(No Model.) 5 Sheets—Sheet 1.

J. C. GITHENS.

Steam Rock Drill.

No. 235,080. **Patented Dec. 7, 1880.**

Figure 1.

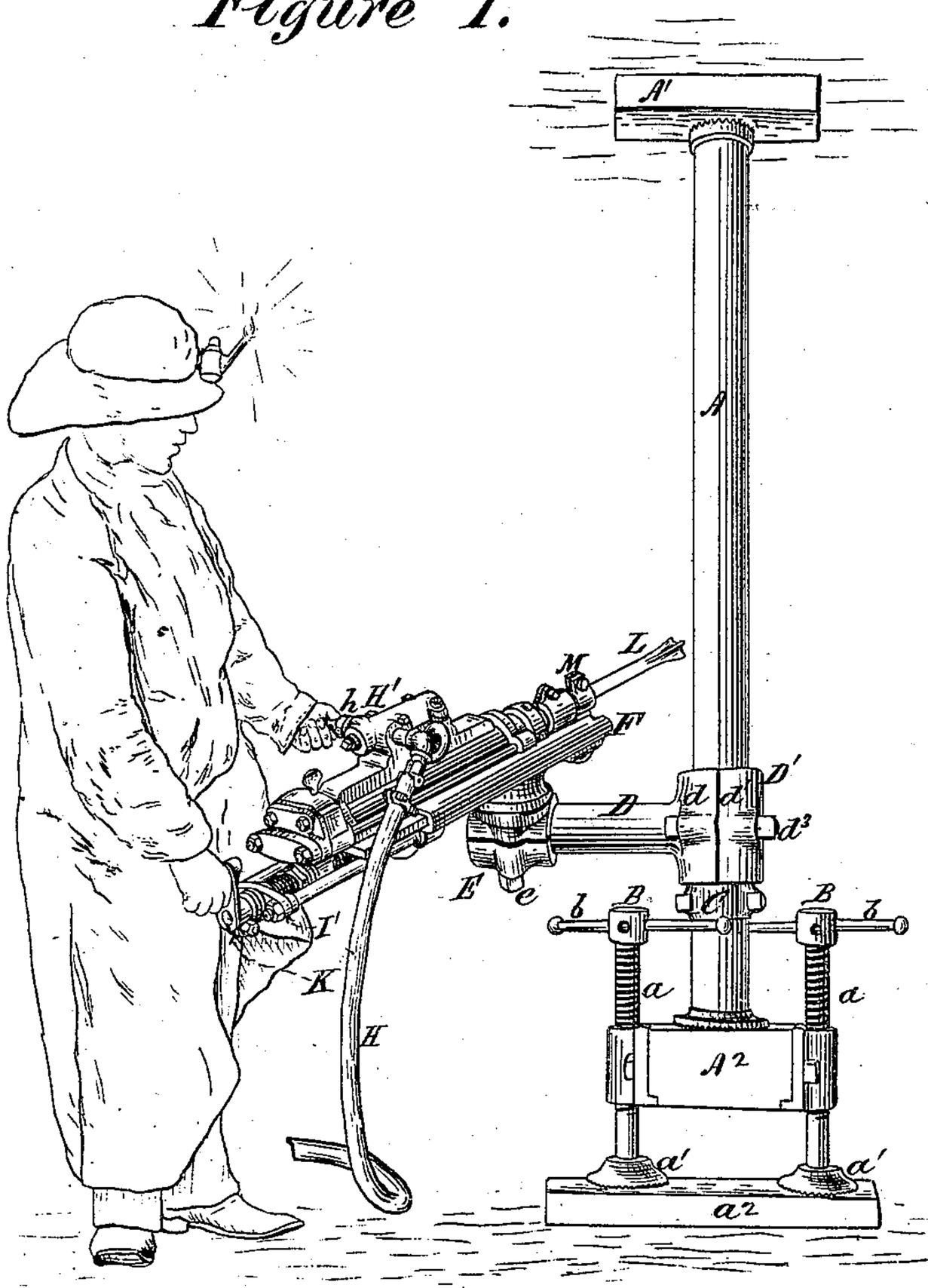
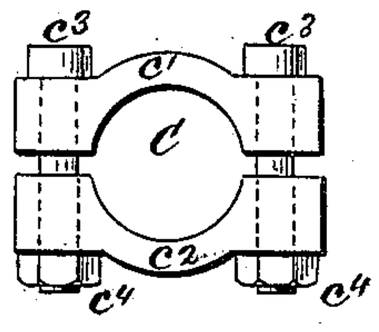


Figure 2.



Witnesses:
M. L. Adams.
Edw^d Payson

Inventor:
Joseph C. Githens,
Per Edw. E. Quinby,
Atty.

(No Model.) 5 Sheets—Sheet 2.

J. C. GITHENS.
Steam Rock Drill.

No. 235,080. **Patented Dec. 7, 1880.**

Figure 3.

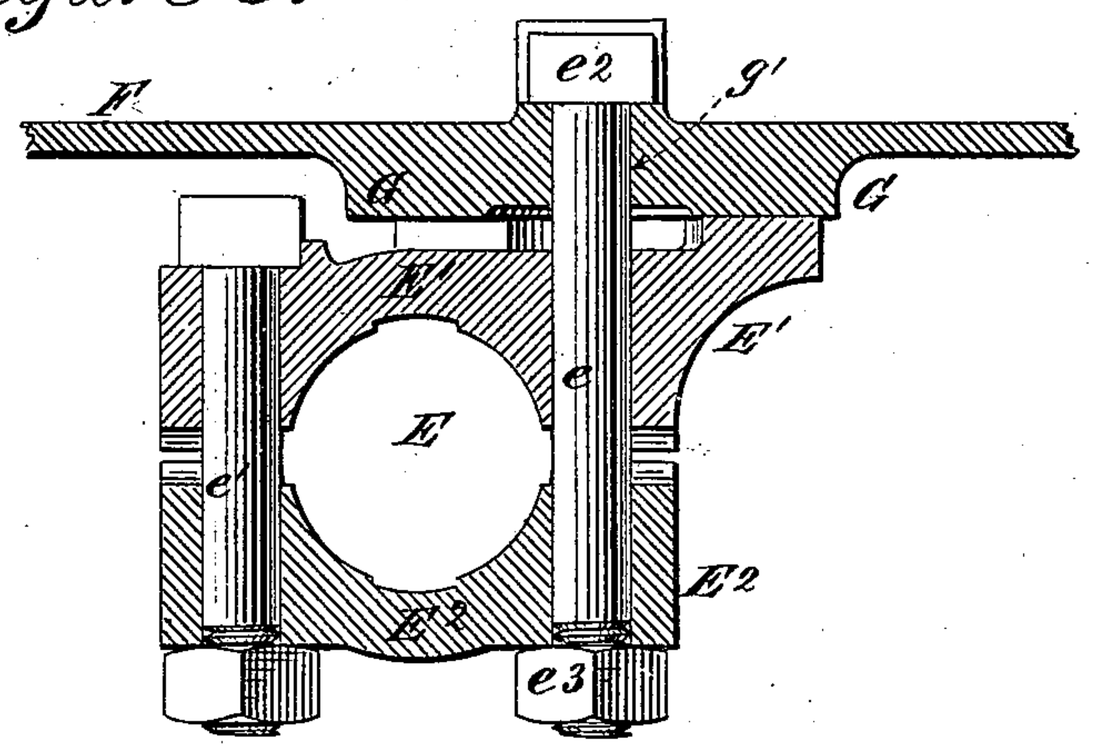
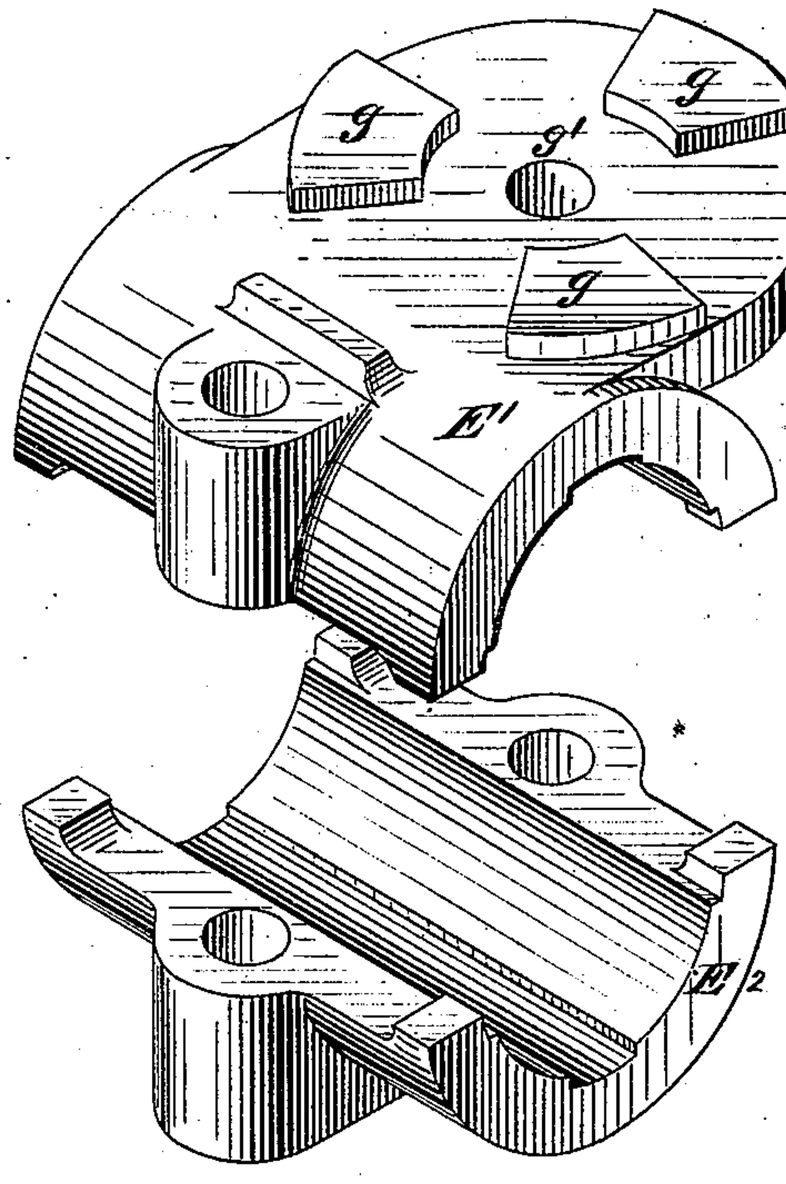


Figure 4.



Witnesses:
M. L. Adams.
Edw^d Payson

Inventor:
Joseph C Githens,
Per Edw. E. Lumby,
Atty.

(No Model.)

5 Sheets—Sheet 3.

J. C. GITHENS.

Steam Rock Drill

No. 235,080. Patented Dec. 7, 1880.

Figure 5.

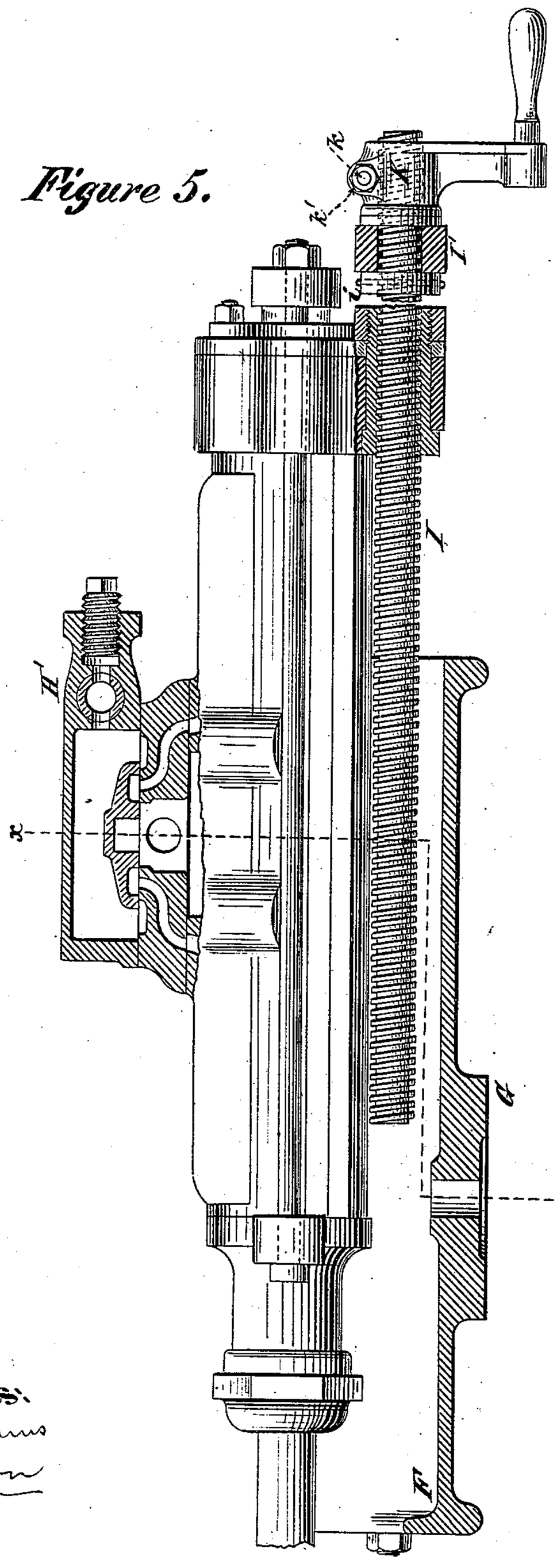
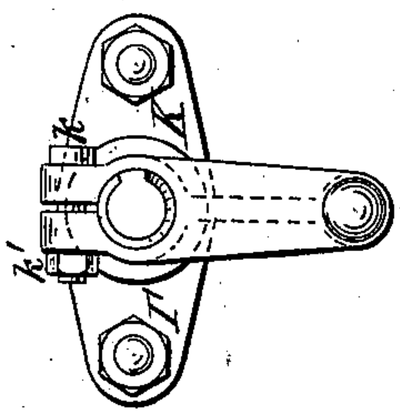


Figure 6.



Witnesses:
M. L. Adams
Edw. Payson

Inventor:
Joseph C. Githens
Per Edw. E. Quinby,
Atty.

(No Model.)

5 Sheets—Sheet 4.

J. C. GITHENS.

Steam Rock Drill.

No. 235,080. Patented Dec. 7, 1880.

Figure 7.

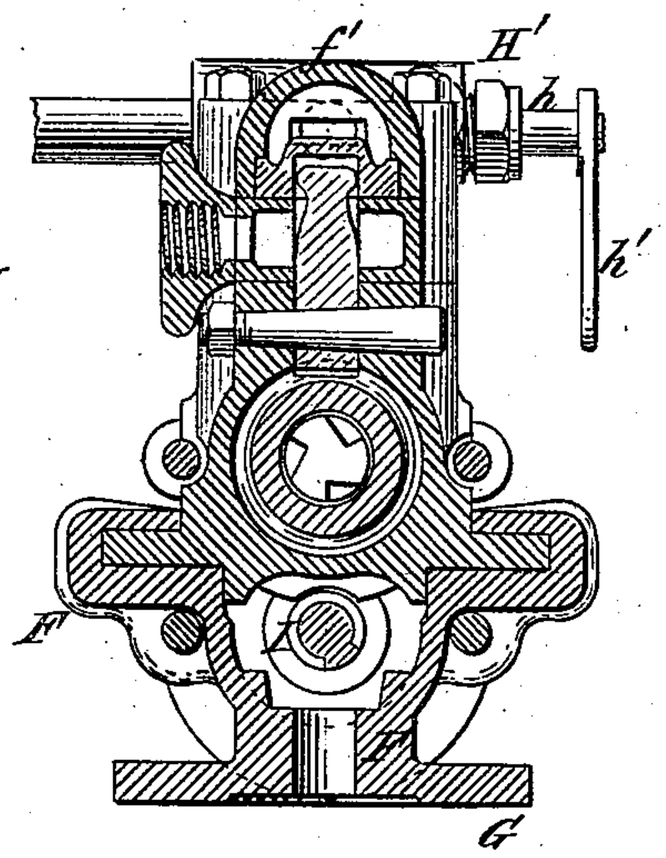
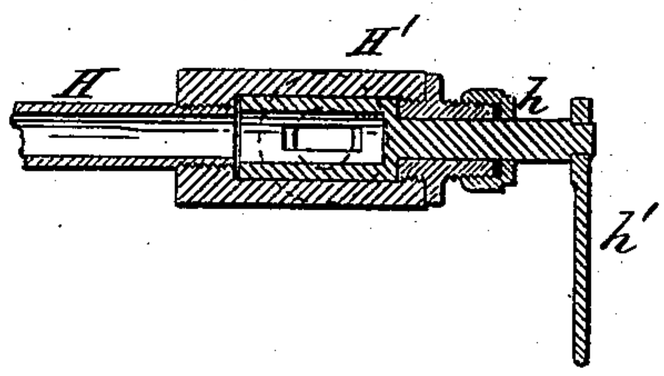


Figure 8.



Witnesses:
M. L. Adams.
Edw^d Bryson

Inventor:
Joseph C. Githens,
Per Edw. E. Linsley,
Atty.

(No Model.) 5 Sheets—Sheet 5.

J. C. GITHENS.

Steam Rock Drill.

No. 235,080. **Patented Dec. 7, 1880.**

Figure 9.

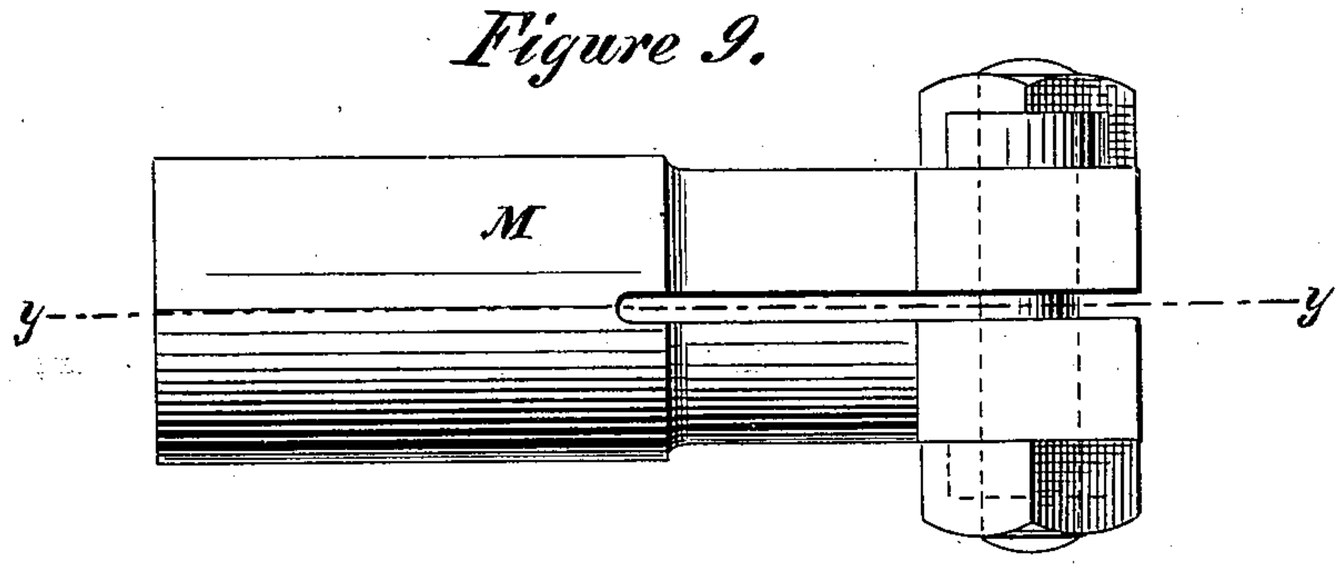


Figure 10.

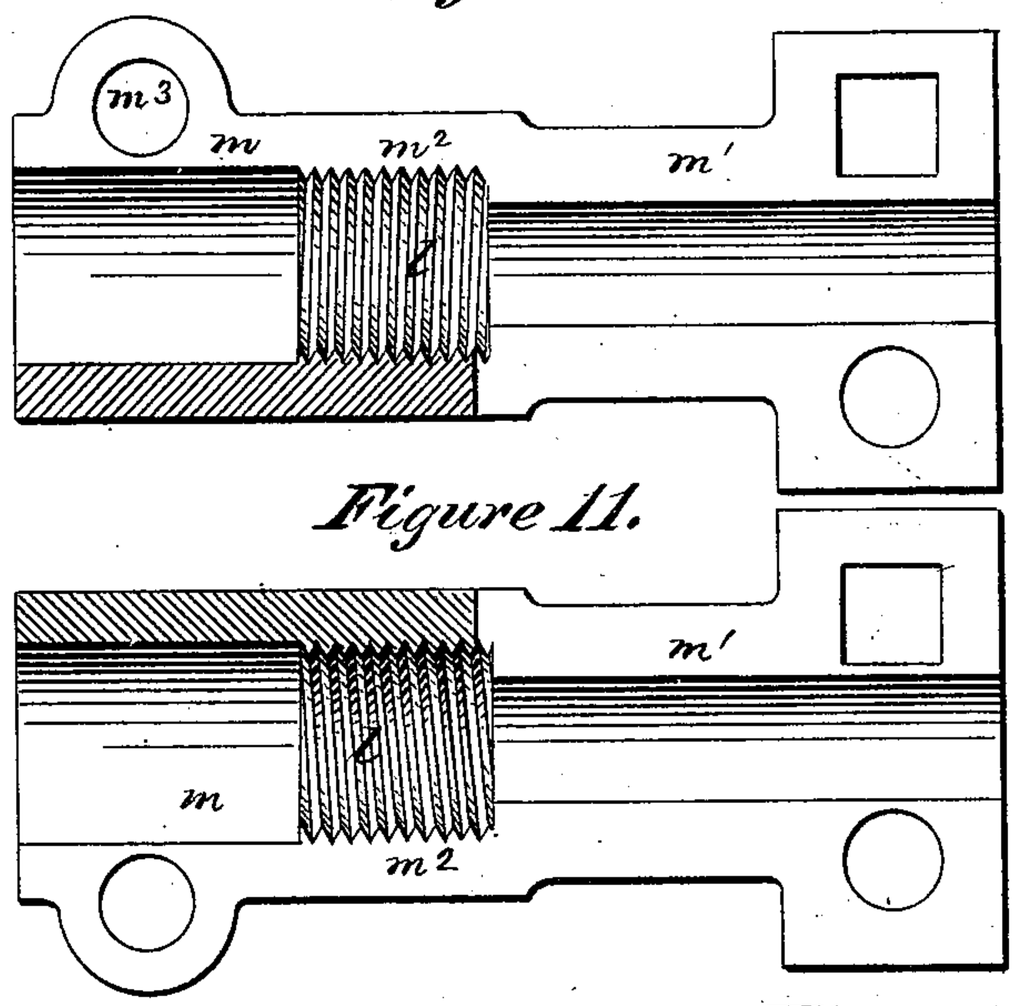


Figure 11.

Figure 12.

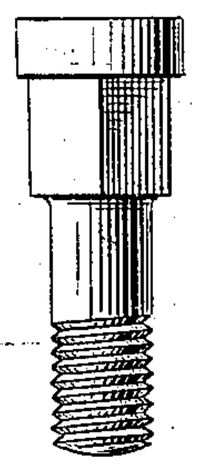


Figure 13.

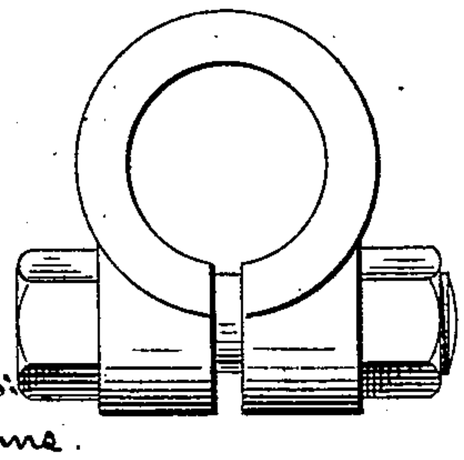
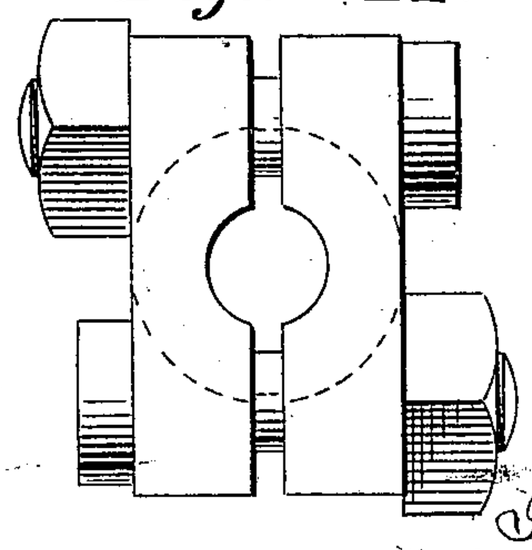


Figure 14.



Witnesses:
M. L. Adams.
Edw^d Payson

Inventor:
Joseph C Githens,
Per Edw. E. Lumby,
Atty.

UNITED STATES PATENT OFFICE.

JOSEPH C. GITHENS, OF NEW YORK, N. Y., ASSIGNOR TO RAND DRILL COMPANY, OF SAME PLACE.

STEAM ROCK-DRILL.

SPECIFICATION forming part of Letters Patent No. 235,080, dated December 7, 1880.

Application filed October 8, 1880. (No model.)

To all whom it may concern:

Be it known that I, JOSEPH C. GITHENS, of the city and State of New York, have invented certain Improvements in Steam Rock-Drills, of which the following is a specification.

My improvements relate to the class of rock-drills which are adjustably supported upon extensible columns, or upon columns resting upon platforms provided with jack-screws, by means of which the platform is elevated and the upper end of the column firmly pressed against the top of the tunnel or chamber in which the rock-drill is to be used.

My invention consists, first, in providing the transversely-perforated head of each jack-screw with a radius-bar slightly exceeding in length the distance from the jack-screw to the column, so that when the jack-screw is screwed hard down the column may be used as a stop to arrest the backward sweep of the radius-bar, and hence to prevent the shocks of the drill-strokes from unscrewing the jack-screw; secondly, in the employment of an adjustable ring-clamp upon the column, as a shoulder to support the hub of the laterally-projecting arm which carries the rock-drill cylinder, so that this arm may be loosely hung and be capable of swinging in a plane perpendicular to the column; thirdly, in mounting the carriage of the drill-cylinder upon a bearing composed of sector-shaped elevations arranged radially with relation to the bolt upon which the carriage oscillates, and formed upon the face of a disk cast upon the upper half of a clamp-sleeve embracing the end of the lateral arm; fourthly, in providing the steam-chest of the cylinder with a steam-valve, the handle of which is arranged upon the side of the steam-chest in position to be conveniently reached by the left hand of the operator, while his right hand is grasped upon the crank-pin of the longitudinal feed-screw; fifthly, in an axially-split crank-nut provided with a transverse clamping-screw, by means of which the crank-nut can be firmly jammed when it has been properly screwed on the end of the longitudinal feed-screw; sixthly, in providing the chuck which carries the drill with a split sleeve sufficiently long to embrace the piston-rod some distance above the point where the male screw-thread is cut upon it.

The accompanying drawings, representing a steam rock-drill containing my improvements, are as follows: Figure 1 is a perspective view of the apparatus, showing the operator in the position which he occupies when working. Fig. 2 is a top view of the adjustable ring-clamp for the column. Fig. 3 is a central transverse section of the split sleeve, upon the upper part of which is cast the disk which affords the bearing for the drill-cylinder carriage, a portion of the bottom of the carriage being also represented in section. Fig. 4 is an isometrical perspective of the two parts of the sleeve, showing the sector-shaped elevations upon the face of the disk. Fig. 5 is a side elevation of the drill-cylinder, showing the valve-chest and the carriage in central longitudinal section, and affording a side view of the split crank-nut. Fig. 6 is an end view of the split crank-nut. Fig. 7 is a transverse section of the valve-chest, cylinder, and carriage through the broken line *x x* on Fig. 5. Fig. 8 is a central longitudinal section of the steam-pipe and cut-off valve. Fig. 9 is a side elevation of the split chuck for holding the drill-bar. Figs. 10 and 11 are longitudinal sections of the chuck, taken through the line *y y* on Fig. 9. Fig. 12 is an elevation of one of the clamping-bolts for the chuck. Fig. 13 is a view of the inner end of the chuck, and Fig. 14 a view of the outer end of the same.

Referring to the drawings, it will be seen that Fig. 1 represents the usual vertical column A, the upper end of which bears upon the under side of a piece of timber, A′, which is interposed between the upper end of the column and the roof of the chamber or tunnel.

The lower end of the column rests upon a platform; A^2, which is set up from the floor of the tunnel by means of the jack-screws *a a*, the lower ends of which are stepped in the sockets *a′ a′*, which rest upon the top of the piece of timber a^2 placed upon the floor of the tunnel.

The jack-screws have transversely-perforated heads B, and are provided with longitudinally-sliding radius-bars *b* of sufficient length to ex-

tend from the head of the jack-screws to a point beyond the center of the column A.

In use, when the platform has been suitably elevated, by screwing down the jack-screws the radius-bars are slid inward, so that their inner ends extend beyond the column A, which therefore acts as a stop to prevent the backward swing of the radius-bars and the unscrewing of the jack-screws, a tendency to which is induced by the shock of the drill-strokes.

The column A is provided with the vertically-adjustable shoulder C, a top view of which, on an enlarged scale, is exhibited in Fig. 2. The shoulder C is composed of two curved jaws, c' and c^2, which embrace the column on opposite sides, and are clamped thereon by the two transverse clamping-bolts c^3 c^3, provided with the nuts c^4 c^4, respectively. The shoulder C forms the bearing for the hub of the lateral arm D, upon the free end of which the rock-drill is supported. The hub D′ of the arm D is longitudinally divided into two parts, d and d', which are secured together by the transverse clamping-bolts d^3 and embrace the column A.

The bolts d^3 may be, if desired, set up sufficiently to fasten the hub rigidly upon and clamp the column A, or may be loosened to allow the lateral arm D to swing in a horizontal plane at whatever elevation may be determined by the position of the vertically-adjustable shoulder C, upon which the lower end of the hub D′ bears.

The free end of the lateral arm D is provided with the usual sleeve E. (Shown in detail on an enlarged scale in Figs. 3 and 4.) This sleeve is divided axially into two parts, E′ and E², which are clamped upon the arm D by the transverse clamping-bolts e and e'. One of these bolts, e, which is longer than the other, is inserted through the drill-cylinder carriage F and through a perforated boss, G, cast upon the under side of the drill-cylinder carriage, and serves as the pivot upon which the carriage can be oscillated in a plane parallel with the longitudinal axis of the lateral arm D. The face of the perforated boss G bears upon the sector-shaped elevations g g g, cast upon the top of the upper part, E′, of the sleeve E, in positions which are equidistant from each other and concentric with relation to the perforation g', through which the bolt e passes.

The drill-cylinder is of the usual construction, and is supplied with steam through the usual flexible pipe H.

Instead of having the steam-valve inserted in the flexible pipe H, as is usual, I provide a valve, H′, in the steam-chest f', as shown in detail in Figs. 7 and 8. As will be seen, the stem h of this valve projects laterally outward from the steam-chest, and is provided with a lever, h', which can be conveniently grasped by the left hand of the operator, as shown in Fig. 1.

The carriage F is provided with the usual longitudinal feed-screw I, upon the outer edge of which I apply my improved crank-nut K. This crank-nut, which is shown upon an enlarged scale in Figs. 5 and 6, is axially split and provided with the transverse clamping-bolt k and nut k'.

The feed-screw extends through the usual cross-bar I′, which is bolted to the carriage. The usual collar i is fastened to the feed-screw and bears against the inner face of the cross-bar I′. The crank-nut bears against the outer face of the cross-bar I′.

When the wear of the parts is such that it becomes necessary to take up the slack the transverse clamping-bolt k of the crank-nut is loosened and the crank-nut is screwed down against the outer side of the cross-bar with sufficient force to bring the face of the collar i against the inner side of the cross-bar, and the clamping-bolt k is then tightened so that the crank-nut is rigidly fastened to the feed-screw.

The drill-bar L is secured in the chuck M, which is screwed onto the outer end of the piston-rod. The chuck M is shown in detail in Figs. 9, 10, 11, 12, 13, and 14. It consists of a sleeve slotted on one side from end to end and on the opposite side for about half of its length, and provided with transverse bolts upon its outer end, for the purpose of clamping it upon the end of the drill-bar, and with a single transverse bolt in its inner end for the purpose of clamping it upon the end of the piston-rod. The inner portion, m, of the sleeve is of the same diameter as the shank of the piston, which it embraces, the outer portion, m', being of the same diameter as the drill-bar, which is usually smaller than the piston-rod.

The middle portion, m^2, of the sleeve has formed upon its interior the female screw-thread l, for engagement with the male thread cut upon the end of the piston-rod. Heretofore the female thread has been carried out to the inner end of the chuck, and the piston-rod has been liable to break at a point immediately in line with the end of the chuck. By elongating the chuck and forming the female thread upon its middle portion only I am enabled to clamp the chuck upon the shank of the piston-rod above that portion which has been weakened by having the male screw-thread cut upon it.

I claim as my invention—

1. In a column for the support of a rock-drill, the elongated radius-bars b, in combination with the jack-screws a a, inserted through the platform A² and the column A, substantially as and for the purpose set forth.

2. The column A, provided with the adjustable shoulder C, composed of the two curved jaws c' and c^2, which embrace the column upon opposite sides, and are clamped thereon by the transverse clamping-bolts c^3 c^3, provided with the nuts c^4 c^4, for the purpose of affording a vertically-adjustable bearing for the

lower end of the hub D′ of the lateral arm D, substantially as described.

3. The bearing for the drill-cylinder carriage, composed of a number of equidistant elevations, *g g g*, arranged radially with relation to the bolt which constitutes the axis of oscillation for the carriage, substantially as shown and described.

4. The arrangement of the steam-valve H′, having its stem projecting laterally from the side of the steam-chest *f′*, and provided with a lever or handle in convenient position to be reached by one hand of the operator while his other hand is grasped upon the crank of the feed-screw, as shown.

5. The axially-split crank-nut K, provided with the transverse clamping screw-bolt *k*, in combination with the longitudinal feed-screw I, as and for the purpose set forth.

6. The chuck M, provided upon its inner end with the transverse clamping-bolt m^3, and having a female screw-thread formed upon its middle section only, and having its inner section sufficiently large in diameter to embrace the shank of the piston-rod above the portion upon which the male screw-thread is cut, substantially as shown and described.

JOSEPH C. GITHENS.

Witnesses:
EDWD. PAYSON,
M. L. ADAMS.