Aug. 25, 1936. H. J. JONES 2,051,861

SPINNERET

Filed Oct. 4, 1934

Fig. 1

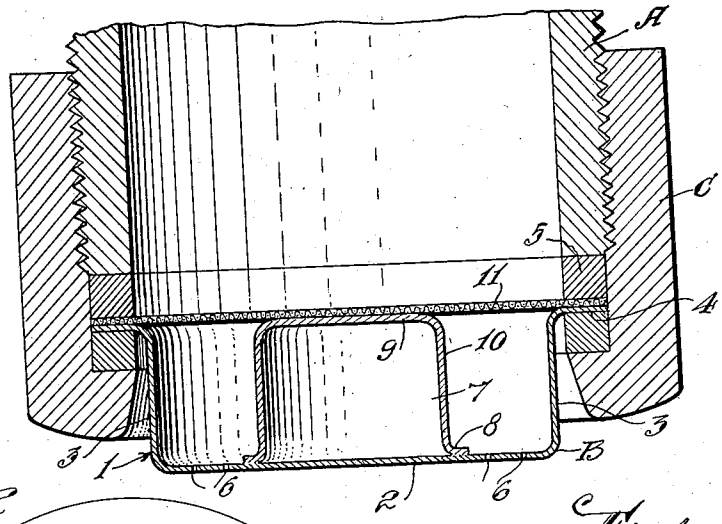


Fig. 2

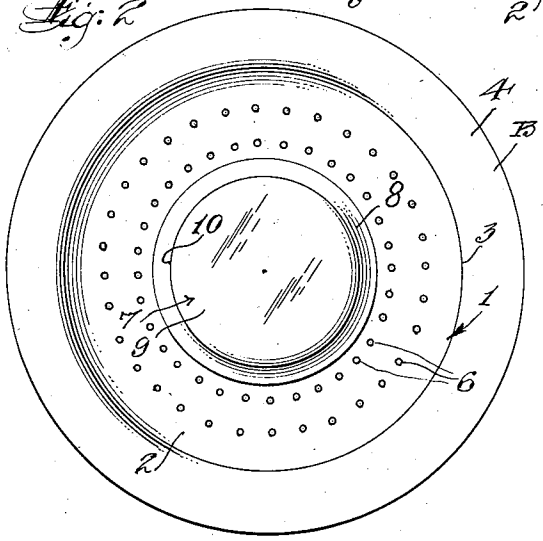


Fig. 4

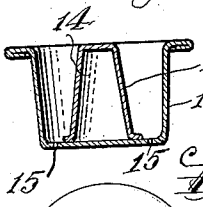
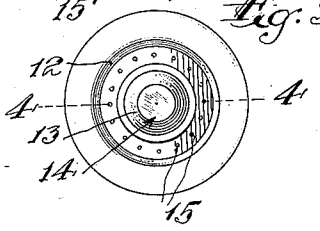


Fig. 3



INVENTOR
Harry J. Jones,
BY
Harry Silcock.
ATTORNEY

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SPINNERET

Harry J. Jones, Irvington, N. J., assignor to Baker & Company, Inc., Newark, N. J., a corporation of New Jersey

Application October 4, 1934, Serial No. 746,785

2 Claims. (Cl. 18—8)

This invention relates particularly to spinnerets that are used for forming filaments from viscid or viscous substances such as cellulose, by forcing of the material under pressure through one or more openings or capillary pores in the spinneret.

In the manufacture of artificial filament or "silk" of this character, the spinneret is generally connected to a tube or pipe through which the viscous substance is forced under pressure so as to extrude the substance through the openings in the spinneret. The viscose or viscous material generally used in this process is subject to coagulation and sometimes becomes so thick or stiff that it clogs or will not pass through the spinneret openings, or results in inferior filament. I have discovered that this coagulation most frequently occurs in proximity to the spinneret openings, where large quantities of the material may be dormant or inert for long periods of time in contact with solid portions of the spinneret around the openings; and that it can be prevented or greatly reduced by maintaining the viscous substance constantly in motion or continuously agitating the substance in the zones adjacent the spinneret openings.

A prime object of my invention is to provide a novel and improved spinneret which shall be so constructed that the viscous material shall be constantly moved or agitated in the zones in proximity to the spinneret openings during operation of the spinneret so that coagulation or thickening of the material shall be reduced or prevented.

Another object is to provide such a spinneret embodying novel and improved features of construction wherein there shall be no surface, or at most a surface of minimum area, upon which the viscous substance can become dormant, "dead" or inert during operation of the spinneret.

In processes of this general character a screen or filter is frequently mounted in the supply tube or pipe for the viscous substance in spaced relation to the perforated wall of the spinneret to prevent solid particles or foreign matter from reaching the openings in the spinneret so as to eliminate clogging of the openings; and another object of my invention is to provide a spinneret which shall embody novel and improved features of construction for supporting or reenforcing the central portion of such a screen against tearing or collapse under the pressure of the viscous material on the screen.

Other objects are to provide a spinneret which shall comprise a flanged cup the bottom of which has perforations in its bottom adjacent its side walls, and a novel and improved baffle on the bottom of said cup so that all of the viscous material adjacent the perforations shall be maintained constantly in a state of flow or shall be constantly agitated to prevent coagulation or stagnation of any portion of the substance on the walls of the spinneret; to provide such a spinneret which shall include novel and improved construction and combination of a sheet metal cup-shaped body and an inverted cup-shaped baffle secured to the bottom of the body, whereby the baffle shall reenforce the bottom of the body against the pressure of the viscous material and shall thereby enable the attachment of the cup to a supply tube solely at the rim of the cup to insure a minimum of obstruction to flow of the viscous material around the baffle and into the body; to provide a spinneret of the character described which shall be simple and inexpensive in construction and reliable and durable in operation; and to obtain other advantages and results as will be brought out by the following description.

Referring to the accompanying drawing in which corresponding and like parts are designated throughout the several views by the same reference characters,

Figure 1 is a vertical longitudinal sectional view on a greatly enlarged scale through a spinneret embodying my invention, showing it connected to a supply tube or pipe for the viscous material to be extruded into filaments.

Figure 2 is a top plan view of a spinneret,

Figure 3 is a top plan view on a reduced scale of another form of spinneret embodying the invention, and

Figure 4 is a vertical longitudinal sectional view on the line 4—4 of Figure 3.

Specifically describing the embodiment of the invention illustrated in Figures 1 and 2, the reference character A designates a tube or pipe through which the viscous material to be extruded into filaments is supplied. The spinneret B embodying the invention is connected to the end of this tube in the usual way by a coupling C.

As shown, the spinneret comprises a cup-shaped body 1 of thin metal, preferably platinum or an alloy thereof, and has a bottom wall 2 and cylindrical side walls 3. At the mouth of the cup is provided a peripheral flange 4 which is clamped between gaskets 5 by the coupling C. The bottom wall 2 has a plurality of extruding openings or apertures 6 adjacent the side walls 3, and the material supplied through the tube A under pressure is forced or extruded through

these openings 6 in the form of fine filaments. The interior diameter of the cup is substantially the same as the interior diameter of the tube A and the cup is secured to the tube at only the rim of the cup so that the viscous material can flow unobstructedly into the cup.

This viscous material is subject to coagulation, and to maintain the viscous material in constantly flowing state and to concentrate the flow of the material at the opening 6 so as to prevent coagulation of the material, I have provided a baffle 7 on the central portion of the inner surface of the bottom 2, so that the openings 6 are disposed between the baffle and the side walls 3 of the spinneret. As shown, this baffle consists of an inverted cup-shaped body having a perimetral flange 8 which is welded, brazed or otherwise firmly secured to the bottom wall 2. The top 9 of the baffle may be flat or corrugated and is disposed in a common plane with the rim of the cup-shaped body 1 for a purpose hereinafter described. The side walls 10 of the baffle and the side walls 3 of the cup-like body 1 are thus disposed closely adjacent the openings 6, and the baffle guides or directs the viscous material away from the center of the body 1 and cooperates with the side walls 3 of the body to direct the material to and concentrate the flow thereof at the openings 6. Therefore, during operation of the spinneret, the viscous material is maintained constantly in a flowing state around the openings 6, and there is a minimum of area of surface around the openings on which the viscous material may become inert or stagnated adjacent the openings so that the viscous material is constantly agitated and moved over such surfaces to prevent coagulation of the material.

In use of the spinneret, a screen or filter 11 is generally provided in the tube A across the mouth of the spinneret to prevent the passage of solid particles or foreign matter to the openings and thereby eliminate the possibility of clogging of the opening. This screen is of course subjected to considerable pressure from the viscous material flowing therethrough, but with my spinneret the top 9 of the baffle 7 serves as a support for the central portion of the screen to reenforce it against the pressure of the viscous material. Moreover, the baffle reenforces the central portion of the bottom wall 2 of spinneret against the pressure of the material.

As shown, the openings 6 are preferably arranged in two concentric annular rows, but other arrangements of the openings may be utilized.

In Figures 3 and 4 of the drawing is shown a modification of the spinneret wherein the side walls 12 of the cup-like body and the side walls 13 of the baffle 14 converge toward each other and the annular row of extruding openings 15. These converging walls induce a free flow of the viscous material along them to the openings to further reduce the possibility of stagnation or coagulation of the material around the openings.

While I have shown and described the invention as embodied in two different forms of spinnerets it should be understood that this is primarily for illustrating the principles of the invention and that the invention may be embodied in other spinnerets and filament extruding apparatus without departing from the spirit or scope of the invention. Moreover, the shapes of the spinnerets and the baffles, as well as the manner of forming the baffles may be widely modified within the scope of the invention.

Having thus described my invention, what I claim is:

1. A spinneret comprising a sheet metal cup-shaped body the mouth of which is formed for connection to a supply tube for viscous material, and an imperforate sheet metal baffle of inverted cup-like shape projecting upwardly from the bottom wall centrally of the body and rigidly secured at its rim solely to said bottom wall, with a plurality of extruding openings in the bottom wall between the side walls of the body and the baffle.

2. In apparatus of the character described, the combination with a supply tube for viscous material under pressure, of a spinneret including a cup-shaped sheet metal body formed with a perimetral flange at its mouth, and imperforate sheet metal baffle of inverted cup-like shape projecting upwardly from the bottom wall centrally of the body and rigidly secured at its rim solely to said bottom wall, with a plurality of extruding openings in the bottom wall between the side walls of the body and the baffle, the top of said baffle being flat and lying in substantially a common plane with said perimetral flange, a filter sheet superimposed on said flange and said top of the baffle, and means clamping said flange and the edge portion of said filter upon the end of said supply tube.

HARRY J. JONES.