No. 786,137. PATENTED MAR. 28, 1905.

E. MOSER.

DRILL BIT.

APPLICATION FILED NOV. 17, 1904.

2 SHEETS—SHEET 1.

Fig 1.

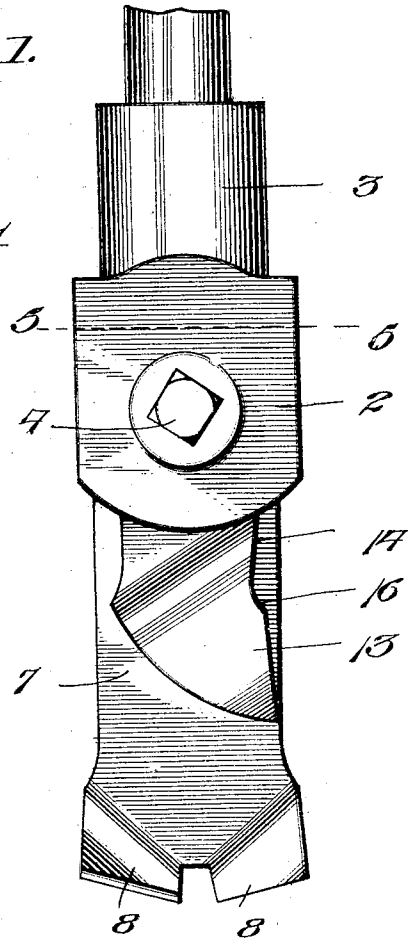


Fig 5

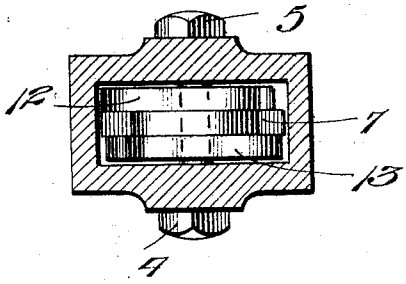
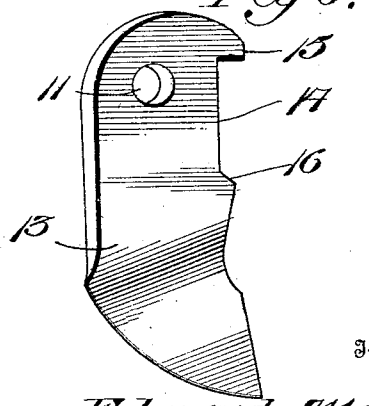


Fig 6.



Witnesses

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2 SHEETS—SHEET 2.

Fig 3.

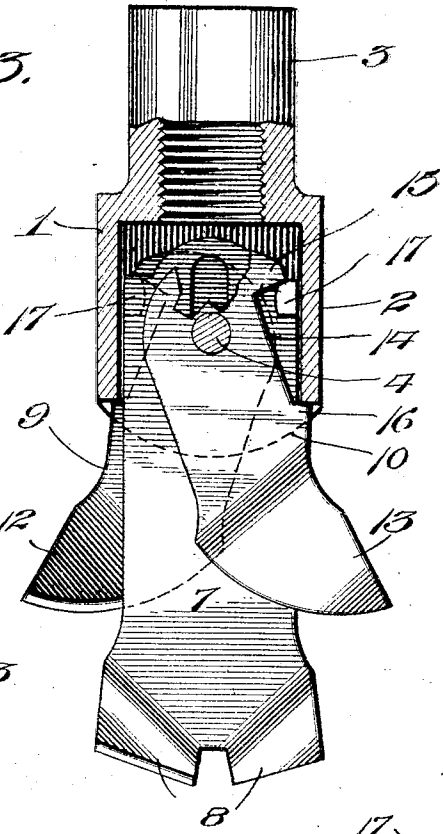


Fig 2.

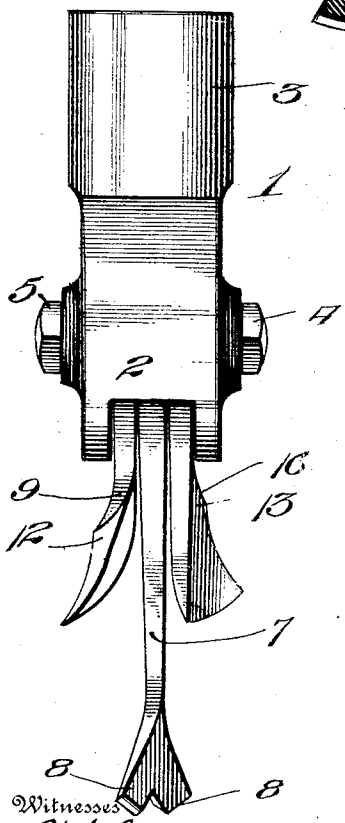
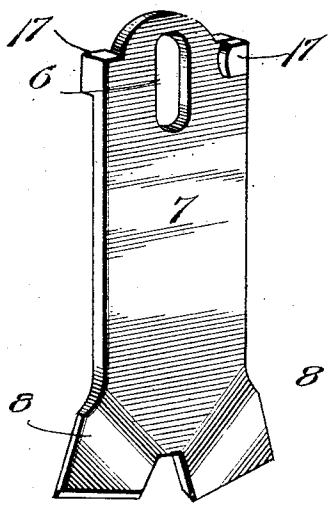


Fig 4.



Witnesses
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No. 786,137. Patented March 28, 1905.

UNITED STATES PATENT OFFICE.

EDMUND MOSER, OF EAST MINERAL, KANSAS.

DRILL-BIT.

SPECIFICATION forming part of Letters Patent No. 786,137, dated March 28, 1905.

Application filed November 17, 1904. Serial No. 233,211.

To all whom it may concern:

Be it known that I, EDMUND MOSER, a citizen of the United States, residing at East Mineral, in the county of Cherokee and State of Kansas, have invented new and useful Improvements in Drill-Bits, of which the following is a specification.

This invention relates to improvements in drill-bits designed for use in mining coal, stone, and other substances in which a bore or hole is to be formed for the reception of a blasting charge, the object of the invention being to provide a bit which is adapted to be inserted into a primarily-formed bore or hole of comparatively small diameter and expanded for the formation of a chamber or pocket of increased diameter in which the charge may be closely packed, so as to obviate liability of explosions from so-called "windy" or loose charges, and in which cutting-blades are provided, which are projectible to enable said chamber or pocket to be formed and are adapted to fold or close to permit the bit to be readily and conveniently withdrawn.

With this and other objects in view the invention consists of the features of construction, combination, and arrangement of parts hereinafter fully described and claimed, reference being had to the accompanying drawings, in which—

Figure 1 is a front elevation of a drill-bit constructed in accordance with my invention. Fig. 2 is a side elevation of the same. Fig. 3 is a vertical section through the socket of the bit-head, the bits appearing in elevation, the forward expansion-bit being partially broken away to expose the interior construction. Fig. 4 is a perspective view of the main or center bit. Fig. 5 is a sectional view through the bit-head on line 5 5 of Fig. 1, and Fig. 6 is a perspective view of one of the expansion-bits.

The numeral 1 in the drawings represents the bit-head, which is provided with a socket 2 for the reception of the confined ends of the cutting-blades and with a tubular shank or stem 3, internally threaded for the reception of the threaded end of the rod or shaft of any ordinary drill-machine.

The socket 2 is preferably of oblong rectangular form in cross-section and is provided in its front and rear walls with holes for the passage of a securing-bolt 4, removably retained in position by a nut or other like fastening 5. The bolt passes through an elongated slot 6, formed in the inner or upper end of a main cutting-blade 7, which projects a suitable distance beyond the socket and is provided at its outer end with divergent cutting wings or lips 8, which project at an angle in opposite directions. The slot 6 is of such length as to permit the blade 7 to have limited longitudinal movement in the socket 2 for effecting the projection and retraction of the side cutting-blades 9 and 10. These blades are provided at their inner ends with openings 11 for the passage of the bolt 4, whereby they are pivotally mounted upon said bolt to swing laterally in opposite directions, and are respectively formed at their outer ends with cutting wings or lips 12 and 13, which incline in opposite directions, as shown clearly in Fig. 2, to coöperate with the divergent reversely-inclined cutting-wings 8 of the main blade 7 to successively act upon the substance to be bored or cut and produce a continuous cutting operation when the bit is turned or rotated.

Each side bit is formed in one of its side edges with a longitudinal slot or recess 14 and shoulders 15 and 16, disposed, respectively, at the inner and outer ends of said recesses, the shoulders 15 being adapted to engage lugs or projections 17, formed upon opposite sides of the inner end of the main blade 7 adjacent to the side edges thereof and in a plane slightly above the central transverse line of the elongated slot 6. Recesses 14 in the two blades 9 and 10 are oppositely disposed—that is to say, are located in their outer side edges and of such length as to bring the shoulders 15 and 16 into proper position to respectively engage the lugs 17 and lower edges of the end walls of the socket 2 to retain the blades in projected position when the bit is expanded for the purpose of increasing the diameter of a bore or opening.

The main blade 7 is made of a width to correspond substantially with the diameter of the

bore which is to be enlarged, and in the normal condition of the parts the side blades 9 and 10 lie upon opposite sides of and parallel with and within the plane of the side edges of the said blade 7, as clearly shown in Figs. 1 and 2. When the parts are so disposed, the bit may be conveniently introduced into the bore and adjusted to the inner end of the bore for operation. When the cutting-wings 8 of the blade 7 strike the inner end wall of the bore, further forward movement of the main blade is of course resisted and the said blade is caused to yield rearwardly, which is permitted to the limited extent afforded by the elongated slot 6. This rearward movement of the blade 7 brings the lugs 17 into engagement with the shoulders 15 of the two side bits 9 and 10, whereby the latter are swung upon the bolt 4 to project their cutting wings or lips 12 and 13 outwardly beyond the side edges of the main bit, thus expanding or increasing the area of the cutting-surface of the tool, so as to bore a chamber or pocket of increased diameter. When the side blades are forced out or projected to the limit of their movement, the stop-shoulders 16 come into abutting engagement with the lower or outer edges of the end walls of the socket 2, while the shoulders 15 maintain engagement with the lugs 17, whereby the side blades are stayed and supported in their projected position and prevented from yielding during the rotation of the bit to effect the expansion of the bore. It will thus be seen that the device may be introduced into a primarily-formed bore or hole of limited diameter, and the side blades will be expanded automatically when the device reaches the limit of the bore to expand the cutting-surface, so that upon the further rotation of the drill rod or shaft the main cutting-blade and side cutting-blades will coöperate to form a pocket or chamber of increased diameter at the inner end of the bore, in which pocket or chamber the powder or explosive mixture composing the blasting charge may be closely packed in such manner as to obviate the objections resulting from the packing of the charge in the ordinary bore in which the charge frequently scatters or becomes loosened and is liable to produce a windy shot and destructive explosion. When pressure upon the bit is relieved and the bit is drawn outwardly, the side cutters 9 and 10 are forced by the wall of the primary bore back to their normal position, enabling the bit to be readily and conveniently withdrawn.

In using the bit the miner simply detaches the ordinary bit from the drill rod or shaft and substitutes my improved expansible bit and then reinserts the drill until the end of the bore is reached and again operates the drilling apparatus to form the pocket or chamber at the end of the bore.

From the foregoing description, taken in connection with the accompanying drawings, the construction and mode of operation of the invention will be understood without a further extended description.

Changes in the form, proportions, and minor details of construction may be made within the scope of the invention without departing from the spirit or sacrificing any of the advantages thereof.

Having thus described the invention, what is claimed as new is—

1. A drill-bit having a central cutter mounted for limited receding movement, side cutters pivoted at one end and having cutting edges at their free ends adapted to normally lie in the plane of the central cutter, engaging devices on the inner end of the central cutter, and corresponding engaging devices on the pivoted ends of the side cutters for swinging said side cutters to project the cutting edges thereof beyond the plane of the central cutter upon the receding movement of said central cutter.

2. In a drill-bit, the combination of a drill-head, a stem passing therethrough, a central cutter having an elongated opening for the passage of said stem to permit the cutter to have limited rearward movement, side cutters pivotally mounted upon said stem and normally adapted to lie in the plane of the main cutter, and means for laterally swinging said side cutters to project the cutting-surfaces thereof beyond the central cutter when the latter moves rearwardly.

3. In a drill-bit, the combination of a head, a stem mounted therein, a central cutter having an elongated slot through which the stem passes to permit said cutter to have limited longitudinal movement, side cutters pivotally mounted on said stem and adapted to normally lie in the plane of the central cutter, and coacting projections upon the central cutters and side cutters for swinging said side cutters to project the cutting-surfaces thereof beyond the central cutter when the latter moves rearwardly, substantially as described.

4. The combination with a head, of a central cutter having a slot-and-pin connection with the head to adapt it to have a limited receding movement, side cutters pivoted on the pin of such connection, and engaging devices upon said central and side cutters respectively for swinging said side cutters into cutting position upon the receding movement of the central cutter.

5. A drill-bit comprising a socketed head, a stem extending therethrough, a central cutter having its inner end arranged within the head and provided with a slot receiving said stem, said slot being of a length to permit said cutter to have longitudinal movement, said central cutter also being provided adjacent to said slot with cam projections, side cutters pivotally mounted upon said stem and provided with projections adapted to be engaged by said projections on said c

cutter to swing the side cutters to cutting position when the central cutter moves rearwardly, and means for limiting the swinging movement of said side cutters.

6. In a drill-bit, the combination with a socketed head having a stem extending therethrough, of a central cutter having its inner end seated in the socket in the head and provided with a slot receiving said stem and adapted to permit longitudinal movement of said cutter, cam-lugs on opposite sides of the inner end of the central cutter, and side cutters pivotally mounted upon said stem on opposite sides of the central cutter and adapted to be projected in opposite directions, said side cutters being provided with projections adapted to be engaged by the cam projections on the central cutter to throw them outwardly when the central cutter moves rearwardly and having shoulders to engage the head to limit their outward movement.

In testimony whereof I affix my signature in presence of two witnesses.

EDMUND MOSER.

Witnesses:
JOHN A. BANMAN,
AUGUST JUENEMANN.