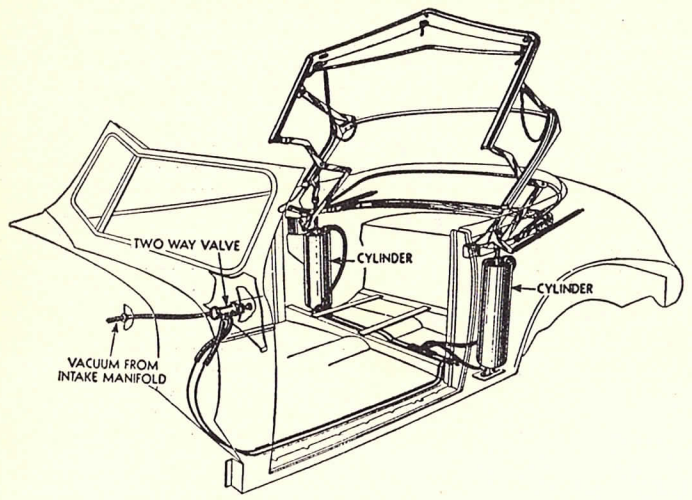


Fig. 1 Diagram of a vacuum operated top lift

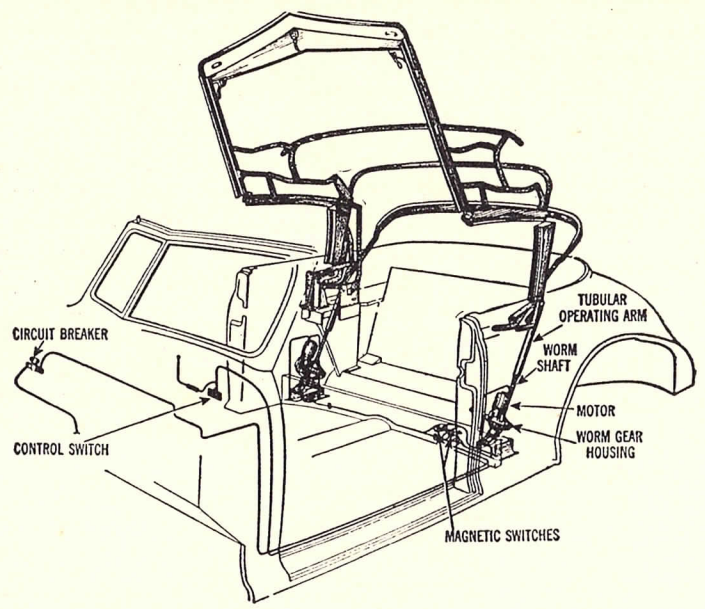


Fig. 2 Electric operated top

vertibles in Chrysler lines employ an automatic circuit-breaker and a differential relay in the circuit between switch and driving motors. The circuit-breaker opens the circuit when the mechanism reaches the limit of travel in either direction. The differential relay prevents damage to the top due to tilting in case one motor is loaded more than the other.

On General Motors cars the principal mechanical difference is the use of a spring-loaded centrifugal clutch between the motor and gear reduction case. The wiring circuit includes a circuit-breaker, 9-amp. fuse and two magnetic switches to control each motor.

On Ford, Mercury and Lincoln the electric top lift mechanism, like the vacuum units, is not rigidly mounted. This allows both motor and power shaft to move on their yoke or pivot mounting when the top is being opened or closed.

Mechanical Service — The folding arm assembly of the top should work freely when the operating or power screw is disconnected. The power screw also should operate easily and be free of distortion or bends.

Similarly the sleeve should operate freely on the screw. To check the operation of the screw disconnect the motor and turn the pinion shaft with a screwdriver.

On Ford, Mercury and Lincoln cars equipped with a horizontally positioned motor, a screwdriver can be inserted in the slotted end of the worm gear shaft. In this way the power shaft can be turned.

On General Motors cars, the clutch cup can be turned by hand when the motor is removed. On all units check entire assembly to determine if it is free to rock on the mounts or bases.

Removal and replacement of units requires taking off the side trim panel and in some cases necessitates removal of seat back as well as the rear seat. The top should be up when working on the unit. Of course the operation also requires removal of the wires from the motor. It is a good plan to use suitable identification on the wires to insure proper terminal positions when reinstalling unit.

Care should be used to make sure both sleeves or tubular lifts are installed in the same relative or synchronized position to obtain equal loads on both motors. This also assures equal thrust on both sides of the top when raising or lowering.

On General Motors convertibles a length adjustment is provided by turning the clutch hub between the motor and gear housing. This turns the power screw and aligns the sleeve hole with that in the top linkage.

Electric Circuit—The testing procedure is similar to that used on ordinary circuits. In most cases the ignition switch has to be turned on to bring in the top circuit. The dash control switch should be checked first, followed by an inspection of top circuit fuse. Loose connections, pinched wires and shorts should be checked.

On GM cars check the ground wire from the motor to the floor-pan mounting bracket. It should have a clean, tight ground connection. Another point to inspect is the metal cover of the solenoid switches under the rear seat. The forward edge of this cover might be grounded to the solenoid terminals or battery cable.

On Chrysler products the operation of the differential relay should be checked with the dash control switch in either up or down position. When the switch is in an operative position ground the differential relay terminals.

If the motors run, the relay is at fault. Take off the cover and check the relay points. Normally these points are closed. If it is necessary to hold the points closed to run the motors it indicates that one motor has a greater load and the relay is functioning properly. If points are pitted, they can be filed. If unit buzzes and does not stay open, the voltage coil is open.

The differential relay coils are wound in opposite directions so there is no magnetic flux present at equal motor currents. If there is a difference of 20-30 amp. draw between motors, the relay coil having the greatest amperage causes the points to open. The voltage coil then holds the points open until the dash control switch is turned off.

Solenoid switches or circuit-breakers should not be tampered with, as they are set in the factory and wiring trouble due to overloads may result.

HYDRO-LECTRIC SYSTEM VENTED TYPE

The Hydro-Lectric system, Fig. 3, employs a single electric motor driven pump to deliver oil under pressure to the actuating cylinders. The windows and seats are held in any position by fluid trapped in the cylinders by a magnetically-operated valve, normally closed, in the bottom of each window and seat adjustment cylinder.

The cylinders for operating windows and front seat adjustment are one-way or single-acting types. Hydraulic pressure raises and holds windows and moves the seat forward. When pressure is relieved by opening the magnetic or solenoid valves, coil springs lower or retract the windows or move the seat back.

The convertible top operating cylinders are two-way or double-acting types using hydraulic pressure for both the lifting and lowering operations.

HYDRO-ELECTRIC PUMP

The electro-hydraulic power unit consists of a series wound electric motor, an internal gear rotary pump, a spring controlled maximum pressure relief valve, and a fluid reservoir. Electrically grounded to the body, it is located in the engine compartment.

The motor, pump and fluid reservoir are assembled as a single unit and a solenoid attached to the motor is the principal control. A circuit-breaker is

AUTOMATIC TOPS, WINDOWS & SEATS

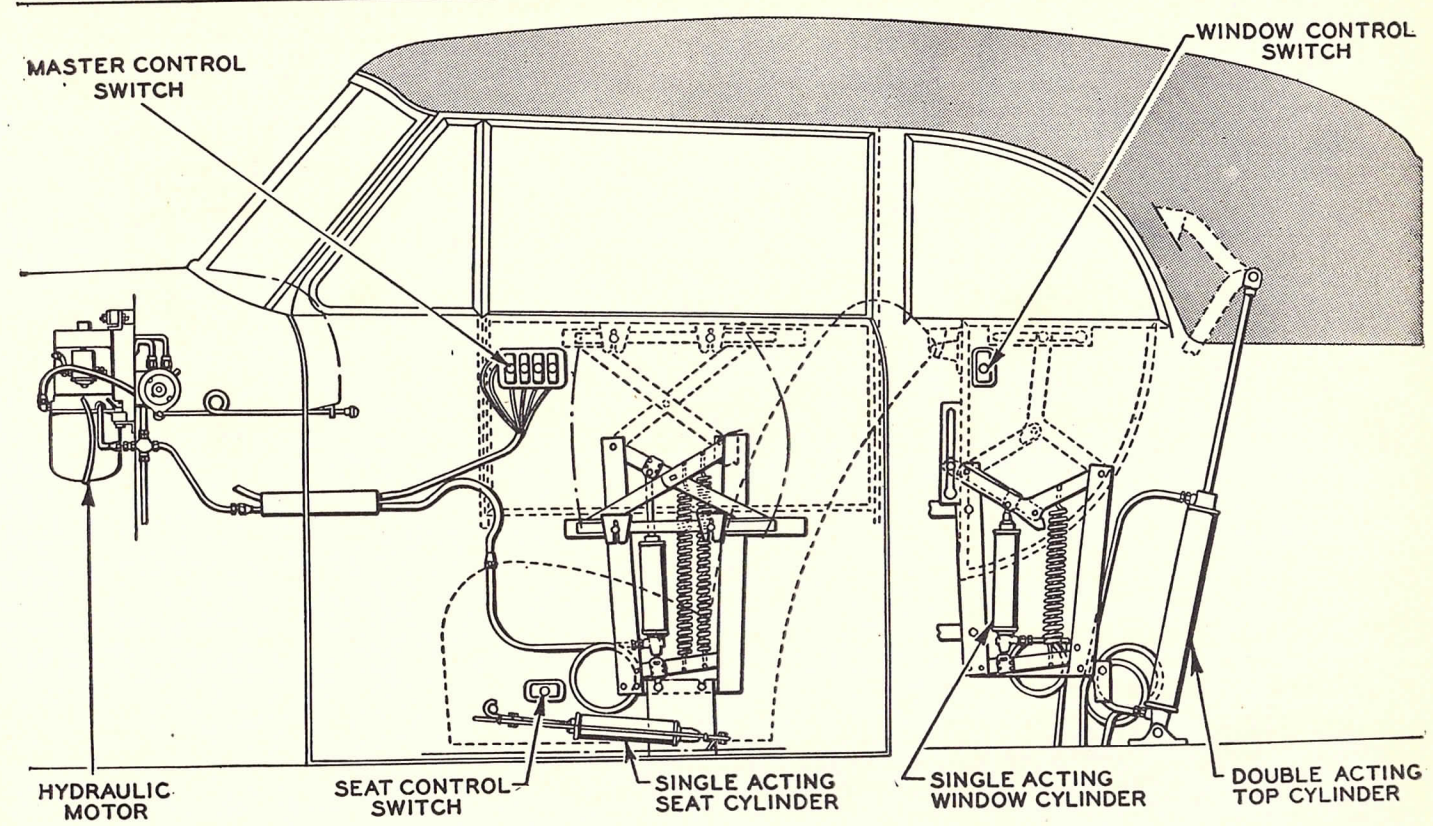


Fig. 3 Diagram showing inter-connected electric-hydraulic mechanism to operate windows, front seat and convertible top

wired to one of the solenoid terminals. The line pressure is controlled by a combination spring-loaded maximum pressure relief valve and a flow control valve of the piston type. The valve spring is adjusted to the maximum pressure and under no circumstances should it be changed to achieve higher pressure.

Two types of pumps have been used. The Dura Pump, which with modification has been used since 1946, and the Moraine Pump. The outward appearance of both pumps is similar. They differ, however, in the design of the internal pump gears and the relief and flow control valve. Their operation is similar and each may be identified by a name plate on the side of the motor.

PUMP SERVICE

TESTING PUMP PRESSURE—Faulty, erratic operation of the system may be due to lack of hydraulic fluid in the pump reservoir. For efficient operation, fluid level should be checked and additional fluid added as indicated by the fluid level markers on the side of the reservoir.

Foreign matter obstructing the pressure relief valve or internal gears of the pump may also cause low pressure, resulting in slow operation of the various hydraulic units.

Fig. 4 shows the method of testing the fluid pressure with a pressure gauge connected to the pressure port of the pump. Early pumps, such as used in 1946, operate at 210 pounds pressure maximum and are identified by a cadmium plated relief valve plug, while later pumps operate at 250 pounds mimimum to 260 pounds maximum and are identified by copper plated relief valve plugs.

MORAINE PUMP—To disassemble the pump, disconnect the battery cable and inspect the pressure relief valve by removing plug, stop washers and compression spring, Fig. 5. Pressure adjustments may be made at the valve by adding washers to increase pressure or removing washers to reduce pressure.

Remove the motor and pump assembly from its mounting after first removing the pump reservoir and wire bail. Check the reservoir gasket. Lay the motor and pump assembly on the bench and remove the five cover attaching screws and washers, "A", Fig. 6. Remove and inspect cover assembly for clogging and wear.

Fig. 7 shows the Moraine pump with pump cover removed showing the internal rotors or gears of the pump. With a small screwdriver or similar tool, carefully and uniformly pry up the outer rotor "A" of the pump. The inner rotor "B" may then be lifted off the pump motor shaft. Inspect these parts for wear as well as for presence of dirt or other foreign matter either on rotor parts or on the exposed face of the pump body assembly.

Check the ball and valve seat in the pump, Fig. 8. The ball and valve assembly may be removed by first removing the pressure relief plug, stop washers and spring. Then insert a hook type tool or stiff hooked wire into the pressure relief port and pull out the valve. Then tip the motor and pump over, allowing the ball to drop out. If the valve is seated too snugly in position, it may be removed by inserting the tool into the small hole at bottom of rotor gear well and pushing out.

To remove the pump body assembly from the motor, first place scribe marks across the junction of the motor housing and pump body assembly. Then loosen the two long bolts, "A" Fig 9, from the motor end of the unit and remove the pump body. Check motor shaft seal "B" and filter vent "C". The pump body assembly, less cover, is supplied as a unit.

Avoid disturbing armature of motor if possible. If armature is pulled out, the metal band at the motor head must be removed, the brushes separated, and the end of the armature shaft installed between brushes prior to reassembling pump.

To reassemble the pump, reverse the above procedure.

NOTE—Recent changes in thickness of inner and outer rotor gears have resulted in first and second type rotor assemblies which are not interchangeable. Corresponding rotor and pump body assemblies only may be used together. When ordering these parts, note the part number stamped on the identification plate attached to the outside of the motor housing. This number is the part number of the complete motor and pump assembly and will indicate whether it is a first or second type pump.