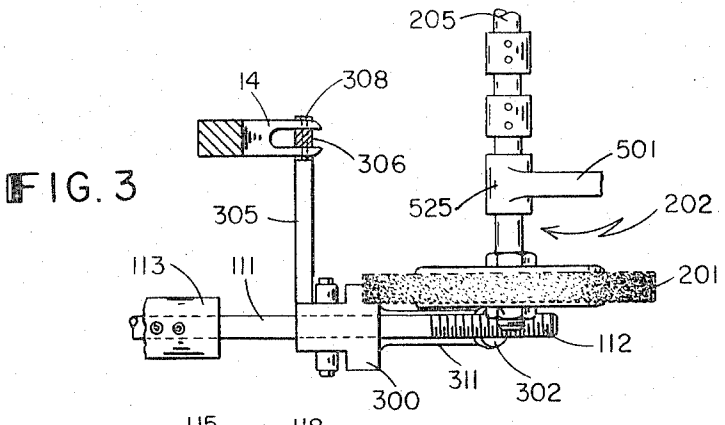
Jan. 17, 1967 M. DZIKI ET AL 3,298,048

MACHINE FOR ROUGHENING THE MARGIN OF THE BOTTOM OF A SHOE

Filed Aug. 14, 1963 3 Sheets-Sheet 1

FIG. 3



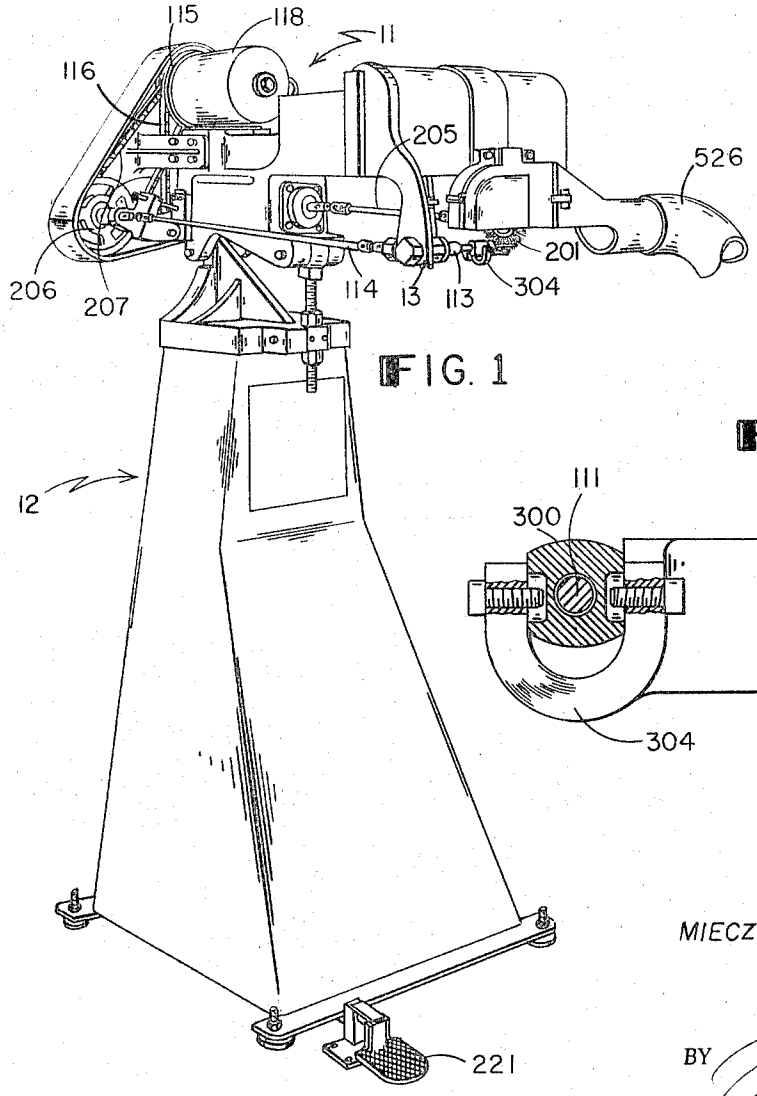


FIG. 1

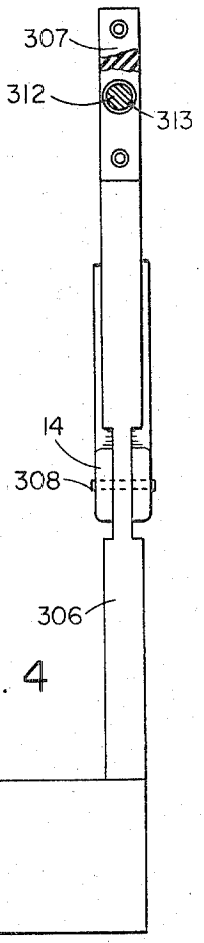


FIG. 4

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MACHINE FOR ROUGHENING THE MARGIN OF THE BOTTOM OF A SHOE

Filed Aug. 14, 1963 3 Sheets-Sheet 2

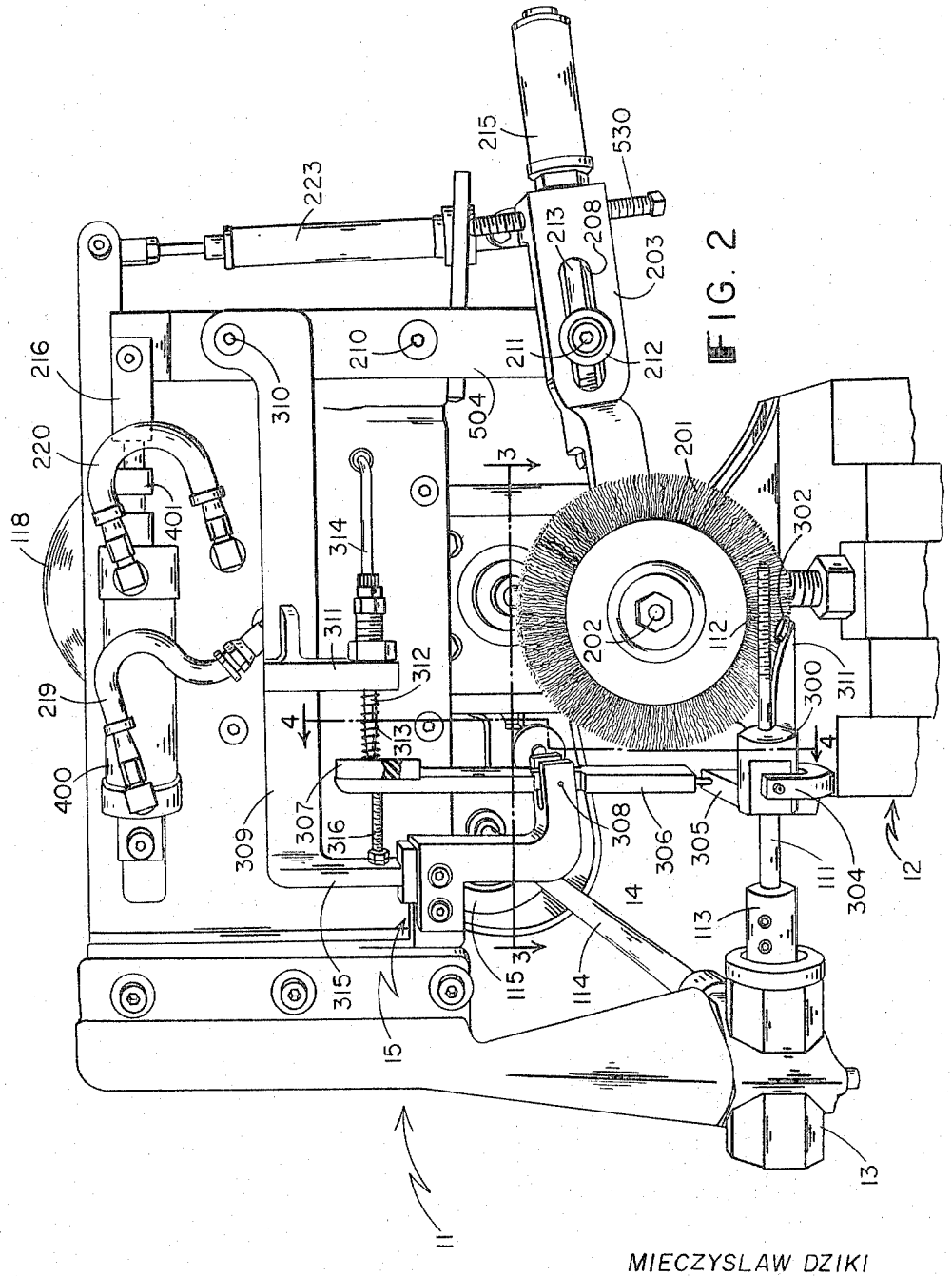

FIG. 2

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MACHINE FOR ROUGHENING THE MARGIN OF THE BOTTOM OF A SHOE

Filed Aug. 14, 1963 3 Sheets-Sheet 3

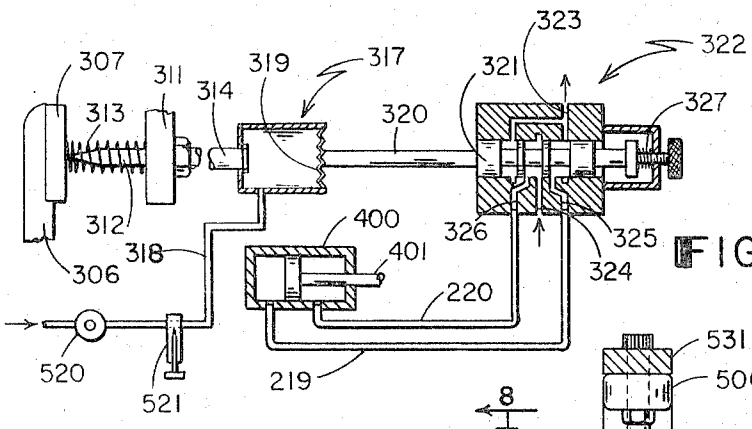
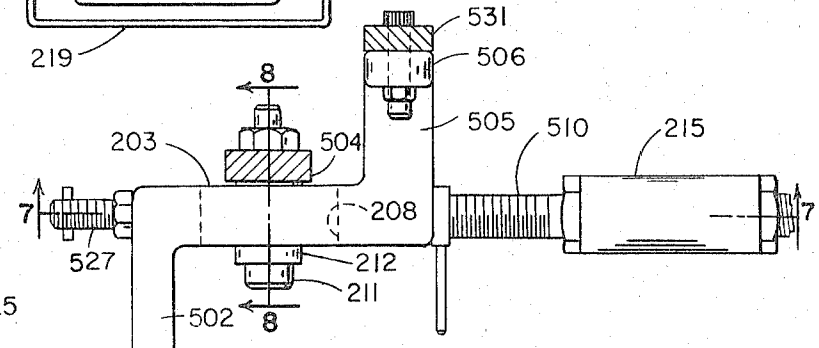


FIG. 5



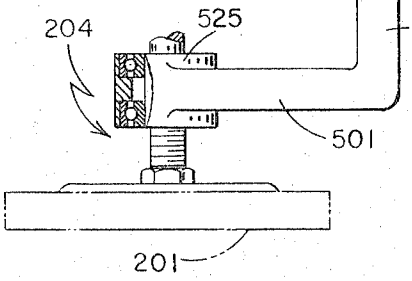


FIG. 6

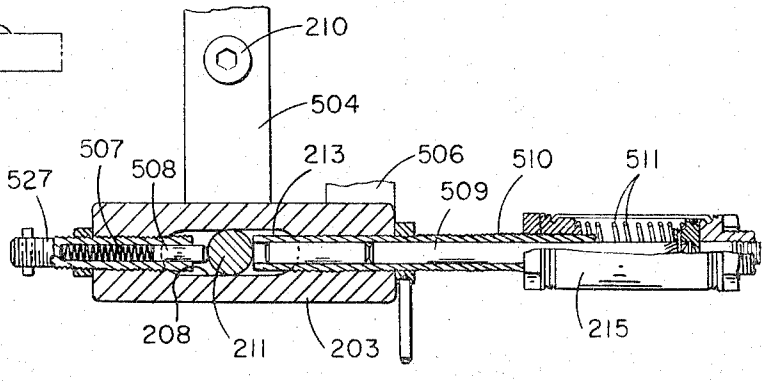


FIG. 7

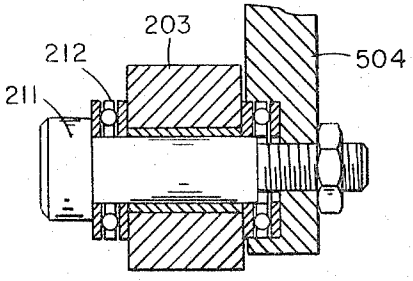


FIG. 8

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United States Patent Office 3,298,048
Patented Jan. 17, 1967

3,298,048

MACHINE FOR ROUGHENING THE MARGIN OF THE BOTTOM OF A SHOE

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Filed Aug. 14, 1963, Ser. No. 302,144
14 Claims. (Cl. 12—17)

This invention relates to a machine having a tool operable on a work-piece, wherein the work-piece causes the tool to move in accordance with the change in width of the work-piece. More particularly, it relates to a machine wherein there is a horizontally movable tool, a horizontally movable sensing member actuable by the edge of a work-piece moving towards the tool and a means for causing the tool to move horizontally in response to the horizontal motion of the sensing member.

This invention has particular application to a machine for roughing the overlasted margin portion of an upper lying on a shoe bottom. Roughing of this folded-over marginal portion of the upper leather is necessary to smooth the wrinkles and in order to have a suitable surface for cementing the outer sole.

Prior to the present invention, roughening of the margin of the bottom of the shoe prior to cementing consisted generally of the operator holding the shoe in his hand and facing the margin to be roughened against a rotating wire brush. Such a method requires great skill in order to control the width of the margin to be roughened and in order to avoid scoring or scarring any of the upper leather of the shoe.

One object of this invention is to provide a machine which will roughen the margin of the bottom of the shoe, permit accurate control of the margin width and avoid scoring the upper leather.

Another object of this invention is to provide such a machine which can be operated with a minimum of skill and which will be rapid and reproducible.

Other objects and advantages of this invention will be apparent from the specifications and claims which follow, together with the appended drawings wherein:

FIG. 1 is a perspective view of a machine made in accordance with this invention.

FIG. 2 is a frontal view of the top portion of the machine, with the casing removed.

FIG. 3 is a plan view along line 3—3 of FIG. 2.

FIG. 4 is a side view along line 4—4 of FIG. 2.

FIG. 5 is a schematic diagram showing the air-oil cycle.

FIG. 6 is a plan view of the lower portion of FIG. 2.

FIG. 7 is a section along line 7—7 of FIG. 6.

FIG. 8 is a section along line 8—8 of FIG. 6.

The invention comprises in one form a horizontally movable tool which is constantly rotating but is movable horizontally, a horizontally movable sensing member which is actuable by the motion of the edge of a work-piece as it is fed to the tool, and a means which causes the tool to move horizontally in response to the horizontal motion of the sensing member. In particular the invention comprises a rotatable wire brush which is movable horizontally, a rotating horizontal feed screw which is in a fixed position in front of said brush, a sensing member which is slideable on the feed screw, and means for causing the wire brush to follow the motion of the sensing member. A horizontal extension of the sensing member is positioned below the feed screw and is arranged so that when an operator pushes the shoe against and past the bottom of the feed screw and towards the brush, the sensing member will move laterally in accordance with the change in width of the shoe bottom. As the sensing member, for example, moves to the left, so does the wire wheel which is directly behind the feed screw move to the left so that there is automatic control of where the wire brush will contact the bottom of the shoe.

One feature of this invention is the provision of a shoe roughing machine where a rotatable wire brush is movable vertically, with means for limiting the downward motion of the brush and resilient means for restoring the brush to its downward limiting position. Another feature of this invention is a shoe roughing machine comprising a rotatable wire brush capable of moving both horizontally and vertically and having means for limiting the downward motion of the brush and resilient means for restoring the brush to its downward limiting position, a horizontally movable sensing member actuable by the edge of a work-piece moving to the brush and means for causing the brush to move horizontally in response to the horizontal motion of the sensing member.

A further feature of this invention is a control mechanism comprising in combination an air chamber provided with an inward flow of air at a selected pressure and having one thin flexible wall. There is an outlet conduit leading from the chamber and having an orifice open to the atmosphere. The mechanism includes a closing member capable of blocking the orifice so as to reduce the flow of air from the orifice. There is also provided means connecting the thin flexible wall to the spool of a directional control valve. This valve operates a fluid pressure means which includes means for a desired operation and also means for restoring the relative original position of the closing member and the orifice. As used in the roughing machine of this invention this control mechanism provides a sensitive control for adjusting the position of the wire brush to the change in width of a shoe bottom as it is fed to the brush, thus providing a constant width marginal roughing by the brush.

Another feature of this invention is the provision of means for independently moving the wire brush horizontally during the actual roughening operation. The purpose of this is to allow a change in the width of a margin which may be required by a certain shape of shoe. This is preferably accomplished by foot pedal operated air pressure means which causes the rotating wire brush support to move in a horizontal direction.

Referring now to the drawings, the frame of the machine illustrated therein comprises a hinged upper portion **11** mounted on a base **12**. The depending frame extension **13** supports a horizontal rotatable feed rod, **111**, which terminates in a threaded end, **112**. The rod **111** held by socket **13** is coupled to a double-universal jointed drive shaft **114** which is in turn connected to the shaft of a pulley, **206**. Wheel **206** is driven by chain **207** connected to a double pulley **115** on the shaft of motor **118**.

A circular wire brush **201** is mounted on a shaft **202** supported by a brush holder member, **203**. The shaft **202** is connected by a universal joint to a shaft **205** which in turn is connected to another universal joint coupled to the shaft of a pulley (not shown) connected by chain **116** to pulley **115**. Because of these universal joints, the wire brush **201** can be moved in various horizontal and vertical positions without affecting the rotation of the wire brush.

Mounted on the rod **111** is a sensing member **300**. The sensing member has a body portion which is slideable on the smooth portion of rod **111** and also has a horizontal extension below the rod and extending to a point below the approximate middle portion of the threaded portion **112** of the feed rod **111**. This horizontal extension **301** has at its terminus a steel roller **302**. The threaded portion **112** acts as the upper guide while the steel roller **302** acts as the left lateral guide for the operator who is inserting the bottom of the shoe for roughening. The body portion of the sensing member **300** has vertical slots **303** which are cooperable with rods **304***a* and **304***b*

of yoke **304**. To the inner side of yoke **304** is attached a transverse horizontal bar **305** which terminates in a vertical fixed rod **306**. Rod **306** is pivotally supported by pin **308** which is held by the forked depending projection of the frame extension **14**. The upper end of the vertical rod **306** has a rubber facing **307** on one side. The rubber facing **307** of the rod **306** is engagable with the orifice of air jet **312** surrounded by spring **313** and supported by a depending projection **311** of a horizontal, elongated member **309**.

Member **309** has a terminal depending portion **315** which has a smooth bottom plate slideably supported on the flat upper surface **15** of the frame extension **14**. The other end of the horizontal member **309** is pivotally supported by pin **310** mounted on vertical member **209**. Extending from the depending portion **315** is a horizontal rod **316** which acts as a stop for the face of the vertical rod **306** opposite to that of the rubber section.

Vertical member **504** is pivotally connected to the frame of the machine at **210**. The bottom portion of member **504** has a transverse rod **211** extending through a slot **208** in horizontal member **203**, and terminating in a head **212**. The frame **203** which supports the wire brush **201** has an extension rod **213** connected to the piston of an air cylinder **215** which in turn is actuable and releasable by a foot pedal **221** connected to the cylinder **215** by an air line.

The brush holder member **203** has a double bent arm **502–501** terminating in a sleeve **525** surrounding shaft **202**. Air cylinder **215** has a spring **511** acting on a piston rod **510** which is threadably horizontally inserted through **203** into the slot portion **208** so as to abut rod **211**. Abutting the other side of the rod **211** and in line with the shaft of the piston **510** is a rod **508** backed by a spring **507** within a hollow rod **527** threadably horizontally inserted through **203** into the other side of the slot **208**. Pressure on pedal **221** causes air to be admitted to cylinder **215** causing piston rod **510** to pull frame **203** (and brush **201**) to the right, sliding on rod **211**. This pushes rod **508** against rod **211** and compresses spring **507**. Release of the pedal allows the air to exhaust from the cylinder **215** permitting spring **507** and cylinder spring **511** to restore **203** and brush **201** to the position prior to applying the foot pedal. Thus, independently controlled horizontal motion of the rotating wire brush is provided.

When the bottom of the shoe is placed against the bottom of the threaded feed rod **112**, and against the roller **302** of the sensor member **300**, pushing the shoe in this position towards the wire brush provides controlled width roughening of the margin of the bottom of the shoe. If, for example, the toe end is fed first, as the toe widens, the sensor **300** is slid somewhat to the left. Instantaneously this causes the vertical rod **306** to pivot and cause the resilient section **307** to block the opening of air jet **312**. When the opening of air jet **312** is blocked, this causes a temporary increase in pressure which is transmitted through air line **314** to chamber **317**. A constant air supply of about 5 to 10 lbs. pressure is normally being fed into chamber **317** by air supply line **318** from regulator valve **520** and needle valve **521**. The increase in pressure in the chamber **317** acts to move the diaphragm **319**. Diaphragm **319** is connected by a rod **320** to the spool **321** of a 4-way oil valve **322**. This oil valve **322** normally maintains the piston **401** to the left in oil cylinder **400**. When the diaphragm **319** is expanded by the increase in air pressure caused by blocking the orifice of jet **313**, it causes the rod **320** to move spool **321** to the right. Thus, the oil flow which normally goes into port **324**, out through port **326**, into line **220** and then to the right side of the piston **401**, is reversed. The oil now momentarily flows out through port **325** into line **219** to the left side of piston **401**, and the exhaust port **323** is connected to the port **326** rather than to port **325**. This causes piston **401** to move to the right. Piston **401** is coupled to bar **216** which, being pivotally connected to vertical bar **209** causes the top end of bar **209** to move to the right. The lower end of bar **209**, pivoting on pin **210** moves assembly **203**, and hence wire brush **201** to the left. At the same time, horizontal member **309**, pivoting on pin **310**, is moved to the right so as to disengage **307** from **313** and restore their relative original positions. This in turn restores the air-oil control system to its original position.

Another feature of this invention is the ability of the machine to adjust to the change in contour of the bottom of the shoe as it passes under the wire brush. Thus, the pressure of the shoe can cause the brush to rise slightly and then be restored as the contour recedes. This is accomplished by means of the double-acting air cylinder **223** which is regulated so as to provide a constant upward pull on the extension **504** of the member **203**. The bolt **530** acts as a stop. Thus, if the contour of the shoe causes the brush to rise, the pull of the piston in cylinder **223** acts as a resilient means for pushing the brush down to the limiting position of the stop **530**.

Inasmuch as the operation of roughing with a rotating wire brush or the like causes the formation of flying particles of upper material, means for shielding and removal of the particles is recommended. Thus, in FIG. 1 a casing **526** is shown providing a pocket for approximately the upper half of the brush **201** and leading to a conduit (shown partially) which is provided with suction means (not shown) for removing the particles.

While a preferred embodiment of our invention has been described in detail, it will be understood that we do not wish to be limited to the particular construction set forth, since various changes in the form, proportions and arrangement of parts, and in the detail of construction may be resorted to without departing from the spirit and scope of the invention, or destroying any of the advantages contained in the same, heretofore described and defined in the following claims.

We claim:

1. A machine comprising in combination: a horizontally movable tool; a fixed guide member spaced in front of said tool; a horizontally movable sensing member adjacent to said guide member and actuable by the edge of a work piece moving in contact with said guide member towards said tool; and means causing said tool to move horizontally in response to the horizontal motion of said sensing member.

2. The machine of claim **1** wherein said guide member is a horizontal, rotatable rod.

3. The machine of claim **1** wherein said guide member is a horizontal, rotatable rod and said sensing member is slideably mounted on said rod.

4. A roughening machine comprising in combination: a fixed horizontal rotatable rod; a horizontally movable rotatable roughing tool spaced to the rear of said rod; a horizontally movable sensing member adjacent said rod and actuable by the edge of a work piece moving in contact with said rod towards said tool; and means causing said tool to move horizontally in response to the horizontal motion of said sensing member.

5. The machine of claim **4** wherein said sensing member is slideably mounted on said rod.

6. A control mechanism comprising in combination: an air chamber provided with an inward flow of air at a selected pressure and having one thin flexible wall; an outlet conduit leading from said chamber and having an orifice open to the atmosphere; sensing means including a closing member capable of blocking said orifice so as to reduce the flow of air from said orifice; means connecting said wall to the spool of a directional control valve; a fluid pressure means operable by said valve; and means actuable by said fluid pressure means including operating means and means to restore the relative original position of said closing member and said orifice.

7. A roughening machine, comprising in combination: a vertically movable, rotatable wire brush, means for limiting the downward motion of said brush, and resilient means for restoring said brush to its downward limiting position.

8. A roughening machine comprising in combination: a rotatable wire brush capable of moving both horizontally and vertically; means for limiting the downward motion of said brush, and resilient means for restoring said brush to its downward limiting position; a horizontally-movable sensing member actuable by the edge of a work piece moving towards said brush; and means causing said brush to move horizontally in response to the horizontal motion of said sensing member.

9. The machine of claim 8 wherein additional means are provided to cause horizontal motion of said brush independently of said sensing member.

10. A roughening machine comprising in combination: a rotatable wire brush capable of moving both horizontally and vertically, means for limiting the downward motion of said brush, resilient means for restoring said brush to its downward limiting position, a fixed horizontal rotatable rod spaced in front of said brush, a horizontally movable sensing member slideably mounted on said rod and actuable by the edge of a work piece moving in contact with said rod towards said brush, and means causing said brush to move horizontally in response to the horizontal motion of said sensing member.

11. The machine of claim 10 wherein said latter means comprises fluid pressure means.

12. The machine of claim 10 wherein said rod has threading normally feeding a work piece towards said brush when said work piece is pressed up against said rod.

13. The machine of claim 10 wherein additional means are provided to cause horizontal motion of said brush independently of said sensing member.

14. The machine of claim 10 wherein said brush moving means comprises: an air chamber provided with an inward flow of air at a selected pressure and having one thin, flexible wall; an outlet conduit leading from said chamber and having an orifice open to the atmosphere; a closing member actuable by said sensing member and capable of blocking said orifice so as to reduce the flow of air from said orifice; means connecting said wall to the spool of a directional control valve; a fluid pressure means operable by said valve; and means operable by said fluid pressure means including means causing said brush to move horizontally and means to restore the relative original position of said closing member and said orifice.

References Cited by the Examiner

UNITED STATES PATENTS

2,231,134	2/1941	Marchetta et al.	12—1
2,879,745	3/1959	Brown	91—421
3,119,133	1/1961	Smalley et al.	12—17

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