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J. M. HUGHES ET AL

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APPARATUS FOR SCRUBBING AND POLISHING STRIP METAL

Filed Jan. 18, 1938

2 Sheets-Sheet 1

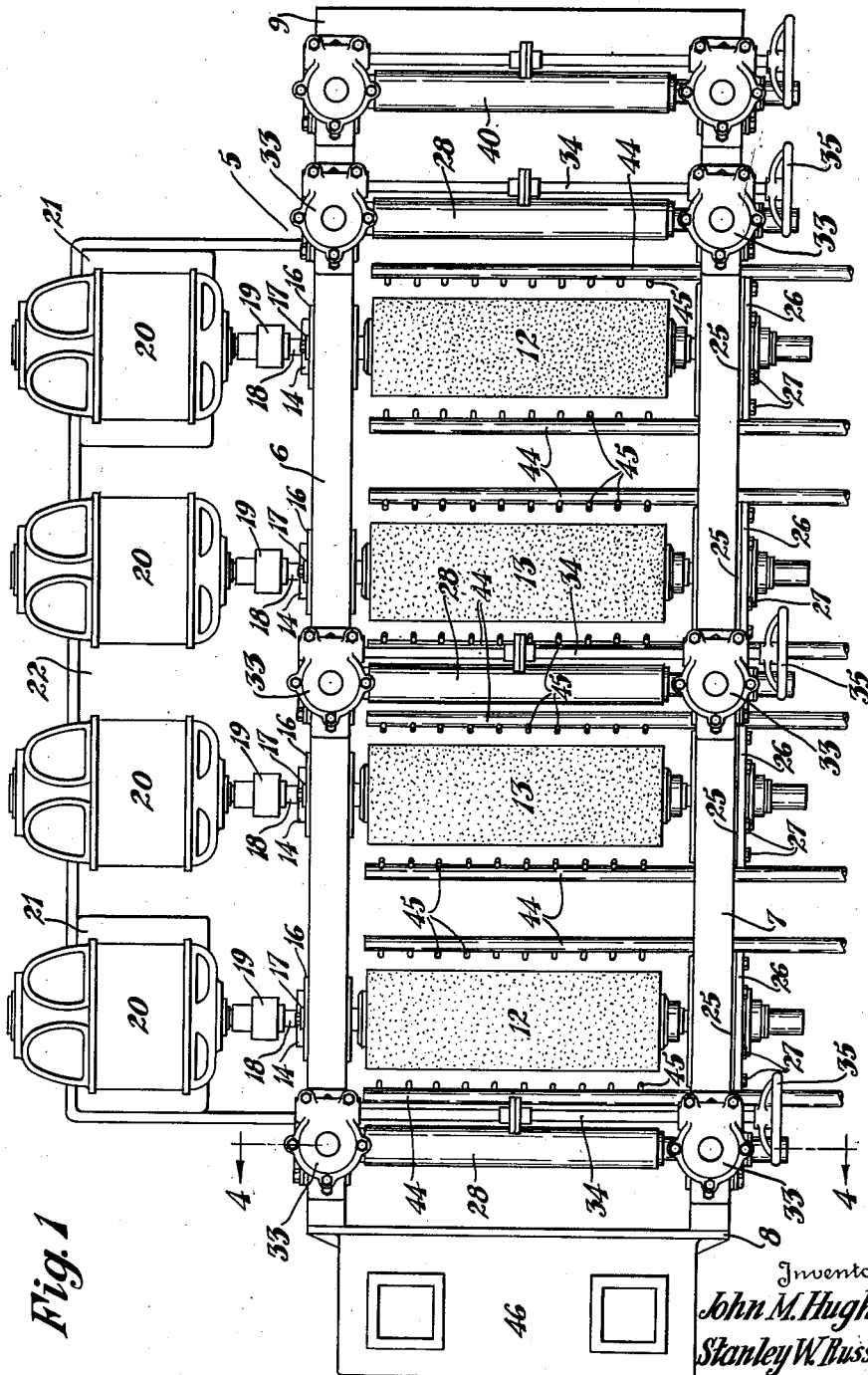


Fig. 1

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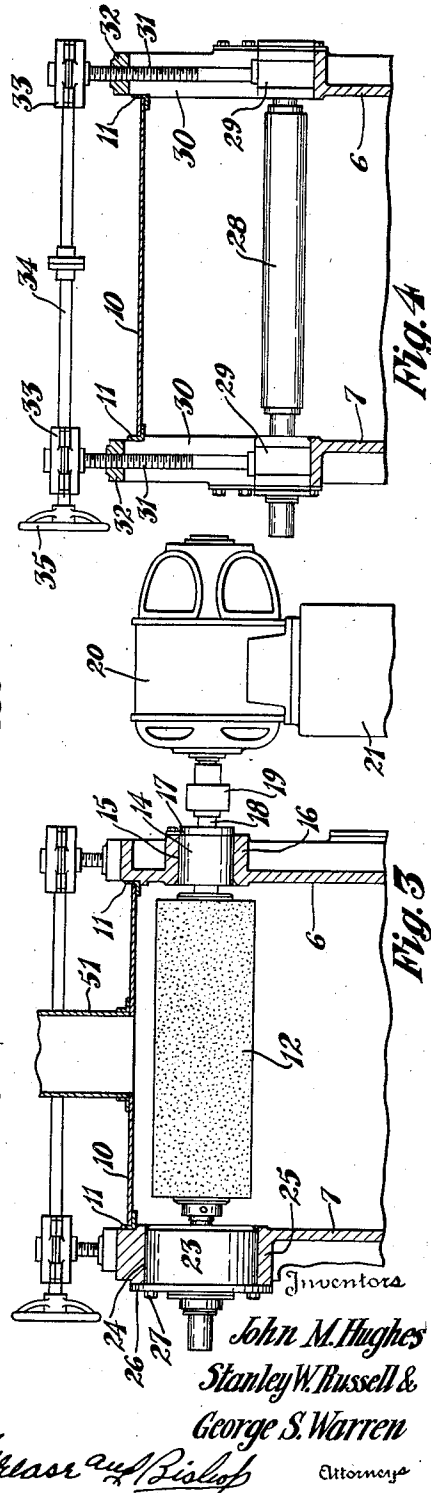
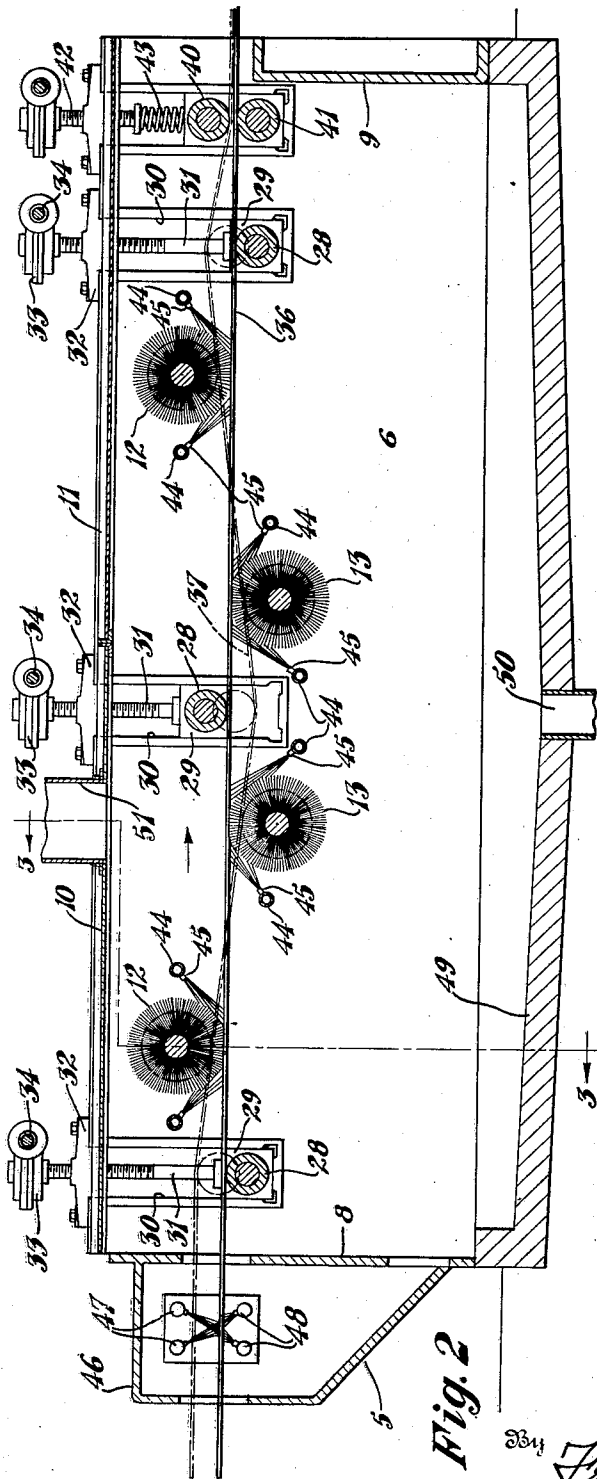
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2 Sheets-Sheet 2



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UNITED STATES PATENT OFFICE

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APPARATUS FOR SCRUBBING AND
POLISHING STRIP METALJohn M. Hughes, Youngstown, Ohio, and Stanley
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Application January 18, 1938, Serial No. 185,534

1 Claim. (Cl. 15—77)

The invention relates in general to scrubbing and polishing machines for treating metal, and in particular to an improved machine adapted for scrubbing, polishing, and/or buffing strip steel or non-ferrous metal strips, or metal products known to the trade as strips or stripsheets.

Various kinds of metal strips and strip sheets require treatment with various kinds of scrubbing, polishing or buffing rolls in order to obtain the many desired finished surfaces on strip products, so that it becomes necessary to frequently change the rolls in accordance with the type of finished surface to be produced.

Such rolls include brush, wire, fiber, emery or fabric buffing and wiping rolls, and the rolls must be rotatable at variable speeds in order to produce variations in the finished surfaces. Certain finished surfaces also require that the scrubbing, polishing or buffing rolls be rotated in opposite directions in order to obtain the desired effect in the finished surface.

Prior scrubbing and polishing machines have provided rolls which are not independently driven or capable of variable speeds, or both. Such machines have also provided adjustable scrubbing, polishing or buffing rolls to compensate for the ever present wear on the rolls, and this adjustability not only makes the rolls difficult to change but requires a relatively complicated driving mechanism suitable for driving the rolls in their various adjusted positions.

It is a general object of the present invention to provide an improved scrubbing and polishing machine of simple and compact construction, which overcomes all of the foregoing disadvantages and difficulties present in prior machines.

More specific objects include the provision of a machine having scrubbing and polishing rolls independently driven for rotation in opposite directions and at variable speeds.

Another object is to provide improved mounting means for each scrubbing and polishing roll so as to provide for quickly and easily changing the same.

A further object is to provide adjustable idler roll means adapted for compensating for wear on the scrubbing and polishing rolls, without complicating the roll driving mechanism.

These and other objects are accomplished by the separate elements and the novel combinations of elements embodied in the present improved apparatus comprising the present invention, a preferred embodiment of which is shown

in the accompanying drawings, and which is hereinafter described and claimed.

The invention may be set forth in general terms as including a series of scrubbing or polishing rolls journaled in fixed positions in a frame for endwise removal therefrom, each roll having independent reversible variable speed drive means, and there being idler rolls adjustably mounted in the frame for supporting the metal strip and for compensating for wear on the scrubbing or polishing rolls.

Referring to the drawings forming part hereof:

Figure 1 is a plan view of the improved apparatus, a cover plate therefor having been removed;

Fig. 2 is a longitudinal sectional view thereof, showing the metal strip passing therethrough in two positions corresponding to two adjusted positions of the idler rolls;

Fig. 3 is a transverse sectional view as of line 3—3 Fig. 2;

Fig. 4 is a transverse sectional view taken substantially on line 4—4 Fig. 1;

Similar numerals refer to similar parts throughout the several views of the drawings. In the drawings, four scrubbing or polishing rolls are shown, two above the strip and two below. It is understood that the present invention comprehends the use of one upper and one lower roll, or the use of any number of upper and any number of lower rolls, without departing from the scope of the invention as defined in the appended claims.

The improved apparatus preferably includes a frame indicated generally at 5 having two side portions 6 and 7 between which the metal strip passes. The frame 5 is preferably substantially closed at its entrance end by a member 8, and at its discharge end by a member 9.

Preferably, the top of the frame is provided with a cover plate 10 and ventstack 11 suitably supported by angle bars 11, neither of which are shown in Fig. 1, for the sake of clearness.

A plurality of scrubbing rolls are journaled in the side portions 6 and 7 of the frame, there being two upper rolls 12 and two lower rolls 13 shown in the drawings. Means for journaling the rolls in fixed positions in the frame preferably includes cartridge type bearings 14 mounted in side portion 6, one for each roll 12 and 13. The cartridge type bearings 14 are preferably somewhat smaller in diameter than the rolls and are mounted in bores 15 provided in cylindrical bosses 16 formed in the frame side portion 6.

Preferably a lock plate 17 is secured to each boss 16 for fitting into a slot in each bearing 14 to hold the same in place.

The roll shafts 18 project outwardly from the bearing 14 and are connected by means of couplings 19 to the shafts of driving motors 20. The driving motors 20 are variable speed reversible motors, suitably supported on bases 21 and 22. Thus each roll shaft is directly connected to a separate and independent variable speed reversible driving means.

Means for journaling the other ends of the roll shafts in the side portion 7 of the frame, preferably includes a cartridge type bearing 23 for each roll. The bearings 23 are somewhat greater in diameter than the diameter of the rolls, as shown, and each cartridge bearing 23 is mounted in a bore 24 provided in bosses 25 formed in side portion 7 of the frame. Preferably the cartridge bearings 23 are provided with annular flange portions 26 which may be secured to the bosses 25 by means of bolts 27.

Since the bores 24 for the cartridge bearings 23 are larger than the rolls 12 or 13, each roll and its bearings may be quickly and easily removed from the frame by merely withdrawing the lock plate 17 from the bearing cartridge 14, uncoupling the coupling 19, removing bolts 27, and then withdrawing the roll and its cartridge bearings axially or endwise through the bore 24.

Idler rolls are preferably provided for supporting and guiding a metal strip passing through the improved scrubbing apparatus, and may include rolls 28 journaled in the frame, preferably one at the entrance end and one at the discharge end and one at the central portion of the frame. The idler rolls 28 are preferably journaled in bearing blocks 29 at each end thereof, and the bearing blocks 29 are vertically slidable in ways 30 provided in the side frame portions 6 and 7 respectively.

Means for vertically adjusting the bearing blocks to raise and lower the idler rolls 28 preferably includes an adjusting screw 31 secured to each block 29 and screwed through cap plates 32 secured to the frame and extending into the usual worm gear housing 33 above the frame. These adjusting screws 31 are rotatable in the usual manner by means of worm gear shafts 34 having hand wheels 35 thereon and extending between opposite screws and meshing with the worm gears in housing 33 for turning the screws 31.

By providing idler rolls at suitable staggered positions along the series of scrubbing rolls, the metal strip passing through the machine may be changed from the horizontal full-line position 36 shown in Fig. 2 to the angular dot-dash line position 37, so as to maintain the strip in such position that it will contact the scrubbing rolls 12 and 13 even though they are worn sufficiently to substantially decrease their diametric size, as indicated in Fig. 2.

Accordingly, by adjusting the positions of the idler rolls 28, the metal strip is supported in such a way as to compensate for wear on the scrubbing or polishing rolls, by inclining that portion of the strip between the idler rolls to maintain it in con-

tact with the scrubbing rolls, without requiring any adjustment or complication of the driving mechanism for the scrubbing or polishing rolls.

Preferably, a pair of discharging rolls 40 and 41 are provided at the discharge end of the apparatus, the upper roll 40 being yieldably adjustable by means of the adjusting screw 42 and spring 43, so as to adjust the amount of tension on the metal strip as it passes through the scrubbing apparatus.

Spray pipe headers 44 may be provided, preferably at each side of each scrubbing or polishing roll. Each header 44 is provided with a series of spray tips 45 which are directed so as to spray a suitable hot or cold fluid against the surfaces of the metal strip, the sprays for each roll being directed so as to impinge upon the surface of the strip immediately adjacent to the roll.

Preferably the entrance end frame member 8 is provided with an outwardly projecting enclosure 46 through which the metal strip passes, and sprays 47 and 48 are provided within said enclosure for spraying the upper and lower surfaces respectively of the strip as it enters the scrubbing apparatus.

The side portions 6 and 7 and end portions 8 and 9 of the frame, together with the cover plate 10, substantially enclose the scrubbing apparatus so as to confine the spray liquid within the same and the frame is preferably mounted on a suitable base 49 having a drain 50, as shown in Fig. 2.

The scrubbing rolls 12 and 13 shown in the drawings are rotatable at variable speeds or in reverse directions by the motors 20 for producing certain variations in the finished surfaces of the metal strip. Each and all of the scrubbing rolls are quickly removable through the bearing bores 24 and may be replaced by wire, fiber or emery rolls, or by other polishing or buffing rolls, for obtaining various other desired surfaces on the finished strip.

The idler rolls 28 are easily adjusted to hold the metal strip against the scrubbing, polishing or buffing rolls as the diameters of the rolls decrease due to wear.

Various modifications in the details of construction and arrangement of the present improved apparatus may be made without departing from the scope of the invention defined in the appended claim.

We claim:

Apparatus for scrubbing and polishing strip metal including a frame, a lower idler roll, an upper scrubbing roll, a lower scrubbing roll and an upper idler roll mounted in the frame in staggered relation in the order named to a metal strip passing between the rolls, said scrubbing rolls being journaled in fixed positions in the frame, said idler rolls being vertically adjustably mounted in the frame for longitudinally tilting the portion of the strip between the idler rolls to maintain the strip in contact with both scrubbing rolls as they wear, and means for driving the scrubbing rolls.

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