

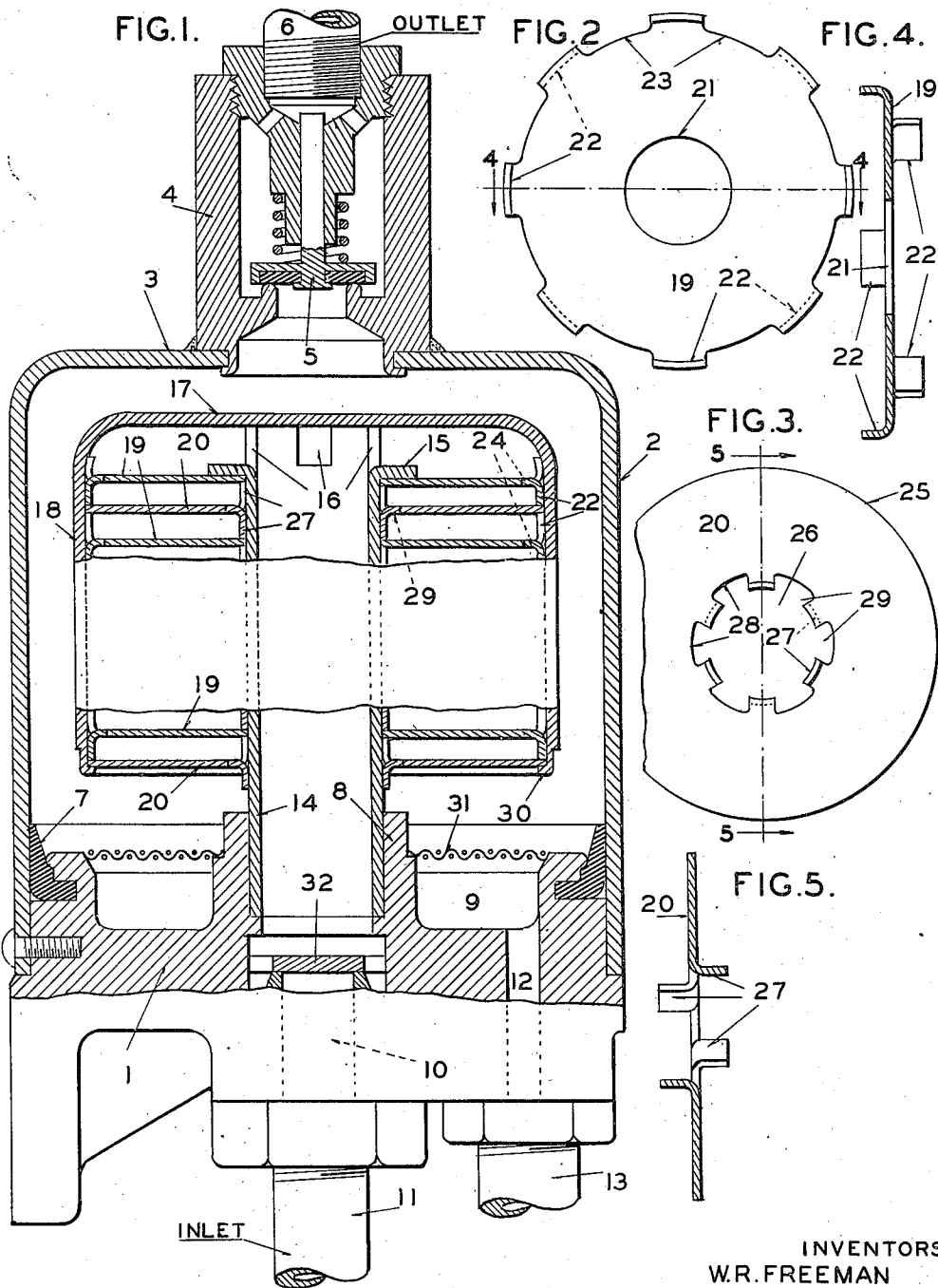
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1 Claim. (Cl. 183—94)

Our invention relates to separators for extracting liquid, such as oil, from air or other gas.

One of the objects of our invention is to produce an improved separator of the type having a plurality of baffles which is so constructed that the parts of the separator can be quickly assembled with a minimum of operations.

Another object of our invention is to produce a separator in which substantially all the parts can be made from stamped and drawn metal and assembled without the necessity of welding or otherwise rigidly securing the parts together.

Other objects of our invention will become apparent from the following description taken in connection with the accompanying drawing in which Figure 1 is a partial sectional view showing the separator in assembled condition; Figures 2 and 3 are views of the different baffle constructions; Figure 4 is a sectional view taken on the line 4—4 of Figure 2; and Figure 5 is a sectional view taken on the line 5—5 of Figure 3.

The separator shown is particularly adapted for use in separating oil carried by the discharged compressed air of a compressor but it is to be understood that it may be used for extracting other liquids in the form of vapor or small particles which may be carried by any gas.

In the drawing the numeral 1 indicates the bottom member of the separator and attached thereto is a cylindrical housing member 2 having an integral top 3. Secured to this top is a fitting 4 forming the outlet of the separator. A check valve 5 is associated with this fitting member to prevent the return of compressed air to the separator and a conduit 6 conducts the compressed air to a tank or other receptacle.

The bottom member of the separator carries an annular sealing cup 7 for sealing the cylindrical housing and the bottom member at the point where they are joined together. The central portion of the bottom member has an annular portion 8 which projects inwardly therefrom and forms an annular recess 9 in the bottom member for the separated liquid. An inlet passage 10 in the bottom member is connected to a conduit 11 which conveys fluid to the separator. When the separator is to be used with an air compressor, this conduit 11 will be connected to communicate with the discharge outlet of said compressor. The bottom member also has a passage 12 which places the annular recess 9 in communication with the conduit 13 for conducting the oil which accumulates in the recess back to the reservoir or other chamber which is

provided to receive the oil. The conduit 13, when the separator is associated with a compressor, has a valve (not shown) so that the oil can only be drained back to the reservoir when desired.

Fitted within the annular portion 8 of the bottom member is one end of a tube 14 which extends up into the housing member 2 to a point adjacent its top wall 3. The upper end of this tube has turned out portions 15 providing openings 16. Resting on the top end of tube 14 is an inverted cup-shaped member 17 which has its cylindrical side wall 18 in concentric spaced relation to the tube 14. Associated with the side walls of the inverted cup-shaped member and with the tube are alternately arranged baffles 19 and 20. A baffle 19 is shown in detail in Figures 2 and 4 and a baffle 20 is shown in detail in Figures 3 and 5. Both baffles are in the general form of annular discs and can be stamped from a flat sheet of metal.

Each baffle 19 has a central circular opening 21 of a diameter substantially the same as the external diameter of the tube 14. The periphery of the baffle is provided with a plurality of circumferentially spaced apart ears 22. These ears are bent from the body of the baffle so as to extend at right angles to the plane of said body and are arranged so that they project alternately in opposite directions. The baffle is so cut that the edges 23 of the baffle between the ears are spaced inwardly of the outer edges of the ears so as to provide passages 24 between the baffle and the wall 18 of the cup-shaped member 17 when the baffle is in position, thus allowing fluid to pass around the baffle.

The baffle 20 is formed with a circular outer edge 25, the diameter of which is substantially the same as the inner diameter of the cylindrical wall of the inverted cup-shaped member 17. The central portion of the baffle is provided with an opening 26 for receiving the tube and the inner edge of said baffle at the opening provided with spaced ears 27 bent so as to project alternately from opposite sides of the baffle and at right angles to the plane of the body of the baffle. The inner surfaces of these ears lie on a circle which has a diameter substantially the same as the outer diameter of tube 14. The inner edges 28 of the baffle between the ears is spaced backward of the ears so as to provide openings 29 when the baffle is in position.

When the baffles are stacked alternately in the manner shown in Figure 1, they will be held in

spaced apart relation by the ears thereon and the openings through which fluid passes are arranged so that the fluid in passing through the separator must pass back and forth between the baffles. The baffles are supported by an inturned flange 30 on the lower end of the inverted cup-shaped member, said flange cooperating with the surface adjacent the circular edge of the bottom baffle 20. The cup-shaped member when the baffles are assembled is maintained on the top of tube 14 by the top baffle 19 engaging the portions 15 on the top end of the tube.

To assemble the cup-shaped member, the tube, and the baffles, all that need be done is to set the cup-shaped member open side up, place the tube in the center thereof with the end having the opening 16 in engagement with the bottom of the cup-shaped member and then alternately stack the baffles 19 and 20 on the tube and in the cup-shaped member. Due to the construction of the baffles, they will be properly spaced apart by the ears extending therefrom. After the baffles have been stacked, the end of wall 18 is turned in to form the flange 30, thereby holding the entire assembly together. The tube 14 is next inserted into the annular projection 8.

With the separator constructed and assembled as shown in Figure 1, fluid will pass from the inlet conduit 11 up through tube 14, through the openings 16, and then alternately back and forth between the baffles. If the fluid passing through the separator is from an air compressor, it will carry with it a certain amount of oil in the form of mist or particles and as the compressed air passes back and forth between the baffles, the oil will collect on the baffles and thus be separated from the compressed air. The collected oil will run off the baffles through the openings at the ends thereof and eventually run into the annular recess 9 in the bottom member. The compressed air which has been freed of oil passes out through the check valve 5 to the conduit 6 and the storage tank. The accumulated oil in recess 9 is returned to the reservoir of the compressor or any other receptacle through the conduit 13. When the separator is used with a compressor it is, of course, desirable to return this accumulated oil only when the compressor is not compressing air. This is accomplished by suitable valve means which need not be shown as it

has nothing to do with the separator construction. If desired, a screen 31 can be provided above recess 9 to strain the oil when it drips from the baffle plates into the recess. There may also be provided a disc valve 32 for the inlet passage 10 of the separator which will prevent the compressed fluid from flowing back from the separator to the compressor when the compressor is unloaded. The valve also will maintain air under pressure in the housing 2 which is useful in forcing accumulated oil back to the compressor reservoir whenever the oil is permitted to flow back through the conduit 13.

Being aware of the possibility of modifications in the particular structure herein described without departing from the fundamental principles of our invention, we do not intend that its scope be limited except as set forth by the appended claim.

Having fully described our invention, what we claim as new and desire to secure by Letters Patent of the United States is:

In a separator, a housing having an inlet and an outlet, a tube communicating with the inlet and extending into said casing, said tube having its inner end provided with turned out portions forming openings in the wall of the tube, a cup-shaped member positioned over the end of the tube with its side wall concentrically spaced from the tube, and a plurality of baffles in the form of annular discs positioned in the space between the tube and the wall of the cup-shaped member and lying in planes at substantially right angles to the tube and wall, the discs forming one series of alternate baffles having ears extending from opposite sides at its outer edge and the discs forming the other series of alternate baffles having ears extending from opposite sides of its inner edge whereby to maintain said discs in spaced relation, each disc also being so formed between its ears as to provide openings permitting fluid to pass the baffles at said eared edge, and the end of the wall of the cup-shaped member being provided with an inturned flange for maintaining said baffles between the turned out portions at the end of the tube and the said flange and preventing removal of the cup-shaped member.

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