

(No Model.)

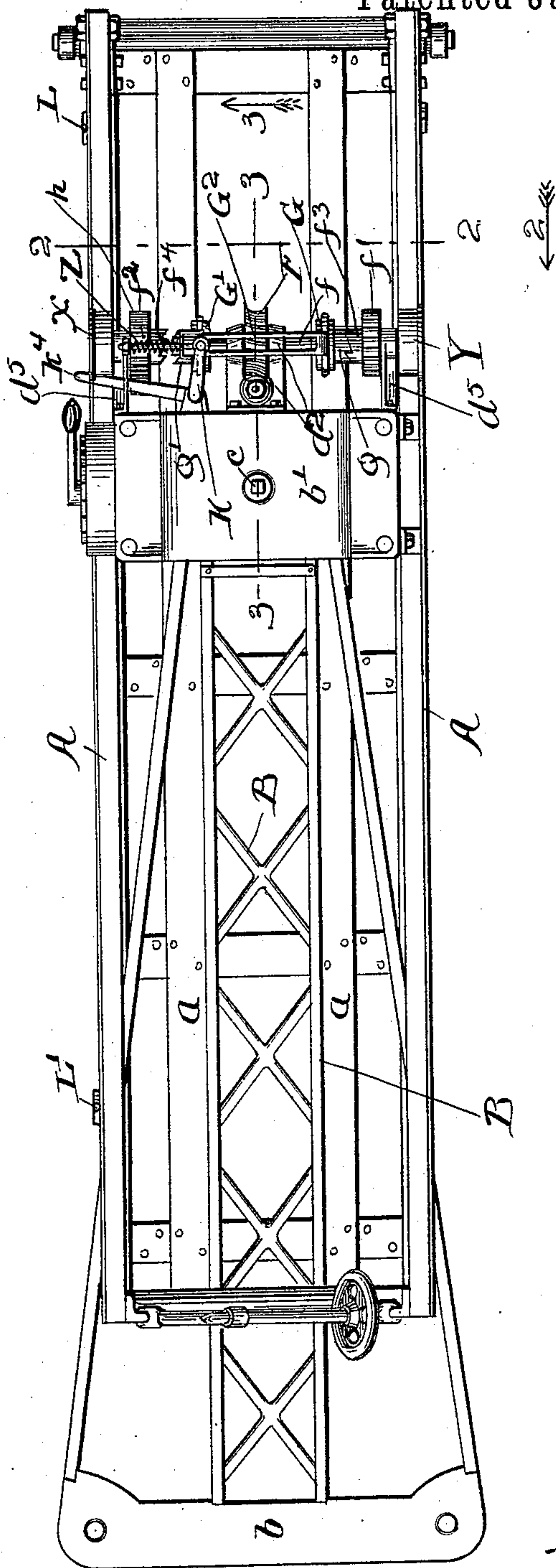
3 Sheets—Sheet 1.

E. P. RAUSCHER.  
COAL MINING MACHINE.

No. 574,822.

Patented Jan. 5, 1897.

Fig. 1.



Witnesses:

Chas. A. Hervey.  
M. L. Shuman.

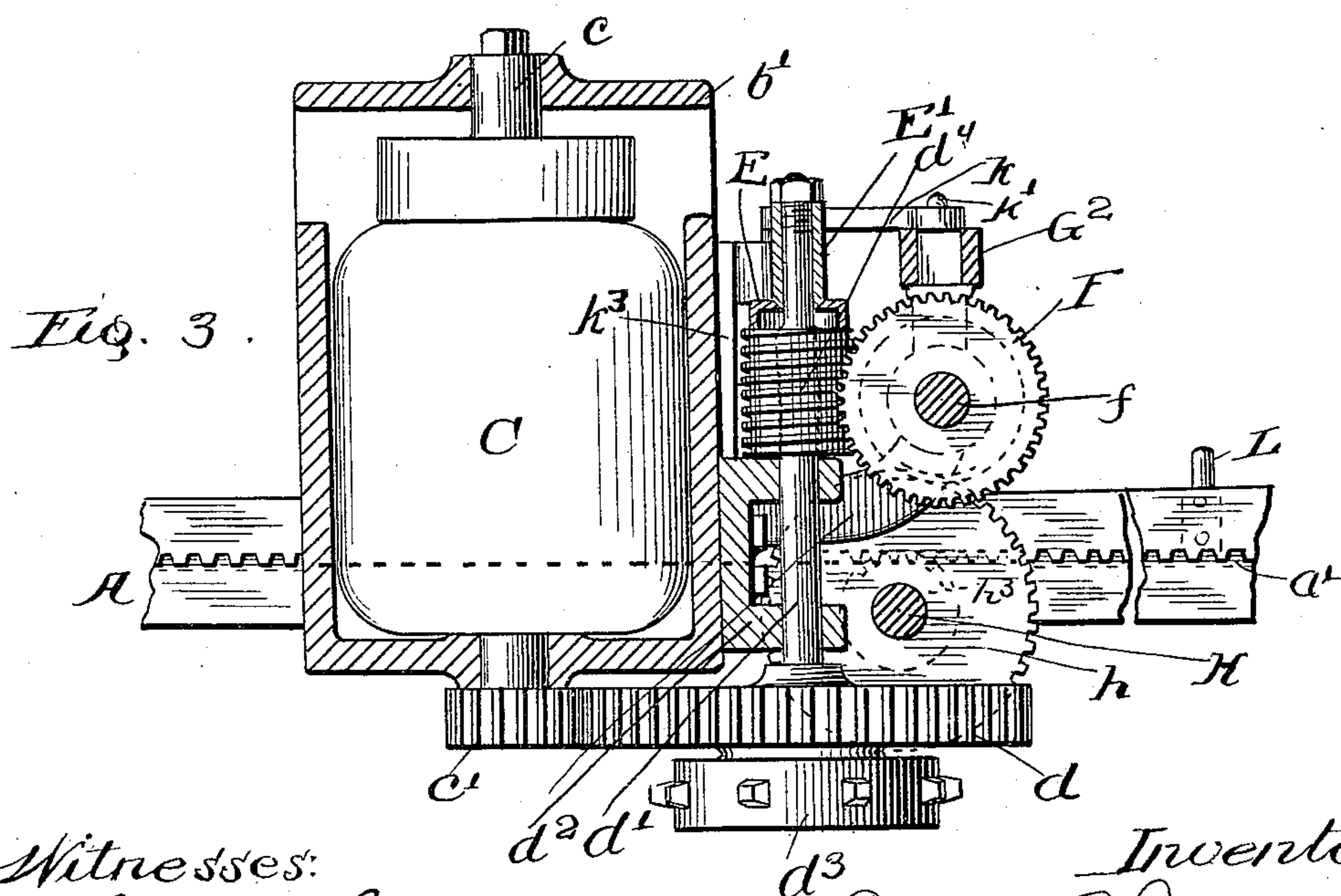
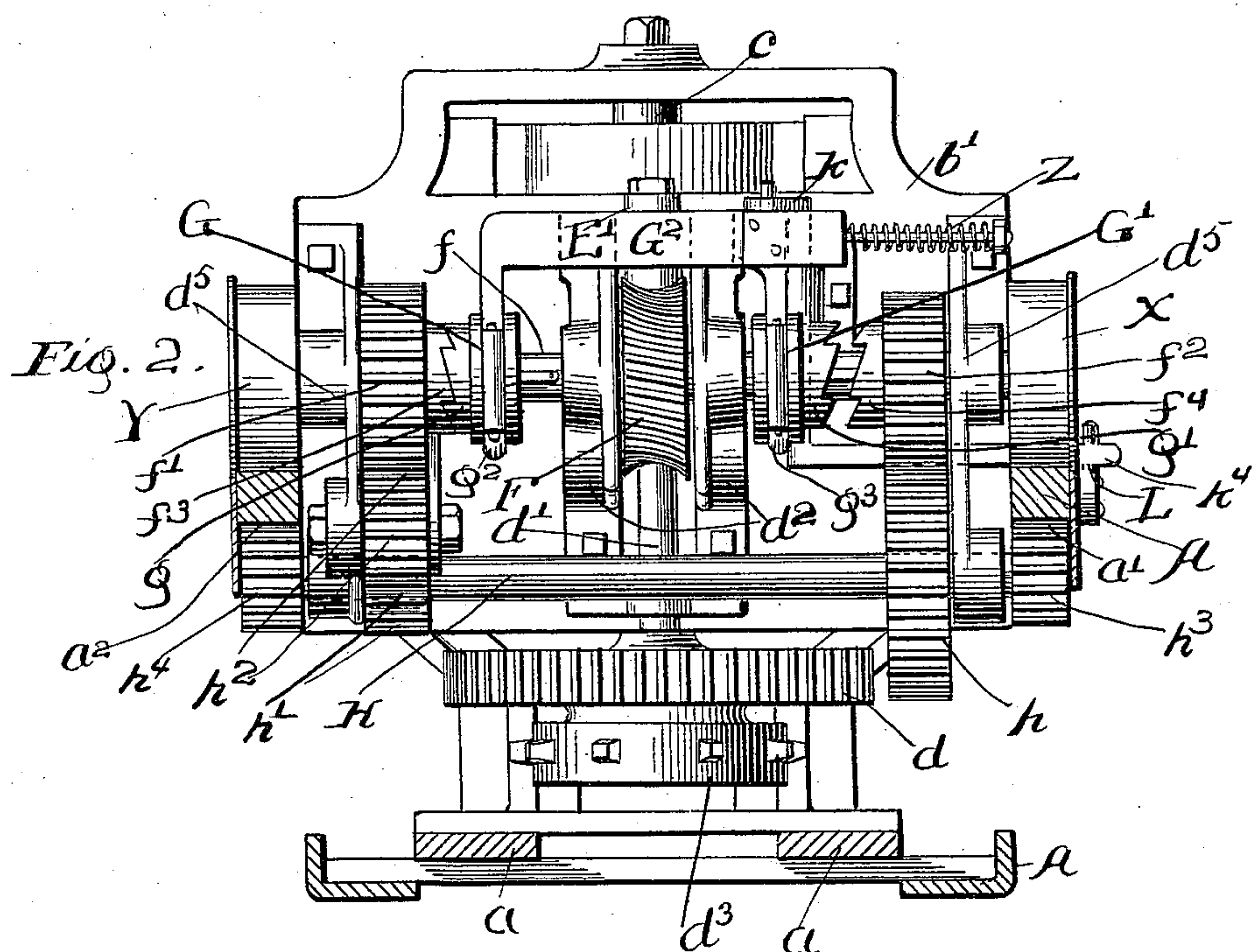
Inventor:

Edward P. Raucher  
by Messrs. Pitner  
His Attys.

3 Sheets—Sheet 2.

No. 574,822.

Patented Jan. 5, 1897.



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(No Model.)

3 Sheets—Sheet 3.

E. P. RAUSCHER.  
COAL MINING MACHINE.

No. 574,822.

Patented Jan. 5, 1897.

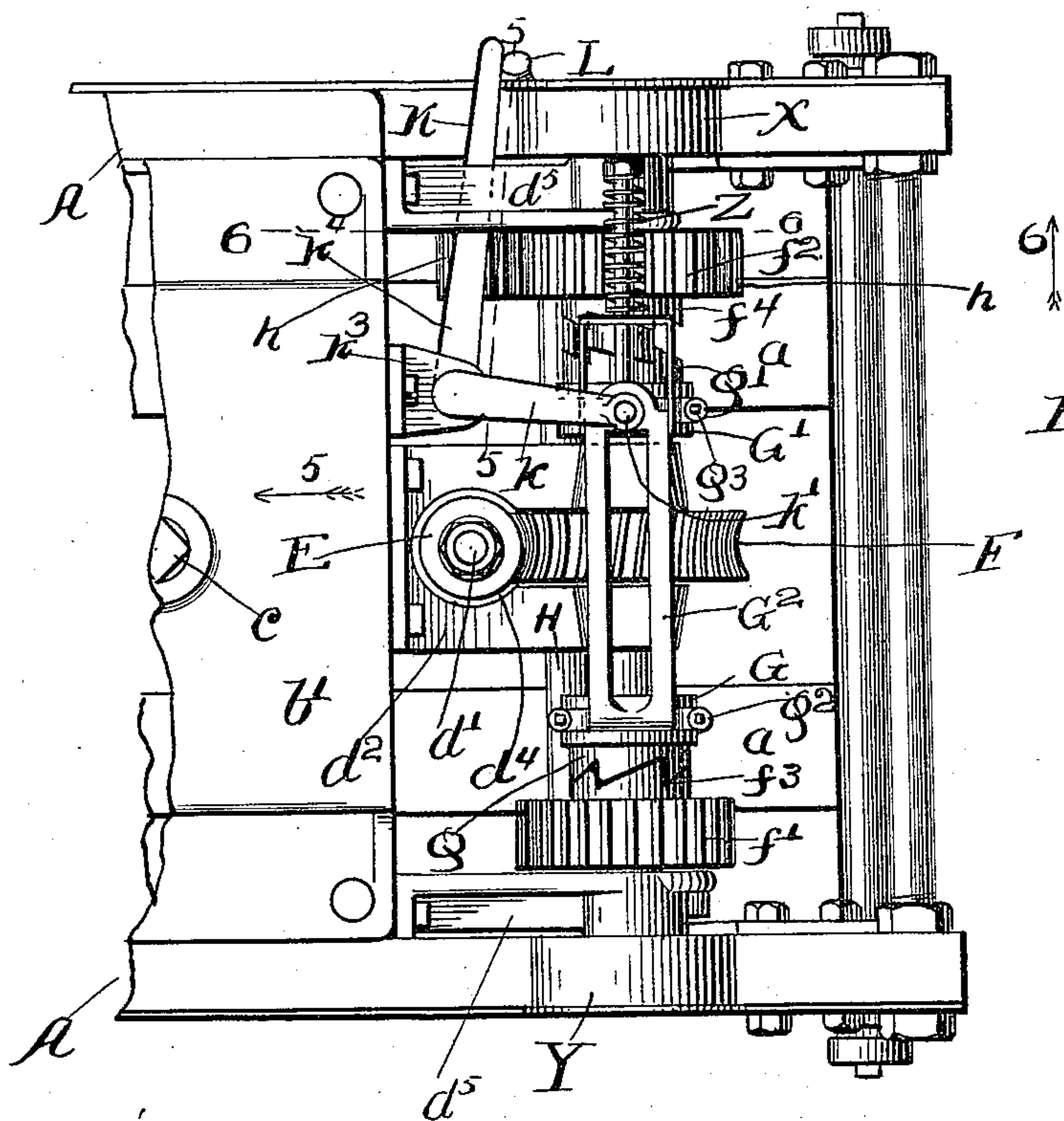


Fig. 4.

Fig. 5.

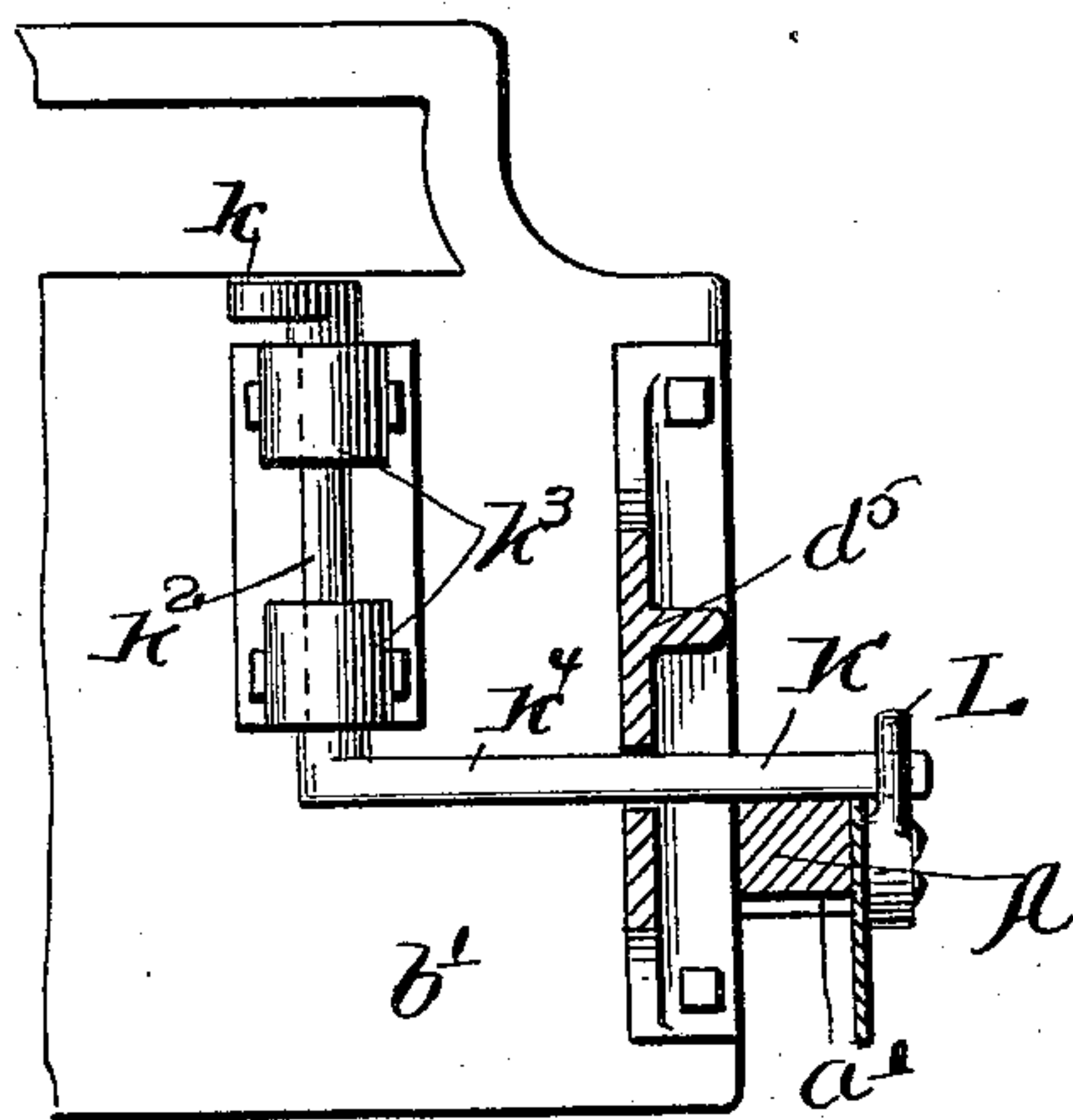
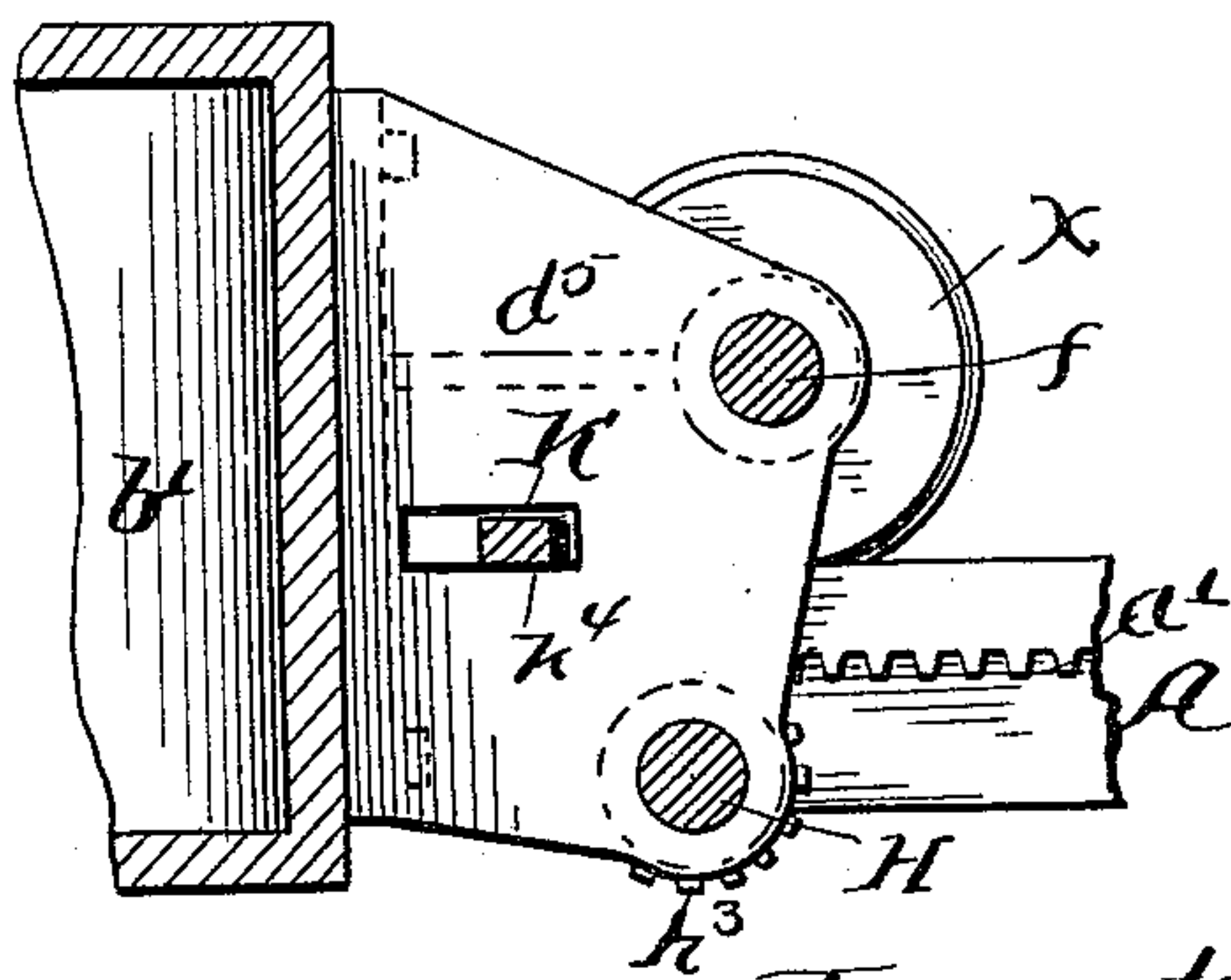


Fig. 6.



Witnesses:

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Inventor:

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Att'y.



# UNITED STATES PATENT OFFICE.

EDWARD P. RAUSCHER, OF CHICAGO, ILLINOIS, ASSIGNOR TO THE MORGAN-GARDNER ELECTRIC COMPANY, OF SAME PLACE.

## COAL-MINING MACHINE.

SPECIFICATION forming part of Letters Patent No. 574,822, dated January 5, 1897.

Application filed April 23, 1896. Serial No. 588,747. (No model.)

*To all whom it may concern:*

Be it known that I, EDWARD P. RAUSCHER, a citizen of the United States of America, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Coal-Mining Machines, of which the following is a specification.

My invention relates to certain improvements in mining-machines of the class known as "channeling-machines," said improvements being directed to the portions of the machine which feed the cutting mechanism into the coal and return the same.

The purpose of the invention is to provide devices to protect the machinery from breakage under an unusual strain, devices for automatically reversing the feed when the cutting mechanism has reached the limit of its movement into the coal, and devices for automatically stopping the feed at the end of the return movement.

To such end the invention consists in certain novel features fully set forth in the following description and defined in the appended claims.

In the drawings presented herewith, Figure 1 is a plan of the portions of a mining-machine necessary to illustrate my invention. Fig. 2 is a section in line 2 2 of Fig. 1, looking in the direction of the arrow 2 in said figure. Fig. 3 is a broken section in line 3 3 of the same figure, looking in the direction of the arrow 3. Fig. 4 is a broken plan, upon an enlarged scale, of a portion of Fig. 1. Fig. 5 is a broken section in line 5 5 of Fig. 4, looking in the direction of the arrow 5; and Fig. 6 is a broken section in line 6 6 of Fig. 4, looking in the direction of the arrow 6.

Looking at Fig. 1, a frame A will be seen which is stationary with respect to the work and which carries a longitudinally-sliding frame B, guided by ways *a* in the frame A, and carrying in practice a cutting-chain which extends completely around the frame and across the head *b* thereof, where it encounters the coal and cuts the channel therein. This chain is not shown in the drawings for the reason that it is a common feature of this class of machines. The sliding frame B also carries the driving mechanism for the chain

as well as the mechanism for feeding the sliding frame and chain thereon into the work. For this purpose a solid framework *b'* is secured to the sliding frame at the rear end thereof which does not enter the channel cut by the machine. This framework is seen in end elevation in Fig. 2 and in section in Fig. 3. Looking at the latter figure it will be seen that a shaft *c* is journaled therein carrying upon its middle portion an armature C, about which are arranged the necessary auxiliary devices to make up an electric motor, and at the lower end the same shaft carries a pinion *c'*, fast thereon in mesh with a gear-wheel *d*, fast upon a shaft *d'*, journaled in a bracket *d''*, secured to the frame *b'*, and also carrying below the gear-wheel a sprocket-wheel *d'''* and above the bracket a worm *d''''*. The cutting-chain passes about the sprocket-wheel *d'''* and is driven thereby, and the worm-wheel *d''''* is provided with suitable connections whereby it moves the sliding frame B back and forth upon its stationary frame.

The thread upon the worm *d''''* is such that the movement of the same tends to raise the worm, and said worm is movable up and down upon the shaft *d'*. To withstand the tendency of moving upward, a washer E, of comparatively weak material, as, for instance, cast-iron, is placed upon the shaft, and above the washer a metal tube E' is fitted upon the shaft, the bottom of said tube being beveled and resting in a corresponding beveled hole in the top of the washer E. The washer and tube are held down upon the worm by a nut screwed upon the end of the shaft *d'*. This washer is made of such strength that in case any unusual obstruction is met with in the coal the washer will break before the other parts of the machine and protect the latter from injury.

The worm *d''''* meshes with a suitable gear F upon a shaft *f*, journaled horizontally in brackets *d''* *d'''* and extending laterally across the frame from side to side. At the opposite ends of said shaft are two gears *f'* *f''*, loose upon the shaft and having upon their inner faces series of teeth *f'''* *f''''*, opposed to corresponding teeth *g* *g'* upon collars G G', keyed upon the shaft *f*, but longitudinally movable thereon. These collars are spaced apart by



means of a frame  $G^2$ , having yokes  $g^2 g^3$  embracing the collars, the space between the collars being such that when one is in engagement with one of the gears the other is thrown  
 5 out of engagement with the gear upon the opposite end of the shaft. The gear  $f^2$  meshes with a gear  $h$ , fast upon a shaft II, also journaled in the brackets  $d^5$ . Another gear  $h'$ , fast upon the same shaft, engages by means of an  
 10 intermediate gear  $h^2$  with the gear  $f'$ . Because of this intermediate gear the motion imparted to the shaft II by the gear  $f'$  is the reverse of the motion imparted by the gear  $f^2$ . The shaft II extends at both ends beyond the jour-  
 15 nals and without the same carries two gears  $h^3 h^4$ , meshing with racks  $a' a^2$  upon the stationary frame A. To insure the complete mesh with these racks, rollers X Y, journaled in the brackets  $d^5$ , are arranged upon the op-  
 20 posite sides of the racks. The rotation of the gears  $h^3 h^4$  moves the sliding frame or carriage back and forth upon the stationary frame or base, and the reversible clutch carried by the frame  $G^2$  and above described provides means  
 25 for imparting the desired motion to this feeding device. To move this frame  $G^2$  back and forth to reverse the feed, a lever K is employed, which is best shown in Figs. 4 and 5. This lever has an arm  $k$ , pivoted to the frame  $G^2$   
 30 at  $k'$ , a vertical portion  $k^2$ , journaled in brackets  $k^3$  upon the frame  $b'$ , and an arm  $k^4$ , extending laterally over the rack  $a'$ . Upon this rack are arranged two pins or stops L L'. (See Fig. 1, also Figs. 2, 3, and 4.) These  
 35 stops are so located that the arm  $k^4$  will engage the stop L' when the carriage reaches the limit of its motion into the coal and the stop L when the carriage is wholly withdrawn therefrom.

In the drawings the carriage is shown as 40 upon its return movement, the clutch being thrown to the left. When the arm reaches the stop L, it will disengage the clutch and stop the carriage.

At the right end of the frame  $G'$  in Figs. 1 45 and 2 and at the top in Fig. 4 will be seen a coiled spring Z, tending to crowd the clutch toward the left in Figs. 1 and 2. To start the carriage into the coal, the arm  $k^4$  is moved still farther away from the stop until the col- 50 lar  $g'$  engages with the pinion  $f^2$ , which starts the carriage on its inward movement. When this movement is once made, the resistance of the carriage prevents the spring Z from disengaging the clutch until the inward move- 55 ment is completed, when the disengagement is caused by the striking of the arm  $k^4$  against the stop L', and as soon as the clutch is disengaged from the right-hand pinion the spring Z engages it with the left-hand pinion and 60 starts the return movement.

I claim as new and desire to secure by Letters Patent—

In a device of the class described, the combination with the driven shaft,  $d'$ , and worm, 65  $d^4$ , longitudinally movable thereon, of the hollow washer, E, resting upon said worm and having a conical hole in its upper end, and a collar, E', having a corresponding conical end resting in the conical hole in the washer, 70 whereby the collar, E', will split the washer, E, before sufficient strain is put upon the other portions of the machine to injure the same; substantially as described.

EDWARD P. RAUSCHER.

Witnesses:

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 ROBERT RYAN.