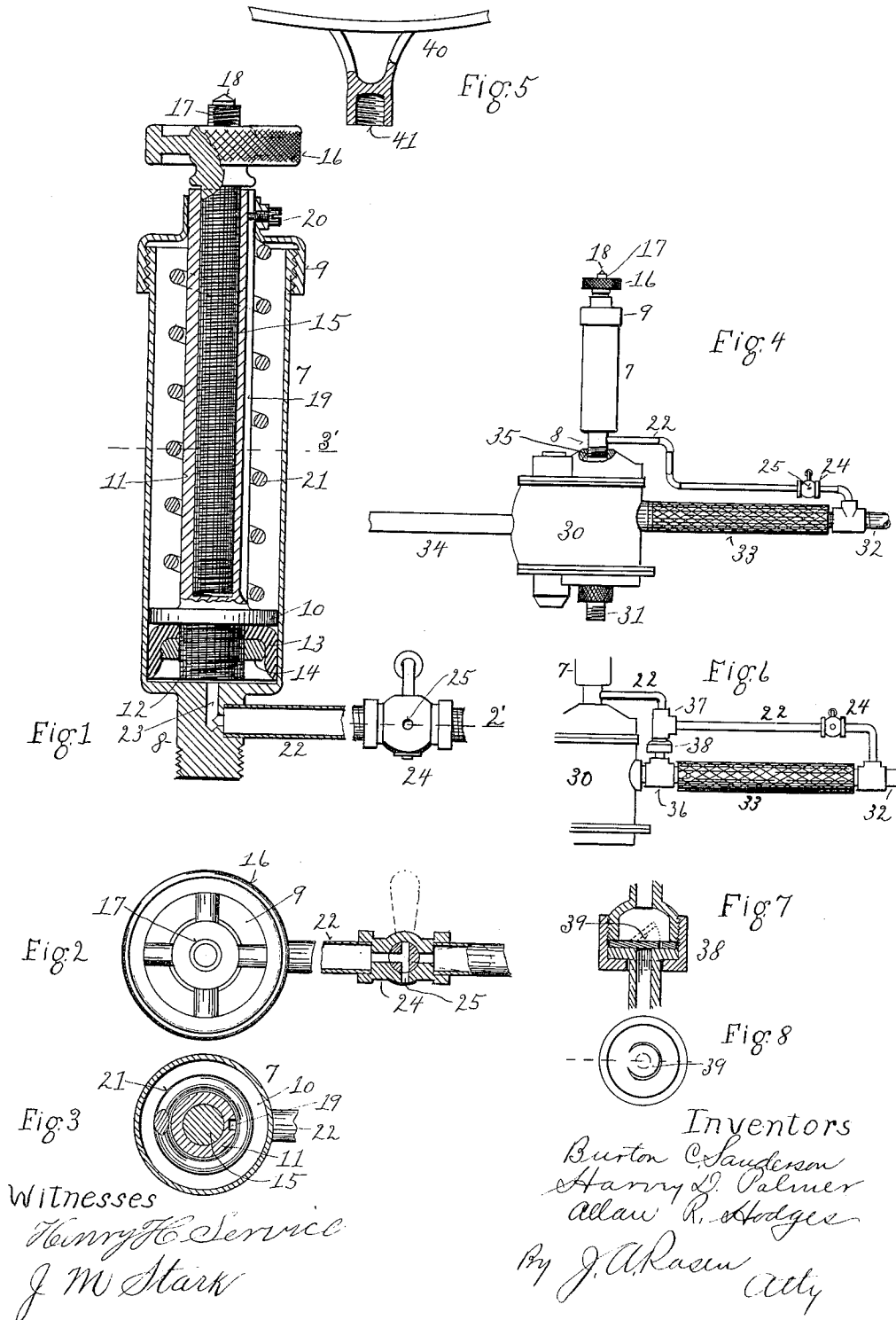


B. C. SANDERSON, H. D. PALMER & A. R. HODGES.
FEEDING DEVICE FOR PNEUMATIC TOOLS.

APPLICATION FILED JULY 6, 1912.

1,046,861.

Patented Dec. 10, 1912.



UNITED STATES PATENT OFFICE.

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KANSAS.

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To all whom it may concern:

Be it known that we, BURTON C. SANDERSON, HARVEY D. PALMER, and ALLAN R. HODGES, 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 Feeding Devices for Pneumatic Tools, of which the following is a specification.

Our invention is an attachment for automatically feeding the tool to its work. While of wide application, it is designed with special reference to portable pneumatic tools, such, for instance, as portable air drills. Its special usefulness is found in drilling sheet metal, such as boiler plates, test holes, etc., where large numbers of holes are to be drilled, and where high-speed drills are used. Its object is to feed the tool to the work uniformly and positively so as to keep the tool at its work under uniform pressure at all times.

A further object is to provide for simplicity in construction of our invention.

A further object is to provide for simple and efficient operation, so that the workman may make great speed in the drilling and as well in moving the tool from place to place to be drilled, in adjusting the tool with respect to the feed, and in manipulating or controlling the feeding device.

We attain these objects by providing the attachment herein described, comprising principally a cylinder, a piston and hollow stem working therein, a rod having screw-threaded engagement with and in the hollow stem, a hand-wheel for the rod, the cylinder having inlet port leading to one side of the piston, a spring for restoring the piston against the movement caused by air under pressure brought in through said passage, and a controlling valve for said passage.

It further consists of 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 form, and what we deem to be the best mode of applying the principles thereof; but it is to be understood that, within the scope of the appended claims, we contemplate changes in form, proportions, and materials, the trans-

position of parts, and the substitution of equivalent members, without departing from the spirit of our invention.

Figure 1 is a sectional elevation of a device made in accordance with the principles of our invention. Fig. 2 is a plan view, the controlling cock being shown in section on line 2' in Fig. 1. Fig. 3 is a section on line 3' in Fig. 1. Fig. 4 is an elevation of a portable pneumatic tool with our invention attached thereto. Fig. 5 is a sectional elevation of a breast plate which is removably attachable to the feeding device whenever its use is desired. Fig. 6 is a view similar to Fig. 4, with parts broken away, showing a method of connecting the supply pipe for the feeding device with the main supply pipe for controlling the feeder by, or independently of, the throttle handle. Fig. 7 is an enlarged vertical sectional elevation of the union and check valve used in that method of connecting. Fig. 8 is a plan view of the lower member of the union with the check valve therein.

Similar reference characters indicate like or corresponding parts throughout the several views.

7 is a cylinder which is closed at the bottom and provided with a screw-threaded stem 8.

9 is a cap fitting on the upper end.

10 is a piston working in the cylinder and 11 is the piston rod or stem projecting out through the cap.

12 is a short screw-threaded nipple extending below the piston. 13 is a leather washer, and 14 is a round nut screwed onto the nipple to hold the washer in place; these parts being for the purpose of packing the piston.

The stem 11 is hollow and internally threaded and takes in a correspondingly externally threaded rod 15, which, projecting from the upper end of the stem, is provided with a hand-wheel 16, a screw-threaded nipple 17, and a bearing point 18. The stem is grooved longitudinally as shown at 19, and the set-screw 20 engages in the groove to prevent the stem from turning with the rod.

21 is a compression spring surrounding the stem within the cylinder and bearing between the cap and the piston, and tending to force the piston to the lower end of the cylinder, which is its normal position.

22 is an air supply pipe screwed into the shank or stem 8 and communicating with the cylinder under the piston through the passage 23.

24 is a three-way cock in the supply pipe capable in one position of affording direct passage therethrough for the air, and in another position of closing the air supply and exhausting the air from the cylinder through the exhaust port 25.

30 (Fig. 4) is an outline of a portable pneumatic tool, such as an air drill. 31 is the spindle for attaching the chuck. 32 is the air supply pipe for the motor, the supply pipe having the throttle 33 which also serves as a handle, 34 being another handle. These tools are usually provided with a means opposite the drill for attaching a feeding device, in this case shown as an internally threaded socket 35, in which the threaded stem or shank 8 may be screwed. The pipe 22 for the attachment is extended about as shown in Fig. 4 adjacent to the throttle handle and connected with the supply pipe, preferably back of the throttle, so as to be independent thereof. The three-way cock is also located adjacent to the throttle handle so as to be conveniently operated.

The operation of our device is as follows: The tool is placed in position with the drill against the work and the bearing point 18 against a brace. In drilling boiler sheets and the like, this brace usually consists of a temporary frame called an "old man". To adjust the machine to the space between the work and the brace, the hand-wheel 16 is turned to extend the rod 15; or, the cock may be turned to admit air through the supply pipe to the cylinder so as to force the piston and connected parts upward or outward until the point bears against the brace. With a long rod, however, it is understood that a wide range of adjustment is possible in this respect. The cock 25 is opened to admit the air through the supply pipe to the cylinder while the drill is running, so that the entire tool is forced to the work by reason of the cylinder being forced lengthwise of the piston and stem while the latter are held stationary against the brace. Preferably, when the tool is adjusted to the work, the air is first turned into the feeder to get proper pressure on the drill, and then the drill is started.

It is a point of special merit that with our feeding device, the drill is being forced into the work every instant, thus doing the work quickly and preventing taking the temper out of the cutting edge by letting the tool run at high speed without cutting. When the hole is drilled, the air is shut off from the motor and then from the feeder, which latter is shown in the drawings, and the spring returns the parts to normal positions.

In Fig. 6 we have shown a modified form of connections with the main supply pipe. A T or other suitable connection is inserted between the throttle handle and casing, as shown at 36, and this is connected with the pipe 22 at 37, the union 38 inserted in this branch having a check valve 39, as shown in Figs. 7 and 8. This arrangement provides for controlling both the motor and the feeder by the throttle when the three-way cock 24 is kept closed. The throttle is always provided with a relief port, by means of which the pressure in the feeder is relieved when the throttle is closed. So that with this arrangement, the starting and stopping of both drill and feeder are controlled simultaneously by the throttle only. The feeder may, however, be controlled independently of the motor by operating the cock 24, as the check valve will prevent the air from going to the motor.

It is to be understood that by means of the rod and hand-wheel the feeding may be done by hand. But we prefer to use the rod and hand-wheel for the purpose already stated, of initially adjusting the machine to the work. The breast-piece 40 (Fig. 5), having the internally screw-threaded socket 41, may be attached to the nipple 17 if it be desired to use the machine as a breast drill. It will thus be understood that our attachment in no way interferes with the ordinary range of usefulness of this class of tools, being capable not only of automatic pneumatic feed, but also of hand feed and of use as a breast drill.

What we claim is:

1. In a device of the kind described, the combination of a cylinder that is closed at one end and provided at its closed end with a shank adapted to be attached to a fluid-pressure tool and having a passage through said closed end, a cap for the other end of the cylinder, a piston working in the cylinder and a hollow stem for the piston extending through the cap and said stem having a longitudinal groove, a set-screw in the cap engaging in said groove, a rod in said hollow stem having screw-threaded engagement therewith and having a threaded nipple and a bearing point at its outer end, a hand-wheel for turning said rod, a compression spring within the cylinder and surrounding said stem and bearing between the cap and the piston, a supply pipe secured to said shank and communicating with the cylinder through said passage, said supply pipe being adapted to be connected with the supply pipe of the tool, and a three-way cock in said first-named supply pipe; substantially as set forth.

2. In a device of the kind described, the combination of a cylinder that is closed at one end and provided at its closed end with a shank adapted to be attached to a fluid-

pressure tool, a cap for the other end of the cylinder, a piston working in the cylinder, a hollow stem for the piston, means for preventing rotary motion of the stem, a rod in
5 said hollow stem and having screw-threaded engagement therewith and projecting from the outer end of said stem, means for turning the rod independently of the stem, a compression spring within the cylinder and
10 surrounding the stem and bearing between the cap and the piston, a supply pipe communicating with the cylinder at the closed end and adapted to be connected with the supply pipe of a fluid-pressure tool, and a
15 three-way cock in said first-named supply pipe.

3. In a device of the kind described, the combination of a cylinder adapted to be attached at one of its ends to a fluid-pressure
20 tool, a piston in the cylinder, a hollow stem for the piston, an adjusting rod in and having screw-threaded engagement with said stem, a compression spring within the cylinder and surrounding the stem and bearing
25 between the piston and one end of the cylinder, a supply pipe communicating with the interior of the cylinder on the side of the piston opposite the spring and adapted to be connected with the supply pipe of the
30 tool, and a three-way cock in the first-named supply pipe.

4. In a device of the kind described, the

combination of a cylinder adapted to be attached at one of its ends to a fluid-pressure tool, a piston in the cylinder, a stem for the
31 piston, an adjusting rod having screw-threaded engagement with the stem, a compression spring bearing between the piston and the cylinder for forcing the piston in
one direction, a supply pipe communicating
40 with the interior of the cylinder to admit fluid under pressure to force the piston in the opposite direction, and a three-way cock in said supply pipe.

5. In a device of the kind described, the
45 combination of a cylinder, a piston therein, a stem for the piston projecting from the cylinder, means for admitting fluid under pressure into the cylinder to force the piston in one direction and means for forcing the
50 piston in the opposite direction; said device being formed with a bearing at one end and being formed at its other end so as to be capable of attachment to the casing of a pneumatic tool.
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In testimony whereof we have affixed our signatures in presence of two witnesses.

BURTON C. SANDERSON.
HARVEY D. PALMER.
ALLAN R. HODGES.

Witnesses:

HENRY H. SERVICE,
J. M. STARK.