

Jan. 2, 1923.

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SEPARATOR.
FILED JUNE 2, 1920.

Fig. 1.

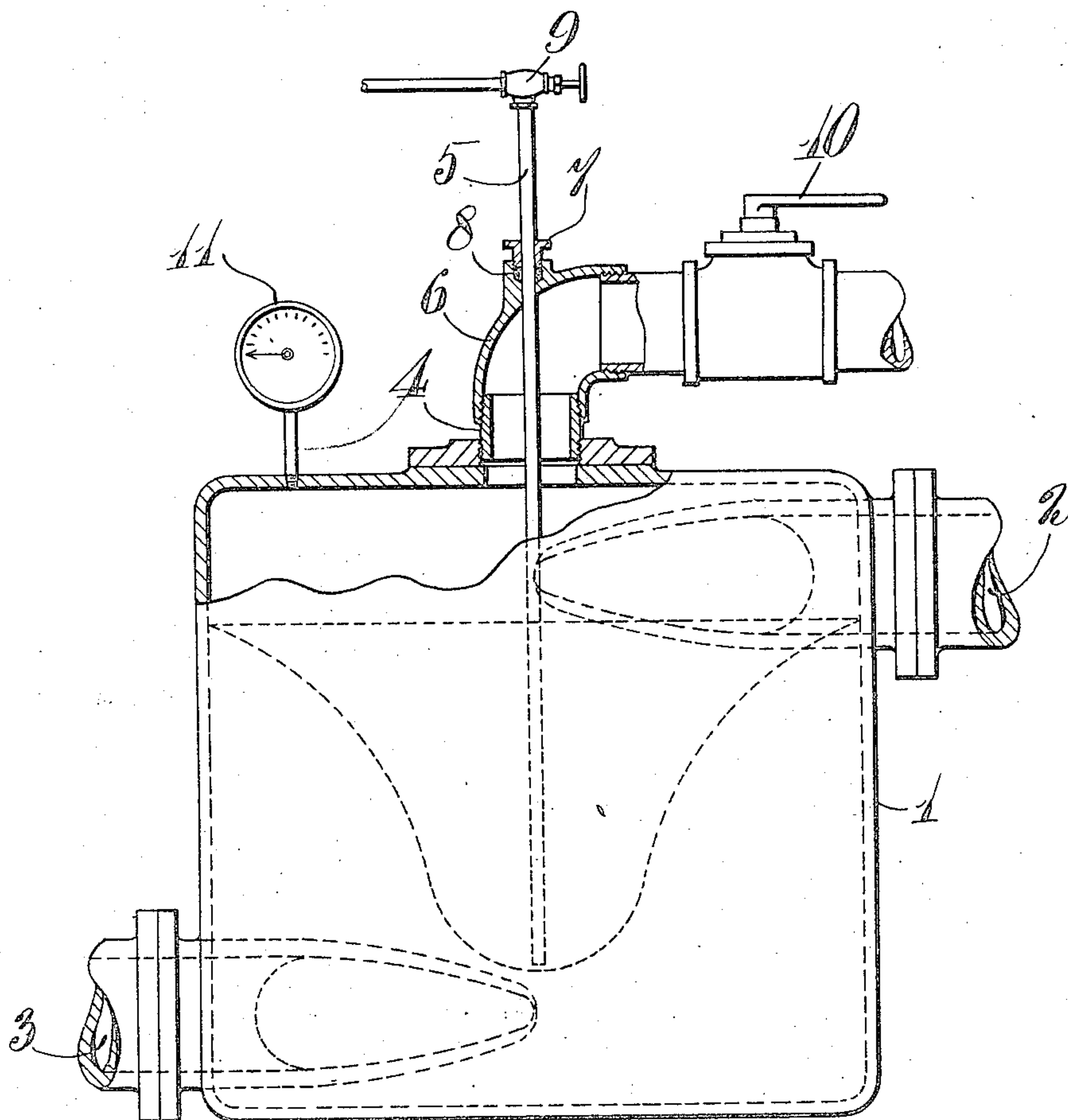
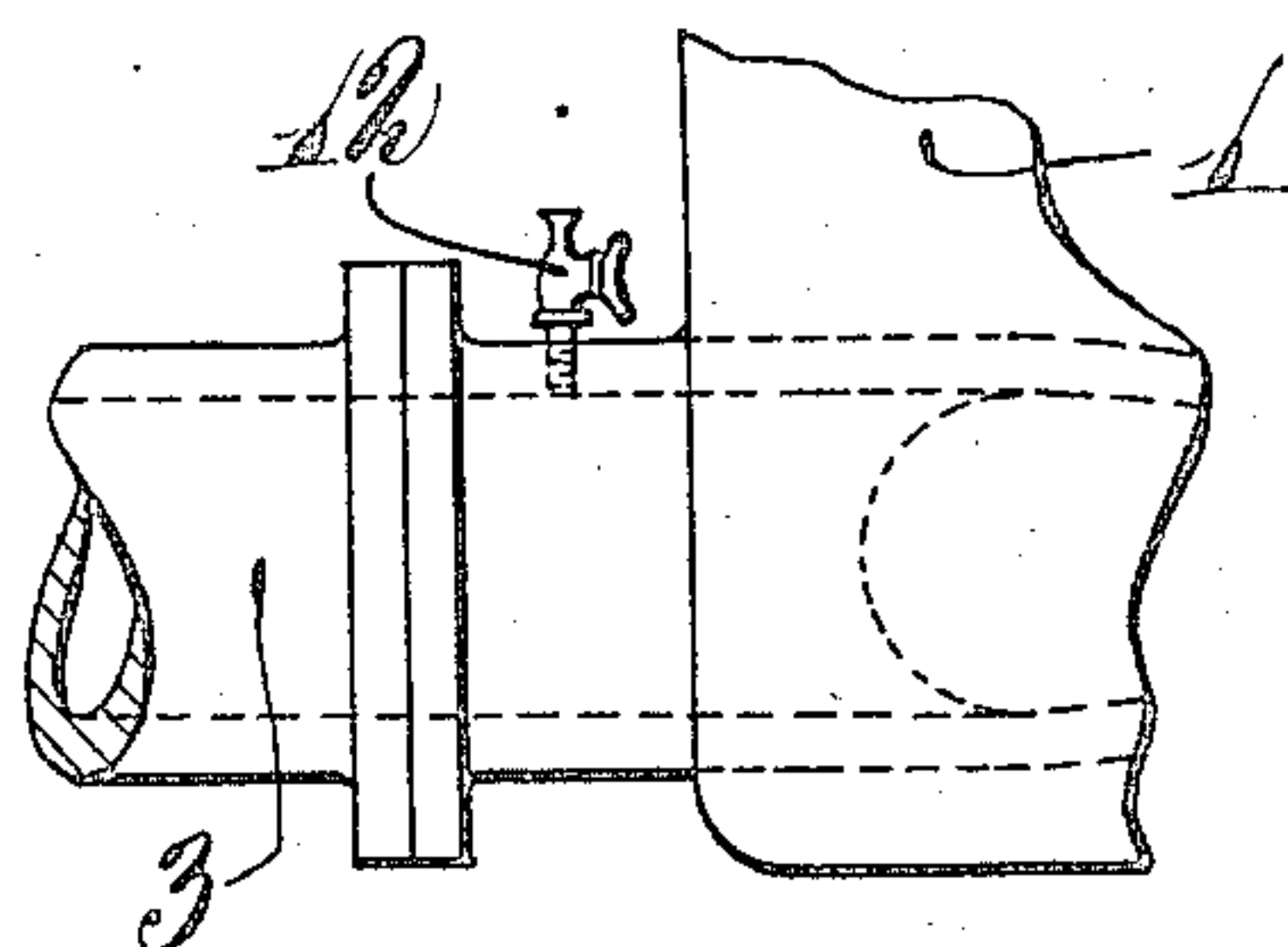


Fig. 2.



Inventor:
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by
[Signature]
Atty.

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UNITED STATES PATENT OFFICE.

WADE H. WINEMAN, OF CHICAGO, ILLINOIS, ASSIGNOR TO SULLIVAN MACHINERY COMPANY, A CORPORATION OF MASSACHUSETTS.

SEPARATOR.

Application filed June 2, 1920. Serial No. 386,024.

To all whom it may concern:

Be it known that I, WADE H. WINEMAN, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Separators, of which the following is a full, clear, and exact specification.

My invention relates to separators and more especially to centrifugal separators.

It has for its object to provide an improved controlling means for a separator and more especially for a centrifugal gas and liquid separator whereby the level of the liquid in the separator may be determined and gaseous discharge through the liquid outlet discovered should it occur. A more specific object of my invention is to provide an improved controller especially adapted to use in connection with centrifugal separators or boosters of the type used in air lift systems or the like whereby the level of the liquid in the booster casing may be readily determined and regulated as desired.

In the accompanying drawings I have shown for purposes of illustration two embodiments which my invention may assume in practice.

In these drawings,—

Fig. 1 is a side elevation of an air lift separator equipped with one form of my improvement, parts being broken away to facilitate illustration.

Fig. 2 is a detail view showing a modified form of indicating means.

In these drawings, I have illustrated my invention applied to a centrifugal air lift separator or booster of the type described and claimed in my co-pending application, Serial No. 314,103, filed July 29, 1919, the same comprising a cylindrical casing 1 having a tangential air and liquid mixture inlet 2 at its top and a corresponding tangential liquid discharge 3 at its bottom, an air discharge pipe 4 being provided in the top of the casing to remove the excess air.

I find that the liquid entering a booster of this type is rotated about the inner periphery of the casing in a whirlpool form forming a central vortex extending from near the top of the casing to a point above the bottom thereof. In my improved construction I utilize this vortex created by the liquid and by determining the height of

the bottom thereof from the bottom of the casing, determine the effectiveness of the booster at any given moment, since I find that if the bottom of the vortex is too low or too high relative to the liquid discharge, the booster will not function at its maximum efficiency.

In the form of my improvement shown in Figure 1, I provide a tube 5 slidable axially down through an elbow 6 on the discharge pipe 4 and adjustably positioned with respect to said elbow by a gland 7 receivable with suitable packing 8 in the elbow. I also, as herein, preferably provide a valve 9 at the end of the tube 5 so that communication between the interior of the casing and the atmosphere may be established when desired. In order that the pressure acting upon the top of the fluid in the casing may be regulated when necessary, I also provide a mine cock 10 in the discharge pipe 4 and in order that the pressure within the casing may be determined at a glance, I may, if desired, provide a gage 11 connected to the top of the casing.

As a result of this construction it will be observed that the height of the liquid in the casing may be determined at any time desired by simply opening the valve 9, releasing the gland 7, and adjusting the pipe 5 vertically in the casing until a mixture of air and liquid is discharged from the upper end of the tube 5. When this occurs, if the tube is of a length equal to the distance between the gland 7 and the bottom of the casing, it will be evident that the height of the valve 9 above the gland 7 will show the height of the bottom of the vortex from the bottom of the casing. With the height of the bottom of the vortex thus determined, it will be evident that the pressure at the top of the casing may be regulated as desired through the valve 10 to raise or lower the level of the liquid in the casing relative to the discharge 3, the tube and valve being adjusted until a mixture of air and liquid ascapes from the tube when the latter is so located relative to the discharge 3 as to indicate a flow of air free liquid from the latter. It will be understood that the inlet 2 is connected to the riser pipe of an air lift pump and that a mixture of air and water enters the booster 1 therethrough. It will also be understood that the discharge 3 may be connected to a discharge line leading to an ele-

vated tank or any other point of use or storage and that water is discharged under the pressure of the air above it in the booster 1. As the mode of operation of boosters is well known, further explanation is believed unnecessary.

In Fig. 2, I have illustrated a modified form of indicating means adapted when desired to replace the tube and to be used with the valve 10 in the control of the mechanism. In this construction, a pet-cock 12 is provided on the liquid discharge 3, preferably, for convenience, at a point adjacent the booster casing. When this pet-cock is opened and air is discharged therethrough, it will be evident that the bottom of the vortex is too low. Conversely, when no air escapes through this pet-cock, it will be evident that the height of the bottom of the vortex is such as to give the desired liquid flow. Thus, when air escapes through the pet-cock, by adjusting the valve 10 in such a manner as to decrease the pressure in the top of the casing until the cessation of air discharge through the pet-cock, the desired liquid flow may be obtained.

While I have in this application specifically described two forms which my invention may assume in practice, it will be understood that these forms of the same are shown for purposes of illustration and that the invention may be modified and embodied in other forms without departing from its spirit or the scope of the appended claims.

What I claim as new and desire to secure by Letters Patent is:

1. A separator for fluids of different specific gravities comprising a casing, inlet means for a mixture of the fluids, separate discharges therefor after separation, and means for ascertaining the location of the surface of separation between the separating fluids comprising vent means communicating with the interior of the separator and automatically operative when opened to discharge the fluid with which its inner end communicates.

2. A centrifugal separator for fluids of different specific gravities comprising a casing, tangential inlet means for a mixture of the fluids and separate discharges for the separated fluids, and means for ascertaining the location of the surface of separation of the separating fluids comprising vent means having an orifice adapted to communicate with the interior of the casing adjacent the surface of separation.

3. A centrifugal separator for fluids of different specific gravities comprising a casing, tangential inlet means for a mixture of the fluids, separate discharges for the separated fluids, means for effecting discharge of the fluids under pressure, and means for ascertaining the location of the surface of separation between the separated fluids com-

prising vent means having an orifice adapted to communicate with the interior of the casing and adjustable to dispose said orifice at different levels therein.

4. A centrifugal separator for fluids of different specific gravities comprising a casing, tangential inlet means for a mixture of the fluids and separate discharges for the same after separation, and means for ascertaining when the top of the denser of the fluids is below a predetermined level comprising passage forming means communicating with the interior of the casing and controlling means therefor operative when opened to open a communication between the interior of the casing and the atmosphere.

5. An air lift centrifugal booster for separating gaseous and liquid fluids comprising a casing having tangential inlet and discharge directing means, and means for determining the position of the bottom of the vortex of the liquid fluid therein relative to said discharge connection, comprising a valve controlled passage forming means communicating with the interior of the casing.

6. An air lift centrifugal booster for separating gaseous and liquid fluids comprising a casing having inlet and discharge connections, means for determining the position of the bottom of the vortex of the liquid fluid therein relative to said discharge connection comprising a valve controlled passage forming means communicating with the interior of the casing, and pressure control means adjustable to control the pressure in said casing.

7. In a centrifugal separator, a casing having tangential inlet and discharge connections, and means whereby the conditions in the interior of the casing may be ascertained comprising a tube disposed axially of said casing and adjustable therein toward or from the bottom of said casing.

8. In a centrifugal separator, a casing having tangential inlet and discharge connections, means whereby the conditions in the interior of the casing may be ascertained comprising a tube disposed axially of said casing and adjustable therein, and a valve carried on the upper end of said tube.

9. In a centrifugal separator, a casing having tangential inlet and discharge connections, means whereby the conditions in the interior of the casing may be ascertained comprising a tube disposed axially of said casing and adjustable therein, and means for releasably holding said tube in any position of adjustment.

10. In a centrifugal separator, a casing having tangential inlet and discharge connections and an axial discharge connection, means whereby the conditions in the interior of the casing may be ascertained comprising a tube adjustable through said last mentioned discharge connection, and means for

varying the flow through said discharge connection.

11. In a centrifugal separator, a casing having tangential inlet and discharge connections and an axial discharge connection, a tube adjustable through said last mentioned discharge connection, a valve controlling the

flow through said tube, means for holding said tube in different positions of adjustment, and a control valve in said axial discharge connection. 10

In testimony whereof I affix my signature.

WADE H. WINEMAN.