



POWER OPERATED
DOOR EQUIPMENT
(Compressed Air)

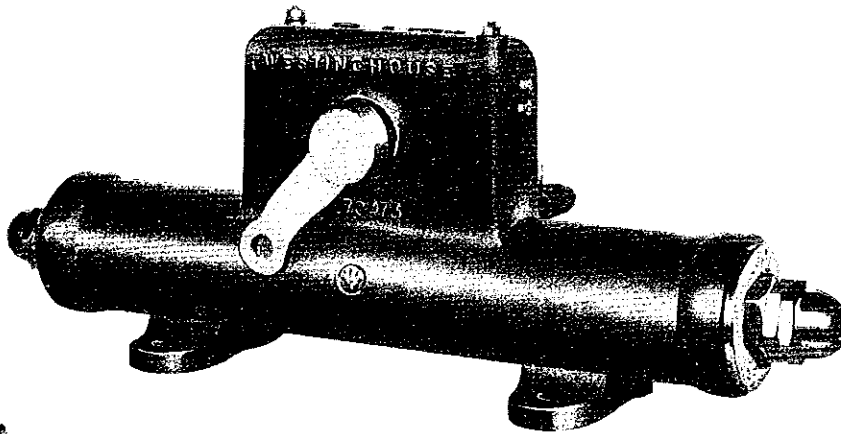
Provides
POWERFUL MOVEMENT with
ADJUSTABLE DOOR SPEED and
ABSOLUTE SAFETY for Passengers.

Patents applied for

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WESTINGHOUSE POWER OPERATED DOOR EQUIPMENT (Compressed Air)



The Westinghouse compressed air door engine is designed for the opening and closing of doors on all classes of passenger vehicles. It is usually operated from the same source of supply as the compressed air brakes.

The movement is powerful and decisive, but the design is such that, if any obstruction is in the way of the door, the power is reduced until the obstruction is removed. Thus the door can be easily held and no injury is caused to a person caught in a closing door.

Construction.

The door engine consists of a main body casting in which are two opposing cylinders, one being used to open the door and the other to close it. The pistons are connected by a rod which has teeth cut in it to operate a similarly toothed quadrant to which is connected the door actuating lever.

Valve units, which are bolted to the main casting and can be removed without disturbing the door engine itself, control the flow of air to and from the cylinders. The control of the exhaust by the valve units provides effective cushioning at the end of the door movement.

Provision is made for magnet valves to be bolted to the main casting when they are required for electro-pneumatic operation.

There is also provision made for the addition of contacts operated by the door lever to enable electrical indication of the door position to be carried out.

Control and Operation.

There are two systems of control for the door engine. These are direct control, which necessitates a two-way operating valve, and indirect control which only requires a one-way operating valve with consequent reduction in the number of pipe connections, but requires the incorporation into the door engine of additional valve mechanism.

Indirect

With indirect control, the air supply is permanently connected to one port of the valve portion of the door engine to hold a piston and slide valve in one position. The slide valve in this position feeds air to the door closing cylinder. On the application of air from the one way operating valve, the piston and slide valve are moved to their other extreme position and air is then fed to the door opening cylinder and cut off from the door closing cylinder.

On the release of air through the operating valve the piston and slide valve move back to their original position and air is cut off from the door opening cylinder and connected to the door closing cylinder again.

Direct

The two-way operating valve used in direct control connects the air supply with either the door opening or door closing cylinders of the door engine and exhausts the other cylinder to atmosphere.

Electro-Pneumatic.

Either of the above methods of control can be carried out by electro-pneumatic means. The operating valves are replaced by magnet valves bolted to the main casting. In the case of direct control two magnet valves are needed; with indirect control, only one. These valves are, in both instances, controlled by push button switches.

When a number of doors have to be operated simultaneously electro pneumatic control is highly preferable.

Door Speed Adjustment.

In both the above methods of control, during the first part of the motion air is allowed to escape freely. Towards the end of the stroke, however, the exhaust is restricted to give a cushioning effect to the door and so to slow its movement for the last quarter. It is possible to obtain various speeds of movement of the door by varying the restriction of the exhaust. In this manner the door may be made to open and close in equal times, or to open slowly and close quickly, or to open quickly and close slowly. The latter is the most usual arrangement.

Another adjustment by means of screw stops provides means of locating the position at which the pistons and the door stop at the end of the movement.

Emergency Feature.

A cock is arranged so that when it is operated both sides of the door cylinder are opened to atmosphere and the door can be moved freely and easily by hand.

Indication.

Contacts can be fitted which are actuated by the door operating lever. A circuit taken over all such contacts in series enables an indication to be given of the position of the doors.

