No. 824,922. PATENTED JULY 3, 1906.

E. W. FAHL.

DYNAMO MOTOR.

APPLICATION FILED DEC. 18, 1905.

3 SHEETS—SHEET 1.

Fig. 1

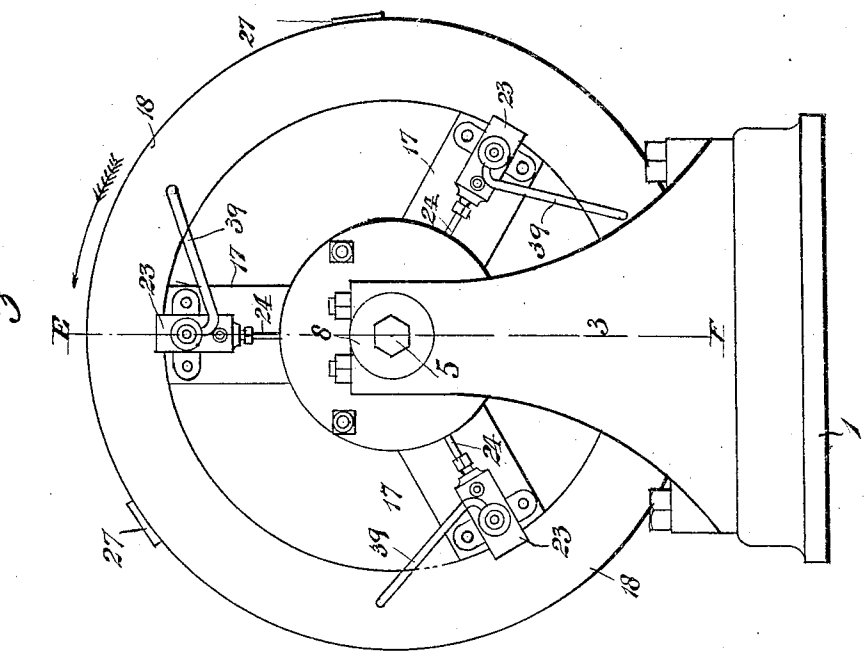
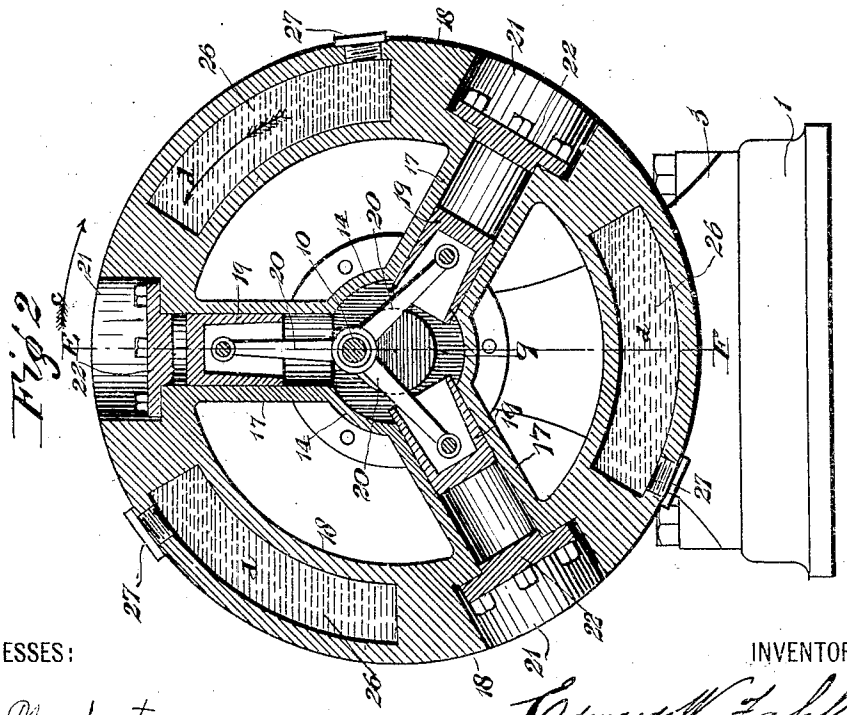


Fig. 2



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3 SHEETS—SHEET 2.

Fig. 4

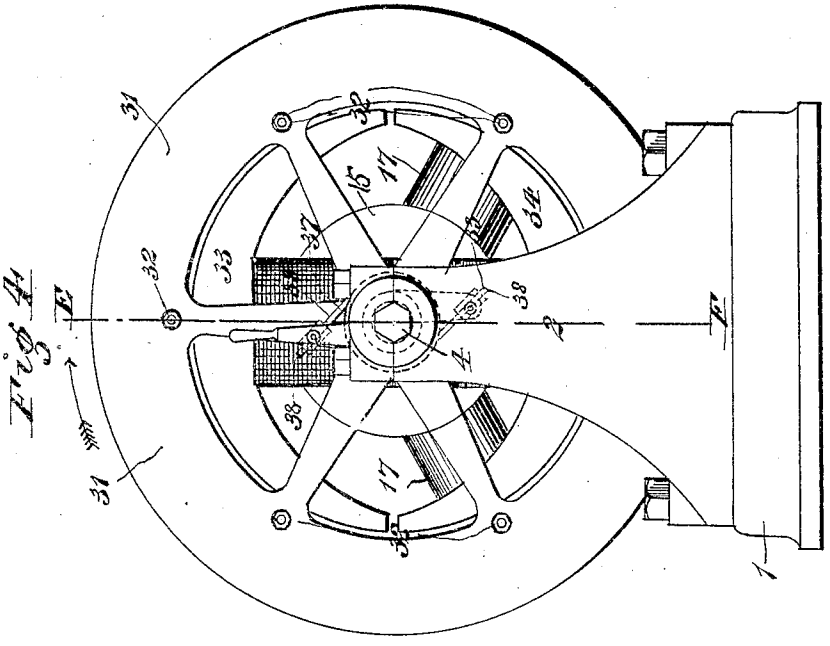
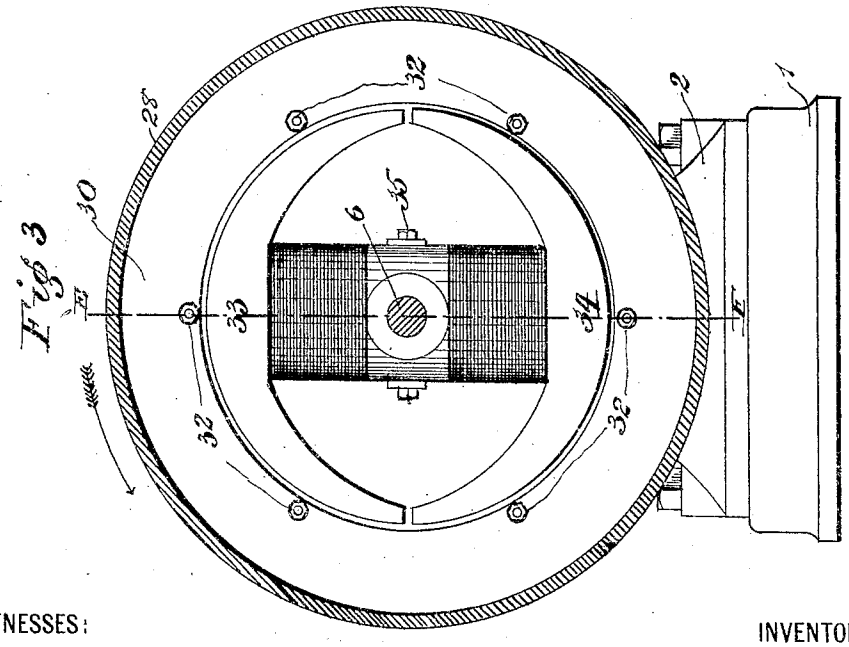


Fig. 3



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3 SHEETS—SHEET 3.

Fig 6

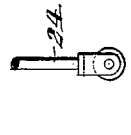


Fig 7

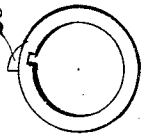
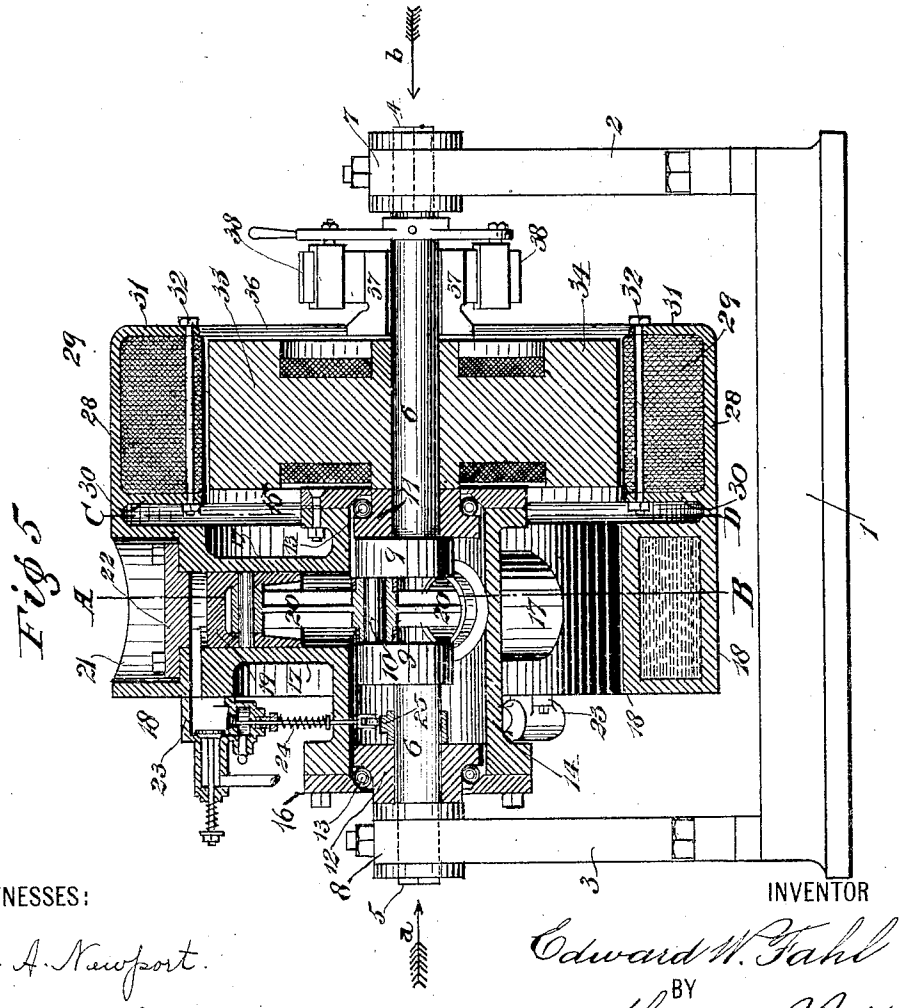


Fig 5



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UNITED STATES PATENT OFFICE.

EDWARD W. FAHL, OF SHIRLEY, INDIANA.

DYNAMO-MOTOR.

No. 824,922. Specification of Letters Patent. Patented July 3, 1906.

Application filed December 18, 1905. Serial No. 292,347.

To all whom it may concern:

Be it known that I, EDWARD W. FAHL, a citizen of the United States, residing at Shirley, in the county of Hancock and State of Indiana, have invented certain new and useful Improvements in Dynamo-Motors, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention relates to a dynamo or electric generator or a motor therefor, which motor is so constructed that the greater mass of the motor and the dynamo or generator is concentrated in the revolving mass, and said motor and generator are so connected and the weights or masses thereof distributed to render the running of the motor steady and uniform.

The object of this invention is to construct a compact electric generator and its motor to form practically a single self-contained machine and connect them in such a manner that a minimum space will be occupied by the elementary machines thus combined to form a single machine, also to construct the motor itself in such a way that the mass of the motor will be approximately concentrated in that portion of the motor corresponding to the fly-wheel thereof, also to provide a compact cheap, self-contained directly-connected and driven electric generator particularly adapted to produce electricity for smaller plants or domestic purposes. I obtain these objects by means of the combined electric generator and motor illustrated in the accompanying drawings, in which similar numerals of reference designate like views throughout the several parts.

Figure 1 is a front elevational view of the apparatus looking in the direction of the arrow *a*. (See Fig. 5.) Fig. 2 is a transverse sectional elevation taken through the line A B (see Fig. 5) and looking in the direction of the arrow *b*. Fig. 3 is a similar section taken through the line C D and looking in the direction of the arrow *a*. Fig. 4 is an end elevational view looking in the direction of the arrow *b*. (See also Fig. 5.) Fig. 5 is a longitudinal sectional elevational view of the apparatus, taken through the line E F. (See Figs. 1, 2, 3, and 4.) Fig. 6 is a detail view of the roller or tappet end of one of the valve-stems of the valve-gear of the motor, and Fig. 7 is a detail view of the cam for operating the valve mechanism of the motor.

The supporting-frame of this machine comprises a base or bed plate 1, upon the top ends of which rest and are secured the standards or end housings 2 and 3. The top portions of the standards or housings 2 and 3 are recessed or formed to accurately receive the hexagonally-formed ends 4 and 5 of the fixed crank-shaft 6, and the said shaft 6 is removably and fixedly secured in said standards by the clamping-caps 7 and 8. The fixed crank-shaft 6 is provided with the integral cranks 9 and the crank-pin 10, all of which are either formed in one integral piece or are rigidly secured together. Ball-bearing collars 11 and 12 are secured on the crank-shaft 6, around which the ball-bearings 13 run.

A central casing 14 encircles and completely incloses the crank portion of the fixed crank-shaft 6, and to its flanged ends are secured the ball-bearing retaining-caps 15 and 16, which are removably secured to said flanged ends of said casing, and said retaining-caps are provided for the purpose of forming outer bearings for the ball-bearings 13 and to retain the motor-cylinders centrally over the crank-pin 10 of the crank-shaft 6. Integral with the centrally-inclosed casing 14 are the three equally-spaced radially-extending cylinders 17, which extend to the rim 18 and are formed integral therewith and serve the purpose of spokes or arms for the rim 18.

Each of the cylinders 17 is provided with trunk-pistons 19, and each of said pistons is connected to the crank-pin 10 by suitable connecting-rods 20. The outer periphery of the rim 18 is provided with recesses 21, which are situated centrally over the cylinder 17, and the same are provided for the purpose of introducing the cylinder-heads 22 therein to be fitted to the cylinder ends 17 to close the outer ends of the latter. Suitable valves 23 are provided for each of said cylinders 17, and each cylinder-valve is provided with a valve-stem 24, which is operated in its order by a suitable cam, as the cam 25, mounted on the fixed shaft 6, and the said cam 5 may be regulated or adjusted in any suitable manner by suitably-arranged gears or any of the well-known mechanisms peculiarly adapted to this class of engine.

Suitable independent reservoirs or tanks 26 for carrying a supply of gasolene or other explosive fluid are formed in the rim 18, and each of said tanks is independently and directly connected to that valve-gear on the cylinder supplied by it. Removable plugs 27 are screwed into the ends of each reservoir

26, and the same are provided for the purpose of charging the tanks or reservoirs 26. Integral with the side of the rim 18 of the motor is formed an overhanging armature-rim 28, which is situated to be equally distant from the axis of the crank-shaft 6 similar to the rim 18, and the said overhanging rim 28 carries the armature 29, which latter is secured to the inner and outer flange 30 and 31 of said rim by suitable clamping-bolts 32.

The field-magnets 33 and 34 are formed in one integral piece and are mounted on the shaft 6 and securely held in position thereon to be situated within the surrounding armature 29 by suitable set-screws 35. Radial arms extend from the outer flange 31 to the commutator 37, and the same are provided for the purpose of connecting the armature 29 with the commutator 37. Any suitable brushes 38 are provided for the purpose of collecting the current in the usual way.

It will be noticed on examining the motor and dynamo as a complete structure that the revoluble parts of the motor and the dynamo are so connected as to concentrate the entire revolving mass in the rim of the motor, thereby producing and insuring a regular and continuously smooth rotative motion of the motor, thereby producing a continuous and steady flow of current to produce a steady and clear light.

When the motor has its valve mechanism arranged to operate the motor to revolve in the direction of the arrow *c*, it will be noted that the fluid contained in each of the reservoirs 26 will tend to flow in the opposite direction—that is, in the direction of the arrow *d*, that is toward its outlet-pipe. Each cylinder is connected directly to its own reservoir—that is, the reservoir preceding a cylinder is connected to the latter by its connecting feed-pipe 39. The advantage of connecting each of the cylinders of the motor to its own reservoir—that is, the reservoir directly preceding it—is the tendency of the fluid contained in each reservoir to move in an opposite direction to that of the rotation of the rim of the motor. In other words, the tendency when the motor is caused to revolve in the direction indicated is to cause the fluid to flow toward that end of the reservoir next to the cylinder to be supplied thereby. It is obvious that the entire fluid contained in each of the reservoirs 26 will therefore pass through the feed-tube 39 to the valve and completely drain each of the tanks or reservoirs. As a matter of course when the supply of the fluid in each of the tanks or reservoirs 26 is exhausted it becomes necessary to revolve each of the openings closed by the blocks 27 to the most elevated or top position in order to completely fill the reservoir. This operation of course will be readily understood on referring to the drawings.

I claim—

1. In a combined dynamo and motor, the combination with a fixed or non-revolubl crank-shaft, the crank thereof, a crank-shaft-supporting frame, a crank-inclosing casing revolubly mounted on said shaft, a series of cylinders equally spaced around said crank-shaft casing and extending radially therefrom, and an integral exterior rim connecting the outer ends of each of said cylinders and each of said cylinders connected to said fixed crank-inclosing casing of an armature secured to said motor to revolve therewith, and a fixed magnet situated within said armature and carried by said shaft.

2. In a combined dynamo and motor, the combination with a fixed crank-shaft, the crank thereof, and a crank-shaft-supporting frame, of a crank-inclosing casing revolubly mounted on said shaft, a plurality of equally-spaced radially-extending cylinders connected to said crank-inclosing casing, an exterior rim connecting the outer ends of said radially-extending cylinders and having independent fluid-containing reservoirs formed therein and situated between the outer ends of each cylinder, an armature secured to said motor to revolve therewith, and a fixed magnet situated within said armature.

3. In a combined dynamo and motor, the combination with a fixed or non-revoluble crank-shaft, the crank thereof, and a crank-shaft-supporting frame, of ball-bearing collars situated on each side of said crank, a crank-inclosing casing, ball-bearings situated between said crank-inclosing casing and said ball-bearing collars upon which said crank-inclosing casing revolves, suitable means for retaining said ball-bearings in position between said ball-bearing collars and said crank-inclosing casing, a plurality of radially-extending cylinders formed integral with and equally spaced around said crank-inclosing casing and formed integral with the latter, reciprocating pistons in said cylinders, connecting-rods connecting said pistons to said crank, an integral rim connecting the outer ends of said radially-extending cylinders and having independent fluid-containing reservoirs formed therein and situated between the outer ends of each cylinder, an armature secured to said motor to revolve therewith, and a fixed magnet situated within said armature.

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

EDWARD W. FAHL.

Witnesses:

JOHN C. WOOD,

CLAUDE A. HIATT.