Sept. 18, 1945. H. G. STEINMETZ 2,385,039

DRAWING ROLL CLEANING MACHINE

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Fig. 1.

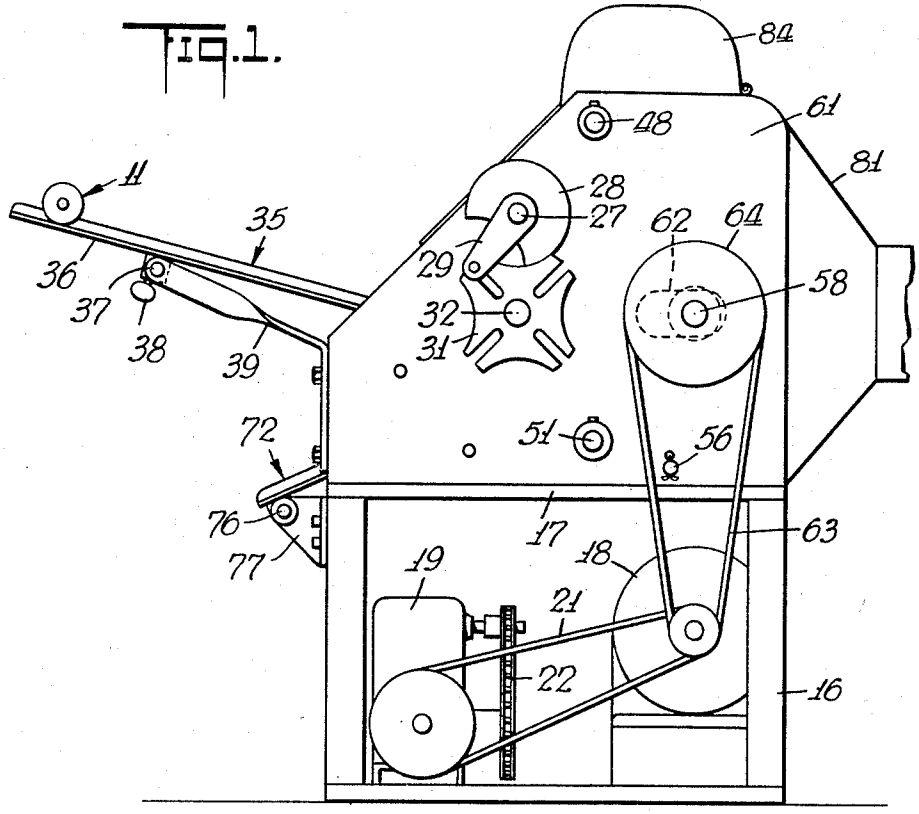
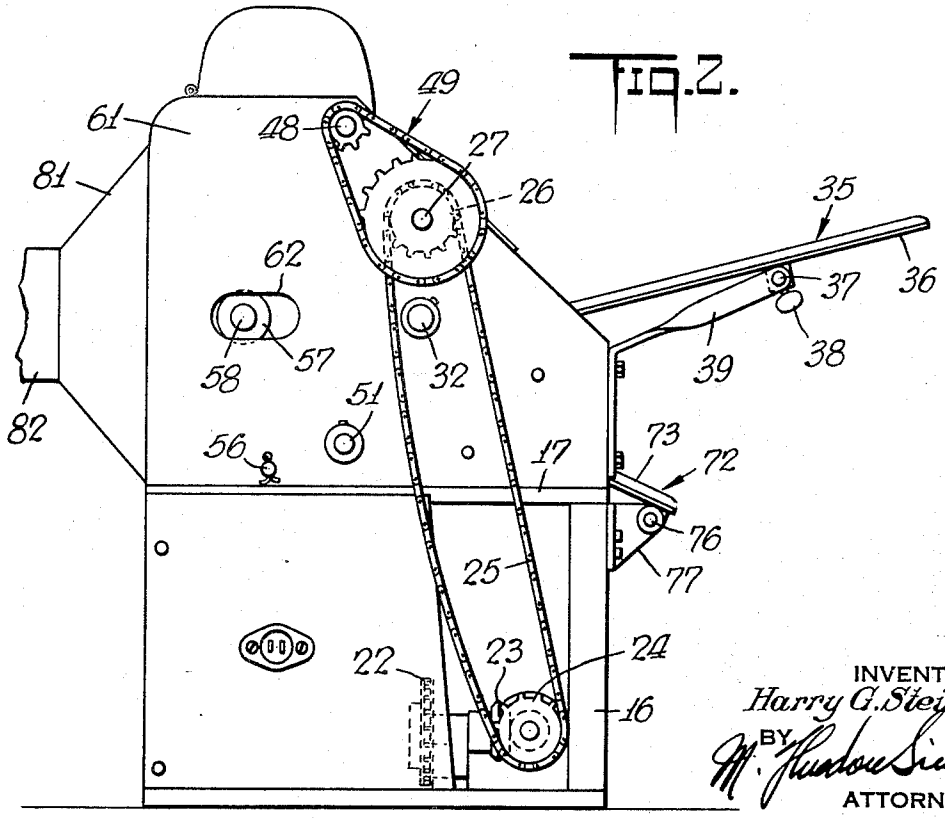


Fig. 2.



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FIG. 3.

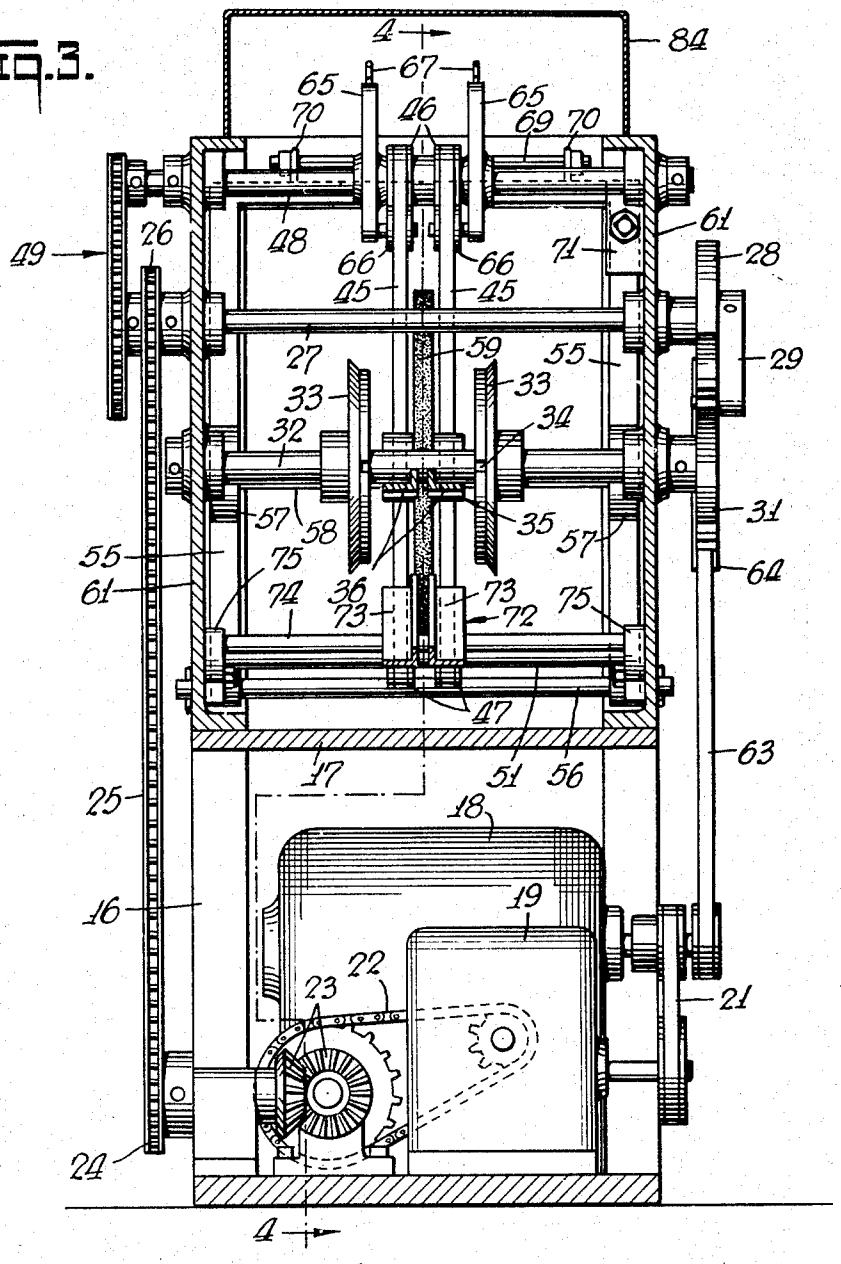
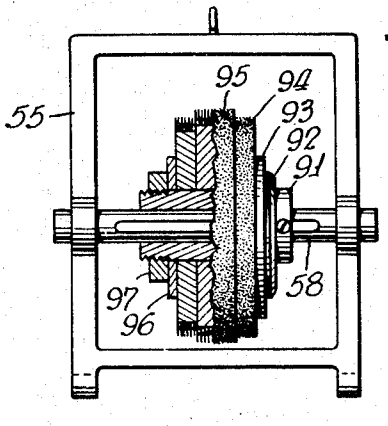


FIG. 6.



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Fig. 4.

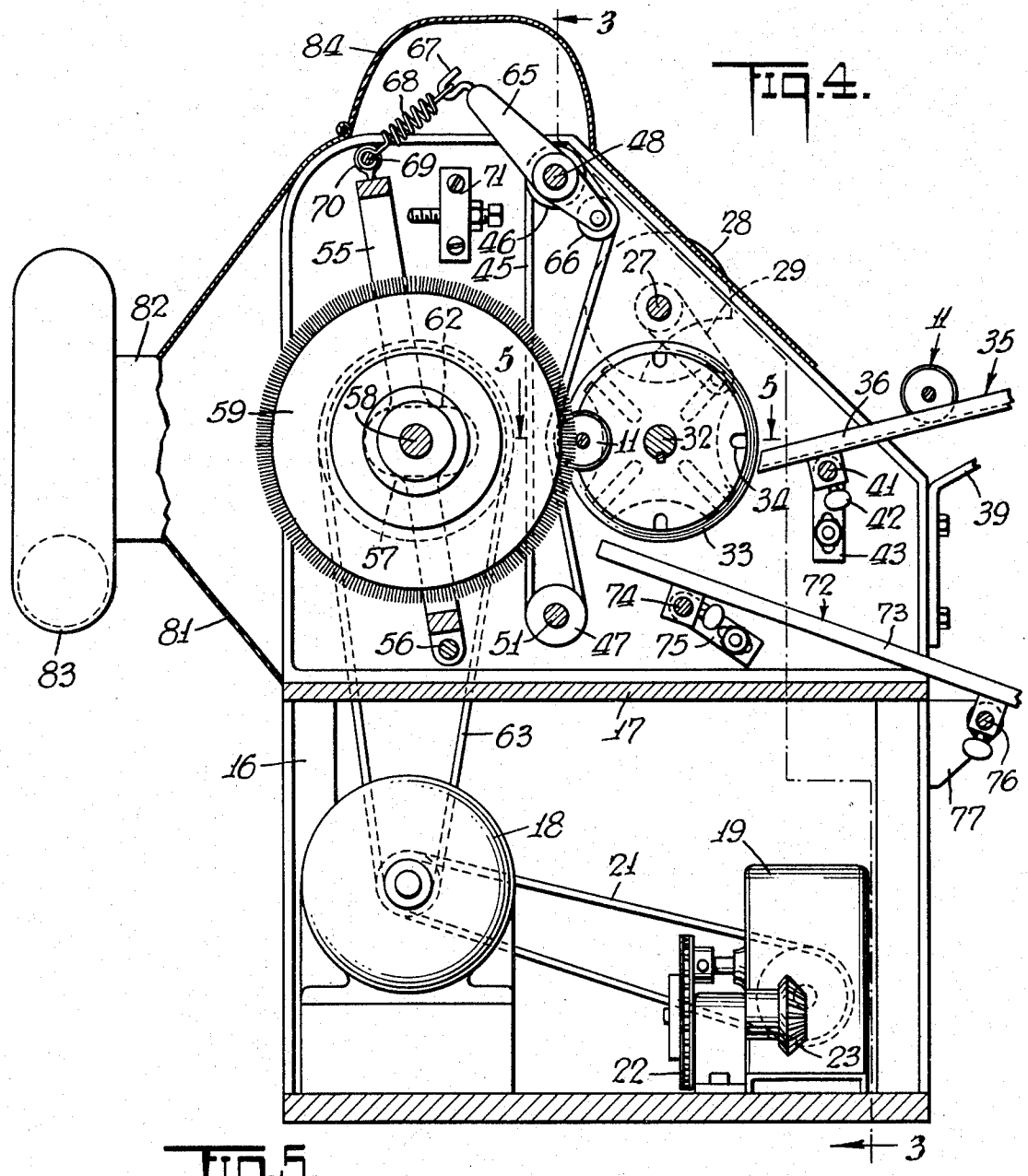
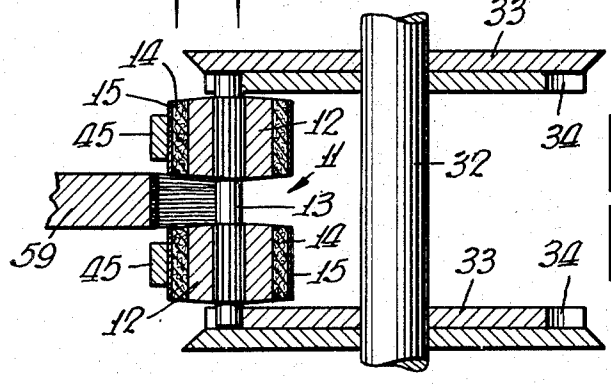


Fig. 5.



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Patented Sept. 18, 1945

2,385,039

UNITED STATES PATENT OFFICE

2,385,039

DRAWING ROLL CLEANING MACHINE

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Application February 20, 1943, Serial No. 476,612

10 Claims. (Cl. 15—21)

This invention relates to a machine for cleaning rollers, and more particularly to such a machine for cleaning drawing rolls of spinning machines.

This application is a continuation in part of my co-pending application Serial No. 440,035, filed April 22, 1942.

Drawing rolls usually consist of a pair of spaced apart rollers mounted fast upon a spindle, the outer ends of which project beyond the rollers. The perimeters of the rollers are covered by a felt or similar padding over which a strip of cellulosic material, such as parchment paper, may be applied. In use, lint and other dirt accumulates around the spindles of the rolls in various degrees of depth, hardness, compactness and matted condition, which occurs repeatedly before the rollers need to be re-covered. Such accumulations of dirt, etc., interfere with the proper operation of the spinning machine so that the rolls must be removed and cleaned periodically. This cleaning operation is difficult and has heretofore been done by hand, which consumes considerable time, is costly, and frequently results in injury to the person doing the cleaning as well as damage to the rolls.

It is one object of this invention to provide a machine for automatically cleaning spinning machine drawing rolls as they are fed thereto, and automatically discharge the cleaned rolls.

It is another object of this invention to provide a machine of the above indicated character which is readily adaptable at the factory or by the customer or user for cleaning the different sizes of drawing rolls normally encountered in a mill.

Further objects of this invention are to provide a machine of the above indicated character in which the drawing rolls are cleaned individually; in which the cleaning brush is operated at a much greater peripheral speed than the drawing roll during the cleaning operation; and to rotate the drawing rolls frictionally during the cleaning operation.

It is a still further object of this invention to provide a machine of the above indicated character in which the mounting for the cleaning brush is flexible so as to accommodate the brush to the varying cleaning conditions, and to protect the brush and mechanism from damage due to any faulty conditions of operation.

It is an even further object of this invention to provide a blower or similar mechanism for removing all lint, dirt, etc., from the mechanism continuously during the operation thereof.

It is an even further object of this invention to provide a machine which is rugged and simple in construction, economical to manufacture, and foolproof in operation.

Other and further objects of this invention will be understood from this specification taken in conjunction with the accompanying drawings, in which—

Fig. 1 and Fig. 2 are respectively side views of opposite sides of a cleaning machine constructed in accordance with this invention.

Fig. 3 is a front view of the machine of Figs. 1 and 2, parts being shown in section and some parts being omitted for the sake of clarity of illustration, the view being taken on the lines 3—3 of Fig. 4.

Fig. 4 is a central vertical section on the line 4—4 of Fig. 3.

Fig. 5 is an enlarged detail of the carrier for the drawing rolls, showing one of the drawing rolls in cleaning position and in cross section.

Fig. 6 is a detail view, partly in section, showing a modified construction of cleaning brush mounted in its supporting frame.

Referring first to Fig. 5, a drawing roll such as is cleaned in the machine of this application is shown at 11 as comprising a pair of spaced apart rollers 12 secured to a spindle 13. As seen, the ends of this spindle project beyond the rollers. Each roller has a felt covering 14 over which is a covering 15 of parchment paper or the like.

Referring now to the other figures of the drawings, the cleaning machine comprises a frame 16 having a transverse partition 17 which divides the same into upper and lower compartments. The lower compartment contains the motor 18, and a speed reducing mechanism 19, connected thereto by means of a belt 21. The speed reducer is connected by means of a chain and sprocket drive 22 to a pair of bevel gears 23 (Fig. 3) on the shaft of the outer one of which is mounted a sprocket 24 which, through chain 25 drives sprocket 26 that is fast upon transverse shaft 27 that is rotatably mounted in the frame in the upper compartment. On the opposite end of the shaft 27 from the sprocket 26 is mounted the disc 28 and crank 29 of a Geneva movement. The slotted star disc 31 of this Geneva movement is carried by a shaft 32, which is also journaled in the frame of the machine in the upper compartment, the Geneva movement functioning in the usual manner to produce a step by step movement of the shaft 32.

Mounted on the shaft 32 in the upper compartment are a pair of spaced apart carrier discs

33 which are adjustable along the shaft 32 to accommodate different widths of the drawing rolls, and are secured in their adjusted positions by any suitable means as, for example, by set screws. The inner faces of the discs 33 are provided with slots or sockets 34 projecting inwardly from the edges of the discs and spaced equally therearound, the slots in the respective discs being aligned laterally. In the present embodiment four such slots are used.

Extending forwardly from the vicinity of the discs 33 is an inclined feeder trackway 35 consisting of a pair of angle iron sections 36, having upturned portions which are on opposite sides of the center line of the trackway and serve to guide the drawing rolls 11 by engagement along the inner surfaces of the rollers 12. The angle iron sections 36 are supported adjacent their outer ends upon a transverse rod 37, to which they are adjustably secured by thumb screws 38, the rod being supported by a pair of brackets 39 that are mounted upon the frame of the machine. Near their inner ends the trackway sections are supported upon another transverse rod 41, to which they are also adjustably secured by thumb screws 42. Rod 41 is supported at each side of the frame by a slotted bracket 43 which is adjustable vertically, being held in adjusted position by a bolt, as shown in Fig. 4. In this manner, the trackway sections can be adjusted laterally and also vertically to accommodate the various widths and diameters of drawing rolls to bring the lowermost roll on the trackway into proper position so that the protruding ends of the spindle thereof will roll directly into one of the pair of slots 34 in the carrier discs 33 as the same are presented to this loading position.

The second following step of the Geneva movement will bring the drawing roll 11 to the cleaning position, shown in Fig. 4. In this position the perimeters of the rollers 12 are respectively engaged by one of a pair of endless belts 45 that are mounted upon upper and lower pulleys 46 and 47, respectively. The upper pulleys 46 are adjustably secured upon a shaft 48 that is driven by a sprocket and chain drive 49 (Fig. 3) from the continuously rotating shaft 27 of the Geneva movement. The driven lower pulleys 47 also are laterally adjustable upon their shaft 51, the adjustments of the belt pulleys being to properly position the same for wider or narrower drawing rolls, as the case may be.

It will be noted from Fig. 4 that the belts extend across the position of the drawing roll 11 in the cleaning position so that as the roll approaches that position it engages and deflects the belt strands to establish sufficient frictional contact between belts and drawing roll to rotate the latter by the travel of the belts, this being permitted by reason of the free mounting of the spindle of the drawing roll in the slots or sockets 34 of the carrier discs 33.

Mounted to the rear of the belt 45 is a swinging frame 55 that is pivoted at its lower end upon the pivot rod 56. Intermediate the top and bottom thereof, the frame has a hub 57 in which is mounted the transverse shaft 58. A rotary brush 59, preferably having wire teeth on the perimeter thereof, is detachably mounted upon the shaft 58 by means of a set screw, or similar fastening means. The frame 16 of the machine is covered on each side by means of plates 61, each of which is provided with a slot 62 through which the shaft 58 projects. The shaft 58 and slots 62 act to guide the frame in its forward and backward movements, as will be explained.

The shaft 58 is continuously driven by the motor 18 through the belt 63 and pulley 64 which is mounted on the shaft 58. The brush and frame move forwardly so that the wire bristles of the brush contact the spindle 13 between the rollers 12, as shown in Fig. 5, whenever a drawing roll 11 is in the cleaning position and the frame and brush move backwardly as the drawing roll is moved from the cleaning position and while a new roll is brought into the cleaning position. This moving is done by means of a resilient connection, about to be described, which also allows for the separation of the parts should any unusual situation arise that might result in damage to the brush or to the other mechanisms. A pair of levers 65 are pivotally mounted upon the shaft 48 of the upper belt pulley 46. At its lower end each lever carries an idler 66 that engages beneath each of the belts 56. At the upper ends the levers 65 each carry a hook 67 to which is fastened a coiled spring 68. At the other ends the coiled springs 68 fasten to a bar 69 that is carried in the eyes 70 on the top of the swinging brush frame 55. Thus, as the drawing roll 11 is brought to the cleaning position (Fig. 4) additional tension is placed upon the belt 45, which is transmitted through the idlers 66 and levers 65 to the coiled springs 68 that in turn pull the swinging frame 55 forwardly to bring the wire brush into position to thoroughly sweep the spindle 13. At times the accumulated matter on the spindle 13 has built up to a considerable extent but this spring tension insures that the wire teeth of the brush will move forwardly without damage as fast as the accumulated matter is removed and until the spindle is completely cleaned. An adjustable stop 71 is mounted on the side of the machine in position to be engaged by the frame 55, which stop prevents the brush from being moved so far forwardly as to damage the same on the spindle of the drawing roll being cleaned. As the Geneva movement makes the next step, the cleaned drawing roll is moved from the cleaning position and a new drawing roll is brought into that cleaning position.

As the cleaned roll leaves the cleaning position, it is free to drop out of the slots 34, which it does, on to a discharge trackway 72. This trackway also is formed of a pair of angle iron sections 73 similarly arranged to the sections 36 of the feed trackway. The angle iron sections 73 are adjustably supported upon a transverse rod 74 that in turn is mounted in slotted brackets 75, secured to the sides of the frame of the machine and adjustable so as to raise or lower the inner end of the discharge trackway 72 to accommodate drawing rolls of different diameters. The outer ends of the angle iron sections 73 are adjustably supported upon a transverse rod 76 and pivot thereupon in accordance with the adjustment of the brackets 75. The rod 76 is supported on the frame 16 by means of brackets 77. The angle iron sections 73 of the discharge trackway will be spaced laterally similarly to the feed trackway, so that the upturned portions thereof will act as guides on the inner surfaces of the rollers 12 for the different widths of drawing rolls.

The upper compartment is closed at its rear by a tapering section 81 which terminates in a throat 82 that connects with the eye of a blower type suction fan 83 that serves to withdraw all of the lint and dust from the compartment and mechanism as it is removed from the drawing

rolls, the blower communicating with any suitable place of waste disposal. The entire closing of the upper compartment, except for the openings for the two trackways, is completed by means of a hinged cover **84** that has a portion that extends down over the front of the machine between the side frames. This arrangement insures the removal of all the dirt, and yet the cover may be tilted back for the purpose of repair, replacement or adjustments, as needed.

Reference has been made in several places to the fact that drawing rolls of different widths and different diameters are used in spinning machines, and it is necessary that the apparatus be readily adaptable to these varying conditions. Furthermore, some of the spindles **13** have a step or shoulder between the rollers. It has been explained how the carrier discs **33**, the trackways and the belts **45** are laterally adjustable to accommodate the different sizes of drawing rolls. However, with more widely spaced rollers, a single brush such as illustrated at **59** will not be sufficient to clean the wider spindle space or an irregularly shaped spindle. For these purposes an arrangement such as shown in Fig. 6 may be provided. A hub **91** is secured upon the brush shaft **58**, the hub having a flange **92** near one end. A ring shaped plate **93** fits upon the hub and bears against the flange. The brush in this case is made up of multiple sections **94** and **95** of varying diameters as the case may be. On the opposite side of the brush sections a clamping plate **96** is placed upon the hub **91**, and the brush sections are clamped together by the nut **97** that engages the threaded outer end of the hub **91**.

All these various arrangements enable the user to quickly adapt the entire mechanism to use with the different sizes of drawing rolls that may be used in a mill; and similarly the manufacturer of the cleaning machine may quickly assemble a cleaning machine from a plurality of standard parts so as to meet the requirements of any particular mill.

The operation of the cleaning machine may be briefly described as follows:

Drawing rolls are placed upon the feeder trackway **35**, which is kept filled, and these rolls descend by gravity to the lower end of the trackway. Here the rolls are picked up one by one by the engagement of the ends of the spindles in the slots **34** of the carrier discs **33** as they rotate in a counterclockwise direction, the rotation being step by step under the action of the Geneva movement.

The rolls are carried to the cleaning position shown in Fig. 4 where the revolving brush **59**, or the brushes **94** and **95** of Fig. 6, clean the accumulations from the spindle in the space between the rollers. In this connection, it will be noted from the several drives that the peripheral speed of the brush, or brushes, is much greater than the peripheral speed of the rolls as they are rotated by the belts **45**, the ratio being of the order of ten to one, although other ratios may be used of this order and higher so as to produce the desired tearing action. The cleaning operation is completed by the time the Geneva movement turns the carrier discs another step, and as this further step is made, the cleaned roll drops onto the discharge trackway **72** along which it descends by gravity, falling into any suitable receptacle at the end of this trackway. Simultaneously as the cleaned drawing roll is carried away from the cleaning position another roll is carried to that position, and an empty set of slots **34** is brought to the feed position at the end of the feed trackway **35**. The flexible connection for moving the brush, or brushes, back and forth and tensioning the belt **45** has been described, as have the several drives and the arrangement for continuously removing the lint, etc., from the cleaning mechanism.

Modifications may be made in the arrangement and location of parts within the spirit and scope of my invention, and such modifications are intended to be covered by the appended claims.

I claim:

1. In a cleaning machine for spinning machine drawing rolls, a frame, a pair of rotary carrier discs having means for receiving a drawing roll and supporting the same during cleaning thereof, belt means for rotating the roll while being cleaned, rotary brush means engaging portions of the drawing roll to clean the same, means for tensioning the belt during the cleaning operation, such means being connected to the brush means so as to also move the same forwardly for the cleaning operation, and motor means having connections whereby the brush means is rotated and the belt means is moved.

2. In a cleaning machine for spinning machine drawing rolls, a main frame, a pair of rotary carrier discs having means for receiving a drawing roll and supporting the same during cleaning thereof, a pair of moving belts engaging the drawing roll to rotate the same while being cleaned, a pivoted frame, rotary brush means carried thereby and arranged to engage portions of the drawing roll to be cleaned, a belt tensioning means comprising a lever, a spring connection from the lever to the brush frame, the belt being further tensioned as the drawing roll is brought to cleaning position, the arrangement being such that the brush is brought into contact with the parts of the roll to be cleaned, and motor means having connections whereby the brush means is rotated and the belts are moved.

3. In a cleaning machine for spinning machine drawing rolls, a frame, a pair of carrier discs having slots within for receiving drawing rolls and supporting the same during cleaning thereof, means for rotating the carrier discs step by step, a feeder trackway along which the drawing rolls move by gravity into position to be picked up by the carrier discs to be carried to a cleaning position, means for rotating the roll while in the cleaning position, rotary brush means engaging portions of the drawing roll to be cleaned, motor means having connections whereby the brush means is rotated at a higher peripheral speed than the drawing roll, and a discharge trackway onto which the cleaned drawing rolls fall by gravity and along which they move by gravity to be discharged from the machine.

4. A cleaning machine for spinning machine drawing rolls, each drawing roll having a spindle, said machine comprising a frame, a shaft, means for rotating the same step by step, a pair of carrier discs mounted on the shaft having slots therein for receiving the spindle of a drawing roll and freely supporting the same during cleaning thereof, a feeder trackway presenting the drawing rolls in position to be picked up by the carrier discs and carried to a cleaning position, means for rotating the roll while being cleaned, rotary brush means engaging portions of the drawing roll to be cleaned, and a discharge for the cleaned rolls from said carrier.

5. A cleaning machine for spinning machine drawing rolls, each drawing roll having a spin-

die, comprising in combination, a frame, a shaft, means for rotating the same step by step, a pair of carrier discs mounted on the shaft having slots therein for receiving the spindle of a drawing roll and freely supporting the same during cleaning thereof, a feeder trackway presenting the drawing rolls in position to be picked up by the carrier discs and carried to a cleaning position, a moving belt mounted so as to be engaged by the drawing roll to rotate the roll as it is brought into cleaning position, rotary brush means engaging portions of the drawing roll while it is in the cleaning position, and a discharge for the cleaned rolls.

6. In a cleaning machine for spinning machine drawing rolls, each drawing roll having a spindle, a frame, a shaft, means for rotating the shaft step by step, a pair of carrier discs mounted on the shaft having slots therein for receiving the spindle of a drawing roll and freely supporting the same during cleaning thereof, a feeder trackway presenting the drawing rolls in position to be picked up by the carrier discs and carried to a cleaning position, a moving belt mounted so as to be engaged by the drawing roll to rotate the roll as it is brought into and while in cleaning position, rotary brush means engaging portions of the drawing roll to be cleaned, a connection whereby as the roll is brought to cleaning position the brush means is moved forwardly to clean the roll, and a discharge for the cleaned rolls.

7. In a cleaning machine for spinning machine drawing rolls, each drawing roll having a spindle, a frame, a shaft, means for rotating the same step by step, a pair of carrier discs mounted on the shaft having slots therein for receiving the spindle of a drawing roll and freely supporting the same during cleaning thereof, a feeder trackway presenting the drawing rolls in position to be picked up by the carrier discs and carried to a cleaning position, a moving belt mounted so as to be engaged by the drawing roll to rotate the roll as it is brought into cleaning position, rotary brush means engaging portions of the drawing roll to be cleaned, a discharge for the cleaned rolls, an enclosure for the cleaning mechanism, and blower means connected to the enclosure for removing from the machine the material cleaned from the drawing rolls.

8. In a cleaning machine for spinning machine drawing rolls, each drawing roll having a spindle, a frame, a shaft, means for rotating the same step by step, a pair of carrier discs mounted on the shaft having slots therein for receiving the spindle of a drawing roll and freely supporting the same during cleaning thereof, a feeder trackway presenting the drawing rolls in position to be picked up by the carrier discs and carried to a cleaning position, a pair of pulleys one of which is mounted on a continuously rotating shaft, an endless belt operated by said pulleys and extending into position to be engaged by the drawing roll to rotate the same as it is brought into cleaning position by the carrier discs, rotary brush means also mounted on a continuously rotating shaft, means for bringing the brush means into engagement with the drawing roll while in the cleaning position, the brush having a higher peripheral speed than the drawing roll while in the cleaning position, a motor having connections for rotating the several shafts, and a discharge for the cleaned rolls.

9. A machine for cleaning spinning machine drawing rolls, each roll comprising a spindle on which is mounted a pair of spaced apart rollers, said machine comprising a frame, a shaft, means for moving the shaft step by step, a pair of carrier discs having slots spaced around the periphery thereof, a trackway for feeding uncleaned drawing rolls to the slots in said discs, the discs carrying the drawing rolls to and supporting the same in a cleaning position, a moving belt mounted in said frame so as to move past the cleaning position and engaging the drawing roll in that position so as to rotate the same during the cleaning thereof, brush means mounted in said frame for reciprocating movement toward and from the roll that is in cleaning position, the brush means cleaning the area between the rollers of said drawing roll as it is moved forward and retreating as the cleaned roll is carried away from the cleaning position, a discharge means receiving the cleaned roll from said carrier discs, and a motor for operating the carrier disc shaft, the belt and the brush means, the brush having a greater peripheral speed than the roller in the cleaning position.

10. In a cleaning machine for spinning machine drawing rolls, a main frame, a pair of rotary carrier discs having means for receiving a drawing roll and supporting the same in a cleaning position, a moving belt engaging the drawing roll to rotate the same while being cleaned, the belt being tensioned by the roll in the cleaning position, brush means mounted in said frame for reciprocating movement toward and from the roll in the cleaning position, means actuated by the tensioned belt for moving the brush means toward the roll in the cleaning position, and motor means having connections for operating the carrier discs, the belt and the brush means.

HARRY G. STEINMETZ.

CERTIFICATE OF CORRECTION.

Patent No. 2,385,039. September 18, 1945.

HARRY G. STEINMETZ.

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction as follows: Page 3, second column, line 73, claim 4, for the words "for the" read --trackway receiving the--; and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 25th day of December, A. D. 1945.

Leslie Frazer

(Seal) First Assistant Commissioner of Patents.