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J. P. PAYNTER.

MINING DRILL AND CHANNEL CUTTER.

No. 597,589. Patented Jan. 18, 1898.

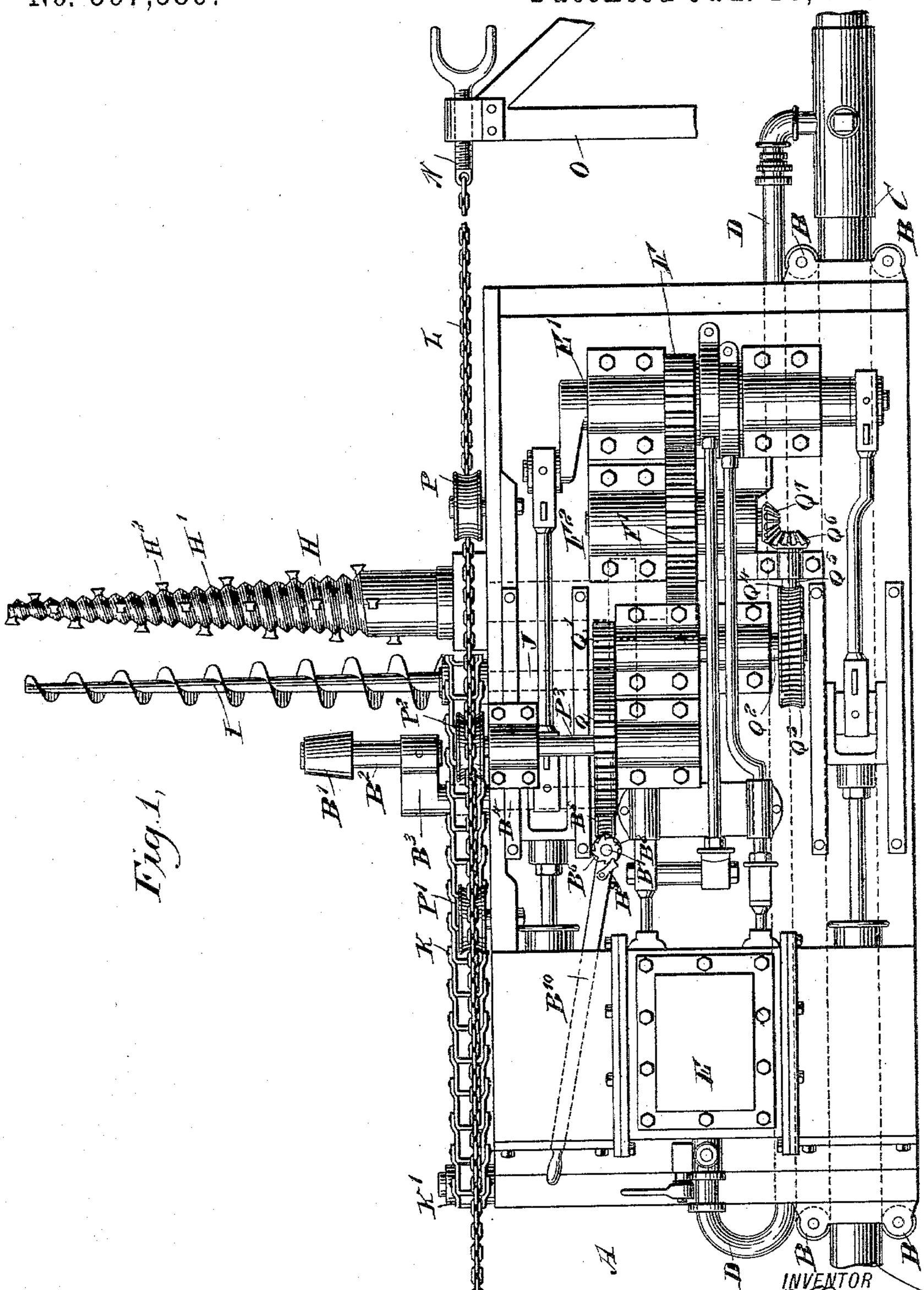

Fig. 1.

WITNESSES.

Edward Thorpe

Rud. F. Hoster

INVENTOR

J. P. Paynter.

BY

Munn & Co

ATTORNEYS.

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Fig. 2.

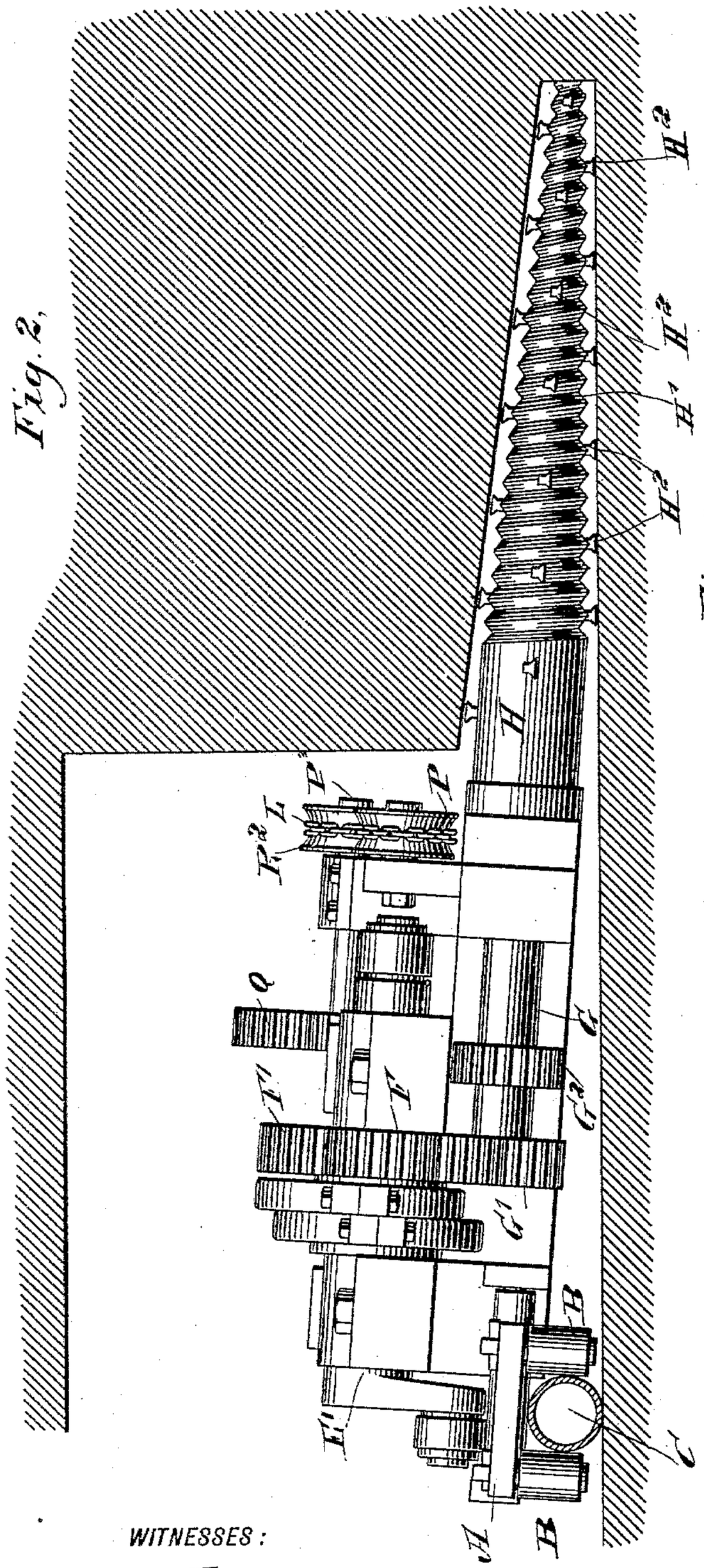
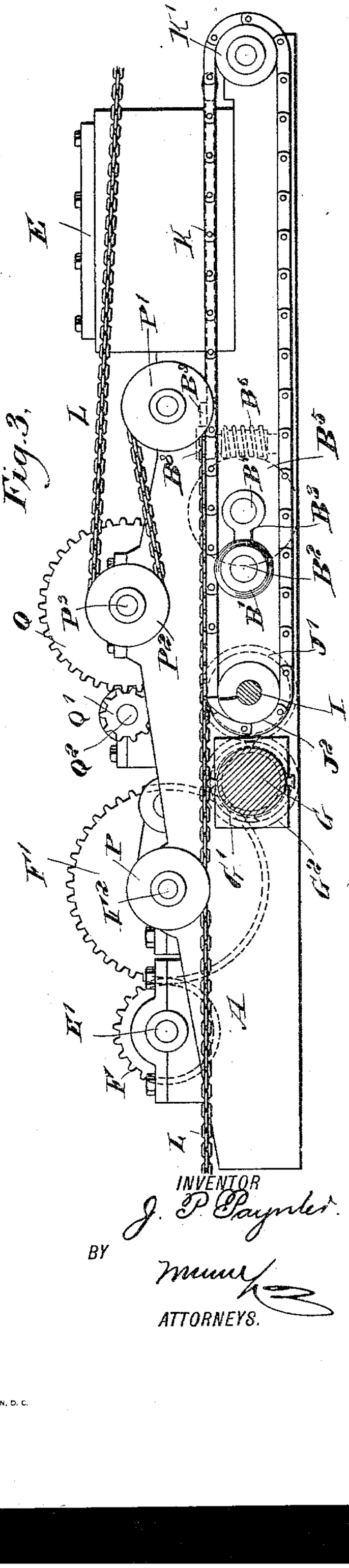


Fig. 3.



WITNESSES:

Edward Thorpe.
Rud. J. Hoster Jr.

INVENTOR
J. P. Paynter.
BY
Munn & Co
ATTORNEYS.

(No Model.) 3 Sheets—Sheet 3.

J. P. PAYNTER.

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Fig. 5.

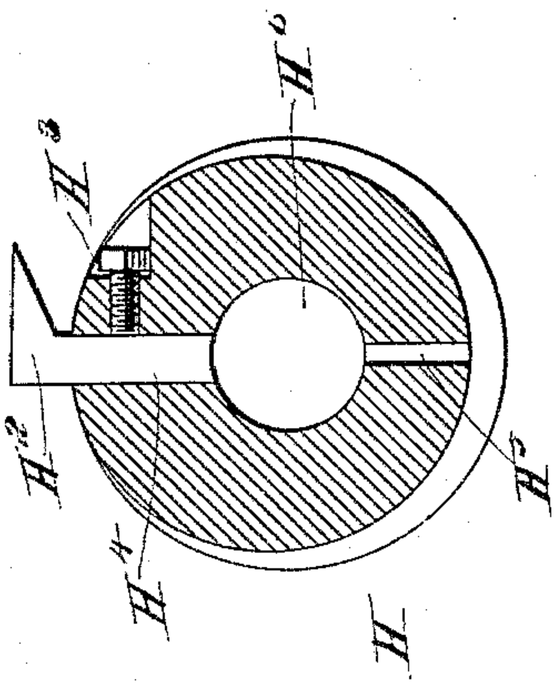


Fig. 7.

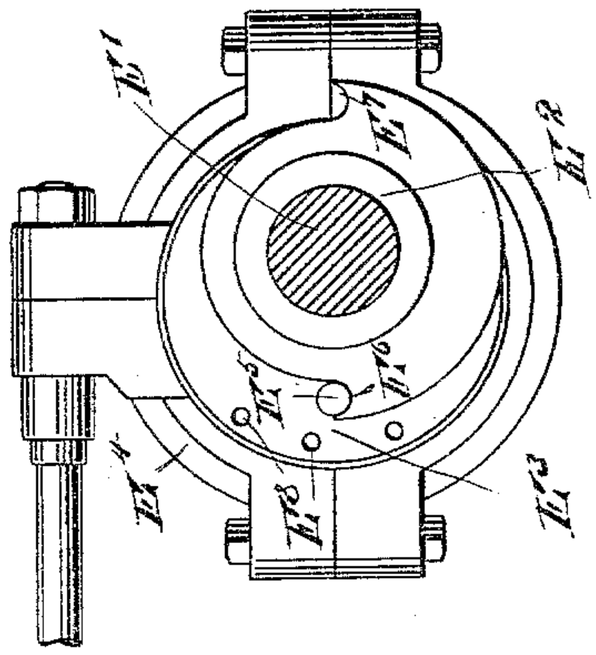


Fig. 4.

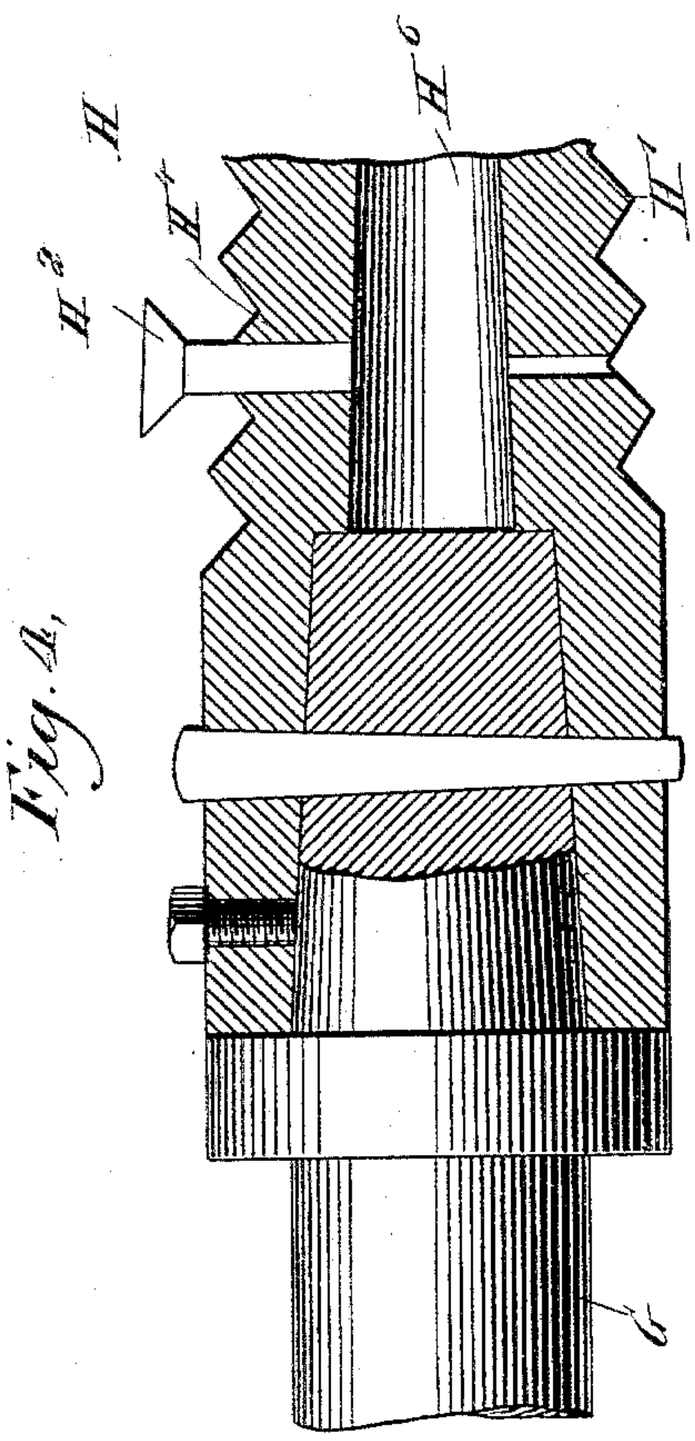
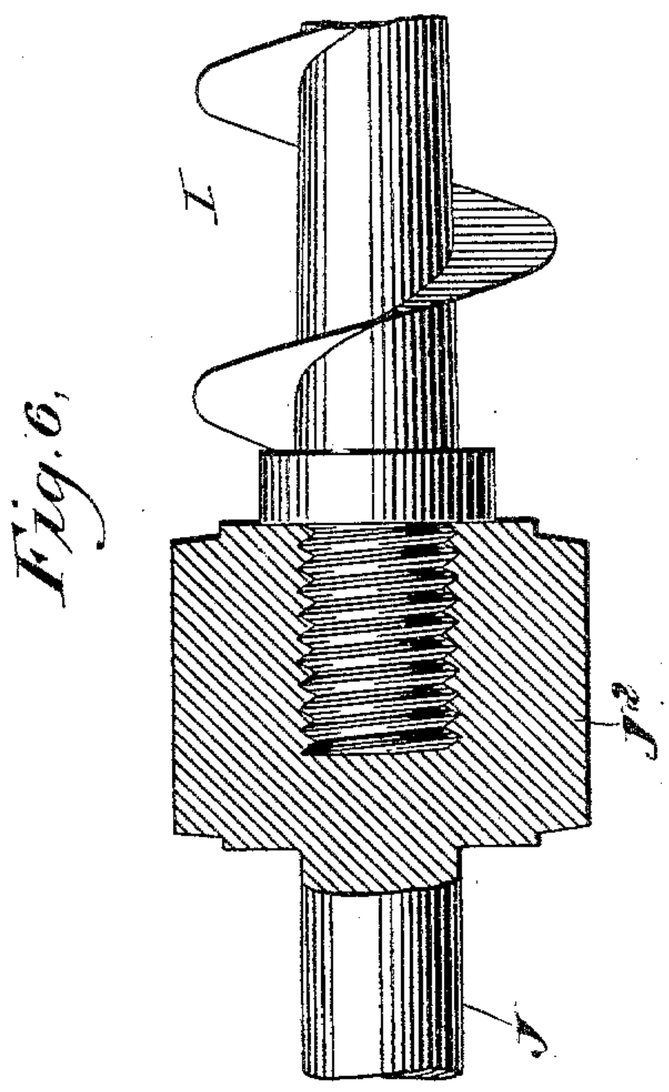


Fig. 6.



WITNESSES:

Edward Thorpe.

Thos. J. Hooker Jr.

INVENTOR

J. P. Paynter.

BY Munn & Co.

ATTORNEYS.

UNITED STATES PATENT OFFICE.

JOHN PHILLIP PAYNTER, OF TOPEKA, KANSAS.

MINING-DRILL AND CHANNEL-CUTTER.

SPECIFICATION forming part of Letters Patent No. 597,589, dated January 18, 1898.

Application filed November 30, 1896. Serial No. 613,922. (No model.)

To all whom it may concern:

Be it known that I, JOHN PHILLIP PAYNTER, of Topeka, in the county of Shawnee and State of Kansas, have invented a new and Improved Mining-Drill and Channel-Cutter, of which the following is a full, clear, and exact description.

The invention relates to mining-drills and channel-cutters such as shown and described in the Letters Patent of the United States, No. 395,716, granted to me on January 8, 1889.

The object of the present invention is to provide a new and improved mining-drill and channel-cutter arranged to cut a narrow opening or slot in the seam or underneath the coal and remove the cuttings from the seam to enable the miner to easily wedge or break down the coal above.

The invention consists of certain parts and details and combinations of the same, as will be fully described hereinafter and then pointed out in the claims.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the figures.

Figure 1 is a plan view of the improvement. Fig. 2 is a front end elevation of the same as applied. Fig. 3 is a rear side elevation of the improvement, with part in section. Fig. 4 is an enlarged sectional side elevation of the drilling-tool. Fig. 5 is a transverse section of the same. Fig. 6 is an enlarged side elevation of the conveyer, with part in section; and Fig. 7 is an enlarged side elevation of the reversing mechanism for the engine.

The improved machine is provided with a suitably-constructed frame A, provided at each end and near one side thereof with vertically-disposed pulleys B, engaging opposite sides of a tube C, extending longitudinally in the mine and forming the track for the said frame A to travel on, said tube also forming a supply-tube for furnishing the engine E on the said frame A with compressed air as the motive agent for actuating the engine, the tube C being for this purpose connected by a flexible tube D with the engine, as indicated in Fig. 1. The tube C thus stands under one side of the frame A, said tube forming a fulcrum for the said frame for swinging the latter up and down in a transverse direction, the free end of the frame being supported by a pulley B′, adapted to travel in the undercut or channel and journaled on a transversely-extending pin B^2, projecting from an arm B^3, secured on a transversely-extending shaft B^4, journaled in suitable bearings on the free end of the frame A. (See dotted lines in Figs. 1 and 3.)

The inner end of the shaft B^4 carries a worm-wheel B^5, in mesh with a worm B^6, secured on a shaft B^7, disposed vertically and journaled in suitable bearings in the frame A. On the upper end of the shaft B^7 is secured a ratchet-wheel B^8, in mesh with a pawl B^9, secured on a lever B^{10}, extending horizontally and fulcrumed on the said shaft B^7. The lever B^{10} is under the control of the operator to enable the latter to move the lever forward and backward and impart an intermittent rotary motion to the shaft B^7 by the pawl B^9 and ratchet-wheel B^8. The rotary motion of the shaft B^7 is transmitted by the worm B^6 and worm-wheel B^5 to the shaft B^4, so that the arm B^3 thereon is swung up or down, and consequently the pulley B′ is raised or lowered to impart an up-and-down swinging motion to the frame A as the pulley travels on the bottom of the undercut or channel.

The engine E previously mentioned is preferably made with two cylinders connected in the usual manner with the main driving-shaft E′, on which is secured a gear-wheel F, in mesh with an intermediate gear-wheel F′, secured on the shaft F^2, journaled in suitable bearings on the frame A. The gear-wheel F′ is in mesh with a pinion G′, secured on a transversely-extending shaft G, journaled in suitable bearings in the frame A and supporting at its outer end the drill-tool H, extending from the free end of the frame A, as is plainly shown in Figs. 1 and 2. Thus when the engine is set in motion the rotary motion of the shaft E′ is transmitted by the gear-wheels F, F′, and G′ to the shaft G, and by the latter to the drill-tool H, so that the latter rotates and at the same time moves longitudinally with the frame A.

The drill-tool H (shown in detail in Figs. 4 and 5) is made conical and formed with a thread H′, from which extend cutters H^2 in a radial direction, said cutters being securely

held in place by set-screws H^3 or other suitable means. Each cutter H^2 has its shank fitted into an aperture H^4, formed radially in the drilling-tool, and opposite this aperture is arranged another radial aperture H^5 for the introduction of a tool for driving out the cutter H^2 whenever it is desired to remove the same for repairs or replacement. It is understood that the said set-screw H^3 is loosened when it is desired to remove the cutter, as above mentioned. The drill-tool is also provided with a longitudinally-extending bore or aperture H^6, into which open the oppositely-arranged apertures H^4 H^5.

Directly in the rear of the drilling-tool H is arranged a transversely-extending conveyer I, formed with a spiral blade for removing the cuttings produced by the drilling-tool H out of the undercut or channel. The inner end of the conveyer I is secured on a shaft J, (see Fig. 6,) journaled in suitable bearings in the main frame and carrying a gear-wheel J', in mesh with a gear-wheel G^2, secured on the shaft G, so that when the latter is rotated, as previously explained, a rotary motion is transmitted by the gear-wheels G^2 and J' to the shaft J and to the conveyer I.

The inner end of the conveyer I discharges the cuttings upon a conveyer belt or chain K, which passes over a sprocket-wheel J^2, formed on the end of the shaft J, the conveyer chain or belt extending longitudinally in a rearward direction to pass over a pulley K', journaled at the rear end of the frame A. Thus the cuttings delivered to the chain or belt are removed rearwardly and discharge at the end of the frame in the shaft.

In order to impart a forward traveling motion to the frame A, I provide a chain L, extending longitudinally and secured at its forward end to a screw-rod N, held on a bracket O, secured in the end of the mine-shaft. The chain L extends first under a guiding-pulley P, to then pass around a pulley P', journaled loosely on the free side of the frame A, (see Figs. 1 and 3,) the chain then passing around a pulley P^2, to then extend rearwardly. The pulley P^2 is secured on a shaft P^3, journaled in suitable bearings on the main frame A, and on the said shaft is fastened a sprocket-wheel Q, in mesh with a pinion Q', attached to a transversely-extending shaft Q^2, journaled in suitable bearings on the frame A. (See Figs. 1 and 3.) The forward end of the shaft Q^2 carries a worm-wheel Q^3, in mesh with a worm Q^4, secured on a longitudinally-extending shaft Q^5, journaled in bearings on the top of the frame A. On the shaft Q^5 is secured a beveled gear-wheel Q^6, in mesh with a beveled gear-wheel Q^7, secured on the shaft F^2, carrying the intermediate gear-wheel F', as previously described.

When the engine is in motion and the pinion F rotates the gear-wheel F' and its shaft F^2, then the motion of the latter is transmitted by the beveled gear-wheels Q^7 Q^6 to the shaft Q^5, which by the worm Q^4 and the worm-wheel Q^3 rotates the shaft Q^2, and the motion of the latter is transmitted by the pinion Q' and the gear-wheel Q to the shaft P^3 to revolve the pulley P^2 and cause the latter to travel on the chain L, fixed at one end to the screw-rod end of the bracket O. Thus the frame A is drawn forward, traveling on the tube C, with the pulleys B' resting on the ground of the cut.

The operation is as follows: When the parts are in the position illustrated in Figs. 1, 2, and 3 and the motive agent is admitted from the tube C and pipe D to the engine E, then the latter is set in motion and causes a forward feeding of the frame, as above described, by the action of the pulley P^2 on the chain L and at the same time a rotary motion is given to the drilling-tool H, so that the cutters H^2 thereof cut the material and form an undercut or channel. The cuttings left by the drilling-tool in the undercut are moved transversely in an outward direction by the conveyer I, which discharges the cuttings upon the longitudinal belt or chain K, so that the cuttings are discharged outside of the undercut in the mine-shaft at the rear end of the frame. Thus when the frame A arrives at the end of its travel an undercut or channel is produced free of cuttings, which enables a miner to easily wedge down the coal above.

The frame A may be run in either direction, and for this purpose I provide the engine with the reversing mechanism shown in Fig. 7. On the shaft E' of the engine is secured a sleeve E^2, on which is mounted to rotate loosely an eccentric disk E^3, carrying an eccentric-strap E^4. From the face of the eccentric disk E^3 projects a pin E^5, adapted to engage either of the two recesses or lugs E^6 E^7 formed on the sleeve E^2. The disk E^3 is also provided with apertures E^8, adapted to be engaged by a suitable wrench or other tool for conveniently turning the said disk E^3 and engaging the pin E^5 with either of the recesses or lugs E^6 E^7. As the latter are arranged diametrically opposite each other, it is evident that the half-turn given to the disk E^3 reverses the position of the eccentric to reverse the engine.

Having thus fully described my invention, I claim as new and desire to secure by Letters Patent—

1. A rock-cutting device having a combined air-supply pipe and rail, an air-operated motor and flexible connections between the combined pipe and rail and the motor, substantially as described.

2. A mining-machine having a cutting-arm projecting from one side thereof, means for operating said arm, a track located upon the opposite side of the machine consisting of a pipe, connections therefrom to a compressed-air supply, and flexible connections from said pipe to the operating mechanism, substantially as described.

3. A mining-machine having a single track located under one side thereof, a transverse

shaft journaled in the frame of the machine having a crank-arm upon the end opposite the rail, a wheel carried upon said crank-arm and means for rotating and adjustably holding said shaft, substantially as described.

4. In a channeler, the combination of a frame carrying an outwardly-extending cutting-arm, a spoils-conveyer behind the cutting-arm, and an air-motor for operating the same with a hollow track therefor connected to an air-supply, and flexible connections from said hollow track to the air-motor, substantially as described.

5. In a channeler, the combination of a frame carrying a cutting-arm having radial teeth, a spoils-conveyer behind said cutting-arm with a transversely-extending shaft having a crank-arm thereon at the end toward the cutters, a wheel upon said crank, a worm-gear upon the shaft, and a worm engaging said gear, substantially as described.

6. In a channel-cutter, the combination of a frame carrying a cutting-arm having radial teeth, a spoils-conveyer behind said cutting-arm, a transversely-extending shaft having a crank-arm thereon at the end toward the cutters, a wheel upon said crank, a worm-gear upon the shaft, and a worm engaging said gear with an air-motor mounted on the frame for operating said mechanism, a single hollow rail beneath the side of the frame opposite the cutters, connections between said rail and an air-supply and flexible air connections between the rail and motor, substantially as described.

7. A mining-drill, provided with a frame mounted to travel, a drilling-tool mounted to rotate in the said frame and moving with the latter to form an undercut, a conveyer mounted to turn on the said frame and arranged in the rear of the said drilling-tool, to remove the cuttings transversely from the undercut, a separate conveyer, an air-motor upon said frame and operating said mechanism, a combined track and air-supply pipe beneath said frame and flexible connections between said pipe and motor, a chain or belt mounted to travel longitudinally and receiving the cuttings from the said conveyer, substantially as shown and described.

8. A mining-drill, provided with a single track, a frame mounted to travel longitudinally thereon, and adapted to swing sidewise and up and down, with the track as a fulcrum, a pulley journaled on an arm mounted to turn in the frame to adjust the position of the latter, and means, substantially as described, for adjusting the position of the said arm, as set forth.

JOHN PHILLIP PAYNTER.

Witnesses:
H. T. MARCH,
JOHN H. MARCH.