

March 11, 1930.

J. W. NESBITT
BURNISHING MACHINE
Filed Oct. 22, 1928

1,749,982

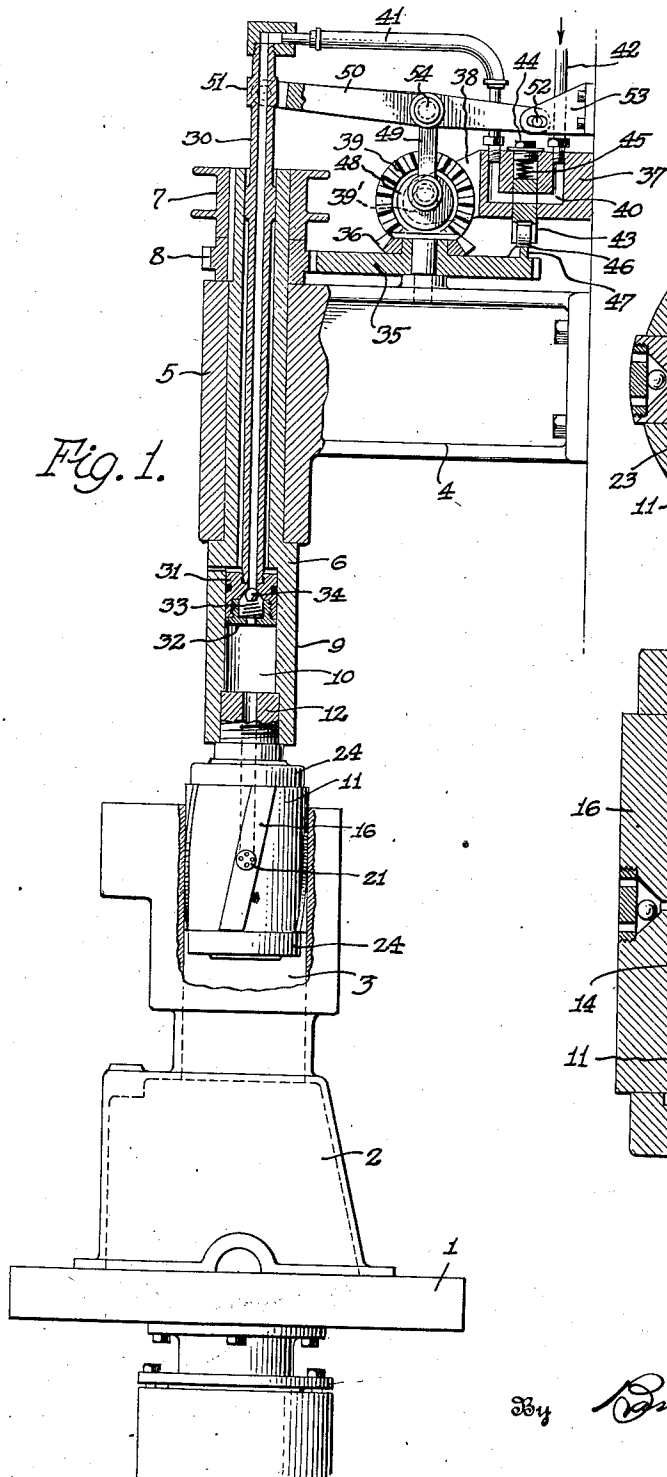


Fig. 1.

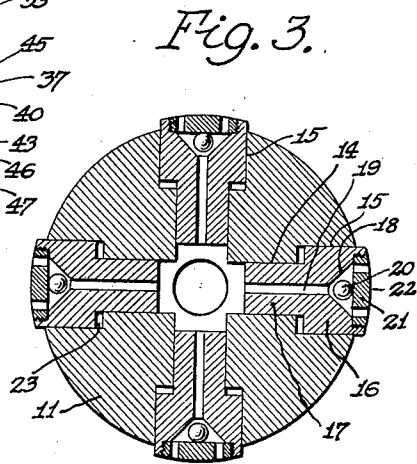


Fig. 3.

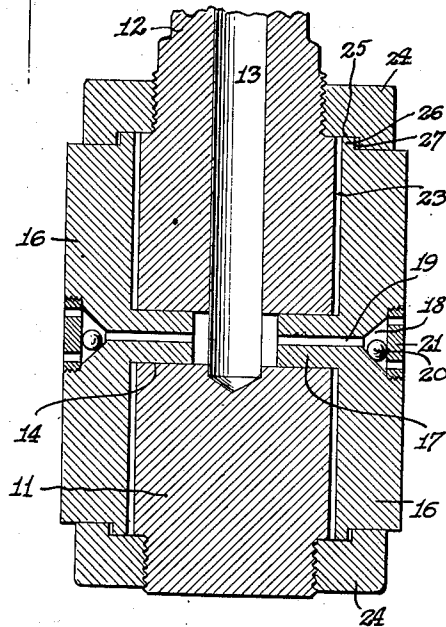


Fig. 2.

Inventor
James W. Nesbitt,

By *Butt & Butt*

Attorneys

UNITED STATES PATENT OFFICE

JAMES W. NESBITT, OF GROSSE POINTE PARK, MICHIGAN

BURNISHING MACHINE

Application filed October 22, 1928. Serial No. 314,108.

The present invention pertains to a novel machine for burnishing cylinder walls and the like, and the principal object is to provide a device of this character wherein lubricating fluid is delivered to the cylinder walls in pulsations of rather high pressure for the purpose of cleaning the walls during the burnishing operation.

The invention is fully disclosed by way of example in the following description and in the accompanying drawings, in which—

Figure 1 is a vertical section of the machine partly in elevation;

Fig. 2 is a transverse section of the burnishing head, and

Fig. 3 is a longitudinal or axial section thereof.

Reference to these views will now be made by use of like characters which are employed to designate corresponding parts throughout.

In Figure 1 is illustrated a suitable adjustable table 1 adapted to support the cylinder block 2 having cylinder bores 3, the walls of which are to be burnished. The burnishing machine is supported principally on a horizontal bracket 4 having a vertical bearing 5 in which is journaled a spindle 6. At the upper end of the spindle is fixed a pulley 7 by which the device is driven, and beneath the pulley is a fixed pinion 8, the purpose of which will subsequently appear.

The lower end of the spindle is somewhat enlarged as at 9 and formed with a cavity 10. Into the lower end of the cavity is threaded the reduced upper end 12 of a substantially cylindrical burnishing head 11 formed with an axial port 13 extending through the end 12 and to substantially the mid point of the longitudinal axis of the head. At the lower or blinded end of the bore 13, the head is formed with radial ports 14 which lead into superficial grooves or sockets 15 formed substantially axially of the head but preferably in a somewhat spiral relation thereto. These grooves receive burnishing laps 16 arranged in the manner shown more clearly in Figure 1, and these laps have stems 17 which enter the ports 14. At the center of each lap is a conical socket 18 from which extends a duct 19 through the stem 17. The socket contains

a ball valve 20 adapted to close the duct 19 in a manner which will presently be described, and the socket is fitted at the surface of the lap with a perforated disk 21. The face of the disk is convex as indicated by the numeral 22 in Figure 3 and merges into the usual convex outer face of the lap 16.

It will be seen in Figures 2 and 3 that the grooves 15 are of such depth as to permit clearance 23 between the base of each groove and the inner surface of the corresponding lap. The laps are retained against slipping away from the head by means of end caps 24 secured to the ends of the head and having each a depression 25 for receiving a shoulder 26 at the corresponding end of the laps. There is also clearance 27 between the shoulders and the outer walls of the recesses as illustrated in Figure 2, whereby in conjunction with the clearance 23, the laps are permitted a limited play radially of the head.

In the spindle 6 is slidably mounted a hollow rod 30 having attached to its lower end a piston 31 disposed in the cavity 10. To the lower face of the piston is applied an apertured cage 32 receiving a spring 33 on which is mounted a ball valve 34 adapted to close the lower end of the rod 30. On the bracket 4 is journaled a gear 35 meshing with the pinion 8 and carrying a bevel gear 36. A body 37 is supported above the bracket 4 and has projecting ears 38 for supporting a rotatable bevel gear 39 meshing with the member 36. The body 37 is formed with a U-shaped channel 40 connected at one end by means of a conduit 41 to the upper end of the hollow rod 30 and receiving at the other end a pipe 42 which supplies lubricating fluid under pressure. Slidably mounted in the channel 42 is a valve member 43 adapted to control flow through the channel. Into the top of the body 37 is fitted a plug 44 for retaining one end of a spring 45, the other end of which bears on the valve and tends to move it downwardly into closed position. The lower and exterior end of the valve carries a roller 46 adapted to ride on a cam 47 formed on the upper surface of the gear 35.

It will be seen in Figure 1 that when the roller is raised to its highest position on the

cam, the valve is open. The stub shaft 39' which carries the bevel gear 39 also carries a disk 48 to which is eccentrically pivoted one end of a link 49. A cross arm 50 supported
 5 above the bevel gear has one end pivoted as at 51 to the upper end of the rod 30 and the other end loosely connected at 52 to a bracket 53. The remaining end of the link 49 is pivotally attached as at 54 to an intermediate
 10 point of the arm 50. The mechanism associated with the arm 50 obviously oscillates the arm around the point 52 as a pivot and reciprocates the rod 30 and piston 31.

In the operation of the device, on the
 15 down stroke of the rod and plunger from the position illustrated in Figure 1, the channel 40 will be obstructed by the valve 43, thereby reducing the resistance which the ball valve 34 must overcome in order to close.

20 With the ball valve closed, the continued downward movement of the piston forces lubricant through the ports 13 and 14 and apertured disks 21 against the walls of the cylinder bore, thereby cleaning the latter simultaneously with the rotation of the burnishing
 25 head by the application of power to the pulley 7. The fluid pressure also acts on the inner ends of the stems 17 and moves the laps 16 into close contact with the cylinder wall.

30 At the commencement of the upstroke of the piston, a suction will be developed in the chamber 10 due to the lifting movement of the piston and also to the obstruction of the channel 40. This suction draws the ball
 35 valves to their seats, thereby closing the ducts 19 whereby the laps 16 are drawn inwardly in a radial direction of the head.

The rotation of the head is very rapid, and it is desired to have the laps in contact with
 40 the cylinder wall only while fluid is delivered thereto under pressure, hence the desirability of withdrawing the laps when the flow of pressure fluid is obstructed. It will be apparent that there is a moderate flow of
 45 fluid between the extreme positions of the valve 43, that is, when the valve is neither fully open nor entirely closed. Fluid supplied under these conditions is sufficient to avoid overheating in the intermediate posi-
 50 tions of the laps 16.

Although a specific embodiment of the invention has been illustrated and described, it will be understood that various alterations in the details of construction may be made
 55 without departing from the scope of the invention as indicated by the appended claims.

What I claim is:

1. In a burnishing machine, a head adapted to enter a cylinder bore, laps carried by said
 60 head, a rotatable spindle supporting said head, means permitting the flow of lubricating fluid under pressure through said spindle into said head and through said laps, and means in said spindle for intermittently in-
 65 creasing the pressure of said fluid.

2. In a burnishing machine, a head adapted to enter a cylinder bore, laps carried by said head, a rotatable spindle supporting said head, a hollow rod slidable in said spindle, means permitting flow of lubricating fluid
 70 under pressure through said rod, head and laps, a piston carried by said rod and slidable in said spindle, and means for reciprocating said rod.

3. In a burnishing machine, a head adapted to enter a cylinder bore, laps carried by said head, a rotatable spindle, supporting said head, a hollow rod slidable in said spindle, means permitting flow of lubricating fluid
 75 under pressure through said rod, head and laps, a piston carried by said rod and slidable in said spindle, and a check valve in said piston positioned to close as said piston approaches said head.
 80

4. In a burnishing machine, a head adapted to enter a cylinder bore, laps carried by said head, a rotatable spindle supporting said head, a hollow rod slidable in said spindle, means permitting flow of lubricating fluid
 85 under pressure through said rod, head and laps, a piston carried by said rod and slidable in said spindle, means for reciprocating said rod, and check valves in said laps adapted to close inwardly towards the center of said head.
 90

5. In a burnishing machine, a head adapted to enter a cylinder bore, laps carried by said head, a rotatable spindle supporting said head, a hollow rod slidable in said spindle, means permitting flow of lubricating fluid
 95 under pressure through said rod, head and laps, a piston carried by said rod and slidable in said spindle, a check valve in said piston positioned to close as said piston approaches said head, and check valves in said laps adapted to close inwardly towards the center of said head.
 100

6. In a burnishing machine, a head adapted to enter a cylinder bore, laps carried by said head, a rotatable spindle supporting said head, a hollow rod slidable in said spindle, a pressure fluid line connected to said rod, means permitting flow of lubricating fluid
 105 under pressure through said rod, head and laps, a piston carried by said rod and slidable in said spindle, means for reciprocating said rod, a valve in said line, and means for intermittently closing said valve, said means being timed to close said valve on insertion of said piston from said head.
 110

7. In a burnishing machine, a head adapted to enter a cylinder bore, laps carried by said head, a rotatable spindle supporting said head, a hollow rod slidable in said spindle, a pressure fluid line connected to said rod, means permitting flow of lubricating fluid
 115 under pressure through said rod, head and laps, a piston carried by said rod and slidable in said spindle, means for reciprocating said rod, a valve in said line, means for inter-
 120

mittently closing said valve, said means being timed to close said valve on insertion of said piston from said head, and a check valve in said piston positioned to close as said piston approaches said head.

5 8. In a burnishing machine, a head adapted to enter a cylinder bore, laps carried by said head, a rotatable spindle supporting said head, a hollow rod slidable in said spindle, 10 a pressure fluid line connected to said rod, means permitting flow of lubricating fluid under pressure through said rod, head and laps, a piston carried by said rod and slidable in said spindle, means for reciprocating said 15 rod, a valve in said line, means for intermittently closing said valve, said means being timed to close said valve on insertion of said piston from said head, and check valves in said laps adapted to close inwardly to- 20 wards the center of said head.

9. In a burnishing machine, a head adapted to enter a cylinder bore, laps carried by said head, a rotatable spindle supporting said head, a hollow rod slidable in said spindle, 25 a pressure fluid line connected to said rod, means permitting flow of lubricating fluid under pressure through said rod, head and laps, a piston carried by said rod and slidable in said spindle, means for reciprocating said 30 rod, a valve in said line, means for intermittently closing said valve, said means being timed to close said valve on insertion of said piston from said head, a check valve in said piston positioned to close as said piston ap- 35 proaches said head, and check valves in said laps adapted to close inwardly towards the center of said head.

10. In a burnishing machine, a head adapted to enter a cylinder bore, laps carried by 40 said head, said laps being mounted to have play radially in said head, a rotatable spindle supporting said head, a hollow rod slidable in said spindle, means permitting flow of lubricating fluid under pressure through said 45 rod, head and laps, a piston carried by said rod and slidable in said spindle, means for reciprocating said rod, and check valves in said laps adapted to close inwardly towards the center of said head.

50 In testimony whereof I affix my signature.
JAMES W. NESBITT.

55

60

65