

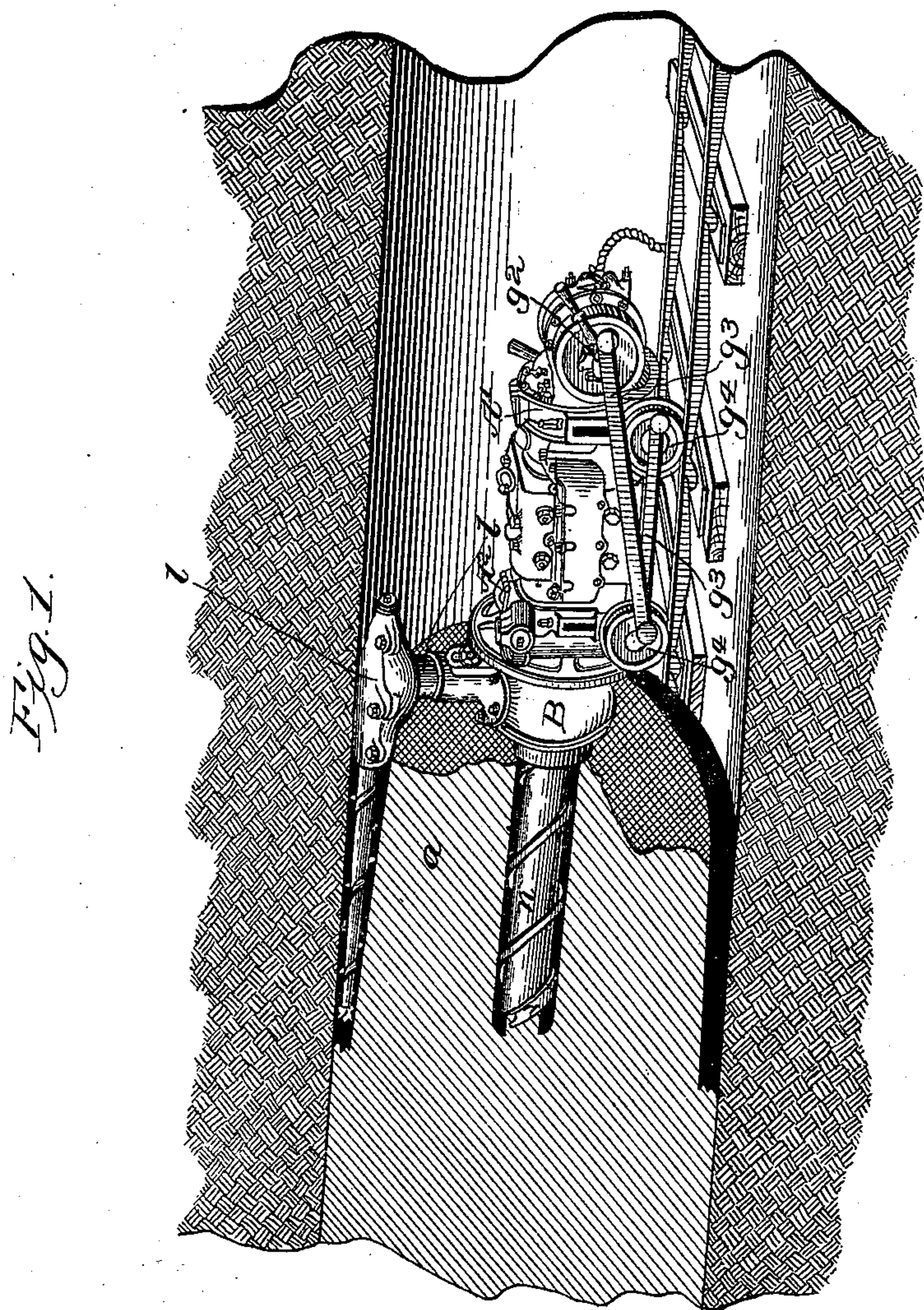
(No Model.)

3 Sheets—Sheet 1.

F. HURD.  
COAL CUTTING OR LIKE MACHINE.

No. 556,985.

Patented Mar. 24, 1896.



Witnesses:

Herbert Bradley

Geo. E. Chase

Inventor

Frederick Hurd

By Knights Bros.  
Attorneys



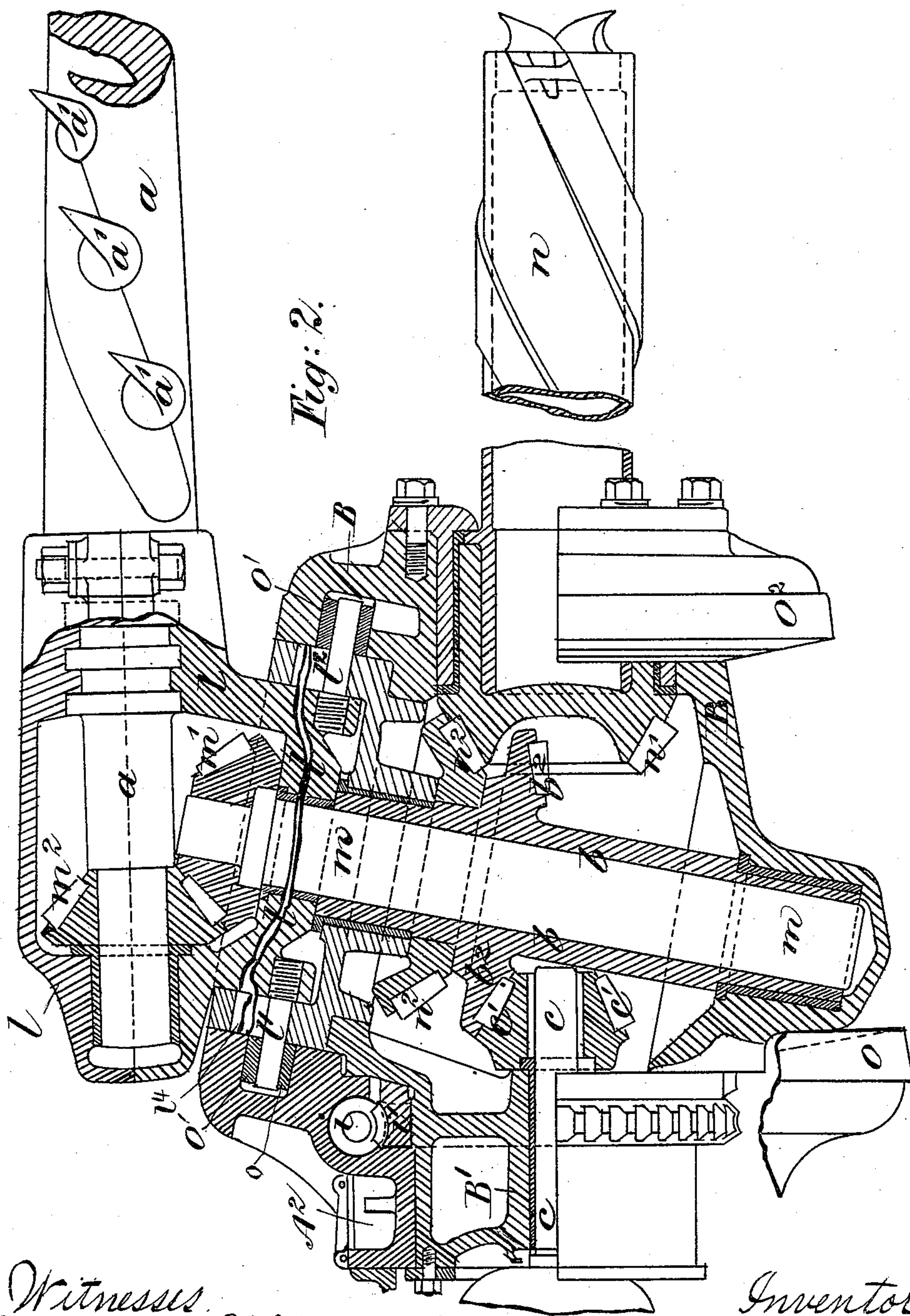
(No Model.)

3 Sheets—Sheet 2.

F. HURD.  
COAL CUTTING OR LIKE MACHINE.

No. 556,985.

Patented Mar. 24, 1896.



Witnesses.  
Walter E. Allen.  
S. Allen.

Inventor.  
Frederick Hurd.  
By Knight Bros  
Attorneys

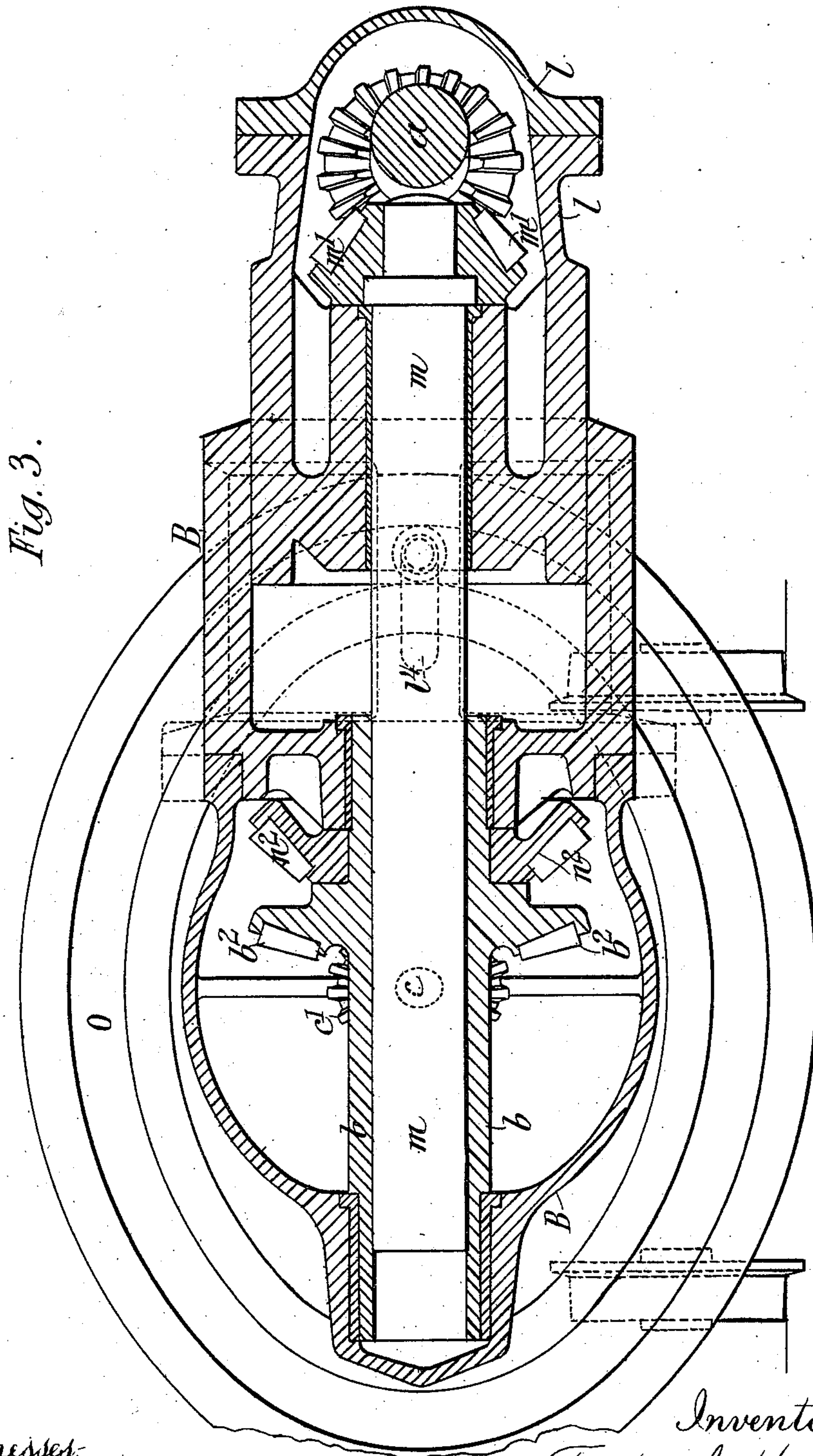
(No Model.)

3 Sheets—Sheet 3.

F. HURD.  
COAL CUTTING OR LIKE MACHINE.

No. 556,985.

Patented Mar. 24, 1896.



Witnesses:  
Walter E. Allen.  
Geo. C. Cruise.

Inventor.  
Frederick Hurd.  
By *Knights Bros.*  
Attorneys.



# UNITED STATES PATENT OFFICE.

FREDERICK HURD, OF LONDON, ENGLAND.

## COAL-CUTTING OR LIKE MACHINE.

SPECIFICATION forming part of Letters Patent No. 556,985, dated March 24, 1896.

Application filed August 3, 1893. Serial No. 482,307. (No model.) Patented in England August 4, 1892, No. 14,124; in France August 8, 1893, No. 232,025; in Belgium August 8, 1893, No. 105,926; in Germany August 8, 1893, No. 76,919; in Victoria November 3, 1893, No. 10,937; in New South Wales November 6, 1893, No. 4,715; in Tasmania November 6, 1893, No. 1,218; in South Australia November 6, 1893, No. 2,589; in New Zealand November 11, 1893, No. 6,532; in Western Australia November 14, 1893, No. 465, and in India April 9, 1894, No. 359.

*To all whom it may concern:*

Be it known that I, FREDERICK HURD, mining, civil, and mechanical engineer, a subject of the Queen of Great Britain, residing at 11 Grittleton Road, London, in the county of Middlesex, England, have invented certain new and useful Improvements in Mining-Machines, (for which I have obtained Letters Patent in England, No. 14,124, dated August 4, 1892; in France, No. 232,025, dated August 8, 1893; in Belgium, No. 105,926, dated August 8, 1893; in Germany, No. 76,919, dated August 8, 1893; in Victoria, No. 10,937, dated November 3, 1893; in New South Wales, No. 4,715, dated November 6, 1893; in Tasmania, No. 1,218, dated November 6, 1893; in South Australia, No. 2,589, dated November 6, 1893; in New Zealand, No. 6,532, dated November 11, 1893; in Western Australia, No. 465, dated November 14, 1893, and in India, No. 359, dated April 9, 1894,) of which the following is a specification.

My present invention is designed as an improvement upon the mining-machine described in my application, Serial No. 482,308, filed simultaneously herewith, and it relates more particularly to the construction of the cutter-bar head of the machine, which carries the drills and their operating and guiding mechanism, whereby the machine is rendered more suitable for sinking and tunneling.

My invention consists, broadly, in constructing the casing of the machine carrying one of the drills telescopic, so that as the casing is revolved a cam-groove carried on the motor-casing, either square, oval, or circular, guides the telescopic section, so that a cut can be made in the mineral around the central drill in order that the ore, earth, or mineral cut can be easily broken up and excavated; and my invention further consists of certain details of novel construction that will be hereinafter fully described, and specifically pointed out in the claims.

In order that my invention may be fully understood I will proceed to describe the same

with reference to the accompanying drawings, in which—

Figure 1 is a perspective view of a mining-machine at work and embodying my improvements. Fig. 2 is a vertical section of one end of the machine, showing the mechanism for operating the drills; and Fig. 3 is an end view of the machine, partly in section, showing the telescopic portion of the casing which carries the movable drill and also the cam-groove for guiding the telescopic section as the casing carrying the drills is revolved.

In said drawings, A represents the motor-casing provided with the end casings A' A<sup>2</sup> and the means  $g^2$ ,  $g^3$ , and  $g^4$  for moving the machine backward and forward. The motor end casings and the mechanism for moving the motor are fully described in the application above referred to and they need not therefore be described in this specification.

B represents a casing inclosing the mechanism for driving the drills  $a$  and  $n$ . This mechanism consists of the motor-shaft  $c$  extending through a collar B' and having a worm  $c'$  rigidly mounted thereon and in engagement with a beveled pinion-wheel  $b^2$  formed integral with a sleeve  $b$  surrounding a shaft  $m$ . Mounted on the end of this shaft  $m$  is a bevel cog-wheel  $m'$  in engagement with a bevel cog-wheel  $m^2$  mounted on one end of the drill  $a$ . This drill may be of any desired construction, but I prefer to construct it as described in the application above referred to with the detachable cutter-teeth  $a'$  secured thereto. Thus it will be seen that as the motor-shaft  $c$  is rotated the drill  $a$  will be operated through the mechanism above described. The means for operating the central drill  $n$  simultaneously with the drill  $a$  consists of the bevel-wheel  $n^2$  fixed on the sleeve  $b$  in engagement with the beveled toothed face of the sleeve  $n'$ , which is rigidly secured on the drill  $n$ .

O represents a cam-groove formed on the end casing A<sup>2</sup> and designed to guide the telescopic section  $l$ , which carries the drill  $a$  when the casing is revolved around the central



drill  $n$ . This groove may be either round, oval, square or any other form according to the character of the opening desired to be cut in the mineral.

5  $o^2$  represents a second cam-groove carried by the casing B, which aids in guiding and steadying the section  $l$ .

As will be seen from Fig. 3 the telescopic section  $l$  carrying the drill  $a$  and part of the  
10 driving mechanism works in an opening formed for it in the casing B. This section is secured in the said opening by means of the rollers  $o'$   $o^3$  and bolts  $l'$  and  $l^2$ , which also form axles for the said rollers. As the casing  
15 B is revolved by the worm  $i$ , the worm-wheel  $i'$  being rigidly fixed on the casing B, and the worm  $i$  carried by the casing A and worm-wheel  $i'$ , the rollers  $o'$  and  $o^3$  move in the grooves  $o$   $o^2$  and force or guide the section  $l$   
20 in or out according to the character of the groove formed, such movement of the section  $l$  being allowed by the slots  $l^4$  formed in the walls of the opening in the casing B.

The operation of my device is as follows:  
25 The machine is brought up to the face of the mineral and the drills  $n$  and  $a$  set in motion. These drills are fed into the mineral by the whole machine being moved forward by the means  $g^2$ ,  $g^3$ , and  $g^4$ . After the drills have  
30 entered the mineral their full length the casing B is caused to revolve. This revolution of the casing causes the drill  $a$  to move about the drill  $n$  and cut an opening in the mineral similar to the shape of the cam-grooves.  
35 When a complete revolution has been made by the drill  $a$ , both drills are withdrawn by the machine being moved backward, after which the mineral is broken up and removed. After the material has been removed the same  
40 operation above described is gone through with again.

In sinking mines the whole machine is mounted in a cage, the mode of operation being the same as above described.

45 Having thus described my invention, the

following is what I claim as new therein and desire to secure by Letters Patent:

1. In a mining-machine, the combination of a motor, a casing therefor, a drill carried by said casing, means for operating said drill and  
50 a casing covering said means, said casing being formed with a telescopic section having a drill mounted therein, a cam-groove formed on the motor-casing and a roller carried by the telescopic section fitting in said groove, and  
55 suitable means for revolving said second casing, substantially as shown and described.

2. In a mining-machine, the combination of a motor and a casing therefor, a central drill carried thereby a revoluble casing-head containing mechanism for operating said drill, a  
60 telescopic section provided in said casing-head and fitted with a drill and mechanism for operating such second drill, and means for automatically increasing and decreasing  
65 the distance between the two drills consisting of cam-grooves carried by the motor-casing, and suitable studs or bolts with antifriction-rollers carried by the telescopic arm to work in said cam-grooves, substantially as herein  
70 shown and described.

3. In a mining-machine the combination of a motor, a casing therefor, a drill carried thereby, suitable means connected therewith for operating the drill by the motor, a casing  
75 surrounding said means and adapted to be revolved, a telescopic section carried by said casing and adapted to be rotated by the same gearing as that rotating the first drill, cam-grooves carried by the motor-casing, and a  
80 connection between the cam-grooves and telescopic section consisting of rollers and bolts secured to the section and carrying the rollers, and slots formed in the casing in which the bolts work, substantially as shown and de-  
85 scribed.

FREDERICK HURD.

Witnesses:

B. J. B. MILLS,

CLAUDE K. MILLS.