No. 863,030. PATENTED AUG. 13, 1907.

S. P. JOHNSON.

PORTABLE AIR DRILL.

APPLICATION FILED MAY 11, 1907.

2 SHEETS—SHEET 1.

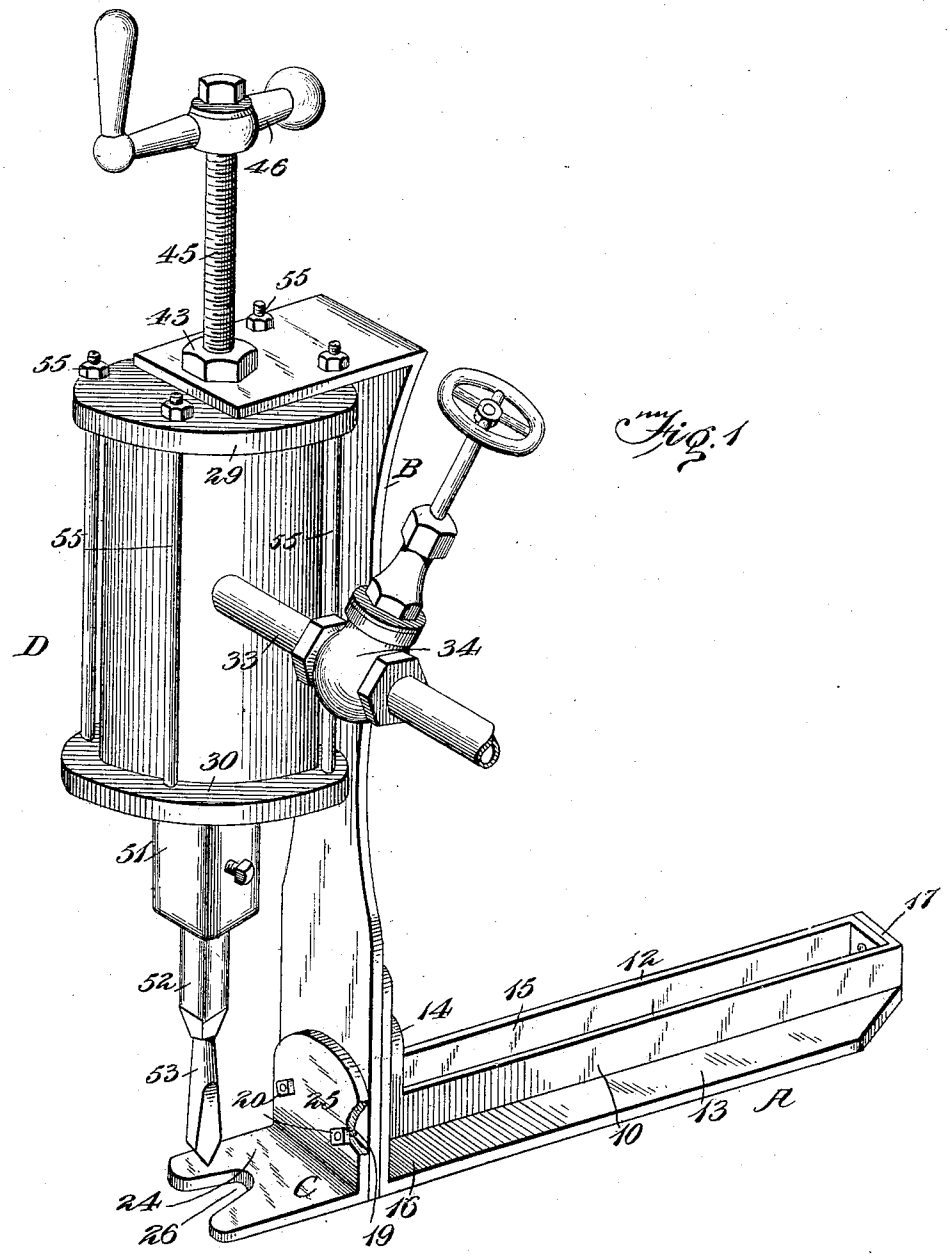


Fig. 1.

Witnesses

M. E. Kelly,

M. L. Hopkins

Inventor

Swan P. Johnson,

By Beeler & Robb

Attorneys

THE NORRIS PETERS CO., WASHINGTON, D. C.

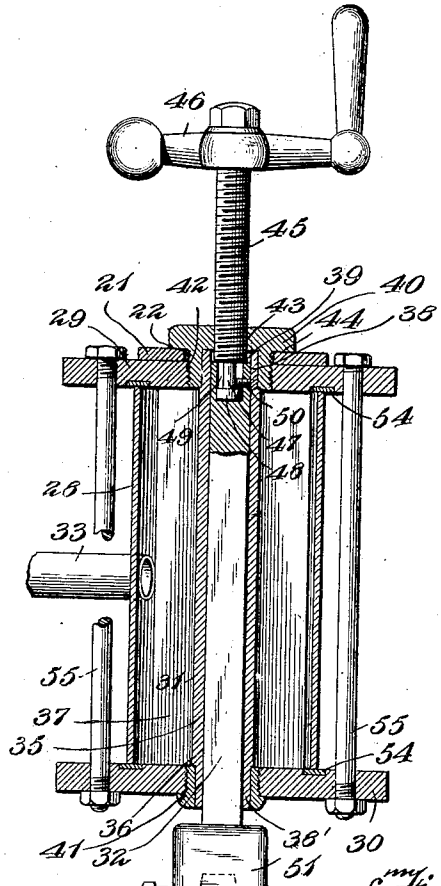
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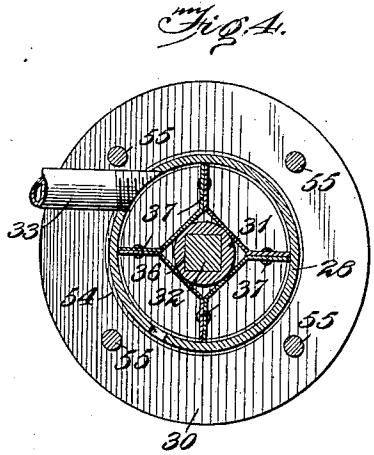
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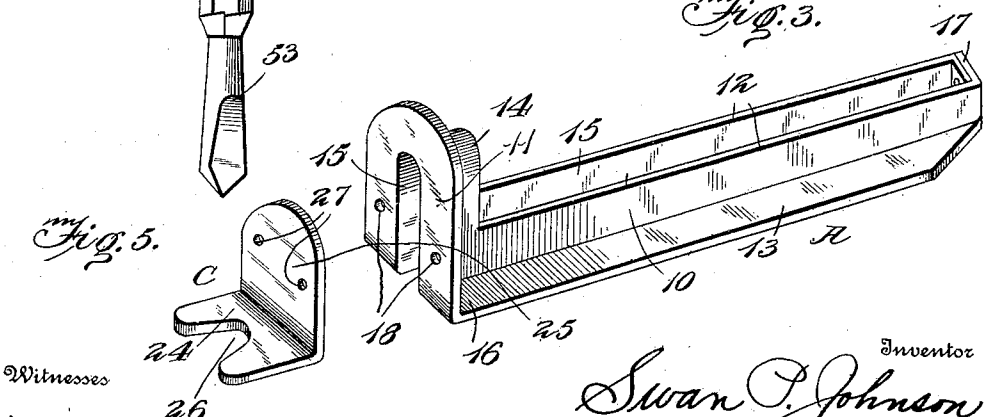
2 SHEETS—SHEET 2.



my Fig. 2.



my Fig. 4.



my Fig. 3.

my Fig. 5.

Witnesses

M. E. Kelly.

M. L. Hopkins.

Inventor

Swan P. Johnson,

By Deeley & Robb

Attorneys

THE NORRIS PETERS CO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

SWAN P. JOHNSON, OF CLINTON, IOWA.

PORTABLE AIR-DRILL.

No. 863,030. Specification of Letters Patent. Patented Aug. 13, 1907.

Application filed May 11, 1907. Serial No. 373,041.

To all whom it may concern:

Be it known that I, SWAN P. JOHNSON, a citizen of the United States, residing at Clinton, in the county of Clinton and State of Iowa, have invented certain new and useful Improvements in Portable Air-Drills, of which the following is a specification.

This invention relates to portable machinery used in machine shops, boiler works, ship yards, and analogous places, and has particular reference to that type of metal working implements operated by fluid under pressure, and designed primarily for drilling, countersinking, and punching.

Among the special objects aimed at in this invention are,—to improve the general structure of the fluid operated mechanism, and to devise supporting and clamping means of peculiar form and susceptible of a great amount of variation in use, according to the exigencies of any particular case or the character of the work to be performed.

For a full understanding of the invention and the merits thereof, reference is to be had to the following specific description and accompanying drawings, in which:

Figure 1 is a general perspective view of the entire apparatus in operative position; Fig. 2 is a vertical central sectional view; Fig. 3 is a perspective view of the angle iron clamp base detached; Fig. 4 is a transverse sectional view substantially on the plane of the inlet port, and Fig. 5 is a detail view of the foot piece.

Similar parts are indicated by like reference characters on all the several views of the drawings.

The letter A indicates a clamp base constructed of angle iron, and as indicated in Figs. 1 and 3 comprises the horizontal portion 10 and the vertical portion 11. The angle iron from which this part is formed has the flanges 12 and 13 which extend throughout the entire length of the material, said flanges being at right angles to each other throughout. The bar is first bent substantially midway of its ends at 14, forming a loop and with the two halves or legs parallel to each other and leaving a space 15 therebetween. The next step is to bend the looped bars intermediate of the loop and the outer ends, as at 16, in such a manner that the portion 11 will be perpendicular to the portion 10, the flanges 12 however, of the two legs remaining parallel to each other and the space or slot 15 being co-extensive with both the vertical and horizontal portions. The extreme ends of the angle bar are overlapped at 17 and secured together by any suitable means such as rivets.

It will be understood that wherein the terms horizontal and vertical are employed they are to be taken relatively, for the reason that the tool or implement is capable of use in any position with relation to the vertical. The vertical part 11 is provided with bolt holes 18.

The letter B indicates a substantially vertical standard having bolt holes 19 near its lower end and adapted to register with the holes 18 aforesaid, and through which securing means such as bolts 20 are passed to secure the standard rigidly, though detachably, to the base A. The standard at its upper end is bent at substantially right angles, and the flange portion 21 of the same thus bent over is provided with an opening 22, and one or more bolt holes between the opening 21 and the angle.

I provide, also, as specifically indicated in the drawings at the lower end of the standard, and substantially opposite the vertical portion 11 of the base, a foot piece C. This foot piece is constructed of plate metal, and has two portions 24 and 25 bent at right angles to each other. The part 24 is substantially horizontal in the normal position of the machine, and is provided with a notch 26. The part 25 is provided with holes 27 adapted to register with the aforesaid holes 18 and 19 whereby the said foot piece may be secured either to the standard B alone or to both the standard B and clamp base A, according to the character of the work to be done or according to the place where the operation is to be performed.

It may be stated that the standard B in connection with the clamp base A are adapted to be used instead of the wellknown "Old Man". When the clamp base is employed, the machine will be used in the nature of a drill press, and the base A having considerable lateral extent is readily capable of being clamped to a bench or base through the slot 15. By reason of the length of said slot 15 the drill press is capable of considerable adjustment during the operation thereof. The machine herein illustrated is well adapted for the purpose of punching light materials and ordinarily in this adaptation the foot piece C will be employed with or without the clamp piece A. They may both, however, be retained in connection with each other, if desired.

Reverting now more particularly to the mechanism of the drilling and punching device, D indicates generally a fluid operated tool comprising a cylinder or casing 28 having the upper head 29 and the lower head 30. Mounted within said cylinder is a driving member or runner 31 mounted upon a central stem 32 and adapted to be rotated by any suitable motive fluid such as compressed air, the same being admitted tangentially with respect to the cylinder as by means of an inlet pipe 33, the motive fluid being controlled by means of a suitable valve 34 in a wellknown manner. The body portion 35 of the runner 31 has a polygonal bore 36 in which the stem 32 is fitted slidably and whereby the stem 32 is adapted to be rotated upon the rotation of the runner. The runner is also provided with a plurality of wings 37 against which the motive fluid impinges. The body portion of the runner is provided further with trunnions 38 and 38′ which constitute bearing parts for the same. The trunnion 38 is journaled in the socket 39 of a clamping nut 40, and the

trunnion 38′ is journaled in a bushing or bearing 41. The nut 40 is screw-threaded at 42 into the upper head 29 of the cylinder whereby it is secured in place. Said nut is also provided with a central threaded bore 43 and a shoulder 44. Mounted within said central bore 43 is the feed screw 45 provided at its upper end with any suitable hand means 46 whereby the same may be operated downwardly or the reverse. The screw 45 is provided at its lower end with a reduced portion 47 forming a head 48, the same being seated against the bottom of a socket 49 formed in the upper end of the stem 32 and is detachably held therein by means of a screw pin 50. By this means the screw may be rotated independently of the stem when the machine is used as a punch, or the stem may be rotated independently of the screw in the operation of the runner, and also the stem may be rotated rapidly by means of the fluid pressure while the screw is being rotated more slowly by hand for the purpose of feeding the tool in the operation of drilling. The said stem 32 is provided at its lower end with any suitable tool holding chuck 51, shown herein as being fitted with a countersink 52 in which is secured the drill bit 53. The flange 21 of the standard B lies against the upper head 29 and is rigidly secured thereto by means of the clamping nut 40, the shoulder 44 thereof being applied directly against said flange. In assembling the cylinder suitable gaskets 54 may be employed between the cylinder 28 and the respective heads thereof, if desired, and the parts are bound together by tie rods 55, certain of the said tie rods passing through the holes 23 of the standard B whereby the standard and tool cylinder are more firmly secured together.

It will be understood that the several parts of the machine herein disclosed will be made of any suitable materials, and also that the relative sizes and proportions of the same may be varied without departing from the spirit of the invention.

From the foregoing specific description of the mechanism, the following description or operation will be appreciated: With the machine adjustably secured as a drill press to a bench or machine through the slotted base A and with the foot piece C attached if desired, the drill may be set in operation by admitting compressed air to the cylinder through the valve 34 whereupon the tool will be rapidly rotated. By turning the handle 46 the screw 45 will be moved downwardly through the fixed nut 40 causing the tool stem to be fed downwardly to and through the work. If the job is to be countersunk the tool will be driven down far enough for the countersink 52 to perform its function either with or without stopping to remove the drill bit. After this operation the feed screw 45 is reversed to elevate the stem 32 and the tool carried thereby, ready for the second operation. When this machine is used as a punch, a punching tool will be secured in the chuck 51, whereupon by a direct application of force through the screw 45 and the stem 32 the tool carried thereby will be forced downwardly without rotation of the stem, in an obvious manner.

Having thus described the invention, what is claimed as new is:—

1. In a machine of the type specified, the combination with a supporting standard for metal working tools, of a clamp base therefor comprising a one-piece angle iron structure having parallel horizontal legs and a vertical portion, the said legs forming a longitudinal slot coextensive therewith, and the ends of the legs being overlapped and secured together at the end of the slot, and means for detachably securing said standard to the vertical portion of said clamp base, substantially as described.

2. Supporting means for metal working tools comprising a standard, a clamp base constructed of angle iron having flanges at right angles to each other and formed with vertical and horizontal portions with an intermediate slot through the length thereof, said standard having holes in its lower portion, and said vertical portion of the base having corresponding holes, an angle foot piece comprising a notched bottom portion and a vertical portion at right angles thereto and integral therewith, said vertical portion of the foot piece having holes in alinement with the aforesaid holes in the standard and clamp base, and fastening means passing through the said alined holes to secure the several parts together, substantially as described.

3. In a device of the class described, the combination of a casing, a rotary driving member therein, the body of the said member having a central bore and being extended at its upper end to form a trunnion, a tool-holding stem slidably fitted in said bore for rotation with said member, a support for the casing having a flange with an opening adjacent the casing head, a shouldered clamping nut projecting through said opening whereby the support is clamped to the said head, said nut having a socket to receive the trunnion of the driving member, and means cooperating with said nut to move said stem longitudinally with respect to the driving member.

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

SWAN P. JOHNSON.

Witnesses:
CLYDE E. WILLETTS,
A. R. JOHNSON.