Dec. 7, 1926. 1,609,564

M. LUND

GRINDING, POLISHING, OR BUFFING MACHINE

Filed Jan. 28, 1924 6 Sheets-Sheet 1

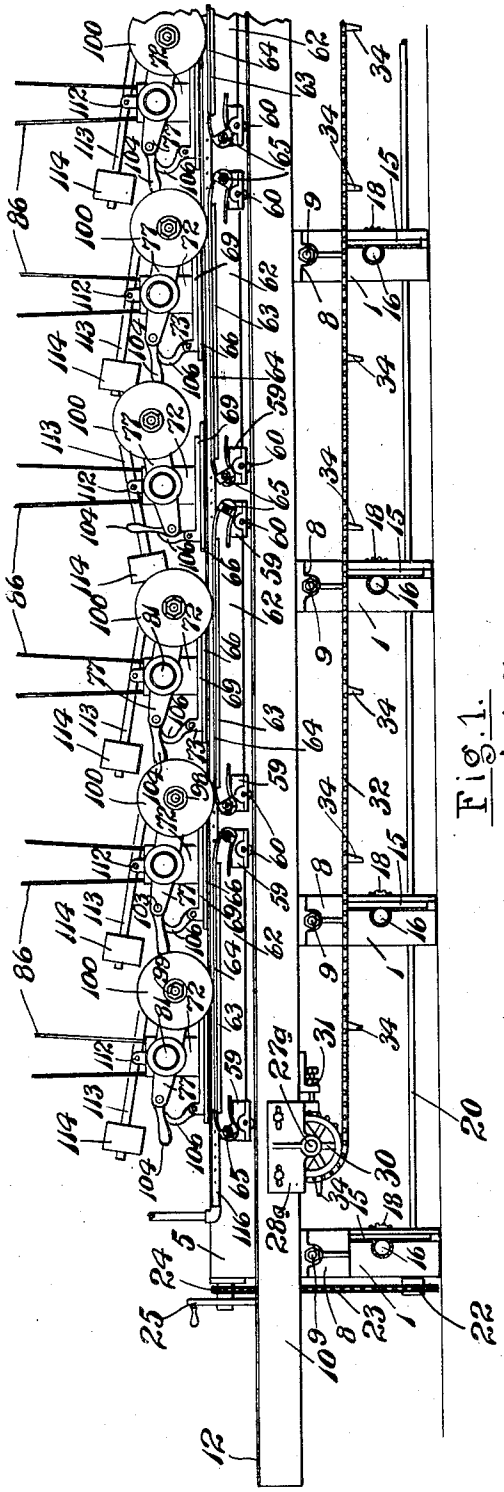


Fig. 1.

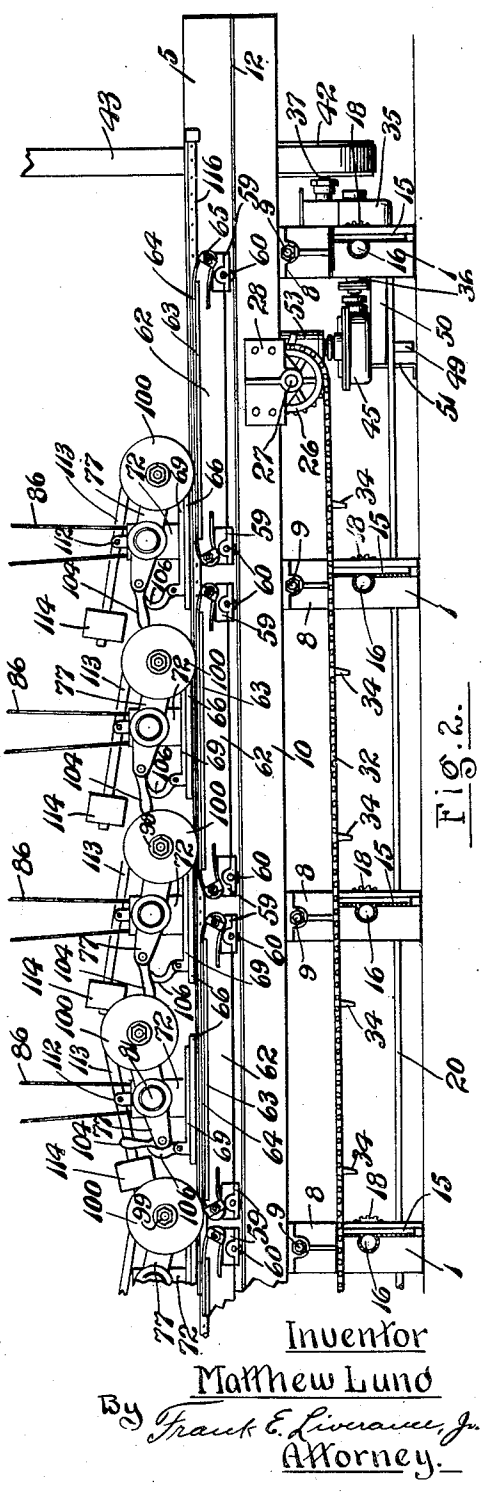


Fig. 2.

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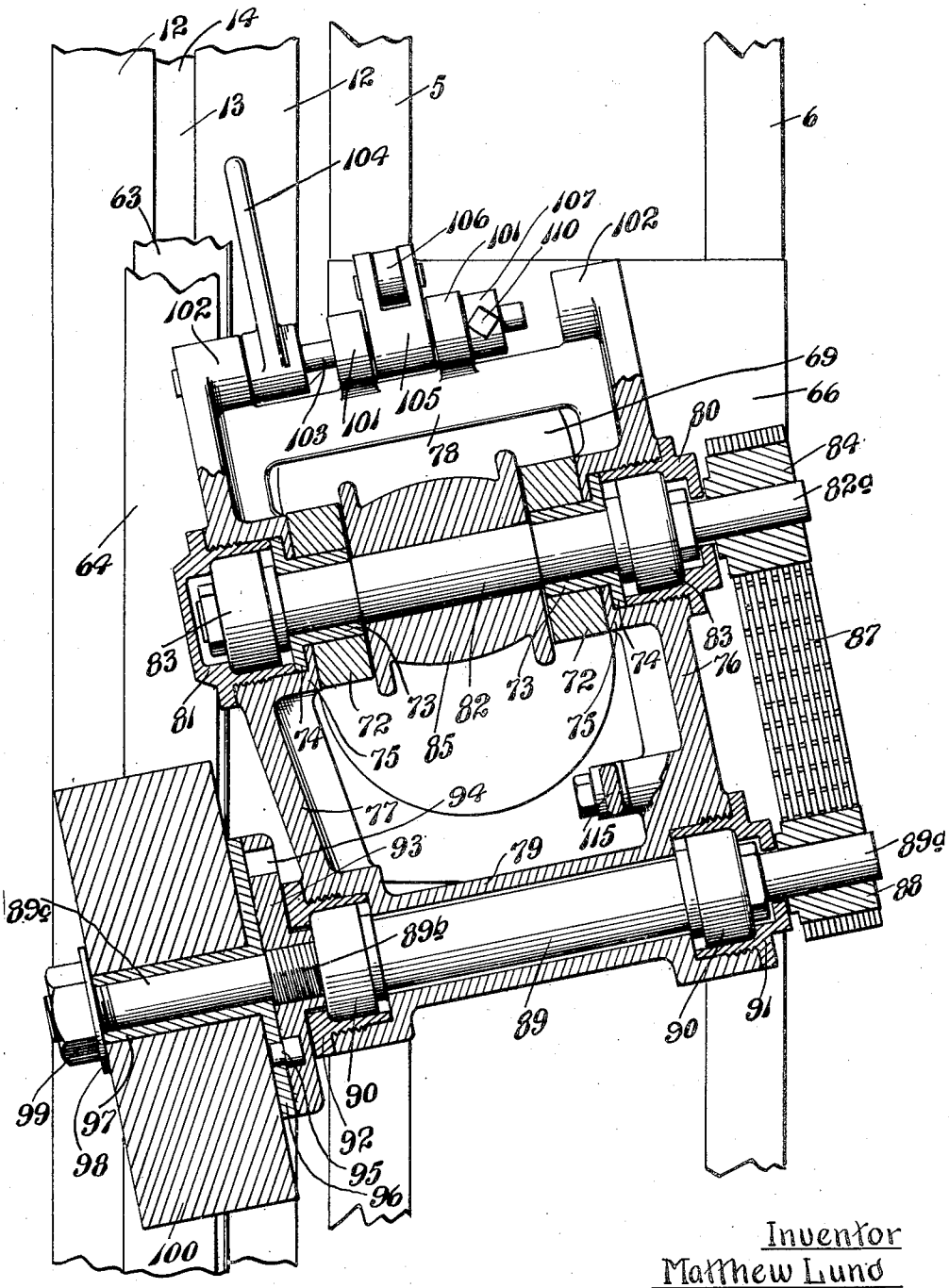


Fig. 3.

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GRINDING, POLISHING, OR BUFFING MACHINE

Filed Jan. 28, 1924 6 Sheets-Sheet 3

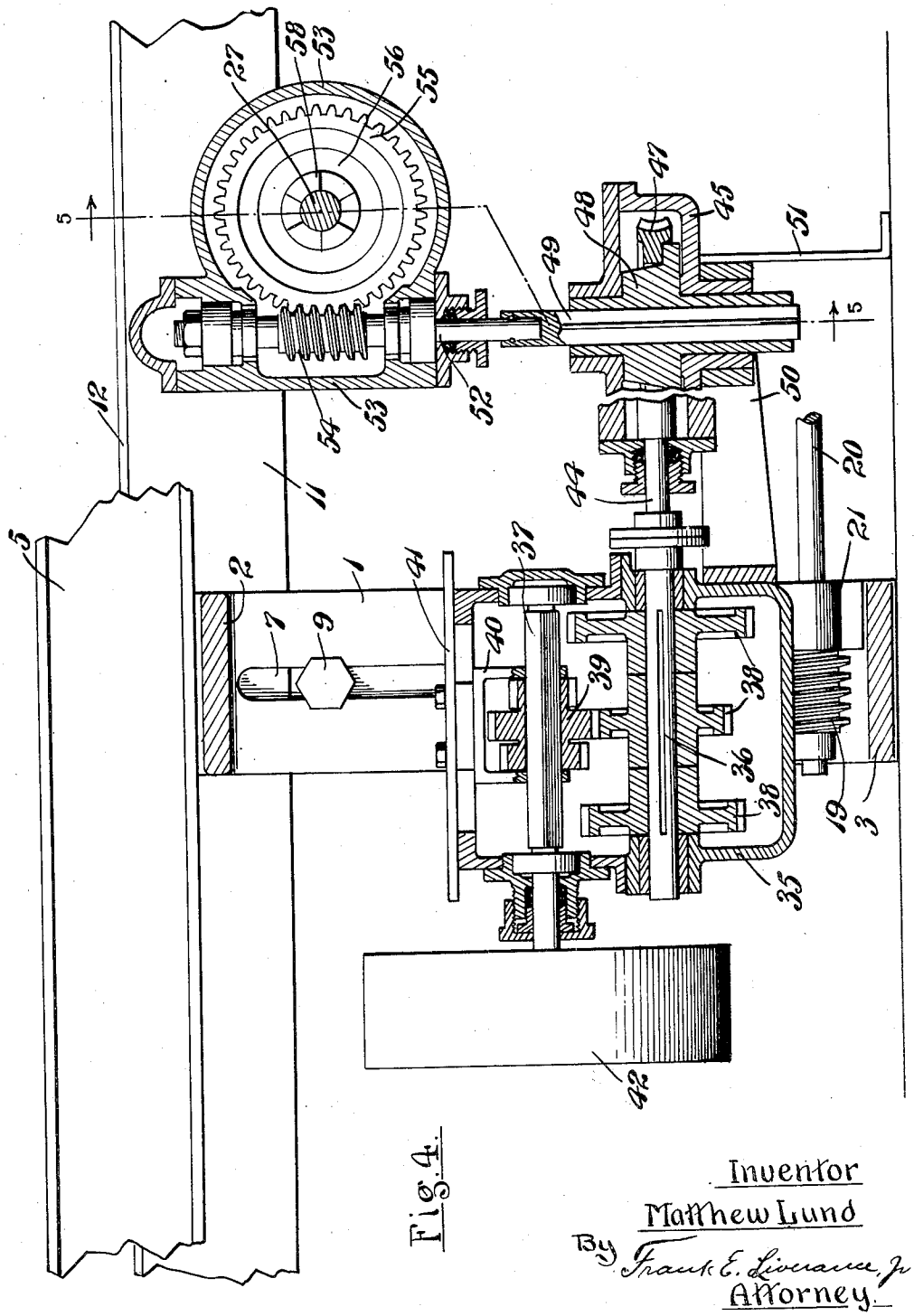


Fig. 4.

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GRINDING, POLISHING, OR BUFFING MACHINE

Filed Jan. 28, 1924 6 Sheets-Sheet 4

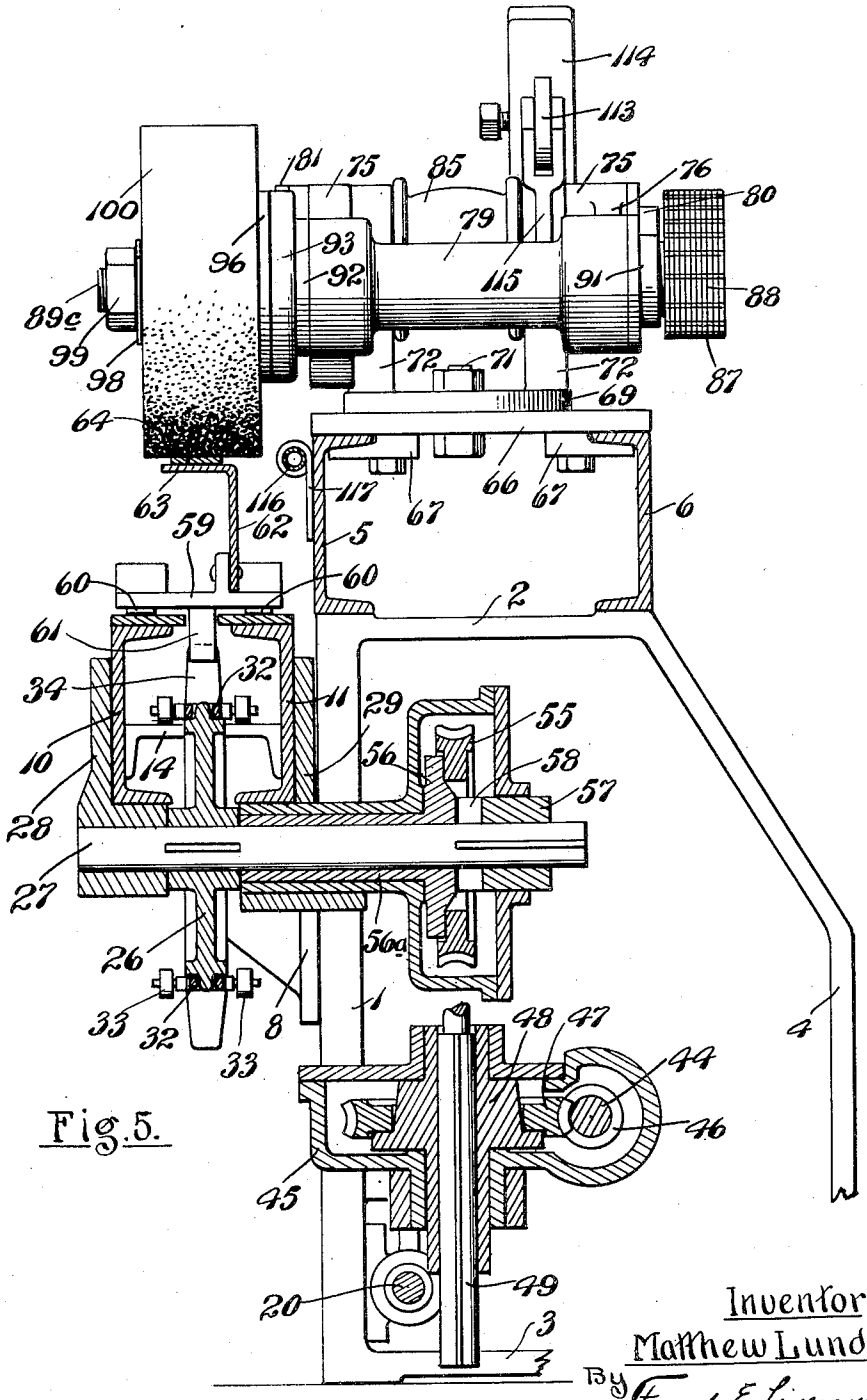


Fig. 5.

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GRINDING, POLISHING, OR BUFFING MACHINE

Filed Jan. 28, 1924 6 Sheets-Sheet 5

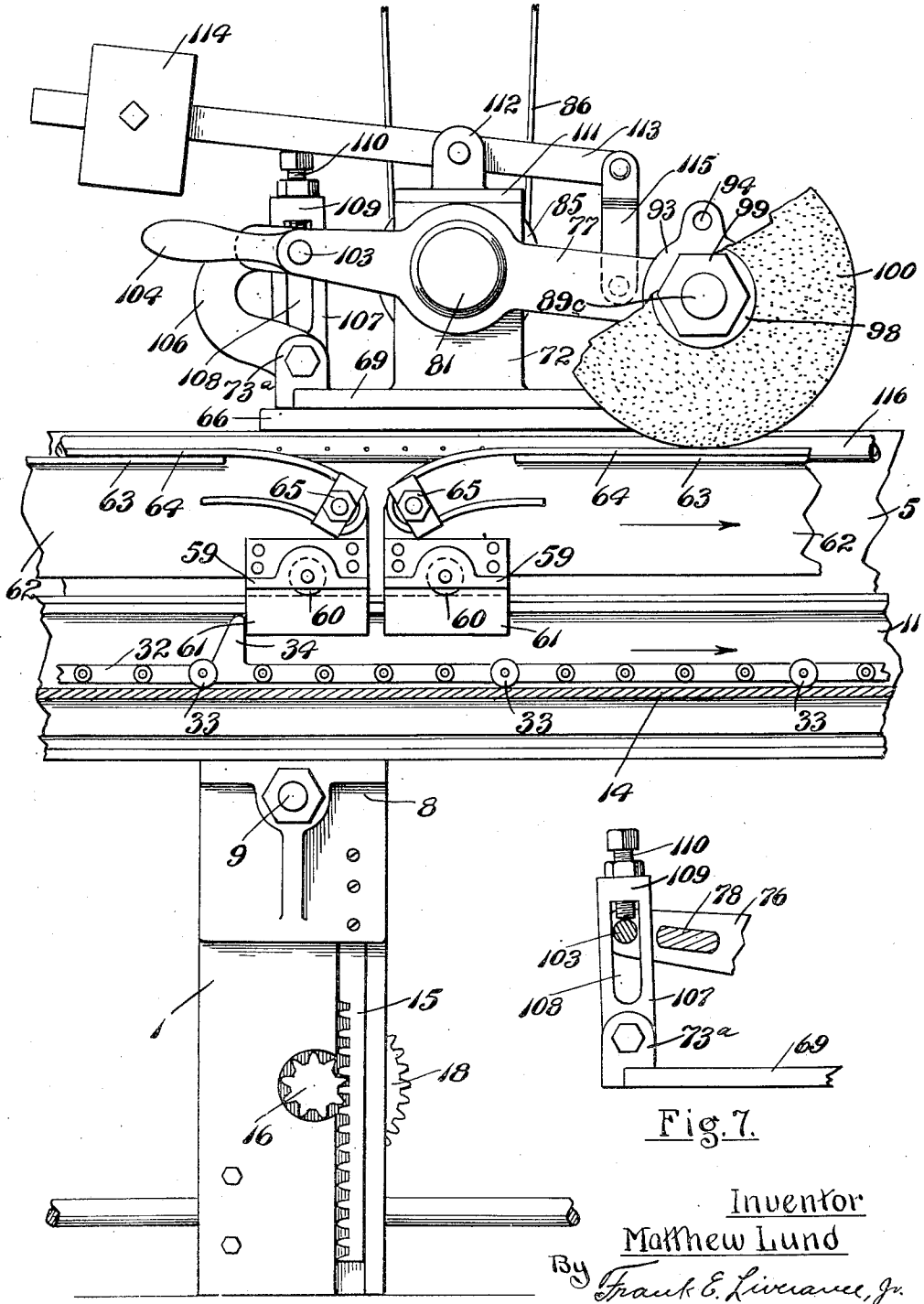


Fig. 6.

Fig. 7.

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Dec. 7, 1926. 1,609,564

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GRINDING, POLISHING, OR BUFFING MACHINE

Filed Jan. 28, 1924 6 Sheets-Sheet 6

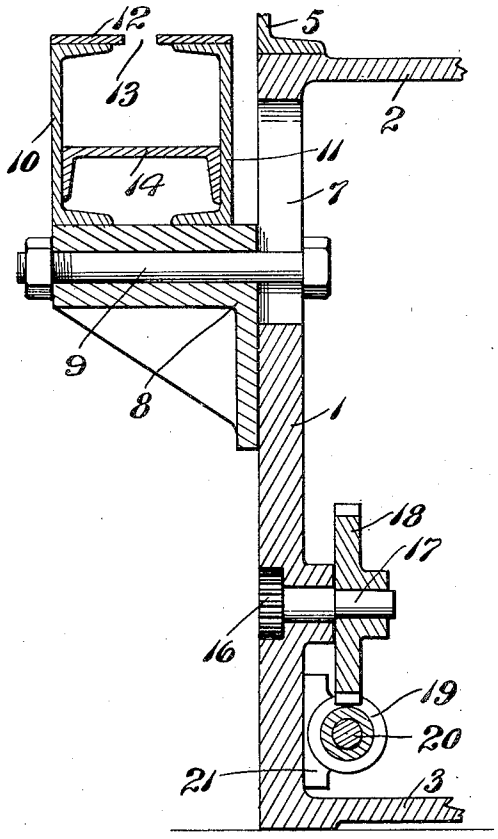


Fig. 8.

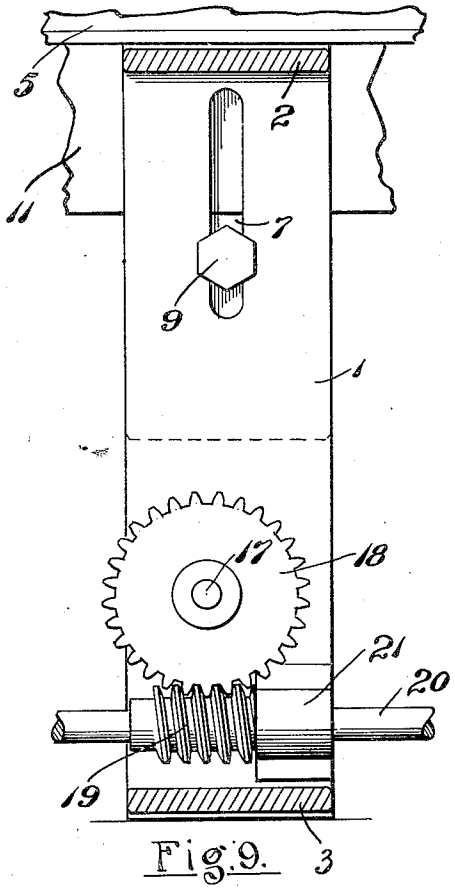


Fig. 9.

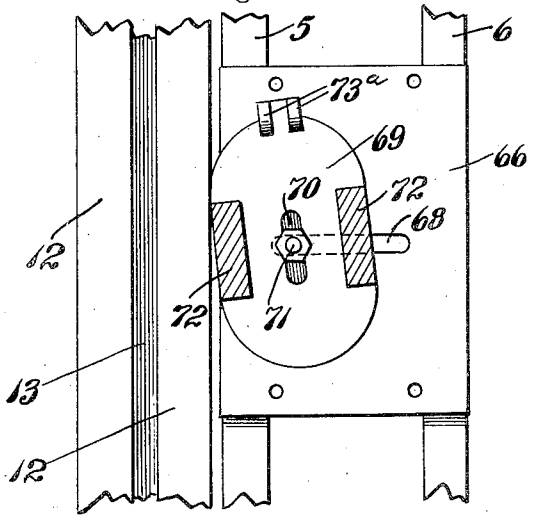


Fig. 10.

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UNITED STATES PATENT OFFICE.

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GRINDING, POLISHING, OR BUFFING MACHINE.

Application filed January 28, 1924. Serial No. 689,015.

This invention relates to grinding, polishing or buffing machines and is particularly directed to novel constructions and combinations wherein quantity production may be attained. The machine designed and which is shown in the accompanying drawings is for polishing or buffing bumper bars of the type used commonly in bumpers for motor vehicles, though it is to be understood that my invention is not limited to the one use shown. It is a primary object and purpose of the present invention to make a machine of this character for the rapid polishing, buffing or grinding of work, one wherein the polishing, buffing or grinding wheels are mounted in a novel manner so as to automatically follow the work should the same have any uneven or depressed portions, and one wherein the polishing, buffing or grinding wheels are individually mounted and driven and which can be independently moved away from the work and replaced without stopping or disturbing the other wheels in operation. A further object of the invention is to mount the different independent units so that the same are independently adjustable to different positions about a changeable vertical axis whereby the grinding, polishing or buffing wheels have a wide range of adjustment, adapting them to different widths of work and to perform work of different characters. A still further object is to provide a mounting for the wheels so constructed that the same are not distorted or otherwise moved out of proper balance when mounted in the machine. Many other objects and purposes, including constructions whereby the machine may be made to perform its functions as either a polishing, a buffing or a grinding machine effectively, will appear as understanding of the invention is had from the following description, taken in connection with the drawings, pertaining thereto, in which,

Fig. 1 is a front elevation of one end portion of the machine.

Fig. 2 is a like view of the other end portion of the machine.

Fig. 3 is an enlarged fragmentary plan view of the machine showing one of the units for polishing or buffing in horizontal section.

Fig. 4 is an enlarged vertical section through the driving means used for driving the work carrying conveyer.

Fig. 5 is a transverse vertical section taken substantially on the plane of line 5—5, of Fig. 4.

Fig. 6 is a fragmentary enlarged front elevation, with parts in section and broken away, showing one unit of the machine.

Fig. 7 is a fragmentary detail in elevation illustrating the means for limiting the movement of the polishing, buffing or grinding wheel.

Fig. 8 is a fragmentary vertical section through one of the supporting frames for the machine and the adjustable support for the work conveyer.

Fig. 9 is a rear elevation of the construction shown in Fig. 8, and

Fig. 10 is a horizontal section taken through one of the units above the base plates therefor.

Like reference characters refer to like parts in the different figures of the drawings.

In the construction of the machine, a plurality of vertical supporting frames are used, each including a front post 1, upper and lower sides 2 and 3 and a rear member 4, making an open frame, as best shown in Fig. 5. The frames are located in spaced apart relation and as many used as need be. Front and rear channel bars 5 and 6 are located horizontally and parallel to each other on and above the said supporting frames and secured thereto permanently in any suitable manner.

Each of the front posts 1 is vertically slotted near its upper end, as indicated at 7, Fig. 8. A bracket 8 is located at the front of each post 1, a bolt 9 passing through the slot 7 and through the bracket whereby the same may be secured in any place to which adjusted within the limits prescribed by the slot. Two channel bars 10 and 11 are positioned over all of the brackets 8 in spaced apart parallel relation and are secured to said brackets. The flanges of the channel bars extend toward each other and on the upper flanges, plates 12 are secured to serve as tracks for the work carrying carriages to run over, there being a continuous slot 13 between the inner edges of the plates 12, as shown. A channel bar 14 is located between the channels 10 and 11, being positioned horizontally. This channel bar 14 terminates at its ends a distance short of the ends of the channels 10 and 11.

A rack bar 15 is permanently secured at its upper end to each bracket 8, extending downwardly therefrom and seated in a ver-

tical slot or groove made in the front side of each post 1. The rack meshes with a pinion 16 fastened at the front end of a short shaft 17 passing through and rotatably mounted in the post 1, at its rear end carrying a worm gear 18. Each of the worm gears engages and is driven by a worm 19, all of which are mounted on a common shaft 20 located horizontally and mounted in bearings 21 secured at the rear sides and near the lower ends of the posts 1. This shaft extends the full length of the machine. At one end (see Fig. 1), a sprocket wheel 22 is fastened to the shaft 20, around which an endless chain 23 passes, it also passing around a second sprocket wheel 24 mounted at the ends of the channels 5 and 6 which is adapted to be turned manually by means of a crank 25. It is evident that on loosening all of the bolts 9 and turning crank 25, all of the brackets 8 may be simultaneously raised or lowered to a desired position and the channel bars 10 and 11 and the mechanism carried thereby are raised or lowered with the brackets. When a desired position is reached, the bolts 9 are tightened to hold the position to which adjusted.

A distance in from an end of the channel bars 10 and 11 a relatively large sprocket wheel 26 is located, being mounted on a shaft 27 carried in bearings at the lower portions of plates 28 and 29 secured to the channel bars 10 and 11, respectively. This sprocket wheel extends upwardly between the channel bars 10 and 11 at a point beyond the end of the channel bar 14. A relatively heavy chain 32 passes around the wheel 26 and also around a second similar wheel 30 mounted adjacent the opposite end of the machine on a shaft 27^a carried on brackets 28^a adjustably fixed on the channel bars 10 and 11 and held in adjusted position by bolts after being adjusted by the adjusting screw 31, as shown in Fig. 1. Chain 32 at intervals is provided with outwardly extending pintles on which rollers 33 are mounted, which rollers are adapted to traverse the channel bar 14 as a supporting track therefor. And said chain at wider intervals is provided with links from which lugs 34 project, projecting upwardly in the upper run of the chain and downwardly in the lower run.

A gearing housing 35 is carried on the rear side of the post 1 at the end of the machine where the sprocket wheel 26 is located in which two shafts 36 and 37 are mounted horizontally in parallel relation. Three gears 38 of different sizes are keyed to the lower shaft 36 and a shiftable sleeve 39 having three different sizes of pinions thereon is mounted on the shaft 37 to be shifted to any one of three different positions so that one of the pinions will mesh with a gear 38 in each of the three different positions. A yoke 40 embraces the sleeve and is attached to a shiftable bar 41 at the upper side of the housing 35 whereby the shifting may be accomplished. Pulley 42 is fixed on an end of the shaft 37 and may be driven by belt 43 from any suitable source of power.

In alinement with the shaft 36 is a shaft 44 connected thereto which passes into a housing 45. Within said housing the shaft 44 is equipped with a worm 46 which engages and drives a worm wheel 47 secured to a hub 48 which is rotatably mounted in the housing and through which a vertical shaft 49 passes, said shaft being keyed to the hub 48 but vertically movable therethrough. The housing 45 and mechanism therein is supported by the arm 50 attached to the post 1 and by a leg 51, as shown in Fig. 4.

At its upper end above the housing 45, shaft 49 has attachment to a shaft 52 in vertical alinement therewith which is rotatably mounted in a housing 53 connected to the channel 11 and movable up and down therewith. A worm 54 is carried on shaft 52 within the housing 53 and engages with a worm wheel 55 which is attached to the head 56 of a sleeve 56^a loosely mounted on shaft 27, as shown in Fig. 5. A clutch member 57 is splined on the end of the shaft 27 and it and the head 56 are formed with coacting dog clutch teeth 58 for interengagement whereby the shaft 27 is driven by the shaft 52 when the clutch is engaged but may be free and remain at rest when the clutch is disengaged. Normally the clutch is in engagement, but if desired at any time, the movement of the chain 32 and work carried thereby may be stopped without cutting off the power by moving clutch member 57 to the rear.

Individual carriers for the work to be acted upon by the machine are provided to move over the track plates 12. These carriers include two members 59 equipped with rollers 60 to run on the plates 12 and having lugs 61 projecting downwardly through the slot 13 in position to be engaged by the lugs 34 on the chain 32. The two members 59 are located in spaced apart relation. Each has a lug projecting upwardly to which a vertical plate 62 is permanently attached, at the upper edge of which a horizontal ledge 63 is turned and on which the work, in the present case, a bumper bar 64 is laid. At the ends, the bumper bar 64 may be secured by clamps 65 to the vertical plate 62. It is of course apparent that the carriage for carrying the work may be designed for any particular character of work and the one shown is for illustrative purposes only and not in any sense to be considered the only type of work carriage that can be used.

These work carrying carriages have the bumper bars attached thereto and are then placed on the track plates 12 at one end of the machine, a lug 34 on the chain 32 engaging with the first of the members 59

whereby the carriage with its attached bumper is moved lengthwise of the machine over the channel bars 10 and 11 until the chain changes direction in passing around the wheel 26. When this occurs, lug 34 disengages from the member 59 and the carriage is at the opposite end of the machine. It may be removed therefrom, its bumper bar released, and the carriage returned to the entrance end of the machine to receive another bumper bar. During its passage lengthwise of the machine the bumper bar is buffed, polished or ground; the mechanism for accomplishing the same will now be described.

The grinding and polishing or buffing is done by a plurality of grinding and polishing or buffing wheels, each of which is designed to be operated as a unit and is adjustably mounted on the machine as an independently placed and driven unit. A description of one of these units will suffice for all. In the construction, a base plate 66 of rectangular form is located above and bears against the upper flanges of the channels 5 and 6 and is secured wherever desired in the length of the channels by releasable clips 67 engaging with the under sides of the upper flanges of said channels 5 and 6. Plate 66 is formed with a transverse slot 68 therein (see Fig. 10). A second plate 69 is located over the plate 66 and has a slot 70 therein positioned to cross the slot 68, a bolt 71 passing through both slots. This permits a considerable range of adjustment of the plate 69 with reference to plate 66, either transversely of the machine or longitudinally, and plate 69 may take any desired angular position with respect to plate 66. Two spaced apart upright posts 72 extend upwardly, one at each side of the plate 69 and at one end two spaced apart ears 73^a are cast and extend upwardly.

Alined openings are made through the posts 72 near their upper ends in which sleeves 73 are mounted, at their outer ends being formed each with an annular flange 74. Enlarged housings 75 are formed between the ends of each of the sides 76 and 77 of a frame, through which said sleeves are passed in mounting the same in the posts 72, the flanges 74 seating in the bottoms of the recesses made in said housings. The frame is completed by a cross bar 78 connecting the sides 76 and 77 adjacent one end thereof and by a cylindrical cross member 79 integral with and connecting the opposite ends of said sides. Cup-shaped members 80 and 81 are threaded into the recesses in said housings 75 closing the same and serving as supports for bearings for a shaft 82 which passes through the sleeves 73, the bearings for the shaft being located within the cups 83 shown. One end of the shaft 82 is reduced in size, as indicated at 82^a, extends beyond the adjacent side 76 of the frame and through the bottom of the member 80, being equipped with a pulley or wheel 84. Shaft 82 is adapted to be driven by a belt passed around the pulley 85 fixed to the shaft between posts 72. Each pulley 85 has an individual belt 86 to drive it in each of the units.

A link belt 87 passes around the pulley or wheel 84 and also around a second pulley or wheel 88 fixed on the reduced end portion 89^a of a shaft 89 which passes through the cylindrical cross member 79, being mounted in bearings contained in the cups 90 which in turn are carried in the housings 91 and 92 threaded into opposite enlarged end portions of the cross member 79. The shaft 89 is formed with a threaded section 89^b on to which a plate 93 is threaded, at one side having a projecting ear in which an opening 94 is made therethrough (see Fig. 6). A pin 95 is secured to the plate 93 and projects therefrom so as to enter an opening made therefor on an enlarged flange 96 at the inner end of a sleeve 97 which is adapted to be placed over an extension 89^c of shaft 89. The sleeve is detachably held in place by a washer 98 which comes against the outer end of the sleeve and a nut 99 threaded on to the end of the shaft section 89^c. The wheel used for polishing, indicated at 100, is carried on and around the sleeve 97. In many instances, particularly in buffing wheels, the body 100 of the wheel is of canvas and the same is subject to compression in many cases in its attachment to the spindle or shaft on which it is mounted, with a distortion and destruction of the balance of the wheel which should be maintained as the wheels travel at a high rate of speed. With this construction, with the wheel body carried on the sleeve and driven by the driving stud 95, and the attachment of the wheel so that no attaching pressure of the nut 99 and washer 98 comes thereagainst no change of the wheel balance is caused.

It will be noted that the frame that carries the grinding, polishing or buffing wheels is mounted to tilt on the supports 72 through the rotatable mounting of the sleeves 73 in said supports, the said sleeves being secured to the sides 76 and 77 in fixed relation by the pressure of the members 80 and 81 thereagainst. The frame does not turn or tilt on the shaft 82 but the sleeves 73 serve as trunnions for the tilting of the frame in the supporting posts 72. The shaft 82 runs freely and has no actual bearing in the sleeves 73, the bearings being of anti-friction character housed within the cup members 83. This avoids wear of the shaft in the sleeves 73 and permits a high speed of shaft 82 without vibration.

Two spaced apart lugs 101 project from the cross bar 78 of the frame and the ends of the sides 76 and 77 of said frame are

formed with bearings 102 having openings in alinement with like openings in the lugs 101. A shaft is mounted for rocking movements through said lugs and one of the bearings 102 and has a handle 104 attached thereto for manual operation. An arm 105 is fixed to shaft 103 between the lugs and to this arm the upper end of a curved bar 106 is pivotally connected, the lower end thereof being pivotally connected to and located between the ears 73a on the plate 69. It is evident that by operating the handle 104, the tilting frame may be moved to two different extreme positions, in one of which, as shown in Fig. 6, the wheel 100 is lowered to operative position, and in the other of which, as shown in one place in both Figs. 1 and 2, the wheel 100 is lifted to inoperative position. When the frame is thus tilted, the curved bar 106 serves as an automatic lock to hold the wheel 100 elevated, the concaved or recessed side of the bar allowing the upper end thereof to pass over the axis of the shaft 103 to perform said retaining or locking function. Each unit being independently driven and manually operated to inoperative position, it is evident that the machine as a whole does not need to be stopped any time that a wheel 100 is to be removed and replaced by another, the production of machine continuing at all times. In fact it is designed that enough units shall be used that two or more of them may at all times be left in inoperative position to serve as a supply when any unit that is in operation needs attention such as repair, replacement of the wheel 100 or otherwise.

A limit stop means is used to limit the downward movement of the wheel 100. It consists in a link 107 connected at its lower end with the pivot passing through the ears 73a and the bar 106, said link being longitudinally slotted, as at 108, whereby the upper end of the link is provided with a cross section 109 through which an adjusting screw 110 may be threaded. The shaft 103 passes through the slot 108 and comes against the lower end of the screw 110 when the wheel 100 is lowered to operative position, it being evident that the wheel 100 can be lowered only to the point where the shaft 103 engages against the screw 110.

The weight of the wheel 100 and the mechanism at the end of the frame where it is mounted is counterbalanced partly. A plate 111 is attached at the upper end of one of the posts 72 and has upwardly projecting ears to which a lever 113 is pivotally mounted between its ends. On the free end portion of the lever a weight 114 is adjustably mounted and the opposite end of the lever is connected with the side 76 of the frame by a link 115. This serves as a counterbalance construction though it is to be understood that the weight of the wheel 100 and the end of the frame on which it is mounted does not want to be wholly counterbalanced as the wheel has to bear with some pressure against the bars 64 in operating thereon.

The bars 64 move slowly from one end of the machine to the other being acted upon by a relatively large number of grinding and polishing wheels during the movement. At the initiation of the grinding and polishing process, the coarser wheels are used and the change to the finest polishing wheels at the other end of the machine is gradual. The wheels being carried by freely tilting frames follow the surfaces of the bars and grind and polish the same, even to part of the curved end portions thereof. The wheels 100 may be set at different angles and this is desirable in order that scratches in the surfaces of the bars 64 made by one wheel shall be practically removed by the succeeding wheel which rotates against the bumper bar surfaces at a different angle. The adjustment provided by the slots in the plates 66 and 69 with the securing bolt 71 passing therethrough permits this and the adjustment for each unit is independent of any other unit.

In grinding and polishing metal, all of the wheels 100 rotate in the same direction and the grinding and polishing may be done completely with the movement of the work through the machine. Buffing is done with different wheels and with a rotation of the wheels in the opposite direction. Accordingly, a separate machine should be provided for buffing having identically the same construction as the one outlined above but with the frames carrying the buffing wheels reversed in position. This is done by removing each frame from its supporting posts 72, turning it over so that the wheels will be on the opposite sides of said posts and then remounting the same. The construction used for mounting the frames permits this or the initial assembly in such manner so that for either buffing or for grinding and polishing the machine in its elements does not have to be changed, merely being differently assembled.

The lugs 34 on the conveyor chain may be placed any desired distance apart so that the bars 64 may follow one another closely or be farther apart as may be required to permit cooling of the bars during the operations thereon, considerable heat being generated during the operations. As an additional cooling safeguard, a pipe 116 may be located between the channel bar 5 and the work carrying carriages, being supported by supports 117 attached to the channel bar 5 and having openings in its outer side through which compressed air forced into the pipe escapes and is blown across the bars 64 to aid in cooling the same.

The machine described is very practical and efficient for the purposes of securing quantity production in certain classes of work. The free tilting movement of the frames which carry the grinding, polishing or buffing wheels, permitting the wheels to follow the work; the independent mounting, driving, and operation of each unit to either operative or inoperative position; the simultaneous elevation or depression of all of the supports for the work carrying conveyor to elevate or lower the same in accordance with the character of work to be done, for different diameters of the grinding or polishing or buffing wheels; and the independent adjustment of the said wheels to different angular positions all combine to make the machine one of great practical value, which has been demonstrated in actual practice. The invention is defined in the appended claims and is to be considered as comprehending all forms of structure coming within their scope.

I claim:

1. In a machine of the class described, the combination of a horizontally located elongated support, a plurality of individual units connected to and located above the support in spaced apart relation, each of said units including a rigid supporting element, a frame pivotally mounted on said element to turn about a horizontal axis, a spindle mounted at one end of the frame, and a wheel mounted on the spindle normally tending to drop by gravity, an elongated supporting means positioned horizontally below all of said wheels, means for raising and lowering said supporting means, work holding devices adapted to move over the supporting means, means mounted on said supporting means adapted to detachably engage said devices to move the same, means for driving said moving means and means for driving said spindles.

2. In a machine of the class described, a horizontally located elongated support, a plurality of individual units located in spaced apart relation above the support, each of said units including a base plate provided with a transverse slot therein and adjustably connected to the support to be located in different positions lengthwise thereof, a second plate located against the upper side of the base plate and formed with a slot therein crossing the slot in the base plate, a pair of spaced apart posts projecting upwardly from the second plate, a frame mounted on the posts to turn about a horizontal axis, a spindle at one end of the frame, a wheel on one end of the spindle, said wheel normally dropping by gravity, a bolt passing through the slots in the base and second plates, and means for moving work to be acted upon by said wheels under the same, substantially as described.

3. In a machine of the class described, an individual unit forming one unit of the machine, comprising a base plate, a second plate located against the upper side of the base plate, a bolt connecting the plates and permitting adjustment of the second plate to different positions about the vertical axis of the bolt, two posts projecting upwardly from the second plate, a frame mounted on said posts to turn about a horizontal axis, a spindle mounted in one end of the frame, a wheel attached to one end of the spindle, a shaft mounted to turn about an axis coincident with the pivotal axis of the frame, means for driving the shaft, means for driving the spindle from the shaft, means for limiting the downward movement of the wheel and the end of the frame at which it is mounted, means for partly counterbalancing the weight of the wheel, and manually operable means for tilting the frame to elevate the wheel and hold it in elevated position.

4. In a machine of the class described, a unit comprising a base plate, a second plate mounted on and above the base plate to turn about a vertical axis, two posts projecting upwardly from the second plate, a frame mounted between its ends to turn on a horizontal axis on the posts, a spindle rotatably mounted at one end of the frame, a wheel attached at one end of the spindle, a shaft carried by the frame and rotatable about an axis coincident with the pivotal axis of the frame, means to drive the shaft, means to drive the spindle from the shaft, and manually operable means disposed between the opposite end of the frame and the second plate for elevating the wheel and the end of the frame at which it is mounted and for holding it in elevated position.

5. In a machine of the class described, a unit comprising a base plate, a second plate mounted on and above the base plate to turn about a vertical axis, two posts projecting upwardly from the second plate, a frame pivotally mounted between its ends on the posts to turn about a horizontal axis, a spindle rotatably mounted at one end of the frame, a wheel on the spindle, a shaft carried by the frame and rotatable on an axis coincident with the pivotal axis of the frame, means to drive the shaft, means to drive the spindle by the shaft, a short shaft rotatably mounted at the opposite end of the frame, a handle attached thereto for manually rocking said short shaft, an arm projecting from said short shaft, and a link pivotally connected at its upper end to said arm and at its lower end to the second plate, said link being curved with its concave side located toward the frame, substantially as and for the purposes described.

6. In a machine of the class described, a unit comprising a base plate, a second plate

mounted on and above the base plate and adjustable about a vertical axis, two posts projecting upwardly from the second plate, a frame having spaced apart sides with a cross bar connecting the same at one end and a hollow cylindrical member connecting them at the other end located adjacent the upper ends of the posts, each of said sides being formed with enlarged portions between their ends recessed from their outer sides inwardly, sleeves having flanges at their outer ends passing through the said sides of the frame into the posts with the flanges thereof seated in the bottoms of said recesses, cup-like retaining members screwed into said recesses against said flanges, a shaft passing through the said sleeves and having bearings therefor mounted in the cup-like members, a spindle rotatably mounted through said cylindrical member of the frame, means to drive the shaft, means to drive the spindle from the shaft, and a wheel attached to one end of the spindle.

7. A construction containing the elements in combination defined in claim 6, combined with means for partly balancing the end of the frame at which the wheel and spindle are mounted, and means for manually elevating said end of the frame.

8. In a machine of the class described, an elongated support comprising two channel members paralleling each other, a plurality of units located over said elongated support, means for detachably connecting each of the units independently to said channel members, each of said units including a wheel adapted to grind, polish or buff work and mounted for up and down movements, normally dropping by gravity, vertical supporting members carrying the said elongated support, said vertical members being located in spaced apart relation to each other, a bracket carried on each of the vertical members at the front thereof, means for simultaneously raising or lowering said brackets, two channel members located in spaced apart parallel relation on said brackets, an endless conveyer chain mounted on the channel members whereby the upper run of the chain passes longitudinally of and between the channel members, means to drive the chain, lugs extending from the chain at spaced apart intervals, work carrying carriages adapted to traverse the last named channel members lengthwise thereof, said carriages having lugs projecting downwardly therefrom between the channel members to be engaged by the lugs on the chain to move the said carriages under said wheels, substantially as described.

9. In a machine of the class described, a plurality of spaced apart vertical supports, an elongated support located over the vertical supports and attached thereto, a bracket mounted on the front side of each of the vertical supports, two channel members located in spaced apart parallel relation on and attached to said brackets, a third channel member located between the two channel members part of the length thereof, said last named channel being located with its web horizontal, sprocket wheels mounted on the two channels, a sprocket chain around the wheels, the upper run thereof riding on the third channel, means to drive one of the sprocket wheels, work carrying devices adapted to traverse the upper sides of said two channels, lugs on the chain and on said devices engaging to move the said devices by the chain, and means mounted on the elongated support to act on the work carried by said work carrying devices.

10. In a machine of the class described, a plurality of spaced apart vertical supports, an elongated support located over the vertical supports and attached thereto, a bracket at the front side of each vertical support, a rack bar attached to and depending from each bracket, a pinion meshing with each rack bar, means for simultaneously turning all of the pinions, devices for releasably securing the brackets to the vertical supports, spaced apart channels located over all of the brackets and attached thereto, work holding devices adapted to travel lengthwise of the channels, means for moving said work holding devices lengthwise of the channels, and means mounted on the elongated support to act on the work carried by said devices.

11. In a machine of the class described, a plurality of units, located in longitudinal alignment, supporting means therefor, each of said units having means for attachment of a grinding, polishing or buffing wheel, means for driving each of said wheels independently, means for independently adjusting each of said wheels to a desired position with reference to the work, means for carrying the work to and by said wheels, and means for manually moving any wheel to an inoperative position with reference to the work.

12. In a machine of the class described, a spindle, a plate attached thereto adjacent one end thereof, a sleeve formed at one end with an enlarged outwardly extending flange to bear against the plate, said flange and plate having readily disengageable driving engagement, a wheel body adapted to be placed over the sleeve, and means detachably connected to the end of the spindle to bear against the end of the sleeve to hold it on the spindle without affecting the body of the wheel.

In testimony whereof I affix my signature.

MATTHEW LUND.