No. 824,250. PATENTED JUNE 26, 1906.

A. E. KNAPP.

PNEUMATIC TOOL HOLDER.

APPLICATION FILED NOV. 27, 1905.

2 SHEETS—SHEET 1.

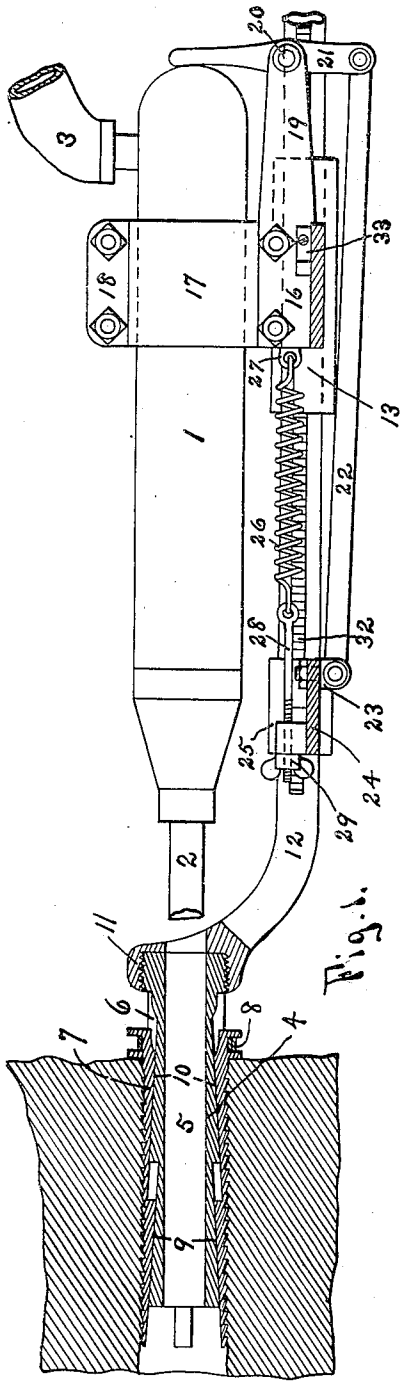


Fig. 1.

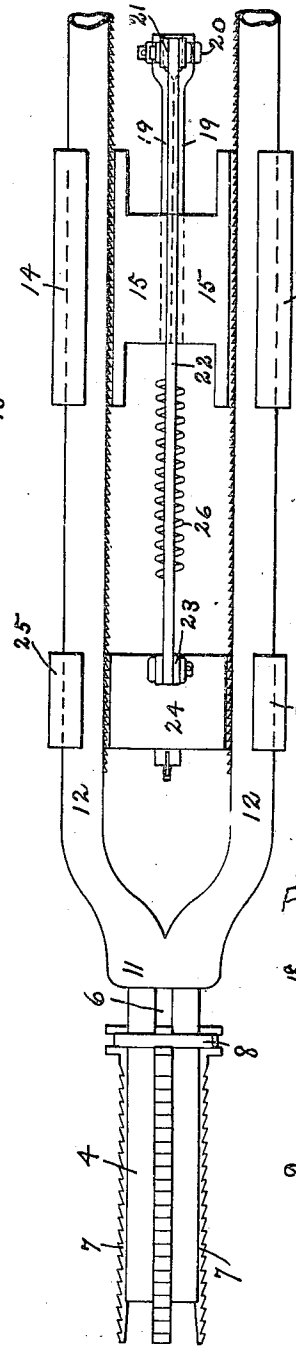


Fig. 2.

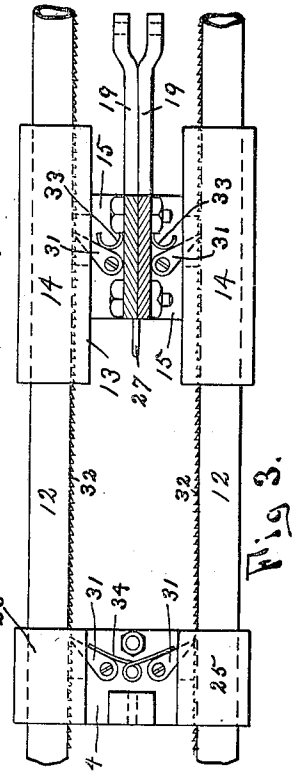


Fig. 3.

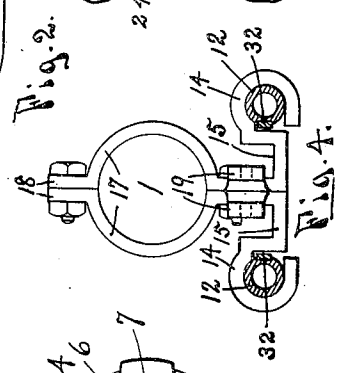


Fig. 4.

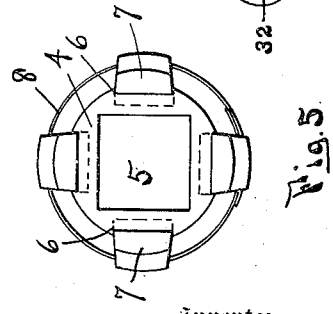


Fig. 5.

Witnesses:

Geo. W. Barnes

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2 SHEETS—SHEET 2.

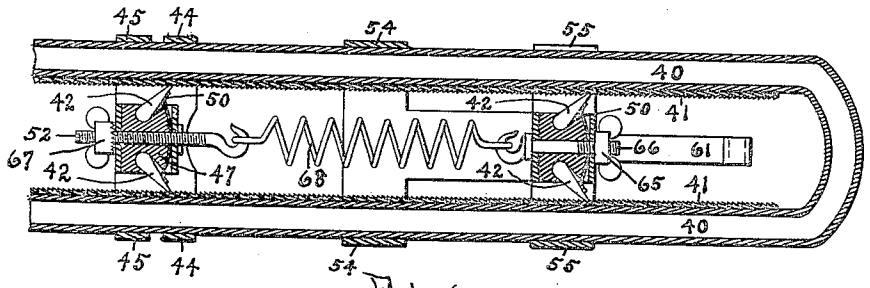


Fig. 6.

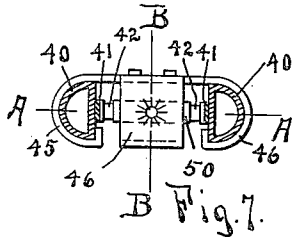


Fig. 7.

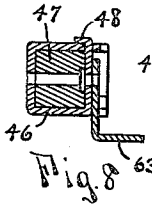


Fig. 8.

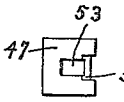


Fig. 10.

Fig. 9.

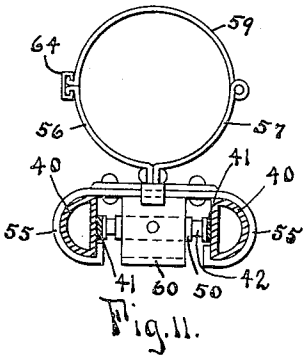


Fig. 11.

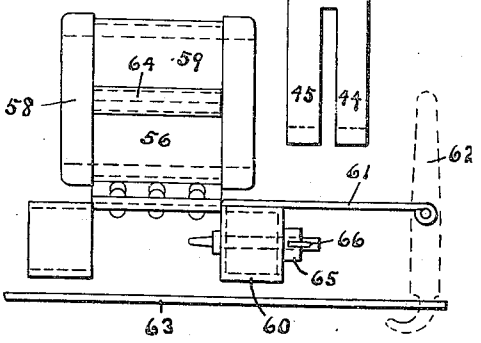


Fig. 12.

Fig. 13.

Witnesses:

Geo. W. Barnes.

G. Wilson.

Inventor

By his Attorney A. E. Knapp.

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UNITED STATES PATENT OFFICE.

AMBROSE EUGENE KNAPP, OF SEATTLE, WASHINGTON.

PNEUMATIC-TOOL HOLDER.

No. 824,250. Specification of Letters Patent. Patented June 26, 1906.

Application filed November 27, 1905. Serial No. 289,232.

To all whom it may concern:

Be it known that I, AMBROSE EUGENE KNAPP, a citizen of the United States, and a resident of Seattle, in the county of King and State of Washington, have invented a new and Improved Pneumatic-Tool Holder, of which the following is a specification.

My invention relates to holders, brackets, or frames for supporting pneumatic hammers or drills; and the objects of my improvements are to provide means for the support of pneumatic tools so constructed that the rebound of the pneumatic cylinder will cause the supporting means for the cylinder to be advanced toward the article or substance acted upon by the tool, and to provide improved self-adjusting means for securing supporting means for tools to the faces of walls, ceilings, or floors of mines or quarries.

I attain these objects by the constructions illustrated in the accompanying drawings, in which—

Figure 1 is a view, partly in section, showing the entire supporting means. Fig. 2 is a plan of the same, taken from the bottom side of Fig. 1. Fig. 3 is a view of the opposite side of Fig. 2 of a portion of the mechanism. Fig. 4 is an end view of the construction, taken from the right in Fig. 1. Fig. 5 is an end view of the frame-holder. Fig. 6 is a cross-section on the line A A of Fig. 7, showing a modified form of construction. Fig. 8 is a cross-section of a front carriage on the line B B in Fig. 7. Fig. 9 is a view of a detail. Fig. 10 is a view of a blank from which the modified front carriage is formed. Fig. 11 is a rear elevation of the rear carriage. Fig. 12 is a side elevation of the same. Fig. 13 is a view of the blank from which the rear carriage is formed.

Similar reference characters refer to like parts throughout the several views.

Pneumatic drills are operated at every conceivable angle to the faces of walls, ceilings, and floors of the chambers, shafts, and tunnels of mines and excavations, often in places where it is very difficult to obtain lateral bracing for the tools and often where it is impossible to hold the drill against the surface to be operated upon. My present invention is designed to afford means whereby a pneumatic hammer used to operate a drill may be held at any desired angle against any desired face without lateral bracing or other means to hold the drill against the material operated upon.

The pneumatic cylinder 1 in the drawings may be of any desired construction, and the drill-rod 2 is merely indicated as connected to the cylinder. The usual air-supply pipe 3 also forms no part of this invention.

The sleeve 4 is provided with a square hole 5 and the grooves 6, which are formed wider at the bottom than at the top. In the grooves are seated and slidable the feathers 7, provided with ratchet-teeth and with lugs at their inner ends to form jaws in which rests the ring-spring 8, which is adapted to permit the feathers to separate, but holds them from moving endwise with reference to each other. The inner faces of the feathers are formed with double inclines 9 and 10, which are adapted to contact with similar inclines at the bottoms of the grooves 6 of the sleeve. Thus when the feathers are at their innermost position and the sleeve and feathers are introduced into a hole in a rock-face and the sleeve portion of the holder is then pulled out the feathers will be separated, finally jamming all parts firmly in position in the hole. In practice then the operator will first drill a hole of the proper size and depth by hand, and thus furnish an opening in which the holder may be secured.

Screwed onto the inner end of the sleeve 4 is a collar 11, from which extend the two rods or tubes 12. On these rods are two carriages, the larger rear carriage 13 carrying the pneumatic tool 1. This carriage is made up of two parts, each composed of a half-sleeve 14, a horizontal part 15, a vertical part 16, another half-sleeve 17, and a final vertical portion 18. Bolts passing through the vertical portions secure the two halves together and also hold the cylinder 1 in position.

Attached to the carriage are rearwardly-extending arms 19, carrying a pin 20, upon which is pivoted the lever 21, which connects to the front carriage by means of the link 22 and bolt 23. The front carriage is much like the rear carriage and has a horizontal portion 24 and guide-sleeves 25. A spring 26 connects to the eye 27, secured to the rear carriage, and by means of the screw 28 and thumb-nut 29 connects to the front carriage. On the upper side of each carriage are mounted the pawls 31, which engage the ratchet-

teeth on the inner sides of the rods 12, which teeth may be formed directly on the rods or on small bars 32, secured to the rods. Springs 33 and 34 hold the pawls in engagement with the teeth.

The operation of the tool-carrier is as follows: When the entire machine has been secured in place by means of the sleeve and feathers 7 and the drill is in position, the carriages and cylinder 1 are pushed toward the sleeve by the operator and air is admitted to the cylinder. The tool under normal conditions has little "back kick;" but when the piston begins to strike the end of the cylinder instead of the drill or chisel the back kick becomes heavy. This is transmitted to the lever 21 by the cylinder, which lever pushes the front carriage toward the sleeve 4. On the front stroke of the piston or immediately after the "kick" the spring 26 will pull the rear carriage toward the sleeve. The balance between the normal reaction of the cylinder and the spring is thereby restored and the tool-carrier is thus fed forward automatically. The thumb-nut 29 by the tension of the spring regulates the pressure on the drill.

Rock-drilling is usually accomplished by crushing the material being drilled at the bottom of the hole into a powder and space must be left around the drill-shank for the discharge of this waste. Were a round hole provided in the sleeve 4 it could be made of no larger diameter than the shortest diameter of the square hole now shown, because of the thickness of metal necessary under the fastening members 7. The drill-shank that could be used in a round hole would necessarily be of less diameter than the hole, because of the space around the shank required for the discharge of rock-waste; but by forming the hole square, as shown, a drill-rod of full diameter may be used and space still left for the discharge of waste rock and sufficient metal left to furnish supports for the feathers 7. When the drill is to be replaced by another, the sleeve is disengaged, the entire mechanism removed, the exchange made, and the apparatus returned to place, the loss of time being very slight.

On the second sheet of drawings modified constructions of the parts are shown. The tubes 40 are D-shaped and have secured to their inner sides the toothed bars 41, which are engaged by the pawls 42. The front carriage is formed from a blank 43, which is bent as shown in Figs. 7 and 8 along the dotted lines in Fig. 10. The parts 44 and 45 are bent so as to form sleeves adapted to embrace the tubes 40. The strip 46 is bent down, back, and then up around the block 47, the fingers 48 extending through the holes 49, and being bent down lock the block in place. The spring 50 for the pawls is held in the slot 51 in the block and also by the screw 52, which passes through the holes in the block and the strip 46, as shown. The pawls are seated in the recesses 53. The blocks, pawls, and spring for them on the front carriage and rear carriage are alike.

The rear carriage is formed from the blank shown in Fig. 13, being bent on the dotted lines, the parts 54 and 55 forming sleeves and the parts 56 and 57 the immediate support for the sleeve 58, in which the tool is mounted. The parts 56 and 57 are held in proper position by rivets, as shown. Interchangeable sleeves adapt the support for tools of different diameters, and as the parts 56, 57, and 58 become roughened by the hard usage new sleeves having smooth bores can be substituted, thus giving the tool a good guide. The cap 59 is hinged to the part 57 and locked in place by the clip 64.

The strip 60 is bent down, forward, and up, the reduced portion 61 being passed through the slot 61^a and then bent back, as shown in Fig. 12, forming the arm to support the rear lever. This arm has an eye formed in its outer end, which supports the lever 62, which has a hook at its lower end to engage the link 63, which link connects to the front carriage, as shown in Fig. 8. The lever is shown in dotted lines to permit the construction of the end of the arm to be well shown, the construction of the lever being similar to that in Fig. 1. The hook-bolt 66 is held in place by the thumb-nut 65 in the rear carriage, while the adjusting-bolt 52 carries the thumb-nut 67, which has a roughened lower surface to engage the roughened surface with which it contacts, as shown in Figs. 6 and 7, thus preventing its turning. The spring 68 acts in the same manner as the spring 26, and the operation of all the parts is generally the same as in the construction shown on the first sheet of the drawings.

Having now explained my improvements, what I claim as my invention, and desire to secure by Letters Patent, is—

1. In a tool-holder, the combination of a sleeve having a square hole and dovetail slots, longitudinally-extending engaging members mounted in said slots and provided with teeth on their outer sides and a plurality of inclines on their inner sides, said sleeves having inclines corresponding thereto, a spring-ring adapted to hold said engaging means in position, a tool-holder comprising parallel rods secured to one end of said sleeve, and a tool-carrier slidably mounted on said rods.

2. In a tool-holder, the combination of a sleeve having longitudinal slots, engaging means slidably mounted in said slots and provided with inclines adapted to engage corresponding inclines on said sleeve, means to hold said engaging means in operative position, a tool-holder carried by one end of said sleeve, and a tool adjustably mounted on said holder.

3. In a tool-holder, the combination of a sleeve having dovetail grooves, adjustable engaging members mounted therein, parallel rods secured to said sleeve, a carriage mounted on said rods, and a tool secured to said carriage.

4. In a tool-holder, the combination of a sleeve, slidable toothed and outwardly-movable engaging members mounted thereon, means to connect said engaging members and a tool-carrier secured to one end of said sleeve.

5. In a tool-holder, the combination of a sleeve having a square hole, engaging members mounted thereon, and a tool-carrier mounted on said sleeve, the corners of said square hole providing passages through which the waste from the operation of the tool may be discharged out along the round shank of a tool having the same diameter as the hole, substantially as described.

6. In a tool-holder, the combination of a sleeve having a square hole, and means to hold said sleeve firmly in position, the corners of said square hole providing passages through which the waste from the operation of the tool may be discharged along the round shank of a tool having the same diameter as the hole, substantially as described.

7. In a tool-holder, the combination of a sleeve having a square hole to permit the passage of a drill-rod, and adjustable means to hold said sleeve firmly in position, the corners of said square hole providing passages through which the waste from the operation of the tool may be discharged out along the round shank of a tool having the same diameter as the hole, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

AMBROSE EUGENE KNAPP

Witnesses:
ROBT. F. BOOTH,
A. C. MARTIN.