Nov. 24, 1953 W. C. BURT 2,660,007

SURFACE FINISHING MACHINE

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Fig. 1.

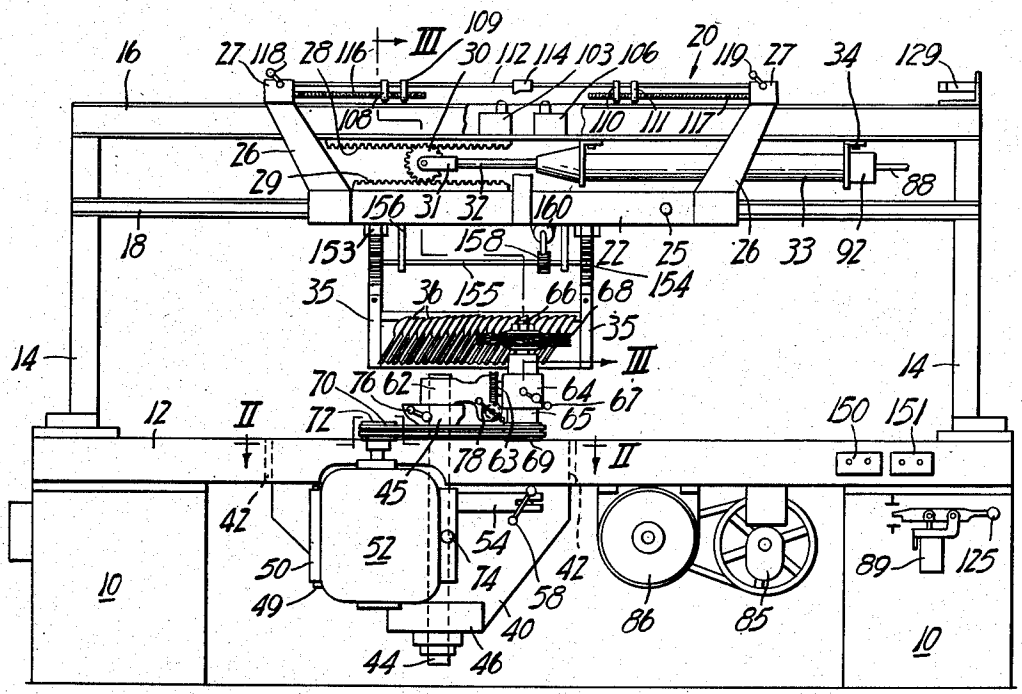


Fig. 4

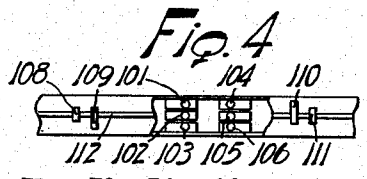
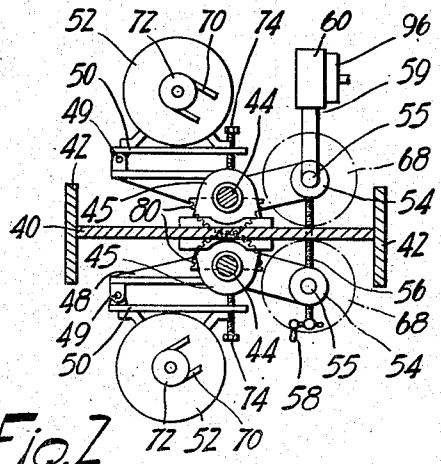


Fig. 2



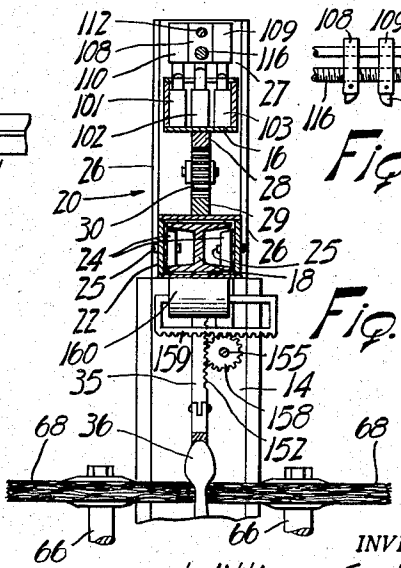


Fig. 3.
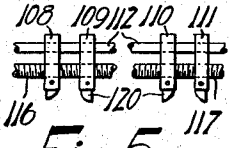


Fig. 5.

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Fig. 6.

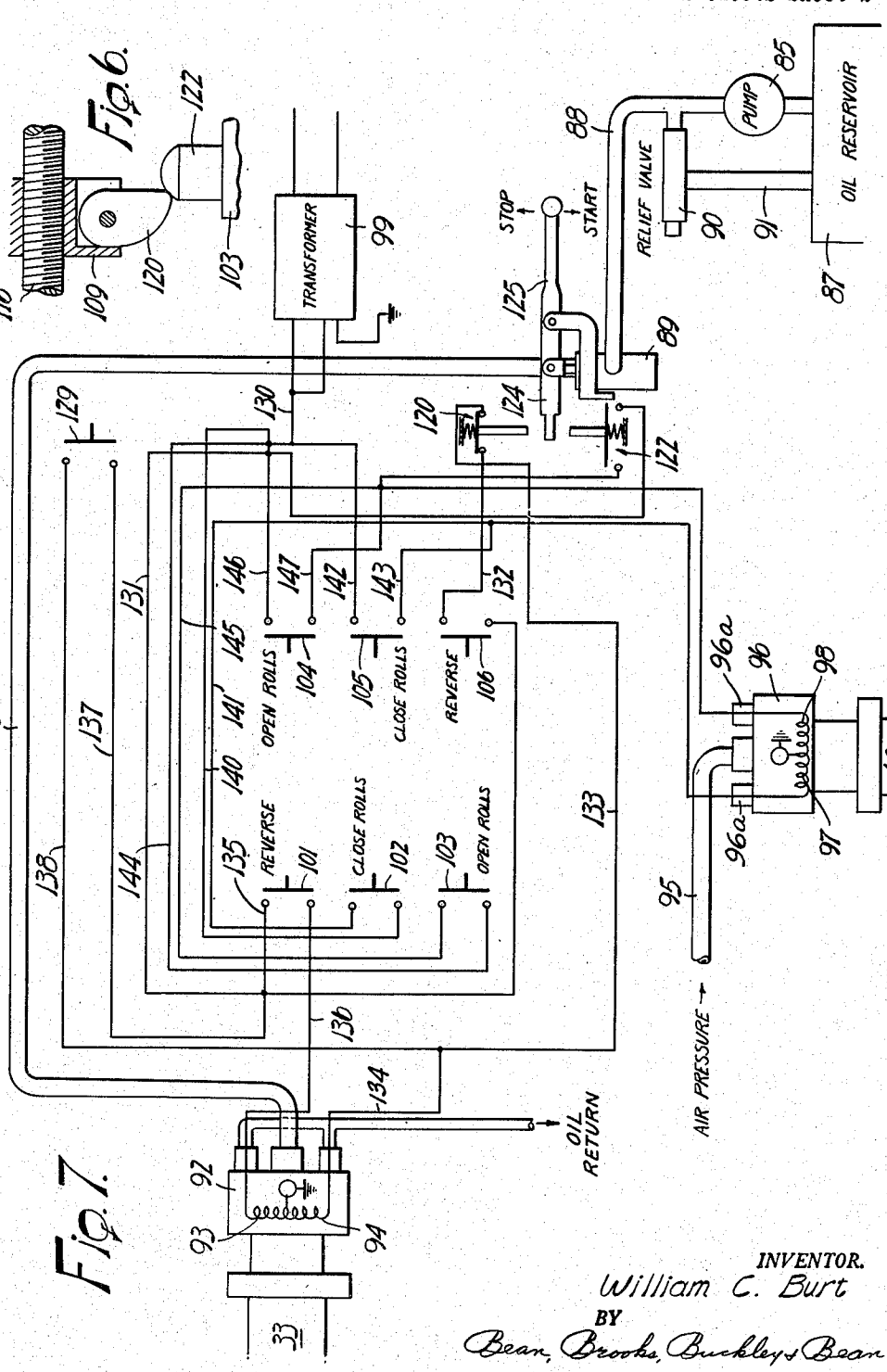


Fig. 7.

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2,660,007

SURFACE FINISHING MACHINE

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Application May 5, 1950, Serial No. 160,291

8 Claims. (Cl. 51—84)

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This invention relates to surface finishing machines of the type adapted for glazing or polishing articles of manufacture such as hardware or cutlery pieces or the like; and more particularly to machines for surface finishing side or "shoulder" portions of irregularly shaped articles such as forks or spoons or the like when mounted in "gangs" for batch processing.

One of the objects of the invention is to provide an improved glazing or polishing machine adapted to mount a batch of articles of manufacture, such as a series of tablespoons or forks or the like in row formation, and to move such row of articles back and forth between rotating paired buffing rolls.

Another object of the invention is to provide a machine of the character aforesaid which is controlled for automatic operation in improved manner.

Another object of the invention is to provide an improved machine of the character aforesaid which incorporates improved adjusting facilities so as to readily suit the machine to various types of work.

Another object of the invention is to provide a machine as aforesaid which is relatively inexpensive to manufacture and which is rugged and fool-proof in operation, and which incorporates improved safety provisions for protection of the machine attendant.

Other objects and advantages of the invention will appear from the specification hereinafter.

In the drawing:

Fig. 1 is a side elevation of a machine of the invention;

Fig. 2 is a fragmentary section taken along the line II—II of Fig. 1;

Fig. 3 is a fragmentary section, on an enlarged scale, taken along line III—III of Fig. 1;

Fig. 4 is a fragmentary top plan of a portion of the electrical control mechanism of the machine;

Fig. 5 is a fragmentary elevation of the portion of the control mechanism of Fig. 4;

Fig. 6 is a detail of one portion of the control mechanism of Fig. 5; and

Fig. 7 is a schematic diagram of the pneumatic-hydraulic-electrical control circuits of the mechanism.

As illustrated in Fig. 1 the invention is embodied in a machine comprising a pair of base supports 10—10 which carry a horizontal platform 12 above which extend opposite end pedestals 14—14 rigidly interconnected at their top ends by means of a cap piece 16 which as illustrated in Fig. 3 may conveniently comprise a box beam fabrication. A rail 18 also extends between the pedestals 14—14 in spaced relation below the cap piece 16 and parallel thereto; and as illustrated in Fig. 3 may conveniently comprise an I beam or the like.

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A work piece carrying frame designated generally by the numeral 20 is illustrated to comprise a box shaped bottom housing portion 22 which encloses the rail 18 in free sliding relation thereon, and mounts rollers 24 therein by means of pins 25; the rollers 24 being arranged to run upon the flange portions of the rail 18 so as to thereby mount the housing portion 22 in free sliding and accurately guided relation thereon. Opposite side arms 26 extend upwardly from the ends of the housing 22 to straddle the cap piece 16; and the arms 26—26 at opposite ends of the device are interconnected by spacer blocks 27 to complete the framing of the unit 20 which stabilizes it in longitudinally free sliding relation on the slide rail 18. The cap piece 16 mounts a gear rack 28 at its under surface while the frame portion 22 mounts a similar gear rack 29 and a gear wheel 30 is disposed in meshing relation therebetween. The gear 30 is connected by means of a pivot clevis device 31 to the piston rod 32 of a hydraulic jack 33 which is mounted stationarily upon the cap piece 16 as indicated at 34. Thus, it will be appreciated that alternate reverse direction operation of the hydraulic jack 33 will force the gear wheel 30 to roll in corresponding opposite directions upon the stationary rack 28, thereby in turn imparting motion to the frame 20 at twice the speed of motion of the piston rod.

A work holder of any suitable type such as shown in the drawing may comprise a frame 35 detachably mounted to extend below the frame 20 and to have racked thereon a series of articles to be finished, such as a series of tablespoons as indicated at 36; and thus it will be appreciated that upon reciprocation of the carriage 20 from right to left and from left to right, as illustrated in Fig. 1, the spoon blanks 36 will be similarly carried to reciprocate for the glazing or polishing operations upon the shoulder portions thereof, as will be explained hereinafter.

The platform portion 12 of the machine frame supports in integral relation a downwardly extending base plate 40 which is conveniently fabricated to the platform 12 by welding and braced by means of transverse web plates 42—42, or other suitable means. Thus, the base plate 40 is disposed to extend vertically and in longitu-

dinal alignment with the machine frame, and mounts at opposite sides thereof vertically extending shafts 44—44 by means of bearing blocks 45—46; the shafts 44 extending both above and below the elevation of the platform portion 12. Below the level of the platform 12 each of the shafts 44 carries in keyed relation therewith a vertically disposed bracket plate 48 which carries a hinge device 49 pivotally connecting the bracket 48 to a motor base plate 50 upon which is mounted an electric motor 52. Also, each of the shafts 44 mounts in keyed relation thereon and below the level of the platform 12, a crank arm 54 which carries at its outer end a pivot pin 55. One of the pins 55 is bored and screwthreaded to receive therein a threaded rod 56 (Fig. 2) which carries at one end an adjustment handle 58 and is arranged to abut at its other end against a shoulder portion of the other crank arm, so as to thereby limit the degree to which the crank arms 54—54 may move toward each other, for purposes to be explained hereinafter. The other crank arm connects by means of its pivot pin device to a piston rod 59 to a pneumatic cylinder 60.

At their upper ends the shafts 44—44 mount arms 62 (Fig. 1) which extend radially therefrom parallel to the corresponding crank arms 54—54 disposed therebelow; each of the arms 62 carrying at its outer end an extension shaft piece 63 terminating in a cylindrical cuff portion 64 which mounts in vertically extending relation therethrough a vertically splined telescopic bearing sleeve 65. The object of the adjustable bearing is to facilitate vertical adjustment of the buffing wheel 68 by means of the handle 67 while maintaining a driving relation between the wheel and the pulley 69 over which the belt 70 trains. Preferably vertical adjustment is made without requiring change in the vertical position of the pulley, as by use of a spline shaft device or the like, which is of a conventional construction of the type used in drill presses. Thus, it will be appreciated that operation of the motors 52—52 will drive the polishing or glazing wheels 68 to rotate for glazing or polishing the work pieces 36 whenever the frame 20 is operated to pass the work holder rack 35 backward and forward between the wheels 68. Set screws 74 are arranged to extend between the motor plates 50 and the brackets 48 so as to permit adjustments thereof for tension adjustments of the drive belts 70. A gear arrangement is provided in one of the bearing pedestals 45 and controlled by a hand crank 76 (Fig. 1) for lateral swinging adjustments of the wheel carrying arm 62 so as to permit adjustments of one of the arms relative to the gear device 80—80 so as to compensate for unequal wear of the work surfaces of the polishing wheels so that the wheels will always close in accurately centered relation upon the work carriage; and the arms 62 carry gear devices operated by hand cranks 78 for rotating the extension shafts 63 relative to the arms 62, to provide for angular adjustments of the working surfaces of the wheels 68 to suit the machine to differently shaped work pieces.

The crank arms 54—54 are fitted at their inner ends adjacent the shafts 44—44 with gear segments 89—89 which intermesh and thereby drive both of the shafts 44—44 in synchronism in response to operation of the pneumatic cylinder 60. Thus, it will be understood that upon operation of the cylinder 60 the arms 54—54 will be thereby actuated so as to rock the vertical shafts 44—44 about their axes, causing the polishing wheels 68—68 to be correspondingly displaced toward or away from each other while the entire motor and mounting bracket assemblies also pivot with the respective shafts 44—44 to maintain the polishing wheels and driving motors in proper positional relation. Thus, the polishing wheels 68—68 may be "opened" and "closed" incidental to each polishing or glazing operation so as to retract away from the path of movement of the work holder frame 35 back and forth between the wheels and to come together for working contact with the work pieces when the holder has "cleared" the wheels. In this manner the wheels 68—68 may be positioned to polish relatively narrow work pieces such as the illustrated spoons 36 and yet clear the relatively wider work holder frame end portions. However, as explained hereinabove, the adjustment screw 56 is manually controlled by the handle 58, and so may be set to limit the degree of movement of the polishing wheels 68—68 toward one another whenever the cylinder 60 is actuated to bring the wheels together; thereby fixing the gap between the wheels 68—68 to the desired width, depending upon the shape and size of the work pieces to be handled.

The work piece carriage motivating mechanism of the invention includes a suitable hydraulic pressure supply source such as a pump 85 (Figs. 1 and 7) driven by a motor 86, drawing oil from a reservoir 87 (Fig. 7) and delivering oil under pressure to the hydraulic jack 33 through a conduit 88. Passage of oil through the conduit 88 is controlled by a valve 89, and a relief valve 90 and return conduit 91 is arranged in conjunction with the conduit 88 ahead of the control valve 89 so as to permit the pressured oil to circulate whenever the valve 89 is closed so that the pump may operate continuously. The conduit 88 leads from the valve 89 to a two-way valve 92 which is controlled by a pair of solenoids 93—94 to deliver oil under pressure and to permit oil return alternately to opposite ends of the hydraulic cylinder 33 upon corresponding shifting of the solenoid controlled valve. The polishing wheel control cylinder 60 is arranged to be powered by any suitable air pressure source such as a conduit 95 which leads to the intake port of a two-way valve 96 which is controlled by a pair of solenoids 97—98 for alternate introduction of air under pressure into the opposite ends of the cylinder 60. The valve 96 includes exhaust ports 96a which may simply exhaust to the atmosphere as shown. The solenoids 93—94 and 97—98 are arranged to be energized from a suitable power source such as a transformer 99 by means of a control system as will be described hereinafter.

A group of microswitches as indicated at 101, 102, 103, 104, 105, 106 are mounted within the top rail 16 with the actuating button portions thereof directed upwardly for contact with depending toe portions of control devices designated 108, 109, 110, 111, respectively (Figs. 1, 3, 4, 5). The control devices 108, 109, 110, 111 are slidably carried upon a slide rod 112 which extends between the end block portions 27—27 of the frame 20, and the slide rod 112 is preferably supported intermediately of its ends by means of a vertical strut 114 (Fig. 1) extending from the lower frame member 22. Furthermore, the control device 108, 109, 110, 111 are positionally regulated by means of screw devices 116, 117 which are rotatably mounted to extend from the end blocks 27—27

and to be controlled by corresponding hand cranks 118, 119, so that the positions of the control members 108, 109, 110, 111 may be manually regulated relative to the frame strucure 20. As illustrated in further detail in Figs. 5 and 6, the control devices each include a main body portion subtended by a toe which is designated in Fig. 6 at 120 and which normally droops straight downwardly from its pivotal connection with the main body portion thereof and is pivotable thereon in only one direction.

Thus, whenever the toe is being displaced by movement of the carriage 20 longitudinally of the machine so as to bring the straight-sided portion of the toe into abutting relation against the top crowned end portion of the actuating button of one of the microswitches as indicated at 122 in Fig. 6, the toe is prevented by the body portion as indicated at 109 from pivoting about its connection therewith and is thereby forced to press firmly against the crowned top portion of the microswitch actuator so as to depress the latter as the toe passes over the position of the microswitch, thereby momentarily closing the switch. However, it will be appreciated that upon subsequent return movement of the carriage over the position of the microswitch the toe will be permitted to pivot freely upon its connection with the body portion 109 so that it simply rides over the crowned top portion of the microswitch actuator thereby avoiding operation of the switch.

As illustrated in Fig. 5, the pivoted toe portions of the actuator devices 109 and 111 are faced in the direction as illustrated in Fig. 6, while the toe portions of the actuators 108 and 110 face in the opposite direction; and as illustrated in Fig. 4, the actuators 108 and 111 are in longitudinal alignment with the centrally disposed microswitches 102 and 105, while the actuator 109 is in longitudinal alignment with the switches 103 and 106 and the actuator 110 is in alignment with the switches 101 and 104.

As illustrated by Fig. 7, the microswitches 101, 102, 103, 104, 105, 106 are arranged to control electrical circuits deriving energy from the transformer 99 through suitable conductor and ground connections, for alternate two-way actuations of the hydraulic and pneumatic control valves 92—96, respectively. For this purpose the circuits include a normally closed microswitch 120 and a normally open microswitch 122, both of which are arranged adjacent a moving end portion 124 of a control handle 125 which is operably connected to the hydraulic control valve 89 referred to hereinabove. Thus, as illustrated in Figs. 1 and 7, the handle 125 is arranged to be manually pushed downwardly so as to start the machine in operation, and to be pulled upwardly so as to stop the machine; and the control device is arranged so as to permit the handle 125 to be actuated to a limited degree in either direction from neutral for control of the valve 89 without corresponding actuation of the switches 120 and 122. Then, further displacement of the handle 125 in either direction will thereupon cause the microswitches 120—122 to be actuated to their abnormal open or closed positions, as the case may be.

Inasmuch as either one of the solenoids 93—94 will have been last energized just prior to any previous controlled stopping of the machine, it will be understood that when the machine is at rest the valve 92 will be in position to direct oil under pressure into one end or the other of the hydraulic cylinder 33. Then, upon opening of the valve 89, as by depression of the handle 125, oil will be delivered by the pump 85 through the conduit 88 and through the valve 92 so as to thereupon drive the piston in the cylinder 33 to move the carriage 20 toward either the right or the left as viewed in Fig. 1. For example, commencing from a position of rest as illustrated in Fig. 1, and assuming that the valve 92 is then set so as to cause the cylinder 33 to drive the carriage to move toward the right when the handle 125 is depressed, the carriage will thereupon move the work pieces 36 through the polishing gap between the wheels 68—68 and will continue to move in that direction until such time as the finger 109 presses downwardly against the actuator button of the microswitch 106, thereby momentarily closing the latter. This will immediately close that portion of the circuit comprising conductors 130, 131, 132, 133, 134, which causes the solenoid 94 to be energized, thereby drawing the armature of the valve 92 over into its other position so as to thereby direct the hydraulic pressure to flow into the opposite end of the cylinder 33, causing reversal of the carriage travel. Then, after the work pieces have been thereby again moved through the polishing gap from right to left as viewed in Fig. 1, the carriage will continue to move to the left until such time as the actuator 110 comes into bearing relation against the button portion of the microswitch 101 so as to thereby depress and close the latter momentarily which closes the circuit comprising the conductors 130, 131, 135, 136 causing the solenoid portion 93 to be energized so as to draw the core of the valve 92 over again into its original position to cause the carriage to again reverse and start to travel toward the right as explained hereinabove.

Thus, it will be appreciated that subsequent to commencement of the carriage travel operation, the carriage will continue to travel back and forth, automatically reversing its direction of travel without operator-attention until such time as the operation is interrupted as will be explained hereinafter; and that the positional adjustment of the actuators 103, 109, 110, 111 as provided for by the control handles 118—119 will correspondingly regulate the amplitude of carriage movement as well as the positional range thereof relative to the machine bed to suit the machine to different work set-ups.

Also, as illustrated in Figs. 1 and 7, the electrical control circuit of the mechanism includes a normally open microswitch 129 which when closed completes a circuit including the conductors 130, 131, 137, 138, 134 causing the solenoid 94 to be energized irrespective of the position of the switch 120. Thus, subsequent to completion of a polishing operation on a batch of work pieces, the control handle 125 may be depressed further downwardly than is required to open the hydraulic valve 89, so that the handle portion 124 operates to open the microswitch 120, whereby the circuit including the normal carriage reverse switch 106 will be rendered inactive. Hence, as the carriage 20 moves toward the right as viewed in Fig. 1 the switch 106 will be impotent when actuated to reverse the carriage travel, and the carriage will continue to move on over to the right until the operator moves the handle 125 to stop position. This enables the operator to control the carriage to move well away from the position of the polishing wheel 68—68, so that the work piece holder

frame may be removed and a new group of work pieces mounted on the machine. In event the operator is careless and permits the carriage to travel all the way over to the right the microswitch 129 will be actuated by one of the spacer blocks 27 to operate to then reverse the carriage travel to avoid damage to the machine.

Again referring to Fig. 7, the electrical control system also includes circuits controlling energization of the solenoids 97—98 through the microswitches 102, 103, 104, 105, and these microswitches are in turn arranged to be periodically closed by the actuators 108, 109, 110, 111. The actuators are so arranged that whenever either end portion of the work piece holder frame approaches the polishing gap between the wheels 68—68, the pneumatic cylinder 60 is energized so as to force the wheels 68—68 to move apart, thereby avoiding interference thereof with the work holder frame. Reversely, whenever the leading end portion of the work holder frame has passed between the polishing gap, the cylinder is actuated so as to force the polishing wheels to move together so as to proceed with the work of glazing or polishing the work pieces mounted upon the frame. Thus, the microswitches 102 and 105 are arranged to complete circuits including conductors 130, 140, 141 and 130, 142, 143, 141, respectively, to energize the solenoid 97 of the valve device 96 so as to cause the cylinder 60 to close the polishing wheels whenever either one of the microswitches 102 or 105 are closed by either one of the actuators 108 or 111. Likewise, the microswitches 103 and 104 are arranged to complete circuits including conductors 130, 144, 145 and 130, 146, 147, 145, respectively, to energize the solenoid 98 to shift the control valve 96 so as to cause the cylinder 60 to open the polishing wheels whenever either one of the actuators 109 or 110 causes either one of the switches 103 or 104 to be closed. The microswitch 102 is arranged to stand at a higher elevation than the switch 105 (see Fig. 3) and the actuator toe 108 is shorter than the toe 111 (see Fig. 5) so that although the toe 108 will actuate the microswitch 102 as explained hereinabove for normal reversing of the carriage, it will not actuate the switch 105 so as to close the rolls; which should preferably remain open throughout "overtravel" movement of the carriage. Conventional polishing wheel and pump motor stop-start control devices will of course be mounted at convenient positions upon the machine frame, such as are indicated at 150—151 (Fig. 1).

To give the work pieces some vertical reciprocatory movement within the polishing gap to produce an improved smoothness in the product, the platform struts 35—35 are telescopically carried at their upper ends within socketed frame portion 153. Also, the struts 35—35 are formed with toothed rack portions 152 (Figs. 1 and 3) which mesh with drive gears 154 carried by a shaft 155 which is supported upon bearings 156—156 extending from the frame 22. The shaft 155 is in turn driven by a gear 158 which is actuated by a rack 159 carried by the piston element of a pneumatic cylinder 160 which also mounts upon the frame 22 transversely thereof. The cylinder 160 is operated by any suitable supply of compressed air and includes a self-reversing valve device so that the rack 159 simply reciprocates back and forth without operator-attention and in non-synchronized manner relative to other motions of the work carriage;

thereby producing a more smoothly polished product.

Thus, it will be appreciated that the machine of the invention requires no operator-attention to the matter of the opening and closing of the polishing wheels relative to the work piece frame subsequent to proper positional adjustment of the actuators by means of the control handles 116—119; and that the machine operates automatically to reciprocate the work piece carrying frame back and forth through the polishing gap without operator-attention except to start and stop the operation. Also, as explained hereinabove, the mechanism of the invention includes a novel control arrangement whereby whenever a batch polishing or glazing operation is completed the carriage may be caused to "over travel" its normal range of reciprocation so as to bring the work piece carrying frame out to a position where it is clear of the polishing wheel mechanism, to facilitate unloading and reloading of the work holding frame; and that a novel safety arrangement is provided in conjunction therewith to prevent damage to the machine and/or to the operator in event of careless control thereof.

What is claimed is:

1. In a polishing and glazing machine, in combination, a pair of polishing rolls movably mounted in opposition to each other, means connected to the rolls to drive the same, power means connected to the rolls and adapted to alternately open and close said rolls relative to each other from and to opposing work contacting positions, a work holder including opposed end frame portions, said holder being movably mounted for reciprocation endwise in the gap between said rolls in a plane parallel to the longitudinal axes of the rolls, said work holder including support means extending between said opposed end frame portions arranged for supporting a plurality of work pieces in stacked relation thereon to extend forwardly along said work holder for single file passage between said rolls for polishing or glazing purposes, power supply means coupled to said work holder for said reciprocation thereof, and automatic control means connected to said power means and adapted and arranged to be actuated by and upon movements of said work holder approaching a position of adjacency between said holder end frame portions and said rolls and adapted to thereupon actuate said power means to cause said rolls to open out of said work contacting positions to avoid interference with said frame portions, and to be actuated by and upon movements of said holder retreating from position of adjacency between said frame and said rolls and adapted to thereupon actuate said power means to cause said rolls to close to said work contacting positions for polishing purposes.

2. In a polishing and glazing machine, in combination, a pair of polishing rolls mounted upon swinging arbors in opposition to each other, motor means carried upon said arbors and connected to drive the rolls, power means connected to said arbors and adapted to alternately open and close said rolls relative to each other from and to work contacting positions, a work holder including leading and trailing end frame portions, said holder being movably mounted for oscillation endwise in the gap between the rolls in a plane parallel to the longitudinal axes of the rolls, work supporting means extending between said leading and trailing frame portions and adapted to

support a plurality of work pieces in stacked relation on said work holder for single file passage between said rolls for polishing or glazing purposes, power supply means coupled to said work holder for said oscillation thereof, and automatic control means connected to said power means and adapted and arranged to be actuated upon movements of said work holder leading and trailing end frame portions relative to said rolls into positions adjacent therewith and adapted to thereupon actuate said power means to cause said rolls to open out of said work contacting positions to avoid interference with said frame portions, and to be actuated by and upon movements of said holder when retreating from positions wherein said frame and said rolls are adjacent and adapted to thereupon actuate said power means to cause said rolls to close to said work contacting positions for polishing or glazing purposes.

3. In a polishing and glazing machine, in combination, a pair of polishing rolls movably mounted in opposition to each other, means connected to the rolls to drive the same, power means connected to the rolls for alternately opening and closing said rolls relative to each other from and to work contacting positions, a work holder including leading and trailing end frame portions, said holder being movably mounted for reciprocation endwise in the gap between said rolls in a plane parallel to the longitudinal axes of the rolls, said work holder including a support structure constructed and arranged so as to support a plurality of work pieces in stacked relation intermediate said leading and trailing frame portions thereof for single file passage between said rolls for polishing or glazing purposes, reversal control power supply means coupled to said work holder for said reciprocation thereof, automatic control means connected to said power means and adapted and arranged to be actuated by and upon movements of said work holder approaching positions of adjacency of said holder frame portions and said rolls in said reciprocation and adapted to thereupon actuate said power means to cause said rolls to open out of said work contacting positions to avoid interference with said frame portions, and to be actuated by and upon movements of said holder retreating from positions of adjacency of said frame and said rolls and adapted to thereupon actuate said power means to cause said rolls to close to said work contacting positions for polishing or glazing purposes, and reversing automatic control means connected to said power supply means and adapted and arranged to be actuated by and upon movements of said work holder beyond the positions of roll opening operations and adapted to thereupon cause said power supply control means to reverse for reciprocation of said holder frame, whereby said holder frame reciprocates beyond the position of roll opening operations.

4. In a polishing and glazing machine, in combination, a pair of polishing rolls rotatably mounted on axes movable in opposition to each other, means connected to the rolls to drive the same, power means connected to the rolls for alternately opening and closing said rolls relative to each other from and to work contacting positions, a work holder including leading and trailing end frame portions, said holder being movably mounted for oscillation endwise in the gap between the rolls in a plane parallel to the longitudinal axes of the rolls, said work holder being constructed and arranged so as to support work piece supporting means extending between said leading and trailing frame arranged for supporting a plurality of work pieces in stacked relation on said work holder for single file passage between said rolls for polishing or glazing purposes, reversal control power supply means coupled to said work holder for said oscillation thereof, automatic control means connected to said power means and adapted and arranged to be actuated by and upon movements of said work holder approaching positions of adjacency of said holder end frame portions and said rolls in said oscillation and adapted to thereupon actuate said power means to cause said rolls to open out of said work contacting positions to avoid interference with said frame portions, and to be actuated by and upon movements of said holder retreating from positions of adjacency of said end frame positions and said rolls and adapted to thereupon actuate said power means to cause said rolls to close to said work contacting positions for polishing or glazing purposes, and reversing automatic control means connected to said power supply means and adapted and arranged to be actuated by and upon movements of said work holder beyond the positions of roll opening operations and adapted to thereupon cause said power supply control means to reverse for oscillation of said holder frame.

5. In a polishing and glazing machine, in combination, a pair of polishing rolls rotatably mounted upon movable vertical axes, means connected to the rolls to drive the same, power means connected to the rolls for alternately opening and closing said rolls relative to each other from and to work contacting positions, a work holder including leading and trailing end frame portions, said holder being shiftably mounted for reciprocation in the gap between the rolls in a plane parallel to the longitudinal axes of the rolls, said work holder including support means extending between said leading and trailing frame portions for supporting a plurality of work pieces in stacked relation for single file passage between said rolls for polishing or glazing purposes, reversal control power supply means coupled to said work holder for reciprocation thereof, automatic control means connected to said power means and adapted and arranged to be actuated upon movements of said work holder approaching positions of adjacency of said holder frame portions and said rolls and adapted to thereupon actuate said power means to cause said rolls to open out of said work contacting positions to avoid interference with said frame portions, and to be actuated by movements of said holder retreating from positions of adjacency of said frame and said rolls and adapted to thereupon actuate said power means to cause said rolls to close to said work contacting positions for polishing or glazing purposes, and reversing automatic control means connected to said power supply means and adapted and arranged to be actuated by movements of said work holder beyond the positions of roll opening operations and adapted to thereupon cause said power supply control means to reverse for reciprocation of said holder frame, and manual setting means connected in common to said automatic control means and said reversing automatic control means and adapted and arranged to provide correlated adjustment of the actuation thereof for varying the range of stroke and position of said range of stroke of said holder relative to said rolls.

6. The structure of claim 5 wherein the work holder is slidably mounted upon a horizontal track for reciprocating movement and includes a portion which is shiftable vertically relative to the horizontally movable portion.

7. In a polishing machine, in combination, a polishing tool mounted for movement into and out of an operative position, means operatively connected with said tool for driving the same, power operated means connected with said tool and serving to alternately move the tool into and out of an operative position, a work holder movably mounted for reciprocation adjacent to and in a plane substantially parallel to the tool, said work holder including a work supporting means arranged for supporting the work in position for polishing engagement by said tool as the work holder is reciprocated, power means for reciprocating the work holder, and control means connected with the power means and responsive to movement of the work holder approaching a position of adjacency between end portions of the holder and said tool and adapted to thereupon actuate the power means to move the tool out of its working position and thereby avoid interference with the said end portions of the frame and to be also actuated by movement of the holder retreating from a position of adjacency

between the frame and said tool and to thereupon actuate the power means to cause the tool to move to a work contacting position for polishing purposes.

8. The structure of claim 7 wherein the polishing tool is a roll rotatably mounted for turning about a vertical axis and shiftable transversely of the work holder toward and away from the same into and out of an operative position during reciprocating movements of the work holder.

WILLIAM C. BURT.

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