G. N. B.

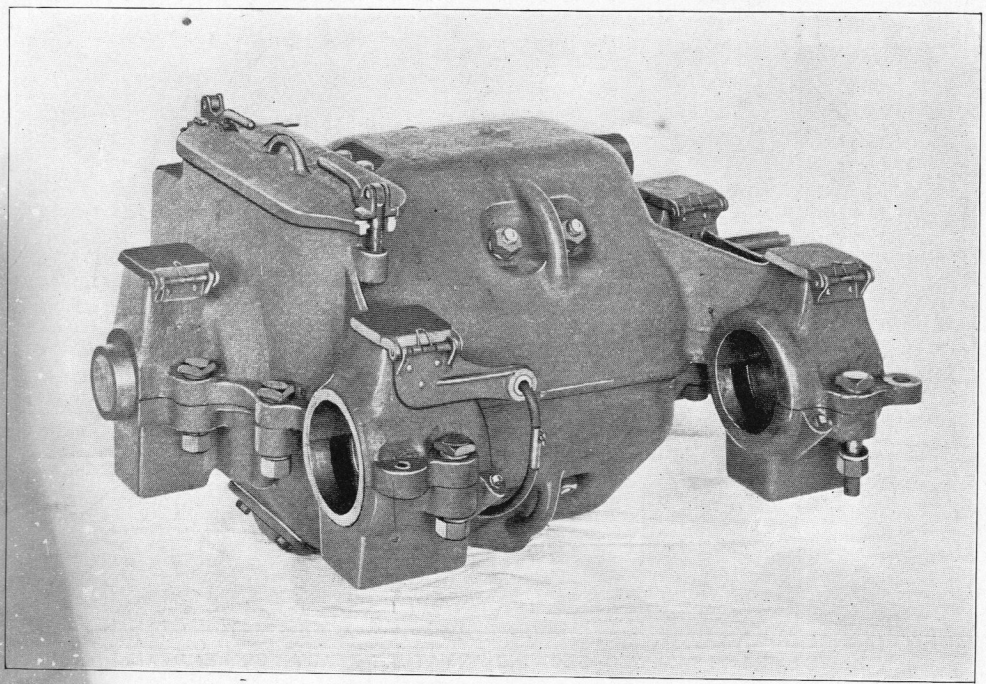
General Electric Company

RAILWAY DEPARTMENT.

Bulletin No. 4107. **June 28, 1897.**

THE GE-52 RAILWAY MOTOR.

The unqualified success of the GE–1000 motor has determined the Company to develop a motor on the same general lines, but of less capacity, and as a result such a motor is now ready for production and will be known as the GE–52. This motor has been designed with special reference to light weight, compactness and simplicity, combining all of the strong features evolved by our experience in Railway motor manufacture.



THE GE-52 RAILWAY MOTOR.

RATING.

The GE–52 motor has an output of 27 H.P., rated according to our standard basis, i.e., a maximum rise of 75° C. in the temperature of the windings after a run of one hour at rated load, the temperature of the surrounding air not exceeding 25° C.

The GE–52 motor is intended only for ordinary street railway work similar to that handled by the GE–800 motor, and is not recommended for the heavier service to which the GE–1000 motor is adapted. The motor has been designed similarly to the GE–1000 motor, to accommodate electric brakes, when so desired, but as some additional capacity is required where electric brakes are used, this motor is not recommended for such service excepting where the duty required of it will be light.

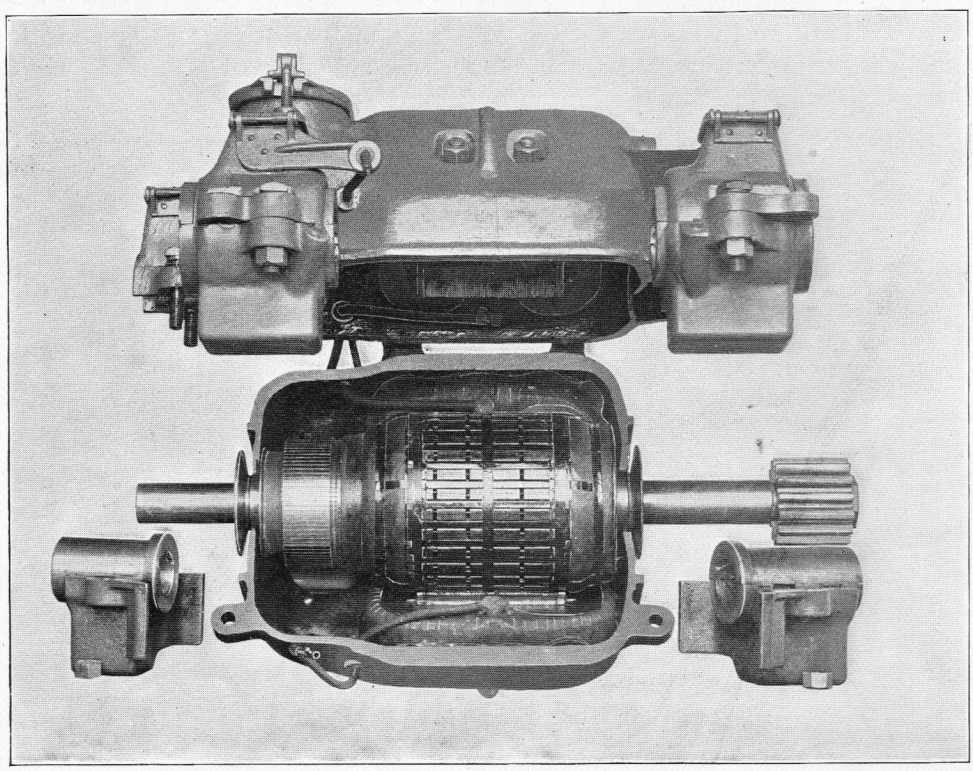
FRAME.

The frame is steel, cast in two bowl-shaped pieces, hinged and bolted in a manner that renders the motor practically water and dust proof.

A hand hole, fitted with a cover plate and gasket, is located in the lower half, directly beneath the commutator, thus permitting easy access to the bottom of the motor for inspection or for the removal of any foreign substance. The motor has four poles, each having its own coil. The pole pieces (unlike the GE–1000) are laminated, but are bolted to the frame in the same manner as the GE–1000, the bolts extending through the frame.

BEARINGS.

It is a well known fact that too much attention cannot be bestowed upon the designing



LOWER FRAME DROPPED--SHOWING ARMATURE READY FOR REMOVAL.

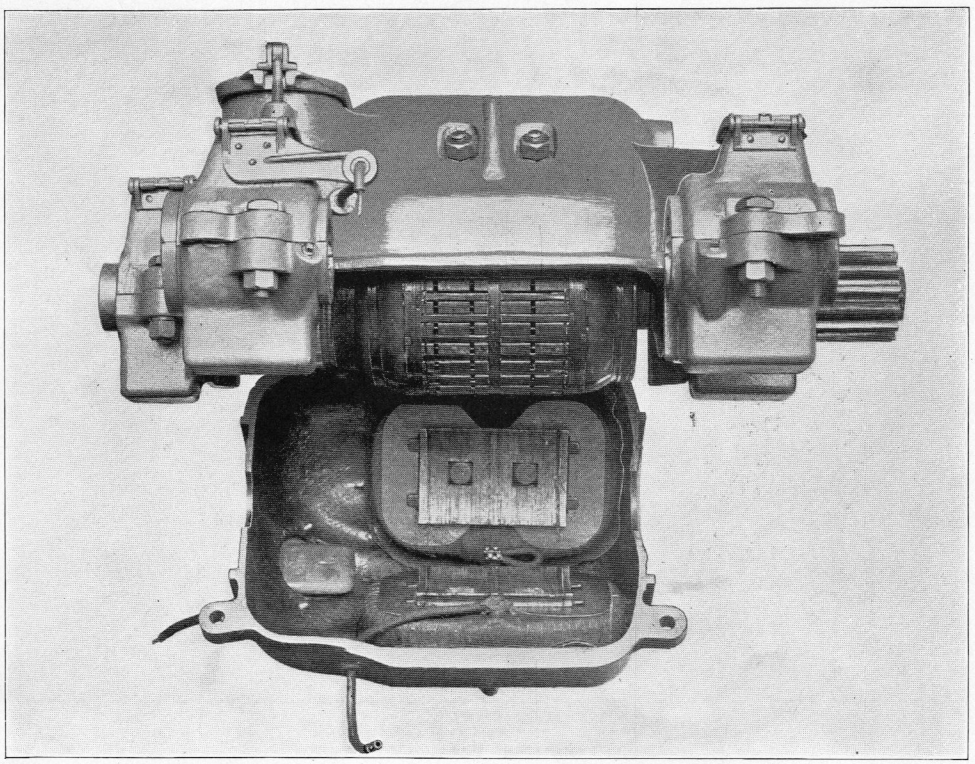
of bearings, as a large percentage of the cost of maintenance is due to the expense of renewing the linings.

The large bearing surface of this motor is one of its most important features. The armature bearings, designed for the use of oil or grease, or both, are of the following dimensions—pinion end, $7\frac{3}{4}''$ x $2\frac{3}{4}''$; commutator end, $6\frac{3}{8}''$ x $2\frac{1}{2}''$, and are constructed on the "outboard" plan. The upper support for the lining is cast with the upper half of the motor frame, and when the lining is in place, there is a space of one inch in the cored recess, between the inner end of lining and motor frame. This space is occupied by a combination thrust collar and oil guard. The thrust collar is extended through the motor frame into the recess where it acts as an oil guard. This portion of the collar is a tapered disk, $6\frac{1}{2}''$ in diameter. The lower support for the lining is a cap bolted to the upper half, but does not enclose the lower half of oil guard, which allows free outlet to the oil or grease. It will readily be seen that with this construction it will

be impossible for the lubricant to work into the motor. The upper grease or oil boxes are of ample size, and of the following dimensions inside—commutator end $3\frac{1}{2}''$ x $3\frac{1}{2}''$ x $3''$; pinion end $3\frac{1}{2}''$ x $3\frac{1}{2}''$ x $3\frac{1}{2}''$. The oil wells in the lower half are also of ample size, and of the following dimensions inside—commutator end $3''$ x $3''$ x $3\frac{1}{2}''$; pinion end $3\frac{1}{2}''$ x $3\frac{1}{2}''$ x $4\frac{1}{2}''$. The oil wells are provided with felt wicks or wipers, which wipe the shaft through openings cut in the linings. The axle bearings are also fitted with two wipers to each bearing, and linings are furnished for $3\frac{3}{8}''$, $3\frac{3}{4}''$ or $4''$ axles, as may be specified. The upper grease or oil boxes are $3''$ x $3''$ x $4''$ inside, and the lower oil wells are $3\frac{1}{2}''$ x $4''$ x $4''$ inside.

FIELD COILS.

Coils are wound with asbestos covered wire and "mummified", each being held in place on its respective pole by means of the pole piece projections, supplemented by a spring steel



LOWER FRAME DROPPED--SHOWING ARMATURE IN POSITION.

plate, and is placed in position before the pole piece is bolted to the frame. For convenience in car wiring and opening of motors, the field connections between upper and lower fields have been made on the outside of this motor, and both the field and armature leads are brought out at the front of the motor, the same as in the GE–1000.

ARMATURE.

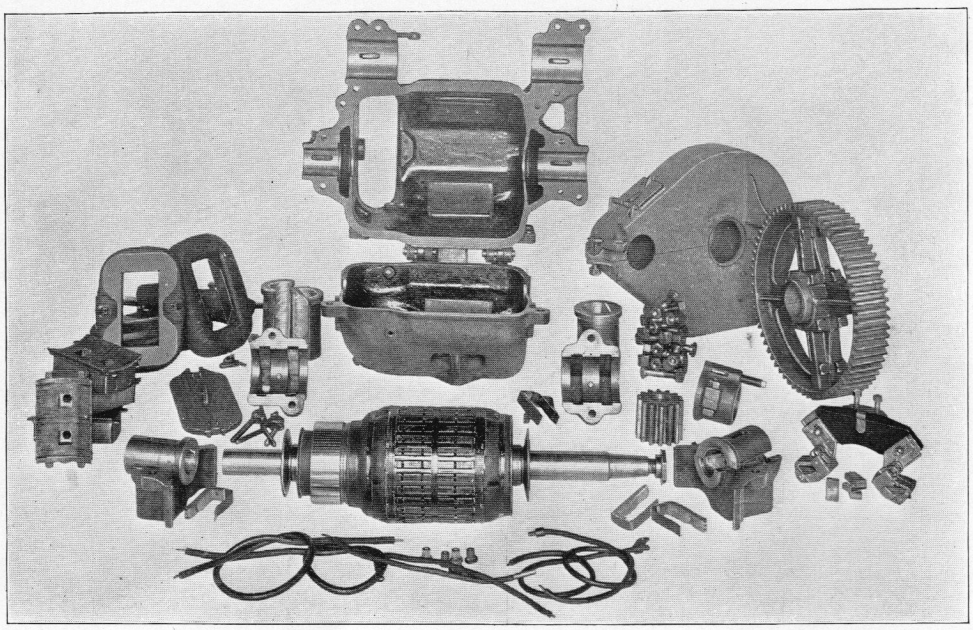
The armature is of the well known iron-clad, hollow core type, and is $11''$ in diameter with a spread of $9''$. The core is built up of well annealed laminæ, and to increase circulation of air, is provided with three ventilating ducts similar to our generator armatures. The armature has no spider but is assembled directly on the shaft. There are twenty-nine slots, each slot containing three coils formed into a compact unit, hence there are twenty-nine sets of coils and eighty-seven commutator bars.

The small number of coils is of special advantage in the matter of armature repairs, and the method of forming them in groups of three admits of a substantial insulation of high quality. The comparatively light weight of the armature and its consequent small inertia, will be readily appreciated, as it is well known that the stored energy in the mass of an armature must be overcome by means of the brake, when the car is brought to a stop.

The standard gear ratio is 4.78 with taper bore pinion having 14 teeth and a cast steel gear having 67 teeth. Higher speed gear ratios may be used, furnishing increased speed with proportionately decreased tractive effort.

COMMUTATOR AND BRUSH-HOLDERS.

The commutator is constructed on the same lines as that for the GE–1000 motor. The segments are of hard drawn copper, $1\frac{3}{16}''$ deep, allowing a wearing depth of $1''$. In assembling,



PARTS OF GE-52 RAILWAY MOTOR.

clamping bolts have been dispensed with and the clamping ring is held in place by a ring nut.

The brush-holders are standard and staggered to prevent the wearing of ridges in the center of the commutator. Each holder contains two radial brushes, $2\frac{1}{4}''$ long, $1\frac{1}{4}''$ wide and $\frac{1}{2}''$ thick. The brush-holder yoke is carefully treated with an insulating compound and rubbed to an enamel finish, preventing the lodging of carbon dust.

SUSPENSION.

The method of suspension can be the nose, the yoke, or the sidebar, the same as with the GE–1000 motor. The yoke suspension is especially recommended, as with this suspension the weight of the motor is carried on springs, placed upon the side frames of the car trucks. Lugs

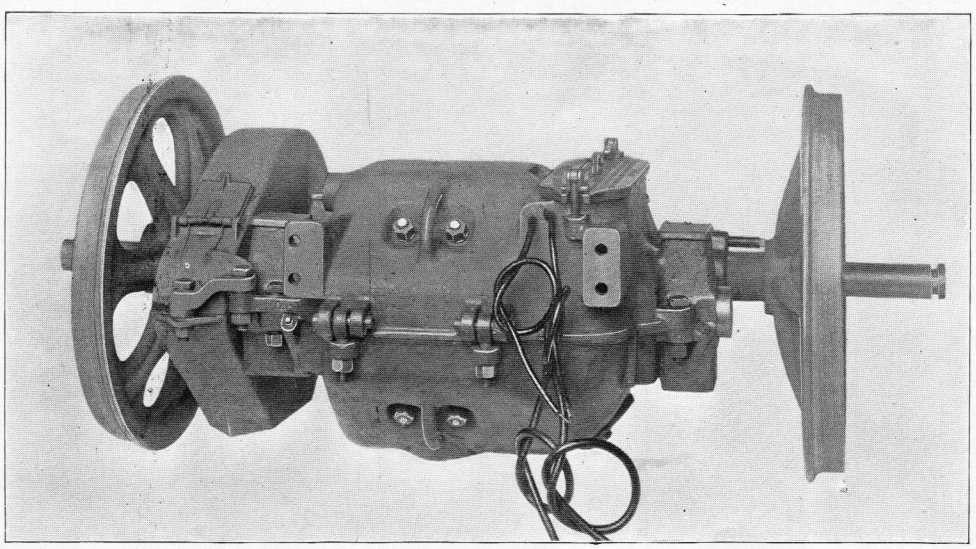
are cast on the upper half of the motor frame, to which the suspension bar is bolted, the motor being suspended from the top half. This permits easy access for inspection or repairs, as the lower half can be swung down into the pit without disturbing the upper half, which remains suspended from the axle and suspension yoke.

The same adjustable axle collar is furnished as with the GE–1000 motor.

When the motor is mounted on 33″ wheels, the clearance between the bottom of the motor and the top of the track rails is $5\frac{7}{8}$″. The clearance between the bottom of the gear case and the top of the track rail is $4\frac{5}{8}$″.

WEIGHT.

The motor, without gear or gear case, weighs 1460 lbs.; complete, with 67 tooth gear and malleable iron gear case, the weight is 1725 lbs.



GE-52 RAILWAY MOTOR ON AXLE.

EQUIPMENTS.

The controller equipment for one GE–52 motor is two R17 controllers, one PR 101 and one PR 102 resistance.

The controller equipment for two GE–52 motors is two K10 controllers, one PR 101 and one PR 102 resistance.

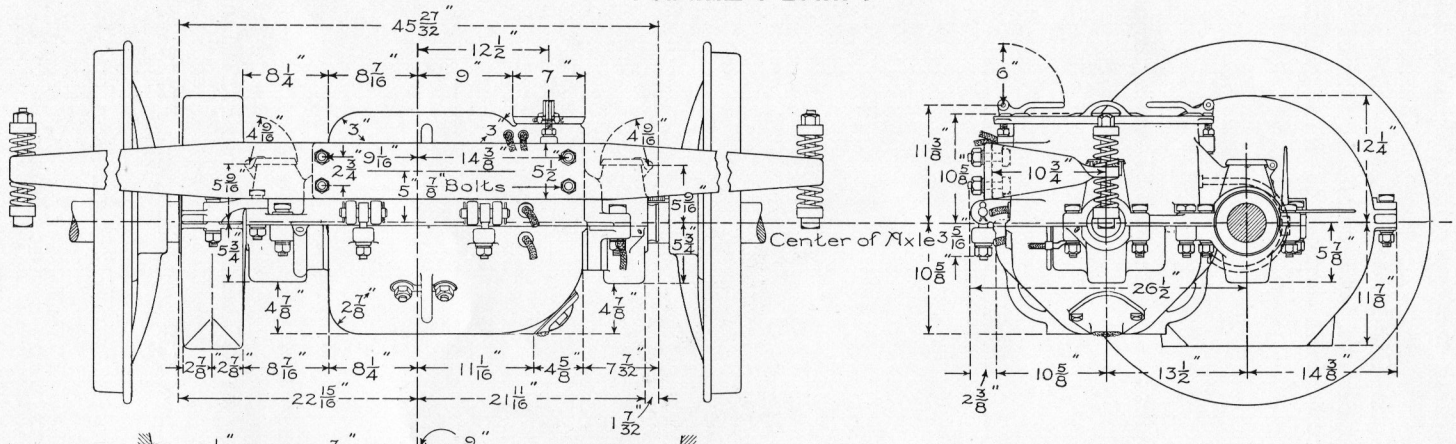
The controller equipment for four GE–52 motors is two K12 controllers and four resistances of suitable capacity.

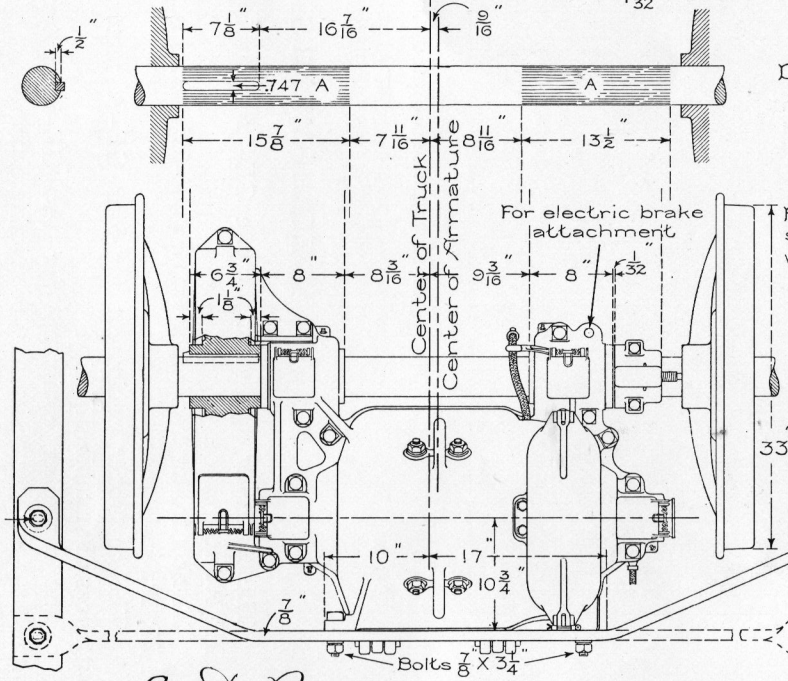
The controller equipment for two GE–52 motors with electric brakes is two B2 controllers and three resistances of suitable capacity.

The controller equipment for four GE–52 motors with electric brakes is two B6 controllers and six resistances of suitable capacity.

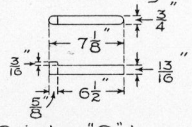
GE-52 MOTOR YOKE SUSPENSION

FRAME FORM I

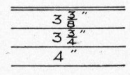




Details of Key



Diam. of Axle A

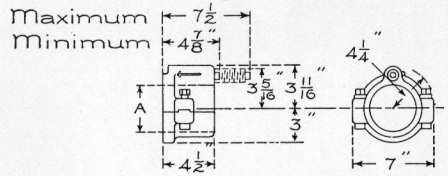


Dimensions of unfinished parts are subject to a small variation
Weights of pinion and gear change with ratio of gearing.

Points "S" to come as near as possible to line of armature shaft.

Weight of Motor complete without axle gear and case	1460	lbs.
" " Armature and Pinion (Pinion 14 teeth.)	357	"
" " Axle Gear (67 teeth)	140	"
" " Gear Case	125	"

Adjustable Axle Collar



Checked by E. D. Priest Engineering Dept. Approved by John L. Rice

No. 13327 General Electric Co. May 10, '97.

G.W.T.

GENERAL ELECTRIC COMPANY.

MAIN OFFICES, SCHENECTADY, N. Y.

SALES OFFICES:

BOSTON, MASS., 180 Summer Street.
NEW YORK, N. Y., 44 Broad Street.
SYRACUSE, N. Y., Sedgwick, Andrews & Kennedy Blg.
BUFFALO, N. Y., 901 D. S. Morgan Building.
PHILADELPHIA, PA., 509 Arch Street.
BALTIMORE, MD., 227 E. German Street.
PITTSBURG, PA., 502 Tradesmen's Bank Building.
ATLANTA, GA., Equitable Building.
NEW ORLEANS, LA., 423 Baronne Street.
CINCINNATI, OHIO., 420 West Fourth Street.
COLUMBUS, OHIO, 14 North High Street.
NASHVILLE, TENN., 308 North Summer Street.
CHICAGO, ILL., Monadnock Building.
DETROIT, MICH., 101 Woodward Ave.
ST. LOUIS, MO., Wainwright Building.
DALLAS, TEXAS, Junction Building.
HELENA, MONT., Electric Building.
MINNEAPOLIS, MINN., Phoenix Building.
DENVER, COLO., Kittredge Building.
SAN FRANCISCO, CAL., 15 First Street.
PORTLAND, ORE., Worcester Building.

For all business outside the United States and Canada: Foreign Dept., Schenectady, N. Y., and 44 Broad Street, New York.

For Canada, address Canadian General Electric Company, Ltd., Toronto, Ontario.