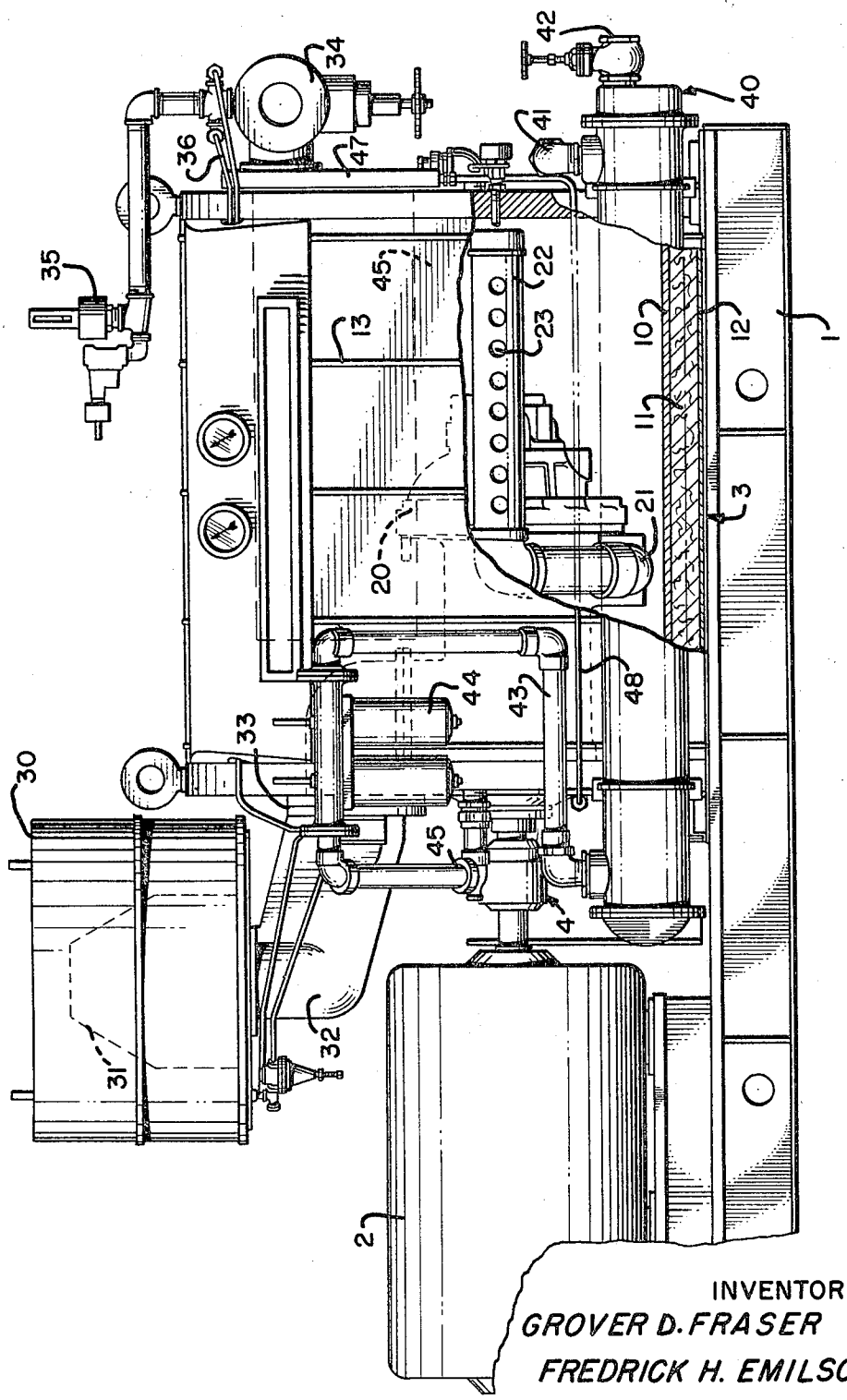
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ENCAPSULATED COMPRESSOR

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ENCAPSULATED COMPRESSOR

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ABSTRACT OF THE DISCLOSURE

A compressor unit where the compressor itself is mounted within the receiver. The receiving tank is covered with fiber glass or other sound insulating material. The compressor itself is preferably of the oil flooded type and the oil separator is mounted within an inlet filter.

This invention relates to compressors and more particularly to a compressor unit which is quieter and more compact.

In prior compressors or compressor units, the compressor is mounted on a platform with a motor or engine for driving the compressor mounted adjacent the compressor. The compressor inlet has a filter for removing dirt from the air or other fluid to be compressed and is provided with an unloader or inlet control valve between the filter and the compressor inlet. The discharge from the compressor goes into a storage tank which is separate from the compressor. One problem encountered with this design is noise. The compressor is generally in the open and the operation of the compressor is easily heard by one working near it. As the air or other fluid is discharged from the compressor and enters the storage tank it strikes the side wall of the tank and a "pinging" noise is produced.

It is, therefore, the principal object of this invention to provide a compressor unit which is quieter in operation.

It is another object of this invention to provide a compressor unit which is more compact.

In general, these objects are carried out by providing a compressor unit which includes a tank for storing fluid under pressure; a compressor is mounted within this tank in such a manner as to allow said tank to act as a receiver for fluid under pressure and having an inlet connected to the outside of the tank to receive fluid to be compressed and an outlet for discharging compressed fluid into the tank and power means for driving the compressor. A filter is connected to the inlet on the outside of the tank and means for regulating the amount of fluid admitted to the compressor mounted within the filter.

The aforementioned and other objects will become apparent from the following description and drawing in which:

The single figure represents a plan view of a compressor unit showing an embodiment of this invention with parts being broken away for purposes of clarity.

It will be readily apparent from the following description that all the components of this invention are known to the art and for this reason they will not be described in detail. This invention relates to a novel arrangement of known parts.

Referring to the drawing, there is a base **1** on which is mounted a power means **2** such as an electric motor and a storage tank-compressor generally indicated at **3**. The storage tank includes a tank **10** which is lagged on the outside with a sound deadening material such as fiber glass **11** which, in turn, is covered with an outer sheet material **12** such as steel which is held in place by bands **13**. A compressor **20** is mounted within the tank **10**. The compressor **20** is preferably of the axial flow or screw type

but may be any liquid lubricated fluid compressor such as a sliding vane type. The compressor **20** is connected to the power means **2** through a rotating shaft unit which is generally indicated at **4**. This unit is held so that compressed air within the storage tank **10** will not leak out into the surrounding atmosphere.

An inlet pipe **32** is connected to the compressor **20** and is sealed at **33** so that air under pressure will not escape from the storage tank **10**. A filter **30** is connected to the upper portion of the inlet pipe **32** to remove any dust or foreign matter from the air before entering the compressor **20**. A throttling unloader of any suitable type is mounted internally of the filter **30**. This unloader is responsive to the output requirements of the compressor. If the output requirements are low, the valve **31** will, at least partially close off the inlet to limit the air entering the compressor.

An oil cooler, generally indicated at **40**, is mounted on the outside of the storage tank **10** and is preferably of the water cooled type.

In compressors of the oil lubricated type, oil is injected into the compressor at a point where the air begins to be compressed. In order to cool the air being compressed, oil from the cooler **40** passes through pipe **43**, filters **44**, pipe **45** and is injected into the compressor **20**. Because this air-oil mixture cannot be readily used by the consuming devices, the oil must be separated from the air.

This is done by connecting a primary oil separator **22** of a known type which is connected to the outlet **21** of the compressor. In the preferred embodiment, the separator **22** consists of an elongated tubular member having a plurality of holes **23** therein. As the air-oil mixture enters the primary separator **22**, it is forced out of the openings **23** and impinges against the inside wall of the tank **10**. As this mixture impinges against the internal wall, the majority of the oil is separated and forms drops which settle to the bottom of the tank. Some oil in the form of a mist still remains in the air. Before the compressed air is useful, this mist must be separated.

In order to accomplish this, a secondary oil separator **45** is mounted internally of the tank. This separator is of a known type and may comprise a tubular member with a plurality of disc screens mounted thereon. Between the disc screens there is packing material of any desired type. As the oil passes through the secondary separator **45**, which it must do in order to leave the tank **10** through the outlet **34**, droplets of oil are formed which are collected in the space **47**. As the droplets form they pass through a conduit **48** which leads to the inlet end of the compressor and is injected into the compressor with the oil from the cooler **40**.

The oil which settles to the bottom of the tank exits from the tank through a connection **41** back into the oil cooler **40** and the process begins again. Water for cooling the oil is admitted through a valve **42**.

The outlet valve from the tank **10** includes a conduit **36** which transmits a pressure signal to the unloader **31** to indicate the amount of air required by the consuming devices. If desired, there may be a pressure relief valve **35** connected to the outlet **34**.

Because the unloader **31** is mounted within the filter **30**, rather than separate from the filter, the overall height of the compressor is reduced. By placing the compressor within the storage tank **10**, the overall appearance of the unit is improved as well as producing quieter operation. The storage tank is somewhat sound proof, thereby hiding the majority of the noise generated by operation of the compressor. The sound deadening material **11** serves to reduce the noise produced by the fluid exiting from the compressor and striking the side wall of the storage tank.

From the foregoing it is readily apparent that the ob-

jects of this invention have been carried out. It is intended that the description be merely that of a preferred embodiment and that the invention not be limited in any way except by that which is within the scope of the appended claims.

We claim:

1. A compressor unit comprising:
a tank for receiving and storing fluid under pressure;
a compressor mounted within said tank in such a manner as to allow said tank to act as a receiver for compressed fluid;
said compressor having an inlet connected to the outside of said tank to receive fluid to be compressed and an outlet for discharging compressed fluid into said tank;
power means for driving said compressor; and
means responsive to the output requirements of said compressor for regulating the amount of fluid admitted to said compressor.

2. The apparatus of claim 1 further including a filter connected to said inlet on the outside of said tank and said means for regulating the amount of fluid admitted to said compressor is mounted within said filter.

3. The apparatus of claim 2 wherein said tank has an outlet for allowing the compressed fluid in said tank to pass from said tank to a consuming device and means for transmitting a signal indicating the pressure required by said consuming device for actuating said regulating means.

4. The apparatus of claim 1 further including means for supplying a cooling fluid to said compressor.

5. The apparatus of claim 4 wherein said cooling fluid is liquid and further including a first means connected to said compressor outlet for separating at least a part of said liquid from said compressed fluid and discharging the separated liquid into said tank.

6. The apparatus of claim 5 wherein said first separator means includes a tubular member having a plurality of openings therein for directing the cooling liquid and compressed fluid mixture against the inside wall of said tank.

7. The apparatus of claim 6 wherein said cooling liquid is oil and further including means for cooling said oil connected at one end to said tank for receiving and cooling the oil separated from said compressed fluid and connected at its other end for forcing said oil into said compressor.

8. The apparatus of claim 7 further including a second means mounted within said tank and connected to said tank outlet for separating the remainder of oil from said compressed fluid.

9. The apparatus of claim 1 wherein said tank has a sound deadening material around the outside and a sheet metal material covering said sound deadening material.

10. The apparatus of claim 1 wherein said compressor is of the rotary liquid cooled type.

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