

(No Model.)

F. M. LECHNER.  
MINING MACHINE.

No. 526,451.

Patented Sept. 25, 1894.

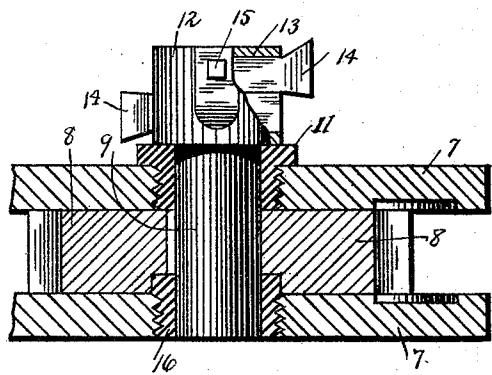
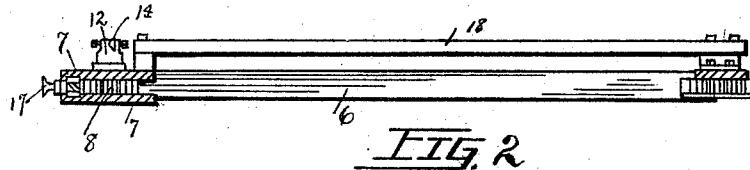
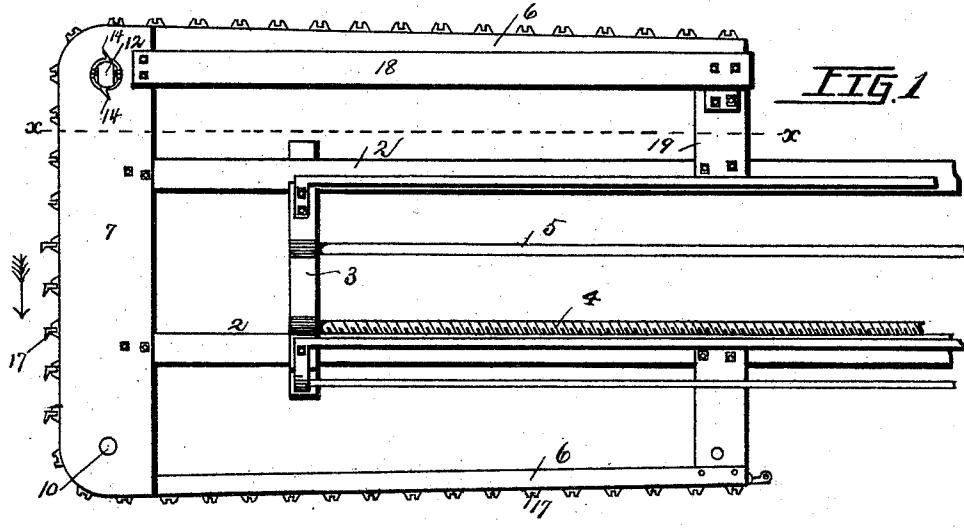
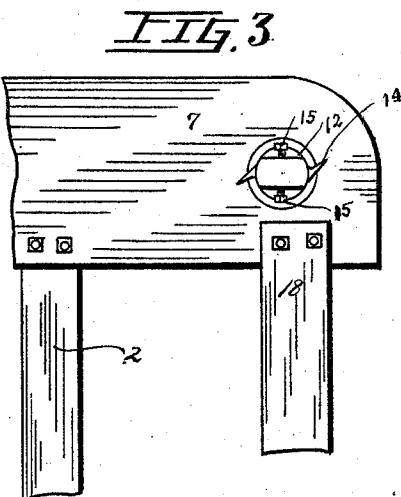


FIG. 4



Witnesses  
H. B. Bradshaw  
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By his Attorney

Inventor  
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# UNITED STATES PATENT OFFICE.

FRANCIS M. LECHNER, OF COLUMBUS, OHIO.

## MINING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 526,451, dated September 25, 1894.

Application filed February 25, 1892. Serial No. 422,735. (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 5 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 machines for mining coal and other minerals 10 and the objects of my invention are, to so construct a machine of this class as to greatly reduce the expense of manufacture and complication of construction; to obviate the necessity of employing a rotating auger and thus 15 dispense with the mechanism for driving and supporting the same; to provide improved means for producing an engagement of the machine with the coal wall which will operate to prevent lateral movement or displacement 20 of the machine during the cutting action, and to produce other improvements which will be more specifically pointed out hereinafter. These objects I accomplish in the manner illustrated in the accompanying drawings, 25 in which—

Figure 1 is a plan view of the forward portion of a mining machine having my improvements thereon. Fig. 2 is a sectional view on line  $\alpha\alpha$  of Fig. 1. Fig. 3 is an enlarged plan 30 view of that portion of the forward end of a machine which carries the cutter head and Fig. 4 is an enlarged central sectional view in detail through one of the sprocket wheels showing my improved rotary cutter therein, 35 partly in section and partly in elevation.

Like numerals indicate like parts throughout the several views.

2 represents the sliding frame of a machine and 3 the stationary frame thereof, which may 40 be arranged in the usual manner.

4 represents the usual screw feed-shaft and 5 the power shaft which may be operated in any well-known manner.

6 represents the side bars or arms of a sliding frame and 7 the guide-plates which are 45 arranged one above the other in the usual manner at the head of the sliding frame.

As is usual in this class of machines, a sprocket wheel 8 is supported in a position 50 for rotation between the ends of the plates 7. These sprocket wheels 8 are carried upon vertical shafts 9 and 10. The shaft 9 is extended

upward through the upper plate 7, while its lower end portion passes through the lower plate 7 and is preferably flush with the under side thereof. A boxing or bushing for the upper portion of said shaft 9 is formed as shown in the drawings, by screwing into a threaded perforation of the upper plate 7, a short screw-threaded stem of a T-shaped boxing piece 11, the upper flanged head of which forms a shoulder which bears upon the upper side of the upper plate 7. The bore or central-opening of the boxing piece 11 is of a size to provide a suitable rotating bearing for the 65 shaft which passes therethrough.

Upon the upper end of the shaft 9 immediately above the boxing 11 is secured or formed an enlarged cutter-head, indicated at 12, the body of said head being provided at suitable 70 points in its periphery with one or more sockets 13 into which are adapted to be inserted, the shanks of suitable cutting tools 14, the cutting heads of which project as shown, beyond the periphery of said cutter head. These 75 tools are adapted to be held in place by means of suitable set-screws 15 which extend into the head 12 and thus come into contact with the shanks of the tools 14.

A suitable form of boxing collar 16 is employed to surround the lower bearing portion of the shaft 9, said bearing collar having a threaded periphery which engages with the internal threads of the enlarged shaft opening in the bottom plate 7. The ends of the 85 remaining shaft 9 at the opposite side of the machine are provided with suitable bearings in the plates 7 with the outer surfaces of which the ends of said shaft 10 are flush.

Although any desired or suitable form of 90 sprocket wheels and chain may be used in connection with my improvements, I preferably employ the form of sprocket or pocket wheels and chain shown in my former application for Letters Patent, Serial No. 421,977, 95 dated February 18, 1892.

About the sprocket or pocket wheels 8, runs a cutting chain 17, the cutting tools of which project in the usual manner in front of the guide plates 7. From the sprocket 100 wheels 8 said cutting chain is carried to the rear of the machine where motion is imparted thereto in the usual manner.

18 represents my improved retaining bar,

said bar extending in the direction of the length of the machine and having its forward end supported from and above a suitable cross-piece 19 of the sliding frame.

5 As shown in the drawings, the bar 18 is supported substantially at the height of the cutter head which it precedes and the outer side of the bar is in alignment with the outer side of the circle described by the outer ends 10 of the cutting tools 14, when the cutter head is rotated as hereinafter described. The circle described by these cutting tools 14 preferably projects however, slightly beyond the inner side of said bar 18, as shown in the 15 drawings.

As shown in the drawings, the shaft 9 which carries the cutter head is located on that side of the machine which is opposite the direction in which the forward portion of 20 the cutting chain travels.

The operation herein described of my improved machine and the advantages gained thereby, are as follows: As is usual in this class of machines, the forward portion of the cutting 25 chain travels in the direction of the face of the coal wall (as indicated by the arrow in Fig. 1) the engagement with the cutting tools of the chain with the coal serving to cut the desired kerf therein. As the sliding frame is fed forward in the usual manner, it will be observed that the projecting tools of the rotating cutter head 12 will form an additional kerf or cut immediately above that formed by the cutting chain, and that the entrance of said cutter head within the coal wall will be directly followed by the entrance of the bar 18. The relative positions hereinbefore described of 30 said bar and cutter head are such as to afford the outer side of the latter a bearing within 40 the cut produced by the rotating cutters in the direction opposite that in which the forward portion of the cutting chain is traveling. This bearing of the bar 18 will afford an effective resistance against any lateral 45 movement or displacement of the sliding frame of the machine which otherwise results

from the resistance offered by the coal to the cutting tools of the chain. It will also be observed that the cut produced by the cutter head is of such size as to permit of the cuttings produced thereby being forced outward past the inner side of the bar 18. From this construction and operation, it will readily be seen that said retaining bar serves to firmly lock the sliding frame against lateral movement in the direction of the strain or side thrust of the machine, and that said rotating cutter head gradually forms a way or plate for said bar as the sliding frame is fed forward.

It will be observed that this construction 60 and operation obviates the necessity of employing the usual rotating auger or chisel and the means and mechanism for supporting and operating the latter.

Having now fully described my invention, 65 what I claim, and desire to secure by Letters Patent, is—

1. In a mining machine, the combination with a stationary and sliding frame, guide-plates and sprocket wheel carrying shafts 70 therein, a cutter head on one of said shafts having one or more cutting tools projecting therefrom, of a retaining bar arranged in rear of said cutter head and adapted to enter the cut formed by the latter, substantially as and 75 for the purpose specified.

2. In a mining machine, the combination with the stationary and sliding frame, the forward guide-plates and sprocket wheel carrying shafts therein, and a cutter head on one of said shafts adapted to rotate therewith, of a retaining bar supported as described in rear of said cutter head and having one of its sides in alignment with one side of the circle described by the tools of 80 said cutter head and being of a less width than the diameter of said circle, substantially 85 as and for the purpose specified.

FRANCIS M. LECHNER.

In presence of—

C. C. SHEPHERD,  
THOS. S. GATES.