

Nov. 18, 1958

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2,860,604

AIR AND LIQUID OPERATED APPARATUS FOR INTERMITTENTLY
FEEDING A BUFFING BAR TO A BUFFING WHEEL

Filed Oct. 8, 1956

2 Sheets-Sheet 1

Fig. 1

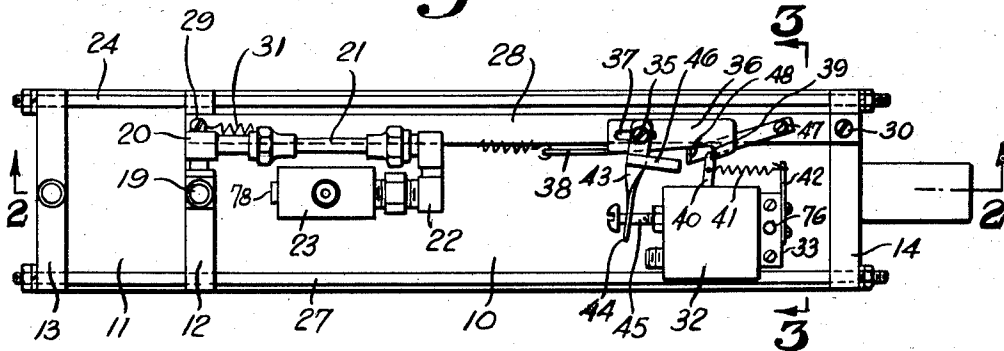


Fig. 2

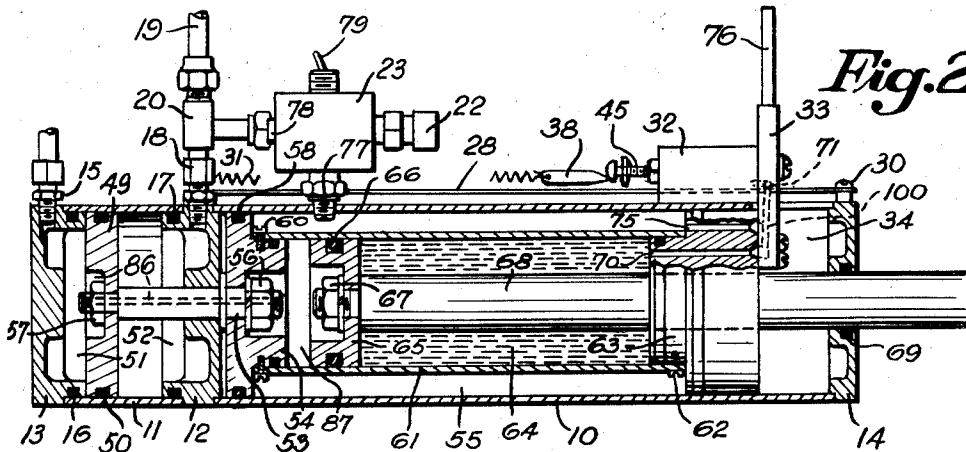
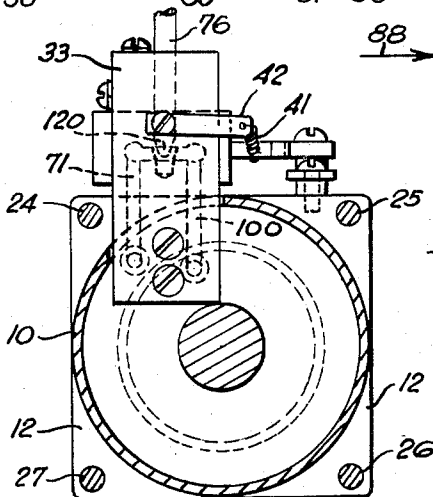


Fig. 3



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2 Sheets-Sheet 2

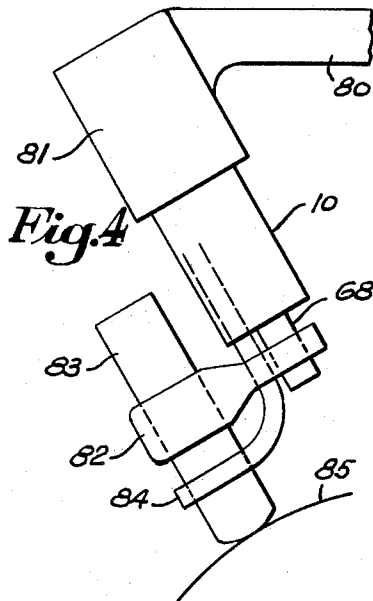


Fig. 4

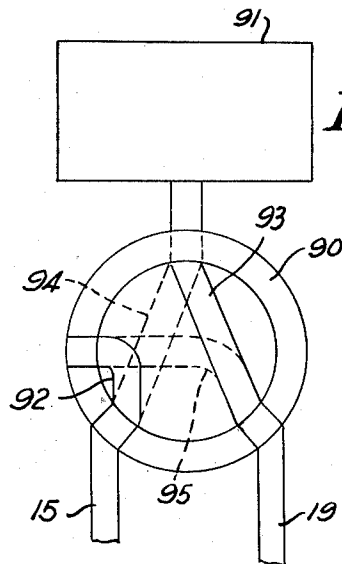


Fig. 6

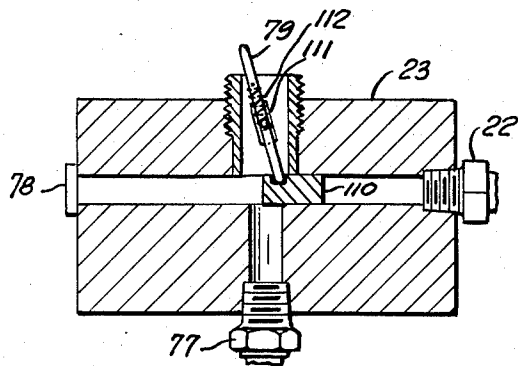


Fig. 7

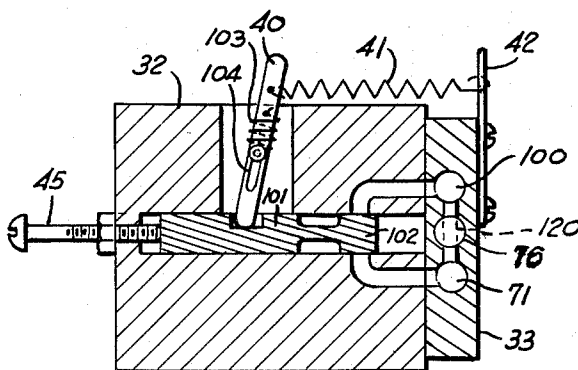


Fig. 5

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AIR AND LIQUID OPERATED APPARATUS FOR INTERMITTENTLY FEEDING A BUFFING BAR TO A BUFFING WHEEL

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Application October 8, 1956, Serial No. 614,708

13 Claims. (Cl. 121—38)

This invention relates to an apparatus for feeding a buffing bar to a buffing wheel.

Buffing wheels used for grinding and polishing purposes must be continuously supplied with a buffing coating which is usually applied to the wheel in the form of a buffing bar. Therefore, a feed must be provided by means of which the buffing bar must remain in engagement with the wheel despite the diminution of its size.

An object of the present invention is to provide a device for supplying a buffing bar to a buffing wheel which is most effective in operation and inexpensive to manufacture.

Another object is the provision of a feed for a buffing bar provided with an effective and easily adjustable feed control.

Yet another object is the provision of a feeding device of the described type, wherein air pressure is converted into an intermittent movement of elements carrying the buffing bar.

Other objects of the present invention will be apparent in the course of the following specification.

In accomplishing the objects of the present invention it was found desirable to provide a feed mechanism comprising essentially a front portion wherein pressure is to be exerted by means of compressed air to provide a reciprocatory movement. The mechanism also includes a further portion wherein hydraulic means are utilized for actuating a stepwise movement of the carrier for the buffing bar.

In accordance with the present invention front pressure is controlled through a control of the exhaust pressure, which is accomplished by means of a microvalve. The feed of the bar is controlled, firstly, by the time during which the valve stays open, and, secondly, by the speed of travel, while the speed of advance is used to determine the length of time of the opening of the microvalve.

The microvalve used for the purposes of the present invention is preferably one described in the co-pending application of John C. Swatsworth, Ser. No. 377,007, filed August 28, 1953.

The invention will appear more clearly from the following detailed description when taken in connection with the accompanying drawings showing, by way of example, a preferred embodiment of the inventive idea.

In the drawings:

Figure 1 is a plan view of the feed mechanism constructed in accordance with the principles of the present invention.

Figure 2 is a longitudinal section along the line 2—2 of Figure 1.

Figure 3 is a transverse section along the line 3—3 of Figure 1, on an enlarged scale.

Figure 4 is a side view illustrating the feed of the buffing bar.

Figure 5 is a sectional view on an enlarged scale illustrating the microvalve constituting a part of the feed mechanism.

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Figure 6 is a diagram illustrating the control mechanism.

Figure 7 is a sectional view illustrating another valve constituting a part of the apparatus.

The feed mechanism shown in the drawings includes an elongated cylindrical main casing 10 and a smaller cylindrical front casing 11, which is in alignment with the casing 10, and which is separated therefrom by a preferably square support 12. A preferably square front closure member 13 is used to close the front portion of the cylinder 11. A square closure member 14 is located upon the rear end of the cylinder 10 and is used to close the rear end of this cylinder. The closure members 13 and 14 are held together by rods 24 to 27 which extend parallel to the longitudinal axis of the containers 10 and 11 and through the support 12 and which have threaded ends carrying nuts engaging the underlying surfaces of the closure members 13 and 14.

The closure 13 carries a tubular piece 15 which is threaded into the closure 13 and the interior of which is in communication with the chamber 51 within the container 11. As will be described in greater detail hereinafter, the tube 15 may be conveniently attached to a pipe or hose by means of which compressed air is introduced into the interior 51 of the container 11. A rubber seal 16 carried by the closure 13 may be effectively used to provide an air-tight connection.

The supporting piece 12 also carries a rubber insert or ring 17 which engages the inner surfaces of the sleeve 11 to provide an air tight connection and is provided with openings through which the rods 24 to 27 extend. The support 12 carries a tube 18 which communicates with the interior 52 of the casing 11. The tube 18 is connected with a pipe 19 and an elbow pipe 20 which is connected to a pipe 21. The pipe 21 is connected by an elbow pipe 22 with a valve 23 which is carried by the casing 10 and is in communication with the interior thereof through the pipe 77.

An elongated plate 28 has one end which is mounted by a screw 29 in the supporting plate 12. The plate 28 extends parallel to the longitudinal axis of the container 10 and its opposite end is attached to the closure 14 by a screw 30.

The screw 29 also serves as an attachment for one end of an elongated coiled spring 31.

A microvalve 32 is attached to a plate 33 which extends through an opening 34 provided in the container 10.

The valve-tripping mechanism of the present invention includes a pivot 35 which is carried upon the plate 28. The pivot 35 carries a swingable plate 36 having an elongated opening 37 through which the pivot 35 extends. Due to the provision of the elongated slot 37, the position of the plate 36 may be adjusted within certain limits. The plate 36 is firmly connected with a projection 38 which carries the other end of the spring 31. The hooked portion 39 of the plate 36 is adapted to engage a lever 40 constituting a part of the microvalve 32 and carrying one end of a spring 41. The other end of the spring 41 is attached to a plate 42, which is carried by the casing of the microvalve 32.

The pivot 35 also carries a swingable arm 43 which has an end 44 turned at right angles to the plane of the piece 43 and having an opening through which the rod 45 extends. The rod 45 is also carried by the casing of the microvalve 32. The arm 43 is firmly connected with an arm 46 which extends substantially at right angles thereto.

The plate 28 also carries an elongated arm 47 which is firmly connected to the plate 28 and has a hook-shaped end 48.

A piston 49 is located within the casing 11 and is provided with a rubber seal 50. The piston 49 separates the

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interior of the container 11 into the front chamber 51 and the rear chamber 52. A hollow piston rod 53 connects the piston 49 with a piston 54 located within the chamber 55 constituting the interior of the container 10. The piston rod 53 extends through the supporting member 12 and is connected with the piston 54 by a nut 56. The opposite end of the piston rod 53 is connected by a nut 57 with the piston 49. The piston 54 is provided with a rubber seal 58 and is connected by screws 60 with a sleeve 61 located within the chamber 55 and coaxial with the container 10. The sleeve 61 has a rear end which is connected by screws 62 with a piston or plate 63. The piston 63 constitutes a closure for the rear end of the rear chamber 64 enclosed by the sleeve 61.

A feed piston 65 is located within the chamber 64 and has a rubber seal 66 engaging the inner walls of the sleeve 61. The piston 65 is connected by a nut 67 with one end of a carrying rod 68. The rod 68 extends through the piston 63 and through the closure 14 which carries a rubber seal 69 embracing the rod 68.

As shown in Figure 2, the piston 54 has a wider portion which is in contact with the inner walls of the container 10 and a narrower portion connected to an end of the sleeve 61. Similarly, the piston or plate 63 has a wider portion contacting the inner side walls of the container 10 and a narrower portion firmly connected with the opposite end of the sleeve 61. The piston 63 is provided with a passage 70 which connects the chamber 64 with a passage 71 formed in the plate 33 and leading to the microvalve 32.

Figure 4 shows a frame 80 provided with a support 81 carrying the casing 10 of the feed mechanism. The rod 68 carries a clamp 82 which carries the buffing bar 83. A guide 84 is used to guide the movement of the buffing bar 83 toward the buffing wheel 85, preventing radial movement of rod 68.

Figure 6 shows a valve 90 supplying compressed air from a reservoir 91 to the tube 15 or the tube 19. In the position shown in full lines in Fig. 6, the passage 92 connects the tube 15 with the atmosphere, while the passage 93 connects the tube 19 with the reservoir 91. In the position shown by broken lines, the passage 94 connects the tube 15 with the reservoir 91, while the passage 95 connects the tube 19 with the atmosphere.

The microvalve 32 which is shown in greater detail in Figure 5 is used to interconnect passages 71 and 100 provided in the plate 33 and to interrupt this connection. For that purpose, the microvalve 32 has a valve body 101 having a member 102 which in the position shown in Figure 5 prevents any communication between the passages 71 and 100. The valve body 101 is engaged and actuated by the lever 40 which is maintained in the closed position by the spring 41. The lever 40 is swingably mounted upon a yoke 104 and is connected with a spring 103 which makes it possible for the lever 40 to operate with snap action, so that when actuated, it will snap either into the open position or the closed position. As already stated, a microvalve of this type is described in greater detail in the aforesaid patent application. In the open position of the microvalve, the passage 71 is connected with the passage 100.

The valve 23 shown in Figure 7 has a valve body 110 actuated by a lever or projection 79. The lever 79 is pivoted upon a yoke 111 and carries a spring 112, so that the lever 79 can move by snap action from the position shown in Figures 1 and 7 in which the valve body 110 closes the passage 22, to a position in which the valve body 110 closes the passage 78 leading to the atmosphere.

While the valve 23 illustrated in the drawings operates by means of a snap action lever 79, any valve of other suitable construction may be used as a substitute.

As will be set forth in greater detail hereinafter, the chambers 51, 87 and/or 52 are usually filled with com-

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pressed air, while the chamber 64 is filled with oil. The chamber 55 will contain oil and/or compressed air, or atmospheric air.

The apparatus operates as follows:

When the valve 90 is in the position shown in broken lines in Fig. 6, compressed air from the reservoir 91 flows through the passage 94 into the pipe 15 and thence into the chamber 51 located in front of the piston 49 in the casing 11 (Fig. 2). The piston rod 53 of the piston 49 has an inner passage 86 which connects the chamber 51 with the chamber 87 located within the sleeve 61 in front of the piston 65. Thus, the same compressed air will be present in the chambers 51 and 87. As the result of this pressure, the piston 49 will move in the direction of the arrow 88. Since the piston 49 constitutes a rigid unit with the piston rod 53, the piston 54, the sleeve 61, the piston 63, the plate 33 and the microvalve 32, all these parts will move in the same direction until the piston 49 strikes the plate 12.

At the beginning of this movement, the lever 40 of the microvalve 32 strikes the hose 39 and snaps from the closed position shown in Figure 1 into its open position, thereby extending the spring 41. The lever 40 will actuate the valve body 101 (Fig. 5), so as to establish connection between the passages 71 and 100. Thus connection will be established between the chamber 64 located within the sleeve 61 (Fig. 2) and the chamber 55 enclosing the sleeve 61, through the passage 70 extending within the piston 63, the passage 71 within the plate 33, the microvalve 32, the passage 100 in the plate 33, and the passage 75 located in the piston 63 and leading to the chamber 55.

As already stated, compressed air is present in the chamber 87 in front of the piston 65, while the chamber 64 behind the piston 65 is filled with oil. Due to the opening of the microvalve 32, air pressure in the chamber 87 will move the piston 65 in the direction of the arrow 88, causing the oil to flow from the chamber 64 to the chamber 55 through the microvalve 32 and the above described passages which are connected therewith in the open position of the microvalve.

The piston 65 is connected with the rod 68 which is connected with the buffing bar 83 by the clamp 82 (Fig. 4). Thus, the buffing bar 83 will be moved toward the buffing wheel 85.

It is apparent that the piston 49 and the parts connected therewith, and the piston 65 with the parts connected thereto carry out independent stepwise movements in the same direction, the movement of the piston 65 beginning after the piston 49 started its movement due to the time lag caused by the opening of the microvalve 32.

In the course of the forward movement of the microvalve 32—which moves along with the piston 49—the lever 40 of the microvalve which snapped into its open position, will maintain its contact with the nose 39 of the plate 36 (Fig. 1) and will move the plate 36 along with it, thereby extending the spring 31 until the immovable pivot 35 strikes the left hand edge of the elongated slot 37 of the plate 36 (looking in the direction of Figure 1). Thereupon the plate 36 trips outwardly about the pivot 35, so that contact between the lever 40 of the microvalve and the nose 39 of the plate 36 is interrupted. Then the spring 41 will pull the lever 40 back to its closed position shown in Figure 1, thereby closing the microvalve 32 and stopping the forward movement of the piston 65 and the rod 68 connected therewith. The arrangement is such that the microvalve 32 will close before the end of the forward stroke of the piston 49.

While the microvalve 32 was open, the flow of oil through it from the chamber 64 to the chamber 55 was made possible due to the fact that the valve 23 is in the open position shown in Figures 2 and 7. In this position the chamber 55 is connected with the atmosphere through the tube 77 and the open passage 78.

The closing of the microvalve 32 will stop the move-

ment of the piston 65. The piston 49 will continue its movement until it strikes the plate 12.

Thereupon the valve 90 (Fig. 6) is operated either manually or mechanically by any suitable means not shown in the drawings, so that the valve body will move to the position shown in full lines in Figure 6. In this position the conduit 15 is connected with the atmosphere through the passage 92. Thus compressed air from the chambers 87 and 51 will escape to the atmosphere. The reservoir 91 of compressed air will be connected with the conduit 19 by the passage 93, so that compressed air will flow through the conduits 19, 20, and 18 into the chamber 52 and will move the piston 49 in the direction opposite to that of the arrow 88 (Fig. 2) until the piston 49 strikes the plate 13. The piston rod 53, the piston 57, the sleeve 61, the piston 63, the plate 33 and the microvalve 32 will move along with the piston 49. Since the microvalve 32 is closed, the piston 65 and the rod 68 connected therewith will participate in this return movement.

It is apparent, however, that while the piston 49 will return to its initial position at the end of each stroke, the piston 65 will not return to its initial position; each time the movement of the piston 65 is reversed, it will be located a little further from the piston 57 and closer to the piston 63.

It is apparent that the rate of exhaust through the conduit 19 controls the speed of movement of the piston 49, namely, the wider the exhaust, the faster will be the speed of movement of the piston 49 and, conversely, the narrower the exhaust at 19, the slower is the movement of the piston 49. This affects the time of opening and closing of the microvalve 32.

The time of the opening and closing of the microvalve 32 can be also varied by changing the position of the screw 45 carried by the microvalve 32 (Fig. 1). In the illustrated positions, the levers 44, 43, 46 are not operable, since the valve lever 40 is released when the plate 36 is swung by the pivot 35. However, when it is desired that the microvalve 32 be open for a shorter time period, the screw 45 can be so set that it will engage and swing the end 44 of the lever 43 before the edge of the slot 37 of the plate 36 reaches the pivot 35. The lever 43 will turn counter-clockwise (looking in the direction of Figure 1) and the projection 46 carried by the lever 43 will strike the plate 36 and will disconnect the valve lever 40 from the nose 39, thus enabling the spring 41 to close the microvalve 32.

At the completion of the entire forward movement, the apparatus can be conveniently reset by tripping the lever 79 of the valve 23 out of the position shown in Figure 2 to a position in which the chamber 55 is connected with the compressed air reservoir 91 through the conduits 77, 22, 21, 20, 19 and 93. At that time the valve 90 must be in the position shown by full lines in Figure 6, so that the connection between the conduit 15 and the compressed air reservoir 91 is interrupted. Compressed air flowing into the chamber 55 will cause the oil in the chamber 55 to flow through the passages 75 and 70 back into the chamber 64. The microvalve 32 can be by-passed by operating the pin 76 carried by the plate 33 until a bore 120 provided between the passages 71 and 100 may be closed or opened by the seat of pin 76 outside of the microvalve 32. Then oil can flow as the result of air pressure in the chamber 55 through the passages 75, 71, 120, 100 and 70 into the chamber 64 to reset the piston 65 to its initial position.

It is apparent that the example illustrated has been given solely by way of illustration and not by way of limitation and that it is capable of many variations and modifications within the scope of the present invention. All such variations and modifications are to be included within the scope of the present invention, for example, the basic principles of this invention may be applicable to machine tool operation, measuring devices or any other devices whereby a reciprocal stroke motion is com-

bined or is utilized with an incremental forward feed motion.

What is claimed is:

1. A feed mechanism, particularly for feeding buffing bars to buffing wheels, said mechanism comprising a casing, a supporting plate separating the interior of said casing into a main portion and a front portion in alignment with said main portion, a piston located in said front portion of the casing intermediate its ends to divide the interior of said front portion of the casing into a front chamber and a rear chamber, means supplying compressed air alternately to said chambers for the forward and return movements of said piston, a cylinder within said main portion of the casing, another piston located in said cylinder intermediate its ends to divide the interior of said cylinder into a front chamber and a rear fluid-containing chamber, a closure member firmly connected with the front end of said cylinder and with the first-mentioned piston and having a passage operatively connecting the front chamber of said casing with the front chamber of said cylinder, and means operable by the movement of the first-mentioned piston for providing an outflow for the fluid in the rear chamber of said cylinder and for interrupting said outflow.

2. A feed mechanism, particularly for feeding buffing bars to buffing wheels, said mechanism comprising a casing, a supporting plate separating the interior of said casing into a main portion and a front portion in alignment with said main portion, a piston located in said front portion of the casing intermediate its ends to divide the interior of said front portion of the casing into a front chamber and a rear chamber, means supplying compressed air alternately to said chambers for the forward and return movements of said piston, a cylinder within said main portion of the casing, another piston located in said cylinder intermediate its ends to divide the interior of said cylinder into a front chamber and a rear fluid-containing chamber, a closure member firmly connected with the front end of said cylinder and with the first-mentioned piston and having a passage operatively connecting the front chamber of said casing with the front chamber of said cylinder, another closure member firmly connected with the rear end of said cylinder and contacting said casing, said other closure member having passages for the flow of the fluid out of and into the rear chamber of said cylinder, and valve means operable by the movement of the first-mentioned piston for providing said flow of the fluid and for interrupting it.

3. A feed mechanism, particularly for feeding buffing bars to buffing wheels, said mechanism comprising a casing having a main portion and a front portion in alignment with said main portion, a supporting plate between the two portions, a piston located in said front portion intermediate its ends to divide the interior of said front portion of the casing into a front chamber and a rear chamber, means supplying compressed air alternately to said chambers for the forward and return movements of said piston, a cylinder within said main portion of the casing, another feed piston located in said cylinder intermediate its ends to divide the interior of said cylinder into a front chamber and a rear fluid-containing chamber, a closure firmly connected with the front end of said cylinder, a piston rod firmly connecting the first-mentioned piston with said closure and extending through said supporting plate, said piston rod having a passage operatively connecting the front chamber of said casing with the front chamber of said cylinder, another closure member firmly connected with the rear end of said cylinder and contacting said casing, said other closure member having passages for the flow of the fluid communicating with the rear chamber of the cylinder and the space between the cylinder and the casing, and valve means operable by the movement of the

first-mentioned piston for providing a flow of the fluid through said passages and for interrupting said flow.

4. A feed mechanism, particularly for feeding buffing bars to buffing wheels, said mechanism comprising a casing having a main portion and a front portion in alignment with said main portion, a supporting plate between the two portions, a piston located in said front portion intermediate its ends to divide the interior of said front portion of the casing into a front chamber and a rear chamber, means connected with said front portion and said plate for supplying compressed air alternately to said chambers for the forward and return movements of said piston, a cylinder within said main portion of the casing, whereby an annular chamber is formed between said cylinder and said casing, another feed piston located in said cylinder intermediate its ends to divide the interior of said cylinder into a front chamber and a rear fluid-containing chamber, a closure firmly connected with the front end of said cylinder, a piston rod firmly connecting the first-mentioned piston with said closure and extending through said supporting plate, said piston rod having a passage operatively connecting the front chamber of said casing with the front chamber of said cylinder, another closure member firmly connected with the rear end of said cylinder and contacting said casing, said other closure member having passages for the flow of the fluid communicating with the rear chamber of the cylinder and said annular chamber, means connected with the first-mentioned means for supplying compressed air to said annular chamber, and valve means operable by the movement of the first-mentioned piston for providing a connection between the passages of said other closure member and for interrupting this connection.

5. A feed mechanism, particularly for feeding buffing bars to buffing wheels, said mechanism comprising a casing, a supporting plate separating the interior of said casing into a main portion and a front portion in alignment with said main portion, a support carried by said casing, a piston located in said front portion of the casing intermediate its ends to divide the interior of said front portion of the casing into a front chamber and a rear chamber, means supplying compressed air alternately to said chambers for the forward and return movements of said piston, a cylinder within said main portion of the casing, another piston located in said cylinder intermediate its ends to divide the interior of said cylinder into a front chamber and a rear fluid-containing chamber, a closure member firmly connected with the front end of said cylinder and with the first-mentioned piston and having a passage operatively connecting the front chamber of said casing with the front chamber of said cylinder, another closure member firmly connected with the rear end of said cylinder and contacting said casing, said other closure member having passages for the flow of the fluid out of and into the rear chamber of said cylinder, a valve tripping device carried by said support, and valve means carried by said other closure member and movable therewith for providing said flow of the fluid and for interrupting it, said valve means being actuated by said valve tripping device.

6. A feed mechanism, particularly for feeding buffing bars to buffing wheels, said mechanism comprising a casing, a supporting plate separating the interior of said casing into a main portion and a front portion in alignment with said main portion, a support carried by said casing, a piston located in said front portion of the casing intermediate its ends to divide the interior of said front portion of the casing into a front chamber and a rear chamber, means supplying compressed air alternately to said chambers for the forward and return movements of said piston, a cylinder within said main portion of the casing, whereby an annular chamber is formed between said cylinder and said casing, another piston located in said cylinder intermediate its ends to divide the interior of said cylinder into a front chamber and a rear fluid-

containing chamber, a closure member firmly connected with the front end of said cylinder and with the first-mentioned piston and having a passage operatively connecting the front chamber of said casing with the front chamber of said cylinder, whereby said cylinder is movable along with the first-mentioned piston, said closure member forming a peripheral sealing engagement with the interior of the casing, another closure member firmly connected with the rear end of said cylinder and contacting said casing, said other closure member having passages for the flow of the fluid out of and into the rear chamber of said cylinder, a valve tripping device carried by said support, a plate having passages communicating with the passages in said other closure member, said plate being carried by said other closure member and extending through an opening formed in said casing, and a valve carried by said plate for providing said flow of the fluid and for interrupting it, said valve being actuated by said valve tripping device.

7. A feed mechanism, particularly for feeding buffing bars to buffing wheels, said mechanism comprising a casing, a supporting plate separating the interior of said casing into a main portion and a front portion in alignment with said main portion, a support carried by said casing, a piston located in said front portion of the casing intermediate its ends to divide the interior of said front portion of the casing into a front chamber and a rear chamber, means supplying compressed air alternately to said chambers for the forward and return movements of said piston, a cylinder within said main portion of the casing, whereby an annular chamber is formed between said cylinder and said main portion of the casing, another piston located in said cylinder intermediate its ends to divide the interior of said cylinder into a front chamber and a rear fluid-containing chamber, a closure member firmly connected with the front end of said cylinder and with the first-mentioned piston and having a passage operatively connecting the front chamber of said casing with the front chamber of said cylinder, whereby said cylinder is movable along with the first-mentioned piston, said closure member forming a peripheral sealing engagement with the interior of the casing, another closure member firmly connected with the rear end of said cylinder and contacting said casing, said other closure member having passages for the flow of the fluid out of and into the rear chamber of said cylinder and said annular chamber, a plate swingably mounted in said support and having a nose, and valve means connected with said other closure member and having an actuating lever adapted to be engaged by the nose of said plate during a relative movement between said valve means and said plate to actuate said valve means.

8. A feed mechanism, particularly for feeding buffing bars to buffing wheels, said mechanism comprising a casing, a supporting plate separating the interior of said casing into a main portion and a front portion in alignment with said main portion, a support carried by said casing, a piston located in said front portion of the casing intermediate its ends to divide the interior of said front portion of the casing into a front chamber and a rear chamber, means supplying compressed air alternately to said chambers for the forward and return movements of said piston, a cylinder within said main portion of the casing, whereby an annular chamber is formed between said cylinder and said main portion of the casing, another piston located in said cylinder intermediate its ends to divide the interior of said cylinder into a front chamber and a rear fluid-containing chamber, a closure member firmly connected with the front end of said cylinder and with the first-mentioned piston and having a passage operatively connecting the front chamber of said casing with the front chamber of said cylinder, whereby said cylinder is movable along with the first-mentioned piston, said closure member forming a peripheral sealing engagement with the interior of the casing, another closure member firmly

connected with the rear end of said cylinder and contacting said casing, said other closure member having passages for the flow of the fluid out of and into the rear chamber of said cylinder and said annular chamber, a pivot carried by said support, a plate having an elongated slot extending in the direction of movement of the pistons and containing said slot, a spring connected with said plate and extending in the direction of movement of said pistons, said plate having a nose, and valve means connected with said other closure member and having an actuating lever adapted to be engaged by the nose of said plate during a relative movement between said valve means and said plate to actuate said valve means, and a spring connected with the actuating lever of the valve means and extending in the direction of movement of said pistons.

9. A feed mechanism, particularly for feeding buffing bars to buffing wheels, said mechanism comprising a casing, a supporting plate separating the interior of said casing into a main portion and a front portion in alignment with said main portion, a support carried by said casing, a piston located in said front portion of the casing intermediate its ends to divide the interior of said front portion of the casing into a front chamber and a rear chamber, means supplying compressed air alternately to said chambers for the forward and return movements of said piston, a cylinder within said main portion of the casing, whereby an annular chamber is formed between said cylinder and said main portion of the casing, another piston located in said cylinder intermediate its ends to divide the interior of said cylinder into a front chamber and a rear fluid-containing chamber, a closure member firmly connected with the front end of said cylinder and with the first-mentioned piston and having a passage operatively connecting the front chamber of said casing with the front chamber of said cylinder, whereby said cylinder is movable along with the first-mentioned piston, said closure member forming a peripheral sealing engagement with the interior of the casing, another closure member firmly connected with the rear end of said cylinder and contacting said casing, said other closure member having passages for the flow of the fluid out of and into the rear chamber of said cylinder and said annular chamber, a plate having passages communicating with the passages in said other closure member, said plate being carried by said other closure member and extending through an opening formed in said casing, a valve carried by said plate for providing said flow of the fluid and for interrupting it, said valve comprising an actuating lever, another plate swingably mounted in said support and having a nose adapted to engage said actuating lever for actuating said valve, a pin carried by said valve, a lever swingably mounted upon said support and having an end through which said pin extends, and an arm firmly connected with the last-mentioned lever and adapted to engage the last-mentioned plate for swinging the same.

10. A feed mechanism, particularly for feeding buffing bars to buffing wheels, said mechanism comprising a casing, a supporting plate separating the interior of said casing into a main portion and a front portion in alignment with said main portion, a support carried by said casing, a piston located in said front portion of the casing intermediate its ends to divide the interior of said front portion of the casing into a front chamber and a rear chamber, means supplying compressed air alternately to said chambers for the forward and return movements of said piston, a cylinder within said main portion of the casing, whereby an annular chamber is formed between said cylinder and said main portion of the casing, another piston located in said cylinder intermediate its ends to divide the interior of said cylinder into a front chamber and a rear fluid-containing chamber, a closure member firmly connected with the front end of said cylinder and with the first-mentioned piston and having a passage operatively connecting the front chamber of said casing with the front

chamber of said cylinder, whereby said cylinder is movable along with the first-mentioned piston, said closure member forming a peripheral sealing engagement with the interior of the casing, another closure member firmly connected with the rear end of said cylinder and contacting said casing, said other closure member having passages for the flow of the fluid out of and into the rear chamber of said cylinder, a valve tripping device carried by said support, a plate having passages communicating with the passages in said other closure member, said plate being carried by said other closure member and extending through an opening formed in said casing, a valve carried by said plate for providing said flow of the fluid and for interrupting it, said valve being actuated by said valve tripping device, and a pin carried by said plate having passages formed therein for short-circuiting said valve.

11. A feed mechanism, particularly for feeding buffing bars to buffing wheels, said mechanism comprising a casing having a main portion and a front portion in alignment with said main portion, a supporting plate between the two portions, a piston located in said front portion intermediate its ends to divide the interior of said front portion of the casing into a front chamber and a rear chamber, means supplying compressed air alternately to said chambers for the forward and return movements of said piston, a cylinder within said main portion of the casing, whereby an annular chamber is formed between said cylinder and said casing, a valve carried by said main portion of said casing and including means connecting said annular chamber alternately with the means supplying compressed air and with the atmosphere, another feed piston located in said cylinder intermediate its ends to divide the interior of said cylinder into a front chamber and a rear fluid-containing chamber, a closure member firmly connected with the front end of said cylinder, a piston rod firmly connecting the first-mentioned piston with said closure and extending through said supporting plate, said piston rod having a passage operatively connecting the front chamber of said casing with the front chamber of said cylinder, said closure member forming a peripheral sealing engagement with the interior of the casing, another closure member firmly connected with the rear end of said cylinder and contacting said casing, said other closure member having passages for the flow of the fluid communicating with the rear chamber of the cylinder and said annular chamber, and valve means operable by the movement of the first-mentioned piston for providing a flow of the fluid through said passages and for interrupting said flow.

12. A feed mechanism, particularly for feeding buffing bars to buffing wheels, said mechanism comprising a casing having a main portion and a front portion in alignment with said main portion, a supporting plate between the two portions, a piston located in said front portion intermediate its ends to divide the interior of said front portion of the casing into a front chamber and a rear chamber, a pipe connected with said front portion, another pipe connected with said plate, a source of compressed air, a valve connected with said source of compressed air and said pipes for selectively connecting one pipe with said source and the other pipe with the atmosphere, a cylinder within said main portion of the casing, whereby an annular chamber is formed between said cylinder and said casing, a valve carried by said main portion of said casing and including means connecting said annular chamber alternately with said other pipe and with the atmosphere, another feed piston located in said cylinder intermediate its ends to divide the interior of said cylinder into a front chamber and a rear fluid-containing chamber, a closure member firmly connected with the front end of said cylinder, a piston rod firmly connecting the first-mentioned piston with said closure and extending through said supporting plate, said piston rod having a passage operatively connecting the front chamber of said casing with the front chamber of said cylinder, said

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closure member forming a peripheral sealing engagement with the interior of the casing, another closure member firmly connected with the rear end of said cylinder and contacting said casing, said other closure member having passages for the flow of the fluid communicating with the rear chamber of the cylinder and said annular chamber, and valve means operable by the movement of the first-mentioned piston for providing a flow of the fluid through said passages and for interrupting said flow.

13. A feed mechanism, particularly for feeding buffing bars to buffing wheels, said mechanism comprising a casing, a supporting plate separating the interior of said casing into a main portion and a front portion in alignment with said main portion, a piston located in said front portion of the casing intermediate its ends, compressed air means connected with said piston for reciprocating said piston, a cylinder within said main portion of the casing, another reciprocatory feed piston within said cylinder, means operatively connecting said cylinder with said compressed air means for moving said cylinder when said

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piston is moved by the compressed air means, and hydraulic means connected with said cylinder and actuated by the movement thereof for varying in time and space the movement of the second-mentioned piston in one direction when the first-mentioned piston is moved in the same direction by the compressed air means and preventing the movement of the second-mentioned piston in the opposite direction when the first-mentioned piston is moved in said opposite direction by the compressed air means for gradually advancing the second-mentioned piston relatively to the first-mentioned piston.

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