Dec. 6, 1960 A. SCHOCH 2,962,739

TWIN-ROTARY BRUSH FOR CLEANING PIPES

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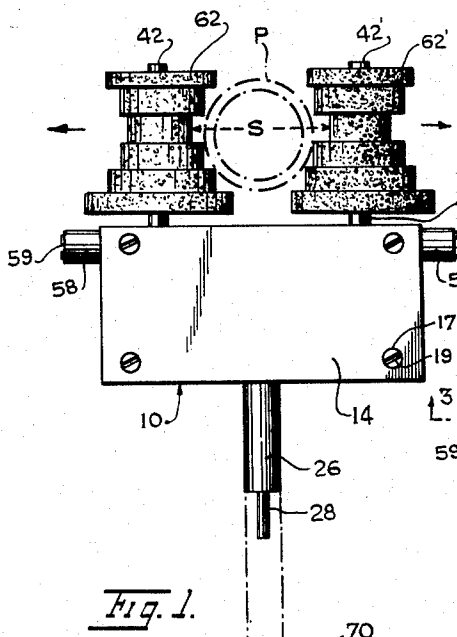


Fig. 1.

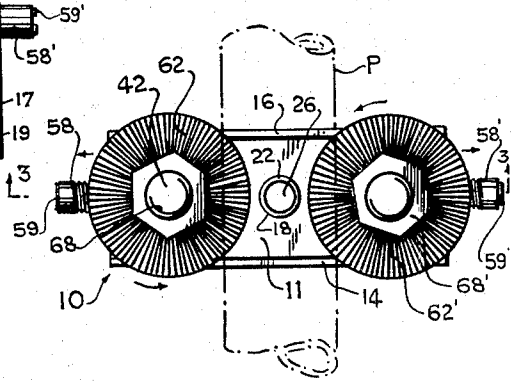


Fig. 2.

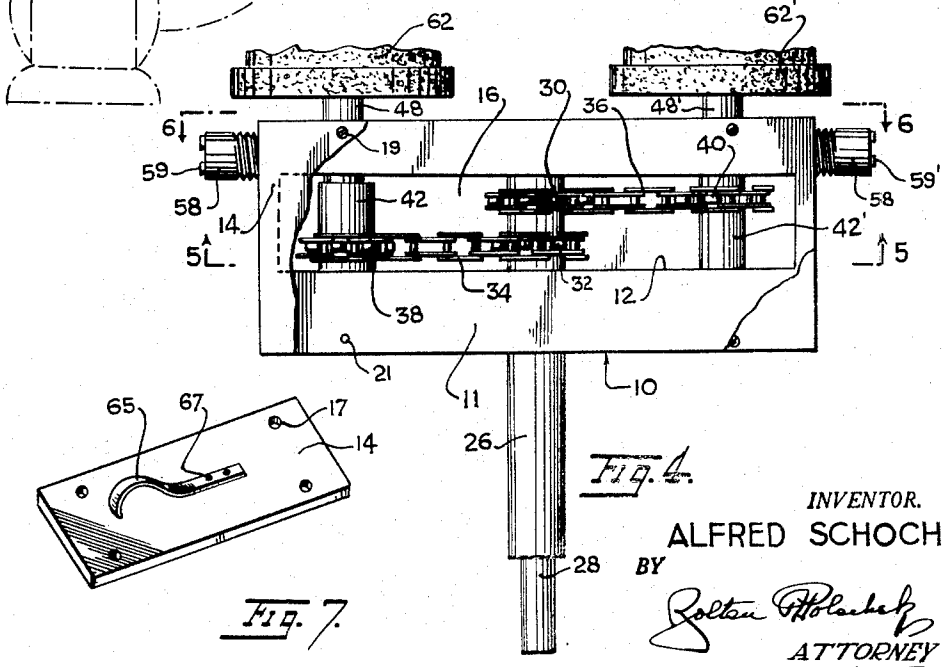


Fig. 4.

Fig. 7.

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TWIN-ROTARY BRUSH FOR CLEANING PIPES

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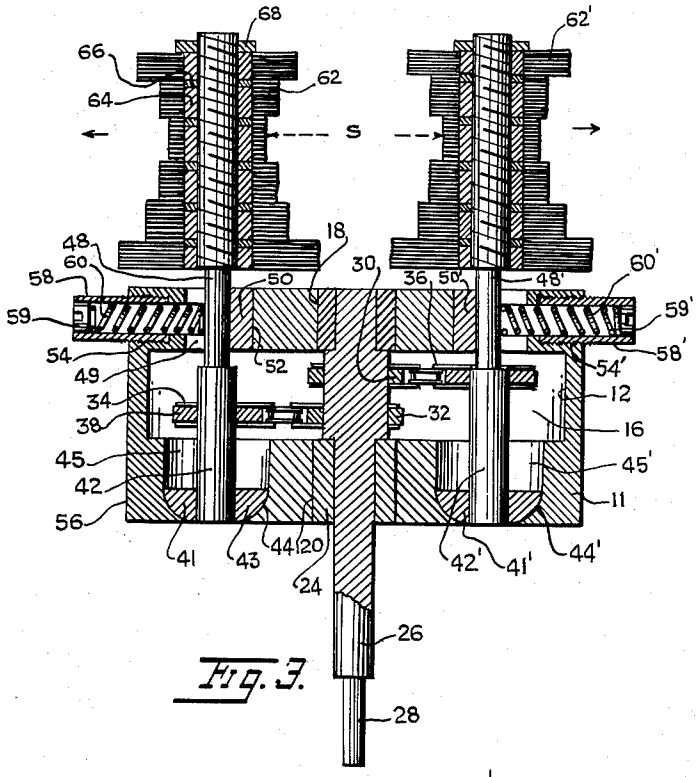


Fig. 3.

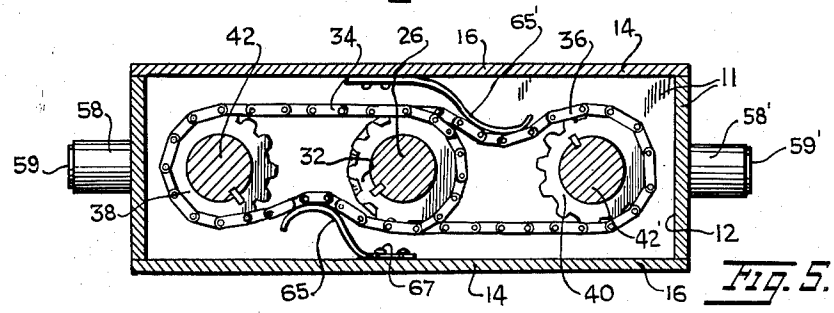


Fig. 5.

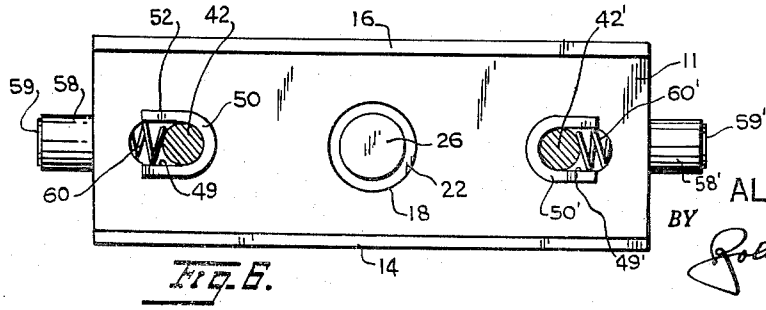


Fig. 6.

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TWIN-ROTARY BRUSH FOR CLEANING PIPES

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5 Claims. (Cl. 15—23)

This invention concerns a pipe cleaner employing twin rotary brushes.

Heretofore in breweries, dairies and factories where a great deal of piping is used one of the most difficult and onerous tasks has been the cleaning and polishing of the pipes. Where the pipes are made of copper or brass, they are subject to discoloration and corrosion which are both unsightly and unhygienic. Furthermore, the accumulation of corrosion on the pipes affects their heat transmission characteristics which is undesirable in critical brewing or chemical processes. Conventionally the pipes have been cleaned by hand using various types of cleansers along with steel wool, wire brushes and the like. The manual cleaning of pipes is a time-consuming operation and very costly in labor. Results are not uniform, since some pipes are cleaned more thoroughly than others and portions of pipes hard to reach may not be cleaned and polished at all.

The present invention is directed at overcoming the foregoing difficulties and disadvantages by providing a motor-driven twin brush rotary cleaner for pipes.

A further object of the invention is provision of a pipe cleaning device having pivotally mounted wire brushes adapted to accommodate themselves to pipes of different diameters for effective cleaning thereof.

Another object is to provide a pipe cleaning device having wire brushes rotated via a chain drive by power applied to a drive shaft. The chains driving the respective brushes are spring biased to maintain tension therein while the brushes themselves are independently pivotable toward and away from each other.

For further comprehension of the invention, and of the objects and advantages thereof, reference will be had to the following description and accompanying drawings, and to the appended claims in which the various novel features of the invention are more particularly set forth.

In the accompanying drawings forming a material part of this disclosure:

Fig. 1 is a side elevational view of a pipe cleaning device embodying the invention.

Fig. 2 is a top plan view of the device.

Fig. 3 is a vertical sectional view taken on line 3—3 of Fig. 2.

Fig. 4 is a fragmentary side elevational view on an enlarged scale of the device with a portion of a cover plate broken away to show internal parts.

Figs. 5 and 6 are sectional views taken on lines 5—5 and 6—6 of Fig. 4.

Fig. 7 is a perspective view on a reduced scale of a cover plate of the device.

Referring to the drawings, there is shown the device 10 including a rectangular block 11 having a rectangular cavity 12 formed therein. The block is open at its sides which are closed by two rectangular cover plates 14, 16.

Centrally disposed in bore 18, 20 in the top and bottom of the block communicating with cavity 12 are two cylindrical bearings 22, 24; see Fig. 3. These bearings are

force fitted into the block and rotatably support a drive shaft 26 which terminates at its outer end in a spindle 28. The shaft carries two spaced sprocket wheels 30, 32 in cavity 12. Entrained on the wheels 30, 32 are two endless chains 34, 36 best shown in Figs. 3, 4 and 5. Chain 34 is entrained on a sprocket wheel 38. Chain 36 is entrained on sprocket wheel 40. Sprocket wheel 38 is carried on a shaft 42 which is pivotally or tiltably mounted in a vertical plane. Secured to the lower end of shaft 42 is an annular bearing element 41 having a spherically curved outer surface 43. The flange seats in a curved concave recess 44 at the end of a cylindrical bore 45 in the block. The shaft has a portion 48 of reduced diameter which passes through slot 49 in a U-shaped spacer or insert 50 secured in an elongated slot 52 in the top of the block as best shown in Figs. 3 and 6. A horizontal threaded bore 54 extends inwardly from one end 56 of the block and communicates with the slot 49. Threaded in bore 54 is a sleeve 58 in which is seated under tension a coil spring 60. A screw 59 is threaded in sleeve 58 to retain the spring in the sleeve. The spring 60 is axailly perpendicular to shaft 42 and presses against the shaft to hold it vertical and axially parallel to shaft 26. The shaft abuts the inner end of slot 49 at the bight of the spacer or insert 50.

The upper and outer end of shaft 42 is threaded and carries a plurality of circular wire brushes 62 of different diameters. The brushes have threaded inner rings 64 engaged on the shaft and spaced by washers 66. A nut 68 on the end of the shaft holds the brushes securely thereon.

Sprocket wheel 40 is carried on a shaft 42' constructed exactly like shaft 42 with a reduced diameter portion 48' passing through U-shaped insert 50'. A bearing 41' similar to bearing 41 seats in the curved seat 44' at the end of cylindrical bore 45'. The shaft 42' carries further wire brushes 62' of various diameters on the threaded end of the shaft. The wire brushes 62, 62' are so shaped as to define a space S with bowed sides which can receive and embrace a pipe P shown in dotted lines in Figs. 1 and 2. Screw 68' at the end of shaft 42' holds the brushes on the shaft.

The shafts 26, 42 and 42' are all axially parallel and coplanar, with shaft 26 disposed midway between shafts 42 and 42'. Shaft 42' is biased to tilt inwardly toward shaft 42 by spring 60' inserted in sleeve 58' threaded in a bore 54' axially aligned with bore 54. Screw 59' holds spring 60' in sleeve 58' so that the spring presses against shaft 42' which in turn abuts the inner side of the bight end of insert 50'.

It will be noted that the shafts 42 and 42' are tiltable outwardly in a vertical plane from each other as indicated by arrows in Figs. 1–3. The sides of the slots 49 and 49' constrain the shafts to move in a common vertical plane as the shafts tilt on their curved bearings 41, 41' in the concave seats 44, 44'.

In order to keep the chains tensioned when the shafts are tilted outwardly, there are provided leaf springs 65, 65' on the inner sides of cover plates 14, 16, as clearly shown in Figs. 5 and 7. The springs are secured by rivets 67 at one end and have free bowed ends which press inwardly against the chains to keep them tensioned and take up slack.

A flexible shaft 70 driven by a motor M as indicated by dotted lines in Fig. 1 may be attached to the spindle end of the drive shaft 26 to rotate the drive shaft.

To operate the pipe cleaner device, it will be placed in a position so that the axis of the pipe P to be cleaned is between and perpendicular to the axes of the brushes. The cleaner will then be pushed toward the pipe as the pipe enters the space S between the brushes and is em-

braced thereby. The shafts 42, 42' bearing the brushes will yield by tilting slightly away from each other against the tension in springs 60, 60' so that the brushes press against the outer wall of the cylindrical pipe and partially encircle it on both sides. As the shaft 26 is rotated, the chains drive shafts 42, 42' and rotate the wire brushes to quickly scour and clean the pipe. By rotating the cleaning device 90° in its plane perpendicular to the axis of the pipe, the portions of the pipe surface not reached in the initial position indicated in Figs. 1 and 2, may be cleaned.

It is preferred that the cavity 12 be filled with a suitable grease lubricant for the chains and bearings. Cover plates 14 and 16 have countersunk holes 17 which receive screws 19 threaded in holes 21 in the block for removably holding the cover plates on the sides of the block, and permitting access to the cavity 12 when required.

The entire device is rugged in construction for heavy duty, continuous use. All parts subject to wear are readily replaceable when required. The device is simple to use, safe and effective for the purposes intended.

While I have illustrated and described the preferred embodiment of my invention, it is to be understood that I do not limit myself to the precise construction herein disclosed and that various changes and modifications may be made within the scope of the invention as defined in the appended claims.

Having thus described my invention, what I claim as new, and desire to secure by United States Letters Patent is:

1. A pipe cleaning device comprising a block having a cavity, a drive shaft rotatably mounted in the block and carrying two sprocket wheels thereon rotatable in said cavity, a pair of other shafts rotatably mounted in the block and carrying other sprocket wheels respectively thereon, endless chains engaged respectively on one of the two sprocket wheels and one of said other sprocket wheels, spring means pressing said chains to take up slack therein, circular brushes carried on exterior portions of said other shafts and spaced apart to receive said pipe therebetween for cleaning, bearing means tiltably supporting said other shafts in the block for movement toward and away from each other in a single plane including axes of the drive shaft and the other shafts, and further spring means carried by the block and urging said other shafts to tilt toward each other in said plane, whereby the brushes will press against the pipe for effectively cleaning the same, said block having slotted means guiding said other shafts to move in said plane, said bearing means including convex bearing members secured to ends of said other shafts in said block, and bores having concave ends receiving and seating said convex bearing members.

2. A pipe cleaning device comprising a block having a cavity, a drive shaft rotatably mounted in the block and carrying two sprocket wheels thereon rotatable in said cavity, a pair of other shafts rotatably mounted in the block and carrying other sprocket wheels respectively thereon, endless chains engaged respectively on one of the two sprocket wheels and one of said other sprocket wheels, spring means pressing said chains to take up slack therein, circular brushes carried on exterior portions of said other shafts and spaced apart to receive said pipe therebetween for cleaning, bearing means tiltably supporting said other shafts in the block for movement toward and away from each other in a single plane including axes of the drive shaft and the other shafts, and further spring means carried by the block and urging said other shafts to tilt toward each other in said plane, whereby the brushes will press against the pipe for effectively cleaning the same, said block having slotted means guiding said other shafts to move in said plane, said bearing means including convex bearing members secured to ends of said other shafts in said block, and bores having concave ends receiving and seating said convex bearing members, the first-named spring means including leaf springs, there being a pair of removable cover plates at opposite sides of the block closing said cavity, said leaf springs being secured to said cover plates.

3. A pipe cleaning device comprising a block having a cavity, a drive shaft rotatably mounted in the block and carrying two sprocket wheels thereon rotatable in said cavity, a pair of other shafts rotatably mounted in the block and carrying other sprocket wheels respectively thereon, endless chains engaged respectively on one of the two sprocket wheels and one of said other sprocket wheels, spring means pressing said chains to take up slack therein, circular brushes carried on exterior portions of said other shafts and spaced apart to receive said pipe therebetween for cleaning, bearing means tiltably supporting said other shafts in the block for movement toward and away from each other in a single plane including axes of the drive shaft and the other shafts, and further spring means carried by the block and urging said other shafts to tilt toward each other in said plane, whereby the brushes will press against the pipe for effectively cleaning the same, said block having slotted means guiding said other shafts to move in said plane, said bearing means including convex bearing members secured to ends of said other shafts in said block, and bores having concave ends receiving and seating said convex bearing members, there being rectangular cover plates removably secured to opposite sides of the block closing said cavity.

4. A pipe cleaning device comprising a block having a cavity, a drive shaft rotatably mounted in the block and carrying two sprocket wheels thereon rotatable in said cavity, a pair of other shafts rotatably mounted in the block and carrying other sprocket wheels respectively thereon, endless chains engaged respectively on one of the two sprocket wheels and one of said other sprocket wheels, spring means pressing said chains to take up slack therein, circular brushes carried on exterior portions of said other shafts and spaced apart to receive said pipe therebetween for cleaning, bearing means tiltably supporting said other shafts in the block for movement toward and away from each other in a single plane including axes of the drive shaft and the other shafts, and further spring means carried by the block and urging said other shafts to tilt toward each other in said plane, whereby the brushes will press against the pipe for effectively cleaning the same, there being a pair of cover plates removably disposed at opposite sides of said block closing said cavity, the first-named spring means including leaf springs secured to said cover plates.

5. A pipe cleaning device comprising a block having a cavity, a drive shaft rotatably mounted in the block and carrying two sprocket wheels thereon rotatable in said cavity, a pair of other shafts rotatably mounted in the block and carrying other sprocket wheels respectively thereon, endless chains engaged respectively on one of the two sprocket wheels and one of said other sprocket wheels, spring means pressing said chains to take up slack therein, circular brushes carried on exterior portions of said other shafts and spaced apart to receive said pipe therebetween for cleaning, bearing means tiltably supporting said other shafts in the block for movement toward and away from each other in a single plane including axes of the drive shaft and the other shafts, and further spring means carried by the block and urging said other shafts to tilt toward each other in said plane, whereby the brushes will press against the pipe for effectively cleaning the same, said block having slotted means guiding said other shafts to move in said plane, said bearing means including convex bearing members secured to ends of said other shafts in said block, and bores having concave ends receiving and seating said convex bearing members, the first-named spring means including leaf springs, there being a pair of removable cover plates at opposite sides of the block closing said cavity, said leaf springs being secured to said cover plates, said further

spring means including coil springs, a pair of threaded sleeves disposed in threaded bores in said block, said threaded bores communicating with said cavity, said coil springs being disposed in said sleeves and passing through said threaded bores so that ends of the coil springs press against said other shafts, and screw means threaded on the sleeves retaining the coil springs under compression in said sleeves.

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