No. 815,720. PATENTED MAR. 20, 1906.

W. P. LIGHTBODY.

MECHANISM FOR SHARPENING ROCK DRILLS.

APPLICATION FILED JULY 2, 1904.

2 SHEETS—SHEET 1.

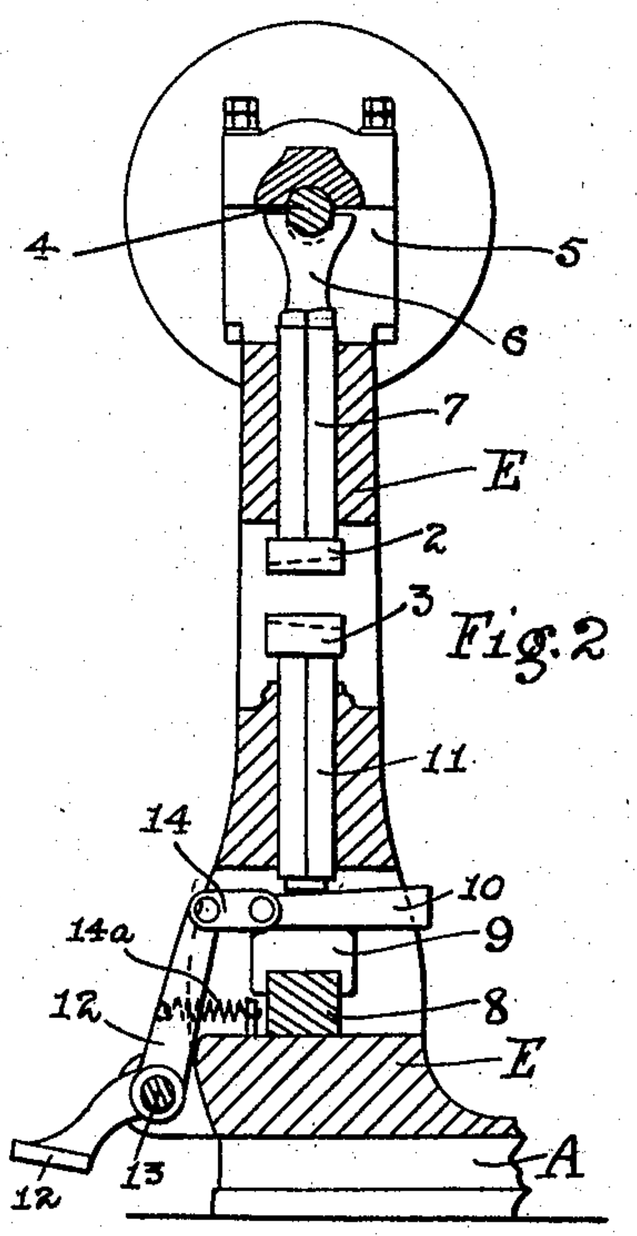

Fig. 2

Fig. 4

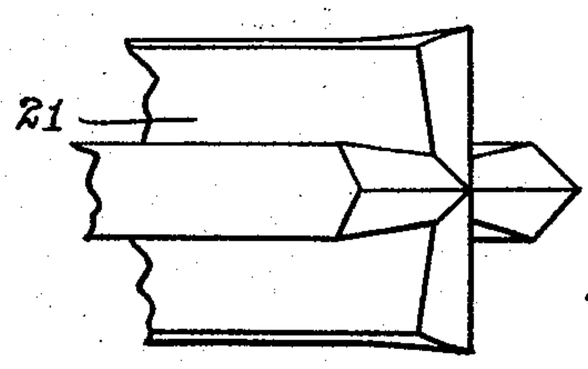

Fig. 1

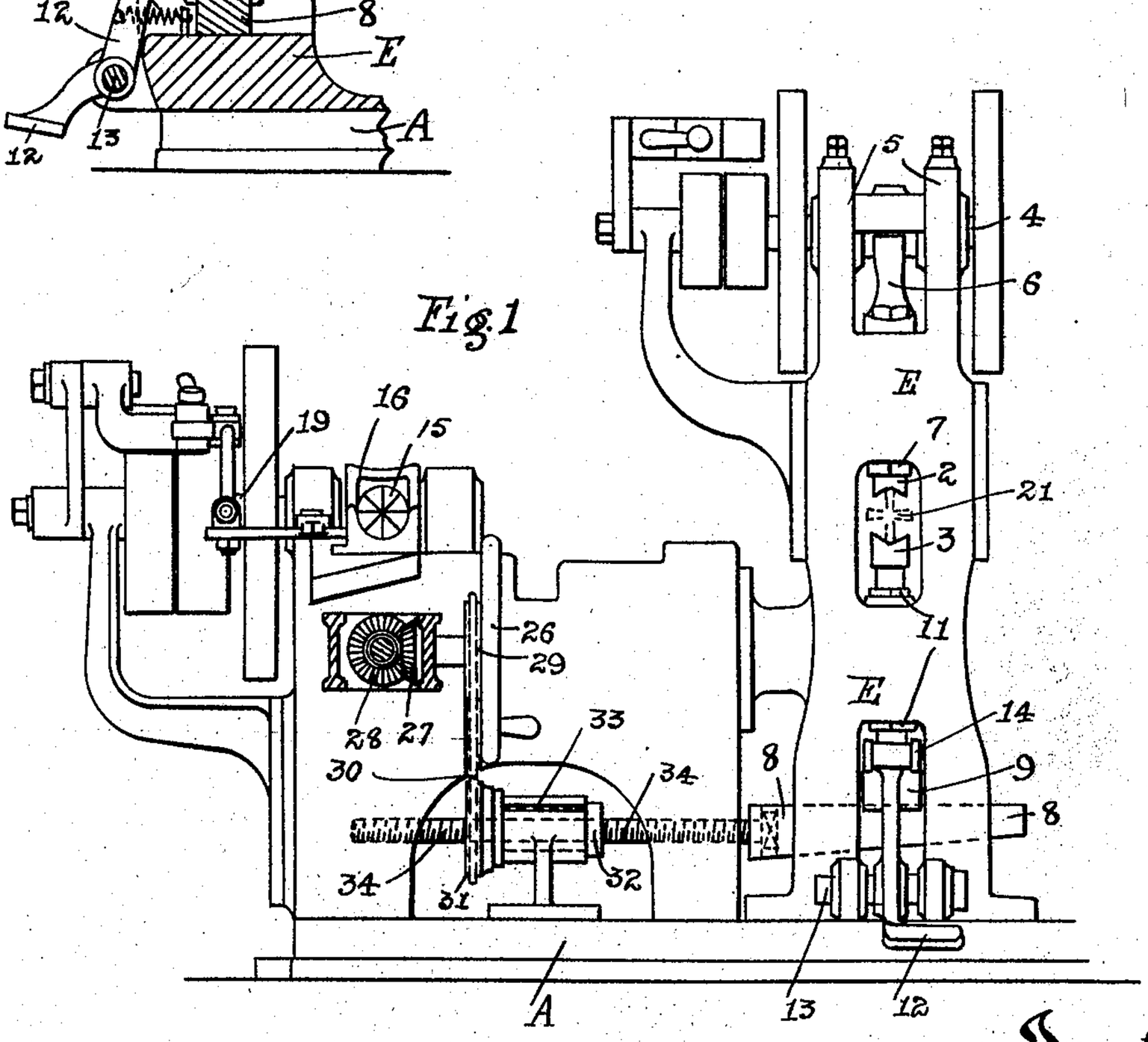

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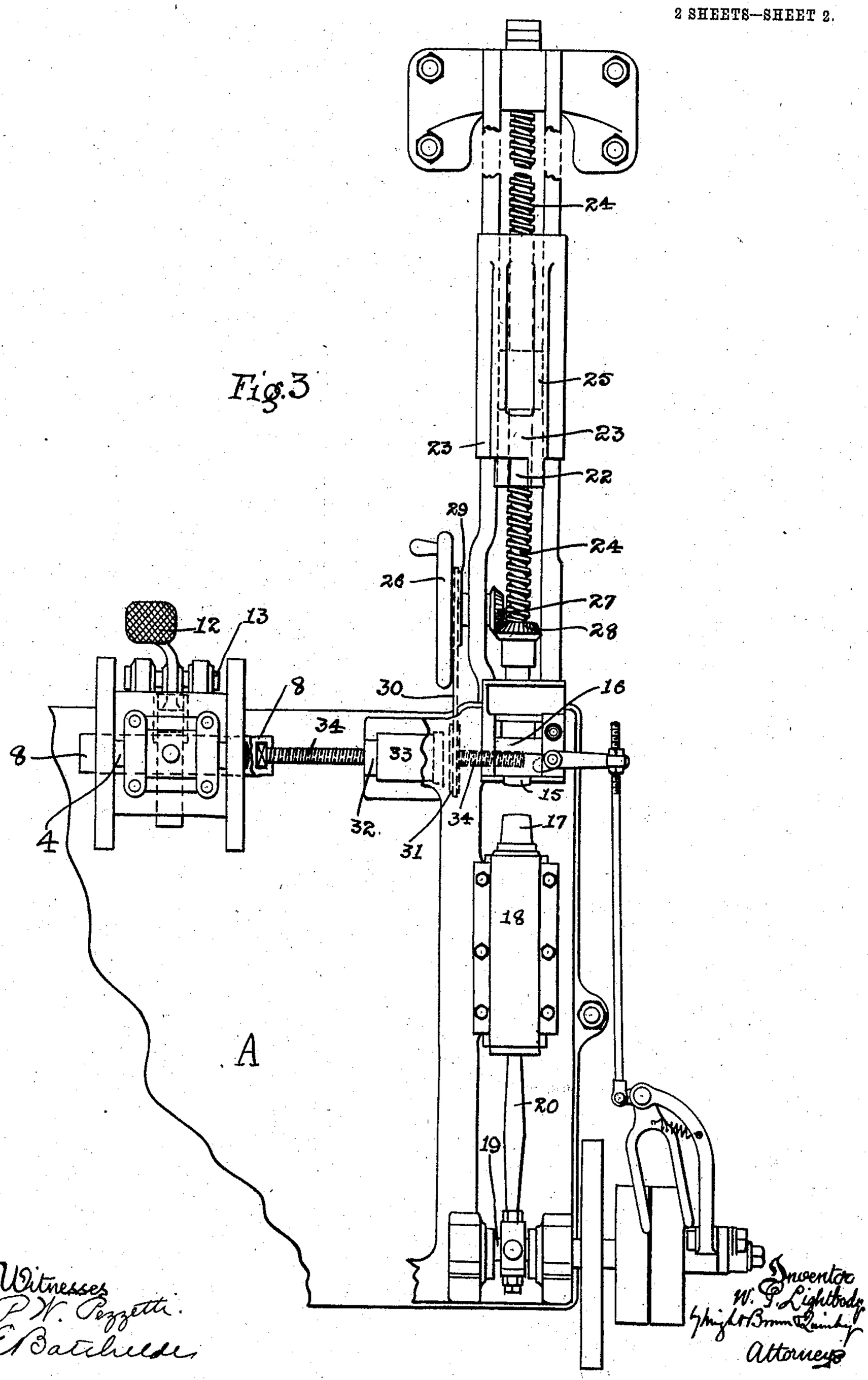
Fig. 3



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UNITED STATES PATENT OFFICE.

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MECHANISM FOR SHARPENING ROCK-DRILLS.

No. 815,720. Specification of Letters Patent. Patented March 20, 1906.

Application filed July 2, 1904. Serial No. 215,140.

To all whom it may concern:

Be it known that I, WILLIAM PARR LIGHTBODY, a subject of the King of Great Britain, and a resident of Langlaagte Deep, Box 1,056, Johannesburg, Transvaal, South Africa, but at present of Beehive Works, Bolton, in the county of Lancaster, England, have invented certain new and useful Improvements in Mechanism for Sharpening Rock-Drills, of which the following description, together with the accompanying sheets of drawings, is a specification.

My invention relates to improvements in mechanism for use in the process of sharpening rock-drills of the class wherein the cutting edges converge so that they form a kind of star or cross, the bar of metal out of which they are formed having three or four ribs; and my said invention consists in the arrangement of means for acting upon the outer edges of the wings or ribs of the drills after they have been treated by other devices forming part of the drill-sharpening process in order to bring them to their proper or desired radial dimensions.

It is well known in the mining industries that in order to secure the best results the width or diameter of the drill should bear a fixed ratio proportionate to the length of the drill, and it is one of the objects of the present invention to maintain this ratio in the sharpening process.

In the accompanying sheets of drawings, which are illustrative of my said invention, Figure 1 is a front elevation of my improved devices. Fig. 2 is a sectional side elevation thereof. Fig. 3 is a plan of parts shown by Figs. 1 and 2. Fig. 4 is a detail drawing showing the kind of rock-drill for the treatment of which my invention is especially applicable.

A indicates the base-plate of the machine. Upon this I mount my improved devices, consisting of the machine E, which is somewhat similar in general construction to the machine known as a "Ryder's forging-machine," in which are mounted the two dies or swages 2 and 3, the former of which is reciprocated from the crank or cam shaft 4, mounted in bearings 5, through the "cradle" 6 and slide 7. The lower swage 3 is held stationary during the actual swaging operations. As the upper "die" or block 2 is always reciprocated through the same distance vertically by the crank-shaft 4, it is necessary to adjust the height of the lower block 3 so that different sizes of drills may be acted upon, and this is effected by the longitudinal movement of the wedge 8 in the manner hereinafter described. This wedge 8 is adjusted for each different size of drill to be treated by the swages 2 and 3. I mount the block 9 and wedge 10 to intervene between the wedge 8 and slide 11, and this wedge 10 is connected to the foot-lever 12 (fulcrumed at 13) through the link 14. The spring 14ª tends to hold said wedge 10 in the position indicated by Fig. 2, wherein the slide 11 and swage 3 are in their lowered positions. However, on inserting a drill between the swages 2 and 3 and drawing the wedge 10 forward by means of the foot-lever 12 the swage 3 is raised to its proper position for the upper swage 2 to act upon the outer edges of the drill's wings or ribs and bring them to the exact sizes required. The swages 2 and 3 are shaped to form the drill of greater diameter at its outer end than is its body part, so as to allow clearance therefor for purposes well understood. The releasing of the foot-lever 12 allows the spring 14ª to withdraw the wedge 10, causing the slide 11 and swage 3 to be lowered in order that the drill may be withdrawn.

The mechanism hereinbefore described is used in conjunction with "dollying" mechanism, whereby the cutting edges of the drill are formed of a certain desired shape by a die, and this mechanism consists of a die or dolly 15, which is mounted in bearings 16 and is acted upon by the hammer 17, fixed in the sliding bearings 18, operated by the crank-shaft 19 through the connecting-rod 20. The drill 21 as it is being acted upon by this device is held by its opposite end, taking within the opening 22 and against the face of the anchorage 23, and in order that drills of different or varied lengths may be acted upon this anchorage or holder 23 is moved nearer to or farther from the dolly 15, this being effected by the rotation of the screw 24, which meshes with the nut 25. (Shown in broken lines, Fig. 3.) The opposite end of the drill rests upon an extension of the dolly-bearing, and the latter serves as a stop for the anchorage 23 when the adjustment of the latter brings the end of the drill against the end wall of said extension. The screw 24 is rotated by the hand-wheel 26 and bevel-gears 27 and 28.

It will be seen that by causing the hand-wheel 26 to transmit movement to the wedge 8 this latter will at all times be moved relatively with the anchorage or holder 23. The devices for transmitting this movement to the wedge 8 consist of the chain-wheel 29, chain 30, the chain-wheel 31, (which is fixed to the nut 32 revolving in bearings 33,) and the screw 34, which is fixed to the wedge 8 to move longitudinally through the nut 32 as the latter is rotated. It will be noted that when the anchorage 23 is adjusted by the hand-wheel 26 for the treatment of any particular drill the wedge 8 is simultaneously moved, so that the swage 3 is in proper position for treating the same drill. Hence the lateral dimensions of the rock-drill are automatically adjusted proportionate to its length.

It is well known in the art that rock-drills of the percussion type—*i. e.*, those operated by a blow from a hammer or some other intermittent force—are of necessity constructed with their cutting edges projecting radially beyond the periphery of the body part in order to allow freedom for the drill to operate and also to enable the clearing out of the substances which have been cut away by the action of the drill. It is also well known that the effect of the wearing or abrading action of the substance being worked is to continually lessen or reduce the length of the radiating ribs or cutting edges, and as a consequence from the beginning of the cutting action until the finish of the same the hole being bored by a drill continually and gradually diminishes in diameter. Now assuming that it is desired to bore a hole four inches in diameter and six or eight feet deep, it is customary to start the work with a drill of not over three feet in length and having cutting ribs of a length equal to the desired diameter and to drill a hole from fifteen to twenty-four inches deep. The first drill is then replaced by another longer drill; but it would not do to have the cutting edges a full four inches across, for the reason that the wear upon the first drill has reduced the diameter of the cutting edge so that the diameter of the hole at the bottom is slightly less than the diameter at the mouth. A full-sized four-inch drill, therefore, would jam in the bottom of the hole and could not be turned after the blow had been imparted thereto. Following out the example, the second drill would not exceed five feet in length and would be used until a longer drill was required, which longer drill would of necessity be slightly smaller in diameter than the second, owing to the wear thereon. It is therefore quite apparent that the longer the drill the shorter the diameter thereof must be, clearly showing that the width or diameter of the drill must be proportionate to its length. The shorter the drill the larger the hole it must make, and, vice versa, the longer the drill the smaller the hole it will have to operate with. In the machine hereinbefore described the parts are so adjusted as to secure these relative proportions.

Having thus described the nature and object of my said invention, what I claim is—

1. A machine of the character described comprising oppositely-arranged swaging-dies, means for reciprocating one of said dies, means for adjusting the other die relatively to said reciprocating die, an adjustable drill-carrier, means for controlling said die-adjusting means, said controlling means being operatively connected to the drill-carrier, whereby movement of the latter is imparted to the former, and means interposed between said adjustable die and said die-adjusting means to move said die independently of said adjusting means.

2. A machine of the character described comprising an upper reciprocating die, a lower normally stationary die, an adjustable block for said latter die, a base upon which said block is free to reciprocate, an adjustable drill-carrier mounted independently of said base, means for adjusting said drill-carrier, and independent means for reciprocating said adjusting-block on its base, said block-reciprocating means being operatively connected with said drill-carrier-adjusting means, whereby said parts are adjusted in unison.

3. A machine of the character described comprising an upper reciprocating die, a lower normally stationary die, an adjustable block for said latter die, a base upon which said block is free to reciprocate, an adjustable drill-carrier mounted independently of said base, a hand-wheel for adjusting said drill-carrier, and independent means for reciprocating said block on its base, said means being operatively connected to said hand-wheel, whereby said block and said drill-carrier may be adjusted in unison.

4. A machine of the character described comprising an upper reciprocating die, a lower normally stationary die, an adjusting-wedge for the latter die, a feed-screw for said wedge, an adjustable drill-carrier, connections between said drill-carrier and feed-screw, whereby movement of the former is imparted to said screw.

5. A machine of the character described comprising an upper reciprocating die, a lower normally stationary die, an adjusting-wedge for the latter die, an adjustable drill-carrier, connections between said carrier and wedge, whereby movement of said carrier is simultaneously imparted to said wedge, and means independent of said adjusting means and interposed between the latter and said lower die for placing said lower die into operative position.

6. A machine of the character described

comprising an upper reciprocating die, a lower normally stationary die, an adjusting-wedge for the latter die, an adjustable drill-carrier mounted independently of said wedge, and arranged at right angles to the latter, and means for simultaneously adjusting said drill-carrier and wedge.

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

WILLIAM PARR LIGHTBODY.

Witnesses:
SAMUEL HEY,
JAMES HENRY ELLISON.