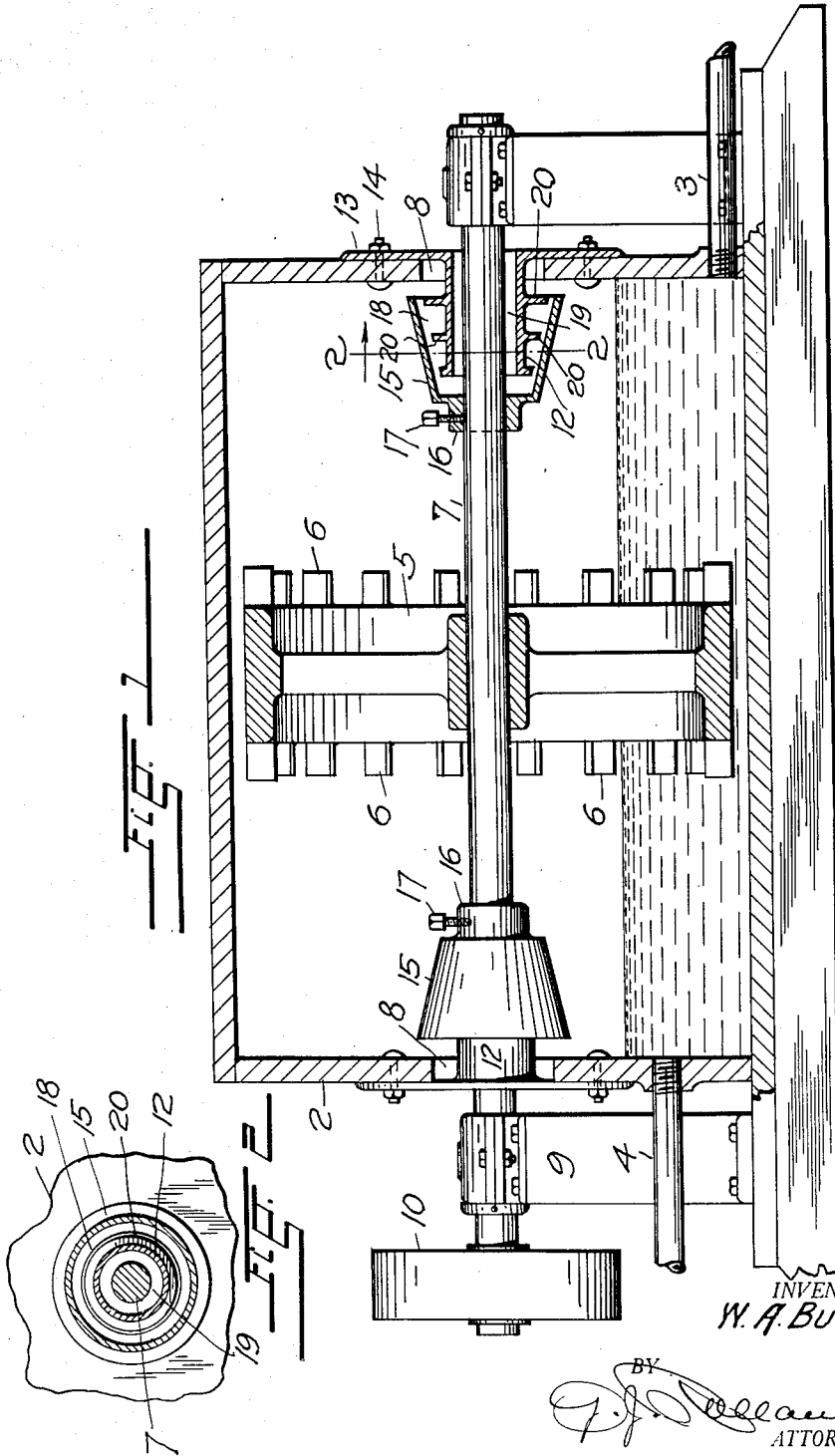


W. A. BUTCHART.
AGITATOR.
APPLICATION FILED MAR. 22, 1921.

1,395,480.

Patented Nov. 1, 1921.



INVENTOR.
W. A. BUTCHART.

BY
J. J. Blum
ATTORNEY.

UNITED STATES PATENT OFFICE.

WILLIAM A. BUTCHART, OF DENVER, COLORADO.

AGITATOR.

1,395,480.

Specification of Letters Patent.

Patented Nov. 1, 1921.

Application filed March 22, 1921. Serial No. 454,580.

To all whom it may concern:

Be it known that I, WILLIAM A. BUTCHART, a citizen of the United States, residing at Denver, in the county of Denver and State of Colorado, have invented certain new and useful Improvements in Agitators, of which the following is a specification.

This invention relates to agitators, and its primary object is to provide in an agitator of the type in which a rotary element operates in a closed container to stir and mix the liquid or semi-liquid contents thereof, an appliance of simple and highly efficient construction which prevents the leakage of liquid around the shaft of the rotary element where it passes through the walls of the container and which at the same time provides a convenient medium for the egress and ingress of air and other gases which are liberated or supplied in the operation of the apparatus.

The appliance provides a very efficient substitute for the packing boxes at present commonly employed to prevent the leakage of liquid around the shaft of a rotating element in apparatus of the type above referred to, inasmuch as it performs its functions without the use of packings which are subject to wear and disintegration by the gritty constituents of the material under treatment.

My invention furthermore obviates the use of separate openings and conduits for the egress and ingress of air and other gases, and the employment of liquid seals, special valves or other attachments ordinarily required to prevent the leakage of liquid, and it permits of introducing the gases directly into the interior of an agitating element of hollow construction at which point they are most readily diffused through the material.

With the above and other objects in view, all of which will fully appear in the course of the following description, my invention consists in the construction and combination of parts shown in their preferred form and arrangement in the accompanying drawings in the several views of which corresponding parts are designated by similar characters of reference and in which

Figure 1 is a sectional elevation of an ap-

paratus to which my invention is applied, and

Fig. 2, a section taken along the line 2—2, Fig. 1.

The reference character 2 designates the closed container of an agitator of suitable form and construction provided with an inlet 4 for the material to be treated and with an outlet 3 for the product of the agitating action.

The agitating element consists in the construction shown in the drawings, of a wheel 5 provided with oppositely projecting series of peripheral paddles 6 and mounted upon a horizontal shaft 7 which projects through axially aligned openings 8 in the ends of the container.

The shaft is rotatably supported in boxes on pedestals erected exteriorly of the container and it carries at one of its ends a pulley 10 for its connection with a conveniently located source of power.

The appliances which prevent the leakage of liquid around the shaft through the openings in the end walls of the container and at the same time permit of the ingress or egress of gaseous fluids in accordance with the present invention, each comprises a cylindrical sleeve 12 which is arranged concentrically with the shaft and in spaced relation to the surface thereof by a flange 13 at its outer end which is fastened upon the exterior surface of the respective wall of the container by means of bolts or rivets 14.

The flange closes the portion of the opening 8 around the sleeve leaving only the space inside the same for the ingress or egress of air or other gases.

A hood 15 of conoidal form which surrounds the sleeve inside the container is mounted on the shaft through the medium of a hub 16 at its smallest end and is securely fastened for conjunctive rotation with the same by one or more set screws 17.

The hood flaring outwardly toward the opening in the end of the container forms around the sleeve an annular space 18 of gradually increasing width which in connection with the space 19 between the sleeve and the shaft provides a tortuous passage for

gases to and from the interior of the container, and the inner surface of the cone-shaped hood functions as a drain for any liquid which may enter the same as will hereinafter be more fully described.

The sleeve has a plurality of equidistant ribs 20 the peripheral edges of which are equidistantly spaced from the interior surface of the hood and which in the operation of the device function as baffles to obstruct the inward passage of liquid in the space between the hood and the exterior surface of the sleeve.

In the operation of the machine, the liquid or semi-liquid material fed into the container through the inlet 4 is acted upon by the rotating agitator which breaks it into drops and streams and throws it to all parts of the interior of the container.

The liquid which falls or is thrown against the outer surface of the hoods of the closing appliances of my invention flows off without reaching the openings in the walls of the containers through which the shaft extends, and any liquid which by being splashed around the ends of the hoods, may have entered the spaces around the sleeves is obstructed by the baffles which, aided by centrifugal force, compel it to engage the sloping interior surfaces of the rotating hoods along which it returns to and through the open ends thereof to reënter the container without having reached the surfaces of the shaft inside the sleeves or the respective openings in the walls of the container.

The constantly open tortuous passages formed by the spaced arrangement of the hoods and the sleeves with relation to each other and the end portions of the shaft permit of the free passage of air and vapors to and from the container, while the egress of liquid is prevented as hereinbefore explained.

Inasmuch as the passages permit the flow of air and other gases in either direction, it is evident that they may be introduced at one end of the container and discharged at the opposite end of the same, that vapors created in the treatment of the material may be continuously discharged from the container at either end, that air or other gases under atmospheric pressure may freely enter the container, and that gases under more than atmospheric pressure can be forcibly introduced into the same.

It will furthermore be apparent that the agitator may be of any desired form and size within the confines of the container in which it has its movement, and that by either extending the sleeves or the agitator, or both, the gases entering the container through the tortuous passages may be introduced at any point inside the rotating element.

The material after having been agitated and mixed by the action of the rotating wheel is discharged from the container through the outlet 3, it being understood that in order to prevent the leakage of liquid by the use of my invention, its normal level must be maintained below the shaft.

Having thus described my invention what I claim and desire to secure by Letters-Patent is:

1. In apparatus of the character described, the combination with a container having an opening and an agitating element having a shaft extending through said opening, of a closing appliance comprising two members coöperatively forming an annular tortuous passage around the shaft and between said opening and the interior of the container, the surface of a terminal portion of said passage, sloping toward an open end of the same inside the container.

2. In apparatus of the character described, the combination with a container having an opening and an agitating element having a shaft extending through said opening, of a closing appliance comprising two members coöperatively forming an annular tortuous passage around the shaft and between said opening and the interior of the container, the surface of a terminal portion of said passage sloping toward an open end of the same inside the container, and means in the passage to compel entering liquid to engage said sloping surface.

3. In apparatus of the character described, the combination with a container having an opening and an agitating element having a shaft extending through said opening, of a closing appliance comprising an outer rotary member and a relatively stationary inner member which coöperatively form an annular tortuous passage around the shaft and between said opening and the interior of the container, the surface of a terminal portion of said passage sloping toward an open end of the same inside the container.

4. In apparatus of the character described, the combination with a container having an opening and an agitating element having a shaft extending through said opening, of a sleeve spaced from the shaft inside the container, and an interiorly conical hood spaced from the sleeve and connected to the shaft.

5. In apparatus of the character described, the combination with a container having an opening and an agitating element having a shaft extending through said opening, of a sleeve spaced from the shaft inside the container and having a flange covering the part of the opening exteriorly of its inner surface, and an interiorly conical hood spaced from the sleeve and connected to the shaft.

6. In apparatus of the character described, the combination with a container having an opening and an agitating element having a shaft extending through said opening, of a sleeve spaced from the shaft inside the container, and an interiorly and exteriorly conical hood spaced from the sleeve and connected to the shaft. 30
7. In apparatus of the character described, the combination with a container having an opening and an agitating element having a shaft extending through said opening, of a sleeve spaced from the shaft inside the container, a hood spaced from the sleeve and connected to the shaft, and baffles in the space between the hood and the sleeve. 35
8. In apparatus of the character described, the combination with a container having an opening and an agitating element having a shaft extending through said opening, of a sleeve spaced from the shaft inside the container, a hood spaced from the sleeve and connected to the shaft, and baffles on the sleeve, spaced from the interior surface of the hood. 40
9. In apparatus of the character described, the combination with a container having an opening and an agitating element having a shaft extending through said opening, of a sleeve spaced from the shaft inside the container, an interiorly conical hood spaced from the sleeve and connected to the shaft, and baffles on the sleeve spaced from the interior surface of the hood. 45
10. In apparatus of the character described, the combination with a container having an opening and an agitating element having a shaft extending through said opening, of a closing appliance comprising two members coöperatively forming in connection with the opening, an annular tortuous passage around the shaft which has an open end inside of the container. 50
11. In apparatus of the character described, the combination with a container having an opening and an agitating element having a shaft extending through said opening, of a sleeve spaced from the shaft inside the container, and an open-ended hood spaced from the sleeve and connected to the shaft.
- In testimony whereof I have affixed my signature.

WILLIAM A. BUTCHART.