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CENTRIFUGAL BUCKET ASSEMBLY

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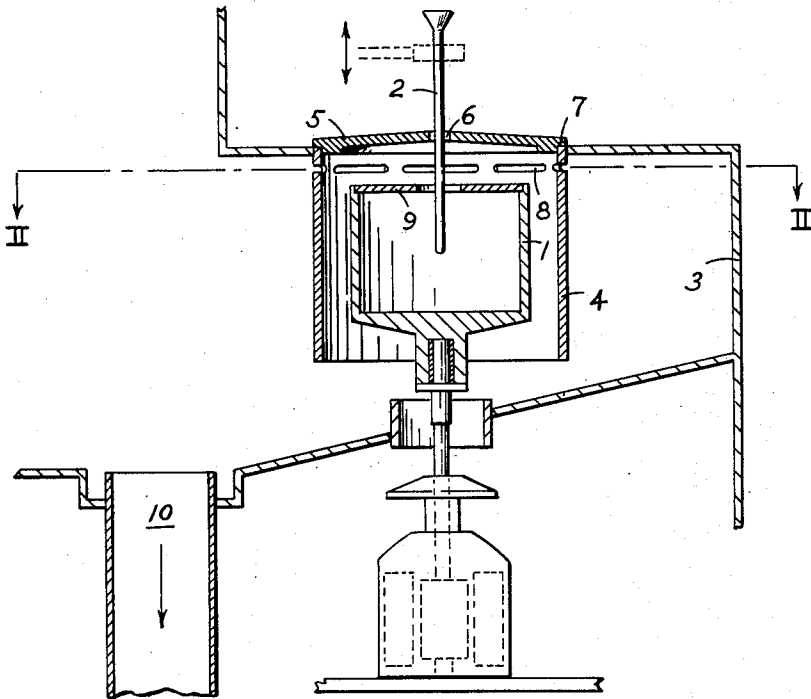


Fig. 1

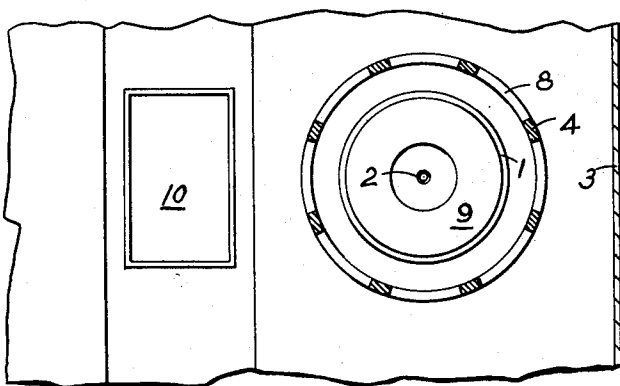


Fig. 2

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CENTRIFUGAL BUCKET ASSEMBLY

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7 Claims. (Cl. 57-76)

This invention relates to an improved centrifugal bucket assembly, such as may be used in collecting artificial filamentary material, as for example artificial fibers produced in accordance with the viscose process.

In that process, the viscose is extruded through the orifices of a spinneret or jet into a coagulating bath, and is led up from the liquid around guides over a godet and down to a vertically disposed funnel or tube which is vertically reciprocated within a bucket or pot which is rotated at high speed. The thread or filament led into the pot through the funnel is caught to the side of the pot as it rotates, and is wound around the interior of the pot in the form of an annular package or cake.

In the chemical reactions which result in the formation of cellulose hydrate fibers when the sodium cellulose xanthate or viscose is extruded into the coagulating bath, which contains sulfuric acid, a considerable amount of noxious gases, the most objectionable of which are hydrogen sulphide and carbon disulphide, are evolved, and during the collection of the filamentary material in the spinning pot such gases are released. A primary problem in the manufacture of rayon on a commercial scale concerns the prevention of dissemination of such gases into the room in which the spinning machines are located, because the gases have a deleterious effect on the health and efficiency of the operators.

It is the usual practice to mount the spinning pots side by side in a spinning machine, in an enclosed area, and to provide each pot with a guard or casing, both the spinning pot and casing being provided with covers having centrally disposed apertures for accommodating the reciprocating funnel or guide means which supplies the filamentary material or thread to the inside of the spinning pot. The gases released while the filamentary material is being collected in the rapidly rotating spinning pot and air are thrown outwardly, due to centrifugal force, and exert a high gas pressure against the junction of the guard or casing and its cover. Experience has shown that even where the covers are tightly fitted on the casing or the like, the force exerted by the gas against the seal between the cover and casing is great enough to permit gases and air to blow-out from under the cover in sufficient amounts to contaminate the atmosphere around the spinning machine.

Various expedients have been proposed in an effort to overcome this disadvantage incident to

the use of centrifugal spinning pots in the collection of thread or the like. For example, it has been suggested to provide a pot chamber having a water-seal between it and the cover therefor and to prevent the development of high gas pressures against the seal by placing a series of radial ribs on the underside of the lid or cover for the pot chamber, dependence being placed upon the ribs for break-up of gas currents created by the rapid rotation of the spinning pot so that no appreciable amount of pressure will be exerted against the water-seal. That arrangement is impracticable from the operating standpoint. As is obvious, a water-seal between the pot chamber and its cover is undesirable, because the removal and replacement of the cover on the chamber results in splashing of the water, leading to sloppy conditions in the plant. Also, such an arrangement requires that a relatively wide and deep channel be provided about the outside of the chamber which is space consuming, and interferes with the preferred arrangement of the spinning pots in close proximity to each other within the housing of the spinning machine.

Thus, the problem of maintaining the atmosphere around the spinning machines substantially free of injurious gases remains a troublesome one in the rayon industry, the more so, because, as will be apparent, for reasons of operating economy, any modification of conventional designs or equipment must be such as not to require any substantial increase in the power required to operate the machines.

The present invention has for its object the provision of an improved spinning pot assembly having means for substantially entirely preventing the blow-out of gases therefrom into the air surrounding the machines.

In the drawing, illustrative of the invention, in which like numerals indicate like parts throughout,

Figure 1 is an elevation in partial section of a preferred embodiment of the invention, and

Figure 2 is a plan view taken on line II-II of Figure 1.

Referring to Fig. 1, the spinning bucket 1 in which a funnel 2 is vertically reciprocated, and which is mounted within the housing 3 of the spinning machine, is provided with a protective member 4 which surrounds at least the sides and top of the spinning pot 1. The protective member 4 is provided with a cover 5 which has a central aperture 6 for passage therethrough of funnel 2, and which rests in place on member 4 on its grooved seat 7. The protective member 4

is provided with a series of venting passages which, in the preferred embodiment of the invention, take the form of slots 8 and are preferably substantially equidistantly spaced around the protective member at a point above the cover 9 of spinning pot 1. A duct 10 connected to a suitable pump (not shown), is provided to apply suction to the region about the protective member 4.

With a centrifugal pot assembly constructed in accordance with our invention, any gases which are released during the collection of filamentary material in the rapidly rotating centrifuge are afforded immediate and continuous egress from the area about the pot through venting passages 8, to the outside of protective member 4, and are continuously withdrawn from the neighborhood of the spinning machine by suction applied through duct 10. With such an arrangement, there is no opportunity for the development of localized high gas pressure and, as a consequence, a substantially sub-atmospheric gas pressure exists in the neighborhood of the seal formed by the junction of the protective member and its cover. The amount of gas which can force its way through the seal into the surrounding air is maintained at a minimum, being reduced practically to the zero point in most cases.

Within the purview of our invention, and as a specific embodiment thereof, we have discovered that, in some cases, it may be desirable to so construct the protective member 4 that the various co-acting factors constituting our improved centrifugal bucket assembly will bear certain predetermined relationships with respect to each other. Thus, it may be preferable for the protective member to extend a considerable distance above the top of the spinning pot, and for the venting passages to be so located therein that when the spinning pot is positioned in the protective member, the venting passages will be situated at a distance above the top of the spinning pot and at a predetermined distance below the point of junction of the protective member and the cover.

The point at which the venting passages should be spaced about the protective member with respect to the seal made by the junction of the member and its cover, the optimum dimension of the venting passages, and the number of venting passages which best serve the intended purposes in any given case, will depend upon the diameter and height of the spinning pot and the speed of rotation thereof. As an illustration, we have found that in the case of a spinning pot 6" high and 7" in diameter, and rotated at a speed of about 7,000 R. P. M., best results may be obtained if the protective member therefor is provided with eight venting passages or slots which are preferably about one-half inch high, and spaced about the protective member at about one-half inch intervals, at a distance of about one-half inch below the seal formed by the junction of the protective member and the cover therefor.

Under such optimum conditions, where a rotating pot of the specified dimensions is utilized the gas blow-out during the collection of filamentary material therein is reduced practically to the zero point and the atmosphere surrounding the spinning machine equipped with such assemblies remains substantially free of noxious gases.

The improved centrifugal bucket assembly of

our invention has the additional advantage that the use thereof results in only a negligible increase in the power required to rotate the spinning pots at the desired high speeds.

The protective member forming a part of the centrifugal bucket assembly described herein may be of any shape, but the cylindrical form is preferred. Further, the bottom of the protective member may be sealed or unsealed, and if sealed, it is provided with a central aperture to accommodate the spindle on which the spinning pot is mounted.

While a preferred embodiment of the invention has been disclosed, the description is intended to be illustrative only, and it is to be understood that changes and variations may be made therein without departing from the spirit and scope of the invention as defined in the appended claims.

We claim:

1. In combination, a centrifugal spinning pot, means for guiding filamentary material into said pot, a protective member surrounding at least the top and sides of said pot, a cover for said protective member, said member having venting passages in the vicinity of the top of the spinning pot, whereby gases released during the collection of the filamentary material in the spinning pot are afforded continuous egress from the area surrounding the pot to the region about said protective member.

2. In combination, a centrifugal spinning pot, means for guiding filamentary material into said pot, a protective member surrounding at least the top and sides of said pot, a cover for said protective member, said member having a plurality of venting passages spaced about the circumference thereof whereby gases released during the collection of filamentary material in the spinning pot are afforded continuous egress from the area surrounding the pot to the region about said protective member, and means for continuously withdrawing the gases from the region about said protective member.

3. In combination, a centrifugal spinning pot, means for guiding filamentary material into said pot, a cylindrical protective member surrounding at least the side walls and top of said pot, a cover for said protective member, said member having a plurality of venting passages spaced about the circumference thereof whereby gases released during the collection of filamentary material in the spinning pot are afforded continuous egress from the area surrounding the spinning pot to the region about said protective member, and means for continuously withdrawing the gases from the region about said protective member.

4. In combination, a centrifugal spinning pot, means for guiding filamentary material into said pot, a cylindrical protective member surrounding at least the side walls and top of said pot, a cover for said protective member, said member having a plurality of venting passages spaced about the circumference thereof at a point above the top of the spinning pot whereby gases released during the collection of filamentary material in the spinning pot are afforded continuous egress from the area surrounding the spinning pot to the region about said protective member, and means for continuously withdrawing the gases from the region about said protective member.

5. In combination, a centrifugal spinning pot, means for guiding filamentary material into said

pot, a cylindrical protective member surrounding at least the side walls and top of said pot and extending beyond the top thereof, a cover for said protective member, said member having a plurality of venting passages spaced about the circumference thereof at a point about one-half inch below the seal formed by the junction of the protective member and the cover therefor whereby gases released during the collection of filamentary material in the spinning pot are afforded continuous egress from the area surrounding the spinning pot to the region about said protective member, and means for continuously withdrawing the gases from the region about said protective member.

6. In combination, a centrifugal spinning pot, means for guiding filamentary material into said pot, a cylindrical protective member surrounding at least the side walls and top of said pot, and extending beyond the top thereof, a cover for said member, said member having a plurality of venting passages spaced substantially equidistantly thereabout at a point above the top of the spinning pot whereby gases released during the collection of filamentary material in the spinning pot are afforded continuous

egress from the area surrounding the spinning pot to the region about said protective member, and means for continuously removing the gases from the region about said protective member.

7. In combination, a centrifugal spinning pot, means for guiding filamentary material into said pot, a cylindrical protective member surrounding at least the side walls and top of said pot, and extending beyond the top thereof, a cover for said member, said member having a plurality of venting passages about one-half inch in height, spaced at about one-half inch intervals thereabout, and at a distance of about one-half inch below the point of junction of the protective member and the cover therefor, whereby gases released during the collection of filamentary material in the spinning pot are afforded continuous egress from the area surrounding the spinning pot to the region about said protective member, and means for continuously removing the gases from the region about said protective member.

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