

No. 635,905.

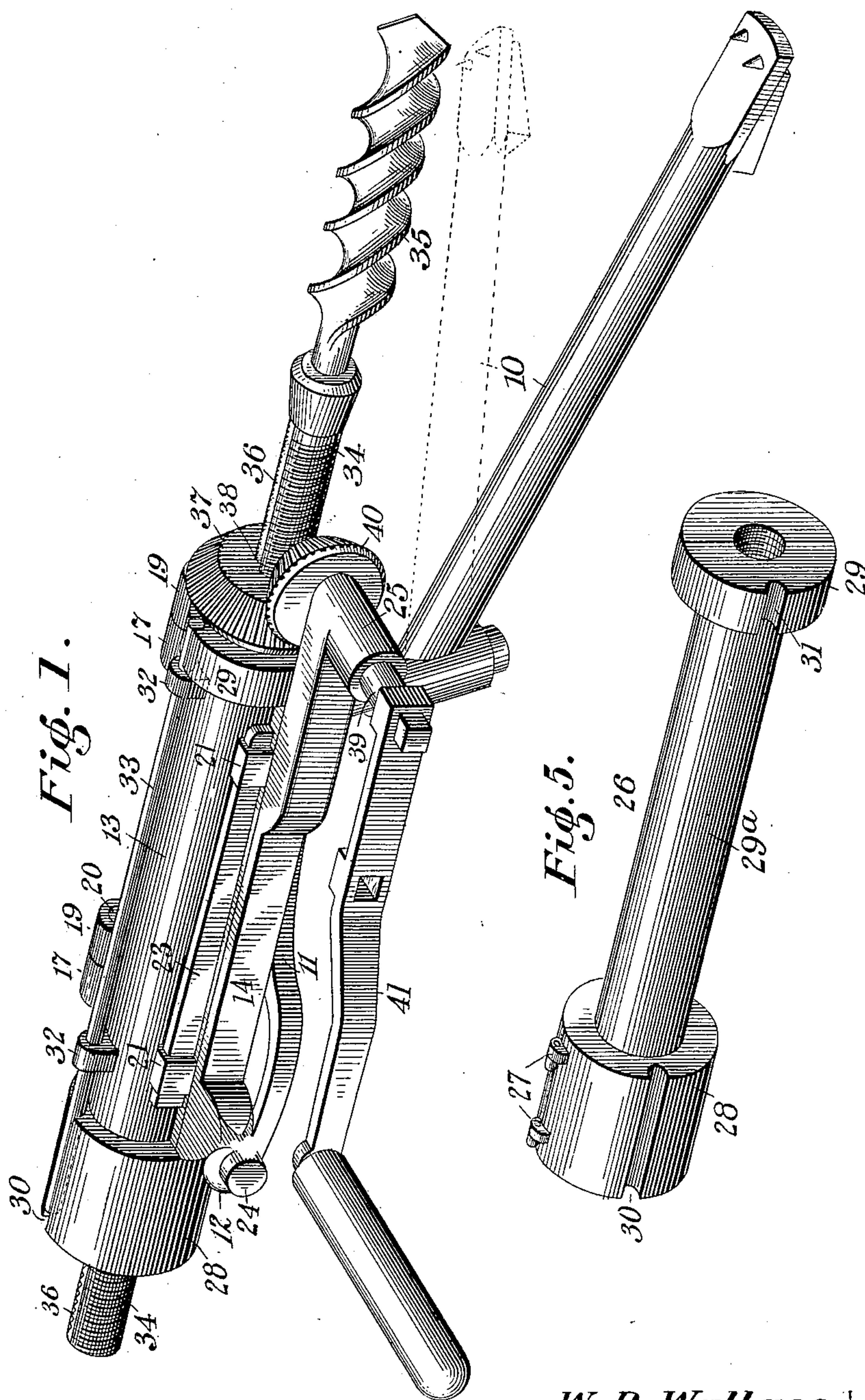
Patented Oct. 31, 1899.

W. R. WALLACE.  
MINING DRILL.

(Application filed Mar. 13, 1899.)

(No Model.)

2 Sheets—Sheet 1.



Witnesses

*A. Perry Hahn*  
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By his Attorneys.

W. R. Wallace, Inventor

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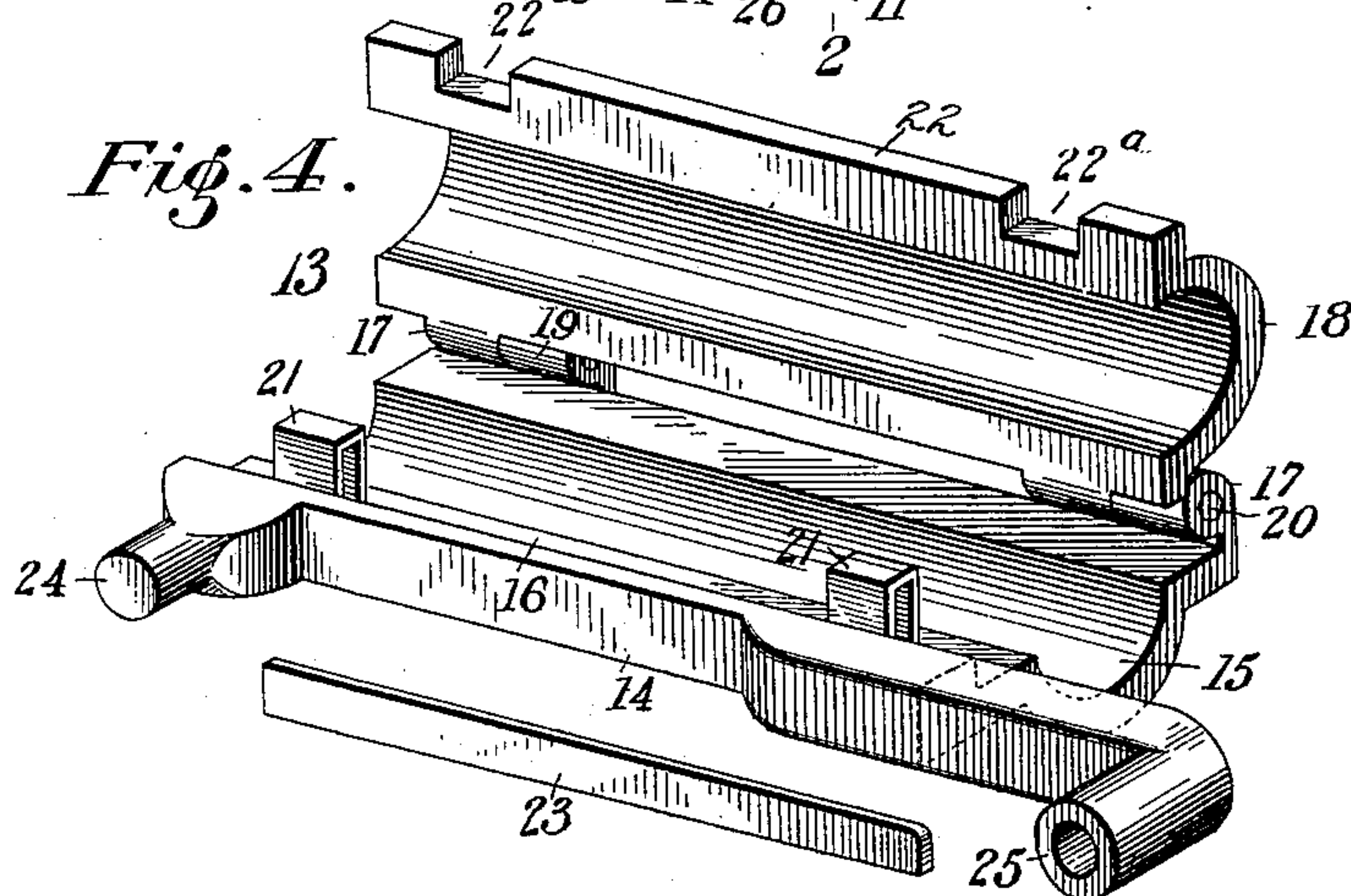
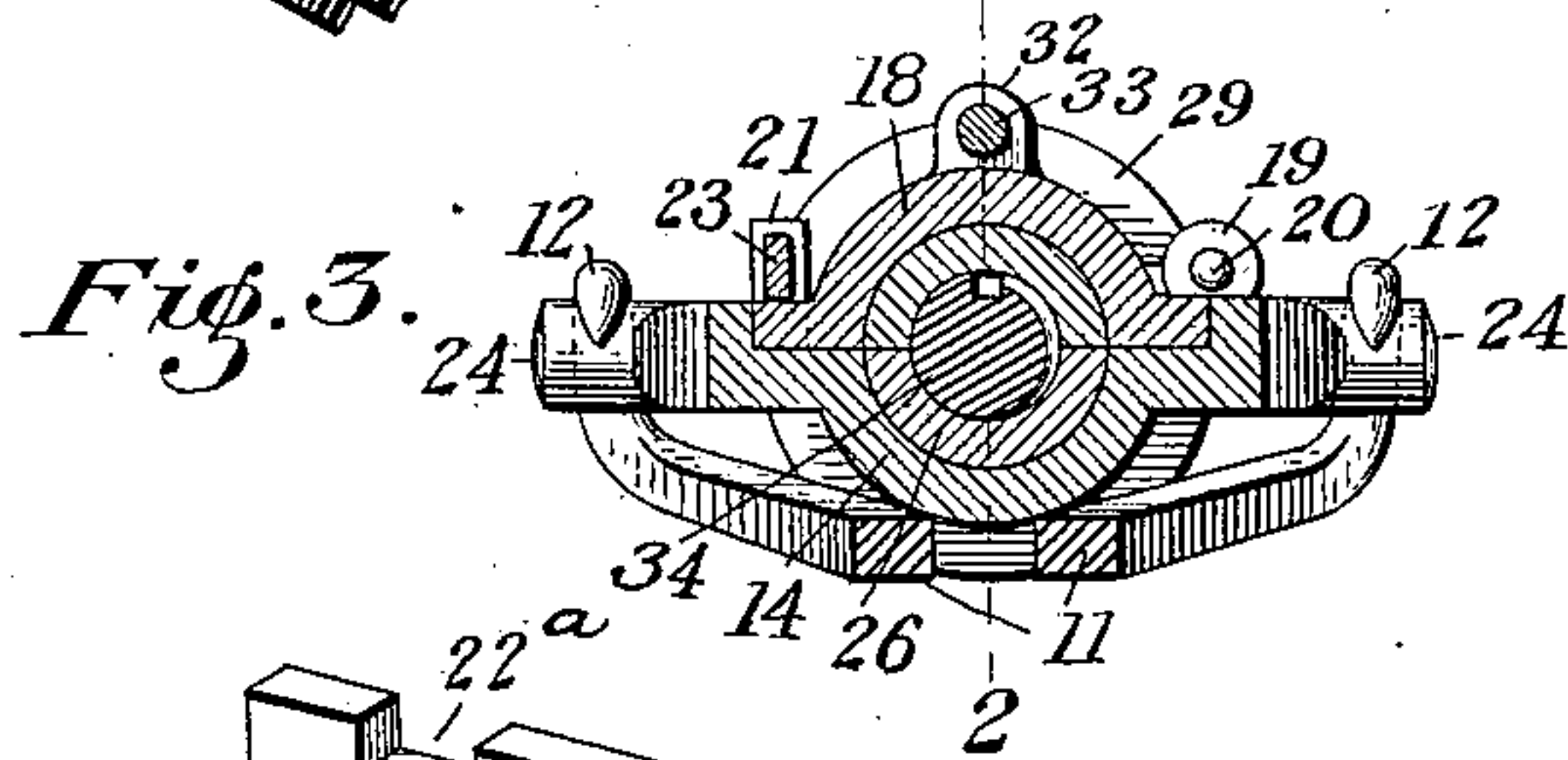
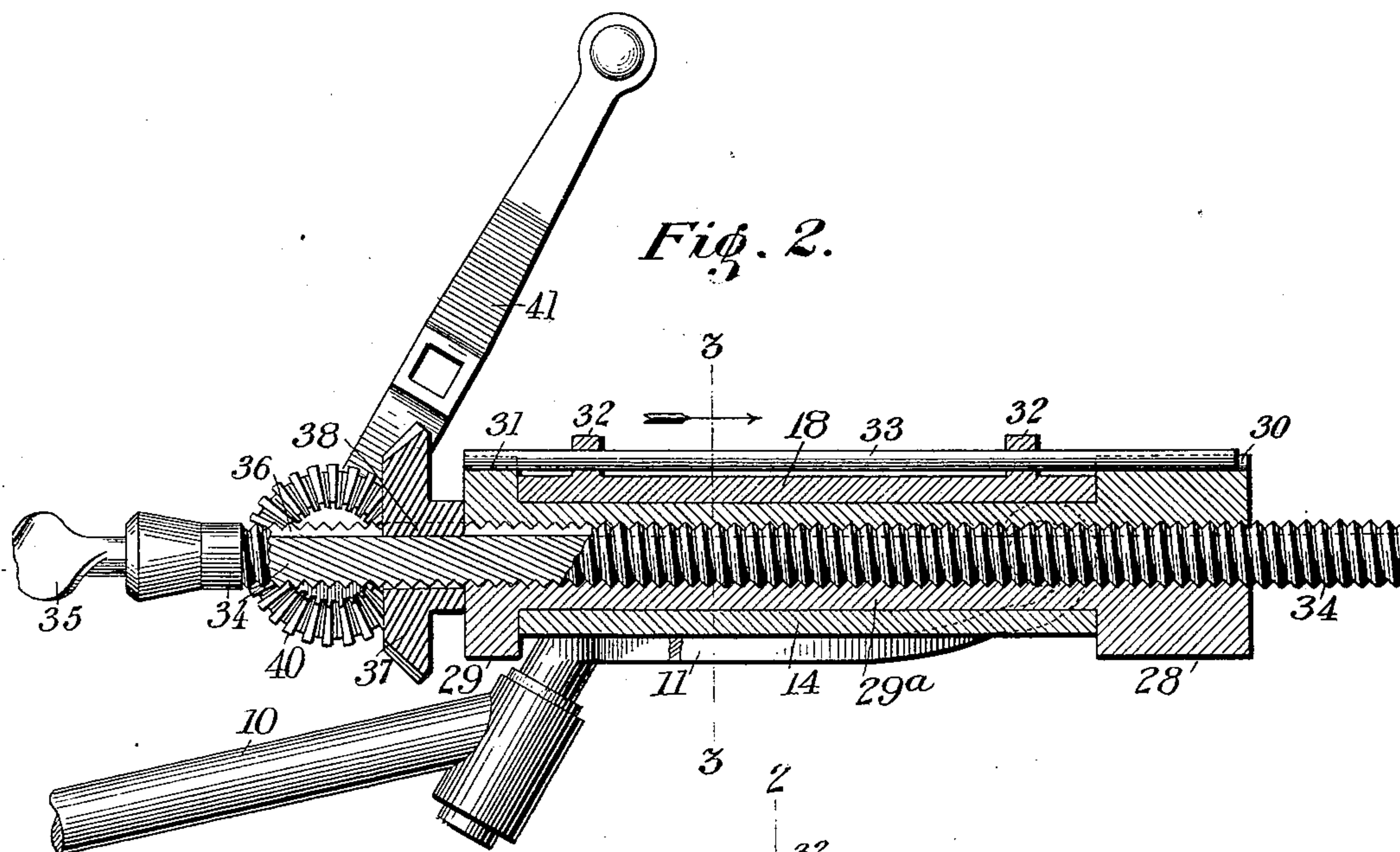
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# UNITED STATES PATENT OFFICE.

WILLIAM R. WALLACE, OF MOUNT VERNON, ILLINOIS.

## MINING-DRILL.

SPECIFICATION forming part of Letters Patent No. 635,905, dated October 31, 1899.

Application filed March 13, 1899. Serial No. 708,882. (No model.)

*To all whom it may concern:*

Be it known that I, WILLIAM R. WALLACE, a citizen of the United States, residing at Mount Vernon, in the county of Jefferson and State of Illinois, have invented a new and useful Mining-Drill, of which the following is a specification.

My invention relates to improvements in mining-drills especially adapted for use in coal-mining operations, although it may be employed advantageously for other purposes by reason of the portable nature of the structure.

In mining coal the boring-auger frequently encounters a sulfur "band" or strata which is very difficult to penetrate, and it is also necessary to clean out the cavity or hole bored by the tool or auger. I contemplate the provision of a drill in which the feed mechanism for the bit or auger shaft may be manipulated to insure the forward progress of the boring-tool under normal conditions of service, but which feed mechanism may be allowed to rotate idly with the boring-tool when the latter encounters a sulfur strata, so that the "spring" or weight of the machine may be utilized to hold the boring-tool up to the work while the driving mechanism remains in service to impart the necessary rotary motion to the bit-shaft. This adaptation of the feed and driving mechanisms is also desirable, because the boring-auger may be operated to clean out the cuttings or dust from the cavity or hole produced in the bed of coal by the action of the tool or auger. This provision for cleaning the cavity is especially advantageous when operating in a bed of wet coal.

To the accomplishment of these ends the invention consists in the novel combinations of elements and in the construction and arrangement of parts, which will be hereinafter fully described and claimed.

To enable others skilled in the art to understand the invention, I have illustrated a preferred embodiment thereof in the accompanying drawings, forming a part of this specification, and in which—

Figure 1 is a perspective view of a mining-auger constructed in accordance with my invention. Fig. 2 is a vertical longitudinal sectional view on the plane indicated by the dotted

line 2 2 of Fig. 3. Fig. 3 is a vertical transverse sectional view on the plane indicated by the dotted line 3 3 of Fig. 2. Fig. 4 is a detail perspective view of the sectional boxing or housing for supporting the feed-nut. Fig. 5 is a similar view of the female threaded sectional feed-nut.

The same numerals of reference are used to indicate corresponding parts in each of the several figures of the drawings.

The grip-bar 10 for supporting the operative elements of my mining-drill is similar in all substantial respects to devices known to those skilled in the art. At one end this grip-bar 10 is provided with the diverging arms 11, which terminate in the upwardly-turned hooks 12, adapted to receive and support the housing or boxing in which the rotary feed-nut is to be mounted.

The boxing or housing 13 is provided with a base member 14, which is cast or otherwise formed in a single piece of metal with a longitudinal cavity 15, which is of curved or segmental shape in cross-section. Said base member 14 of the boxing is provided on one side with an integral offstanding flange or ledge 16, and the base member is further provided with pivotal ears or lugs 17 on the opposite side from the flange 16. The boxing or housing is completed by the provision of the upper adjustable member 18, which in cross-section is curved to resemble the curved cavity 15 in the member 14, and the two members 14 18 are arranged to match or register with each other in order to produce in the boxing or housing a longitudinal opening the diameter of which corresponds to the external diameter of the revoluble feed-nut, whereby said feed-nut may be fitted in the boxing or housing snugly to rotate freely on its longitudinal axis therein under certain conditions in the practical service of the mining-drill.

The upper adjustable member 18 of the boxing is provided on one side with the ears or lugs 19, which are arranged to overlap the similar ears 17 on the base member 14, and through these ears are passed the pintles 20, which thus serve to pivotally attach the member 18 to the base member 14, so that the member 18 can be thrown in an upward and backward direction to open the boxing for the insertion or removal of the sectional feed-nut.



On the ledge or flange 16 of the base member 14 are provided the keepers 21, which project upwardly from said flange, said keepers being either cast in a single piece with the base member 14 or secured firmly thereto in any suitable manner. The hinged member 18 of said boxing is provided at its free or unhinged edge with an offstanding flange 22, which is notched at 22<sup>a</sup> or otherwise formed to fit closely to the keepers 21, whereby the flange 22 of the hinged member 18 is adapted to fit firmly to the flange or ledge 16 of the base member 14. The hinged member 18 when closed upon the base member to confine the feed-nut within the boxing is adapted to be secured firmly in position by means of a bar-key 23, which is passed through the keepers 21 of the base member and engages with or rests on the flange 22 of the hinged member 18. It will thus be seen that the bar-key confines the two members of the boxing in closed relation in order to confine and retain the feed-nut in place; but the bar-key may be withdrawn from the keepers and from engagement with the flanged edge of the hinged member 18 for the purpose of enabling the operator to lift the hinged member, and thereby open the boxing for the removal of the feed-nut.

The base member of the boxing is constructed at one end with the arms 24, which extend laterally or outwardly from the boxing on opposite sides thereof, and the base member is further constructed with an integral tubular arm 25, that serves as the journal-bearing for the driving-shaft of the mining-drill. The base of the boxing is designed to be fitted on the arms 11 of the grip-bar, and its arms or trunnions 24 are received in the hooks 12 of the grip-bar, thus detachably connecting the boxing to the grip-bar in a manner for the latter to sustain the boxing in operative position and to permit the boxing to be removed bodily from the grip-bar.

The feed-nut which actuates and supports the bit or screw shaft of the improved mining-drill is designated in its entirety by the numeral 26. This feed-nut is divided transversely on its median line or longitudinally to produce two members which are hinged or connected pivotally, as at 27, to permit the nut to be opened and closed for the introduction or removal of the threaded bit-shaft. This feed-nut is formed with an internal or female screw-threaded portion, said thread extending continuously of the nut, and said nut is constructed at its ends with means which prevent endwise movement or displacement of said nut when it is fitted in the boxing and the member 18 thereof is closed and fastened. At one end—preferably the rear end—said nut 26 is constructed with an enlarged and widened head 28, and at its opposite or front end the nut is formed with a narrow head 29. I prefer to make the two heads of equal diameter, but of different widths, and the heads are spaced apart a dis-

tance equal to the length of the boxing or housing. The described construction of the feed-nut produces a length or section 29<sup>a</sup>, which is of small diameter as compared with the diameter of the heads 28 29; but this length or section 29<sup>a</sup> is of a diameter to fit snugly in the boxing or housing to permit the feed-nut to rotate freely therein. The feed-nut is thus adapted to be mounted in the boxing or housing by fitting its length or section 29<sup>a</sup> in the members of said boxing, while the heads of the nut lie externally to the boxing and bear against the ends thereof. The heads of said nut prevent the same from moving endwise in the boxing, and said heads are of such diameter that the faces thereof lie flush with or project slightly beyond the surface of the hinged box member 18 for a purpose which will presently appear.

The head 28 of the feed-nut is provided in its exposed face with a longitudinal groove or recess 30, and the other narrow head 29 is similarly provided in its face with a groove 31, which is arranged in alinement with the groove 30 in the wide head 28. On the surface of the hinged member 18 of the boxing is provided two or a series of lugs 32, which are formed with openings in line with each other, and the sectional feed-nut is adapted to be turned to a position where the grooves 30 31 in its wide and narrow heads 28 29 will coincide or register with the openings in the ears 32. A latch-pin 33 is adapted to be passed through the perforated ears 32 on the box member 18 and to have its ends fit in the grooves 30 31 of the heads of the feed-nut, whereby the latch-pin is mounted on the boxing in a manner to connect the feed-nut to the boxing. The feed-nut is thus adapted to be keyed or fastened to the boxing in a manner to hold the feed-nut against rotation within said boxing for the purpose of propelling the threaded bit-shaft to feed the boring tool or auger into the bed of coal or other material; but at the same time the latch-pin 33 may be withdrawn from the lugs 32 and from engagement with the grooved heads of the feed-nut, so that the latter may be unkeyed or released from the boxing for the purpose of permitting the feed-nut under certain conditions in the service of the drill to rotate or turn freely in the boxing. This is an important feature of my improved mining-drill, because it provides a combination and arrangement of parts which when the feed-nut is fixed or stationary insures the proper feeding of the bit-shaft and the boring-tool; but when the drill encounters a hard resistance or strata, such as a sulfur band, the feed-nut may be unkeyed or released in order to permit the nut to rotate with the bit-shaft and the auger, whereby the spring or weight of the machine may be utilized to hold the boring-tool and the machine in an operative position to the bed of coal, thus allowing the boring-tool to feed itself and advance gradually, but slowly, into the bed of coal.



The bit-shaft 34 is provided with an external or male screw-thread throughout its length, and to the working end of this shaft is secured in any suitable way a boring tool or auger 35, which may be of any desired construction. The bit-shaft is, furthermore, provided with a longitudinal keyway 36, and on the shaft is loosely fitted a bevel-gear 37, which is provided with a key 38, that is adapted to fit into the keyway of the shaft, whereby the bevel-gear is connected to the bit-shaft in a manner to rotate the latter and to permit it to advance under the feeding action of the sectional feed-nut in a manner well understood by those skilled in the art.

The bevel-gear 37 is rotated by intermeshing with a driving bevel-pinion 40, which is secured to one end of the driving-shaft 39. This shaft is journaled in the tubular arm 25 of the boxing, and to one end of the shaft is fitted or secured the driving-crank 41.

This being the construction of my improved mining-auger, the operation may be described as follows: To assemble the parts together, the member 18 of the boxing is opened and the feed-nut is removed. Said nut is opened to receive the threaded bit-shaft which carries the boring-tool, and the nut, with its contained shaft, is then placed in the boxing for its reduced length 29<sup>a</sup> to occupy the space of said boxing with the grooved heads of the nut exposed beyond the boxing. The boxing member 18 is now closed, and the key-bar 23 is fitted in the keepers 21 to engage the flange of the member 18, thereby confining the feed-nut in the boxing. The feed-nut is now turned to bring the grooves 30 31 of the nut-heads in line with the ears 32, and the latch-pin 33 is fitted in the ears to engage with the grooved heads, thereby keying the feed-nut in a fixed position in the boxing. This boxing may now be fitted to the grip-bar by having the arms or trunnions 24 occupy the hooks 12 of said grip-bar, and the bevel-gear 37 meshes with the driving-pinion 40 on the crank-shaft. The drill is in a condition for service, and it is adapted to be supported contiguous to the coal-bed by the grip-bar. By rotating the crank-shaft the gears are driven to rotate the bit-shaft and the boring-tool, and the feed-nut advances or feeds the bit-shaft to make the auger or tool cut into the coal. When a hard strata in the coal-bed is encountered, the latch-pin 33 is withdrawn from the ears 32 and the grooved heads of the feed-nut, and the nut is thus free to rotate with the bit-shaft when the latter is driven by the crank-shaft. The weight or spring of the machine serves to hold the bit-shaft in position for the boring-tool to continue to advance slowly into the work. This arrangement also permits the operator to rotate the bit-shaft in the same direction for the purpose of making the auger deliver the cuttings or bored material out of the hole or cavity in order to clean the latter, which is especially desirable when operating in a wet bed of coal. The machine

may be withdrawn or retracted from the bed, and the feed-nut and shaft may be removed from the boxing by drawing out the key-bar 23 and opening the hinged member 18 of the boxing, the nut being easily lifted out of place. The bit-shaft may be removed from the feed-nut by opening the latter, and thus provision is made for the ready assemblage and disconnection of the several working elements.

Having thus fully described the invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a mining-drill, the combination with a sectional boxing having a plane unthreaded bore, and means for holding the sections of the boxing in locked position, of a feed-nut having an unthreaded exterior face and fitted therein to rotate on its axis, means for restraining the nut against endwise movement in the boxing, a bit-shaft engaging with said feed-nut, and a latch device adapted to be connected to said feed-nut to hold the latter in a stationary position within the boxing or to permit said feed-nut to rotate in the boxing with the bit-shaft, for the purpose described, substantially as set forth.

2. In a mining-drill, a feed-nut provided with the heads, combined with a boxing in which the feed-nut may be revolubly fitted for its heads to restrain the nut against movement endwise in the boxing, a latch connected with the boxing and engaging with the heads of said feed-nut, a bit-shaft mounted in the feed-nut, and a driving mechanism connected operatively to the bit-shaft, substantially as described.

3. In a mining-auger, the combination with a sectional hinged boxing, of a sectional feed-nut provided with the grooved heads and fitted in said boxing for the grooved heads to lie externally to the boxing, a latch-pin fitted to the hinged member of the boxing and engaging with said grooved heads of the feed-nut, a bit-shaft in the feed-nut, and a driving mechanism for the bit-shaft, substantially as described.

4. In a mining-auger, a sectional boxing consisting of a base member having the flange and keepers on one side, and the upper member hinged to the base member and flanged to fit the flanged edge and keepers of said base member, combined with a feed-nut fitted in the boxing, a bar-key fitted to the keepers and engaging the flanged edge of the hinged member, a latch-pin separate from the bar-key and fitted to the hinged member to engage with the feed-nut, a bit-shaft, and a driving mechanism, substantially as described.

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

WILLIAM R. WALLACE.

Witnesses:

ROBERT C. SMITH,  
EUGENE JOHNSTONE.