U. CUMMINGS.
Rock-Drill.

No. 215,101. Patented May 6, 1879.

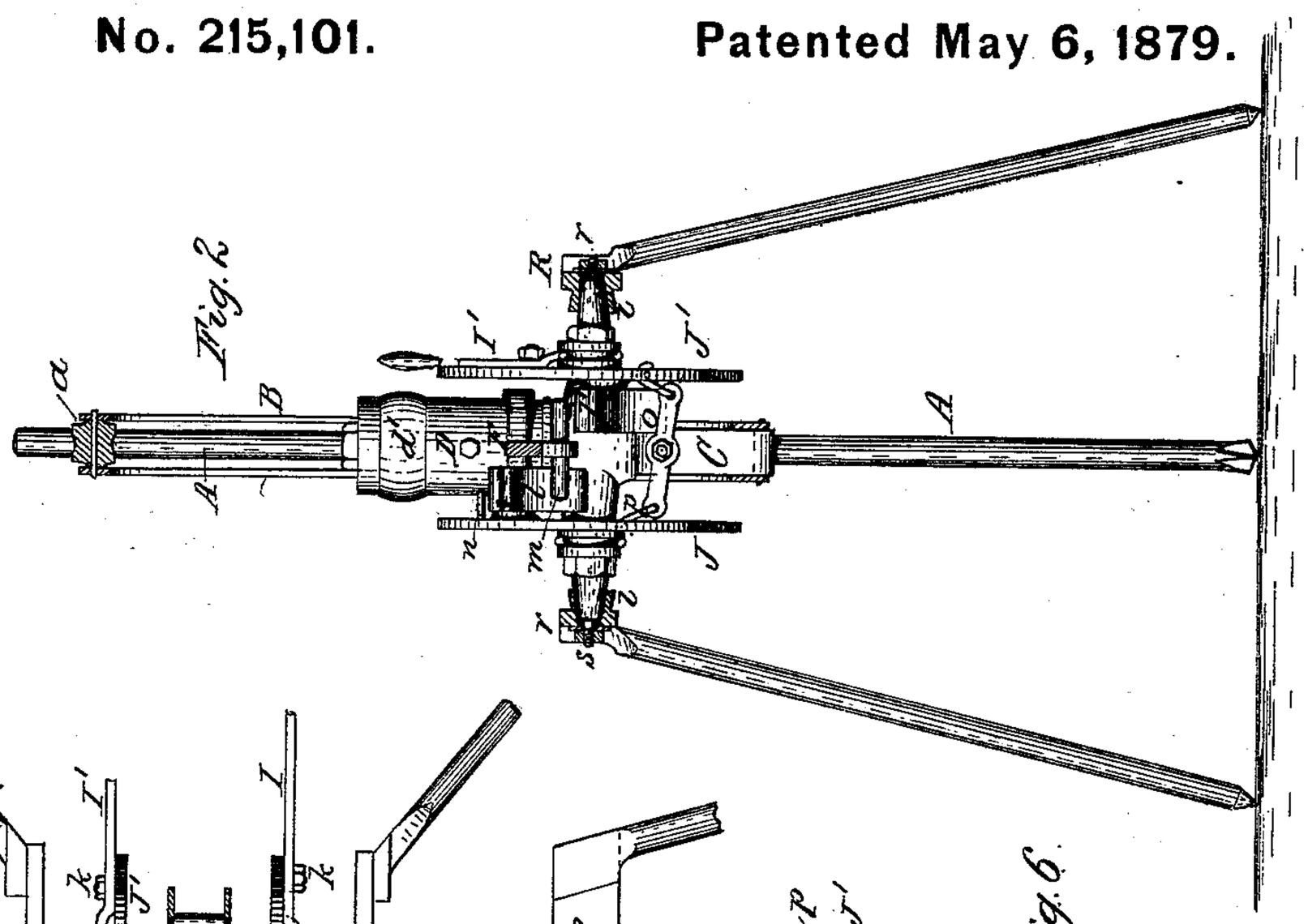

Fig. 2.

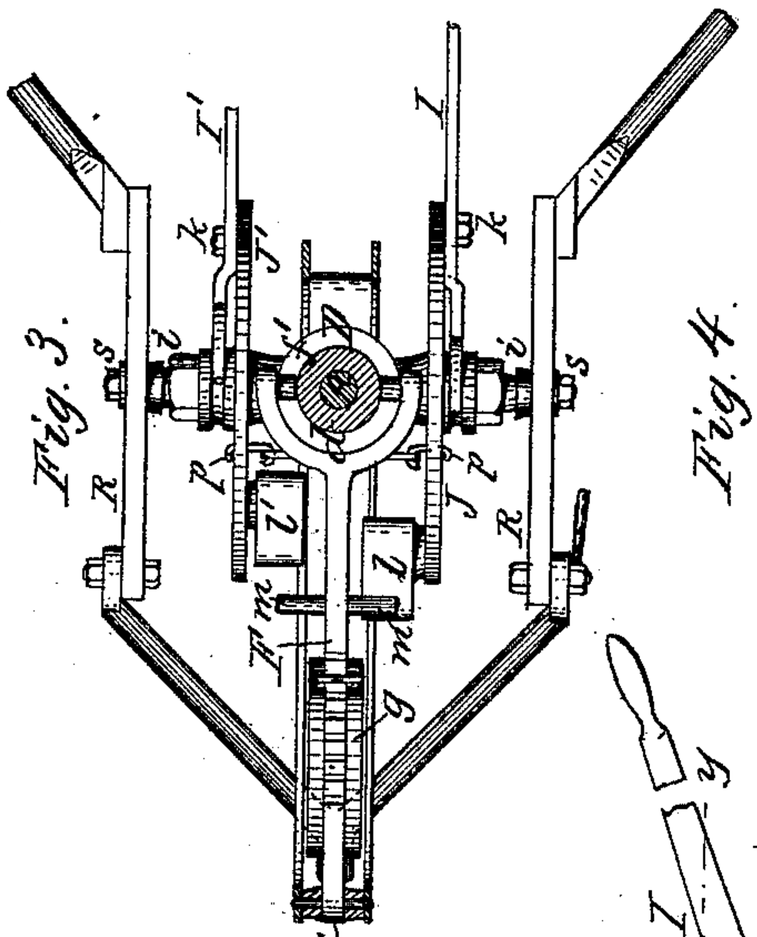

Fig. 3.

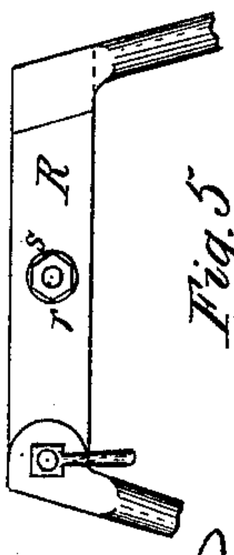

Fig. 4.

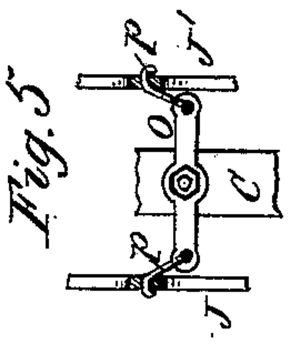

Fig. 5.

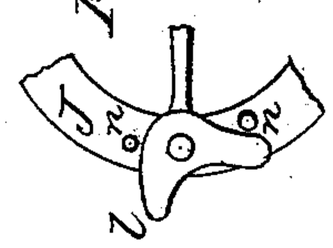

Fig. 6.

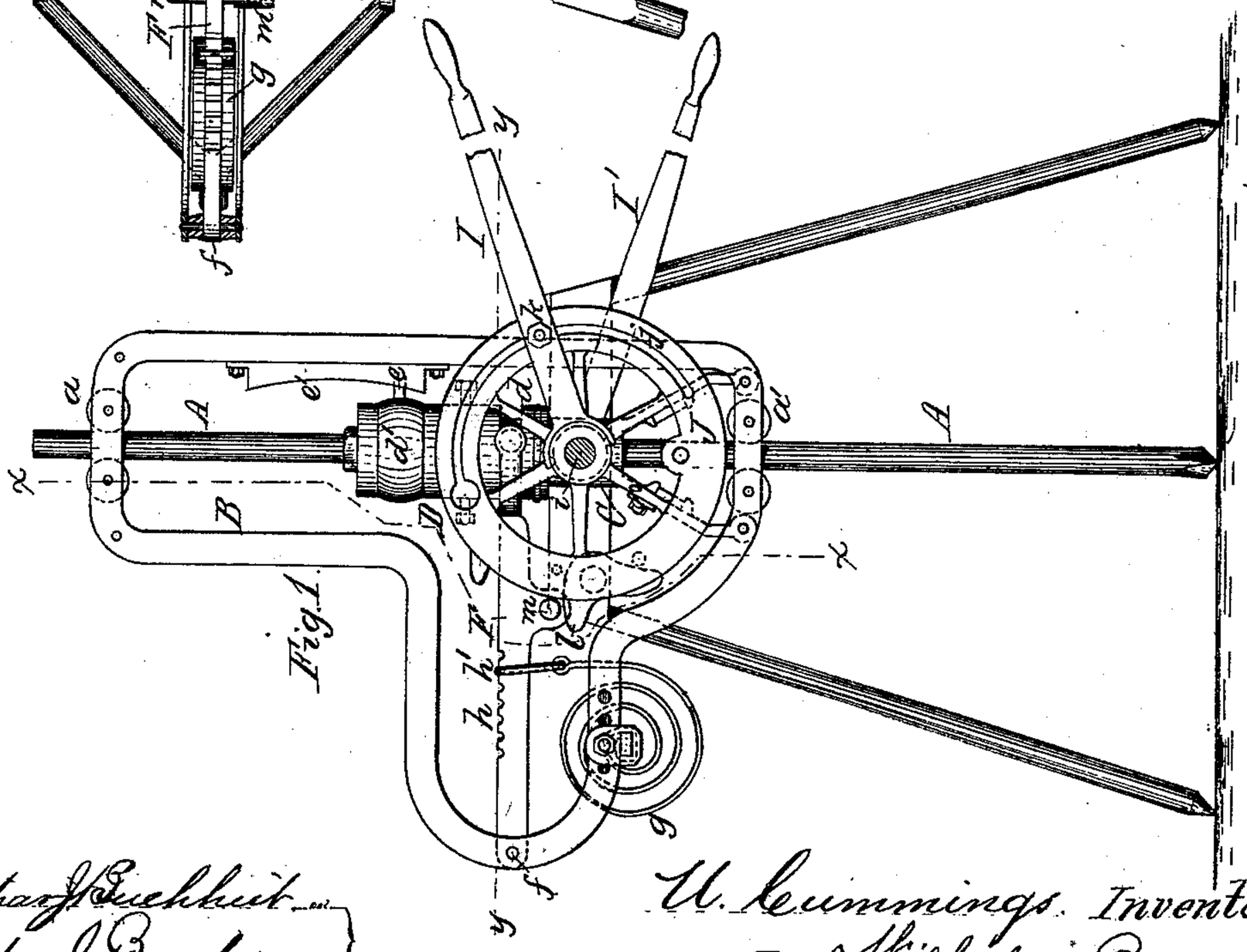

Fig. 1.

Witnesses.
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UNITED STATES PATENT OFFICE.

URIAH CUMMINGS, OF BUFFALO, NEW YORK.

IMPROVEMENT IN ROCK-DRILLS.

Specification forming part of Letters Patent No. **215,101**, dated May 6, 1879; application filed February 28, 1879.

To all whom it may concern:

Be it known that I, URIAH CUMMINGS, of the city of Buffalo, in the county of Erie and State of New York, have invented a new and useful Improvement in Rock-Drills, of which the following is a specification, reference being had to the accompanying drawings.

This invention relates more especially to that class of rock-drilling machines which are operated by hand-power.

Previous to my invention the spring which imparts the blow to the drill-bar has generally been applied to this class of machines directly to the clutch-head or lifting-block, by which the drill-bar is rotated during its upward movement. This spring is gradually compressed as the clutch-head ascends, and its pressure upon the rotating gear causes a rapid wearing thereof, and necessitates the expenditure of considerable power for rotating the drill.

One of the objects of my invention is to remedy this defect; and my invention consists, to that end, in interposing between the actuating-lever and the clutch-head an auxiliary lever, to which the spring-power is applied, and whereby the rotating gear is relieved from the pressure of the spring.

It also consists of certain details of construction, whereby the operation of the machine is rendered more convenient and effective; and, finally, in providing the drill-frame with journals, and supporting the same adjustably in a stationary frame, so that the drill can be used at any desired inclination or horizontally, as will be hereinafter fully set forth.

In the accompanying drawings, Figure 1 is a side elevation of my improved machine, with one side of the stationary frame removed. Fig. 2 is a vertical section in line *x x*, Fig. 1. Fig. 3 is a horizontal section in line *y y*, Fig. 1. Fig. 4 is a side view of the top portion of the stationary frame. Fig. 5 is a detached view of the rock-lever. Fig. 6 is a detached view of one of the lifting-pawls.

Like letters of reference designate like parts in the several figures.

A represents the drill bar or rod, and B the frame in which the bar A is guided in any suitable manner, a guide cylinder or barrel, C, secured centrally to the frame, and rollers *a a'*, being represented in the drawings.

D represents the clutch-head or lifting-block, of any ordinary and suitable construction; and *d*, the cylindrical portion thereof, to which the drill-rod A is secured; and *d'*, the clutch-sleeve, which is moved back and forth by means of a pin, *e*, working in the inclined slot of a plate, *e'*, in a common manner.

F is the auxiliary lever, pivoted with one end to the drill-frame B at *f*, and grasping with its other bifurcated end the portion *d* of the clutch-head, to which the drill-bar is secured, and which is provided with an annular groove or recess, *f'*, for engaging with the lever F.

g is a spiral or other suitable spring, secured to the drill-frame B and connected with the lever F, so as to draw the latter downward. The spring *g* is connected with the lever F in such manner that its point of attachment can be readily changed toward or from the fulcrum of the lever, whereby the force which the spring exerts upon the lever can be reduced or increased, as may be desired. As shown in the drawings, the lever F is for this purpose provided with a series of notches, *h*, and the spring *g* with a ring or link, *h'*, which may be placed in any one of these notches of the auxiliary lever.

I I' represent the actuating hand-levers, arranged on opposite sides of the drill-rod, and swinging loosely with their inner ends upon a shaft, stud, or journal, *i*, projecting horizontally in the same axial line from each side of the guide barrel or cylinder C.

J J' are circular or segmental frames, mounted loosely on the studs *i* on the inner side of each hand-lever, and preferably provided on their outer side with a circular or segmental dovetail slot, *j*, for the reception of a bolt, *k*, by which each hand-lever is adjustably secured to the circular frame J. *l l'* are lifting dogs or pawls, attached to the frames J J'; and *m* is a projection or stud, arranged on each side of the auxiliary lever F, for engaging with the pawls *l l'*. The latter are loosely pivoted to the rims of the swinging frames J J', and their movement is limited in either direction by stop-pins *n n'*.

O is a rock-lever, pivoted centrally to the

guide cylinder or barrel C, and having its ends connected with both swinging frames J J′ by links *p*, in such manner that the motion of one of the swinging frames will produce a motion in the opposite direction in the other swinging frame, thereby causing one actuating-lever to ascend when the other is being depressed, and vice versa.

R is the stationary frame of the machine, provided with bearings *r*, in which the studs or journals *i* of the adjustable drill-frame B are supported. The journals *i*, which are preferably made tapering, as shown in the drawings, may be provided with screw-nuts *s*, or with any other suitable device, whereby the frame B may be secured in position. Upon loosening the screw-nuts *s* the drill-frame B can be swung on its journals and adjusted to a horizontal or inclined position, in which it is readily secured by tightening the screw-nuts *s*, or other equivalent means. This construction enables my improved machine to be used equally well for drilling vertical, horizontal, or inclined holes, as circumstances may require. Upon adjusting the drill-frame B to any desired position, the hand-levers I I′ are also adjusted on the swinging frames J J′ to a position in which they can be conveniently operated.

In operating this machine, the hand-levers I I′ are moved in opposite directions by the operators, whereby the swinging frames J J′ are oscillated, and the lifting-pawls *l l′* are alternately raised and lowered. As each pawl rises it engages under the projection *m* of the auxiliary lever F, thereby raising the latter and the clutch-head and drill-bar, with which its inner end is connected. The pawls *l l′* and the lever F swing on different centers, whereby the pawl and the projection *m* are caused to recede from each other gradually as the lever F is raised until they reach a point at which the stop *m* becomes disengaged from the pawl, when the lever F is swung back and the clutch-head and drill-bar are forced down by the reaction of the spring *g*.

In my improved drill the rotating gear of the clutch-head is entirely relieved from the pressure of the spring, and the gear is thereby rendered more durable and capable of being operated with less power. The motion of the spring is considerably reduced by connecting the spring with the auxiliary lever, instead of applying it directly to the clutch-head; and although a stronger and stiffer spring is required by this arrangement than ordinarily, the spring will retain its elasticity for a greater length of time than if it were subjected to a movement equal to the full stroke of the drill, as in ordinary drills.

It is obvious that a machine provided with only one actuating hand-lever, I, is a complete working machine, as the two hand-levers operate independent of each other in lifting the drill. By using two operating-levers, connected as described, to operate alternately, the same auxiliary lever and connecting parts of the machine are made to do service for both operators, and the machine is enabled to execute double the amount of work of a single machine by merely duplicating the parts to which the hand-power is directly applied.

I claim as my invention—

1. In a rock-drilling machine, the combination, with the actuating-lever I and clutch-head D, of the interposed auxiliary lever F, pivoted to the frame B, substantially as set forth.

2. The combination, with the actuating-lever I and clutch-head D, provided with groove *d*, of the forked auxiliary lever F, pivoted to the frame B, and swinging frame J, carrying a lifting-pawl, *l*, substantially as set forth.

3. The combination, with the actuating-lever I and swinging frame J, provided with lifting-dog *l*, of the auxiliary lever F, spring *g*, clutch-head D, and drill-bar A, substantially as set forth.

4. The combination, with the clutch-head D, of the auxiliary lever F and spring *g*, adjustably connected with the auxiliary lever, substantially as set forth.

5. The combination, with a single drill-bar, A, and auxiliary lever F, of two actuating-levers, I I′, operating upon the auxiliary lever alternately, substantially as set forth.

6. The combination, with a single drill-bar, A, and auxiliary lever F, of two actuating levers, I I′, and swinging frames J J′, connected by a rock-lever, O, substantially as set forth.

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Witnesses:
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