

(No Model.)

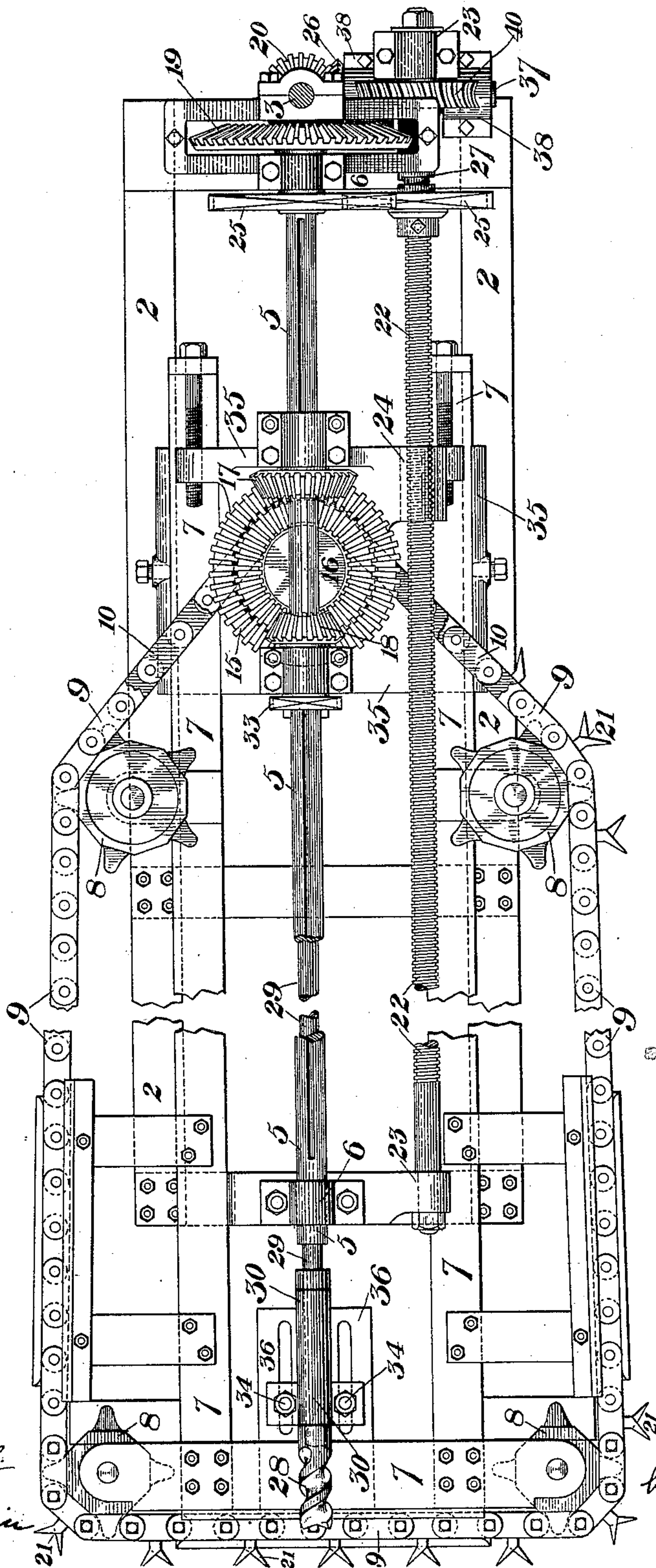
2 Sheets—Sheet 1.

F. M. LECHNER.
COAL MINING MACHINE.

No. 428,920.

Patented May 27, 1890.

Fig. 1.



Witnesses.
H. L. Gill
M. J. Corwin

Inventor
Francis M. Lechner
by W. Baxwell & Sons
his Attorneys

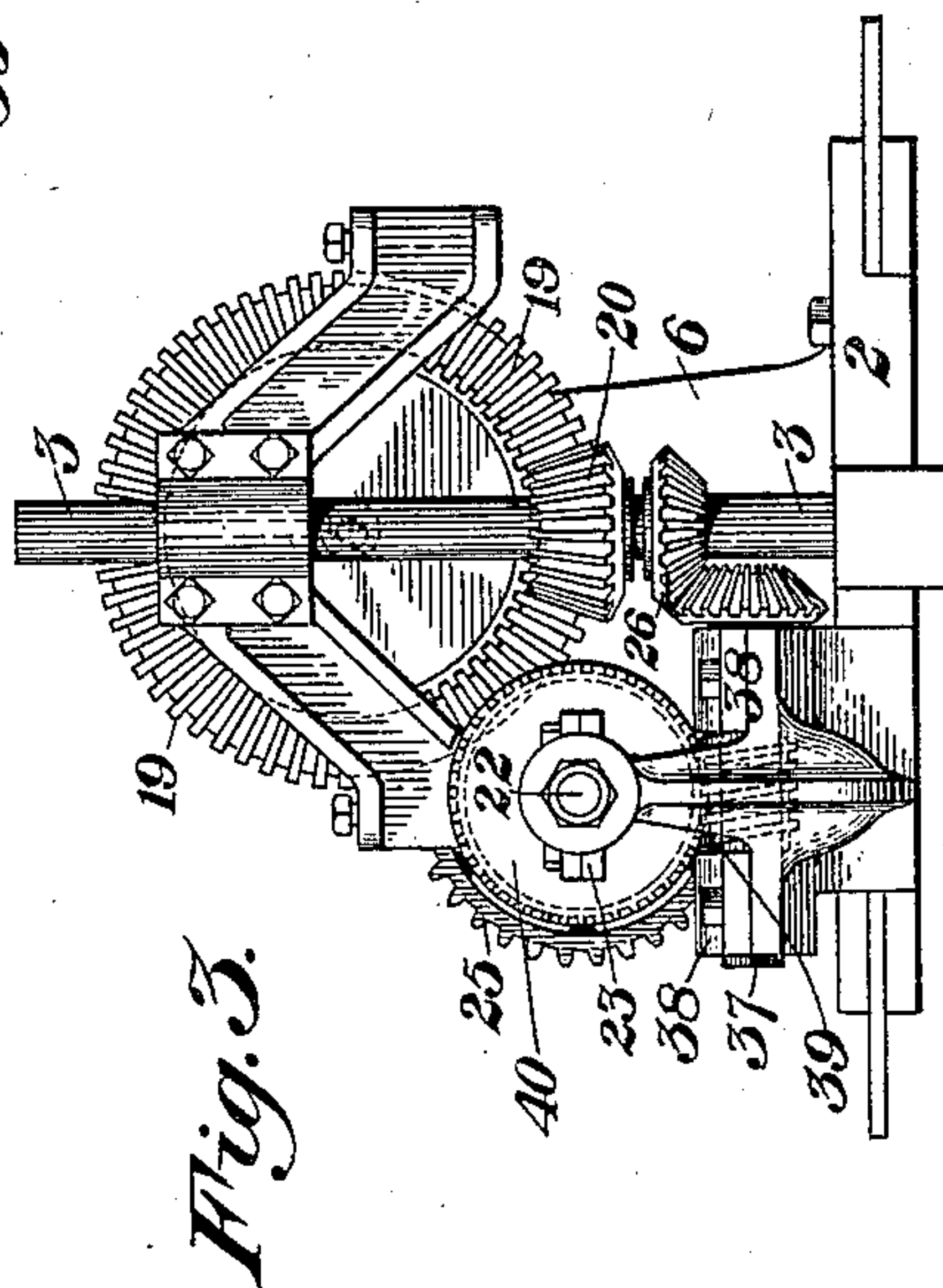
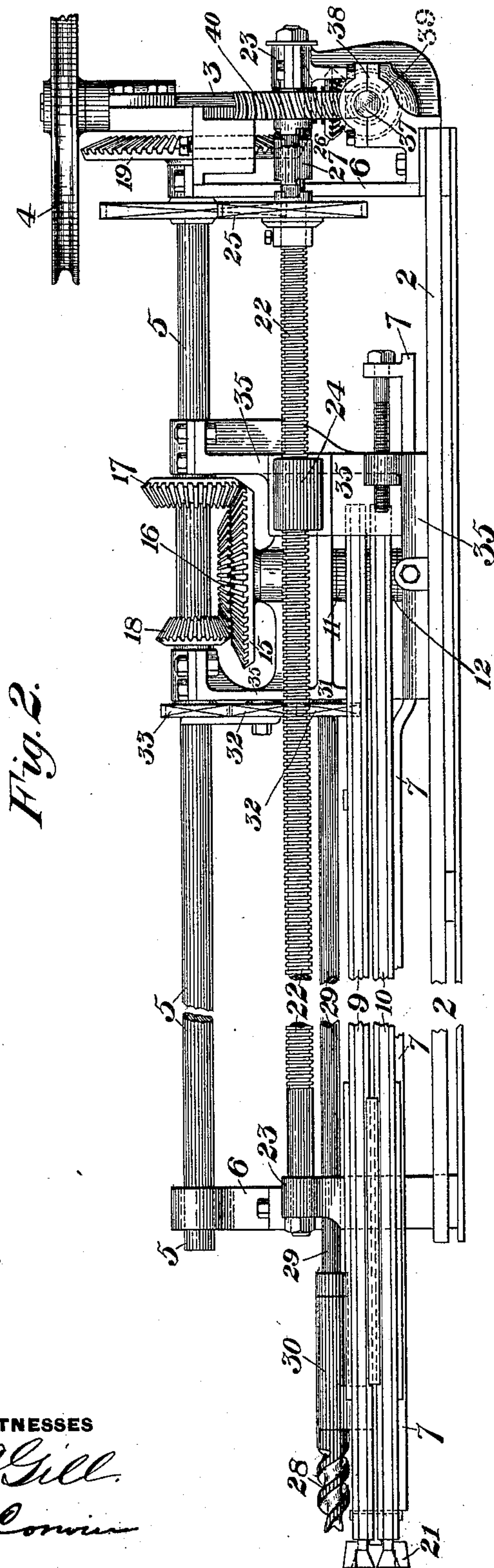
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UNITED STATES PATENT OFFICE.

FRANCIS M. LECHNER, OF COLUMBUS, OHIO, ASSIGNOR TO FRANK N. SLADE,
OF SAME PLACE.

COAL-MINING MACHINE.

SPECIFICATION forming part of Letters Patent No. 428,920, dated May 27, 1890.

Application filed December 10, 1889. Serial No. 333,210. (No model.)

To all whom it may concern:

Be it known that I, FRANCIS M. LECHNER, of Columbus, in the county of Franklin and State of Ohio, have invented a new and useful Improvement in Coal-Mining Machines, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification, in which—

10 Figure 1 is a plan view of my improved machine. Fig. 2 is a side elevation thereof. Fig. 3 is an elevation of the bearings of the main power-shaft.

15 Like symbols of reference indicate like parts in each.

In the drawings, 2 represents the stationary frame or bed of the machine. 3 is a shaft which is journaled in suitable bearings thereon, and which is rotated by means of a suitable motor, (not shown,) the power of which is transmitted to the shaft through a sheave-wheel 4.

25 5 is the main shaft of the machine, which has its bearings in standard 6, extending from the stationary frame 2. The movable part of the machine which carries the cutters consists of a frame 7, mounted on the stationary frame 2, and adapted to slide longitudinally thereon.

30 8 8 are sprocket-wheels, which are journaled, as shown in Fig. 1, on the moving frame, said sprocket-wheels being arranged in pairs, one wheel of each pair being above its companion wheel, so that there are four pairs of sprocket-wheels shown in the drawings.

40 9 and 10 are sprocket-chains arranged one above the other and extending around the sprocket-wheels 8 and around driving sprocket-wheels 11 and 12 on shafts which are journaled in bearings on the moving carriage 35 of the machine. The shaft to which is keyed the sprocket-wheel 11 is hollow, and is affixed to a beveled pinion 15, and the shaft to which is keyed the sprocket-wheel 12 is arranged inside the shaft 13, and is affixed to a beveled pinion 16, which is concentric with the pinion 15.

50 17 and 18 are beveled gear-wheels set on the shaft 5 by a feather and spline or other sliding connection, and meshing with the

teeth of the pinions 15 and 16, respectively. The shaft 5 is mechanically connected with the driving-shaft 3 by gearing 19 and 20, and it follows from this construction that rotation 55 of said driving-shaft will, through the gearing 15, 16, 17, and 18, transmit motion to the sprockets 11 and 12, and will drive the sprocket-chains 9 and 10 in opposite directions. The sprocket-chains are provided with 60 the usual cutters 21, and by presenting the end of the machine to a bed of coal the opposite motions of these cutters will cut the kerf. The moving frame of the machine is fed inwardly to advance the cutters into the bed 65 of coal by means of a screw-shaft 22, which is journaled at its ends in bearings 23 on the stationary frame of the machine and passes through a nut 24 on the moving frame 7. This screw-shaft is connected with the driven 70 parts of the machine by means of gearing. The set of gearing 25 connects the screw-shaft with the shaft 5 and the set 26 connects the driving-shaft with a shaft 37, mounted in bearings 38. On the shaft 37 is a worm-wheel 75 39, which drives the gear-wheel 40 on the screw-shaft. The pinions of these sets of gearing are set loosely on the screw-shaft, and the shaft is provided with a clutch 27, which is movable to connect the shaft with either 80 set of gearing, and thereby to cause the shaft to be driven in either direction. It is obvious that when thus constructed motion of the screw-shaft in one direction will advance the moving frame of the machine and movement 85 of the shaft in the other direction will retract the same.

The coal-mining machine which I have described is one which has been heretofore known, and I do not intend to claim it specifically herein, but have described it merely 90 for the purpose of illustrating my improvement, which is applicable not only to this particular form of mining-machine, but to many other forms, and I do not, therefore, intend to 95 limit my claims to this particular machine, but intend to claim it generally and independently of the construction of the machine to which it may be applied.

The difficulty which my improvement is designed to remedy is the tendency of a machine 100 having chain cutters to vibrate laterally, and

thus often to move the machine so far as to jam the cutters and to oppose such resistance to the cutters as to stop the machine or break the cutters. To obviate this, I employ, in connection with a machine, a drill or boring shaft which advances with the cutters and which has a bearing on the moving frame of the machine, which bearing is of substantially the same diameter as the end of the drill or boring shaft, so that it shall enter the hole made thereby, and shall afford means for holding the machine-frame stationary and for preventing the lateral motion mentioned above.

Referring to the drawings, 28 represents the end of the drill, and 29 is the shaft by which it is driven. This shaft is journaled in bearings 30 and 31 on the moving frame 7, the front bearing 30 encircling the shaft and bearing of the same external diameter as the drill 28 at the end of the shaft. The shaft 29 is driven by gear-wheels 32 and 33 from the shaft 5, the gear-wheel 33 being connected with the shaft 5 by feather and spline or other sliding connection, so as to permit forward motion of the drill-shaft and of the other gear-wheels 32 with the moving frame of the machine.

When thus constructed, it is obvious that as the moving frame advances with the cutters the drill 28 and its shaft will also advance therewith and will bore a hole in the coal, and the entrance of the bearing 30 in this hole will effectually steady the moving frame of the machine and will prevent its lateral motion. To permit the drill-shaft to advance freely into the bore formed by the drill, the bearing 30 of this shaft is supported by a standard from the moving frame in such position that the base of the bearing shall be about on a level with the top of the kerf made by the cutters on the sprocket-chains. In order to permit the machine to be adjusted for the purpose of taking up slack in the sprocket-chains, I make the side bars 7 of the movable frame endwise adjustable relatively to the block or carriage 35, by which the gearings 15 and 16

are supported, and to admit of such adjustment the bearings 30 of the drill-shaft are secured to a plate 36 on the moving machine-frame by bolts 34, passing through longitudinal slots in said plate, as shown in Fig. 1.

The advantages of my improvement will be appreciated by those skilled in the art.

By use of my improvement I overcome the serious difficulty in the operation of machines of this class and increase the efficiency of the machine and render it more durable, and by use of the guiding-drill I am enabled to operate the machine even with one sprocket-chain instead of employing two sprocket-chains operated in opposite directions.

I claim—

1. In a coal-mining machine, the combination, with laterally-acting cutters and a forwardly-movable frame by which they are carried, of a drill-shaft 29, having bearings on said frame and having its end situate in proximity to the cutters, but in such position relatively thereto that the hole drilled thereby shall not be coincident in width with or be included by the cutter-kerf, whereby the drill-hole will communicate with the cutter-kerf and the bearing of the drill-shaft will enter the hole and will steady the machine, substantially as and for the purposes described.

2. In a coal-mining machine, the combination, with the cutters and a forwardly-movable cutter-frame, of a rotary drill which advances with the cutters and is so situate relatively thereto that the hole drilled thereby shall not be coincident in width with or included by the cutter-kerf, said drill having bearings of substantially the same diameter as the drill, whereby the bearings will enter the drill-hole and will steady the machine, substantially as and for the purposes described.

In testimony whereof I have hereunto set my hand this 26th day of October, A. D. 1889.

FRANCIS M. LECHNER.

Witnesses:

W. B. CORWIN,
THOMAS W. BAKEWELL.