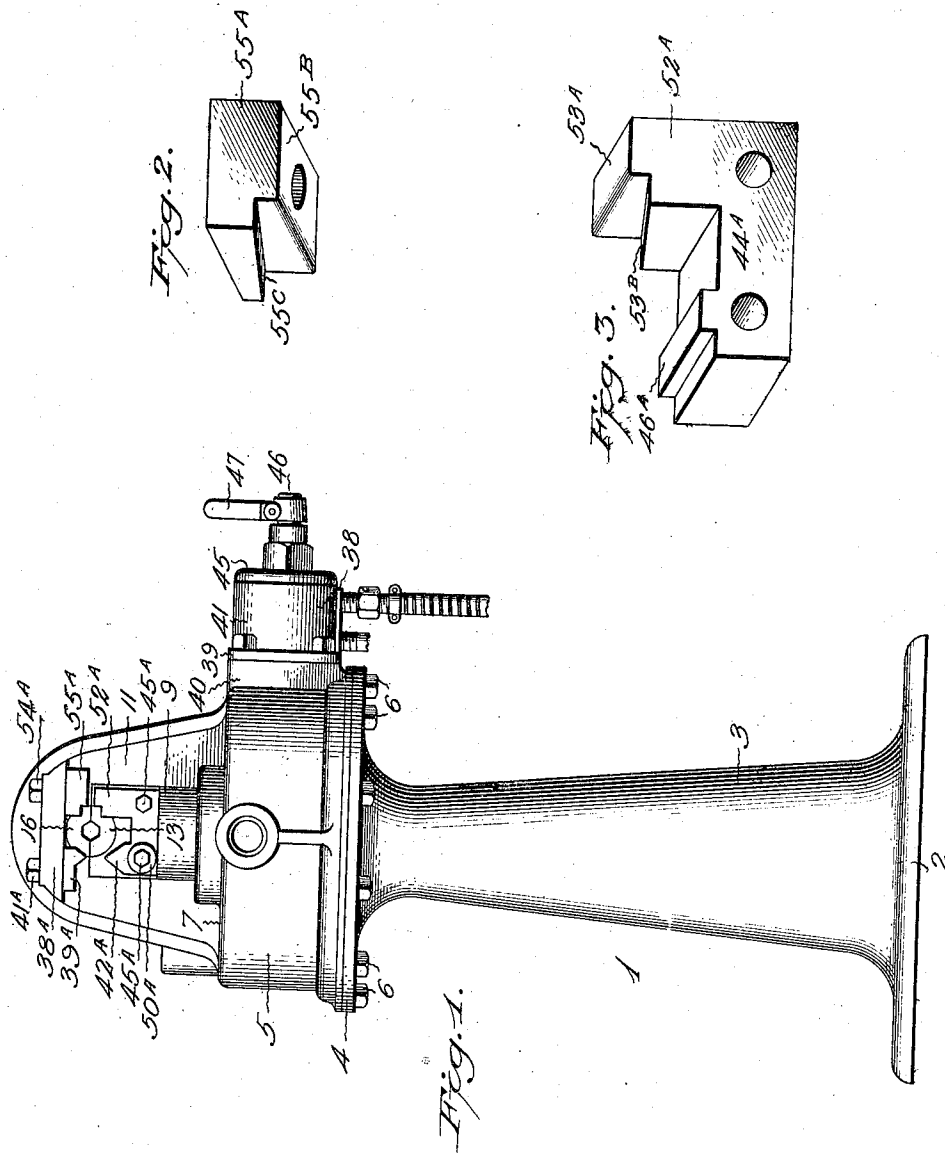


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 FLUID CONTROLLED DRILL BIT SWAGING AND SHARPENING MACHINE.
 APPLICATION FILED AUG. 13, 1907.

931,779.

Patented Aug. 24, 1909.



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JOHN GEORGE LEYNER, OF DENVER, COLORADO.

FLUID-CONTROLLED DRILL-BIT SWAGING AND SHARPENING MACHINE.

931,779.

Specification of Letters Patent.

Patented Aug. 24, 1909.

Application filed August 13, 1907. Serial No. 388,351.

To all whom it may concern:

Be it known that I, JOHN GEORGE LEYNER, a citizen of the United States of America, residing in the city and county of Denver and State of Colorado, have invented a new and useful Fluid-Controlled Drill-Bit Swaging and Sharpening Machine, of which the following is a specification.

My invention relates to a fluid or pneumatically controlled and operated rock cutting drill-bit sharpening machine; and the object of my invention is: to provide a simple, durable, accurate rock cutting lip multiple and interchangeable die holding and dolly striking compressed air or other fluid controlled and operated drill-bit holder, worker, former, and sharpener for the rock cutting drill-bits of rock drilling engines. I attain this object by the mechanism illustrated in the accompanying drawings, in which:

Figure 1, is a front elevation of the improved drill sharpener. Fig. 2, is a perspective view of the upper presser die, and Fig. 3, is a perspective view of the lower presser die.

Similar characters of reference refer to similar parts throughout the several views.

Referring to the drawings, the numeral 1, designates the supporting stand of my fluid controlled drill sharpener. This stand comprises a floor or foundation base 2, a hollow vertical column or standard 3, and a top or table portion 4, all of which are preferably made of circular form. Upon this supporting stand, I place the drill sharpener and holder, which comprises a cylinder 5, which sits on and is secured to the table portion of the stand by any suitable means, but preferably by bolts or cap screws 6. This cylinder is open at its bottom, the table portion forming its lower cylinder head, and it is closed at its upper end by an integral head 7. This cylinder is provided with an axial bore or piston chamber, in which a piston is reciprocally mounted, and which is provided with a short piston-rod 9, that extends through an aperture, formed in the upper head of the cylinder. A vertically projecting standard 11, is formed on the top of the cylinder, having a central bore, which forms a continuation of the aperture 10, in the upper cylinder head 7. The thickness of this standard is less than the diameter of the piston stem, hence its bore 12 is formed in diametrically opposite sides of the stand-

ard, while the piston rod projects laterally through the opposite faces of the standard as shown. The upper end of the piston rod, however, is reduced in width to correspond to the thickness of the standard, and in this upper end is formed a recess, in which is secured a drill holding die 13. The bore of the guide-way or standard 11, extends up into the standard a short distance above the end of the piston stem, and at its upper end it terminates into a semi-circular curve, in which a die 16 is fitted, which is a counterpart of the die 13.

My invention contemplates the use of an additional set of vise dies from that of the drill-bit holding and rib upsetting dies. These additional vise dies are adapted to press out and shape up the rock cutting lips after they are first formed on the drill steel, and are used independently of the drill-bit gripping and swaging dies, and in alternate order with them once or twice or three or more times, in forming and shaping up and finishing the rock cutting lips on the drill bits, as is necessary. There are several ways in which these jaw dies can be cooperatively used with the swaging jaws, and connected to the piston rod and standard to be fluid or pneumatically operated and controlled to work out the rock cutting lips of the drill bits, but I preferably carry out this feature of my invention in the following manner: Upon the front side of the standard, which is the side from which the drill-bits are inserted in the jaw dies constituting the vise, I form a forwardly projecting lug portion 38^A, to the under side of which I removably secure by bolts a swage die 39^A, which I term a clearance swage die. This swage die comprises a depending V-shaped lip or die portion which is adapted to work into the clearance spaces between the lips of the drill-bit, and a rectangular portion, which is adapted to be removably secured by a set screw 41^A to the under side of the projecting lug portion of the standard. On the piston rod, below this swage die, I removably secure a similar V-shaped swage die 42^A, which projects vertically upward in vertical alinement with the swage die 39^A. The swage die 42^A, is preferably made independent of its support in order that other forms of swage dies may be used in forming and shaping the drill bits. This support comprises a block 44^A, which is removably secured by cap screws 45^A to

the side of the piston rod. The swage die 42^A, may be secured to its supporting block in any desired manner, but I preferably provide the top of the block with a raised key lug 46^A, and form a key-way recess in the bottom of the swage die 42^A, to fit snugly but loosely over it, and provide a wide bearing surface on each side of the key way lug for the base of the swage die to sit on.

Swage dies differing in form from the V-shaped die 42^A, and adapted to be used with a different form of drill tool steel, can be used on the block 44^A, and are made interchangeable with the die 42^A. The swages are slightly thicker than the support 44^A, and in operation they are held upon the support by a washer 50^A, which is slipped upon the adjacent bolt 45^A, and thus clamps the swage against the piston stem, and holds it securely in place. The block 44^A is also provided with a die 52^A, for pressing out the ribs of cutting lips of the drill-bit. This die I term the lower presser or forming die. This presser die 52^A, comprises a vertical extension, which is provided with a flat top 53^A, at its outer end, and with a rearward and downward angular top surface 53^B on its inner edge (see Fig. 3), of the same angle of inclination as the upsetting die portion of the drill-bit gripping die 13. Above this lower presser die and in vertical alinement with it, I secure by a cap screw 54^A to the projecting lug portion of the standard, a die block 55^A, which I term the upper presser die. This upper presser die comprises a block that is provided with a flat face die 55^B, on its outer end, of the same size of the flat face die 53^A of the die 52^A, and arranged to register in alinement with the flat surface of the lower presser or former die, and with a rearward and upward diverging angular surface 55^C, on its inner side, arranged in alinement with the diverging angular surface 53^B, of the lower presser die. These two angular portions of these presser dies are adapted to permit the diverging conical head portion of the ribs of the drill-bit which is formed in the conical entrance to the half dies 13 and 16, to be pressed down smooth on their edges, while the flat top dies 53^A and 55^B of these die blocks 55^A and 44^A and the die portion 52^A of the block 44^A are used to press the sides of the ribs of the drill-bit down.

The cylinder is provided with a valve chest 38, which comprises a flange portion 39, that is bolted or is otherwise secured to a base portion 40, formed on the side of the cylinder, and a cylindrical portion 41 formed on the flange portion. This cylindrical portion 41, is formed with a valve chamber, and a cover 35 is threaded to it, and is provided with a hexagonal wrench receiving portion by which the cover may be screwed into it.

An axial aperture is formed through the

cover, and a valve stem 46 extends into and through the cap and is coupled to the valve, and to its outer end a handle 47 is secured.

The operation of my pneumatic drill sharpener is as follows: A supply of compressed air under the desired pressure is led from a source of supply through a pipe or hose 69, a fragment of which is shown in Fig. 1, to the lower end of the cylinder 5, below the piston, which will thereby be raised. A drill bit or a bar of drill steel, the point of which is to be resharpened, or on which a new set of rock cutting lips is to be formed, is previously placed in the lower half die 13 of the vise, which is moved up with the piston 9 until the bit is clamped between the dies 13 and 16, when its end is formed or sharpened in the manner shown and described in an application filed by me on June 8, 1907, No. 377,985. This first rock cutting lips forming action of the dolly invariably leaves a somewhat ragged fin of metal in the bottoms of the V-shaped spaces between the rock cutting lips; and in addition, the ribs back of the lips are not as smoothly, regularly, and as fully formed by this first action of the dolly as is required in a perfectly formed sharpened drill bit; consequently, it is necessary that the fins of metal at the bottoms of the interstices between the lips be pressed smoothly down, as these interstices form the clearance passages for the rock cuttings from the cutting edges of the lips between and past the ribs of the head portion to the body of the drill bit, and also that the ribs be smoothly pressed out along their sides between each other. These requirements lead to a working which I term the second working, which consists of removing the drill-bar from the gripping and holding jaws, which is done by turning the valve to admit compressed air to the top of the vise operated cylinder and piston, which causes the piston rod and the lower vise die to move instantly downward, thus releasing the drill bar. The operator then moves the drill bit to the V-shaped swaging dies and places the ribs over the edge of the lower die so that the edge of the die extends into the space between the ribs, and consequently such edges or uneven welts or fins of metal as have been swaged up by the first working action of the dolly bear directly on the edge of the lower die. The throttle valve is then opened by turning the crank, which causes the piston rod to instantly rise and moves the drill bit up against the upper swage die, which depends into the upper space of ribs on the opposite side of the drill bar, and the upward pressure of the lower die against the upper die swages the fins of metal between the ribs of the drill bit and also the adjacent sides of the ribs out smooth, and also shapes these clearance spaces out smooth, and presses bot

tom apexes into sharp clear straight lines down even with the longitudinal plane of the body of the drill bar. The operator then instantly reverses the air pressure to the top of the piston, and over the dies, and turning the drill bit places the next pair of cutting ribs over the edge of the lower die so that the die projects into the space between them, and again turns on the compressed air and raises the drill bit into the upper die and swages these sides and bottoms of this pair of cutting ribs out, and then releases and lowers the vise, piston, and dies, and again turns the drill bit on the lower die to the next pair of ribs, and repeats the operation until all of the sides and the fins and the bottom apexes of the ribs have been pressed out smooth and to the depth desired.

The operator having swaged out the sides of the ribs and the bottoms of the spaces between them until they are smooth and even, next proceeds to the third working, which consists of third, the thinning and narrowing of the ribs of the diverging conical head portion, which as a rule are too thick, and at the same time to widen the clearance spaces between the ribs, which as a rule are left too narrow by the first working action of the dolly, and in order to accomplish this, he places the ribs of the drill-bit one at a time on the lower presser die, placing the diverging edges of the ribs on the angular die surface and the side of a rib of the flat die surface of the lower presser die, and turns on air pressure into the cylinder, which forces the lower presser die up, and the diverging edge of the vertical upper lip against the angular die surface and the upper side surface of the side rib against the flat die surface of the upper presser die, and thus presses the edges and sides of the ribs of the diverging conical head of the drill-bit out as thin as desired. The drawing out of the

ribs can be done by alternately applying the drill-bit to the swaging and presser dies if desired. The drill-bit is then returned to the gripping and holding vise dies, and given the finishing working.

My invention contemplates broadly a fluid or compressed air controlled vise for holding a drill-bit, and a plurality of interchangeable and renewable vise dies fluid-controlled in the action and adapted to form perfect rock cutting lips, supporting ribs, and clearance spaces on rock cutting drill-bits.

While I have illustrated and described the preferred construction and arrangement of my fluid controlled or pneumatic drill sharpener, I do not wish to be limited to the precise construction and arrangement shown and described, as many changes might be made without departing from the spirit of my invention.

Some of the features of this invention are shown in my pending applications Serial Numbers 377,985 and 400,955.

Having described my invention, what I claim as new and desire to secure by Letters Patent, is:

In a fluid operated drill sharpener, the combination of the base, the cylinder, the piston, the supporting yoke above said piston on said cylinder, and the fixed V-shaped clearance spacing half die fixed to said yoke, with a V-shaped half die secured to said piston to register opposite to and in alignment with said yoke's fixed clearance spacing half die, and a valve and ports operatively connected to said cylinder and piston.

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

JOHN GEORGE LEYNER.

Witnesses:

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