(No Model.) 2 Sheets—Sheet 1.

B. H. LOCKE.

DRILL CARRIAGE.

No. 261,935. Patented Aug. 1, 1882.

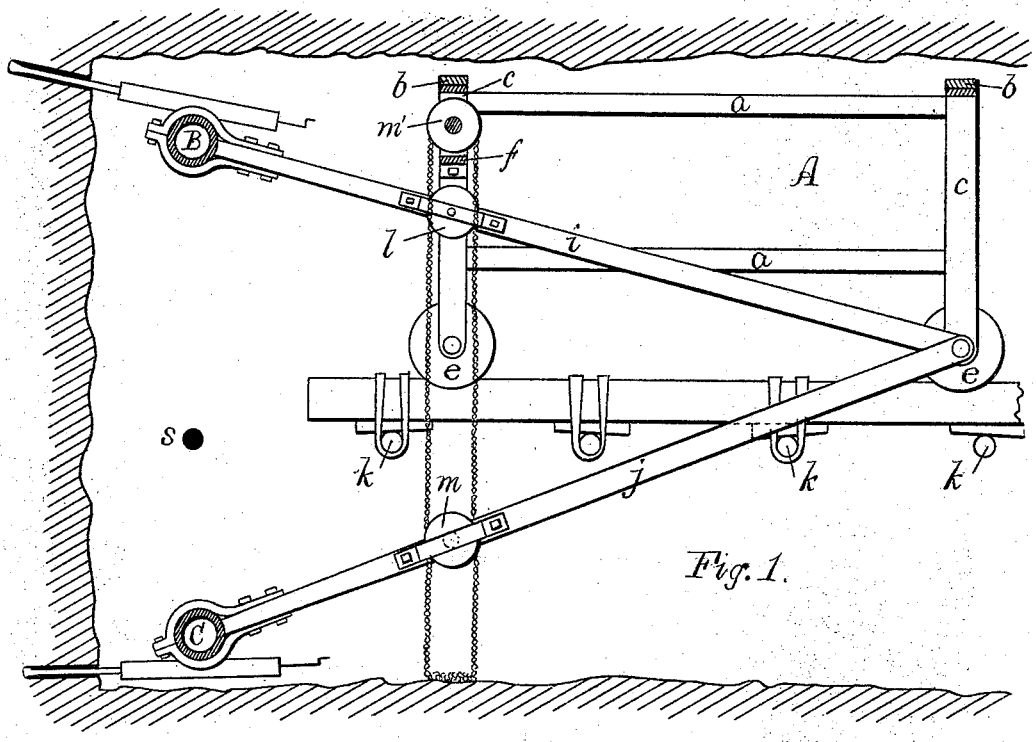

Fig. 1.

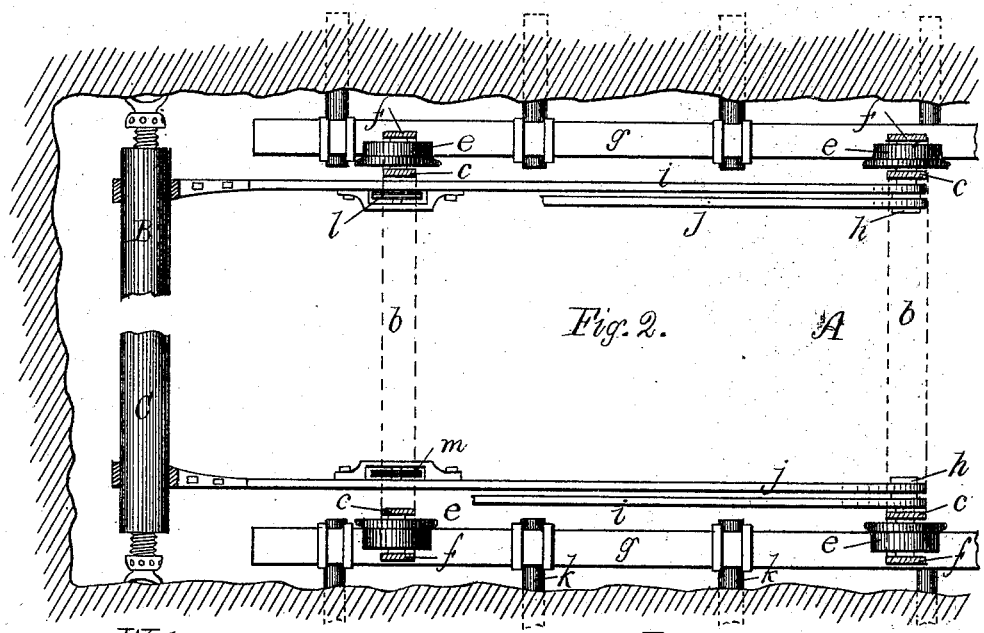

Fig. 2.

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H. E. Lodge
Wm. T. Andrews.

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F. Curtis. Atty.

(No Model.)

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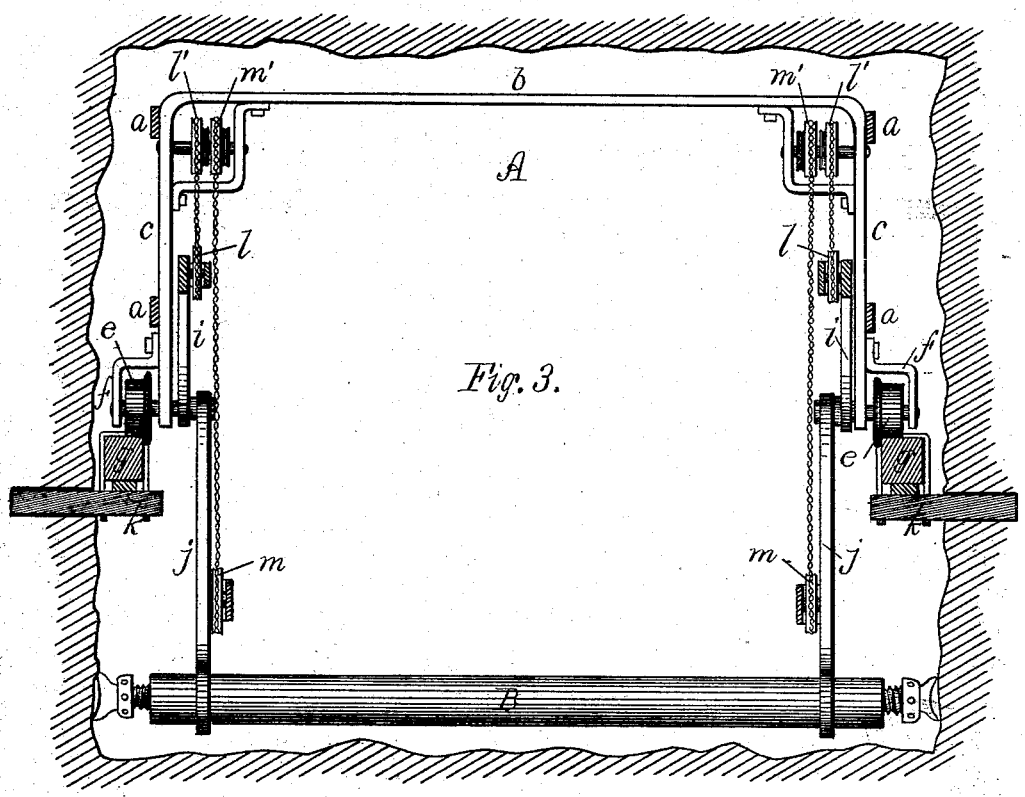

Fig. 3.

Witnesses.

H. E. Lodge.

Wm. T. Andrews

Inventor.

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UNITED STATES PATENT OFFICE.

BRADFORD H. LOCKE, OF CENTRAL CITY, COLORADO.

DRILL-CARRIAGE.

SPECIFICATION forming part of Letters Patent No. 261,935, dated August 1, 1882.

Application filed December 8, 1881. (No model.)

To all whom it may concern:

Be it known that I, BRADFORD H. LOCKE, a citizen of the United States, residing at Central City, in the county of Gilpin and State of Colorado, have invented certain new and useful Improvements in Drill-Carriages; and I do hereby 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 letters or figures of reference marked thereon, which form a part of this specification.

This invention relates to a "drill-carriage," so called, for mining and other similar purposes; and it consists in its general features of a carriage composed of an iron or other suitable frame mounted on wheels, the latter resting and moving on a temporary structure erected, in general, midway of the height of the tunnel or excavation in process of construction. To the rear portion of the frame are pivoted four arms—an upper and lower pair—which, at their farther extremities, or practically so, are supported by chain blocks or pulleys, these arms projecting some ways beyond the main structure or frame and swinging in vertical paths of movement. To the extreme outer end of each pair of arms, or "cranes," as they may be termed, are securely fastened two large hollow iron cylinders or rods, as the case may be, on and by means of which the drills and drill mechanism are supported, and which act as a brace or backing for the drills when the latter are in operation. Minor features of the construction will be hereinafter more fully explained.

The drawings accompanying this specification represent, in Figure 1, a side elevation of one-half of the carriage, looking toward the side of the tunnel. Fig. 2 is a plan, and Fig. 3 a vertical cross-section, of a drill-carriage embodying my improvements.

Hitherto in mining operations success and rapidity in accomplishing the maximum amount of work has been limited by the time allowed for drilling, and with the apparatus now generally in use most of the delay is occasioned in "clearing away" after a blast and before being able to reset the drills in position for operating. As a consequence, much valuable time is lost which could otherwise be spent in sinking holes and advancing the work, provided the drills could be put to work at once after a blast and continue in operation while the process of clearing away is taking place below.

To obviate these difficulties I have shown in the accompanying drawings at A a strong rectangular iron or other suitable frame, with side braces, *a a a a*, and end ties, *b b*, these bars giving rigidity and strength to the structure. To the four corners of the structure A, I securely affix four posts or columns, *c c c c*, to the lower ends of which, supported in proper bearings, *d d*, &c., are affixed four wheels, each separately mounted, inasmuch as it is very essential to have the carriage fit the tunnel tolerably closely and at the same time procure free space for the operation of the workmen within the frame of the carriage, as shown in Fig. 3 of the drawings, and which could not be accomplished provided the wheels were connected by axles. These four wheels *e e e e* are mounted with one bearing in the lower extremities of the posts *c c c c* and the other in small brackets *f f f f*, securely bolted to the outside of said posts. The wheels, as mounted, are adapted to run on a temporary track composed of heavy timbers, joists, or other suitable material, *g g*, placed along the side of the tunnel and resting on and securely fastened with iron straps and keys to heavy iron rods or bolts *k k*, &c., thrust into holes drilled in the side of the shaft. These holes are in practice drilled in the side of the tunnel halfway up, or thereabout, which position allows of free space beneath the frame for clearing away. This temporary track extends sufficiently far back from the head of the tunnel to insure the safety of said carriage when run back for every blast.

The rear axles, *h h*, are somewhat longer than the front ones, and extend through the rear posts *c c* a short distance and form a short shaft or arm, to which are pivoted the ends of the pair of cranes above mentioned. These cranes consist of an upper and lower pair, respectively, *i i* and *j j*, and are composed of two long iron rods or bars extending some distance in front of the drill-carriage proper and hav-

ing loops or straps of iron bolted to their extremities, said straps clasping closely the "drill-column," which extends across the heading. These "drill-columns," so called—an upper one, B, and lower one, C—may be a hollow cylinder or a solid bar, as experience may dictate, and to these columns are attached the drills and their operative mechanism. At either end of the drill-columns are inserted powerful screws, and when the drills are at their proper position these said screws are extended, wedging the drill-columns securely in place between the walls of the tunnel while the required holes are being sunk in the heading.

As I propose using unusually-heavy drills (several in number on each drill-column) and drill-columns, and also to obviate the great labor and difficulty of adjusting the drill-columns, as now generally practiced, and to effect the shifting of the drills at different elevations with ease and celerity, I have attached to the ends of the said cranes *i i* and *j j*, or at a place about two-thirds of their length from the pivoted ends, chain blocks or tackles *l m*, and these blocks are properly adjusted to and connect above with suitable corresponding blocks and sheaves *l' m'*, as shown in Fig. 3 of the drawings, attached to the upper portions of the forward posts *c c*.

The operation of my drill-carriage is as follows, supposing the tunnel to have been just started: A series of holes, *s*, Fig. 1, are first drilled in both sides of the shaft at suitable distances, and large iron pins or bolts inserted loosely, that they may be readily removed and advanced as progress on the work is effected. Upon these pins are securely fastened with iron straps and wedges a track composed of heavy timbers or other suitable material. I propose drilling these holes about midway of the entire height of the tunnel, in order that after a discharge or blast the drill-carriage can be run forward above the débris to allow new holes to be commenced at once and at the same time that clearing up is proceeding. Supposing a blast to have been discharged, the drill-carriage is at once run forward; and, as the débris now occupies a considerable portion of the lower part of the tunnel, the lower drill-column, and with it the drills, is raised above the broken rocks, and after being secured in position with screws drilling commences. The central portion of the tunnel being clear and free from the frame of the carriage allows of the ready removal of débris. The upper drill-column is likewise put in operation, and both cranes, by means of the several chain-pulleys, are gradually and readily lowered as the several rows of holes are drilled. When the lower drill-column approaches the bottom of the shaft the débris has been sufficiently removed, and no delay consequent upon the removal of the débris and adjustment of the drill-column, as now generally practiced, ensues.

By this method I can easily and readily handle very heavy drill-columns, and consequently propose to use much heavier drills and a greater number on each column than heretofore, whereas in the methods now practiced weight is an objection, though a real advantage, in consequence of the difficulty and time required in making the necessary changes of the drills in vertical adjustment.

I have shown in the present instance the carriage as supported about midway of the entire height of the tunnel; but I do not confine myself in any sense to this precise construction, as it may be modified according to circumstances, the track being constructed either above or below the center height of said tunnel, and can be so modified in position as to be placed at the top and have the carriage suspended therefrom, yet without departing from the spirit of my invention.

What I claim, and desire to secure by Letters Patent of the United States, is—

1. In a drill-carriage for mining or other similar operations, composed of a supporting-frame movably adjusted and adapted to furnish free space within the interior of the excavation, the combination of the pivoted cranes and their operative mechanism acting as a support to the drill-column with its drills and their operative mechanism, substantially as described.

2. A drill-carriage for mining or other similar operations, movably adjusted on a temporary track, the latter resting on and being secured to pins or bolts or their equivalents sunk in the side of the tunnel and sufficiently above the bottom of the tunnel to allow of removal of the débris during drilling operations, as hereinbefore stated.

3. In a drill-carriage for mining or other similar operations, the combination of the supporting-frame A, movably adjusted, and its roller or wheel trucks *f*, bolted to the frame, operating-wheels *e e*, &c., the pivoted cranes *i* and *j*, and their operating pulleys or blocks *l m* and *l' m'*, to effect the raising and lowering of the drill-column, as and for purposes stated.

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

BRADFORD H. LOCKE.

Witnesses:

H. E. LODGE,

F. CURTIS.