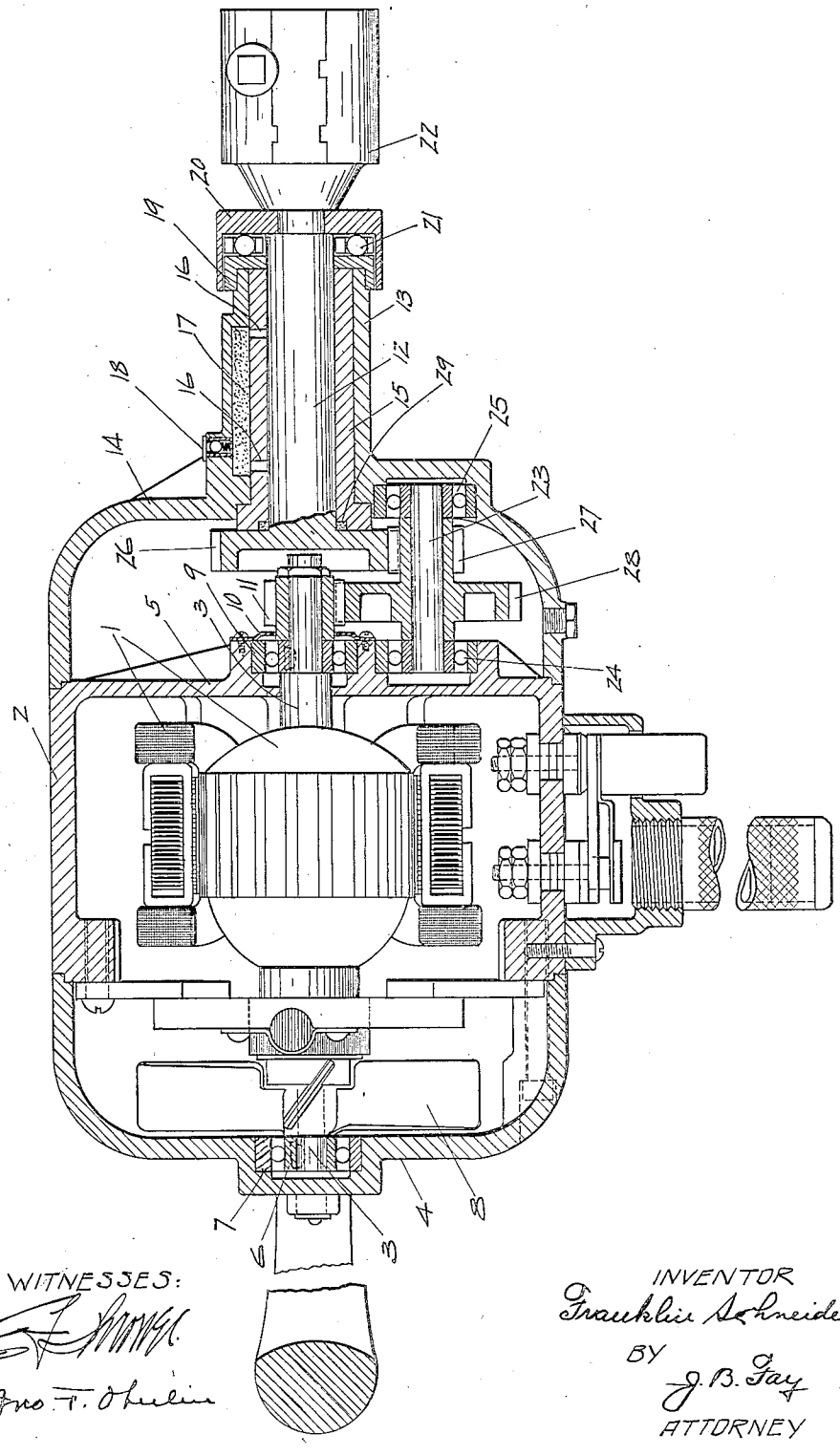
F. SCHNEIDER.

ELECTRICALLY OPERATED TOOL.

APPLICATION FILED FEB. 13, 1911.

1,231,071. Patented June 26, 1917.



WITNESSES:

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FRANKLIN SCHNEIDER, OF CLEVELAND, OHIO, ASSIGNOR, BY MESNE ASSIGNMENTS, TO THE VAN DORN ELECTRIC TOOL COMPANY, OF CLEVELAND, OHIO, A CORPORATION OF OHIO.

ELECTRICALLY-OPERATED TOOL.

1,231,071. Specification of Letters Patent. Patented June 26, 1917.

Application filed February 13, 1911. Serial No. 608,382.

To all whom it may concern:

Be it known that I, FRANKLIN SCHNEIDER, a citizen of the United States, and a resident of Cleveland, county of Cuyahoga and State of Ohio, have invented a new and useful Improvement in Electrically-Operated Tools, of which the following is a specification, the principle of the invention being herein explained and the best mode in which I have contemplated applying that principle, so as to distinguish it from other inventions.

While the present invention, as indicated, relates to electrically operated tools, said invention has more particular regard to the construction of tools in this class designed to be carried about by the workmen, such as portable electric drills, and the like. It is, however, a matter of indifference what particular kind of tool be employed, as should be obvious. The object of the invention is the provision of a tool of this class which will be light, strong and durable, and to the accomplishment of the latter result more especially, particular pains have been taken to provide adequate lubricating means for the several operative parts. Said invention, then, consists of the means hereinafter fully described and particularly pointed out in the claims.

The annexed drawing and the following description set forth in detail certain mechanism embodying the invention, such disclosed means constituting, however, but one of various mechanical forms in which the principle of the invention may be used.

In said annexed drawing:—

The single figure there appearing represents, in central longitudinal section, a tool embodying my present improvements.

The details of construction of the motor 1 proper need not, of course, be noted as they form no part of the present invention. Such motor is housed within a casing, preferably of general cylindrical form, constructed of three portions, a central body portion 2 closed at one end by a transverse partition 5 and two end portions 4 and 14, respectively closing the open end of such body portion and forming a chamber in connection with such partition. The motor 1 has its spindle 3 journaled at one end, in the end-wall of portion 4 of said casing and at the other end in the transverse partition 5, which is imperforate save for the bearing for such spindle. The spindle bearing in end-wall 4 does not extend through the latter and is of the ball-bearing type, the inner ball-race 6 being keyed on the spindle, while the outer one 7 is held in the recess in the casing wall, so as to be longitudinally movable.

Adjacent to the bearing just described, a fan 8 is provided, being so disposed as to drive air through the motor to cool the latter, suitable apertures (not shown) being provided laterally adjacent to the motor coils through which the air is discharged.

The inner end of the motor spindle, journaled, as has been explained, in the transverse partition 5, is likewise provided with ball-bearings, the outer ring 9, being here held against longitudinal movement in the partition formed to receive the same by means of a washer 10 which also serves the further purpose of making a tight fitting joint with the spindle or rather with the hub of the pinion 11 on said spindle, by means of which the latter is geared with the tool-spindle 12.

Such tool-spindle is journaled in an apertured extension 13 in the corresponding end-wall 14 of the casing, a bushing 15 co-extensive with such extension forming the bearing proper. This bushing is formed with lateral openings 16 that register with an open lubricant chamber 17 in the inner wall of the extension 13 filled with felt or like absorbent material, and provided with an external opening 18 for the introduction of lubricant in quantity. Over the ends of the extension and the bushing thus held therein, is fitted a bearing ring 19 which is inclosed by a second bearing ring 20 longitudinally fixed to the spindle and having a flange laterally inclosing said first ring. Balls 21, are introduced between such two bearing rings to form an anti-frictional bearing, which is obviously adapted to take up the thrust imposed upon the tool carried by the spindle. Such tool is secured to the latter by means of a chuck 22 of familiar construction.

The gearing connections between the motor and tool spindles comprise an intermediate spindle 23 journaled at its respective ends in suitable ball-bearings 24 and 25 formed in the partition 5 adjacent to the motor spindle bearing and in the opposite end-wall 14 of the casing adjacent to the extension 13 that receives the tool spindle. The latter is formed with an integral gear

26, which meshes with a pinion 27 on such intermediate spindle, while a second gear 28 on such last-named spindle, connects the latter with the pinion 11 on the motor spindle.

By reason of the imperforate character of the partition wall 5, taken in connection with the washer 10 that surrounds the motor spindle and constitutes in effect a baffle, the chamber between such partition and the opposite end-wall 14 of the casing is adapted to retain lubricant, preferably one of the non-fluid oils, so that the gearing thus connecting the motor and work spindles, is at all times insured thorough lubrication without any waste of oil, or escape thereof into the windings of the motor. A ring 29, of felt, or equivalent packing material, is interposed at the inner end of the extension 13 between the sleeve 15 therein and the work-spindle so as to prevent the escape of lubricant from the chamber into the extension wherein said work-spindle is journaled. The latter is more directly lubricated at the point where the heaviest strain is imposed upon it through lubricating chamber 17, and the lubricant thus supplied may be selected especially for the service, a different quality from that utilized in the gear-chamber being obviously preferable.

In conclusion, it should also be remarked that the construction of the body in three portions, as hereinbefore described, contributes materially to the ease and expedition with which the tool may be assembled. Thus the motor may be readily placed in the intermediate, or body, portion of said casing, and the inner end of its spindle adjusted in the bearing therefor provided in partition 5; the end portion 4 is then fitted onto said body portion of the casing so as to completely inclose the motor and accessory parts, it being noted that the construction of the ball-bearing in such end, designed to receive the corresponding end of the spindle, automatically accommodates itself to variation in the longitudinal position of said spindle.

Finally the other end portion 14, with the work-spindle independently assembled therein, is fitted to the other end of the casing, the intermediate, connecting gearing being incidentally interposed between the motor and work-spindles.

Other modes of applying the principle of my invention may be employed instead of the one explained, change being made as regards the mechanism herein disclosed provided the means stated by any of the following claims or the equivalent of such stated means be employed.

I therefore particularly point out and distinctly claim as my invention:—

1. In mechanism of the character described, the combination of a casing provided at one end with a transverse partition integral with said casing, imperforate save for a central aperture; walls respectively closing the other end of said casing and forming a chamber in connection with said partition; a single motor housed centrally in said casing and having a spindle, one end of said spindle extending through the aperture in said partition into such chamber and the other end of said spindle being journaled in the wall closing the other end of said casing; an anti-friction bearing in said partition adapted to support such extending spindle-end, the latter being otherwise un-supported; a gear secured on such extending spindle-end and lying in such chamber; a tool spindle journaled in and wholly supported by the end-wall of the casing adjacent to said partition; a gear on said spindle lying within the chamber between said end-wall and partition; an intermediate spindle disposed within said chamber and journaled in said partition and adjacent end-wall; and gears borne by said intermediate spindle and meshing respectively with the gear on said motor spindle and the gear on said tool spindle.

2. In mechanism of the character described, the combination of a casing provided at one end with a transverse partition integral with said casing, imperforate save for a central aperture; walls respectively closing the outer end of said casing and forming a chamber in connection with said partition; a single motor housed centrally in said casing and having a spindle, one end of said spindle extending through the aperture in said partition into such chamber and the other end of said spindle being journaled in the wall closing the other end of said casing, such aperture being formed to permit the snug, rotatable engagement of such first spindle-end therein; an anti-friction bearing for such extending spindle-end, comprising an outer ball-race mounted in said partition and an inner ball-race fitted on such spindle-end, the latter being otherwise un-supported; a washer attached to said partition and retaining said outer ball-race in place, said washer surrounding such spindle-end and closing the aperture through said partition against the passage of lubricant; a gear secured on such extending spindle-end and lying in such chamber; a tool spindle journaled in and wholly supported by the end-wall of the casing adjacent to said partition; a gear on said spindle lying within the chamber between said end-wall and partition; an intermediate spindle disposed within said chamber and journaled in said partition and adjacent end-wall; and gears borne by said intermediate spindle and meshing respectively with the gear on said motor spindle and the gear on said tool spindle.

3. In mechanism of the character described, the combination of a casing pro-

vided at one end with a transverse integral partition, imperforate save for a central aperture; walls respectively closing the outer end of said casing and forming a chamber in connection with said partition; a single motor housed centrally in said casing and having a spindle, one end of said spindle extending through the aperture in said partition into such chamber and the other end being journaled in the wall closing the other end of said casing, such aperture being formed to permit the snug, rotatable engagement of such first-named spindle end therein; such end being of reduced diameter exteriorly of such partition, thereby forming a shoulder on said spindle; an anti-friction bearing for such extending spindle end, comprising an outer ball-race mounted in said partition and an inner ball-race fitted on such spindle against such shoulder, the spindle being otherwise unsupported; a washer attached to said partition and retaining said outer ball-race in place, said washer surrounding such spindle-end and closing the aperture through said partition against the passage of lubricant; a gear secured on such extending spindle end and lying in such chamber, the mounting and disposition of said bearing and said gear preventing endwise movement of said motor and spindle; a tool spindle journaled in and wholly supported by the end-wall of the casing adjacent to said partition; a gear on said spindle lying within the chamber between said end-wall and partition; an intermediate spindle disposed within said chamber and journaled in said partition and adjacent end-wall; and meshing respectively with the gear on said motor spindle and the gear on said tool spindle.

Signed by me this 6th day of February, 1911.

FRANKLIN SCHNEIDER.

Attested by—

CHRISTINE E. ARNS,

JNO. F. OBERLIN.