(No Model.)

F. M. LECHNER.

MINING MACHINE.

No. 564,705. Patented July 28, 1896.

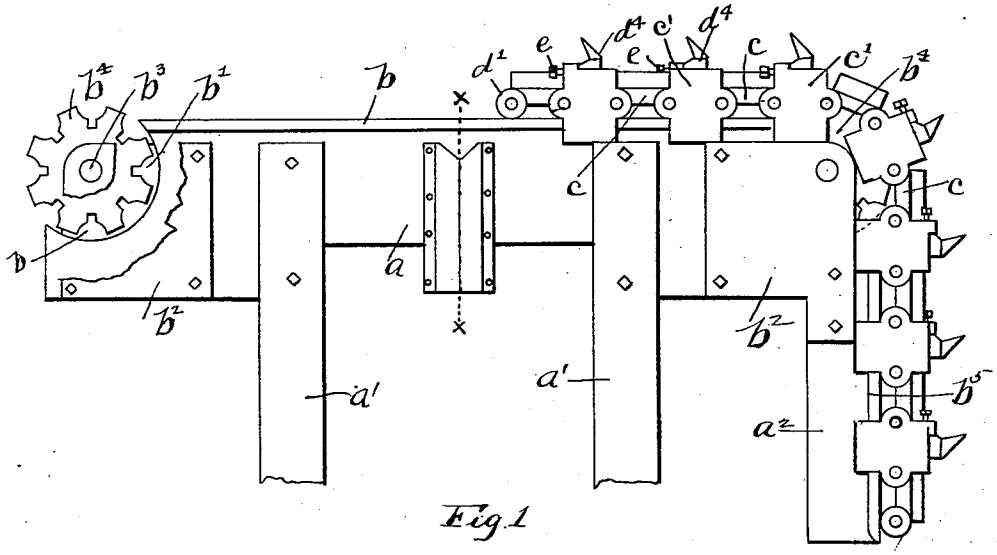

Fig. 1

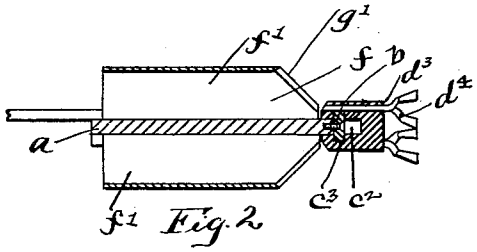

Fig. 2

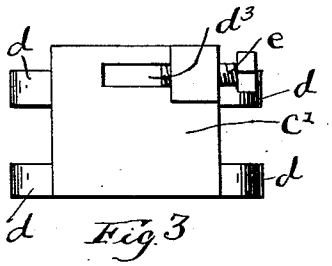

Fig. 3

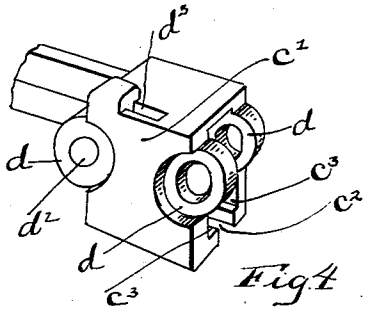

Fig. 4

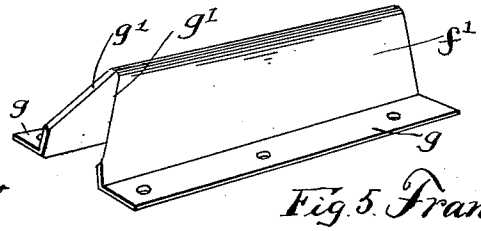

Fig. 5

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UNITED STATES PATENT OFFICE.

FRANCIS M. LECHNER, OF COLUMBUS, OHIO.

MINING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 564,705, dated July 28, 1896.

Application filed July 5, 1894. Serial No. 516,577. (No model.)

To all whom it may concern:

Be it known that I, FRANCIS M. LECHNER, a citizen of the United States, residing at Columbus, in the county of Franklin and State of Ohio, have invented a certain new and useful Improvement in Mining-Machines, of which the following is a specification.

My invention relates to the improvement of mining-machines of that class wherein is provided a stationary frame and a sliding frame thereon, the latter having an endless cutting-chain.

The objects of my invention are to provide the sliding frame with a holding device of superior construction, to provide the forward end of the sliding frame with an improved detachable guide, to provide an improved cutting-chain, and to produce other improvements in details of construction which will be more fully pointed out hereinafter. These objects I accomplish in the manner illustrated in the accompanying drawings, in which—

Figure 1 is a plan view of the forward end portion of the sliding frame of a mining-machine having my improvements thereon. Fig. 2 is a central longitudinal section on line $x\,x$ of Fig. 1 and enlarged therefrom. Fig. 3 is an outer side view of my improved chain tool-link. Fig. 4 is a perspective view of the same, showing a portion of one of the connecting-links joined thereto; and Fig. 5 is a detail view in perspective of the holding device.

Similar letters refer to similar parts throughout the several views.

Owing to the well-known general construction of the sliding frame and to the fact that my improvements relate only to the forward portion of said frame, I have, as indicated, shown in this application the forward portion of said frame only. Of this frame portion, a represents the transverse forward end plate, and a' the rearwardly-extending parallel frame-bars which are connected therewith. It will be observed that in the construction of the forward end portion of the sliding frame I employ a single end plate a instead of the usual double end plate or parallel plates. On the forward edge of the end plate a I secure by screws or otherwise a guide or track strip b of greater width than the thickness of the plate a, the upper and lower edges of which project above and below the plate a in the manner indicated and form a T-shaped track on which the cutting-chain travels. At the corners or junctions of the front and side edges of the plate a I form, as shown, a semi-circular cut or wheel-recess b', each of which is covered by two suitable cover-plates b^2, which are secured upon the upper and lower sides of the plate a, and the projecting portions of which serve, as shown, to form a journal-bearing for a short vertical shaft b^3, which carries a sprocket-wheel b^4 beneath the plate b^2. This sprocket-wheel, as shown, is adapted to be partially encircled by the recess b' in the plate corner.

As shown in the drawings, I provide the sliding frame-head on one side with a rearward-extending arm a^2, which is also provided on its outer side with a cleat or guide-strip b^5, which corresponds with the guide-strip b in form and arrangement.

In the construction of the cutting-chain which is adapted to run over the sprocket-wheels b^5 and along the front and sides of the sliding frame I employ the alternately-arranged connecting and tool links indicated, respectively, at c and c'.

As shown in the drawings, the tool-link c' has substantially the form of a block, which is provided with a central recess or channel c^2 on its inner side, and the inner walls of said channeled portion are adjacent to the rear sides of the block provided with oppositely-located grooves or guideways c^3, thereby forming a T-shaped recess adapted to receive, in the manner hereinafter described, the T-shaped tracks formed by the plate a, its arm a^2, and the upwardly and downwardly projecting edges or lips of the guide-strips b and b^5, on which said tool-links are adapted to slide. Each of the links c' is provided at each end with two parallel hinge-lugs d, having oppositely-located hinge-pin holes therethrough. In the construction of the connecting-links c I provide each of said links with end extensions d', which are adapted, in the usual manner, to be inserted between the projecting hinge-lugs d of the tool-link, with which they are jointedly connected by means of a hinge-pin d^2. Each of the tool-links c' has formed in its outer face, adjacent to its upper or lower edge, or both, an inwardly-extending tool-socket d^3, the latter being adapt-

ed to receive the shanks of suitable cutting-tools d^4. The shanks of these cutting-tools are adjustably held within said sockets by means of set-screws e, which are screwed into the ends of the tool-links.

f represents my improved holding device, which, as shown in the drawings, is formed in two sheet-metal sections f'. Each of these sections consists of a sheet-metal plate bent centrally throughout its length to form an angular or substantially V-shaped body in cross-section, the edges of which are bent outward to form lateral attaching-flanges g. The forward end of each of these sections is beveled, as shown, or inclined rearwardly, and the incline edges thus formed are sharpened or beveled, as indicated at g'. As shown in Figs. 1 and 2 of the drawings, these sections f' have their flanges g secured, respectively, to the upper and under sides of the central portion of the end plate a, said sections extending in the direction of the length of the lsiding frame and the forward ends thereof being arranged slightly in rear of the forward edge of the plate a.

As shown in Fig. 1 of the drawings, the links of the endless cutting-chain, which extend forwardly from the rear portion of the sliding frame on which said chain is mounted, extend along the outer side of the frame-arm a^2, the recesses c^2 of the tool-links being made to receive the projecting edges of the side guide-strips or cleats b^5, said guide-strips thus forming a guide for the links of the chain. Leaving the side guide-strips said chain-links pass in the usual manner over the sprocket-wheels b^4, thence extend across the forward end of the machine, the grooves c^3 of the links engaging with the projecting edges of the forward guide-strip b. Owing to the engagement as described of these guide-strips and tool-link grooves it is obvious that said strips will serve to guide the chain and retain the links in the proper alinement, thus obviating any irregularity or wabbling motion of the links.

Heretofore it has been common to employ the sliding-frame end plates as guides for the cutting-chain links, and the wear to which said end plates was thus subjected was found to be considerable. By the employment of the strips b and b^5, it will be seen that should the same become worn through frictional contact with the links said strips may be readily removed and new ones substituted therefor with but slight labor and expense. It will also be observed that the employment of said strips obviates the necessity of employing a double end plate or two parallel plates between which the links are ordinarily guided.

As the sliding frame is advanced into the kerf produced by the usual traveling action of the cutting-tools, it will be seen that the forward and inclined ends of the holder sections or gouges f' will come into contact with and be gradually forced into the coal wall, thereby forming angular incisions immediately above and below and communicating with the main kerf. The engagement thus produced of the holding-sections with the coal must result, as will readily be seen, in preventing any tendency of the machine to move laterally, which, as is well known, occurs from the resistance which the coal offers to the cutting-tools. Owing to the incline of the forward end edges of the holder-sections, it will be seen that the holding-kerf will be formed gradually, thus necessitating less power in forcing said sections into the coal. It will also be observed that owing to the angular form of said holding-sections the cuttings may pass backward through the channels or conduits formed between said sections and the plate a.

Having now fully described my invention, what I claim, and desire to secure by Letters Patent, is—

1. In a mining-machine, the combination with the single end plate of a sliding frame, of a guide-strip of greater width than the thickness of the plate removably secured to the edge of said plate to form a T-shaped track, and a traveling endless cutting-chain having T-shaped grooves formed in some of its links in which grooves the T-shaped track is received, substantially as and for the purpose specified.

2. In a mining-machine, the combination with the forward end plate of the sliding frame and an endless cutting-chain supported on said end plate to cut a kerf in advance thereof, of a V-shaped gouge and holding-plate secured on the said end plate in the rear of its forward edge, said gouge as it advances cutting a V-shaped groove communicating with the kerf made by the endless chain, which groove forms a bearing for the said gouge to prevent lateral movement of the sliding frame, substantially as described.

FRANCIS M. LECHNER.

In presence of—
C. C. SHEPHERD,
A. L. PHELPS.