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CENTRIFUGAL APPARATUS AND PROCESS FOR SHAPING PLASTIC MATERIAL.

APPLICATION FILED NOV. 24, 1917.

1,293,535. Patented Feb. 4, 1919.

Fig. 1

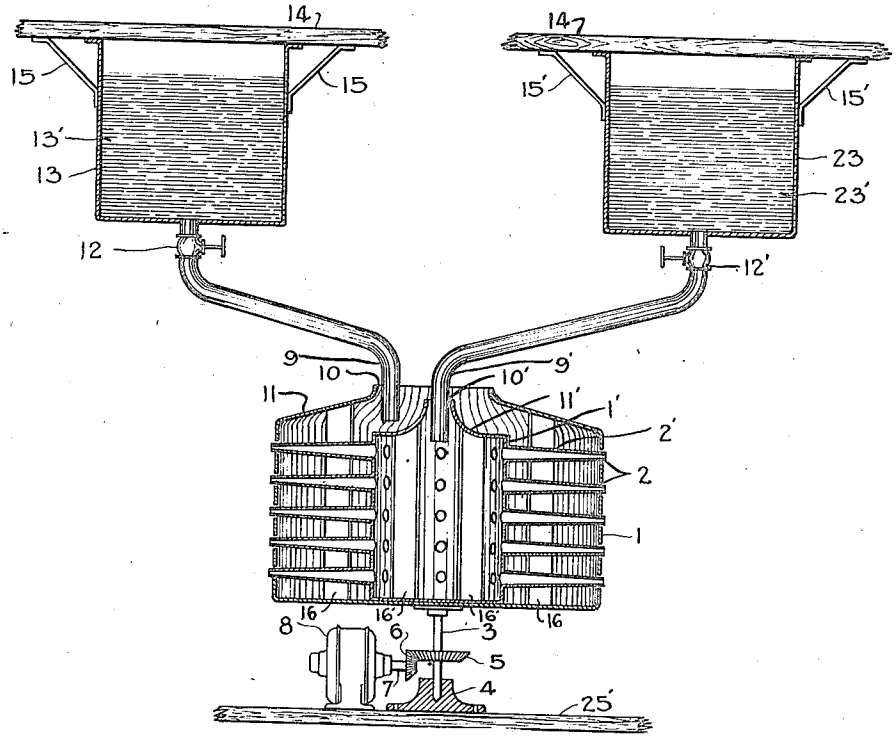


Fig. 2



Fig. 6.

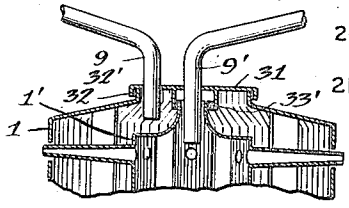


Fig. 3

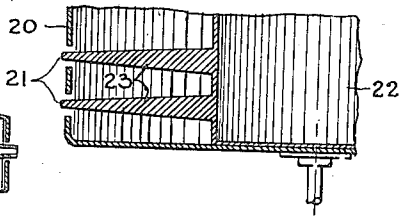


Fig. 4

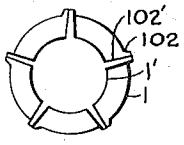


Fig. 5



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CENTRIFUGAL APPARATUS AND PROCESS FOR SHAPING PLASTIC MATERIAL.

1,293,535. Specification of Letters Patent. Patented Feb. 4, 1919.

Application filed November 24, 1917. Serial No. 203,779.

To all whom it may concern:

Be it known that I, RAY P. PERRY, a citizen of the United States, residing at Upper Montclair, in the county of Essex and State of New Jersey, have invented certain new and useful Improvements in Centrifugal Apparatus and Processes for Shaping Plastic Material, of which the following is a specification.

My invention relates to a process of and machine for treating materials in fluid, that is, either in gaseous or in liquid form, or both. The apparatus of my invention may be used for many purposes, and in one of the forms disclosed such apparatus may be employed to effect an intimate intermixture of two different materials in fluid form. My apparatus may also be used for making filamentary tubes of capillary dimensions.

Referring to the drawing, wherein I have illustrated my invention,

Figure 1 is a view partly in section and partly in elevation of the preferred form of my invention;

Fig. 2 is a detail cross-sectional view showing one of the forms which a material treated in my apparatus may acquire;

Fig. 3 is a cross-sectional detail view of a modification;

Fig. 4 is a cross-sectional detail view of another modification; and

Fig. 5 is an end view, on an enlarged scale, of the tubes shown in Fig. 4.

Fig. 6 is a sectional view, partly broken away, showing a gas tight connection.

1 indicates a receptacle having a substantially cylindrical form. The receptacle 1 is provided with a plurality of apertures 2, 2, 2. These apertures may be disposed in any desired manner and may be provided in any desired number and may be of any desired shape. I prefer to arrange the apertures in a series of horizontal rows in the side walls of the receptacle 1. Within the receptacle 1 is a receptacle 1′ which is fixedly attached at the bottom thereof to the inner wall of the bottom of the receptacle 1. The receptacle 1′ may be cylindrical or have any other desired form. Attached to and communicating with the receptacle 1′ are the tube-like elongated members 2′ whose outer ends are located adjacent to and project through the apertures 2.

Communicating with the receptacle 1 through the opening 10 in the cover member 11 is the tube 9 having therein the stop-cock 12 controlling the source of material 13′ in fluid form which is contained within the receptacle 13. Such receptacle 13 is supported by the bracket members 15 from the support 14. Communicating with the receptacle 1′ through the opening 10′ of the cover member 11′ is the tube 9′ having therein the stop-cock 12′ controlling the supply of material 23′ in fluid form contained within the receptacle 23. The receptacle 23 is supported by the brackets 15′ from the support 14. The receptacle 1 is secured to the vertical shaft 3 supported in the bearing 4. Mounted on the shaft 3 a short distance above the top of the bearing 4 is the bevel gear 5 which meshes with the corresponding gear 6 on the horizontal shaft 7 of the electric or other motor 8. The bearing 4 and the motor 8 are supported upon the member 25′. Radial plates 16 may be provided in the receptacle 1 and radial plates 16′ in the receptacle 1′ to prevent slipping between the fluid and the receptacles so as to make certain that the fluids will be carried around bodily in the receptacles and have centrifugal force imparted thereto.

Where it is desired merely to intimately mix two materials in fluid form together, as for example, to bring about a chemical reaction between such two fluids, when the two receptacles are set in rapid motion by means of the gears 5 and 6 and the motor 8, the fluids supplied thereto from the containers 13 and 23 will be driven by centrifugal force or by hydrostatic pressure, or both, through the apertures 2 and the tube-like members 2′, respectively. Since the apertures 2 and the outlets of the tube-like members 2′ are in close proximity together the fluid 23′ will be emitted from the tube-like members 2′ adjacent the points where the fluid 13′ will be emitted through the apertures 2. In this way there will result a very intimate intermixture or commingling of the two fluids in what is substantially an atomized condition. If desired, both of these fluids may be liquids, or both may be gases, or either may be a liquid and the other a gas. If the fluids are gases, a gas tight connection will be provided between the inlet tubes 9 and 9′ and the corresponding cover members of the respective receptacles

in order to prevent loss of the materials. In this case the gas may be introduced under pressure to aid the centrifugal force in expelling the same through the openings.

Such a connection is illustrated in Fig. 6 in which the tubes 9 and 9′ enter through a fixed disk 31 which has depending flanges 32 and 32′. Between these flanges and the upper open ends of the receptacles 1 and 1′ are placed gaskets 33 and 33′, respectively, to form gas tight joints and take the wear.

It is often desirable to treat molten materials which become solidified on cooling in the air. Where the materials 13′ and 23′ are of such a nature, it is possible to form filaments consisting of the two materials, a thread of the material 23′ being within an inclosing sheath or tube of the material 13′. Such a product is illustrated in Fig. 2 where the material 23′ forms the inner thread *a′* and the material 13′ forms the outer sheath or tube *a* of what might be termed a composite filament. For such a product the materials 13′ and 23′ may consist of molten bituminous materials, such as molten pitch or asphalt. Where materials such as waxes are treated, shot rather than filaments will be formed with the result that the shot so formed will be made up of mixtures of the two materials 13′ and 23′.

In Fig. 3 I have illustrated a modified form of apparatus wherein the receptacle 20 has provided therein the apertures 21 in any suitable arrangement and number. Within the receptacle 20 and fixedly attached thereto is the member 22 on the sides of which are arranged the pins or similar members 23. The outer ends of the pins 23 protrude into the apertures 21 so that such apertures are thereby provided with annular openings. This type of apparatus may be used for making filamentary tubes of capillary dimensions. The apparatus illustrated in Fig. 1 may also be used to produce filamentary tubes of capillary dimensions. In such a case the material 13′, of any desired filament-forming material, is ejected by centrifugal force through the apertures 2, which may have any desired form, while through the tube-like members 2′ which may have any desired cross-section a gaseous fluid, such as air, under pressure is emitted. This fine stream of air serves at once to prevent the semi-molten tubes from collapsing and also to help cool the same from the interior of the tubes, the air or other gaseous medium being cooled below its normal temperature, if desired, to increase the cooling effect. The fluids may be mixed by being thrown out from tubes whose ends lie close together as illustrated. For example, in the modification shown in Fig. 4 the apertures 102 from the receptacle 1 are slightly elongated tubes each one of which converges toward the corresponding tube 102′ from the inner receptacle 1′. These apertures 102 and tubes 102′ may be of any desired number and of any desired shape in cross-section. It is thus evident that instead of the fluids being mixed by one being introduced within the other they may be mixed by being forcibly thrown out in streams directed toward each other as shown.

What I claim is:

1. In an apparatus of the character described, a revoluble receptacle having a plurality of lateral apertures, means communicating with said receptacle for providing the same with a supply of material in fluid form, and means located adjacent and within each of said apertures for providing a substantially annular opening at each such aperture.

2. In an apparatus of the character described, a receptacle having a plurality of lateral apertures, means communicating with said receptacle for providing the same with a supply of material in fluid form, a container within the said receptacle, means communicating with said container for providing the same with a supply of material in fluid form, a plurality of tube-like members communicating with and fixedly attached to the said container, the outer ends of the said members being positioned adjacent and within said apertures, and means for rotating the said container and receptacle together.

3. In a centrifugal apparatus of the character described, a substantially cylindrical receptacle having a plurality of horizontally disposed rows of lateral apertures, means communicating with said receptacle for providing the same with a supply of material in fluid form, a substantially cylindrical container within the said receptacle and fixedly positioned with respect to the latter, means communicating with said container for providing the same with a supply of material in fluid form, a plurality of tube-like members communicating with and fixedly attached to the said container, the outer ends of the said members being positioned adjacent and within said apertures, and means for rotating the said container and receptacle together.

4. In an apparatus of the character described, a revoluble receptacle having a plurality of lateral apertures, means communicating with said receptacle for providing the same with a supply of material in fluid form, a container within said receptacle, means for supplying said container with a fluid, tubes leading from said container and terminating adjacent the apertures in the receptacle.

5. In an apparatus of the character described, a revoluble receptacle having a plurality of lateral apertures, means communicating with said receptacle for providing the same with a supply of material in fluid

form, a container within said receptacle, means for supplying said container with a fluid, tubes leading from said container and terminating adjacent the apertures in the receptacle and at an angle thereto.

6. In an apparatus of the class described, an inner receptacle, an outer revoluble receptacle, tubes leading from the inner receptacle, openings in the outer receptacle in proximity to the ends of said tubes.

7. The process of making tubular filaments, comprising the steps of extruding molten filament-forming material by means of centrifugal force through a substantially annular aperture into a cooling medium, thereby forming a semi-molten tube of such material, and simultaneously with said extrusion sending a fluid medium under pressure into the bore of the tube to prevent the same from collapsing and to permit the same to cool and solidify in tubular form.

8. The process of making tubular filaments, comprising the steps of extruding molten filament-forming material by means of centrifugal force through a substantially annular aperture into a cooling medium, thereby forming a semi-molten tube of such material, and simultaneously with said extrusion sending a fluid cooling medium under pressure into the bore of the tube to prevent the same from collapsing and to cause the same to cool and solidify in tubular form.

9. The process of making tubular filaments, comprising the steps of extruding molten filament-forming material by means of centrifugal force through a substantially annular aperture into a cooling medium, thereby forming a semi-molten tube of such material, and simultaneously with said extrusion sending a gaseous cooling medium under pressure into the bore of the tube to prevent the same from collapsing and to cause the same to cool and solidify in tubular form.

10. The process of making tubular filaments which comprises the steps of introducing molten filament-forming material into a revolving centrifugal machine, permitting said material to pass out of said machine through apertures, and simultaneously sending a fluid cooling medium under pressure through the central portion of said apertures.

In testimony whereof I affix my signature.

RAY P. PERRY.