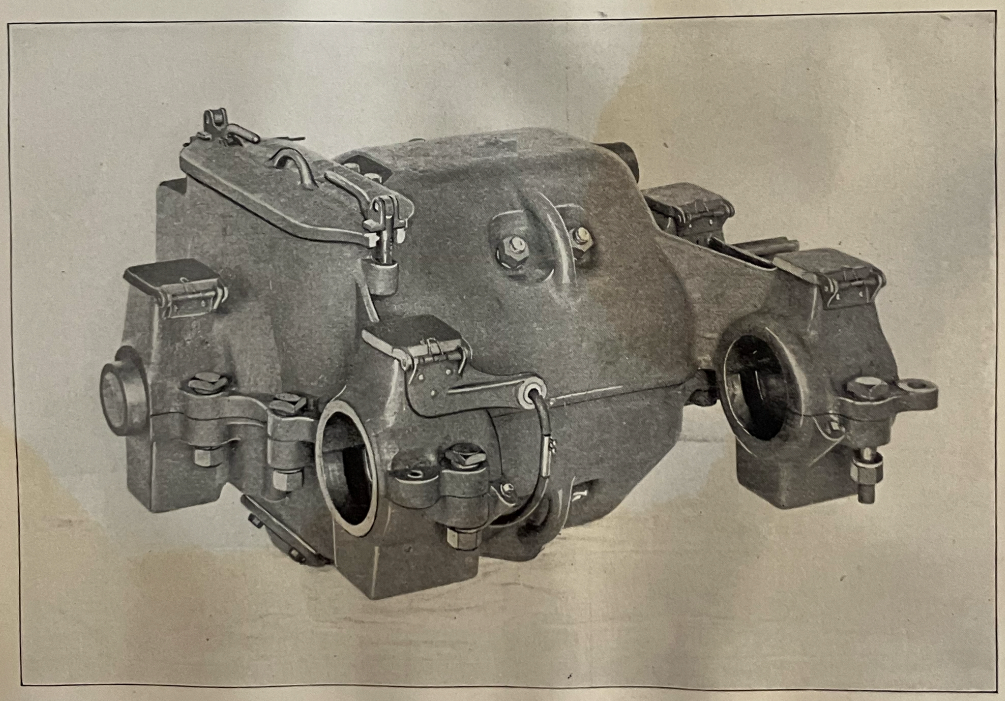
General Electric Company

RAILWAY DEPARTMENT.

March 27, 1900. **Bulletin No. 4221.**

THE GE-54 RAILWAY MOTOR.

The rapid growth of passenger traffic resulting in the increasing use of heavy cars on the lines of many of the electric roads operating within city limits has induced the General Electric Company to design and manufacture a motor known as the GE-54.



THE GE-54 RAILWAY MOTOR.

It is adapted for use on a minimum gauge of 48⅝″ and in general design and construction is similar to the GE-52.

RATING.

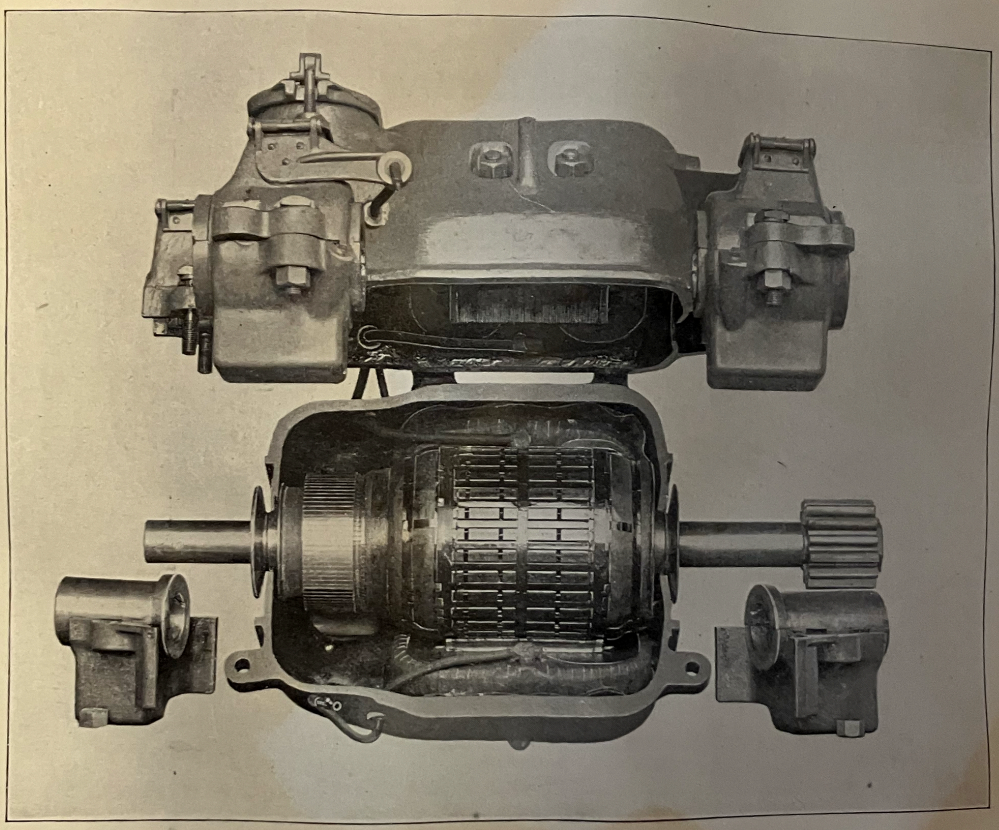
On 500 volts the GE-54 railway motor with three-turn armature will develop 25 H.P. This output is the standard rating, that is, a maximum rise of 75°C. in the temperature of the winding after a run of one hour at full rated load, the temperature of the surrounding air not exceeding 25°C.

Second Edition

MAGNET FRAME.

The magnet frame is in the form of a hexagon with well rounded corners and is cast in two pieces of soft steel of high magnetic permeability. The two castings are bolted together, but the front bolts are hinged in order that the lower frame may be swung down conveniently so as to permit inspection or repairs of the field or armature.

There is an opening in the frame just over the commutator large enough to provide for the removal of the brush-holders and brush-holder yoke and also to permit of inspection of the



LOWER FRAME DROPPED--SHOWING ARMATURE READY FOR REMOVAL.

commutator and brush-holders. The cover, which is of malleable iron, is held in place by an adjustable cam locking device and can be readily removed when necessary. The lower frame has a small opening directly under the commutator, also protected by a suitable cover.

BEARINGS.

The armature and axle bearings consist of cast iron shells of ample thickness ure stiffness, and are lined with Babbitt metal swaged into the shells as to them compact and tight.

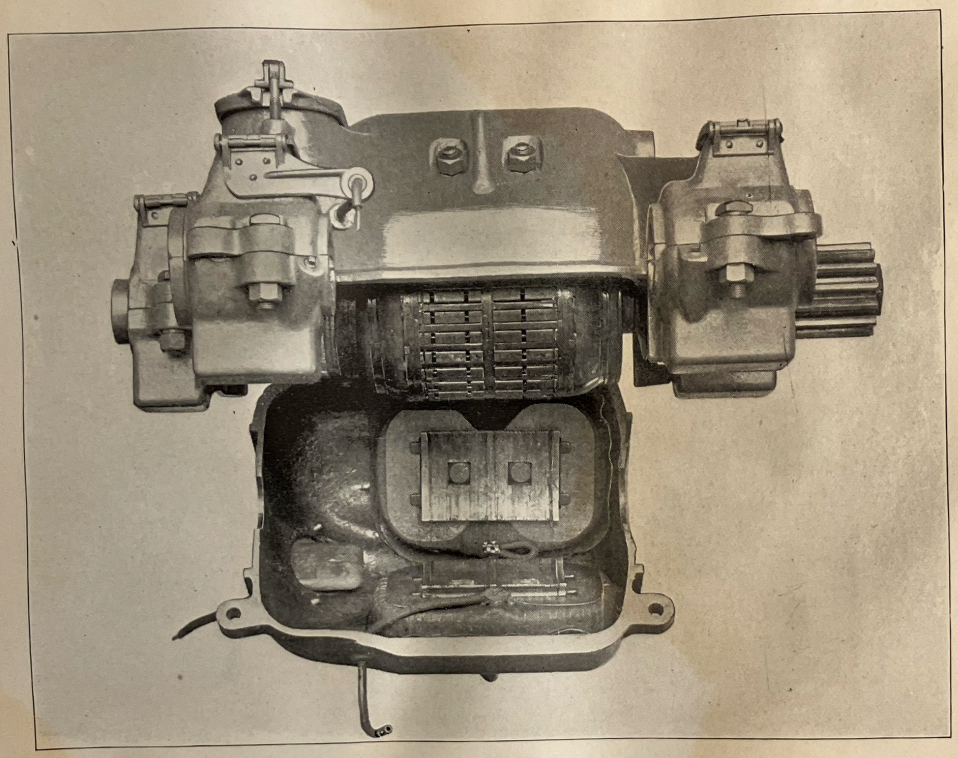
The bearings are designed for the use of both oil from oil wells in the caps by means of felt wicks, while grease box which is over each bearing, through a slotted

The armature bearings which are built on the end and 6″ x 2½″ at the commutator end. The supports as parts of the lower half of the magnet frame, and a la

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the lining and the frame to accommodate the combined thrust collar and oil guard. The design of the oil guard practically prevents oil or grease from working into the motor frame. The lower half of the armature bearing is supported by a cap bolted to the upper frame, and an opening is provided to allow free egress of the lubricant after it has passed through the bearing.

The axle bearing caps are bolted to the under side of extension pieces which are cast on each end of the upper half of the magnet frame, and which reach over and partly enclose the car axle. These parts are bored out to support and enclose the axle linings, which are 8″ long.



LOWER FRAME DROPPED--SHOWING ARMATURE IN POSITION.

POLE PIECES AND FIELD COILS.

The pole pieces are built up from thin soft iron laminations, riveted together and bolted to the frame by through bolts with nuts on the outside.

The four field coils are placed at an angle of 45° from the horizontal and are held in place by pressed steel flanges or spool holders which are clamped to the pole pieces. The coils are made of asbestos, cotton covered wire, and are further insulated with wrappings of varnished cloth and tape. The insulation on the coils is subjected to a high potential test of 4000 volts alternating cur[illegible]t.

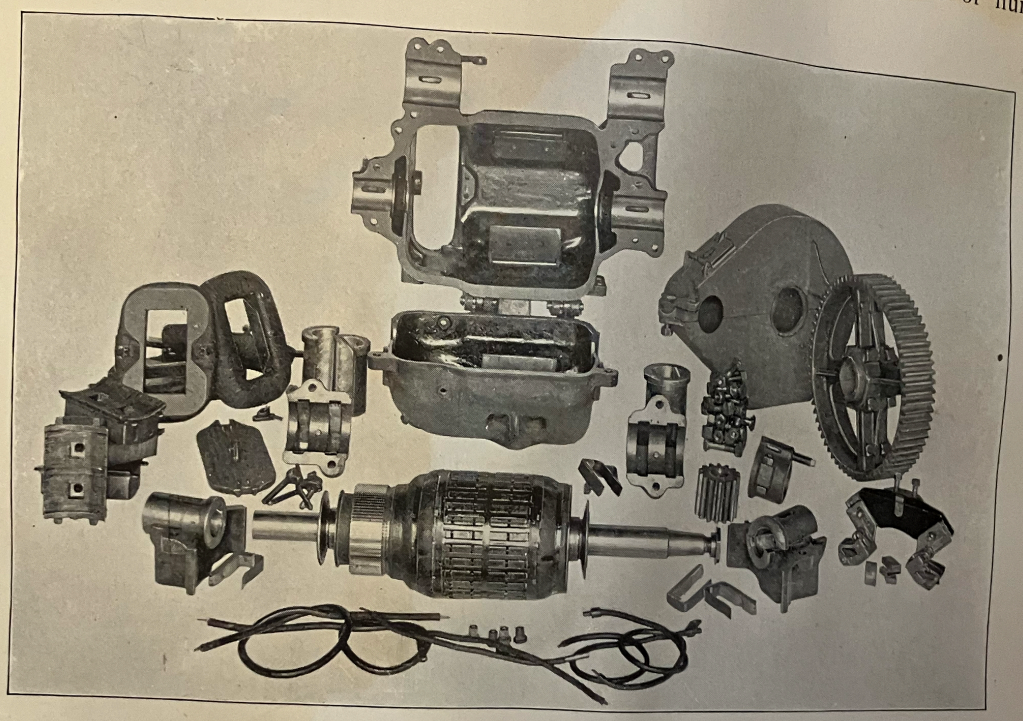
RMATURE.

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[illegible]pe, and the core is built up of thin soft iron laminations
[illegible]ly keyed to the shaft. The laminations are clamped
[illegible] also keyed to the shaft. The core is hollow and is
[illegible]ion end of the core and passes out through the air ducts
[illegible]minations.

The armature winding is of the series drum type, the number of turns per coil varying with the requirements of each case. The coils are made up in sets, and, before being placed in the slots of the armature core, each set is formed and thoroughly insulated with specially prepared tape and cloth which have high insulating qualities and are practically impervious to moisture.

The terminals of each coil are brought directly to the commutator segments and soldered so as to properly connect the coils to each other and at the same time form the connections between the windings and the commutator. They are so arranged that any coil or number of



PARTS OF GE-54 RAILWAY MOTOR.

coils can be easily removed and repaired, or replaced with new coils when necessary. The coils are held in place in the slots and on the ends of the core by bands of tinned steel wire held together by clips and soldered. The end windings are thoroughly protected by canvas, and, at the pinion end, they are further shielded by a flange which extends past the windings and prevents injury from careless handling.

When the coils have been placed on the core and the armature is completed, the insulation between the winding and the core is subjected to a high potential test of 2500 volts ...ting current.

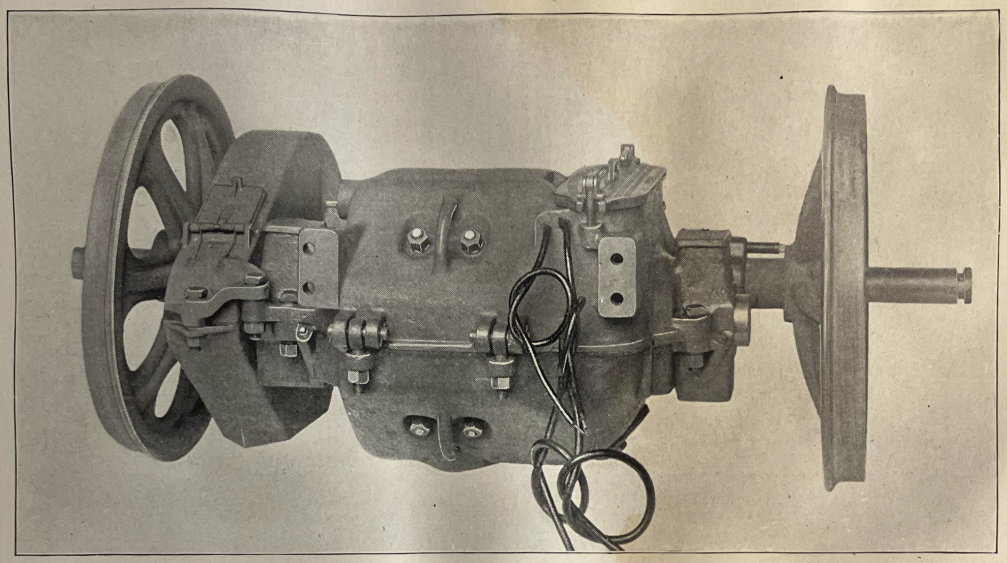
COMMUTATOR.

The commutator consists of 115 hard drawn ... back to receive the armature ...s, insulated with ca... to a malleable iron shell. ... diameter of the comm... with a depth of $1\frac{1}{32}$" measu... the front end. The ... quality of mica, built up a... ...d head and compac... a somewhat ... quality ... ...ven wear of se...

After the commutator is completed the insulation between the segments and the shell is subjected to a high potential test of 4000 volts, and that between adjacent segments, to 400 volts alternating current.

BRUSH-HOLDERS.

The two brush-holders are of cast brass and are clamped to a hardwood yoke which is bolted to the top of the magnet frame and can be removed through the opening in the frame over the commutator. The brushes slide in finished ways and are pressed against the commutator



THE GE-54 RAILWAY MOTOR ON AXLE.

by pressure fingers which give a practically uniform pressure throughout the working range of the brushes.

All leads from the motor to the cable are brought out at the front of the motor through rubber bushed holes in the magnet frame.

GEARING.

The pinion is of steel and is bored to a taper fit on the shaft. The gear also is of steel, and gear and pinion have a $4\frac{1}{2}''$ face and No. 3 pitch. They are protected by a dust-proof case of malleable iron which is securely bolted to the upper half of the magnet frame.

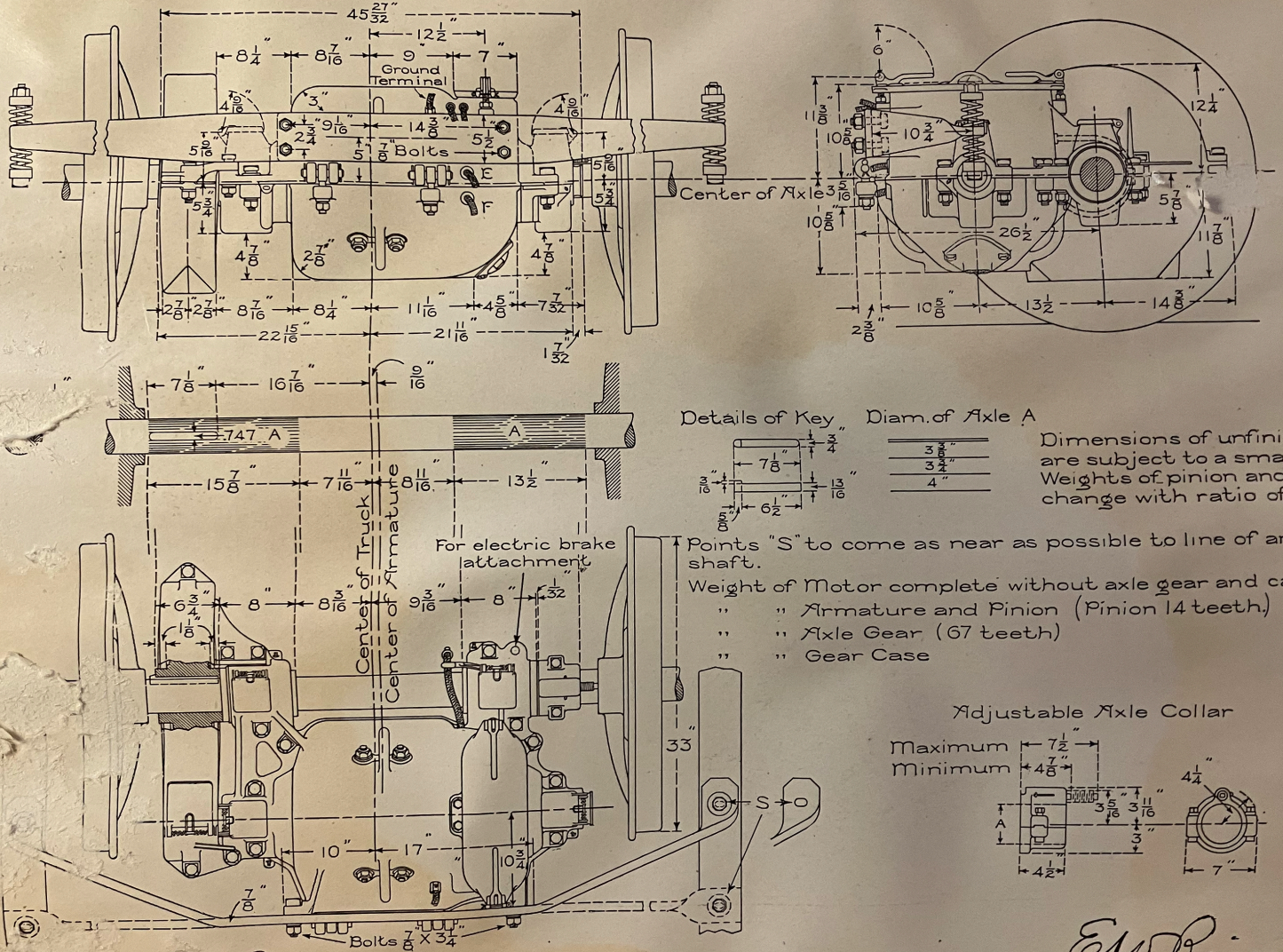
SUSPENSION.

The GE-54 motor is adapted for use with either nose or yoke suspension. Four bolts are provided for fastening to the suspension bar.

With $33''$ wheels, the clearance between the bottom of the gear case and the top of the rails when new is $4\frac{5}{8}''$.

Dimensions of the motor are given on the accompanying diagram.

GE-54-A MOTOR YOKE SUSPENSION



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	1536 lbs.
" " Armature and Pinion (Pinion 14 teeth.)	395 "
" " Axle Gear (67 teeth)	170 "
" " Gear Case	125 "

Adjustable Axle Collar

Checked by E. D. Priest

Engineering Dept

Approved by E. W. Rice, Jr.
Chief Engineer

No. 13612

General Electric Co.

11 Dec. '99