

Oct. 13, 1936.

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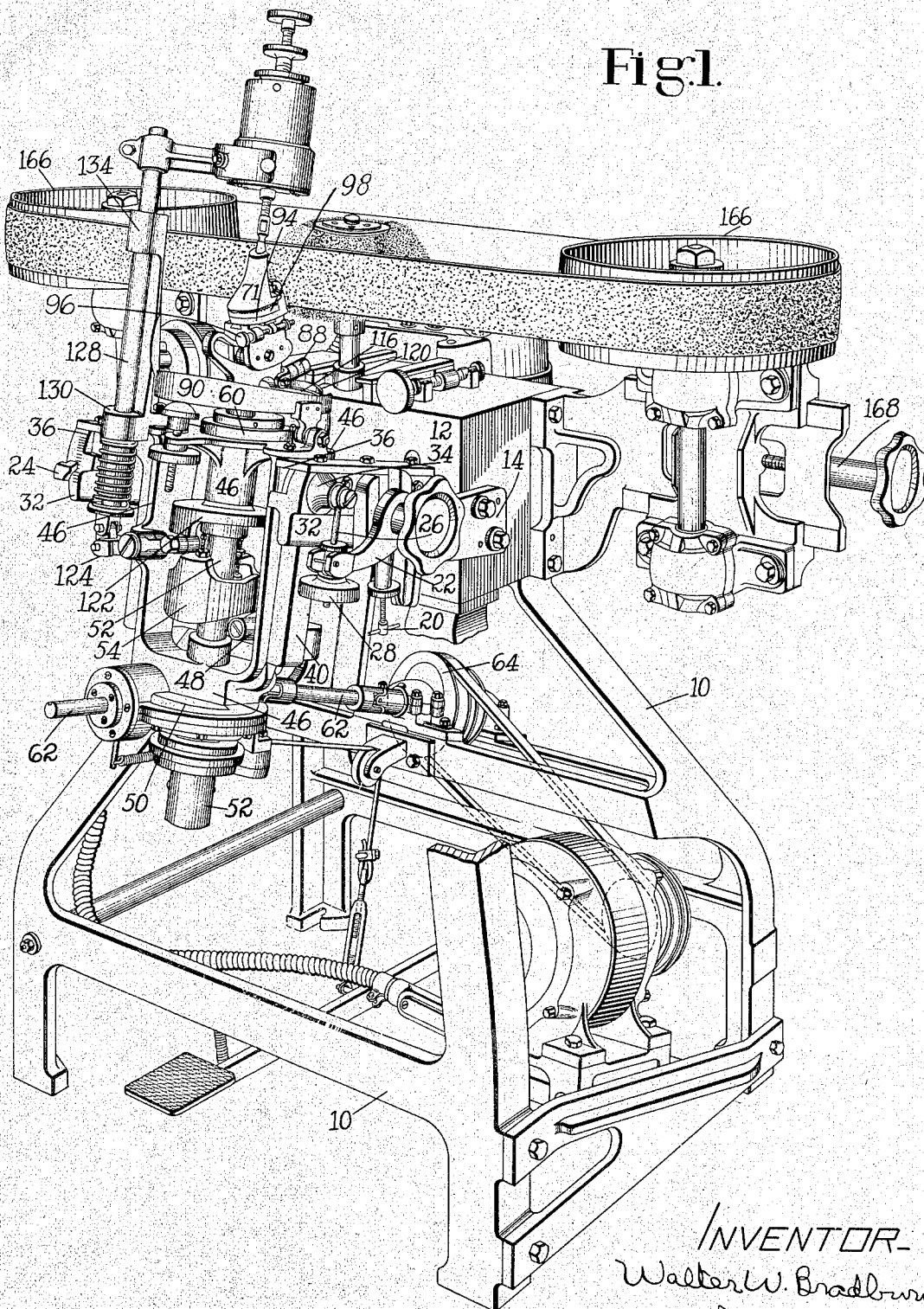
2,057,290

SCOURING MACHINE

Filed Aug. 27, 1934

6 Sheets-Sheet 1

Fig. 1.



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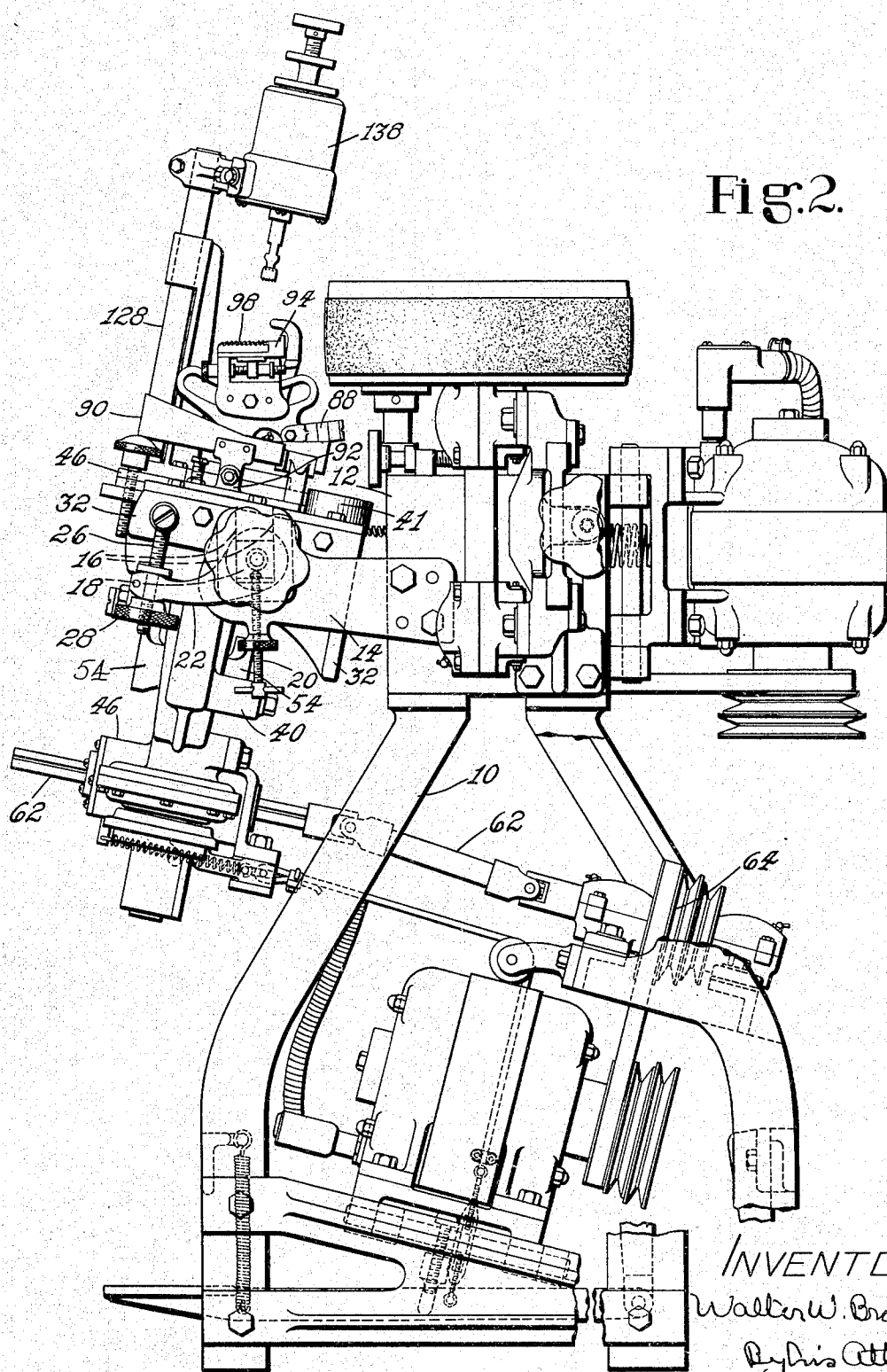
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SCOURING MACHINE

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6 Sheets-Sheet 2

Fig. 2.



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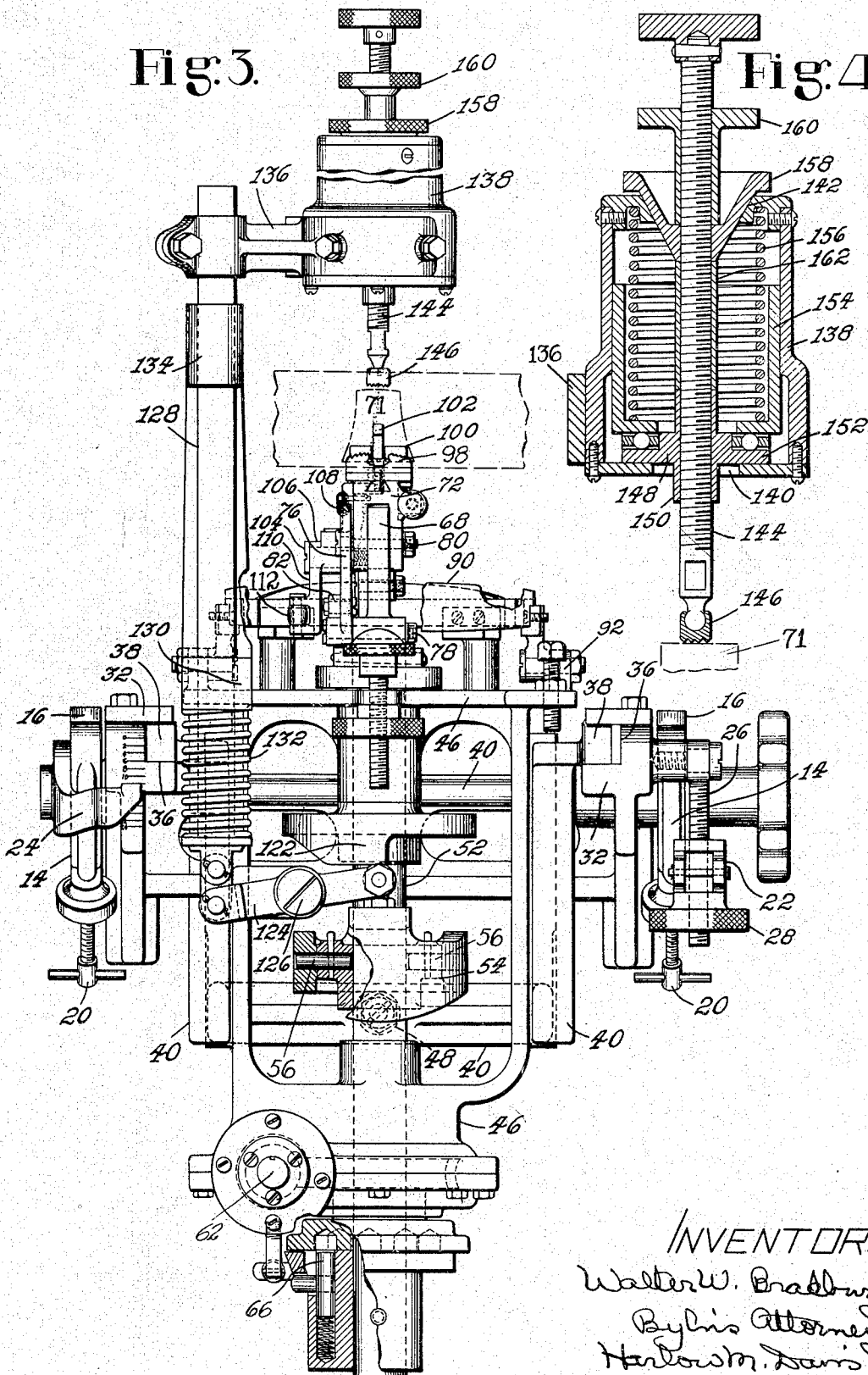
SCOURING MACHINE

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6 Sheets-Sheet 3

Fig. 3.

Fig. 4.



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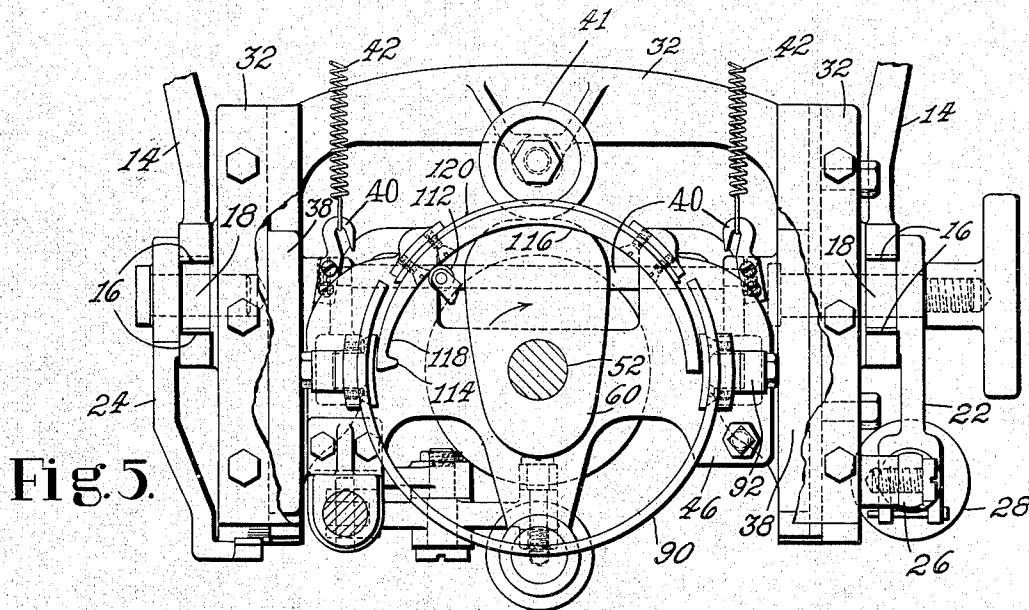
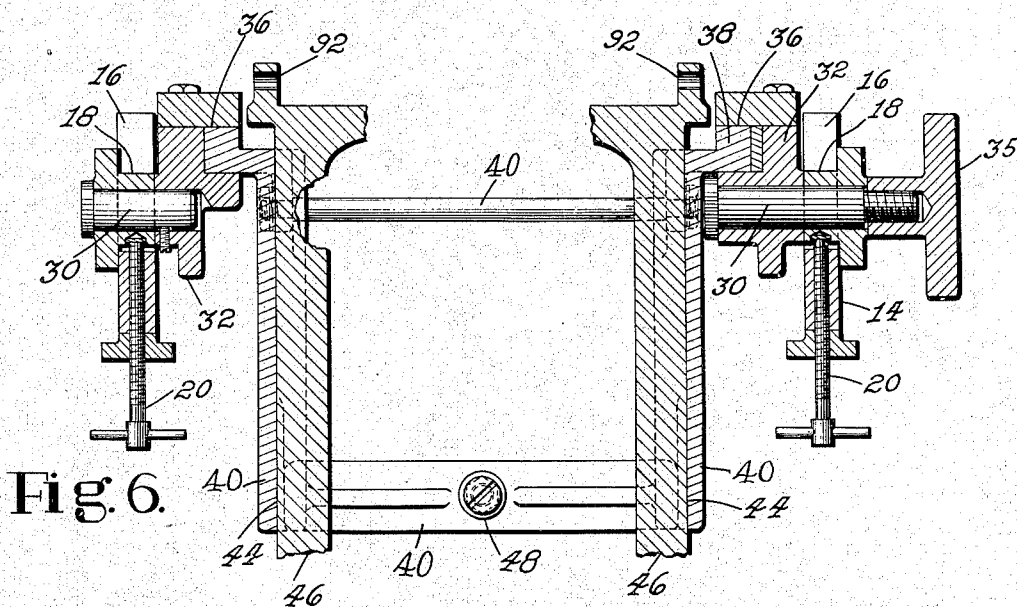
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SCOURING MACHINE

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6 Sheets-Sheet 4



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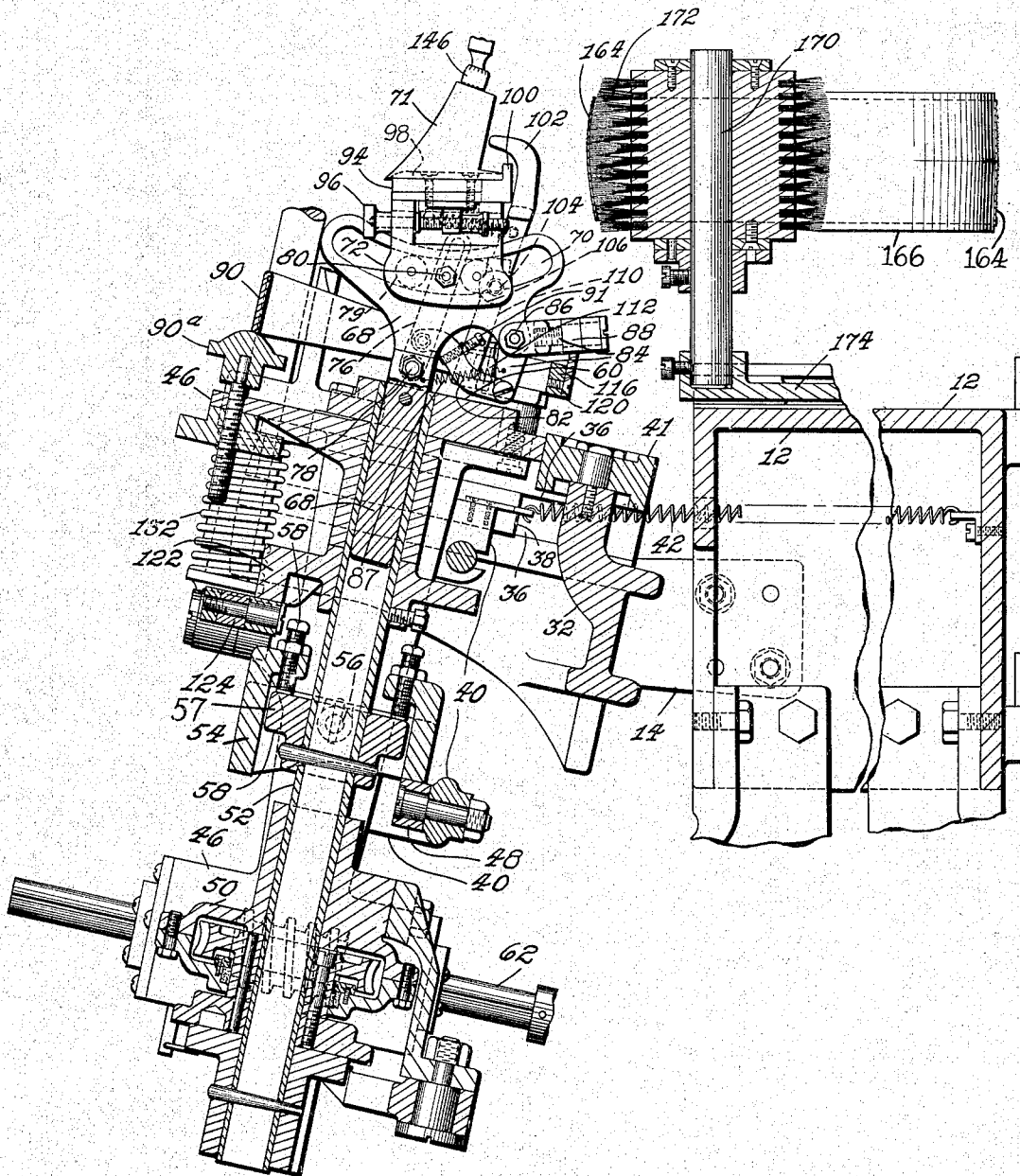
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SCOURING MACHINE

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6 Sheets-Sheet 5

Fig. 7.



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SCOURING MACHINE

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6 Sheets-Sheet 6

Fig. 8

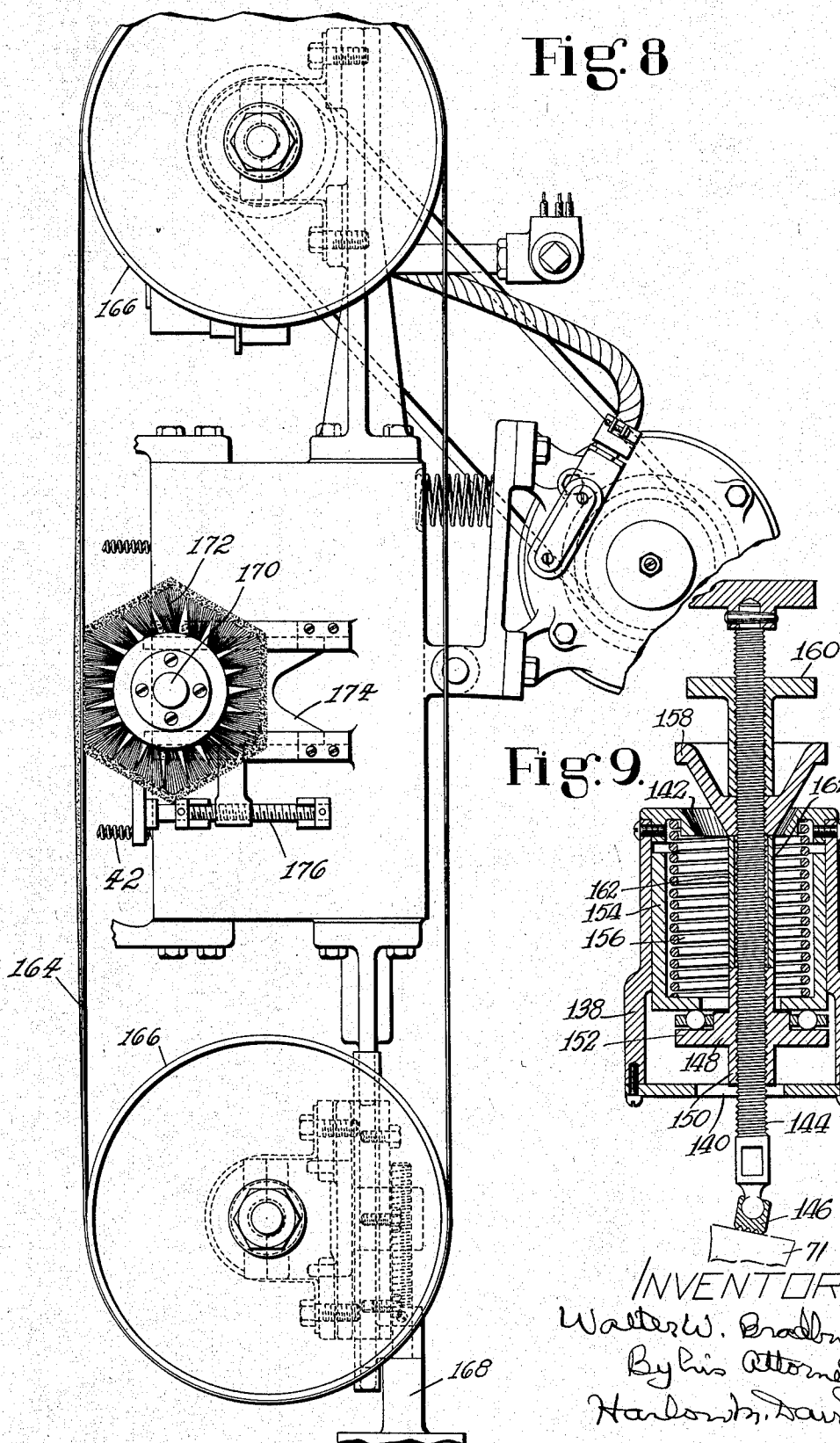
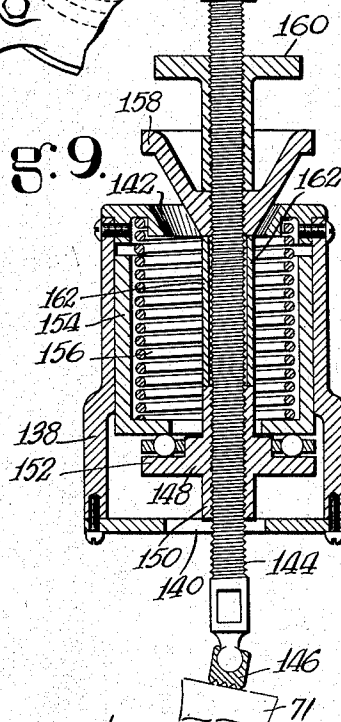


Fig. 9



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UNITED STATES PATENT OFFICE

2,057,290

SCOURING MACHINE

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Application August 27, 1934, Serial No. 741,544

22 Claims. (Cl. 51—144)

This invention relates to heel scouring machines.

In the manufacture of wood heels the side and rear surfaces are cut in two operations, the cuts extending from the breast surface to the center of the back, in order not to cut against the grain of the wood. This always leaves a fine line at the center of the back. For this reason, and occasionally others, it is necessary to scour the heel before it is covered, and the scouring is preferably extended to the entire side and rear surfaces of the heel.

It is an object of the present invention to provide a machine for doing this work. Such a machine must be able to turn the heel past a profiled abrasive member while reproducing, to a satisfactory degree, the somewhat complicated movements of the heel relative to its cutter when the surface to be scoured was originally cut. Further, since the amount of material removed is very small, rapidity of action is feasible, and the machine should be automatic.

With the above considerations in view, the illustrated automatic machine which constitutes a preferred embodiment of the invention is provided with an organization of scouring means and a work support arranged to pass a work piece over the scouring means, the work support, when inoperative, being held in a loading position remote from the scouring means, and an operator-controlled means for terminating the condition just described and actuating the work piece relatively to the scouring means. As the back of the heel approaches the scouring means the heel is tipped in its own vertical longitudinal plane. This tipping movement, cam-controlled, is also utilized in moving the heel support to the loading position, and means is provided, in accordance with a feature of the invention, for inhibiting the action of the cam control, as the newly inserted heel is moved and turned toward the scouring means, at the precise point where the heel is properly tilted for the beginning of the scouring at the breast corner, the control being resumed later in the operation when the rear portion of the heel is being treated: a reverse condition of things obtains at the end of the scouring.

Since it is not necessary, in scouring, to treat the two sides of the heel in the same relation to the grain, it is feasible to simplify the machine and to save time by rotating the heel continuously in the same direction past the scouring tool. To facilitate this the invention provides an improved clamping mechanism which does not

partake of the rotation of the heel nor of the above-mentioned tipping movement of the heel, and thereby avoids interference with the scouring means. This preferably comprises a resilient member floating in its support so as to follow these peculiar movements of the heel without sacrificing its efficiency as a clamp.

These and other features of the invention comprising certain combination and arrangements of parts will be apparent from the following description of a preferred embodiment of the invention shown in the drawings, in which

Fig. 1 is a perspective view;

Fig. 2 is a side elevation;

Fig. 3 is a front elevation of the upper part of the machine;

Fig. 4 is a cross-section of the clamping mechanism at the instant it begins to apply pressure to the heel;

Fig. 5 is a plan view of a detail;

Fig. 6 is a front elevational cross-section of a detail;

Fig. 7 is a front-rear cross-section of the parts shown in Fig. 3;

Fig. 8 is a plan view of the sand belt; and

Fig. 9 is a cross-section of the clamping mechanism as it appears during the sanding operation on a heel.

The main frame 10 carries a block 12 which has bolted to its sides a pair of ears 14. Each of the ears 14 has a guide slot having vertical faces 16. Square blocks 18 are vertically adjustable in these guide slots by means of screws 20. The blocks 18 have arms 22, 24, respectively, the former of which is arranged to coact with an adjusting screw 26 and nut 28, and the latter of which carries an index mark.

The blocks 18 have mounted in them coaxial stub shafts 30 (Fig. 6) on which is pivotally hung a rocking frame 32 having an ear 34 to which the upper end of the screw 26 is pivotally attached. Thus the adjustment of the nut 28 angularly adjusts the frame 32 about the axis of the shafts 30, the extent of adjustment being read on a scale by the index arm 24 (Figs. 1 and 3). The parts are held steady by a clamp nut 35 which clamps the frame 32 to the right-hand block 18.

The frame 32 has guideways 36 extending in a fore-and-aft direction, roughly horizontally, though this orientation is affected by the angular adjustment above described. The guideways 36 embrace sliding ribs 38 on a frame 40, which slides freely in the guideways 36 and is held resiliently in its rearmost position by springs 42, 55

whose rear ends are attached to the main frame 10. The position of the frame 40 is controlled by a roller 41 mounted on the frame 32 and coacting with a cam described later. The frame 40 has a pair of vertical guideways 44 (Fig. 6) in which is freely vertically slidable a frame 46, whose vertical position is controlled by a roller 48 mounted on the frame 40 and coacting with a cam which will be later described.

The frame 46 carries a gear box 50 at its lower end, in which is mounted, rotatably but not slidably, a vertical jack shaft 52 having a bearing also at the upper end of the frame 46. The shaft 52 carries a cam 54 which rides on the roller 48 and thus controls the vertical position of the frame 46, shaft 52 and all that they carry. The cam 54 (Fig. 7) is pivotally carried on pins 56 in a fixed collar 57 mounted on the shaft 52, and is angularly adjustable by means of screws 58. The shaft 52 carries at its upper end a cam collar or "form" 60 coacting with the roller 41 to control the in-and-out position of the frame 40 and all the elements that it carries.

The shaft 52 is driven by a worm and gear shown in Fig. 7, the worm shaft 62 being splined in its worm, and having two universal joints (Fig. 1) connecting it to the drive pulley 64. This structure permits free driving of the worm and shaft 52 in all positions of the shaft, which, as seen, is vertically and horizontally movable, and also angularly adjustable about the axis of the shafts 30. A one-revolution clutch 66 (Fig. 3) is available to connect the shaft 52 to the worm wheel.

The heel handling mechanism or jack is mounted on the upper end of the jack shaft 52. This shaft has a plate member 68 bolted to its upper end. This member 68 has an arc-shaped slot 70, the center of which is located approximately at the top-lift end of a heel blank 71 in the jack. The base of the jack itself is a little carriage 72 straddling the member 68 and having rollers 79, shown in dotted lines in Fig. 7, traveling in the arc-shaped slot 70. This travel tilts the heel blank 71 about a transverse axis passing near its top-lift end, and is controlled by a lever 76 (Figs. 3 and 7) pivoted at 78 on the member 68, and having a slotted upper end engaging a bolt 80 passing through the straddling arms of the jack. The lever 76 is swung by a link 82 pivoted to it and to one arm of a crank lever 84 which is pivoted at 86 on the member 68 and is connected by a spring 87 to the member 68. This spring tends to force the carriage 72 to the left (Fig. 7) and tilts the heel 71 forward. The other arm of the crank lever has a roller 88 which during most of the sanding operation runs on a cam 90 encircling the shaft 52. The cam 90 is pivotally and adjustably (by the screw 90a) mounted in ears 92 mounted on the top plate of the frame 46. The cam 90 thus limits movement of the carriage 72 to the left (Fig. 7). At times, also, movement of the carriage 72 to the left is limited by a screw 91 mounted in the link 82, and coming in contact with the lever 76. This will be described later.

The upper horizontal surface of the carriage 72 carries a slide 94 which is adjustable lengthwise of the carriage by a screw 96, and has mounted on its upper surface a toothed plate 98. Its rear edge is turned up at 100 to form a gage for the heel 71 which sits with its attaching face on the plate 98 and with its lip or breast edge against the gage 100.

The rear end of the plate 98 is slotted (Fig. 3) to permit entering of an ejector arm 102 which is pivotally mounted at 104 on the side of the carriage 72. The ejector has an offset hub 106 acting as a journal for that purpose and is resiliently drawn toward the heel 71 by a spring 108 connected to the carriage 72. An arm 110 having a roller 112 at its lower end projects downward from the hub 106 to operate the ejector 102. With the machine in the loading position, this roller 112 contacts with the cam 116 (Fig. 5) at a portion sufficiently thick to force the arm 110 back against the tension of the spring 108 and to withdraw the ejector 102, thus permitting the untreated heel to be inserted in the machine. As the jack rotates clockwise after loading and clamping the heel the roller 112 is withdrawn from contact with the cam 116 by the backward motion of the carriage 72, thus allowing the ejector 102 to come to rest against the heel 71. After the sanding has been completed and the clamp released the tension of the spring 108 will eject the heel.

The cam 116 may be provided with a tooth 114 to provide for an actual ejecting blow. In such case, after the sanding has been completed, the roll 112 comes around against the tooth 114 and is forced back in a direction parallel to the axis of symmetry of the form 60 which moves it nearer to the axis of the shaft 52 (though not directly toward the shaft) and allows it to pass over the tooth 114. Meanwhile, the ejector arm 102 has been drawn away from the heel 71 against the tension of its spring 108 and as the roll 112 drops over the tooth 114 on to the thin part 118 of the cam 116 it snaps against the heel and ejects it, the clamp having been previously released, as will be seen.

A short arcuate cam 120 is mounted outside the cam 116 with its ends near the ends of the cam 90. This cam 120 is taller than the cam 116 and coacts with the roll 88 at its central portion to hold the jack in loading position. The cam 120, as shown, is not adjustable. It has been found that the upper edge of the cam 116, if properly shaped, will fulfill the function of the cam 120. The choice between the two constructions is largely a matter of manufacturing expense.

The clamping mechanism will now be described. The shaft 52 carries a cam 122 which cooperates with a roll on the end of a lever 124 pivoted at 126 on the frame 46. The other end of the lever 124 is pivotally connected to the lower end of a rod 128 which slides vertically in a boss 130 on the frame 46. A spring 132 between the lower side of the boss 130 and a collar on the rod 128 normally holds the rod down and is strong enough to effect the desired clamping pressure on the heel 71. The rod 128 runs up through another boss 134 mounted on the frame 46, and has an arm 136 at its upper end carrying the pressure mechanism, which is shown in detail in Fig. 4. The arm 136 carries a casing 138 having a cylindrical hole 140 in its bottom and a conical hole 142 in its top. A clamping member, shown as a screw 144, extends through both those holes and has a toothed dog 146 on a ball and socket joint at its lower end to contact with the top-lift end of the heel 71. A nut 148 on the screw 144 has a hub 150 projecting loosely through the hole 140 and has a flange 152 acting as the lower member of a ball race. The upper member 154 of the ball race is of cup-shaped formation with a hole in its bottom to loosely

accommodate an upper hub on the nut 148, and its vertical sides slide freely in the casing 138. A spring 156, which is weaker than the spring 132, is confined between the member 154 and the top of the casing 138.

A cone-shaped nut 158 is mounted on the screw 144 and projects through and fits the hole 142, and above the nut 158 is a jam nut 160. An unthreaded spacing tube 162 is mounted on the screw between the nuts.

When the cam 122 releases the lever 124, the spring 132 pushes down the rod 128 which carries the casing 138 with it. The dog 146 is arrested by striking the heel 71, which stops the screw 144 and the parts threaded on it, while the casing 138 continues to descend, compressing the spring 156. The screw 144 and the parts mounted on it then float freely in the holes 140, 142, under the pressure of the spring 156, and the dog 146 is thus enabled to follow the heel 71 freely in its movement during the rest of the operation cycle, without loss of pressure on the heel 71, which is thus held firmly against the plate 98 at all times except when the cam 122 is operative.

When the heel is finished and the cam 122 has operated to lift the rod 128 and the parts it carries, the conical nut 158 settles into the conical hole 142 and the flange 152 is forced to lie flat against the bottom of the casing 138, thus centering the dog 146 again.

The scouring mechanism is mounted on the member 12 and comprises a sand belt 164 running on two horizontal pulleys 166 which are preferably motor driven and provided with an appropriate belt tightening device 168. Opposite the jack there is mounted an upright stud 170 carrying a normally fixed but rotatively adjustable brush 172. The stud 170 is adjustable toward and from the jack by a slide 174 and screw 176, and the brush 172 is polygonal in form, as shown in Fig. 8, with its different vertical faces trimmed to different heel profiles. In any given situation that side of the brush is turned toward the jack which most nearly corresponds with the profile of the heel then being sanded and the brush yields enough to permit the sand belt to contact properly with the sides and back of the heel.

In using the machine the operator selects that side of the brush 172 which best fits the contour of the heel to be sanded and turns that side of the brush toward the sand belt 164. He will then place an unsanded heel on the plate 98 and treadle the machine. The cam 122 drops the dog 146 on the heel, as above described, as the jack begins to turn clockwise. This first movement brings the left-hand breast edge (as seen by the operator) of the heel toward the sand belt. It is essential that the heel be in just the right position, as regards orientation in its own longitudinal vertical plane, at the instant the sanding begins. If it is tilted forwardly substantially (in the direction in which its breast faces) the top-lift corner will strike the sand belt before the heel has turned sufficiently around its vertical axis to bring the side of the heel to the sand belt, the sanding will begin on the breast side of the top-lift corner, and the top-lift corner will tend to be rounded. A certain amount of this rounding (called "spooling") is desirable on many styles of heels and such formation is actually cut on the top-lift corners by the machine shown in United States Letters Patent No. 1,951,468, granted March 20, 1934, on the application of

L. J. Bazzoni. A proper control of the tilt of the

heel in the instant machine, at the time the heel first encounters the sand belt, enables the machine to follow the spooling previously cut on the heel. This is accomplished by adjusting the screw 91 so as to stop the leftward movement (Fig. 7) and consequent forward tipping of the heel at just the right point as it approaches the sand belt and the top-lift corner is thus turned on the belt just the proper amount before the side of the heel comes to the belt.

Directly after the left-hand breast edge (as seen by the operator in Fig. 7) has been treated by the sand belt, the heel being then turned substantially 90° from the position shown in Fig. 7, the roll 88 rides up on the cam 90 which then controls the position of the carriage 72 and the tilt of the heel until it has turned about 180° into a position the reverse of that described above, and the other breast edge locality of the heel is treated in the same way as that first described. The heel is then ejected in the manner above described and the machine stops.

In order to understand the movements of the heel while being sanded it is necessary to remember that, while the same profile gage will fit at all points around the sides and back of a heel, it fits at different points heightwise of the heel as it is moved around the heel; that is, a certain point on the profile gage will contact with the heel at points farther and farther from the top-lift end as the gage moves from the breast to the back of the heel. The requisite vertical relative movements of the heel and sand belt are secured by the adjustable cam 54 which lifts and lowers the jack shaft 52. The proper in-and-out movement of the heel is effected by the form 60. It has been found that the same form 60 can be used satisfactorily with all heels by making suitable adjustment of the toothed heel-seat plate 98 by means of the screw 96, the deformability of the brush 172 taking care of small inaccuracies.

The jointed construction of the shaft 62 permits free movement of the jack without the disturbance of the drive.

Having described my invention, what I claim as new and desire to secure by Letters Patent of the United States is:

1. A machine for scouring heels and like articles comprising a scouring tool, a work support, a frame in which said work support is rotatably mounted, said frame being mounted for movement toward and from said scouring tool, yieldable means for urging said work support toward said tool to cause a work piece to engage the tool, means for holding said frame in a position removed from said tool to facilitate loading and unloading of said work support, operator-controlled means for terminating the action of said holding means to enable said yieldable means to move said frame toward said tool to bring a heel blank in said work support into engagement with said tool at a breast corner of said heel blank, and means actuated by said operator-controlled means for turning said work support to carry the heel blank over the scouring tool from the said breast corner around its back to the other breast corner, and for then moving said frame back to the starting position and stopping the turning of the work support at the end of a single complete revolution thereof.

2. A machine for scouring heels comprising a normally flat flexible abrasive member, a brush shaped approximately to the contour of a work

piece backing said abrasive member, a work support, a frame in which the work support is rotatably mounted, and mechanism for moving the work support toward and from the abrasive member and for moving it substantially parallel to the abrasive member as the rotation of the work support proceeds, said mechanism operating automatically to hold the work support at a distance from the abrasive member when in loading position and to bring it into operative position after loading.

3. A machine for scouring heels comprising a normally flat flexible abrasive member, a brush shaped approximately to the contour of a work piece backing said abrasive member, a work support, a frame in which the work support is rotatably mounted, and mechanism for moving the work support toward and from the abrasive member and for moving it substantially parallel to the abrasive member and for tilting it progressively as the rotation of the work support proceeds, said mechanism operating automatically to hold the work support at a distance from the abrasive member when in loading position and to bring it into operative position after loading.

4. A machine for scouring heels comprising a normally flat flexible abrasive member, a resilient contoured backing member for said abrasive member, a work support, a frame in which the work support is rotatably mounted, and mechanism for moving the work support toward and from the abrasive member and for tilting it progressively as the rotation of the work support proceeds, said mechanism operating automatically to hold the work support at a distance from the abrasive member when in loading position and to bring it into operative position after loading.

5. A machine for scouring heels comprising a normally flat flexible abrasive member, a resilient contoured backing member for said abrasive member, a work support, a frame in which the work support is rotatably mounted, and cam-controlled slide mechanism for moving the work support translationally relatively to the abrasive member and for tilting it progressively in the longitudinal vertical plane of a heel therein as the treatment of the heel proceeds, said mechanism operating automatically to hold the work support at a distance from the abrasive member when in loading position and to bring it into operative position after loading.

6. A machine for scouring heels comprising a normally flat flexible abrasive member, a resilient contoured backing member for said abrasive member, a work support, a frame in which the work support is rotatably mounted, a slide for moving the work support toward and from the abrasive member, a second slide for moving the work support parallel to the abrasive member, cams for controlling the slides, automatic means for tilting the work support progressively as the treatment of a heel thereon proceeds, and means for rotating the work support continuously through a complete revolution to carry a heel thereon past the abrasive member.

7. In a machine for scouring heels, a tool having substantially the contour of a work piece, a rotatable jack shaft, a work support on the jack shaft, means for tilting said work support during the rotation of the shaft in a plane parallel to the shaft comprising an arcuately slotted guide member and a cam, a frame carrying the jack shaft and arranged for cam-con-

trolled movements toward and from the tool and across the tool during the rotation of the jack shaft, a cam-controlled clamping member for holding a work piece against the work support, a cam-controlled kick-out member operating to remove the work piece when the clamping member has been released, and means for rotating the jack shaft to move a work piece on the work holder past the tool.

8. In a heel making machine, a heel holding jack, a tool, means for rotating the jack past the tool in order to treat the surface of a heel therein, means for tilting the heel in the jack during the rotation, a cam arranged to control the tilting movement during the major part of the time that the heel is in contact with the tool, a second cam for controlling the tilting movement during the time that the heel is not in contact with the tool, and means for inhibiting the action of the last-named cam at the beginning and end of the treatment of a heel by the tool.

9. In a heel making machine, a tool, a jack arranged to carry a heel past the tool, resilient means for tilting the jack as it moves the heel over the tool, a cam for opposing and controlling the resilient tilting means during the greater part of the time the heel is in contact with the tool, a cam roll and a lever cooperating with the cam and jack for the purpose just described, a second cam cooperating with the cam roll during the remainder of the operative cycle of the machine, and an adjustable screw for preventing the falling of the roll on the lower portions of the second cam to inhibit the action of the lower portions of this cam.

10. In a heel scouring machine, a sand belt, a backing brush having a heel profile for the said belt, a jack shaft arranged to move toward and from, and parallel to the surface of, the sand belt, a cam and cooperating means therefor one of which is located on the jack shaft for controlling the said two movements, a heel clamping device, a cam and cooperating means therefor one of which is located on the jack shaft for controlling the clamping device, and means for rotating the jack shaft to carry a heel past the sand belt.

11. In a heel making machine, a tool, a jack comprising a member arranged to support a heel and a clamping member arranged to press the heel against the supporting member, means for rotating the heel around its vertical axis relatively to the tool and to the clamping member, and slides for moving the jack toward and from, and across, the tool.

12. In a heel making machine, a tool, a jack comprising a member arranged to support a heel and a clamping member arranged to press the heel against the supporting member, and means for rotating the heel around its vertical axis and for simultaneously tilting the heel, relatively to the tool and the clamping member.

13. In a heel making machine, a tool, a jack comprising a member arranged to support a heel and a clamping member arranged to press the heel against the supporting member, means for rotating the heel around its vertical axis past the tool, means for tilting the heel in a plane vertical and longitudinal of the heel, and means for translating the heel heightwise and laterally of the heel, while rotation is taking place, the clamping member having the said translational movements, but not having the others.

14. In a heel scouring machine, a scouring

tool, means arranged to support and to rotate a heel about its vertical axis relatively to the scouring tool, and to tilt it forwardly and backwardly during the rotation, and a clamping mechanism comprising a support which does not partake of the movements mentioned and a clamping member resiliently floating on said support and contacting with the heel to hold it against the supporting means.

15. In a heel scouring machine, a scouring tool, means arranged to support and to rotate a heel about its vertical axis relatively to the scouring tool, and to tilt it forwardly and backwardly during the rotation, and a clamping mechanism mounted independently of the heel rotating and tilting means arranged to press the heel toward the heel support and arranged to resiliently follow the movements of the heel due to the action of the rotating and tilting means.

16. In a heel treating machine, a tool, a work support, means for translating, rotating and tilting the work support relatively to the tool, and a clamping mechanism for holding a heel on the work support comprising a supporting member and a clamping member resiliently supported thereby and arranged to float during such support in order to follow movements of a heel on the heel support.

17. In a heel treating machine, a tool, a work support, means for translating, rotating and tilting the work support relatively to the tool, and a clamping mechanism for holding a heel on the work support comprising a casing, a resiliently supported member in the casing, and a clamping member supported by the resiliently supported member and having freedom of movement in a direction transverse to the direction of resilient support to enable the clamping member to follow movements of a heel on the heel support.

18. In a heel treating machine, a tool, a work support, means for translating, rotating and tilting the work support relatively to the tool, and a clamping mechanism for holding a heel on the work support comprising a casing, a resiliently supported member in the casing, and a clamping member longitudinally adjustable relatively to and supported by the resiliently supported member and having freedom of movement in a direction transverse to the direction of resilient support to enable the clamping

member to follow movements of a heel on the heel support.

19. In a heel treating machine, a tool, a work support, means for translating, rotating and tilting the work support relatively to the tool, a clamping mechanism for holding a heel on the work support comprising a supporting member and a clamping member resiliently supported thereby and arranged to float during such support in order to follow movements of a heel on the heel support, and a cam for controlling movement of the supporting member to bring the clamping member into engagement with the heel.

20. In a heel scouring machine, an abrasive sheet, a resilient, profiled backing member therefor, a slide moving toward and from the tool, a second slide moving transversely to the first-named slide, one of these slides being mounted on the other and carrying a jack shaft, cams for controlling the slides, a work support tiltably mounted on the jack shaft, a cam for controlling the tilting movement of the work support, and means for rotating the jack shaft in any position of the slides.

21. In a heel scouring machine, an abrasive sheet, a resilient, profiled backing member therefor, a slide moving toward and from the tool, a second slide moving transversely to the first-named slide, one of these slides being mounted on the other and carrying a jack shaft, cams mounted on the jack shaft for controlling the slides, a work support tiltably mounted on the jack shaft, a cam for controlling the tilting movement of the work support, and means for rotating the jack shaft in any position of the slides.

22. In a heel scouring machine, an abrasive sheet, a resilient, profiled backing member therefor, a slide moving toward and from the tool, a second slide moving transversely to the first-named slide, one of these slides being mounted on the other and carrying a jack shaft, cams for controlling the slides, a work support tiltably mounted on the jack shaft, a cam mounted on that slide which carries the jack shaft for controlling the tilting movement of the work support, and means for rotating the jack shaft in any position of the slides.

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