Dec. 18, 1934. L. S. DAHL ET AL 1,984,729

APPARATUS FOR CLEANING METAL WORKING ROLLS

Filed Oct. 19, 1933 2 Sheets-Sheet 1

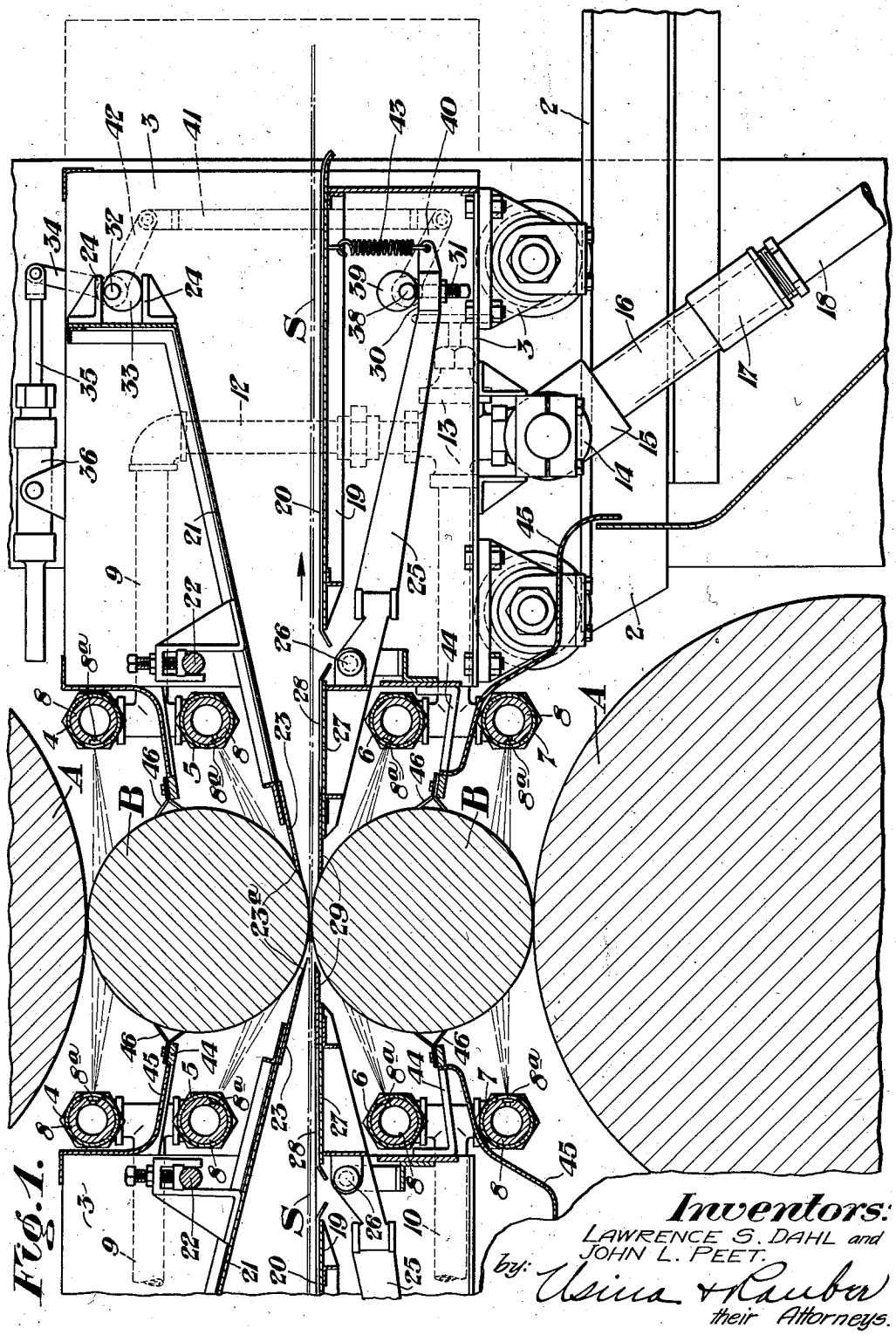


Fig. 1.

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Fig. 2.

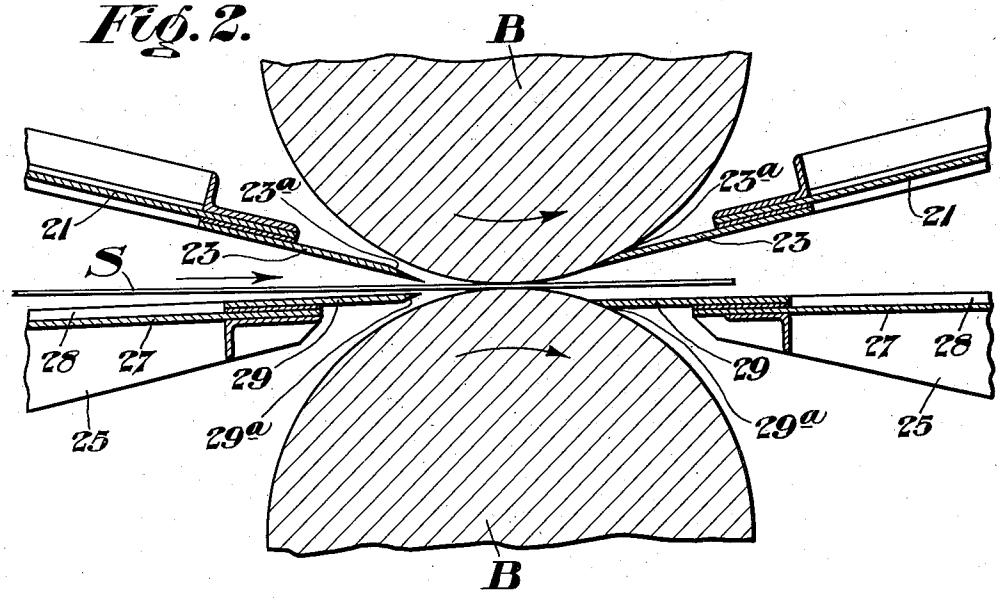
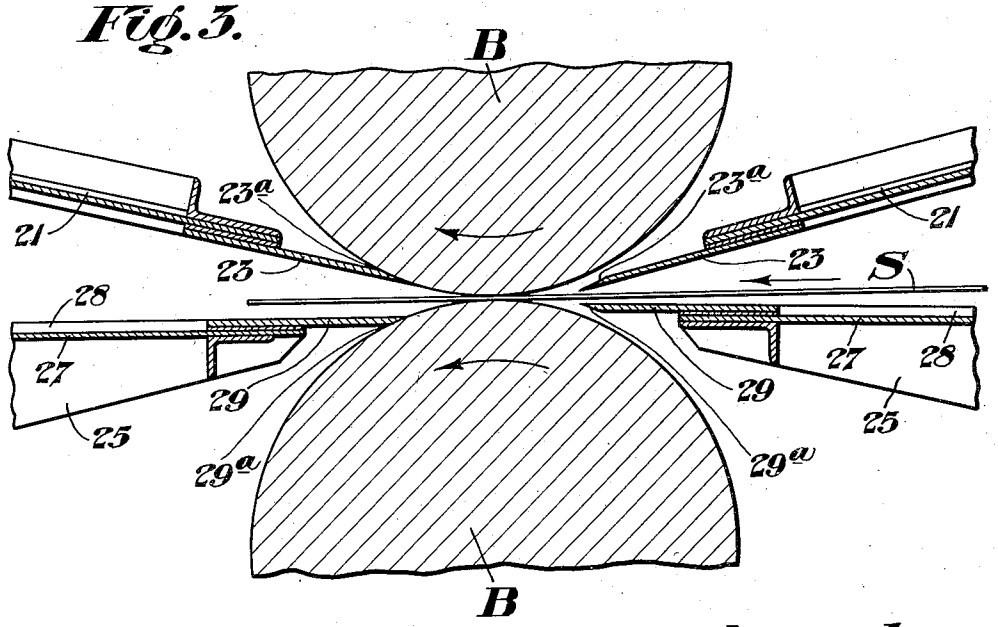


Fig. 3.



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Patented Dec. 18, 1934 1,984,729

UNITED STATES PATENT OFFICE

1,984,729

APPARATUS FOR CLEANING METAL WORKING ROLLS

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Application October 19, 1933, Serial No. 694,315

3 Claims. (Cl. 80—1)

This invention relates to an apparatus for cleaning metal working rolls, and particularly those used in the cold rolling of sheet, tin plate, or continuous strip material, although not limited thereto.

In the manufacture of cold reduced continuous strip material for subsequent processing into commercial sheets, plates and the like, the material is usually processed in a 4-high rolling mill wherein its reduction is transposed into length, and without any substantial change in its width. Due to the severe strains imparted to the materials being processed, numerous slivers break away from its surfaces and collect on the bodies of the metal working rolls. In addition, carbonized oil from the surface of the material likewise collects on the surfaces of the metal working rolls.

In a co-pending application of Edwin T. Lorig and Carl E. Moore entitled "Method and apparatus for maintaining constant the temperature of metal working rolls", filed November 13, 1933, Serial No. 697,862 there is disclosed a novel means for spraying a liquid coolant on the surfaces of the metal working rolls. While the use of such a device is highly desirable, the coolant must be removed from the surfaces of the metal working rolls on the side from which the strip is emerging, otherwise it will drop onto the strip and occasion considerable difficulty in subsequent operations such as, for example, annealing.

One object of the present invention is the provision of a novel apparatus for cleaning metal working rolls in such manner as to preclude the possibility of impurities, and slivers of metal, etc., from being ground into the surface of the metal being processed.

Another object is to provide novel means for cleaning metal working rolls in order to extenuate their length of service prior to troublesome and expensive regrinding operations.

A further object is to provide a novel apparatus for removing liquid coolant from the surfaces of metal working rolls on the side of the mill from which the strip being processed is emerging, thereby insuring the clean surfaces of the latter.

These and still further objects will be apparent after referring to the drawings, in which:

Figure 1 is a sectional elevation of the apparatus of the invention, as used on a conventional type of 4-high cold reduction mill.

Figure 2 is an enlarged fragmentary sectional view showing the operation of the apparatus of the invention.

Figure 3 is a view similar to Figure 2, but showing the apparatus in another stage of operation.

Referring more particularly to the drawings, the letters A indicate a pair of large backing-up rolls between which there is disposed a pair of smaller metal working rolls B and all of which, when taken as a unit, comprise a conventional type of 4-high mill.

A pair of tracks 2 are disposed on either side of the backing-up and metal working rolls A and B, respectively, and are each adapted to support a wheeled carriage generally indicated at 3. A pair of dispenser tubes 4 and 5 are mounted on each of the carriages 3 as are a similar pair of dispenser tubes 6 and 7. Each of the tubes 4, 5, 6 and 7 is provided with a rotatable inner tube 8 having apertures 8^a disposed therein for spraying a liquid coolant onto the surfaces of the adjacent metal working rolls B. The inner tubes 8 in the upper dispensing tubes 4 and 5, for the upper metal working roll, are supplied with a liquid coolant through a pipe 9, while the inner tubes 8 in the lower dispenser tubes 6 and 7, for the lower metal working roll, are similarly supplied through a pipe 10. A common supply pipe 12 is connected to the upper and lower pipes 9 and 10, and communicates with a valve 13, pivoted joint 14, swivel fitting 15, a short pipe 16, slip-joint 17 and a conduit 18. The conduit 18 receives the liquid coolant from any suitable source, such as a reservoir.

Each of the carriages 3 is provided with a table 19 having on its upper surface a suitable covering 20. An upper movable lever 21 is pivoted about a journal 22 on the upper portion of each of the carriages 3 and carries at its end adjacent the bottom portion of the upper metal working roll a blade 23 of brass, or other suitable material, which is hollow-ground as at 23^a, for contact with the body of the roll. A pair of ears 24 are secured to the opposite end of each of the pivoted plates 21. A lower movable lever 25 is pivoted as at 26 to each of the carriages 3 below the horizontal center line of the mill and provides a table portion 27 which has on its upper surface a suitable covering 28. The ends of the movable tables 27 which are adjacent the upper portion of the lower metal working roll are each provided with a blade 29, which is hollow-ground as at 29^a for a close contact with the body of the roll. The opposite ends of each of the levers 25 are provided with a detachable contact block 30 having an adjusting screw 31.

A shaft 32 is journaled on the upper portion of each of the carriages 3 and provided with a cam 33 which is disposed between the ears 24 on the

pivoted plate 21. A lever 34 is connected to each of the shafts 32 at one of its ends and to a piston rod 35 of a fluid cylinder 36 at its other end.

A shaft 38 is similarly journaled on each of the carriages 3 below the horizontal center line of the mill and provided with a cam 39 which is adapted to contact with the detachable contact block 30 on each of the lower movable levers 25. A lever 40 is secured to each of the shafts 38 at one of its ends and to a link 41 at its other end. The link 40 is connected at its other end to a lever 42 which is, in turn, connected to the upper shaft 32 on each of the carriages 3.

A spring 43 is connected to each of the tables 19 at one of its ends and to the rearward end of one of the lower levers 25 at its other end in order to influence the detachable contact blocks 30 against the cams 39.

A support 44 is secured to each of the wheeled carriages 3 adjacent the center of the lower metal working roll B and provided with a guard or baffle plate 45 and auxiliary scraper devices 46 which contact the approximate central portions of the sides of the lower metal working roll.

In operation, fluid is admitted to the fluid cylinder 36 on the wheeled carriage 3 on the right-hand side of the mill and operates the linkage described in such manner as to cause the scraper blades 23 and 29 on this side of the mill to contact sharply on their hollow-ground surfaces 23^a and 29^a while the material emerges from this side of the mill, as shown by the arrow in Figure 1.

Referring to Figure 2 of the drawings, the enlarged fragmentary section more clearly discloses the relative position of the various scraper devices during this stage of the operation.

When the direction of processing of the material is changed, in accordance with well known principles, the fluid is exhausted from the fluid cylinder 36 on the right-hand carriage in such manner as to cause the linkage to rotate the cams 33 and 39 in such manner as to position them more closely adjacent the strip material and accordingly out of contact with the metal working rolls, while the fluid cylinder 36 on the left-hand carriage 3 is supplied with fluid in order to cause the cams 33 and 39 to move the stripper devices 23 and 29 on that side of the mill into contact with the bodies of the metal working rolls.

The operation described is alternatively actuated in accordance with the direction of rolling and may be connected in any suitable manner to operate automatically upon a change of direction of rotation of the various rolls.

It is to be understood that the spraying devices illustrated form no part of the present invention, being the subject matter of the copending application previously referred to, and while we have shown and described one specific embodiment of our invention it will be understood that we do not wish to be limited exactly thereto, since various modifications may be made without departing from the scope of our invention, as defined in the following claims.

We claim:

1. Apparatus for cleaning the surfaces of metal working rolls comprising a lever pivoted adjacent each of said metal working rolls and on either side thereof, a blade on the end of each of said levers and adapted to contact with said metal working rolls adjacent their line of pass, said blades being hollow-ground on their contact edges, a cam for moving each of said levers into and out of operative position, a leverage system for moving said cams in unison, a fluid cylinder for actuating said leverage system, and auxiliary blades for said metal working rolls.

2. Apparatus for cleaning the working rolls of metal processing mills comprising a wheeled carriage on each side of said mill, a lever pivoted on the upper portion of each of said carriages and carrying a blade adapted to contact with the lower portion of the upper of said metal working rolls, said levers being provided with ears on their ends remote from said blades, a cam disposed between the ears on each of said levers, a lever pivoted on the lower portion of each of said carriages and carrying a blade adapted to contact with the upper portion of the lower of said metal working rolls, said lower levers having an adjustable contact block on their ends remote from said blades, a cam on each of said carriages disposed adjacent said contact blocks, means for biasing said lower levers in such manner as to cause their contact blocks to engage said cams, a leverage system on each of said carriages for actuating said upper and lower cams, and fluid cylinder means for operating said leverage systems.

3. Apparatus for cleaning the working rolls of metal processing mills comprising a trackway on either side of said mill, a wheeled carriage adapted to move on each of said trackways, a lever pivoted on the upper portion of each of said carriages and carrying a blade adapted to contact with the lower portion of the upper of said metal working rolls, said levers being provided with ears on their ends remote from said blades, a cam disposed between the ears on each of said levers, a lever pivoted on the lower portion of each of said carriages and carrying a blade adapted to contact with the upper portion of the lower of said metal working rolls, said lower levers having an adjustable contact block on their ends remote from said blades, a cam on each of said carriages disposed adjacent said contact blocks, means for biasing said lower levers in such manner as to cause their contact blocks to engage said cams, a leverage system on each of said carriages for actuating said upper and lower cams, and fluid cylinder means for operating said leverage systems.

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