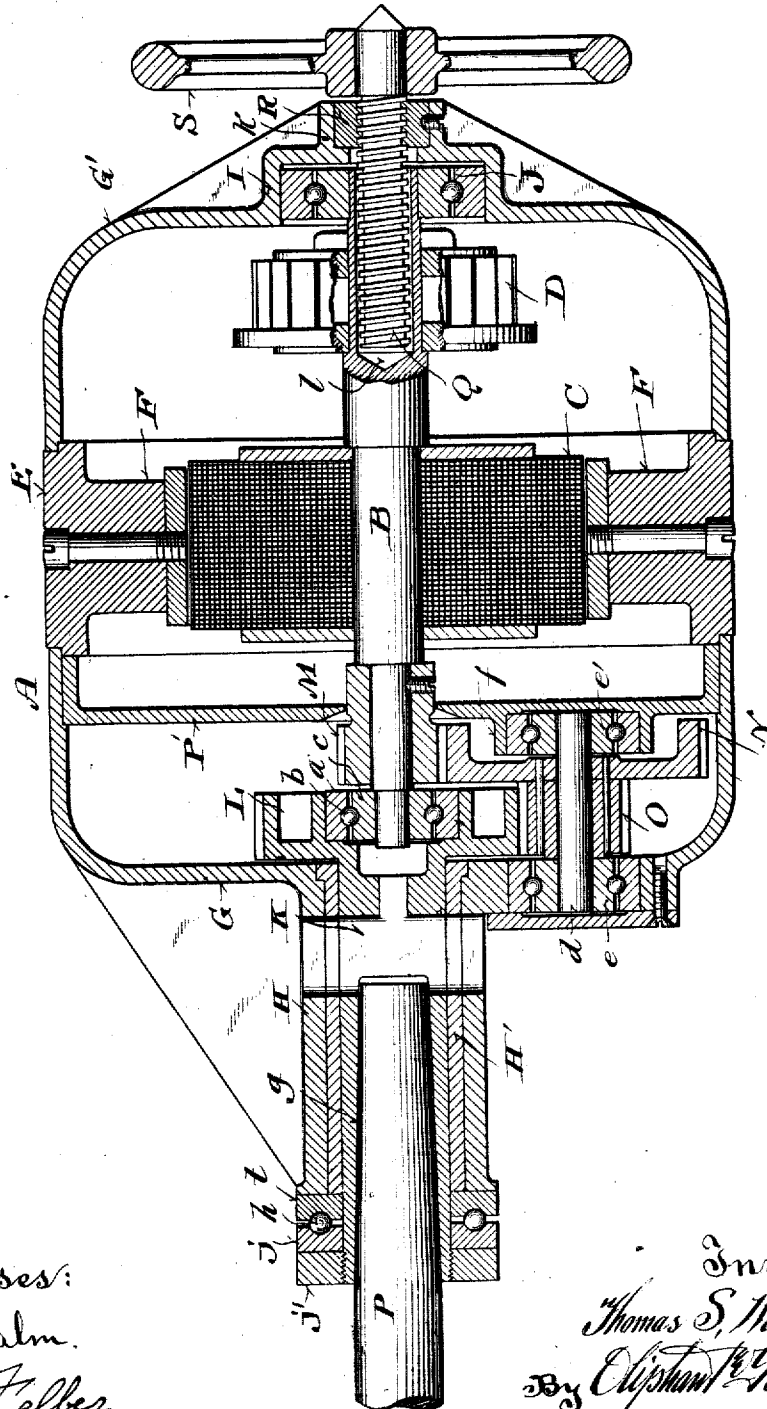


T. S. WATSON.
PORTABLE DRILL DRIVER.
APPLICATION FILED SEPT. 1, 1906.

Patented Sept. 7, 1909.
2 SHEETS—SHEET 1.

933,144.

Fig. 1



Witnesses:
Fred Palm.
George Felber

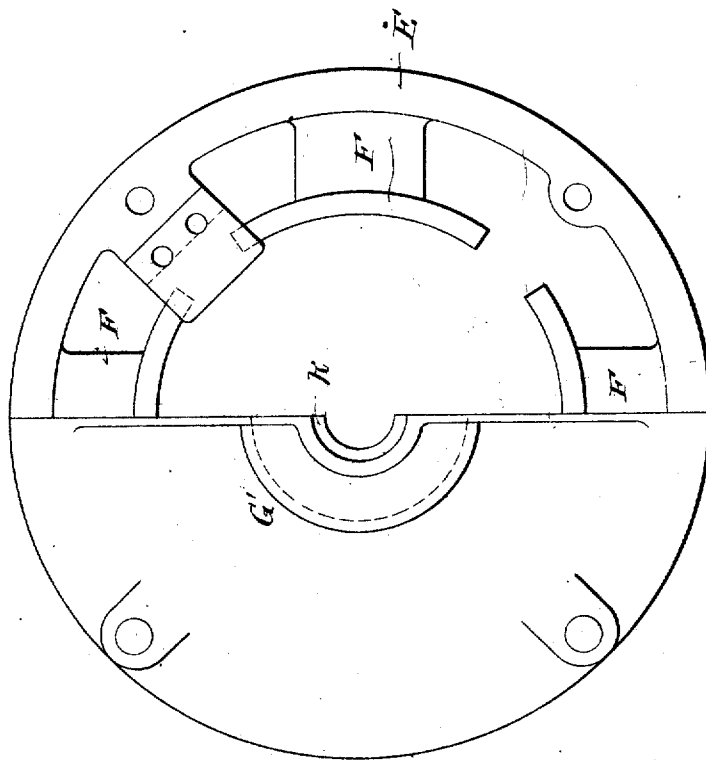
Inventor
Thomas S. Watson
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2 SHEETS—SHEET 2.

Fig. 2.



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UNITED STATES PATENT OFFICE.

THOMAS S. WATSON, OF MILWAUKEE, WISCONSIN.

PORTABLE DRILL-DRIVER.

933,144.

Specification of Letters Patent.

Patented Sept. 7, 1909.

Application filed September 1, 1908. Serial No. 333,000.

To all whom it may concern:

Be it known that I, THOMAS S. WATSON, a citizen of the United States, and resident of Milwaukee, in the county of Milwaukee and State of Wisconsin, have invented certain new and useful Improvements in Portable Drill-Drivers; and I do hereby declare that the following is a full, clear, and exact description thereof.

My invention pertains to portable electric motors for driving drills, its object being to produce a simple, economical and compact motor for this purpose, the construction and arrangement being such that the tool-chuck thereof is alined with the motor-shaft, provision being made for receiving the thrust resistance of said chuck and drill upon the motor-casing.

Said invention consists in certain peculiarities of construction and combination of parts as hereinafter fully set forth with reference to the accompanying drawings and subsequently claimed.

In the drawings: Figure 1 represents a longitudinal central section of an electric motor embodying the features of my invention, and Fig. 2, an end-view of the motor-casing partly in elevation and partly sectioned away.

Referring by letter to the drawings, A indicates the casing of a portable electric motor, B the motor-shaft, C the armature and D the commutator. The casing comprises a central ring section E, which carries the cores F of the field magnets, and end castings G, G', bolted to the central ring section, the cap G being formed with a hub extension H, alined with the motor-shaft, while the cap G' is provided with a cup I for the reception of a ball-bearing J for said motor-shaft. The hub H carries a bushing H' that forms a bearing for a tool-chuck K, having its inner end formed with a gear-wheel L, which wheel is centrally recessed for the reception of a ball race a, that together with balls b and a cone c, secured to the motor-shaft serve as the front bearing for the latter. The said motor-shaft is back-gearred to the tool-chuck through a pinion M fast on the aforesaid shaft and in mesh with a gear-wheel N, having a toothed hub O that meshes with and drives the tool chuck gear-wheel.

The gear-wheel N is fast upon a stud d

that revolves in ball-bearings e, e', respectively seated in the cap G and a cup f of a disk P, between which disk and cup the gears are nested, the disk being secured to said cap G and provided with a central opening through which the motor-shaft protrudes.

The shank P' of a drill tool is fitted into a recess g of the chuck, end-thrust of said tool being taken up by balls h interposed between a ball-race t abutting the end of the hub H and a collar j that is carried by said chuck and held in place therein by a set-nut j' in threaded engagement with a correspondingly threaded end of the aforesaid chuck.

In order to feed the drilling tool in its work a threaded feed spindle Q engages a nut R that is fitted in a recess k of the rear cap portion G' of the motor-casing; this spindle at its outer end is provided with an adjusting wheel S, and cone point, adapted to engage a suitable rest, the inner end of said spindle being arranged to telescope within a bored opening l of the motor-shaft.

From the foregoing it will be understood that motion is communicated, at reduced speed, from the motor-shaft to the drilling-tool through the back-gear, and thrust on the chuck taken up by the ball-bearing between the latter and hub H, the alinement of said motor-shaft and chuck being such as to permit the front shaft bearing being placed within the revoluble chuck, which chuck is entirely within the hub, thereby reduces the length of the device to a minimum, resulting in a compact, rigid and simple mechanism, having the working parts all protected by the motor-casing.

I claim:

A drill-driver comprising a motor-casing having a centrally disposed hub-extension at one end and a centrally disposed fixed nut at the opposite end, an end-thrust ball-bearing at the outer end of the hub-extension, a collared tool-chucking sleeve fitted into said hub-extension adapted to be opposed by its end-thrust ball-bearing, the tool-chucking sleeve being provided with a gear at its inner end, a partially hollow shaft mounted in bearings concentric with said tool-chucking sleeve and fixed nut, the partially hollow shaft being free to have end-play in its bearings independent of the aforesaid tool-chuck-

ing sleeve, an armature carried by the shaft
in gear-connection with the tool-chucking
sleeve, and a spindle in threaded engagement
with said fixed nut, the spindle being nor-
5 mally nested within the hollow portion of
the shaft but independent thereof.

In testimony that I claim the foregoing I

have hereunto set my hand at Milwaukee in
the county of Milwaukee and State of Wis-
consin in the presence of two witnesses.

THOMAS S. WATSON.

Witnesses:

GEO. W. YOUNG,
N. E. OLIPHANT.