

**Feb. 25, 1958**

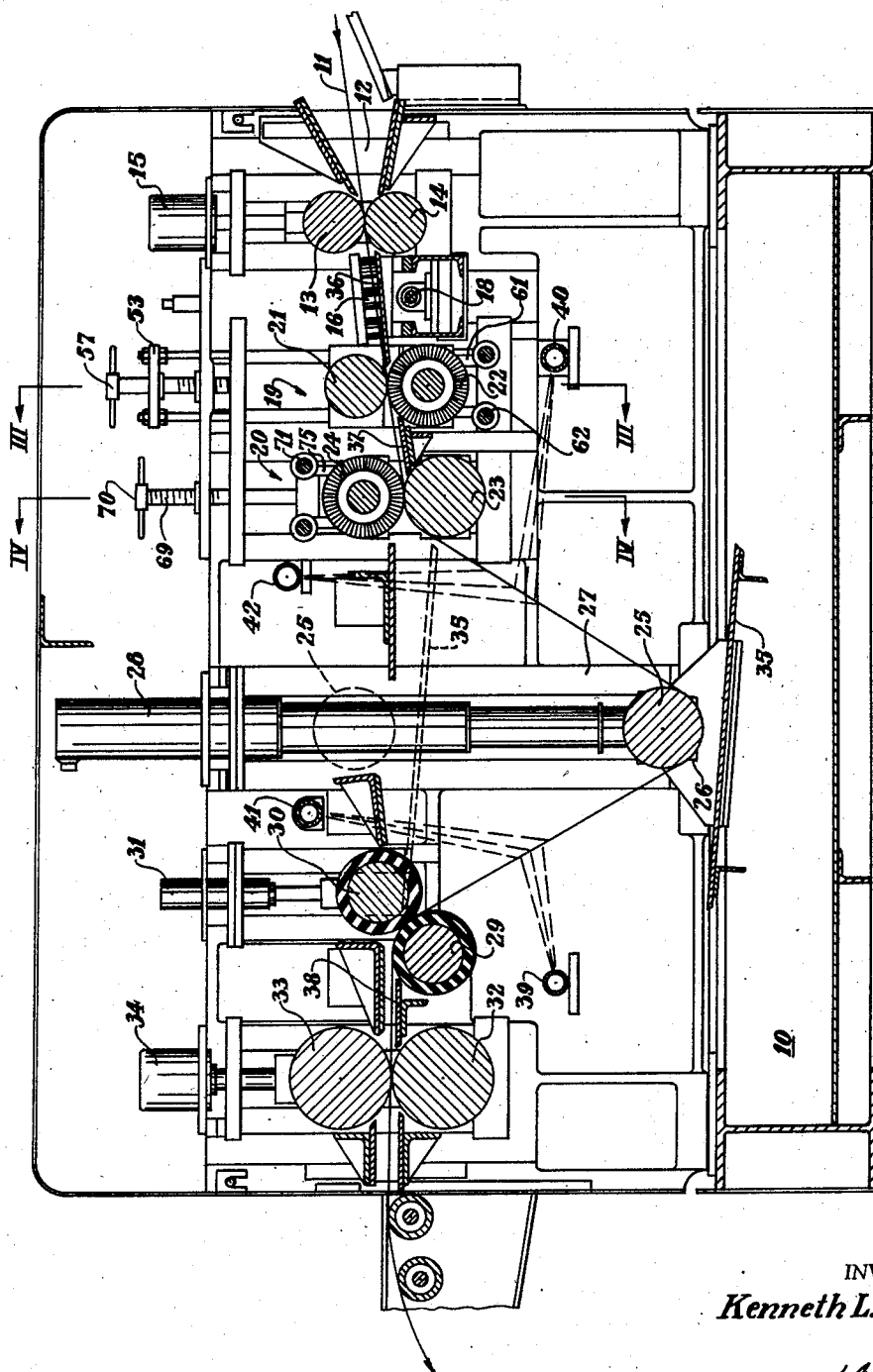
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**2,824,321**

# STRIP CLEANING AND PROCESSING MACHINE

Filed Aug. 9, 1954

5 Sheets-Sheet 1



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STRIP CLEANING AND PROCESSING MACHINE

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5 Sheets-Sheet 2

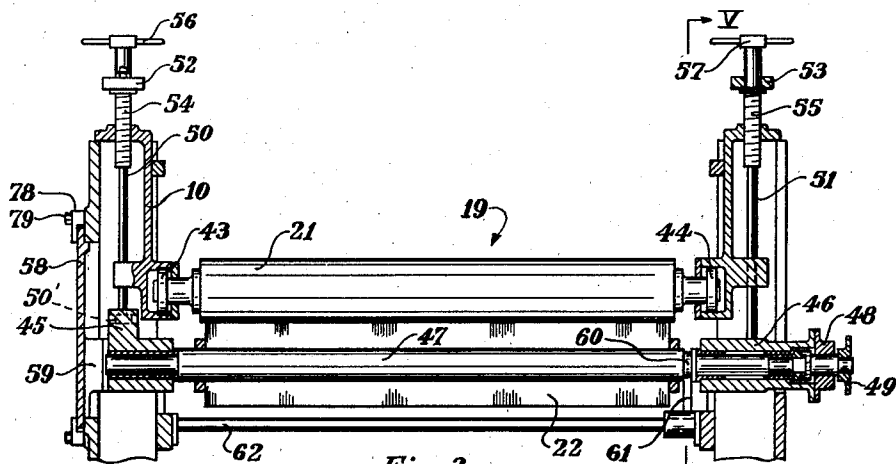


Fig. 3.

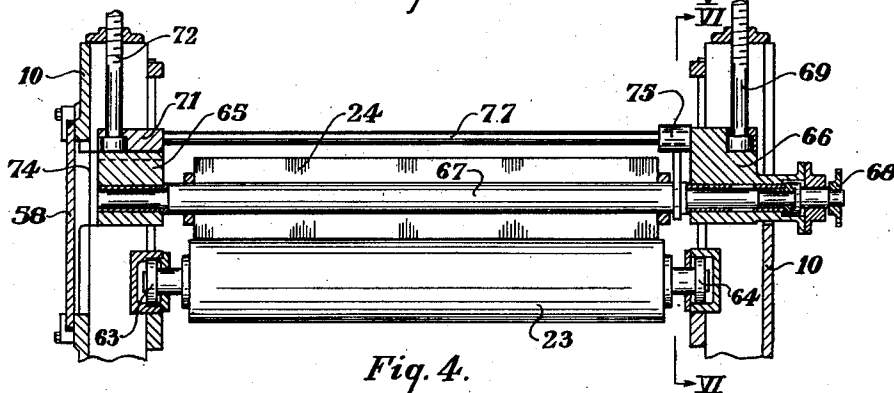


Fig. 4.

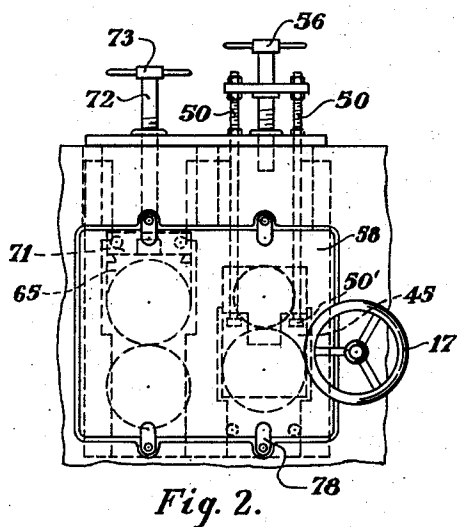


Fig. 2.

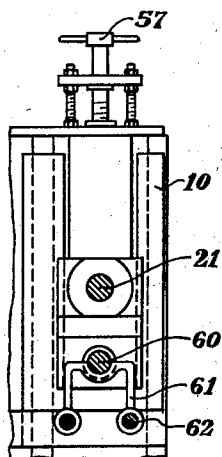


Fig. 5.

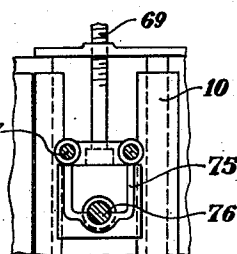


Fig. 6.

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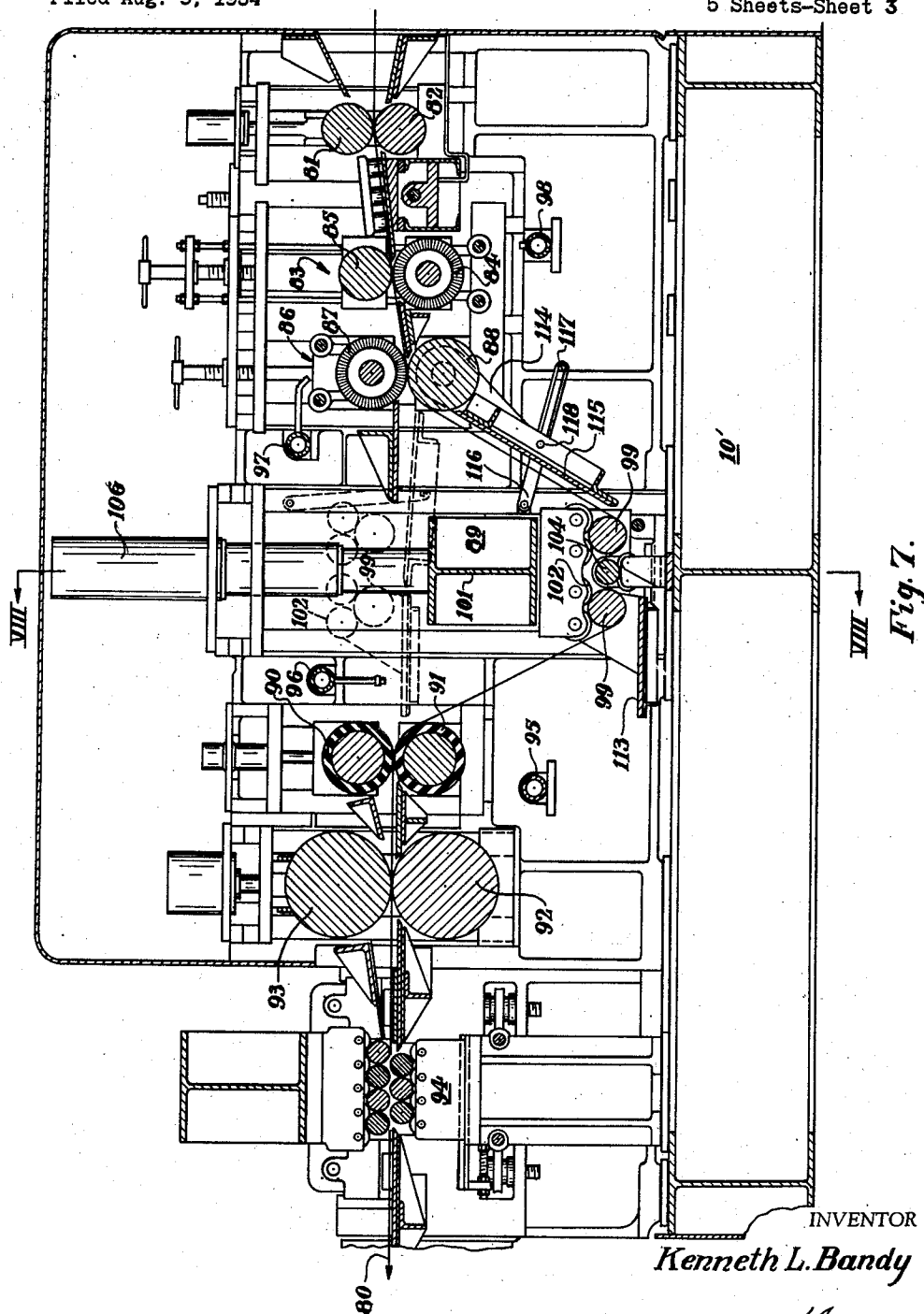
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5 Sheets-Sheet 3



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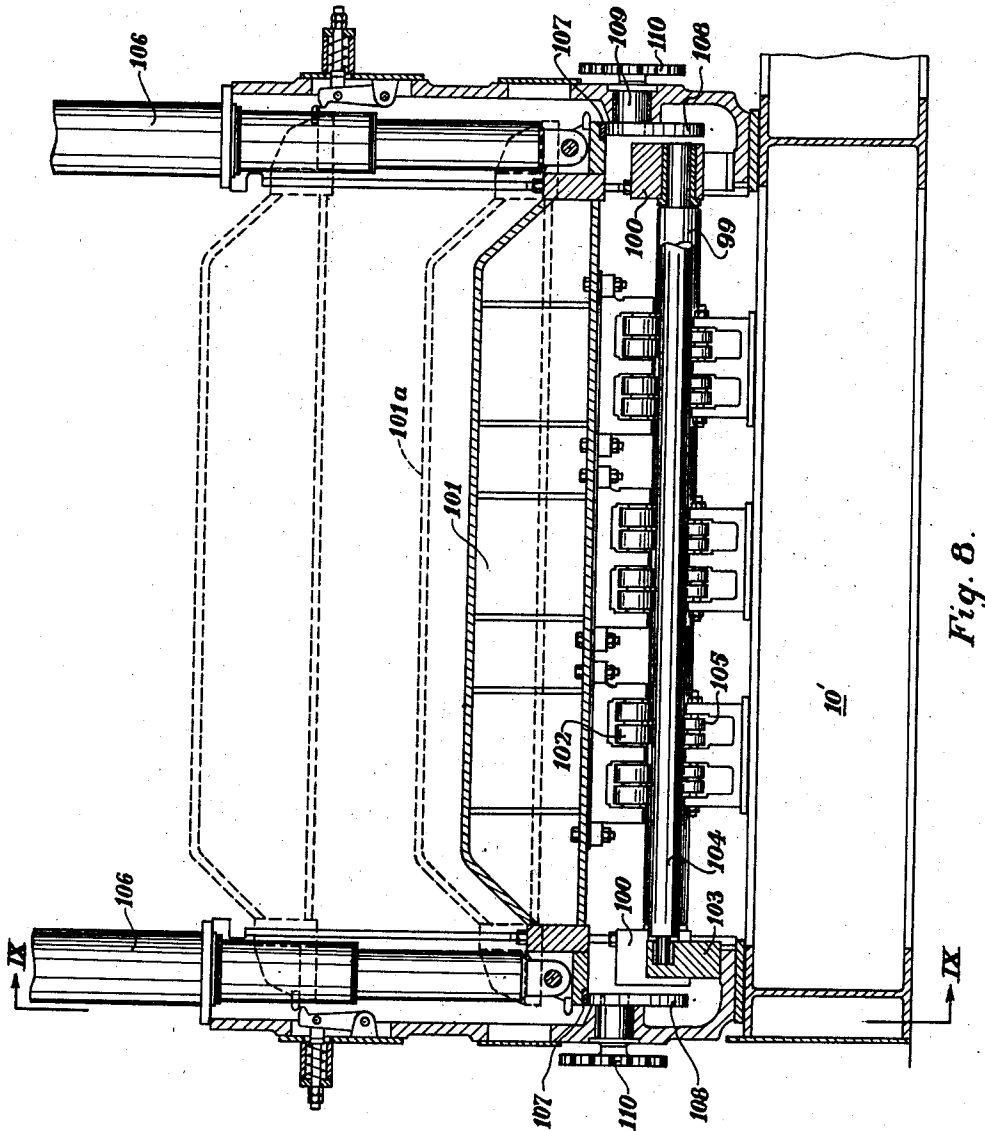
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5 Sheets-Sheet 4



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STRIP CLEANING AND PROCESSING MACHINE

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5 Sheets-Sheet 5

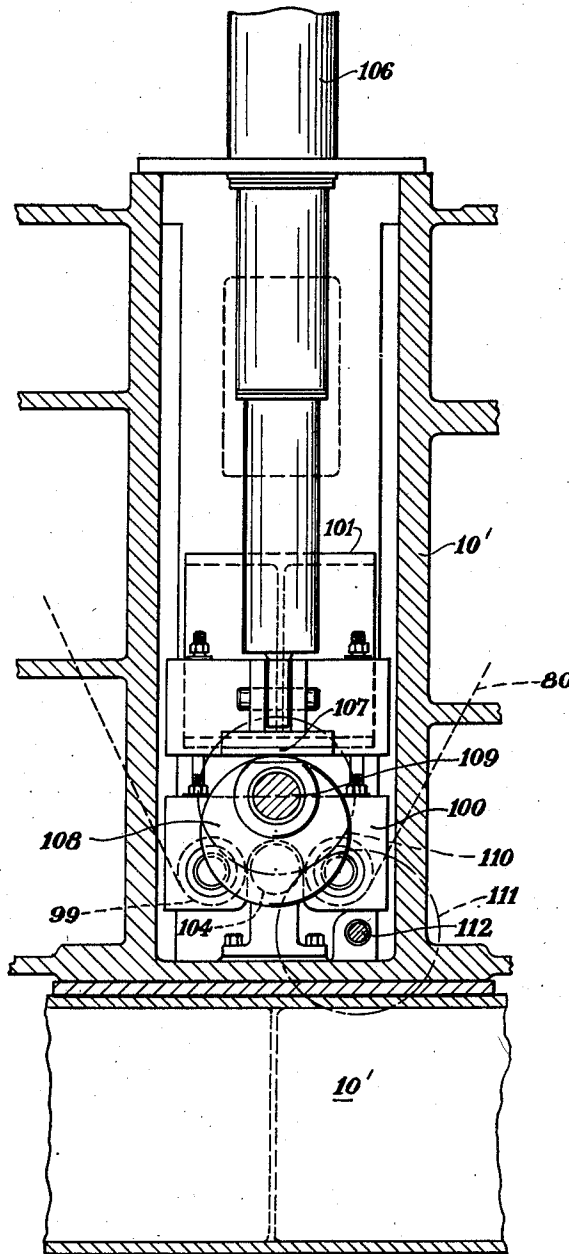


Fig. 9.

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## STRIP CLEANING AND PROCESSING MACHINE

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Application August 9, 1954, Serial No. 448,658

16 Claims. (Cl. 15—77)

The present invention relates to strip handling and processing equipment, and more particularly to an improved apparatus for incorporation into strip feeding lines and the like for the purpose of cleaning and processing the strip preparatory to performing other operations thereon, such as stamping and forming, for example.

As an overall object, the present invention seeks to provide a novel and improved apparatus for incorporation into a strip feeding line whereby the strip material may be continuously cleansed of dirt and other foreign matter in an improved and facilitated manner and with a minimum wastage of cleaning solutions.

The apparatus of the present invention has particular applicability to strip feeding lines of other than the continuous type; that is, to lines adapted for the feeding of coils of material one at a time, as distinguished from continuous feeding wherein the ends of succeeding coils are welded or otherwise joined so that the trailing end of a first coil draws the leading end of the next subsequent coil through the equipment. To this end, it is one of the primary objects of the invention to provide an improved strip cleaning machine which is arranged to cause the strip to travel through an essentially looped course, to facilitate cleaning, and which is provided with novel and improved arrangements for threading strip into the apparatus.

With further reference to the above object, the present invention contemplates the provision of an improved strip cleaning machine having a strip deflecting roll therein which may be fully retracted to facilitate threading of a length of strip into the apparatus in a straight line manner.

A more specific object of the invention is the provision of an improved strip cleaning machine having spaced pairs of rolls and a fully retractible deflecting roll positioned between such spaced pairs of rolls wherein novel means are provided for guiding and supporting the end of an incoming strip section between the said spaced pairs of rolls so that the strip may be threaded in a substantially straight line manner.

Yet another object of the invention is the provision of an improved strip cleaning machine having the above described characteristics wherein is incorporated a novel means including a retractible deflecting roll for flexing and processing strip material during its passage through the cleaning machine.

A further object of the invention is the provision in a strip cleaning machine having one or more expendable cleaning rolls therein of a novel arrangement for supporting such cleaning rolls so that the same may be readily removed and replaced when necessary. To this end the invention provides a novel cleaning roll supporting structure providing for removal and replacement of the cleaning or brush rolls in an axial direction, from the side of the machine proper, so that a minimum of time and effort is required.

The above and other objects of the invention will become apparent upon full consideration of the following

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detailed specification and accompanying drawing wherein there are shown certain preferred embodiments of my invention.

In the drawing:

Figure 1 is a longitudinal section view of a strip cleaning constructed in accordance with the teachings of my invention;

Figure 2 is a fragmentary side view of the apparatus of Figure 1 illustrating certain novel features thereof;

Figures 3 and 4 are fragmentary section views taken along lines III—III and IV—IV respectively of Figure 1;

Figure 5 is a fragmentary section view taken along line V—V of Figure 3;

Figure 6 is a fragmentary section view taken along line VI—VI of Figure 4;

Figure 7 is a longitudinal section view of a second embodiment of my improved strip cleaning machine having improved arrangements therein for processing strip during its passage through the machine;

Figure 8 is a fragmentary section view taken along line VIII—VIII of Figure 7; and

Figure 9 is an enlarged fragmentary section view taken along line IX—IX of Figure 8.

Referring now to the drawing, and initially to Figures 1—6 thereof, the reference numeral 10 designates generally a base and frame structure constituting a tank for the reception of a strip cleaning solution and having means therein for journaling a plurality of rolls which act in various capacities upon a length of strip 11 as will be described in detail.

At the forward end of the frame 10 there is an opening 12 to receive the strip 11. And positioned within the outlines of the frame, adjacent the opening 12, are threading rolls 13 and 14, the upper of the two rolls being vertically movable upon appropriate actuation of a cylinder 15 to facilitate initial insertion of the strip 11 into the machine. Located on the exit side of the threading rolls 13 and 14 are laterally spaced sets of guiding or centering rolls 16 which engage the side edges of the strip 11 to maintain the same in proper alignment with respect to the sides of the machine. A hand wheel 17 (Figure 2) and threaded operating shaft 18 may be provided to effect inward or outward adjusting movements of the sets of guide rolls 16 so that strip material of various sizes may be properly accommodated.

Journalled in the frame 10 at the exit side of the guide rolls 16 are spaced sets 19 and 20 of cleaning rolls or brushes which are arranged to act upon the lower and upper surfaces respectively of the strip 11 to scrub and abrade the same in the manner desired to remove scale and other foreign matter from such surfaces. The first set of cleaning rolls 19 comprises an upper backing roll 21 which is journalled in fixed relation in the frame 10, and a lower brush roll 22 which is adjustably journalled in the frame 10 for movement toward and away from the upper backing roll 21. The specific arrangement for mounting and journaling the brush roll 22 forms an important part of the present invention and will be discussed in detail in later parts of the description.

Closely adjacent the first mentioned set of cleaning rolls 19 is a second set 20 thereof comprising a lower backing roll 23, journalled in fixed relation in the frame 10, and an upper brush roll 24 journalled in adjustable relation in the frame. Thus, it will be apparent that as the strip 11 passes through the cleaning stations 19 and 20 both surfaces of the strip will be acted upon by the brush rolls 22 and 24. And, of course, there is provided suitable means not specifically shown for rotating the brush rolls at a relatively high speed and preferably in a direction opposite to that direction of strip travel so that an effective abrading action is obtained.

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Spaced somewhat from the second cleaning station 20 in the direction of strip travel is a deflecting roll 25 which is journaled at its ends in blocks 26 which in turn are guided for vertical movement with respect to the frame 10 by means of spaced tracks of ways 27. In the illustrated and preferred embodiment of the invention the blocks 26 are supported by means of fluid cylinders 28, positioned one on each side of the frame 10, so that by suitable actuation of the cylinders 28 the deflecting roll 25 may be moved from a position above the roll 23 to a position substantially below the same, the latter position being illustrated in Figure 1. Preferably the cylinders 28 are of the type having a plurality of telescopically arranged actuating members so that a large extending and retracting movement may be obtained while the overall assembly may be of a relatively compact nature.

Positioned in spaced relation to the deflecting roll 25, in the direction of strip travel, are resilient squeegee rolls 29 and 30, the upper one of which, at least, is movably mounted by means of cylinders 31. The rolls 29 and 30 are arranged to be moved into resilient pressure engagement with the upper and lower surfaces of the strip 11 to remove therefrom excess cleaning solution, as will be hereafter more fully described.

At the exit side of the machine there are provided upper and lower power driven pinch rolls 32 and 33, the upper one of which is carried by spaced actuating cylinders 34 so that the pinch rolls may be separated for threading, and subsequently brought into pressure engagement with the strip 11. Suitable power means, not specifically shown, are provided for driving the pinch rolls 32 and 33 to draw the strip 11 from a suitable uncoiling device, also not shown, and through the cleaning machine.

In accordance with the teachings of the invention there is mounted on the deflecting roll journaling blocks 26, below and in spaced relation to the deflecting roll 25, a strip supporting table or platform 35 which extends substantially between the ends of the roll 25 in a transverse direction, and substantially between the cleaning station 20 and the squeegee rolls 29 and 30 in a longitudinal direction. Thus, when the telescopic actuating cylinders 28 are fully retracted the strip supporting platform 35 is moved to the position shown in broken lines in Figure 1, wherein one longitudinal edge of the plate lies closely adjacent the lower roll 23 of cleaning station 20 while the forward longitudinal edge of the plate lies closely adjacent the lower squeegee roll 29. And preferably the platform 35 is inclined upwardly somewhat from its rear to its forward edge so that the forward edges lie close to the level of the upper edge of the lower squeegee roll 29 while the rear edge of the plate may be positioned somewhat below the upper edge of the backing roll 23.

Thus, in threading a new length of strip through the cleaning machine actuating cylinders 15, 28, 31 and 34 are initially retracted to move rolls 13, 25, 30 and 33 respectively into their upper positions. When the leading end of the strip is positioned between the threading rolls 13 and 14 the cylinder 15 is extended to bring rolls 13 and 14 into clamping engagement with the strip, and the rolls 13 and 14 are then rotated to cause the strip to progress through the machine.

A fixed guide plate 36 is positioned between threading rolls 13 and 14 and the first cleaning station 19 so that the strip is properly supported until it reaches and passes between brush roll 22 and its upper backing roll 21. Likewise, a fixed guide plate 37 is positioned between cleaning stations 19 and 20 so that the strip is properly oriented to pass between brush roll 24 and backing roll 23.

After the leading end of the strip passes through the second cleaning station 20 the end of the strip engages and is supported by the platform 35 as it passes under the upraised deflecting roll 25 and toward the squeegee rolls 29 and 30. The platform 35 supports the strip for movement along a generally horizontal path until it

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reaches the squeegee rolls, whereupon it is supported by the lower squeegee roll 29 and by a fixed supporting plate 38 as it progresses toward and through the power driven pinch rolls 32 and 33 and out of the machine on the exit side thereof.

After the strip passes through the pinch rolls 32 and 33, the pinch roll supporting cylinders 34 are extended to move the pinch rolls into pressure engagement with the strip, and power is applied to the pinch rolls to cause the strip 11 to be drawn through the machine in the manner desired. At this same time cylinders 31 and 28 are also actuated to move into extended positions so that the squeegee rolls 29 and 30 move into resilient pressure engagement with the strip 11 and the deflecting roll 25 moves into its illustrated extended position wherein the strip 11 is caused to move through a sharp V-shaped path between the second cleaning station 20 and the squeegee rolls 29 and 30.

Mounted in the frame 10, below the main pass line of the strip and positioned on each side of the deflecting roll 25, are transversely disposed conduits 39 and 40 having axially spaced side wall apertures directed toward the V-shaped path of strip travel. The conduits 39 and 40 connect with a suitable high pressure source of cleaning solution such as kerosene, for example, so that a plurality of high pressure streams of such solution are directed toward the lower surface of the strip to thoroughly cleanse the same of oil and loose foreign particles which remain on the strip after its passage through the cleaning brushes 22 and 24. Similarly, mounted above the main pass line of the strip on either side of the deflecting roll 25 are other transversely disposed apertured conduits 41 and 42 which are arranged to direct high pressure streams of cleaning fluid upon the upper surface of the strip 11, along the sides of the V-shaped path through which the strip is caused to pass.

Thus, it will be observed that the several high pressure streams of cleaning solution are directed upon the surfaces of the strip at points where the strip is inclined at a sharp angle. The arrangement is such that the cleaning solution readily flows downwardly toward the apex of the V and thence to the bottom of the frame 10, which comprises a suitable receptacle for the used solution. This greatly simplifies the handling of the solution inasmuch as it is self-draining, for the most part, and further in that the splash and spray of the high pressure streams is confined to the lower part of the tank, generally.

Such excess of cleaning solution as adheres to the surface of the strip as it passes through its V-shaped path is removed by the squeegee rolls 29 and 30.

During the cleaning process brush rolls 22 and 24 are rotated at high speed and in opposition to the direction of movement of the strip so that frequent replacement of the rolls is required. Accordingly, it is one of the more important objects of this invention to facilitate replacement of the brush rolls, and this aspect of the invention may be understood by reference to Figures 2-6 of the drawing.

Thus, in Figure 3 there are shown fragmentary portions of the main frame 10 wherein is journaled in fixed relation the upper backing roll 21 of the first cleaning station 19, suitable anti-friction bearings 43 and 44 being provided for this purpose. In the illustrated machine the backing roll 21 rotates freely as an idler roll.

Positioned below the bearings 43 and 44 and guided for vertical sliding movement in the frame 10 are bearing blocks 45 and 46 which are slidably received over outwardly extending end portions of a shaft 47 forming the body of the brush roll 22. One end of the shaft (the right hand end in Figure 3) is splined, as at 48, and has a slidable driving connection with a sprocket 49 which is driven by suitable means not shown.

To support the bearings 45 and 46 there are provided pairs of suspension rods 50 and 51 which are engaged through suitable yokes 52 and 53 with threaded shafts 54 and 55, operated by hand operated screw adjustments 56

After a length of strip is loaded into the machine of Figures 7-9 the cylinders 106 are energized to lower the roll assembly 89 toward the processing roll 104. The strip 80 is of course carried downwardly with the rolls 99, and when the strip contacts the processing roll 104, between the rolls 99, it is deformed upwardly so that the strip undergoes a series of reverse bends as it passes about the rolls 99 and 104. The arrangement is clearly shown in Figure 7.

Depending upon the nature and condition of the material to be cleaned and processed it may be desirable to flex the strip 80 through a relatively severe reverse bend or to provide for little or no reverse flexing. To this end I provide adjustable abutment means to limit the downward movement of the deflecting roll assembly 89 to a predetermined level with respect to the fixed processing roll 104. Thus, referring to Figures 8 and 9, it will be observed that the heavy cross beam member 101 is provided at its outer ends with abutment surfaces 107 which are adapted to engage adjustable abutment cams 108 which are mounted upon the frame 10'. The cams 108, as shown in Figure 9, are generally circular in shape but are eccentrically mounted on shafts 109, so that upon rotation of the shafts 109 the cams 108 present abutment surfaces at varying distances from the axis of the processing roll 104. And when the cylinders 106 are energized to lower the deflector roll assembly 89 the surfaces 107 engage the cams 108 in their preadjusted positions so that the deflecting rolls 99 are positioned in high or low relation to the processing roll 104. In Figure 8 the deflecting roll assembly is illustrated in its lower position, in solid lines, while at 101a in broken lines, the cross beam 101 is illustrated in its uppermost adjusted limit position, corresponding to its position when the cams 108 are rotated to a position 180 degrees from that illustrated in Figure 9.

For setting the abutment cams 108 in desired position there is mounted on the outer end of each of the cam supporting shafts 109 a gear 110 which meshes with a similar gear 111 (Figure 9). The gears 111 are keyed to a common shaft 112 so that movements of the cams 108 are mechanically interlocked to assure that the cams are at all times in identical adjusted positions. Suitable power or manual means, not shown, are provided to rotate the shaft 112 to effect adjustment of the cams 108 when desired.

As in the embodiment of Figures 1-6 it is desired, in accordance with the teachings of the invention, to provide means to support the strip 80 on a relatively level plane as it passes from the second cleaning station 86 to the squeegee rolls 90 and 91 during threading of a new length of material into the machine. However, whereas in the embodiment of Figures 1-6 a supporting plate or platform 35 is positioned beneath the deflector roll 25 and is arranged to extend substantially over the whole of the span between the last cleaning station 19 and the squeegee rolls 29 and 30, this same arrangement is not practical in the embodiment of Figures 7-9 since the processing roll 104 would interfere with a full span platform. Accordingly, I have provided a partially retractible strip supporting platform which is actuated by or concurrently with movements of the deflector roll assembly 89 so that as the assembly 89 is moved downwardly the strip supporting platform is retracted to the extent necessary to avoid interference with the processing roll 104.

Referring to Figure 7, there is secured in fixed relation to the roll assembly 89 a strip supporting member 113 which is positioned below the forwardmost of the deflecting rolls 99 and arranged to extend substantially from the rearward edge of the squeegee roll 91 to the forward edge of the processing roll 104. The arrangement, however, is such that there is ample clearance between the strip supporting member 113 and the processing roll 104 so that the former may move past the latter as

the deflecting roll assembly 89 moves into its lowermost position.

Pivoted about the axis of the lower back-up roll 88 of the second cleaning station 86 are spaced brackets 114 which mount a second strip supporting plate or member 115 for pivotal movement about the axis of the roll 88 between a substantially horizontal position and a retracted position wherein the member 115 is disposed in a downwardly inclined position, at the rearward side of the deflecting roll assembly 89, as illustrated in Figure 7.

Interconnecting the roll assembly 89 and the strip supporting member 115 are spaced links 116 having elongated slots 117 therein which engage pins 118. The arrangement is such that when the roll assembly is retracted upwardly into the position shown in broken lines in Figure 7 the links 116 draw the strip supporting member upwardly into a substantially horizontal position, as also indicated by broken lines in Figure 7, so that the member 115 extends substantially from the forward edge of the roll 88 to the rearward edge of the first described strip supporting member 113. Thus, when the roll assembly 89 is in its uppermost retracted position the strip supporting members 113 and 115 conjointly define a substantially continuous strip supporting platform extending over substantially the whole of the span between the last cleaning station 86 and the squeegee rolls 90 and 91, all in accordance with the desired objects of the invention. The elongated slots 117 in the links 118 provide for lost motion in the interconnection between the roll assembly 89 and the strip supporting member 115 since the downward movement of the assembly 89 is more than sufficient to retract the member 115 to the extent required.

It should thus be apparent that I have accomplished the several objects initially set forth. The within invention provides a highly improved apparatus for cleaning and processing strip material preparatory to performing other operations thereon such as stamping and forming and the like. As strip passes through the machine it is thoroughly brushed and abraded on both principal surfaces and then subjected to high pressure streams of cleaning solution. One of the improved features of the apparatus resides in the provision of means to deflect the strip material into a V-shaped path, in combination with other means to direct high pressure streams of cleaning solution toward the sharply inclined sides of the V so that the cleaning solution readily drains off of the surface of the material, at least to the extent that upon subsequent passage of the strip material through a pair of squeegee rolls a thorough removal of the solution from the surface of the strip is assured.

Another novel feature of the apparatus is the provision of a retractible deflecting roll whereby strip sections may be easily threaded into the cleaning apparatus in a substantially straight line manner. And, of course, this aspect of the invention includes the provision of strip supporting platform means which are automatically moved into position upon retraction of the deflecting roll so that a new strip section is adequately supported during threading thereof into the machine.

In connection with the above, the invention includes a further novel and improved arrangement wherein a pair of retractible deflecting rolls are provided in combination with a fixed processing roll whereby when the deflecting rolls are moved into an extended or operative position the strip is caused to pass in a reverse bend about the deflecting and processing rolls to effect a desired working of the material.

Another novel feature of the invention is the provision of a novel brush roll supporting structure including quickly accessible and easily removable bearings and axially removable rolls, combined with a novel arrangement for supporting the non-accessible end of the rolls during axial withdrawal thereof so that a minimum of time and man-power effort is required to effect a quick removal and replacement of worn brush rolls.

and 57 respectively. By rotation of members 56 and 57 the yokes 52 and 53, and consequently the bearings 45 and 46 may be raised or lowered to bring the brush roll 22 into a desired relation to the backup roll 21 therefor.

At the left hand side of the frame 10 there is provided a removable door 58, having a projecting boss 59 thereon which engages the outer face of the left hand bearing 45 and maintains the same in position in the frame 10. However, upon removal of the door 58 the bearing 45 is exposed at the side of the frame.

In accordance with the preferred teachings of the invention the rods 50 are provided with enlarged heads 50' at their lower ends (see Figure 2) which are received in T-shaped slots in upper portion of the bearing block 45. Thus, upon removal of the door 58, and exposure of the block 45, the latter may be removed from the assembly by merely sliding the block 45 outwardly of the frame, free of the rods 20 and shaft 47.

Also in accordance with the teachings of the invention the shaft 47 is provided adjacent its right hand end portion with a reduced portion 60, about the lower side of which is received a supporting member 61 (see Figure 5) having a semi-circular recess along its upper edge. The supporting member extends downwardly of the shaft 47 and is slidably supported by spaced transversely disposed rods 62 for movement from one side to the other of the frame 10.

Thus, in replacing the brush roll 22 the bearings 45 and 46 are first lowered through appropriate manipulation of hand adjustments 56 and 57 until the shaft 47 is supported at its right hand end on the member 61. The door 58 and bearing block 45 are then removed, and the entire brush roll 22 is drawn axially to the left, out of the bearing 46 and out through the opening provided by the removed door 58. As the roll 22 is drawn to the left the member 61 continuously supports the right hand end portion of the roll so that intricate crane or hoist manipulation is not required at any stage of the operation.

When the supporting member 61 comes to the end of its travel at the left hand side of the frame 10 the roll 22 may be easily lifted bodily out of the machine.

To install a new brush roll a reverse procedure is employed. And it will be at once apparent that the entire sequence of operations may be carried out in an absolute minimum of time, with a minimum of manpower, and with little or no auxiliary power equipment such as hoists and cranes, for example.

In Figure 4 there is shown the brush roll supporting arrangement for the second cleaning station 20, wherein the brush roll 24 is positioned above the back-up roll 23. The back-up roll 23 is, of course, fixedly journaled in the frame 10 by anti-friction bearings 63 and 64, while the brush roll 24 is journaled in vertically movable bearing blocks 65 and 66. The right hand bearing block 66 slidably receives the splined end of the brush roll shaft 67, and carries a sprocket 68 having a splined driving connection with the shaft 67 and also having driving connection with a suitable driving means not shown.

To support the right hand bearing block 66 there is provided a rod 69 which threadedly engages the frame 10 and has a rotatable connection with the block 66. At the upper end of the rod 69 there is a hand operated adjustment 70 (see Figure 1), and upon suitable rotation of the adjustment 70 the block 66 is raised or lowered to adjust the position of the shaft 67 in the manner desired.

Above the left hand bearing block 65 there is positioned a supporting pad 71 which has slidable interlocking engagement with the block 65 and which has a rotatable connection with a rod 72 which threadedly engages the frame 10. A hand operated adjustment 73 (Figure 2) is connected to the rod 72 so that the same may be easily manipulated to raise or lower the pad 71 and bearing block 65 as desired.

Adjacent the outer side of the bearing block 65 there is provided a boss or abutment 74 which extends inwardly from the door 58 and which serves to retain the block 65 in its operative roll-supporting position. However, upon removal of the door 58 the bearing block 65 may be removed outwardly through the thus exposed opening and thereby disconnected from the shaft 67 and supporting pad 71. At this time the brush roll 24 may be withdrawn axially out of the side opening in the frame 10 in the same manner as described with respect to the brush roll 22.

To support the right hand end of the brush roll 24 during axial withdrawal of the same from the machine there is provided a U-shaped supporting member 75 (see Figure 6) having a semi-circular recess in its lower side for the reception of a reduced diameter portion 76 of the shaft 67. The supporting member 75 is in turn slidably supported upon spaced transversely extending rods 77 which are anchored at their ends in the bearing block 66 and in the pad 71.

To facilitate removal and replacement of the door 58 there are provided a plurality of pivotally mounted latches or keepers 78 secured to the frame 10 by bolts 79. The keepers 78 engage the door 58 at various points about its outer edge to retain it in its normal closed position, but by merely loosening the bolts 79 and swinging the keepers 78 to the side the door 58 may be quickly removed.

Referring now to Figures 7-9 of the drawing, there is shown a second embodiment of my invention incorporating further novel features for the purpose of working and processing strip, as well as cleaning the same, as it passes through the machine. In many respects the machine of Figures 7-9 is similar to that of Figures 1-6, and where such similarity exists it will be readily apparent and the description herein will be of a brief and general nature.

Thus, in Figure 7 there is shown a cleaning machine comprising a main frame 10' mounting, in the order of the direction of travel of the strip material 80, a pair of threading rolls 81 and 82, a first cleaning station 83 having a lower brush roll 84 and upper back-up roll 85, a second cleaning station 86 having an upper brush roll 87 and a lower back-up roll 88, a strip deflecting roll assembly 89, to be further described, a pair of squeegee rolls 90 and 91, a pair of power driven pinch rolls 92 and 93, and a processing roller leveler 94. As in the machine of Figures 1-6 a plurality of apertured conduits 95-98 are provided to direct high pressure streams of cleaning fluid toward the upper and lower surfaces of the strip 80.

In accordance with the teachings of the invention the strip deflecting roll assembly 89 comprises a pair of transversely disposed spaced deflecting and processing rolls 99 which are supported at their ends by means of bearing blocks 100. The blocks 100 are in turn supported from a heavy cross beam member 101 which may be in the form of a heavy I-beam member and which has mounted at spaced points along its lower flange a plurality of sets of back-up rollers 102.

Mounted upon the base of the frame 10' and journaled at its ends in bearings 103 is a processing roll 104 which is located between the axes of the deflecting rolls 99. A plurality of back-up rollers 105 are also secured to the base of the frame for the purpose of supporting the processing roll 104 over its entire axial extent.

Having particular reference to Figure 8, it will be observed that the cross beam 101 is connected at its ends to telescopically arranged fluid cylinders 106 by means of which the cross beam and deflecting rolls may be raised and lowered between strip loading or threading and strip cleaning and processing positions. In Figure 7 the deflecting roll assembly is shown principally in a strip cleaning and processing position, and is shown in broken lines in its upper or strip loading position.

It should be understood, however, that the several embodiments herein illustrated and specifically described are intended to be illustrative only, as many changes and alterations may be made therein within the clear teachings of the invention. Reference should therefore be had to the following appended claims in determining the full scope of the invention.

I claim:

1. In a strip cleaning machine the combination of a frame having means therein for guiding and confining moving strip material, said means therein including spaced roll means defining a relative horizontal path of movement of said strip material, second roll means mounted in said frame between said spaced roll means, said second roll means comprising a thin diametered processing roll and a pair of spaced parallel small diametered deflecting rolls, said processing roll being positioned in parallel relation to and centrally located between the axes of said deflecting rolls in nesting relation therewith, means to vertically separate said processing roll and deflecting rolls to opposite sides of said horizontal path whereby strip material may be threaded through said spaced roll means and thereafter to close said rolls whereby said strip may be deflected from said first path of movement and caused to be flexed in a reverse bend about said deflecting rolls and said processing roll.

2. In a strip cleaning machine the combination of a frame, a first roll journaled in said frame for supporting and guiding moving strip material, a second roll journaled in said frame and spaced substantially forwardly of said first roll, said first and second rolls defining a relatively horizontal path of movement for said strip, a third roll mounted in said frame between said first and second rolls, means to move said third roll in a vertical direction from a position above said path to a position substantially below said path, said rolls defining a V-shaped path for said strip with said third roll positioned substantially below said first mentioned path, a strip supporting platform carried in fixed relation to said third roll, said platform being positioned below and in spaced relation to said third roll and having a longitudinal dimension substantially equal to the distance between said first and second rolls, the arrangement being such that when said third roll is moved to a position above said first mentioned path said platform is positioned substantially along said path whereby to support strip material moving from said first to said second roll, and means to direct streams of cleaning solution upon the surfaces of said strip as the same passes through said V-shaped path.

3. In a strip cleaning machine the combination of a frame, a first roll journaled in said frame for supporting and guiding moving strip material, a second roll journaled in said frame and spaced substantially forwardly of said first roll, said first and second rolls defining a relatively horizontal path of movement for said strip, a third roll mounted in said frame between said first and second rolls, means to move said third roll in a vertical direction from a position above said path to a position substantially below said path, said rolls defining a V-shaped path for said strip when said third roll is positioned substantially below said first mentioned path, strip supporting platform means movably positioned within said frame, means to move said platform means into strip supporting position substantially along said first mentioned path and extending substantially between said first and second rolls when said third roll is positioned above said first mentioned path, and means to move said platform means into a retracted position clear of said first mentioned and V-shaped paths when said third roll is positioned below said first mentioned path, and means to direct streams of cleaning solution upon the surfaces of said strip as the same passes through said V-shaped path.

4. Apparatus according to claim 3 further characterized by said platform means including a member pivotally mounted on said frame and interconnected with said third roll whereby upon movement of said third roll to a posi-

tion above said first mentioned path said member is pivoted into strip supporting position and upon movement of said third roll to a position below said first mentioned path said member is pivoted into said retracted position.

5. In a strip cleaning machine the combination of a frame, a first roll journaled in said frame for supporting and guiding moving strip material, a second roll journaled in said frame and spaced substantially forwardly of said first roll, said first and second rolls defining a first path of movement for said strip, strip deflecting means mounted in said frame between said first and second rolls, means to move said strip deflecting means from a first position above said path to a second position substantially below said path, retractable means movable into a position below said path when said strip deflecting means is in said first position for supporting strip material moving from said first to said second roll, said strip deflecting means comprising a pair of spaced parallel deflecting rolls, a processing roll journaled in said frame substantially below said path, and said processing roll being positioned in parallel relation to and centrally located between the axes of said deflecting rolls whereby upon movement of said strip deflecting means into said second position said strip is caused to be flexed in a reverse bend about said deflecting rolls and said processing roll.

6. Apparatus according to claim 5 further characterized in that said retractable means comprises a pivotal member operative when said deflecting rolls are moved toward said second position to pivot into retracted relation to said deflecting rolls and said processing rolls.

7. Apparatus according to claim 5 further including adjustable means to limit the movement of said deflecting rolls toward said second position whereby the severity of said reverse bend may be regulated.

8. Apparatus according to claim 7 further characterized by said adjustable means comprising abutment cam means, and means to rotate said cam means to provide an adjustable abutment stop for said deflecting rolls.

9. In a strip cleaning machine having a frame, a power driven brush roll, and means to journal said brush roll in said frame; the improvement in said brush roll and said means to journal comprising a supporting shaft for said brush roll having axial spline means at one end, a first bearing block at one side of said frame for slidably and rotatably receiving said one end, said bearing block including means for drivingly engaging said spline means, a second bearing block at the other side of said frame for slidable reception over the other end of said supporting shaft, means to retain said second bearing block in said frame comprising a removable portion of said frame positioned on the outer axial side of said second bearing block whereby upon removal of said portion said second bearing block may be removed axially from said shaft, and means independent of said bearing means to support said one end of said shaft in substantially all axial positions of the same within said frame, the arrangement being such that upon removal of said portion and said second bearing block said brush roll may be removed axially from said other side of said frame with continuous support being provided for said one end of said shaft.

10. Apparatus according to claim 9 further characterized in that said means to support comprises a guide rod positioned parallel to and adjacent said brush roll, and means slidable on said guide rod and supportably engaging said shaft adjacent its said one end.

11. Apparatus according to claim 9 further characterized in that said removable portion comprises a door forming part of the side wall of said frame, and means on said door having abutting relation to said second bearing block whereby to retain the same in operative position when said door is attached to said frame.

12. In a machine having a frame, a roll, and means to journal said roll in said frame; the improvement in said means to journal comprising a first bearing block at one

side of said frame for slidably and rotatably receiving one end portion of said roll, a second bearing block at the other side of said frame for slidable reception over the other end portion of said roll, means to retain said second bearing block in said frame comprising a removable portion of said frame positioned on the outer axial side of said second bearing block whereby upon removal of said portion said second bearing block may be removed axially from said shaft, and means independent of said bearing means to support said one end portion of said roll in substantially all axial positions of the same in said frame, the arrangement being such that upon removal of said portion and said second bearing block said roll may be removed axially from said other side of said frame with continuous support being provided for the said one end portion of said roll.

13. Apparatus according to claim 12 further including means to adjust the position of said roll transversely of its axis comprising adjusting means engaging said frame and said bearing blocks, said adjusting means having slidable engagement with said second bearing block to permit removal of the same axially of said roll.

14. Apparatus according to claim 13 further characterized by said adjusting means comprising a threaded member engaging said frame, a supporting pad connecting said adjusting means and said second bearing block, and said supporting pad having slidable interconnection with said second bearing block.

15. In a machine having a frame, a roll, and means to

journal said roll in said frame; the improvement in said means to journal comprising a first bearing block at one side of said frame for slidably and rotatably receiving one end portion of said roll, a second bearing block at the other side of said frame for slidable reception over the other end portion of said roll, removable means to retain said second bearing block in said frame, and means to support said one end portion of said roll in substantially all axial positions of the same within said frame, said frame having an opening therein in said other side for the axial withdrawal of said roll therethrough, the arrangement being such that upon removal of said second bearing block said roll may be removed axially from said other side of said frame with continuous support being provided for the said one end portion of said roll.

16. Apparatus according to claim 15 further characterized by said means to support comprising a member slidable axially of said roll in parallel relation thereto and having supporting engagement with said roll adjacent the said one end portion thereof.

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