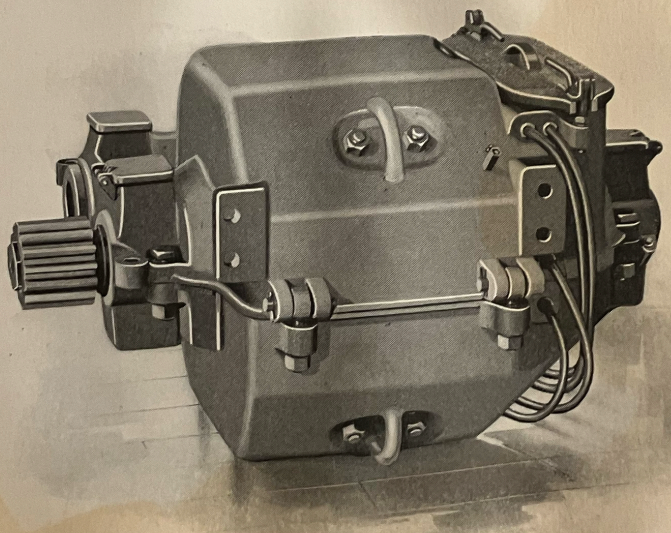
General Electric Company

RAILWAY DEPARTMENT.

January 22, 1900. **Bulletin No. 4217.**

THE GE-67 RAILWAY MOTOR.

The increase in sizes and speeds of cars used for city service by a majority of the electric railways has created a demand for motors correspondingly larger than those heretofore used. To meet this condition the General Electric Company is manufacturing a motor known as the GE–67, which is of somewhat greater capacity than the well-known GE–1000.



THE GE-67 RAILWAY MOTOR--FRONT END.

The standard motor is provided with a three-turn armature, but other windings can be provided when required by the speed and character of the service. The field winding contains 110 turns per spool, or if the motor is installed with electric brakes a winding having 125 turns per spool is furnished.

The motor is adapted for use on a minimum gauge of 48″ with or without electric brakes.

RATING.

On 500 volt circuits, the GE–67 railway motor with three-turn armature will develop 38 H P., the output being based on our standard rating; that is, a maximum rise of 75° C. in the temperature of the windings after a run of one hour at full rated load, the temperature of the surrounding air not exceeding 25° C.



PARTS OF THE GE-67 RAILWAY MOTOR.

MAGNET FRAME.

The magnet frame is hexagonal with well rounded corners, and is cast in two pieces from soft steel of high magnetic permeability. The two castings are bolted together, and hinged in order to allow the lower frame to swing down so as to permit inspection or cleaning.

An opening over the commutator permits inspection of the commutator and brushes and the removal of the brush-holder yoke 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. A small opening in the lower frame directly beneath the commutator provides for the removal of any foreign substance which may find lodgment there.

BEARINGS.

The armature and axle bearings consist of cast iron shells of ample thickness to ensure stiffness and lined with Babbitt metal swaged into the shells so as to make it compact and tight.

The bearings are designed for the use of both oil and grease. The oil is fed to the shaft from oil wells in the caps by means of felt wicks. The grease is contained in a grease box over each bearing and reaches the bearing through a slotted opening in the top of the lining.

The armature bearings, which are built on the outboard principle, are 3″ x 8″ at the pinion end and $2\frac{5}{8}$″ x $6\frac{1}{8}$″ at the commutator end. The supports for the upper parts of the linings are cast as parts of the upper half of the magnet frame, and a large recess is cored between the inner end of the lining and the frame to accommodate the combined thrust collar and oil guard. The design of the oil guard 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, an opening being provided to allow the outlet for the lubricant after it has passed through the bearing.

The axle bearings are supported by the under side of extension brackets, which are cast on each end of the upper half of the magnet frame, and reach over and partly enclose the car axle. These brackets are bored out to support and enclose the axle linings, which are 8″ long.

POLE PIECES AND FIELD COILS.

The pole pieces are built up of thin soft iron laminations, riveted together, and are held in place by through bolts secured by nuts on the outside of the frame.

The four field coils are placed at an angle of 45° with the horizontal and are held in place by pressed steel flanges or spool holders which are clamped to the pole pieces. The coils are wound with asbestos cotton covered wire, and when completed 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 current.

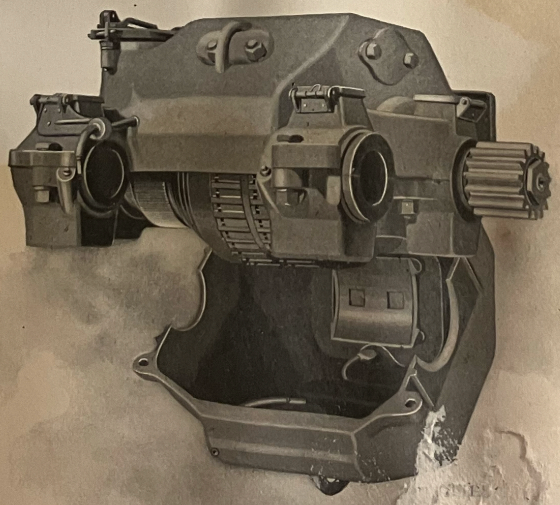
ARMATURE.

The armature is of the iron-clad type, the core being built up of thin soft iron laminations, which are carefully japanned and securely keyed to the shaft. The laminations are clamped at each end by cast iron heads, also keyed to the shaft. The core is hollow and is ventilated by the air which enters the pinion end of the core head and passes out through the air ducts between the laminations.

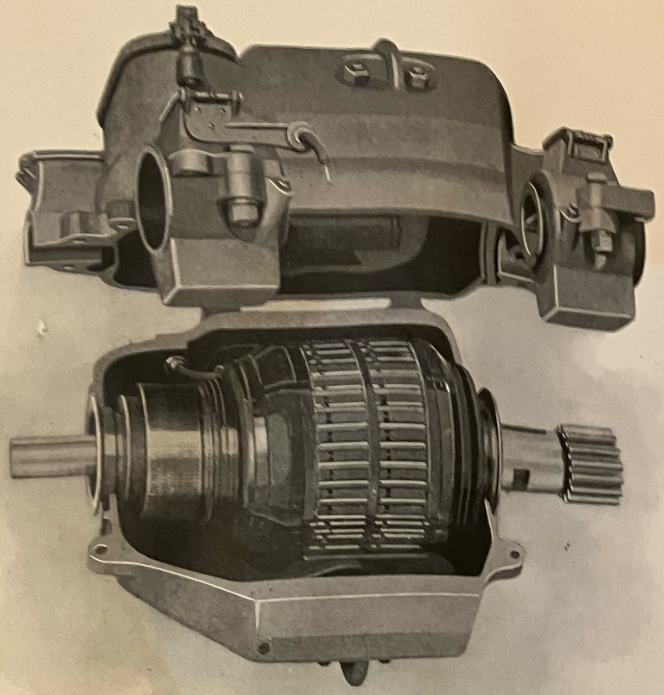
The armature winding is of the series drum type with 111 coils, the number of turns per coil depending on the requirements of each case. The coils are made up in sets of three and each set is formed and thoroughly insulated before it is placed in the slots of the armature core. The coils are insulated 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 and soldered. The coils are held in place 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 are further protected by a flange which extends past the windings and prevents injury from careless handling.

The completed armature is subjected to a high potential test of 3000 volts alternating current between the winding and the core.



THE GE-67 RAILWAY MOTOR WITH LOW[illegible]AME DROPPED SHOWING ARMATURE IN POSITION.



THE GE-67 RAILWAY MOTOR WITH LOWER FRAME DROPPED SHOWING ARMATURE READY FOR REMOVAL.

COMMUTATOR.

The commutator has 111 hard drawn copper segments, insulated with carefully selected mica and securely clamped to a malleable iron shell. The segments are slotted at the back to receive the commutator leads. The diameter of the commutator is $9\frac{1}{8}''$ and the wearing length $3\frac{1}{8}''$, with a depth of $1''$, measured at the front end. The cone clamping insulation is of the best quality of mica, built up and pressed hard and compact. The mica between the segments is of a somewhat softer quality, in order that it may wear down evenly with the segments.

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

BRUSH HOLDERS.

The two brush h s a cast brass. The brushes slide in finished ways and are pressed against the con tor by independent pressure fingers which give a practically uniform pressure throughout th rking range of the brushes. The brush holders are clamped to a hard wood yoke, which is bo o the top of the magnet frame and can be removed through the opening in the frame over the c utator.

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

GEARING.

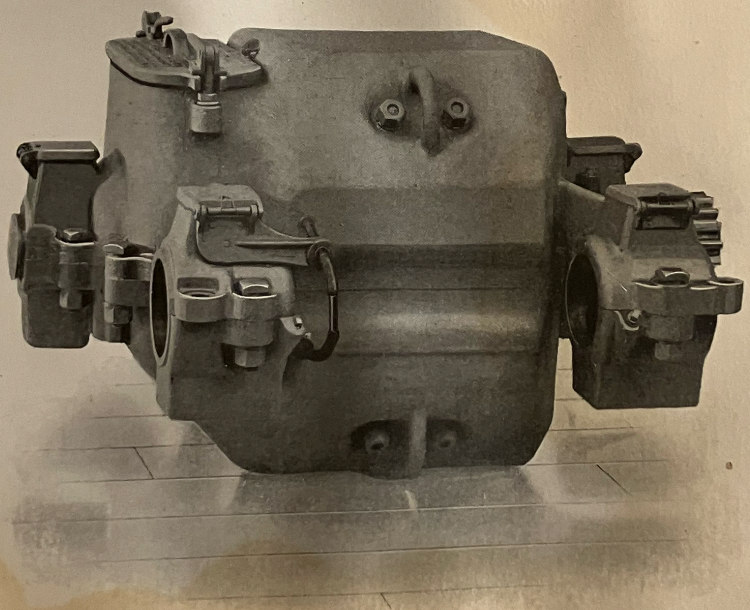
The pinion is bored for a taper fit on the armature shaft, both the pinion and gear being made of steel. The gearing has a $4\frac{1}{2}''$ face and the teeth are 3 pitch. The gearing is entirely enclosed by a gear case bolted to upper half of the motor frame.

SUSPENSION.

The GE–67 motor is adapted for use with either nose or yoke suspension, and four bolts are provided at the front of the motor for attaching the suspension bar.

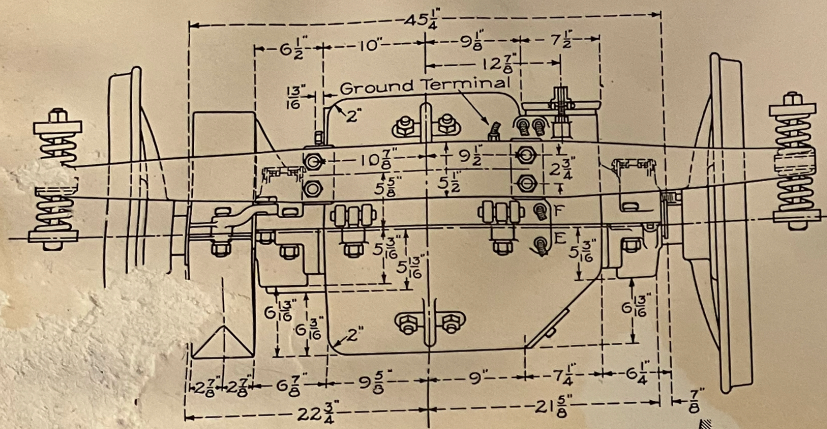
When the motor is mounted on 33″ wheels, the clearance between the bottom of the motor and the top of the rails is $4\frac{1}{2}''$ and that between the bottom of the gear case and the top of the rails, with the maximum gear reduction, is 4″.

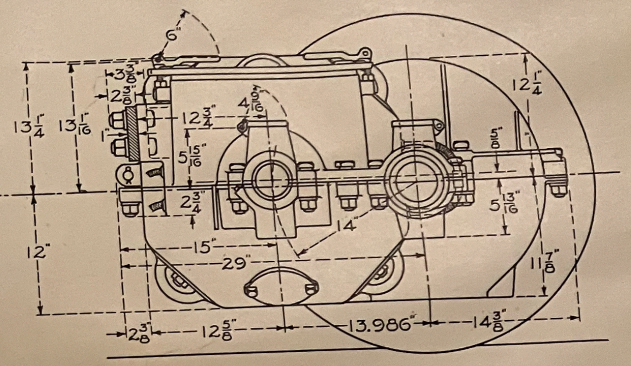
Data relative to weights and dimensions of this motor are given in the accompanying diagram.

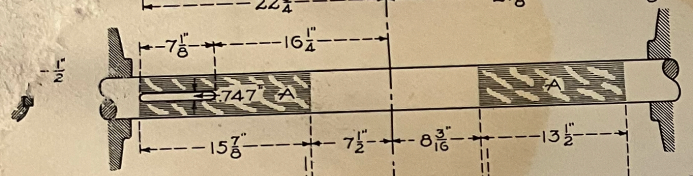


THE GE-67 RAILWAY MOTOR--REAR END.

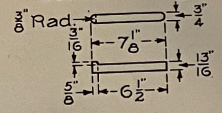
GE-67-A MOTOR YOKE SUSPENSION



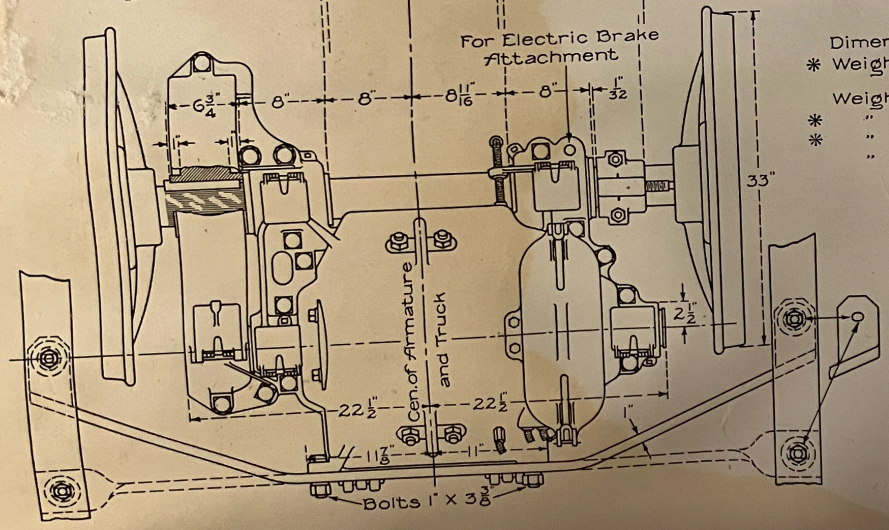




Details of Key



Diam. of Axle A
3 3/4"
4"
4 1/4"

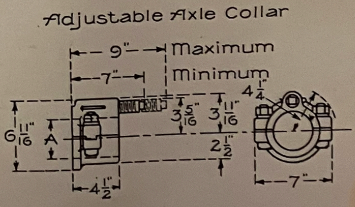


Dimensions of unfinished parts are subject to a small variation.

* Weights of pinion and gear change with ratio of gearing.

	Weight of Motor complete without axle gear and case	2100 Lbs.
	" " Armature and Pinion (17 teeth)	595 "
*	" " Axle Gear (67 teeth)	157 "
*	" " Gear Case	128 "

Adjustable Axle Collar



Checked E. D. Priest

Engineering Dept.

Approved E. W. Rice, Jr.
Chief Engineer

7 Dec. '99.

General Electric Company

No. 13593