UNITED STATES PATENT OFFICE.

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DRILL-SHARPENING APPARATUS.

1,159,722.


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To all whom it may concern:

Be it known that I, ARTHUR H. SKAER, a citizen of the United States, residing at Denver, in the county of Denver and State of Colorado, have invented new and useful Improvements in Drill-Sharpening Apparatus, of which the following is a specification.

The present invention relates to drill sharpening apparatus, and more particularly to the clamping or die operating mechanism thereof.

One of the primary objects is to provide a compact structure, in which a cylinder of relatively small diameter may be employed, together with means for effecting a powerful clamping action upon the relatively movable die members, said means being actuated by the piston in said cylinder.

In the drawings:—Figure 1 is a side elevation of a machine embodying the invention, and Fig. 2 is a vertical sectional view on the line 2—2 of Fig. 1.

Similar reference numerals designate corresponding parts in all the figures of the drawings.

In the embodiment disclosed, a base is employed, comprising a tubular lower portion 3 having an outstanding foot flange 4 and upstanding spaced side walls 5, said tubular portion thus forming an internal bore 6 therein that communicates with an internal chamber 7 formed between the side walls. The chamber 7 is accessible through opposite sides of the base, the openings, however, being normally closed by removable slides 8 having handles 9, whereby they may be readily operated.

Mounted upon the side walls 5 is a lower stationary die member 10 carrying a suitable work clamping die 11. An upper movable die member 12 is located above, and cooperates with the lower member 11, being provided with an upper clamping die 13 which coacts with the lower die 11.

The upper die member 12 is rigidly secured to a pair of vertical spaced side rods 14 having heads 15 that rest upon said die member, said rods having sliding bearings 16 in the lower die member and extending downwardly through the chamber 7, their lower ends 17 being reduced in diameter and being slidably mounted in guideways or sockets 18 formed in diametrically opposite portions of the tubular portion 3 of the base.

A cross head 19 connects the two side rods 14 beneath the lower die member 10, said cross head being abutted against shoulders 20 formed at the juncture of the reduced portions 17 of the side rods with the portions of maximum diameter. Jam nuts 21 located upon the said portions 17 bear against the under side of the cross head and serve to secure the same in place.

Sets of vertically disposed spaced toggle links 22 are located in the chamber 7 between the side rods 14, the upper ends of said toggles being mounted on pivots 23 extending across the chamber 7 directly beneath the lower die member 10. The lower ends of these toggles have pivotal connections 24 with the cross head 19. The central pivots 25 of said sets of toggles are connected by a cross toggle, comprising links 26 pivoted together at their center, as shown at 27.

Located in the tubular portion 3 of the base is a vertically disposed cylinder member 28 having an upper head 29 and a lower head 30, said lower head being secured in place by screws 31 which pass through a flange 32 formed on the lower end of the cylinder 28 and into the tubular portion of the base, thus securing the cylinder member in place. It will be noted that the said flange 32 is seated against an abutment shoulder 33 formed in the lower portion of the base, thus the cylinder member is securely held in position, but is readily accessible and removable as will be obvious. Operating in the cylinder member is a reciprocatory piston 34 having a piston rod 35 that extends upwardly through a stuffing box 36 formed in the upper cylinder head 29, the upper end of the piston rod 35 being connected to the pivot 27 of the cross toggle.

Any suitable means may be employed for introducing motive fluid to and exhausting it from the cylinder member, no claim being herein made to the supply and exhaust means nor to the mechanism for controlling the same. It will be evident that with this structure when the piston is elevated by motive fluid introduced into the cylinder member beneath the same, the upward movement of the piston rod 35 will cause the cross toggle links 26 to assume an acute angular relation, thereby drawing the sets of side toggles toward each other and causing the cross head 19 to be elevated. This will in turn elevate the side rods 14 and the upper die 11.
member 12, so that the two die members will be separated. Having introduced a tool between the dies, if motive fluid is now introduced into the cylinder member 22 above the piston 34 and motive fluid beneath said piston is allowed to escape, it will be obvious that a downward movement of the piston will take place, all the sets of toggles will be straightened, thereby effecting a downward movement of the cross head 19, the side rods 14 and the upper die member 12, so that the tool will be effectively clamped by and between the dies.

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

1. In apparatus of the character set forth, the combination with coacting die members, of a cross head connected to one of the members, toggles connecting the cross head and the other member, a cylinder member, and a piston operating therein and having cooperating connections with said toggles.

2. In apparatus of the character set forth, the combination with coacting die members, of a cross head connected to one of the members, sets of toggles connecting the cross head and the other member, another set of toggles connecting the first mentioned sets, a cylinder member, and a piston operating therein and connected to the last mentioned toggles.

3. In apparatus of the character set forth, the combination with coacting die members, of spaced side rods connected to one of the die members, sets of toggles connected with the side rods, a cylinder member, a piston operating in the cylinder member and means connecting the piston with all of said sets of toggles for operating the same.

4. In apparatus of the character set forth, the combination with relatively movable coacting die members, of spaced side rods connected to one of the die members, sets of toggles connected to the side rods, a cylinder member, a piston operating in the cylinder member and means for swinging said sets toward and from each other.

7. In apparatus of the character set forth, the combination with coacting die members, of spaced side rods connected to one of the members, a cross head connecting the side rods, sets of toggle links interposed between the other member and the cross head, a cross toggle connecting the sets of toggles, and means for moving the cross toggle to swing said sets toward and from each other.

8. In apparatus of the character set forth, the combination with a lower die member, of an upper movable die member coacting therewith, spaced side rods connected to the upper member, a cross head connecting the side rods beneath the lower member, sets of toggle links interposed between the cross head and the lower die member, a cylinder member located beneath the lower member, and a piston operating in the cylinder member and connected to the toggle link for operating the same.

9. In apparatus of the character set forth, the combination with a base, of a lower die member mounted thereon, an upper movable die member coacting with the lower member and disposed above the same, spaced side rods connected to the upper member and extending downwardly into the base, a cross head connected to the side rods beneath the lower die member, sets of toggle links located beneath the side rods and interposed between the lower die member and the cross head, a cross toggle connecting the said sets, a cylinder member disposed below the lower die member, and a piston operating therein and having an upstanding piston rod connected to the cross toggle.

10. In apparatus of the character set forth, the combination with a base, of coacting relatively movable die members mounted thereon, side rods connected to one of the members and having upper and lower sliding bearings in the base, and means connected to the side rods between said bearings for moving the rods.

11. In apparatus of the character set forth, the combination with a base, of coacting relatively movable die members mounted thereon and including an upper movable member, side rods connected to said upper member and slidably passing through the lower member, said side rods having sliding bearings at their lower ends in the base, and means connected to the side rods between the lower bearings and the upper member for reciprocating the rods.

12. In apparatus of the character set forth, the combination with a base, of a lower die member mounted thereon, an upper die member movable toward and from the lower die member, spaced side rods connected to the upper member, said side rods slidably passing through the lower member. 
and having slidable bearings at their lower ends in the base, a cross head connected to the rods between the lower die member and the sliding bearings, and means connected to the cross head for reciprocating said rods and thereby the upper die member.

15. In apparatus of the character set forth, the combination with a base comprising a lower tubular portion and spaced side walls thereon, of relatively movable coating die members arranged on the side walls, a cylinder member in the tubular portion of the base, a piston operating in the cylinder member, and means connected to the piston and to the die members and located between the side walls for relatively moving said die members.

14. In apparatus of the character set forth, the combination with a base comprising a lower tubular portion and spaced side walls thereon, of relatively movable coating die members arranged on the side walls and including an upper movable member, spaced side rods connected to the upper member and having sliding bearings at their lower ends in the tubular portion of the base, a cylinder member in the tubular portion, a piston operating in the cylinder member, and means connected to the piston and to the side rods and located between the side walls of the base for relatively moving the die members.

15. In apparatus of the character set forth, the combination with a base comprising a lower tubular portion and spaced side walls thereon, of a lower die member mounted on the side walls, an upper die member located above the lower die member and movable toward and from the same, spaced side rods carrying the upper member, said side rods slidably passing through the lower member and having their lower ends slidably mounted in the tubular portion of the base, a cross head connecting the side rods between the side walls of the base, sets of toggle links connected to the base and to the cross head, a cross toggle connecting the sets of toggles, an upright cylinder member located in the tubular portion of the base, and a piston operating in the cylinder member and having an upstanding piston rod connected to the cross toggle.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

ARTHUR H. SKAER.

Witnesses:
F. L. EMERSON,
H. W. TAYLOR.

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