

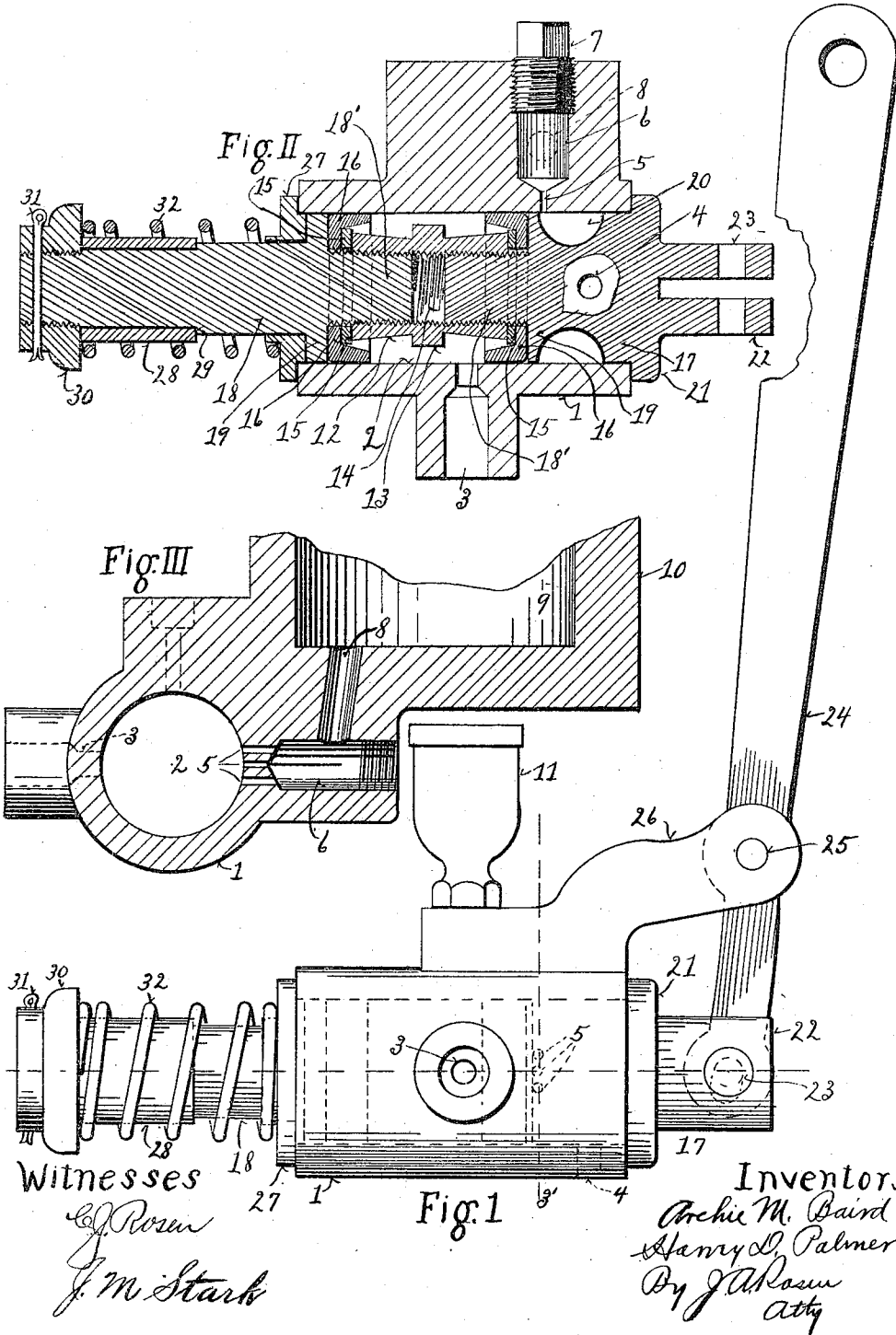
A. M. BAIRD & H. D. PALMER.
VALVE.

APPLICATION FILED JAN. 25, 1915.

Patented Jan. 2, 1917.

2 SHEETS—SHEET 1.

1,211,040.



A. M. BAIRD & H. D. PALMER.

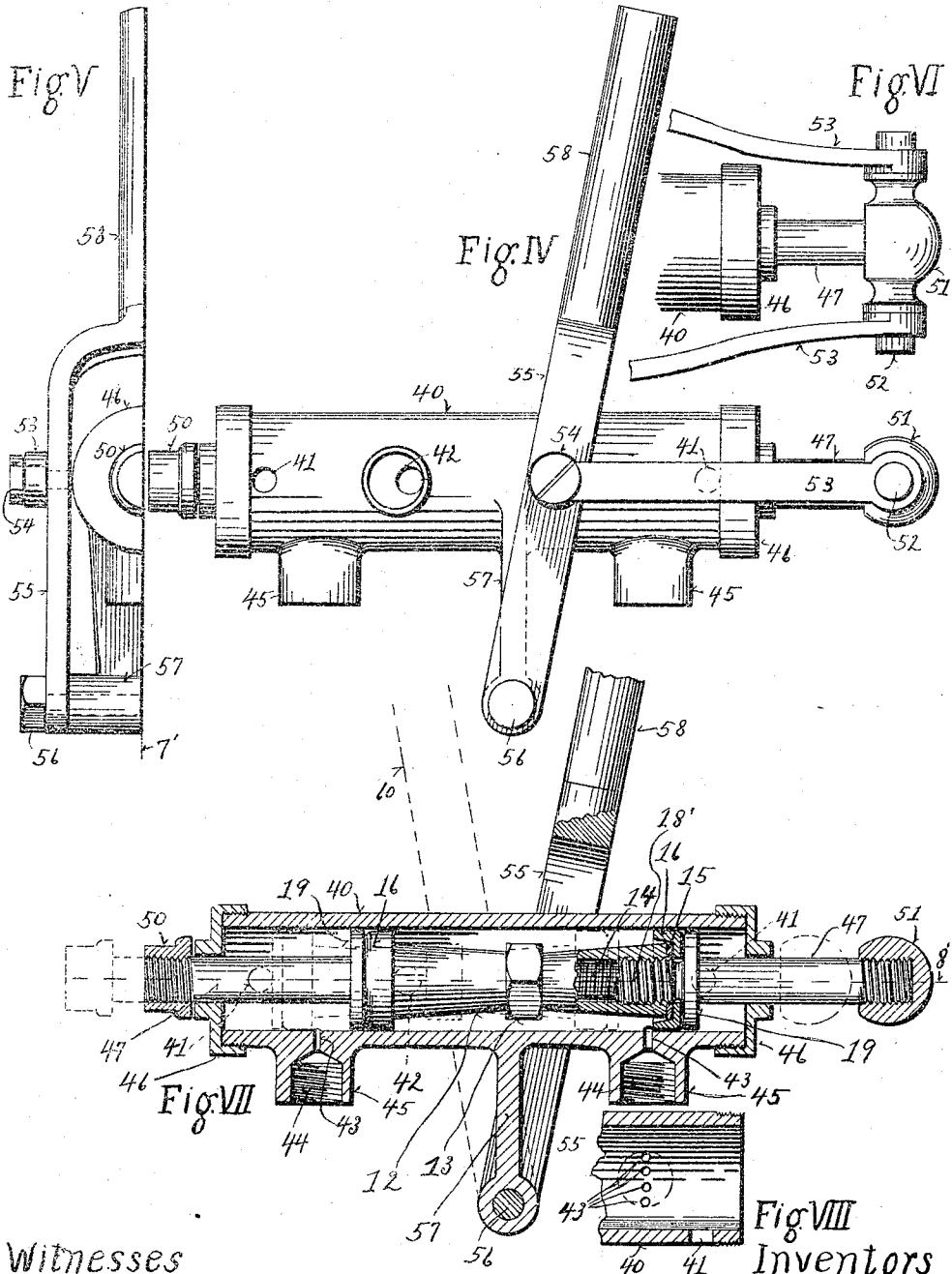
VALVE.

APPLICATION FILED JAN. 25, 1915.

Patented Jan. 2, 1917.

2 SHEETS—SHEET 2.

1,211,040.



Witnesses

E. J. Rosen
J. M. Stark

Fig. VIII

Inventors

Archie M. Baird
Stanley D. Palmer
By *J. A. Rosen*
Att'y

UNITED STATES PATENT OFFICE.

ARCHIE M. BAIRD AND HARVEY D. PALMER, OF TOPEKA, KANSAS; SAID BAIRD
ASSIGNOR TO BAIRD PNEUMATIC TOOL COMPANY, INCORPORATED, OF TOPEKA,
KANSAS, A CORPORATION OF KANSAS.

VALVE.

1,211,040.

Specification of Letters Patent.

Patented Jan. 2, 1917.

Application filed January 25, 1915. Serial No. 4,121.

To all whom it may concern:

Be it known that we, ARCHIE M. BAIRD and HARVEY D. PALMER, citizens of the United States, residing at Topeka, in the county of Shawnee and State of Kansas, have invented certain new and useful Improvements in Valves, of which the following is a specification.

It is the object of our invention to produce a simple, durable, and efficient non-leaking valve suitable especially for the control of compressed air; also to produce a non-leaking balanced valve of this nature; also to provide for its simple construction in such manner that the parts may be easily assembled and taken apart; also to provide the parts, improvements, and combinations hereinafter set forth.

In the drawings accompanying and forming part of this specification and in the description of the drawings we have shown our invention in its preferred forms and what we deem to be the best modes of applying the principles thereof; but, within the scope of the appended claims, we contemplate changes in form, proportions, and materials, the transposition of parts, and the substitution of equivalent members, without departing from the spirit of our invention.

Figure I is a side elevation of a valve made in accordance with the principles of our invention. Fig. II is a sectional plan view. Fig. III is a transverse section of the casing. Fig. IV is a side elevation of a modified form of the valve. Fig. V is an end elevation of one-half of same. Fig. VI is a plan view of the right-hand end of Fig. IV. Fig. VII is a vertical central sectional elevation. Fig. VIII is a sectional plan of one end of the valve casing.

Similar reference characters indicate similar parts throughout the several views.

Referring first to Figs. I, II, and III: 1 is the valve casing and is formed with a cylindrical valve chamber 2, a centrally disposed inlet port 3, an exhaust port 4, and a series of peripherally aligned small ports 5 which lead through the casing wall to a larger opening or passage 6 and then communicate through the passage 8 with the main working piston chamber 9 of the working cylinder 10 of which the valve casing

forms preferably an integral part. 11 is an oil cup communicating with the valve chamber.

The valve proper is a reciprocating valve and is made up as follows: The elongated nut 12 is formed at its middle part with an angular shoulder 13, and its axial opening is screw-threaded, as shown at 14.

15, 15 are washers, and 16, 16 are leather packing cups placed to face each other and fitting snugly within the valve chamber. The two stems 17 and 18 are formed similarly to each other for the purpose of engaging the central nut and holding the washers and packing cups. Each is formed with a screw-threaded extension 18' adapted to engage in the nut, and with a collar 19; and a washer and packing cup is placed at each end of the nut and held firmly there by being clamped between the nut end and the adjacent collar 19. The stem 17 is formed with an annular passage or groove 20 which affords communication between the working ports 5 and the exhaust port 4 when the air is exhausted from the working cylinder; also it is formed with a stop collar 21 adapted to strike against the adjacent end of the valve casing to limit the travel of the valve; also it is formed with arms 22, between which, at 23, is pivoted one end of the operating lever 24, which is fulcrumed at 25 to a bracket 26 extending from and formed integrally with the valve casing. The other stem, 18, is reduced at its outer end and formed with a shoulder 29 against which abuts the sleeve 28 which is of larger outside diameter than the main portion of the stem, and the sleeve is held in place by means of the nut 30, which is held from unscrewing by the cotter pin 31.

27 is a cap fitting over the end of the valve casing. 32 is a compression spring surrounding the stem 18 and sleeve 28 and bearing between the cap 27 and the nut 30. The travel to the right of the valve is limited by the sleeve 28 striking against the cap 27.

The inlet port 3 communicates at all times with the valve chamber between the two packing cups; and the air pressure against the flanges of the cups keeps them perfectly air tight. In one position of the valve shown in the drawings) the working ports

communicate with the exhaust. The spring holds the valve in that position and returns it to that position whenever relieved from contrary action of the lever. The lever may be worked directly by hand or it may be operated by means of a cord as described in our Application, Serial No. 827,950, filed March 28, 1914, for a pneumatic trip, of which application this present application is filed as a division. By operating the lever by pulling the handle to the left, the valve will be shifted to the right so as to bring the right-hand packing cup to the right of the working ports 5, thereby cutting off communication with the exhaust and opening communication from the inlet port to the working ports through the valve chamber between the packing cups. On releasing the lever, the spring returns the valve to its normal position.

The purpose in having the working ports 5 arranged in a plane at right angles to the axis of the valve is to have a passage of sufficiently large area for the purpose in hand, which can be opened by relatively short travel of the valve, and which are yet so small that the leather of the packing cup flange will not be pressed thereinto and become readily worn out.

It will be noted that the valve itself may be easily taken apart and assembled and that parts may be easily replaced.

The form of the passages 6 and 8 are for convenience in manufacture, the outer end of the passage 6 receiving a plug 7.

Referring to the figures on Sheet 2: The valve here shown follows the general principles of that shown in the first three figures, the main difference being that this valve has two working ports and two exhaust ports and is for the purpose of reversing the application of the fluid pressure from either end of a working cylinder to the other. 40 is the cylindrical valve casing formed with exhaust ports 41 at opposite ends, with an inlet port 42 located near the middle portion, and the working ports 43 near the ends but between the respective exhaust ports and the inlet port. Each working port is really composed of a series of small ports in peripheral alinement (as in Figs. I, II, and III) communicating with the larger opening 44 in the boss 45. On each end of the cylindrical casing is screwed a cap 46. The valve proper is made up similarly to that already described, except that the central nut is longer, and the extensions 47 are similar to each other. On one of the extensions is screwed a stop nut 50, and on the other is screwed a cross-head 51 to the opposite ends 52, 52 of which are pivoted the ends of links 53, 53, the other ends of which are pivoted at 54 to the two legs 55, 55, respectively, of the bifurcated operating lever, which legs are fulcrumed at their lower ends on the bolt

56 in the bracket 57 formed integrally with the valve casing, the other end of the lever being formed as a handle 58. This valve also differs from that first described in that it is operable both ways by hand. The valve chamber between the packing cups is in all positions in communication with the inlet port; in one position, that shown in the full outlines in Fig. VIII, it is also in communication with the right-hand working port 43 and closes that port to the exhaust, while the left-hand working port is open to the exhaust. In the other position, that indicated by the dotted outlines 60, it communicates with the left-hand working port, closes that port to the exhaust, and opens communication between the right-hand working port and its exhaust.

The first-described valve is specially designed for a pneumatic trip, or similar office, where the pressure fluid is normally shut off from the working cylinder and it is only desired that it be admitted thereto momentarily, as by a quick jerk of the operating lever. The other form is designed more particularly for working cylinders operable both ways by the pressure fluid. Each is designed in most substantial form and capable of withstanding much hard usage, each is easy to operate, and each is capable of holding the pressure fluid without leaking.

Having thus described our invention, what we claim as new and desire to secure by Letters Patent is:

1. The combination of a valve casing formed with a cylinder bore and with inlet, exhaust, and working ports; and a valve proper reciprocatingly mounted in said cylinder bore and comprising a central elongated sleeve formed with an axial internally threaded opening and with an angular outside portion, two stems each formed integrally with a collar fitting in said bore and forming guides for the valve and each stem being formed with a screw-threaded extension engaging in opposite ends respectively of said opening, washers on the respective threaded portions of said stems and bearing against opposite ends of said sleeve, and two packing cups on the respective extensions between the respective washers and collars; one of said stems projecting axially out of said cylinder bore and there formed with an integral collar larger than the cylinder bore and adapted to abut the end of the cylinder casing.

2. The combination of a valve casing formed with a cylinder bore and with inlet, exhaust, and working ports; and a valve reciprocatingly mounted in said cylinder bore and comprising a central elongated sleeve formed with an axial internally threaded opening, two stems each formed with a collar and with a threaded end said threaded ends engaging in the opposite ends respec-

tively of said threaded opening and one of said stems extending out of the cylinder bore and formed for connection with an operating lever, two packing cups mounted on the respective threaded ends and clamped between the respective ends of said sleeve and the respective collars, each of said stems being integrally formed with its collar, threaded end, and extension, and an operat-

ing lever pivoted to the casing and connected with said extension. 10

In testimony whereof we have affixed our signatures in presence of two witnesses.

ARCHIE M. BAIRD.

HARVEY D. PALMER.

Witnesses:

C. J. ROSEN,

J. M. STARK.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."