H. J. KIMMAN.

DRILL.

APPLICATION FILED AUG. 21, 1919.

1,385,458.

Patented July 26, 1921.

2 SHEETS—SHEET 1.

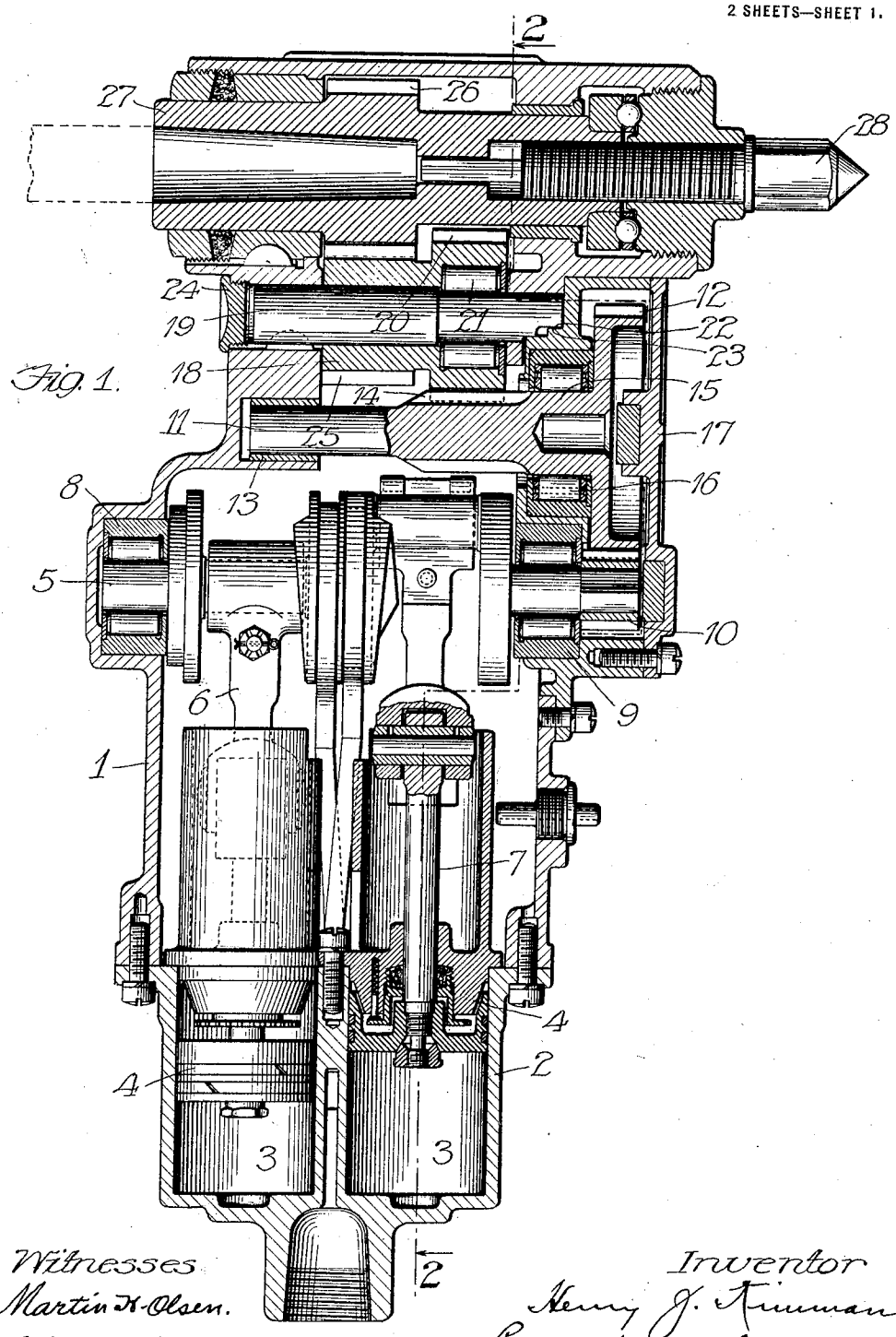


Fig. 1.

Witnesses
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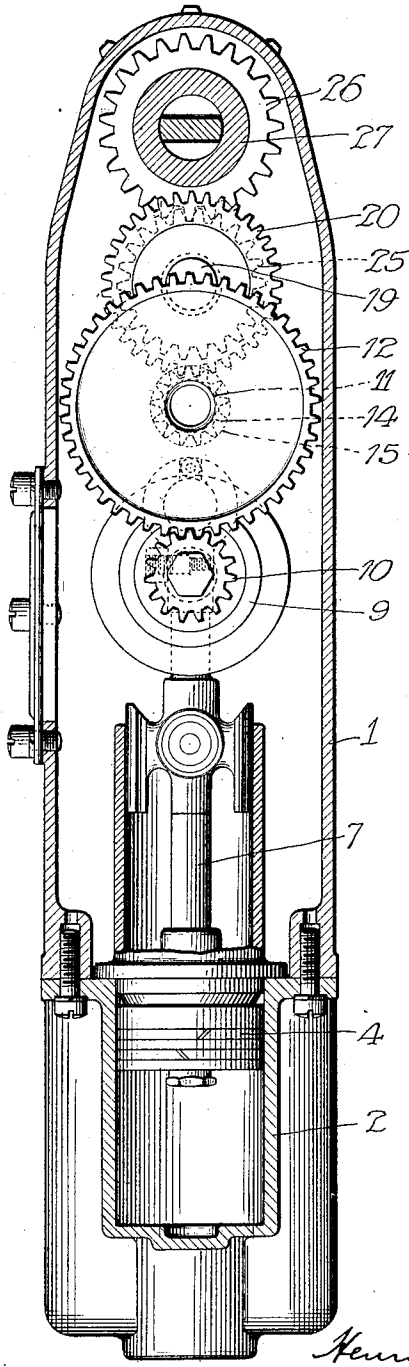
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2 SHEETS—SHEET 2.

Fig. 2.



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UNITED STATES PATENT OFFICE.

HENRY J. KIMMAN, OF CLEVELAND, OHIO, ASSIGNOR TO CHICAGO PNEUMATIC TOOL COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF NEW JERSEY.

DRILL.

1,385,458. Specification of Letters Patent. **Patented July 26, 1921.**

Application filed August 21, 1919. Serial No. 318,935.

To all whom it may concern:

Be it known that I, HENRY J. KIMMAN, a citizen of the United States, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented certain new and useful Improvements in Drills, of which the following is a specification.

My invention relates to fluid pressure drills and more particularly to that type known as close-quarter or corner drills. The object of my invention is to provide a simple and efficient, as well as compact construction of drill of this character, such invention pertaining more particularly to the construction and arrangement of the gearing between the power shaft and the drill spindle. The various features of advantage and utility in my construction of drill will be apparent from the description hereinafter given.

In the drawings Figure 1 is a longitudinal sectional elevation of drill embodying my invention and Fig. 2 a section on the line 2—2 of Fig. 1.

Referring to the embodiment of my invention as herein shown the drill body comprises a main casing 1 and an end casing or cap 2, within which body are contained the operating parts or engines and the drill spindle together with the intermediate operating connections.

Within the drill body are arranged a plurality of engines consisting of cylinders 3 within the cap 2, pistons 4 within such cylinders, a main driving shaft in the form of a crank shaft 5, and connecting rods 6 and piston rods 7. The crank shaft is supported in bearings 8 and 9 arranged within the main body or casing of the drill and the extreme right hand end of such shaft is fashioned as or provided with a pinion 10.

The pinion 10 is adapted to drive a main intermediate shaft 11 which is of novel construction and arrangement. As shown this shaft 11 has a stem or shank portion and an enlarged gear wheel portion 12, the latter meshing with the pinion 10. The extreme left hand end portion of the shaft 11 is plain and mounted in a bearing 13 within the main casing. The intermediate portion of this stem is fashioned as or provided with a pinion 14 while the portion intervening between this pinion 14 and the gear portion 12 and indicated at 15 is made plain and is supported in bearings 16 which are here roller bearings, the same as the bearings 8 and 9.

The side of the main casing adjacent this main intermediate shaft and gear wheel 12 is made removable as by means of the side plate 17 removably connected to the main casing, with the result that this shaft, etc., may be readily removed for inspection, repairs, or replacement.

The pinion 14 is adapted to mesh with a secondary intermediate shaft which is here in the form of a hollow sleeve 18 loosely mounted upon a shaft 19 which is supported at its ends in the main casing. This sleeve has at one end an enlarged head provided with a gear 20 with which the pinion 14 meshes. Within this head are located the bearings 21 which are here roller bearings. The shaft 19 is stationary and prevented from rotating by means of its shouldered end 22 adapted to contact with a shoulder 23 in the inner side of the main casing. Such shaft is prevented from moving longitudinally out of place by means of the screw plug 24.

The sleeve portion of this secondary shaft, that is the left hand end portion, is provided with pinion teeth 25 adapted to mesh with the gear teeth 26 on the periphery of the drill spindle 27. This spindle is suitably mounted in the usual manner in the extreme end of the main casing and also is provided with the usual feed screw 28.

By the construction above described I provide a simple and efficient structure and a well-balanced and effective means for transmitting the power from the crank shaft of the engine to the drill spindle.

I claim:

1. A drill of the class described, comprising a casing, an engine therein including a main driving shaft, a drill spindle supported by the casing and operating connections between said shaft and spindle including a pinion at one end of the main driving shaft, a bearing for said shaft coacting with one end thereof and a second bearing for the shaft engaging an intermediate surface of said shaft, a main intermediate shaft mounted within the casing and having at one end a gear meshing with said pinion and provided intermediate its length with a pinion, a bearing for one end of said intermediate shaft, and a second bearing for said shaft

coöperating therewith between the pinion and gear thereon, and a secondary shaft mounted within the casing and having disposed thereon a gear meshing with the pinion of the main intermediate shaft and also having a pinion, and a gear portion on said spindle meshing with said last mentioned pinion.

2. A drill of the character described, comprising a casing, an engine therein and a main driving shaft, a drill spindle and operating connections between said shaft and spindle consisting of a pinion disposed at one end of the shaft, bearings for said main driving shaft, one of said bearings coöperating with the shaft intermediate its ends and the other bearing engaging said shaft at one end thereof, a main intermediate shaft mounted within said casing and comprising a stem having two separated plain surfaces constituting bearings for said shaft and an intermediate pinion portion and also an enlarged gear at one end of the shaft with which the pinion of the main driving shaft meshes, one of the bearings for the shaft engaging the plain surface thereof between said gears and the other cooperating with one end of the shaft, a secondary shaft mounted within the casing having a gear thereon with which the intermediate pinion of the main intermediate shaft meshes, and a second gear on said secondary shaft having a driving connection with the spindle, said casing having a removable closure for permitting access to be had to the coöperating gears on the main drive shaft and the main intermediate shaft.

3. A drill of the class described, comprising a casing adapted to receive a driving engine, a main driving shaft disposed within said casing and supported in bearings arranged in the walls of the casing, said driving shaft having a driving gear thereon, a main intermediate shaft mounted within the casing and supported thereby, said shaft having at one end a gear meshing with said pinion and intermediate its length a pinion, a secondary intermediate shaft mounted in the casing and having a gear meshing with the pinion of the main intermediate shaft and also a driven pinion connected with said gear, a spindle rotatably mounted within the casing, and a gear on said spindle driven by said last mentioned gear on the secondary shaft, said casing being provided along one side with a removable closure to permit access to be had to the meshing pinion on the main drive shaft and the gear on the main intermediate shaft.

HENRY J. KIMMAN.