Sept. 9, 1941. H. B. SPINK 2,255,395

PNEUMATIC FILING DEVICE

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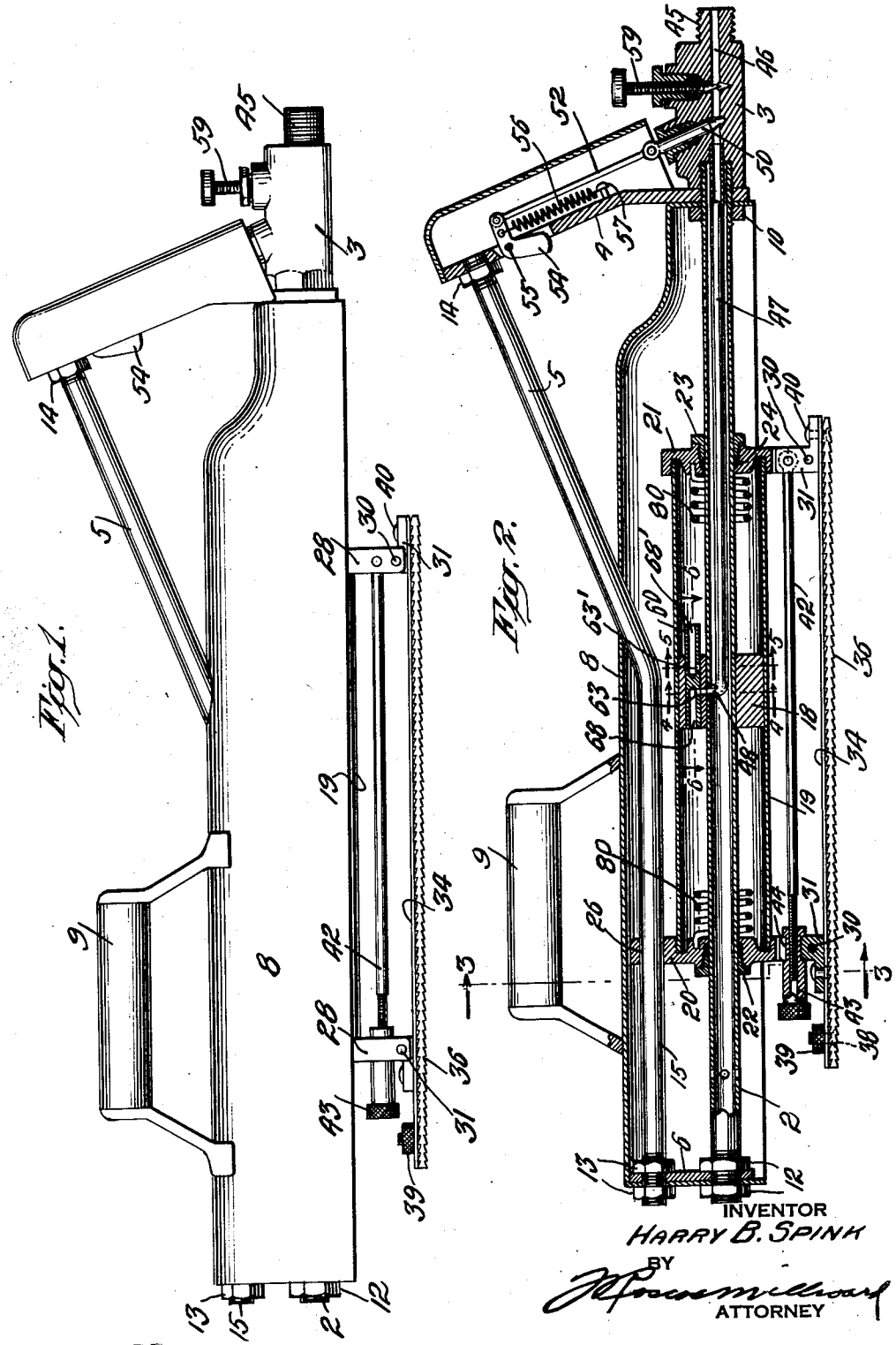


Fig. 1.

Fig. 2.

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Fig. 3.

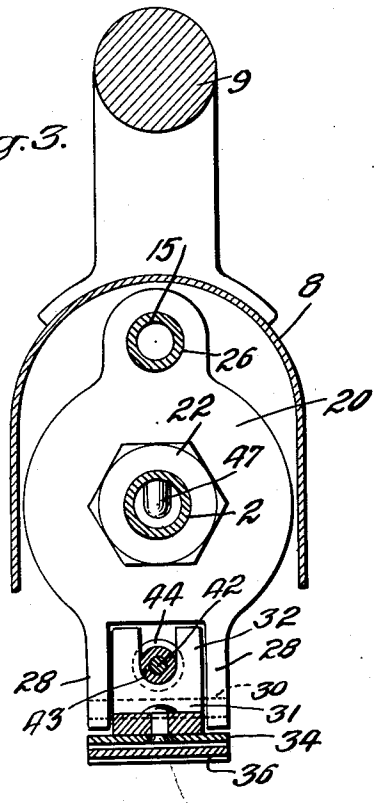


Fig. 4.

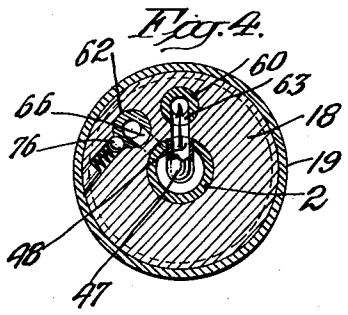


Fig. 5.

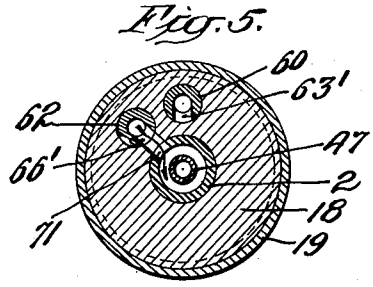


Fig. 7.

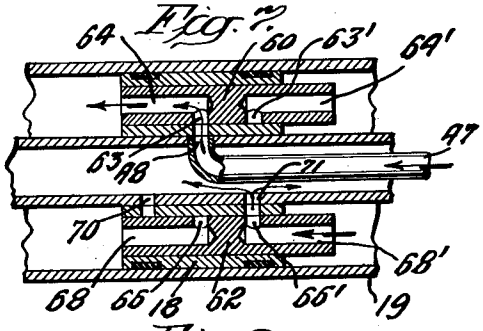


Fig. 6.

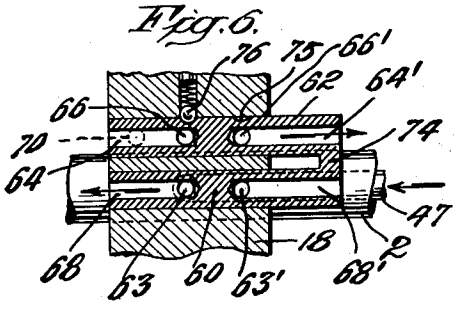
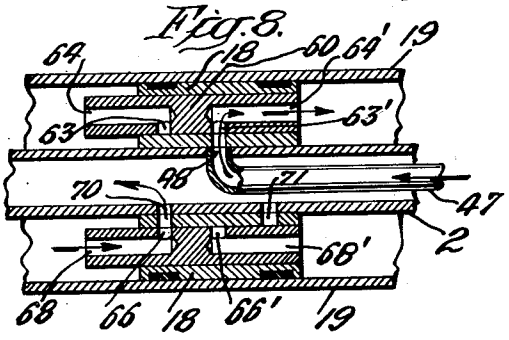


Fig. 8.



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PNEUMATIC FILING DEVICE

Harry Burdette Spink, West Palm Beach, Fla.

Application January 24, 1940, Serial No. 315,343

4 Claims. (Cl. 121—3)

This invention relates to improvements in portable power tools for metal trimming and like use and consists of an improved pneumatically operated device particularly adapted for reciprocating an abrasive or cutting tool such as a rasp or file so as to facilitate the operation of metal trimming or finishing.

A particular object of the present invention is to provide a portable tool of light weight, good balance and conveniently operable design which will be well suited for manual direction or manipulation and control and wherein the power reciprocation of the working tool will materially expedite the operation thereby resulting in increased efficiency and labor economy, particularly in operations such as automobile body work, fender trimming and like operations wherein shifting of the operating position is a factor.

To this end I have designed a pneumatically actuated tool reciprocating device employing an axial bearing member supporting a stationary piston upon which is slidably mounted a movable cylinder carrying a suitable tool holder and having automatically actuated valve means to effect the reciprocation of the cylinder and tool carried thereby; the assembly including a desirable arrangement of manual support and valve control features contributing materially to the facility of operation and improved balance of the tool. In addition, there is provided supplemental valve means for controlling the maximum power fluid or air intake to the device to govern the maximum speed of operation.

The described and other features and advantages of the present invention will be more fully understood by reference to the accompanying drawings wherein like reference characters are applied to the corresponding parts in the several views.

In the drawings:

Fig. 1 is a view of my improved device taken in side elevation.

Fig. 2 is a vertical, sectional view thereof taken centrally and longitudinally thereof.

Fig. 3 is a vertical, cross-section taken on line 3—3 of Fig. 2.

Fig. 4 is a detail, cross-section of the piston and valve structure taken on line 4—4 of Fig. 2.

Fig. 5 is a similar view taken on line 5—5 of Fig. 2.

Fig. 6 is a detail, longitudinal, sectional view of the same taken on line 6—6 of Fig. 2.

Figs. 7 and 8 are diagrammatic, sectional views of the valve and piston port arrangement showing the valves respectively in reversed position and indicating with arrows the intake and exhaust of the operating fluid.

In the approved embodiment of the features of my invention as here shown, the device comprises a rigid or stationary assembly of supporting parts including an elongated bearing tube 2 to which is attached at one end a valve member 3 and handle bracket 4, the upper end of the latter being connected by bearing rod 5 to a forward bracket 6 connected to the opposite or forward end of the bearing tube 2. Also rigidly connected therewith there is a protective casing member 8 having a forward hand grip 9 on its upper, forward portion. The valve member is threaded to receive the forward threaded portion of the tube 2. The bracket 4 and casing 8 are fitted over the tube and clamped against the member 3 by nut 10. At the opposite end the bracket 6 and the casing are fitted over the tube 2 and rod 5 and clamped by the nuts 12—13 and the rod 5 at its rearward end is secured by threading to bracket 4 secured by lock nut 14. The rod 5, as shown, is of angular form, having a forward bearing guide portion 15 in parallel relation to the tube 2.

Upon the bearing tube 2 there is fixedly supported a stationary piston member 18 which is enclosed within a movable cylinder 19 closely fitted thereto with the usual interposed piston rings and supported at its ends by end wall bearing members 20—21 or glands fitted to be slidable upon the tube 2. The members 20—21 as shown are provided with threaded bearing collars 22—23 and suitable packing 24. The forward cylinder end wall member 20 is upwardly extended and formed with a bearing aperture 26 slidable upon the rod portion 15. The members 20 and 21 are formed with spaced downward extensions 28 apertured to support pins 30 passed through angularly formed tool supports 31 having upper forked lug portions 32 and lower flange portions to which is secured a flexible backing plate 34 for a cutting tool, here shown as a file 36, secured at its forward end by clamping screw 38 and nut 39 and at its rearward end by clamping screw 40; the screws 38 and 40 being headed and fitted to countersunk apertures in the file body. The pivotal mounting of the tool supports 31 permits of flexing the files to either convex or concave curvature by means of adjusting parts consisting of a threaded rod 42 pivotally secured to the rearward support 31 and engaged at its forward end by internally threaded adjusting collar 43 rotatably secured to forward member 31 by being formed with an an-

nular groove 44 fitted between the forked lugs of the member 31.

To reciprocate the cylinder and tool under fluid pressure, the valve member 3 is formed with a threaded portion 45 adapted for the attachment thereto of the air line from a suitable compressor and has a longitudinal passage or duct 46 communicating through an intake tube 47 connected at its inner end to an intake port 48 of the piston 18. The admission of the operating fluid is controlled by the retractive needle valve 50 pivotally connected by link 52 to a pivoted trigger control lever 54 supported on pin 55 carried by bracket 4. The valve 50 is normally closed under the influence of spring 56 connected to pin 57 and the trigger arm as shown. A supplemental threaded needle type valve 59 is also provided to adjust the maximum operating pressures as may be desired.

As will be best understood by reference to Figs. 6, 7 and 8, the reciprocal movement of the cylinder under the action of the fluid pressure is effected under the control of valve slides or slide valve members carried by the piston and shifted into reverse operating position in effect by engagement therewith of the cylinder end walls at the end of each stroke. The slide valve members, comprise the intake control valve slide 60 and the exhaust control valve slide 62 which, structurally, are arranged as shown in Figs. 4 and 5, extending longitudinally through the piston by fitting suitable bores therein and are of a length to extend beyond the piston body to either side thereof. The intake slide 60, as best understood by reference to diagrammatic, sectional views of Figs. 7 and 8, is formed with inner ports 63 and 63', each communicating with the cylinder interior at its side of the piston by passages or bores 64—64' and positioned so as alternately to register with the port 48 of tube 47 through a small connecting bore in the piston. Accordingly when shifted axially of the piston the intake valve slide will operate to admit the operating fluid to one and then to the other side of the piston.

In similar manner, the exhaust valve slide 62, is provided with inner ports 66—66' communicating with bores 68—68' opening into the cylinder at opposite sides of the piston. The ports 66—66' are positioned alternately to register with coacting exhaust ports formed in the piston and tube 2; as shown exhaust port 70 cooperating with port 66. The valve slides 60 and 62, as shown, in Fig. 6, are connected to move in unison by being formed integrally with an end connecting wall 74. To yieldingly retain the valve slides in the positions of port registration at the end of the its stroke, the valve member 62 is formed with recesses 75 engaged by spring pressed ball 76 operating within a bore in the piston as shown.

In operation, under the fluid pressure, the cylinder 19 carrying the cutting tool or file will be reciprocated axially on the bearing tube 2 and at the end of its stroke, the end walls of the cylinder, through the intermediary of buffer coil springs 80 secured to the end walls 20—21 and surrounding the tube, by engagement with the valve slide members 60—62 will shift the valve slides to effect reversal of the cylinder stroke. This valve operation will be best understood by reference to Figs. 7 and 8 wherein the respective operating positions of the valve slides is shown. As shown in Fig. 7 and as indicated by arrows, the port registration is such as to admit intake of the operating fluid to the cylinder at the left or forward of the piston to effect movement of the cylinder in that direction while at the same time the exhaust ports communicating with the opposite side of the piston are open or in registration. In Fig. 8 is shown, the oppositely shifted position of the valve slides and reversal of the port registration operative for admission of fluid to the right or rearward side of the piston as indicated. The exhaust as will be understood passes outwardly through the forward open end of the tube 2.

The arrangement of the hand grips, as shown, above and forwardly and rearwardly positioned of the device produces a desirable balance and instinctive alignment for improved operation and accurate guidance by the operator. As will be understood, the trigger valve in the arrangement as shown provides for convenient and responsive control of the air intake contributing to the facility of the trimming or filing operation with my improved device.

Having described my invention, I claim:

1. A fluid operated tool reciprocating device of the character described comprising a longitudinally extending bearing member, forward and rearward brackets on the bearing member upwardly extending therefrom, a bearing rod connecting the upper portions of the brackets and formed with a forward bearing portion parallel to the bearing member and having an upwardly inclined rearward portion connected to the rearward bracket, a piston secured on the bearing member, a cylinder slidably bearing on the bearing member and having an upward extension having slidable engagement with the bearing rod, a tool holder supported by the cylinder member at the underside thereof, means for admitting and exhausting operating fluid at opposite sides of the piston including an intake pipe and a manually controlled valve in the intake pipe.

2. A fluid operated tool reciprocating device of the character described comprising a longitudinally extending bearing member, forward and rearward brackets on the bearing member upwardly extending therefrom, a bearing rod connecting the upper portions of the brackets and having a bearing portion parallel to the bearing member and having an upwardly inclined rearward portion connected to the rearward bracket, a piston secured on the bearing member, a cylinder slidably bearing on the bearing member and having an upward extension fitted for sliding engagement with the bearing rod, a tool holder supported by the cylinder member at the underside thereof, means for admitting and exhausing operating fluid at opposite sides of the piston to reciprocate the cylinder including an intake pipe, a manually controlled valve in the intake pipe, a control trigger therefor pivotally supported on the rearward bracket and a connection therefrom to the manually controlled valve.

3. A fluid operated tool reciprocating device comprising, a longitudinally extending bearing tube, a piston element affixed to the tube and formed with an intake port, a cylinder member enclosing the piston and slidably bearing on the tube, a tool holder carried by the cylinder member to the underside thereof, intake and exhaust valve slides fitted to the piston for controlling the admission and exhaust of operating fluid at opposite sides of the piston, buffer springs fitted to surround the bearing tube within the cylinder end portions, said valve slides being shiftable by engagement

with said buffer springs, yieldable retaining means engaging the valve slides, said piston having intake and exhaust ports for cooperating with the valve slides, an intake pipe connecting with the intake port of the piston and a manually controlled valve in the intake pipe.

4. A fluid operated tool reciprocating device comprising a longitudinally extending bearing tube, a piston element affixed to the tube and formed with an intake port, a cylinder member enclosing the piston and slidably bearing upon the tube, a tool holder carried by the cylinder member, intake and exhaust valve slides fitted to the piston to be movable axial thereof, buffer springs within the cylinder ends positioned to engage the valve slides, yieldable retaining means carried by the piston engaging the valve slides to retain them in their respective positions, said piston having intake and exhaust ports cooperatively related to the valve slides, an intake pipe connecting with the piston intake port, forward and rearward supporting grips for the device positioned above the bearing tube, a control trigger lever pivotally supported with relation to the rearward grip, a control valve in the intake pipe and a connection from the control trigger thereto, substantially as described.

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