

(No Model.)

2 Sheets—Sheet 1.

J. JOPLING.
DRILLING MACHINE.

No. 513,937.

Patented Jan. 30, 1894.

Fig. 1.

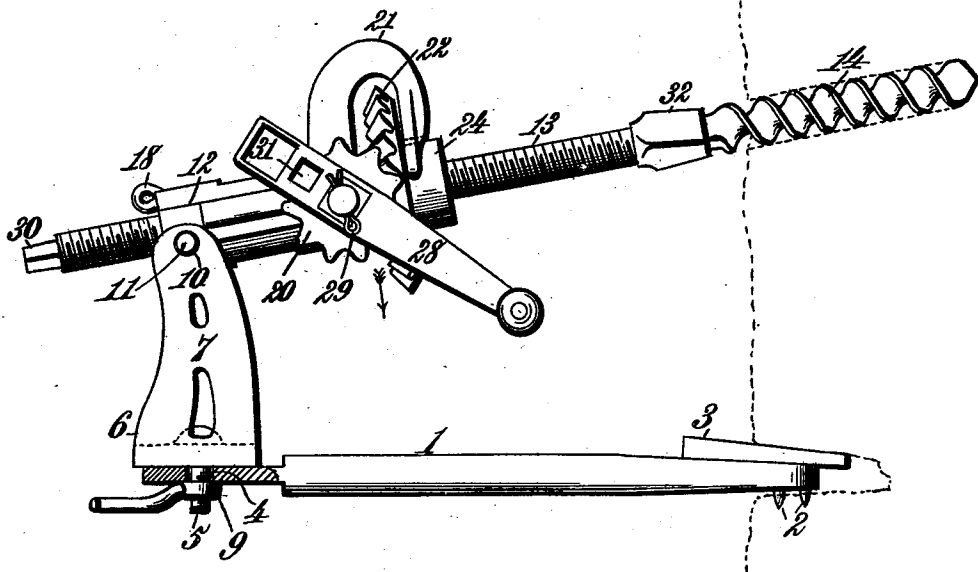
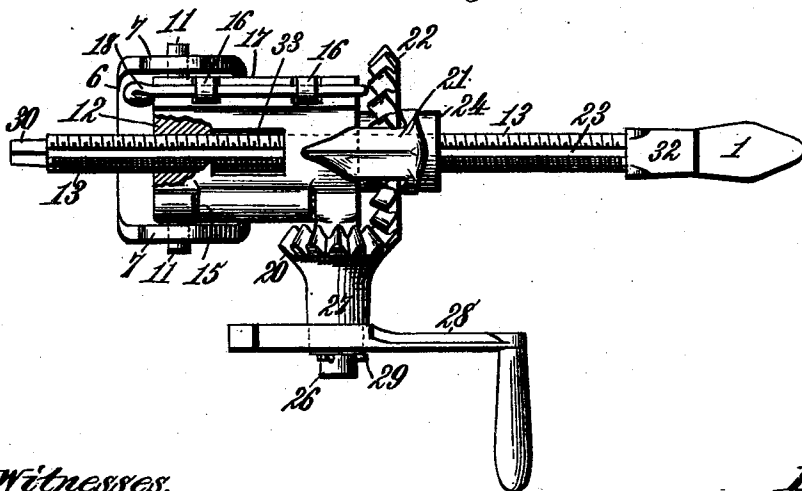


Fig. 2.



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2 Sheets—Sheet 2.

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Fig. 3.

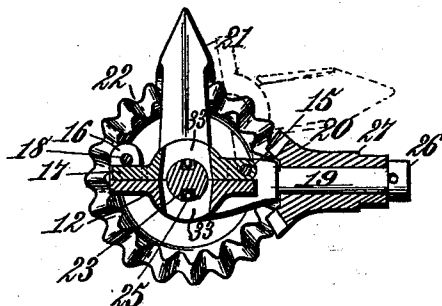


Fig. 5.

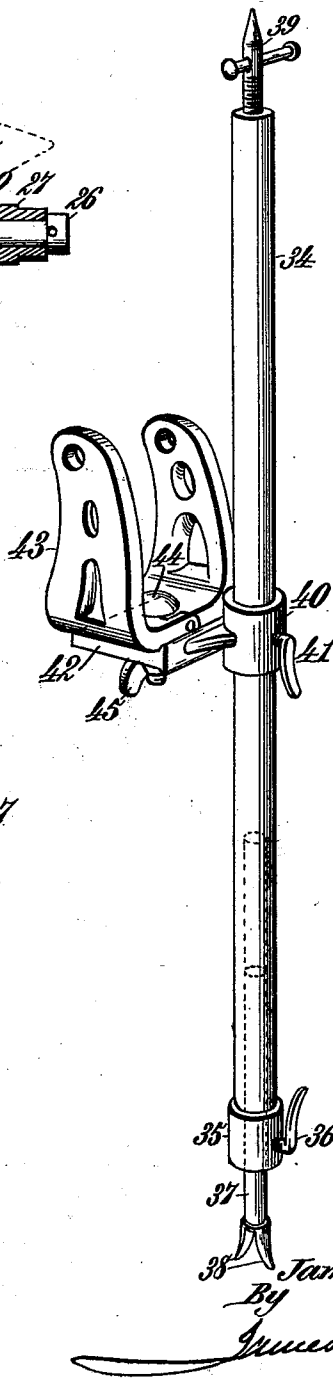
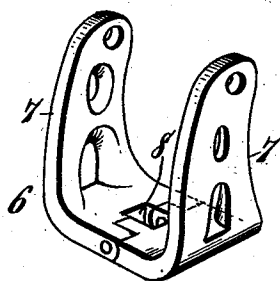


Fig. 4.



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UNITED STATES PATENT OFFICE.

JAMES JOPLING, OF WHAT CHEER, IOWA, ASSIGNOR TO THE AMERICAN MINING TOOL COMPANY, OF SAME PLACE.

DRILLING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 513,937, dated January 30, 1894.

Application filed March 2, 1893. Serial No. 464,447. (No model.)

To all whom it may concern:

Be it known that I, JAMES JOPLING, a citizen of the United States, residing at What Cheer, in the county of Keokuk and State of Iowa, have invented new and useful Improvements in Drilling-Machines, of which the following is a specification.

This invention relates to that type of machines for drilling rock, coal, and the like, wherein a tool-carrying screw shaft engages threads on the interior of a sectional hinged boxing, and is provided with a bevel gear through which said shaft moves longitudinally when the gear is rotated by a bevel pinion journaled on a part of the hinged boxing and rotated by a crank handle.

The objects of my invention are to improve the prior construction and construct a drilling machine of the character alluded to, which is light, compact, simple, durable, economical and efficient; to provide novel means for holding the bevel gear to its proper working position; to provide novel means for preventing the upper section of the hinged boxing from falling back while removing or adjusting the screw shaft; and to provide novel means for supporting and adjusting the hinged boxing to vary the working position of the drill bit or tool.

To accomplish all these objects my invention involves the features of construction and the combination or arrangement of devices hereinafter described and claimed, reference being made to the accompanying drawings, in which—

Figure 1 is a side elevation, partly in section, of a drilling machine constructed in accordance with my invention. Fig. 2 is a plan view of the same, partly in section. Fig. 3 is a transverse sectional view, taken through the hinged boxing. Fig. 4 is a detail view of the folding support or bracket for the hinged boxing; and Fig. 5 is a detail perspective view of a modified construction hereinafter explained.

In order to enable those skilled in the art to make and use my invention, I will now describe the same in detail, referring to the drawings, wherein the numeral 1 designates a grip bar which is provided on its under side at one end with a number of teeth 2 by which

said bar can be held in a hole cut to a depth of about six inches in a wall of coal or rock. After the toothed end of the grip-bar has been inserted in such hole a wedge block 3 may be driven into the hole above and in close contact with the upper side of the grip-bar so as to force the teeth 2 into the rock or coal and hold the bar securely.

In the outer end of the grip-bar 1 is a vertical hole 4 to permit the passage of a screw bolt 5 by means of which a hinged or folding bracket 6 is attached to the upper side of the horizontally projecting bar. The hinged or folding bracket 6 consists of two corresponding angular pieces comprising two vertically projecting arms 7 having their lower ends bent horizontally toward each other, pivotally attached together by a pivot or hinge and resting against a supporting part of the grip-bar. In the center of the bracket is formed an opening 8 for passage of the screw bolt 5 by which said hinged or folding bracket is attached to the grip-bar. By means of a hand nut 9 placed on the lower portion of the screw bolt 5 and turned up against the under side of the grip-bar 1, the bracket 6 will be securely held in place in such a manner that it may be swung circularly or adjusted laterally to any desired angle by simply loosening the hand nut.

In the ends of the bracket arms 7 are apertures 10 that serve as bearings for reception of trunnions 11 on the opposite sides of an internally-threaded boxing 12 that supports the screw shaft 13 to which the drill or bit 14 is attached. The internally-threaded boxing 12 constitutes a divided nut for the screw shaft 13 and comprises upper and lower hinged sections provided with lateral flanges constructed to form on one side of the boxing a hinged joint 15 and on the other side a series of interlocking lugs 16 and 17; the lugs 16 on one half or section of the boxing being provided with perforations to receive a locking pin 18 by which the two parts of the boxing are secured when closed onto the screw shaft. The trunnions 11 are preferably located on the lower section of the boxing 12, near one end. This lower section of the boxing 12 has at its other end, on one side, a laterally projecting spindle or stationary shaft

19 on which a bevel pinion 20 is loosely mounted.

On one end of the upper half of the boxing 12, adjacent to the bevel pinion 20, is an inverted U-shaped horn 21, which is adapted and arranged to overhang a bevel gear 22 that is mounted on the screw shaft 13 in such a manner as to permit the shaft to have both a rotary and a longitudinal movement. The screw shaft 13 is provided with oppositely arranged longitudinal grooves 23, and the bevel-gear 22 has an elongated hub 24 in which are formed keys 25 that fit loosely in said grooves so as to permit a longitudinal movement of the screw shaft resulting from its rotation within the internally threaded boxing. The bevel gear 22 is arranged to mesh with the bevel pinion 20 and is held in place by the overhanging horn 21 which has its outer end concaved to correspond with and rest against the periphery of the gear hub 24. The bevel pinion 20 is held in place by a collar 26 on the end of the spindle 19 and is provided with an elongated hub 27 that is squared at its end for attachment of a crank 28 which is held thereon by a split pin or key 29 passed through an opening in the spindle collar. It is obvious that when the crank 28 is turned the screw shaft 13 will be rotated within the divided nut formed by the internally-threaded boxing 12, and be thus carried either forward or backward according to the direction in which the crank is operated. The screw shaft may also be rotated by attaching the crank to the rear squared end 30 of said shaft. The crank 28 is provided with a series of square openings 31 of suitable size to fit either the screw shaft or the hub of the bevel pinion 20, as may be required.

To the forward end of the screw shaft 13 is attached a socket 32 in which the drill or bit 14 is carried.

It will be seen that the trunnions 11 of the divided boxing 12 will permit said boxing to be swung upward or downward as may be required in order to bring the screw shaft 13 and attached drill 14 into the required position, while by loosening the hand nut 9 the bracket 6 in which the boxing 12 is trunnioned can be swung circularly or laterally to any desired inclination with reference to the supporting grip bar. It is therefore obvious that the drill can be readily and quickly adjusted to any required position according to the direction in which it is to be operated.

For the purpose of imparting lightness to the screw shaft boxing 12 it may be partly cut away in the center at top and bottom to form holes 33 which will also serve to admit the introduction of a lubricant and permit any dirt to drop away from the screw shaft.

When it is not practicable to employ the horizontally-supported grip bar 1 a single post or vertical support 34 may be substituted. This post 34 may be partly or wholly tubular or be made of gas pipe. At one end it is provided with a reducing coupling 35

perforated for insertion of a set screw 36 to hold a sliding bar 37 which projects from the post and is provided with prongs 38 adapted to be driven into the ground or into a floor or other support. The other end of the post 34 is provided with an adjusting screw 39 having a conical, pointed or sharpened end that may be engaged in a roof or other overhead support to assist in holding the post rigid.

On the post 34 is mounted a support composed of a vertically-adjustable sleeve or yoke 40 provided with a set-screw 41 by which it can be secured at any required elevation, and having a table 42, formed integral therewith and projecting horizontally therefrom.

On the table 42 is supported a hinged or folding bracket 43 similar in all respects to the folding bracket 6 hereinbefore described and secured to said table by means of a screw bolt 44 and hand nut 45 so arranged that by loosening the said hand nut the hinged arms of the bracket can be spread apart to receive the trunnions 11 of the divided nut or boxing 12 in which the drill-carrying screw shaft is mounted and operated, as already explained. It will be seen that by loosening the set screw 41 of the sleeve or yoke 40, the latter can be rotated on the post 34 or be raised or lowered thereon so as to give any desired inclination or elevation to the folding bracket in which the drill-operating mechanism is supported.

The manner of mounting and operating the drill carrying screw shaft permits a ready adjustment of the drill or cutting bit to any required position and enables it to perform its required work with accuracy and ease and without subjecting the apparatus to undue wear. By constructing the overhanging horn 21 with a concaved end resting on the hub 24, the bevel gear 22 is held to its working position and prevented from any tendency to rise or lift up, and as the small pinion meshes with the inner side of the bevel-gear at a point near the trunnions of boxing, strain on the screw shaft is reduced and the several parts co-operate to equalize the strain or twist caused by operating the crank. The overhanging horn is also utilized as a balance weight to hold the upper section of the hinged boxing from falling back while removing or adjusting the screw shaft. This will be clearly understood by reference to Fig. 3, where the upper half of the boxing is shown closed in full lines, and open in dotted lines. In the absence of the horn 21, if the boxing were opened and screw-shaft 13 removed, the lower half of the boxing would swing on its trunnions 11, and fall downward in the direction of the arrow, Fig. 1, and the momentum would cause the upper half of the boxing to swing back into its closed position; but by providing the horn 21, when the upper half of the boxing is open, as in dotted lines, Fig. 3, and the screw-shaft 13 is removed, the horn will lie over the pinion 20, and a counterbalancing weight will thus be thrown to the right hand side of pivot 15, Fig. 3, in such manner that the lower half of the boxing will

be sustained, and the upper half will remain open, as in dotted lines, Fig. 3.

My invention provides a drilling machine which is light, simple, durable, and easily operated; and which is so constructed as to bore straight holes as the crank power is close to the center of resistance, which prevents the side or back pressure caused by operating the crank from pulling the machine laterally toward that side where the power is applied.

Having thus described my invention, what I claim is—

1. In a drilling machine, the combination with the drill-carrying screw shaft, of an internally threaded boxing composed of upper and lower hinged sections, provided with trunnions and adapted to receive the screw shaft, the upper section of the boxing having the overhanging horn 21 which constitutes a balance weight to hold the said boxing open, substantially as described.

2. In a drilling machine, the combination with the drill-carrying screw shaft, of an internally-threaded boxing composed of two sections connected by a hinge joint on one side, and provided with a lock or fastening on the other side, the upper section of the boxing having the overhanging horn 21 which constitutes a balance weight to hold said boxing open, substantially as described.

3. In a drilling machine, the combination with the drill-carrying screw shaft provided with longitudinal grooves, of an internally-threaded boxing composed of upper and lower hinged sections, and provided at one end with a laterally-projecting spindle having a collar on its outer end, the upper section of the boxing having the overhanging horn 21 which constitutes a balance weight to hold said boxing open, a bevel gear wheel mounted on the screw shaft and having an elongated hub provided with keys that engage in the longitudinal grooves of said shaft, a bevel pinion mounted on the spindle of the boxing in mesh with said bevel gear and provided with an elongated hub, and a crank attached to the hub of said pinion, substantially as described.

4. In a drilling machine, the combination with the drill-carrying screw shaft, of an internally-threaded boxing adapted to receive

the screw shaft and having at one end an overhanging horn or housing, a bevel gear mounted on the screw shaft and held in place thereon by said horn, a bevel pinion mounted on boxing in mesh with said bevel gear, and a crank for actuating the pinion, substantially as described.

5. In a drilling machine, the combination with a grip-bar, a drill-carrying screw, and an internally threaded boxing adapted to receive the screw shaft, and provided with trunnions, of a folding supporting bracket, composed of two arms 7 having their lower ends bent horizontally toward each other, pivotally attached together, and resting against a part of the grip bar, and a bolt passing through and adjustably connecting the pivotally-attached ends of the bracket arms to said part of the grip-bar, substantially as described.

6. In a drilling machine, the combination with a grip-bar having a bracket support, a drill-carrying screw-shaft, and an internally-threaded boxing adapted to receive the screw shaft, and provided with trunnions, of a folding supporting bracket composed of two arms having their lower ends bent horizontally toward each other, pivotally attached together, and resting upon the bracket support of the grip-bar, a bolt passing through the pivoted parts of the bracket arms, and through the bracket support of the grip-bar, and a nut engaging the bolt beneath said bracket support of the grip-bar, substantially as described.

7. The combination with a cylindrical grip-bar, of a bracket-support adjustable circularly on and longitudinally along the length thereof, a bifurcated hinged folding bracket arranged on the bracket-support, a bolt passing through the hinged folding bracket and the bracket-support, a nut engaging the bolt, a threaded boxing having trunnions engaging the hinged folding bracket, and a drill-carrying screw-shaft engaging the boxing, substantially as described.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

JAMES JOPLING.

Witnesses:

FRED FUNK,
H. J. BENSON.