(No Model.) 2 Sheets—Sheet 1.

W. WANLISS.

ROCK DRILL DRESSING AND SHARPENING MACHINE.

No. 584,568. Patented June 15, 1897.

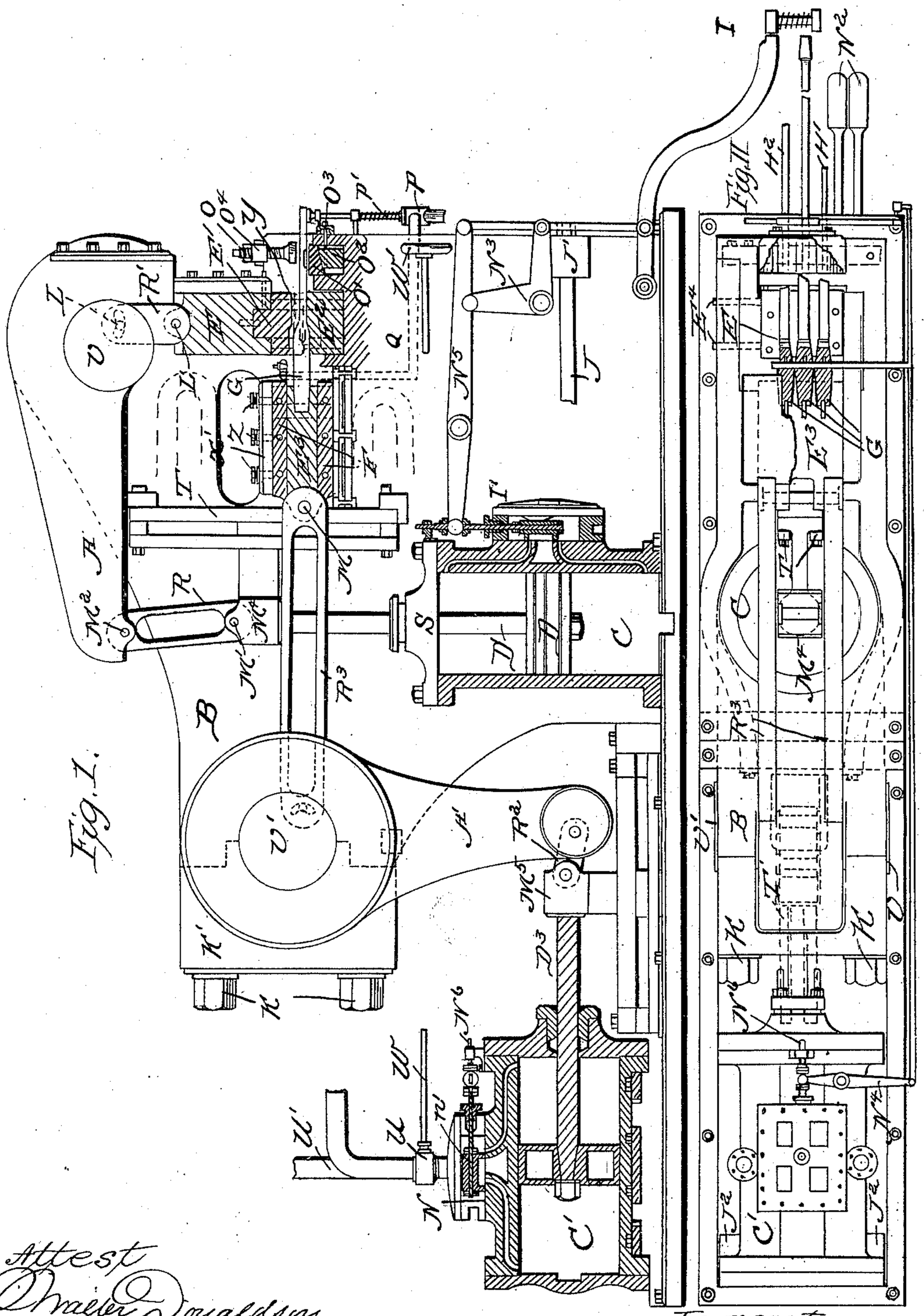

Fig. 1.

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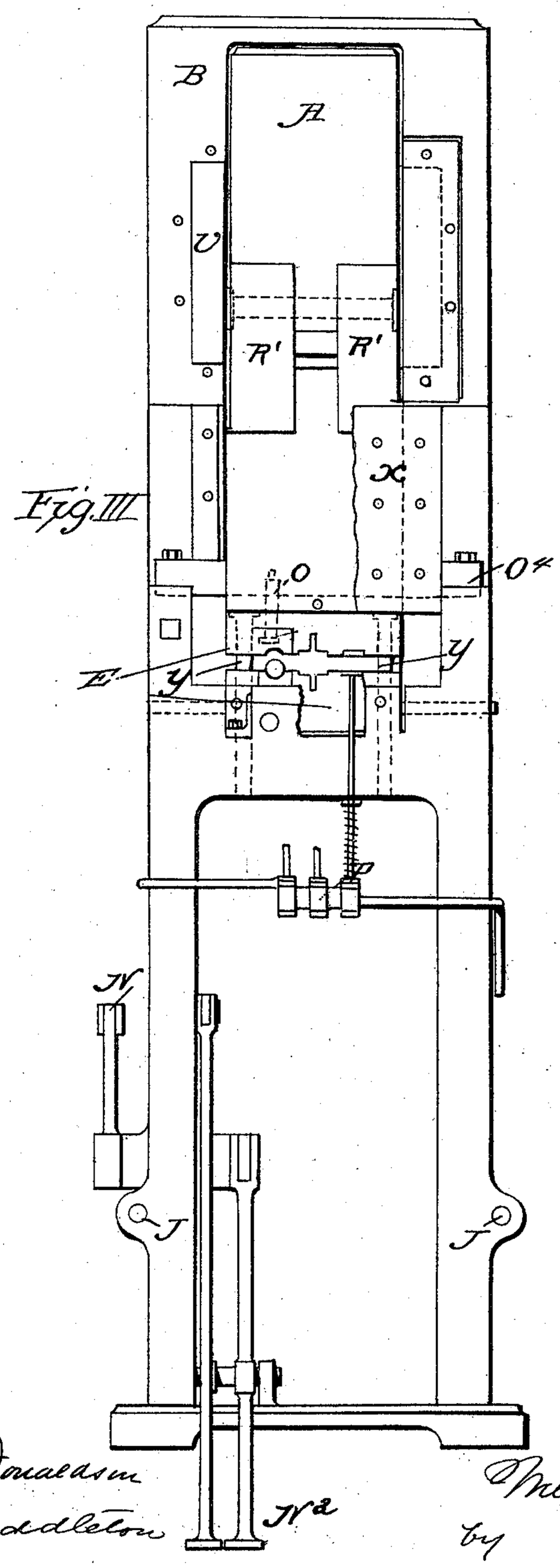
Fig. III



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UNITED STATES PATENT OFFICE.

WILLIAM WANLISS, OF JOHANNESBURG, SOUTH AFRICAN REPUBLIC.

ROCK-DRILL DRESSING AND SHARPENING MACHINE.

SPECIFICATION forming part of Letters Patent No. 584,568, dated June 15, 1897.

Application filed October 20, 1896. Serial No. 609,440. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM WANLISS, a British subject, and a resident of Johannesburg, South African Republic, have invented certain new and useful Improvements in Rock-Drill Dressing and Sharpening Machines Operated by Steam or other Motive Power by which Pressure can be Exerted, of which the following is a specification.

This invention relates to the construction, adaptation, and application of an improved, more simple, and effective mechanical appliance or means for dressing and sharpening rock-drills either of "star," "chisel," or other shape, and in order that the carrying out of my invention in practice may be fully understood I have illustrated it on the accompanying drawings and have marked the same with letters of reference corresponding with those in the following description thereof.

In the drawings, Figure 1 is a side elevation of the machine with parts in section. Fig. 2 is a plan view, and Fig. 3 is a front elevation.

The whole apparatus as herein described is designed and constructed to perform the work of dressing and sharpening the drills at one operation—that is to say, that when the drills are removed from the first die into which they have been inserted they are dressed and sharpened, needing but tempering only to be ready for use.

The machine as illustrated consists of a rigid cast or wrought iron frame B, preferably the former, of suitable construction and having a base of about ten feet, a width of about two feet, and a height of about five feet. At a distance of about three feet ten inches from one end of the base-plate a vertical cylinder C, twelve inches in diameter by twenty-four inches in length, furnished with the usual slide-valve and steam-ports, is bolted, in which works the piston-rod D′, connected with the piston D. The piston-rod D′ passes through the stuffing-box S on the cylinder-cover. At its other end the piston-rod is attached to a cross-head M^4, connected to an arm R, which forms a connecting-rod between the end of the piston-rod and the powerful lever A by means of the pins M′ M^3. The cross-head M^4 on the end of the piston-rod D′ is extended at one end, so as to work in the vertical guide T, bolted to a bracket cast or wrought on the frame B.

The lever A is furnished with trunnions V, cast or forged on either side at or near its supported end. These trunnions are about two inches long and eleven inches in diameter and work in recesses formed in the inner faces of the vertical sides of the frame B, and are held in place by caps or covers on the end of the latter. The long arm of the lever A moves in an arc formed by a vertical stroke of about twenty inches of the piston-rod.

The under side of the beam abreast of the trunnions is hollowed out on both sides, so as to form a web of metal between the two recesses, in which latter work the ends of a pair of toggle-joints R′ on a pin L, the center of which is two inches from the center of the trunnion. The other ends of this pair of toggle-joints are connected to a suitably-shaped die-rod E, having a cross-section of about seven inches by nine inches, by the pin L′. No strain more than is sufficient to pull back the levers is at any time put on the connecting-rod pins, the power of the thrust being taken direct onto the ends of the connecting-rod and toggle-joints. The slots in the toggle-joints, through which the pin L passes, are formed in the shape of a segment to permit of a vertical motion being given to the die-rod E, which works in guides forming a portion of the framework.

X is a cover for retaining the die-block E in position.

The end of the die-rod E is bored out to receive the taper shank of the upper die or cress E′, which is raised and lowered with the motion of the die-rod E.

A corresponding die E^2 is fixed underneath the upper one to a solid anvil or block cast or formed on the bed-plate of the frame and which is recessed to receive the die, which is held in position by six or more set-screws E^4, and in order to place the dies in proper adjustment the one with the other and to facilitate their easy setting I fit two or more pins Y at opposite angles on the face of the lower die, and which correspond with and fit in similarly-placed holes in the upper one.

The dies are formed with one or more recesses in their faces (three being shown on the drawings) suitable for dressing either

chisel, star, or other shaped drills, or for all shapes, as may be required.

The mechanism and dies hereinbefore described are for dressing and forging the drills only, the sharpening being effected while the drill is still held in the die by an apparatus or machine, of which the following is a description:

At the other end of the bed-plate of the machine hereinbefore described a second cylinder C′ is fixed having the same dimensions as the one described in the foregoing statement, but placed horizontally instead of vertically. The cylinder is well bolted down to the frame, but in addition to the ordinary holding-down bolts two lateral bolts J are provided, one on either side of the cylinder, passing through lugs J′ J², cast thereon, and through the whole length of the frame, where they are set up by nuts on the ends of the bed-plate. The bolts are to help in resisting the lateral strain put on the cylinder when at work. The end of the piston-rod D³ is attached through the cross-head M⁵, working in the slides or guides T′, to a connecting-rod R² of similar construction to that on the vertical piston-rod D′ and lettered R on the drawings. The other end of the connecting-rod R² is attached to one end of a vertical lever A′, the upper end of which is supported on trunnions V′, carried on projections of the sides of the frame B. The upper end of the lever A′ is hollowed out in a similar manner to that of lever A and carries a pair of toggle-joints R³, between which the cross-head of the vertical piston-rod works, and which are attached at their other ends to a horizontal die-rod E³ by means of the pins M, the die-rods working in suitable guides F, held in position by the cover X′ and the screws Z. The other end of the die-rod E³ is bored to receive the taper shanks of the die-blocks G, which have dies formed or sunk on their ends corresponding to the shape and cutting edges of the star, chisel, or other shaped drills. These dies G G G, having a lateral motion communicated to them by the die-rod E³, are so set in the frame that they exactly coincide with the centers of the ends of the vertical dies E′ and E², (which are made the required size to form the drill, the remaining portion being hollowed and squared out to form a guide for the die G when E′ and E² are in contact with each other,) their purpose being to form by pressure a sharp cutting edge on the drills, which, having been dressed or forged in the latter, are held there for the sharpening process of the lateral dies G G G.

The trunnions on the lever A′ are held in their bearings by caps K′, screwed onto the ends of the projected sides of the frame B by means of the bolts K, which are two and one-half inches in diameter and pass half-way through the sides of the frame, which are cored out to receive them. These large and strong bolts are necessary to withstand the pressure on the fulcrum of the lever when the dies are in operation.

Should the drills operated on be smaller than the dies, and when finished not be held firmly between them for operation of the sharpening-dies, the following device is used for holding them firmly in place with the axis of the drill-shaft in a direct line with the center of the sharpening-dies G G G.

Across the face of the machine and in front of the vertical dies I fix a cross-bar O⁴, bolted firmly to the sides of the base-plate, which are carried up sufficiently high for the purpose. Holes are bored and tapped vertically through the cross-bar at as many places as there are dies in the machine and exactly opposite to the center of each. Through these holes pass screwed bolts O, to the lower ends of which are fitted shoes and upon which the latter revolve freely. These shoes are formed with recesses on their faces to grip the upper surface of a drill placed beneath them. Underneath and exactly opposite the shoes are wedge-shaped beds O′, carrying corresponding shoes which can be raised or lowered by means of the wedges O², operated by the screws O³, which draw the wedges in or out, as may be required to bring the beds O′ to the desired height for the axis of the drill to be fixed in a central horizontal position.

In order to cool the dies, a jet of water is injected upon and between each pair the moment the drill has been operated upon and is released. This is automatically effected by the drill itself, which, on being placed between the dies, presses down a valve stem or rod P′, which operates a valve P and shuts off the water, its release and withdrawal causing the valve to rise and admit of water again flowing on the dies. Steam, air, or water is admitted to the valve-chest N on cylinder C′ through the admission-pipe U′ and throttle-valve U, operated by the rod W, which is extended back to the other end of the frame, where it is under control of the workman by means of the hand-wheel W′. The throttle-valve having been opened by means of the hand-wheel W′ and the rod W, and steam, air, or water being admitted to the valve-chest, the workman places his foot on the foot-lever N², connected by a rod N⁶ with a bell-crank N³, the other arm of which is connected with a lever N⁵, connecting in turn with the lever N⁴, which operates the slide-valve spindle N′ and through it the slide-valve N to admit steam, air, or water to the bottom of the cylinder. On releasing the foot-lever it resumes its normal position by means of a spiral spring placed underneath the thread and forces the slide-valve back, so as to admit steam, air, or water to the upper end of the cylinder, which forces the piston down and brings the die-rod back in readiness for another operation.

Cylinder C is furnished with similar steam, air, or water pipe, throttle-valve, rods, levers, and foot-lever, all of which are operated in the same way as described for cylinder C′.

Method of working.—Steam, air, or water having been admitted to the valve-chest, (from any convenient source,) as hereinbefore described, a heated drill H, H′, or H² is placed between the dies E′ and E². The workman then presses down the foot-lever I′, which raises the slide-valve I on cylinder C and admits steam, air, or water through the lower part. The piston being then forced up raises up the long arm of the lever A and forces down the toggle-joint R′ and die-rod E, which brings the upper die E′ down upon the drill H, which is resting upon the lower die E² and compresses it into the required form and size. The workman, still keeping the foot-lever I′ down, places his other foot on the lever N², which, by means of its hereinbefore-described valve connections, admits steam, air, or water to the lower end of the horizontal cylinder C′. The piston D² and with it the piston-rod D³ is thus forced out and thrusts forward the vertical lever A′. The die G on the end of the die-rod E³ is thus forced under enormous pressure up against the end of the drill H, which is still held in the grip of dies E′ and E² and forms a sharp cutting edge thereon by it taking the impression formed on the die, no metal being wasted or lost in the operation. Should the first operation between dies E′ and E² not be sufficient to swage the drill to the exact size and form required, it is repeated by the workman pressing down the foot-lever I′ as many times as are required until the upper and lower dies meet, when the first operation is completed, the horizontal die being then brought into action. The drill is then withdrawn and is ready for tempering. Should the drill be smaller than the dies E′ and E² and not be gripped by them, it is held firmly by the device in front of the dies, as hereinbefore described.

By my invention the process of sharpening rock-drills is greatly simplified and the labor reduced to a minimum or to that of one man, the cost of dressing and sharpening being correspondingly reduced. I therefore claim and think worthy of a patent the improvements hereinbefore set forth.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that I do not limit myself to the precise details of my invention, as hereinbefore specified and as illustrated on the accompanying sheet of drawings, because equivalent modifications or variations can be made in such details and quite consistent with the principles or characteristic features of my invention, and in conclusion I declare that

What I claim is—

1. A machine for forging and sharpening rock-drills comprising the stationary and vertically-movable dies for shaping the drill, the rocking lever for operating the movable die, the cylinder and piston for operating said lever, the horizontally-moving sharpening-dies, the rocking lever for moving the same, and the cylinder and piston for rocking said second lever, substantially as described.

2. In combination, the stationary and movable shaping-dies, the rocking lever, toggle-joints connecting said lever to the movable die, the vertical cylinder beneath the end of said rocking lever, the piston connected to said end, the horizontally-reciprocating sharpening-die, the rocking lever in rear of the same having toggle connections thereto, the horizontal cylinder and piston and connections from the horizontal piston to the said last-named lever, substantially as described.

3. A machine for forging and sharpening rock-drills comprising the vertically-acting shaping-dies adapted to form the body of the drill, the horizontally-acting sharpening-dies located at one side of the vertically-acting dies and adapted to form the points of the drills, and the clamping means located at the other side of the vertically-acting dies and adapted to clamp the shanks of the drills, with means for operating said dies, substantially as described.

4. In combination, with the shaping and sharpening dies with means for operating them, the water-supply pipe, and the valve connections operated by the stock whereby the release of the stock by the dies, turns on the water to cool the same, substantially as described.

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

WILLIAM WANLISS.

Witnesses:
WILLIAM J. ROBSON,
D. M. KISCH.