This invention relates to air compressors, and especially to that type of air compressor used in connection with inflating automobile tires and is adapted for automatic operation.

It is an object of this invention to provide a device of this type in which there is an intermediate reservoir or tank which is located between the compressor apparatus and the main tank or reservoir. It is the purpose of this reservoir to permit of the pressure being low at the time the operation of the compressor begins, regardless of the pressure in the main tank or reservoir.

It is also an object of this invention to provide a device of this kind in which any oil or water present in the air is trapped and can be removed therefrom.

It is a further object of this invention to provide an automatic switch operating device in which the operating means is maintained in the condition free from moisture, oil and other foreign matters that might be injurious to the parts of the switch operating mechanism.

It is a further object of this invention to provide a compressor in which the tank is composed of sheet metal with the parts welded together and having on the end a ring with an outstanding supporting flange, to which the super-structure of the compressor is attached.

It is also an object of this invention to provide a compressor of the tank as above described, supporting a compressor mechanism consisting of a motor and its operating gear mechanism securely mounted in a housing just above the tank. In said mechanism the motor shaft is directly connected to the gearing that operates the compressor itself.

It is a further object of this invention to provide, in connection with the operating parts, an oil reservoir by which the bearings may be well lubricated.

It is a still further object to provide a compressor composed essentially of a main tank with the compressor actuating means mounted on said tank with compressor cylinders, an auxiliary tank, and a manifold immediately mounted on top of the operating machinery. By this means there is provided a compressor that is compact and one in which the parts are mounted one on the other, so that the whole assembled device will occupy a minimum of space with the parts so attached that there is no play or movement, in order that the connecting pipes will not become loosened.

For the purposes of illustration there is presented here a preferred embodiment of this invention, but it is not the intention of applicant to be limited by the form of device shown in the accompanying drawings.

Referring to the drawings, Figure 1 is a side view of the device showing part of the tank in section.

Figure 2 is a vertical section on the line 2-2 of Figure 3.

Figure 3 is a section on the line 3-3 of Figure 2.

Figure 4 is a section on the line 4-4 of Figure 2.

Figure 5 is a plan view of the plate for supporting the intermediate reservoir and the manifold, and is attached to the upper part of the motor.

Figure 6 is a view partly in section showing the intermediate tank, the gauge and section of the manifold, as well as the switch casing.

Figure 7 is a side view of the main tank.

Figure 8 is a view of the ring mounted upon a tank.

Figure 9 is a sectional view of the lower part of the tank.

Referring to the drawings in detail, this invention comprises essentially a main reservoir, a compressor and an intermediate reservoir. The condensed air is first forced by the compressor into the intermediate tank or reservoir, from which it passes into the main tank or reservoir and is retained therein by means of a check valve, leaving the intermediate reservoir more or less in a condition that the air will leak out and become of substantially the same pressure as atmospheric air.

1 indicates the main tank or reservoir which is cylindrical in shape. On top of this tank is mounted a ring 2 having holes 3 for the purpose of having the super-structure at...
attached to the ring. There extends from the ring 2 a flange 4 which extends into the inside of the tank 1 and is welded to the side of the tank, being therefore substantially integral with the main walls of the tank.

The upper closure of the tank is composed of a concaved saucer-like structure 5. The edge of this closure is bent up to form wall shaped parts which contact with the walls of the tank and is welded thereeto. On the lower part of the tank there is a ring very similar to ring 2 but instead of fitting on the inside of the tank it fits on the outside and is represented by the numeral 6. In this ring there are suitable holes indicated by 7, for the purpose of attaching it to any support or base structure. This ring 6 also has an upwardly extending flange 8 which is also attached to the outside wall of the tank and is welded thereto.

These closures, both upper and lower, being welded on the tank, compose the tank structure which is formed of substantially one piece of metal. Fitted within the lower part of the tank there is a bottom closure 9, substantially the same shape as the upper closure and placed in the tank in substantially the same relation as the upper closure. This bottom closure has a flange extending around the lower inside part of the tank and is welded thereto, the same as the upper closure 5.

Mounted upon the tank 1 and fixed thereto by bolt or screw means extending through the holes 3, there is mounted a motor and an eccentric means for operating the compressor. The motor casing is indicated by 10, while the casing that contains the eccentric is indicated by 11. This casing 11 also contains a suitable lubricant for lubricating the machinery enclosed therein.

Casings 10 and 11 are fastened together by means of screws indicated by 12, as is clearly shown by Figure 3. The motor itself is represented by 13 and has the usual motor shaft 14. The shaft bearings, two in number, are indicated by 15 and are in the housings. This motor shaft extends substantially horizontally and has on the end thereof which projects into the eccentric casing, a gear 16 which meshes with another gear 17. The gear 17 is mounted upon a sleeve 18 in any suitable manner. It might be made integral with it or it might be made separate therefrom and united therewith by screws or bolts. In the present instance it is shown to be united with the sleeve by means of screws. On each end of the sleeve 18 there is an eccentric 19 which is circular in shape.

The sleeve 18 and the accompanying eccentrics are mounted upon a shaft 20 which is suitably supported in holes 21, on each side of the eccentric casing. Around the shaft 20 adjacent the sleeve there is located a plate member 22 which is held by means of screws 23. By means of the screws 23 the plate member may be adjusted so as to bear against one end of the sleeve and take up any slack or motion it might have with respect to the side walls of the casing.

Each side wall, at the point where the shaft 20 enters it and around the hole 21, is enlarged to make the wall heavier and stouter at this point. Around each eccentric 19 there is a strap 24 which forms part of the piston rods 25. The other end of the piston rods from the rings 24 have holes therein to receive pins 27 which are suitably mounted in the pistons 26. Each of these pistons move up and down in the cylinder 26.

When the sleeve 18 rotates by means of the motor through the gear 17, the pistons are caused to move up and down in the cylinders and force the air out. Located at a suitable point in the upper surface of the cylinders is a valve 28 which is held in closed position by means of the spring 29. This spring 29 is sufficient to keep the valve closed under ordinary conditions, but permits air to be forced through the valve when the piston is forced upward by the rotation of the sleeve 18. There is also provided in the upper parts of the cylinders an intake valve 30, which valve is so constructed that air can be freely admitted into the cylinders on the downward stroke of the piston, but is closed on the upward stroke, while at the same time the air is being allowed to pass valve 28.

For the purpose of providing means of admission of the air through the valve 30, there is an intake pipe or tube 31 which leads from without the cylinder to the inside thereof, and admits air through the intake valve 30. When the air is forced out of the cylinders through valve 28, it passes through pipe 32 into the intermediate reservoir 33. The intermediate reservoir is cylindrical in shape and has the top part thereof welded to the sides 33'. The lower part of the intermediate tank is welded by means of welds 34 to a base plate 34'. By this means there is constructed an intermediate reservoir of metal in substantially one piece. This reservoir is attached to one end of the base plate as well indicated in Figure 5.

On the other end of the base plate there is attached a manifold. The pipe 32 leads into the reservoir 33 as clearly indicated in Figure 3. Extending from the upper part of this tank there is a threaded pipe that leads into a check valve 35 which is held by means of a spring 36. From this check valve the air is forced through the pipe 37 into a manifold 38.

There is also fitted in the upper part of the intermediate tank a relief valve 39 which is of conventional structure, and adapted to relieve excess pressure. The manifold 38 is welded to the base plate 34' along the side and lower edge thereof as indicated by 40 and shown in Figure 3.
The manifold 38 has four openings, one to receive pipe 37 from the intermediate reservoir, another leading into the pressure control contact casing, one into a pressure gauge, and the other into the main tank. The pipe 41 leading from the manifold to the switch leads immediately into a casing 42 which is in the lower part of a larger casing or housing 43. Within the casing 42 and suitably supported therein is a diaphragm 44 against which pressure from the manifold, through the pipe 41, acts to move up and down a rod member 45 which rests on the diaphragm 44. The rod member 45 is suitably attached to some switch mechanism whereby the contact is made and broken for the purpose of opening and closing an electrical circuit, whereby the control of the motor to operate the compressor is effected.

The gauge 38 is a conventional form of gauge to determine the amount of air pressure at any particular time. From one of the holes in the manifold the pipe 46 leads to an opening or hole in the upper part of the main tank or reservoir 1.

It is clear from the foregoing description that upon starting the motor the generator will act to force air into the intermediate reservoir, from which it passes through the check valve and pipe 37 into the main tank or reservoir. In passing from the pipe 37 into the main reservoir the air passes into a manifold which has connected thereto a pressure gauge and device for controlling a switch mechanism for starting and stopping the motor.

After the pressure has reached a certain point, the mechanism in connection with casing 43 is adjusted so that the current will be cut off by the automatic breaking of the circuit, but when the pressure has been removed from the main tank by use of the air stored therein, the pressure on the diaphragm is removed and contact again is made whereby the circuit is closed and the motor again started to operate the compressor. This action is repeated automatically as the supply of air is exhausted and restored.

From the foregoing description in connection with the drawings it is seen that applicant has provided a compact and conveniently arranged device of this class. The parts are arranged one above the other so as to occupy a minimum of space. The lower part of the device consists of the tank which affords means of support for the other part of the device. Immediately upon the upper end of the tank is located a housing in which the motor and the operating gears are placed in close fitting cooperation with each other.

There is a direct drive from the motor shaft to the gear parts and there is ample lubrication provided for these parts. Just on top of the casing of the motor and the gear there is located the compression cylinders and intermediate compression tank and a manifold. From the manifold there are four passages, one leading to the intermediate tank, another leading to the main tank, another to the pressure indicated and still another to a pressure control contact operating means. All of these parts are connected to each other in the most compact and convenient way so as to occupy a minimum of space and to afford a maximum of efficiency.

Having thus fully described my invention, what I claim as new and desire to secure by Letters Patent is:

1. In an air compressor, a double casing, a motor in one casing, a motor shaft supported in a bearing in one outer wall and the partition wall of said casing, a gear on the end of said shaft within the other casing, a gear shaft mounted within the other casing and having a gear in engagement with the gear on the motor shaft.

2. In an air compressor, compressor means, compressor operating means, a plate mounted upon said compressor operating means, said plate having welded thereon an intermediate tank and a manifold welded to said plate, and means for conducting the air from the compressor means to the intermediate tank and to the manifold.

3. In an air compressor, a double casing, a motor mounted in one casing, a motor shaft supported in bearings in one wall and the partition of said casing, a gear on the end of said shaft within the other casing, a shaft mounted in the other casing and supported by the walls thereof, a sleeve on said shaft, said sleeve having an eccentric and a gear thereon, said gear being in engagement with the first named gear, the last named casing being constructed to contain a lubricant for lubricating the sleeve and gear and the bearing in the partition.

4. In an air compressor, a plate, a reservoir formed on said plate so that the plate is the bottom thereof, a manifold welded to said plate, and means to force air through the reservoir and manifold.

5. In an air compressor, a tank, a casing adapted to contain a lubricant supported on said tank, a motor and motor operated gears enclosed and supported in bearings in said casing, part of said gearing extending into the lubricant in said casing and adapted during operation to distribute said lubricant to the bearings of said motor and gearing and compressor means operated by the gear and supported upon the casing for forcing air into the tank.

6. In an air compressor, a compressor and a compressor operating means, a plate having a tank and a manifold welded thereto supported on top of the compressor operating means, an upright switch control casing mounted on said manifold and connected therewith by a vertical pipe which forms a...
trap to prevent oil and water from reaching
the interior of the casing, and means con-
necting the tank and the manifold to the
compressor.

7. In an air compressor, a compressor and
a compressor operating means, a plate having
welded thereto an intermediate tank and a
manifold supported on top of the compressor
operating means, a casing supported on the
manifold and having air connection with the
manifold by a vertical pipe which serves to
keep oil and moisture out of the casing, a
diaphragm operated means in said casing to
start and stop the compressor operating
means at a fixed air pressure, and means con-
necting the manifold and the intermediate
tank with the compressor.

8. In a compressor, a tank, compressor
means supported by the tank, an intermediate
tank connected to the compressor and having
an inlet and an outlet pipe in the top thereof
and adapted to retain any foreign matter in
the air, a manifold supported by the com-
pressor means, and connected to the tank and
the intermediate tank, and a start and stop
mechanism supported by the manifold, said
mechanism including a casing having a verti-
cal pipe connection with the manifold, and a
diaphragm operated plunger therein.

9. In an air compressor, air compressing
means, a plate supported by said means, a
reservoir welded to said plate, air connection
between the compressing means and the reser-
voir, a manifold welded to the plate and hav-
ing an air connection with the reservoir, and
an air outlet from the manifold.

10. In an air compressor, a reservoir for
said compressor open at one end, a plate
welded to the open end of the reservoir to
form a closure therefor, and a manifold
welded to said plate, said manifold having a
plurality of outlets and an air connection with
the reservoir, said plate, reservoir and mani-
fold being supported by the compressor.

In testimony whereof, I affix my signature.

EDWARD A. HOBART.