J. F. GAIL.

BUFFING MACHINE.

APPLICATION FILED JULY 27, 1908.

927,036.

Patented July 6, 1909.

5 SHEETS—SHEET 1.

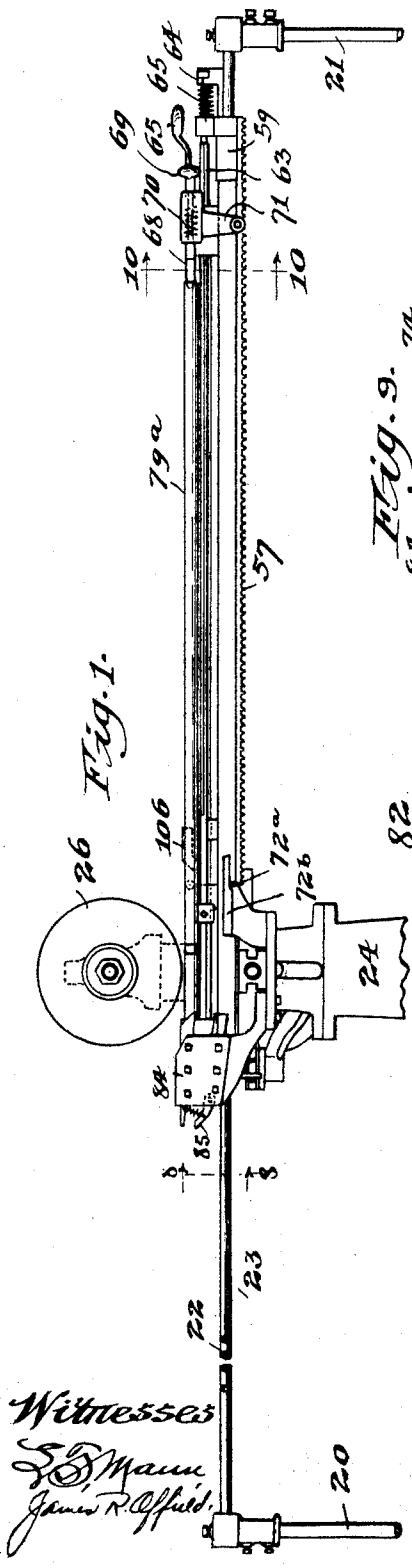


Fig. 1.

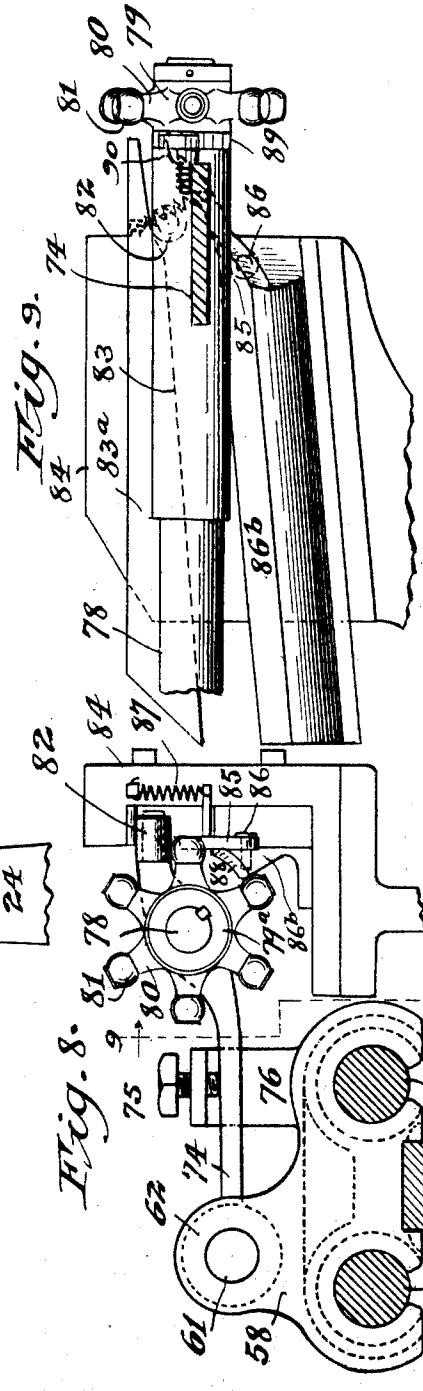


Fig. 9.

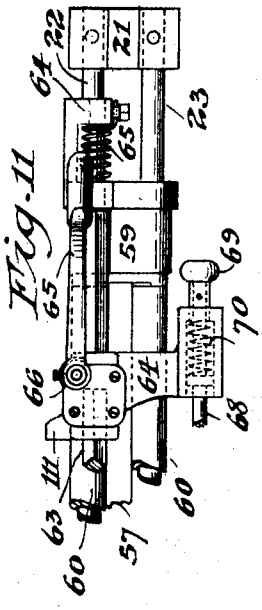


Fig. 11.

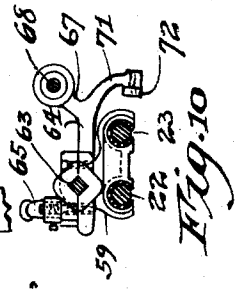


Fig. 10.

Fig. 8.

Witnesses

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5 SHEETS—SHEET 2.

Fig. 2.

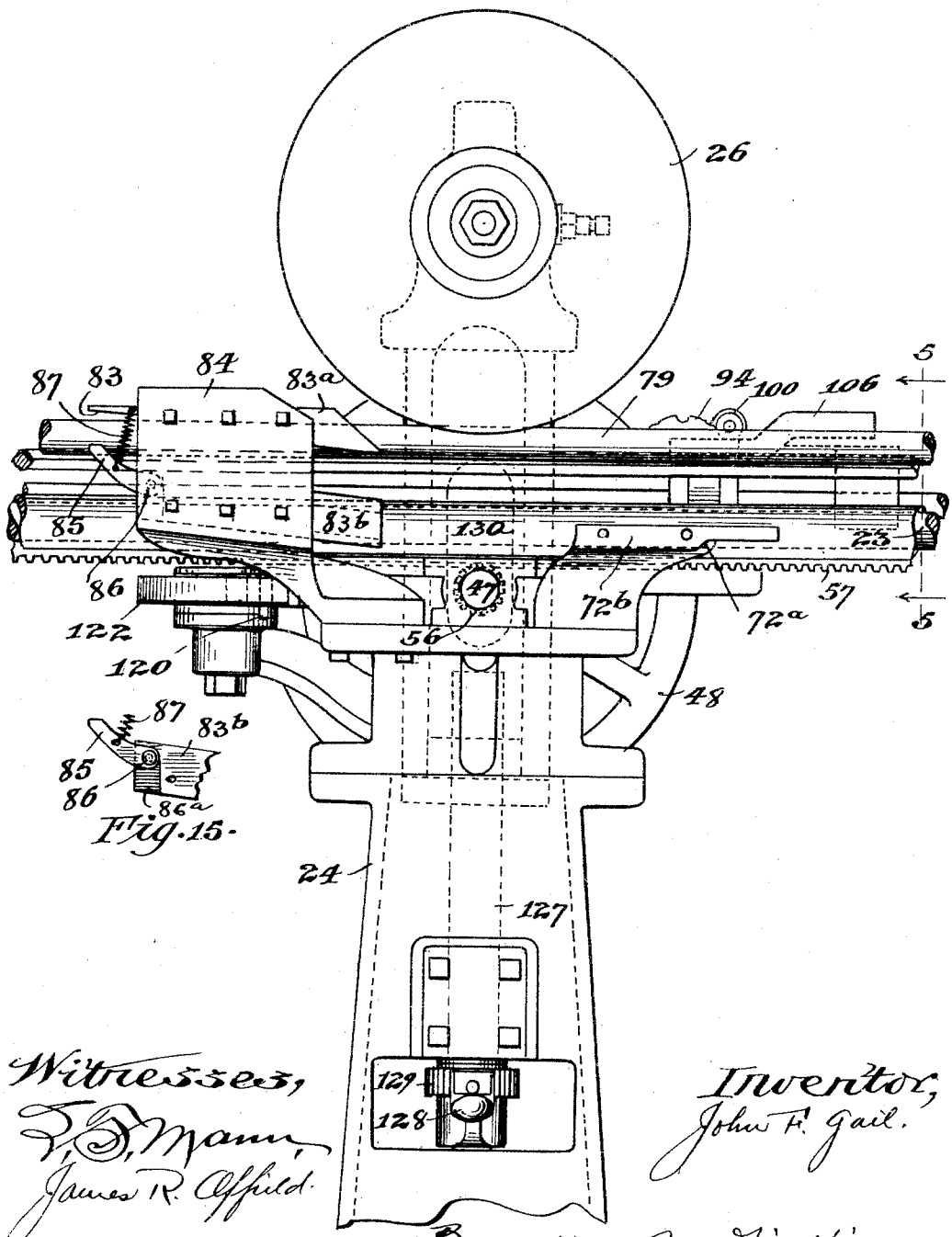


Fig. 15.

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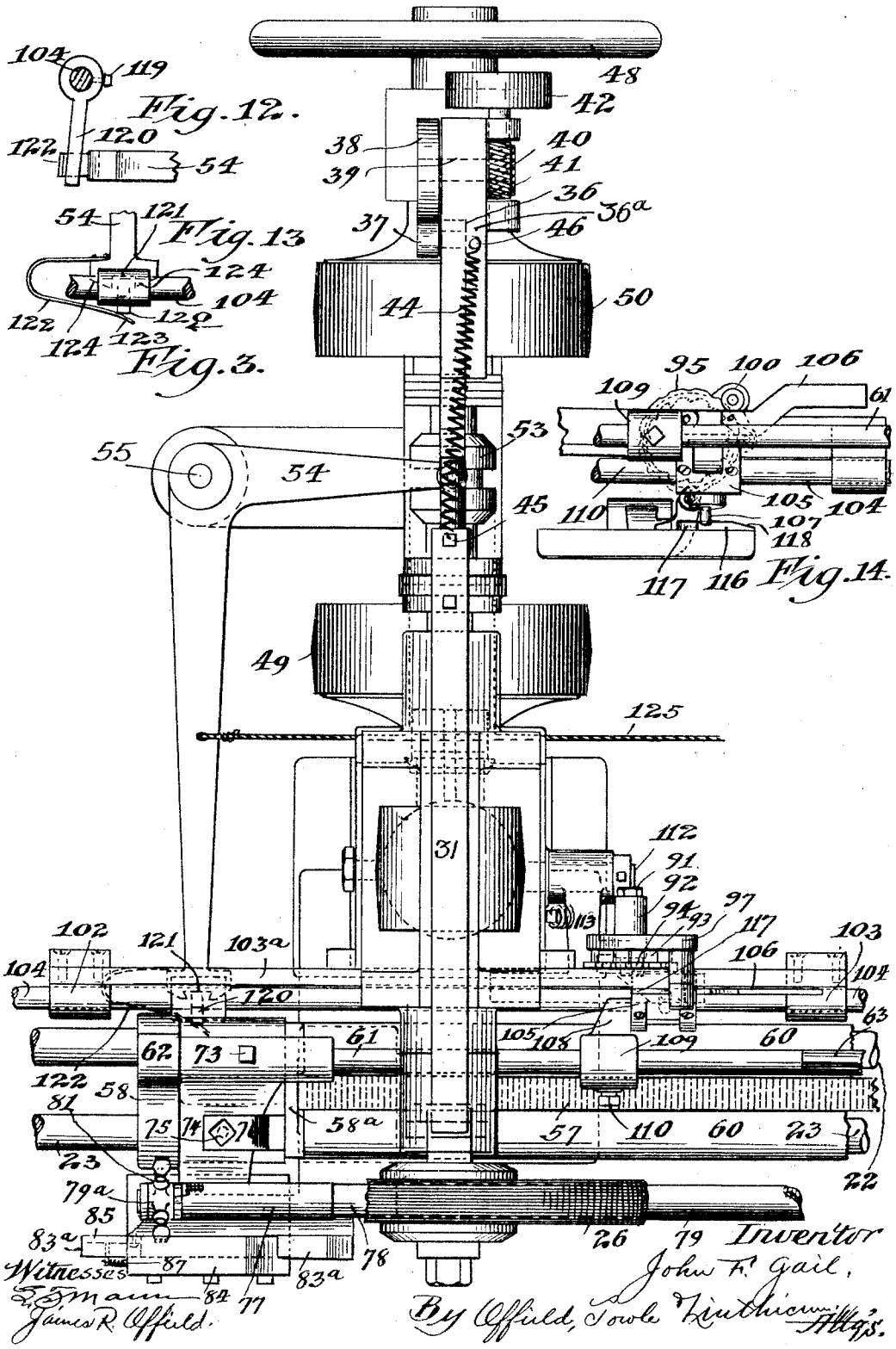
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5 SHEETS—SHEET 3.

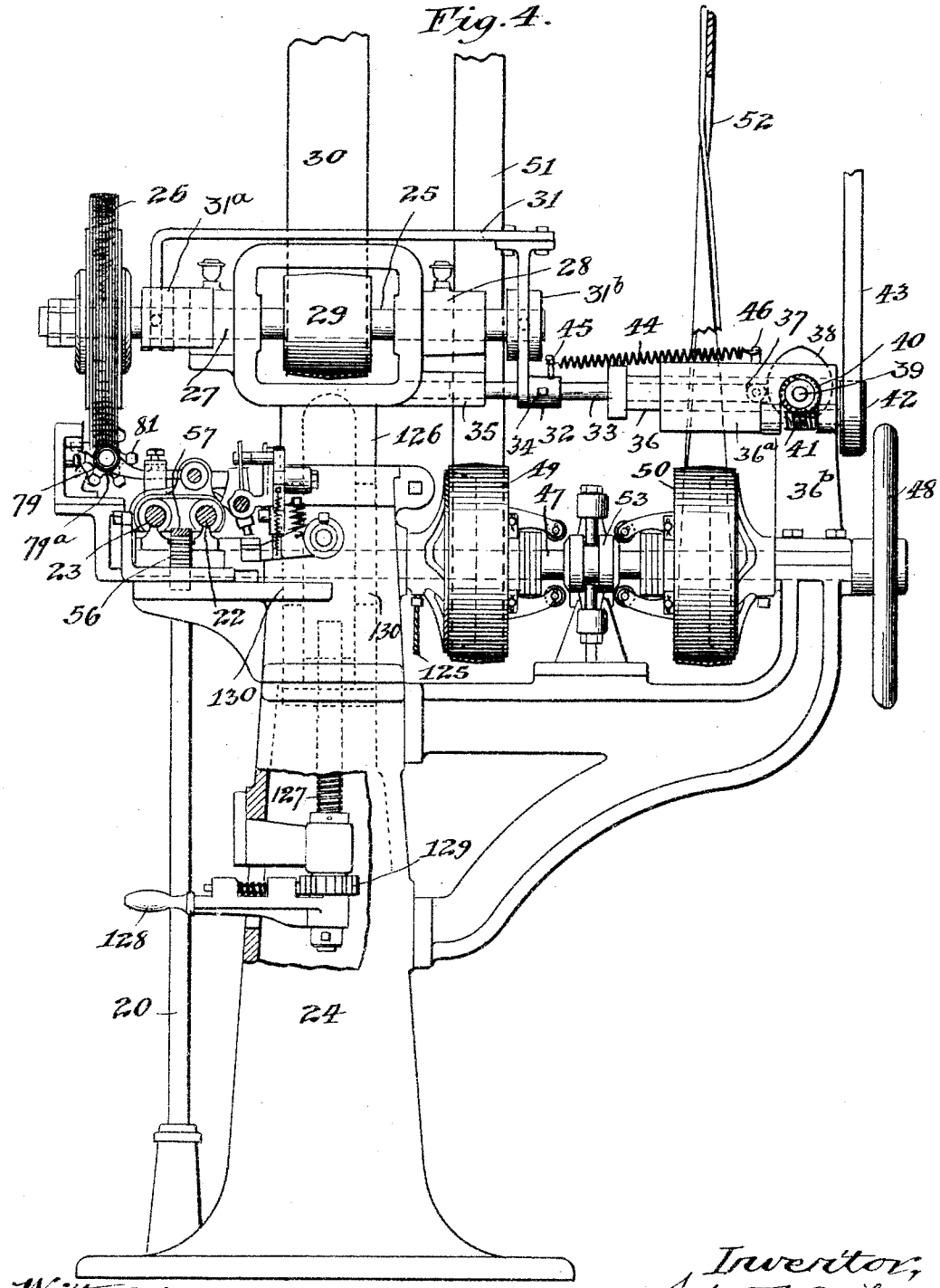


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927,036. APPLICATION FILED JULY 27, 1908. Patented July 6, 1909.

5 SHEETS—SHEET 4.

Fig. 4.



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5 SHEETS—SHEET 5.

Fig. 5.

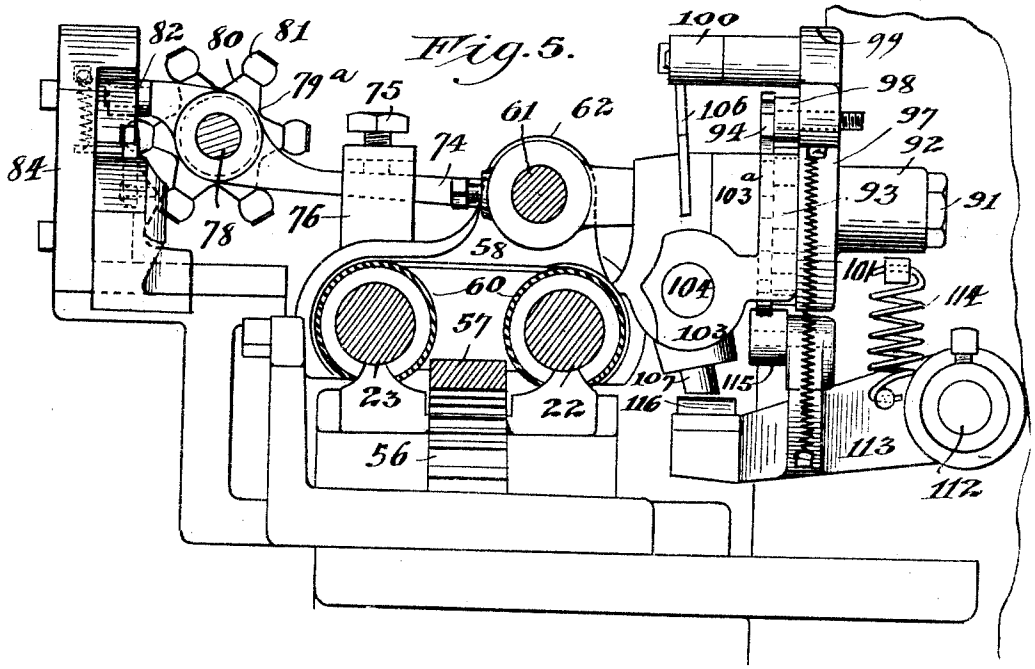


Fig. 6.

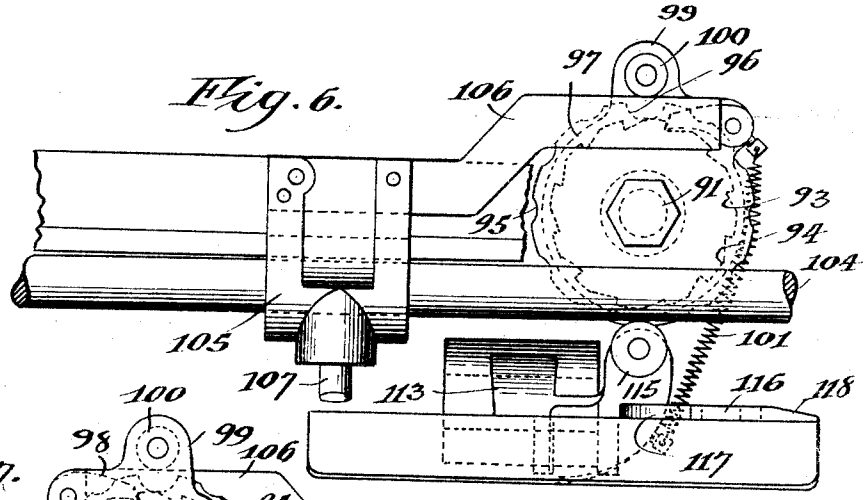
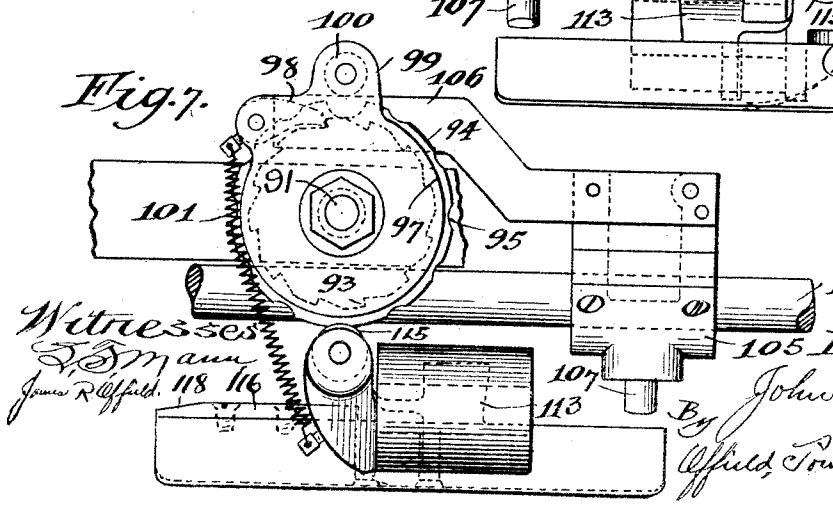


Fig. 7.



Witnesses

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UNITED STATES PATENT OFFICE.

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BUFFING-MACHINE.

No. 927,036. Specification of Letters Patent. Patented July 6, 1909.

Application filed July 27, 1908. Serial No. 445,635.

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 Buffing-Machines, of which the following is a specification.

My invention relates to buffing machines in general, but concerns more particularly or especially devices for burnishing, polishing, or grinding the surfaces of hollow metallic tubes, posts, or the like, which form parts of metallic, such as brass, bedsteads either with a bright or satin surface, the latter at present being an attractive and fashionable finish.

It is the principal aim and object of this invention to make the machine substantially entirely automatic in its action, the insertion and removal of the tube or piece operated upon being practically all that is required of the operator or workman.

The tube is reciprocated while being subjected to the action of the rotating buffing wheel, and is turned step by step automatically so as to bring new portions of the surface under the wheel, the tube during the turning or rotating operation being unacted upon by the wheel. This reciprocation and step by step revolution of the tube to present new portions of the same to the action of the wheel continues uninterruptedly for a predetermined length of time, at the expiration of which the entire mechanism, except the revolution of the buffing wheel, ceases its operation and the workman is thereby advised and informed that the finished tube may be replaced by another. In order that the surface of the wheel may wear evenly, and that the buffing or polishing may be more satisfactorily and evenly done, the wheel is preferably moved laterally or transversely of the tube during its action thereon.

On the accompanying drawings, forming a part of this specification, and to which reference should be made in connection with the following detailed description, I have illustrated a desirable embodiment of my invention, like reference characters referring to the same parts throughout the various views.

On these drawings—Figure 1 is a partial front elevation of the complete buffing machine; Fig. 2 is a fragmentary front elevation, on an enlarged scale, of the main central portion of the machine on which the buffing wheel is mounted; Fig. 3 is a plan view of the construction shown in Fig. 2 with the parts in different positions; Fig. 4 is an end or side elevation of the structure shown in Figs. 2 and 3; Fig. 5 is a vertical section on line 5—5 of Fig. 2, as viewed in the direction indicated by the arrows, certain parts such as the buffing wheel and its operating mechanism being omitted; Figs. 6 and 7 are front and rear elevations, respectively, of the means for determining the time of the automatic cessation of the operation of the mechanism; Fig. 8 is a section on line 8—8 of Fig. 1, on an enlarged scale, certain parts being omitted, and illustrates the means for turning the tube operated upon step by step; Fig. 9 is a section on line 9—9 of Fig. 8, as viewed in the direction indicated by the arrows; Fig. 10 is a vertical cross-section on line 10—10 of Fig. 1, on an enlarged scale; Fig. 11 is a plan view, on an enlarged scale, of the portion of the device which locks the tube in place, this part of the mechanism being located at the right-hand end of the machine, as shown in Fig. 1; Figs. 12 and 13 are illustrations of details of the clutch-controlling mechanism; Fig. 14 is a view similar to Fig. 6, on a reduced scale, and illustrates the parts in different positions; and Fig. 15 illustrates the mounting of the spring-pressed finger or arm adapted to rotate the tube step by step by coöperation with the star wheel on the end of the head stock.

Referring first to Fig. 1, it will be noticed that at the two opposite ends the machine has upright standards 20 and 21 on which are mounted a pair of long parallel round supporting rods 22 and 23, which pass in front of a main substantially-central post or standard 24 at the upper portion of which, on a transverse rotatable sliding shaft 25, is mounted a buffing or grinding wheel 26 of any suitable or desirable construction, the wheel being located somewhat above and in front of the two rods 22 and 23, as is clearly indicated in Fig. 4. This shaft 25 is rotatable and slidable in a pair of bearings 27 and 28, and has keyed or fixed thereto a driving pulley 29 with which coöperates a driving belt 30 passing around any suitably-driven driving pulley, not shown. A frame 31 at its front end is connected to a dust cover 31^a and at its rear end to a collar 31^b on shaft 25, the lower end of the frame having a socket 32 through which passes a rod or shaft 33, the socket 32 being fixed thereto by a set-

screw 34. The front end of the shaft or rod 33 has a sliding bearing 35 below the shaft bearing 28, while the rear end of the shaft bears against an elongated head of a block 36 slidably mounted in a supporting member 36[a] at the top of a rear standard or post 36[b]. At one side of its rear end this block 36 is supplied with a roller 37, which co-acts and bears against the face of a cam 38 fixed to a short rotatable shaft 39, having at its opposite end a worm wheel 40 with which meshes a worm 41 driven by a pulley 42 and co-acting belt 43. In order to pull the shaft 25 rearwardly and maintain the roller 37 in constant engagement with the face of cam 38, I fasten one end of a spring 44 to the socket 32 at 45, the opposite end of the spring being secured to the member 36[a] at 46, as is clearly indicated in Figs. 3 and 4. It will, therefore, be obvious that during the rotation of the buffing or grinding wheel 26 by its belt 30, the wheel and its shaft will be constantly reciprocated transversely of the supporting rods 22 and 23 by means of the constantly rotating cam 38 and the co-acting or coöperating spring 44, the cam forcing the wheel forwardly, while the spring retracts it when permitted to do so by the cam.

Below the shaft 25 and rotatable in suitable bearings, I provide another shaft 47 equipped at its rear end with a hand wheel 48 and supplied with a pair of loosely-mounted pulleys 49 and 50 rotated in opposite directions by their belts 51 and 52, respectively, either pulley being capable of rotating the shaft 47 by means of the clutch mechanism 53, the shifting of which is controlled by a bell-crank lever 54 pivoted on a suitable bracket at 55. Since any suitable form of double-acting clutch mechanism may be provided for these pulleys, the details of construction of the one indicated need not be explained further. Suffice it to state that when the bell-crank lever 54 is moved in one direction, the shaft will be driven by the pulley 49, and when shifted in the opposite direction the shaft will be rotated by the pulley 50, while when the arm 54 is in central position, as indicated in Fig. 3, both pulleys will be loose on the shaft. At its forward end the shaft 47 has fixed thereto a pinion 56 which meshes with the teeth of a rack 57 which connects together the head and tail supporting members 58 and 59 (Figs. 3 and 11, respectively) of a carriage slidable on the pair of longitudinal ribs 22 and 23. Between the head and tail supporting members 58 and 59 the rods 22 and 23 are covered and protected by inclosing sleeves or casings 60, illustrated in section in Fig. 5. The shaft 61, Fig. 8 which is rotatable at the head end of the reciprocating carriage in a bearing 62 on the member 58, is square at 63 for a portion of its length, its rear or tail end being rotatable in a bearing 64 on the member 59 (Fig. 11). A spring 65 connected to the bearing member 64 and also to the shaft 61, of which the squared portion is characterized 63, tends to rock the shaft 61—63 in its bearings 62, 64 so as to yieldingly swing the tube to be buffed or burnished against the periphery of the buffing wheel, as described hereinafter. Slidable and adjustable on the squared or angular portion 63 of the shaft 61, I provide a split bracket 64 (Figs. 10 and 11) which may be firmly and securely clamped to the shaft 63 by turning a handle 65 having a threaded aperture receiving the top end of a threaded stud 66 passed through the two parts of the split portion of the bracket and fastened to one of them. The bracket 64 has a forward upwardly-extended arm 67, which has slidable therein a tail stock 68 equipped with a handle 69 and pressed toward the head stock, described hereinafter, by a coil spring 70 housed within a suitable bearing on the bracket arm. The bracket 64 also has a depending arm 71 carrying a roller 72 adapted to coöperate with an inclined or beveled cam surface 72[a] (Fig. 2) on the under side of a bar 72[b] suitably mounted on the front portion of the post or standard 24.

Fixed by means of a set-screw 73 to the end of shaft 61 adjacent to its bearing 62, as indicated clearly in Fig. 3, I provide a forwardly-projecting bracket or supporting arm 74 limited in its upward movement by an adjustable screw 75 passing through the top end of an arm 76 rising from the member 58[a] carried on the rods 22 and 23 and forming a portion of the carriage 58. The bracket or supporting arm 74 has at its forward or front end a bearing 77 Fig. 3 carrying a head stock or rotatable supporting shaft 78 Fig. 8 adapted to support one end of the tube 79 to be burnished, while the other end of the tube is supported by the tail stock 68. The head stock has at its opposite end a star wheel 79[a] having a plurality of radiating arms 80 each equipped with a roller 81. As is shown in Figs. 5 and 8, the extreme forward end of the bracket 74 has an anti-friction roller 82 adapted to coöperate with the inclined or beveled cam surface 83 of a block 83[a] mounted on the inner face of a block or plate 84 suitably supported on the central post or standard 24.

A cam or finger 85, pivoted at 86 in a recess 86[a] at the end of a cam bar 86[b] on the inner face of plate 84, is spring-pulled upwardly by a coil spring 87, and is limited as to its upward travel by the top wall of recess 86[a] (Fig. 15). The end of the cam bar 86[b] adjacent to the pivoted arm or finger 85 is supplied with an inclined or beveled cam surface 88, clearly shown in Fig. 8, the arm and surface coöperating to turn the head stock 78 and tube 79 a part of a revolution

each time that one of the rollers 81 strikes the under face of the arm or cam 85 and the beveled surface 88 during the travel of the carriage and tube on the supporting rods 22 and 23, the next adjacent roller 81 passing over the arm, and on its movement in the opposite direction pressing the arm down out of the way so as to be unmoved thereby. By this means, every time that the reciprocating carriage travels to the limit of its movement to the right of the machine, as viewed in Fig. 1, the tube 79 supported by the head and tail stocks is moved downwardly away from the buffing roller or wheel 26 by the coöperation of the roller 82 with the inclined or cam surface 83, and while thus depressed the tube or piece 79 and head stock 78 are rotated a part of a revolution, due to the co-action between one of the rollers 81 and the arm 85 and surface 88, backward rotation of the tube and headstock being prevented by a ratchet 89 (Fig. 9) on the head stock with which co-acts a spring-pressed pawl 90. Fixed to a shaft 91 rotatable in a boss or bearing 92 on the main standard or post 24, I provide a ratchet 93 and a notched pattern or controlling substantially-circular plate 94 having a plurality of notches 95 and a single deeper notch 96. Oscillatory on this shaft 91 and between the ratchet 93 and the bearing 92, I provide a pawl plate 97 pulled downwardly by a spring 101 and carrying a pivoted pawl 98 co-acting with the teeth of the ratchet 93, the pawl plate 97 having an outwardly-extended arm 99 equipped with a roller 100.

Slidable and rotatable in a pair of bearings 102 and 103 mounted on the opposite ends of a longitudinally-extended bar 103[a] suitably supported by the central post or standard of the machine, I employ a reciprocatory rod 104 having fixed thereto a cam carrying member 105 on which is mounted an inclined cam 106, and depending from which is a finger 107, the member 105 being adapted to be struck on opposite ends and shifted in opposite directions by the lug 108 on a collar 109 (Fig. 3) fastened to the shaft 61 by a set-screw 110 and the finger or lug 111 of the bracket 64, illustrated in Fig. 11. As the shaft or rod 104 and the member 105 are shifted back and forth or reciprocated by the fingers or lugs 108 and 111, the cam 106 cooperates with the roller 100 so as to oscillate the pawl plate 107, the spring 101 retracting the same, whereby the ratchet 93 and the notched or recessed plate 95 are fed around step by step by means of the co-acting pawl 98. On a stud 112 on the post or standard 24 I pivot or hinge a forwardly-extended arm 113, normally pulled upwardly by a coil spring 114 having its opposite ends fastened to the post and to the arm, respectively, the arm carrying a roller 115 adapted to travel on the periphery of the notched or recessed wheel 95 and enter the various notches thereof as they come opposite the roller. The broadened outer end of the arm 113 has mounted on its top face a cam or wedge 116 normally below and out of the path of travel of the depending finger 107, the cam being permitted to ascend into the path of travel of this finger when the deep notch 96 comes opposite the roller 115, permitting an unusual elevation of the arm 113 by the spring 114. The front end 117 of the cam 116 is beveled laterally, as is indicated in Fig. 3, while the rear end of the cam 118 is beveled or inclined vertically, as shown in Fig. 6. Also fixed to the shaft 104 by a set-screw 119 (Fig. 12) is a depending arm 120 normally fitting in a notch 121 at the front end of the bell crank lever 54. Fastened at one end to the lever 54 and engaging the front face of the finger or arm 120, I employ a U-shaped spring 122 which has a slightly flared end 123, the portions of the arm 54 on opposite sides of the notch 121 being beveled at 124. Also attached to the arm 54 is a cord 125, the free end of which may be attached, if desired, to the support 21 or other part of the tail portion of the machine.

In order to raise and lower the buffer wheel 26, as may be necessary or desirable when tubes of different sizes are being operated upon, or to compensate for wear of the buffer wheel, the wheel and its operating mechanism is mounted on a support 126 slidable vertically in the post 24 and adjustable by means of a screw-threaded shaft 127 having a threaded connection therewith, and rotatable by a handle 128 having a pawl and ratchet connection therewith, the ratchet being characterized 129 on the drawings. It will, therefore, be apparent that by oscillating the handle 128 the buffer wheel and adjacent parts may be raised or lowered as occasion demands. To accommodate the shaft 47, which at its outer end carries the pinion 56, regardless of the height at which the shaft 25 may be located, the post or pillar 24 may be vertically slotted at 130.

The operation of this mechanism is substantially as follows: Assuming that the bracket 64 has been clamped or secured by the turning of handle 65 on the squared portion 63 of shaft 61 in such position that the device can readily accommodate tubes or other pieces of the length to be operated upon, the workman grasps the handle 69 of the tail stock, pulls it rearwardly sufficiently to permit the insertion of a new tube 79 in such manner that its one end will be supported by the rotatable head stock 78 and its other end will be engaged and supported by the tail stock 68 when the operator releases the spring-pressed handle 69. Assuming also that the buffer wheel 26 is being rotated in the ordinary manner by its pulley 29 and the coöperating belt 30, and that the

wheel 26 is being reciprocated transversely of the tube by the cam 38 and co-acting parts, the operator, after having inserted the tube, pulls the cord 125 so as to swing the bell crank lever 54 on its pivot 55 and clutch the pulley 50 to the shaft 47, whereupon the pinion 56 on this shaft, due to its rotation, causes the movement lengthwise of the rods 22 and 23 of the reciprocating carriage which carries the tube to be burnished. As the tube travels along and is spring-actuated upwardly by the spring 65 into contact with the buffer wheel, this upward movement being limited by the screw 75, the tube is burnished or buffed its full length, as will be readily apparent. When the bell crank arm 54 is pulled to the right, as viewed in Fig. 3, by the cord 125, the finger 120 fixed to shaft 104, which has been previously disengaged from the notch 121 of shifter 54 and spring 122, is struck by the inclined surfaces 124 and 123 of the arm 54 and spring 122, respectively, and acts upon the latter, spreading it away sufficiently for the arm 120 to enter the notch 121, being held therein by the spring 122 pressing on its edge. The reciprocating carriage and the tube being operated upon by the buffer wheel are carried to the left, as the machine is viewed in Figs. 1, 2 and 3, until the finger or lug 111 of the bracket 64 strikes the cam carrying member 105 carrying the same, the shaft 104, finger 107, and cam 106 along with it until the arm 120, by engaging one side of the recess 121, shifts the bell crank lever 54 so as to render the pulley 50 inoperative upon the shaft 47 and clutches the pulley 49 thereto. During this travel of the cam 106 it engages the roller 100 of the pawl plate 97, swinging the latter on the shaft 91 so as to cause the pawl 98, which is in engagement with one of the teeth of the ratchet 93, to turn the ratchet and the notched or recessed plate 95 around one step so that the roller 115 engages the next notch.

When the carriage approaches the limit of its lengthwise movement to the left of the machine, as viewed in Fig. 1, the roller 72 on the bracket 64 comes in contact with the inclined cam surface 72^a so as to swing the carriage and the tube operated upon downwardly away from the buffing wheel to prevent the latter from acting on the parts of the machine after the end of the tube passes thereby and the tail stock and assembled parts come under the wheel. As soon as the pulley 49 is clutched to the shaft 47, as explained above, the rotation of the pinion 46 is reversed, thereby causing a reverse sliding travel of the carriage on which the tube 79 is mounted, the tube being operated upon by the buffer wheel while moving in this opposite direction. This action continues until the finger or lug 108 of the collar 109 fixed to the shaft 61 strikes the opposite side of the cam carrying member 105, whereupon the cam is shifted rearwardly as well as the shaft or rod 104 and the finger or arm 120, which movement of the latter arm turns the bell crank arm 54 on its pivot or hinge 55, rendering the pulley 50 again operative upon or clutched to the shaft 47, whereupon a reversed travel of the tube carrying carriage takes place. Before this reversed travel occurs, however, and as the tube and reciprocating parts reach their limit of movement to the right, as the machine is viewed in Figs. 1, 2 and 3, the roller 82 is caused to travel down the inclined or cam surface 83, causing a lowering or descent of the tube 79 operated upon, the shaft 61 turning in its bearings 62 and 64, this movement of the shaft being in opposition to the action of spring 65. Then the roller 81 on one of the arms 80 strikes the bottom surface of the arm 85 and travels from the same on to the beveled or inclined surface 88, thereby giving a partial turn to the head stock 78 and tube 79, the next higher roller passing over the top end of the arm 85. It will be observed, therefore, that the tube is given its partial or step by step rotation while it is unacted upon by the buffer wheel 26, otherwise there would be a tendency to scratch the tube cross-wise. When the pulley 50 again becomes operative upon the shaft 47, and the carriage and tube slide to the left, the roller 81 which passed over the finger 80 presses down this finger in opposition to the action of spring 87, no turning of the head stock or tube occurring at this time, reverse rotation of the head stock being prevented, as described above, by the ratchet 89 and the co-acting spring-operated pawl 90. During this action of the buffer wheel on the tube the wheel is being shifted laterally or transversely of the tube, as set forth above, whereby the wheel is worn evenly on its surface and the tube is properly finished. This action of the parts and step by step rotation of the notched wheel 94 continues until the deeper notch or recess 96 is brought opposite the roller 115, whereupon, owing to the spring 114 acting on the arm 113, the latter is raised sufficiently to bring the cam 116 into the path of travel of the depending finger 107, which by striking the laterally beveled surface 117 of the cam 116 causes the shaft 104 to turn in its bearings sufficiently to move the arm 120 out of the notch 121 in opposition to the action of spring 122, this movement of the arm 120 occurring while the bell crank lever 54 is in neutral position, that is, when neither pulley 49 nor 50 is clutched to the shaft. The momentum of the parts carries the arm 120 away from the arm 54 and spring 122, and they are not clutched together again until the operator pulls the cord 125 after he has inserted a new tube. It will be apparent, therefore, that the machine stops automat-

ically for the reception of a new tube with the arm 54 in neutral inoperative position and the finger 120 disengaged therefrom. It should be apparent to those skilled in this art that by using ratchets 93 with different numbers of teeth and notched wheels 94 with different numbers of notches, or with a greater or less number of deep notches, the length of time that each tube will be operated upon can be readily varied or changed and predetermined. By the employment of members 79[a] equipped with varying numbers of radiating arms, the amount of turning of the tube at each actuation can be readily varied to meet the requirements in each case. For example, if a square tube is to be operated upon such parts can be provided as to give the piece a turn of 90 degrees at each partial revolution.

The structural features of my improved machine have been described and set forth with some degree of particularity, but it is to be remembered and understood that my invention is not limited to the precise structural features shown and described, since they may be varied within wide limits without departure from the heart and essence of my invention.

I claim:

1. In a buffing machine, the combination of means to reciprocate the part to be buffed, a buffing wheel, means to rotate said wheel, and means to intermittently rotate said part step by step, substantially as described.

2. In a buffing machine, the combination of means to reciprocate the part to be buffed, a buffing wheel, means to rotate said wheel, means to automatically intermittently render said wheel temporarily inoperative on said part, and means to rotate said part step by step during the intervals when said wheel is inoperative on said part, substantially as described.

3. In a buffing machine, the combination of means to reciprocate the part to be buffed, a buffing wheel, means to rotate said wheel, means to shift said wheel transversely of the part to be buffed, and means to intermittently rotate said part step by step, substantially as described.

4. In a buffing machine, the combination of means to reciprocate the part to be buffed, a buffing wheel, means to rotate said wheel, means to shift said buffing wheel transversely of the part to be buffed, means to automatically intermittently render said wheel temporarily inoperative on said part, and means to rotate said part step by step during the intervals when said wheel is inoperative on said part, substantially as described.

5. In a buffing machine, the combination of a buffing wheel, means to rotate said wheel, a reciprocating hinged or swinging support for the part to be buffed, means to reciprocate said support and part, means to swing said support at intervals to move the part to be buffed away from said wheel, and means to rotate said part step by step while it is swung away from the wheel, substantially as described.

6. In a buffing machine, the combination of a buffing wheel, means to rotate said wheel, a reciprocating hinged or swinging support for the part to be buffed, means to reciprocate said support and part, means to swing said support at intervals to move the part being buffed away from said wheel, means to rotate said part step by step while it is swung away from said wheel, and means to shift said wheel transversely of the part being buffed, substantially as described.

7. In a buffing machine, the combination of means to reciprocate the part being buffed, a buffing wheel, means to rotate said wheel, means to automatically intermittently render said wheel temporarily inoperative on said part, means to rotate said part step by step during the intervals when said wheel is inoperative on said part, and means to stop the reciprocation of said part after a predetermined period of action of the buffing wheel on said part, substantially as described.

8. In a buffing machine, the combination of means to reciprocate the part to be buffed, a buffing wheel, means to rotate said wheel, means to shift said wheel transversely of the part to be buffed, means to automatically intermittently render said wheel temporarily inoperative on said part, means to rotate said part step by step during the intervals when said wheel is inoperative on said part, and means to stop the reciprocation of said part after a predetermined period of action of the buffing wheel on said part, substantially as described.

9. In a buffing machine, the combination of a buffer, means to actuate said buffer, means to reciprocate the part to be buffed, and controlling means to automatically cause the cessation of said reciprocation upon the completion of a predetermined action of said buffer on said part, substantially as described.

10. In a buffing machine, the combination of a buffer, means to actuate said buffer, means to reciprocate the part to be buffed, controlling means to automatically cause the cessation of said reciprocation upon the completion of a predetermined action of said buffer on said part, and means to operate said controlling means step by step during said reciprocation, substantially as described.

11. In a buffing machine, the combination of a buffer, means to actuate said buffer, means to reciprocate the part to be buffed, controlling means to automatically cause the cessation of said reciprocation upon the completion of a predetermined action of said buffer on said part, and a pawl and ratchet to

operate said controlling means step by step during said reciprocation, substantially as described.

12. In a buffing machine, the combination of a buffer, means to actuate said buffer, means to reciprocate the part to be buffed, controlling means governing the operation of said reciprocating means and including a movable member, a cam normally out of the path of travel of said member, means tending to bring said cam into the path of travel of said member, means governing the position of said cam, and means to actuate said latter means step by step during the reciprocation of the part to be buffed, substantially as described.

13. In a buffing machine, the combination of a buffer, means to actuate said buffer, means to reciprocate the part to be buffed, controlling means governing the operation of said reciprocating means and including a movable member, a cam normally out of the path of travel of said member, means tending to bring said cam into the path of travel of said member, a notched wheel governing the position of said cam, and means to turn said notched wheel step by step during the reciprocation of the part to be buffed, substantially as described.

14. In a buffing machine, the combination of a buffer, means to actuate said buffer, means to reciprocate the part to be buffed, a movable shifter controlling the operation of said reciprocating means and capable of assuming a neutral position corresponding to the inoperative condition of said reciprocating means, shifter-operating means detachably connected thereto, and means to automatically detach said shifter-operating means from said shifter when the latter is in its neutral position and after a predetermined period of action of said buffer on said part, substantially as described.

15. In a buffing machine, the combination of means to reciprocate the part to be buffed, a buffing wheel means to revolve said wheel, and means to rotate said part to be buffed, substantially as described.

16. In a buffing machine, the combination of means to reciprocate the part to be buffed, a buffing wheel, arranged with its axis transverse to the longest dimension of and adapted to act upon said part to be buffed, means to rotate said wheel, and means to effect a substantially uniform wear of the active face of said wheel, substantially as described.

17. In a buffing machine, the combination of a buffer, means to actuate said buffer, a pair of centers to support the piece to be buffed, the axis of said buffer being transverse to the longest dimension of the piece to be buffed, and means to reciprocate said centers, substantially as described.

18. In a buffing machine, the combination of means to reciprocate the part to be buffed, a buffing wheel, means to rotate said wheel, and means to automatically intermittently render said wheel temporarily inoperative on said part, substantially as described.

JOHN F. GAIL.

Witnesses:
WALTER M. FULLER,
CLARE L. ROSENOW.