

No. 862,525.

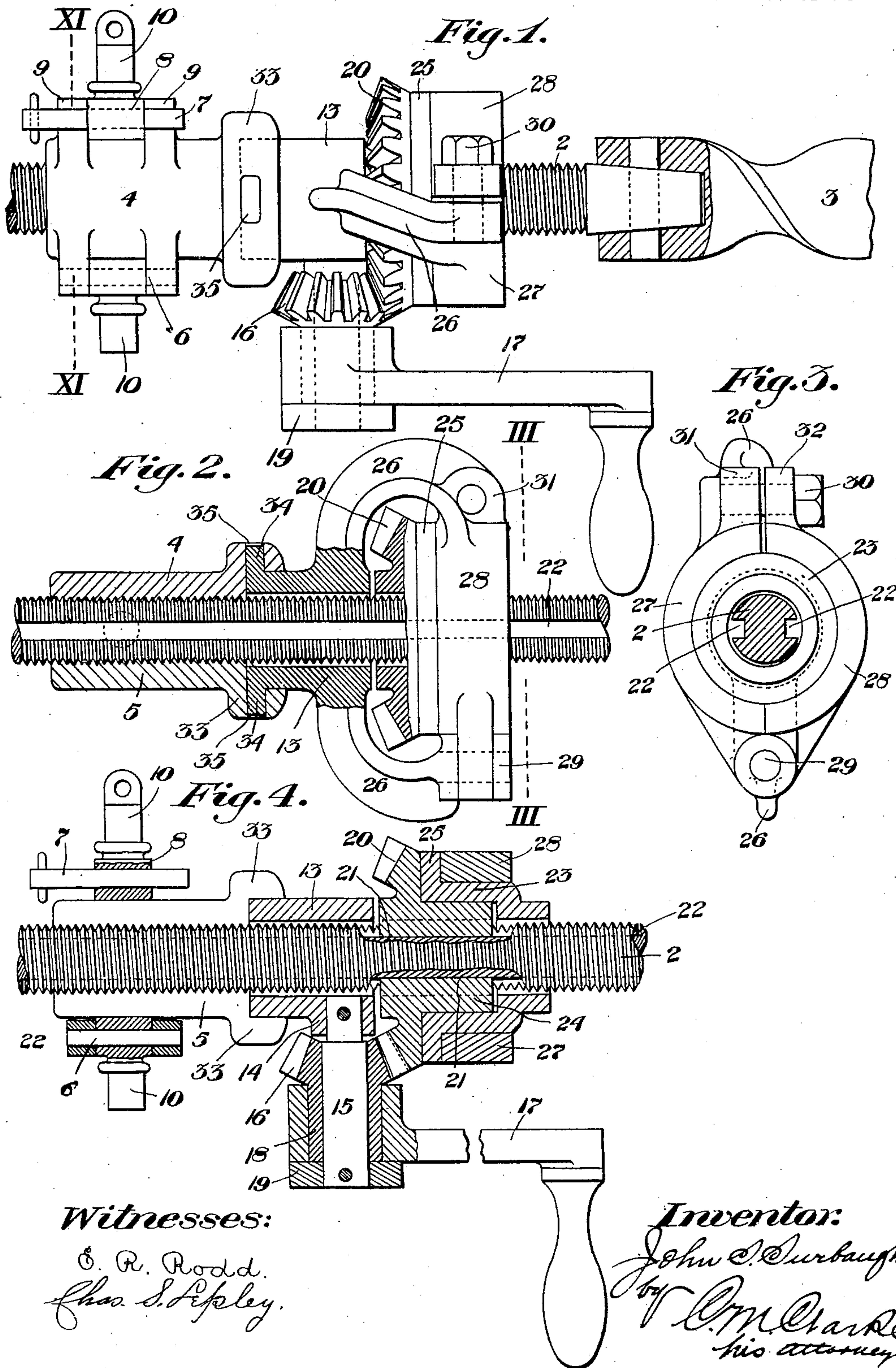
PATENTED AUG. 6, 1907.

J. S. SURBAUGH.

COAL DRILL.

APPLICATION FILED MAR. 28, 1906.

2 SHEETS—SHEET 1.



Witnesses:

C. R. Rodd.
Chas. S. Pley.

Inventor:

John S. Surbaugh
by C. M. Clarke
his attorney

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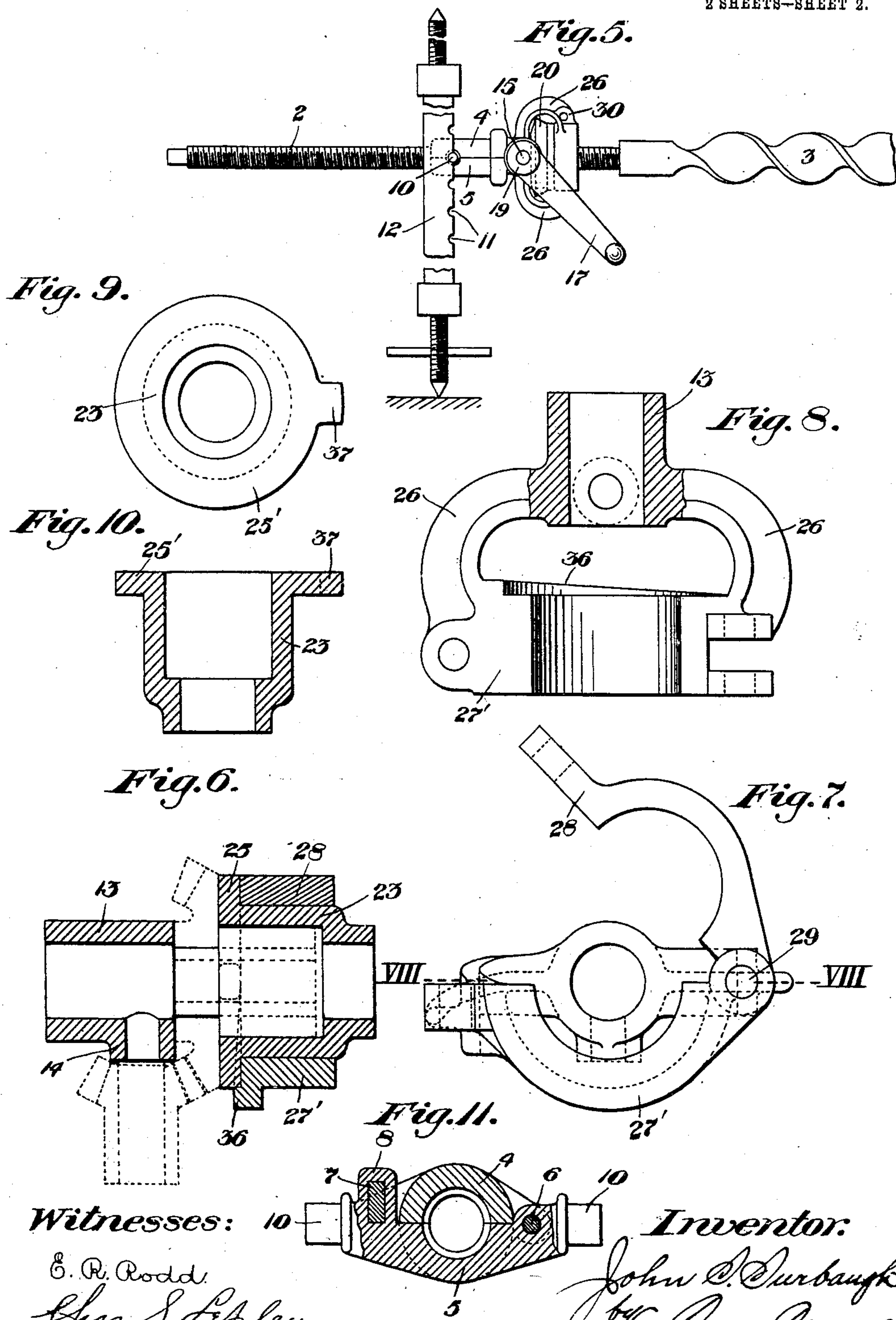
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2 SHEETS—SHEET 2.



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G. R. Rodd.
Chas. S. Ripley.

Inventor:

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UNITED STATES PATENT OFFICE.

JOHN S. SURBAUGH, OF TERRE HAUTE, INDIANA.

COAL-DRILL.

No. 862,525.

Specification of Letters Patent.

Patented Aug. 6, 1907.

Application filed March 28, 1906. Serial No. 308,411.

To all whom it may concern:

Be it known that I, JOHN S. SURBAUGH, a citizen of the United States, residing at Terre Haute, in the county of Vigo and State of Indiana, have invented certain new and useful Improvements in Coal-Drills, of which the following is a specification, reference being had therein to the accompanying drawing, forming part of this specification.

My invention relates to improvements in mechanism for coal drills of that class used for drilling into the face of coal, rock, etc. and particularly refers to the gear box, its connection with the separable nut, the separable nut itself, and the means by which the driven gear may be adjusted to take up wear. In devices of this class, where the wear is rapid, it is desirable to provide means for readily compensating for such wear due to the presence of dust, grit, etc. and to avoid the necessity of substituting new gears, and my invention has in view the construction of a separable gear box by which the gear bushing may be easily and quickly adjusted to accomplish these objects.

Other features of improvement and advantage will be more fully hereinafter described.

Referring now to the drawings:—Figure 1. is a plan view of my invention showing the threaded screw shaft and drill partly broken away. Fig. 2. is a vertical longitudinal sectional view of Fig. 1, partly in elevation. Fig. 3. is an end view of Fig. 2, the shaft being in section on the line III. III. of Fig. 2. Fig. 4. is a plan view similar to Fig. 1, but showing the gear box, gearing, etc. in horizontal section. Fig. 5. is a view in side elevation of the device, showing it mounted in a vertical bracing support. Fig. 6. is a horizontal sectional view similar to Fig. 4, but showing a modified construction employing a cam adjustment for the gear bushing. Fig. 7. is an end view of Fig. 6 showing the removable hinged half of the box raised. Fig. 8. is a plan view of Fig. 7 partly in section on the line VIII. VIII. thereof, the hinged side of the box having been removed. Figs. 9 and 10 are detail views of the adjustable bushing. Fig. 11. is a cross sectional view on the line XI. XI. of Fig. 1.

In general, the device consists of a feed nut for the threaded drill shaft 2 provided at its forward end with the usual drill 3, said feed nut or boxing comprising two separable halves 4 and 5 hinged together at one side as at 6, and secured together at the other side by means of a wedge pin 7 passing through a lug 8 extending upwardly from the lower half 5 between flanking lug 9, 9, of the upper half 4. The lower half of the drill box 5 is provided with oppositely extended trunnions 10, 10, arranged to rest in receiving notches 11 of a suitable receiving support 12, of well known construction, as indicated in Fig. 5.

13 represents the main body portion of the gear

housing comprising a cylindrical portion through which the threaded shaft 2 passes, as clearly shown in Fig. 2, with sufficient interior clearance, said housing 13 having a laterally extending lug 14 in which is secured the spindle 15 upon which is rotatably mounted the driving bevel gear 16 operated by means of hand-crank 17. The hand crank may be of any suitable construction, and if desired, provided with a plurality of polygonal shaped openings by which the handle may be set at different distances from the center of spindle 15 upon which revolves the correspondingly shaped polygonal hub 18 of the driving bevel gear 16.

19 is a terminal collar secured upon the outer end of stud 15 by a cotter pin or other suitable means.

20 is the driven bevel gear in mesh with gear 16 and by means of which shaft 2 is rotated through inwardly extending spline projections 21, preferably formed integral with gear 20, and engaging shaft 2 by corresponding longitudinally arranged spline slots or grooves 22.

By this construction it will be seen that as the shaft is rotated by the operator through the gearing it will be fed forward by reason of the threaded engagement with the nut box 4 and 5 for the full extent of the length of the threaded screw.

23 is a bushing surrounding an extended hub 24 of gear 20 and provided with a bearing terminal extremity 25 against which the back face of gear 20 bears, and by means of which said gear is held into meshing engagement with the teeth of gear 16. Bushing 23 is mounted within the front separable portion of housing 13, connected with the fixed back portion by upper and lower arms 26, 26. Said front portion is made separable as stated and consists of two halves, 27 and 28, said half 27 being integral with housing 13 by arms 26 and half 28 being connected with said integral portion by hinge joint 29 at the lower side. The sides 27, 28, are connected at the top by means of bolt 30 passing through lugs 31, 32, whereby the halves containing the driven bevel bushing 23 are maintained in operative position as shown in Fig. 3, or by which the driven gear box may be separated by opening the side 28 on hinge 29.

The halves 4 and 5 comprising the separable nut are provided at their front portions with an enlarged shrouding 33, 33, which embraces the rear portion of housing 13 and makes positive engagement therewith by means of lugs 34, 34, extending through interlocking openings 35, 35, as clearly shown in Fig. 2. By this construction, when the threaded nut is assembled in engagement with shaft 2 it will be positively connected with the gear housing whereby the parts comprise one assembled device.

Ordinarily the bushing 23 may be adjusted manually and clamped between the separable sides 27, 28, but for the purpose of providing positive accurate

means for setting up the bushing I have provided the construction illustrated in Figs. 6 to 10 inclusive whereby upon rotating the bushing it will be caused to gradually move toward the driven gear by reason of interposed cam mechanism. To accomplish this purpose an inclined cam 36 is arranged around the semi-circular outer face of the fixed half 27' of the gear box beyond the periphery of flange 25', while the said flange is provided at one side with an outwardly extending lug 37 arranged to project over upon said cam 36. The outer bearing face of the bushing is flat as already described, bearing against the back face of the driven gear 20 at all times. It will be seen that by this construction, upon partially rotating the bushing, it will be caused to travel outwardly from the boxing, resulting in corresponding adjustment of the gear. The construction otherwise is substantially the same as has been already described, and it will be seen that where such cam adjustment is employed I provide a positive backing for the bushing and do not depend entirely upon the clamping effect of the box.

As thus constructed the entire apparatus provides a complete equipment well adapted for the objects in view, capable of quick and easy adjustment both as to the nut and as to the operating gearing. By slightly opening the gear housing the bushing 23 may be set inwardly to the desired extent to take up the wear of the teeth, and will be held immovably in such adjusted position by means of the tight clamping action of the halves 27, 28 and 30. If desired liners or washers may be inserted between the adjacent faces of flange 25 and the halves 28, 28, but ordinarily clamping action of said halves will be sufficient, while positive action may be secured by the cam construction described.

It will be understood that the separable nut may be used alone without the gear box by disconnecting it therefrom, the drill shaft being driven by a crank attached directly to the rear end, as is the common practice.

The advantages of my invention will be readily appreciated by all those familiar with this class of apparatus. It is simple and economical in construction, effects a great saving of time and economy in the adjustment and substitution of gears, and may be readily operated by an unskilled workman.

The invention may be changed or varied in its design, construction, or various features of detail by the skilled mechanic, or features of it may be adapted to other uses or objects, but all such changes or variations are to be considered as within the scope of the following claims.

What I claim is:

1. A separable gear box for drill gearing provided with an adjustable bushing, substantially as set forth.
2. A gear housing for drills provided with an integral apertured body portion for the drill screw, a laterally arranged mounting for the driving gear, and a separable connected box portion for the driven gear, substantially as set forth.
3. A gear housing for drills provided with an integral apertured body portion for the drill screw, a laterally arranged mounting for the driving gear, and a separable con-

nected box portion for the driven gear, with an interior adjustable bushing, substantially as set forth.

4. A gear housing provided with an apertured body portion for the drill screw, a laterally arranged mounting for the driving gear, a front bearing for the driving gear having a separable side, and an inclosed bushing adapted to bear against the hub of the driven gear, substantially as set forth.

5. A gear housing provided with an apertured body portion for the drill screw, a laterally arranged mounting for the driving gear, a front semi-circular bearing for the driven gear, arms connecting said bearing with the apertured body portion, a separable side hinged to said driven gear bearing, and an inclosed removable and adjustable bushing, substantially as set forth.

6. A gear housing for drills provided with a separable box, a cam, and a rotatable bushing arranged to cooperate therewith, substantially as set forth.

7. A gear housing provided with an apertured body portion for the drill screw, a laterally arranged mounting for the driving gear, a front bearing for the driven gear having a semi-circular cam and a separable side, and an inclosed bushing adapted to bear against the hub of the driven gear, substantially as set forth.

8. The combination of an apertured body portion, a drill screw passing therethrough, a laterally arranged mounting for the driving gear, a driving gear mounted thereon, a front separable bearing for the driven gear, a removable bushing capable of being adjustably set and clamped therein, and a driven gear bearing against said bushing and in mesh with the driving gear, substantially as set forth.

9. In a drill housing, the combination of a separable gear box provided with a rear extension and holding lugs thereon, and a separable nut box arranged to embrace said extension and engage said lugs, substantially as set forth.

10. The combination with the gear housing having lugs, of a two-part internally threaded boxing for drill screws provided with embracing terminals each having a transverse aperture extending laterally through the terminal and arranged to engage a lug or projection of the gear housing at opposite sides thereof, and to prevent relative rotative movement of the threaded boxing when in engagement with said lugs, substantially as set forth.

11. The combination with the gear housing having lugs, of a two-part internally threaded boxing for drill screws provided with embracing terminals each having a transverse aperture extending laterally through the terminal and arranged to engage a lug or projection of the gear housing at opposite sides thereof, and to prevent relative rotative movement of the threaded boxing when in engagement with said lugs, said boxing having lateral supporting trunnions, and means for securing parts of the boxing together, substantially as set forth.

12. In a drill housing, the combination of a gear box provided with an apertured body portion for the drill screw, a laterally arranged mounting for the driving gear, a bushing contained therein, a rear extension of the apertured body portion provided with holding lugs, and a separable nut box arranged to engage said lugs, substantially as set forth.

13. In a drill housing, the combination of a gear box provided with an apertured body portion for the drill screw, a laterally arranged mounting for the driving gear, a front separable bearing for the driven gear, a bushing contained therein, a rear extension of the apertured body portion provided with holding lugs, and a separable nut box arranged to engage said lugs, and provided with laterally arranged supporting trunnions, substantially as set forth.

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

JOHN S. SURBAUGH.

Witnesses:

CHAS. S. LEPLEY,
C. M. CLARKE.