Chapter 3

ROTARY INVERTER, TYPE MG4B

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LIST OF ILLUSTRATIONS

LEADING PARTICULARS

Rotary inverter Type MG4B	*Stores Ref. 5UB/3884*
Input	*120 amp. at 29 volts d.c.*
Output	*25 amp. at 80 volts a.c. (R.M.S.) 2,000 c/s at 6,000 r.p.m.*
Resistance values—	
Motor field	*12 ohms*
A.C. generator field	*2·7 ohms*
Motor armature (A1—A2)	*0·005 ohms*
A.C. generator stator	*0·024 ohms*
Field current	*6 amp.*
Brush grade	*Type EGO (HAM) (Stores Ref. 5UB/4208)*
Brush spring pressure	*13½ to 16 oz.*
Weight	*46 lb.*
Used with—	
Control panel, Type 11A	*Stores Ref. 5UC/5213*

Introduction

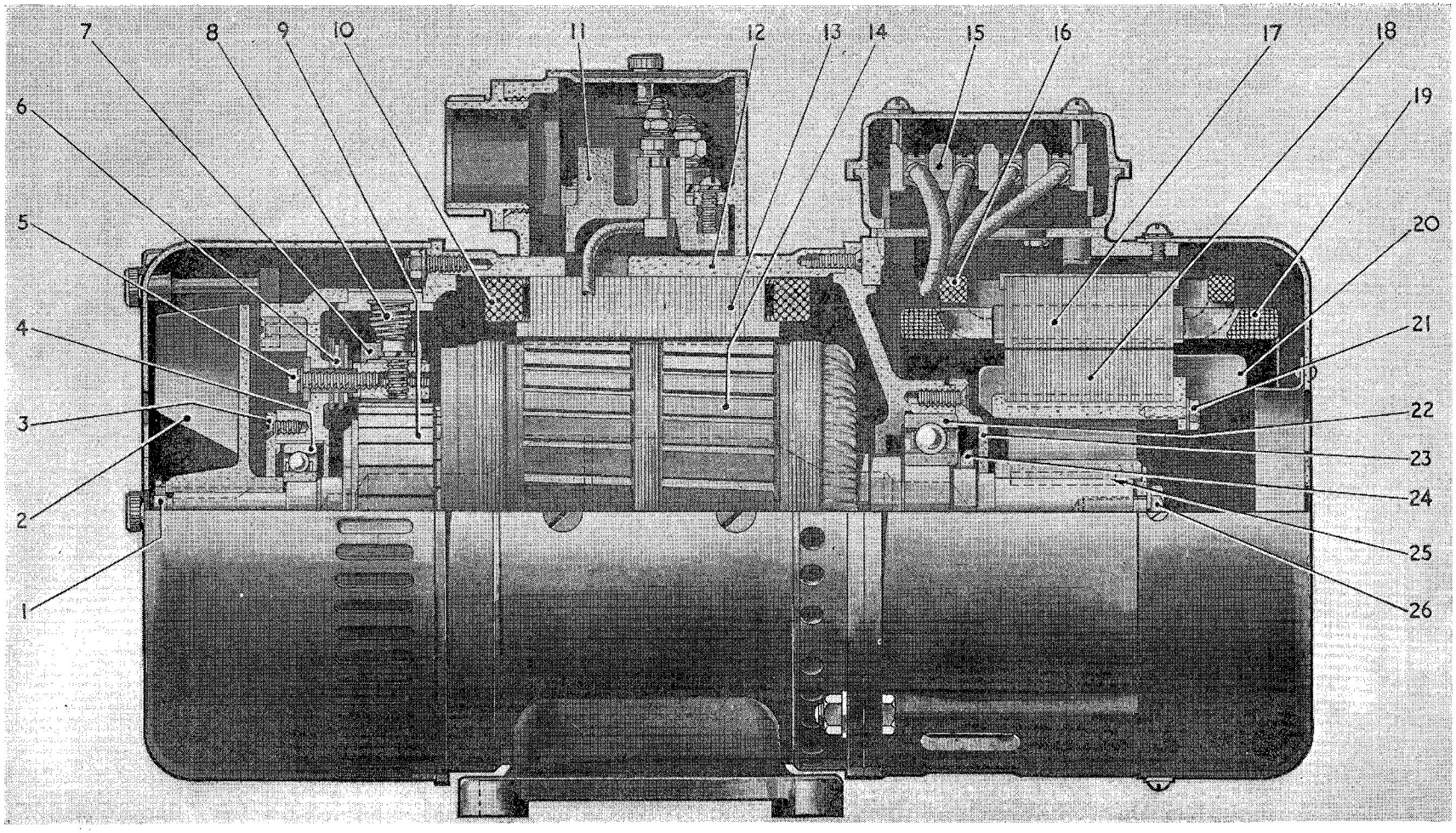
1. The rotary inverter, Type MG4B (*fig.* 1), produces an 80-volt, 25-amp., a.c. output at unity power factor, at a frequency of 2,000 c/s when running at 6,000 r.p.m. It enables this a.c. supply to be fed to radio equipment in aircraft without the necessity of running the main aircraft engines. The machine comprises a shunt-wound d.c. motor and inductor type a.c. generator on the same shaft and housed in separate frames bolted together. The machines are separately excited, the d.c. motor being fed from the 28-volt aircraft general services supply and the a.c. generator from the same supply but fed through a control panel, Type 11A.

DESCRIPTION

2. The motor embodied in this machine is of six-pole construction, shunt connected, the pole pieces being screwed to the body of the machine. The connections from the field and brush gear are brought out to a separate d.c. terminal box mounted on top of the frame.

3. The commutator end frame, to which the brush gear is fixed, is spigoted to the main frame. The brush boxes are secured directly to this end frame, the holding screws being suitably bushed. Non-adjustable helical coil springs are used to apply pressure to brushes, the spring rest being fitted across the aperture in the commutator end frame. It should be noted that the spring is eccentrically disposed on this rest.

4. The armature shaft at this end runs on ball bearings protected by an outer bearing plate and an extension of the shaft carries a fan which is keyed and locked into position by a large screw in the end of the shaft. This screw and an extension of the fan hub serves to lock the commutator end bearing to the shaft.



1 C.E. FAN NUT
2 C.E. FAN
3 C.E. OUTER BEARING PLATE
4 C.E. BEARING
5 BRUSH BOX SECURING SCREW
6 BRUSH BOX INSULATING WASHER
7 BRUSH
8 BRUSH SPRING
9 COMMUTATOR
10 MOTOR FIELD COIL
11 TERMINAL BLOCK (D.C.)
12 MAIN FRAME
13 MOTOR FIELD POLE
14 MOTOR ARMATURE
15 TERMINAL BLOCK (A.C.)
16 A.C. STATOR COIL
17 A.C. STATOR
18 ROTOR
19 A.C. FIELD COILS
20 FAN
21 ROTOR SECURING SCREW
22 A.C. END BEARING
23 OUTER BEARING CAP
24 BEARING SECURING SCREW
25 ROTOR KEY
26 ROTOR SECURING SCREW

Fig. 1. Sectional view of inverter

5. At the opposite end the shaft is extended to carry an overhung rotor for the a.c. generator and runs in a larger bearing housed in the opposite end frame. This end frame is held by screws to the main frame and carries an outer bearing cap to protect the bearing against the ingress of dirt, the bearing itself being locked in position on the shaft by a ring nut. A dismantled view of the machine is shown in fig. 2.

6. The laminated a.c. rotor spider is keyed to the shaft extension and locked in position by a hexagon-headed screw in the end of the shaft. The field system and the associated a.c. stator windings are housed in slots in stator laminations mounted in a frame, this frame being flanged at one end and bolted to a corresponding flange in the main frame.

7. The principle of operation of this a.c. generator is the same as that of the generator, Type U2, the variation in the magnetic flux across the teeth of the rotor and the stator, as the former revolves, causing an a.c. e.m.f. to be built up in the stator windings. A description of the generator, Type U2, will be found in A.P.4343A, Vol. 1, Sect. 2.

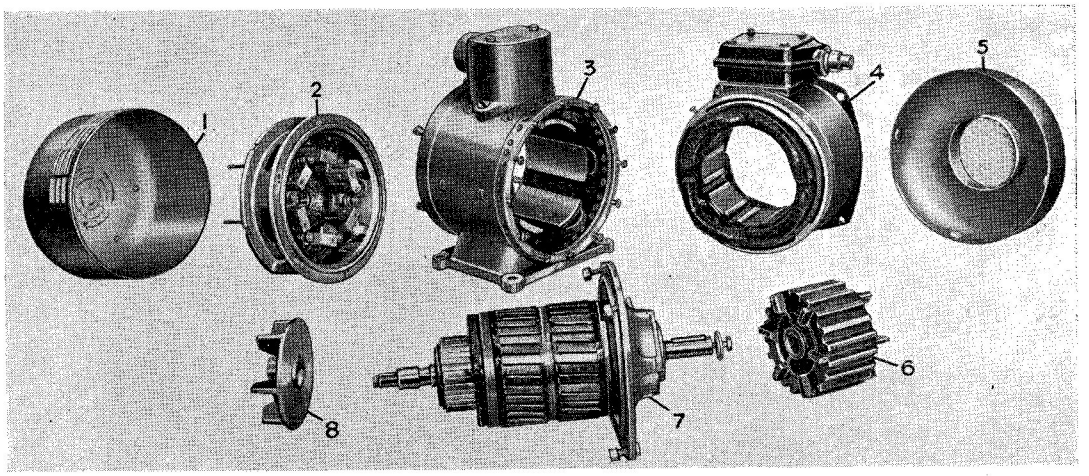
8. The a.c. generator is driven at a constant speed and the regulation of the a.c. output is achieved by control of the field voltage by means of a carbon pile voltage regulator housed in a control panel, Type 11A. Cooling is obtained by a fan attached at the commutator end of the shaft, ventilation holes being provided in the dust shields at both ends, and in the yoke, so that the machine has through cooling.

INSTALLATION AND OPERATION

9. The inverter, Type MG4B, is used to supply radio equipment and is connected to such equipment through a control panel, Type 11A. No special operating instructions are required as this is automatic once the supply to the machine has been switched on.

SERVICING

10. For the general servicing instructions for this machine reference should be made to A.P.4343, Vol. 1, Sect. 8, Chap. 2. The brushes should not be allowed to wear down to less than $\frac{5}{16}$ in., and the springs should be renewed if their pressure on the brushes falls below $12\frac{1}{2}$ oz. Worn brushes should be replaced by new ones of the type listed in Leading Particulars. The correct lubricant for this machine is grease XG–275 (Stores Ref. 34B/9100512).



1 COMMUTATOR END COVER
2 C.E. FRAME
3 MOTOR MAIN FRAME
4 GENERATOR MAIN FRAME
5 GENERATOR END COVER
6 ROTOR
7 MOTOR D.E. FRAME
8 FAN

Fig. 2. Dismantled view