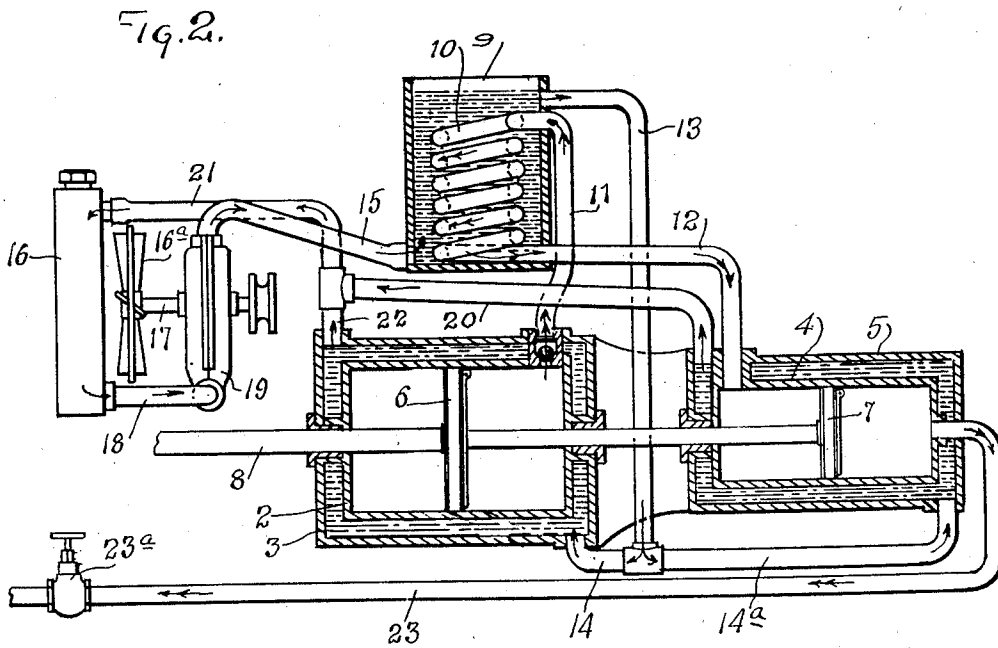


1,582,028

PORTABLE AIR COMPRESSOR



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PORTABLE AIR COMPRESSOR.

Original application filed October 20, 1924, Serial No. 744,675. Divided and this application filed July 6, 1925. Serial No. 41,491.

To all whom it may concern:

Be it known that I, IRWIN L. DUNN, a citizen of the United States, residing at Tulsa, in the county of Tulsa and State of Oklahoma, have invented certain new and useful Improvements in Portable Air Compressors, of which the following is a specification, reference being had therein to the accompanying drawing.

This invention relates to air compressors and is a division of my application filed October 20th, 1924, Serial No. 744,675.

It is the object of the invention to provide a portable compressor which may be installed in a system of apparatus for the blowing out of oil wells and supplying a sufficient volume of pressure to effectually carry out the blowing out operation.

To this end I provide a compressor having low and high pressure cylinders surrounded by water jackets with an intercooling means between said cylinders for cooling the temperature of the compressed air as it passes from the low pressure cylinder to the high pressure cylinder, and means for cooling and circulating water through said water jackets and intercooler so as to maintain the temperature therein sufficiently low to effect the desired cooling.

In the accompanying drawings:

Fig. 1 is a side elevation of my portable compressor apparatus mounted on a tractor; and

Fig. 2 is a detailed sectional view of such compressor and cooling apparatus therefor.

In these drawings I have shown a tractor, generally indicated 1, for furnishing power to operate the compressor and cooling apparatus, as also to move the same from place to place as desired. The compressor, in the illustration given, comprises a low pressure cylinder 2 surrounded by a water jacket 3 and a high pressure cylinder 4 surrounded by a water jacket 5. The cylinders are provided with the usual pistons 6 and 7 carried by a common piston rod 8 adapted to be driven by any suitable means, the power in this instance being supplied by the tractor engine. A tank 9, which I will term an intercooler, is located above the pressure cylinders and has suspended therein a coil of pipe 10, to one end of which is connected a pipe 11 leading from the low pressure cylinder 2. To the other end of the coil 10 is attached a pipe 12 leading into the high

pressure cylinder 4. A radiator 16 has been provided to contain a supply of water for cooling purposes and a fan 16^a mounted on a shaft 17 adapted to be driven in the manner hereinafter set forth maintains the water in the radiator cool. The water in the radiator 16 passes through a pipe 18 into a pump 19 also operated by the shaft 17 and forced through a pipe 15 into the tank 9 where it is desired to maintain a supply of cool water as hereinafter set forth.

A pipe 13 leading from the tank 9 supplies cool water to the space enclosed by the water jacket 3 through a branch pipe 14 and also to the space enclosed by the water jacket 5 through a branch pipe 14^a. The water surrounding the cylinder 4 is carried back to the radiator 16 where it may be cooled through pipes 20 and 21 while the water surrounding the cylinder 2 is returned to the radiator through pipes 22 and 21.

When the mechanism is put in operation the radiator 16, tank 9, water jackets 3 and 5, together with the inter-connecting pipes are filled with water which is kept in circulation by the pump 19 and cooled by the fan 16^a. In operation the course of the cooling water is from the bottom of the radiator through the pump, thence through the intercooler or tank 9, thence through the water jackets of the compressor cylinders and thence back to the top of the radiator. It will also be noted that the counter current principle is utilized in the intercooler, that is, the air current through the coil 10 and the cooling water current through the tank are in opposite directions so that the hot air enters the intercooler as the cooling water leaves it and the cool air leaves the intercooler where the cold water enters, thus making the most complete exchange of heat possible. A pipe 23 having a cut-off 23^a leads from the high pressure cylinder 4 to convey the compressed air to a storage tank or source of consumption.

The power for driving the shaft 17, as also actuating the piston rod 8, may be derived from the tractor engine, as above stated. In Figure 1, I have shown a shaft 24 adapted to be driven by the tractor engine and having mounted thereon a pulley 25 which drives a belt 26 extending around a second pulley 27 carried by the shaft 29 of a balance wheel 30. A pulley 31 also secured to the shaft 29 drives a belt 32 which

extends around a pulley 33 mounted on the shaft 17 and thereby actuates the fan 16^a and pump 20. The piston rod 8 is actuated by a pitman connection 34 with the driven shaft 29.

Thus it will be understood that I have provided an improved air compressor with means for effectually cooling the circulating water whose function is to keep the temperature of the cylinders, piston rod and pistons at a proper reduced temperature. This apparatus I have constructed and put into use and have found it to be very effectual and satisfactory under conditions where I have subjected air in the compressor to very high degrees of compression tending to generate excessive heat. In the machine shown and described I maintain temperatures down to un hurtful degrees in long hours of constant usage. While I have mounted my improvements on a chassis connected with a tractor for the purpose of movability or portability, still it will be understood that in so far as concerns my cooling apparatus the compressor need not be so mounted.

My invention is not confined to a two-stage compressor, but extends to and includes a greater number of stages in the compressor and is adapted to a multiple stage compressor having its cylinders placed either horizontally, vertically or at some angle. I therefore desire to comprehend within my invention such modifications as may be necessary to adapt it to varying conditions and uses.

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

1. In an air compressor, the combination with low pressure and high pressure cylinders each having water jackets, and means for conveying compressed air from the low pressure to the high pressure cylinders, of circulating and cooling means adapted to act on water within the water jackets to cool the same, the means for conveying the compressed air passing through the circulating water.

2. In an air compressor, low and high pressure cylinders, water jackets for said cylinders, means for conveying air from the low pressure to the high pressure cylinders, an intercooler for lowering the temperature of the air while being so conveyed, a radiator, means for cooling said radiator, and a pump to circulate the water through said water jackets, intercooler and radiator.

3. In an air compressor, low and high

pressure cylinders, water jackets for said cylinders, means for conveying air from low pressure to the high pressure cylinders, and means for lowering the temperature of the air while being so conveyed, comprising a tank into which cool water is introduced near one end and delivered therefrom near the opposite end, and a coil in said tank adapted to receive the air from one cylinder on its passage to another cylinder, the air entering said coil in the vicinity of the exit of the water from the tank and leaving the coil in the vicinity of the entrance of cooling water to the tank thereby establishing a countercurrent flow of the water and air and means for circulating and maintaining cool the water in said water jackets.

4. In an air compressor, low pressure and high pressure cylinders, water jackets for said cylinders, means for conveying air from the low pressure to the high pressure cylinders, a water tank for cooling the air while being so conveyed, means for delivering water to said tank, and means for cooling water and circulating it through said tank and water jackets.

5. In an air compressor, low pressure and high pressure cylinders, water jackets for said cylinders, means for conveying air from the low pressure to the high pressure cylinders, a water tank for cooling the air while being so conveyed, means for delivering water to said tank, and means for cooling water and circulating it through said water jackets and tank comprising a radiator, fan and pump.

6. In an air compressor, the combination with low and high pressure cylinders having water jackets, pistons for said cylinders, a common piston rod for said pistons, and means for conveying compressed air from the low pressure to the high pressure cylinders, of means for cooling and circulating water comprising a radiator, fan and pump, said pump, fan and piston rod being driven from the same source of power.

7. In an air compressor, low and high pressure cylinders, water jackets for said cylinders, means for conveying air from the low pressure to the high pressure cylinders, an intercooler for lowering the temperature of the air while being so conveyed, a radiator, a fan for cooling said radiator, and a pump to circulate the water through said water jackets, intercooler and radiator, and a common means for actuating said fan and pump.

In testimony whereof I affix my signature.

IRWIN L. DUNN.