April 26, 1938. I. W. WOLFNER 2,115,439

BRUSHING MACHINE

Filed Nov. 28, 1934 2 Sheets-Sheet 1

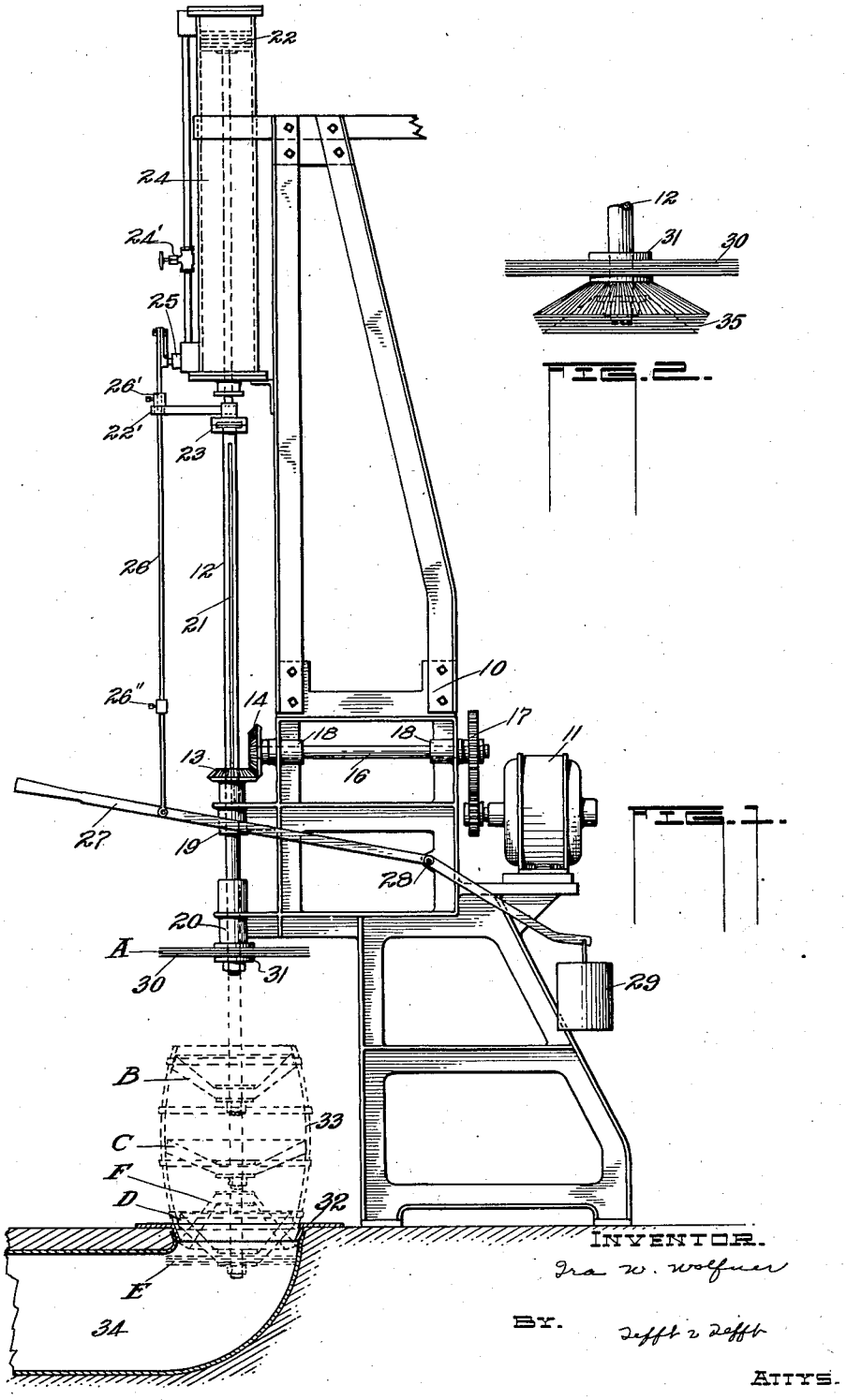


FIG. 2.

FIG. 1.

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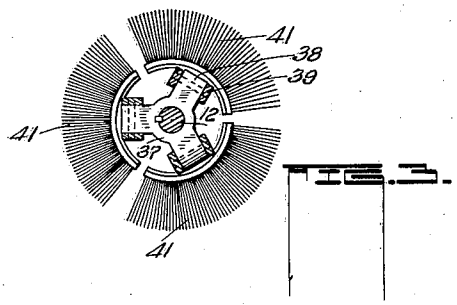


FIG. 3.

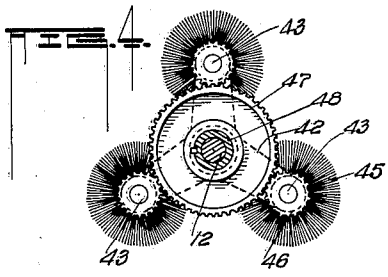


FIG. 4.

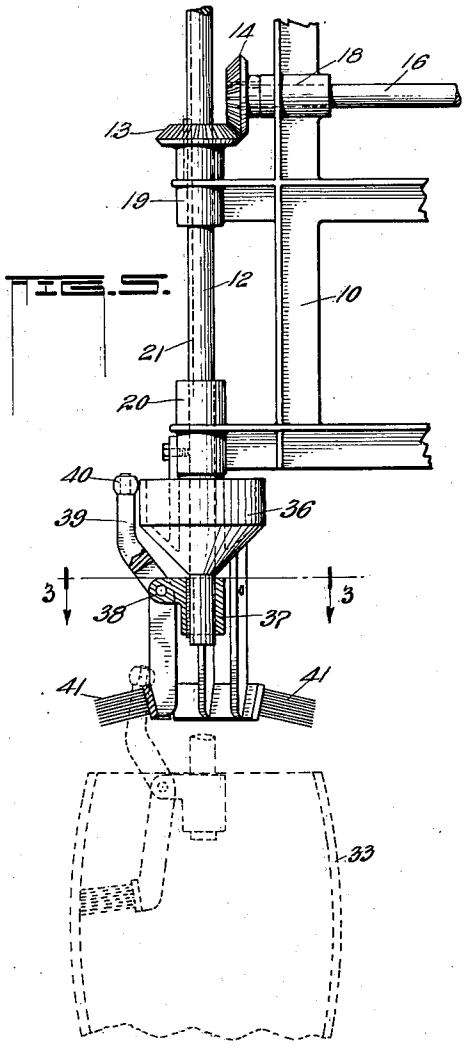


FIG. 5.

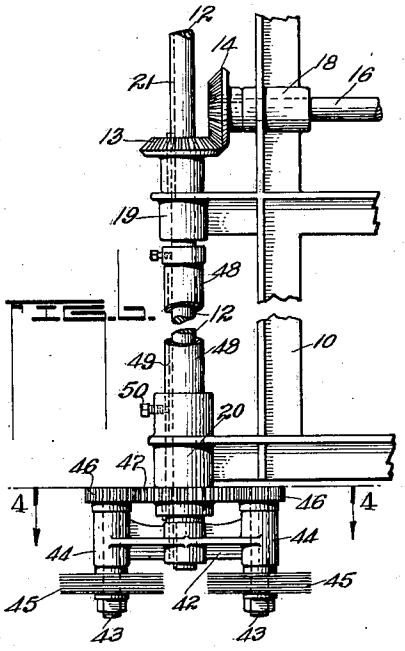


FIG. 6.

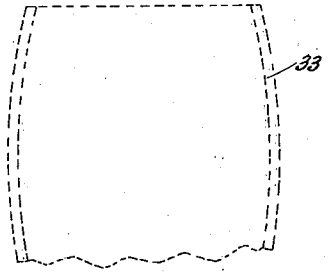


FIG. 7.

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BRUSHING MACHINE

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Application November 28, 1934, Serial No. 755,104

2 Claims. (Cl. 15—58)

This invention is directed to barrel cleaning machinery, and has for one of its objects the provision of a brush mechanism and mechanism associated therewith for brushing the interior surfaces of barrels or other circular articles.

Another object is to provide a rotating circular brush adapted to be inserted in a barrel or the like and to automatically adjust its diameter to that of the barrel.

A further object lies in the provision of a rotatable circular brush adapted to be inserted in a barrel or the like and to automatically adjust its diameter to that of the barrel, in combination with means for rotating the brush and manually controlled means for moving the brush perpendicular to its plane of rotation whereby it may be moved longitudinally of the barrel to be placed in contact with all interior surfaces thereof.

An additional object is to provide a mechanism capable of moving a brush within a barrel in combination with a brush which, by reason of its inherent flexibility, is capable of automatically adjusting its diameter to that of the barrel.

Another object is to provide a mechanism as noted in combination with a brush mechanism capable of automatically adjusting its diameter in accordance with the interior contour of a barrel and having means whereby the diameter of the brush may be manually adjusted.

A further object is to provide a mechanism, as aforesaid, wherein the brushing mechanism comprises a plurality of brushes revolving in planetary relation.

An additional object is to provide a mechanism of the class described wherein the brushing action is modified by the speed of rotation of the brushes.

Additional objects will appear in the following description and accompanying drawings in which;

Fig. 1 is a side elevational view of my device as the same would appear ready for use;

Fig. 2 is a fragmental view showing details of a brush mechanism to be described;

Fig. 3 is a plan view taken on line 3—3 in Fig. 5, showing details of a brush mechanism to be explained;

Fig. 4 is a plan view taken on line 4—4 in Fig. 6;

Fig. 5 is a fragmental side elevational view showing details of a brush and operating mechanism to be referred to, and

Fig. 6 is a view similar to that shown in Fig. 5 showing details of a modified form of brush mechanism.

As already noted this invention has for its primary object the provision of means for brushing, scrubbing or cleaning barrels and the like and to this end I provide a mechanism as shown in Fig. 1, comprising a frame structure 10, upon which is mounted a motor 11 having driving connection with a vertical shaft 12 through mitre gears 13 and 14, a shaft 16 and suitable gears 17.

Motor 11 is herein shown as a driving means for the apparatus, although driving power from any source may be utilized. In some cases, as will be hereinafter explained, a variable speed drive may be used. Various driving apparatus are thought sufficiently well known to obviate detail description.

Shaft 16 is journalled in bearings 18, disposed in the frame structure, and shaft 12 is journalled in upper and lower bearings 19 and 20 disposed in bracket portions of the frame.

Shaft 12 is provided with a longitudinal keyway 21. Gear 13 is made movable on shaft 12 and is provided with a key engaged in keyway 21 whereby gear 13 is maintained in driving relationship with shaft 12 while the shaft may be freely moved longitudinally within the gear. The shaft is rotatably connected at its upper end with the end of a conventional air-hoist piston 22 by means of a thrust coupling 23, and the weight of the shaft and attached mechanism is supported by the piston.

The air hoist mechanism 24 is conventional and is supported upon the upper part of frame 10 as shown. It is adapted to be operated by air or water from any source and is controlled to operate the piston 22 and shaft 12 by means of a valve mechanism 25, which latter is mechanically or manually operated, as will be explained, through a vertical rod 26 which is connected with a hand lever 27 as shown.

The hand lever is pivotally supported at 28 and suitably counterbalanced by a weight 29.

Secured to the lower end of the air-hoist piston is an extending arm member 22', and upon the rod 26 there is secured upper and lower collars 26' and 26''.

The collars are so adjusted that arm 22' will engage them when piston 22 reaches predetermined positions in its upward and downward stroke. A valve 24' is disposed in the air line leading from valve mechanism 25 to the upper end of the air hoist cylinder whereby operation of the hoist mechanism to lower the piston 22 may

be prevented. The utility of the latter described mechanism will be explained shortly.

The air hoist 24 is herein shown as an example of mechanism for operating the brush. However any suitable mechanism may be utilized for the purpose.

Attached to the lower end of shaft 12 is a brush 30 comprising a hub 31 provided with radially disposed brushing elements which may be of any suitable material, such as wire, bristle or fibre.

Below the brush is disposed a circular frame 32 of such proportions as to adapt it to receive the lower end of a barrel 33, as shown in dotted outline. Frame 32 is disposed in axial alignment with shaft 12 and forms a means whereby a barrel may be quickly and accurately spotted in position to be operated on by the brush.

The lower end of the barrel here shown communicates with a duct 34 by means of which air may be exhausted through the barrel to carry away any material removed from the barrel by the brush.

Assuming shaft 12 to be in more or less rapid rotation, operation of the device is accomplished by manipulation of handle 27 to cause air hoist 24 to propel the shaft and brush 30 downwardly. The material of the brush being flexible, contact with the top of the barrel brings about a dishing action as indicated at B and throughout continued downward movement of the brush the tips thereof are held in contact with the interior surface of the barrel as indicated at C and D.

Continued downward movement of the brush eventually places it in position E in which position it again assumes its normally flat conformity. Upon return movement, the brush is distorted in reverse manner as at F and the same movements are repeated in reverse order.

It is to be noted that the centrifugal force set up during rapid rotation of the brush will add to the normal tendency of the fibres thereof to remain in plane position as at A. When the brush fibres are distorted as at B their normal tendency is to assume a plane position which movement is opposed by the surface of the barrel. The contact pressure between the barrel surface and brush tips obviously depends upon the stiffness of the brush fibres and their ability to resist distortion. Further, with the brush fibres distorted, the centrifugal force noted is active to increase the contact pressure. Thus the contact pressure may be modified by varying the rotational speed of the brush.

The arm 22' and collars 26' and 26'' are provided for the purpose of assisting an attendant in operating the brush as above described.

The collars are adjusted to be engaged by the arm when the piston reaches the end of a desired stroke. The valve mechanism 25 is so arranged that when hand lever 27 is elevated the air of the hoist is directed so as to lower the piston, whereas when the hand lever is depressed the piston is elevated. With valve 24' closed the piston may be elevated in the usual manner but a lowering stroke thereof is prevented.

It will now become apparent that to operate the brush as described an attendant has but to open valve 24' whereupon air will be admitted to the upper end of the hoist cylinder to force piston 22 downwardly.

Such movement will eventually bring arm 22' into engagement with collar 26'' and continued movement will cause downward movement of hand lever 27 to direct air into the lower end of the cylinder to elevate the piston. Elevational movement of the piston places arm 26' in engagement with upper collar 26' to bring about a reversal of the movement above described.

In this manner the brush is automatically caused to travel forwardly and backwardly through the barrel for any desired length of time.

Arrestment of the reciprocal movement described may be brought about by means of the closing of valve 24' or any other obvious means.

By adjustment of collar 26' out of the stroke range of arm 22' the piston may be caused to operate through only one cycle. In this case an attendant would initiate the operation by elevation of hand lever 27, whereupon the piston would move downwardly to engage arm 22' with collar 26'' to reverse the valve 25 and automatically cause the piston to be elevated. There being no automatic reverse movement brought about at the upper end of the stroke, the piston will obviously remain in elevated position pending further manipulation of hand lever 27.

In the work of cleaning barrels it is often desired to operate upon a barrel having a bottom member fitted therein and, due to the dished form of the brush and contact of the hub thereof with the bottom of the barrel, it would obviously be impossible to bring the brush tips in contact with the lower portions of the barrel. In the event of such use I provide a brush constructed as in Fig. 2 wherein the brush has additional brushing elements 35 which are angularly directed in position to contact the lower portions of a barrel.

In Figs. 3 and 5 I show a brush mechanism adapted for use with my device which includes a cone member 36 secured to frame 10, below which is a hub member 37 secured to shaft 12, the same having radially directed extending portions 38 which carry pivotally mounted arms 39. The upper ends of arms 39 are provided with rollers 40 and the lower ends thereof are provided with outwardly directed brush elements 41.

It will be apparent that rapid rotation of shaft 12 will set up centrifugal force tending to propel brushes 41 outwardly. With the parts in position shown in solid lines, the brushes are obviously held in contracted position. Downward movement of the brush mechanism obviously brings about movement of rollers 40 on the surface of cone 36 to a point where the face of the latter recedes, when the centrifugal force is effective to expand the brushes.

In the present illustration I show the cone so fashioned as to hold the brushes contracted until they enter the barrel, after which the full outward pressure of the brushes is exerted against the interior barrel surface.

Adjustment of the speed of rotation or weighting of the brushes will obviously control the pressure exerted upon the barrel surface by the brushes and ensure that the brushes will follow the interior contour of the barrel with fidelity.

It is to be noted that a member having any suitable conformity may be substituted for cone 36 to cause the brushes to follow any arbitrary pattern or contour.

The latter described brush mechanism may be used for the same purpose as that noted in connection with brush 30, but has preferred application for certain work such as, for example, where it is desired to more vigorously brush or scrape the interior surface of containers.

The brushing elements 41 may be made from wire or the like which has sufficient stiffness to

preclude its satisfactory use in a brush arrangement such as **30**.

A stiff brush would, for instance, be particularly effective when used for the purpose of removing charcoal from used whiskey barrels, where a scratching or scraping action is desired.

As an additional modification of my brush mechanism I show, in Figs. 4 and 6, a mechanism including the usual drive shaft **12** to which is secured a spider frame **42** carrying a plurality of shafts **43** journalled in boss portions **44**.

Circular brushes **45** are secured to the lower ends of shafts **43** and pinions **46** are secured to the upper ends thereof.

Pinions **46** are arranged in planetary relation to revolve with and about a sun gear **47** which is secured to a sleeve member **48**. The sleeve is made slidable in bearing **20** and has a longitudinal groove **49** in which is engaged an inwardly extending portion of a screw **50** which is mounted in the body structure of bearing **20**.

The described arrangement provides a mechanism in which shaft **12** is vertically movable and rotatable in the usual manner, to rotate brushes **45** about the center of the shaft, while sleeve **48**, carrying gear **47** is vertically movable unitarily with the shaft but is stationary as to rotation.

It will be apparent that rotation of shaft **12** will bring about planetary rotation of brushes **45** while at the same time the brushes will be revolved about their axes.

The foregoing arrangement may be particularly useful when it is desired to use the apparatus for scrubbing operation in a receptacle, wherein it is desirable to utilize a brush made from animal or vegetable fibres which may be too soft to admit the use of long bristles such as would be required in brush **30**.

Numerous additional modifications of the structure of my device are possible. However, I do not wish to be limited in structure or principle except within the scope of the appended claims.

What I claim is:

1. A device of the class described including a vertically disposed rotating shaft, a brush secured to the lower end thereof, a receptacle disposed to hold a barrel in position to receive said brush, said shaft being longitudinally movable to insert the brush in the barrel and move the same longitudinally thereof, said brush comprising a hub portion having radially extending flexible brushing fibres normally lying parallel to the plane of its rotation, said brush having an external diameter larger than the interior of the barrel whereby, when the brush is inserted in the barrel the fibres thereof are distorted out of said plane line with the tips thereof resiliently contacting the interior surface of the receptacle, an air cylinder and piston disposed in axial alignment with said shaft, a rotatable coupling connecting the piston with said shaft, valves controlling operation of said piston and means on the piston engaging said valves so as to automatically cause continuous reciprocal movement of said piston and brush.

2. A device as set forth in claim 1 provided with means for rotating the brush at controlled predetermined speed to thereby control the centrifugal force set up in the brush elements whereby the pressure of the brush tips upon the interior surface of the receptacle is modified in accordance with the speed of rotation of the brush.

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