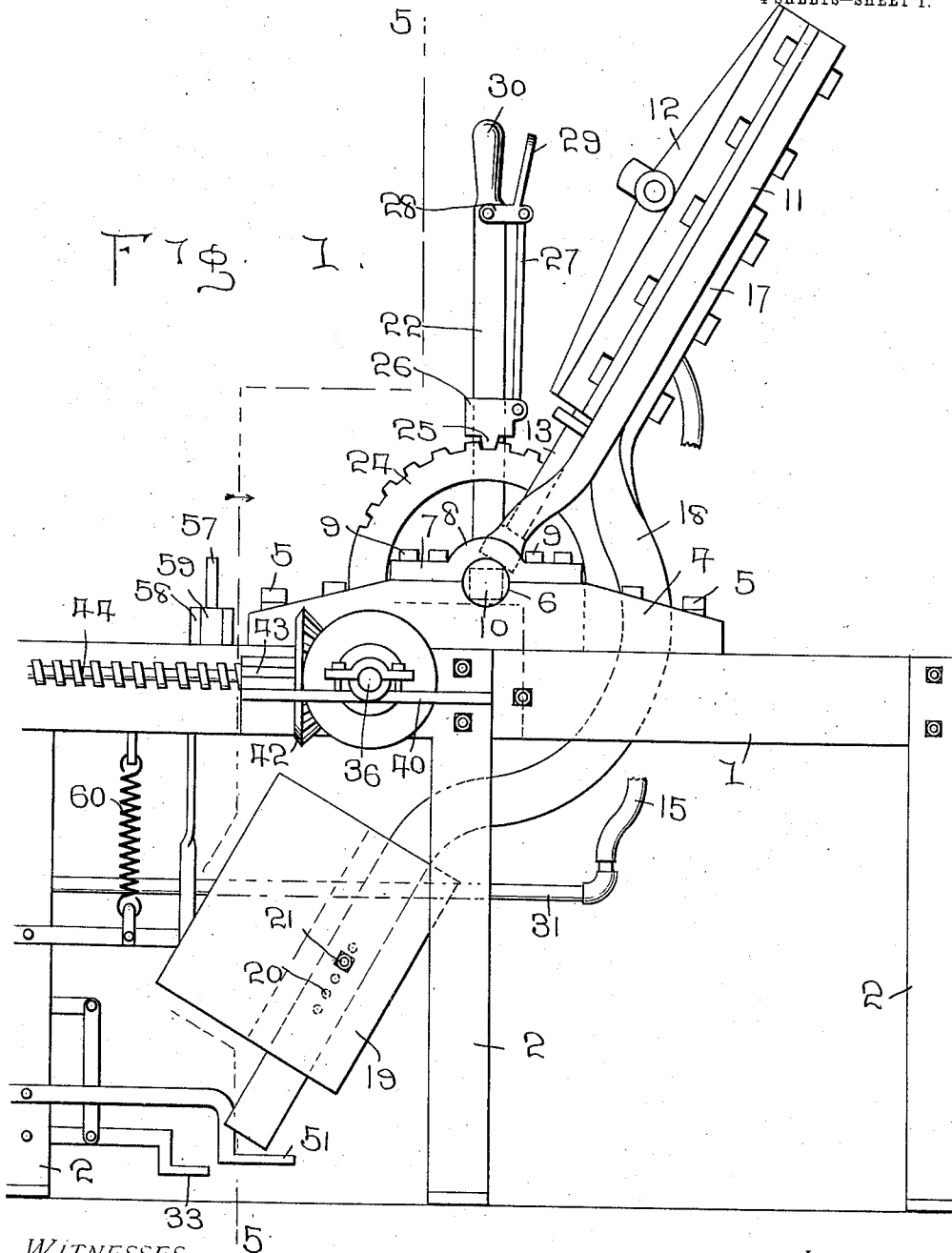


1,016,551.

J. W. COYLE.
 DRILL SHARPENING MACHINE.
 APPLICATION FILED FEB. 28, 1911.

Patented Feb. 6, 1912.

4 SHEETS—SHEET 1.



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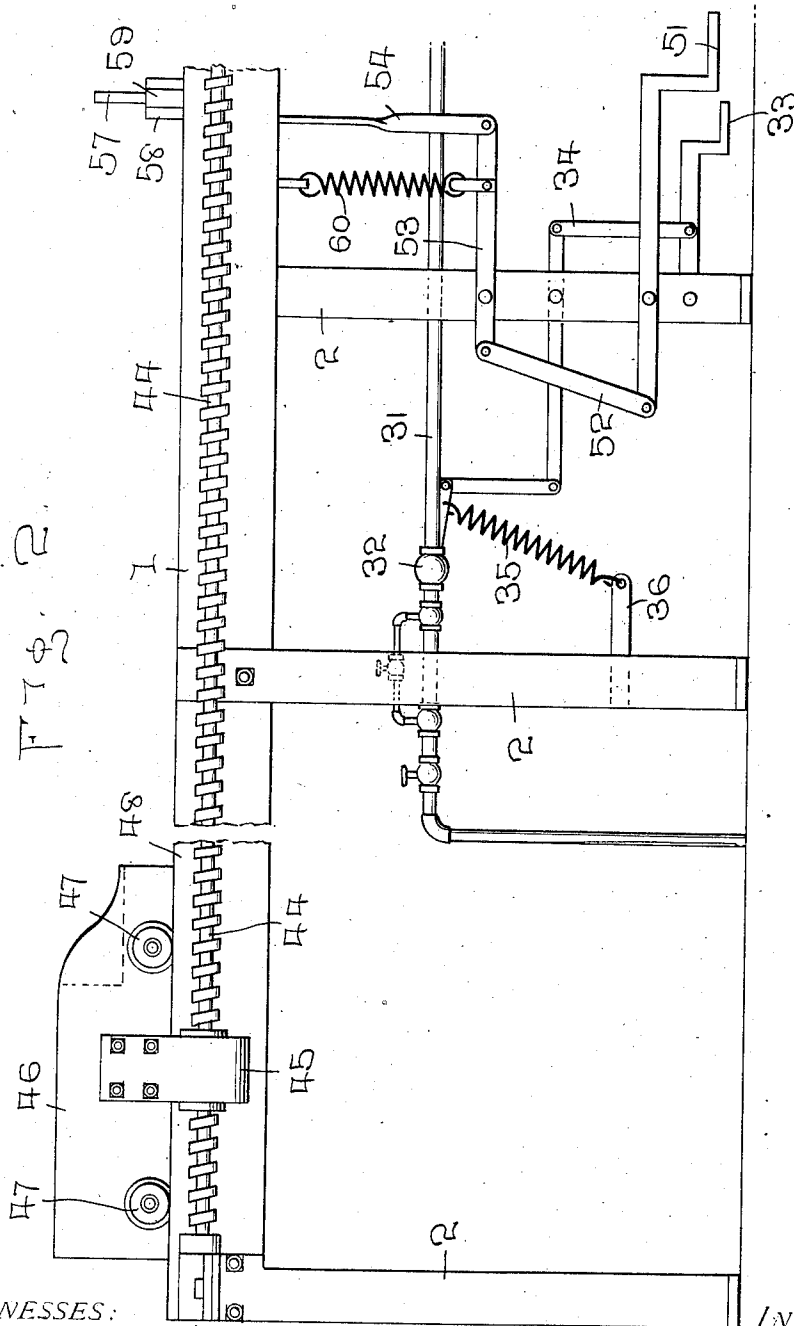
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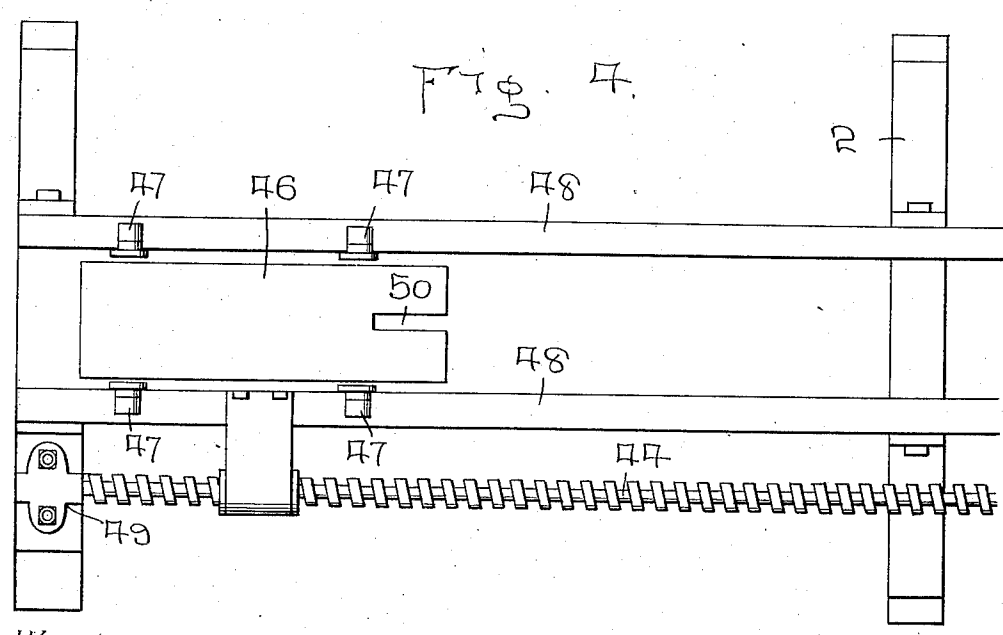
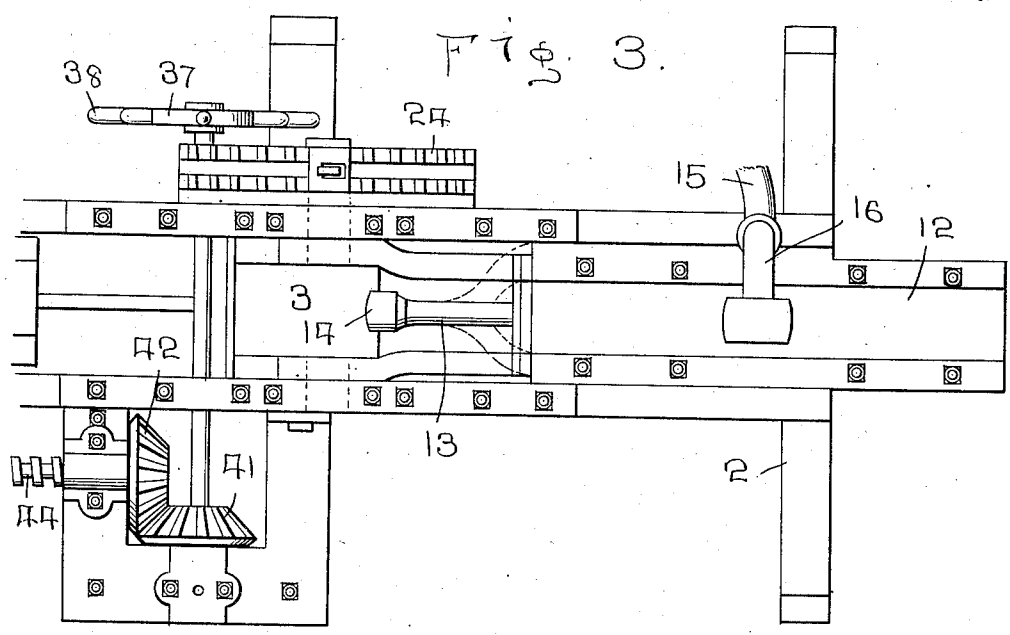
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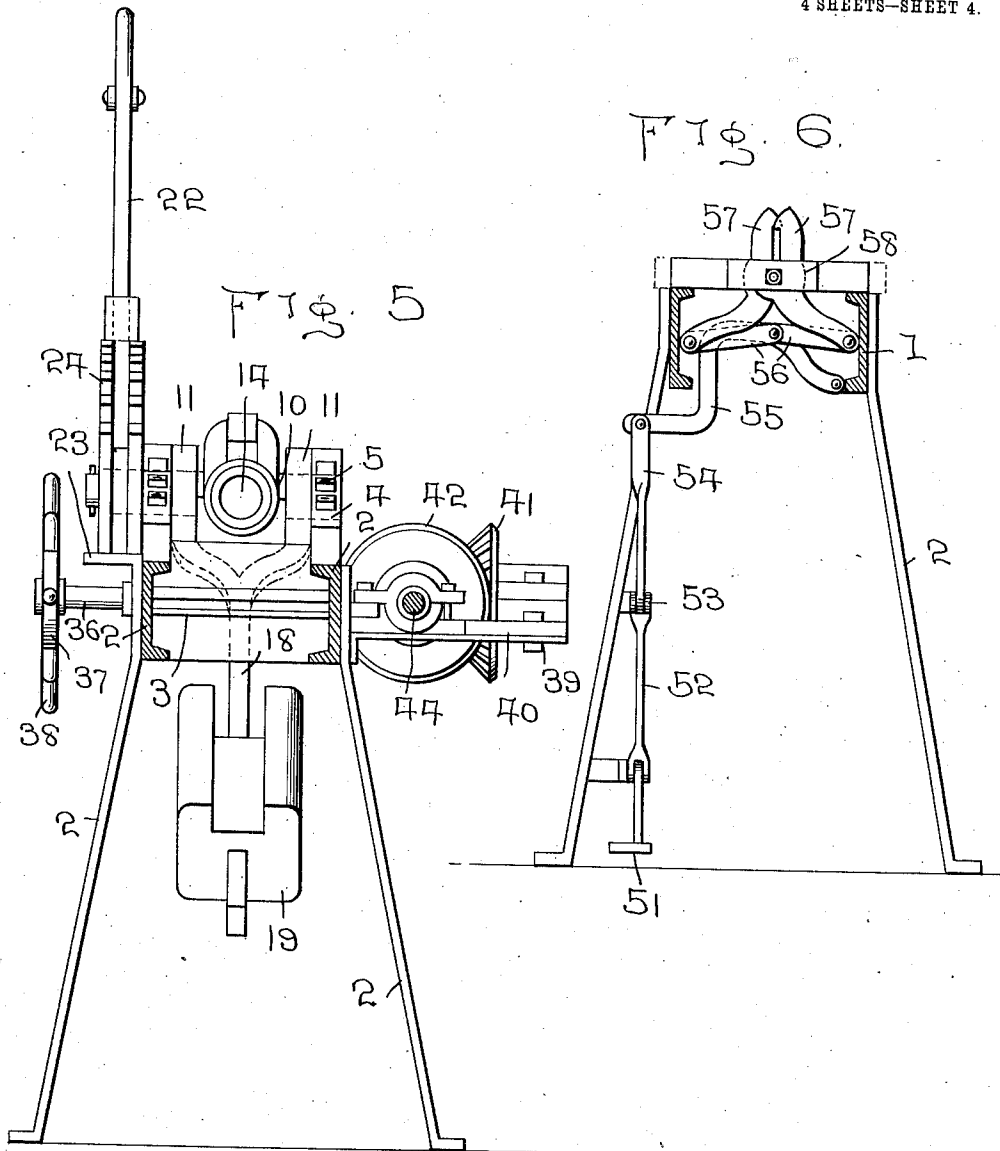
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4 SHEETS—SHEET 4.



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UNITED STATES PATENT OFFICE.

JAMES W. COYLE, OF CARTERVILLE, MISSOURI, ASSIGNOR OF ONE-HALF TO W. A. CRISTY, OF JOPLIN, MISSOURI.

DRILL-SHARPENING MACHINE.

1,016,551.

Specification of Letters Patent.

Patented Feb. 6, 1912.

Application filed February 28, 1911. Serial No. 611,497.

To all whom it may concern:

Be it known that I, JAMES W. COYLE, a citizen of the United States, residing at Carterville, in the county of Jasper and State of Missouri, have invented certain new and useful Improvements in Drill-Sharp-
5 ening Machines; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable
10 others skilled in the art to which it appertains to make and use the same.

This invention relates to drill sharpening machines and more particularly to the machines specially adapted to sharpen or
15 rapidly forge the bits generally known as bull or chisel bits used on machines for drilling through chert or flint rock in sheet form.

An object of the invention is to provide a
20 machine for sharpening bits which will perform the work in a minimum period of time and in a highly satisfactory manner.

Another object is to provide a machine of this character which may be operated by
25 compressed air, steam or other suitable power to reciprocate the piston hammer, forcing the latter against the heated end of the tool to forge the latter.

Another object is to provide a machine of
30 this character having means for counterbalancing automatically the angularly adjustable pounding hammer, and, another object is to construct a machine of the above
35 stated nature provided with means for automatically feeding the tool longitudinally of the machine to retain the heated end of the tool directly beneath the piston hammer, means for controlling the amount of steam
40 or air passing to the piston cylinder to vary the force of the stroke of the piston, and means for gripping and holding the tool in proper position.

Other objects and advantages will be hereinafter set forth and pointed out in the
45 specification.

In the accompanying drawings which are made a part of this application, Figure 1 is a side view of the front end of the machine.

Fig. 2 is a side view of the rear end of the machine. Fig. 3 is a top plan view of the
50 front end of the machine. Fig. 4 is a top plan view of the opposite end of the machine. Fig. 5 is a cross sectional view on the line 5—5 of Fig. 1, looking in the direction of the arrow, and, Fig. 6 is a detail
55 view of the tool gripping mechanism.

Referring to the drawings in which similar reference numerals designate corresponding parts throughout the several views, 1 represents the framework of the
60 machine, which is preferably constructed of steel channel bars supported upon the wrought iron legs 2.

Secured between the channel bars 1 is the anvil 3 and extending upwardly from the
65 channel bars 2' and secured thereto are the journal bearing boxes 4 fastened to the bars 1 by the bolts or other suitable means 5. Within the upper surface of the bearing
70 boxes are the semicircular bearing openings 6. Secured upon the upper side of the boxes 4 are the plates 7 having the semicircular central offset portions 8 directly
75 above the bearing openings 6, the plates 7 being secured to the boxes 4 by bolts or other means 9. The rock shaft 10 has its opposite
80 ends secured in the circular bearing opening formed by the semicircular recess 6 and the semicircular portion 8 of the plate 7 directly above said openings.

Secured rigidly to the shaft 10, inwardly of the bearing boxes and plates 4 and 7, respectively, are the parallel supporting bars
85 11, which support outwardly of the shaft the cylinder 12 secured to the supporting bars in any suitable manner. Within the cylinder 12 the piston head (not shown) reciprocates and upon the outer end of the
90 piston rod 13 is carried the pounding or forging hammer 14, which works upon the heated end of the tool placed upon the anvil 3 when the piston is operated by suitable power. One end of the flexible hose 15 is connected to the short pipe 16 in the cylinder 12 to convey compressed air or steam to
95 the interior of the cylinder 12 to operate the

piston therein. Secured to the cylinder 12 and the supporting bars 11 are the parallel portions 17 of the upper forked end of the depending rod 18, which is curved at its center portion, to avoid the anvil 3, and carries adjustably secured upon its lower end the counterbalancing weight 19, which may be adjusted by means of the spaced openings 20 within the bar 18 and the securing bolt 21, which pass through the counterbalancing block 19 and the said openings 20 and is secured by bolts or other suitable means. The cylinder 12 may be positioned at any angle desired in respect to the upper surface of the anvil 3 to vary the pitch or bevel of the tool being sharpened and the weight of the cylinder 12 will be counterbalanced automatically by the counterbalancing weight 19.

Upon one end of the shaft 10, which projects beyond the bearing box and plate to that side of the machine, is secured the lever 22, the end of the shaft 10 being squared to receive the lower end of said lever. Secured upon a shelf extension 23 of the adjacent leg 2 is the double rack 24, which is adapted to be engaged by the lug 25 of the sleeve 26, which is slidable upon the lever 22. Secured to the sleeve 26 is the lower end of the connecting rod 27, which has its upper end secured to the link 28 carried by the lever 22. Secured to the outer end of the link 28 and extending upwardly therethrough, is the releasing finger 29, resting adjacent the handle portion 30 of the lever 22. The weight of the sleeve 26 retains the lug 25 normally between the teeth of the rack 24 and by drawing the finger 29 toward the handle 30 the sleeve 26 is raised to disengage the lug 25 from the teeth of the rack 24 to allow the angular adjustment of the hammer 14, cylinder 12, etc., the weight of which will be counterbalanced by the weight 19, as previously described.

The lower end of the flexible pipe 15 is connected to the longitudinally extending conducting pipe 31 which has suitable valves therein. Within the pipe 31 is the turn-valve 32, which is controlled by the pedal 33 connected thereto by a series of pivoted arms 34. To the arm 34, connected to the valve 32, is fastened the upper end of the spring 35, which has its lower end secured to the arm 36 projecting from one of the legs 2. The spring 35 tends to resiliently hold the valve 32 in closed position, the valve being opened by pressing upon the pedal 33. Thus, it will be seen that the valve 32 may be opened to any distance desired by the operator regulating the amount of pressure applied to the pedal 33. The pedal 33 is preferably located adjacent the front end of the machine within ready reach of the operator when standing near the anvil 3 and lever 22.

A shaft 36' extends through the frame 1

a short distance forward of the shaft 10 and has secured upon the end projecting through the side of the machine upon which is secured the lever 22, the wheel 37 having radially extending turning handles or hand-holds 38, the purpose of which will later appear. The opposite end of the shaft 36 extends through the boxing 39 supported upon the shelf 40, extending from the opposite side of the machine frame 1.

Between the frame 1 and the boxing 39 is mounted upon the shaft 36', a bevel gear 41 adapted to mesh with the bevel gear 42 extending through the boxing 43, carried upon the shelf 40. The bevel gear 42 is mounted upon the end of the feed-screw 44, which extends at right angles to the shaft 36. The feed-screw 44 passes through the internally threaded ear 45 carried by the car 46 having wheels 47 adapted to run upon the upper or track edge 48 of the angle bars or frame 1. The rear end of the feed-screw 44 is secured within the boxing 49 extending outwardly from the frame 1 at the rear end thereof.

The heated end of the tool to be sharpened is placed upon the anvil 3 and the other end is rested within the car 46, the car being moved upon the track 48 to the proper position by manipulating the wheel 37 to rotate the shaft 36 which through the bevel gears 41 and 42, operates the feed-screw 44 to move the car 46 in the proper direction. As will be noted the car 46 is provided with the tool receiving opening 50 in the front end thereof, within which the tool is positioned and thereby retained against lateral movement. A second pedal 51 is positioned adjacent the pedal 33 and is pivoted to the adjacent leg 2. Upon the opposite end of the pivoted pedal 51 is secured one end of the link 52, which has its opposite end connected to the pivoted rod 53, which is pivotally secured to the same leg 2 as pedal 51. Upon the opposite end of the rod 53 and nearly directly above the pedal 51, is secured the vertical rod 54, which is fastened at its upper end to the curved connecting member 55, which is secured at its opposite end to one of the angle bars of the frame 1. Pivoted to the curved portion of the member 55 are the meeting ends of the links 56, which extend in opposite directions and are connected at their outer ends to the depending ends of the jaws 57. The jaws 57 are pivoted at their central offset portions between the parallel bars 58, which rest upon the frame 1 and are secured together by the spacing and connecting blocks 59. Connected to the rod 53 and the under side of the frame 1 is a spring 60, which resiliently holds the rod 53 and vertical rod 54 in their upward positions to separate the jaws 57. When the tool is in position to be sharpened, the jaws 57 are normally raised to either side thereof a short

distance from the anvil 3, and by pressing upon the lever 51, the operator may bring the jaws 57 toward each other to grip the tool upon opposite sides to hold said tool securely in position at this point. When the operation of sharpening the tool is completed the operator raises his foot from upon the pedal 51 and thereby releases the grip of the jaws 57, allowing the latter to be forced outwardly from engagement with the tool by means of the spring 60, as previously described.

In operation the tool, after being heated, is placed upon the machine so that the heated end or point thereof to be sharpened or forged rests upon the anvil 3, while the opposite end rests within the grooved end of the car 46 and the wheel 37 is rotated to bring the car 46 in proper position so that the end of the tool resting therein is tightly positioned within the car. The finger 29 is drawn toward the handle 30 to disengage the lug 25 from the rack 24 and the power operated hammer 14 is adjusted by swinging the cylinder 12 and its connections upon the shaft 10 to give the desired bevel to the point of the drill or other tool. When these parts are in proper position the finger 29 is released and the lug 25 allowed to engage the teeth of the rack 24 to hold the hammer and its connections in this position, the weight of the cylinder 12, etc. being counterbalanced by the counterbalancing weight 19. The weight 19 also serves to absorb the shock incident to the striking of the hammer 14 upon the tool resting upon the anvil 3. The pedal 51 may then be engaged by the foot of the operator to cause the jaws 57 to grip the tool's shank adjacent the anvil 3 to prevent any unnecessary bounding or other movement of the tool while being operated upon by the hammer. The tool now being in proper position and the parts of the machine properly adjusted, the pedal 33 is manipulated by the operator to control the passage of the compressed air or other operating medium passing to the cylinder 12. By properly manipulating the pedal 33 the operator may vary the force of the strokes of the hammer 14 upon the tool, causing it to strike with great force or very lightly, as desired.

Thus, it will be seen that I have provided a tool sharpening machine which is adapted to sharpen tools of various characters, especially those employed upon machines adapted for use in mining chert, flint or other hard rock generally found in sheet form.

It will also be seen that the above described machine is adapted to forge or sharpen a tool having a point of any angle or bevel.

It will also be seen that the striking mechanism may be positioned so as to force

the hammer 14 squarely against the end of a tool, if so desired.

The machine is extremely simple and highly efficient in operation and, as the parts are of simple form and may be easily replaced whenever necessary, the machine may be manufactured and operated at an extremely low cost.

What I claim is:

1. A drill sharpening machine comprising a framework, means for supporting said framework, shaft mountings carried by said framework, a shaft mounted in said shaft mountings, a cylinder supported upon the said shaft, a piston working within said cylinder, a hammer upon the other end of said piston, an anvil mounted in said frame below the hammer, counterbalancing and shock absorbing means connected with said cylinder, said counterbalancing and shock absorbing means being adapted to counterbalance the weight of the cylinder and absorb the shock caused by the strokes of the piston and hammer, a lever upon one end of said shaft, a sleeve slidable upon said lever, a rack mounted upon said framework adjacent said lever, said sleeve adapted for engagement with said rack, means for disengaging said sleeve from said rack, said lever being adapted to be swung in reverse directions when the sleeve is disengaged from the rack to adjust the angle of the piston carrying the hammer in respect to the upper surface of the anvil, said anvil being adapted to receive thereupon the heated end of a tool to be sharpened, said hammer being adapted to strike upon the heated end of the tool to sharpen the latter, means for operating said piston to cause it to strike upon said tool, a rest for the opposite end of said tool, and means for adjusting said rest longitudinally of the framework.

2. A drill sharpening machine comprising a frame work, an anvil carried thereby, means carried by said frame work for holding a tool against said anvil, a transverse shaft carried by said frame work, parallel bars rigidly secured to said shaft, a cylinder mounted on said bars, a piston in said cylinder, a hammer connected thereto, a bar having a bifurcated end secured to said parallel bars, a counterbalancing weight carried by the other end of said bar, means carried by said shaft for adjusting said cylinder relative to said anvil, and means for operating said hammer.

3. A tool sharpening machine comprising a frame work, supporting means therefor, an anvil carried by said frame work and adapted to receive one end of a tool, a reciprocating carriage for supporting the opposite end of said tool, pivot jaws for gripping the shank of said tool, said pivot jaws being positioned near said anvil, links con-

necting said jaws, a connecting arm pivoted to said links, means carried by said frame work supporting means pivoted to said connecting arm for operating said jaws, and
5 tool sharpening means carried by said frame work.

In testimony whereof I have signed my

name to this specification in the presence of two subscribing witnesses.

JAMES W. COYLE.

Witnesses:

H. E. MOODY,
F. P. BLAIR.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents-
Washington, D. C."