No. 631,914. Patented Aug. 29, 1899.

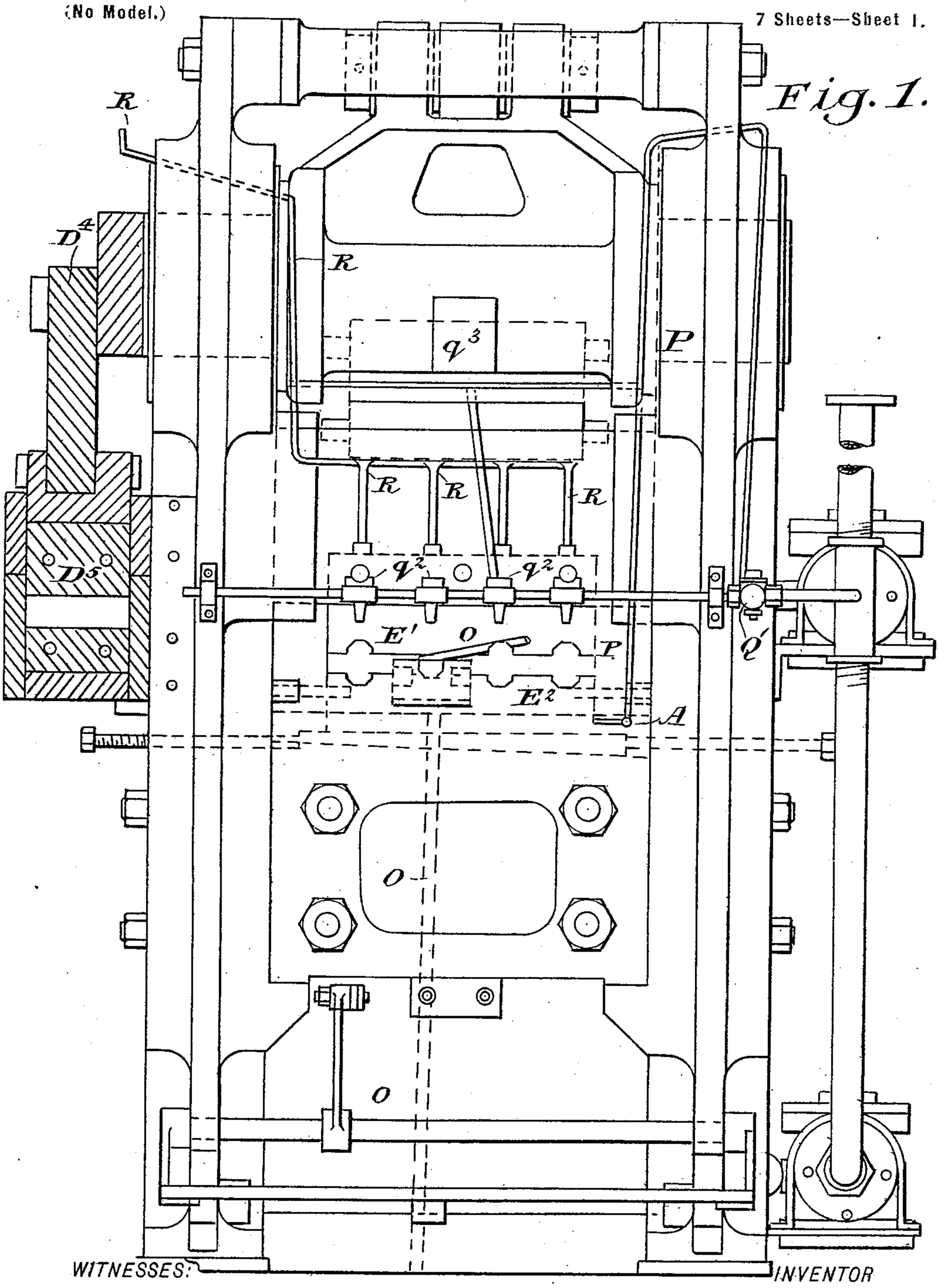
W. WANLISS.

ROCK DRILL DRESSING AND SHARPENING MACHINE.

(Application filed Aug. 10, 1898.)

(No Model.) 7 Sheets—Sheet 1.

Fig. 1.



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No. 631,914. Patented Aug. 29, 1899.

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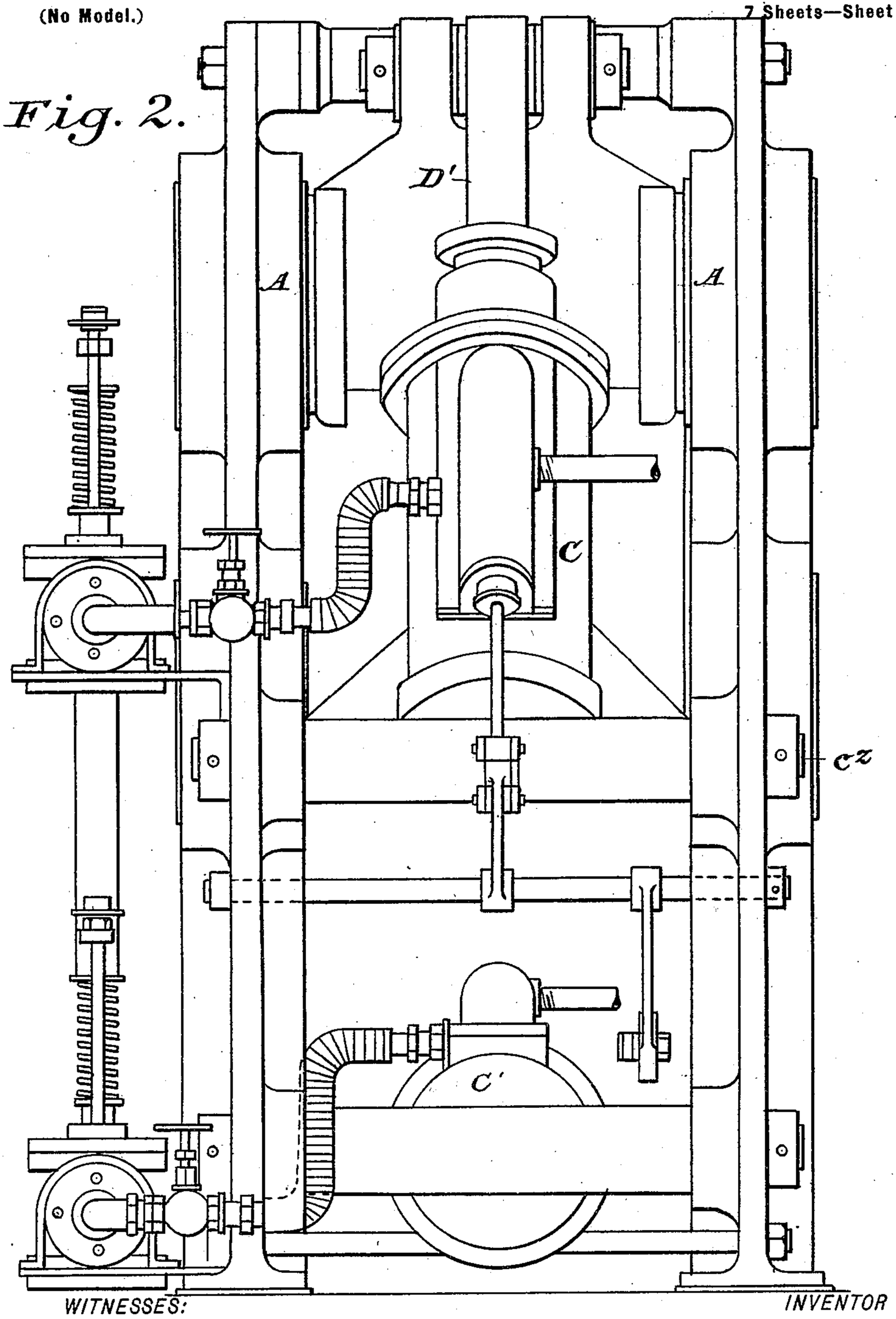
(No Model.) 7 Sheets—Sheet 2.

Fig. 2.



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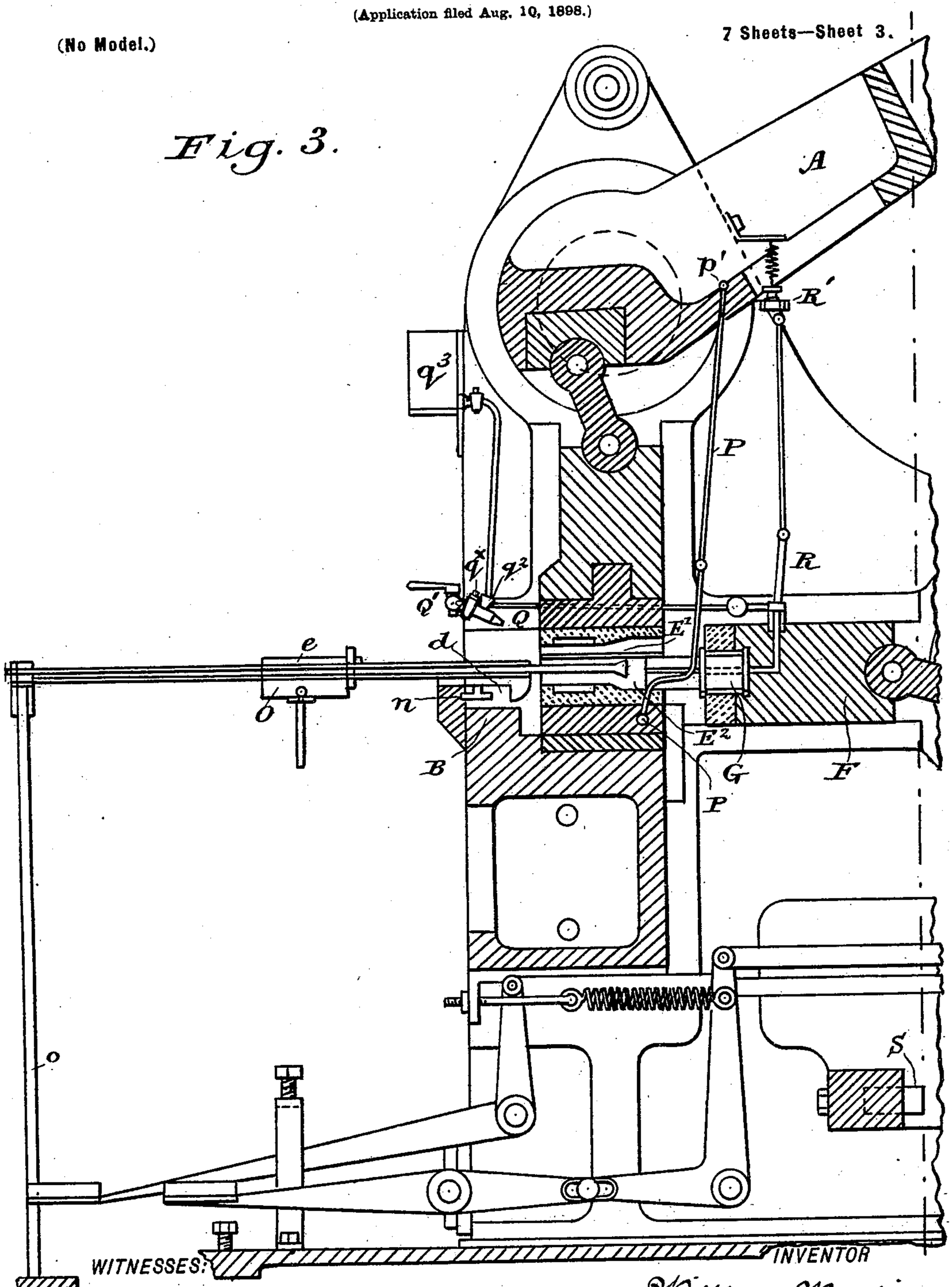
(No Model.) 7 Sheets—Sheet 3.

Fig. 3.



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ROCK DRILL DRESSING AND SHARPENING MACHINE.

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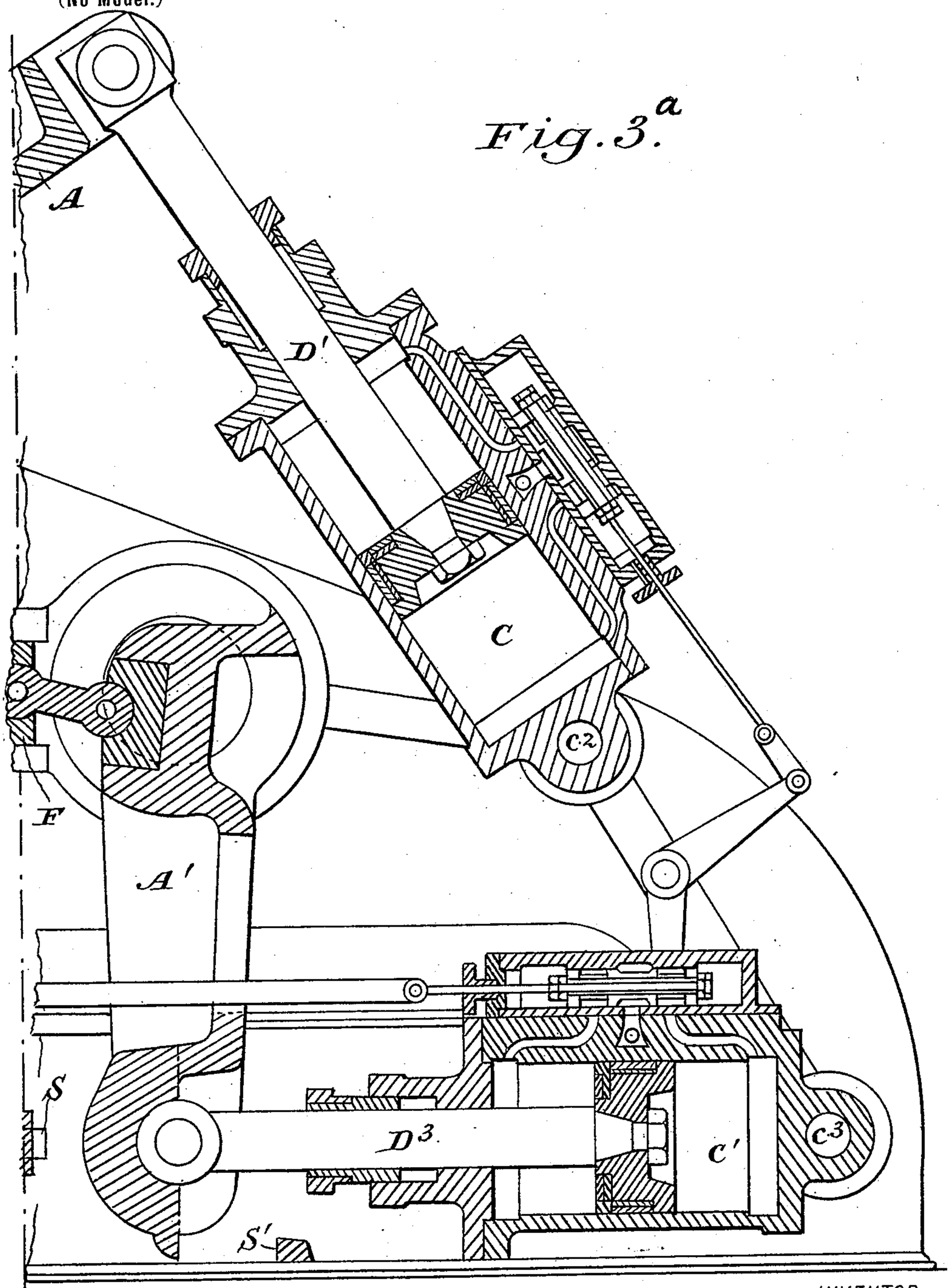
(No Model.) 7 Sheets—Sheet 4.

Fig. 3a



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(Application filed Aug. 10, 1898.) 7 Sheets—Sheet 5.

(No Model.)

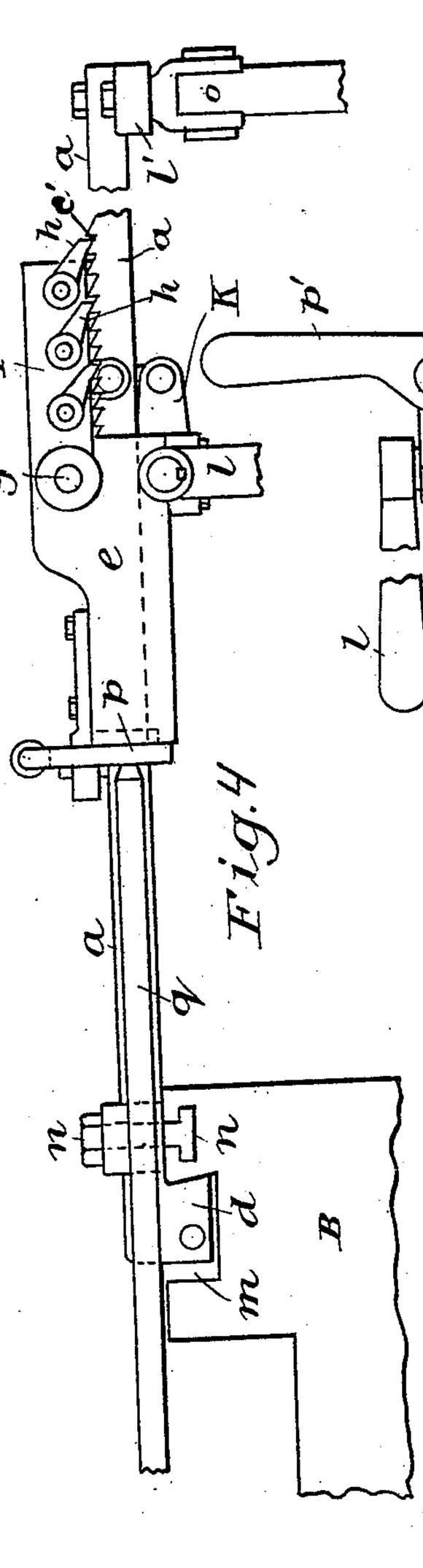

Fig. 4.

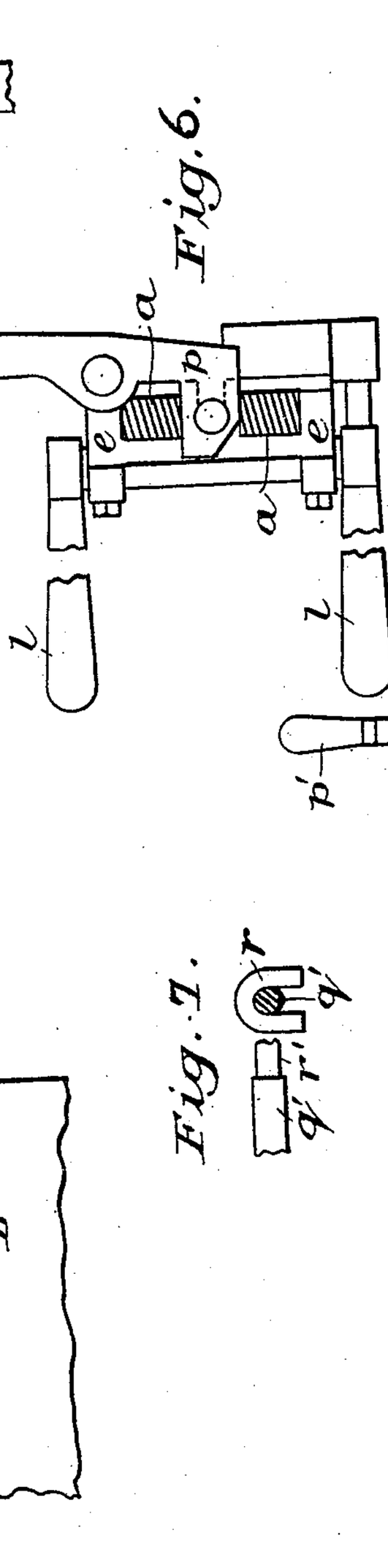

Fig. 6.

Fig. 7.

Fig. 5.

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Fig. 8

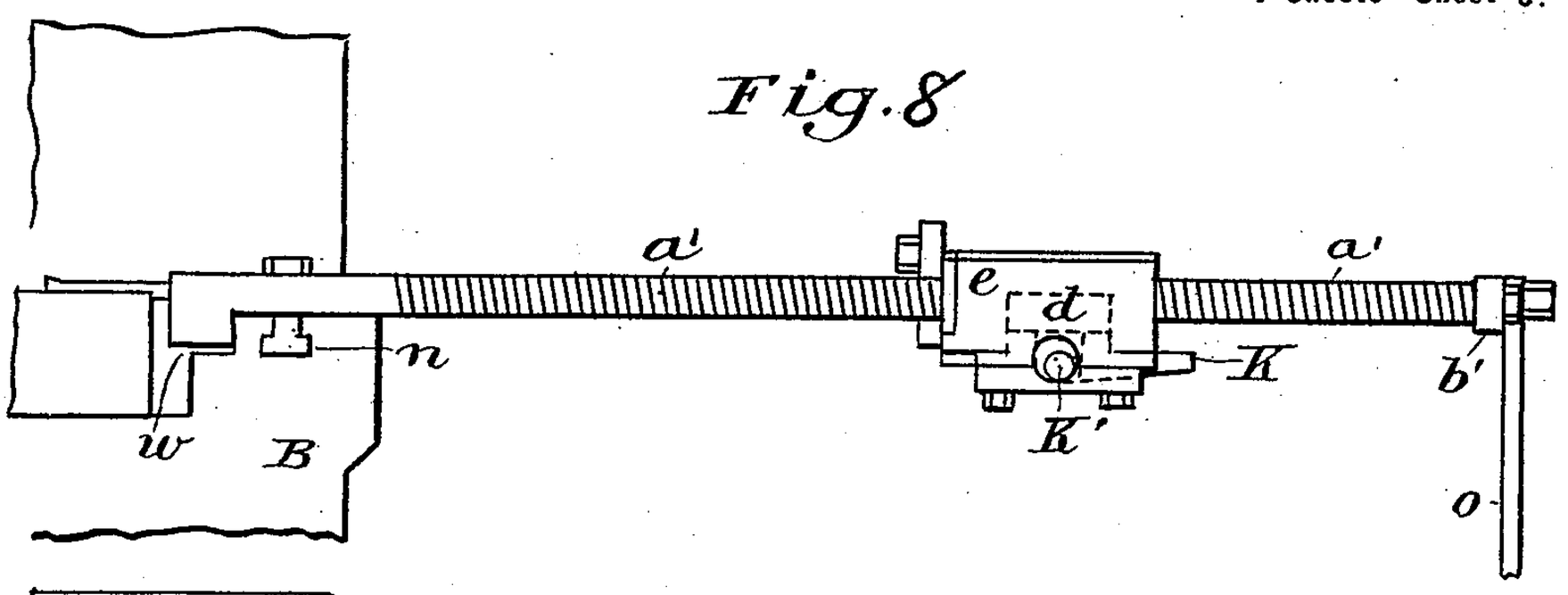


Fig. 9.

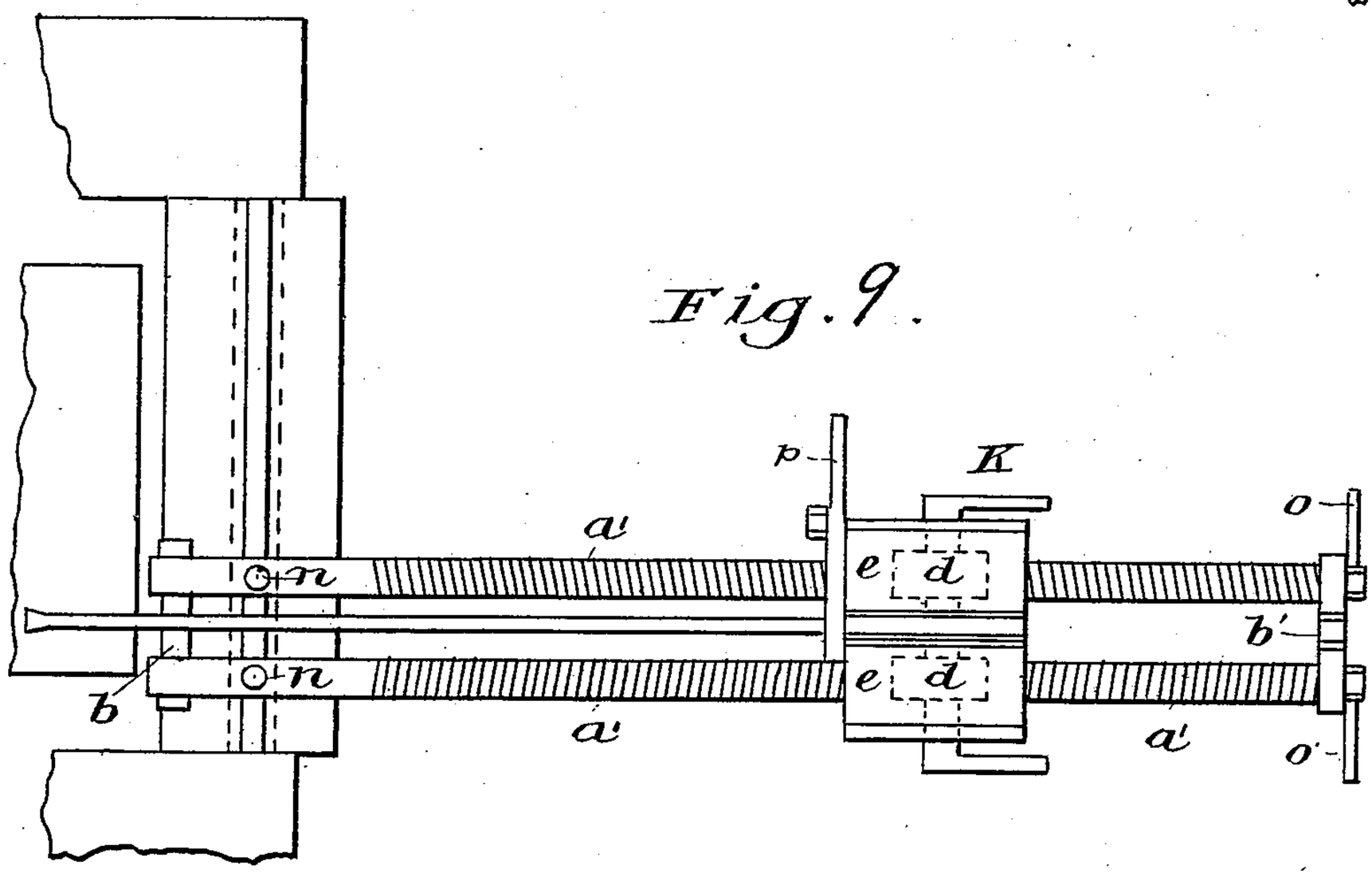
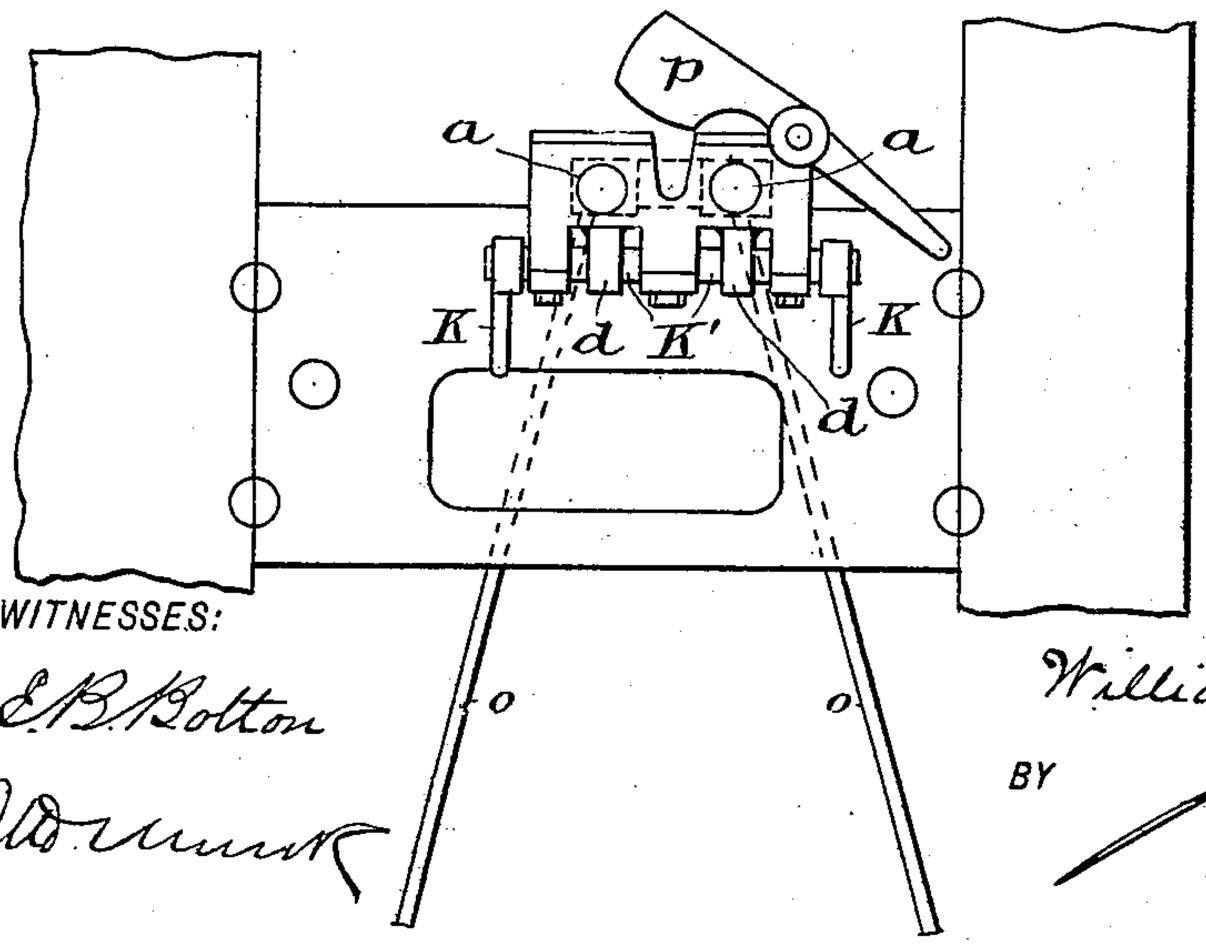


Fig. 10.



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(Application filed Aug. 10, 1898.)

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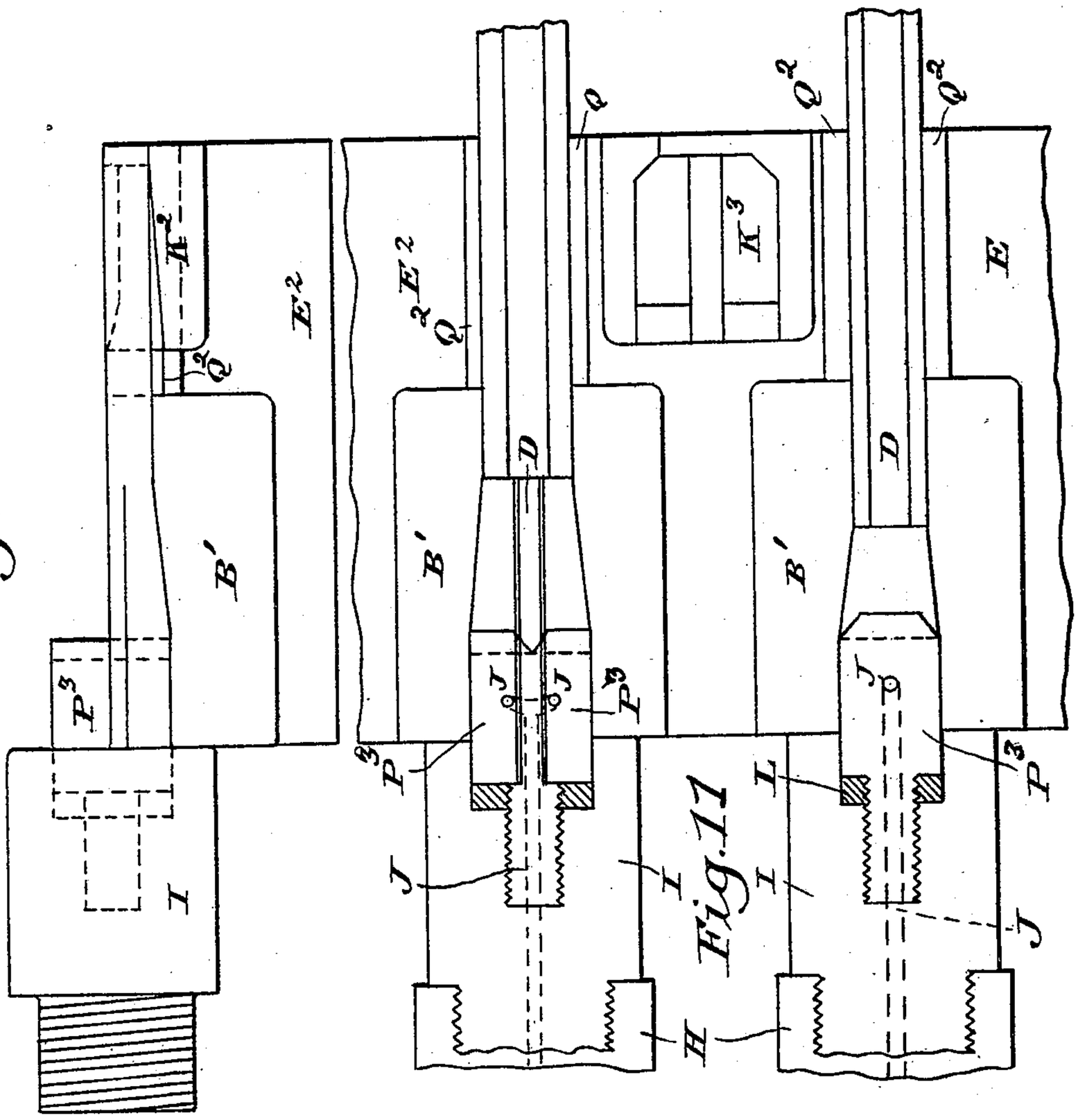

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UNITED STATES PATENT OFFICE.

WILLIAM WANLISS, OF JOHANNESBURG, SOUTH AFRICAN REPUBLIC.

ROCK-DRILL DRESSING AND SHARPENING MACHINE.

SPECIFICATION forming part of Letters Patent No. 631,914, dated August 29, 1899.

Application filed August 10, 1898. Serial No. 688,300. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM WANLISS, engineer, a subject of the Queen of Great Britain and Ireland, residing at 43 Ginsburg Buildings, Main street, Johannesburg, South African Republic, have invented certain new and useful Improvements in Rock-Drill Dressing and Sharpening Machines, of which the following is a specification.

This invention has particular reference to the machine for dressing or sharpening rock-drills which forms the subject of Letters Patent in the United States of America granted to me under No. 584,568, and dated June 15, 1897, but further relates to an improved construction of dies for use therewith.

The invention consists in certain improvements in the constructional details of the machine, whereby it is rendered more efficient, less complex, and more compact, and consequently not so liable to get out of order and at the same time much cheaper to construct.

As described in the specification and shown in the drawings of the Letters Patent previously referred to, the machine is arranged with two (a vertical and a horizontal) fixed cylinders, the piston-rods of which are connected through the medium of cross-heads working in slide bars or guides and links or toggles, with the extremities of the levers operating the die-blocks. In place of these fixed cylinders I now propose to employ oscillating cylinders, the piston-rods of which are connected to said operating-levers direct. The cylinder operating the upper vertically-moving die is set at a suitable inclination and capable of oscillating at its lower end on a pin or trunnion carried or supported by the frame of the machine. The other cylinder (for working the horizontally-moving plunger or sharpening die) is set approximately horizontally and is capable of oscillating on a similar supporting pin or trunnion also carried by the machine-frame. The piston-rod, as before, is connected to the operating-lever direct. By this arrangement the necessity for the use of all cross-heads, slide-bars, and connecting-links for transmitting the movement of the piston-rods to the operating-levers is dispensed with. In this connection I may mention that I consider the use of piston or other equilibrium valves preferable to ordinary slide-valves for these cylinders, as in practice I find that piston-valves work more easily and rapidly.

The operating-levers are each fitted with bearing-blocks, in which the toggle-joint between the die-blocks and levers works. These blocks are fitted with caps bolted thereto and to the lever for supporting the pins on which the toggle-joints move.

At the front of the apparatus a device for securing the drills is provided, consisting of a saddle provided with a series of pawls traveling on two parallel bars with ratchet-teeth thereon, or the parallel bars may be cut with a screw-thread in lieu of the ratchet-teeth and the saddle fitted with two half-nuts for locking the same in lieu of the pawls. Should this latter method be adopted, it is advisable that each bar be cut with respectively a right and left hand screw-thread, as the pressure exerted on the end of the saddle will then be in a line more or less parallel to the bars. I, however, prefer to employ the first described—viz., a saddle provided with a series of pawls working in suitable ratchet-teeth cut on the parallel bars—the reason being that each successive pawl may be slightly longer (or shorter, as the case may be) than the preceding one, so that the saddle may be fixed practically at any desired point as required by the different lengths of drills to be operated upon without any adjustment on the part of the workman other than in the case of short drills to push the saddle up against the projecting end of the drill. In the case of long drills the shank of the drill lies in a groove cut in the saddle. On the drill-shank a slight cress is formed to provide a shoulder on which a collar or washer may be placed, which in turn bears against the end of the saddle. For making the cress aforementioned suitable dies are provided on the vertically-moving die-blocks.

At the end of the saddle nearest the machine is fitted a short lever, the end of which when in position forms a stop and when withdrawn leaves a space between the end of the drill and the saddle in the case of short drills. In the case of long drills the stop is between the collar or washer above described and the saddle. This stop will vary in thickness according to the length of stroke of the punching or sharpening die and the quantity of

steel required to fill the forming-dies when the sharpening-die is nearly at the end of its stroke, the object of this arrangement being to insure a uniform size of drill. It is evident that any form of stop other than that attached to a lever may be employed.

The parallel bars are themselves mounted in the front of the machine in such a manner as to admit of the securing device being fixed opposite any particular set of dies. Arrangements are also provided for blowing away any scales left in the dies. One arrangement is worked automatically by the lever operating the upper die for a certain portion of its return stroke. This lever acts, through suitable connections, to open a valve interposed between a pipe leading from the steam or air supply pipe or other convenient source of supply, and a pipe leading into a hole in the die-block, which is connected with the dies. A passage is formed below each die and inclined or directed upward under the horizontal plunger or sharpening die, into which the steam or air pipes communicate, so as to remove the scales. A further arrangement is provided for clearing away the scales, which comprises a steam or air pipe, with nozzles arranged along the front of the several dies and capable of being operated by means of any suitable hand valve or cock. Each of these nozzles is provided with a cock to shut off the steam or air from blowing into those dies which are not in use. On each of these nozzles a small oil-cup is fixed, which is kept supplied from an overhead oil-can. The object of this arrangement is when the steam or air is turned on to blow away the scales to inject a spray of oil into and over the dies to keep them constantly lubricated.

Provision is made for cooling the dies by an arrangement operated in a precisely similar manner to that described for removing the scales, with the difference, however, that water is in this case introduced through the center of the horizontally-moving die and then directed upward through a suitable hole or passage to the vertically-moving dies.

With regard to the dies, whether for sharpening star or chisel bits, I have designed a special method of constructing the same whereby a larger cutting-surface on the drill-bits is provided. The cutting edge of the finished bits instead of terminating at a point, as in the ordinary form, is carried around the full width of the web. This form gives a greater cutting-surface near the circumference of the drill.

In this machine the shears for cutting broken drills are situated outside the frame and are worked from the trunnion of the lever that operates the vertical dies instead of being attached directly to the vertically-moving die-blocks, as in the old machine.

Referring to the accompanying drawings, I beg to state that the machine generally is the same as that which forms the subject of Letters Patent No. 584,568. I have, however, found that by making certain constructional alterations a simpler and more effective machine is the result, the details of which will be hereinafter described.

In the drawings, Figure 1 shows a front view. Fig. 2 shows a back view. Fig. 3 shows a partly sectional and partly side elevation of a portion of the machine, and Fig. 3^a is a corresponding view of the remaining portion. Fig. 4 is an enlarged side view of the grip for holding the drills. Fig. 5 is a plan view, and Fig. 6 an end view, of the same, and Fig. 7 is a detail of the manner of holding long drills. Figs. 8, 9, and 10 are respectively a side view, a plan, and an end view of a modified form of holding means. Fig. 11 is a plan view showing dies for "star" and "chisel" bits. Fig. 12 is an end view of a star-bit die. Fig. 13 is a similar view of a chisel-bit die. Fig. 14 is a side view showing the relative position of the sharpening-die when in position against the lower forming-die.

Only those parts of the machine are lettered which are directly effected by the alterations and improvements aforementioned.

E′ E^2 are the blocks for holding the vertically-moving dies, a detailed description of which is given hereinafter.

F is the block, as in the old machine, for holding the horizontally-moving sharpening or plunger-die G.

The cylinders C C′ instead of being fixed as heretofore oscillate on the pins or trunnions C^2 C^3. The piston-rods D′ D^3 are thus connected direct to the levers A A′.

The gripping device O is replaced in my improved machine by the cradle O, the details of the construction of which are hereinafter described.

Stops S and S′ are provided for the cylinder C′ to determine the length of the stroke, and thus prevent damage to the sharpening-die as well as the cylinder-covers.

In my old machine the cooling device was operated by the drill, whereas in my improved machine it is operated by the lever A.

In my old machine no device for blowing away the scales was provided. This is now accomplished by two series of steam or air jets P and Q, blowing into and against the dies, the first being worked automatically by the lever A, operating the valve at P′, and the latter by the workman by means of an ordinary cock or valve, as at Q′. Each jet or nozzle of the series Q is provided with a cock $q^\times$ to shut off the steam or air as required. Each jet or nozzle is further provided with a small oil-cup q^2, which is kept supplied from the can q^3. When the steam or air is turned on to blow away the scales, a spray of oil is at the same time injected into and over the dies, thus keeping them constanly lubricated. Another device R is provided for clearing away the scales from and at the same time cooling the dies. This device is similar to the hereinbefore-described arrangement of steam or

air jets Q, with the difference, however, that water is employed in place of steam or air. This is automatically operated by valve R′, which controls the flow of the water, the valve R′ being automatically operated by suitable connections, (not shown,) so that on the upward movement of the lever A the valve is opened.

In my old machine the shears for cutting the ends of broken drills prior to sharpening the same were worked directly from the vertically-moving die-block E. I have, however, found it more convenient to place the shears outside the frame of the machine, fixing the lower knife to the frame by means of suitable bolts and brackets D^5 and working the upper or moving knife from a pin on the trunnion of the lever A, as at D^4, Fig. 1.

In place of the grip for holding the drills in my old machine I now employ an entirely new device O for securing the drills. An enlarged view of this device is shown in Figs. 4 to 7, inclusive.

Two bars *a a* are kept separate from and parallel to one another by suitable distance-pieces, as at *b b′*, Fig. 5. On these bars ratchets *c′ c′ c′* are cut. These parallel bars are themselves capable of sliding in a dovetail groove *m*, cut in the front frame B of the machine, to allow them to be adjusted so that their center line may be opposite any one of the dies, as desired. The bars *a a* are supported at the opposite end by a suitable leg or legs *o*. The dovetail at the end of the parallel bars is shown at *d*, Fig. 4. *n n* are two T-bolts sliding in a groove cut in the frame B to secure the parallel bars *a a* in any position.

A saddle *e* is constructed to slide upon the parallel bars *a a* and is provided with shoes *f f*, pivoted thereto at one end, as at *g*, to which a series of pawls *h h h* are attached. These pawls *h h h* are preferably constructed of different lengths, so as to engage the ratchet-teeth *c′ c′ c′* at almost any point. A suitable lever K, operated through the handles *l l*, is provided for raising the shoes *f f*, which carry the pawls *h h h*, in order to disengage them from the ratchet-teeth *c′ c′ c′* to enable the saddle *e* to be drawn back.

An alternative arrangement of the holding device is shown in Figs. 8, 9, and 10. The bars *a′ a′* instead of being provided with ratchet-teeth are each cut with a screw-thread. The saddle *e* is in this case fitted with two half-nuts *d d*, which may be locked by means of the lever K, operating the eccentrically-mounted spindle K′, so as to fix the saddle at any desired point on the bars *a a*. The bars *a′ a′* are preferably cut, respectively, with a right and left hand screw, as shown in Fig. 9, so that when pressure is exerted on the end of the saddle (as occurs during the process of sharpening) there is no tendency of side movement on the part of the saddle, as I find is the case when each bar is cut with screw-threads having the same direction.

Referring to Figs. 9 and 10, *p p* is a short lever pivoted to the end of the saddle nearest the machine, the end of which when in position forms a stop or gage at the end of the saddle *e*. This stop, as before mentioned, will vary in thickness according to the length of the stroke of the sharpening-die and the quantity of steel required to fill the forming-dies when the sharpening-die is nearly at the end of its stroke. Thus if the sharpening-die has a stroke of one inch, of which one-fourth of an inch is taken up to fill the forming-dies, then the stop would be three-fourths of an inch thick.

In Figs. 4 and 5, *q q′* are drills, shown in position for sharpening, the former being a short and the latter a long drill. The end of the short drill *q* is shown bearing against the stop or gage *p*. The long drill *q′* lies along a groove formed in the saddle *e*, as shown in Fig. 5.

r is a collar fitting against the shoulder of the cress *r′*, Fig. 7, which bears against the stop or gage *p*.

Referring to Figs. 11, 12, 13, and 14 of the accompanying drawings, in which details of the sharpening-dies and the drills as being sharpened are shown, E^2, Fig. 11, is the block into which the lower half of the die required for the particular operation is inserted. B′ B′ are the lower counterparts of the forming-dies inserted in the said block E^2. The upper halves of the forming-dies are inserted in a precisely similar manner in the block E′, which block is shown in Figs. 1 and 3.

Q^2 Q^2 Q^2 are "pads" or supplementary dies formed in two halves, the lower half of which is inserted in the block E^2 immediately behind the forming-die B, the upper half being fitted in the same relative position on the upper die-block E′. These pads or dies are shaped to conform to any of the sections of drill-steel which may be used and are intended to preserve the original section of the drill-steel up to the point where the bit commences.

P^3 is the sharpening-die, shown pressed against the drill-bit D, the section of which is shown by the dotted lines and also by the end views shown in Figs. 12 and 13, *c c c c c c* being the cutting edges. Drills formed in dies constructed in this manner provide a greater length of cutting-edge around the circumference of the drill—*i. e.*, where it is most required.

J J are the passages showing how the water is led through the dies, as hereinbefore described.

K^3 K^3 are dies for roughly forming the steel when necessary preparatory to finishing in the forming-dies.

Method of working.—The general working of the machine remains practically unchanged, the dies being compressed by means of the levers A A′, as before. The piston-rods are, however, directly attached to the levers in place of using connecting rods or links, as heretofore, thus simplifying the construction of the machine. The drill about to be sharp-

ened is inserted between the forming-dies carried in the blocks E′ E² and pushed up against the sharpening-die G. The saddle *e*, with the stop *p* in position, is then pushed forward until the end of the drill bears against the stop or gage *p*. The saddle *e* is then fixed in the one case automatically by the pawls *h h* dropping into the ratchets and in the other by turning the handle K, operating the eccentric K′, which forces the half-nuts *d d* up, thus securely locking the saddle *e*. The stop *p* is then withdrawn by depressing the handle *p′*, leaving a corresponding space between the end of the drill and the saddle *e*. The operator then pulls the drill back through the said space, so that its end bears against the saddle *e* and closes the forming-die by admitting steam or air to the cylinder C. Steam or air is then admitted to the cylinder C′, which forces the plunger or sharpening die G with great velocity against the drill, at the same time filling the forming-dies, thus causing the bit to take the imprint of both the sharpening and forming dies. The dies are then allowed to return to their normal position, and the finished drill is withdrawn. By depressing the handle working the lever K, Fig. 5, the pawls *h h* are released from the ratchets, thus allowing the saddle to be placed in any position on the parallel bars *a a* to suit the length of the following drill. This is accomplished in the alternative arrangement shown in Figs. 8, 9, and 10 by depressing the lever K, which causes the eccentric spindle K′ to release the half-nuts *d d*.

In sharpening a long drill it is undesirable to secure the drill by means of the saddle *e* pressing against its end, as owing to the great length of steel the pressure of the sharpening-die will certainly cause the drill to buckle or bend. I therefore form a slight cress *r′* on the drill at any convenient position, around which, before sharpening, a collar or washer *r* is placed, Figs. 5 and 7. The drill about to be sharpened is then inserted between the dies, as before described, and laid in the groove in the saddle *e*, as shown at *q′* in Fig. 5. The saddle *e* is then pushed forward against the collar or washer *r* and the sharpening proceeded with, as before described. On the return stroke of the levers A A′ the valves R′ and P′ are opened, admitting, respectively, water and steam or air through and into the dies. The water cools and the steam or air removes the scales from the dies, rendering them immediately ready to sharpen the next drill, and so on.

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

1. In a drill-sharpening press, the combination with the dies and the operating-levers therefor, of means for clearing away scale from and cooling said dies, consisting of fluid jets in proximity to the dies, pipe connections for supplying fluid thereto and a valve controlling the flow of the fluid with operating connections to the operating-lever whereby the movement of the operating-lever controls the flow of the cooling fluid, substantially as described.

2. In a drill-sharpening press, the combination with the dies and the operating-levers therefor, of means for clearing away scale from and cooling said dies consisting of fluid jets in proximity to the dies, pipe connections for supplying fluid thereto, a valve controlling the flow of the fluid with operating connections to the operating-lever whereby the movement of the operating-lever controls the flow of the cooling fluid and means for supplying oil to said fluid jets, substantially as described.

3. In a drill-sharpening machine the combination, with the sharpening-die, of a pair of adjustable rods attached to the front of the machine, a saddle movable on said rods, means for securing said saddle in any desired position on the rods, and a movable gage carried by the saddle arranged to be withdrawn when the drill is in position for sharpening to allow the drill to be moved back a desired distance before pressure of the sharpening-die is exerted, substantially as described.

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

WILLIAM WANLISS.

Witnesses:
WILLIAM J. ROBSON,
HAROLD KISCH.