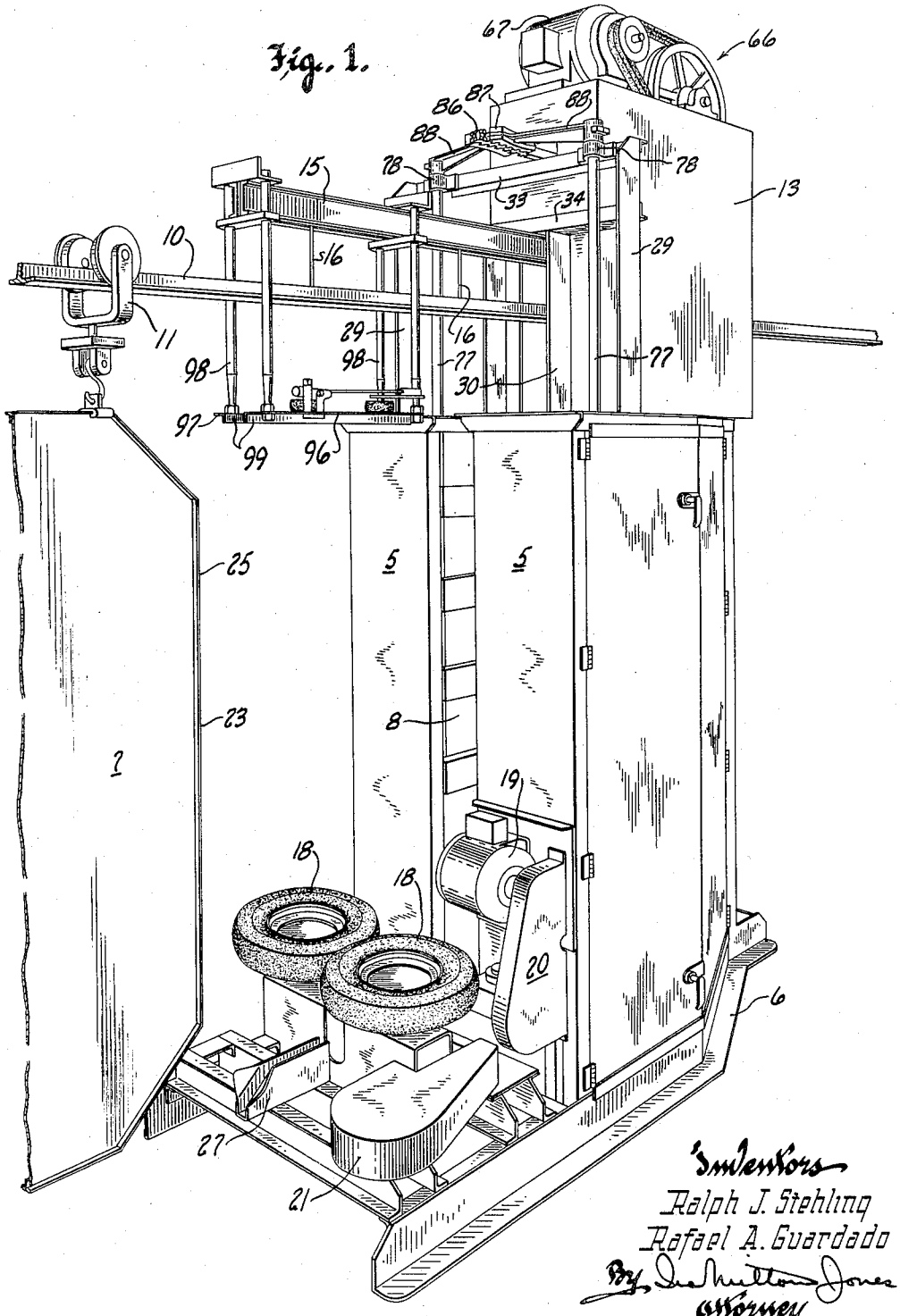
Sept. 16, 1958 R. J. STEHLING ET AL 2,851,711

SCRUBBING APPARATUS FOR PASTING PLATES

Filed June 16, 1954 9 Sheets-Sheet 1

Fig. 1.



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SCRUBBING APPARATUS FOR PASTING PLATES

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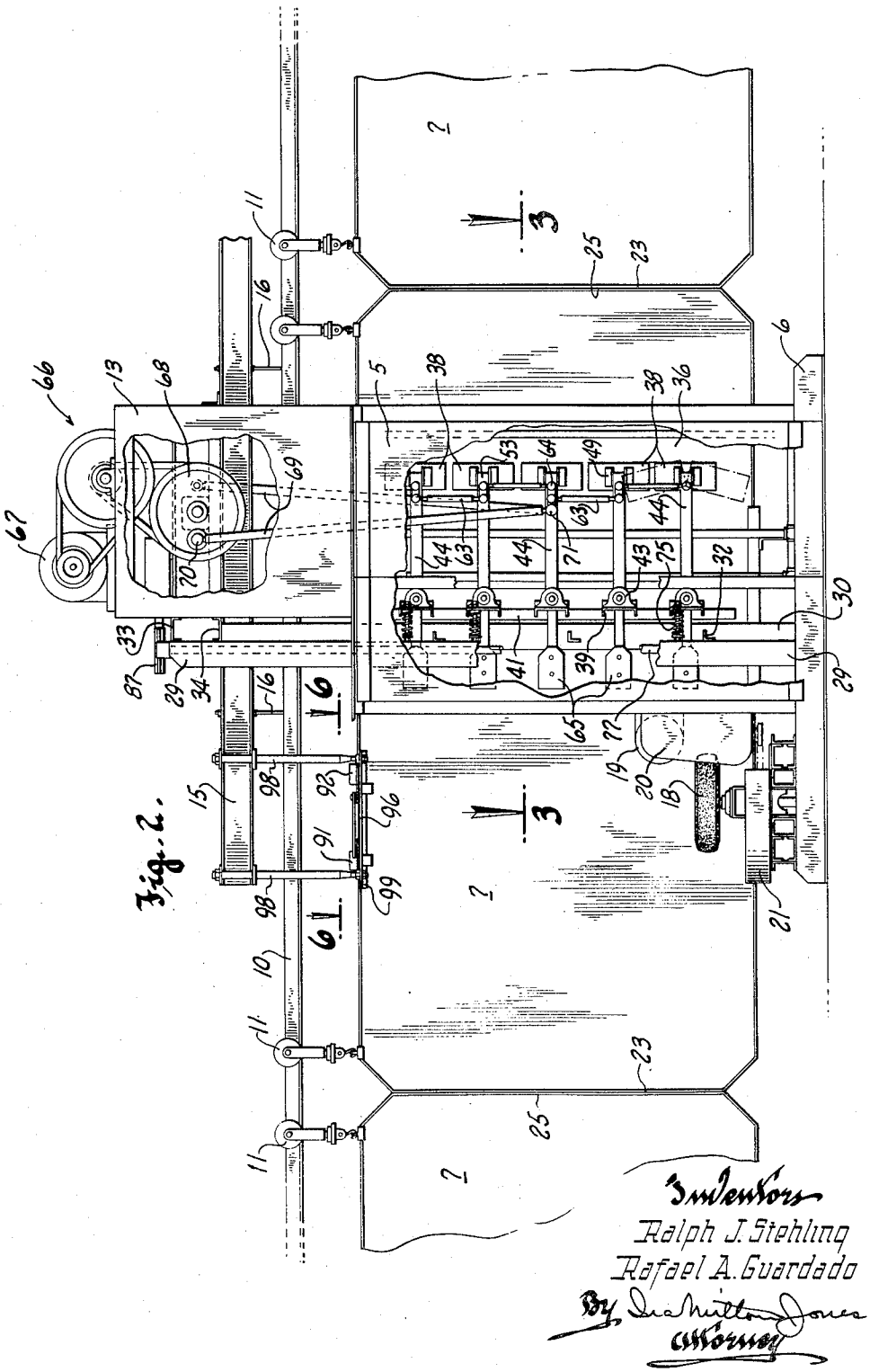


Fig. 2.

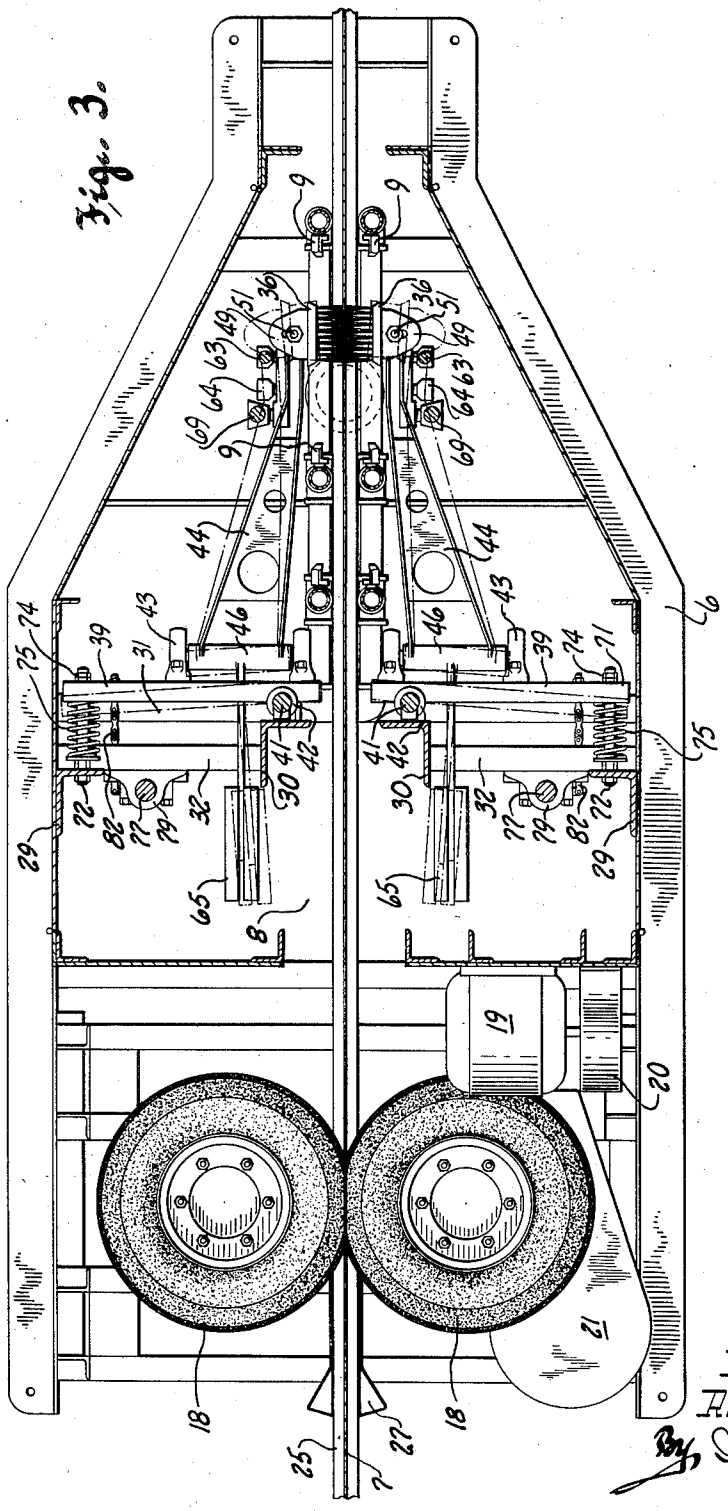
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SCRUBBING APPARATUS FOR PASTING PLATES

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Fig. 3.



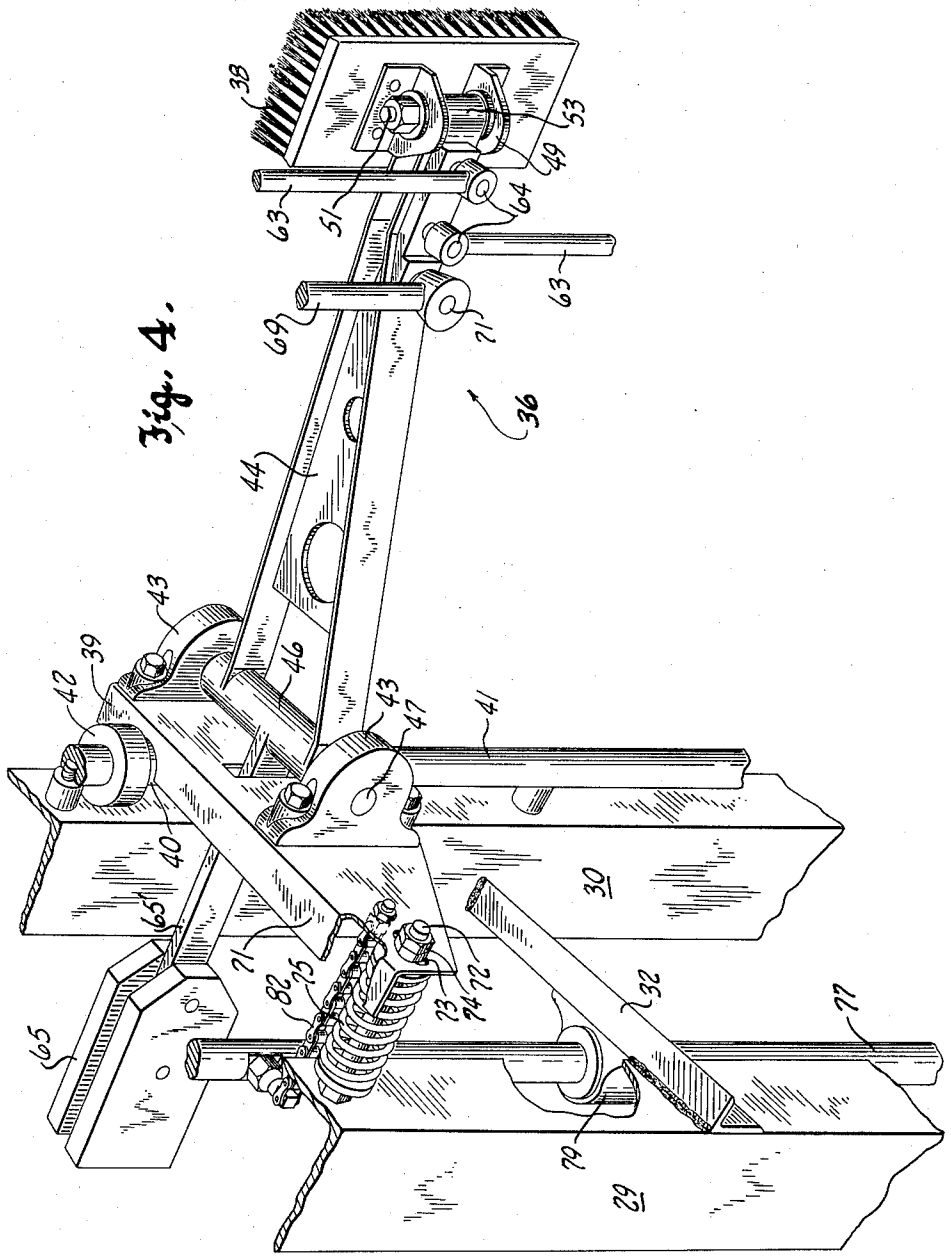
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SCRUBBING APPARATUS FOR PASTING PLATES

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Fig. 4.



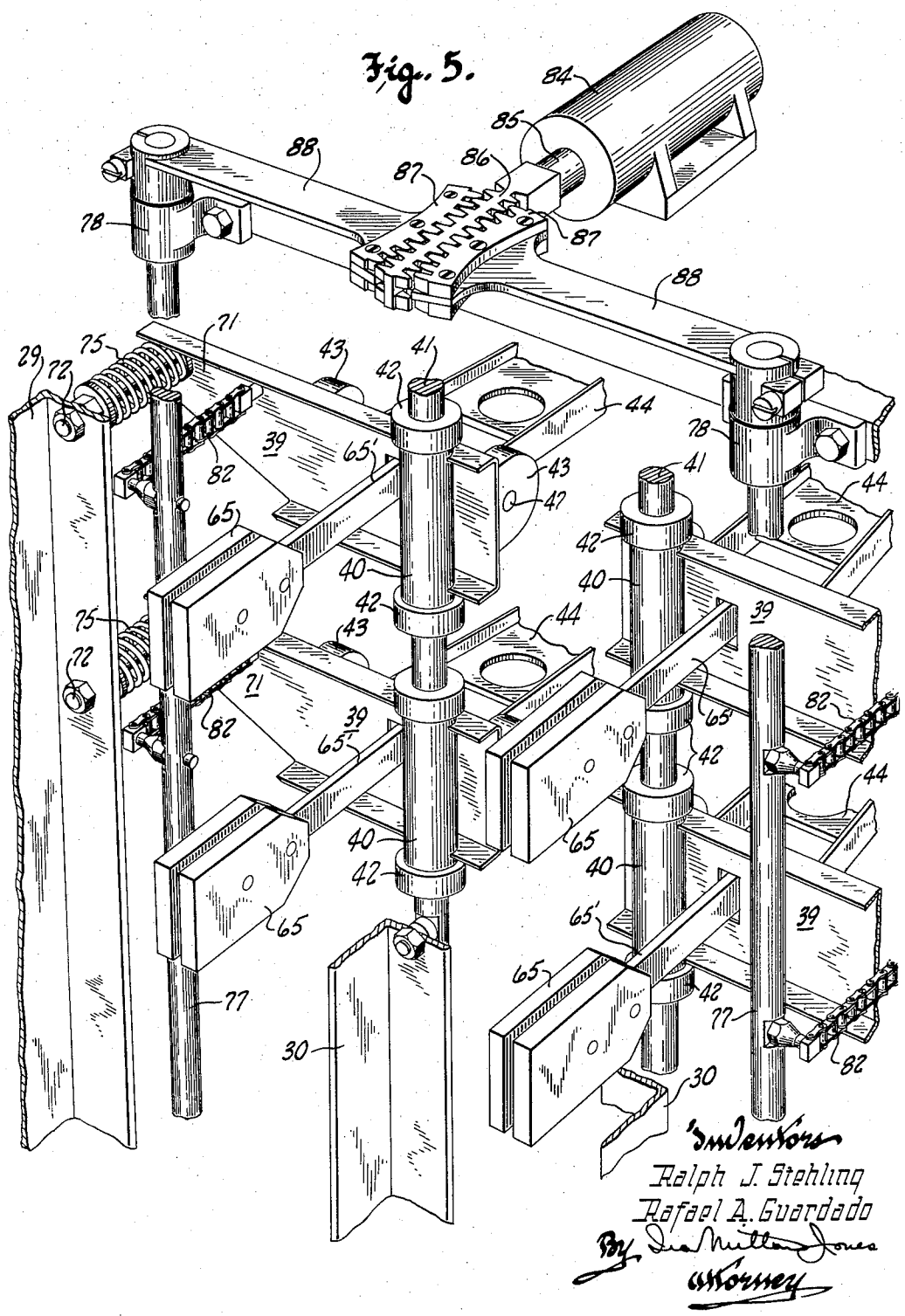
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SCRUBBING APPARATUS FOR PASTING PLATES

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Fig. 5.



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SCRUBBING APPARATUS FOR PASTING PLATES

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Fig. 6.

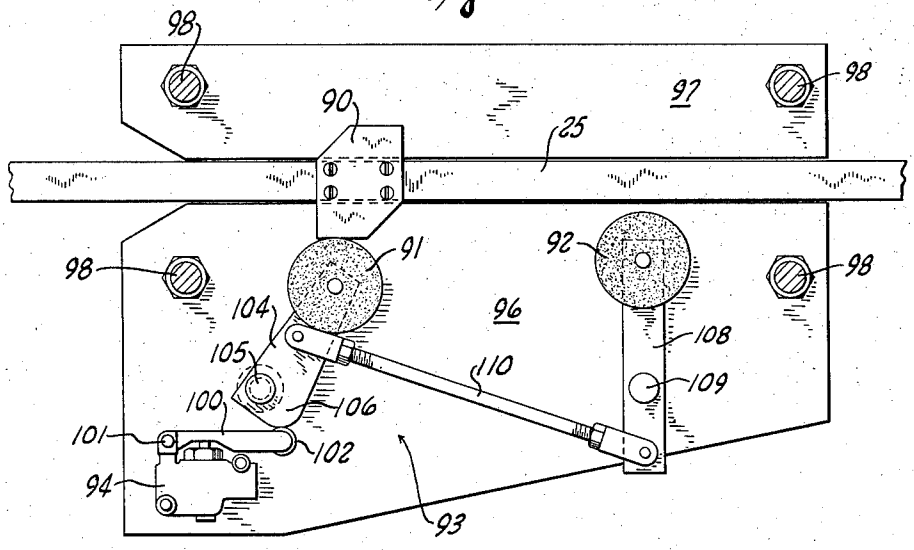
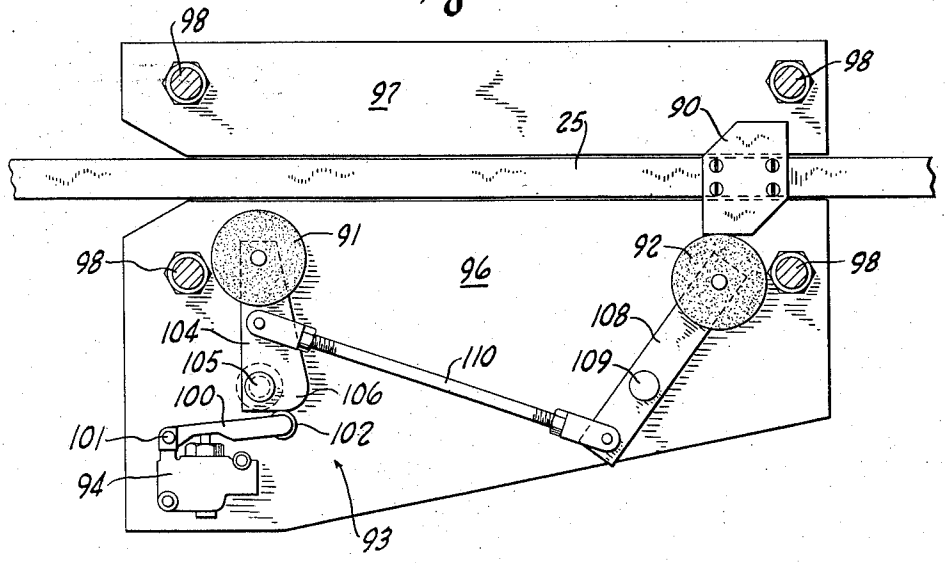


Fig. 7.



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SCRUBBING APPARATUS FOR PASTING PLATES

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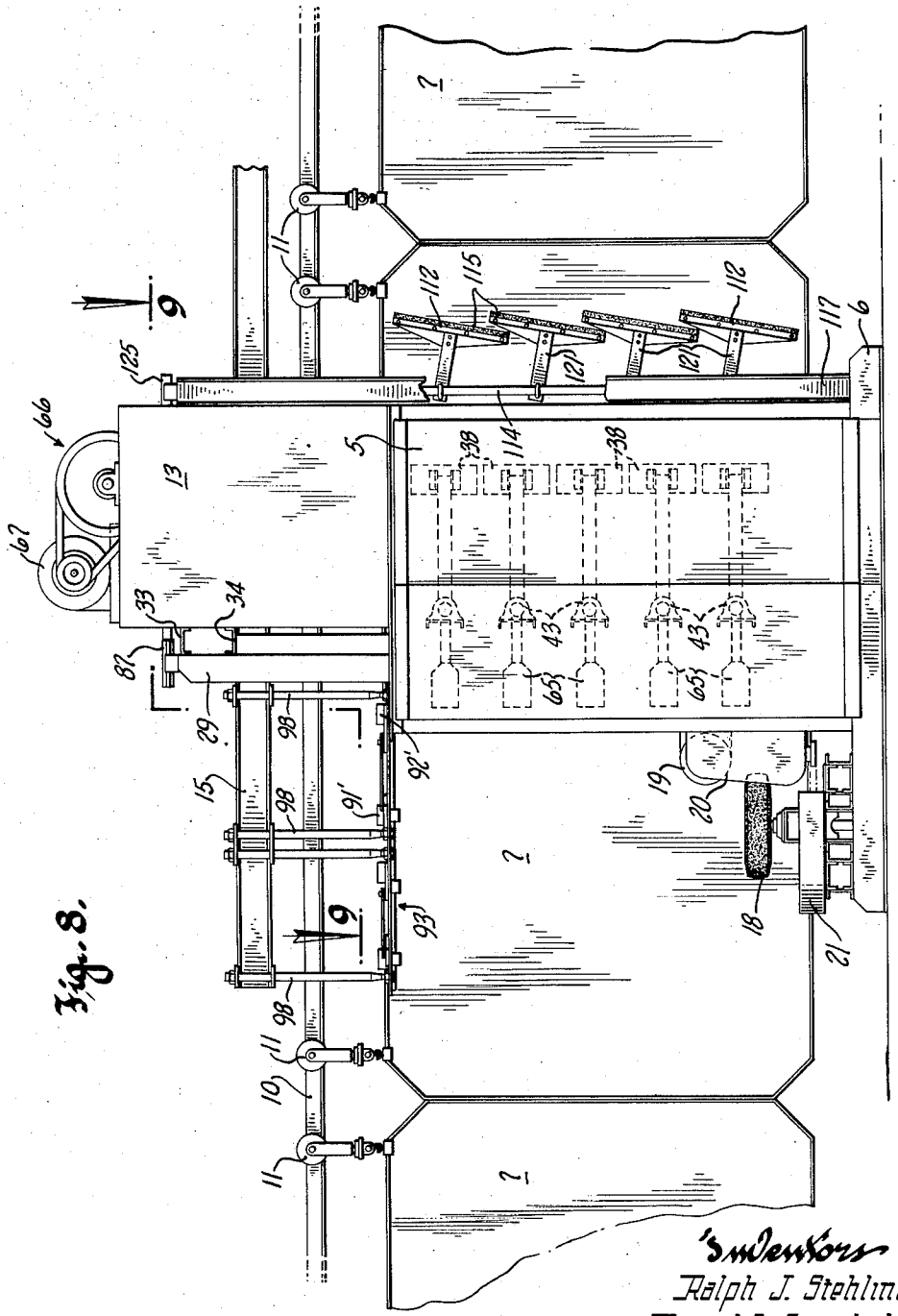


Fig. 8.

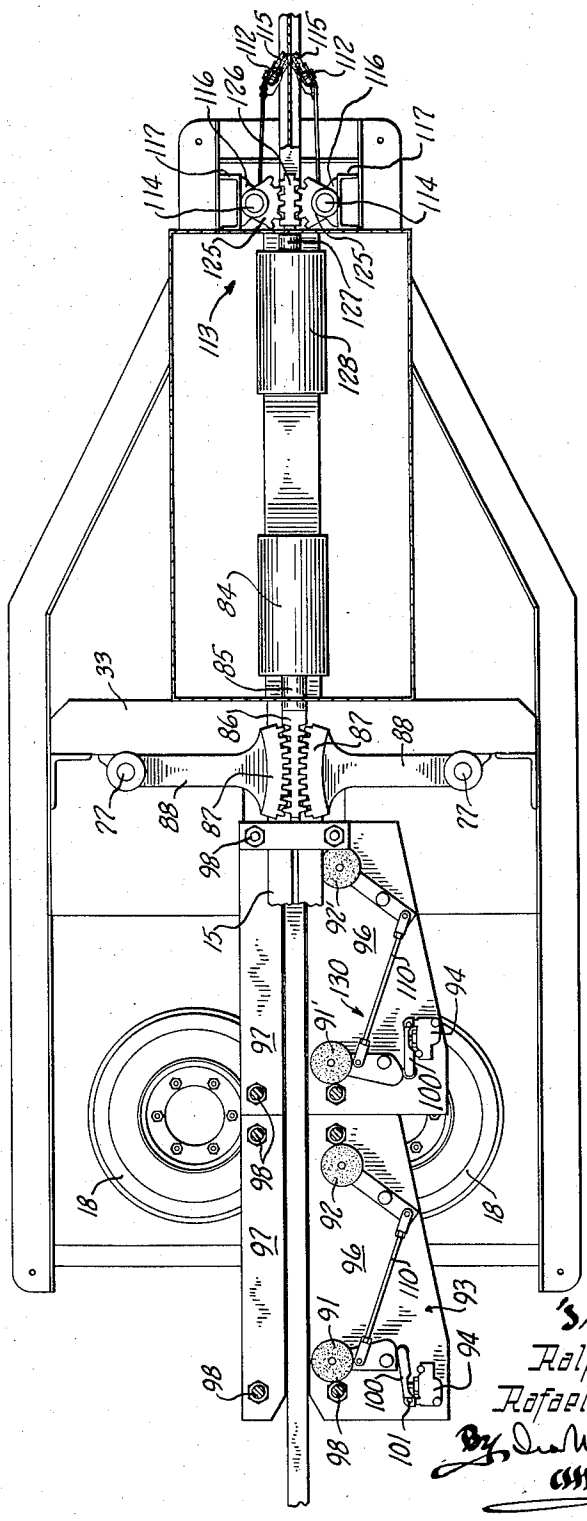
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SCRUBBING APPARATUS FOR PASTING PLATES

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Fig. 9.



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SCRUBBING APPARATUS FOR PASTING PLATES

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Fig. 10.

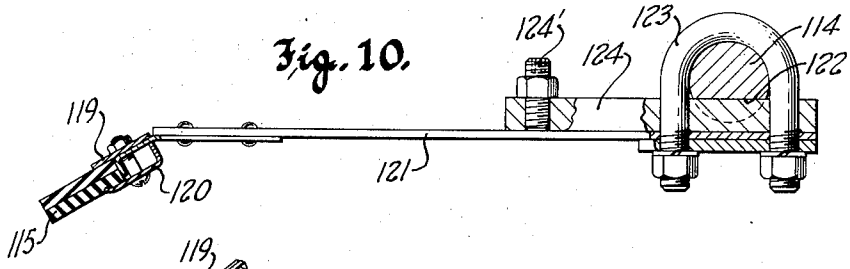
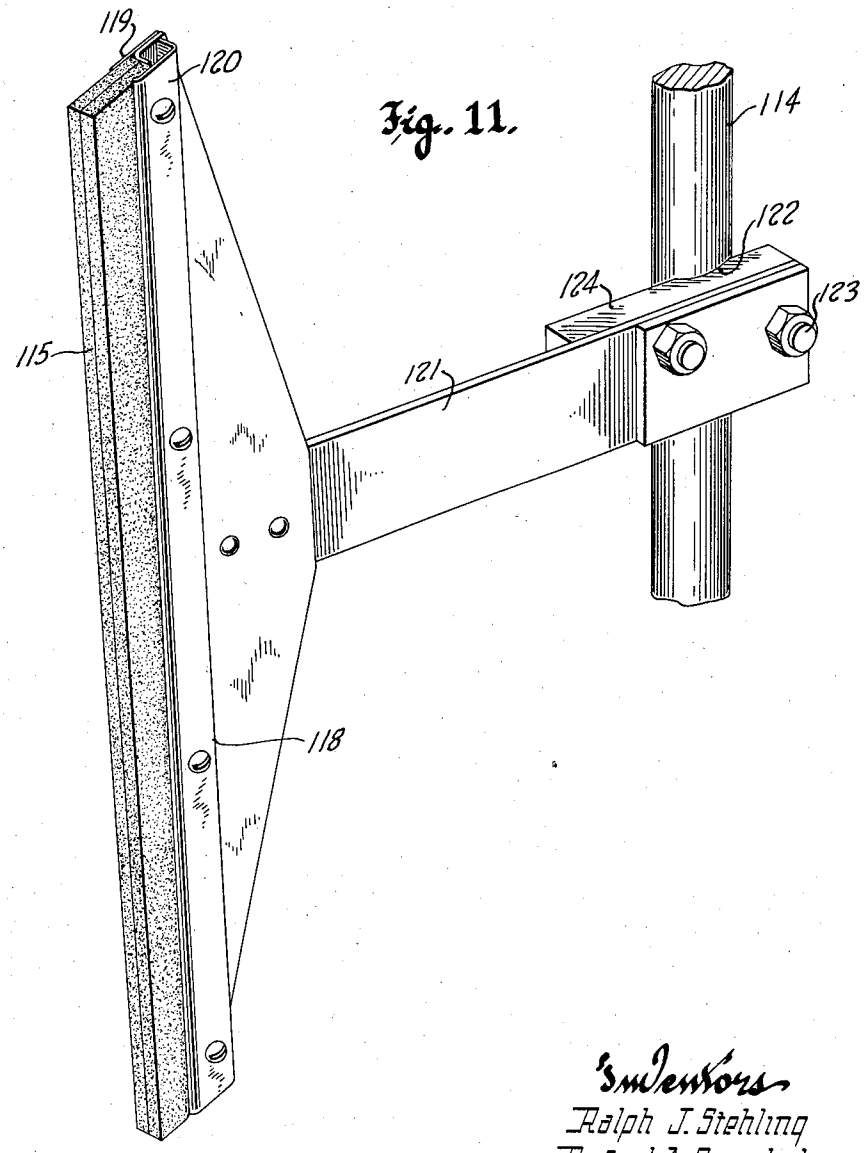


Fig. 11.



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2,851,711

SCRUBBING APPARATUS FOR PASTING PLATES

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Application June 16, 1954, Serial No. 437,226

9 Claims. (Cl. 15—4)

This invention relates to improvements in apparatus for cleansing pasting plates after hides have been removed therefrom.

In tanneries it it customary to paste hides upon large flat metal plates which are moved from one location to another, during processing of the leather, along an overhead rail from which the plates are suspended by trolleys. After the hides are stripped from the pasting plates, it is necessary to cleanse each plate of paste before another hide is pasted thereon. Since water alone sprayed upon the opposite faces of the plates cannot remove all of the paste therefrom, it was customary in the past to scrub the plates with brushes while spraying water thereon.

The efficiency of any cleansing apparatus of this type, therefore, depends upon the effectiveness with which the plates are scrubbed; and in general it is the purpose of this invention to provide improved apparatus for cleansing pasting plates in a more efficient and thorough manner than was possible in the past.

Accordingly, it is an object of the invention to provide apparatus of the character described with two sets of scrubbers mounted opposite one another and defining a scrubbing zone therebetween, each set of scrubbers comprising a plurality of individual brushes which are driven back and forth in unison in a common plane but along separate arcuate paths to effectively cleanse the pasting plates passing through the scrubbing zone.

More specifically, it is the purpose of this invention to provide plate scrubbing apparatus of the character described in which the brushes of each set of scrubbers are individually carried by arms which are mounted in an especially unique manner for up and down swinging motion in unison about horizontal axes to constrain the brushes to scrubbing motion along separate arcuate paths, and which arms are also mounted for lateral swinging motion about vertical axes to enable each brush to be moved relative to adjacent brushes toward and from the plane of a plate passing through the scrubbing zone.

Still another feature of the apparatus of this invention resides in the provision of control means connected with the brushes for simultaneously moving the brushes of each set thereof laterally away from the plane of a plate in the scrubbing zone without interfering with the up and down scrubbing motion of the brushes.

A further object of the invention is to provide plate scrubbing apparatus of the character described with squeegees mounted to act upon the cleansed faces of a plate leaving the scrubbing zone, to remove excess water therefrom; and to provide control means for simultaneously and automatically moving the squeegees laterally away from the plane of the plate to inoperative positions clearing flanges on the leading and trailing edges of the plate.

With these and other objects in view, which will appear as the description proceeds, this invention resides in the novel construction, combination and arrangement

of parts substantially as hereinafter described and more particularly defined by the appended claims, it being understood that such changes in the precise embodiment of the herein-disclosed invention may be made as come within the scope of the claims.

The accompanying drawings illustrate two complete examples of the physical embodiments of the invention constructed according to the best modes so far devised for the practical application of the principles thereof, and in which:

Figure 1 is a perspective view of the apparatus of this invention shown about to receive a pasting plate to be cleansed;

Figure 2 is a side elevational view of the apparatus with portions thereof broken away to illustrate the scrubbing mechanism, and showing a pasting plate in the scrubbing zone;

Figure 3 is a horizontal sectional view taken through Figure 2 along the plane of the line 3—3, at an enlarged scale;

Figure 4 is an enlarged fragmentary perspective view illustrating the manner in which the brushes are mounted for up and down scrubbing motion toward and from an operative position;

Figure 5 is a perspective view illustrating the mechanism for moving the brushes horizontally to and from their operative positions;

Figure 6 is a view taken through Figure 2 along the plane of the line 6—6 and illustrating the means for governing the mechanism shown in Figure 5;

Figure 7 is a view similar to Figure 6 showing another position of the parts thereof;

Figure 8 is a view similar to Figure 2 but illustrating a modified embodiment of the apparatus in which squeegees are employed to remove excess water from the cleansed surfaces of the plates;

Figure 9 is a view taken through Figure 8 along the line 9—9;

Figure 10 is a fragmentary view of one of the squeegees, partly in section and partly in plan, showing the way in which the squeegees are mounted on their control shafts; and

Figure 11 is a rear perspective view of one of the squeegees shown connected to a portion of its control shaft.

Referring now more particularly to the accompanying drawings in which like reference characters indicate like parts throughout the several views, the apparatus of this invention in general comprises two upright housings 5 mounted upon a common elongated base frame 6 in opposing relation to one another and spaced apart transversely of the base frame substantially equal distances to each side of the median vertical plane of the base frame to provide for edgewise passage of a pasting plate 7 therebetween. The space 8 between the housings 5, of course, defines a longitudinal scrubbing zone through which plates to be cleaned may be driven. Water is sprayed on the opposite faces of the plates as they pass through the scrubbing zone, as by a number of spray nozzles 9 in each housing 5 (see Figure 3) arranged in horizontal rows at several levels.

The space 8 aligns vertically with the rail 10 from which the pasting plates are suspended in vertical positions as by trolleys 11. These trolleys provide for edgewise movement of the pasting plates along the rail 10 from one location to another in a conventional manner.

In the present case the rail 10 runs through a superstructure 13 supported on the upper ends of the housings 5 and which serves as a means to mount various mechanisms of the apparatus to be described hereafter. That portion of the rail 10 which extends through the superstructure however, is supported from a beam 15

extending longitudinally over the rail, parallel thereto, as by a number of drop rods **16**.

It will be noted that the upright housings **5** are mounted on the rear portion of the base frame to provide space at the front end portion of the frame for a pair of rubber driving wheels **18** mounted upon rotatable vertically disposed shafts (not shown) and driven at a relatively slow rate of rotation by an electric motor **19** mounted on the front on one of the housings **5**. It will be understood, of course, that suitable gear reduction and transmission means **20** and **21** respectively may be provided to drivingly connect the motor with the shafts of the wheels **18**.

As seen best in Fig. 3 the axes of the drive wheels **18** lie in a common vertical plane transversely of the base frame **6**. Also, the wheels have their peripheries tangent to one another along the median vertical plane of the base frame, the latter, of course, passing midway between the upright housings **5** and through the overhead rail **10**. It is along this median plane that the pasting plates **7** pass successively through the scrubbing zone between the housings **5** to be cleansed of the paste thereon.

As a plate **7** to be cleansed is moved along the rail **10** its leading edge **23** is manually pushed into the bite of the drive wheels **18** which thereafter feed the plate into and part way through the scrubbing zone, and it is propelled the remaining distance through the scrubbing zone by the next plate fed into the bite of the drive wheels **18** through the engagement of its leading edge with the trailing edge **24** of the preceding plate.

To assure good driving engagement between the adjacent leading and trailing edges of the plates as well as to reinforce them, the plates are provided with flanges **25** which extend entirely around their edges and project from both faces of the plates. Also, as seen best in Fig. 1, an upwardly opening trough-shaped guide **27** is mounted on the front portion of the base frame ahead of the drive wheels **18**, and beneath the level thereof, to receive the lower front end portions of the pasting plates as they are manually pushed into the bite of the drive wheels to hold the same against swinging flatwise out of the median vertical plane of the apparatus.

Extending upwardly inside the housings and through the top thereof is a pair of transversely opposite vertical supporting members **29**, each having its lower end fixed to one side rail of the base frame. A second pair of transversely opposite vertical supporting members **30** likewise projects upwardly inside the housings **5** and through the top thereof, and the lower end of each is fixed to a transverse beam **31** on the base frame at a location near the median vertical plane thereof. The supporting members **30** are offset slightly rearwardly of the first designated supporting members **29**.

For the sake of rigidity, the upright supporting members **29** and **30** in each housing **5** are joined together as by angle irons **32** extending horizontally between them at a number of locations along their length. Also for the sake of rigidity the upper ends of the supporting members **29**, which form a part of the superstructure **13**, are joined by a cross bar **33**, while the upper ends of the supporting members **30** are joined to the underside of a cross bar **34** spanning the outer supporting members **29** and welded or otherwise rigidly fixed to the latter.

The scrubbers, of which there are two sets **36**, one at each side of the median plane of the base frame and in one of the housings **5**, are carried jointly by the upright supporting members **29** and **30** in a manner now about to be described.

Each set of scrubbers comprises a number of individual rectangular brushes **38**, five being employed in the present case, so mounted on the upright supporting members **29** and **30** that they may swing up and down in paths parallel to the median plane of the base frame, and so that they may also swing back and forth along paths substantially normal to the median plane of the base frame. For this purpose each set of scrubbers is provided with a bearing bracket **39** for each brush having an upright tubular hub **40** fixed thereto and encircling an upright shaft **41** on the rear of one of the supporting members **30** to provide for oscillatory motion of the bracket about the shaft axis. Collars **42** on the shaft **41** engage the ends of the hubs **40** to hold the brackets **39** equispaced along the length of the shaft and against axial motion thereon.

As shown best in Figure 4 each bearing bracket has transversely spaced bearing flanges **43** fixed to its rear which cooperate to pivotally support one end of an arm **44** having one of the brushes **38** secured to its opposite end. The pivotal connection between each arm and its bearing bracket may comprise a tubular hub **46** on the forward end of the arm confined between the bearing flanges **43** and encircling a pin **47** having its opposite ends anchored in the flanges **43** and held thereby with its axis horizontal.

The rear end of each arm is received between spaced upper and lower flanges **49** secured to the back of the brush and preferably has a pivotal connection with the brush. This pivotal connection may comprise a pivot pin **51** carried by the flanges **49** with its axis parallel to the back of the brush and passing loosely through a vertical hole (not shown) in the rear extremity **53** of the arm, so that the brush may rock back and forth about a substantially vertical axis relative to the arm upon which it is mounted to assure proper engagement of its bristles with the adjacent face of a pasting plate in the scrubbing zone.

With the bearing brackets **39** mounted in the manner described, the arms **44** and the brushes thereon may swing independently laterally toward and from engagement with the adjacent face of a pasting plate in the scrubbing zone about a vertical axis. In addition, the brushes may swing endwise up and down about horizontal axes along intersecting arcuate paths to assure an extremely efficient scrubbing action.

The arms **44** upon which the brushes are mounted may be said to normally extend substantially horizontally rearwardly from their supporting members **30** and they are held in spaced parallel relationship with one another by links **63** connected between the arms of each set of scrubbers near the outer or rear ends of the arms. The links **63** have ball joint connections **64** between their ends and the outer end portions of the arms, and constrain the arms of each set of scrubbers to up and down swinging motion in unison without interfering with lateral movement of the arms relative to one another.

As best shown in Figures 3 and 4, each of the brush carrying arms is balanced on its pivot **47** by a counterweight **65** on the outer end of a bar **65'** joined to the hub **46** of the arm and projecting forwardly therefrom through an opening in its bearing bracket.

Drive means indicated generally by the numeral **66** is provided for recurrently swinging the sets of scrubbers up and down in their scrubbing strokes. The drive means is carried by the superstructure **13** and comprises an electric motor **67** drivingly connected with an eccentric **68** in any suitable manner, and a pitman **69** having one end pivotally connected to the eccentric as at **70** and having its other end connected with one of the arms **44** near the outer end portion thereof, as at **71**. Obviously one pitman **69** is required for each set of scrubbers, as shown best in Figure 2. Consequently upon rotation of the eccentric **68**, up and down swinging motion is transmitted to the arms of each set of scrubbers by its pitman **69** at a relatively rapid rate of motion so related to the speed at which the pasting plates are driven through the scrubbing zone by the rubber drive wheels **18** that the successive upward and downward strokes of the brushes overlap one another to assure that all surfaces of the pasting plates will be acted upon by the brushes.

It is noteworthy that since each of the brushes is

mounted on the outer or rear end of its arm 44 for rocking motion about a substantially vertical axis, that the brushes may accommodate themselves to irregularities in the surfaces of pasting plates contacted thereby to assure more or less uniform scrubbing pressure on all surfaces of the plates.

It is another highly important feature of this invention that the brushes are mounted for independent lateral motion away from the median plane of the base frame, or in other words away from the adjacent face of a plate in the scrubbing zone, against the force of biasing means which normally maintains the brushes engaged with the plates. Therefore, if any brush encounters a relatively large bump or surface irregularity on the pasting plate upon which it is acting, it will be moved outwardly thereby independently of the other brushes, and returned into vertical alignment with the remaining brushes after the irregularity has passed the brush.

This feature is made possible by the provision of an extension 71 on each bearing bracket 39, projecting laterally away from the median plane of the base frame and terminating at an area directly behind but spaced from the adjacent upright supporting member 29. A stud 72 fixed in the upright supporting member 29 projects horizontally rearwardly therefrom and passes loosely through a horizontally elongated slot 73 in the extension 71 of the bracket to allow the latter to swing toward and from the supporting member 29.

Rocking motion of the bracket on its supporting shaft 41 in a direction to carry its brush 38 toward the median vertical plane of the base frame is adjustably limited by a pair of lock nuts 74 threaded on the rear extremity of the stud 72 to bear against the rear face of the bracket extension 71; and a coiled compression spring 75 encircling the stud 72 and confined endwise between the bracket extension 71 and the upright supporting member 29 urges the bracket into engagement with the lock nuts and acts upon the brush through the arm 44 connected with the bracket to assure engagement of the brush with the adjacent side of a pasting plate under spring pressure.

With this construction it will be noted the brushes may swing laterally away from the median vertical plane of the base frame independently of one another, against the force of the compression springs 75 so that should any of the brushes encounter a convex irregularity in a pasting plate being scrubbed it may swing laterally outwardly without disturbing the scrubbing action of any of the other brushes.

In addition to being mounted for individual lateral swinging motion, the sets of brushes may also be moved laterally outwardly in unison, to clear the leading and trailing flanged edges of pasting plates traveling through the scrubbing zone. The mechanism for separating the brushes of the two sets of scrubbers and for returning them to scrubbing positions after the flanged edge of a pasting plate has passed rearwardly beyond the brushes will now be described.

Again referring to Figures 4 and 5 it will be noted that a control shaft 77 is provided for each set of scrubbers. Each shaft extends vertically in its housing 5 and projects upwardly through the top thereof to be journaled in a bearing 78 carried by the cross bar 33 near the top of the superstructure. The lower end of the shaft may be journaled in a similar bearing 79 fixed to a cross member 32 joined between each of the upright supporting members 30 and its companion upright supporting member 29, at the lower ends of the latter.

A tension member 82, which may be in the form of a short length of chain as shown, is connected between control shaft 77 and the lateral extension 71 of each bearing bracket so that rotation of the control shaft in one direction (clockwise as seen in Figure 4) simultaneously rocks all of the brackets of the set of scrubbers in a direction (clockwise in Figure 4) to carry the

brushes 38 of each set thereof laterally outwardly away from the median vertical plane of the base frame.

When the leading edge of a pasting plate approaches the brushes 38, therefore, both control shafts 77 are rocked on their vertical axes simultaneously in opposite directions to separate the brushes of the two sets thereof a distance far enough to clear the flange on the leading edge of the plate, and the brushes are held thus separated for the period of time it takes for the leading edge of the plate to advance rearwardly beyond the brushes. Thereafter, the control shafts 77 are rocked in the opposite direction (counterclockwise in Figure 4) to effect spring propelled return of the brushes to their operative scrubbing positions engaged with the opposite faces of the plate.

Any suitable mechanism may be employed for simultaneously rocking the control shafts 77 in opposite directions to effect this function. By way of illustration, an air motor 84 mounted on the superstructure 13 midway between the control shafts 77 is provided to rock the shafts back and forth in opposite directions. The motor 84 comprises a cylinder having a piston 85 projecting forwardly therefrom and carrying a rack 86 with teeth on the opposite faces thereof. The rack teeth mesh with gear segments 87 fixed on arms 88 having their remote ends secured to the upper ends of the control shafts 77, as seen in Figure 5.

Therefore, when the piston 85 is drawn rearwardly into the cylinder of the air motor rocking motion is simultaneously imparted to the two control shafts 77 in opposite directions such as to pull the bearing brackets through the tension members 82 and cause separation of the brushes of the two sets thereof. When the piston 85 of the air motor is propelled forwardly of the cylinder of the air motor, retrograde rocking motion is simultaneously imparted to the two control shafts in directions to relieve the tension on the chains 82 and allow the compression springs 75 acting on the brackets to return the brushes to their operative scrubbing positions.

The operation of the air motor is controlled in a novel manner by the pasting plates themselves as their flanged leading edges reach a predetermined position closely adjacent to the brushes. For this purpose each plate has a cam 90 secured to the flange on the upper edge of the plate, preferably midway between the leading and trailing edges of the plate. This cam is successively engageable with a pair of cam followers 91 and 92 forming part of a valve operating mechanism generally designated 93, supported by the superstructure beam 15 substantially directly above the rubber driving wheels 18 in alignment with the flange 25 of each pasting plate fed into the apparatus. The valve operating mechanism, of course, includes an air valve 94 governing the supply of air under pressure to the air motor 84, and it will be understood that the latter is a double acting cylinder the piston of which is adapted to be forcefully moved back and forth by air under pressure entering one end or the other of the cylinder under the control of the valve 94 and conducted to the cylinder through suitable tube lines (not shown).

The valve operating mechanism 93 comprises a pair of elongated horizontal plates 96 and 97 suspended by drop rods 98 from the beam 15 and having downwardly directed flanges 99 at their adjacent edges, the flanges being parallel to the median plane of the base frame and spaced apart a distance to guidingly receive the flanged upper edge of a pasting plate entering the scrubbing apparatus to thus cooperate with the trough-shaped guide 27 to hold the pasting plate against flatwise motion while it is being fed into the scrubbing zone.

The valve 94 may be provided with the usual operating lever 100 having one end pivotally mounted on the housing of the valve, as at 101, and having a roller 102 mounted on its outer end to swing toward and from the median plane of the base frame. The valve may be

mounted on the larger plate **96** of the pair thereof, and as is usual, clockwise swinging of the lever as seen in Figure 6 depresses the plunger of the valve against spring bias to connect one end of the air motor cylinder with the source of air under pressure. Counterclockwise swinging of the lever effects spring propelled extension of the valve plunger and connection of the opposite end of the cylinder of the air motor with the source of air under pressure.

The cam follower **91** is first encountered by the cam **90** on a pasting plate entering the scrubbing zone, and it is rotatably mounted on the long arm of a bell-crank lever **104** pivotally supported on the plate **96** to swing about a vertical axis **105** near the operating lever **100** for the air valve. The short leg **106** of the bell-crank lever is adapted to engage the roller **102** of the operating lever **100** during rotation of the bell-crank lever in the clockwise direction as seen in Figure 6 and in which direction it is swung by the engagement of the cam **90** on a pasting plate with the cam follower **91** just before the flanged leading edge of the pasting plate reaches the brushes. This imparts clockwise rocking motion to the lever **100** and causes depression of the plunger of the valve **94**, and consequently rearward propulsion of the piston of the air motor into its cylinder to thereby rock the control shafts **77** in the direction to turn the bearing brackets of all of the brushes in the direction to separate the brushes of the two sets thereof.

After the flanged leading edge of the pasting plate has passed the separated brushes a relatively short distance, the cam **90** on the plate engages the cam follower **92** to effect actuation of the control valve **94** and return of the brushes to their operative scrubbing positions. For this purpose the cam follower **92** is mounted on one end of a lever **108** medially pivoted as at **109**, the other end of the lever being connected with the long leg of the bell-crank lever **104** by a link **110**.

Consequently the cam **90**, during rearward travel of a pasting plate into the apparatus, engages the follower **92** shortly after the flanged leading edge of the pasting plate has passed the brushes **36** to cause clockwise swinging motion of the lever **108** and through the link **110** effect counterclockwise rotation of the bell-crank lever **104**, thereby allowing the operating lever **100** of the valve **94** to be moved in the counterclockwise direction under the influence of the biasing means acting on the plunger of the valve. This, of course, effects reverse movement of the piston of the air motor to rock by the operating shafts **77** in the direction to slacken the tension devices **82**, and the compression springs **75** thereupon act on the brackets **39** to swing the brushes back to their operative positions engaging the opposite sides of the pasting plate just forwardly of its flanged leading edge.

It will be understood that since the next successive pasting plate to be scrubbed has its flanged leading edge in abutting engagement with the flanged trailing edge of a plate about to leave the scrubbing zone, that the cam **90** on the next plate serially engages the followers **91** and **92** of the valve operating mechanism to first effect separation of the brushes and then re-engagement of the same with the opposite faces of said next plate, to clear both the trailing edge of the first plate and the leading edge of the next one.

The apparatus shown in Figures 8 and 9 is like that previously described, but differs therefrom in the provision of two sets of squeegees **112** to act upon the opposite cleansed surfaces of a plate as these surfaces emerge from the scrubbing zone, and operating mechanism **113** for moving the squeegees laterally back and forth between operative and inoperative positions. There are four squeegees in each set, and vertical operating shafts **114** at opposite sides of the median plane of the base frame, at the rear of the apparatus, mount the squeegees of each set one above the other, in positions such that their rubber blades **115** may bear against the opposite faces of a pasting plate at a zone slightly rearwardly of the brushes **38**. Each operating shaft **114** is journalled in a series of vertically spaced bearings **116** fixed to one of a pair of upright channels **117** disposed back to back on the rear of the apparatus, so that the operating shafts may oscillate on their vertical axes.

As shown best in Figures 10 and 11, each squeegee **112** comprises a T-shaped structure. The head **118** of the T is formed of elongated complementary jaws **119** and **120**, having the rubber blades **115** clamped therebetween; and the stem **121** of the T projects forwardly from the head and has its front end portion received in a notch **122** in its control shaft **114**, to which it is securely anchored by a U-bolt **123**. The notches, however, are so formed as to hold the squeegees with their stems **121** at a slight angle to horizontal, as seen in Figure 8, so that the adjacent end portions of adjacent blades nest one behind the other, or overlap in their wiping action.

The stems **121** of the squeegees are preferably formed of spring steel, and the forward end portion of each overlies a cleat **124** interposed between the stem and the bottom of the notch in the shaft. A set screw **124'** threaded into the cleat and bearing upon the stem **121** of the squeegee affords means of adjusting the pressure with which the squeegees engage the surfaces of the pasting plates upon which they act, and these set screws may be locked in any desired position of adjustment by a lock nut threaded onto their outer ends, and bearing against the surfaces of the cleats remote from the stems **121** of the squeegees.

Like the shafts **77**, the operating shafts **114** are also provided with gear segments **125** on their upper ends, meshing with a common rack **126** fixed to the plunger **127** of an air cylinder **128** carried by the superstructure directly behind the cylinder **84**. In the position of the parts seen in Figure 9, air under pressure is acting upon the plunger **127** to hold the same in a forward position, withdrawn into the cylinder, and maintaining the control shafts **114** in one extreme of oscillatory motion at which the rubber blades of the squeegees are firmly engaged with the opposite faces of a pasting plate passing through the apparatus. When the air is shut off, the plunger is projected rearwardly of the cylinder, by yielding bias acting thereon internally of the cylinder, to impart oscillatory motion to the control shafts **114** in the direction to swing the sets of squeegees laterally away from one another a distance sufficient to clear the flanged leading and trailing edges of pasting plates passing through the apparatus.

Control mechanism **130**, like that provided for the brushes, effects separation of the squeegees slightly before the flanged leading and trailing edges of pasting plates reach the zone in which the squeegees operate, and effects re-engagement of the squeegees shortly after passage of the engaged trailing and leading edges of the plates past the squeegees. This control mechanism **130** is mounted directly behind the control mechanism **93**, in the same way as the control mechanism **93**, and to be operated by the same cams **90** on the flanged top edges of pasting plates passing through the apparatus. Hence, shortly after the cam **90** on one of the pasting plates has acted upon the follower **92** to effect re-engagement of the brushes with the opposite faces of a pasting plate at areas slightly forwardly of its flanged leading edge, the cam **90** engages the follower **91'** of the control mechanism **130** for the squeegees, to release the valve operating lever **100**. This shuts off the air to the cylinder **128** and causes separation of the squeegees just before the flanged leading edge of the pasting plate reaches the zone at which the squeegees operate.

The cam **90** on the pasting plate does not engage the second cam follower **92'** until the flanged leading edge of the pasting plate has passed rearwardly beyond the separated squeegees. Accordingly, actuation of the valve operating lever **100** through the engagement of cam **90**

with the follower 92' brings air under pressure back into the cylinder 128 and causes the squeegees to be engaged under pressure with the opposite faces of the pasting plate a slight distance forwardly of its flanged leading edge.

From the foregoing description together with the accompanying drawings it will be readily apparent to those skilled in the art that this invention provides an exceptionally efficient means of controlling the operativeness of the brushes and squeegees of an apparatus for cleansing pasting plates; and that it achieves the best possible scrubbing action by reason of the fact that it employs two sets of scrubbers each comprising a number of individual brushes mounted for up and down scrubbing motion in unison as well as for lateral motion in a direction crosswise of their scrubbing motion, each independently of any other of the brushes, to enable the brushes to accommodate themselves particularly well to irregularities in the surfaces of the plates being scrubbed.

What we claim as our invention is:

1. Apparatus for scrubbing pasting plates after hides have been removed therefrom and as the plates, in vertical positions, travel edgewise along a defined path through a scrubbing zone, said apparatus comprising: a stationary vertical support at each side of said vertical plane; a bearing bracket mounted on each support for swinging motion about a vertical axis; a counterbalanced arm pivotally mounted on each bearing bracket for up and down swinging motion about a horizontal axis, each of said arms extending outwardly from its bracket along the path of travel of plates through the scrubbing zone and having an end portion remote from its pivot axis; a brush mounted on said end portion of each arm with its bristles facing said vertical plane; yieldable biasing means acting upon each bearing bracket for normally holding the brushes supported thereby swung toward said vertical plane and in engagement with the opposite sides of a plate passing through the scrubbing zone; drive means connected with said arms for swinging the same up and down about their horizontal axes; a rotatable control shaft adjacent to each of said bearing brackets; and a unidirectional driving connection between each control shaft and its adjacent bearing bracket operable to swing the bracket about its vertical axis in a direction against the force of the yieldable biasing means acting thereon to carry the brush supported by said bracket away from said vertical plane, as a consequence of rotation of the control shaft in one direction, from which position the brushes may be returned toward said vertical plane by said yieldable biasing means upon rotation of the control shaft in the opposite direction.

2. The apparatus set forth in claim 1, further characterized by the provision of means operated by the pasting plates during travel thereof through the scrubbing zone for simultaneously rocking each control shaft in said direction to move the brushes away from said vertical plane as the leading edge of the plate approaches the brushes, and for simultaneously rocking each control shaft in the opposite direction after the leading edge of the plate has passed the brushes.

3. Apparatus for scrubbing pasting plates after hides have been removed therefrom and as the plates, in vertical positions, travel edgewise along a defined path through a scrubbing zone, said apparatus comprising: a stationary vertical support at each side of said vertical plane; a bearing bracket mounted on each support for swinging motion about a vertical axis; an arm pivotally mounted on each bearing bracket for up and down swinging motion about a horizontal axis, each of said arms extending outwardly from its bracket along the path of travel of plates through the scrubbing zone and having an end portion remote from its pivot axis; a brush mounted on said end portion of each arm with its bristles facing said vertical plane; yieldable biasing means acting upon each bearing bracket for normally holding the brushes supported thereby swung toward said vertical plane and in engagement with the opposite sides of a plate passing through the scrubbing zone; drive means connected with said arms for swinging the same up and down about their horizontal axes; a rotatable control shaft adjacent to each of said bearing bracket supports; and a unidirectional driving connection between each control shaft and each adjacent bearing bracket, comprising a tension member having one end anchored on the control shaft and its other end anchored to the bearing bracket so that rotation of the control shaft in one direction effects bodily swinging of its bearing bracket about its vertical axis, against the force of said yieldable biasing means, to carry the brush on said bracket away from said vertical plane, said unidirectional driving connections providing for swinging of the brushes away from said vertical plane independently of said control shaft.

4. In apparatus for scrubbing pasting plates after hides have been removed therefrom and as the plates, in vertical positions, travel edgewise along a defined path through a scrubbing zone: brush means at each side of a vertical plane in said path along which the plates travel through the scrubbing zone; means mounting said brush means for back and forth scrubbing motion in planes substantially parallel to said vertical plane and for lateral movement in directions substantially normal to said vertical plane toward and from operative positions in which the bristles of said brush means engage the opposite faces of a plate in the scrubbing zone; squeegee means arranged to bear against the opposite faces of a plate as said plate emerges from the scrubbing zone to remove excess water from the scrubbed surfaces of the plate; means mounting said squeegee means for lateral motion in directions substantially normal to said vertical plane toward and from operative positions bearing against the opposite faces of a plate emerging from the scrubbing zone; actuating means for moving the brush means to and from operative positions; other actuating means for moving said squeegee means to and from their operative positions; control means for said brush actuating means; control means for said squeegee actuating means; and means mounting said control means for the brush and squeegee actuating means in positions to be operated upon successively by a single part on a pasting plate passing through the apparatus, so that the brush means will be moved to inoperative positions slightly before the leading edge of the plate reaches the brush means and will be returned to their operative positions shortly after the leading edge of the plate passes the brush means, and so that said squeegee means will next be moved to inoperative positions slightly before the leading edge of the plate reaches the squeegee means and will be returned to their operative positions shortly after the leading edge of the plate passes the squeegee means.

5. Apparatus for scrubbing a series of plates while said plates are being transported edgewise in succession along a predetermined path comprising: a stationary vertically disposed support alongside said path of the plates; a plurality of bearing brackets; bearing means mounting said brackets in vertically spaced relation on said support for swinging motion of each bracket independently of the others about a vertical axis; a brush carrying arm for each bearing bracket; horizontal bearing means, the axis of which is substantially normal to the plane of a plate in position to be scrubbed, connecting each arm medially of its ends with one of said bearing brackets for free rocking motion of the arm about said axis and for bodily movement of the arm with the bearing bracket upon which the arm is mounted; a brush mounted on one end of each of said arms with the bristles thereof facing said plane to have scrubbing engagement with the adjacent side of a plate in position to be scrubbed; a counterweight on the other end of each arm balancing the weight of the brush mounted thereon; spring means in-

dividually biasing each of the bearing brackets about its connection with the vertically disposed stationary support in a direction to press the brush mounted on the arm carried by said bracket against a plate in position to be scrubbed; and means for rocking all of the arms in unison about their connections with their respective bearing brackets to move the brushes arcuately back and forth across the face of a plate in position to be scrubbed.

6. The apparatus of claim 5, further characterized by the provision of: a flexible tension member connected to each of said bearing brackets at a distance from the bearing means by which it is connected to the stationary support; a control shaft; bearing means mounting said control shaft for rotation about its axis and positioning said shaft vertically adjacent to but spaced from the bearing brackets to which said flexible tension members are connected; and means securing all of the flexible tension members to said control shaft so that rotation of the control shaft wraps the tension members thereabout and rocks the bearing members about their connections with the stationary support against the bias of the spring means to retract all of the brushes to inoperative positions.

7. The apparatus of claim 5 wherein the means for rocking the brush carrying arms about their connections with the bearing members comprises: a power driven crank above the path of the plates to be scrubbed and substantially in line with the arms; a pitman connecting said crank with one of said arms, said connection accommodating horizontal swinging movement of the arm bodily with the bearing bracket upon which it is mounted; and link means connecting said arm with the other arms, the connections of said link means with the arms also

accommodating horizontal swinging movement of the arms bodily with their respective bearing brackets.

8. The apparatus of claim 6 wherein the means for rocking the brush carrying arms about their connections with the bearing members comprises: a power driven crank above the path of the plates to be scrubbed and substantially in line with the arms; a pitman connecting said crank with one of said arms, said connection accommodating horizontal swinging movement of the arm bodily with the bearing bracket upon which it is mounted; and link means connecting said arm with the other arms, the connections of said link means with the arms also accommodating horizontal swinging movement of the arms bodily with their respective bearing brackets.

9. The apparatus of claim 6 but wherein all of the structure set forth therein is duplicated on the other side of the path of the plates to be scrubbed; and further characterized by the provision of means for simultaneously rocking both of the control shafts about their axes to move all of the brushes to inoperative positions spaced away from the path of the plates, said means comprising a gear segment fixed to each control shaft with the gears thereof facing and directly opposed to one another but spaced apart; a rack meshing with both gear segments; and power means for reciprocating the rack.

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