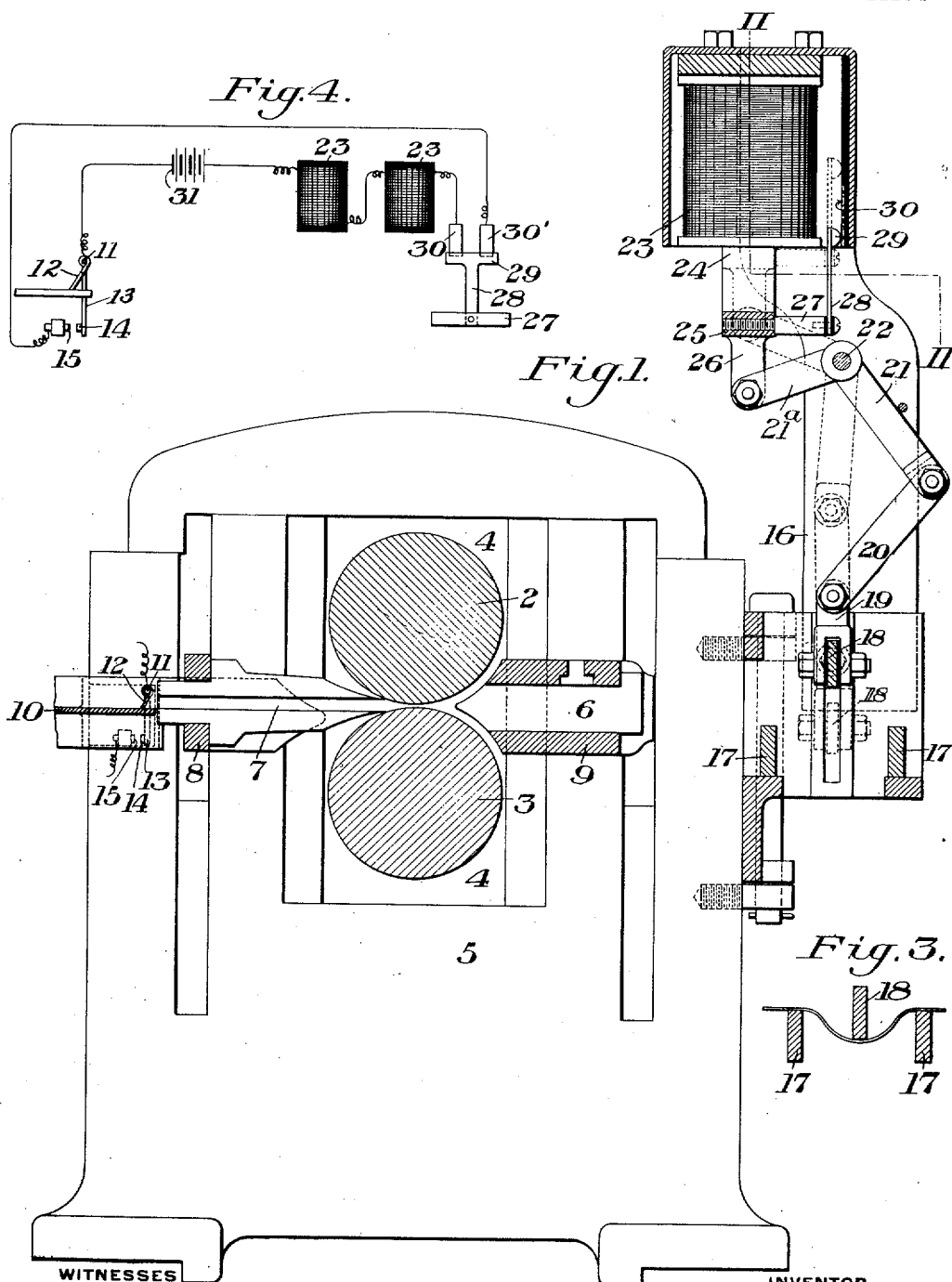


I. L. HUGHES.
 APPARATUS FOR SCRAPING METAL HOOPS.
 APPLICATION FILED MAR. 25, 1909.

988,712.

Patented Apr. 4, 1911.

2 SHEETS—SHEET 1.



WITNESSES
 R. A. Balderson.
 G. L. Brinters.

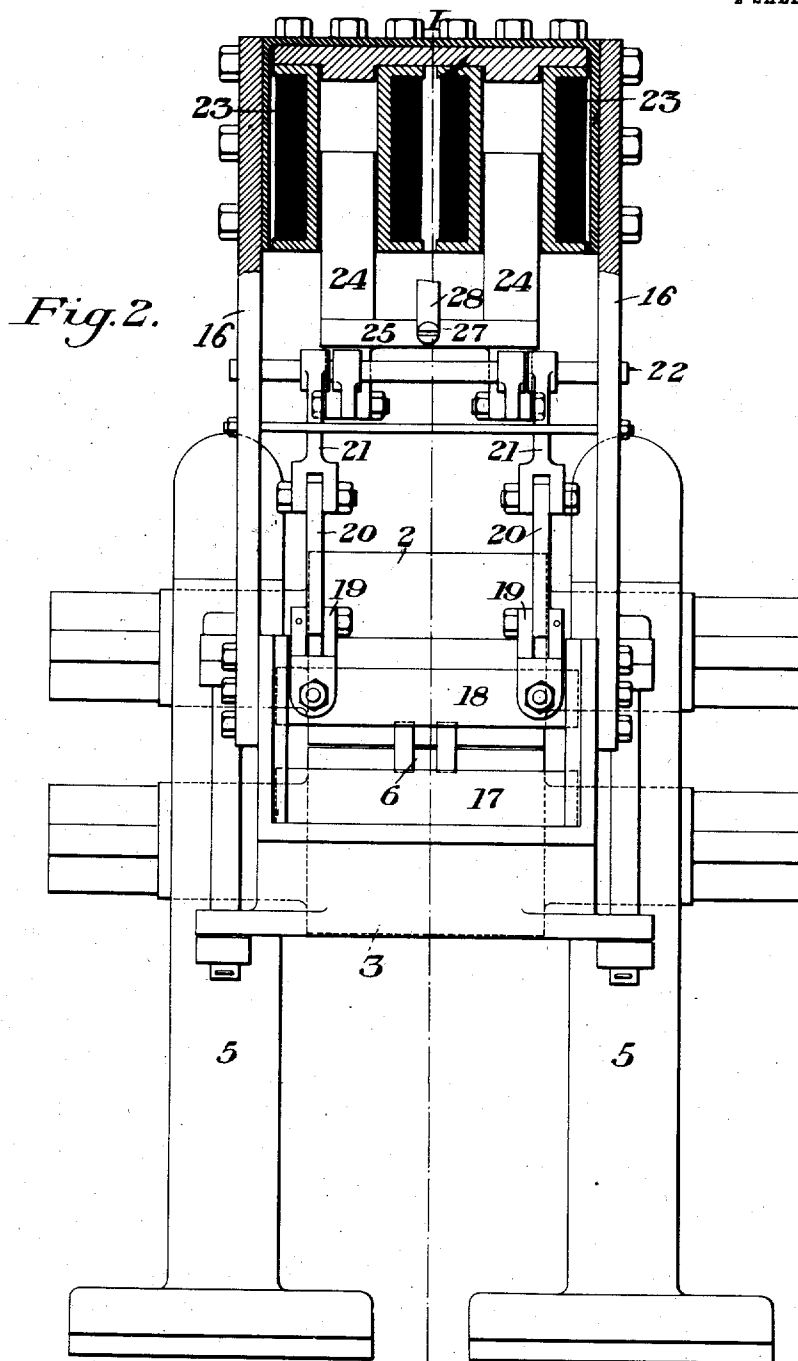
INVENTOR
 I. L. Hughes.
 by Baker, Byrnes & Armistead,
 his Attys

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WITNESSES

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I

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UNITED STATES PATENT OFFICE.

ISAAC LAMONT HUGHES, OF YOUNGSTOWN, OHIO.

APPARATUS FOR SCRAPING METAL HOOPS.

988,712.

Specification of Letters Patent.

Patented Apr. 4, 1911.

Application filed March 25, 1909. Serial No. 485,622.

To all whom it may concern:

Be it known that I, ISAAC LAMONT HUGHES, of Youngstown, Mahoning county, Ohio, have invented a new and useful Apparatus for Scraping Metal Hoops, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification, in which—

10 Figure 1 is a longitudinal sectional elevation on the line I—I of Fig. 2, showing one form of apparatus, constructed and arranged for use in connection with the finishing rolls of a hoop mill, in accordance with my invention; Fig. 2 is a sectional end elevation of the same on the line II—II of Fig. 1; Fig. 3 is a detail sectional side elevation showing the scraping-bars forming part of the apparatus in relation to the hoop during the hoop scraping operation; Fig. 4 is a wiring diagram showing the electrical connections of the apparatus.

My invention relates to apparatus employed to remove scale from the surface of 25 rolled metal hoops and similar flexible rolled metal shapes and the invention more particularly relates to scraping apparatus used in connection with the rolls of hoop mills for removing scale from the metal 30 being rolled, while still hot and before the completion of the rolling operation. Heretofore such scraping operations have been carried out with apparatus which was operated manually to move the scraper bars 35 into and out of their operative position.

With some classes of work it has been proposed to employ a fluid pressure cylinder to operate the scraper bars, a manually operated valve controlling the operation of the 40 cylinder in such case.

The length of the finished materials made in modern hoop mills is very much greater than in the old style hand mills and the speed at which such materials are now finished is very largely increased in both type 45 of such mills, in some cases reaching a speed of over one thousand feet per minute in the finishing rolls of hoop mills. When the scraping apparatus, as constructed heretofore is used with such high speed mills, a large proportion of the length of the materials has been passed through the scraper and the rolling pass to which it is applied, before the operator can bring the scraper 50 bars into their operative position. This results in a large part of the material being

unscraped and proving defective, greatly increases the amount of scrap made in such mills and adds to the cost of manufacture.

The object of my invention is to provide 60 improved means for scraping hoops and similar materials by the use of which the scraping operation is effected upon substantially the entire length of the material operated upon and while material of any 65 length is being finished at any desired rate of speed.

Another object of my invention is to provide means whereby the hoop or other blank being scraped automatically operates to 70 maintain the scraper bars of the apparatus in their operative position during the time any portion of the hoop is between the scraper-bars.

A further object of the invention is to provide 75 means for actuating the scraper bar operating mechanism which is automatically operated and controlled by the hoop being scraped in moving the scraper bars into and out of their operative position. 80

A still further object of my invention is to provide an improved scraping apparatus having novel electro-magnetic mechanism 85 by which the scraper bars are actuated and in the use of which electrical energy is used only in the interval in which the scraper bars are being moved into their operating position.

In the drawings, in which my improved apparatus is shown for use with the bull 90 head or finishing rolls of a hoop mill, 2 designates the top and 3 the bottom roll of a finishing stand of rolls secured in the usual roll bearings 4 which are mounted in the windows of the roll housings 5. The rolls 95 2 and 3 are provided with the usual guides 6 and 7 which are adjustably secured to the rest bars 9 and 8 which extend between the sides of the roll housings 5. In front of the guide 7, which is located on the delivery 100 side of the rolls, is an apron plate or delivery table 10 over which the metal passes in being discharged from the rolls, in this case passing to the hot bed or to the reels.

Mounted above the table or plate 10, on 105 the pivot shaft or pin 11, to which it is keyed or otherwise secured, is a lever or finger 12 which extends downwardly in front of and across the width of the opening in the box guide 7 in the path of the metal 110 as it issues from the guide. Also secured to the pivot shaft 11 is a second lever 13 having

a contact 14 on one end and adjacent to and in the line of movement of the contact 14 is a stationary contact 15. The finger 12 contacts with and is moved by the hoop or other material being rolled, as it emerges from the guide 7 and, through the pivot pin 11 and lever 13 brings the contacts 14 and 15 into engagement for a purpose herein-after described.

Secured to the housings 5 on the front or receiving side of the rolls and projecting upwardly above the roll is a frame 16 and mounted between the sides of this frame are the stationary scraper bars 17, two preferably being used with my improved apparatus. The top surfaces of the bars 17 are preferably in line with the top surface of the bottom roll 3. Mounted in guides on the frame 16, so as to be vertically movable, is the adjustable scraper bar 18. The scraper bar 18 is connected by the forked arms 19 to one end of the links 20 the opposite end of these links being connected to the end of one arm on the bell cranks 21 which are pivotally mounted on the shaft 22 which is carried in dead eyes or bearings on the frame 16.

Mounted between the upper ends of the frame 16 are the solenoids 23 each of which is provided with a core 24. The cores 24 are connected by the armature 25 which is provided with downwardly projecting lugs 26 by which the cores 24 are connected to the end of one arm 21^a on each of the bell cranks 21.

Secured on the rearwardly projecting post or arm 27 on the armature 25 is an electrical contact 28 the upper end of which is provided with a bridge piece 29 which spans the stationary contacts 30 and 30' on the frame 16 carrying the solenoids.

The electrical connections are best illustrated in Fig. 4, in which 31 designates the source of electric current, one wire of which leads to the movable contact 14. From the stationary contact 15 a wire leads to the stationary contact 30' the other stationary contact 30 being in electrical connection with one of the solenoid coils 23. The solenoids are coupled in series and one solenoid 29 has one pole in electrical connection with the source of current 31.

In Fig. 1 the scraper bar 18 is shown in its elevated position in full lines, and in its lowered or operative position in dotted lines. When the solenoids 23 are energized, the cores 24 are raised thereby rocking the bell cranks 21 and depressing the movable scraper bar 18. The solenoid cores will be raised a distance sufficient to move the bell crank arms 21 and links 20 slightly beyond a line drawn between the centers of the pivotal connection of the forked link 19 and the shaft 22, after which the bridge piece 29 will pass beyond the stationary contacts

30'30' in this way shutting off current to the solenoid coils so as to prevent overheating or burning of these coils.

In the operation of my improved apparatus the material to be scraped is first passed between the stationary scrapers 17 and the movable scraper 18 and is then passed through the guide 6, then between the rolls 2-3 and emerges from the guide 7. As soon as the material passes the lever 12, the same will be swung, tilted or moved by contact therewith so as to close the electric circuit through the contacts 14 and 15, the contacts 30-30' and solenoids 23 to the source of supply. By completing the circuit, the solenoid coils are energized thereby, raising their cores and depressing the scraper 18 so as to bring the scraper bars into contact with the material passing between them. As before stated the cores 24 will be raised to a height sufficient to pass the connecting end of the arm of the bell-cranks 21, with the links 20 beyond a line passing through the pivoted centers of the bell-crank and opposite end of the link 20, after which the circuit will be broken by means of the bridge piece 29 and the stationary contacts 30-30'. When the links 20 and the bell-crank arms 21 are moved beyond a line extending through the pivotal centers of the bell-crank and the opposite end of the link 20, as is shown dotted in Fig. 1, the scraper bars will be locked in this position until such time as the hoop being scraped has been passed from between the scraper bars. By reference to Fig. 1 it will be seen that when the arms 21, 21^a and the links 20 are in the position shown dotted, so long as a hoop is held between the scraper bars 17 and 18, downward movement of the solenoid core will be prevented, owing to the pivotal center of the links 20 and the arms 21 being beyond a line extending through the shaft 22 and the end of the links 20 pivoted to the forked arms 19. While the hoop is between the scraper bars, the pull of the rolls on the hoop being scraped causes the hoop to push upwardly on the vertically movable scraper bar 18 and so holds the links and levers in the dotted position shown. When the rear end of the material being operated upon has passed through the scraper, the solenoid cores will be lowered by reason of their weight and will raise the parts into the position shown by full lines in Fig. 1.

The foregoing description describes the scraping operation of thin material of very light weight such as hoops in which the material would be slightly bent, as shown in Fig. 3, while passing between the scrapers. Should the material passing between the scraper bars not be of a flexible character, so that the bell-cranks and thin links pass the center, the solenoid will remain energized during the entire scraping operation

and will hold the bar 18 in contact with the hoop or strip passing between the scraper bars by means of the solenoid.

The scraper bars shown in the drawings 5 present a flat surface to the material to be scraped, although it will readily be understood that the same may be provided with grooves of various contours in order to scrape rounds, hexagonal, or any other 10 shape being rolled.

The advantages of my invention result from the provision of a scraper which is automatically closed upon the material to be scaled as soon as the material has entered the 15 finishing rolls, and the provision of means by which the scraper will be automatically opened as soon as the rear end of the material being scraped has left the finishing rolls.

20 I claim:—

1. Apparatus for scraping metal hoops and like materials comprising a movable scraper bar arranged to contact with and scrape the hoop, means for drawing the 25 hoop through the scraper, and electromagnetic means arranged to move the scraper bar into engagement with the hoop being scraped; substantially as described.

2. Apparatus for scraping metal hoops 30 and like materials comprising a movable scraper bar arranged to contact with and scrape the hoop, means for drawing the hoop through the scraper, electromagnetic means arranged to move the scraper bar 35 into engagement with the hoop being scraped, and means for locking the scraper bar in its operative position while the hoop is being scraped; substantially as described.

3. Apparatus for scraping metal hoops 40 and like materials comprising opposing scraper bars arranged to contact with and scrape opposite sides of a metal hoop, means for drawing the hoop through the scraper bars and means for causing a relative move- 45 ment of the scraper bars toward each other, said bar moving means being locked to hold the scraper bars in scraping position while the hoop is passing between the scraper bars; substantially as described.

50 4. Apparatus for scraping metal hoops and like materials comprising scraper bars, at least one of said bars being adjustable toward and away from the other and arranged to contact with and scrape opposite sides of

a metal hoop, means for drawing the hoop 55 through the scraper, mechanism for bringing the scraper bars into engagement with the hoop and means operated by the hoop being scraped for causing the actuation of the bar moving mechanism; said moving 60 mechanism being held in operative position by the hoop between said scrapers; substantially as described.

5. Apparatus for scraping metal hoops and like materials comprising a movable 65 scraper bar arranged to contact with and scrape the hoop, means for drawing the hoop through the scraper, and electromagnetic means arranged to move the scraper bar into engagement with the hoop being 70 scraped; substantially as described.

6. Apparatus for scraping metal hoops and similar materials comprising a movable scraper bar adapted to contact with and 75 scrape said hoops, means for drawing hoops through the scraper, a toggle arranged to move and hold the bar in its operative position and a solenoid arranged to actuate said toggle in moving said bar into its operative 80 position; substantially as described.

7. Apparatus for scraping metal hoops and similar materials comprising a movable scraper bar adapted to contact with and 85 scrape said hoops, means for drawing hoops through the scraper, a toggle arranged to move the bar into its operative position and a solenoid arranged to actuate said toggle in moving said bar into its operative position; 90 substantially as described.

8. Apparatus for scraping metal bars 90 and similar materials comprising a movable scraper bar arranged to contact with and scrape the hoops, means for drawing the hoops through the scraper, electromagnetic 95 means arranged to move the scraper bar, means controlled by the hoop being scraped arranged to complete the circuit through the electromagnetic means and means arranged to break the circuit after the scraper bar has moved a predetermined distance; substan- 100 tially as described.

In testimony whereof, I have hereunto set my hand.

ISAAC LAMONT HUGHES.

Witnesses:

RAY McLAUGHLIN,
J. S. SCHROCK.