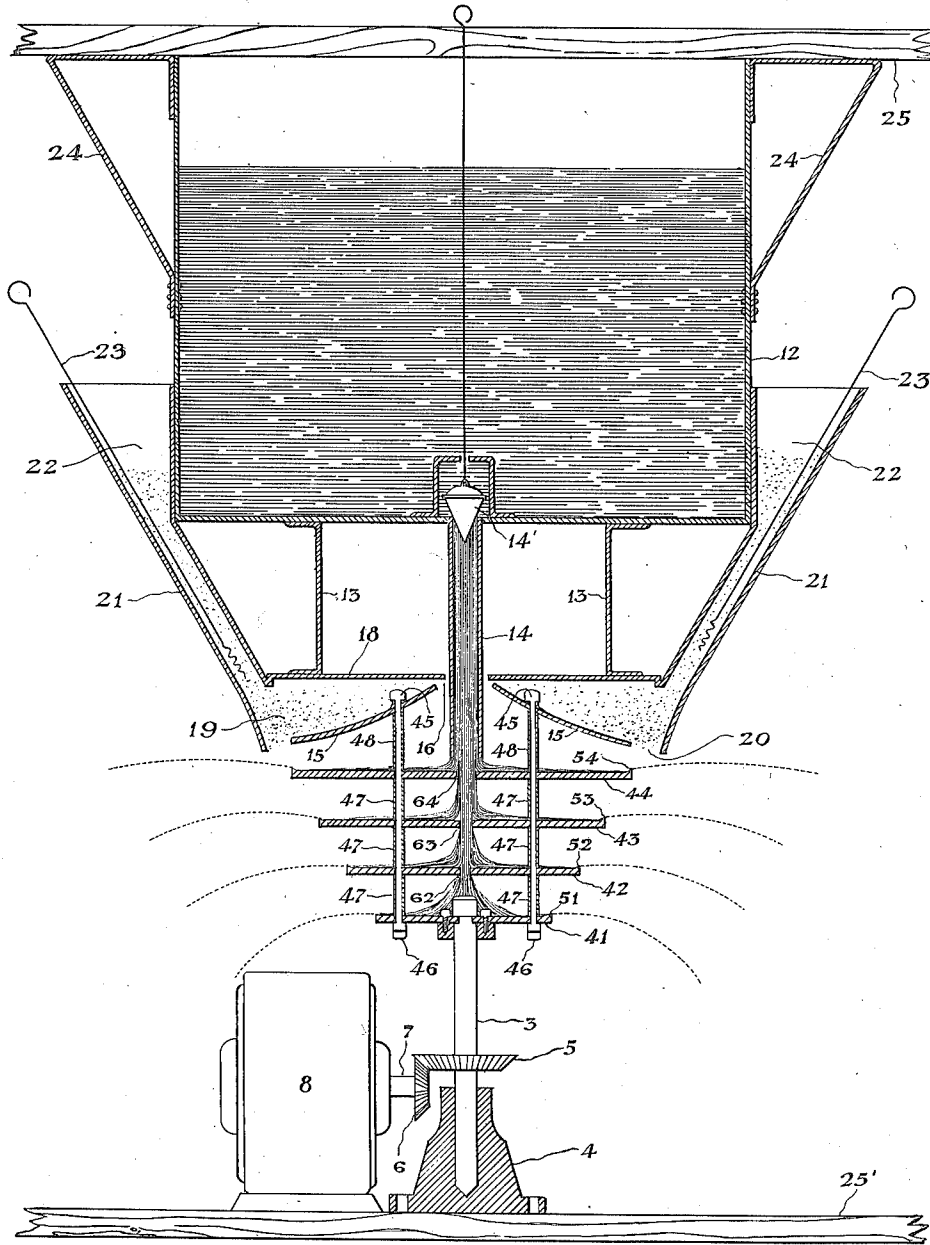


K. B. HOWELL.
CENTRIFUGAL PROCESS AND DEVICE.
APPLICATION FILED NOV. 1, 1917.

1,294,909.

Patented Feb. 18, 1919.



INVENTOR
Kenneth B. Howell
BY
Chas. W. Mortimer
ATTORNEY

UNITED STATES PATENT OFFICE.

KENNETH B. HOWELL, OF EAST ORANGE, NEW JERSEY, ASSIGNOR TO THE BARRETT COMPANY, A CORPORATION OF NEW JERSEY.

CENTRIFUGAL PROCESS AND DEVICE.

1,294,909.

Specification of Letters Patent.

Patented Feb. 18, 1919.

Application filed November 1, 1917. Serial No. 199,793.

To all whom it may concern:

Be it known that I, KENNETH B. HOWELL, a citizen of the United States, residing at East Orange, in the county of Essex and State of New Jersey, have invented certain new and useful Improvements in Centrifugal Processes and Devices, of which the following is a specification.

My invention relates to a method of producing shot or filaments, and the object of my invention is to provide an apparatus at once simple in construction and effective in operation wherein I am enabled to form shot or filaments of the desired material rapidly and efficiently.

The apparatus of my invention comprises a plurality of spaced plates, preferably in the form of coaxially arranged disk-like members. Such members are preferably arranged in a vertical series and all but the lowest member of the series are provided with substantially centrally disposed apertures. The diameter of the successive apertures diminishes from the top member to the bottom member of the series. I also prefer to have the diameter of the disk-like members diminish from the top member to the bottom member of the series, for reasons subsequently to be set forth. The series of spaced disks are held in fixed relation to each other and are provided with means for rapidly rotating the same. By means of the apertures previously described the disks are provided with a supply of molten material of which the shot or filaments are to be formed. Due to the rotation of the series of disks the material on each of the disk-like members is thrown out into a series of shot or filaments as a result of the centrifugal force acting on the molten material. Since the diameter of each disk is substantially greater than that of the disk immediately below it in the series, the velocity of the material leaving any disk is greater than that leaving the disk immediately below it. In this way there results a separation of the shot or filaments of the several disks greater than what would result if the disks were all of the same diameter. In this way I am enabled to prevent the shot or filaments from substantially coming into contact with each other before they are solidified. I prefer to turn up the edges of the disks since I find that this arrangement facilitates the formation of the shot or

filaments and helps to prevent the shot or filaments of any one disk from coming into contact with the shot or filaments of any other disk before the shot or filaments are solidified.

In dealing with materials of an adherent nature, such as the softer grades of pitch or asphalt, it often becomes desirable to render the shot or filaments non-adherent. I accomplish this desirable result by providing my apparatus with means for coating the shot or filaments as formed with a thin film of non-adherent material, generally of a mineral substance, preferably of a silicious nature, such as finely divided talc or soap-

Referring to the drawing wherein I have illustrated one embodiment of my invention, the single figure of the drawing is a view partly in section and partly in elevation of the apparatus of my invention.

My device comprises a series of vertically disposed plates 41, 42, 43 and 44 preferably in the form of substantially circular disks having the apertures 62, 63 and 64 in the disks 42, 43 and 44, respectively. As illustrated, the apertures diminish in diameter from the top member 44 to the lowest member 42 provided with the aperture 62, the disk 41 having no aperture. I prefer to provide the edges of the disks 41, 42, 43 and 44 with the turned-up portions 51, 52, 53 and 54, respectively. The disks are held in fixed spaced relation to each other by means of the bolts 45 and the nuts 46, the distance between the successive members 41, 42, 43 and 44 being determined by means of the spacing sleeves 47. The series of disks is driven or rotated at any desired rate of speed by being mounted on the shaft 3 which is supported in the bearing 4. Fixedly mounted on shaft 3, a small distance above the bearing 4, is a bevel gear 5 which meshes with a corresponding bevel gear 6, which is fixed on the shaft 7 of an electric or other motor 8. By setting the motor 8 in operation it is obvious that the series of disks will be rotated through the mediation of the bevel gears 5 and 6.

Above the plate 44 and held spaced therefrom on the bolts 45 by means of the spacing members 47 is the annular inclined member 15 provided with the opening 16. The shot or filament-forming material is fed in to the series of plates in a molten condition

through the feed pipe 14 communicating with the tank 12 which contains the shot or filament-forming material in a molten condition, the valve 14' controlling the amount and rate of flow. The feed pipe 14 extends through the opening 16 in the member 15.

In order to provide the shot or filaments, if desired, with a coating or covering of material to render the same substantially non-adherent, I provide the annular inverted dish-shaped member 18 attached to the tank 12 by means of the straps 13, the member 18 cooperating with the member 15 to provide a chamber 19 which holds the material with which, if desired, the shot or filaments may be covered as extruded to render the same substantially non-adherent. The covering material, which may consist of finely divided mineral substance, preferably of a silicious nature such as finely divided talc or soapstone, issues through the annular opening 20 through which it is fed by the action of the moving inclined annular member 15 which moves the powdered covering material toward the opening 20. The space 19 is supplied with powdered material by means of the tubes 21 which are provided with the funnels 22, and which may have rods 23 in the tubes to loosen up the powdered material should it become clogged in the tubes. The tank, to which the members 18, 21 and 22 are attached, is removably supported by brackets 24 under the shelf 25, or in any other convenient way.

The operation of the device is as follows:

The inner diameter of the feed pipe 14 is, as illustrated, such that the molten shot or filament-forming material issuing from the feed pipe 14 when the valve 14' is opened is caught at its outer part by the inner substantially circular edge of the upper disk-like member 44. In the same manner each of the succeeding plates catches a portion of the stream of molten shot or filament-forming material, the diameters of the feed pipe and of the central apertures determining what proportion of the molten shot or filament-forming material is caught by each of the disk-like members. The plates being in rapid rotation, the molten material on each of the plates is propelled under the action of centrifugal force to the dished-up margin of the successive disk-like members. As the molten material leaves the disks it is formed into shot or filaments which cool and solidify shortly after leaving the disk-like members 41, 42, 43 and 44. Due to the fact that the velocity at the edge of any of the disks is greater than the velocity of the disks below it, the velocity of the shot or filament leaving any disk will be greater than the velocity of the shot or filament leaving the disks below it, and accordingly there is by this means brought about a greater separation of the shot or filaments leaving the several

disks than would be the case if the disks were all of the same diameter. The non-adherent material, where the same is used, leaves the opening 20 at a point adjacent where the shot or filaments leave the disks and where the shot or filaments are still in a semi-molten condition. This permits the non-adherent material to adhere to the shot or filaments and provide the same with a protective non-adherent coating. The shot or filaments thus formed fall in a solidified condition upon the supporting member 25' where they are gathered and used for any desired purpose.

It may be stated as a general rule that where the molten material is kept at a temperature not far above its melting point, filaments will generally result, while if such temperature is considerably above such melting point, shot will generally result. The nature of the material, also, has considerable influence on the form it will take when treated, certain materials, such as waxes, appearing to form only shot, while other materials, such as pitch and asphalt, form either shot or filaments according to the temperature at which they are worked.

If desired, the disk-like members may be formed more in the shape of dish-shaped members of conical or similar form, and the top faces of the disks may be radially or otherwise grooved, while the edges of the disks may, if desired, be serrated. I prefer, also, to supply the several disks with substantially equal quantities of the shot or filament-forming material.

What I claim is:

1. In a centrifugal apparatus, a plurality of superposed disks, all of said disks above the lowest having holes in the centers thereof, the hole in each disk being larger than the one in a lower disk, means for feeding a solid stream of liquid material larger than the largest of said holes to the center of the topmost disk, and means for revolving said disks.

2. In a centrifugal apparatus, a plurality of superposed disks, all of said disks above the lowest having holes in the centers and turned up portions near the peripheries thereof, the hole in each disk being larger than the one in a lower disk, means for feeding a solid stream of liquid material larger than the largest of said holes to the center of the topmost disk, and means for revolving said disks.

3. In a centrifugal apparatus, a plurality of spaced plate-like members, all but the lowest one of the said members being provided with substantially centrally located apertures, the diameters of the members and of the several apertures diminishing in the successive members from the top member to the bottom member, centrally disposed means for supplying said members with a

solid stream of material, and means for rotating said members.

4. In a centrifugal apparatus, a plurality of spaced plate-like members, the said members being provided with dished-up edges and all but the lowest one of the said members being provided with substantially centrally located apertures, the diameters of the members and of the several apertures diminishing in the successive members from the top member to the bottom member, centrally disposed means for supplying said members with material, and means for rotating said members.

5. In a centrifugal apparatus, a plurality of spaced plate-like members, the said members being provided with dished-up edges and all but the lowest one of the said members being provided with substantially centrally located apertures, the diameters of the members and of the several apertures diminishing in the successive members from the top member to the bottom member, centrally disposed means for supplying said members with material, means for rotating said members, and means for coating the shot or filaments as formed with a film of material to render the same substantially non-adherent.

6. In a centrifugal apparatus, a plurality of rotating disks, a sloping member connected to said disks and extending substantially to the outer edge of the largest one of said disks, a stationary member above said disks, said sloping member and stationary member forming a chamber for anti-sticking material.

7. In a centrifugal apparatus, a plurality of rotating disks, a sloping member connected to said disks, a stationary member above said disks, said sloping member and stationary member forming a chamber for anti-sticking material, means for feeding material to said disks, and an annular channel through which anti-sticking material is fed outside of the outer edges of said disks.

8. The process of dividing material, which consists in projecting a plurality of sheets of said material in a molten state into a cooling medium in such a manner that said sheets travel at different speeds and diverge from each other.

9. The process of dividing material, which consists in projecting a plurality of superposed sheets of said material in a molten state into a cooling medium, each sheet traveling more rapidly than the one below it, and said sheets diverging from each other.

10. The process of dividing material, the step which consists of dividing a stream of said material in a molten state into a number of sheets which travel at various speeds and diverge from each other.

11. The process of dividing material, which consists in dividing a vertical stream of said material in a molten state into a number of horizontal sheets and projecting said sheets into a cooling medium at different speeds.

In testimony whereof I affix my signature.

KENNETH B. HOWELL