

(No Model.)

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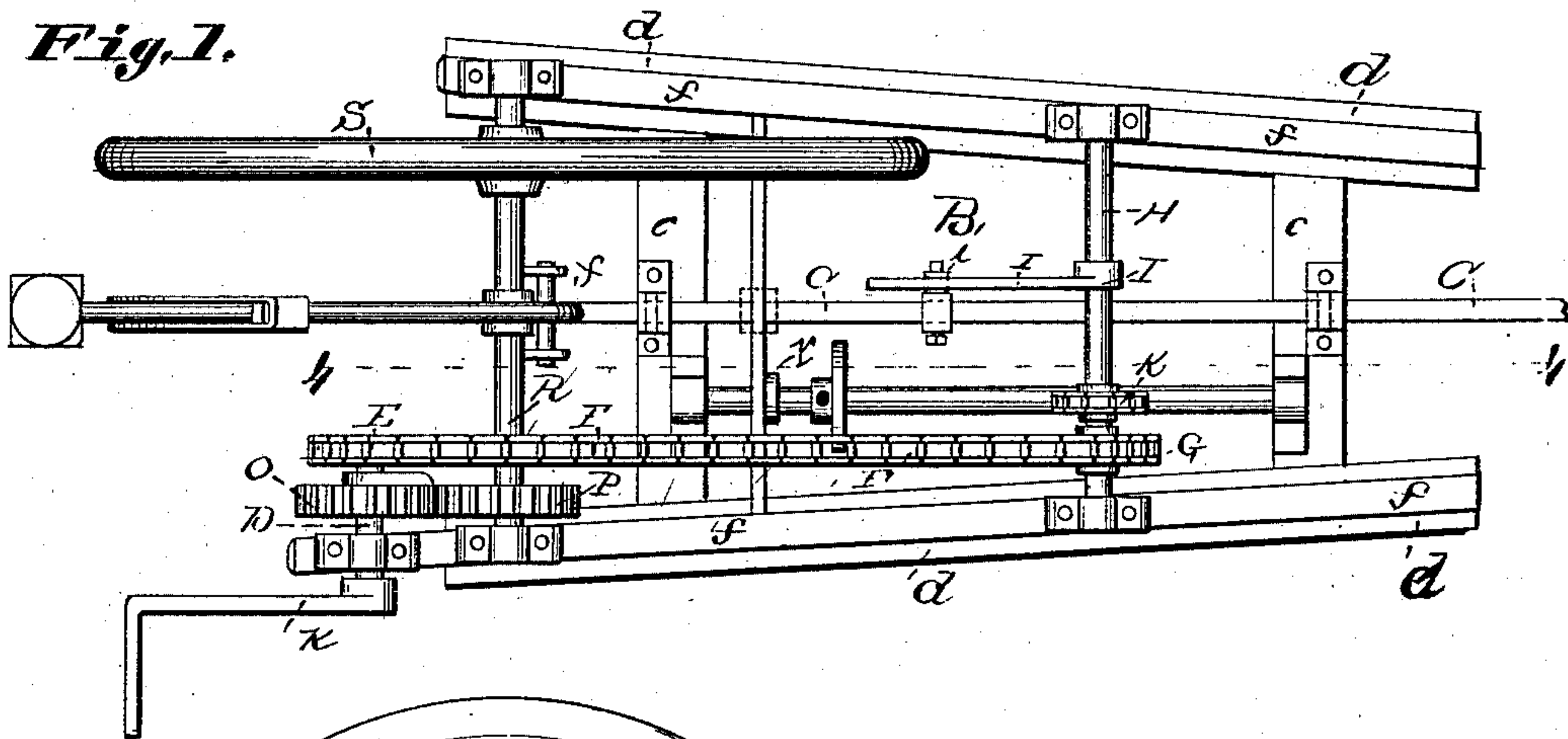
J. H. McDONALD.

MINING MACHINE.

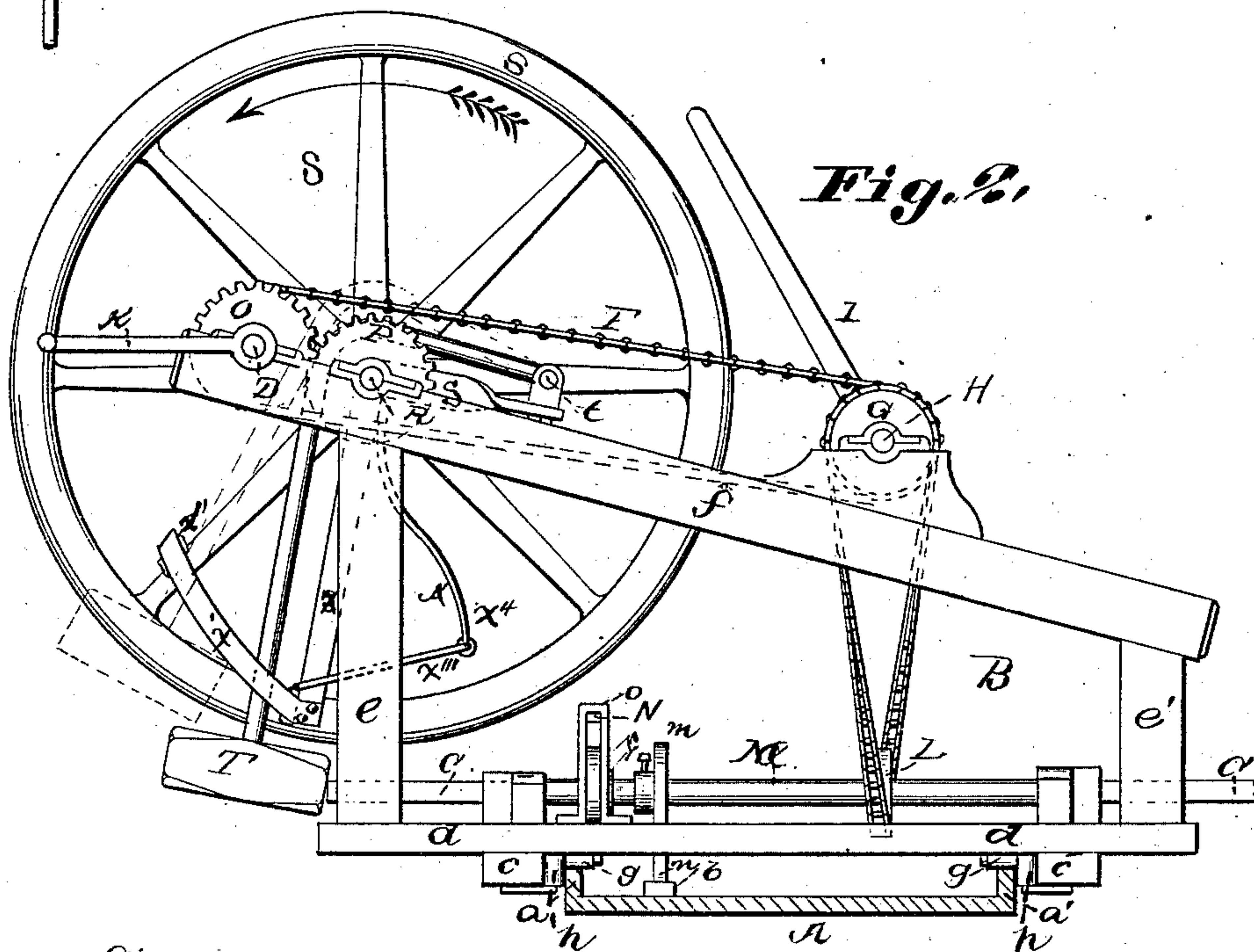
No. 294,247.

Patented Feb. 26, 1884.

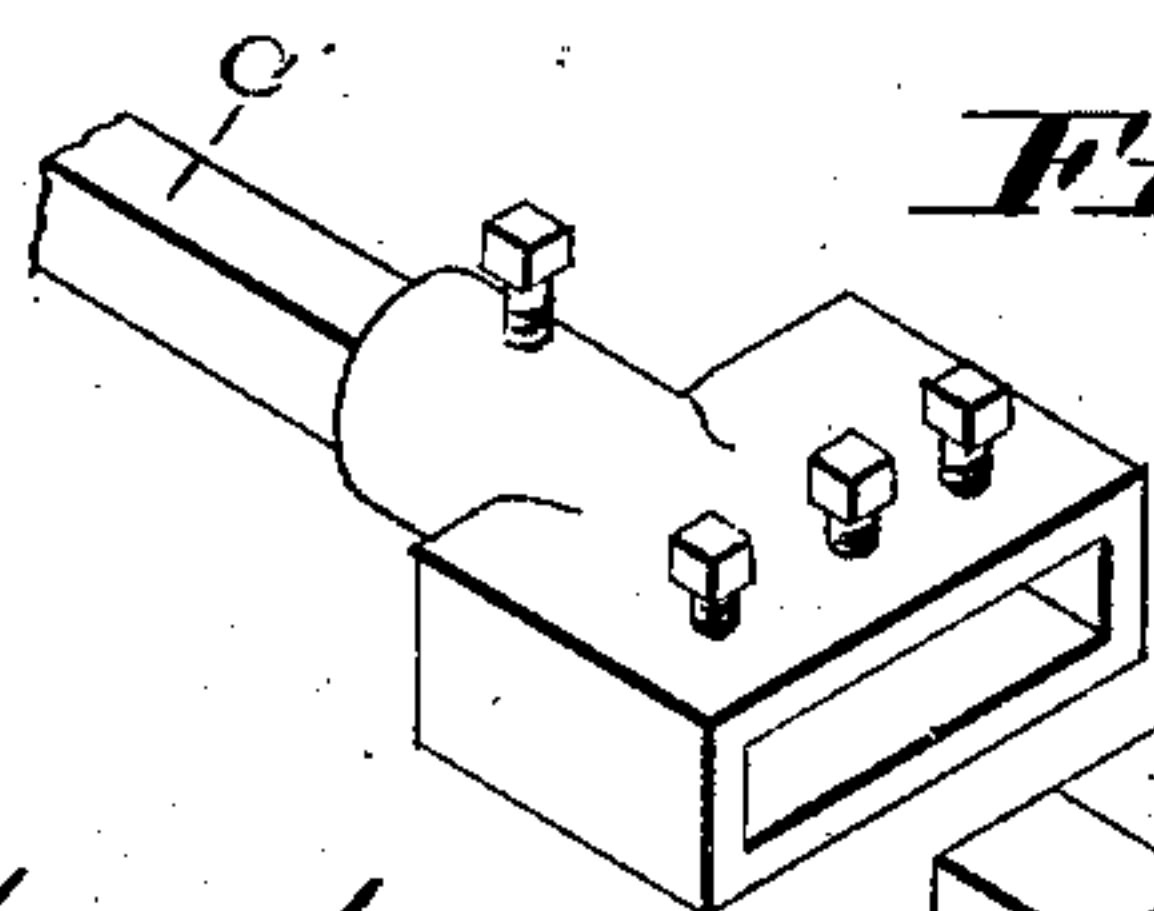
*Fig. 1.*



*Fig. 2.*



*Fig. 3.*



*Attest:*

*W. R. McKenna*  
*G. T. Chase*

*Inventor;*  
*James H. McDonald.*

*By Howard A. Snow.*

*Attorney.*

(No Model.)

3 Sheets—Sheet 2.

J. H. McDONALD.

MINING MACHINE.

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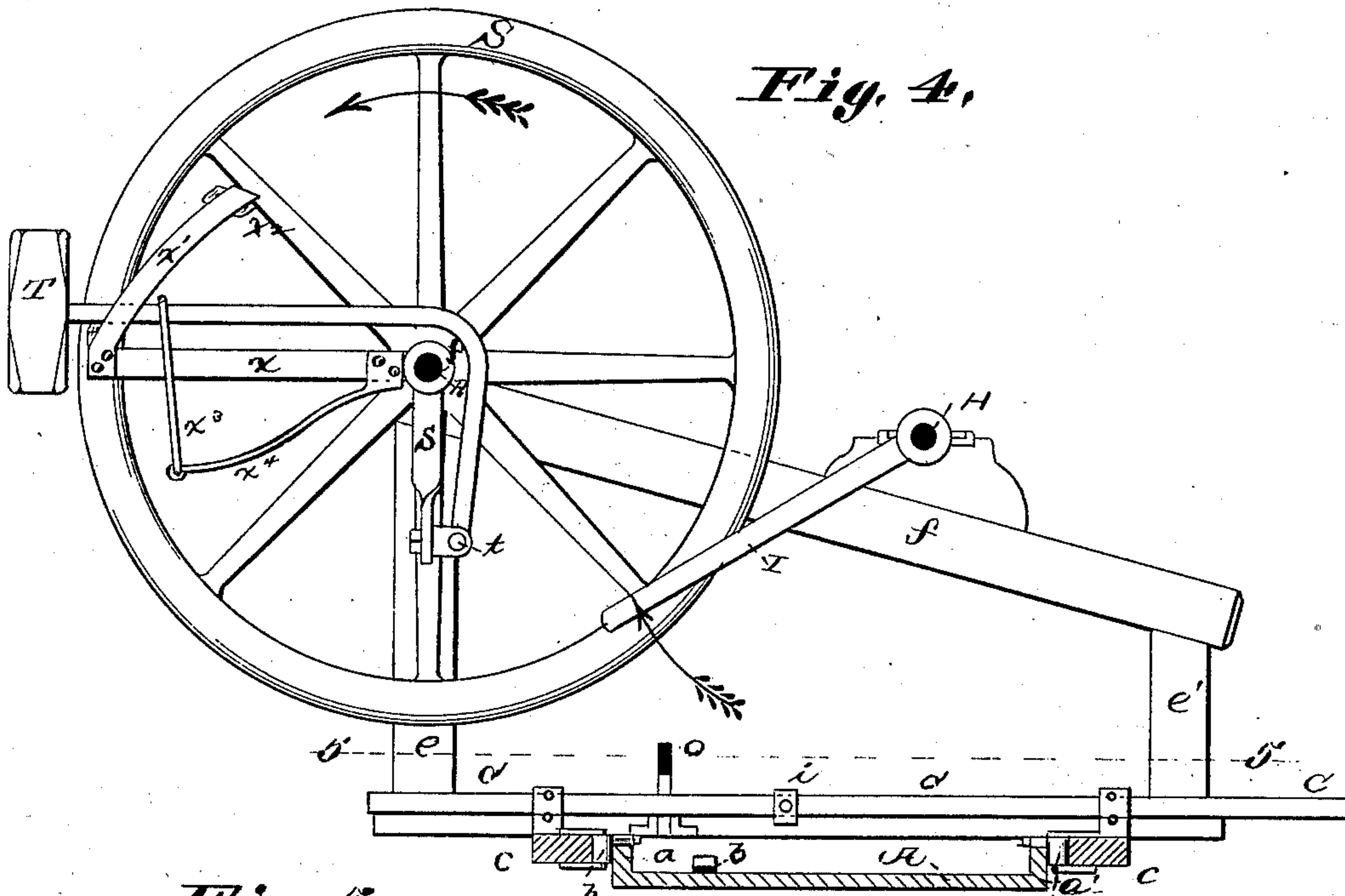


Fig. 5.

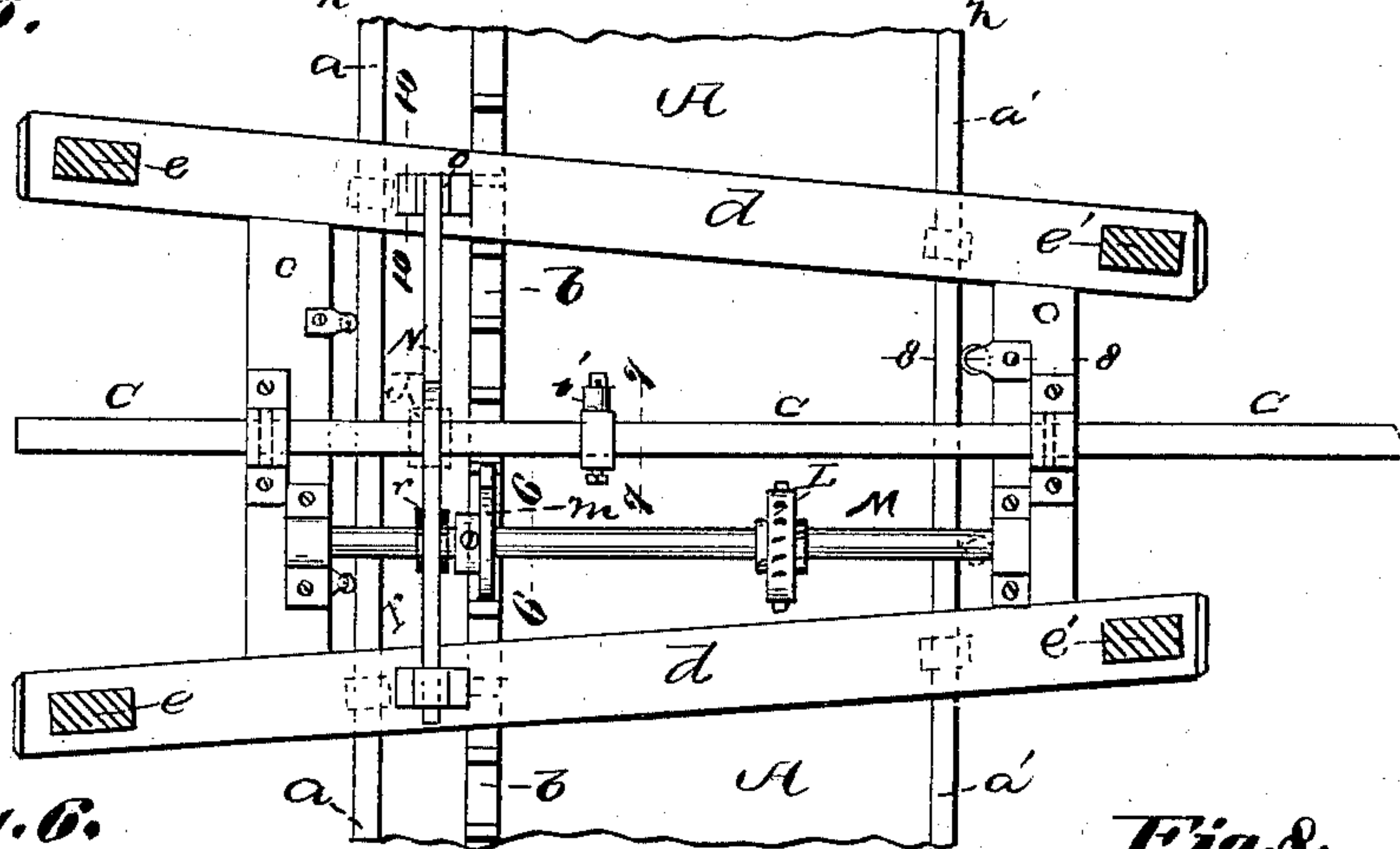


Fig. 6.

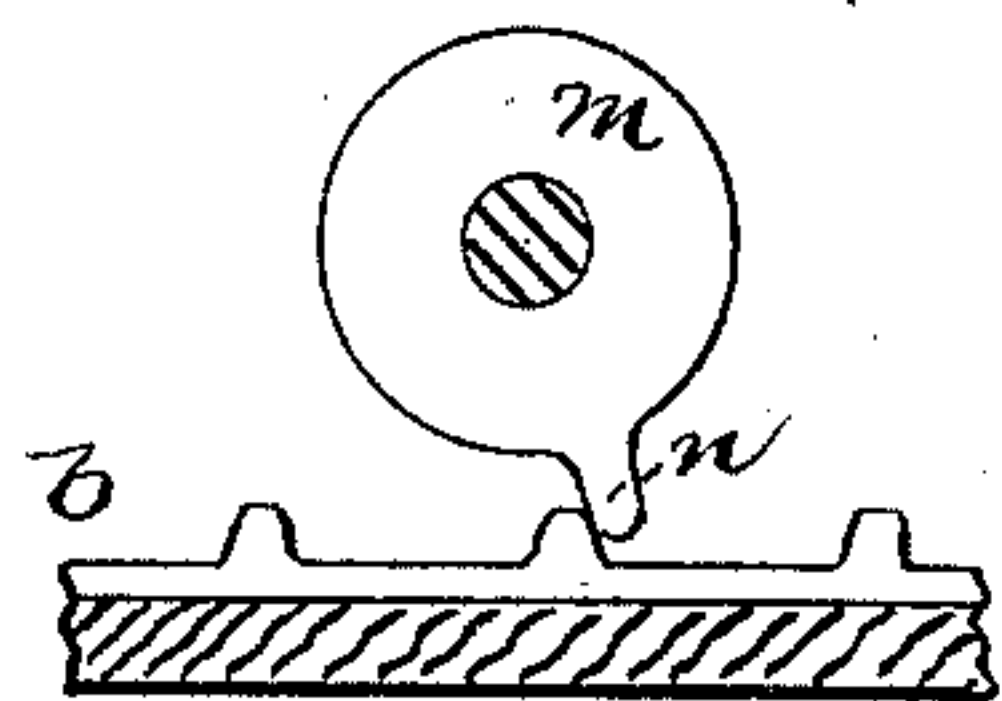


Fig. 8.



Fig. 9.

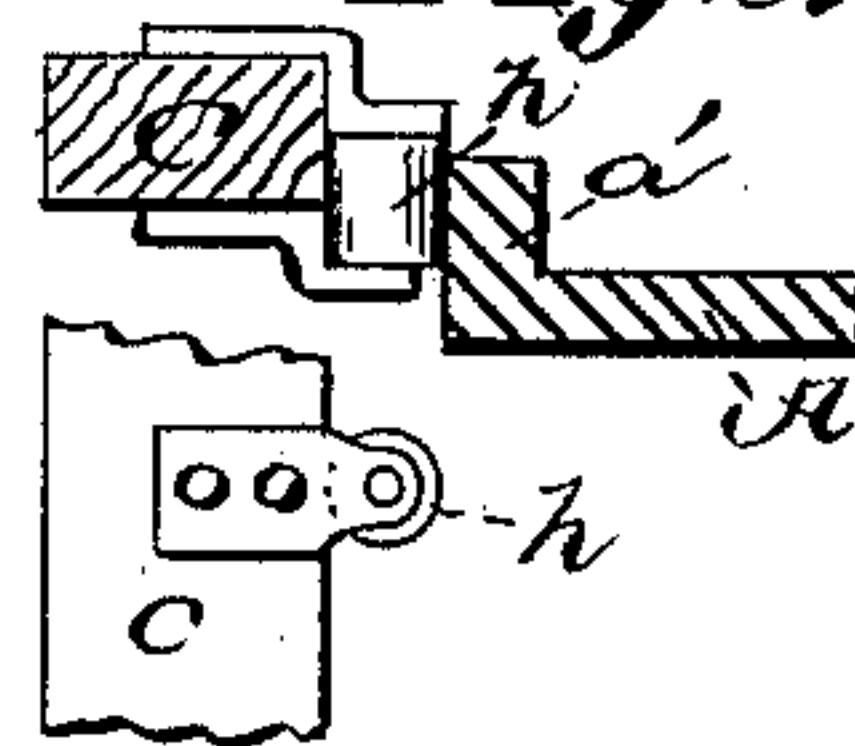
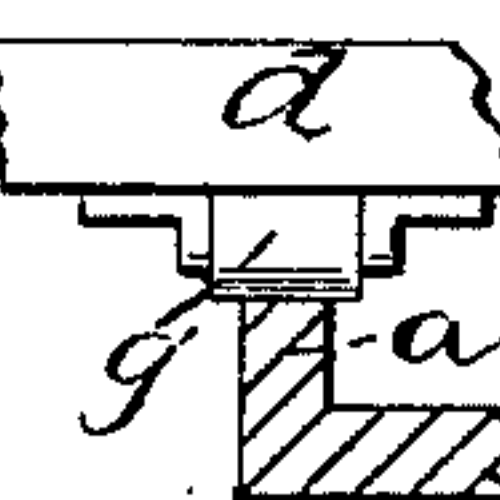
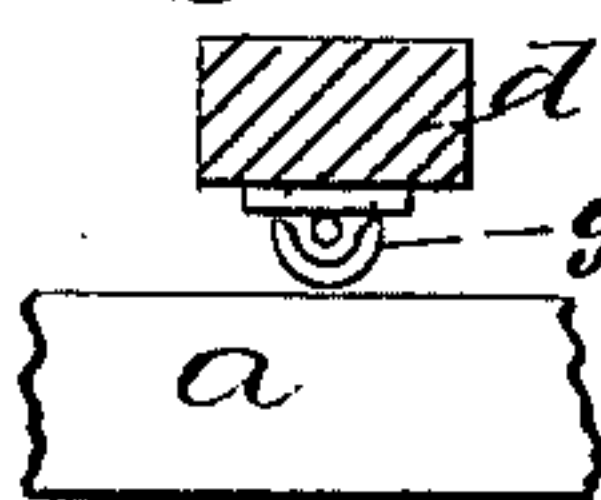


Fig. 10, Fig. 11.



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(No Model.)

3 Sheets—Sheet 3.

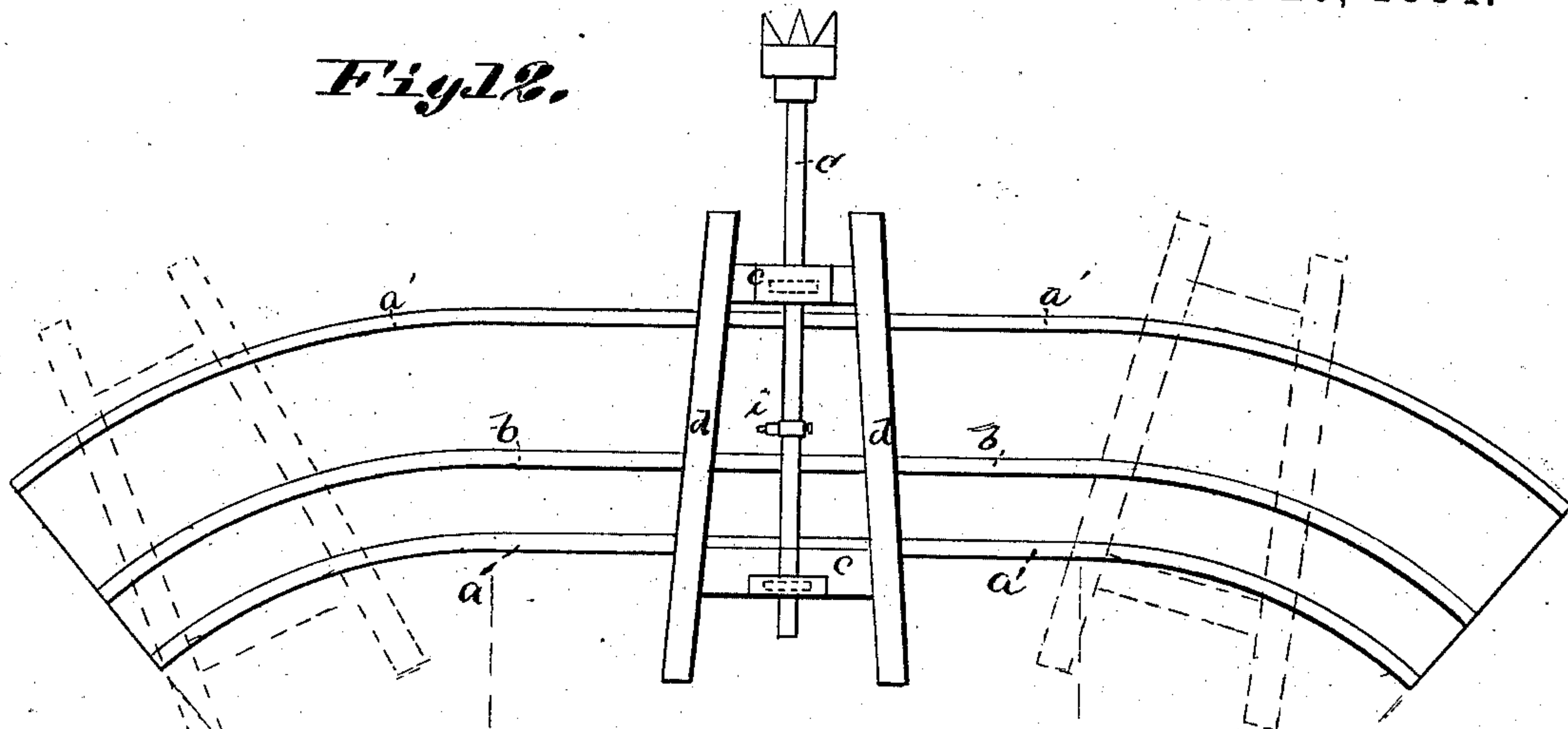
J. H. McDONALD.

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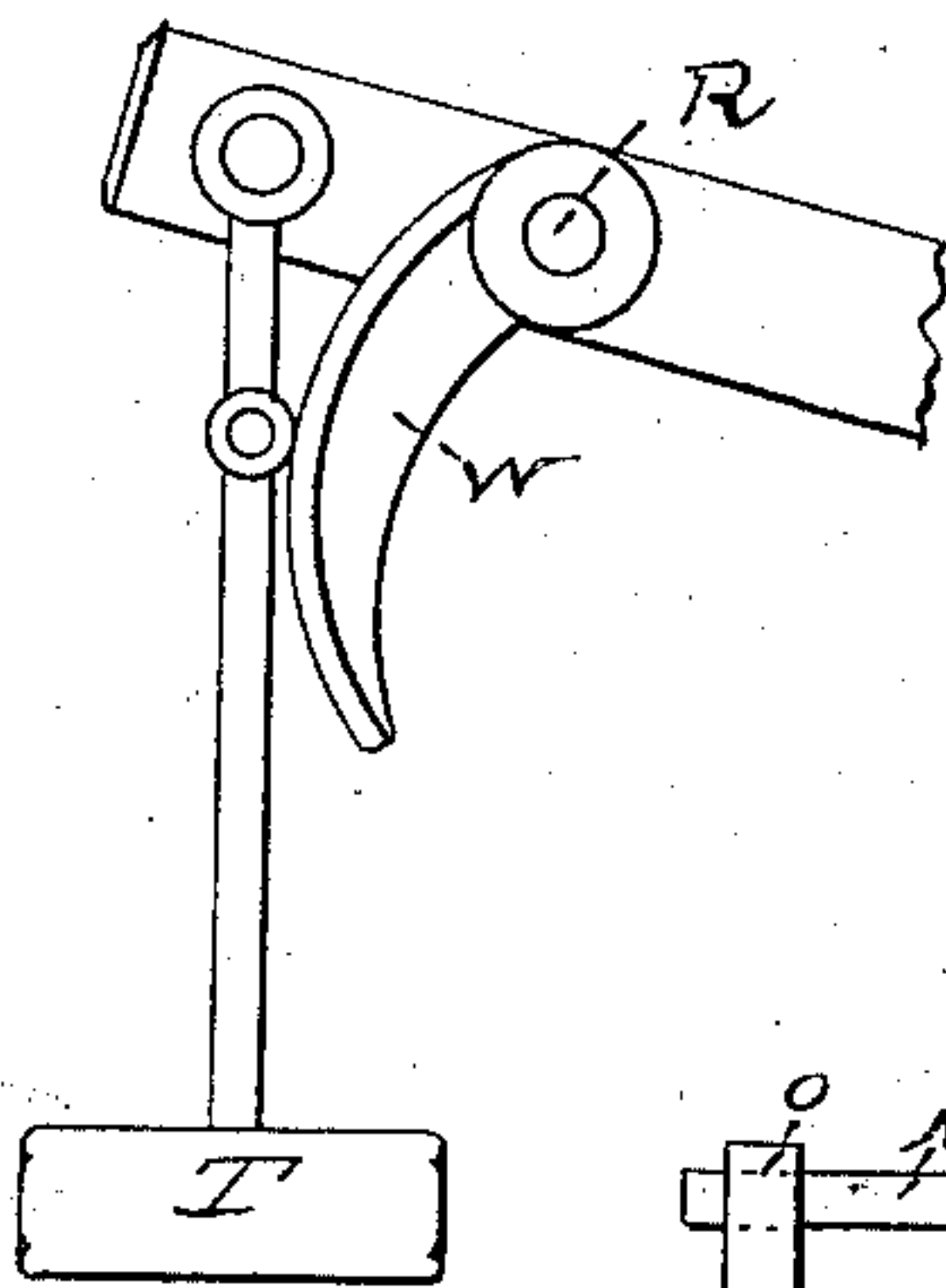
*Fig. 12.*



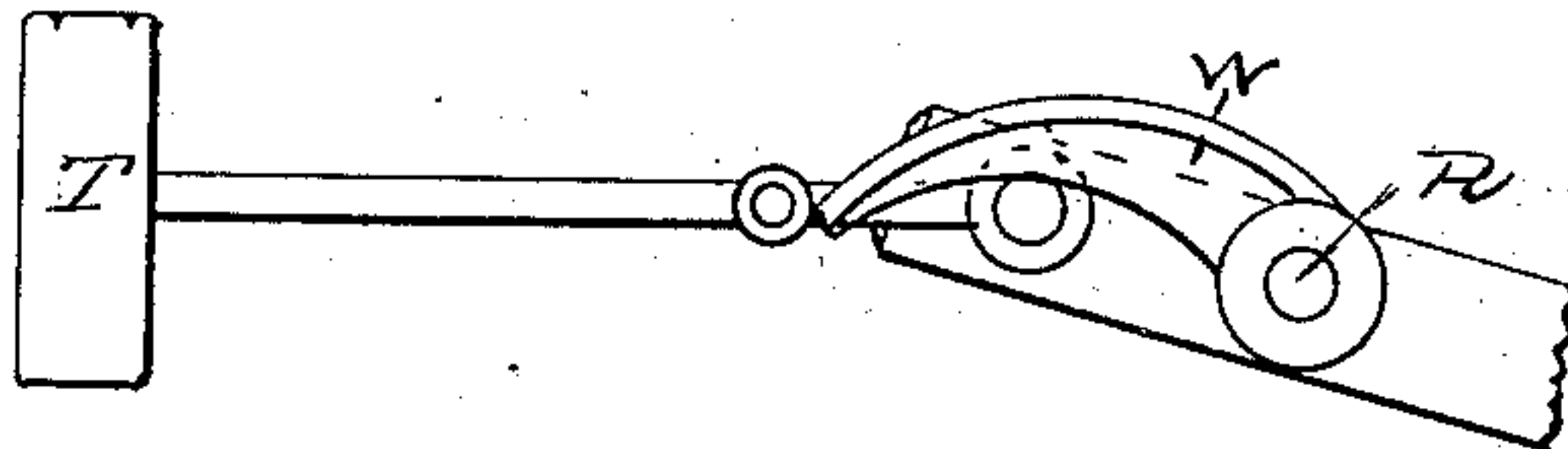
*Fig. 17.*



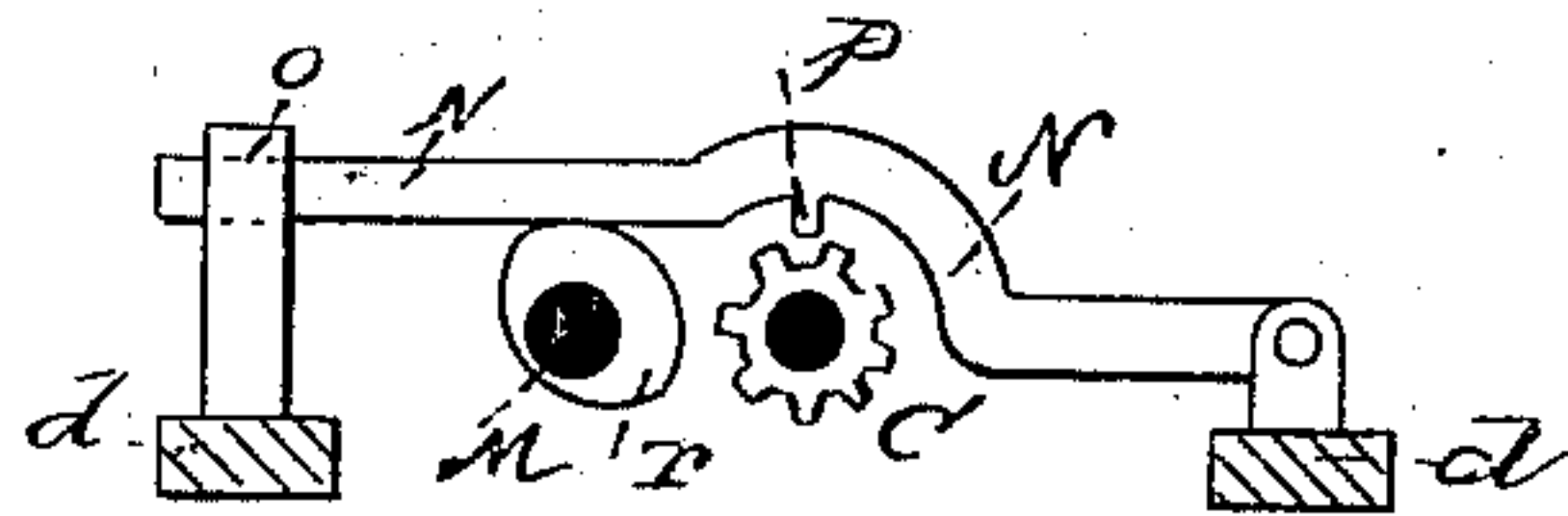
*Fig. 13.*



*Fig. 14.*



*Fig. 15.*



*Fig. 16.*

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# UNITED STATES PATENT OFFICE.

JAMES H. McDONALD, OF WORDEN, ILLINOIS.

## MINING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 294,247, dated February 26, 1884.

Application filed September 4, 1883. (No model.)

*To all whom it may concern:*

Be it known that I, JAMES H. McDONALD, of Worden, in the county of Madison and State of Illinois, have invented a new and useful Improvement in Mining-Machines; and I do hereby declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use it, reference being had to the accompanying drawings, forming a part thereof.

My invention relates to improvements in machines for mining and drilling; and the object is to provide, in the art of mining and quarrying and mining, an engine combining the mechanical elements which can be utilized for drilling purposes in quarries, or for picking or mining coal.

My invention consists in the novel construction and combination of parts, as will be hereinafter more fully described, and specifically pointed out in the claims.

In the accompanying drawings, forming a part of this specification, Figure 1 is a plan view of my improved engine. Fig. 2 is a side view of the same. Fig. 3 is a view in perspective of the end of the pick-bar and the blades. Fig. 4 is a longitudinal and vertical sectional side view. Fig. 5 is a sectional plan view taken through the line 5 5 of Fig. 4. Fig. 6 is a view of a section of the rack-bar and cog. Fig. 7 is a view of the lug on the drill or pick bar. Figs. 8 and 9 are views of the guide-pulleys, as appear at 8 8 of Fig. 5. Figs. 10 and 11 are detail views of the rollers on which the frame rests, as the same would appear at 10 10 of Fig. 5. Fig. 12 is a plan view of the bottom frame and track. Figs. 13 and 14 are modifications of my improved hammer. Figs. 15 and 16 are views of the drill-bar with twist-gear, and the lever with operating-cam; and Fig. 17 is a view of the drill-bar.

The letter A (see Figs. 2, 4, and 5) represents the foundation-frame, formed of the side pieces or guide-rails, *a a'*, and the intermediate rack-bar, *b*. These side pieces or guide-rails and the rack-bar are secured in their relative positions by any well-known means, such as cross ties or bars.

The letter B represents the frame for carrying the mechanism. This frame is built strong and substantial, and consists, preferably, of the bed-sills *c*, cross-pieces *d*, uprights *e e'*, and plates *f*. The uprights *e'* are preferably cut

shorter than those, *e*, at the other end of the frame, and the plates thus giving a bracing-slant, substantially as shown in the drawings. To the under side of each bed-sill, as shown at *g* in Figs. 2 and 4, is fixed a friction wheel or roller set relatively apart, so as to bear on the side rails of the bottom frame or track; and also fixed to the sills are the friction guide-rollers *h*, which press against the outside of the side rails of the bottom frame, and prevent the machine from backward or forward displacement when the hammer strikes the drill or pick bar, and when the bar strikes the object, and then is carried back by the lever engaging the lug.

The letter C represents the pick-bar, provided with the lug *i*, for the purposes hereinafter mentioned; and in Fig. 17 of the drawings is shown this implement adapted for drilling, in which instance it is provided with a plurality of lugs, in order that the lever may engage therewith in any position of revolution, and at a point to engage with the trip-lever is provided with a twist-gear, J, which, in the backward movement of the bar, engages with the lug on the trip-lever, and thus turns the bar to change the cut of the blade.

The letter D represents the power-shaft, supplied with the crank *k*. This shaft is journaled on the frame substantially as shown, and has secured on the inner end the sprocket-wheel E, carrying the chain F, which extends to another sprocket-wheel, G, on the shaft H, journaled on the frame, substantially as shown. On the shaft H is fixed a revolving arm, I, which in revolution strikes the lug on the drill-bar and draws it back for the strokes of the hammer. On the shaft H is also secured a second sprocket-wheel, K, by means of which, through the sprocket-wheel L, motion is given to the shaft M, which is journaled on the cross-piece of the frame, substantially as shown. On the shaft M, arranged on line with the rack-bar *b* of the bed-frame, is secured the sleeve *m*, formed with the finger or lug *n*, which in revolution engages the teeth on the rack-bar and moves the machine in the direction of the motion. In the application or operation of the machine for drilling purposes, this side progression is not required; hence, when so used, this sleeve is loosened, and the shaft revolves without turning the sleeve and finger.

The letter N represents a trip-lever pivoted in suitable bearings on the frame, and, extend-



ing across, has its free end between the side extensions of a loop, *o*, fixed to the other sill of the frame. The form of this trip-lever is seen in Fig. 15 of the drawings, where it is shown as arched over the drill-bar, and formed with the finger-lug *p*, heretofore mentioned, for the purpose of turning the drill-bar by its contact with the twist-gear thereon. This trip-lever is raised from contact with the twist-gear by a cam, *r*, on the shaft M, and the cam is so arranged on the shaft that the lever will be raised from contact when the blow of the hammer is delivered on the end of the bar.

The letter O represents a gear-wheel fixed on the crank or power shaft D, and this engages with the gear-wheel P, secured on the shaft R, suitably journaled on the upper rails of the frame, substantially as shown. This shaft R also has the balance-wheel S secured thereon. Arranged in the center of this shaft and secured thereto is the arm *s*, which is extended in length to suit the size of the machine and the length of the shaft of the hammer. The free end of this arm is slotted, and has keyed therein a pivotal bearing, *t*, for the purpose hereinafter stated.

The letter T represents the hammer, the shaft of which is measured by the distance from the point where the blow is to be delivered to the upper point of the shaft, or nearly so, and from which latter point it is bent over at about a right angle to the other piece, and is pivotally secured in the pivotal bearings *t*.

The letter A' represents a harness for the hammer. It consists of the stout arm *x*, secured to the shaft R, and loop *x'*, having elastic cushions *x''*. The shaft or handle of the hammer plays in this loop, and the purpose is to receive the shank of the hammer after the blow has been delivered, and carry it over the dead-point. To the base of the arm *x* is secured a spring-arm, *x'*, having the stirrup *x''* linked in the free end thereof, the purpose of which is to bring the hammer back against the cushion on arm *x* after delivering the blow, and passing the bit-bar in order to be in position for the next blow.

In Figs. 13 and 14 of the drawings I have shown a modification of the hammer and operating means, which consists of a hammer provided with a lug on the handle and pivotally secured to a sill, through which the shaft R is extended, having a cam, *w*, instead of the arm, fixed thereto. The face of the cam engages the lug in the handle, and lifts the hammer until the point of the cam passes from contact with the lug, when the hammer falls by its own weight and strikes the drill-bar. The drill-bar has its bearings on the lower cross-pieces of the frame, and these bearings have both above and below friction-rollers, in order that the progression and return of the bar may not be impeded by frictional contact with the bearings. In some cases it is proper and useful to have two rack-bars on the lower frame.

To apply my invention to the purposes for

which it is intended, the frame bearing the operating mechanism, arranged substantially as described, is placed on the bed-frame, when the power is applied to the crank, which by the connections communicates motion to the shaft carrying the hammer, which in its revolution carries the hammer around, and in the descent permits it to fall and strike on the end of the drill or pick bar. At the moment immediately after the stroke is released the hammer rests idle; but in the progression of the shaft the loop of the harness comes in contact with the handle, and lifts it up over the stopping-point, and it is carried forward in revolution. The pivotal attachment of the arm and handle is such as to assist in pushing the hammer up from the point to which it falls in its stroke. At the time during revolution of the hammer motion is communicated to the shaft carrying the lever, the office of which is to strike back the bar, and from this shaft, by means of the chain and wheel on the lower shaft, that shaft is revolved, and the finger or stud on the sleeve brought to engage with a tooth of the rack-bar, and the machine is carried to one side, so that when the next blow is delivered the point of the bar strikes in a new place.

When it is required to operate the engine as a drill, the sleeve on the lower shaft is loosened, and the pick-bar exchanged for a round drill-bar, when the operation is in every respect, except the side-movement of the machine, identical with that hereinbefore stated.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. In combination with the shaft R, having the arm *s* fixed thereto, and the hammer pivotally secured in said arm, the harness for the hammer, consisting of the arm *x*, secured to the shaft R, and the loop *x'*, provided with elastic cushions *x''*, substantially as and for the purpose set forth.

2. In combination with the shaft R, having the arm *s* fixed thereto, the hammer pivotally secured in said arm, and the harness for the hammer, consisting of the arm *x*, secured to the shaft R, and the loop *x'*, provided with elastic cushions *x''*, and the spring-arm *x'*, provided with the stirrup *x''*, substantially as and for the purpose set forth.

3. In combination, the gear-wheel E, fixed to the power-shaft, the wheel G, suitably connected to the wheel E, and having fixed to its shaft the lever I and sprocket-wheel K, the latter suitably connected with the wheel L on a shaft, M, having the cam *r*, the lever N, provided with lug P, and the drill-bar C, having the twisted gear J, adapted to engage with the lugs P, on the lever N, and the lug *i*, adapted to engage with the lever I, substantially as and for the purpose set forth.

In testimony that I claim the foregoing I append my signature.

Witnesses: JAMES H. McDONALD.  
JAMES G. KING,  
JOHN C. KING.