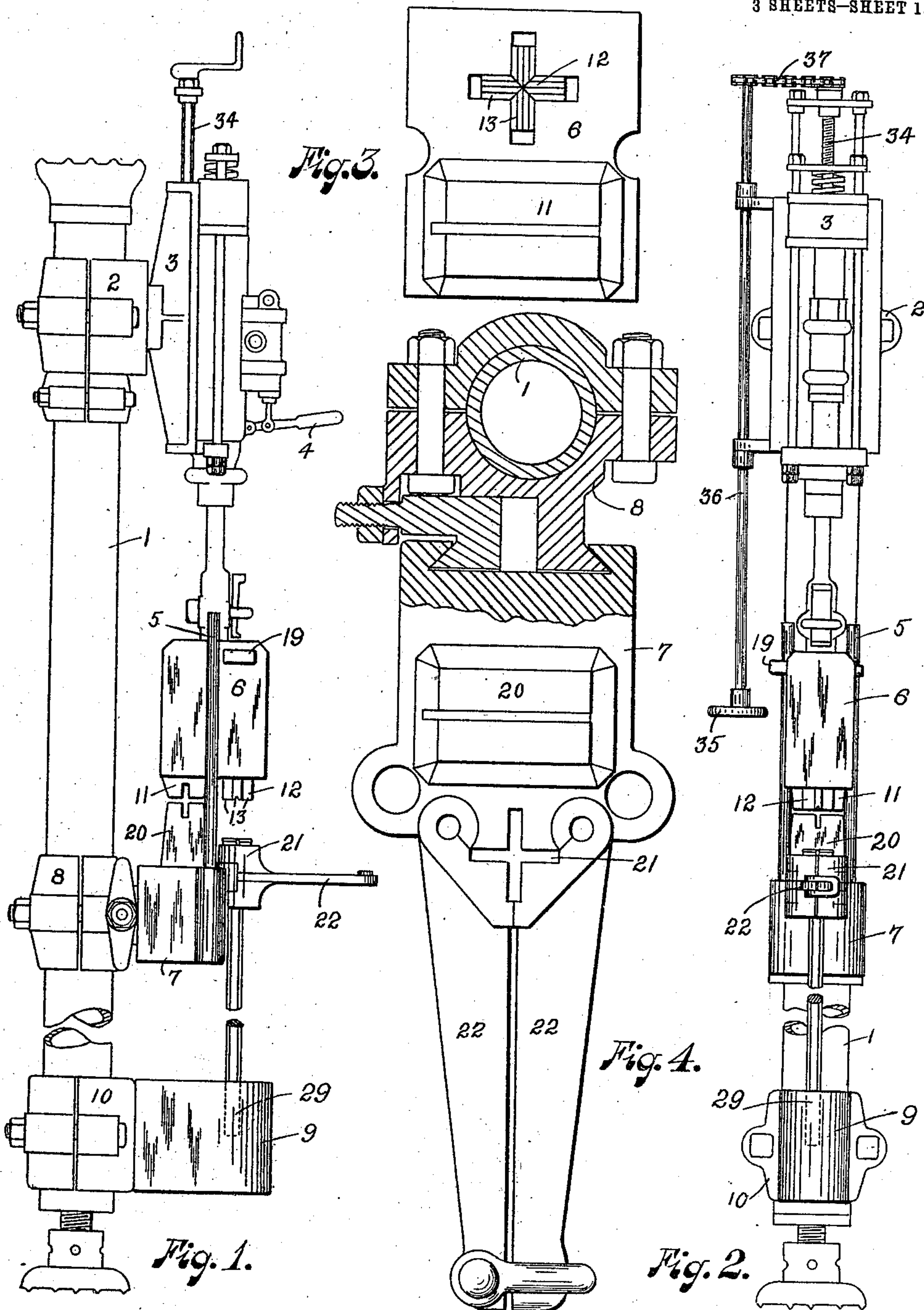


W. H. SMYTH.
 APPARATUS FOR SHAPING AND SHARPENING ROCK DRILL BITS.
 APPLICATION FILED JAN. 20, 1906. RENEWED MAY 25, 1911.

996,807.

Patented July 4, 1911.

3 SHEETS—SHEET 1.



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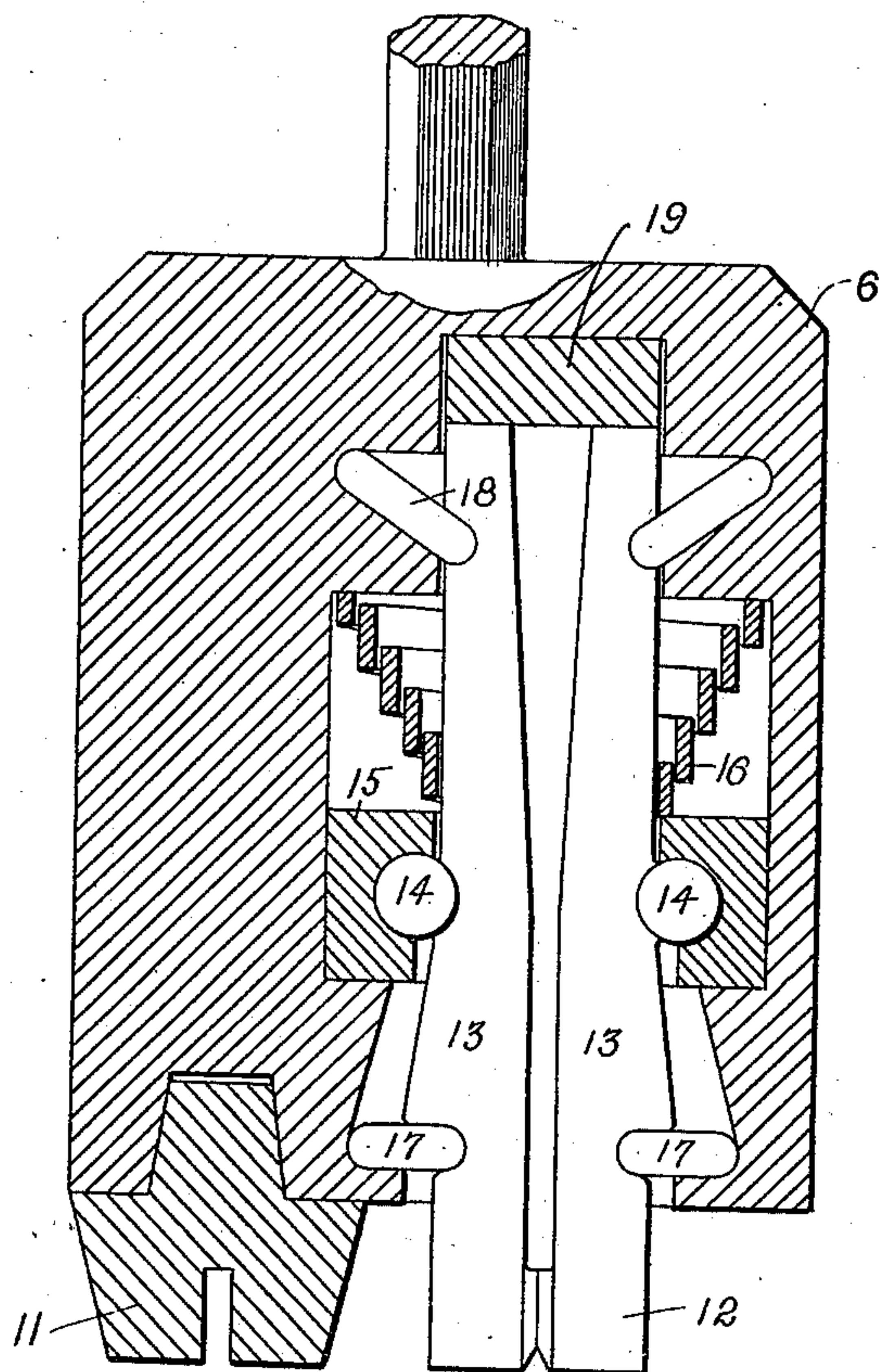


Fig. 5.

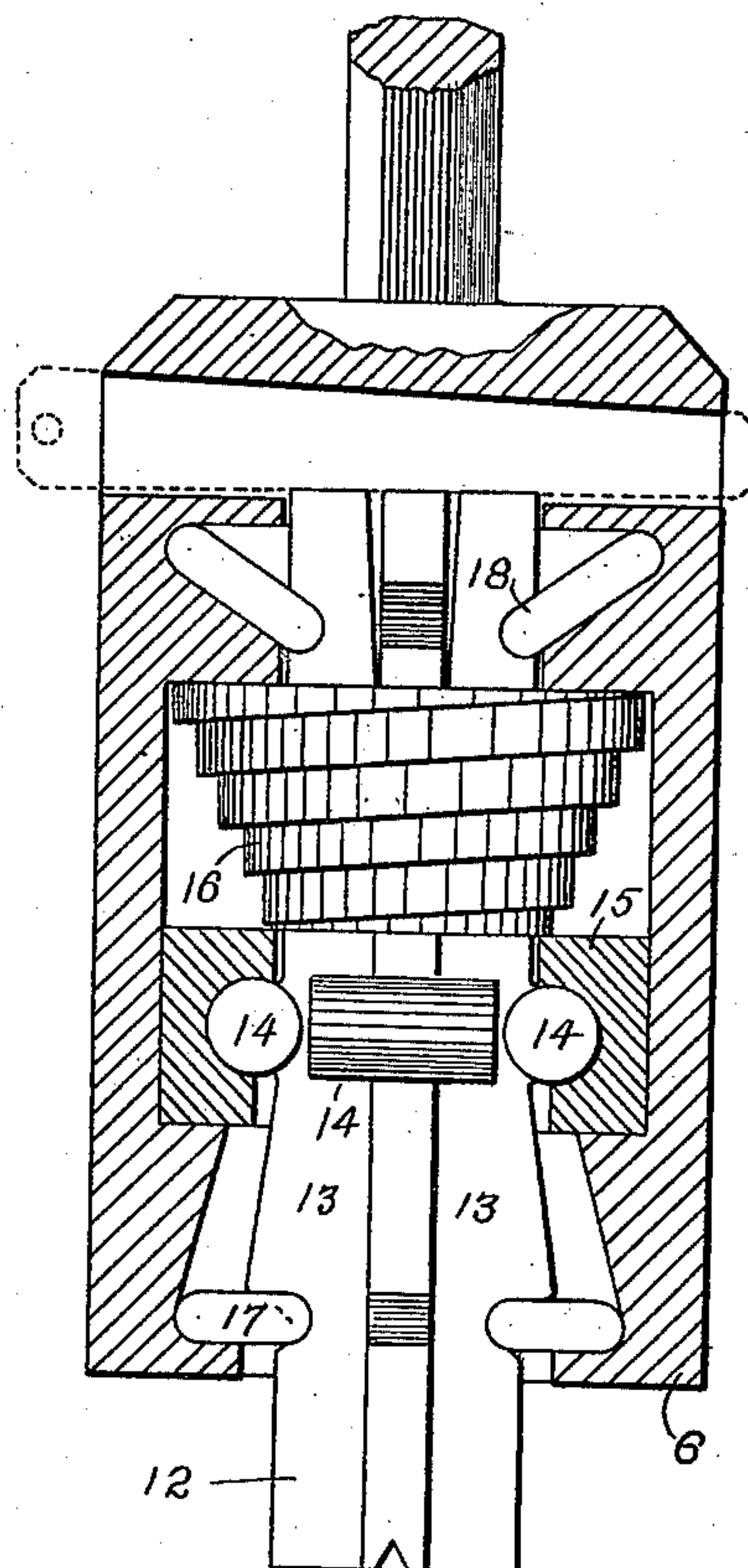


Fig. 7.

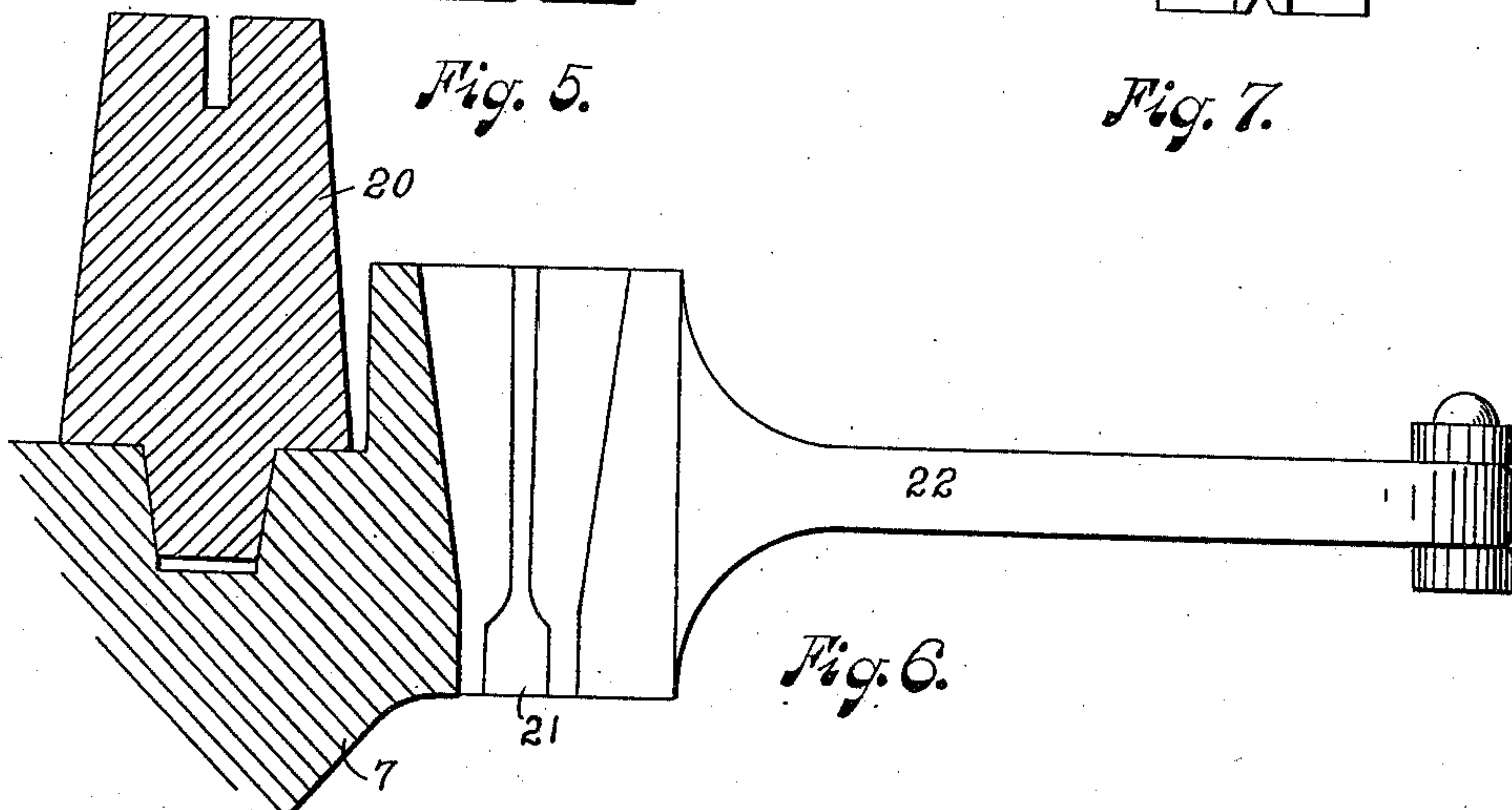


Fig. 6.

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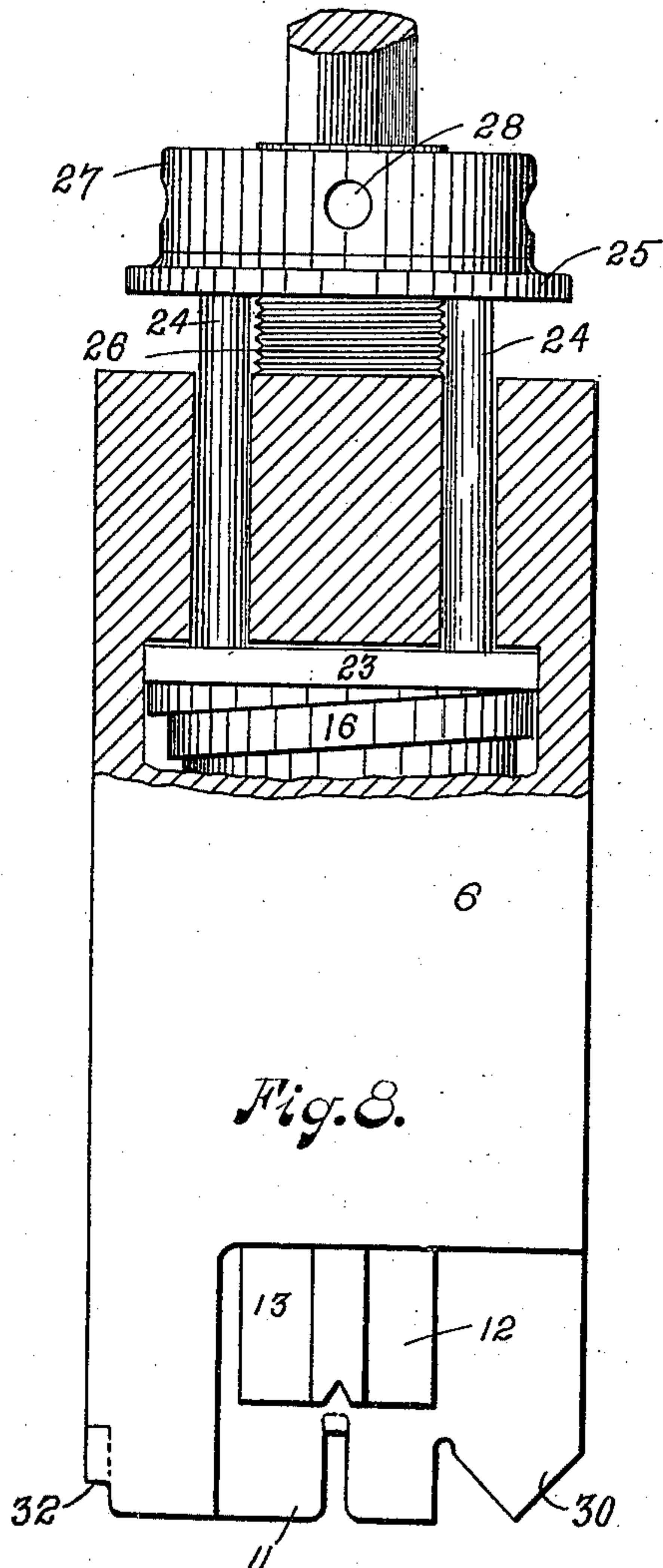


Fig. 8.

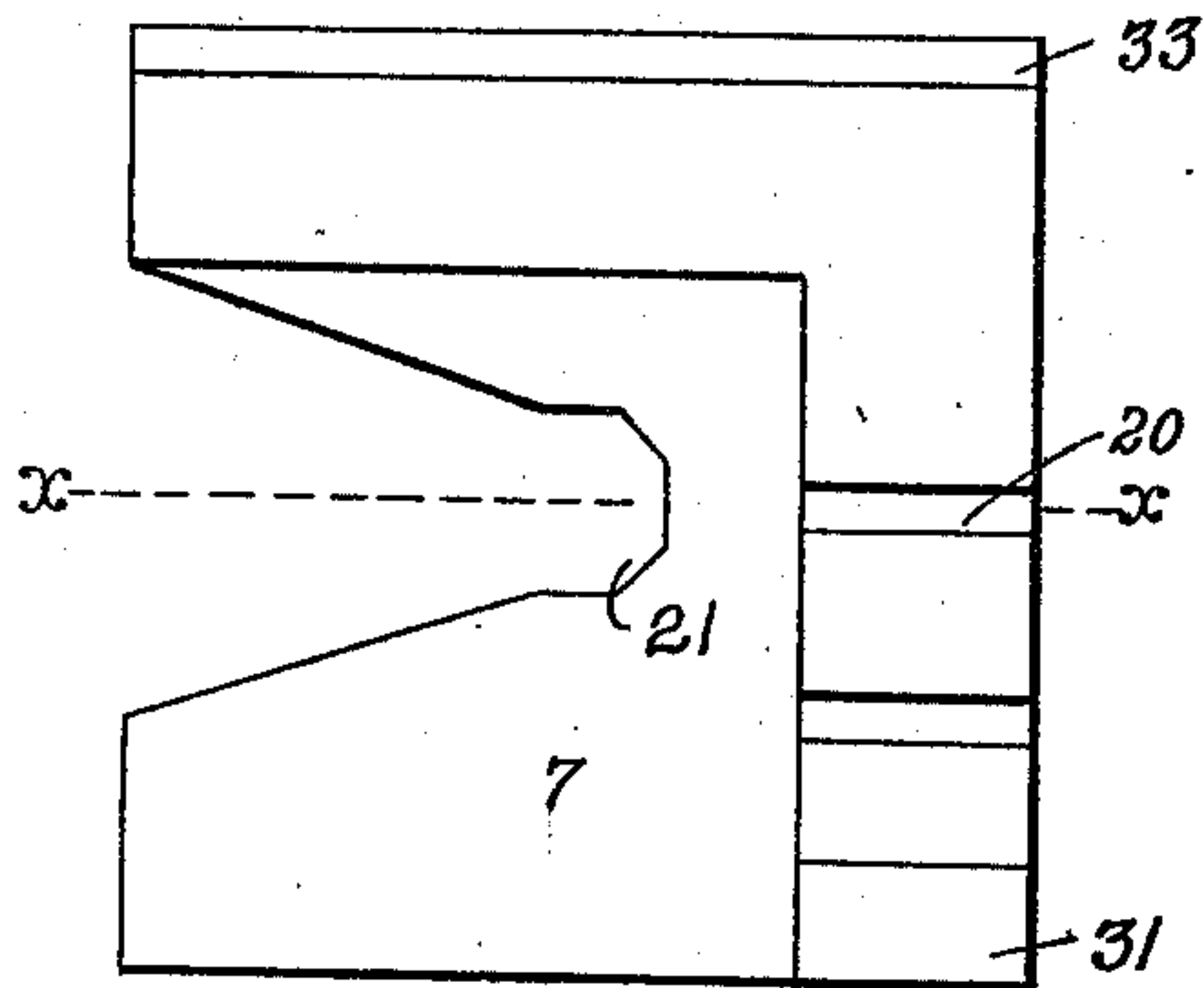


Fig. 10.

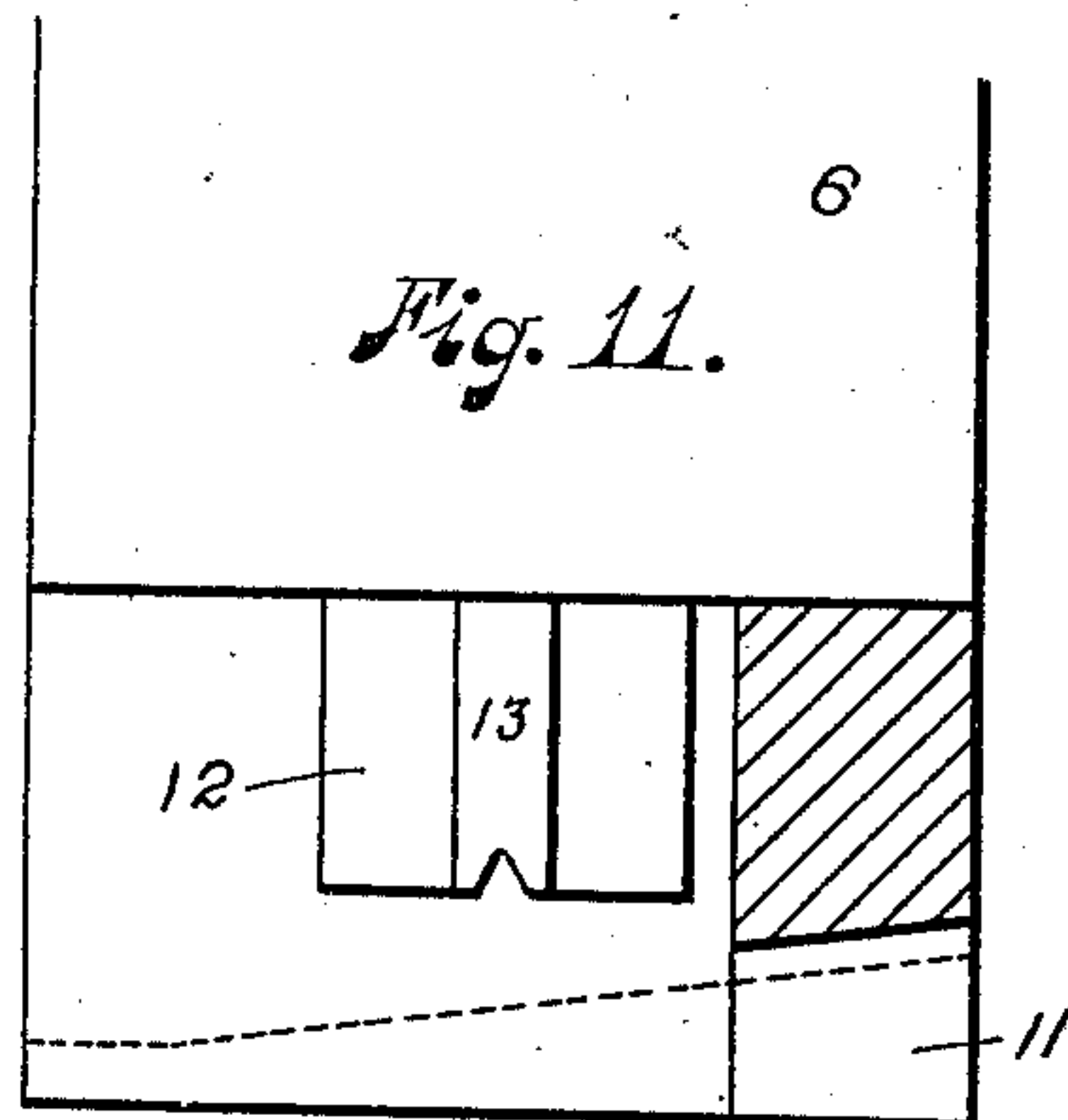


Fig. 11.

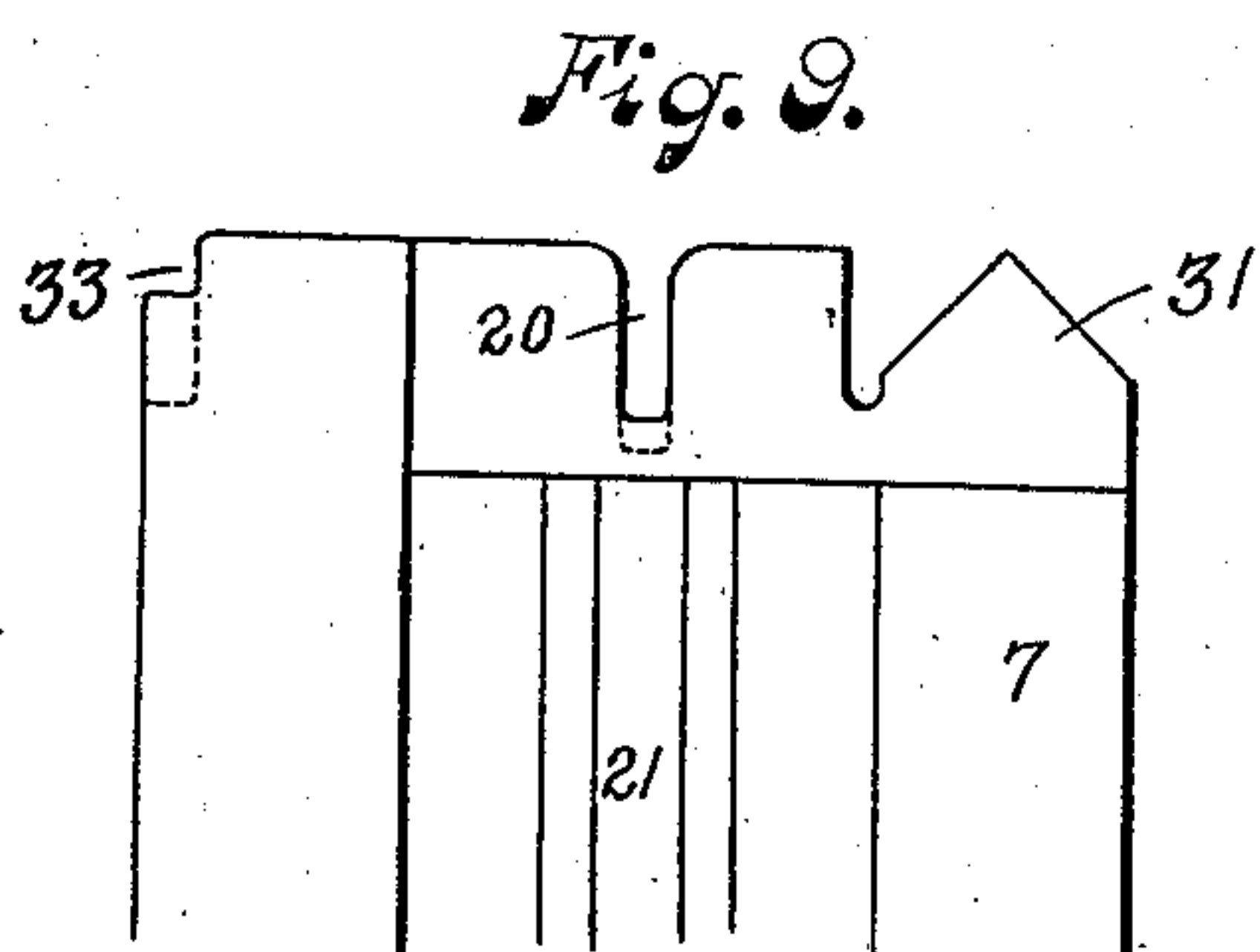


Fig. 9.

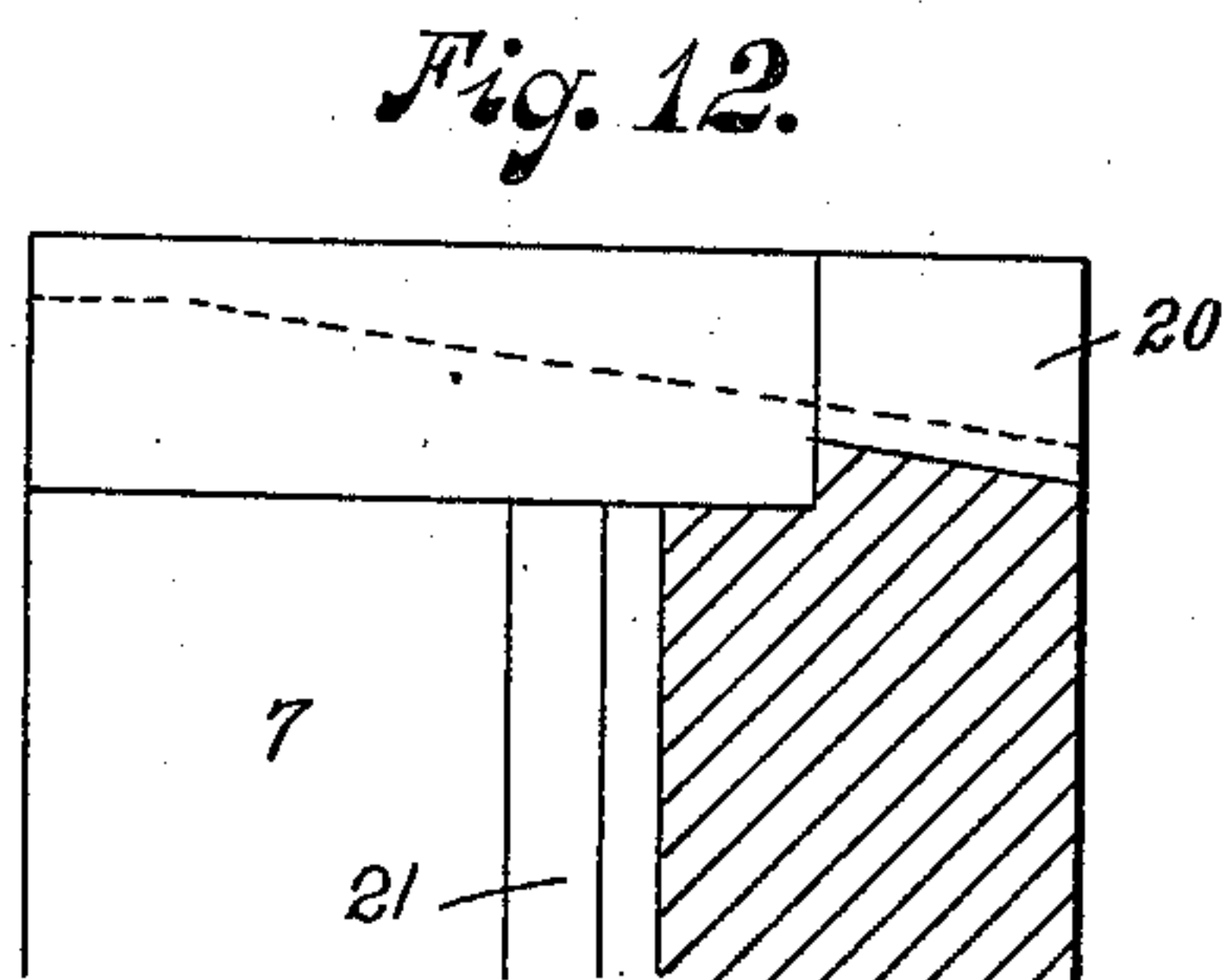


Fig. 12.

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UNITED STATES PATENT OFFICE.

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APPARATUS FOR SHAPING AND SHARPENING ROCK-DRILL BITS.

996,807.

Specification of Letters Patent.

Patented July 4, 1911.

Application filed January 20, 1906, Serial No. 297,076. Renewed May 25, 1911. Serial No. 629,486.

To all whom it may concern:

Be it known that I, WILLIAM H. SMYTH, citizen of the United States, residing at Berkeley, in the county of Alameda and State of California, have invented certain new and useful Improvements in Apparatus for Shaping and Sharpening Rock-Drill Bits; and I do hereby declare the following to be a full, clear, and exact description of the same.

This invention relates to apparatus for shaping and sharpening rock drill bits.

It has for its object, a more simple, cheap and efficient device for the purpose.

Heretofore in machines designed for this character of work, it has been customary to employ two or more machine hammers, and a dolly or dollies separate from the hammer. The dolly is thus subject to a doubly deteriorating action; its necessary wear by contact with the bit and the unnecessary and useless effect of the impact of the hammer on its other end.

Another object therefore of the present invention is to so arrange the device as to perform all the necessary operations with but one machine hammer and to avoid to a great extent, the deterioration of the dolly, other than by contact with the bit.

In practice, it is frequently desirable to have the device for sharpening the bit close to the place of use, which may, from time to time, be changed over a considerable area. The machines heretofore employed for the present purpose have been of such character as to render it practically impossible to move them from place to place, being designed as stationary and not as portable machines and consequently needing a prepared foundation.

So, another object of the present invention is to provide a portable or knock-down machine for the purpose, which can be set up and operated any place where a rock drill can be used and with practically equal facility.

I accomplish these objects by means of the devices illustrated in the accompanying drawings in which:—

Figure 1 is a side elevation. Fig. 2 is a front elevation. Fig. 3 is a bottom plan of a hammer head on enlarged scale. Fig. 4 is a plan view of a detail, partly in section,

on the same scale as Fig. 3. Fig. 5 is a section of hammer head on enlarged scale. Fig. 6 is a section of an anvil block on the same plane as Fig. 5. Fig. 7 is a section of a hammer head at right angles to Fig. 5. Fig. 8 is a front elevation, partly in section, of a slightly modified form of hammer head. Fig. 9 is a similar view to Fig. 8 of an anvil block. Fig. 10 is a plan view of Fig. 9. Fig. 11 is a side elevation of a portion of Fig. 8, partly in section. Fig. 12 is a section through line X X of Fig. 10.

Referring to the drawings, 1 is a suitable bar, column or standard, preferably such as is commonly employed to attach rock drills to, under their various conditions of use.

2 is a clamp or other suitable attaching device for a rock drill engine.

3 is a rock drill engine of any of the ordinary commercial forms secured to the column by means of the clamp 2. The engine 3 is provided with any suitable stopping and starting valve or mechanism to be operated by foot or hand. It is shown in the present instance as a handle 4 connecting with its valve.

The rock drill shown in the drawing is, as has already been stated, an ordinary rock drill with the exception that the rotating device for the piston has been removed. Guides 5 are provided to prevent the accidental rotation of the piston.

6 is a hammer head, the construction of which will be more particularly described hereinafter.

7 is an anvil block which is also secured to the column by a suitable clamping device 8 and in it the guides 5 may be suitably fitted to slidably engage with the hammer head.

9 is a chock or drill rest which is also secured to the column by a clamp 10.

The hammer head 6 is preferably secured to the piston of the rock drill by the ordinary bit chuck and travels therewith and is provided with means for shaping and sharpening the drill bit. These consist of splitting and shaping tools for forming the end of the bit into + section or other suitable shape. One such tool is illustrated at 11, Fig. 5. It is also provided with a spreading or swaging dolly 12. This dolly

is of somewhat peculiar construction in that it is divided into separate wings or sections 13, each of which operates upon one of the wings of the bit. Each of the wings 13 is provided with a trunnion or pivot 14 journaled in a slidable block 15. Preferably surrounding the dolly is a spring 16 resting upon and opposing the movement of the block 15. Each of the members 13 of the dolly is provided with toggles 17 and 18 respectively. Above the dolly and seated transversely in the hammer head is a removable wedge 19.

The anvil 7 may be of any suitable form and be provided with appropriate shaping or forming devices, such being represented by the sow 20 and the centering and sizing device 21. This latter may be constructed with hinge sides 22 as shown in Figs. 4 and 6.

It may be advisable under some circumstances to adjust the tension of the spring 16 and for this purpose I have shown in Fig. 8, an adjusting device consisting of a plate 23 and rods 24 passing upwardly through the upper portion of the hammer head to the exterior thereof. On the outside is a plate 25 engaging with rods 24 and loosely surrounding a threaded upward extension 26 of the hammer head. A nut 27 upon the threaded upward extension is provided, having holes or recesses 28 or other suitable means for turning it.

The hammer head and anvil block illustrated in Figs. 8 and 9 and associated Figs. 10, 11 and 12 illustrate a slight modification in which the centering device 21' consists merely of a recess concentrically above the pocket 29' in the lower anvil block or chock 9' and consequently concentric with the dolly 12'. The wing forming devices are also slightly modified. On one side of the hammer head is shown a V shaped splitter 30' and a corresponding inverted V shaped splitter 31' on the anvil block. Wing formers 32' and 33' are provided on the opposite and corresponding sides of the hammer and anvil, respectively.

The drill engine is feedable longitudinally by the ordinary feed screw mechanism 34, which may remain unchanged and serve for adjusting the position of the hammer. For convenience, a hand wheel 35 may be connected by a suitable shaft 36 and sprocket chain 37 with the screw 34 as shown in Fig. 2. This would take the place of the ordinary handle employed to feed the drill under the usual conditions.

In operation, the bar end is made into + form section by the use of the splitter and other shaping tools upon the hammer head and anvil. The bar is then placed in the socket 29, the + formed end uppermost and centered beneath the sharpening dolly by means of the centering device 21 and the

end is finished and sharpened by end blows of the dolly. The feed, adjustment and control of the positions or relations between the drill bit and the hammer is effected by the ordinary screw feed of the drill, operated either by the ordinary handle or the hand wheel 35. Owing to the construction of the dolly, two radically different character of blows can be used at will. When the wedge 19 is in place, the dolly is locked and is practically solid and integral with the hammer head and consequently under these circumstances, would strike a blow in all respects similar to that which would be struck were the dolly in fact solid and an integral part of the hammer head. By removing the wedge however, the dolly on striking the drill end, compresses the spring 16 and moves backward relatively to the hammer head, consequently the toggles 18 force the upper ends of the dollies toward each other and consequently the lower or striking ends outwardly radially from their combined center owing to their being pivoted in block 15. The result of this is to cause the dollies to strike the drill with a longitudinal and an outward spreading or sliding blow. Each blow of each dolly section 13 commences at the center of the bit. The sliding character of the blow has a doubly desirable effect, it not only upsets the drill end but it also condenses and hardens the working surface leaving it with a smooth and polished finish which greatly enhances the life and efficiency of the bit.

It will be seen from the foregoing that but one hammer is necessary to form and sharpen bits and consequently loss of time avoided as the whole operation is performed in one place. It will be seen also that under most circumstances, great expense is avoided as a large proportion of the device consists of the ordinary parts of commercial drilling appliances with the addition of inexpensive tools which transform an ordinary drill into a portable bit shaping and sharpening machine. For example, the column or bar 1 is the ordinary column or bar employed in mining or quarrying, either vertical or horizontal. The clamps are the ordinary clamps by which drills are usually secured to such columns or bars, so that any spare drill and column may be, by means of the devices illustrated herein, readily and cheaply transformed into an efficient portable drill shaper and sharpener.

When the term column is used herein, it is to be understood to include quarry and drifting bars and like portable devices to which rock-drills may be attached.

What I claim, is:—

1. A knock-down shaping and sharpening device for rock drill bits and the like, comprising a portable column, a mechani-

cally operated hammer with a slidable clamp to secure it to the column, a bit chock adapted to receive a bit and oppose blows of the hammer and means adapted to center the bit.

2. A bit shaping and sharpening device comprising a rock-drill-column, a slidable clamp secured thereon, a rock-drill engine attached to the column by the clamp and provided with a hammer head, a second substantially similar clamp on the column having an anvil provided with bit shaping devices in the path of the hammer head suitably arranged that the hammer head and anvil cooperate to shape or form the drilling end of the bit.

3. A bit shaping and sharpening device comprising a column, a fluid actuated feedable hammer mechanism clamped thereon having a reciprocating hammer head provided with bit shaping devices and guides to prevent the rotation of the hammer head, a bit chock attached to the column adapted to receive a bit and oppose blows of the hammer head, a centering device for the bit and an anvil intermediate of the hammer and chock provided with bit shaping devices.

4. In a bit shaping and sharpening device, a support, a dolly comprising pivoted members mounted and arranged to have longitudinal motion with respect to said support and means whereby the movement of the dolly longitudinally will simultaneously impart arc motion to said members through engagement thereof with the end of the bit.

5. In a bit shaping and sharpening device, a dolly carrier, a pivoted dolly mounted and arranged to have longitudinal motion with respect to the carrier and means whereby the movement of the dolly longitudinally will simultaneously impart arc motion thereto.

6. In a bit shaping and sharpening device, a dolly carrier, a dolly comprising separable members mounted and arranged to have longitudinal motion with respect to the dolly carrier and means whereby the movement of the dolly longitudinally will simultaneously impart lateral motion to the members thereof.

7. In a bit shaping and sharpening device, a dolly carrier, a dolly mounted and arranged to have longitudinal motion with respect to the carrier and means whereby the movement of the dolly longitudinally will simultaneously impart lateral motion thereto.

8. In a bit shaping and sharpening device, a dolly carrier, a dolly mounted and arranged to have longitudinal motion with respect thereto and cooperating means between the dolly and dolly carrier whereby longitudinal motion of the dolly will cause lateral motion thereof.

9. A bit shaping and sharpening device

comprising a column, a hammer clamped thereon and provided with bit shaping devices and a feed mechanism, a bit chock attached to the column adapted to receive and center a bit and oppose blows of the hammer and an anvil intermediate of the hammer and chock provided with bit shaping devices for cooperation with the shaping devices of the hammer.

10. A bit shaping device comprising a column, a mechanically operated hammer clamped thereon, a bit chock attached to the column adapted to receive a bit and oppose blows of the hammer and an anvil intermediate of the hammer and chock provided with bit shaping devices in the path of and cooperating with the hammer.

11. In a bit shaping and sharpening device, a hammer head, a block slidably secured therein provided with pivoted dollies, a spring interposed between the block and hammer head and toggles between said dollies and hammer head whereby through the motion of the block in hammer head, longitudinal and lateral motion is simultaneously given to the dollies.

12. A hammer head provided with a shank adapted to engage with a rock drill chuck and provided with bit wing shaping means and a laterally movable sharpening dolly adapted to engage with the end of the bit and suitable opposing devices to cooperate with the shaping and sharpening means.

13. A hammer head provided with a shank adapted to engage with a rock drill chuck and provided with bit wing shaping means and a sharpening dolly adapted to engage with the end of a bit and suitable opposing devices to cooperate with the shaping and sharpening means.

14. In a bit shaping and sharpening device, a hammer head, a block slidably secured therein and provided with a dolly mounted and arranged to have lateral movement, means between the dolly and hammer head whereby longitudinal movement of the dolly will cause lateral movement of the dolly and a spring interposed between the block and hammer head to resist the forward motion of the hammer head.

15. In a bit shaping and sharpening device, a hammer head provided with a dolly pivotally supported for lateral movement, and means for effecting the movement of the dolly.

16. In a bit shaping and sharpening device, a hammer head, means constructed and arranged to slide on the hammer head longitudinally thereof, dollies pivotally connected to said means for lateral movement, and means for affecting the lateral movement of the dollies upon the longitudinal sliding movement thereof.

17. In a mechanically operated bit shaping device, a dolly consisting of a multi-

plicity of pivoted longitudinally slidable members and means for effecting the pivotal motion of the dolly members.

18. In a mechanically operated bit shaping device, a pivoted slidable dolly and means for effecting the movement of the dolly.

19. In a device for shaping and sharpening drill bits and in combination, an endwise movable dolly, means for imparting endwise motion thereto, a toggle engaged with the dolly whereby the endwise movement of the dolly is constrained to a curved path.

20. In a device for shaping and sharpening drill bits and in combination, an endwise movable dolly consisting of a multiplicity of movable members arranged around a central point in the line of endwise motion, means for imparting motion to the multiple dolly, and toggles engaging with the members whereby their endwise movement is curved.

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