(No Model.) 3 Sheets—Sheet 1.

I. WANTLING & J. T. JOHNSON.

COAL MINING MACHINE.

No. 451,988. Patented May 12, 1891.

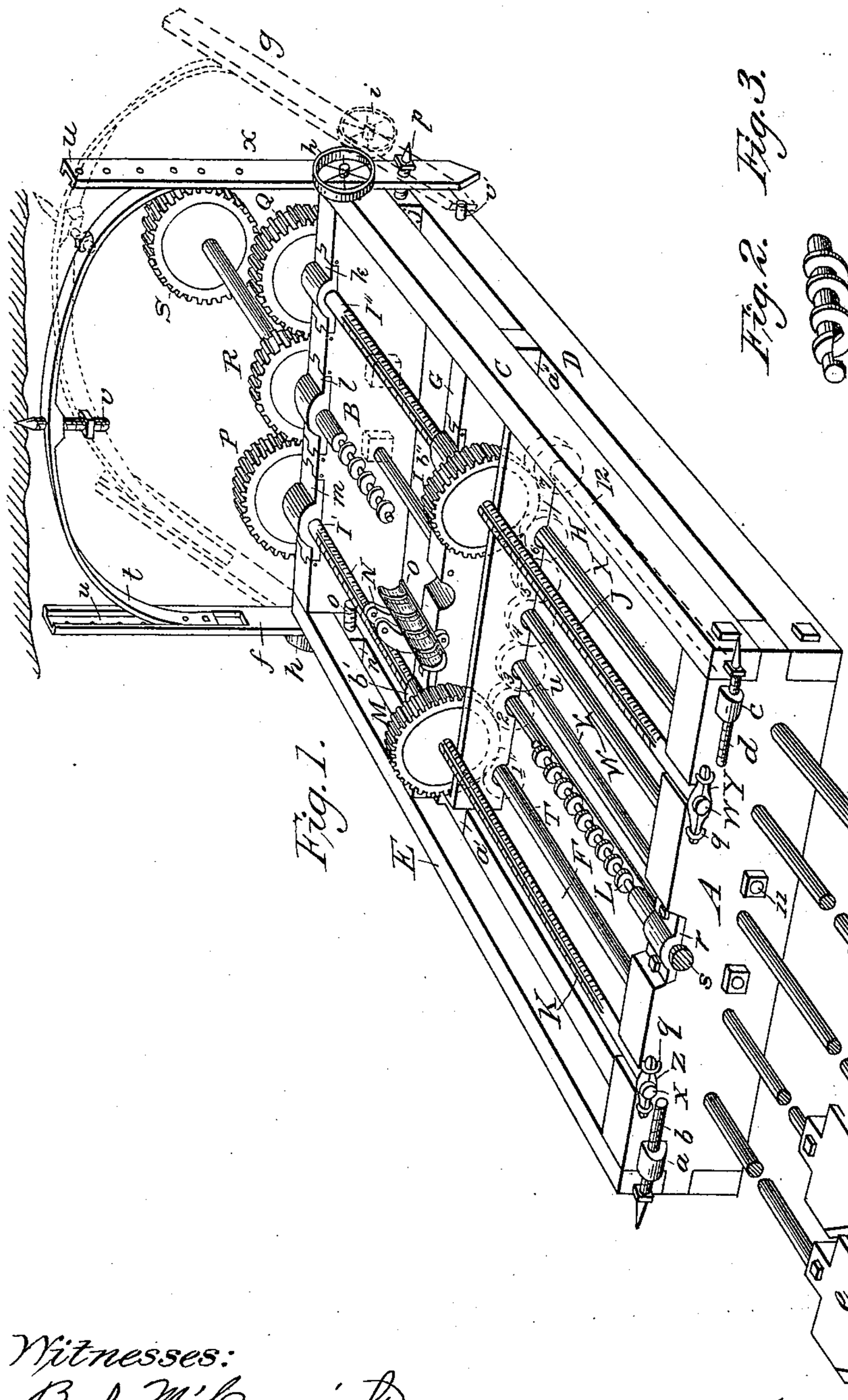

Fig. 1.

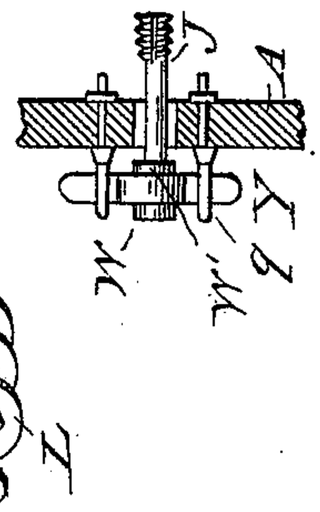

Fig. 2.

Fig. 3.

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Fig. 4.

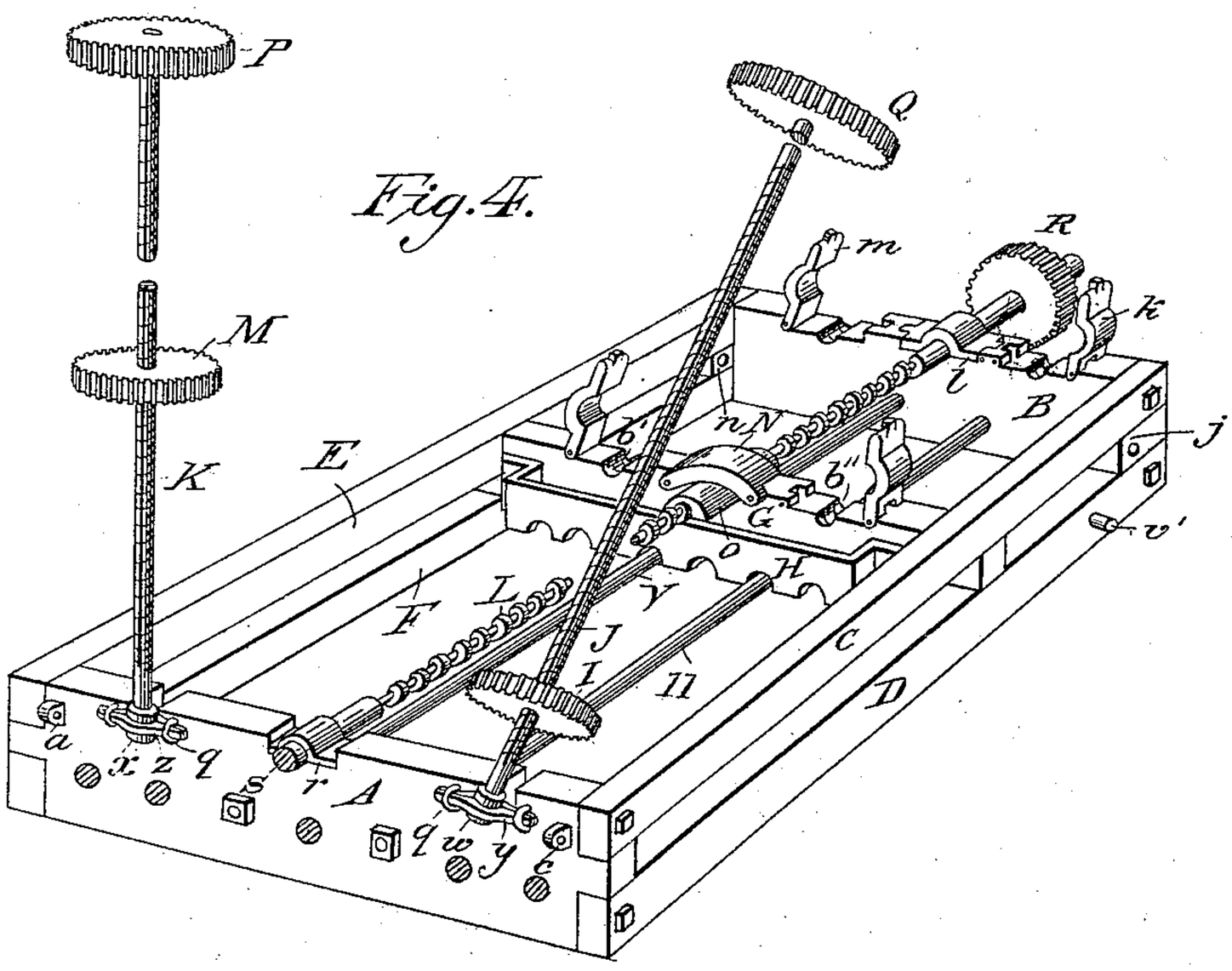
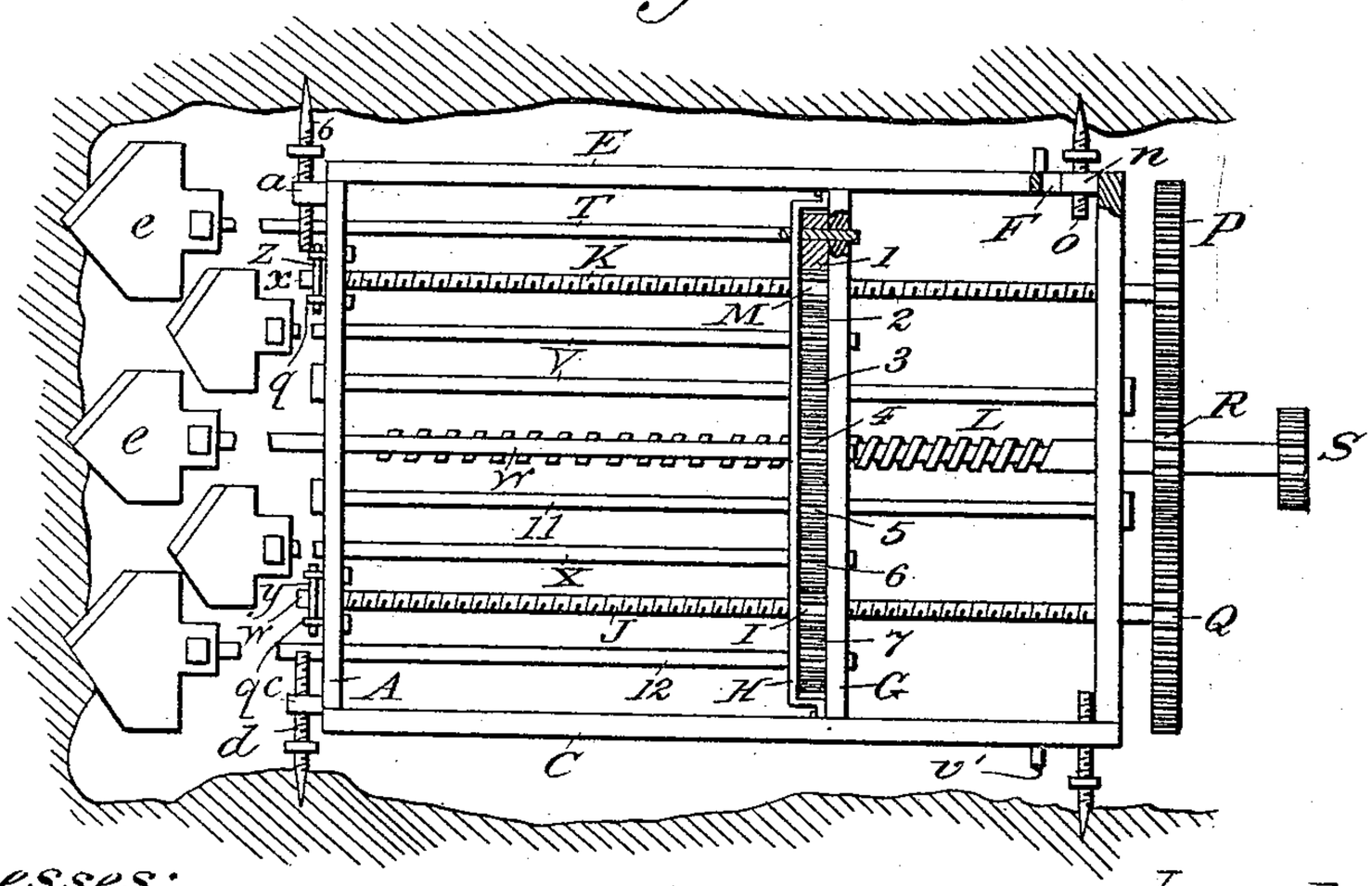


Fig. 5.



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(No Model.) 3 Sheets—Sheet 3.

I. WANTLING & J. T. JOHNSON.

COAL MINING MACHINE.

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Fig. 6.

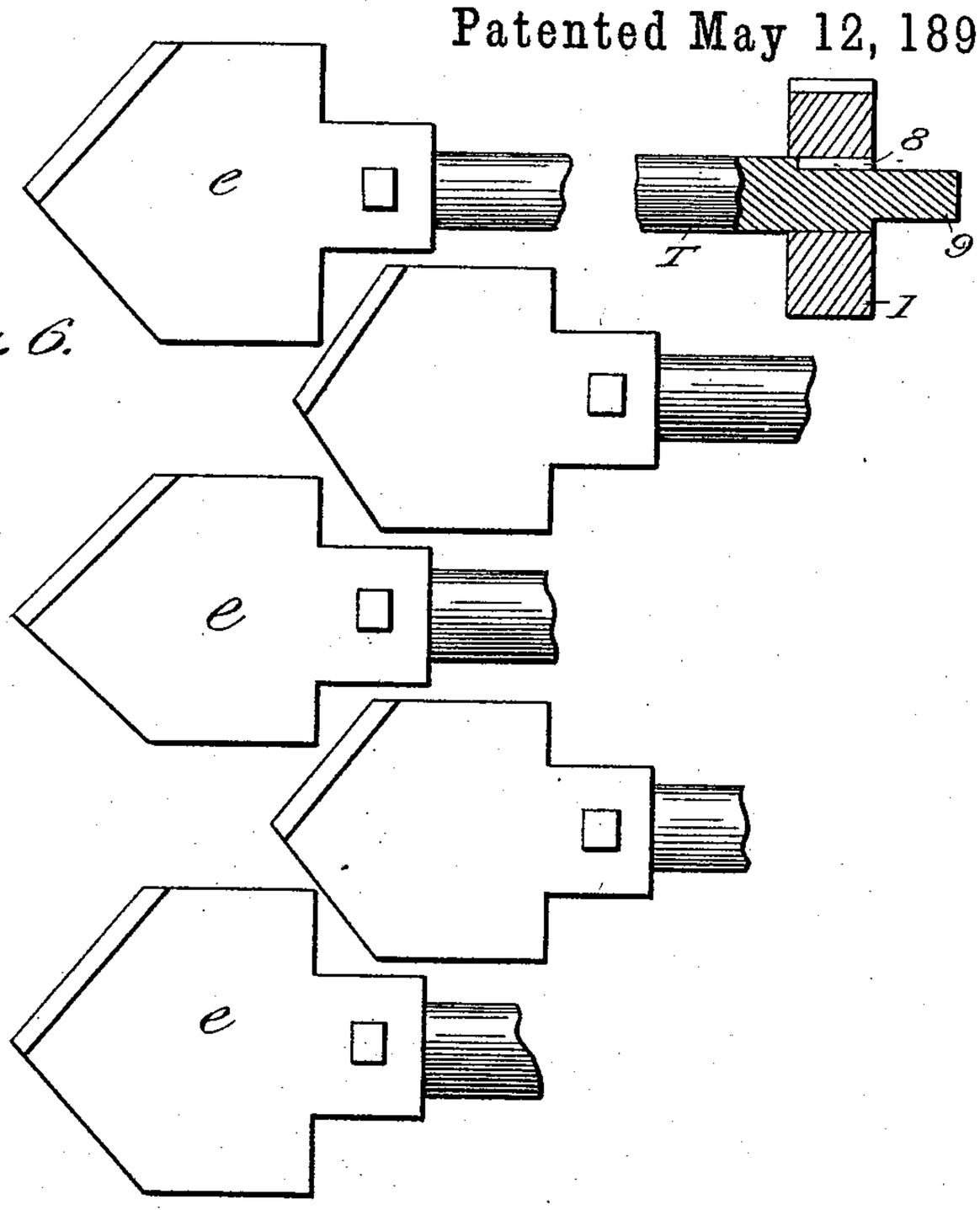
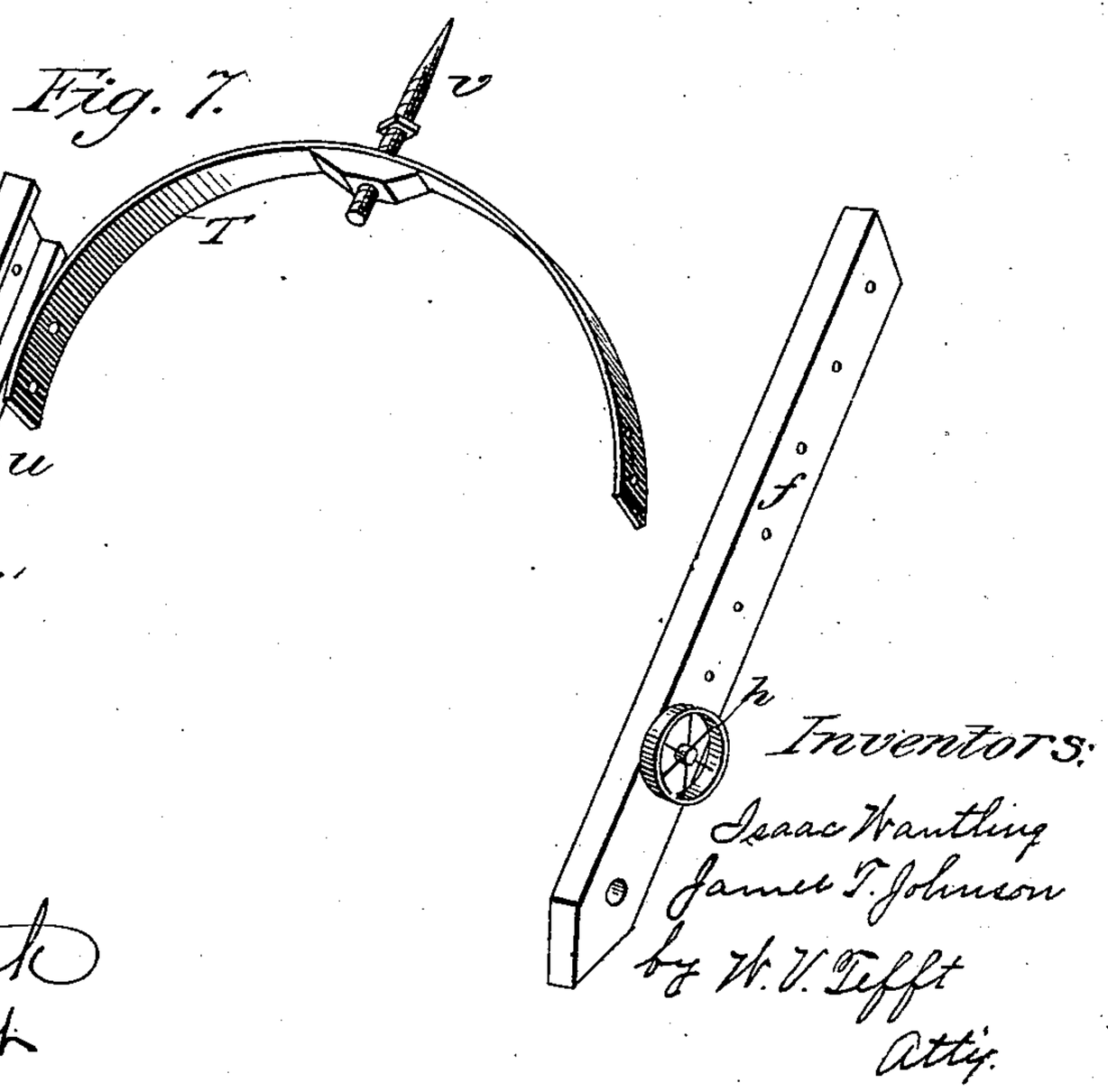


Fig. 7.



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UNITED STATES PATENT OFFICE.

ISAAC WANTLING AND JAMES T. JOHNSON, OF PEORIA, ILLINOIS.

COAL-MINING MACHINE.

SPECIFICATION forming part of Letters Patent No. 451,988, dated May 12, 1891.

Application filed November 14, 1890. Serial No. 371,481. (No model.)

To all whom it may concern:

Be it known that we, ISAAC WANTLING and JAMES T. JOHNSON, citizens of the United States, residing at Peoria, in the county of Peoria and State of Illinois, have invented certain new and useful Improvements in Coal-Mining Machines; and we 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 the same.

Our invention relates to certain new and useful improvements in coal-mining machines, by means of which a machine is provided being simple in construction, durable, and efficient in its working.

More particularly our invention relates to a mining-machine which may be adjusted in a horizontal position to cut an opening in the base of a strata of coal or in a perpendicular position to cut a perpendicular opening, the cut being made by means of cutting-tools carried upon a series of bars rotated and borne forward by means of a sliding frame.

The operation and detailed construction will be hereinafter more particularly described.

That our invention may be more fully understood reference is had to the accompanying drawings, in which—

Figure 1 is a perspective view of the whole machine adjusted in a horizontal position and in readiness for operation. Fig. 2 is a detail view showing a section of a threaded shaft. Fig. 3 is a detail view of a swiveled box provided with suitable supports and bearing the end of a threaded shaft. Fig. 4 is a detail perspective view showing the main frame-work and the means of detaching threaded shafts from their boxes. Fig. 5 is a back elevation of the machine adjusted in a perpendicular position and in readiness for operation. Fig. 6 is a detail view on an enlarged scale, showing a series of cutting-bars. Fig. 7 is a detail view of a combined grip-post and means for changing the location of the machine.

In Fig. 1, A B are the end pieces of the main frame, C D and E F being the side pieces, the said side pieces C D and also the side pieces E F being separated by a narrow space, thus providing slots in which are carried the lugs a' a'', the said lugs being projections from the ends of the sliding frame-piece G.

a c are shoulders provided with threaded openings, in which are carried the threaded bars b d, provided with spikes. At their outward extremities o p are threaded bars carried in threaded openings in the pieces j n, the said threaded bars being provided with spikes at their outward extremities.

f f' are the side pieces, which, together with the arched cross-piece t, constitute a grip-post. The side pieces f f' have their lower extremities sharpened, and are provided with a series of perforations at their upper extremities and also with grooves u, and within the grooves the respective ends of the cross-piece t are carried, and adjusted and secured by means of bolt-connections through the perforations hereinbefore mentioned, thus enabling the cross-piece t to be adjusted to accommodate itself to high or low ceilings in mines. At the central portion of the arched cross-piece is provided a threaded opening, in which operates the spur-pointed thread-bar v.

The wheel h upon the side piece f and a corresponding wheel on the frame-piece f', carried upon suitable axles or pins projecting out from said side pieces, are designed to form a wheeling means for moving the machine. The said side pieces f f' are pivoted upon the thread-bars o p, and may be detached from the same by unscrewing the said thread-bars until they are wholly detached from the frame-work. When the grip-post is properly pivoted to the frame-work and detached from the ceiling, the same may be lowered into the position shown by the dotted lines, in which position it will be seen that the lower extremities of the side pieces, here designated by g, bear against pins or lugs upon the main frame, as shown at v', with the wheels h bearing upon the floor of the mine, and by pressure downward upon the outer extremity of the grip-post the machine is raised from the floor at one end and may with ease be wheeled from one position to another when desired.

J K are threaded shafts provided with the grooves l' l'', running throughout their entire lengths and passing at their forward ends through depressions in the upper edge of the frame-piece A and mounted in swiveled boxes,

the said boxes being suspended in rings on the ends of bolts secured to the frame-piece A, as best shown in Fig. 3, in which A is the frame-piece, to which the bolts bearing the rings *q* are secured.

Y is the box in which the shaft J is journaled, said shaft being provided with the collars W W′ to secure it against endwise movement in the box, the corresponding box and collar which carry the threaded shaft K are represented by X Z. The said threaded shafts J K at their rear ends are journaled in the boxes *m k* and bear on their respective rear ends the cog-wheels P Q, keyed thereon. The said threaded shafts J K also have bearing in the threaded boxes *b′ b″*, and on the said shafts are mounted the cog-wheels I M, the same being provided with splines which travel in the grooves *l′ l″* in the threaded shafts. T U V W X 12 are shafts journaled at their rear ends in the sliding frame-piece G, (best shown in Fig. 5, in which a portion of the said piece is broken away to show how the shaft is journaled,) the size of the rear end of the shaft being somewhat reduced to provide a shoulder to bear against the sliding frame-piece G, (see Fig. 6,) and on the rear end of each of the said shafts is mounted a cog-wheel, one of which is best seen in Fig. 6, in which T is the shaft reduced at its extremity into the journal 9 and bearing the cog-wheel 1, with the key 8 to secure the same in position. The said cog-wheels are designated by numbers 1 2 4 6 7, all of which are keyed securely upon the said shafts. The shafts T U V W X 12 are journaled in perforations in the frame-piece A, and continuing forward terminate in the spear-heads or cutting-tools *e e*, &c., arranged as shown in the several figures, the alternate shafts being shorter or longer to accommodate the proper adjustment of the spear-heads or cutting-tools that they may operate alternately before and behind each other, and thus cut a channel in the breast of the coal.

V 11 are bars extending throughout the length of the frame-work, and being bolted at their respective ends to the pieces A B pass through notches in the sliding piece G and act as additional slides for said piece, and they also act as bearings for the cog-wheels 3 5, the said cog-wheels turning loose upon the said shafts and sliding back and forth thereon, as will hereinafter be shown, the said cog-wheels 3 5 acting as intermediates between the cog-wheels 2 4 and 4 6.

H is a bearing-plate standing out from and secured to the sliding piece G, and is purposed to provide sufficient space for the cog-wheels 1 2 3 4 5 6 7 and the cog-wheels I M and confine them in place either in the backward or forward movement of the piece G, which will be more fully explained in the operation of the machine, the said bearing-plate H being provided with a series of notches in its lower edge to allow the passage of the shafts and bars above mentioned.

L is a threaded shaft journaled at its forward end in the box *r* and being provided with the collar *s* to secure it in position in the said box. Said shaft extends backward through a semicircular depression in the sliding piece G, and is journaled at its rear end in the box *e*, the said shaft extending still backward, but unthreaded, carries without the frame the cog-wheels R S, keyed thereon.

N is a threaded cap secured to the sliding frame-piece G and purposed to mesh with the threaded shaft L when closed down over the same and secured to the said piece G.

In Fig. 4 the main frame is shown with the threaded shafts J K removed from the smooth boxes *m k* and the threaded boxes *b′ b″* and raised upward, which is facilitated by means of the swiveled boxes Y Z. The said threaded shafts being thus raised, the cap N, threaded internally, is closed down over the threaded shaft L, and said shaft being very coarsely threaded, the sliding piece G is drawn backward very rapidly, and as it is threaded the opposite from the shafts J K the same direction of rotation will draw the sliding piece G backward that forced it forward when the threaded shafts J K were in position in their boxes and the cog-wheel R, meshing with the cog-wheels P Q. The necessity of removing the shafts J K from their boxes is apparent, as it would be impossible to operate the shaft L with the threaded cap N closed over it, as they are oppositely threaded, and, besides, one is a quick and the other a slow thread.

In Fig. 5 the machine is shown anchored in a perpendicular position, so as to make a perpendicular cut, its operation in this position and its detailed working being identical with that of the machine when adjusted in a horizontal position.

In operation, the machine being first anchored in the position shown in Fig. 1 or that shown in Fig. 5, which are its working positions, power is applied to the cog-wheel S, which rotates the shaft L, on which the wheel R is mounted, and by means of which the cog-wheels P Q are revolved. The same, being keyed upon the threaded shafts J K, rotate the said shafts and in their rotation carry with them the cog-wheels I M by means of their spline-and-groove connection. The cog-wheels I M, meshing with the cog-wheels 1 2 6 7, rotate the said cog-wheels 1 2 6 7 in the same direction, and the cog-wheels 2 6, meshing with the cog-wheels 3 5, (heretofore termed "intermediates,") rotate the said cog-wheels in the same direction, and the cog-wheels 3 5, meshing with the cog-wheel 4 in their rotation, rotate the said cog-wheel in the same direction; and, since the cog-wheels 1 2 4 6 7 are keyed upon the shafts T U W X 12, the same are rotated in the same direction, and with them the spear-heads or cutting-tools *e e*, &c. The threaded shafts J K, journaled in the threaded boxes *b′ b″*, the same being fixed to the sliding piece G, being rotated in the proper direction, will force forward the sliding piece G, the said

sliding piece bearing and traveling by means of its lugs *a' a''* in the slots between the frame-pieces C D and E F, and also upon the bars V 11, and as the shafts T U W X 12 are journaled in the sliding piece G and the said piece G being forced forward will carry with it the said shafts. The cog-wheels I M and 3 5 will also be borne forward by contact with the sliding piece G, (the cog-wheels G M sliding along the threaded shafts J K by means of the grooves in the said shafts and the cog-wheels 3 5 sliding upon the shafts V 11, upon which they are loosely journaled.) As before explained, by the rotation of the shaft L the machine is set in operation, and as the cutting-tools rapidly rotate and are borne forward they enter the body of coal, cutting it away, the forward tools cutting circular openings and leaving a rib between, while the rearward tools, following up and overlapping from behind the forward tools, cut the rib away, thus making a complete opening. This operation is continued until the sliding piece G, or, rather, the plate H, contacts with the frame-piece A, or is nearly in contact with the same when the cut is completed. To return the sliding piece to its original position—viz., the rear part of the frame—the threaded shafts J K are removed from the boxes *m k b' b''*, as shown in Fig. 4, and the cap N closed down over the threaded shaft L, and by rotating the shaft L the sliding piece G is drawn rapidly backward until it is in the desired position, and in its passage backward the bearing-plate H contacting with the cog-wheels 1 2 4 6 7 on the ends of the shafts T U V W X 12 carry the same backward and with them the said shafts which bear the cutting-tools and also the intermediate cog-wheels 3 5, which are loose upon the bars V 11, and during the passage backward none of the said cog-wheels or shafts are in rotation. The machine may now be moved to a new position, where, being anchored, it is in readiness to cut a new opening—*i. e.*, after the threaded shafts J K are properly placed in their boxes and the threaded cap N raised from the thread-shaft L.

The grip-post may be adjusted at an angle to serve as a brace as well as an anchor. The grip-post is entirely removed when it is desired to adjust the machine in a perpendicular position, and it is anchored by the means as shown in Fig. 5, and its operation in this position is identical with that before described when a horizontal cut is made.

Having thus fully described our invention, what we claim, and desire to secure by Letters Patent, is—

1. In a mining-machine, the combination of the screw-threaded longitudinally-grooved shafts J K, having the splined wheels I M mounted thereon and the wheels P Q keyed thereto, the swiveled boxes Y Z, and the boxes *m k*, with the screw-threaded boxes *b' b''*, all substantially as described and set forth.

2. The combination of the main frame having the slots in which the lugs on the sliding frame work, the feed-shafts J K, provided with the wheels I M and P Q, the swiveled boxes Y Z, and the stationary boxes *m k* on the main frame, with the sliding frame-piece G, having the lugs *a' a''*, the shafts T U V W X 12, journaled at their backward ends in the sliding frame-piece G and having keyed thereto the cog-wheels 1 2 4 6 7, and extending forward through perforations in the frame-piece A, and bearing upon their forward ends the cutting-tools *e e*, &c., and the cog-wheels 3 5, journaled loosely upon the bars V 11, all substantially as described and set forth.

3. In a coal-mining machine, the combination of the main frame having the slots in which the lugs on the sliding frame work, the feed-shafts J K, provided with the wheels I M P Q, the swivel-boxes Y Z, and the stationary boxes *m k* on the main frame, with the sliding frame-piece G, bearing the threaded boxes *b' b''* and the threaded cap N and the lugs *a' a''*, and the bearing-plate H secured thereto, the shafts T U V W X 12, journaled at their rear ends in the sliding frame-piece G and having keyed thereto the cog-wheels 1 2 4 6 7, and extending forward through perforations in the frame-piece A, and bearing upon their forward ends the cutting-tools *e e*, &c., the cog-wheels 3 5, journaled loosely upon the bars V 11, and the threaded return-shaft L, bearing in the smooth boxes *r l* and bearing the cog-wheels *r s* at its rear end, all substantially as described and set forth.

4. In combination with the main frame, the grip-post formed of the parts *f f'*, having the slots *u* and provided with a series of perforations at their upward ends, and the arched cross-piece *t*, provided at its central portion with a threaded opening which bears the threaded spur *v*, pivoted to the main frame by means of the spurs *o p*, and the wheel *h*, carried upon suitable pins on the pieces *f f'*, with the lugs *v'*, all substantially as described and set forth.

5. In combination with the main frame, the threaded spurs *b d o p*, carried in threaded openings in the main frame or in suitable lugs provided with threaded openings, and provided with a squared portion or shoulder at the base of the spur or between the spur and the threads of the bar, the lugs *v'*, with a corresponding lug on the opposite side in the same relative position, and the pieces *f f'*, connected by the cross-piece *t* and having the wheels *h*, all substantially as described and set forth.

6. In a mining-machine, the sliding frame G, bearing and traveling in suitable slots in the bed-frame and having journaled thereto at their backward ends the shafts T U V W X 12 and having the bearing-plate H attached thereto to provide a forward bearing for the cog-wheels 1 2 3 4 5 6 7 and I M, with the threaded boxes *b' b''* and the threaded cap U, in combination with the threaded shafts *j k*, which are grooved to bear the splined wheels

I M, which mesh with the cog-wheels 1 2 and 6 7 on the rear ends of the cutting-bars T U and X 12, whereby the cutter-carrying frame is fed forward, and the screw-shaft L and screw-threaded cap N, whereby it is returned, all substantially as described and set forth.

7. In a coal-mining machine, the combination of the main frame or body frame, the threaded spurs *b d o p*, carried in suitable threaded openings, the lug *v'*, with a corresponding lug on the opposite side in the same relative position, the grip-post formed of the parts *f f'*, having the slots *u* and provided with a series of perforations at their upward ends, and the arched cross-piece *t*, provided at its central portion with a threaded opening which bears the threaded spur *v*, the pieces *f f'* being pivoted to the main frame by means of the spurs *o p*, the wheel *h* and a corresponding wheel on the opposite side in the same relative position carried upon suitable pins on the pieces *f f'*, the feed-shafts J K, provided with the wheels I M and P Q, the swivel-boxes *m k* on the main frame with the sliding frame-piece G, having the lugs *a' a''* and the bearing-plate H attached thereto, the shafts T U V W X 12, journaled at their backward ends in the sliding frame-piece G and having keyed thereto the cog-wheels 1 2 4 6 7 and extending forward through the perforations in the frame-piece A and bearing upon their forward ends the cutting-tools *e e*, &c., and the cog-wheels 3 5, journaled loosely upon the bars V 11, with the threaded shaft L, which bears in the smooth boxes *r l*, and which bears the cog-wheels R S with the threaded cap N, pivoted to the sliding frame-piece G and designed to close down over the threaded shaft L to engage the same, all substantially as described and set forth.

In testimony whereof we affix our signatures in presence of two witnesses.

ISAAC WANTLING.
JAMES T. JOHNSON.

Witnesses:
F. D. MURGOVE,
BOB MCCORMICK.