CHAPTER VIII

IGNITION SYSTEM

The ignition system is a vital portion of the engine installation that must be given consideration during the early stages of the engine installation design. Successful starting and operation of the engine is dependent upon correct functioning of this system. The power plant designer must consider the requirements of this system, the safety features to be incorporated, and the possibility of electrical interference that may originate from it.

All Wright engines are equipped with a completely shielded ignition system. As standard equipment, "Breeze Shielding" is furnished on all the engines. This shielding consists of a dural tube or manifold, in which all the spark plug leads are wrapped. The individual leads branch out from the manifold and each are wrapped in a braided shielding which is grounded to the ignition manifold which in turn is grounded to the engine. In some cases this type shielding is not preferred and instead individually shielded leads are used.

All Wright engines are equipped with magnetos having fixed spark timing. On some engine models, magnetos can be supplied having an adjustable spark timing. On present day engines this is seldom preferred.

The ignition system accessories should be wired in accordance with the accessory manufacturers instructions. Typical wiring diagrams for the principal accessories connected into the ignition system are illustrated in Figures 83 and 84. These accessories generally are the magnetos, ignition switch, booster spark coil, generator, and electric starter.

The ground wires from the magnetos to the ignition switch should be of a good grade stranded cable with rubber and/or cambric insulation. This also applies to the return ground wire from the switch which should be grounded directly to the engine and not the engine mount or airplane structure. Booster coil wires, which carry high amperage, should be high tension cable. High tension cable should not be run in the same conduit with low tension cable nor should magneto ground wires be in the same conduit with the electric starter power leads.

It is desirable to wire the booster coil in a circuit that requires two switches to be closed before the coil is energized. One of these switches should always be the ignition switch. The other should be either the starter or the auxiliary circuit switch. The auxiliary circuit is used for cold weather starting when it is desired to keep the booster operating even after the engine is running and the starter is disconnected. The high tension wire from the booster coil should be connected

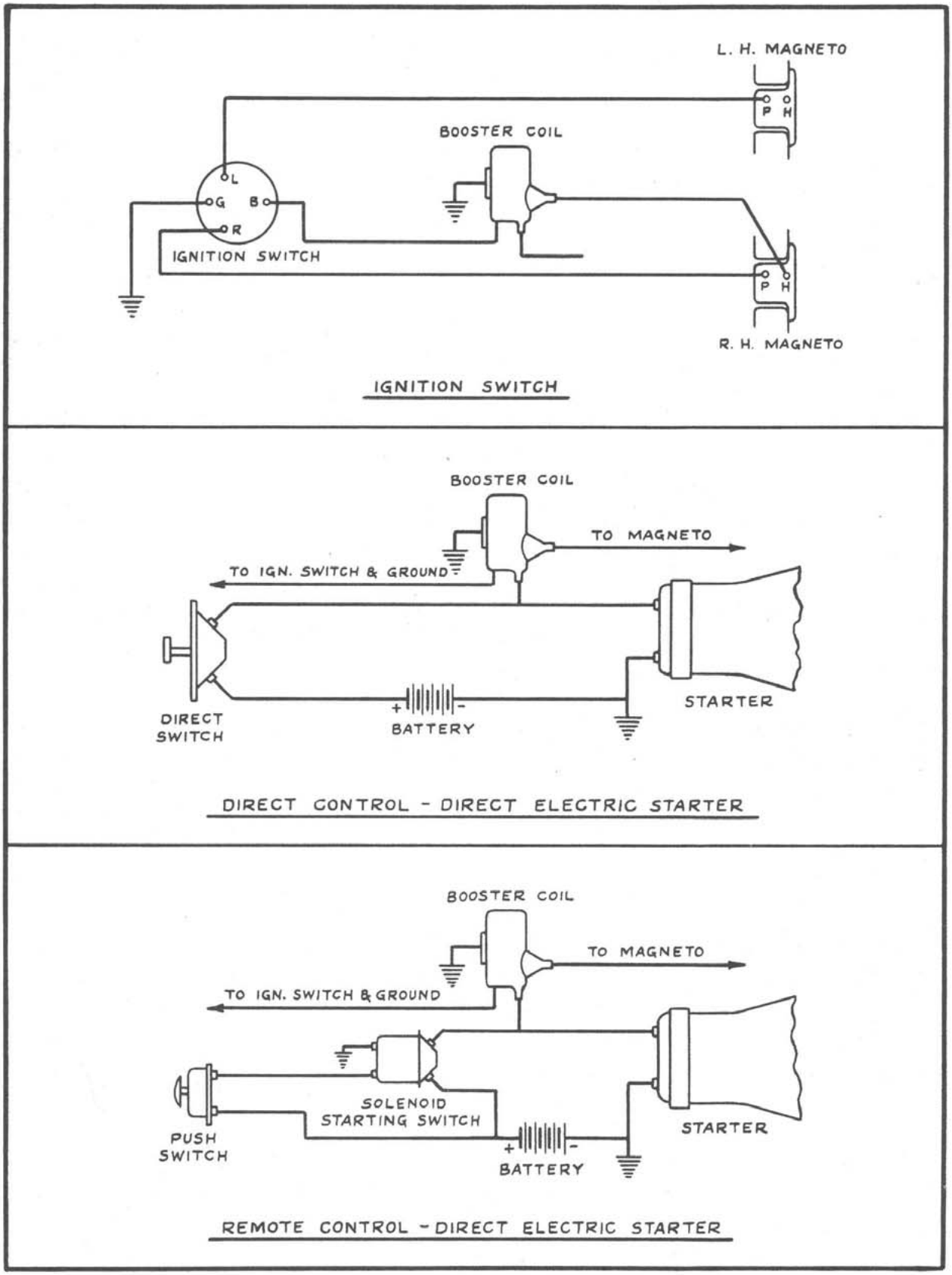
L. H. MAGNETO
P
H
BOOSTER COIL
L
G
B
R
IGNITION SWITCH
P
H
R. H. MAGNETO
IGNITION SWITCH
BOOSTER COIL
TO MAGNETO
TO IGN. SWITCH & GROUND
DIRECT SWITCH
+
-
BATTERY
STARTER
DIRECT CONTROL - DIRECT ELECTRIC STARTER
BOOSTER COIL
TO MAGNETO
TO IGN. SWITCH & GROUND
SOLENOID STARTING SWITCH
PUSH SWITCH
+
-
BATTERY
STARTER
REMOTE CONTROL - DIRECT ELECTRIC STARTER

Figure 83

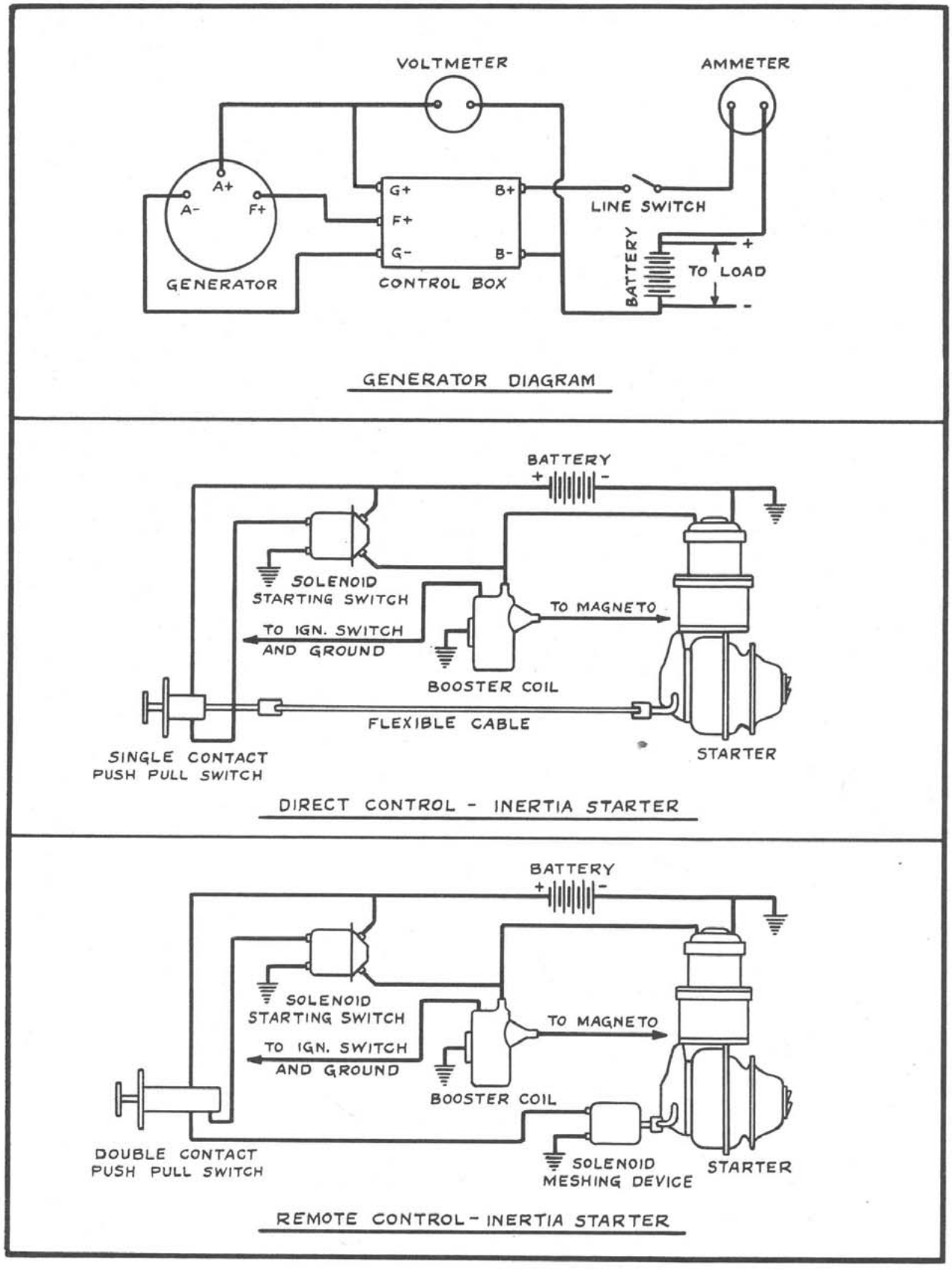
VOLTMETER
AMMETER
A+
A-
F+
G+
F+
G-
B+
B-
LINE SWITCH
BATTERY
+
TO LOAD
-
GENERATOR
CONTROL BOX
GENERATOR DIAGRAM
BATTERY
+
-
SOLENOID
STARTING SWITCH
TO MAGNETO
TO IGN. SWITCH
AND GROUND
BOOSTER COIL
FLEXIBLE CABLE
STARTER
SINGLE CONTACT
PUSH PULL SWITCH
DIRECT CONTROL - INERTIA STARTER
BATTERY
+
-
SOLENOID
STARTING SWITCH
TO MAGNETO
TO IGN. SWITCH
AND GROUND
BOOSTER COIL
DOUBLE CONTACT
PUSH PULL SWITCH
SOLENOID
MESHING DEVICE
STARTER
REMOTE CONTROL - INERTIA STARTER

Figure 84

to the magneto that fires the set of plugs which are easiest to remove. This is desirable since on occasions when plugs foul during attempts to start only one set of plugs need be replaced, or reconditioned, and then the hot spark is obtained on the clear plugs.

On multi-engine airplanes, engine synchronizers are often used which connect into the magneto high tension circuit as an exciting source. This connection should be made at the high tension tap on the ignition switch.

It is necessary to guard against excessive heat on certain portions of the ignition system. Adequate clearance should always be maintained between the ignition wires and the exhaust manifold. Refer to Figure 75. The spark plug elbows usually are exposed to radiant heat from the manifold and if their temperature becomes excessive the wire insulation burns allowing the ignition spark to short through the ignition harness. To guard against this condition shields are usually fastened to the manifold to deflect the manifold heat away from the elbows. On some models of Wright engines, cylinder head baffles incorporating a small blast tube, can be furnished, which will direct a blast of cooling air on the spark plug elbows. It is also necessary to guard against excessive temperature at the magneto coils. This can be avoided by directing a blast of cooling air at the rear portion of the base of the magnetos. Some models of Wright engines are equipped with magnetos having provision for direct connection of a blast tube.