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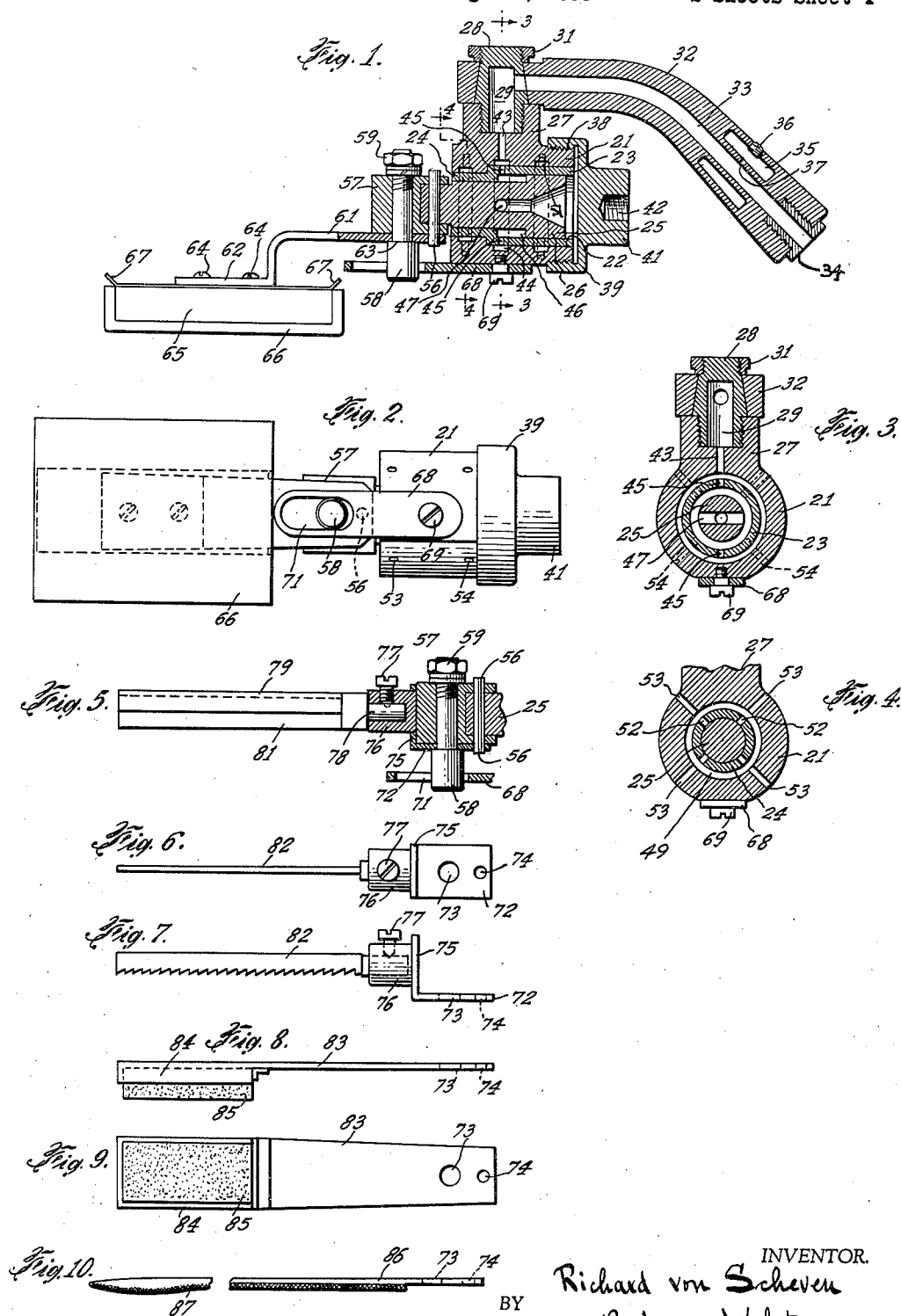
R. VON SCHEVEN

2,197,626

AIR TOOL

Filed Aug. 13, 1938

2 Sheets-Sheet 1



INVENTOR.
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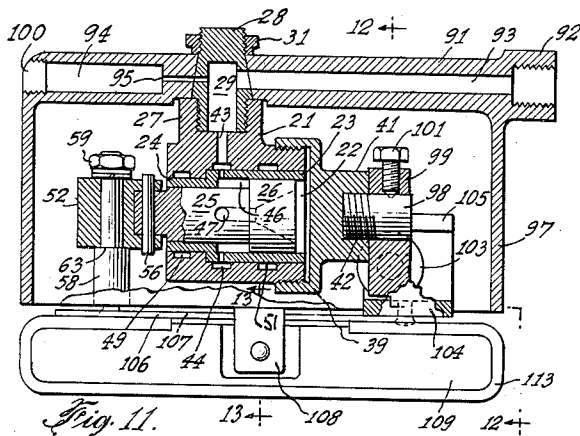
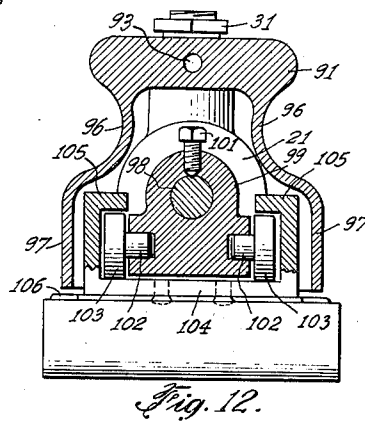
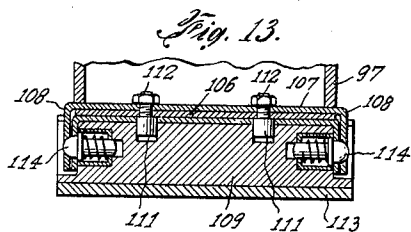
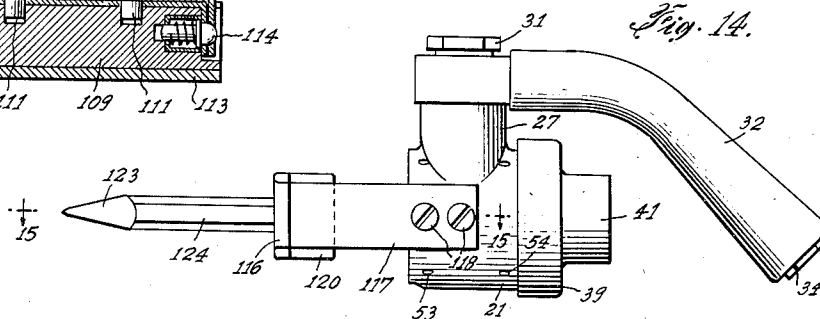
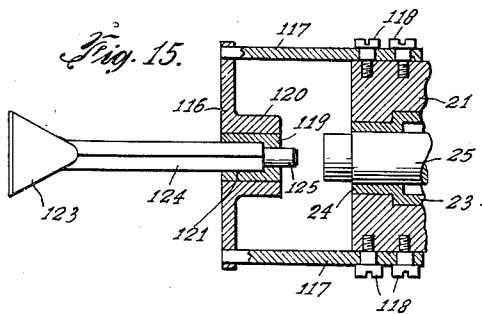
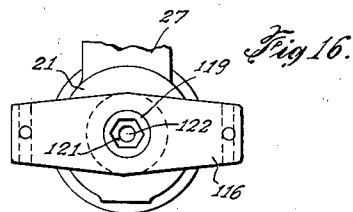
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AIR TOOL

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2 Sheets-Sheet 2



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UNITED STATES PATENT OFFICE

2,197,626

AIR TOOL

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and one-third to William J. Nowak, Port
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Application August 13, 1938, Serial No. 224,741

7 Claims. (Cl. 121—3)

This invention relates to air tools and more especially to such tools in which a single air cylinder mounts a double-action piston.

The objects of the invention, among others are, first to provide a light easily manipulated air tool, second, to provide an air tool which can be manufactured at low cost, third, to provide improved means for supporting the working part on the piston of a double-action single-cylinder air motor, fourth, to provide guide means mounted on the body of the air motor, fifth, to provide a mounting device for the tool which permits quick attaching and detaching of the part or parts adapted to engage the material to be worked, sixth, to provide mounting means which include a pin mounted in the piston of the air motor, and means mounted on the body of the air motor for guiding a tool in a linear path, which may include a wheel and a track, seventh, to provide an oil chamber so disposed that it may readily be filled with oil and having an aperture leading into the air motor so that the motor is at all times subject to lubrication, eighth, the provision of an arrangement of improved air ducts in the air motor to enhance the power and action of the air motor, ninth, to provide an air tool that gives a hammering action on a punch, chisel, or similar tool.

Other objects will appear as the description proceeds.

Reference is made to the drawings, in which:

Figure 1 is a lengthwise section of one form, Figure 2 is a bottom view,

Figure 3 is a section on the line 3—3 of Figure 1,

Figure 4 is a section on the line 4—4 of Figure 1,

Figure 5 is a lengthwise section showing a cylindrical working piece of carborundum,

Figure 6 is a top view of a saw and attaching bracket,

Figure 7 is a side view of Figure 6,

Figure 8 is a side view of an oblong abrasive and holder,

Figure 9 is a bottom view of Figure 8,

Figure 10 is a side view of a rasp,

Figure 11 is a lengthwise section thru a modification,

Figure 12 is a section on the line 12—12 of Figure 11,

Figure 13 is a section on the line 13—13 of Figure 11,

Figure 14 is a side view of a third modification,

Figure 15 is a section on the line 15—15 of Figure 14,

Figure 16 is a left end view of the form shown in Figure 14.

A single cylinder double action air motor of the same design is used throughout the three modifications shown in the drawings. The changes in the different modifications are external to the operating air motor. Referring now to Figs. 1, 2, 3, and 4, inclusive, the air motor includes a cast iron housing 21 which includes a transverse bore 22 in the form of a cylinder with the diameter of the bore larger on the right side. In order to provide a strong durable device, a steel sleeve 23 conforming with the wall of the bore 22 is securely fixed therein. The left end 24 of the sleeve having the smaller diameter is cylindrical in form and mounts for horizontal to and fro sliding motion therein a piston 25 which has an enlarged right end 26 slidably mounted in the larger end of the sleeve 23. On top of the housing 21 is a neck 27 which is internally threaded to receive the external threading of a cap 28 which is hollow to provide an axial air chamber 29. A nut 31 is threaded on the top of the cap 28 and secures the left end of a handle 32, which has a central air duct 33 which leads into the air chamber 29. At the right end of the handle 32 is a connector 34 which is adapted to join an air hose of usual design. In the handle there is provided an annular oil pocket 35 which is accessible on the outside by removing the threaded set screw 36 for filling the chamber with oil. A duct 37 leads into the air conduit 33 providing lubrication for the air motor. On the right circular end of the housing 21 threading 38 is provided for removably mounting an internally threaded cap 39 which has an axial circular projection 41. The central outer face of projection 41 has an internally threaded central bore 42.

Leading from the air chamber 29 is an air port 43 connected with a central annular groove 44 formed on the inner wall of the bore 22 and coinciding with holes 45 formed in the sleeve 23 so that as the air under pressure flows through these holes it enters an annular chamber 46 and presses against the right end 26 to push the piston 25 to the right. A T-shaped duct 47 provided in the piston 25 connects centrally at the right with a recess in the piston that is conical in outline. An annular groove 49 at the left end formed in the wall of the bore 22 and an annular groove 51 formed at the right end in the bore 22 by means of suitable air ports 52 in the sleeve 23 connect the outlets 53 radially disposed in the housing 21

on the left and with outlets 54 at the right. By providing outlets at opposite ends of the stroke, I procure a complete exhaustion of the air and therefore increase the speed and power of my

5 air motor.
On the left end of the piston 25 by means of a vertical pin 56, an end piece extension 57 is securely mounted by means of a recess formed in the right wall of said end piece which fits over the left end of the piston 25. A bolt 58 having a large bottom extends up through the end piece 57 and is secured thereon by means of a nut 59. A flat arm 61 extending to the right of a bracket 62 has two holes centrally formed at the right, 10 one for allowing the passage of the bolt 58 and the other for receiving the lower end of the pin 56. A shoulder 63 formed on top of the enlarged end of the bolt 58 engages the under side of the arm 61 to secure it against the bottom of the end piece 57. Screws 64 secure the bracket 62 to a block 65. On the bottom is a layer of felt 66 and on the top are two oppositely-disposed spring clips 67 which may be lifted up by the finger to insert the ends of sandpaper, which is placed 15 over the felt 66, when desired. An arm 68 is secured transversely on the bottom of the housing 21 by means of a screw 69, and a lengthwise slot 71, the side walls of which engage the bolt 58. In operation the tool is held by the handle 32 and the felt 66 placed in contact with a surface to be polished, and the felt 66 moves at high speed back and forth through a range of $\frac{3}{8}$ " in the air motor shown so that by moving the tool with the hand a large area surface can be quickly polished. 20 It will be noted that this modification is very light and convenient to handle.

Referring now to Fig. 5, a bracket 72 is substituted for the bracket 62 shown in Fig. 1, this bracket also having an aperture for receiving the upper part of the bolt 58 and a second aperture 40 74 for receiving the lower end of the pin 56. A right angled extension 75 from the bracket 72 has an axially bore stub 76 mounted on the outer face. A set screw 77 is so mounted to lock in the bore a supporting pin 78 on the outer extension of which is a supporting casing 79 so formed as to securely hold a cylindrical abrasive 81. Referring now to Figures 6 and 7, a saw 82 may be substituted for the casing 79. Referring to Figures 3 and 9, a bracket 83 provided at the right 50 with the apertures 73 and 74 mounts at the left end a supporting casing 84 in which an oblong abrasive 85 is secured. Referring now to Figure 10, an arm 86 supports a rasp 87 at the left and at the right is provided with apertures 73 and 74.

Referring now to Figures 11, 12 and 13, a cover 91 is substituted for the arm 32 of the modification shown in Figure 1 and at the right has an internally threaded opening for the attachment of an air hose, not shown. An air duct 93 leads to an air chamber 29 similar to that shown in Figure 1. An oil chamber 94 is formed at the left and by a duct 95 conducts oil to the air chamber 29. A threaded cap 100 permits introduction of 65 oil on the outside to the chamber 94. The sides of the cover 91 slightly below the top have lengthwise concave recesses 96 permitting the tool to be grasped by the thumb and fingers of a hand and permitting the palm of the hand to rest on the top of the housing to exert pressure thereon. The cover has also a downwardly-extending wall 97 enclosing all the parts of the air motor and the attaching device. An externally threaded cylindrical stub 98 is fitted in the bore 42 of the 75 projection 41 and supports a casting 99 thereon,

which is detachably fixed by means of an adjusting screw 101 at the top. Opposed horizontal bores 102 in the lower side walls of the casting 99 provide bearings for the axles of two wheels 103 which may be ball bearing type of well known 5 design. A bracket 104 has at the top inwardly projecting flanges 105 which provide locking walls for the wheels 103 at the top, or tracks for the wheels in some positions of the tool. Ordinarily the wheels 103 run back and forth on the flat upper surface of the bracket 104, when the piston is operated by the compressed air. A flat metal plate 106 underlies a second flat metal plate 107 on each side of which is a depending apertured ear 108. A block 109 is held against movement by 15 studs 111, which have shoulders engaging under the plate 106 and locking nuts engaging on top of the plate 107. A felt 113 is detachably mounted with the block 109 by means of spring pressed pins 114 which engage apertures in the ears 108. The 20 construction of the block 109 and the securing device shown in Figure 13, is no part of my invention and will be covered in a separate application by another inventor.

Referring to Figures 14, 15 and 16, a bracket 25 116 has on opposite sides parallel arms 117 extending to the right and secured horizontally on the opposite sides of the housing 21 by means of screws 118. A steel bearing 119 mounting in a central cylindrical boss 120 has an hexagonal bore 30 121 at the left which connects with a smaller cylindrical bore 122 at the right and providing a shoulder which presents the hexagonal arm 124 of a chisel 123 from the moving beyond a predetermined point at the right. The cylindrical 35 end 125 of the arm 124 is chamfered and is so mounted that it receives hammering blows from the piston 25. In the form shown the stroke of the arm 124 is $\frac{3}{4}$ ", the stroke of the piston 25 is $\frac{1}{32}$ ", so that the piston 25 accumulates stored energy through three quarters of this stroke 40 therefore delivering a hard hammer blow on the end of the arm 124. To use the device for punching, or to substitute any other tool, is readily accomplished by mounting such a tool on a similar 45 hexagonal arm 124. It will be understood that the rebound of the tool from the work automatically restores it to the hammer position of the end of the arm 124. This tool is very light in design and efficient in operation. Any suitable retaining 50 device may be used to prevent the tool from leaving the bearing.

It will be noted that the design permits a maximum of interchangeability of parts with reference to an air motor and with reference to various 55 supports, and now that I have disclosed my invention other changes will readily occur to those skilled in the art, parts may be substituted for parts, and parts may be omitted, all within the spirit and scope of the invention. 60

I claim:

1. A double-acting air tool, comprising in combination, a horizontally disposed chamber in the tool, a piston slidably disposed in the chamber and extending at one side of the tool, an extension piece mounted on the end of the piston, a pin passing transversely through said extension piece and through said piston to securely lock said piece on the end of said piston, a vertical hole in said piece, a post in said piece having a 70 round extension below said piece and a shoulder on said round extension for supporting a working device.

2. A double-acting air tool, comprising in combination, a horizontally disposed chamber, a pis- 75

ton slidingly disposed in said chamber and extending at one side of the tool, an extension piece mounted on the end of said piston, having a recess for fitting over the end of the piston, a pin passing through said piece and said piston to securely lock said piece on the end of said piston, a vertical hole in said piece, a bolt in said piece having a round extension below said piece, a shoulder on said round extension for supporting a working portion under said piece, and a nut on the opposite end of said bolt for detachably mounting said bolt on said piece so that different working devices can be quickly attached.

3. A double-acting air tool comprising in combination, a horizontally disposed cylindrical chamber, a cylindrical piston slidingly disposed in said chamber and extending at one side of the tool, means mounted on the extended end of said piston for supporting a working portion thereon, a conduit leading from said cylindrical chamber toward the top of said tool, a hollow-connecting cap having a screw-threaded connection with the top of the tool and said conduit, a handle horizontally disposed, and having a hollow chamber and a transverse aperture by means of which the handle may be fitted over said cap, the hole in the cap connecting with said hollow handle chamber, and a nut for holding said handle on said cap, whereby different handles may be used with the tool.

4. A double-acting air tool, comprising in combination, a horizontally disposed chamber in the tool, a piston slidingly disposed in the chamber and extending at one side of the tool, an extension piece mounted on the end of the piston, a pin passing transversely through said extension piece and through said piston to securely lock said piece on the end of said piston, a vertical hole in said piece, a post in said piece having a round extension below said piece, a shoulder on said round extension for supporting a working portion, and a bracket attached to the bottom of the tool and having a flat slotted arm extending beneath the piston extension piece, a round extension of the post engaging said slot.

5. A double-acting air tool, comprising in combination, a horizontally disposed chamber in the tool, a piston slidingly disposed in the chamber and extending at one side of the tool, an extension piece mounted on the end of the piston, a pin passing transversely through said extension piece and through said piston to securely lock said piece on the end of said piston, a vertical hole in said piece, a post in said piece having a round extension below said piece, a shoulder on said round extension for supporting a working portion, and a pair of wheels mounted on the end of the tool opposite to the piston extension for engaging tracks on a working piece.

6. A double-acting air tool, comprising in combination, a horizontally disposed chamber in the tool, a piston slidingly disposed in the chamber and extending at one side of the tool, an extension piece mounted on the end of the piston, a pin passing transversely through said extension piece and through said piston to securely lock said piece, a shoulder on said round extension for supporting a working portion, and a pair of wheels mounted on the end of the tool opposite to the piston extension, said wheel mounting having a screw-threaded connection with said tool.

7. A double-acting air tool, comprising in combination, a horizontally disposed chamber in the tool, a piston slidingly disposed in the chamber and extending at one side of the tool, an extension piece mounted on the end of the piston, a pin passing transversely through said extension piece and through said piston, to securely lock said piece on the end of said piston, a vertical hole in said piece, a post in said piece having a round extension below said piece, a shoulder on said round extension for supporting a working portion, and a bracket attached to the bottom of the tool and having a flat slotted arm extending beneath the piston extension piece, the round extension of the post engaging said slot, said bracket having a screw-threaded connection with the bottom of said tool.

RICHARD VON SCHEVEN. 45