

(No Model.)

2 Sheets—Sheet 1.

L. W. LE GRAND.
MINING MACHINE.

No. 541,171.

Patented June 18, 1895.

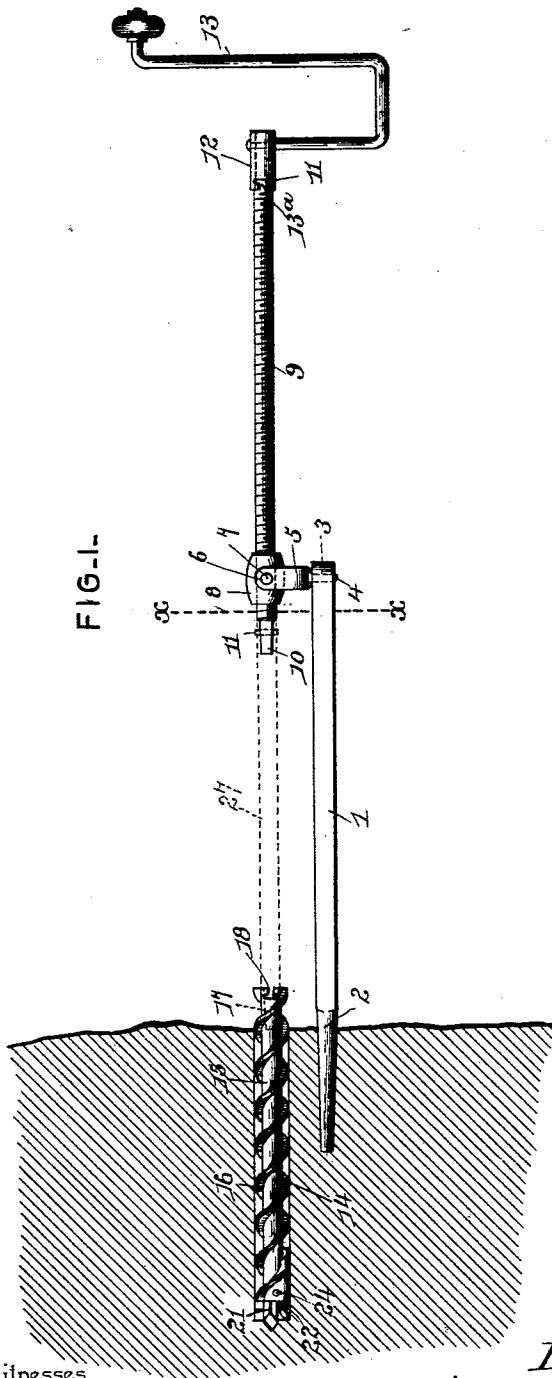


FIG. 1.

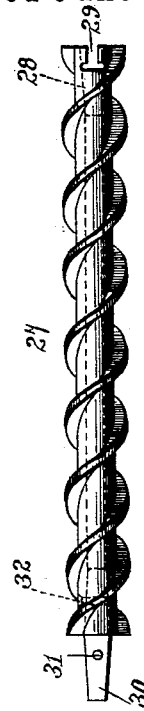


FIG. 3.

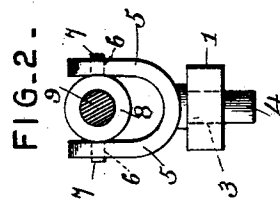


FIG. 2.

Inventor

Lewis W. Le Grand

By his Attorneys.

Witnesses

Jas. H. McEachern
D. P. McEachern

C. Snow & Co

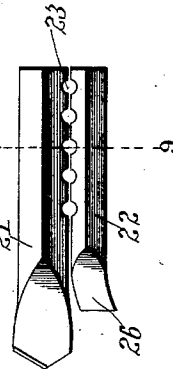
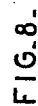
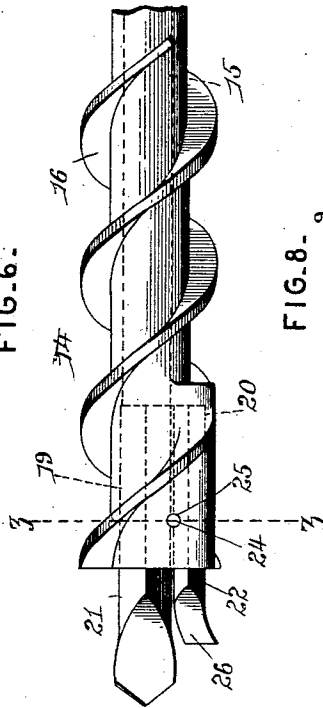
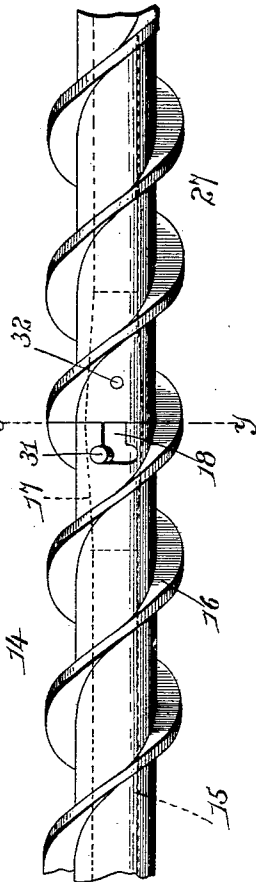
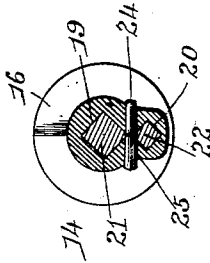
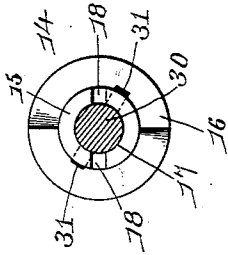
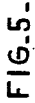
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2 Sheets—Sheet 2.

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Ingvénlör

Witnesses

Jas. K. McCathran
S. R. McLaughlin,

By His Attorneys.

Lewis W. Le Grand

C. Snow & Co.

UNITED STATES PATENT OFFICE.

LEWIS W. LE GRAND, OF WILKES-BARRÉ, PENNSYLVANIA.

MINING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 541,171, dated June 18, 1895.

Application filed June 4, 1894. Serial No. 513,431. (No model.)

To all whom it may concern:

Be it known that I, LEWIS W. LE GRAND, a citizen of the United States, residing at Wilkes-Barré, in the county of Luzerne and State of Pennsylvania, have invented a new and useful Mining-Machine, of which the following is a specification.

This invention relates to mining machines; and it has for its object to effect certain improvements in machines of that class that are employed for drilling holes in coal or rock preparatory to blasting, whereby the efficiency of such machines shall be greatly increased.

To this end the main and primary object of the present invention is to so construct a mining or drilling machine with the several constituent parts thereof so arranged and connected as to render the machine quickly and easily manipulated, while at the same time insuring an efficient operation for rapidly drilling or boring the hole in the rock or coal.

With these and other objects in view, which will readily appear as the nature of the invention is better understood, the same consists in the novel construction, combination, and arrangement of parts hereinafter more fully described, illustrated, and claimed.

In the accompanying drawings, Figure 1 is a side elevation of a mining-machine constructed in accordance with this invention as set up for operation. Fig. 2 is a detail sectional view on the line *x x* of Fig. 1. Fig. 3 is a detail elevation of one of the extension auger-sections. Fig. 4 is an enlarged detail elevation showing clearly the detachable connection between the auger-sections. Fig. 5 is a detail sectional view on the line *y y* of Fig. 4. Fig. 6 is an enlarged detail elevation of one end of the first or advance auger-section provided with the tool-sockets. Fig. 7 is a detail sectional view on the line *z z* of Fig. 6. Fig. 8 is a detail elevation of the pair of cutters. Fig. 9 is a detail sectional view on the line 9 9 of Fig. 8.

Referring to the accompanying drawings, 1 designates a squared or other suitable shaped fastening bar tapered at one end as at 2, for insertion into a previously drilled hole in the rock or coal to provide for the support of the machine, and said fastening bar is provided at its opposite end with a spindle open-

ing 3, adapted to loosely accommodate therein the pivot spindle 4, of the supporting yoke 5. The supporting yoke 5, is provided with the ordinary bearing openings 6, that pivotally receive the opposite trunnions 7, of the feed nut 8, which is thus supported for a swiveled movement on the fastening bar 1, and accommodates therein the feed screw 9. The feed screw 9, is provided at both ends thereof with the tapered connecting plugs or tenons 10, through which are transversely passed the lock-pins 11, projecting beyond opposite sides of said plugs or tenons.

The tapered connecting plug or tenon at one end of the feed screw 9, is adapted to detachably receive the tapered attaching socket 12, at one end of the crank turning handle 13, that simulates in appearance an ordinary brace handle and provides means for revolving or turning the screw through its nut in order to feed the drill into the rock. The attaching socket 12, of the handle 13, is interiorly tapered to correspond with the taper of the plug or tenon on which it is fitted, and at its flared end the socket 12, is provided at diametrically opposite sides with the T-shaped slots 13^a, which are adapted to be passed over the projecting end of one of the lock pins 11 and engaged therewith by a turning of the crank handle, whereby the same is securely connected with the feed screw and prevented from becoming detached therefrom during the operation of the machine. The said T-shaped slots 13^a, are so disposed that the cross-slots which extend to both sides of the other slots at one end thereof are disposed transversely of the socket 12, so that a turning of the socket after having been placed on the plug or tenon will engage the lock pin at either side of the longitudinally disposed portions of said T-shaped slots.

The tapered connecting plug or tenon 10, at the end of the feed screw 9, opposite the handle is adapted to have detachably connected therewith one end of the main or advance auger section 14, when the machine is first started to commence the hole in the rock or coal. The drill auger 14, consists of a hollow or tubular body 15, and a double worm or screw flange 16, spirally arranged on the exterior of such body to provide for relieving the hole being drilled of the cuttings, and to

maintain a clear passage for such cuttings in order that the hole may be quickly and properly drilled, and while securing this important function the hollow or tubular body of the auger renders the same much lighter than those ordinarily employed and therefore provides an auger more easily manipulated.

While the drill auger 14, is preferably provided with a double worm or screw flange 16, such flange may be a single continuous flange if desired, and at one end the said drill auger is provided with a tapered attaching socket 17, corresponding to the handle socket, and at diametrically opposite sides of the flared end of said socket with the T-shaped slots 18, that are adapted to be engaged with the lock pin at the end of the feed screw 9, opposite the end to which the socket of the turning handle is attached, and by reason of detachably connecting the handle socket and the socket at one end of the drill auger to the opposite ends of the feed screw in the manner described, the machine can be quickly adjusted and handled while at the same time providing a connection which renders it impossible for the parts to become disconnected during operation of the machine.

The main or advance auger drill section 14, is provided at the end opposite its attaching socket 17, with the separate angular tool sockets 19 and 20, respectively, the socket 19, being arranged in a line with the center of the auger and the socket 20, being disposed eccentric to the longitudinal center of the auger and of a smaller size than the central socket 19. The sockets 19 and 20 are similar in cross section and are adapted to adjustably and detachably receive therein the center and side cutting bits 21 and 22 respectively. The bits 21 and 22 are correspondingly shaped to the sockets in which they are fitted and are arranged in said sockets with one corner or angle thereof adjacently disposed, and in such adjacently disposed corners or angles, the said cutting bits 21 and 22 are provided with the semicircular notches 23, which are adapted to register with each other to form circular adjustment holes for the reception of the fastening pin 24, that is passed transversely through a pin opening 25, formed in the drill auger 14, at a point between the sockets 19 and 20, in order that the pin 24, may engage the registering notches thereof. By reason of fastening the cutting bits in the tool sockets at one end of the auger in the manner described the same are held firmly in position for operating upon the rock or coal, while at the same time being capable of an adjustment outward in order to compensate for wear. The central cutting bit 21, is of an ordinary configuration and the eccentric or side bit 22, that describes a circle of movement, to bore out the hole, is provided with a laterally curved cutting edge 26, that insures a perfect rounding out of the hole.

After the main or advance auger section 14,

has been carried into the rock or coal as far as the length thereof the feed screw 9, is disconnected therefrom by disengaging the lock-pin from the T-shaped slot in the socket end, and such feed screw is reversed in the ordinary manner to admit of the attachment of an extension auger section 27. The extension auger section 27, is of identically the same construction as the advance auger section 14 and is provided at one end with the tapered attached socket 28, and the diametrically opposite T-shaped slots 29, corresponding to the sockets 17 and the slots 18 of the advance auger section that has already been carried into the rock or coal. The extension auger section 27, is connected with the end of the feed screw nearest the nut in the manner already described, and is provided at the end opposite its socket with the tapered connecting plug or tenon 30, through which is transversely passed the lock pin 31, projecting from both sides of the said plug or tenon and adapted to be engaged with the T-shaped slot 18, of the advance auger section in the same manner that the socket end of the extension auger section is engaged with the connecting plug and lock-pin at one end of the feed screw. The connecting plug or tenon 30, may be either cast solid with the extension auger section or formed separately to be driven into one end thereof and secured permanently therein by a transverse rivet 32, as illustrated in the drawings. After the extension auger section is connected with the feed screw and the advance auger section by the connections described, the drilling is proceeded with until it is necessary to connect another extension section onto the machine, and it will of course be understood that as many extension auger sections may be used as is necessary for the particular work being done.

From the above it is thought that the construction, operation and many advantages of the herein-described mining machine will be apparent to those skilled in the art, and it will be understood that changes in the form, proportion and the minor details of construction may be resorted to without departing from the principle or sacrificing any of the advantages of this invention.

Having thus described the invention, what is claimed, and desired to be secured by Letters Patent, is—

1. In a mining machine, the combination of a reversible feed screw provided at each end with a tapered connecting plug or tenon and a lock-pin projecting from opposite sides of said plug or tenon, the handle having a tapered socket adapted to fit the plug or tenon at either end of the screw and diametrically opposite T-shaped slots to detachably engage the lock-pin, and the drill auger sections provided at one end with tapered sockets and diametrically opposite T-shaped slots, the intermediate of such auger sections being further provided at one end with a tapered

plug or tenon and a lock-pin projecting from both sides thereof, substantially as set forth.

2. In a mining machine, the combination with the feed screw and the support for the same; of the drill auger provided at one end with a central and eccentric angular tool socket and a transverse pin opening located between the sockets, the central and side angular cutting bits fitted in their respective sockets and provided in their adjacent angle edges with a series of registering notches, and a fastening pin passed transversely through

said pin openings and adjustably engaging with the registering notches of the bits, said side bit being provided with a laterally curved cutting edge substantially as set forth. 15

In testimony that I claim the foregoing as my own I have hereto affixed my signature in the presence of two witnesses.

LEWIS W. LE GRAND.

Witnesses:

A. L. LE GRAND,
J. A. WOOD.