June 29, 1943. M. MERZ 2,322,866

MERCURY FEEDER

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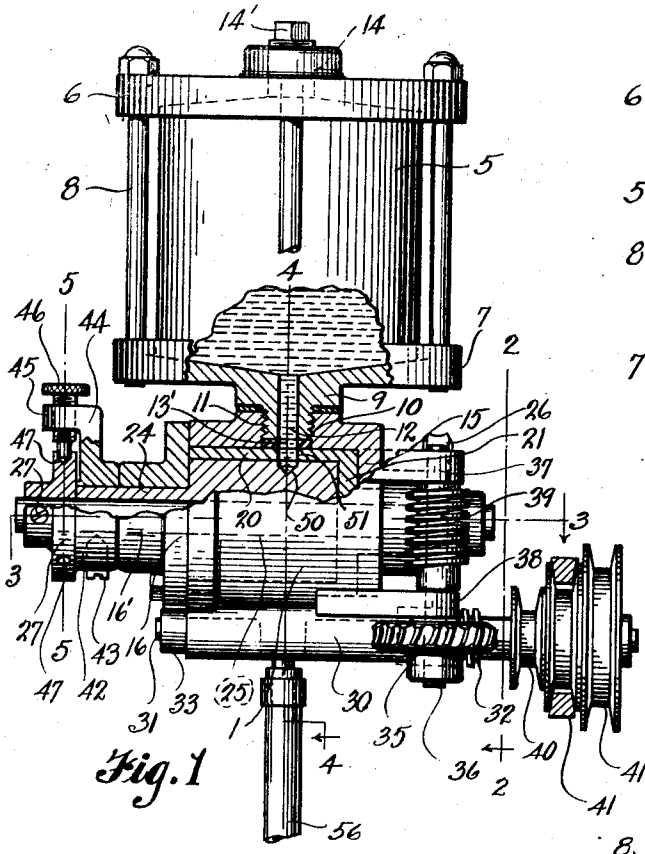


Fig. 1

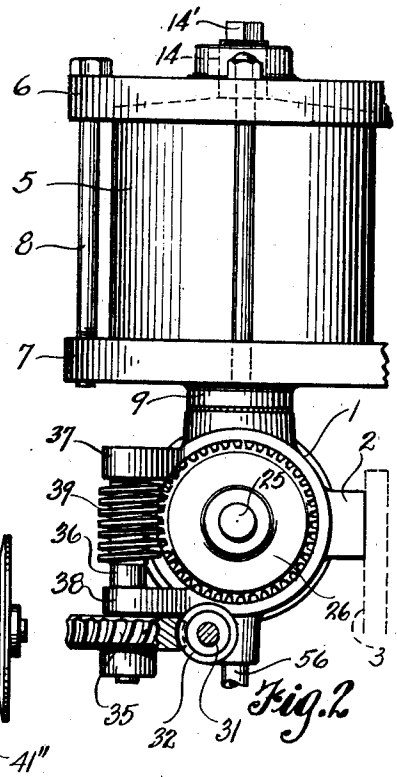


Fig. 2

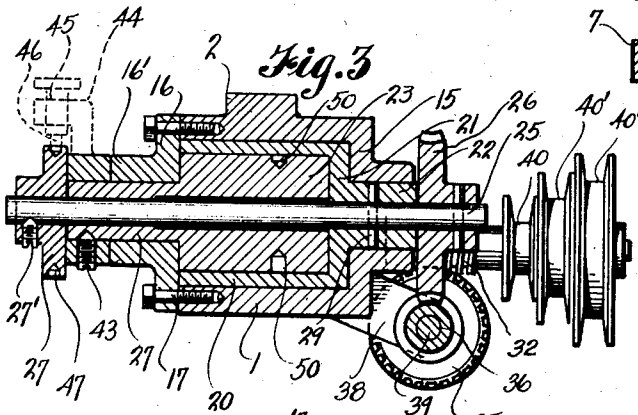


Fig. 3

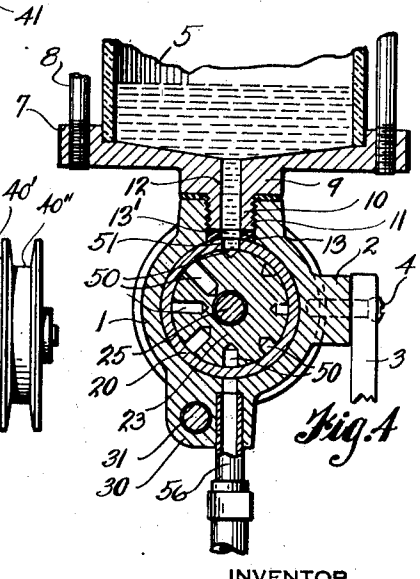


Fig. 4

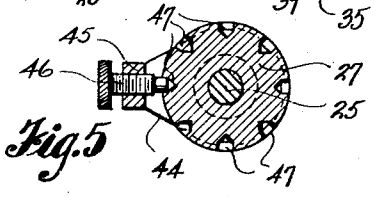


Fig. 5

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MERCURY FEEDER

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4 Claims. (Cl. 221—107)

This invention relates to improvements in devices known in the mining industry as "mercury feeders," and it has reference more particularly to a mechanical means, designed to be used in connection with an amalgamator, or the like, for an accurate and controlled feeding of mercury into the amalgamator in accordance with the amount of gold or "values" in the material being passed through the amalgamator.

It is the principal object of this invention to provide a mechanical mercury feeder, adapted to be driven by or in accordance with the rate of operation of the amalgamator, for a predetermined periodic dropping of definitely measured quantities of mercury into the amalgamator, and wherein an adjustment of the feeder valve is provided for in order to selectively change the volume of the quantities of mercury that are periodically dropped, thereby making it possible to feed the mercury to the amalgamator in accordance with the values in the treated material.

More specifically stated, the objects of the present invention reside in the provision of a mercury feeder wherein there is a rotary feed valve structure formed with a plurality of pockets of different sizes and selectively adjustable to cause any one of the pockets selected to pass, incident to rotation of the valve, across an outlet from a source of supply of mercury to charge the pocket, then to pass an outlet port through which the charge is discharged from the pocket to the amalgamator; the rotation of the valve being continuous and in accordance with the rate of operation of the amalgamator for the periodic delivery of the mercury charges, and there being provision also for the easy selection of a pocket of a volume to best suit the conditions, and for changing the speed of rotation of the valve.

Still further objects of the present invention are to be found in the details of construction, in the combination of parts and in the mode of operation of the device, as will hereinafter be more fully described.

In accomplishing these and other objects of the invention, I have provided the improved details of construction, the preferred forms of which are illustrated in the accompanying drawing, wherein—

Fig. 1 is a side view of a mercury feeder embodied by the present invention; a part thereof being broken away for purpose of better illustration.

Fig. 2 is a cross section taken on the line 2—2 in Fig. 1, showing the device in end elevation.

Fig. 3 is a horizontal sectional view on the line 3—3 in Fig. 1.

Fig. 4 is a cross sectional detail as seen on line 4—4 in Fig. 1, particularly showing the rotary valve and measuring pockets.

Fig. 5 is a cross section on line 5—5 in Fig. 1.

Referring more in detail to the drawing—

1 designates what preferably would be a cylindrical metallic housing for the measuring valve. This is horizontally disposed and provided on one side with a flat faced boss 2 for facilitating solid securement of the device to a supporting bracket such as has been designated by reference numeral 3 in Fig. 4; the securement being effected through the use of screws, or bolts 4, passed through the bracket and threaded into the boss.

While it is not absolutely essential, it is the intent that in the present instance the mercury feeder be supported through the mediacy of the bracket 3 from the frame structure which supports the amalgamator being fed with the mercury, and that the feeder shall be driven through any suitable connection with the rotating drum, or barrel, which is embodied in the amalgamator, or by a connection with the amalgamator driving means. However, since the particular driving connection of the feeder with the amalgamator forms no patentable part of the present invention, it has not been herein illustrated, except to the extent of those parts directly associated with the feeder.

The mercury container is supported upon the housing 1. Preferably, the container comprises a cylindrical glass housing 5 that is held between upper and lower end cover plates 6 and 7, connected by a plurality of tie bolts 8 extended through and between the plates. The lower end plate 7 has a bottom boss 9 from which a mounting neck 10 extends. This neck is threaded into an opening 11 formed through the top wall of the housing to the interior thereof, and there is a vertical feed channel 12 leading downwardly through the bottom plate of the container and neck 10. At its lower end, the neck seats against a sealing washer 13 that seats against a rotary valve member, later to be described, and this washer has an opening or port 13' registering with passage 12 through which mercury may be fed to the valve member.

Suitable packing washers would be used where necessary to insure against leakage of mercury from the container and through the connection of the neck 10 with the housing 1. At the top of the container, the plate 6 would preferably

be provided with a filling opening 14 to which a plug 14' is removably applied.

The cylindrical housing 1 is closed at one end by an integral wall 15 and is normally closed at its opposite end by a removable cover plate 16; the latter being secured in place by a plurality of bolts 17 applied therethrough as observed in Fig. 3.

Revolubly fitted in the cylindrical housing 1 is the feeder valve sleeve 20. This is closed at one end by an integral wall 21 from which a hub 22 extends rotatably through the end wall 15 to the exterior of the housing 1. Likewise, fitted for rotatable adjustment within the sleeve 20 is a valve core 23 having a hub or journal 24 at one end extending rotatably through, and somewhat beyond the cover plate 16; the latter plate being formed with an extended bearing portion 16' rotatably containing the hub 24.

Extending coaxially through the assembled valve parts is a valve driving shaft 25, on one end of which a driving worm gear wheel 26 is fixed; this gear wheel being on that end of the shaft 25 that projects through and beyond the end wall 15 of housing 1. At its other end, the shaft 25 has a circular disk 27 secured thereto by a set screw 27' passing through a hub portion of the disk. This disk, which serves a purpose presently to be disclosed more fully, flatly engages the end of the hub journal 24 and thus holds the shaft 25 against longitudinal movement.

The valve sleeve 20 rotates with the shaft 25 by reason of a fixed connection effected by a pin 29 that is extended through the hub portion 22 of the sleeve 20 and through the shaft 25 as noted in Fig. 3.

The worm 32 is in driving mesh with a larger worm gear 35 that is fixed on the lower end portion of a vertical shaft 36 revolubly mounted in spaced bracket bearings 37 and 38 that extend laterally from the housing 1. On shaft 36 between the bearings 37 and 38 is a worm 39 in driving mesh with the worm gear 26. Thus, a reduction speed drive is provided between the driven shaft 31 and the shaft 25 which rotates the feeder valve.

Fixed on the extending end of shaft 31 beyond the worm gear 32 is a set of V-belt pulleys 40—40'—40'', in which a driven belt 41 may operate for the purpose of driving the feeder valve at three different speeds.

Now, referring more particularly to Figs. 3 and 5, it will be observed that a collar 42 is fixed about the outer end portion of the hub 24 of the valve core which extends beyond the bearing 16', by means of a set screw 43. A radial arm 44 extends from this collar and this has a laterally turned outer end portion 45 overlying the periphery of the disk 27 through which end portion a thumb screw 46 is threaded. The inner end portion of the thumb screw is pointed for seating in any one of a plurality of sockets 47 formed in the disk edge as noted in Fig. 5. In this instance, there are eight equally spaced sockets. Thus, with the understanding that the collar 42 is fixed to the hub portion 24 of the valve member 23, and that the valve sleeve 20 is fixed to shaft 25 by pin 29, it is apparent that by unseating the screw 46 and turning the collar 42 relative to the disk 27, a corresponding rotative adjustment of the parts 23 and sleeve 20 will be accomplished.

Now, by referring to Figs. 3 and 4, it will be noted that the valve core 23 is formed thereabout with eight equally spaced radial sockets 50 of progressively increased depth, which, by rotation of part 23 in part 20, may be successively brought into registration with a single port 51 that is formed in the sleeve 20. Also, when a selected socket 50 has thus been registered with port 51, the parts 20 and 23 may be fixed against relative turning by tightening the thumb screw 46 into one of the sockets 47 in the disk 27. In this connection it is to be understood that the sockets 47 are so located in the disk that when the set screw 46 is seated in any one of them, a socket 50 will be accurately registered with the port 51 of the sleeve 20. Furthermore, the port 51 is so located in the sleeve that rotation of the sleeve will cause this port to pass the outlet port 13' from the mercury supply and then to pass an outlet port 55 at the under side of the housing 1 with which a delivery pipe or tube 56 is connected, and which tube delivers the mercury into the amalgamator by gravity flow.

In order that the operator may know just which of the sockets or pockets 50 is registered with the port 51, the face of the disk 27 may be marked adjacent each pocket 47 with a proper character or number. Then when the operator desires to make an adjustment of the feeder valve for the delivery of any particular volume of mercury to the amalgamator, he merely locates the set screw 46 in the socket 47 that is identified by the character or number designating that particular volume.

Assuming the device to be so constructed, and assuming that it is mounted properly for being driven by or in accordance with the rate of operation of an amalgamator, it is apparent that rotation of the shaft 31 will, through the mediacy of the gearing described and illustrated, cause the valve sleeve 20 to rotate, thus to cause its port 51 alternately to pass the port 13' and port 55. Assuming, then, that the operator has made a desired selection of the socket 50 in the valve core with the port 51, it can be understood that the mercury will feed into the pocket as the port 51 passes the opening 13', and the mercury from the charged pocket will be delivered to the tube 56 when the pocket moves into registration with the outlet port 55.

By reference to Fig. 4, it will be understood that any one of the eight pockets may be brought into registration with the port 51, and that each pocket will deliver a different amount of material than the others, and since these pockets are successively arranged and progressively increased in size about the core, it is an easy matter for the operator to make the proper selection by reference to the characters or markings on the disk.

In addition to the three-speed pulley illustrated, it is contemplated that pulleys of different size might be employed to drive the belt and thus provide for an additional number of different speeds possible to drive the valve.

It is usually the case that mercury feeders of this kind are operated in accordance with a chart on which is disclosed amounts that will be fed when using any one of the eight pockets, and when operating the valve at any of the various speeds possible.

Feeders of this character have proven to be very satisfactory, very accurate and make possible the feeding of mercury to an amalgamator in accordance with the values that are contained in the material being passed through the amalgamator.

I claim:

1. A feeder of the character described comprising a valve housing formed at one side with an

opening for the inflow of a material to be fed and formed at another side with an opening for outflow of the material received through the first mentioned opening, a rotary valve in the housing comprising an outer sleeve formed with a single port, and a core member adjustably contained in the sleeve and formed with a plurality of pockets of different volume adapted to be selectively registered with the port of said sleeve, means for retaining the sleeve and core at any selected position of relative adjustment and means for rotating the valve whereby the sleeve port will be caused to pass in registration alternately with said openings of the valve housing, first for charging the selected pocket with material and then for the outflow of the measured charge.

2. A feeder of the character described, comprising a valve housing formed at the top side with an opening for the inflow of material from a source of supply and formed at the bottom side with an opening for the outflow of the material received through the first opening, a rotary valve fitted in the housing and comprising an enclosing sleeve formed with a port adapted, on rotation of the valve, to alternately pass in registration with said housing openings, and a valve core rotatably adjustable in the sleeve and formed with a plurality of pockets of different volume adapted to be selectively registered with the sleeve port, a drive shaft coaxial of the sleeve and core and means on the shaft for securing the sleeve and core thereon at any of their different positions of relative adjustment.

3. A feeder of the character described, comprising a valve housing formed at the top side with an opening for the inflow of material from a source of supply and formed at the bottom side with an opening for the outflow of the material received through the first opening, a rotary valve fitted in the housing and comprising an enclosing sleeve formed with a port adapted, on rotation of the valve, to alternately pass in registration with said housing openings, and a valve core rotatably adjustable to the sleeve and formed with a plurality of pockets of different volume adapted to be selectively registered with the sleeve port, a drive shaft coaxial of the sleeve and core, means securing the sleeve fixedly to the drive shaft, means for rotatably adjusting the core inside the sleeve, and means for locking the core against rotation on the shaft after being adjusted to any of the different positions of adjustment relative to the core.

4. A mercury feeder of the character described comprising a valve housing formed at its top side with an opening, a mercury container mounted on the valve housing for supplying mercury to the opening; said housing also having an opening at the bottom side and a tube connected with said opening for delivery of mercury to a point of use, a drive shaft extended coaxially of the housing and rotatable therein, a rotary valve member fitted in the housing and mounted on the shaft; said valve member comprising an outer sleeve fixed on the shaft against relative rotation, and formed with a single port, a valve core revolubly fitted in the sleeve and rotatable on the shaft; said core being formed with a plurality of pockets of gradually increased volume adapted, by rotary adjustment of the core in the sleeve, to be selectively registered with the sleeve port, a disk fixed on the shaft and formed with sockets corresponding in spacing to the angular spacing of the core pockets, a turning arm for the core having means thereon for engaging in the disk sockets to secure the sleeve port in registration with a selected pocket of the core, and means for rotating the drive shaft to cause the sleeve port to pass alternately in registration with the housing openings for charging the selected pocket of the core and for discharge of the measured charges.

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