No. 762,863. PATENTED JUNE 14, 1904.

G. F. WEISS.

COAL DRILL.

APPLICATION FILED JUNE 27, 1901. RENEWED NOV. 23, 1903.

NO MODEL.

Fig. 1

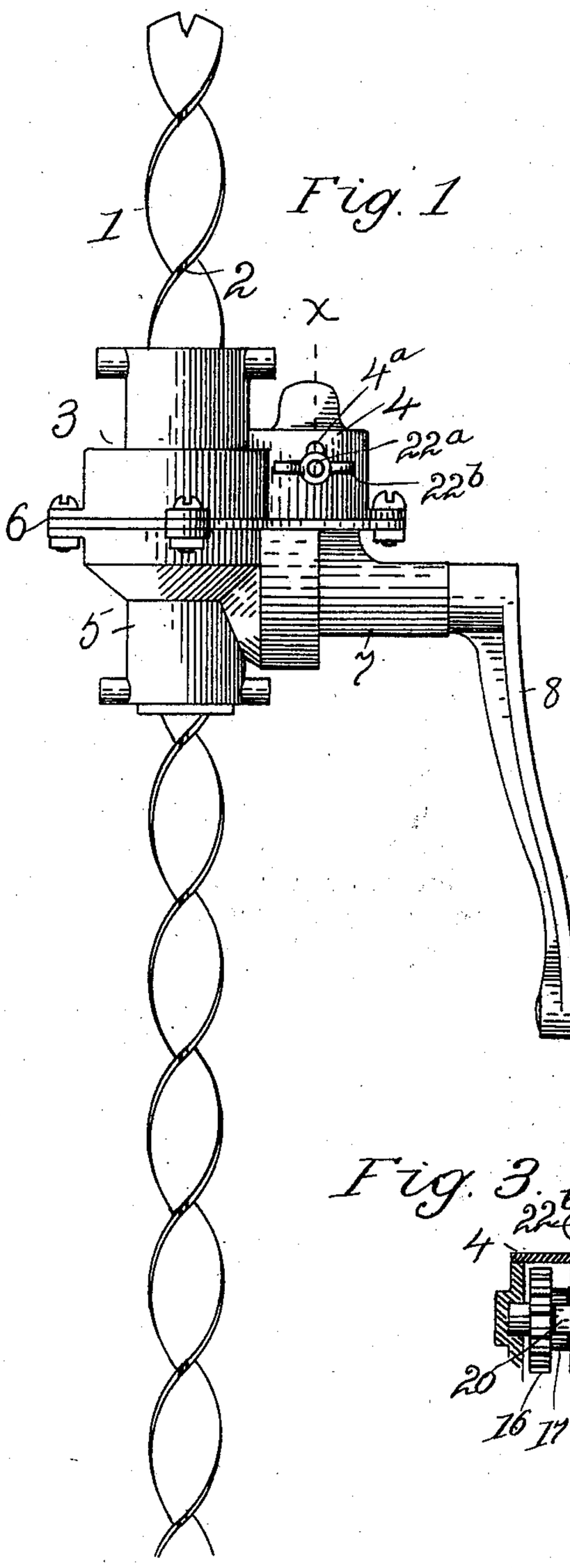


Fig. 2.

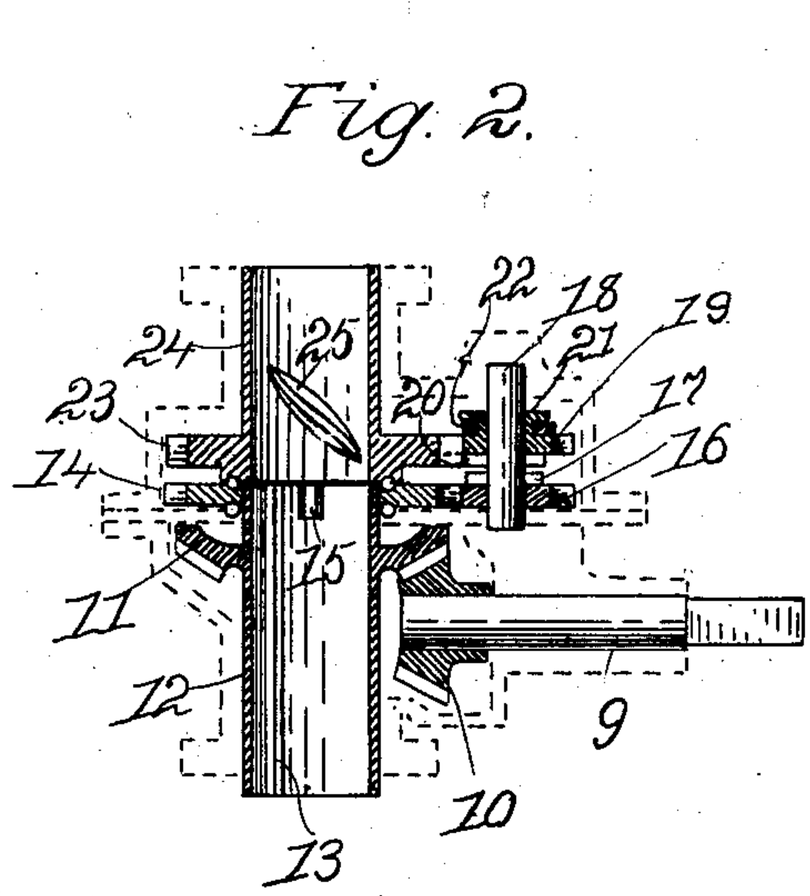


Fig. 3.

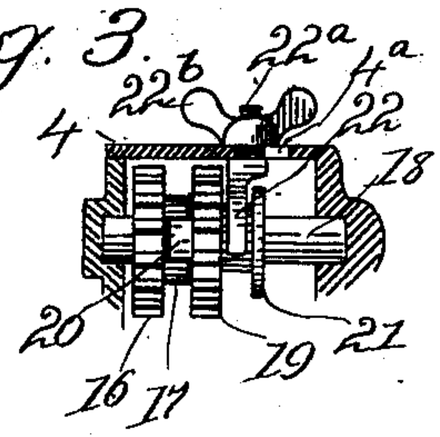
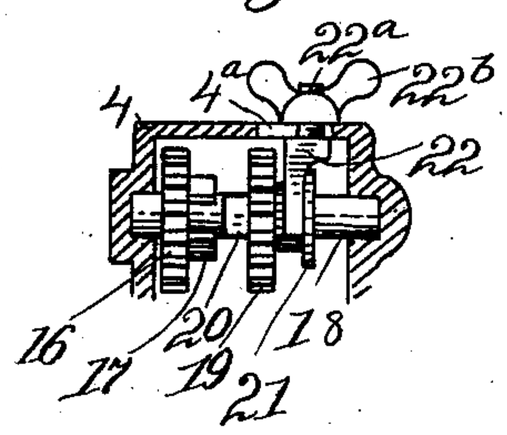


Fig. 4.



Witnesses.

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No. 762,863. Patented June 14, 1904.

UNITED STATES PATENT OFFICE.

GEORGE F. WEISS, OF SPRINGFIELD, ILLINOIS.

COAL-DRILL.

SPECIFICATION forming part of Letters Patent No. 762,863, dated June 14, 1904.

Application filed June 27, 1901. Renewed November 23, 1903. Serial No. 182,406. (No model.)

To all whom it may concern:

Be it known that I, GEORGE F. WEISS, of the city of Springfield, county of Sangamon, and State of Illinois, have invented a certain new and useful Coal-Drill, of which the following is a specification.

This invention provides superior means for rotating and feeding a spiral drill-shaft; and it is particularly adapted to permit rapid withdrawal of the shaft.

The invention is exemplified in the structure hereinafter described, and it is defined in the appended claims.

In the drawings forming part of this specification, Figure 1 is a representation of a drill embodying my invention, the operative parts being concealed by the casing. Fig. 2 represents the operative parts of the drill mechanism in section, the handle being removed from the drive-shaft and the drill-shaft being omitted. Figs. 2 and 3 are details on line *x* in Fig. 1 of the means employed to permit rapid withdrawal of the drill-shaft. Fig. 4 is also a detail on line *x* of Fig. 1, showing clutch in different position.

The drill-shaft 1 has key seats or grooves, as 2, cut into its perimeter lengthwise of its axis, and it is regularly spiral. A sleeve fits loosely on the drill-shaft, and it has a pair of internal longitudinal ribs or splines, as 13, which engage the grooves 2 of the drill-shaft. The sleeve 12 has a gear-wheel 11 beveled to mesh with the beveled pinion 10, and a shaft 9, journaled at right angles with the axis of the sleeve, carries the pinion 10 and is rotated by a crank-handle 8. A sleeve 24 abuts against sleeve 12 or terminates in the vicinity thereof, and such sleeve has a pair of oblique wings, as 25, on its inner surface, which wings engage the spiral shaft after the manner of the threads of a nut. A spur-wheel 14 is attached to the end of sleeve 12 adjacent to sleeve 24, the connection being preferably made through a rib 15, which engages a slot in the end of the sleeve and forms a part of spur-wheel 14. In practice there are two ribs 15 and two slots in the sleeve; but it is inconvenient to show more than one in the drawings. A spur-wheel 23 is formed on the end of sleeve 24 adjacent to sleeve 12. A counter-shaft 18 is journaled parallel with the sleeves 12 and 24 some distance therefrom, and spur-pinions 16 and 19 are mounted on the counter-shaft and mesh one with wheel 14 and the other with wheel 23. Pinion 16 is attached to the counter-shaft, and it has clutch projections 17 on its face adjacent to pinion 19. The pinion 19 is slidable lengthwise of the counter-shaft, and it has clutch-lugs 20 on its face adjacent to pinion 16. A flange 21 is formed on the end of a hub extension of pinion 19, thus producing an annular groove in which a shifter-fork 22 rides. The shifter-fork has a rounded and threaded end 22^a, which extends through a slot 4^a of casing 4, and a wing-nut 22^b is screwed onto the threaded end 22^a outside the casing to hold the shifter-fork in position. When the shifter-fork is set in the position shown in Fig. 3, the clutch projections 20 of pinion 19 will engage the clutch projections 17 of pinion 16, and the two pinions will rotate together. When the shifter-fork is set in the position shown in Fig. 4, the clutch projections are out of engagement and the pinions may each rotate independent of the other.

The gearing is so speeded that the sleeve 24 will move slightly slower than sleeve 12, and this is preferably accomplished by giving pinions 16 and 19 the same number of teeth and providing wheel 23 with one more tooth than wheel 14 has.

When the pinions 16 and 19 are in clutch and the crank-arm 8 is rotated, motion is imparted to sleeve 12 through pinion 10 and wheel 11, and the ribs or splines 13 of the sleeve 12 give rotary motion to the spiral drill-shaft. The gear-wheel 14 rotates with sleeve 12 and drives pinion 16. Pinion 19 receives motion from pinion 16 through the clutch projections, and it imparts motion to gear-wheel 23 at a slightly-reduced speed, as compared with the speed of gear-wheel 14. As the shaft rotates with sleeve 12 its speed is somewhat greater than that of sleeve 24, and so the shaft is gradually forced lengthwise through the sleeves by the inclined-plane action of the retarded wings 25 of sleeve 24.

When the shaft 1 has been forced into the coal a required distance, the pinions 16 and 19

are thrown out of clutch, as shown in Fig. 4, and the shaft is withdrawn by a backward pull applied directly to the shaft. As the shaft is withdrawn the sleeve 24 and pinion 19 are turned by the inclined-plane action of the spiral on the wings 25; but the other gearing remains stationary.

The working mechanism is suitably incased, and the casing provides journals for the rotating bearings. The sleeve 24 journals in the part 3 of the casing, a lateral extension 4 of casing 3 forms a housing for pinions 16 and 19, the part 5 of the casings provides a journal for sleeve 12, and the drive-shaft 9 journals in a box 7, attached to a plate 6. The part 3 4 of the casing is on one side of plate 6, part 5 is on the other side of the plate, and the two parts are secured together and to the plate by bolts passing through suitable lugs. The sleeve 12 extends through plate 6 to engage wheel 14, the counter-shaft 18 journals at one end in the plate, and when the parts of the casing are separated from the plate all the moving parts are accessible and detachable.

I claim—

1. In driving mechanism for coal-drills the combination with a spiral drill-shaft having longitudinal grooves, of a sleeve having internal ribs to engage the grooves, a sleeve having inclined wings to bear against the spiral surfaces of the shaft, gear-wheels on the sleeves, a counter-shaft, parallel with the drill-shaft, a pair of pinions on the counter-shaft meshing one with each of the gear-wheels of the sleeves, and means for connecting and disconnecting the pinions, substantially as described.

2. In mechanism for driving coal-drills, the combination with a spiral drill-shaft having longitudinal grooves, of a sleeve having internal ribs to engage the grooves of the shaft, a sleeve having inclined wings to bear against the spiral surfaces of the shaft, gear-wheels on the sleeves, a counter-shaft parallel with the drill-shaft, a gear-pinion fixed on the drive-shaft in mesh with the wheel of one of the sleeves, such pinion having a clutch-face, a gear-pinion mounted slidably on the counter-shaft in mesh with the wheel of the other sleeve, clutch projections on the slidable pinion adapted to engage the clutch-face of the relatively fixed pinion, means for shifting the slidable pinion to throw it in and out of clutch and means for imparting rotary motion to the sleeve having the ribs, substantially as described.

3. In mechanism for driving coal-drills, the combination with a spiral drill-shaft having longitudinal grooves, of a sleeve having ribs adapted to engage the grooves of the drill-shaft such sleeve being slotted at one end, a bevel gear-wheel on the ribbed sleeve, a drive-shaft at right angles with the ribbed sleeve, a pinion on the drive-shaft meshing with the beveled gear-wheel of the sleeve, a spur-wheel fitting over the slotted end of the ribbed sleeve and having internal lugs to engage the slots thereof, a sleeve having wings to engage the spiral surfaces of the drill-shaft, a spur-wheel on the winged sleeve, a train of gearing connecting the spur-wheel on the ribbed sleeve with the spur-wheel on the winged sleeve and a clutch in the train of gearing, substantially as described.

In testimony whereof I sign my name in the presence of two subscribing witnesses.

GEO. F. WEISS.

Witnesses:
ROSA VOELCKER,
C. G. POWERS.