"N.E." Type C.A.V. Dynamo

Its Regulation and Change of Rotation

DIFFERING in construction and regulation from orthodox constant current dynamos, the "NE" type C.A.V. dynamo often presents a problem when its change of rotation has to be effected. In

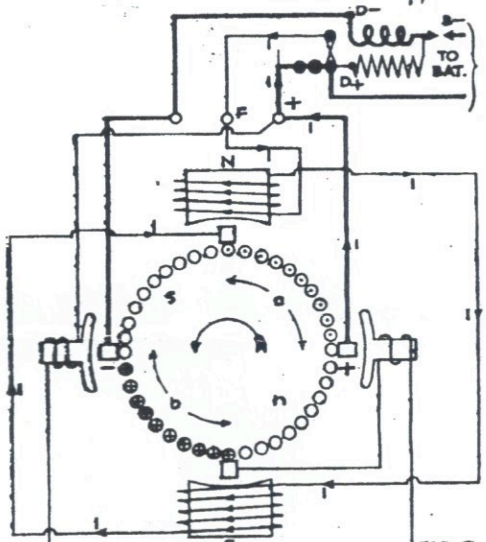

FIG: 2.

construction it differs from the orthodox in regard to the shape of its yoke and the number of its poles and brushes. The yoke is square, and although part of what is virtually a two-pole machine contains four poles. Of these, two are main poles, so that the other two can be regarded as auxiliary or regulating poles.

As to the arrangement of the poles,

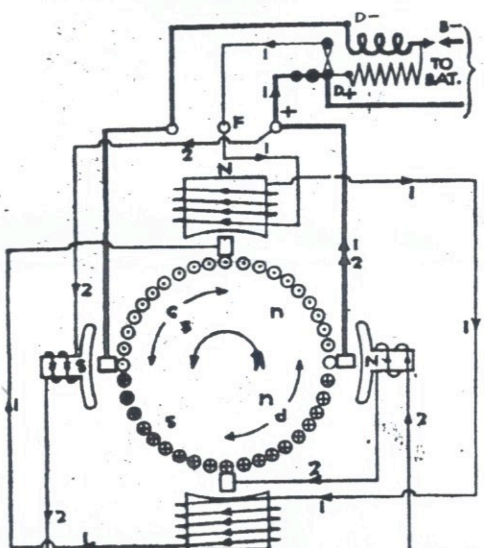

FIG: 3

the main ones take up top and bottom positions and are wound with the field winding in the usual manner, while the regulating ones take up left and right positions, and are wound and fed so as to have a polarity the same as that of the respective *leading* main poles. Further, while the main poles are of the usual size and secured in the usual manner, the regulating poles are somewhat smaller than the mains and secured by brass bolts. It follows, therefore, that the reluctance of the regulating poles is comparatively greater than that of the main poles.

The brushes number four, are set at 90°, and like the poles may be regarded as being made up of two diametrically opposed pairs—mains and regulators. However, assuming the reader is familiar with the subject of armature reaction, the first fact to be observed from Fig. 1 is that the brush position, like that of any other machine, is governed by the lead or throw of the coil leads of the armature as they come down to the commutator. Hence, theoretically, the brush position is as indicated in Fig. 2, where the armature is shown in section in order to facilitate the study of its action and reaction.

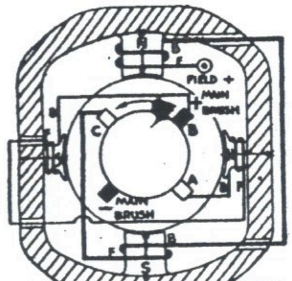

FIG: 1.

CLOCKWISE ROTATION

Referring to Fig. 2, it will be observed that with low speed and open cutout conditions, the field circuit will be as per circuit V1, so that the belt of conductors a and b in carrying the weak field current will tend to set up a cross flux ns, which in turn will make for magnetisation and distortion, and, consequently, a rapid build up.

Secondly, as speed increases the volts increase so that circuit V2 comes into operation with sufficient load to cause the belts of conductors c and d (Fig. 3) to likewise throw out a cross-flux. This flux is about equal to that of belts a and b, so that the result is mainly that of distortion in the direction of rotation such as would arise from a true cross field of an orthodox machine.

Thirdly, a point is reached where the cutout closes and the main load passes as from the positive main brush to the negative main brush via the battery and cutout points. Hence, as the main load returns via the negative main brush, the armature, at this stage, produces the usual cross field which in turn makes for further

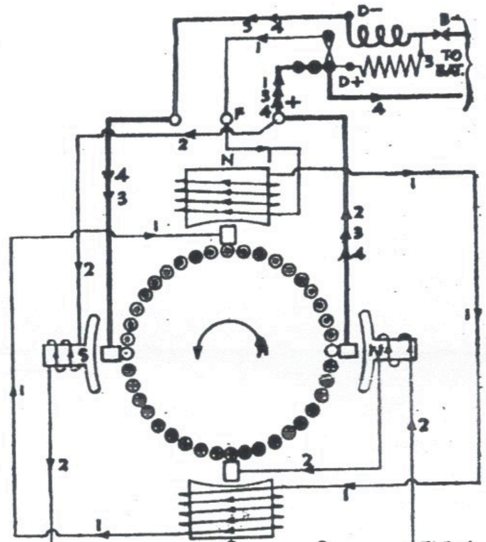

FIG: 4.

distortion. Since, however, this would mean a slight fall in main field energisation and output, together with imperfect commutation, the distortion is counterbalanced by the effect of the regulating poles, the reluctance of which is overcome by the further energisation of circuit V2 due to increased speed. This stage is indicated in Fig. 4, where circuit

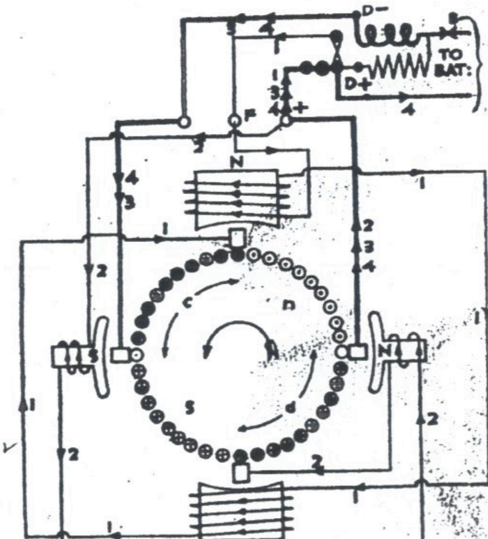

FIG: 5

V3 is the cutout shunt circuit and circuit V4 the charging circuit.

Fourthly, with further speed, the increased energisation of circuit V2 results in the ascendancy of the conductor belts c and d, Fig. 5, so that the main field is gradually de-

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(*Continued from page 365*)

magnetised as speed increases beyond a certain point. Further, as the energisation of the regulating poles will likewise tend to increase, not only is a point of balance reached but the demagnetisation will be unaccompanied by distortion. Thus commutation remains perfect and the output constant, and the machine can be categorised as an inherently controlled constant current unit. Change of direction connections are given in Fig. 6, and when making them the following should be noted:—

From Clockwise to Anti-Clockwise

1. Change over regulating coils to opposite sides of magnet yoke, so that the sides of the regulating coils marked "anti" face the armature.

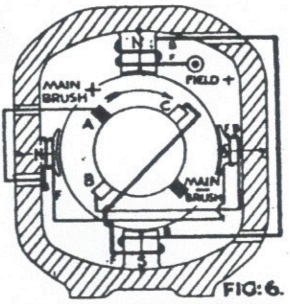

FIG: 6.
ANTICLOCKWISE ROTATION

2. Connect the end A of the regulating coils to the top left hand brush; and the end B to the bottom left hand brush.

3. Connect the end C of the main field coils to the top right hand brush.

4. Turn the main pole pieces round so that (looking at the pulley) the chamfered sloping edge of the top pole piece is on the left hand side and that of the bottom on the righ hand side.

5. The top left hand brush is now the + main and the bottom righ hand one the — main.

6. These instructions concern the connections as seen from the commu tator end of the machine, and on no account must the brass bolts securing the regulating poles be replaced with steel ones.

A complete exposition of the fundamentals of armature reaction is given in our *Working Principles of Motor Vehicle Lighting and Starting*.