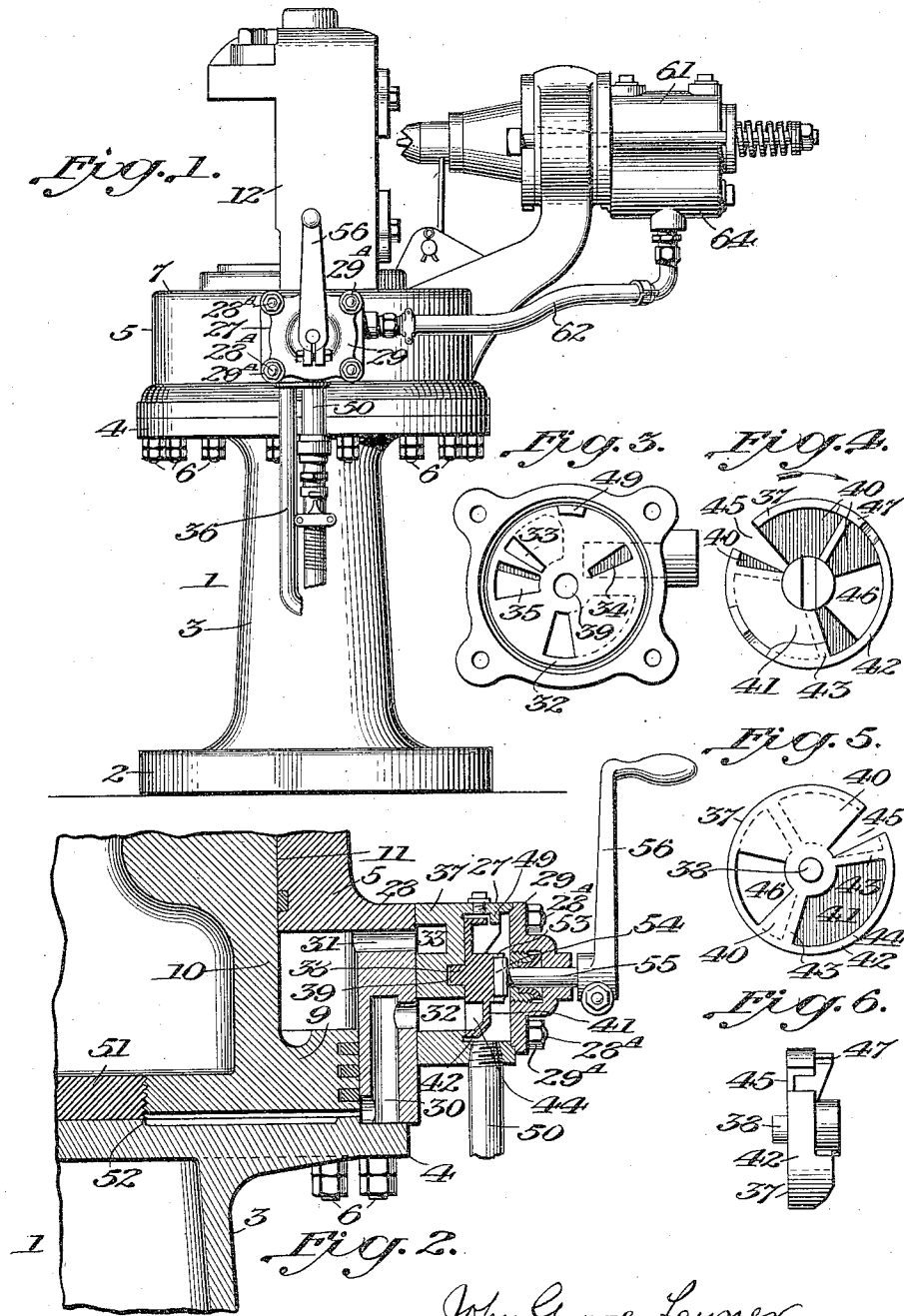


J. G. LEYNER.
 TRIPLE PURPOSE VALVE FOR DRILL BIT SHARPENING MACHINES.
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Patented June 17, 1913.



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UNITED STATES PATENT OFFICE.

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TRIPLE-PURPOSE VALVE FOR DRILL-BIT-SHARPENING MACHINES.

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Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, JOHN GEORGE LEYNER, a citizen of the United States of America, residing at 1707 Glenarm street, Denver, Colorado, have invented a new and useful Triple-Purpose Valve for Drill-Bit-Sharp-
5 ening Machines, of which the following is a specification.

My invention relates to improvements in
10 three purpose valve for drill-bit sharpening and other machines, and the objects of my invention are, first, to provide a drill sharp-
ening machine having a specially arranged three purpose or a three step movement
15 valve and casing that is arranged to control the drill-bit gripping and drill-bit sharpen-
ing and drill-bit releasing movements of the different operative parts of the machine. And second, to provide a three purpose valve
20 for use on any machine that has a three step or purpose operative movement. I attain these objects by the mechanism illustrated in the accompanying drawings, in which:

Figure 1 is a side view of a drill-bit form-
25 ing and sharpening machine, provided with the improved valve mechanism. Fig. 2 is an enlarged vertical sectional view through a portion of the drill clamping cylinder, showing the improved valve and ports controlled thereby. Fig. 3 is a front view of the valve chest, the valve being removed.
30 Fig. 4 is a front view of the improved valve. Fig. 5 is a rear view of the same and Fig. 6 is an edge view thereof.

35 Similar letters of reference refer to similar parts throughout the several views.

My present invention relates to a divi-
sional part of my Patent Number 1,026,872
of May 21, 1912, for improvements in fluid
40 controlled drill steel forming and drill-bit sharpening machines.

My present invention also relates to a
throttle valve for controlling the actuating
fluid that flows to the drill-bit gripping vise
45 and to the dolly driving mechanism and the dolly stopping and the drill-bit releasing mechanism of fluid actuated drill sharpeners.

Referring to the accompanying drawings,
the numeral 1 designates the supporting
50 stand of my fluid or pneumatic controlled drill sharpener. This stand comprises a floor or base portion 2, a hollow vertical

column or standard 3 and a table portion 4, all of which are preferably made of circular form. Upon this supporting stand is placed
55 the drill sharpener and holder, which comprises a cylinder 5, which sits on and is secured to the table top of the stand by any suitable means, but preferably by studs 6, which project from the lower edge of the
60 cylinder through holes in the table, nuts being screwed upon their lower ends. This cylinder is open at its bottom, the table top forming its lower cylinder head, and it is closed at its top end by an integral head 7.
65 This cylinder is provided with an axial bore, and a piston head 9 is reciprocally fitted in the axial bore of the cylinder, which is provided with an axial extension 10, which projects through a circular opening 11 formed
70 in the top head portion of the cylinder.

A vertically extending standard 12 is formed on the top of the cylinder and is adapted to form a supporting frame for the upper stationary drill-bit holding jaw or
75 die, the lower die being secured to the upper end of the piston extension 10 and is adapted to be reciprocally moved to and from the stationary jaw.

The cylinder is provided with a valve
80 chest 27, which is preferably secured to a boss 28 on the cylinder by studs 28^A, which are screwed into the cylinder and extend through holes in the valve chest and a cap
85 29 which closes the front of said chest, nuts 29^A being threaded to the ends of the studs to clamp the cap and also the valve chest to the cylinder. A vertical port 30 is formed
in the boss 28, the upper end of which opens out through the face of the boss, while its
90 lower end communicates with the cylinder 5 below the piston 9. A horizontal port 31 is formed through the upper part of the boss and opens into the upper end of the cylinder 5 above the piston 9. A circular valve re-
95 ceiving chamber is formed in the outer end of the valve chest, and the rear wall of the chest is formed with ports 32, 33, 34 and 35, the ports 32 and 33 communicating respec-
tively with the ports 30 and 31. The port
100 34 is adapted to be connected through pipe 62 with the valve chest 64 of the hammer piston cylinder 61 of a dolly-driving engine, while the port 35 is an exhaust port and

opens out through the under side of the valve chest. An exhaust pipe 36 of suitable length is preferably screwed into this port.

Within the valve chest is rotatably mounted a circular valve 37, of the form shown in Figs. 4, 5, and 6, and comprising a central hub, from the inner end of which projects a short spindle 38, which is adapted to enter a bearing recess 39 in the rear wall of the chest, and segmental plate or wing members 40 and 41, which extend from opposite sides of the hub and on different planes. The wing 40 extends from the inner end of the hub and is adapted to rest against the rear wall of the chest, while the wing 41 extends from about midway of the length of the hub. An annular rim or band 42 extends around the wings in such a manner as to project from the outer face of the wing 40 and from the inner face of the wing 41, and the extremities of the wings 40 and 41 are integrally connected by radial ribs 43, and these ribs, with the wing 41 and band 42, form a pocket or port 44, as clearly shown by Fig. 5. The wing 40 is formed with a radial port 45, which extends through the rim 42 and with a similar but wider port 46, which extends from the hub to the rim, as shown in Figs. 4 and 5.

Projections 47 and 48 extend outward from the rim 42, and these projections are adapted to engage the opposite sides of a stop 49, which depends from the upper portion of the valve chamber into the path of said projections. When the machine is not in operation the valve stands in the position shown in Figs. 2 and 4 and the projection 47 engages the stop 49. When the valve is rotated to open the ports 32 and 34 its movement is defined by the engagement of the projection 48 with the stop 49.

An air inlet aperture is formed in the lower side of the valve chest, which receives a pipe 50 which connects with a supply of air under pressure. When the valve 37 is in the position shown in Figs. 2 and 4 its port 45 registers with the port 33 of the chest which communicates with the port 31, which opens into the cylinder 5 above the piston 9, and the said piston is thus held down by the pressure of air above the same, the port 32 being closed. As the valve is rotated in the direction of the arrow (Fig. 4) the port 33 is first closed by the wing 40 and then uncovered so as to communicate through the valve port or pocket 44 with the exhaust port 35, and thereby permit the air above the piston 9 to escape. Immediately thereafter the port 32 is uncovered as the opposite end of the wing 40 passes beyond it, and air passes through the valve port 46 and ports 32 and 30 to the under side of the piston 9, which is thereby lifted, and as the valve reaches the limit of its movement its port 45 registers with the chest port 34 and

air is admitted to the valve chest 64 of the hammer piston cylinder 61. As the valve is rotated in the reverse direction, the port 34 is closed and then the opposite end of the wing 40 closes the port 32 to entrance of air and as the end of the said wing passes the port 32 the valve port or pocket 44 permits the air beneath the piston 9 to pass through the port 32 and out through the exhaust port 35 to the atmosphere, and when the valve reaches the limit of this reverse movement or when the projection 47 engages the stop 49 the valve port 45 again registers with the chest port 33 and air is admitted above the piston 9, which is thereby forced down.

It will be noted that the piston 9 has an axial plug 51, which projects slightly below the bottom of the piston, and this plug when the piston is down rests upon an axial boss 52, which projects slightly above the table. A space is thus provided between the piston and the table which permits the air to pass beneath the piston, as will be seen by reference to Fig. 2.

The outer face of the valve hub is formed with a groove or recess 53, which is adapted to receive a key 54 on the end of a stem 55, which projects out through an axial hub in the cap 29, and receives an operating crank handle 56.

The operation of my improved three stage movement valve is as follows: When the manually operating handle is turned vertically upward as shown in Fig. 1, the valve is against its stop lugs and any actuating fluid that flows into the valve casing through the supply pipe 50, flows through its ports 45 and 33 into the top side of the vise cylinder through the port 31, and holds the vise piston down and the vise jaws apart and in inoperative relation. The first operation movement of the three step movements of the valve is to cause the vise to grip a drill-bit. This is effected by turning the valve handle far enough to cause the valve 37 first to close the port 33 to the entrance of the actuating fluid to the top of the vise operating piston, and instantly afterward to open the port 33 to the atmosphere through the port 44 of the valve and the exhaust port 35, thus releasing the top of the vise operating piston of pressure. This movement of the valve also instantly after the exhaust is opened to the port 33, causes the port 46 in the valve to register over the port 32, which admits the actuating fluid to the under side of the vise piston 9, and the piston is raised quickly in its cylinder and lifts the lower vise up against the drill-bit and holds it there with a clamping and gripping pressure of such great force that it is held rigidly between the jaws of the vise; the valve handle and valve are then turned until the projection 48 on the valve engages the

stop 49, when the valve port 45 registers with the port 34, thus admitting air to the valve chest 64, but while the valve is making this second step movement the port 46 of the valve is still wide open to the port 32, as it is made of area enough to remain open through this second step movement. Consequently the actuating fluid flows constantly into the port 32, under the vise piston and continuously holds and maintains the grip of the jaw against the drill-bit, while the instant the port 34 is open, the actuating fluid flows to and into the hammer piston cylinder and reciprocates it and drives the dolly into the adjacent heated end of the drill-bit until it is formed as desired. The third step movement of the valve is a quick backward movement until the lug 47 of the valve strikes the stop 49, which instantly closes the port 34, and stops the engine and dolly and opens the port 32 to the exhaust 35, and also instantly afterward opens the port 33 to the port 31 of the boss 28 and the port 45 of the valve proper, causing the vise to instantly and quickly move downward and release the sharpened drill-bit. Consequently it can be seen that my improved valve has three distinct and different function controlling movements that are necessary to properly grip, sharpen and release drill-bits in my improved fluid actuated drill-bit sharpening machine.

While I have illustrated and described the preferred construction and arrangement of my improved three stage valve, I do not wish to be limited to the arrangement shown, as many changes might be made without departing from the spirit of my invention.

Having described my invention, what I claim as new and desire to secure by Letters Patent is:

1. In a valve-mechanism for drill-sharpening machines; a valve-casing provided with a side-passage, a wall having rearwardly extending passages, and a forward valve-chamber; a rotatable disk-shaped valve in said valve-chamber, having diametrically opposite cut-out portions, and intermediate, radial, oppositely-faced pockets, forming passages for conveying fluid to and

from the passages of said valve-casing; and means for rotating said valve.

2. In a valve-mechanism for drill-sharpening machines; a valve-casing provided with a side-passage, a wall having rearwardly extending passages, and a forward valve-chamber; an inwardly extending lug integral with said casing; a rotatable disk-shaped valve in said valve-chamber, having diametrically opposite cut-out portions, and intermediate, radial, oppositely-faced pockets, forming passages for conveying fluid to and from the passages of said valve-casing; a stop-lug integral with said valve and arranged to engage the inwardly extending lug of the casing; and means for rotating said valve.

3. In a valve-mechanism for drill-sharpening machines; a valve-casing provided with a side-passage, a wall having rearwardly extending passages, and a forward valve-chamber; a rotatable disk-shaped valve in said valve-chamber having a rim-portion, a sector-shaped cut-out portion extending through said rim, and a diametrically opposite sector-shaped cut-out portion within said rim, and intermediate, radial, oppositely-faced pockets, forming passages for conveying fluid to and from the passages of said valve-casing; and means for rotating said valve.

4. In a valve-mechanism for drill-sharpening machines, a circular valve-casing provided with fluid-passages and a forward valve-chamber; a rotatable disk-shaped valve in said valve-chamber having a rim-portion, two sector-shaped cut-out portions, one extending through said rim, and the other lying within said rim, and oppositely-faced pockets intermediate said cut-out portions, forming passages for conveying fluid to and from the passages of said casing; and means for rotating said valve.

In testimony whereof I affix my signature in presence of two witnesses.

JOHN GEORGE LEYNER.

Witnesses:

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