(No Model.) 2 Sheets—Sheet 1.

S. W. KIMBLE.

ROCK DRILLING MACHINE.

No. 302,342. Patented July 22, 1884.

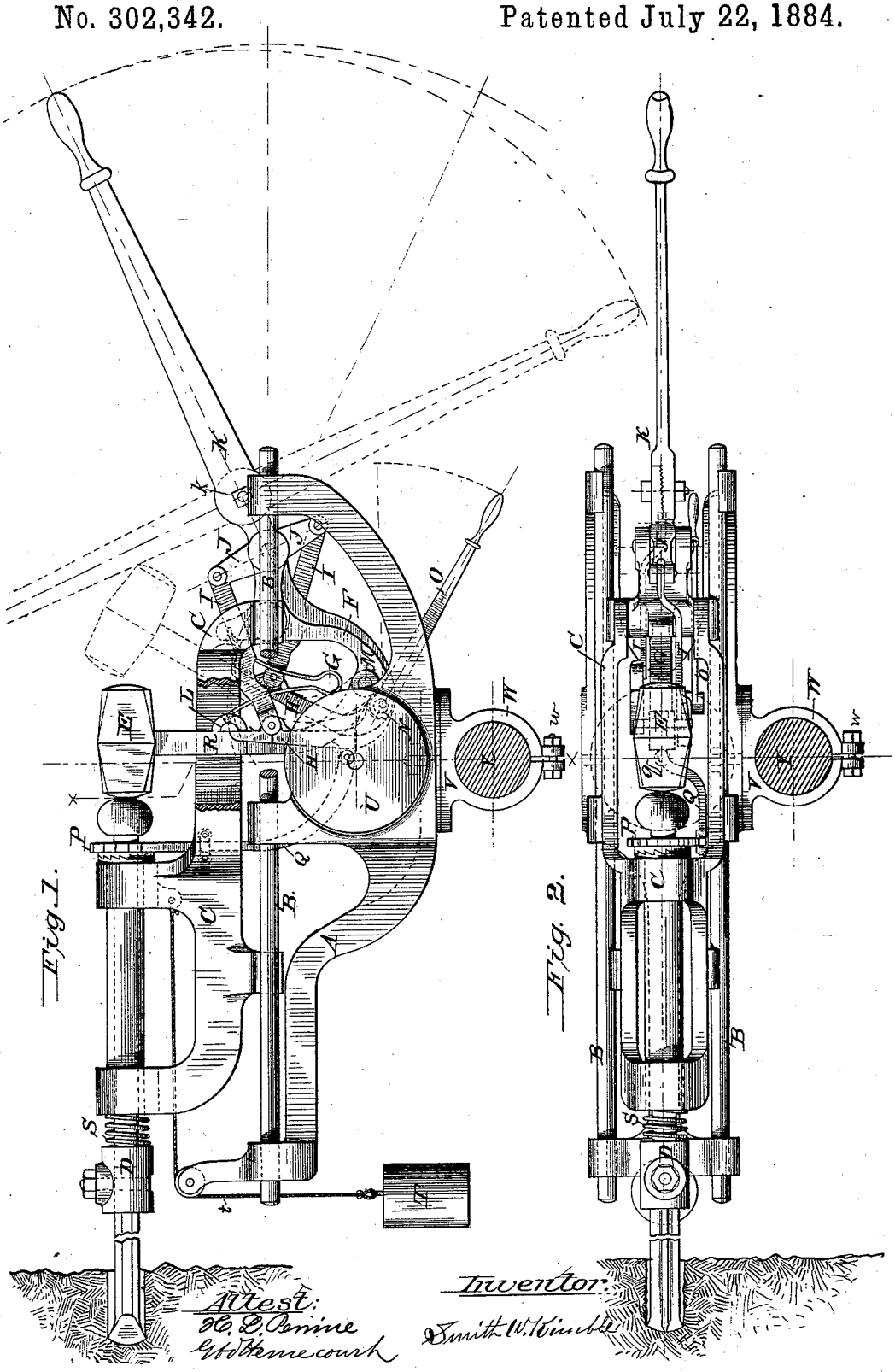

Fig. 1.

Fig. 2.

Attest:
H. C. Devine
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Inventor:
Smith W. Kimble

(No Model.) 2 Sheets—Sheet 2.

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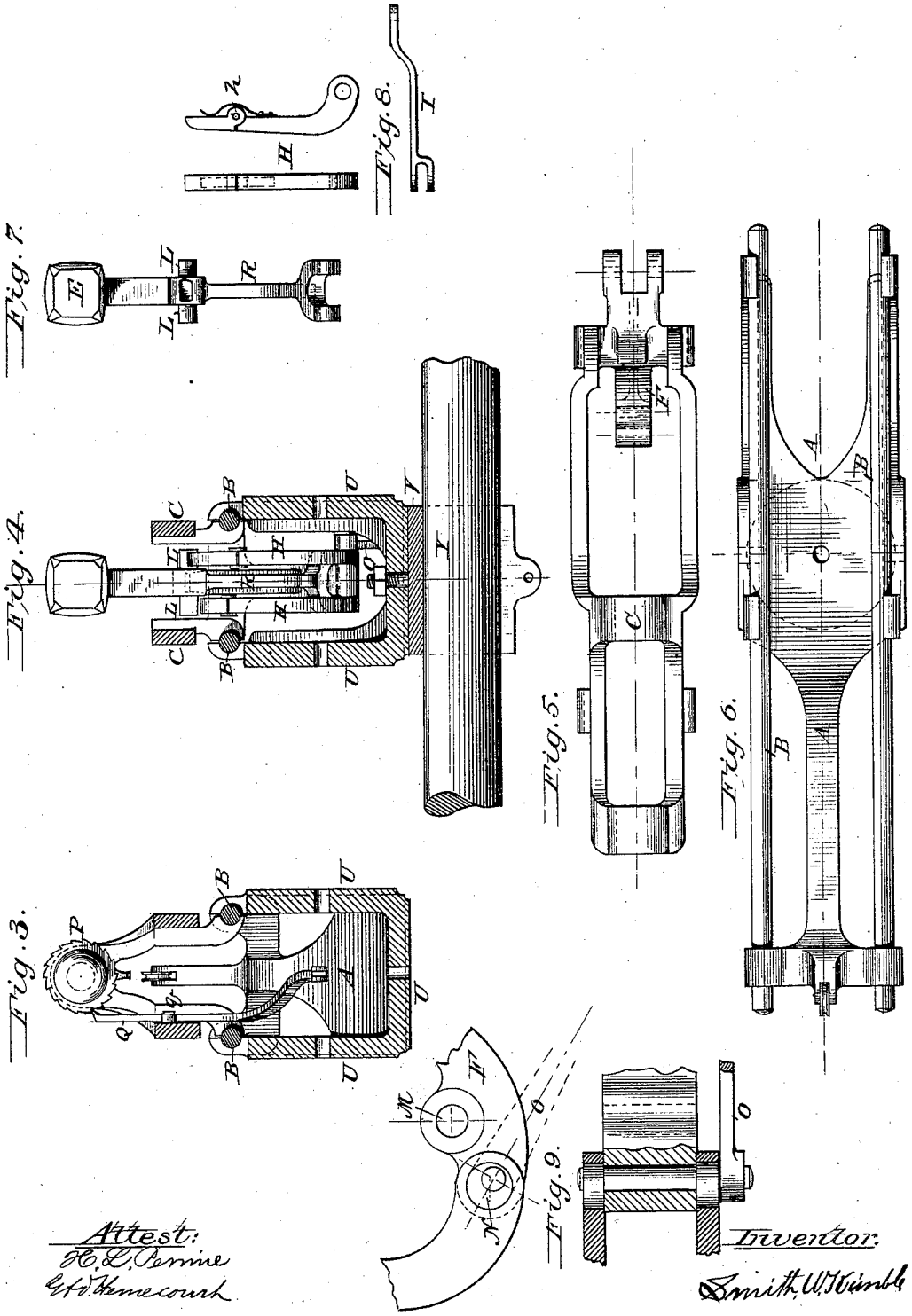

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UNITED STATES PATENT OFFICE.

SMITH W. KIMBLE, OF DENVER, COLORADO.

ROCK-DRILLING MACHINE.

SPECIFICATION forming part of Letters Patent No. 302,342, dated July 22, 1884.

Application filed May 16, 1883. (No model.)

To all whom it may concern:

Be it known that I, SMITH W. KIMBLE, a citizen of the United States, residing at Denver, in the county of Arapahoe and State of Colorado, have invented certain new and useful Improvements in Hand Rock-Drilling Machines; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters and figures of reference marked thereon, which form a part of this specification.

My invention relates to hand rock-drilling machines, and is especially adapted to mining, such as tunneling, sinking shafts, and any and all kinds of rock-work.

Figure 1 is a side elevation. Fig. 2 is a plan or top view. Figs. 3 and 4 are sections through *x x*, Fig. 1. Figs. 5, 6, 7, 8, and 9 are details of the said machine.

Similar letters of reference indicate like parts in all the figures where they occur.

A is the frame, to which guide-rods B B are fastened, supporting a movable frame or carriage, C, containing the drill-shank D. The said movable frame C also carries the hammer E and arm F, as well as a spring, G, and levers H H, connected by links I I to the lever-arms J, operated by the hand-lever K. The hammer is thrown forward by the spring. By the movement of the lever K through a segment of a circle, as shown in dotted lines in Fig. 1, an oscillating movement is produced on the lever-arm J and transmitted through the arms I I to the levers H H, producing an alternate movement of the levers H H back and forth, producing a stroke of the hammer E at each upward motion, and also at each downward motion of the lever K. The levers H H are made with a knuckle-joint turning on the center *h*, that yields in passing back under the lug or half-round pin L in the hammer-helve R. The hammer-helve R is hinged at M, and the levers H at N, on an eccentric pin and lever, O. By turning these to a certain position the levers H H may be lowered, permitting the hammer to strike a light blow, owing to their shortening, and leaving the half-round pin L before the spring G has been compressed to its full strength. By changing the position of the eccentric by turning the small lever O the levers H H may be raised, so as to retain their hold on the pin L until a later period. By thus operating the spring will be more compressed at each backward movement of the hammer, and the hammer will have a longer range of motion in which to accumulate velocity, so that a strong blow will be struck. This gives the operator full control over the force of the blows.

There is in the lever K a joint formed by two flat disks, either smooth or radially grooved, which may be matched together in any position required, and held by a central bolt, *k*. In shifting the drill into various positions to drill holes in various directions and at various heights, the handle may not come in a convenient position for working. When this occurs, the operator slackens the nut on the bolt, turns the lever loosely around, not on its center, but on the bolt as a center, and then tightens the nut on the bolt *k* again, so as to make the joint again rigid. This, in fact, bends the lever K into a new position in which the operator may give it the required range of vibration with greater ease. The effect of vibrating it to a certain extent in any position will be the same. It will always rock the two arms J J, so as to work the two links I I with their connections intermittently, and cause the hammer to make the required two motions at each complete vibration of the lever K. In starting the hole, light blows are in order. After the hole is well started, stronger ones are required. As the drill carried in the drill-shank D deepens the hole in the rock, the carriage C moves forward on its guideways or guide-rods B. When this has progressed to a sufficient extent, the operation is stopped, and the carriage C and its attachments are drawn backward. When the weight T is detached, there is nothing to prevent moving the carriage C freely backward until it leaves the guides B and is entirely free. Then the drill may be taken out of the drill-stock D, a longer one inserted, and the parts returned to their places and the work resumed. This may be repeated as often as desired.

The turning movement of the drill is effected by the double ratchet P and the pawl Q, piv-

oted to the hammer-helve R at *q*. When the hammer E is drawn back, the arm Q rotates the drill one notch of the ratchet P, throwing the drill from the rock at the instant of the partial turning of the drill-shank D, and again throwing it to the rock by means of the spring S, the frame C following up, as the drill advances in the rock, by the weight T and cord *t*, as shown in Fig. 1.

The disk-cheek U on the side of the frame is for supporting the machine when used on a vertical column, and is fastened to a disk-clamp, V. It will be seen that the machine will swivel at any angle on a horizontal, vertical, or variously-inclined column, Y, to allow assuming any position that may be required, with the simple changing of the disk-clamp V from the bottom to either side, slackening the bolt *w* of the spring-clamp W, shifting the machine into the desired position on the column Y, and again tightening the bolt *w*. It can also be moved vertically or horizontally along the column Y, and held in position by means of the said clamp, giving the operator the advantage of working the machine to the highest point in a tunnel with the lever K thrown downward, as shown in Fig. 1 in dotted lines, as also swiveling the machine upside down by means of the disks, making it convenient to drill at the bottom of the tunnel with the lever K standing upright in the most favorable position for the operator to work the machine. The position of the lever K is changed at will by the clamp K′. The liberation of the hammer while the hand-lever K continues to be held in the hand, and perhaps to continue its motion, results from the difference of the positions of the center M of the hammer-helve R, and of the center N of the two levers H. The hinged end or point of each lever H engages strongly with R at the commencement of its movement to draw back the hammer; but as the movement progresses it commences to slip off from R, and at a certain point the motion liberates it. This period is varied by changing the position of the small lever O, and consequently bringing the centers of motion of the levers H nearer to or farther from the center M. By employing two of these levers H, arranged to act alternately, one of the pawls is always back, ready to commence to act at the moment the other has done its work.

Modifications may be made in the forms and proportions within wide limits. Parts of the invention may be used without the whole. I can operate successfully without the weight T and its attached cord, the operator simply pressing the machine gently forward toward its work as he rocks the lever K. It is preferable to work in that manner under most circumstances.

I claim as my invention—

1. In a rock-drill, the carriage C and guideways B, supporting the same, the hammer and hammer-helve borne on the center M, and having a lug, L, together with its operating-spring, in combination with the operating-lever H, turning on a center, N, as shown, out of coincidence with the center M, and with means for strongly vibrating such lever, as herein specified.

2. The duplicate levers H, turning on the adjustable center N, as shown, the duplicate links I, connected to the same and to the arms J, operated by the single lever K, in combination with each other and with the hammer E, operating-spring G, and helve R, having lug L, and turning on a different center, M, whereby the force of the blow may be varied at will, as specified.

3. In a rock-drill having a hammer, E, and helve R, borne on axis M, duplicate levers H H and I I, engaging said helve with arms J of the operating-lever K, said lever having an adjustable joint, *k*, capable of being set at various angles, all in combination substantially as herein specified.

In testimony whereof I have hereunto set my hand, at New York city, this 14th day of May, 1883, in the presence of two subscribing witnesses.

S. W. KIMBLE.

Witnesses:
M. F. BOYLE,
H. A. JOHNSTONE.