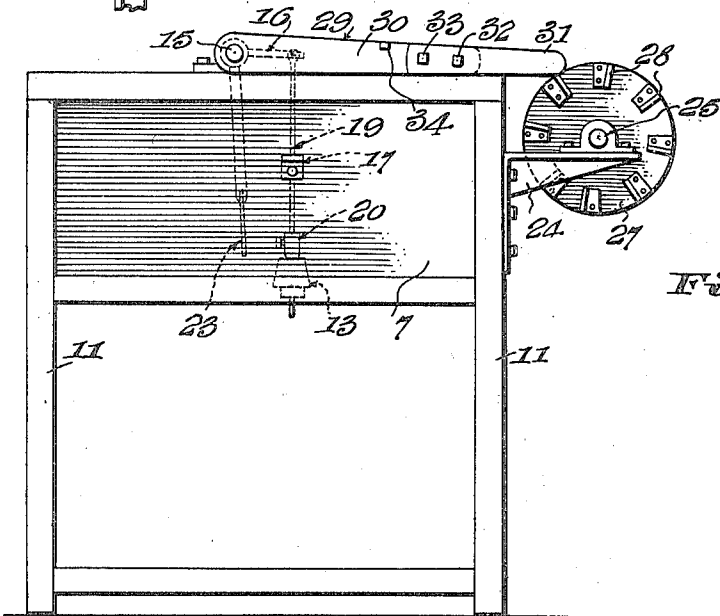


Fig. 4.

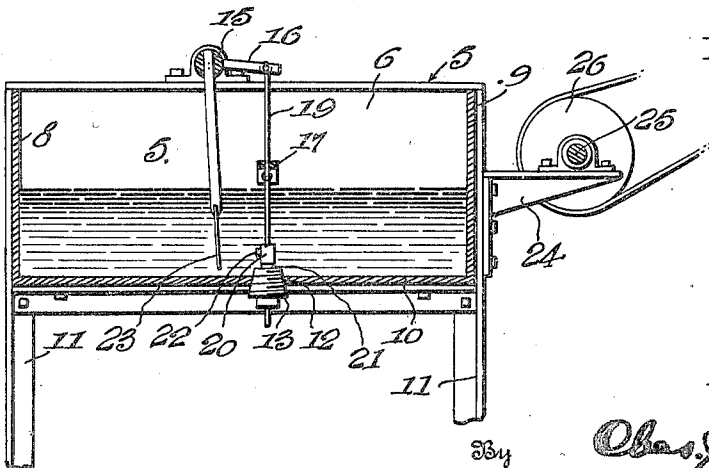


Fig. 5.

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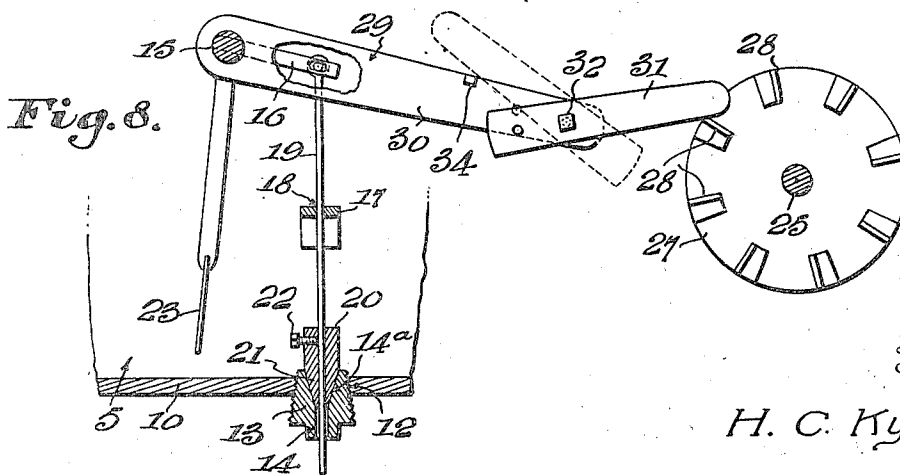
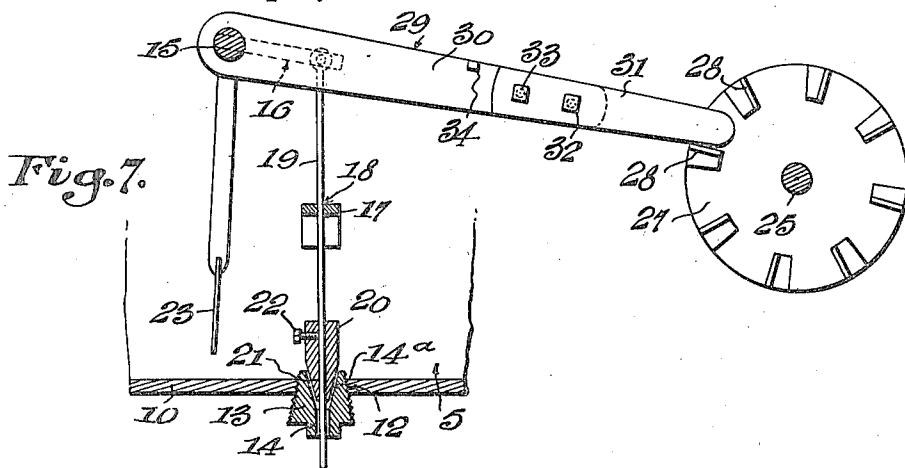
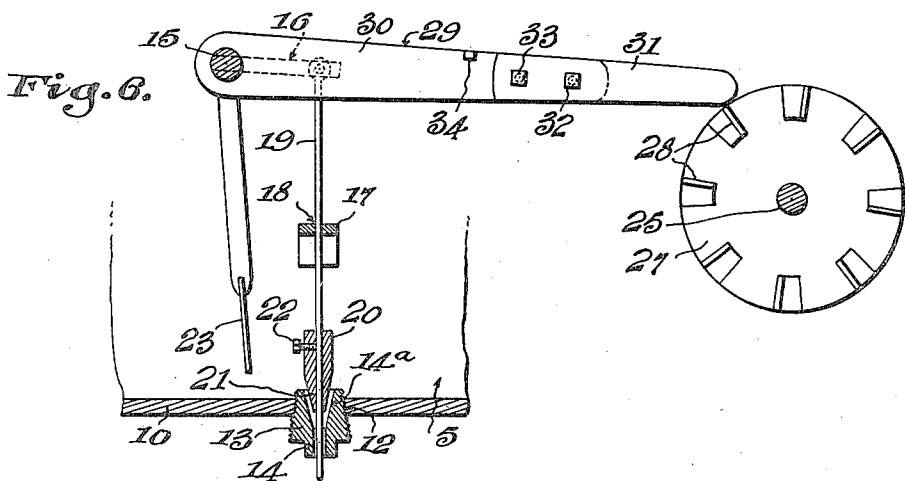
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LIQUID DRIPPING APPARATUS

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3 Sheets-Sheet 3



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UNITED STATES PATENT OFFICE

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LIQUID DRIPPING APPARATUS

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Application April 8, 1938, Serial No. 201,011

7 Claims. (Cl. 91-43)

This invention relates to an apparatus for the continuous dripping of liquids generally, although more particularly to the continuous dripping of those liquids which tend to coagulate upon exposure to air, such as, liquid paint or dye.

The principal object of this invention is to provide an apparatus for dropping liquid paint or dye onto a stream of broken minerals such as coal, whereby a large portion of said coal will be marked for identification with drops of said liquid paint or dye.

With the above and other objects in view which will more fully appear, the nature of the invention will be more clearly understood by following the description, the appended claims, and the several views illustrated in the accompanying drawings.

In the drawings:

Figure 1 is a front elevation of an apparatus embodying my invention,

Figure 2 is a top plan view thereof,

Figure 3 is a longitudinal vertical section taken on the line 3-3 of Figure 2,

Figure 4 is an end elevation of the apparatus,

Figure 5 is a vertical section taken on the line 5-5 of Figure 3,

Figure 6 is a detail section of the valve rod assembly showing the valve rod operating arm at the upper limit of oscillation,

Figure 7 is a detail section of the valve rod assembly showing the valve rod operating arm at the lower limit of oscillation, and

Figure 8 is a detail section of the valve rod assembly showing the valve rod operating arm disconnected from the driving means and the valve in the seated position.

Like reference numerals designate corresponding parts throughout the several figures of the drawings.

Referring to the drawings in detail, a container 5 having end walls 6 and 7, a front wall 8, a rear wall 9, and a bottom 10, is mounted upon a stand 11. The container 5 is preferably mounted over a conveyor which carries broken coal or the like. Within the container is a liquid paint or dye which drips continuously onto the moving coal, thereby marking a large portion of the coal for the purpose of identification. The bottom 10 is provided with a plurality of spaced discharge openings 12 which are disposed in a substantially straight longitudinal line. A plug 13 having a central opening 14 is screwed upwardly into each opening 12, the upper end of the opening 14 terminating in a flared valve seat 14^a.

A horizontal rock shaft 15 is journaled on the

end walls 6 and 7 and is disposed in a vertical plane in parallelism with the openings 12. Rock arms 16 are fixed to the rock shaft 15 and the ends of the arms are in vertical alignment with the openings 14. A horizontal guide bar 17 is rigidly secured within the container to the end walls 6 and 7, and is disposed above and in spaced relation to the outlet openings 14, said guide bar being provided with spaced guide openings 18 respectively located above said discharge openings. Valve rods 19 are pivotally connected at their ends to the rock arms 16, the rods passing downwardly through the openings 18 in the guide bar 17 and thence freely through the openings 14 in the plugs 13, the lower ends of the rods being located below and in spaced relation to said plugs. A valve 20 having a conical lower end 21 is adjustably mounted on each rod 19 between the guide bar 17 and the associated plug 13 by a set screw 22. A plurality of downwardly extending agitator paddles 23, which are spaced intermediate the rock arms 16, are fixed to the rock shaft 15.

Brackets 24, 24 are attached to the rear wall 9 of the container. A drive shaft 25 having a driving pulley 26 is journaled on the brackets 24. Fixed to the drive shaft 25 is a disc 27 which is provided on one face with a concentric series of angularly spaced lugs 28. A two-part rock arm 29 is rigidly fixed to the rock shaft 15 and consists of an inner arm 30 which is fixed to the rock shaft and an outer arm 31 which is pivotally attached to the arm 30 by a pin 32. A removable pin 33 maintains the two arms 30 and 31 in alignment. The outer end of the arm 31 overlies the lugs 28 on the disc 27.

Upon rotation of the disc 27 in a clockwise direction, as viewed in Figs. 6, 7 and 8, the lug in contact with the arm 29 engages the arm, thereby elevating the valve rods 19. When the lug moves beyond the end of the arm 29, the arm then gravitates until it contacts the next oncoming lug. This downward movement of the arm 29 effects a rocking of the shaft 15 and a resultant downward movement of the valve rods 19. The arm 29 contacts the next succeeding lug before the valves 20 are seated, thereby always maintaining the valves 20 in spaced relation to the seats 14^a when the machine is in operation. Continued rotation of the disc causes an intermittent rise and fall of the arm 29, thereby effecting successive reciprocations of the valve rods 19. This reciprocation of the valve rods 19 prevent the liquid within the openings 14 from coagulating, thereby insuring an even and continuous drip.

It is to be noted that the lower ends of the valve rods 19 always extend below the plugs 13. Each rod always extends below its associated plug 13 for two reasons: first, to maintain the rod within the opening 14 of the plug to prevent coagulation of the liquid therein, and secondly to insure an even flow of liquid from the end of said rod.

When it is desired to render the apparatus inoperative, the pin 33 is withdrawn, and the arm 31 is swung upwardly about its pivot 32 until it rests against a stop 34 fixed on the arm 30, thereby disconnecting the rock shaft 15 from the driving shaft 25, the arm 30 then gravitating and causing the shaft 15 to rock and thereby effect the lowering of the valves 20 onto their seats 14^a and preventing further egress of the liquid from the container.

While the invention is herein described as particularly adapted to the use of marking coal or the like, it is to be understood that the invention comprehends broader uses and may be used for dripping glue or paste or other similar materials, all such uses being comprehended within the scope of the appended claims.

It is of course to be understood that the details of structure and arrangement of parts may be variously changed and modified without departing from the spirit and scope of my invention.

I claim:

1. In a liquid dripper, the combination with a container having a bottom discharge opening, of a vertically reciprocatory rod located within the container and having its lower end extending into said opening, and means for reciprocating said rod, said rod having a cylindrical extension of a diameter smaller than said opening and depending in and extending through said opening whereby the extreme lower end thereof is disposed below and in spaced relation to said opening during reciprocation of said rod.

2. In a liquid dripper, the combination with a container having a bottom discharge opening, of a vertically reciprocatory rod located within the container and having its lower end extending into said opening, an agitator located within the container, and means for reciprocating said rod and for simultaneously actuating said agitator, the lower end of the rod being maintained within the opening during the reciprocation of said rod.

3. In a liquid dripper, the combination with a container having a bottom discharge opening, of a vertically reciprocatory rod located within the container and having its lower end extending into said opening, a horizontal rock shaft mounted in said container, a rock arm attached to said rock shaft and operatively connected to said rod, an agitator paddle rigidly secured to said rock shaft, and means for actuating said rock shaft.

4. In a liquid dripper, the combination with a container having a plurality of bottom discharge openings disposed substantially in a line, of a plurality of vertically reciprocatory rods located

within the container and disposed substantially in a vertical plane with the lower ends thereof extending into said openings, a horizontal rock shaft common to all of said rods mounted in said container and disposed in parallelism with said rods, a plurality of rock arms attached to said rock shaft and operatively connected to said rods, a plurality of agitator paddles rigidly secured to said rock shaft one adjacent each opening, and continuously rotating means for actuating said rock shaft.

5. In a liquid dripper, the combination with a container having a bottom discharge opening, of a vertically reciprocatory rod located within the container and having its lower end extending into said opening, an open controlling valve mounted on said rod, a horizontal rock shaft mounted on said container, a rock arm fixed to said rock shaft and operatively connected to said rod, an actuator arm secured to and extended from the rock shaft, and means for alternately effecting a lifting and lowering of the free end of the actuator arm to lift and lower said rod and thereby alternately open and close said valve.

6. In a liquid dripper, the combination with a container having a bottom discharge opening, of a vertically reciprocatory rod located within the container and having its lower end extending into said opening, an opening controlling valve mounted on said rod, a horizontal rock shaft mounted on said container, a rock arm fixed to said rock shaft and operatively connected to said rod, an actuator arm secured to and extended from the rock shaft, and means for alternately effecting a lifting and lowering of the free end of the actuator arm to lift and lower said rod and thereby alternately open and close said valve, said actuator arm including a shiftable end portion displaceable from engagement with said lifting and lowering means to allow the valve to rest in and constantly close said opening.

7. In a liquid dripper, the combination with a container having a bottom discharge opening, of a vertically reciprocatory rod located within the container and having its lower end extending into said opening, an opening controlling valve mounted on said rod, a horizontal rock shaft mounted on said container, a rock arm fixed to said rock shaft and operatively connected to said rod, an actuator arm secured to and extended from the rock shaft, and means for alternately effecting a lifting and lowering of the free end of the actuator arm to lift and lower said rod and thereby alternately open and close said valve, said actuator arm including a shiftable end portion displaceable from engagement with said lifting and lowering means to allow the valve to rest in and constantly close said opening, said lifting and lowering means including a rotary disc having circumferentially spaced lugs thereon successively engageable with said shiftable end portion.

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