



# UNITED STATES PATENT OFFICE.

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## ROCK-DRILL-SHARPENING MACHINE.

No. 920,093.

Specification of Letters Patent.

Patented April 27, 1909.

Original application filed February 8, 1907, Serial No. 356,481. Divided and this application filed May 29, 1907. Serial No. 376,345.

To all whom it may concern:

Be it known that I, CLARK J. SMITH, residing at Ottumwa, in the county of Wapello and State of Iowa, have invented certain new and useful Improvements in Rock-Drill-Sharp-  
5 Sharpening Machines, of which the following is a specification.

My invention relates to certain new and useful improvements in rock drill sharpening  
10 means of the type disclosed in my co-pending application filed Feb. 8, 1907, Ser. No. 356481, of which this application forms a divisional part.

Generically, my present invention comprises a suitable supporting bed upon which the sharpening mechanism is mounted and the sharpening mechanism consists of a drill supporting means including a pneumatic bumper or holder to cooperate with the drill  
20 and also it includes a dolly holder and hammering engine to cooperate with the dolly for sharpening the drill end and upsetting it into form. The pneumatic hammer includes means cooperatively connected therewith  
25 whereby the same can be controlled and automatically fed up to the work.

In its more subordinate nature, the invention embodies certain novel details of construction, combination and arrangement of  
30 parts, all of which will be first described in detail and then be specifically pointed out in the appended claims, reference being had to the accompanying drawings, in which:—

Figure 1, is a central, vertical, longitudinal  
35 section of my invention, showing the position of the parts just prior to bringing the dolly in engagement with the bit. Fig. 2, is a similar view showing the position of the parts as the dolly is engaging the bit to sharpen same and the piston of the hammer being in its dolly engaging position. Fig. 3,  
40 is an enlarged view of a portion of my invention. Fig. 4, is a detail perspective view of the end of a drill bit formed by my machine. Figs. 5, 6 and 7 are perspective views  
45 of the various forms of dollies which may be used in my machine. Fig. 8 is an enlarged detail sectional view of the valve 11 and its cooperating parts.

Referring now to the accompanying drawings in which like numerals and letters of reference indicate like parts in all of the figures, 1 designates the bed frame of the machine, which comprises the bed 1<sup>a</sup> which may

be in the nature of an ordinary I-beam, to  
55 which are bolted the standards or legs 1<sup>b</sup>. To one end of the I-beam 1<sup>a</sup> is a drill holder 2 that is secured by bolts 2<sup>a</sup> or otherwise, and the drill holder 2 is bored out as at 2<sup>b</sup> to form a hollow chamber which is closed at one  
60 end by the web 2<sup>c</sup> that has an aperture as at 2<sup>d</sup> to receive the end 3<sup>a</sup> of the drill bit 3. The chamber 2<sup>b</sup> is closed at the other end by a threaded plug 2<sup>e</sup> which has a passage 2<sup>f</sup> communicating with the air feed pipe 2<sup>g</sup>.  
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Held within the chamber 2 is a buffer block 2<sup>h</sup> which is held against the end 3<sup>a</sup> of the drill bit 3 by pneumatic pressure within the chamber 2<sup>b</sup> between the buffer block 2<sup>h</sup>  
70 and the plug 2<sup>e</sup>, in a manner more fully explained later.

Slidably mounted on the I-beam 1<sup>a</sup> is a drill carriage 4 which has flanges 4<sup>a</sup> to fit over the I-beam and which is provided with a drill receiving pocket 4<sup>b</sup> whereby the drill  
75 may be held in the pocket 4<sup>b</sup> in such a manner as to readily be removable.

5 designates the hammer support which is fixed to the I-beam 1<sup>a</sup> by set screws 5<sup>a</sup> if desired, and the hammer support is provided  
80 with a longitudinal aperture 5<sup>b</sup> to receive the hammer casing 6. The hammer casing and hammer will be more fully described later.

7 designates the dolly support which is slidably mounted on the I-beam 1<sup>a</sup> in a man-  
85 ner similar to the drill support 4, and the dolly support 7 has flanges 7<sup>a</sup> to cooperate with the I-beam 1<sup>a</sup> and has a dolly receiving aperture 7<sup>b</sup> in which the dolly 8 is held.

The dolly 8 has a shank 8<sup>a</sup> and a head 8<sup>b</sup> 90 which is provided with cutting points or teeth 8<sup>c</sup> as clearly shown in Fig. 1. A center 8<sup>d</sup> is provided for use whenever a hollow drill bit is being operated upon. The shank 8<sup>a</sup> of the dolly 8 is of two diameters, one of  
95 which 8<sup>x</sup>, is such as to fit into the chuck 6<sup>x</sup> of the hammer casing.

The pneumatic hammer in my present invention is of the reciprocating type and consists of the casing 6 which has a central bore  
100 provided with internal annular flanges 6<sup>a</sup>—6<sup>b</sup>—6<sup>c</sup> to separate the bore into a series of chambers 6<sup>d</sup>—6<sup>e</sup>—6<sup>f</sup>—6<sup>g</sup> respectively, the chamber 6<sup>g</sup> being adjacent the chuck end of the casing and communicating with the  
105 atmosphere through exhaust ports 6<sup>h</sup>, as shown. The end of the casing 6 opposite the chuck 6<sup>x</sup> is closed by a screw plug 6<sup>y</sup> hav-

ing a bore 6<sup>z</sup> that merges with a passage 6<sup>k</sup> in the hammer casing; the passage 6<sup>k</sup> communicates with the chamber 6<sup>f</sup> through a port 6<sup>m</sup>, as shown. The passage between the chambers 6<sup>f</sup> and 6<sup>s</sup> formed by the web 6<sup>c</sup> is of less diameter than that between the chambers 6<sup>d</sup>—6<sup>e</sup>—6<sup>f</sup>, to properly cooperate with the reciprocating hammer piston 6<sup>n</sup> which has a central bore 6<sup>p</sup> and radial apertures 6<sup>r</sup> and 6<sup>s</sup> at opposite ends. The screw plug 6<sup>v</sup> receives the piston rod 9<sup>v</sup> that passes through the cap 9<sup>a</sup> on the feed piston casing 9 and the piston rod 9<sup>v</sup> projects into the casing 9 and carries a suitably packed piston head 9<sup>z</sup>. The feed piston casing 9 is held in the support 10 by a set screw 10<sup>a</sup>, the support 10 being in turn fixedly secured to the I-beam by screw bolts 10<sup>b</sup> or in any other suitable way. The other end of the piston casing 9 is closed by the screw plug 9<sup>b</sup> having a passage through which the working agent is passed from the working agent feed supply pipe 9<sup>c</sup>. The working agent passes through a three-way valve 11 before it comes in contact with the piston 9<sup>z</sup>. The three-way valve 11 has ports that permit passage of the working agent from the supply pipe 9<sup>c</sup> into the piston casing 9 to force the piston 9<sup>z</sup> outward. The ports of the valve 11 are also so arranged that when the valve is in another position the working agent within the chamber 9<sup>r</sup> of the piston 9 will be exhausted to atmosphere through the port 9<sup>s</sup>, but when the valve 11 is in the third position the exhaust port 9<sup>r</sup> as well as the working agent feed to the chamber 9<sup>r</sup> is cut off, rendering the feeding of the pneumatic hammer to the work inoperative.

The three-way valve 11 is operated through the rod 12 (see dotted lines, Fig. 2) that passes through the bearing 12<sup>a</sup> on the end of a bracket 12<sup>b</sup> secured to the bed plate 1<sup>a</sup> of the machine, the end of the rod 12 being adjacent the drill support 4 so that the operator may grasp the drill 3 and at the same time manipulate the three-way valve 11.

In Figs. 5, 6, and 7 I have shown several forms of dollies, one end of which may be used to form the end of the drill, since in the practical application of my invention, I desire it understood that while the six-point bit is usually used, I do not limit myself to the sharpening of bits having six points since my machine can be used with sharpening dies having the ordinary chisel point or any number of points; the dolly which does the sharpening may have the same number of points as the bit shown in Fig. 4 (see Fig. 5) or it may have a less number of points as will be readily understood by those skilled in the art to which my invention appertains. The dolly heads in Figs. 5, 6 and 7 are indi-

cated by the reference numerals 8<sup>b</sup>, 18<sup>b</sup> and 28<sup>b</sup> respectively.

So far as described, the manner in which my invention operates will be best explained as follows:—After the drill 3 has had its end 3<sup>a</sup> inserted into the holder 2 with its end 3<sup>b</sup> ready to be operated upon by the dolly 8, the operator opens the three-way valve 9 to admit the working agent into the chamber 9<sup>r</sup> of the feed piston mechanism which forces the hammer casing 6, and consequently the dolly 8 forward until the dolly 8 is in contact with the end 3<sup>b</sup> of the bit 3. As the feeding takes place the working agent will pass through the aperture in the piston rod 9<sup>v</sup> and through the passage 6<sup>k</sup> into the interior of the casing 6 and thus operating the hammer 6<sup>n</sup> to force the dolly 8 to form the teeth on the end of the bit 3, and at the same time upsetting the same as at 3<sup>c</sup> to bring it into proper shape, it being understood that the operator may turn the drill on its longitudinal axis during these operations, if desired. After the drill has been sharpened and upset by the action of the dolly 8 it is removed from the holders 2 and 4 and placed in a suitable shaping machine such for instance, as disclosed in my co-pending application.

From the foregoing, taken in connection with the accompanying drawings, the complete construction, operation and advantages of my invention will be readily understood by those skilled in the art to which it appertains.

What I claim is:—

1. In an apparatus of the class described, a bit holding means and a dolly holding means, a means for feeding the dolly to the bit and impacting the dolly against the bit to cut the teeth thereon, combined with a holder for the bit end having a chamber, a piston operatable in said chamber against which the bit contacts and means for establishing a fluid pressure within said chamber to hold said piston against the bit to form an impact relieving means substantially as shown and described.

2. In an apparatus of the class described, a drill bit holding means, combined with pneumatic means for relieving the impact on the drill bit, said last named means comprising a receiver for one end of the drill bit, said receiver having a chamber, a piston within said chamber for engaging the drill bit end, and means for leading compressed agent into the chamber to force the piston into contact with the bit end, substantially as shown and described.

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Witnesses:

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