Dec. 31, 1929. D. PERRIER 1,742,096

CENTRIFUGAL SEPARATOR

Filed Nov. 15, 1928

Fig. 1

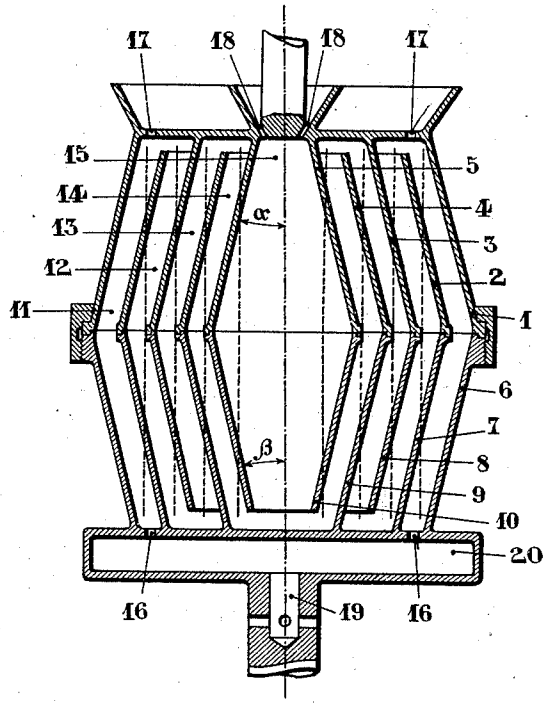
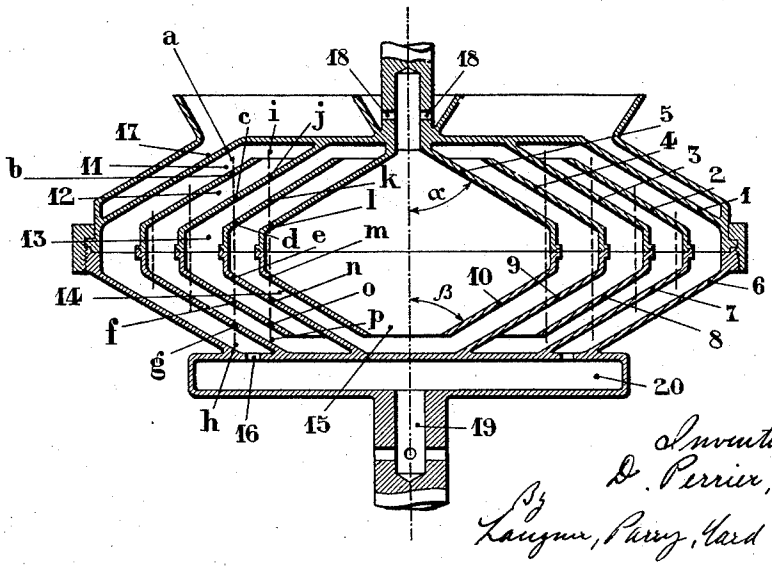


Fig. 2



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UNITED STATES PATENT OFFICE

DANIEL PERRIER, OF UNIEUX, FRANCE, ASSIGNOR OF ONE-HALF TO SOCIÉTÉ ANONYME FRANCAISE DITE: COMPAGNIE INDUSTRIELLE DES MOTEURS A EXPLOSIONS C. I. M. E., OF PARIS, FRANCE

CENTRIFUGAL SEPARATOR

Original application filed January 23, 1928, Serial No. 248,945, and in Germany January 22, 1927. Divided and this application filed November 15, 1928. Serial No. 319,644.

The present invention, a division of my copending application for centrifugal separators, Serial Number 248,945, filed January 23, 1928, relates to improvements in the rotary distributors of centrifugal separators, and more particularly to those in which the liquid (or gaseous fluid) treated follows, from the outside to the inside, a path through baffles.

This application is a division of application Serial Number 248,945, filed January 23, 1928.

The present invention is characterized by the particular arrangement of concentric ribs which form annular chambers, so that the liquid (or gaseous fluid) to be treated is subjected during its path through the apparatus, twice, three times or a number of times which may be practically as large as desired, to the same centrifugal forces as that developed in the outer annular chamber.

Various embodiments of the improved centrifugal separator forming the subject of the invention are illustrated diagrammatically and simply by way of example in the accompanying drawing.

In this drawing:—

Fig. 1 illustrates a first embodiment of a separator according to the invention in which an equal centrifugal force is obtained in two adjacent chambers.

Fig. 2 illustrates another embodiment according to the invention in which an equal centrifugal force is obtained in four annular chambers but in which the volume reserved for the heavy solid sediments to be sparated from the liquid or gaseous fluid is increased.

According to the invention the rotary distributor is formed by a series of concentric ribs 1, 2, 3, 4 and 5 inclined to the general axis of the apparatus at an angle α which varies essentially according to the results to be obtained. These ribs form cone frustums which are assembled by their large bases with other ribs 6, 7, 8, 9 and 10 also inclined to the general axis of the apparatus at an angle β which will generally be equal to the angle α; but this is not an essential feature of the invention, and the angles α and β may be different.

The inclined ribs 6, 7, 8, 9 and 10 are assembled with the inclined ribs 1, 2, 3, 4 and 5 by means of interengaging joints which ensure centering or by any other means. These ribs are then locked upon each other by any known mechanical means.

The inclined ribs 2 and 4 are open at their ends in the neighbourhood of the small bases of the cone frustums so that the annular chambers 11 and 12, 13 and 14 communicate with each other at their upper parts. Similargly, the ribs 8 and 10 are open at their ends located in the neighbourhood of the small bases of the cone frustums so that the annular chambers 12 and 13, 14 and 15, communicate with each other at their lower parts.

Orifices 16 pierced in the lower wall of the distributor, permit the liquid or the fluid to be treated to enter the outer annular chamber 11. Orifices 17 pierced in the upper wall of the distributor upon a circle concentric with the axis of the apparatus permit the discharge of a heavy liquid (or a heavy gaseous fluid) contained in the liquid or the gaseous fluid to be treated and which it is desired to remove from the liquid or the gaseous fluid to be obtained finally.

If the liquid or the gaseous fluid to be treated contains no other liquid or gaseous element which it is desired to remove these orifices 17 will be closed. Their arrangement may, moreover, be different. In the embodiment shown in Fig. 2 they are pierced upon the inclined rib 1 in the neighbourhood of the larger base of the cone frustum, that is to say in the zone in which the centrifugal force is a maximum.

Other orifices 18 are pierced either in the upper wall of the distributor near its central part in the interior of the central chamber 15 or in the axis of the apparatus for discharging the least dense liquid (or gaseous fluid) to be collected in the last place.

The operation of the apparatus is then as follows:—

The liquid or the gaseous fluid to be treated enters through a duct 19 and penetrates into a distributing chamber 20 in which it undergoes a first separation, the most dense solid

element being deposited upon the outer wall of this chamber.

The liquid (or gaseous fluid) then enters the chamber 11 through the orifices 16. A separation by order of density is produced in this chamber. The solid elements which are the heaviest become deposited in the part of the chamber where the centrifugal force is maximum, that is to say, in the zone near the large assembly base of the ribs 6 and 1, the heavy liquid elements (or gaseous) remaining along the inner wall of the rib 1 in order to pass out through the orifices 17.

The remainder of the liquid (or of the gaseous fluid) then enters the chamber 12 in which it undergoes a new separation, and so on in the chambers 13 and 14. It then enters the chamber 15 in which it may again undergo a last separation. It is then collected through the orifices 18.

As will be seen, the liquid to be treated is subjected in its passage through the rotary distributor to an equal centrifugal force in four different annular chambers (cases shown in Figs. 2 and 3). In the zones *ab* and *gh* of the chamber 11; *be* and *fg* of the chamber 12; *cd* and *ef* of the chamber 13; *de* of the chamber 14. Similarly, an equal centrifugal force is obtained in the zones *ij* and *op* of the chamber 12, *jh* and *no* of the chamber 13, *kl* and *mn* of the chamber 14, *lm* of the central chamber 15.

The rotary distributor shown in the accompanying drawing with five concentric ribs may also be constructed according to the invention with any number of ribs.

What I claim is:

1. In a centrifugal separator, a rotary distributor, comprising a casing, upper and lower concentrically arranged assemblages of baffles of frusto-conical form within said casing, the corresponding baffles of the two assemblages being connected to each other at their major ends, relatively adjacent baffles defining, between them, circulation chambers concentrically arranged and concentric to the axis of rotation of the distributor, the said baffles being arranged alternately with respect to one another, to establish communication between said chambers, means for admitting the fluid to be separated into the casing at one point for delivery into the outermost one of said chambers, means arranged substantially at the point of greatest centrifugal force for conducting the heavier of the separated fluids from said distributor, and means for conducting the refined fluid from the distributor at another point.

2. In a centrifugal separator, a rotary distributor, comprising a casing, upper and lower concentrically arranged assemblages of baffles of frusto-conical form within said casing, the corresponding baffles of the two assemblages being connected to each other at their major ends, relatively adjacent baffles defining, between them, circulation chambers concentrically arranged and concentric to the axis of rotation of the distributor, the said baffles being arranged alternately with respect to one another, to establish communication between said chambers, means for admitting the fluid to be separated into the casing at one point for delivery into the outermost one of said chambers, the outermost one of said upper assemblages of baffles having a plurality of openings therein for conducting the heavier of the separated fluids from said distributor, and means for conducting the refined fluid from said distributor at another point.

3. In a centrifugal separator, a rotary distributor, comprising a casing, upper and lower concentrically arranged assemblages of baffles of frusto-conical form within said casing, the coresponding baffles of the two assemblages being connected to each other at their major ends, relatively adjacent baffles defining, between them, circulation chambers concentrically arranged and concentric to the axis of rotation of the distributor, the said baffles being arranged alternately with respect to one another, to establish communication between said chambers, means for admitting the fluid to be separated into the casing at one point for delivery into the outermost one of said chambers, the outermost ones of said upper assemblages of baffles having a plurality of openings therein arranged closely adjacent the point of greatest centrifugal force, for conducting the heavier of the separated liquids from the distributor and means for conducting the refined fluid from the distributor at another point.

In testimony whereof I have signed my name to this specification.

DANIEL PERRIER.