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PIPE BRUSHING MACHINE

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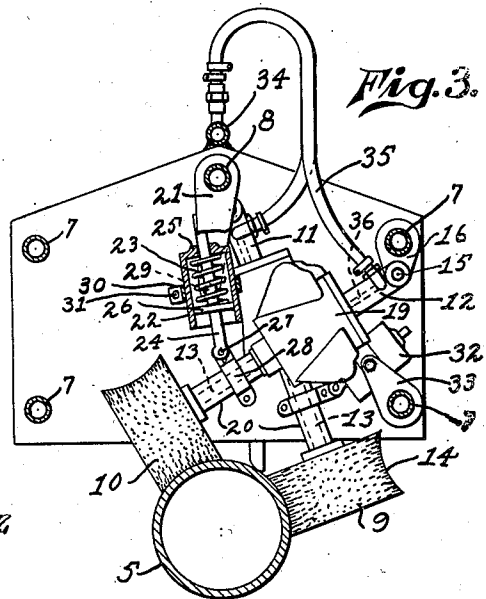
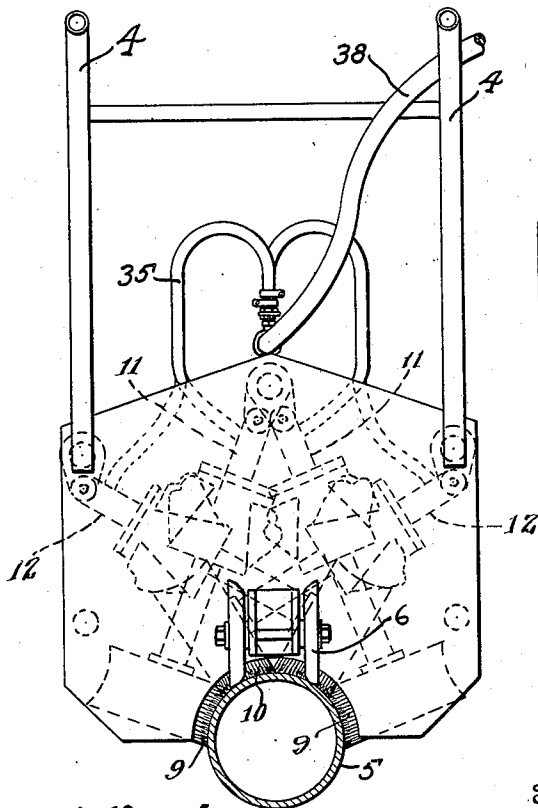
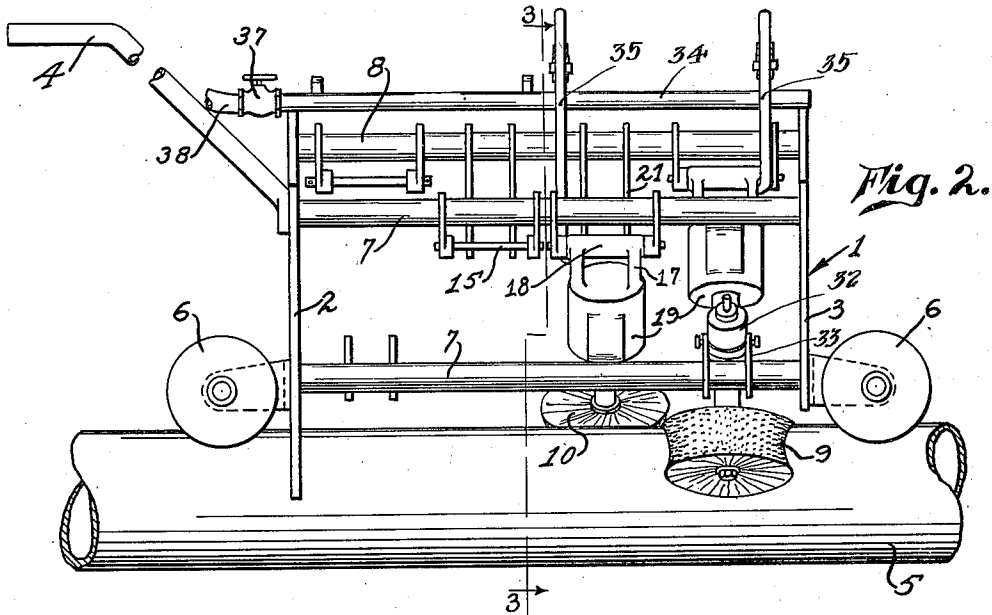


Fig. 1.

Fig. 3.

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PIPE-BRUSHING MACHINE.

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This invention relates to a machine for brushing a surface to clean it for any purpose. This is often necessary about industrial plants to prepare surfaces that are to be painted. While the invention is intended to be useful in any situation requiring the brushing of a surface of large area, it is described by way of example in the present specification as applied to brushing of pipe. It is frequently necessary to brush long lengths of pipe or pipe lines to prepare them for receiving paint.

The general object of this invention is to provide a simple power-driven machine for performing this operation; also to provide a machine of this kind in which the pressure of the brushes on the surface can be regulated; and to provide a machine which can be readily moved by hand over the work or surface to be brushed.

One of the objects of the invention is to provide a machine of this kind in which the zones or areas brushed by the brushes will overlap, so as to enable the machine to clean a broad zone as the machine advances.

As applied to a machine for brushing pipe, one of the objects of the invention is to provide simple means for supporting the brushes to enable them to reach substantially the entire upper side of the pipe, and to provide means for regulating the pressure of the brushes against the surface of the pipe.

Further objects of the invention will appear hereinafter.

The invention consists in the novel parts and combination of parts to be described hereinafter, all of which contribute to produce an efficient pipe brushing machine.

A preferred embodiment of the invention is described in the following specification, while the broad scope of the invention is pointed out in the appended claims.

In the drawing:

Figure 1 is a front elevation of a machine embodying my invention and having a special construction adapting it for brushing a pipe, which is shown in cross section.

Figure 2 is a side elevation of the machine shown in Fig. 1, partly dismantled so as to facilitate the disclosure of its construction.

Figure 3 is a vertical cross section taken about on the line 3—3 of Fig. 2.

In practicing the invention, I provide a

movable frame constructed to be moved over the surface which is to be brushed; this frame carries a plurality of rotary brushes and these brushes are preferably pivotally supported on the frame so as to swing toward the surface. In addition to this, I provide means for pressing the brushes against the surface, and means for rotating them on their axes. I also provide means for adjusting the pressure of the brushes against the surface.

I shall now describe a machine embodying these features which is of special construction adapting it for brushing a pipe.

Referring particularly to the drawings, 1 represents the frame of the machine, which may be of any suitable construction but in the present instance comprises two end plates 2 and 3, the former of which is provided with handles 4 enabling the frame to be shoved along on the upper side of the pipe 5. If desired, the end plates 2 and 3 may be provided with a pair of rollers 6 at each end which roll on the upper side of the pipe. The frame also includes a plurality of longitudinal frame bars or tie bars which connect the end plates. In the present instance, there are four supporting bars 7 disposed near the corners of the end plates, and these bars are referred to hereinafter as lateral supporting bars. In addition to this, I provide a centrally disposed supporting bar 8 which is located in the central plane of the frame and directly over the pipe.

In Fig. 3, two brushes 9 and 10 are illustrated. These brushes are alike and are attached respectively to brush arms 11 and 12. The brush arm 11 is pivotally supported on the central bar 8 and extends down on one side of the pipe, the brush 9 being attached to a brush shaft 13 which is driven to rotate the brush on its axis. The brush preferably has a concave face 14 to fit the periphery of the pipe.

Each brush arm and brush constitutes a brushing unit, and these units are similarly constructed. Practically the only difference between them is in the point at which they are supported in the frame. For example, the brush arm 12 is supported on a pivot or horizontal pin 15 carried at the lower end of a hanger 16 rigidly attached, for example, by welding to one of the upper lateral sup-

porting bars 7. In order to facilitate this attachment, the upper end of each brush arm is provided with arms 17 connected by a sleeve 18 receiving the pivot pin 15. I prefer to mount the brushes to rotate on the longitudinal axes of the arms, and I also prefer to provide an individual motor 19 for driving each brush. Each of these motors is mounted with its axis of rotation on the axis of the arms. From the lower end of the motor a tubular housing 20 extends down to the brush, and this housing envelopes the driving shafts 13 of the brushes.

It will be noted that the brush arm which is attached to the upper lateral supporting arm extends across above the upper side of the pipe, while the brush arm 11 simply hangs down from the center bar to hold its brush 9 against the side of the pipe.

Means are provided for pressing the brushes against the pipe and for resisting the lateral thrust of the brushes on their arms, which thrust is developed by the contact of the brush with the pipe. In order to accomplish this, I provide means supported on the supporting bars and connected to the brush arms preferably below the motors 19, that is to say, between each motor and its corresponding brush. In the case of the brush 10, I provide a hanger 21 attached to the central bar 8, and this hanger has two forks which support a spring carrier, said spring carrier being in the form of a spring barrel 22 with a spring 23 within the same. Means is provided for imparting the pressure from this spring to the brush arm, and for this purpose I provide a piston rod 24 which is guided through the upper end or head 25 of the spring barrel and carries a piston 26 sliding within the spring barrel.

The spring is disposed between the head 25 and the piston 26, and is a compression spring exerting its force in a downward direction.

The lower end of the piston rod 24 is attached by a pivot pin 27 to a collar 28 in the form of a split ring adjustably bolted on the housing 20 for the brush shaft. The spring barrel is supported between the forks 21 by diametrically opposite pins or trunnions 29, and these trunnions are carried on opposite sides of an adjustable clamping ring 30 which is clamped on the barrel. By loosening up the clamping bolt 31 of this clamping ring, the barrel can be adjusted further down, if desired, to increase the pressure of the spring, or it may be adjusted further up to reduce the pressure of the spring.

The brush arm 11 is held against the side of the pipe by a similar spring holding device 32, which is constructed in the same way as the spring barrel 22 and its associated parts, except that the hanger 33 for the spring barrel is attached to one of the lower

lateral supporting bars 7 which is adjacent to the brush 9.

While I prefer to employ an individual motor for each brush, any suitable means may be provided for driving the brushes. I prefer that the motors 19 shall be pneumatic motors, and in order to supply them with operating fluid, such as compressed air, I provide a manifold 34 extending along the upper side of the frame and provided with individual flexible hose connections 35, which connect to the forks 17 which carry the motors. Said forks are provided with passages 36 which conduct the air down to the motors.

As indicated in Fig. 1, it will be evident that by duplicating the construction for supporting the brushes that is illustrated in Fig. 3, four brushes will be provided, two of which will engage the pipe at nearly diametrically opposite points. These two brushes would correspond to the brush 9 illustrated in Fig. 3. Likewise, there would be two brushes 10 intermediately located between the brushes 9. As the machine is moved along, each brush brushes a zone on the pipe. The width of these brushes is sufficient to enable these zones to overlap so that as the machine moves along, it will brush the entire upper surface of the pipe.

The manifold 34 is provided with a valve 37 which is within easy reach of the man operating the machine. This valve is connected to a flexible hose 38 which supplies the compressed air to the machine.

It is understood that the embodiment of the invention described herein is only one of the many embodiments this invention may take, and I do not wish to be limited in the practice of the invention, nor in the claims, to the particular embodiment set forth.

What I claim is:—

1. In a machine for brushing a surface, the combination of a movable frame constructed to be moved in a certain direction over the surface, a plurality of rotary brushes pivotally supported on the frame to swing in a plane substantially at right angles to the said direction of advance and toward the surface, said brushes mounted so as to rotate on axes in a plane substantially at right angles to the said direction of advance, means for pressing the brushes against the surface, and means for rotating the brushes on their axes.

2. In a machine for brushing a surface, the combination of a frame constructed so as to be capable of moving along the surface, a plurality of rotary brushes pivotally supported on the frame to swing in a plane substantially at right angles to the direction of advance of the frame, each brush operating to engage a zone of the surface, said brushes being out of alignment with each other and mounted so that the zones

brushed by the brushes overlap each other, and means for pressing the brushes into contact with the surface.

3. In a machine for brushing a surface, the combination of a frame constructed so as to be capable of movement along the surface, a plurality of brush arms pivotally mounted on the frame, a brush mounted to rotate on the axis of each brush arm, means for pressing the brushes against the surface, and means for rotating each brush.

4. In a machine for brushing a surface, the combination of a movable frame constructed to be capable of moving along the surface, a plurality of brush arms pivotally mounted on the frame, a motor carried on each brush arm, a brush carried on each arm actuated by the motor, means for pressing each brush against the surface, and means for supplying operating fluid to the motors.

5. In a machine for brushing a surface, the combination of a frame constructed so as to be capable of moving along the surface, a plurality of supporting bars extending substantially parallel to the direction of advance of the frame, a plurality of brush arms pivotally mounted on the said bars, brushes carried by the brush arms, means for pressing the brushes against the surface to be brushed, and means for rotating the brushes.

6. In a machine for brushing a surface, the combination of a frame constructed so as to be capable of moving along the surface, a plurality of supporting bars extending substantially parallel to the direction of advance of the frame, a plurality of brush arms pivotally mounted on the said bars, brushes carried by the brush arms and mounted to rotate on the longitudinal axes of the arms, respectively, motors mounted on the arms, respectively, for driving the brushes, and means for supplying operating fluid to the motors.

7. In a machine for brushing the surface of a pipe, the combination of a frame constructed so as to be capable of moving along the pipe, a plurality of brush arms pivotally mounted on the frame and having brushes engaging the sides of the pipe at different points on the periphery thereof, means for pressing the brushes against the pipe, a motor mounted on each brush arm for driving the brushes, and means for supplying operating fluid to the motor.

8. In a machine for brushing the surface of a pipe, the combination of a frame constructed so as to be capable of moving along the surface, said frame having a substantially central supporting bar disposed over the position of the pipe and a pair of laterally disposed supporting bars, a pair of brush arms pivotally supported on the centrally disposed supporting bar and having brushes engaging the pipe on opposite sides, a pair

of brush arms pivotally supported on the lateral supporting bars extending transversely to the frame and having brushes respectively engaging the upper side of the pipe at opposite points, and means for driving the brushes.

9. In a machine for brushing the surface of a pipe, the combination of a frame with wheels for supporting the same to move along the upper side of the pipe, said frame including a substantially central supporting bar and lateral supporting bars, a pair of brush arms pivotally supported on the central bar and extending downward toward each side of the pipe, a brush carried by each of the said brush arms to rotate on its longitudinal axis, a brush arm pivotally supported on each of said lateral supporting bars and extending across the upper side of the pipe, a brush carried by each of the last named brush arms and mounted to rotate on the axis of its corresponding brush arm, a pneumatic motor carried on each brush arm to rotate on the axis of the brush arm and connected with its corresponding brush for rotating the same.

10. In a machine for brushing a surface, the combination of a frame constructed so as to be capable of moving over the surface, a brush carrier with a pivot on the frame and supported so as to swing in a plane substantially transverse to the direction of advance of the frame, a brush carried on the carrier to rotate in a plane transverse to the plane of movement of the carrier on its pivot, and means connected with the brush carrier for resisting the lateral thrust on the carrier developed by the contact of the brush with the surface.

11. In a machine for brushing a surface, the combination of a frame capable of being moved over the surface, a brush arm pivotally mounted on the frame to swing in a plane substantially transverse to the direction of advance of the frame, a rotary brush carried by the arm to rotate in a plane transverse to the plane in which the arm swings, means for rotating the brush, and means for holding the same in contact with the surface and for resisting the lateral thrust on the arm developed by the contact of the brush with the surface.

12. In a machine for brushing a surface, the combination of a frame capable of being moved over the surface, a brush arm pivotally mounted on the frame to swing in a plane transverse to the direction of advance of the frame, a brush rotatably mounted on the brush arm for engaging the surface, a motor mounted on the brush arm for rotating the brush, a spring holder supported on the frame connected with the arm and having a spring for forcing the arm down to press the brush against the surface and operating to resist the lateral thrust de-

veloped in the brush arm by the contact of the brush with the surface.

13. In a machine for brushing a surface, the combination of a frame capable of being moved over the surface, a brush arm pivotally mounted on the frame to swing in a plane substantially transverse to the direction of advance of the frame, a motor carried on the arm, a brush shaft driven by the motor, a brush carried thereby, a housing surrounding the brush shaft, a spring-barrel supported on the frame and having a spring with means for imparting pressure on the housing to hold the brush against the surface.

14. In a machine for brushing a surface, the combination of a frame capable of being moved over the surface, a brush arm pivotally supported on the frame and extending transversely to the direction of advance of the frame, a brush carried by the brush arm, means for rotating the brush on the axis of

the arm, a spring-barrel, means for pivotally supporting the same to swing on a transverse axis, a spring in the barrel, a plunger within the barrel pressed by the spring, and means connecting the same with the brush arm to press the brush against the surface.

15. In a machine for brushing a surface, the combination of a frame capable of being moved over a surface, a brush arm pivotally mounted on the frame to swing in a plane transverse to the direction of advance of the frame, a brush carried thereby, a spring-barrel, means for adjustably supporting the spring-barrel on the frame, enabling the spring-barrel to be adjusted toward or from the brush arm, a spring in the spring-barrel, and means actuated by the spring and connected with the brush arm to press the brush against the surface.

Signed at San Francisco, California, this 13th day of September 1926.

EDWIN P. BLY.