May 24, 1938. G. A. CARLSON 2,118,548

POLISHING AND BUFFING MACHINE

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Fig. 9.

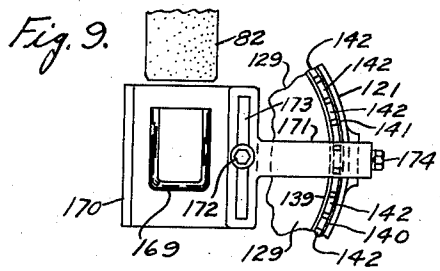
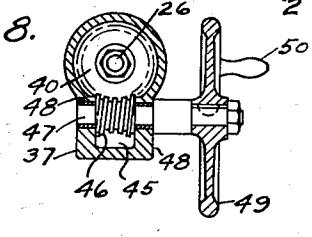


Fig. 1.

Fig. 8.



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May 24, 1938. G. A. CARLSON 2,118,548

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Fig. 10.

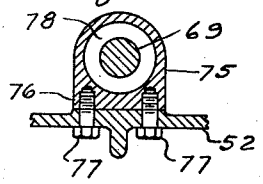


Fig. 2.

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May 24, 1938. G. A. CARLSON 2,118,548

POLISHING AND BUFFING MACHINE

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Fig. 5.

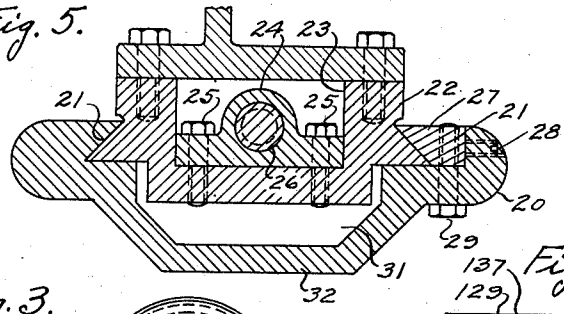


Fig. 3.

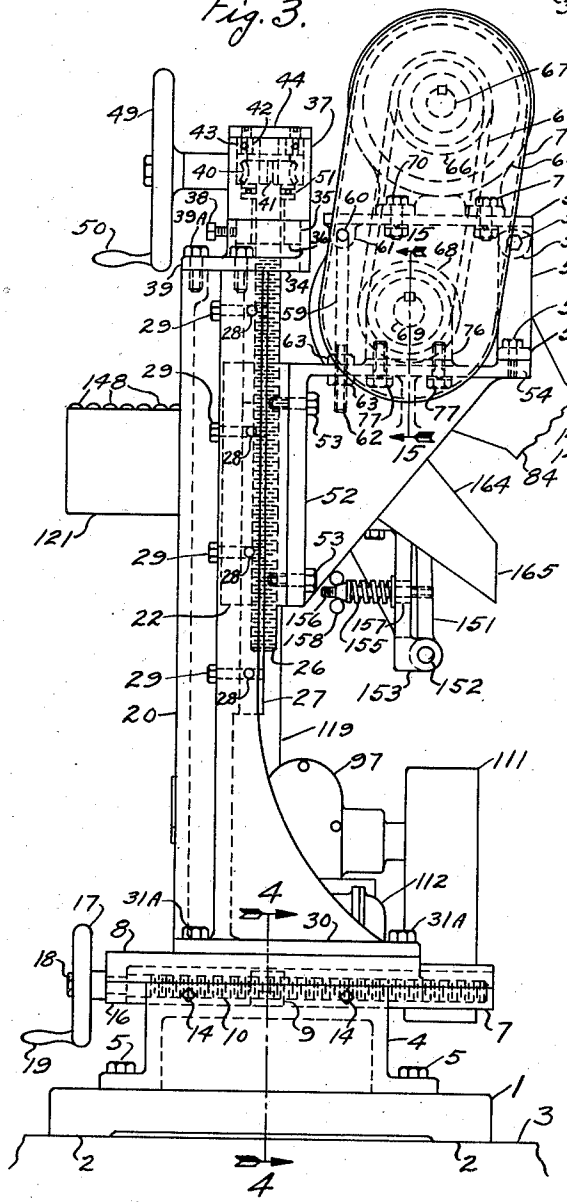


Fig. 7.

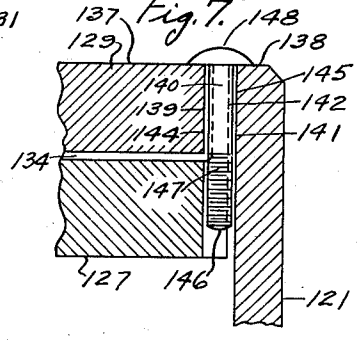


Fig. 6.

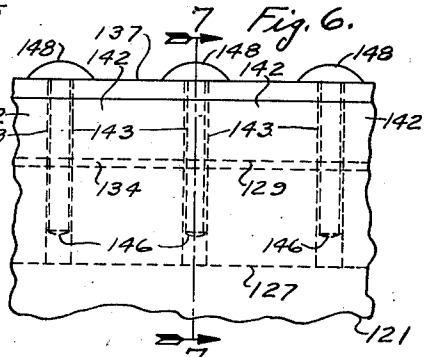
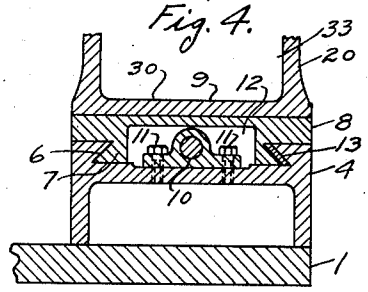


Fig. 4.



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Fig. 11.

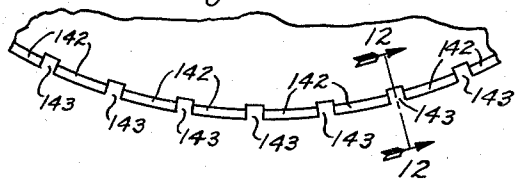


Fig. 12.

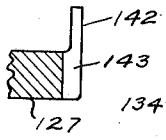


Fig. 19.

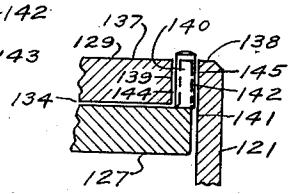


Fig. 14.

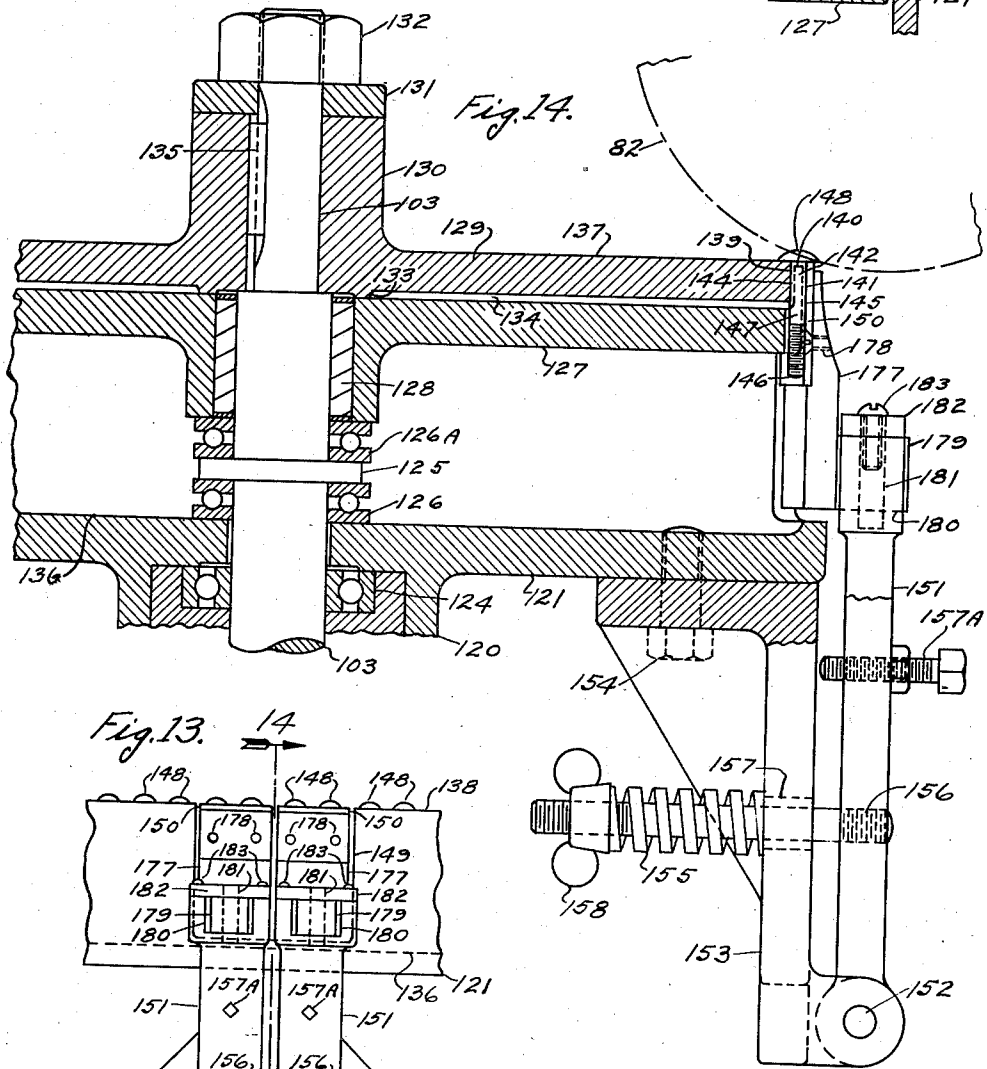


Fig. 13.

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May 24, 1938. G. A. CARLSON 2,118,548

POLISHING AND BUFFING MACHINE

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Fig. 15.

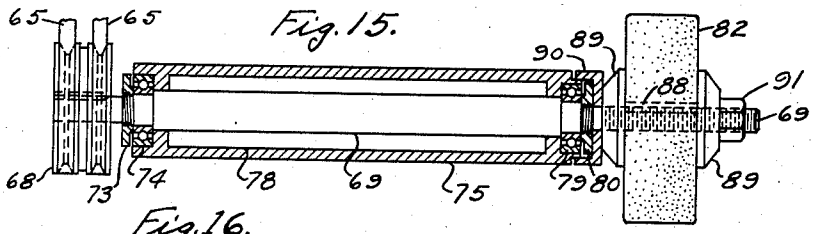


Fig. 16.

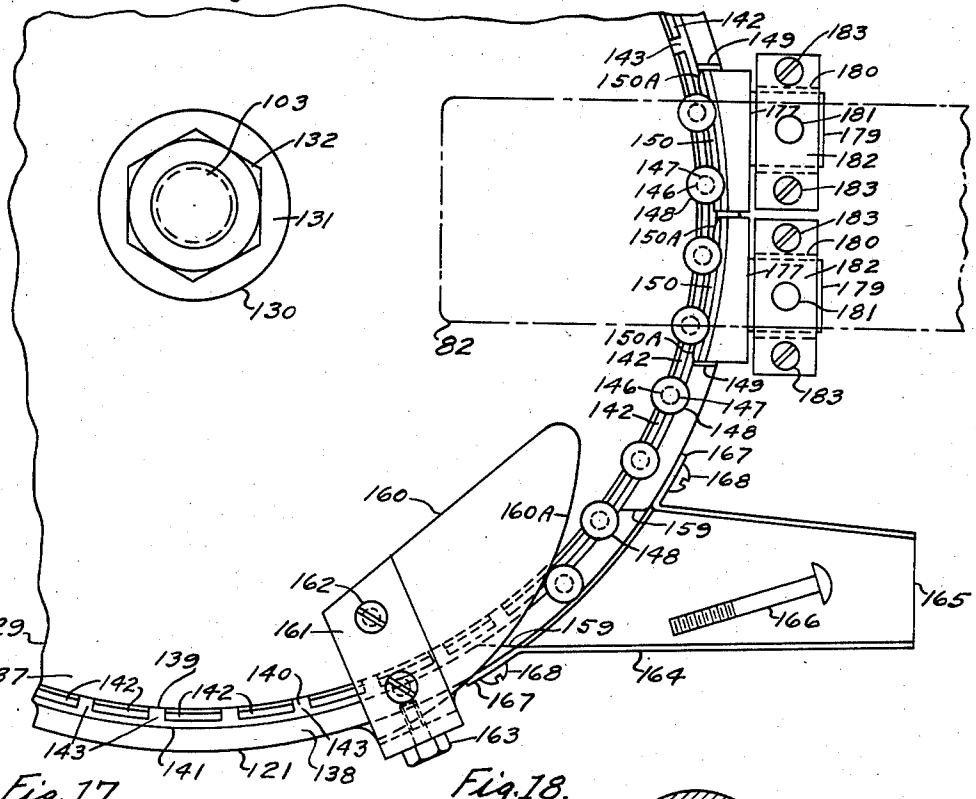


Fig. 17.

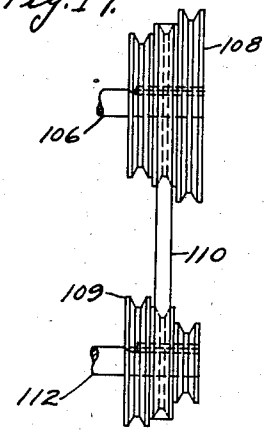
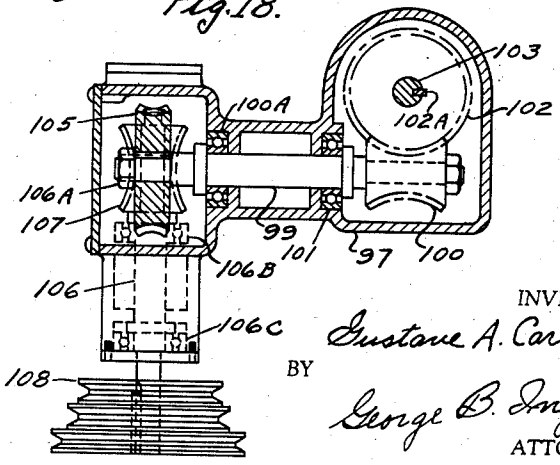


Fig. 18.



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Patented May 24, 1938 2,118,548

UNITED STATES PATENT OFFICE

2,118,548

POLISHING AND BUFFING MACHINE

Gustave A. Carlson, Detroit, Mich.

Application October 28, 1936, Serial No. 108,033

4 Claims. (Cl. 51—108)

My invention relates to improvements in a polishing and buffing machine in which the objects to be polished and buffed are automatically operated therethrough, and the objects of my improvements are, first, to provide means whereby screw heads of various sizes, rivets, pins, lock barrel facings and similar objects may be automatically operated through polishing and buffing operations; second, to provide a polishing and buffing machine with means for revolving the work as it passes a polishing or buffing wheel to obtain uniform finish of the work; third, to provide a polishing and buffing machine with means for ejecting the work after the polishing or buffing operation; fourth, to provide a machine capable of economically polishing and buffing objects in high production; fifth, to provide a polishing and buffing machine with means for continuously feeding objects through the polishing and buffing mechanism; sixth, to provide a polishing and buffing machine with feed mechanism actuated by utilizing a driving movement of an object being polished or buffed; seventh, to provide a polishing and buffing machine capable of accommodating different sizes and shapes of objects to be polished or buffed with a minimum change of parts; and eighth, to provide a polishing and buffing machine with support means to facilitate application of abrasive composition to a wheel.

I attain these objects by the mechanism illustrated in the accompanying drawings, in which:—

Figure 1 is a front side view of the polishing and buffing machine; Fig. 2, a rear side view of the polishing and buffing machine; Fig. 3, a side view of the polishing and buffing machine; Fig. 4, a partial sectional view of the polishing and buffing machine taken on the line 4—4, Fig. 3; Fig. 5, a partial sectional view of the polishing and buffing machine taken on the line 5—5, Fig. 1; Fig. 6, a partial side view of mechanism for retaining an object to be polished and buffed; Fig. 7, a sectional view of the retainer mechanism disclosed in Fig. 6 and taken on the line 7—7, Fig. 6; Fig. 8, a sectional view of the polishing and buffing machine taken on the line 8—8, Fig. 1; Fig. 9, a partial plan view of the polishing and buffing machine as disclosed in Fig. 1; Fig. 10, a partial sectional view of the polishing and buffing machine taken on the line 10—10, Fig. 2; Fig. 11, a partial plan view of the retainer member; Fig. 12, a sectional view of the retainer member taken on the line 12—12, Fig. 11; Fig. 13, a partial side view of the retainer and pressure plate mechanism; Fig. 14, a sectional view of the retainer and pressure plate mechanism taken on the line 14—14, Fig. 13, said sectional view being drawn to larger scale than that of Fig. 13; Fig. 15, a partial sectional view of the polishing and buffing machine taken on the line 15—15, Fig. 3; Fig. 16, a partial plan view of the retainer mechanism disclosed in Fig. 14 together with the ejector mechanism; Fig. 17, a partial side view of the belt driving mechanism taken along the line 17—17, Fig. 2; Fig. 18, a partial sectional view of the polishing and buffing machine taken on the line 18—18, Fig. 2; and Fig. 19, a partial vertical section of retainer mechanism for use with hinge pins or similar members.

Similar numerals refer to similar parts throughout the several views.

The base member 1 is provided with feet portions 2 adapted to rest on a floor 3 or similar supporting surface and a housing 4 is secured to the base member 1 by screws 5.

The housing 4 is provided with a V-groove 6 in which the V portion 7 of the slide member 8 is movably mounted, the housing 4 being provided with a bracket 9 which is threadably engaged by the screw 10, the bracket 9 being secured to the housing 4 by the screws 11, the slide member 8 being provided with a clearance chamber 12.

The housing 34 is provided with a bore 35 in which fits the pilot portion 36 of the housing 37 which is secured therein by the screw 38. The housing 34 is provided with the flange 39 which is secured to the upper portion of the bracket or housing 20 by the screws 39A.

The shaft 26 extends through the bracket 34 and into the housing 37 and also through the worm gear 40 to which it is suitably connected as by a key member 41 to provide a driving connection therebetween. The thrust bearing 51 is mounted in the housing 37 adjacent the worm gear 40 and around the shaft 26, the upper end of the shaft 26 being mounted in the bearing 42 which is mounted in the bore 43.

The housing 37 is provided with the chamber 45 in which is mounted the worm 46 supported on the shaft 47 rotatably mounted in the bushings 48, the worm 46 engaging and driving the worm gear 40.

The shaft 47 is suitably secured to the hand wheel 49 which is provided with the handle 50 which thus is adapted to rotate the hand wheel 49 and operate the worm 46 and worm gear 40 to drive the shaft 26 to move the slide member 22.

The bracket 52 is secured to the slide member 22 by the screws 53 and is provided with the boss portion 54 to which is secured the bracket 55 by the screws 56, the bracket 55 having the arms 56A

to which is pivotally secured the bracket 57 by means of the bosses 57A and the bolts 58. The bracket 57 is further adjustably supported by the bolt 59 which has a bent portion 60 pivotally engaging the boss portion 61 of the bracket 57, the bolt 59 having a threaded end 62 extending through the bracket 52 and adjustably secured by the nuts 63 which thus provides means for pivotally moving the bracket 57, together with the electric motor assembly 64, to different positions to adjust the belts 65 which are connected between the pulley 66, mounted on and secured to the shaft 67 of the electric motor assembly 64, and the pulley 68 mounted on and secured to the spindle or shaft 69.

The electric motor assembly 64 is secured to the bracket 57 by the bolts 70.

The gibs 13 are interposed between the V portion of the slide member 8 and one side of the V groove 6 to take up wear therebetween, the gib 13 being adjustably secured in its operating position by the screws 14 and lock washers 15.

The screw 10 is rotatably mounted in the boss portion 16 of the slide member 8 and is retained longitudinally by suitable shoulder portions on the screw member 10 and the handwheel 17 which is secured thereto by the nut 18, the hand wheel 17 being provided with the handle 19, thus providing movement of the slide member 8 together with its supporting portions, hereinafter described, when the handwheel 17 is revolved.

The housing or bracket 20 is provided with a V groove 21 in which is movably mounted the slide member 22 which is provided with a groove 23 therethrough and in which is mounted the bracket 24 by the screws 25, the bracket 24 being rotatably engaged by the screw 26 which when rotated thus provides movement for the slide member 22 and its supporting mechanism.

The gib member 27 is interposed between a straight side of the groove 21 and an inclined surface of the slide member 22 and is adapted to be adjusted to various wear positions and to be secured in said adjusted wear positions by the screws 28 and also by the screws 29.

The housing or bracket member 20 is provided with a base portion 30 which is secured to the slide member 8 by the screws 31A.

The bracket or housing member 20 is provided with a chamber 31 in which the slide member 22 moves, the chamber 31 being closed at one side by the offset web portion 32, the housing or bracket 20 being further provided with the chamber 33 to facilitate machining the grooves 21, the offset web portion 32 providing reinforcement construction for the housing or bracket 20.

The belts 65, together with their pulleys, are enclosed within the housing 71 which is suitably supported by the strap 72 connected to the electric motor assembly 64 and by further suitable means such as being mounted on the cap member 73 which retains the bearing assembly 74 in one end of the spindle housing 75, the bearing assembly 74 supporting one end portion of the spindle shaft 69.

The spindle housing 75 is provided with the boss portions 76 which are secured to the bracket 52 by the screws 77 which extend through the bracket 52.

The housing 75 is provided with the chamber 78 through which the shaft 69 extends. The outer end portion of the shaft 69 is supported in the bearing assembly 79 which is mounted in the outer end of the spindle housing 75, the bearing assembly 79 being secured on the shaft 69 by the collar member 80 which is suitably secured to the shaft 69.

The housing 81 partially surrounds the polishing or buffing wheel 82, one side of which extends through the opening 83 at one side of the housing 81, the housing 81 thus surrounding the polishing or buffing wheel 82 to shroud it as a hood in its operation and at the same time to permit a sufficient portion of the buffing or polishing wheel 82 to extend through the opening 83 of the housing 81 to permit the buffing wheel 82 to contact the object being polished or buffed.

The lower end of the housing 81 is formed as a spout 84 through the opening 85 of which pass particles, buffed or polished from the object which is going through the polishing and buffing machine, to the atmosphere.

The housing 81 is provided with a boss portion 86 which is provided with a bore which closely fits around and telescopes over the outer end of the spindle housing 75 to support the housing 81, the housing 81 being adjustably secured longitudinally on the spindle housing 75 by the set screw 87 and permitting adjustment around the axis of the shaft 69.

The polishing or buffing wheel 82 is secured to the shaft 69 by the key 88 to form a driving connection therebetween, the polishing or buffing wheel 82 being retained axially by means of the collars or washers 89, which threadably engage the shaft 69, the polishing or buffing wheel 82, together with the collars or washers 89 being tightened against the collar 90 by means of the nut 91 which threadably engages the outer end of the spindle shaft 69, the collar 90 surrounding the spindle shaft 69 and being held against the collar 80. Thus housing 81 is provided with a cover portion 92 which is secured thereto by the studs 93 and thumb nuts 94.

The bracket 95 is mounted on the base member 1 at one of its ends opposite to that end portion which supports the housing 4, the bracket 95 being secured to the base member 1 by the screws 96.

The housing 97 is secured to the bracket 95 by the screws 98 and encloses the shaft 99 upon which is mounted the worm 100, the shaft 99 being rotatably supported in the bearings 100A and 101, the worm 100 engaging and driving the worm gear 102 which is secured to the shaft 103 by the key 102A and the nut 104, the worm gear 102 being suitably connected with the shaft 103 to form a driving connection therebetween.

The worm gear 105 is suitably secured to the shaft 99 by the nut 106A together with suitable means to form a driving connection between the worm gear 105 and shaft 99.

The shaft 106 supports the worm 107 which engages and drives the worm gear 105, the shaft 106 being rotatably supported in the bearings 106B and 106C. The pulley 108 is suitably mounted and secured to the shaft 106 and is operatively connected with the pulley 109 by the belt 110, the belt 110 together with the pulleys 108 and 109 being enclosed within the housing 111 which is suitably mounted on and supported by the housing 97 and the electric motor assembly 112 which is provided with the feet or lugs 113 which are secured to the bracket 114 by the bolts 115 and nuts 116. The bracket 114 is provided with the horizontal flange 117 which is secured to the housing 97 by the bolts 118.

The housing 97 is provided with an upwardly extending portion 119 which telescopes within

the boss portion 120 of the housing 121, the housing 121 being retained from rotating on the upwardly extending portion 119 of the housing 97 by the set screws 122.

The shaft 103 extends through the upwardly extending portion 119 of the housing 97 and also through the bearing assembly 123 which is mounted in the housing 97 adjacent the worm gear 102 and supports the lower end of the shaft 103.

The shaft 103 is further supported by the bearing assembly 124 mounted in a shouldered bore at the upper end of said upstanding portion 119 of the housing 97, the shaft 103 being provided with a flange or collar 125 and the thrust bearing assemblies 126 and 126A surround the shaft 103 and engage opposite sides of the flange 125 for supporting the retainer member 127.

The roller bearing assembly 128 surrounds the shaft 103 and engages a bore of the retainer member 127 to absorb loads in planes extending transversely to the axis of the shaft 103.

The retainer member 127 is retained on the shaft 103 by the disc 129 which is provided with a hub 130 having a bore for receiving the shaft 103 therethrough, the disc 129 being secured on the shaft 103 by the washer 131 and the nut 132, the disc 129 being provided with a boss or extension 133 for engaging an upper surface of the retainer member 127 to space the flange portion of the disc 129 from the retainer member 127 to maintain the clearance space 134. The key member 135 provides a driving connection between the disc 129 and the shaft 103.

The housing 121 is provided with the chamber 136 in which the disc 129 revolves with its upper surface 137 located substantially in the same plane as the upper edge surface 138 of the housing 121. The diameter 139 of the disc 129 is of sufficient size as to provide the annular groove, channel or space 140 between the diameter 139 of the disc 129 and the bore 141 of the housing 121.

The retainer member 127 is provided with a plurality of fingers or extension portions 142 which are constructed by machining the plurality of slots or grooves 143 between the extension portions 142 which thus extend cylindrically around the retainer member in the space 140 with the relatively slight clearance space 144 between the extension portions 142 and the diameter 139 and with the relatively slight clearance space 145 between the extension portions 142 and the bore 141 as disclosed in Figs. 7 and 14.

It is to be noted that my invention provides the slots or grooves 143 extending for the total length of the extension portions 142 and through the flange portion of the retainer member 127 to the lower side of said flange portion when desired for retaining objects such as the screws 146.

It is to be noted that my invention provides means in which objects such as screw heads of various shapes and sizes, rivets, pins, lock barrel facings or similar parts are economically and speedily polished and buffed, and the object disclosed herein as one of many objects to illustrate the operation of my invention is a screw 146 having a shank or body 147 which extends and fits between the sides of the slots or grooves 143, the screw 146 being further provided with an oval head 148, the lower surface of which rests on the surface 137 of the disc 129 and on the edge surface 138 of the housing 121.

It is to be noted that a plurality of screws 146 equal to the number of slots or grooves 143 may be inserted in the retainer mechanism and screws or similar objects of different sizes may be readily accommodated in my invention by utilizing discs 129 and retainer members 127 having extension portions 142 of different diameters and with the requisite spacing and width of slots or grooves 143 by the construction disclosed in Fig. 19.

Now it is to be noted that the wall portion of the housing 121 is cut away, as at 149, Figs. 13 and 16, to expose a portion of the retainer member 127 and to permit the pressure plates 150 to engage and ride on the retainer member 127, the pressure plates 150 which are constructed of metal or similar material being secured to the brackets 177, which are constructed of bronze or similar material, by the screws 178, the brackets 177 being provided with extension portions 179 which extend into the slots 180 of the arms or levers 151, the extension portions being retained and adapted to swivel on the shafts or pins 181 to permit the pressure plates 150 to always accommodate themselves to proper engagement with the screws 146. The shafts or pins 181 are mounted in the arms or levers 151 and in the plates 182 which are secured to the arms or levers 151 by the screws 183. The arms or levers 151 are pivotally mounted on the shaft 152 supported in the bracket 153 which is secured to the housing 121 by the screws 154. The pressure plates 150 are actuated toward the screws 146 by the resilient members or springs 155 which surround the bolts 156 which extend through openings 157 in the brackets 153 and are suitably secured to the arms or levers 151 to exert a pull thereon, the springs 155 being retained by the wing nuts 158 which threadably engage the bolt 156. The pressure plates 150 are rounded at their corners 150A to insure proper engagement with the screws 146 as they roll past and it is to be noted that the pressure plates 150 will engage the diameter of the screws 146 which set beyond the outer diameter of the retainer member 127. Also the pressure plates 150 may be provided with a radius to conform to the radial path of movement of the screws 146.

The screws 157A are mounted in the arms or levers 151 and engage suitable surfaces of the brackets 153 to limit the tension of the springs 155 to permit the pressure plates 150 to engage the screws 146 with sufficient pressure only for the purposes hereinafter disclosed and at the same time to allow the retainer member to revolve freely.

When the shaft 103 is rotatably driven the disc 129 will be positively driven with a rotative movement and due to the engagement of the diameter 139 with the body 147 of the screw 146 together with the engagement of the surface 137 with the under side of the head 148 which rests its weight thereon, together with the engagement of the body 147 of the screw 146 with the pressure plates 150 which are stationary, the screws 146 will be revolved and will travel along the annular space 140, the driving thrust of the screws 146 thus actuating the retainer member 127 with a revolving movement which causes the extension portions 142 to move the screws 146 continually under and into engagement with the wheel 82, the retainer member 127 being rotatably supported by the bearing assemblies 126A and 123, and thus is adapted to be driven by the rotation of the screws 146, the screws 146 being actuated with a rotative movement immediately they are moved adjacent or into engagement with the

wheel 82, thus insuring the total surface being polished and buffed to be engaged by the wheel 82.

As the screws 146 are polished and buffed they are moved out from under the wheel 82 and as they are further moved adjacent the cut away portion 159, they are ejected out of the slots or grooves 143 in the annular space 140 by the knock out member 160 which is provided with the cam surface 160A for engaging the heads 148 of the screws 146, the knock out member 160 being mounted on and secured to the bracket 161 by the screws 162, the bracket 161 being secured to the housing 121 by the screws 163.

The screws 146, as they are ejected by the knock out members 160, fall into the trough 164 which thus guides the screws 146 to fall out of the spout portion 165 into a receptacle, as desired, one of the screws 146 being indicated at 166, Fig. 2 and Fig. 16, as falling down the trough 164, the trough 164 being provided with flanges 167 which are secured to the housing 121 by the screws 168.

It is to be understood that my invention provides means whereby polishing and buffing or similar operations are performed on objects such as above enumerated and when the wheel, such as indicated at 82 is utilized for buffing operations, an abrasive is applied to the wheel 82 as by engaging the wheel 82 with a cake 169 of abrasive composition, said cake 169 being disclosed, in Figs. 1 and 9, as resting on the bracket holder 170 provided with a trough and located adjacent the exposed portion of the wheel 82, the cake 169 being applied by the operator against the wheel 82 while it is supported on the bracket 170 against the thrust of the wheel 82, the bracket 170 providing a support for the cake 169 between applications. The bracket 170 is supported from the bracket 171 by the screw 172 which extends through the slot 173 to permit the bracket 170 to be adjustably positioned to and from the wheel 82 as desired. The bracket 171 is secured to the housing 121 by the screws 174.

The cable 175 connects the electric motor assembly 112 and the cable 176 connects the electric motor assembly 64 with sources of electric current which may be controlled with suitable switches mounted on or adjacent the polishing and buffing machine.

Fig. 19 discloses the retainer member provided with slots or grooves extending for a depth substantially for the length of the extension portions 142 to provide a ledge or shelf for supporting objects such as the hinge pin 146A or similar objects being polished or buffed and which do not have head portions such as 148.

In operation, the polishing and buffing wheel 82 is driven by the shaft 69 which is in turn driven by the belt 65 which is driven by the electric motor assembly 64.

The screws 146 or similar objects to be polished or buffed are placed in the grooves or slots 143 between the extension portion 142 of the retainer member 127, the screws 146 thus being supported in the space 140 between the housing 121 and the disc member 129 with their heads 148, if the object being polished or buffed is provided with a head, resting upon the surface 137 of the disc member 129 and the surface 138 of the housing 121.

Then the operator revolves the hand wheel 49 which, together with the worm 46 and the worm gear 40, revolves the shaft 26 to move the slide member 22 together with its supported mechanism, including the wheel, with the desired adjustment pressure against the heads 148 of the screws 146.

In a similar way the hand wheel 17 is revolved to operate the shaft 10 to move the slide member 8 together with its supported mechanism, including the wheel 82, fore and aft to properly position it relative to the heads 148 of the screws 146.

The electric motor assembly 112 drives the pulley 109 which in turn drives the belt 110 which drives the pulley 108 together with the shaft 106 which drives the worm 107 together with the worm gear 105 and the shaft 99 to revolve the worm 100 to drive the worm gear 102 which in turn drives the upright shaft 103 which drives the disc member 129 with a rotative motion.

The pressure plates 150 are forced into engagement with the screws 146 held in the retainer member 127, the pressure plates 150 extending through the opening 149 in the housing 121.

The screws 157A are adjusted so that both of the pressure plates 150 engage the screws 146 after which the screws 157A are adjusted sufficiently to permit the disc member 129 to revolve freely. The rotative movement of the disc member 129 in engagement with the screws 146 will, due to the pressure of the pressure plates 150 against the screws 146, cause the screws 146 to revolve each about their own axis in the annular space 140 and this will cause the screws 146 to roll along the pressure plates 150 and this revolving motion of the screws 146 about their center axis will occur only while the screws are passing the pressure plates 150 and while rolling along the screws 146 will, due to their engagement with the sides of the slots 143 between the extension portions 142, cause the retainer member 127 to rotate on the bearings 126A and 128, thus causing the screws 146 to be fed around the housing 121 and under the wheel 82, the rotation of the screws 146 in this manner about their own individual axis insuring the heads 148 being polished or buffed uniformly throughout their total area, the heads 148 extending up into the wheel 82 as disclosed in Fig. 14.

As the retainer member 127 continues to rotate the screws 146 will be moved out from under the wheel 82 and as they approach the opening 159 in the side wall of the housing 121 they are engaged by the knock out member 160 and ejected out of the retainer member 127 and into the trough 164 and out through its spout portion 165 into any desired receptacle.

As the screws 146 are ejected from the retainer member 127 they are replaced by other screws 146 by the operator of the machine who thus keeps the retainer member 127 filled with screws 146. From time to time the cake 169 of composition is held by the operator in engagement with the wheel 82 to replace its abrasive composition and to provide proper buffing characteristics in a buffing and polishing operation.

I claim:

1. In a polishing and buffing machine, the combination of a base member, a bracket mounted on said base member, a slide member movably mounted on said slide member in a horizontal plane, a housing mounted on said slide member and provided with a groove extending vertically therein, a second slide movably mounted in said groove, a spindle housing supported by said second slide member, a spindle shaft rotatably mounted in said spindle housing, an electric motor assembly supported by said second slide member and driving said spindle shaft, a polishing or buffing wheel mounted on said spindle shaft and

adapted to rotate therewith, a second bracket mounted on said base member, a housing supported by said second bracket, a shaft extending through said housing supported by said second bracket, a disc member secured to said last mentioned shaft and adapted to rotate therewith, a retainer member rotatably mounted on said last mentioned shaft and provided with means for retaining screws or similar objects to be polished or buffed, between said housing and said disc member, pressure mechanism for engaging said screws to rotate said screws individually and to further rotate said retainer member to feed said screws past said wheel, and an electric motor assembly supported on said second bracket and driving said last mentioned shaft.

2. In a machine, the combination of two concentric relatively driven surfaces having work pieces each of a round cross-section therebetween, spring means urging said work pieces into contact with both of said surfaces whereby said pieces rotate about their own axis and progress between said surfaces, a retainer for said work pieces driven by said pieces at a speed equal substantially to difference between the rotative speeds of said surfaces, a work performing means past which said pieces are driven, and an ejector means for removing said pieces from said retainer after passing said work performing means.

3. In a machine, the combination of two concentric radially spaced cylindrical surfaces adapted to receive therebetween work pieces having a cylindrical portion, means for rotating one of said surfaces, a portion of one of said surfaces being radially movable toward the rotatable surface, spring means urging said portion toward said rotatable surface and against the cylindrical portion of the work pieces whereby said pieces are driven by said rotatable surface, a retainer for said work pieces comprising a radially slotted cylindrical member concentric with said surfaces and rotatable under the influence of said pieces, a polishing or buffing wheel against which an end of each of said pieces is moved, and an ejector for discharging each of said pieces from said retainer after contact with said wheel.

4. In a machine, the combination of two concentric radially spaced cylindrical surfaces adapted to receive therebetween work pieces having a cylindrical portion, means for rotating one of said surfaces, a portion of one of said surfaces being radially movable toward the rotatable surface, spring means urging said portion toward said rotatable surface and against the cylindrical portion of the work pieces whereby said pieces are driven by said rotatable surface, a retainer for said work pieces comprising a web portion having an up-standing radially slotted peripheral portion with the web forming a bottom for said slots and constituting a work supporting means, said peripheral portion being concentric with said surfaces and rotatable by said pieces, a polishing or buffing wheel against which the end of said pieces away from the bottom of said slots is moved, and an ejector for discharging each of said pieces from said retainer after contact with said wheel.

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