J. F. GAIL.

BEDSTEAD MOUNT BUFFING MACHINE.

APPLICATION FILED DEC. 22, 1908.

941,706. Patented Nov. 30, 1909.

9 SHEETS—SHEET 1.

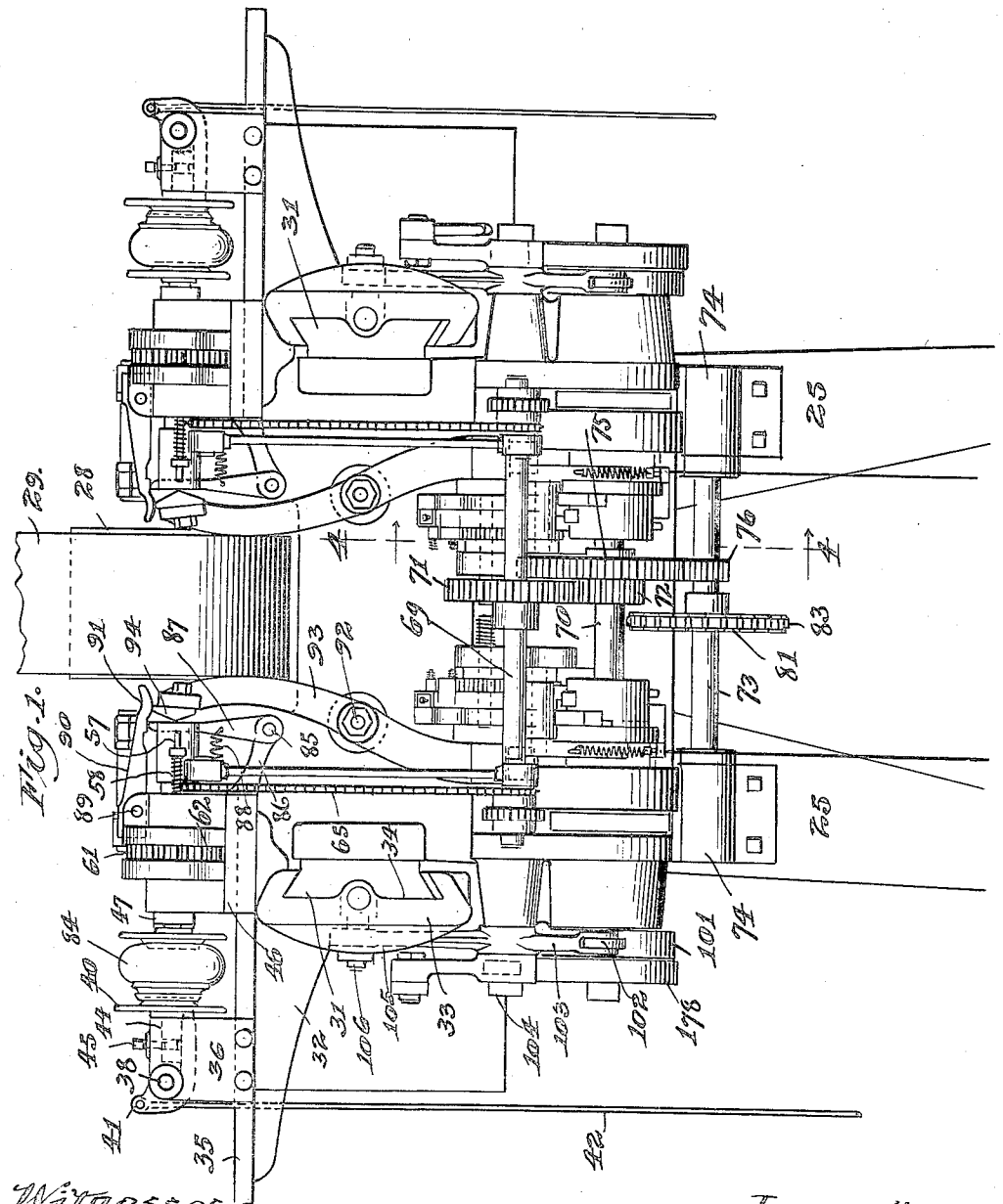

Fig. 1.

Witnesses,
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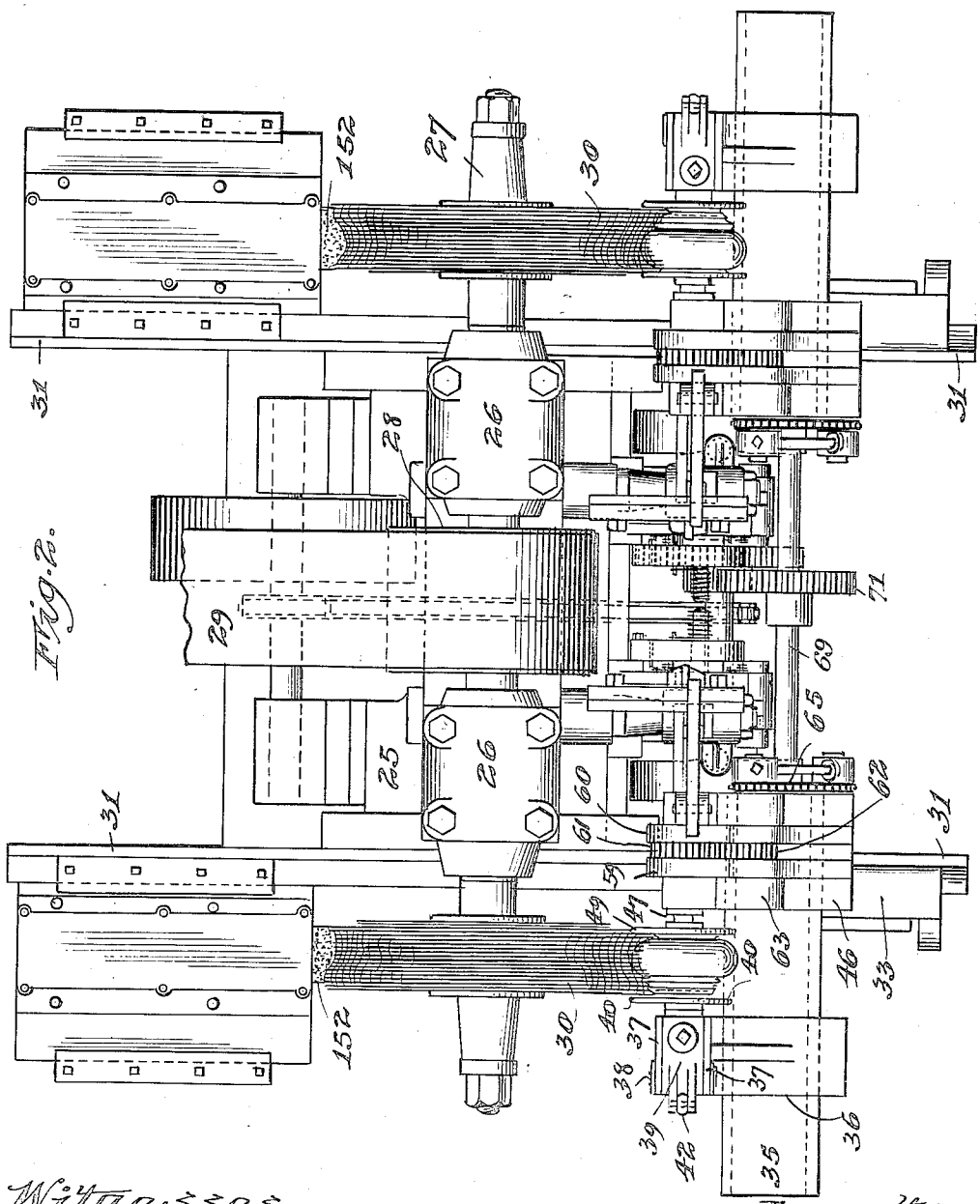

Fig. 2.

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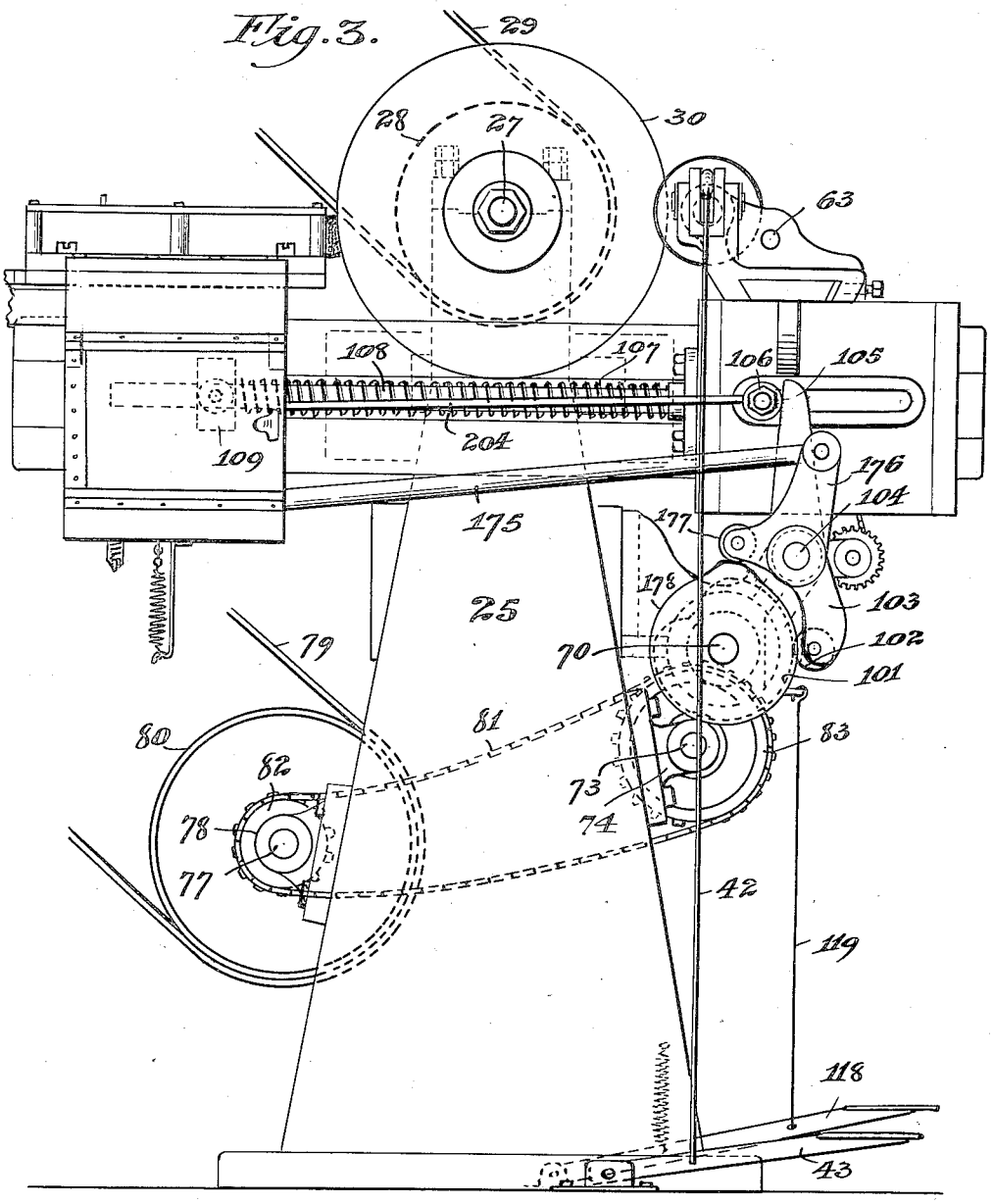
9 SHEETS—SHEET 3.

Fig. 3.



Witnesses,
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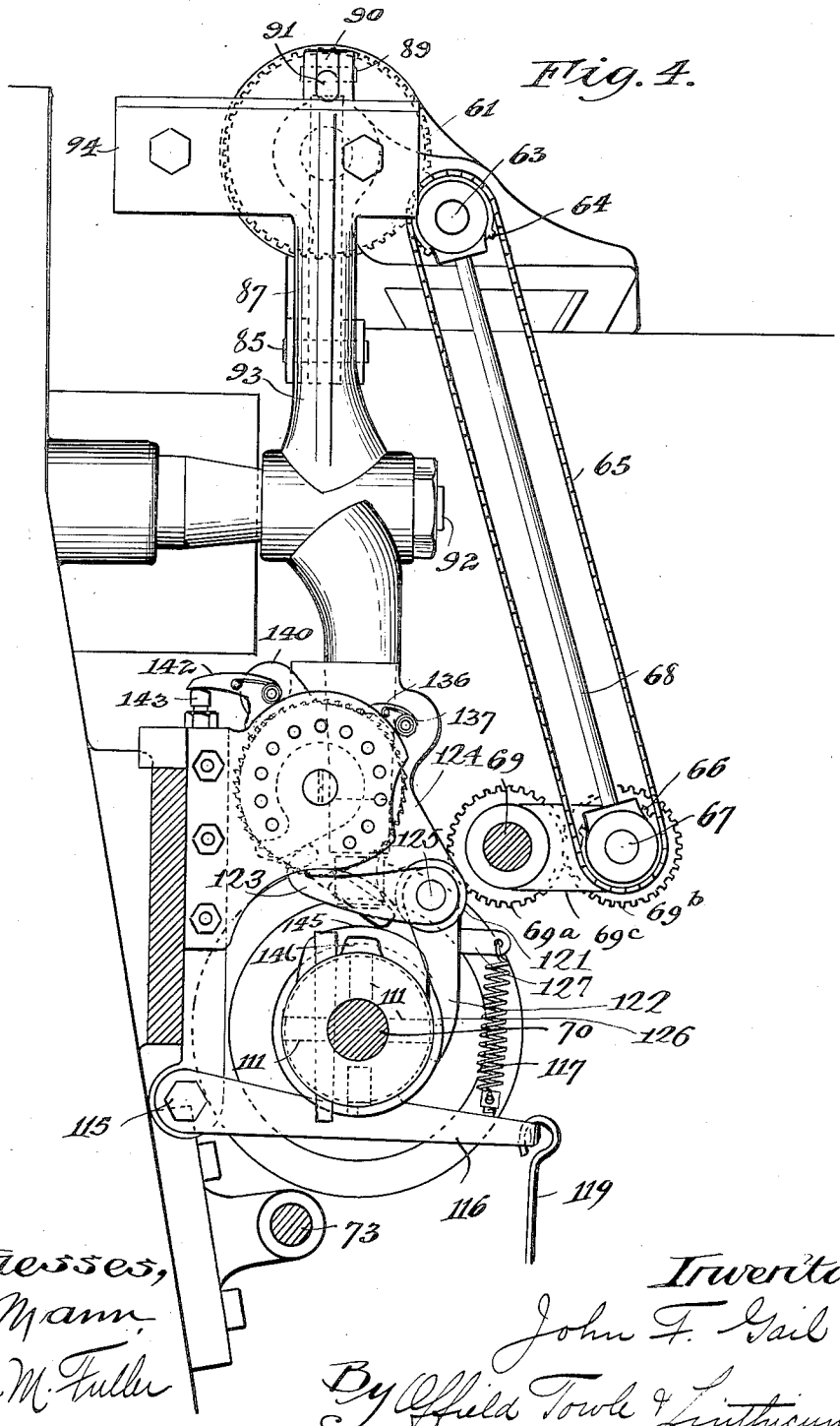
9 SHEETS—SHEET 4.

Fig. 4.



Witnesses,
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9 SHEETS—SHEET 5.

Fig. 5.

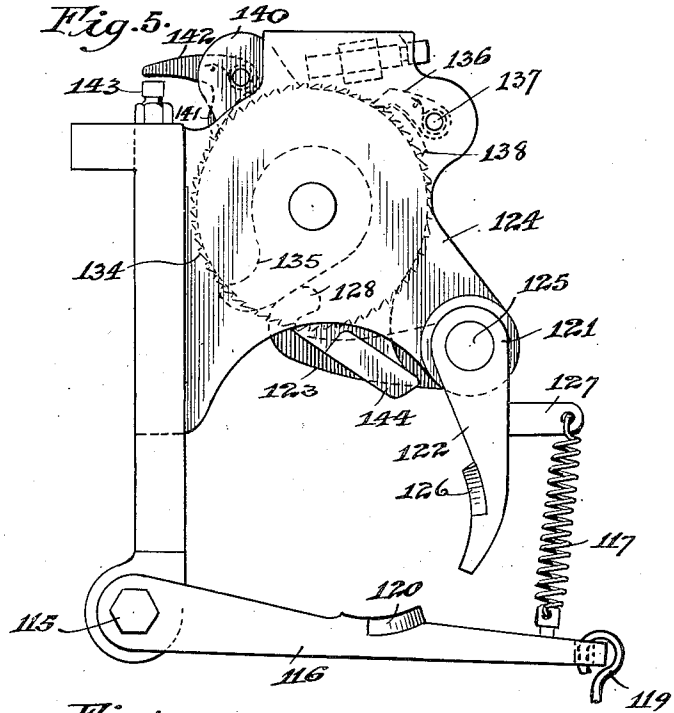


Fig. 7.

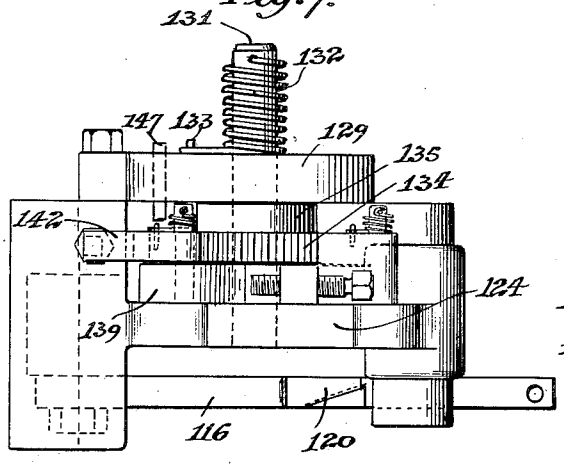
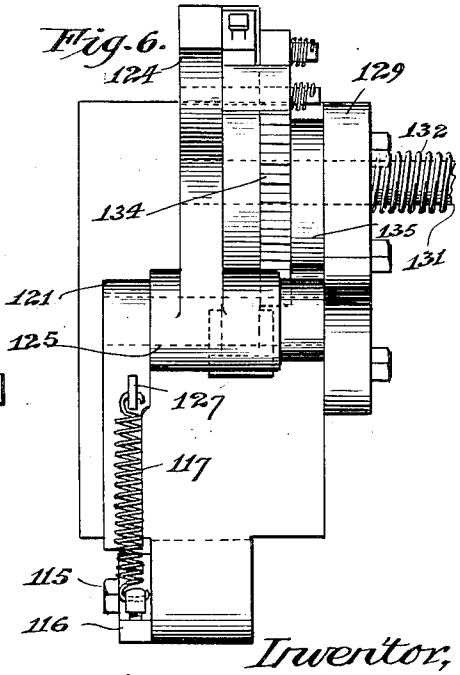


Fig. 6.



Witnesses,

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9 SHEETS—SHEET 6.

Fig. 8.

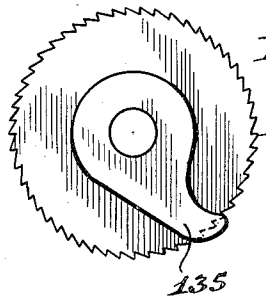
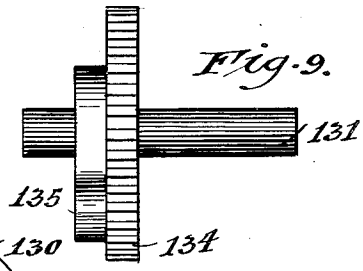


Fig. 9.



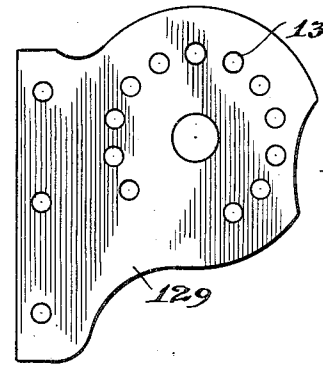


Fig. 10.

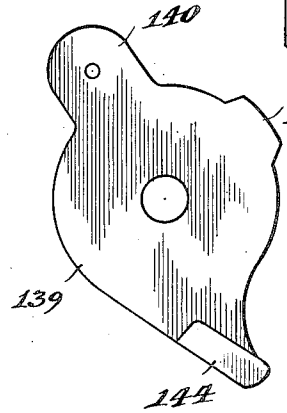


Fig. 11.

Fig. 12.

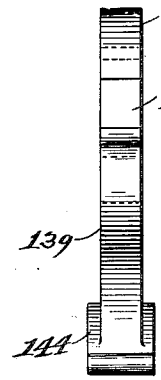
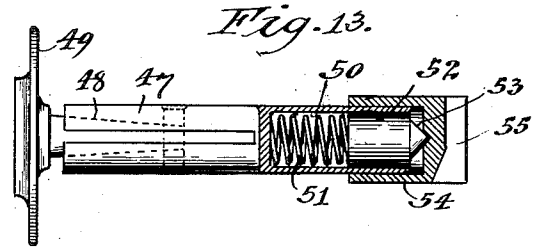
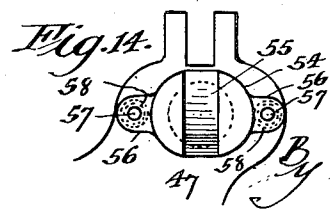


Fig. 13.



Witnesses,
D. D. Mann,
Walter M. Fuller

Fig. 14.



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9 SHEETS—SHEET 7.

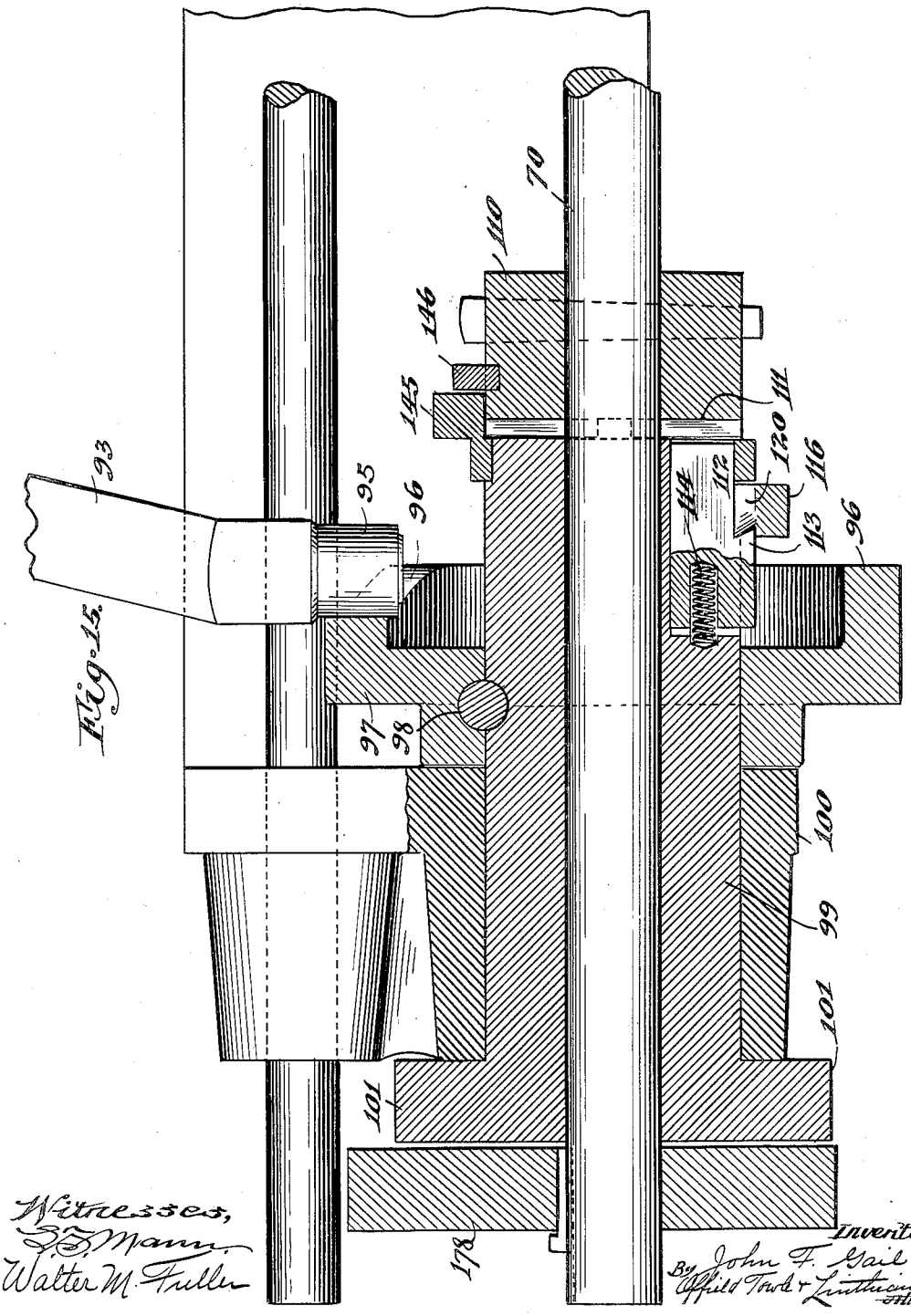

Fig. 15.

Witnesses,
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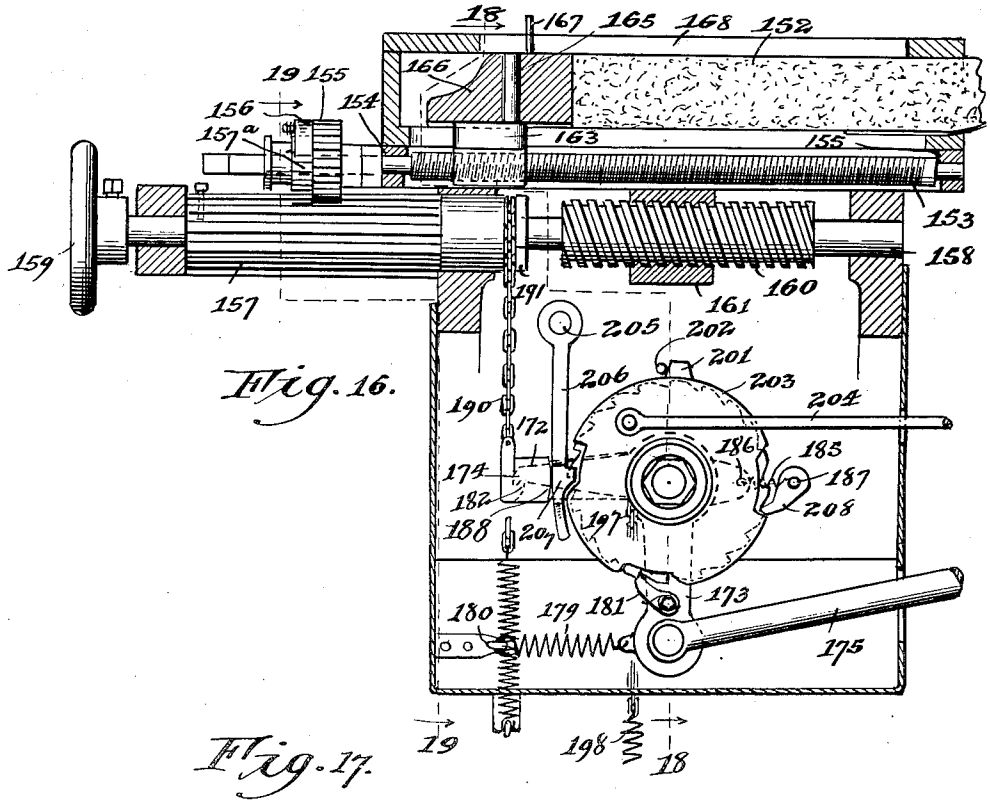
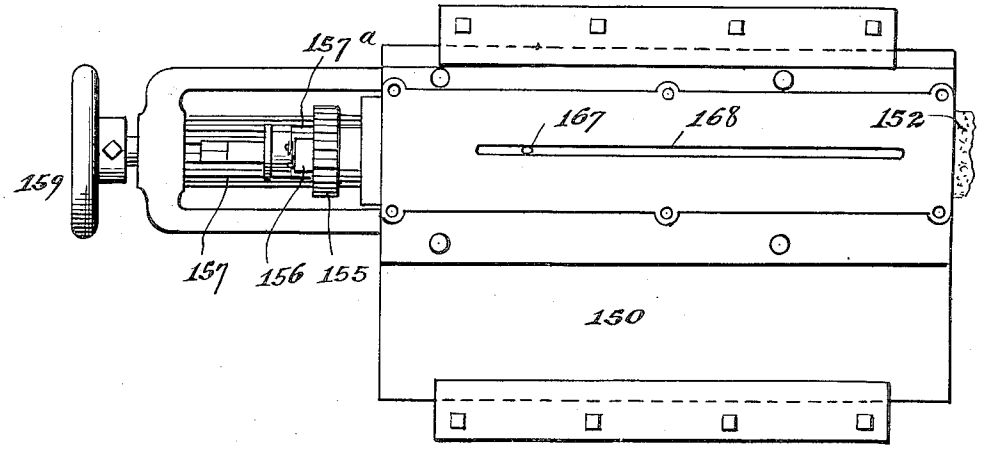


Fig. 16.

Fig. 17.



Witnesses,
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BEDSTEAD MOUNT BUFFING MACHINE.

APPLICATION FILED DEC. 22, 1908.

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9 SHEETS—SHEET 9.

Fig. 18.

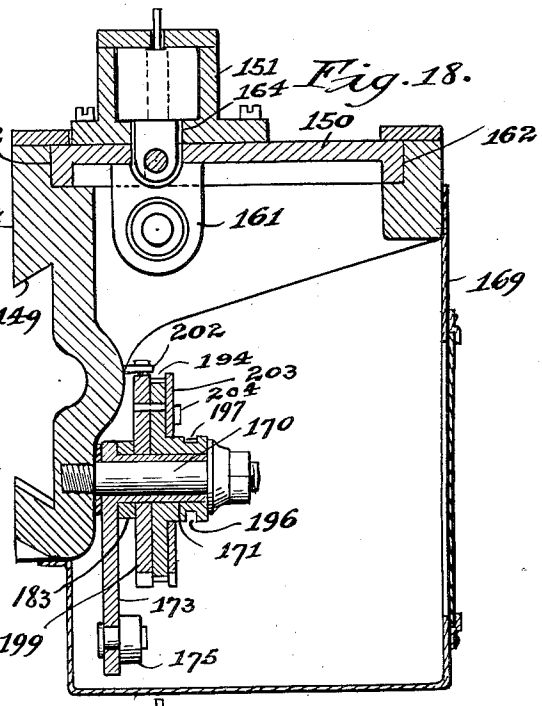


Fig. 20.

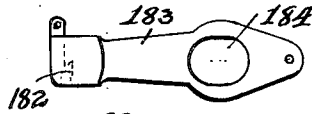


Fig. 21.

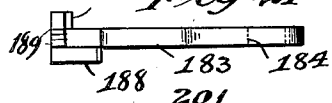


Fig. 22.

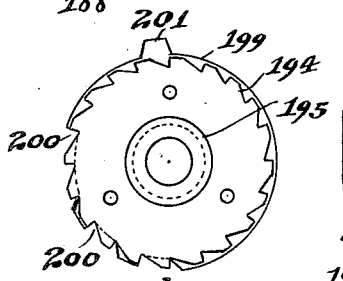
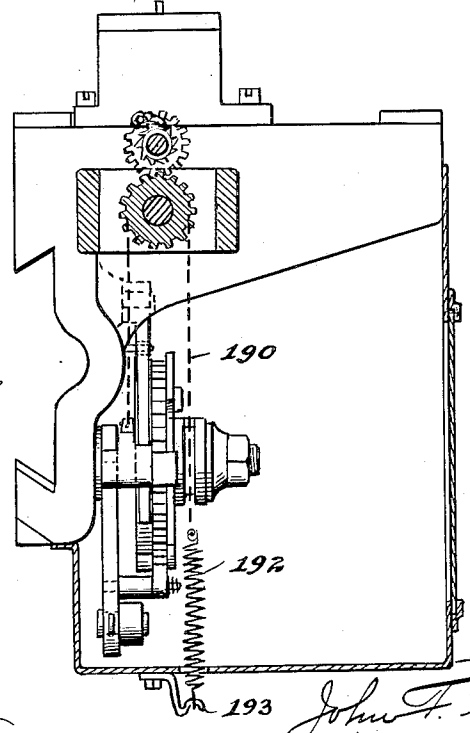


Fig. 19.



Witnesses,

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Walter M. Fuller

Inventor,

John F. Gail

By Offield Towle & Linthicum

Attys

UNITED STATES PATENT OFFICE.

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BEDSTEAD-MOUNT-BUFFING MACHINE.

941,706. Specification of Letters Patent. Patented Nov. 30, 1909.

Application filed December 22, 1908. Serial No. 468,757.

To all whom it may concern:

Be it known that I, JOHN F. GAIL, a citizen of the United States, residing at Kenosha, in the county of Kenosha and State of Wisconsin, have invented certain new and useful Improvements in Bedstead-Mount-Buffing Machines, of which the following is a specification.

The present invention relates to that class of machines or devices for burnishing or buffing articles such as metallic mounts for metal bedsteads, or other pieces of furniture. In my improved machine the hollow brass mount is clamped between holding pieces or rotary head and tail stocks, is moved into the field of operation of a rotating buffer wheel when the polishing is done, and is automatically retracted when the buffing operation is completed, an abradant being applied mechanically and periodically to the buffing wheel.

Many features of novelty and improvement will be made apparent from the following detailed description of the invention and its preferred embodiment.

On the accompanying drawings, forming a part of this specification, I have illustrated a preferred and desirable embodiment of the same, and in these drawings—Figure 1 is a face view or front elevation of the main portion of my improved buffing machine; Fig. 2 is a plan view of the machine; Fig. 3 is an end elevation of the same; Fig. 4 is an enlarged vertical section on line 4—4 of Fig. 1; Fig. 5 is a side elevation of the portion of the mechanism controlling the period of time during which the buffer wheel acts upon the mount; Fig. 6 is a front elevation of the construction shown in Fig. 5; Fig. 7 is a plan view of the same combination of elements; Figs. 8, 9, 10, 11, and 12 are detail views of the governing or controlling parts of the mechanism illustrated in Figs. 5, 6 and 7; Figs. 13 and 14 illustrate details of one of the holding pieces or stocks for the mount; Fig. 15 is a partial elevation and partial vertical section of the cam mechanisms controlling the actuation of the head-stock clamping the mount in place, the sliding of the carriage for bringing the mount into and out of contact with the buffer wheel, and the application of the abradant to the buffer wheel; Fig. 16 is a vertical section of the abradant applying means; Fig. 17 is a plan view of the construction shown in Fig. 16; Fig. 18 is a section on line 18—18 of Fig. 16; Fig. 19 is a section on line 19—19 of Fig. 16; and Figs. 20, 21 and 22 are detail views of parts of the mechanism controlling the application of abradant to the buffer wheel.

The machine has a main frame 25 supplied at its top with a pair of bearings 26 in which turns a shaft 27 rotated by means of a central pulley 28 and its coöperating driving belt 29, and having at its opposite ends the buffer or burnishing wheels 30, 30. At its opposite ends this main supporting frame 25 is equipped with a pair of transverse guiding and supporting bars 31, 31, which project both forwardly and rearwardly from the main portion of the frame. Inasmuch as this is a double machine for burnishing or polishing a pair of mounts simultaneously, and since the two halves of the machine are substantially alike, a description of one half thereof will be sufficient for a complete and thorough understanding of the invention and the construction embodying the same. Slidable on each of the forwardly-projecting horizontal supporting-bars or members 31 I provide a carriage 32 having a supporting portion 33 equipped with an undercut groove 34 accommodating the bar 31 on which the carriage is bodily movable. The carriage 32 also has an upper horizontal table 35 supporting and carrying the head and tail stocks for the mount to be operated upon.

On the table 35 is bolted, or otherwise secured, a supporting-block or member 36 having a pair of parallel upstanding ears 37, 37, between which is pivoted on a pin or shaft 38 a tail-stock 39 carrying at its inner end a rotatable mount-engaging cone or disk 40, while its opposite end is connected at 41 by means of a link or rod 42 to a foot-lever 43. The rotatable tail-stock member 40 for engaging the mount to be burnished may desirably have a cylindrical stem 44 fitted in a correspondingly-shaped aperture in the block 36, being retained therein by a set-screw 45, the end of which fits in an annular groove of the stem, as is shown in Fig. 1. Also mounted on the movable table 35 is a bearing member 46, rotatable in which I provide a spindle or shaft 47 (Figs. 1 and 13) one end of which is split and accommodates the tapered end 48 of the head-stock or mount-engaging

member 49, while its opposite end is recessed at 50 and accommodates or houses an expansion spring 51, tending to press outwardly the center piece or plunger 52 having a conical end 53 engaging the correspondingly-shaped socket on the interior of an end thrust member 54 hollowed out or recessed to receive the end of spindle 47, the other end of the thrust member being vertically-slotted at 55 for a purpose hereinafter indicated. At its opposite sides the thrust-block 54 has apertured lateral ears 56 through the holes of which pass pins 57 mounted in the end of the bearing member 47 and encircled by expansion springs 58, tending to force the thrust member outwardly, as will be readily apparent. Between its pair of bearings 59 and 60 of the block 46 the head-stock spindle 47 has a gear 61, the teeth of which mesh with those of a pinion 62 on a short shaft 63 rotatable in bearings on the block 46, and having at one end a sprocket-wheel 64 with which cooperates a sprocket-chain 65 (Fig. 4), passing around at its lower end another sprocket-wheel 66 on a short shaft 67, separated from the upper shaft 63 a definite distance by a spacer 68.

Each of the shafts 67 at the two ends of the machine receives power from a transmission shaft 69 rotatable in suitable bearings on the main frame by means of a pair of intermeshing gears 69^a and 69^b, the shafts 67 and 69 being spaced apart by links 69^c, this construction and connection between the shafts 63 and 69 permitting inward and outward travel of the mount-supporting carriage or table 35 without interference with the rotation of the mount being operated upon. The shaft 69 receives its power in turn from a lower shaft 70 by means of coöperating gears 71 and 72, the shaft 70 being in its turn connected to and driven by a supplemental shaft 73 rotatable in bearings 74, 74 on the main frame by another pair of gears 75 and 76. A driving shaft 77 revoluble in bearings 78 at the rear of the main frame is driven from any suitable source of power by a belt 79 and pulley 80, the rotation of this shaft being transmitted to the shaft 73 on the front of the machine by a sprocket-chain 81 passing around sprocket-wheels 82 and 83 on the two shafts. It will, therefore, be apparent that the rotation of the driving shaft 77 is transmitted through the shafts 73, 70, 69, 67, 63, and the numerous gears, sprocket chains and sprocket-wheels to the head-stock spindle 47, so as to cause the rotation of the metallic mount 84 adapted to be received between and clamped by the head and tail-stock members 49 and 40.

Pivoted at 85 on an arm 86 on the head-stock block 46, I provide a pressure-arm 87 normally pulled toward the mount by a contractile spring 88, the upper end of this pressure arm resting in and projecting beyond the slot 55 of the thrust-block or member 54. Also pivoted on the head-stock block at 89 I employ a latch 90 adapted to hook over the end of the arm 87 and having at its end a curved tail 91. In order to automatically press the lever-arm 87 so as to force the head-stock into engagement with the mount and to release the latch or hook 90, I fulcrum at 92 a comparatively long cam-arm 93 carrying at its upper end a tranverse block or bar 94 adapted to engage the lever 87 in any of the various positions which it may take during the travel of the mount and its carriage toward and from its buffer-wheel. As is shown in Fig. 15, the lower end of this cam-arm 93 carries a roller 95 coöperating with the cam surface 96 of a cam 97 pinned at 98 to a sleeve 99, rotatable on the shaft 70 and also rotatable in a suitable bearing 100. One end of the sleeve or bushing 99 has integral therewith a cam 101, on the periphery of which travels a roller 102 on the end of a lever 103 fulcrumed on the main frame at 104, its upper end 105 coacting with a block or stud 106 on the slidable mount carriage to move the same to the buffer wheel, its movement in the reverse direction being secured by a coil expansion spring 107 encircling an inner rod 108, the opposite ends of the spring abutting against the carriage and a fixed stop 109. Adjacent to the other end of the sleeve 99 I key to the shaft 70 a clutch-sleeve 110 having on its face adjacent to the sleeve 99 a plurality of grooves 111, in the present instance four, arranged 90° apart. In the proximate end of the sleeve 99 there is slidingly mounted a clutch or connecting block 112 equipped with a shoulder 113, and spring-pressed toward the sleeve 110 by the incased spring 114.

At 115 (Fig. 4) a lever 116 is fulcrumed, the same being pulled upwardly by a suitably-attached coil-spring 117, and capable of being depressed by a foot-lever 118 (Fig. 3) connected to the lever 116 by a link 119. This lever, which is shown in section in Fig. 15, is supplied with a cam or wedge 120 adapted to coöperate with the shoulder or abutment 113 of the clutch-key 112 to retract the same in opposition to the action of its spring so as to unclutch the sleeve 99 and its pair of cams 96 and 101 from the sleeve 110 and the shaft 70 to which it is keyed. A bell-crank 121, having two arms 122 and 123, is fulcrumed in a suitable bracket 124 at 125, the depending arm 122 being equipped with a cam or wedge 126 also adapted to retract the clutch-block 112 under certain conditions, the wedge or cam 126 being in the path of travel of the shoulder 113. In order to yieldingly maintain the arm 122 and its cam or wedge 126 in proper position, I connect

the upper end of the spring 117 to an extension 127 integral with the arm 122. As is shown in Fig. 5, the other arm 123 of the bell-crank is bent around to provide an end 128 for a purpose hereinafter described.

For controlling the period of operation of the buffer-wheel on the mount to be burnished, I provide the following-mentioned parts: In the bracket 124 and a similar bracket 129, the latter being equipped with a plurality of holes or apertures 130, I rotatably mount a short shaft 131 having fixed thereto one end of a coil spring 132 encircling the same, the other end of the spring engaging a pin 133 on the bracket 129. Fixed or integral with the short or ratchet shaft 131 I provide a ratchet 134 and a curved stop-arm 135, shown in detail in Figs. 8 and 9. A spring-pressed pawl 136 pivoted on bracket 124 at 137 overlaps and co-acts with the teeth of the ratchet 134 to prevent backward movement thereof, and the stop-arm 135, under ordinary conditions, this pawl being wide enough to at least partially overlap a cam portion 138 on an actuator 139 loose on the ratchet shaft 131 and disposed between the ratchet and the bracket 124. This actuator has at its upper end an extension 140 to which is pivoted a spring-pressed pawl 145 normally co-acting with the teeth of ratchet 134 and having a tail 142 in proximity to an adjustable set-screw 143. At its lower end this actuator 139 is somewhat broadened or thickened at 144 so as to extend over a cam 145 of approximately a quadrant's length on the clutch end of sleeve 99, and also over a smaller cam or trip 146 on sleeve 110 the external surface of which is nearer the axis of the shaft 70 than is the corresponding surface of the quadrant cam 145.

To limit the turning of the stop-arm 135 and associated ratchet 134 in one direction, I provide a stop or abutment-pin 147 which may be inserted in any one of the spaced holes 130 to vary the extent of travel of the stop-arm and ratchet, as will be fully explained hereinafter.

On the rear portion of each horizontal transverse supporting-bar 31 I provide an abradant-applying means for bringing a suitable body of abradant into contact with the periphery of the adjacent buffer-wheel 30 at certain predetermined intervals. A block or support 148 with an undercut groove 149 is clamped to the outer face of each bar 31, carrying at its top a laterally-extended horizontal table 150 to which is secured a hollow rectangular box or casing 151 adapted to house the body or block of abradant 152. In order to feed the abradant out of its receptacle step by step as it becomes worn off, I provide in the table a comparatively long rotatable screw-threaded shaft 153 capable of revolving in suitable bearings 154 and 155, the outer end of the shaft being equipped with a pinion 155 loose thereon and supplied with a spring-pressed pawl 156 which coöperates with the teeth of a ratchet 157[a] fixed to the shaft, the pinion in turn meshing with the teeth of an elongated gear 157 on the lower shaft 158 rotatable in suitable bearings and equipped at one end with a handle 159, and near its other end with a quick-pitch screw-portion 160, the threads of which engage corresponding threads of a depending arm 161 projecting downwardly from the table 150, the latter being longitudinally slidable in guideways 162. The screw 153 of comparatively small pitch is supplied with a traveling nut 163 which is prevented from rotating due to its engagement with the walls of the slot 164 in the bottom of the receptacle or housing 151, or with its pin connection 165 with the follower 166 fitting in the boxing 151 and adapted to engage the rear end of the block of abradant 152, this follower also having an upstanding index 167 projecting through a slot 168 in the top of the box, thereby at all times indicating the position of the follower and the block of abradant.

Below the parts described above and housed within a suitable casing 169 I employ a stud 170 fixed to the support or block 149, as indicated in Fig. 18. On this stud or fixed shaft I rotatably mount a sleeve 171 having fixed thereto at one end the two arms of a bell-crank lever 172 and 173, the former being supplied at its free end with a hook 174, while the corresponding end of the other arm is connected by means of a link 175 to one arm of a bell-crank 176 mounted on shaft 104, the other arm of this bell-crank being equipped with a roller 177 riding on the periphery of an operating cam 178 keyed to the shaft 70. As is clearly indicated, arm 173 of the bell-crank is normally pulled rearwardly by the contractile spring 179 fastened at one end to the arm and at its opposite end to a suitable support 180. The arm 173 also carries a spring-actuated pawl 181 which cooperates with the teeth of a ratchet hereinafter described.

The hook 174 of the bell-crank 172, 173 cooperates with an abutment or hook 182 at one end of an operating member 183, slotted at 184 to accommodate the stud 170 and sleeve 171, and movable transversely thereto, the member 183 being normally pulled forwardly by a coil spring 185 connected at 186 to the member and at 187 to a fixed pin. The portion of the member 183 carrying the hook 182 is also supplied with a lateral projection 188 and an upwardly-extended pair of ears 189 between which is fastened the lower end of a chain 190 passing transversely around and fixed to a grooved sleeve or collar 191 fixed to the screw-shaft 158. The

portion of the chain 190 depending from the opposite side of the sleeve or collar 191 is connected to a coil spring 192, the lower end of which is fastened to any suitable standard or fixture 193 on the bottom of the casing 169, as is clearly indicated in Fig. 19. It will, therefore, be obvious that if the operating member 183 is rocked on the sleeve 171 so as to depress or lower the hook 182, the screw-shaft 158 will be turned or rotated by means of the chain 190, and thereby, due to the screw connection between the shaft and abradant carriage, advances the body of abradant or tripoli to bring its forward end into contact with the periphery of the revolving buffer wheel. Also mounted on the sleeve 171 I provide a ratchet 194 having a hub 195 provided externally with an annular groove 196 in which lies a chain 197 which at one end is fastened to the hub, its other end being connected to a contractile spring 198 suitably supported as are the other springs above mentioned. At the inner side of this ratchet 194, and pinned thereto so as to rotate therewith, I employ a pattern or controlling wheel or disk 203 which, as is shown in Figs. 3 and 16, is connected to the stud 106 on the slidable carriage supporting the mount by a link 204.

Pivoted at 205 (Fig. 16) there is provided a depending arm 206, the lower portion of which 207 is broadened sufficiently to ride upon the peripheries or edges of the two controlling and governing disks 199 and 203, the opposite portion of the enlargement 207 bearing against the head 188 on the member 183. The construction is such that when the part 207 of the arm 206 is in contact with the higher portions of either the controlling or governing cam disks the member 183 will be thrust to the left, as viewed in Fig. 16, sufficiently to cause disengagement of the two hook portions 174 and 182, thereby rendering the actuation of the abradant-applying means temporarily inoperative. When, however, the head 207 lies partially within the notches of the two disks 199 and 203, as viewed in Fig. 16, the operative connection between the bell-crank lever 172, 173 and the member 183 is maintained, so that the oscillation of the bell-crank through the connection link 175 and the cam 176 with which it coöperates causes the movement of the abradant and its carriage whereby to apply the former to the periphery of the buffer-wheel. To prevent backward movement of the ratchet 134 and associated parts a stop or limiting pawl 208 is provided to co-act with the teeth of the ratchet, as will be readily understood. By providing a controlling-plate or disk 199 having properly spaced notches 200 the application of the abradant to the buffer may be controlled so as to occur at each actuation of the link 175 by its cam 176, or the application may occur at each alternate operation of these parts, or once in three or more actuations of the link and associated mechanism. In order that the abradant may not be brought into contact with the buffer needlessly and at times when it can have no advantage, such as when the mount being burnished is not in contact with the buffer, the disk 203 and its operating mechanism are provided, the actuation of these parts being such that when the mount carriage at the front of the machine is in such position that the buffer is inoperative upon the mount, the disk 203 will be shifted by means of the connecting rod 204 so as to push the arm 206 to one side, causing a disconnection between the bell-crank 172, 173 and the member 183, as will be readily understood, the part 207 of the arm 206 acting against the head or enlargement 188 to perform this function.

The operation of this improved buffing mechanism is substantially as follows: Assuming that either one of the mount-supporting carriages 33 is at the forward end of its sliding movement on the transverse supporting bar or beam 31, the operator presses with his foot on the pedal 43 so as to swing the tail-stock on its hinge pin 38 by means of the link or rod 42 and facilitate the removal of the previously burnished mount 84 from between the head and tail-stocks, the former of which readily yields because of its spring mounting, as is illustrated in Fig. 13. An unburnished mount having been placed between the head and tail stocks and the latter permitted to resume normal position, as illustrated in Fig. 1, the workman steps upon the foot-lever 118, depressing the same and the cam-controlling lever 116 because of the link connection 119 between the two. This downward swinging of the lever 116 causes the descent of cam 120 away from the spring-actuated sliding clutch-block 112. As soon as this block is freed, as indicated, owing to the action of its spring 114, its end is projected into one of the radial slots 111 of the sleeve 110 keyed to the constantly-rotating shaft 70. In this manner the cam-carrying sleeve 99, which is ordinarily loose on the shaft 70, is temporarily keyed or locked thereto so that the sleeve partakes of the rotation of the shaft. Consequently, the rotation of cams 96 and 101 takes place. This turning of the cam 96 operates to swing the lever 93 on its fulcrum 92, thereby pushing the pressure-arm 87 and the pressure-block 54 toward the mount so as to securely retain the same between the head and tail stocks until the latch 90 hooks over the top end of the pressure-arm 87, retaining it in proper position to maintain adequate pressure on the end of the mount for the purpose in view. Since the head-stock is constantly rotated by means of the gearing hereinbefore

described, this rotation will be transmitted to the mount through the frictional engagement of the revolving head therewith.

The rotation of cam 101, which is also rigid with the sleeve 99 acts through the bell-crank lever 103, one end of which 105 contacts with the stud 106 on the mount carriage, to slide the carriage and the mount rotating thereon toward the buffer wheel so as to bring the mount into the field of operation of the latter.

This rotation of the sleeve 99 and its cams 96 and 101 continues for approximately three-quarters of a revolution, at which time the sliding clutch-block 112 comes in contact with cam 126 on the bell-crank 122, 123, which withdraws the same from the radial slot 111, whereupon the sleeve and cams cease rotating. It is to be noted, however, that during this partial rotation of the sleeve 99 the higher quadrant cam 145 rigid therewith passes from beneath the widened foot 144 of the member 139, thereby rendering the lower projection 146 on the sleeve 110 operative upon this actuating member 139 at each rotation of the sleeve and shaft. Each time that the projection or lug 146 passes beneath the foot 144 it causes a slight rotation of the pawl-carrying member 139 on the shaft or stud 131, the pawl 141 by engagement with the teeth of the ratchet 134 feeding the ratchet and the stop-arm 135 rigid therewith around step by step away from the stop-pin 147 in opposition to the action of the torsion-spring 132, tending to return the ratchet and stop-arm to normal position, that is with the stop-arm bearing against the stop-pin 147. All this time the buffer-wheel is acting upon the rapidly revolving mount, and this step by step rotation of the ratchet 134 and stop-arm 135 continues until the latter strikes the end 128 of the bell-crank 122, 123, causing the bell-crank to turn upon its fulcrum 125 against the action of spring 117 sufficiently to free the cam 126 from the shoulder 113 of the sliding clutch-block 112, and as soon as the latter is thus liberated it is projected by its own spring 114 into one of the radial slots 111 of the sleeve 110, causing in this manner the clutching of the sleeve 99 with the constantly rotating shaft 70. When the parts are thus again clutched together, the remaining one-quarter or 90° rotation of the sleeve and its cams takes place, the clutch block 112 being pulled out of the groove 111, when the sleeve has completed its single rotation, by means of the cam 120 on the lever 116, which cam has returned to its normal position in the meantime under the influence of the connecting-spring 117. During this final one-quarter revolution of the sleeve 99 the higher quadrant cam 145 again comes under the toe or foot 144 of the actuating member 139, turning the latter sufficiently on its axis to bring the cam 138 under the stop pawl 136, thereby lifting the latter free from the teeth of the ratchet 134 with which it ordinarily coöperates. This greater turning of the actuator 139 on its axis also swings the pawl 141 sufficiently to bring its tail 142 into contact with the set-screw 143, which coöperation of the parts turns the pawl on its pivot sufficiently to release it also from the teeth of the ratchet, whereupon the ratchet and stop-arm 135 rotate under the influence of the torsion-spring 132 until the stop-arm 135 strikes the stop-pin 147, which it will be understood is in one of a number of spaced holes 130 in the bracket 139. By changing the position of this pin, that is, by putting it in another one of these holes 130, the period of action of the buffer-wheel on the mount may be readily changed, since it will take a longer or shorter time for the operating mechanism to turn the ratchet and stop-arm sufficiently to bring the latter into contact and to operate the tail 128 of the bell-crank 122, 123. During this final one-quarter revolution of the sleeve 99 and cams 96 and 101, the arm 93 is rocked on its fulcrum, lifting the tail 91 of the latch 90 sufficiently to free the pressure-arm 87 and the pressure-block 54, thereby relieving the pressure of the head-stock on the mount. Also the mount carriage is moved forwardly or away from the buffer by the expansion spring 107 during this one-quarter revolution, being permitted to do so by the action of the cam 101 on its coöperating lever 103 and 105. The finished or buffed mount can now be readily taken out and replaced by an unburnished one, as has been described above.

The actuation of the abradant operating mechanism is practically as follows: Since the cam 178 is keyed to the constantly-rotating shaft 70, an uninterrupted oscillation of the bell-crank 172, 173 occurs because of the action of spring 179 thereon and the link connection 175 between the bell-crank and the other bell-crank 176 co-acting with the cam. The spring-actuated pawl on the bell-crank 172, 173 coöperates with the teeth of ratchet 194 so as to feed the ratchet and the controlling plate 199 rigid therewith around step by step in opposition to the action of the spring 198 acting thereon through the chain 197, this step by step action causing the finger or projection 201 to move away from the fixed stop-pin. Provided the notches of the controlling and governing plates 199 and 203 permit the arm 206 to assume the position shown in Fig. 16, and the operative engagement of the hooks 174 and 182, then during each oscillation of the bell-crank 172, 173 the chain 190 will be pulled down so as to cause a rotation of the screw-shaft 158, the screw 160 thereon by cooperation with the nut 161 fixed to the abradant carriage advancing the latter and

block of abradant so that the tripoli or other abradant is brought into contact with the periphery of the revolving buffer wheel. During each travel of the abradant carriage the screw-threaded feed shaft 153 is turned slightly, due to the coöperation of the intermeshing gears 155 and 157 and the pawl and ratchet 156 and 157[a], thereby moving the block 166 slightly relatively to the abradant box, and projecting the block of abradant a small amount from the box or housing so as to compensate for the amount worn off by the buffer wheel. Ordinarily it is not necessary to bring the abradant into contact with the buffer wheel for each revolution of the shaft 70, and by providing a controlling cam disk 199 with properly spaced notches the abradant may be applied to the buffer wheel only once in two, three, four, or more revolutions of the shaft 70, it being understood that whenever one of the high portions of the disk 199 between its notches 200 engages the head 207 of the arm 206 the latter is forced away sufficiently from the axis of the disk so as to disengage the hooks 174, 182, and when thus disengaged there is no operative connection between the constantly oscillating bell-crank 172, 173 and the member 183. Consequently there is no turning of the screw 160 and no advancing of the abradant. The ratchet 194 and the controlling disk 199 rigid therewith are, however, fed around step by step, and as soon as one of the notches 200 comes under the head 207 of the lever 206 an operative connection between the hooks is secured and the abradant applied to the buffer, if the governing cam permits it. Therefore, by employing a controlling disk with properly spaced notches the abradant may be moved up to the buffer wheel as often or as infrequently as the operator desires.

When the mount-supporting carriage moves away from the buffer-wheel it shifts the rod 204 sufficiently so as to bring the higher portions thereof under the two pawls 208 and 181, and also under the head 207 of the arm 206. The result is that since neither of the pawls acts upon the ratchet wheel to prevent its return to its initial position with the finger 201 against the stop-pin 202 it does so return under the influence of the spring 198 operative thereupon through the connecting chain 197. This movement of the arm 206, as has been explained above, disconnects the hooks 174 and 182, or, in other words, breaks the operative connection between the bell-crank 172, 173 and the actuating member 183 so that as long as the mount carriage is not in such position that the buffer is acting on the mount then there will be no actuation of the above-described abradant applying means. As soon, however, as the mount carriage has been brought to such position that the buffer will act on the mount through the operation of cam 101 and associated mechanism, the governing disk 203 is shifted in the reverse direction by the connecting-link 204, permitting the two spring-controlled pawls 181 and 208 to again engage the teeth of the ratchet-wheel, and also permitting the return of arm 206 to the position shown in Fig. 16, whereby an operative engagement is obtained between the two hooks 174 and 182. The parts are now in position for applying the abradant to the buffer in accordance with the predetermined plan, this application being controlled, as will be readily understood, by the pattern or controlling-disk 199.

Although I have described in detail the numerous parts constituting elements of this more or less complicated machine, it is to be understood that the invention is not limited and restricted to the precise structural features shown, since these may be modified to a considerable extent without departure from the substance of the invention or without sacrificing any of its benefits and advantages.

I claim:

1. In a machine of the character described, the combination of a buffer, a support for the piece to be buffed movable to shift said piece into and out of the field of action of said buffer, a movable member controlling the actuation of said support, means to move said member to cause said piece to be acted upon by said buffer and to be shifted away therefrom, and a governing means to interrupt the movement of said member for a predetermined period of time during which said piece is acted upon by said buffer, the piece being moved away from the buffer during the completion of the movement of said member after the expiration of said predetermined period of time, substantially as described.

2. In a machine of the character described, the combination of a buffer, a support for the piece to be buffed movable to shift said piece into and out of the field of action of said buffer, a rotatable member controlling the actuation of said support, means to rotate said member to cause said piece to be acted upon by said buffer and be shifted away therefrom, a governing means to interrupt the rotation of said member for a predetermined period of time during which said piece is acted upon by said buffer, and means to adjust said governing means to vary said period, the piece being moved away from the buffer during the completion of the rotation of said member after the expiration of said predetermined period of time, substantially as described.

3. In a machine of the character described, the combination of a buffer, a support for the piece to be buffed movable to shift said piece into and out of the field of action of said buffer, a movable member

controlling the actuation of said support, means to move said member to cause said piece to be acted upon by said buffer, and a step by step actuated governing means to interrupt the movement of said member for a predetermined period of time during which said piece is acted upon by said buffer, the piece being moved away from the buffer during the completion of the movement of said member after the expiration of said predetermined period of time, substantially as described.

4. In a machine of the character described, the combination of a buffer-wheel, a support for the piece to be buffed movable to bring said piece into and out of the field of action of said buffer wheel, and means controlling the actuation of said support including a rotary shaft, a member equipped with means governing the movement of said support, a clutch between said shaft and member, a clutch-controlling means adapted when in normal position to cause the unclutching of said member and shaft and when displaced to permit the clutch to operatively connect them, means to unclutch said member from said shaft after a definite extent of rotation of said member sufficient to bring said piece against said buffer-wheel, and governing means adapted to act on said unclutching means after a predetermined period of action of said buffer-wheel on said piece to permit reclutching of said member to said shaft, whereby to complete the rotation of said member during which movement said piece is moved away from said buffer-wheel, the unclutching at the end of the rotation of said member being accomplished by said clutch-controlling means, substantially as described.

5. In a machine of the character described, the combination of a buffer-wheel, a support for the piece to be buffed movable to bring said piece into and out of the field of action of said buffer-wheel, and means controlling the actuation of said support including a rotary shaft, a member equipped with means governing the movement of said support, a clutch between said shaft and member, a clutch-controlling means adapted when in normal position to cause the unclutching of said member and shaft and when displaced to permit the clutch to operatively connect them, means to unclutch said member from said shaft after a definite extent of rotation of said member sufficient to bring said piece against said buffer-wheel, a clutch-governing means adapted to act on said unclutching means after a predetermined period of action of said buffer-wheel on said piece to permit the reclutching of said member to said shaft whereby to complete the rotation of said member during which said piece is moved away from said buffer-wheel, the unclutching at the end of the rotation of said member being accomplished by said clutch-controlling means, and means movable simultaneously with the rotation of said shaft adapted to operate said clutch-governing means, substantially as described.

6. In a machine of the character described, the combination of a buffer-wheel, a support for the piece to be buffed movable to bring said piece into and out of the field of action of said buffer-wheel, and means controlling the actuation of said support including a rotary shaft, a member equipped with means governing the movement of said support, a clutch between said shaft and member, a clutch-controlling means adapted when in normal position to cause the unclutching of said member and shaft and when displaced to permit the clutch to operatively connect them, means to unclutch said member from said shaft after a predetermined extent of rotation of said member sufficient to bring said piece against said buffer-wheel, a step by step actuated clutch-governing means adapted to act on said unclutching means after a predetermined period of action of said buffer-wheel on said piece to permit the reclutching of said member to said shaft whereby to complete the rotation of said member during which said piece is moved away from said buffer-wheel, the unclutching at the end of the rotation of said member being accomplished by said clutch-controlling means, and means movable simultaneously with the rotation of said shaft adapted to operate said clutch-governing means, substantially as described.

7. In a machine of the character described, the combination of a buffer-wheel, a support for the piece to be buffed movable to bring said piece into and out of the field of action of said buffer-wheel, and means controlling the actuation of said support including a rotary shaft, a member equipped with means governing the movement of said support, a clutch between said shaft and member, a clutch-controlling means adapted when in normal position to cause the unclutching of said member and shaft and when displaced to permit the clutch to operatively connect them, means to unclutch said member from said shaft after a definite extent of rotation of said member sufficient to bring said piece against said buffer-wheel, a clutch-governing means adapted to act on said unclutching means after a predetermined period of action of said buffer-wheel on said piece to permit the reclutching of said member to said shaft, whereby to complete the rotation of said member during which said piece is moved away from said buffer-wheel, the unclutching at the end of the rotation of said member being accomplished by said clutch-controlling means, means movable simultaneously with said shaft adapted to actuate

said clutch-governing means, and means movable simultaneously with said member adapted to render said latter means inoperative upon said clutch-governing means, substantially as described.

8. In a machine of the character described, the combination of a buffer-wheel, a support for the piece to be buffed movable to bring said piece into and out of the field of action of said buffer-wheel, a rotary shaft, a member equipped with means controlling the movements of same support, a clutch between said shaft and member, a clutch-controlling means adapted when in normal position to cause the unclutching of said member and shaft and when displaced to permit the clutch to operatively connect them, means to unclutch said member from said shaft after a definite extent of rotation of said member sufficient to bring said piece against said buffer-wheel, and a clutch-governing means including a rotatable ratchet wheel, a stop-arm rigid with said ratchet-wheel, a pawl coöperating with said ratchet, and connecting means between said pawl and shaft adapted to actuate said pawl to cause a step by step movement of said ratchet and stop-arm, said stop-arm acting on said unclutching means after a predetermined period of action of said buffer-wheel on said piece to permit the reclutching of said member to said shaft, whereby to complete the rotation of said member during which said piece is moved away from said buffer-wheel, the unclutching at the end of the rotation of said member being accomplished by said clutch-controlling means, substantially as described.

9. In a machine of the character described, the combination of a buffer-wheel, a support for the piece to be buffed movable to bring said piece into and out of the field of action of said buffer-wheel, a rotary shaft, a member equipped with means controlling the movements of said support, a clutch between said shaft and member, a clutch-controlling means adapted when in normal position to cause the unclutching of said member and shaft and when displaced to permit the clutch to operatively connect them, means to unclutch said member from said shaft after a definite extent of rotation of said member sufficient to bring said piece against said buffer-wheel, a stop-arm adapted to act on said unclutching means after a predetermined period of action of said buffer-wheel on said piece to permit the reclutching of said member to said shaft, whereby to complete the rotation of said member during which said piece is moved away from said buffer-wheel, the unclutching at the end of the rotation of said machine being accomplished by said clutch-controlling means, a stop, means acting on said stop-arm tending to hold the same against said stop, means to rotate said stop-arm step by step away from said stop, means to prevent the return of said stop-arm to said stop, and means to render said latter means inoperative whereupon said stop-arm may bear against said stop at the completion of the rotation of said member, substantially as described.

10. In a machine of the character described, the combination of a buffer-wheel, a support for the piece to be buffed movable to bring said piece into and out of the field of action of said buffer-wheel, a clamp to hold said piece in position on said support, a rotary shaft, a member equipped with means controlling the movements of said support and the actuation of said clamp, a clutch between said shaft and member, a clutch-controlling means adapted when in normal position to cause the unclutching of said member and shaft and when displaced to permit the clutch to operatively connect them, means to unclutch said member from said shaft after a definite extent of rotation of said member sufficient to clamp said piece in position and bring said piece against said buffer-wheel, and a clutch-governing means adapted to act on said unclutching means after a predetermined period of action of said buffer-wheel on said piece, to permit the reclutching of said member to said shaft, whereupon to complete the rotation of said member during which said piece is unclamped and is moved away from said buffer-wheel, the unclutching at the end of the rotation of said member being accomplished by said clutch-controlling means, substantially as described.

11. In a machine of the character described, the combination of a buffer-wheel, a movable support for the piece to be buffed, mechanically-actuated means to move said support to bring said piece into and out of the field of action of said buffer-wheel, and means to rotate said piece continuously while being acted upon by said buffer-wheel, substantially as described.

12. In a machine of the character described, the combination of a buffer-wheel, a movable support for the piece to be buffed, means to move said support to bring said piece into the field of action of said buffer-wheel for a predetermined period of time, and means to rotate said piece continuously while being acted on by said buffer-wheel, substantially as described.

13. In a machine of the character described, the combination of a buffer-wheel, a slidable carriage for the piece to be buffed, means to slide said carriage so as to bring said piece into the field of action of said buffer-wheel for a predetermined period of time, and gearing to rotate said piece continuously while being acted upon by said buffer-wheel, substantially as described.

14. In a machine of the character described, the combination of a buffer-wheel, a support for the piece to be buffed, a head

and tail stock on said support and adapted to hold between them the piece to be buffed, means to move said support to bring said piece into the field of action of said buffer-wheel for a predetermined period of time, means to rotate one of said stocks, and means to slide one of said stocks to clamp said piece in place, substantially as described.

15. In a machine of the character described, the combination of a buffer-wheel, a head and tail stock adapted to hold between them the piece to be buffed, one of said stocks being hinged to facilitate the insertion and removal of said piece, and a foot treadle to swing said stock on its hinge, substantially as described.

16. In a machine of the character described, the combination of a buffer-wheel, head and tail stocks adapted to hold between them the piece to be buffed, means to rotate one of said stocks, means to slide one of said stocks to clamp said piece in place, and an automatically-acting latch coöperating with said sliding stock to hold the same in clamping position, substantially as described.

17. In a machine of the character described, the combination of a buffer-wheel, head and tail stocks adapted to hold between them the piece to be buffed, one of said stocks being slidable, means to rotate one of said stocks, a thrust member, a spring between said thrust member and the slidable stock, means to move said thrust member to slide said stock into clamping position, and means to latch said sliding stock in clamping position, substantially as described.

18. In a machine of the character described, the combination of a buffer-wheel, a tail stock, a slidable head stock, the piece to be buffed being adapted to be clamped between said stocks, a thrust member, a spring between said thrust member and slidable head stock, one or more springs acting on said thrust member, a pressure-lever coöperating with said thrust member, means to operate said pressure lever to actuate said thrust member to slide said head-stock into clamping position, and means to latch said pressure-lever with said head-stock in clamping position, substantially as described.

19. In a machine of the character described, the combination of a buffer-wheel, a tail-stock, a slidable head-stock, a pressure-lever adapted to slide said head-stock so as to clamp the piece to be buffed between said stocks, a latch adapted to maintain said pressure-lever in clamping position, means to operate said pressure-lever, and means permitting said operating means to unlatch said lever, substantially as described.

20. In a machine of the character described, the combination of a buffer-wheel, a support for the piece to be buffed movable to shift said piece into and out of the field of action of said buffer-wheel, an abradant-applying mechanism for said wheel, a continuously-operated actuating means for said mechanism, and means to render said actuating means inoperative on said abradant-applying mechanism except when said support is in such position that the buffer-wheel acts on the piece, substantially as described.

21. In a machine of the character described, the combination of a buffer-wheel, an abradant-applying mechanism for said wheel, a continuously-operating actuating means for said mechanism, and a controller adapted to render said actuating means operative or inoperative upon said abradant applying mechanism, substantially as described.

22. In a machine of the character described, the combination of a buffer-wheel, an abradant-applying mechanism for said wheel, a continuously-operating actuating means for said mechanism, and a controller operated by said actuating means and adapted to render said actuating means operative or inoperative on said abradant-applying mechanism, substantially as described.

23. In a machine of the character described, the combination of a buffer-wheel, an abradant-applying mechanism for said wheel, continuously-operating actuating means for said mechanism, and a rotary controller operated step by step by said actuating means and adapted to render said actuating means operative or inoperative on said abradant-applying mechanism, substantially as described.

24. In a machine of the character described, the combination of a buffer-wheel, an abradant-applying mechanism for said wheel, a continuously-operating actuating means for said mechanisms, a cam disk controller adapted to render said actuating means operative or inoperative on said abradant-applying mechanism, a ratchet rigid with said controller, and a pawl operated by said actuating means and adapted to operate said controller step by step by coöperation with said ratchet, substantially as described.

25. In a machine of the character described, the combination of a buffer-wheel, a support for the piece to be buffed movable to shift said piece into and out of the field of action of said buffer-wheel, an abradant-applying mechanism for said wheel, a continuously-operating actuating means for said mechanism, a controller adapted to render said actuating means operative or inoperative on said abradant-applying mechanism, means to operate said controller step by step, and means to automatically return said controller to its initial position when said support carries said piece away from the buffer-wheel, substantially as described.

26. In a machine of the character described, the combination of a buffer-wheel, a

carriage for the piece to be buffed movable to shift said piece into and out of the field of action of said buffer-wheel, an abradant-applying mechanism for said wheel, a continuously-operating actuating means for said mechanism, a controller operated by said actuating means and adapted to render said actuating means operative or inoperative upon said abradant-applying means, and a governor to render said actuating means inoperative on said abradant-applying mechanism except when said carriage is in such position that the buffer-wheel acts on said piece, substantially as described.

27. In a machine of the character described, the combination of a buffer-wheel, a carriage for the piece to be buffed movable to shift said piece into and out of the field of action of said buffer-wheel, an abradant-applying mechanism for said wheel, a continuously-operating actuating means for said mechanism, a controller adapted to render said actuating means operative or inoperative on said abradant-applying mechanism, means whereby said actuating means operates said controller step by step, means tending to return said controller to initial position, a lock to prevent said return movement of said controller, and a governor connected to said carriage adapted to render said actuating means inoperative on said abradant-applying mechanism except when said carriage is in such position that the buffer-wheel acts on said piece, said governor having means to free said controller and permit its return to initial position when the carriage shifts the piece away from said buffer-wheel, substantially as described.

28. In a machine of the character described, the combination of a buffer, head and tail stocks or centers one of which at least is rotatable, said stocks or centers being adapted to support a part to be buffed, means to rotate such stock or center, one of said stocks at least being movable toward and from the other, and a spring acting on said movable stock or center tending to push it toward the other to yieldingly hold said part to be buffed in position on the centers, substantially as described.

JOHN F. GAIL.

Witnesses:
CLARENCE E. HAWLEY,
GUS JACOB.