

Aug. 17, 1965

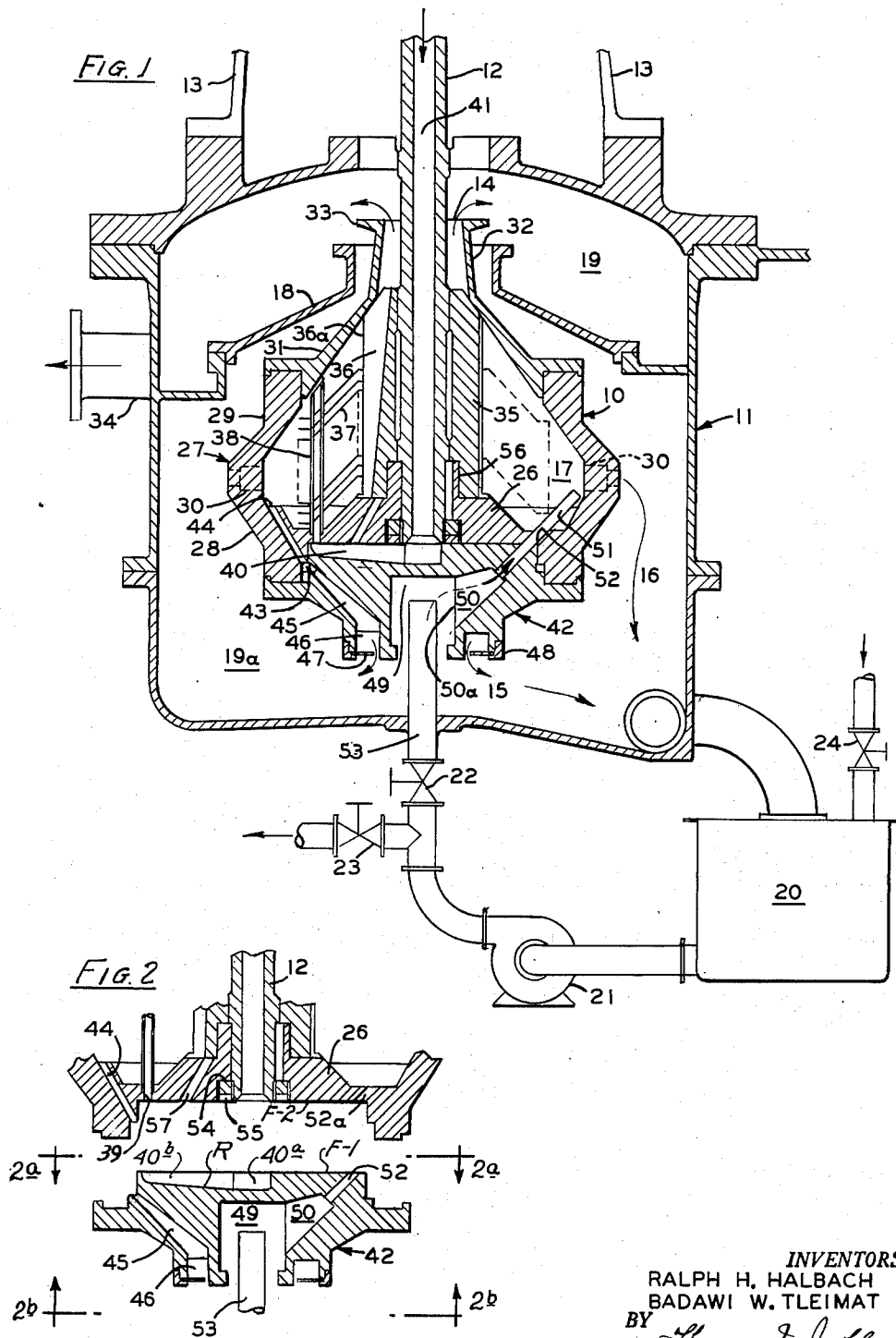
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3,201,036

THREE-PRODUCT NOZZLE-TYPE CENTRIFUGE

Filed Aug. 11, 1964

5 Sheets-Sheet 1



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THREE-PRODUCT NOZZLE-TYPE CENTRIFUGE

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FIG. 2a

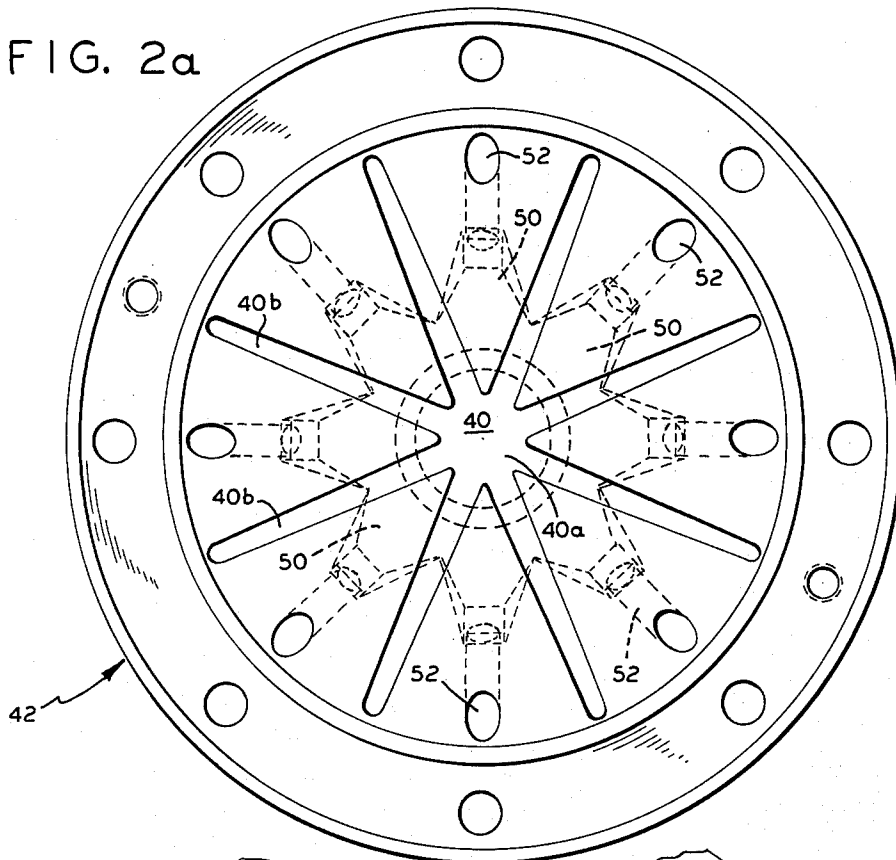
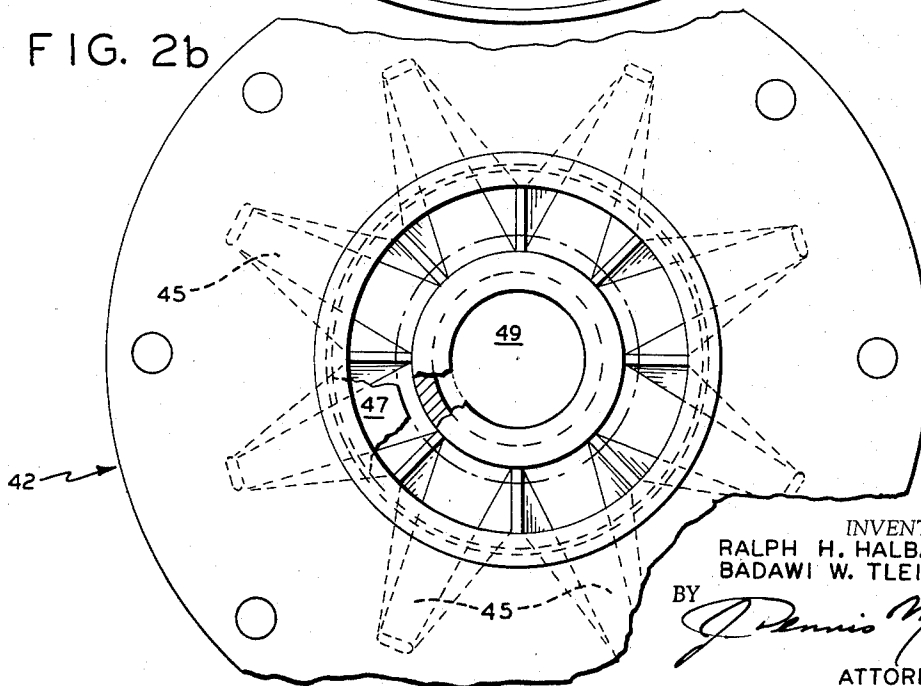


FIG. 2b



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FIG. 3

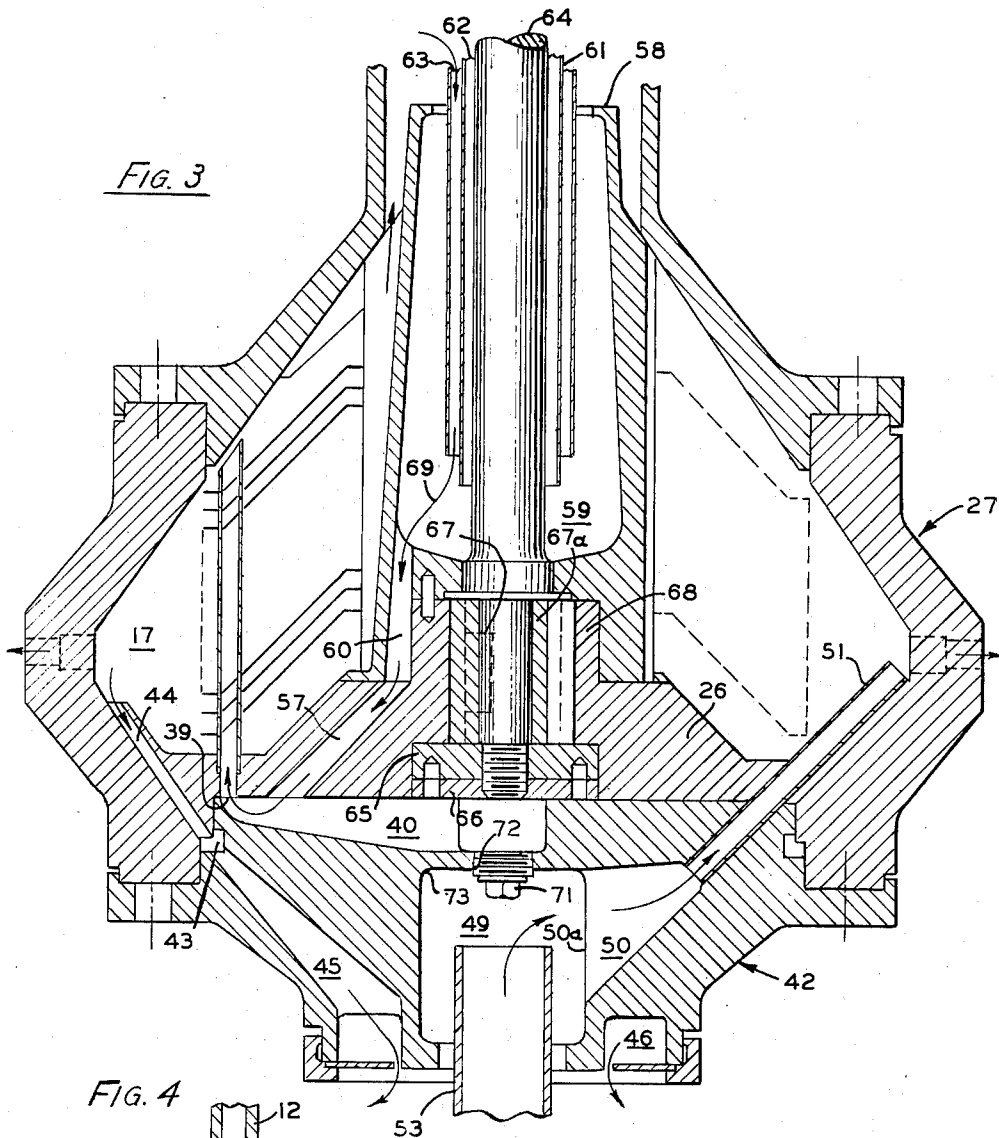
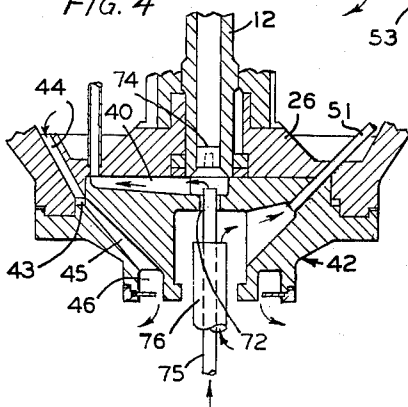


FIG. 4



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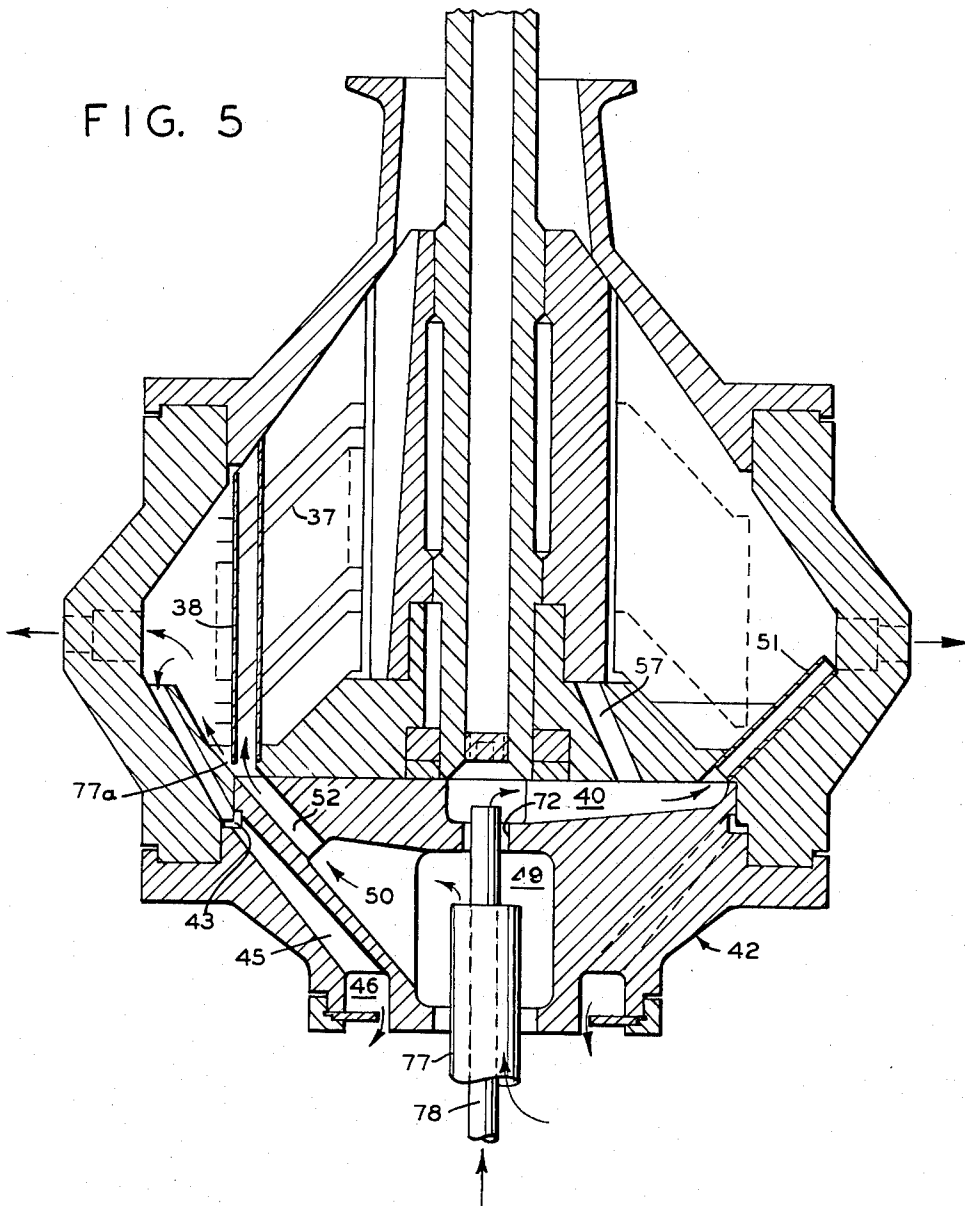
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FIG. 5



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THREE-PRODUCT NOZZLE-TYPE CENTRIFUGE

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FIG. 6

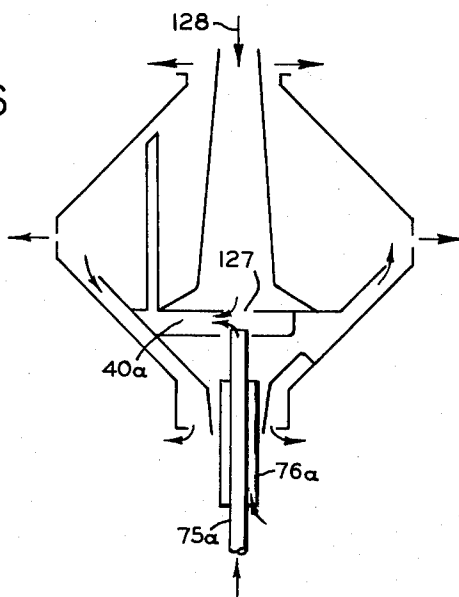
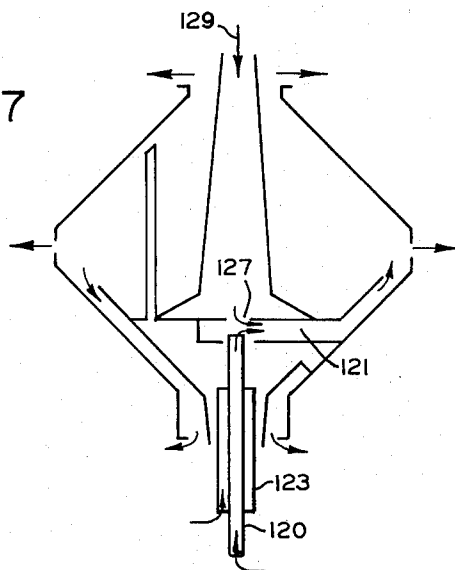


FIG. 7



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THREE-PRODUCT NOZZLE-TYPE CENTRIFUGE
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Filed Aug. 11, 1964, Ser. No. 339,827
10 Claims. (Cl. 233-14)

This application is a continuation-in-part of our co-
pending application Serial No. 36,229, filed June 15,
1960, and now abandoned.

This invention relates to improvements in centrifuges
for effecting the separation of the feed mixture or emul-
sion into overflow liquid fractions of different specific
gravities and a heavier solids bearing concentrate derived
from the centrifugal separation chamber in the rotor bowl
of the centrifuge.

Centrifugal machines for this purpose are of the so-
called nozzle type as distinct from the so-called solid
bowl construction which latter lacks the discharge nozzles
for discharging a concentrate. Solid bowls are, there-
fore, limited to the separation of component liquids of
different specific gravities by overflow.

More particularly, this invention is concerned with a
nozzle-type machine for three-product centrifugal opera-
tion of the respective components of a solids bearing
mixture, where solids bearing concentrate discharges
from the nozzles provided upon the outer periphery of
the separating chamber, while the two liquid fractions of
different specific gravities discharge through respective
overflow passages. For example, crude oil may thus be
separated into an oil fraction, a water fraction, and a
concentrate which may consist of water containing solids
such as sand and other particles.

Control liquid, or nozzle discharge material, or both,
may be supplied into the rotor bowl to satisfy the nozzle
flow requirements as well as for establishing operating
balance as between the underflow from the nozzles and
the overflows. By these controls it is possible to regulate
the underflow concentration as well as to control the
location of the respective centrifugal separation zones in
the bowl, and also to effect washing of the solids to free
them of mother liquor or dissolved values or the like
before they discharge from the nozzle means as concen-
trates. Varying the diameter of at least one of the
overflows is another means of influencing the separating
operation within the bowl.

This invention has among its objects to provide an
improved centrifugal machine for effecting a greatly im-
proved separation of the fractions. The invention, there-
fore, is directed towards obtaining the fractions at maxi-
mum purity, in that contamination of any of the frac-
tions by any of the other fractions is minimized or sub-
stantially avoided. More particularly, the object is to
provide an improved rotor bowl constructed so as to
greatly improve the separation of the two liquid over-
flows from each other by minimizing or eliminating the
possibility of their getting intermingled in the operation
of the machine.

Other objects are to provide a rotor bowl which is so
compartmented and otherwise organized as to embody a
high degree of structural and operational flexibility and
to be adaptable to a variety of operating requirements
and conditions, but nevertheless of simple construction
and readily accessible interiorly as for cleaning and in-
spection, and to make available a relative maximum of
volumetric capacity in the separating chamber.

The invention is embodied in a rotor bowl exemplified
in a construction of preferably double-conical configura-
tion wherein two overflow liquids discharge from respec-
tive overflows at opposite ends of the bowl, while solids

bearing underflow fraction may discharge through the
nozzles about midway between the relatively constricted
end portions of the bowl, from the centrifugal separating
chamber in the bowl. A hub portion is preferably in-
tegral with the nozzle-carrying portion of the bowl which
has a constricted open end providing the primary over-
flow, the rotor shaft extending from the hub portion
through the separating chamber and through the overflow
end of this bowl.

Among the more specific objects are to make possible
the introduction of the feed mixture into the rotor selec-
tively in various ways, either from the top or from the
bottom substantially without alteration of the rotor bowl,
so that the feed may be through the rotor shaft or else
through stationary feed devices; and to provide flexibility
of arrangement in the number of feed-, wash-, and sec-
ondary overflow openings in the bowl.

To attain the foregoing objects, the invention provides
a complementary construction or casting which is de-
tachably connected to the hub portion of the separating
chamber, featuring a compact and novel compartmentation
in a special arrangement of chambers, ports, ducts,
and impeller means for handling the flow of incoming
feed mixture, of return underflow or control liquid, and
also the discharging of the secondary overflow.

This complementary compartmented construction in
one embodiment has a recess facing the hub portion of
the separating chamber and constituting therewith an
inner chamber communicating with corresponding influ-
ent passages in the hub for introducing one of the in-
flowing liquids or materials into the separating chamber;
an intermediate chamber communicating with other influ-
ent passages in the hub for introducing the other one
of the inflowing liquids or materials into the separating
chamber; and a third or outer annular chamber prefer-
ably surrounding the intermediate chamber and com-
municating with still other passages, namely effluent
passages in the hub portion through which an interme-
diate fraction may pass from the separating chamber out
into this annular outer chamber for discharge as sec-
ondary overflow across a ring-shaped dam.

Preferably, the complementary construction is turn-
ably positionable about the rotor axis so that different
chambers, ducts, and ports therein can be brought into
communicating relationship selectively with different sets
of flow passages in the hub portion of the bowl. In
this way, provision can be made for introducing feed
mixture either from the top or from the bottom.

According to another feature, different kinds of liquids
may be introduced into the rotor simultaneously from
both ends, for mixing in a mixing chamber whence the
mixture passes into the separating chamber.

Other features and advantages will hereinafter appear.

As this invention may be embodied in several forms
without departing from the spirit or essential character-
istics thereof, the present embodiment is, therefore, illus-
trative and not restrictive, since the scope of the inven-
tion is defined by the appended claims rather than by the
description preceding them, and all changes that fall
within the metes and bounds of the claims, or equiv-
alents of such metes and bounds, are, therefore, intended
to be embraced by the claims.

FIGURE 1 is a vertical section through a centrifuge
incorporating the improved rotor and impeller of the
present invention.

FIGURE 2 is an exploded fragmentary vertical sec-
tion of one end of the rotor of FIGURE 1.

FIGURE 2a is a top view of the complementary con-
struction of the present invention taken on line 2a-2a
of FIGURE 2.

FIGURE 2b is a bottom view of the complementary
construction taken on line 2b-2b of FIGURE 2.

FIGURE 3 is a vertical section of a modified arrangement of the rotor of the present invention.

FIGURE 4 is a fragmentary vertical section of another modified arrangement of the rotor of the invention.

FIGURE 5 is a vertical section of a further modified arrangement of the rotor of the present invention.

FIGURES 6 and 7 are diagrammatic presentations of still further modified arrangements of the invention.

A centrifuge embodying the invention exemplified in FIGURE 1 comprises a rotor 10 mounted for rotation in a housing 11 by hollow rotor shaft 12 being rotatably suspended as in an overhead bracket construction or supporting means indicated by bracket portions 13 mounted atop the housing 11.

The rotor as constructed in accordance with this invention is of substantially double-conical configuration, and operates to effectively separate the feed mixture, for example crude oil, into its three main components, namely oil, water, and solids bearing aqueous sludge or slurry or a concentrate. The crude oil mixture or emulsion entering the rotor as through the hollow shaft 12 is centrifugally separated into a primary or light overflow fraction 14 such as clean oil discharging from the top end of the rotor, an intermediate or heavier fraction 15, namely water discharging from the rotor bottom end, and a heavy fraction 16 or solids bearing concentrate or the like discharging through nozzles mounted in the wide peripheral portion of the rotor between the relatively constricted top and bottom overflow discharging ends thereof.

An annular partition 18 divides the housing into an upper chamber 19 for receiving the primary overflow, and a lower chamber 19a designed to receive both the secondary overflow or water and the underflow of solids bearing concentrate discharging from the nozzles. In this example, both these latter fractions mix in the lower chamber for discharge into the receiver tank 20 whence a pump 21 may return a portion of the water-solids mixture as through control valve 22 into the rotor centrally through the bottom end thereof, while another portion may discharge from the system as through a control valve 23.

With the valve 22 at least partially open, the discharge valve 23 may be manipulated to vary the rate at which the discharging mixture will recirculate for the purpose of satisfying the nozzle requirements, or of controlling the concentration of the underflow discharging from the nozzle, or of establishing a suitably located interface between the water and the oil in the separating chamber of the rotor bowl. In the instance of crude oil separation treatment, for example if no solids are contained in the oil-water mixture it will be understood that water fraction alone may be recirculated to satisfy nozzle requirements and with respect to establishing a proper water-oil interface. If sufficient water for such control purposes is not available in the crude oil mixture itself, then auxiliary water may be introduced as needed, such as is indicated, for example by the supply valve 24 connected with the receiver tank. However, auxiliary water may also be introduced at various other points of the system.

Furthermore, the improved rotor construction of this invention can be advantageously used, for example where a three-product separation requires the discharge and recovery of the two overflows separate from each other and at a high degree of purity, as well as separate from the underflow.

The improved rotor construction itself, in more detail, comprises a hub portion 26 fixed to the shaft 12 and preferably integral with a body portion 27 of the rotor bowl. This body portion 27 has trunco-conical end portions 28 and 29 constituting between them the outer peripheral portion or nozzle section of the bowl, wherein the discharge nozzles 30 are located, such nozzles of themselves being known in the art. A bowl end portion in the form of a flanged conical terminal member 31 is removably fastened to the top end of body portion 27

opposite to the hub, and is formed with a discharge neck 32 terminating in overflow lip 33 for discharging the primary overflow 14 at the top into the receiving chamber 19 and out through an outlet 34.

Fitted onto the hub and around the shaft is an extension member 35 providing upward flow channels 36 between vanes 36a to open radially outwardly towards the separating chamber, through which channels the light liquid fraction may pass for discharge as primary overflow from the top of the bowl. The extension member 35 is held in place by the abutting engagement of its top end portion with the conical member 31, and it is surrounded by a stack of separating discs 37 the function of which is well-known in the art with respect to separating any heavier particles carried by the light fraction while the same is passing through the interstices between the discs and up the channels 36 to the overflow.

The separating discs are penetrated in a conventional manner by vertical perforated feed tubes 38 communicating with transfer passages 39 located in the hub and which in turn communicate with feed transfer conduit means 40 (see FIG. 3) herein also termed the inner influent chamber extending between the passages 39 and the hollow axial passage 41 in the shaft through which the feed mixture may be fed into the bowl.

According to the invention, the transfer conduit means 40 are provided, in part, by a complementary construction 42 which is compartmented and organized in a special manner for cooperation with the hub portion of the bowl and detachably connected to the underside thereof. Thus, the conduit means 40 is formed (see FIG. 2) by a recess R in the inner transverse face F-1 of the construction or part 42, which recess faces upwardly towards the hub portion of the bowl and constitutes with the other transverse face F-2 thereof the transfer conduit or inner influent chamber 40. The transverse conduit means 40 has a central conduit portion 40a and radial conduit portions 40b extending therefrom to, and communicating with the respective feed tubes 38. Similarly, the part 42 constitutes in cooperation with the hub portion an annular conduit 43 concentric with the shaft and communicating with convergent conduits 44 formed or provided in the hub portion of the bowl.

An intermediate fraction of the material from the separating chamber 17 may flow through these convergent conduits 44 downwardly via the annular conduit 43 into downwardly convergent extension conduits or passages 45 formed in the part 42 and terminating in an annular discharge chamber 46 provided with ring dam 47 held in place by a retainer ring 48. The discharge chamber 46 and the ring dam surround an influent chamber 49 centrally formed in the part 42, and from which in turn extend upwardly divergent passages 50 defined by radial vanes 50a, communicating with inserted upwardly divergent tubes 51 extending through passages 52 in the part 42 and registering passages 52a in the hub portion (see FIG. 2), and thus into the separating chamber where the delivery ends of the tubes terminate in the region of the nozzles 30. Control liquid or recirculating underflow from the receiver tank 20 may enter the influent chamber 49 through an induction pipe 53 or through other suitable injection means.

The configuration of the detachable construction or part 42 appears more clearly in the exploded view of FIGURE 2 indicating the manner in which the conduit means 40 is formed by the assembly of part 42 with body portion 27 of the rotor, and also illustrating the manner in which the recess R can be exposed and rendered accessible simply by detaching the construction 42. This detail also illustrates more clearly the location of the divergent passages or bores 52 and 52a through which extend the divergent return tubes 51 when the rotor is assembled as in FIGURE 1. Lock nuts 54 and 55 and a key connection 56 are also shown to indicate how the shaft 12 is rigidly secured to the rotor hub.

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The hub portion is further provided with special passages 57 which in the embodiment of FIGURES 1 and 2 are shown inactive being then blocked by the bottom face of the extension member 35, which passages 57, however, can be rendered active feed flow passages for purposes appearing in the modified embodiment of FIGURES 3 and 4.

The structure of the rotor shown greatly enlarged in the detail FIG. 3 is the same as that shown in FIG. 1, except for a difference in the manner whereby the feed mixture is introduced through the top end of the rotor and then channeled through the aforementioned special passages 57 in the hub and thereby affording certain advantages described below.

While some like parts in this rotor are designated by like numerals as compared with the rotor of FIG. 1, the modified feed arrangement comprises a differently constructed extension member 58 forming a feed chamber 59 with downwardly continuing feed passages 60 that register and communicate with the special passages 57 in the hub. In this way, feed mixture may flow from the feed chamber 59 through the passages 60 and 57 and then through the outer ends of feed transfer passage 40 into the respective vertical feed distributing tubes 38 provided in the separating chamber of the bowl. Accordingly, the extension member 58 seated on the hub surrounds an annular feed inlet 61 formed by two concentrically arranged stationary tubes 62 and 63 which in turn surround a solid shaft 64 fixed to the rotor hub by means of a pair of lock nuts 65 and 66, together with a first key connection 67 between the shaft and an adaptor sleeve 67a, and a second key connection 68 between this adaptor sleeve and the rotor hub.

Thus, feed mixture 69 from the annular feed inlet 61 will enter the feed chamber 59, and then through connecting passages 60 pass through the now active special feed passages 57 into the separating chamber 17. By thus arranging for the feed mixture to by-pass the separating chamber through special feed passages 57 and through the outer ends of passage 40 reach the feed tubes 38, maximum space is made available for the separating chamber 17, affording an additional gain in the volumetric capacity thereof.

It will be noted with respect to the compartmented construction or complementary part 42 in the embodiment of FIG. 3, that a removable plug 71 closes an opening 72 provided in the wall portion 73 that separates the transfer conduit 40 from the influent chamber 49, while in FIG. 4 the lower end of hollow shaft 12 is closed as by another plug 74. By removing plug 71 from the wall portion 73, the opening 72 can be utilized for establishing another feed arrangement providing various advantages as illustrated in FIG. 4. In this way, feed mixture may be introduced through the bottom end of the bowl, with the advantage that the feed inlet is located in a remote position where feed spillage cannot contaminate the overflow, and that furthermore the diameter of the top overflow rim of the bowl can be reduced to a desirable minimum whereby the volumetric capacity of the bowl may be correspondingly increased even as the energy losses in the overflow are thereby reduced. Hence, FIG. 4 shows an induction pipe 75 extending upwardly through the opening 72 for delivering feed mixture into the feed passage 40. The feed induction pipe 75 may be surrounded by or otherwise associated with another upwardly directed induction pipe 76 terminating in the influent chamber 49 for delivering thereto a control liquid or return underflow from the nozzles for purposes of controlling the centrifugal operation along the lines set forth above.

According to another feature of the invention as illustrated in FIG. 5, the rotor construction as a whole may be substantially similar to that in FIG. 4 providing for feed entrance through the bottom end of the bowl. The compartmented part 42, however, is shown to have been turned and positioned about the rotor axis to a point

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where the communicating connections between this part on the one hand, and the in-leading tubes 51 and 38 on the other hand, are reversed. This makes it possible to provide for feed mixture to enter the rotor from the bottom end instead of through the top.

Accordingly, an upwardly directed feed induction pipe 77 now terminates in the influent chamber 49 allowing the feed mixture to flow through upwardly divergent feed passages 52 continuing into the vertical distributing tubes 38, with the feature that sand or other heavy particles in the feed mixture, such crude oil, if desired may be allowed to escape through a small clearance 77a at the foot of feed distributing tubes and thus make a shortcut into the outer peripheral centrifugal zone discharging through the nozzles with the underflow. Consequently, another induction pipe 78 preferably concentric with pipe 77 extends upwardly through opening 72 for delivering control liquid or return underflow to the upwardly divergent tubes 51 which in turn deliver in the outer zone of the separating chamber, preferably at points midway between respective adjoining nozzles.

Various modes of operating the machine of this invention with the improved rotor structure, will be understood from the FIGS. 1 to 5 so far described, and furthermore from the diagrammatic FIGS. 6 and 7 illustrating the fact that this rotor structure is operable advantageously under diversified conditions.

Whereas the invention as described above provides for the introduction of feed mixture into the rotor either from the top or from the bottom, according to another feature, different kinds of liquids, that is feed mixture and another feed liquid may be introduced into the rotor simultaneously from the respective ends of the rotor for mixing in a mixing chamber therein. For that purpose, the arrangement of the embodiments of FIGS. 4 and 5 may be utilized in the manner diagrammatically shown in FIGS. 6 and 7 respectively.

The operation according to the diagrammatic FIG. 6 utilizes the structural arrangement of FIG. 4, with the difference that it provides the passage 127 (see FIG. 6) for the introduction of additional liquid 128 through the hollow shaft, in order that this additional liquid and the feed mixture entering through pipe 75a may mix in chamber 40a.

If the FIG. 4 arrangement is utilized in the manner shown in FIG. 6, a feed material or liquid may enter downwardly through the hollow shaft 12 (the plug 74 having been removed) while another material or liquid may be introduced upwardly through pipe 75, or vice versa, in order that mixing of these two materials or liquids may take place in chamber 40 (which corresponds to chamber 40a in FIG. 6) whence the resulting mixture will pass upwardly into the separating chamber by way of the feed distributing tubes 38. At the same time, recirculating underflow may enter from tube 76 through influent chamber 49 and divergent tubes 51 into the separating chamber in the region of the nozzles.

The operation according to the diagrammatic FIG. 7 utilizes the structural arrangement of FIG. 5, with the difference that it provides the passage 127 (see FIG. 7) for the introduction of an additional liquid 129 through the hollow shaft, in order that this additional liquid and a control liquid or recirculating underflow entering through pipe 120 may mix in the chamber 121.

If the FIG. 5 arrangement is thus utilized in the manner shown in FIG. 7, recirculating underflow may through pipe 78 enter the chamber 40, while another kind of material or liquid may enter the chamber 40 through the hollow shaft 12 (the plug 74 having been removed therefrom) or vice versa, in order that mixing of the two materials may be effected in that chamber, whence the mixture will pass upwardly through divergent tubes 51 into the outer zone of the separating chamber adjacent to the nozzles. At the same time, feed mixture from pipe 77

and through intermediate chamber 49 will enter the feed distributing tubes 38a in the separating chamber.

From the foregoing, it will be seen that the invention provides a rotor that is simple yet highly flexible with respect to a variety of possibilities of operation, featuring the compartmented part 42 which comprises all the necessary passages and impellers in a single solid casting attachable to the hub portion of the bowl and matching respective flow passages therein. Respective passages in the parts will register also when changes in the internal flow channeling are made as by the rotational positioning of the part 42 relative to the bowl. Simplicity of construction, of assembly, of maintenance of the machine, and of accessibility of the various passages are thus achieved by this invention. Also, the arrangement is highly flexible especially with respect to the manner of introducing feed mixture into the rotor in various ways and without requiring any substantial changes in construction.

One of the ways of feed introduction thus made possible is along a path axially through the rotor shaft as illustrated in FIG. 1, with especial passages 57 then blanked off as shown offering the advantage that possible emulsification of the components of the feed mixture can be minimized or eliminated.

Another path of feed introduction as in FIG. 3 is through a stationary feedwell at the top end or primary overflow end of the bowl and then through the now open special passages 57, requiring only the substitution of a different extension member 58 and of feed inlet tubes 62 and 63 with the member serving as the bushing for the separating discs, and preferably also the substitution of a solid shaft cooperating with an adaptor sleeve 67a. Yet, the hollow shaft 12 may be retained in this connection and may be closed at the bottom as by a plug 74 as indicated in FIG. 4.

Another mode of feed introduction possible with the arrangement of this invention is through the bottom end of the rotor as illustrated in FIG. 4, where closure plug 71 has been removed to expose an opening 72 for allowing the feed pipe to discharge into the transfer passage 40. In that instance, either the hollow shaft 12 of FIG. 4 may be employed, or the solid shaft of FIG. 3 may be retained, although with the feed supply conduit means 62 and 63 and the special passages 57 rendered inactive and preferably closed as by suitable closure means or plugs, or else both a top and the bottom feed may be used alternately or simultaneously in one and the same machine.

Still another path of internal flow conditions in the rotor is made possible by the particular rotational position of the part 42 as shown in FIG. 5, whereby the communications between the respective in-leading feed flow passages and underflow return passages in the rotor are reversed with respect to one another, as compared with FIG. 4. Accordingly, feed mixture now enters through passage 52 into feed distributing tubes in the rotor instead of via transfer passage 40, whereas the passage 40 is now employed for channelling the underflow return into the divergent return tubes 51 into the nozzle section of the separating chamber.

Other flow paths illustrated in FIGS. 4 and 6 represent flow conditions in the rotor, whereby feed mixture and an auxiliary or treatment liquid will enter the rotor from opposite ends for mixing in the chamber 40 (see FIG. 4) or 40a (see FIG. 6) respectively before entering the separating chamber proper of the bowl.

Still other flow paths illustrated in FIGS. 5 and 7 represent flow conditions in the rotor, whereby recirculating underflow and an auxiliary or treatment liquid will enter the rotor from opposite ends for mixing in the chamber 40 (see FIG. 5) or 121 (see FIG. 7) respectively before entering the separating chamber proper of the bowl.

It will be understood that each of the elements described above, or two or more together, may also find

a useful application in other types of centrifuge machines differing from the ones described above.

While the invention has been illustrated and described as embodied in a nozzle type centrifuge machine for three-product separation, it is not intended to be limited to the details shown, since various modifications and structural changes may be made without departing in any way from the spirit of the present invention.

Furthermore, while the invention has been exemplified in its application to three-product separation in one instance as of crude oil into clean oil, water, and solids carrying underflow, other applications are conceivable whereby the features and advantages of the invention may be utilized.

Also, the feed mixture may contain solids at times, but not at other times, yet the invention may be applied advantageously in both instances. Hence, the invention is not to be considered as limited in this respect. For example, the machine may be employed to advantage for the separation treatment of crude oil in a locality where solids are carried by the oil, as well as in other localities where the crude oil may be solids-free.

Whereas the divergent tubes 51 deliver control liquid or recirculating underflow in the region of the nozzles, preferably the tubes are arranged so that the respective points of delivery are located about midway between respective nozzles.

Furthermore, the control liquid as herein understood may comprise any kind of liquid passing or returning through the divergent tubes 51, for example wash liquor or recirculating underflow from the nozzles.

It should also be understood that some of the features of this invention may be embodied in a rotor construction operating without the secondary overflow, in which case the centrifuge would operate in a two-phase or two-product machine, delivering only a light phase product and the overflow, and a heavy phase or underflow through the nozzles, the concentration of which may be regulated by underflow recirculation control.

In other cases, for example with an oil-water mixture which is solids free, a separate nozzle discharge fraction may not be needed and the nozzle openings may therefore be blocked by suitable closure means. The machine is then operable to yield only the two phases which are the primary and secondary overflows, still utilizing some of the features of the invention.

In still another instance, while utilizing some of the features of the invention, it is nevertheless possible to supply the feed mixture as through an annular feedwell arrangement such as illustrated in FIG. 3, while introducing it into the separating chamber proper directly through passages adjacent to the inner face of the hub portion 26, instead of through the special passage 57 passing through the hub and communicating with the transfer passage 40 and with the feed distribution tubes 38.

We claim:

1. In a centrifugal machine a rotor structure which comprises a pair of conically shaped bowl end portions having their wide ends connected to each other to constitute a rotor bowl providing an annular separating chamber; overflow discharge means provided at the narrow end of one of said bowl end portions; discharge nozzles provided upon the outer periphery of the bowl intermediate said bowl end portions for centrifugally discharging underflow from said separating chamber; a hub portion closing the narrow end of the other bowl end portion with a first set of inflow passages in said hub portion spaced from one another around the rotor axis and with a second set of inflow passages in said hub portion spaced from one another around said axis and with divergent inflow conduits extending from respective second set inflow passages to the region of said nozzles; a rotor shaft extending from said hub portion through the narrow end of the first mentioned bowl end portion; a complementary construction removably connected to said hub portion and

constituting therewith a transverse conduit means having a central portion and radial portions extending therefrom communicating with respective first set inflow passages in the hub portion, said complementary construction furthermore formed with a central influent chamber located outwardly from said transverse conduit means and having a centrally disposed outer entrance opening, and furthermore formed with transfer passages providing communication between said influent chamber and respective second set inflow passages in the hub portion for delivery of control liquid from said influent chamber through said divergent conduits to the region of said nozzles; means for admitting feed mixture into said transverse conduit means for delivery through said first set inflow openings into the separating chamber; and means for discharging from said separating chamber a third fraction, which means comprise a first set of outflow conduits in said hub portion spaced from one another around the rotor axis and having their inlet ends located to receive third fraction material from an intermediate zone in said separating chamber, an annular effluent chamber in said complementary construction concentric with said influent chamber, a second set of outflow conduits in said complementary construction spaced from one another around the rotor axis and providing communication between said first set of outflow conduits in said hub portion and said annular effluent chamber, and a ring dam for said annular effluent chamber providing overflow for said third fraction material from said intermediate zone.

2. The rotor structure according to claim 1, wherein said means for admitting feed mixture comprise passage means provided axially in said rotor shaft.

3. The rotor structure according to claim 1, wherein said means for admitting feed mixture comprise centrally disposed intermediate passage means between said transverse conduit means and said influent chamber.

4. The rotor structure according to claim 1, wherein said means for admitting feed mixture comprise a feed chamber formed by a hollow member surrounding the rotor shaft and fastened to said hub portion of the bowl, and passage means in said hub portion providing communication between said feed chamber and said radial conduit portions.

5. The rotor structure according to claim 1, with first influent passage means provided in said shaft communicating with said transverse conduit means, and additional passage means provided between said central influent chamber and said transverse conduit means, said first and additional influent passage means adapted to admit feed liquid into said transverse conduit means.

6. The rotor structure according to claim 1, wherein said transverse conduit means are defined by recesses in said complementary construction and by a planar face on said hub portion.

7. In a centrifugal machine a rotor structure which comprises a pair of conically shaped bowl end portions having their wide ends connected to each other to constitute a rotor bowl providing an annular separating chamber; overflow discharge means provided at the narrow end of one of said bowl end portions; discharge nozzles provided upon the outer periphery of the bowl intermediate said bowl end portions for centrifugally discharging underflow from said separating chamber; a hub portion closing the narrow end of the other bowl end portion with a first set of inflow passages in said hub portion spaced from one another around the rotor axis and with a second set of inflow passages in said hub portion spaced from one another around said axis and with divergent inflow

conduits extending from respective second set inflow passages to the region of said nozzles; a rotor shaft extending from said hub portion through the narrow end of the first mentioned bowl end portion; a complementary construction removably connected to said hub portion and constituting therewith a transverse conduit means having a central portion and radial portions extending therefrom communicating with respective second set inflow passages in the hub portion, said complementary construction furthermore formed with a central influent chamber located outwardly from said transverse conduit means and having a centrally disposed outer entrance opening, and furthermore formed with transfer passages providing communication between said influent chamber and respective first set inflow passages in the hub portion for delivery of feed mixture from said influent chamber to said separating chamber; means for admitting control liquid into said transverse conduit means for delivery through said second set inflow openings and said divergent inflow conduits to the region of said nozzles; and means for discharging from said separating chamber a third fraction, which comprises a first set of outflow conduits in said hub portion spaced from one another around the rotor axis and having their inlet ends located to receive third fraction material from an intermediate zone in said separating chamber, an annular effluent chamber in said complementary construction concentric with said influent chamber, a second set of outflow conduits in said complementary construction spaced from one another around the rotor axis and providing communication between said first set of outflow conduits in said hub portion and said annular effluent chamber, and a ring dam for said annular effluent chamber providing overflow for said third fraction material from said intermediate zone.

8. The rotor structure according to claim 7, wherein said complementary construction has a centrally disposed intermediate passage means between said central influent chamber and said transverse conduit means for the admission of control liquid therethrough.

9. The rotor structure according to claim 7, with first influent passage means provided in said shaft communicating with said transverse conduit means, and additional passage means provided between said central influent chamber and said transverse conduit means, said first and additional influent passage means adapted to admit control liquids into said transverse conduit means.

10. The rotor structure according to claim 7, wherein said transverse conduit means are defined by recesses in said complementary construction and by a planar face on said hub portion.

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