Apparatus for pulping paper, and a rotor therefor.
Description

This invention relates to apparatus for pulping paper making stock at relatively high consistencies, and more particularly to paper pulping apparatus in which a vaned rotor is utilized to circulate the stock within a tub.

Paper pulping apparatus typically includes a tub having a bottom wall and a cylindrical side wall extending upwardly therefrom, a vaned rotor centrally mounted on the bottom wall for rotation within the tub, and a screen or valve means located in or near the bottom wall to provide means for removal of the pulped paper stock. The rotor vanes include leading faces which are shaped and sized to contact stock near the bottom wall of the tub and propel it radially outwardly from the center of the tub. In addition, the vanes periodically direct the stock upwardly. The rising stock flows to the center of the tub and then downwardly toward the rotating vanes. Thus during a pulping operation, the stock is caused to flow in a generally circular pattern, and the reduction in size of the individual particles of paper stock is due largely if not exclusively to the high shear forces between particles of stock created by this flow pattern.

Many pulping devices of this construction presently in use are limited in application to paper making stock having a relatively low consistency, typically in the range of 4—7% solids content. If the consistency of the stock is raised sufficiently above about 7%, the density of viscosity of the stock is such that it does not easily flow downwardly between the spinning vanes of the rotor. The vanes will displace an initial quantity of pulp outwardly, but cavitation will then occur since the displaced pulp is not replaced by downwardly flowing pulp.

In order to perform a pulping process upon stock having a consistency in excess of about 10%, special rotors have been developed. For example, in our copending E.P. Application EP—A—122911 (Article 54,3 EPC) a high consistency pulping apparatus is disclosed having a rotor with a vertically oriented and axially aligned feeding screw. The rotor includes vanes in the form of circumferentially-extending members with a half-crescent shape which are disposed about the periphery of a disk-shaped plate. The feeding screw is mounted in the center of the plate and includes a cylindrically-shaped body having a base which is spaced from the rotor vanes. The screw extends along the body and terminates at a squared end above the disk-shaped plate supporting the vanes.

When rotated in a tub containing stock at 12—13% consistency, the feeding screw guides the stock downwardly to the region of the rotor vanes which then propel it outwardly against the walls of the tub. The higher consistency stock climbs the walls of the tub, and baffles are employed to direct the pulp downwardly toward the tub center.

The potential advantages of high consistency pulping devices have been well recognized. For example, since the density of the stock is considerably higher for pulp stock having a consistency of about 14% than for stock having a consistency of about 7%, the shear stresses created during a high consistency pulping operation are significantly greater, so that the time required to perform a pulping operation with high consistency stock may be the same or even less than the time required for pulping the same volume of low consistency stock in the same pulping tub.

However, there often exist inherent disadvantages with high consistency pulping devices of the type previously described. For example, since the helical screw flight of the feeding screw terminates above the base of the rotor and is spaced from the rotor vanes, there may exist a tendency for the high density stock to collect and form a wedge between the underside of the trailing portion of the screw flight and the portion of the rotor base immediately beneath it. Another disadvantage is that there does not exist means to guide the stock from the squared trailing portion of the screw flight to the working faces of the vanes, so that voids may be created surrounding the working faces of the vanes.

Accordingly, there is a need for a high consistency pulping apparatus having a rotor which minimizes the likelihood of cavitation. There is also a need for a high consistency pulping apparatus in which the rotor provides means for guiding the high density stock in a smooth and uninterrupted path from a location adjacent the center of the rotor to the working faces of the vanes without the stock becoming wedged between the screw flight and rotor vane.

It is known from GB—A—176 412 and DE—A—2542 065 to provide a rotor for use in pulping paper making stock at high consistencies of the type having a rotor body adapted for mounting on a vertically extending drive shaft, vane means attached at root portions thereof to said rotor body and extending generally radially outwardly therefrom, and a feed screw having a conical body mounted centrally of said rotor body and extending upwardly therefrom, and screw flight means extending along said conical body for guiding pulp downwardly to said vanes.

It is an object to provide an improved rotor having the aforesaid features.

According to the invention such a rotor is characterised by a rotor body having a base with an outer periphery immediately adjacent to the said root portions such that pulp guided downwardly by said screw flight means is urged outwardly by said conical body to engage said root portions and be propelled by said vane means.

The invention also includes apparatus for pulping paper making stock at high consistencies of the type having a tub having a bottom wall and a cylindrical side wall extending upwardly therefrom, a rotor body mounted for rotation on a vertical axis in the center of said bottom wall,
vane means extending generally radially outwardly from said rotor body at root portions thereof and constructed to impel high consistency pulp stock toward said side wall, and a feed screw having a conical body mounted centrally of said rotor body and extending upwardly therefrom and screw flight means extending along said conical body for guiding pulp downwardly to said vanes, characterised by said conical body having a base with an outer periphery immediately adjacent to said root portions such that pulp guided downwardly by said screw flight means is guided outwardly to engage said root portions and be propelled by said vane means.

The present invention provides an apparatus for pulping paper making stock which is capable of pulping relatively high consistency stock, that is, stock in a range of approximately 10—25% solids, in a manner that creates the necessary circular flow patterns to generate the high shear forces between paper particles in order to perform the pulping operation in a minimum amount of time. Another advantage of the invention is that it includes a rotor that is designed to minimize the likelihood of cavitation and the likelihood of stock collecting on the rotor to obstruct the downward and outward flow of stock to the vanes.

The downward and outward movement of the pulp resulting from the rotation of the feed screw causes the pulp to flow directly to the faces of the vanes and reduces the likelihood of the stock collecting on the rotor between the feed screw and vanes. Furthermore, this flow path ensures that stock flows downwardly between vanes so that the entire face of each vane can provide the maximum pumping action for which it was designed.

In a preferred embodiment, the conical body of the feed screw includes a base sized such that its periphery is adjacent to the root portions of the rotor vanes. The trailing end of the screw flight blends into the working face of a vane to form a continuous surface therewith. In another embodiment, the flight of the feed screw includes a trailing edge which tapers in width and terminates at the periphery of the base adjacent a vane root. Thus, the combination of the feed screw with the rotor provides a guiding surface along which the stock may travel which extends from the upper tip of the feed screw to the outer tip of the rotor vane.

The present invention preferably includes a tub having a bottom wall and a cylindrical side wall extending upwardly therefrom, and the rotor body is centrally mounted on the bottom wall for rotation in a vertical axis.

The feed screw is sized such that, when mounted on the rotor body, its height above the bottom wall of the pulping tub approximates the intended depth of the stock within the tub. When rotated, the rotor of the preferred embodiment causes the stock within the tub to flow in the previously described circular pattern such that the level of the stock at the center of the tub is below the level of the stock at the side wall, thereby exposing the tip of the feed screw. When the feed screw and stock are in this configuration, the feed screw provides a means of escape for any air which is present in the vicinity of the vanes, thus further reducing the likelihood of cavitation.

Another advantage of the construction of the present invention over prior art high consistency pulping devices is that the invention can utilize prior art rotors which previously were capable of functioning only in low consistency pulping operations. By sizing the feed screw such that the periphery of the base and trailing portion of the flight are substantially contiguous with the faces of the vanes, the feed screw can be retrofitted to a prior art rotor, such as the rotor disclosed in the Couture U.S. Patent No. 3,889,885. However, due to the nature of high consistency paper making stock, it is preferable although not necessary to utilise a rotor having between three and six vanes, since it is difficult to cause high consistency pulp to flow between the relatively narrow spaces existing between the vanes of rotors having more than six vanes. In rotors having more than three or four vanes, it is also preferable to utilise a feed screw having multiple flights so that the stock can be urged downwardly and outwardly in a relatively balanced pattern about the periphery of the rotor.

Accordingly, it is an object of the present invention to provide an apparatus for pulping paper making stock at high consistencies which minimizes the likelihood of cavitation; an apparatus which provides a continuous path along which stock may travel from an upper portion of the pulping tub to the outer tip of the vane; and an apparatus for pulping high consistency stock which can be made by modifying low consistency systems.

Other objects and advantages of the present invention will become apparent from the following description, the accompanying drawings and the appended claims. In order that the invention may be more readily understood, reference will now be made to the accompanying drawings, in which:

Figure 1 is a perspective view of the pulping apparatus of the preferred embodiment of the invention in which the tub wall has been cut away to show the rotor;

Figure 2 is a detail of the rotor of Figure 1;

Figure 3 is a side elevation in section of the tub of Figure 1 showing the flow pattern of pulp stock during a pulping operation;

Figure 4 is an alternate embodiment of the rotor of the invention; and

Figure 5 is another embodiment of a rotor of the invention.

The pulper shown in Figure 1 includes a tub 10 having a cylindrical upper wall 12 and a bottom wall comprising a plane center section 14 surrounded by a frusto-conical portion 16. As shown in Figure 2, the center section 14 includes a perforated bed plate 18 for draining the pulped paper stock from the tub 10 after the completion
of the pulping operation. The tub 10 is mounted on supports 20 above a gear drive 22 which is directly driven by a motor 24. The cylindrical side wall 12 includes baffles 26 which direct pulp stock flowing upwardly against the wall outwardly toward the center of the tub 10.

A rotor, generally designated 28, is mounted in the center of the perforated bed plate 18 and is driven by the motor 24 and gear drive 22. The rotor 28 includes a rotor body 30 having a cover plate 32 and vane ring 34. The vane ring 34 supports a plurality of vanes 36, alternate ones of which are of increased thickness and function as pumping vanes 38. The rotor 28 as described thus far is of a type well-known in the art and is commonly used in pulping devices for defibering stock of 8% to 15% consistency. The structure and cooperation of the rotor 28 with the perforated bed plate 18 are described more fully in the Couture U.S. Patent No. 3,889,885, commonly assigned, the disclosure of which is incorporated herein by reference.

However, the rotor 28 of the present invention differs significantly from prior art rotors in that it includes a feed screw, generally designated 40. The feed screw 40 includes a conical body 42 which is concentric with the rotor body 30, and extends upwardly therefrom. The rotor 28 may be cast as a single unit, or the feed screw 40 and rotor body 30 may be fabricated separately and then joined together. The conical body 42 includes a rounded top 44 and a circular base 46 which extends to the root portions 48 of the pumping vanes 38.

The feed screw 40 includes helical screw flights 50, 52 which intertwine along the length of the conical body 42. Each of the screw flights 50, 52 is ribbon-shaped and includes a trailing portion 54 which terminates at the base 46 of the conical body 42 adjacent the root 48 of a vane 38. In the embodiment shown in Figures 1 and 2, the trailing portions 54 are twisted so that their under-sides 56 are contiguous with the face 58 of the pumping vane 38 so as to form a continuous surface therewith.

The operation of the pumping apparatus is best shown in Figure 3. Prior to operation, the tub 10 is filled with paper making stock 60 which preferably is at a consistency of between 12% and 25% solids. The level of the stock within the tub 10 should approximate the height of the rounded top 44 of the conical body 42. Since the tub is 10 is filled, the rotor 28 is rotated in a counterclockwise direction, indicated by arrows A shows in Figures 2 and 3. When the rotational speed of the rotor 28 has reached its intended operational speed, the helical screw flights 50, 52 of the feed screw 40 draw the stock 60 downwardly toward the rotor body 30. At the same time, the stock is urged outwardly by the increasing diameter of the conical body 42. Thus, the stock travels in a downward helical path of increasing diameter, as indicated by arrows B in Figure 3.

Since the base 46 of the helical body 42 and the trailing portions 54 of the screw flights are located adjacent the roots 48 of the vanes 38, the stock 60 is guided directly to the faces 58 of the pumping vanes 38. The downward and outward motion imparted to the stock 60 by the cooperation of the conical body 42 and flights 50, 52 places the stock down between the vanes 36 and 38 so that it contacts the entire area of the vane face 58. Thus, the efficiency of the vanes 38 is increased since almost the entire vane face 58 contacts the pulp 60.

Once the pulp has contacted the vanes 38, it is propelled outwardly in a generally radial direction toward the frusto-conical portion 16, and then upwardly against the wall 12 to the top of the tub 10. The rising pulp encounters the baffles 26 which act to direct the pulp downwardly and inwardly toward the center of the tube where it again is directed toward the rotor body 30 by the feed screw 40. Due to the high consistency of the stock 60, the depth of the upwardly rising stock at the periphery of the tub 10 is greater than that at the tub center. Therefore, during operation, the rounded top 44 becomes exposed and the feed screw provides a channel or conduit for the escape of air from the vicinity of the rotor body 30, thereby further reducing the likelihood of cavitation. It is to be understood that the apparatus can be operated such that the depth of stock in the tub may exceed the height of the top 44, in which case the feed screw 40 will convey air to the upper level of the stock, where it will escape through the remaining stock to the atmosphere.

With the embodiment shown in Figures 1, 2 and 3, the conical body 42, the flights 50, 52 and the vane faces 58 combine to provide a substantially continuous pathway which positively guides the stock from the top of the feed screw 40 to the outer tips of the rotor vane faces 58. Since the trailing portions 54 of the screw flights blend into the vane faces 58, there are no pockets or gaps which may collect pulp or form voids, so that the generated flow of pulp is much smoother than with prior art rotors having feed screws whose flights are not contiguous with the vane roots 48.

One of the advantages of the present invention is that a previously existing low consistency pulp forming apparatus may be converted to perform the highly efficient high consistency pulp forming operation of the present invention with a minimum of expense. For example, the rotor 28 shown in Figure 4 includes a rotor body 304 in which a feed screw 404 has been attached to the cover plate 324 by a bolted flange 62 which extends outwardly from the periphery base 464 of the conical body 424. The design of the rotor 284 differs from the rotor 28 shown in Figures 1—3 in that the periphery of the base 464 is not immediately adjacent the vane roots 464 of the pumping vanes 384. Furthermore, the trailing portions 544 of the screw flights 504, 524 are not contiguous with the vane roots 484. Rather, the trailing portions 544 taper in width until they terminate at a point 64 located at the base 464 of the conical body 424.

Since the feed screw 404 cannot be fabricated
easily such that its trailing portions 54A blend into the vane faces 58A of the pre-existing rotor 28A. It is designed to taper the width of the trailing portions to a point 64 to reduce the likelihood that pulp stock will become wedged in the space between the underside of the trailing portions and the cover plate 32A or other portions of the rotor body 30A. Despite the fact that the conical body 42A and screw flights 50A, 52A are not immediately adjacent the vane roots 48A, the feed screw 40A will still impart a downward and outward motion to the pulp stock within a tub which directs it to the faces 58A of the vanes 38A. This motion minimizes the likelihood that pump stock will collect or stagnate in the central area of the rotor body 30A and not flow to the pumping vanes 38A.

Another application of the invention is shown in Figure 5 in which a rotor 28B includes a rotor body 30B having four vanes 36B, each of which includes a pumping face 58B. The vanes 36B are mounted on a generally frusto-conical shaped vane ring 34B. Rotor bodies 30B of this type are generally used in pulping operations where the consistency of the pulp stock is between 5% and 8% solids.

A feed screw 40B is mounted to the central portion of the rotor body 30B and includes screw flights 50B, 52B which intertwine about the conical body 42B and terminate immediately adjacent the vane roots 48B. Each of the trailing portions 54B of the screw flights 50B, 52B taper in width in a manner similar to that of the embodiment of Figure 4 and terminate at a point 64B on the base 48B of the conical body 42B.

Since the base 46B and points 64B are located immediately adjacent the vane roots 48B, the outer edges 66 of the trailing portions 54B combine with the upper edges 68 of the pumping faces 58B to form continuous edges therefrom. Again, while the trailing portions 54B of the screw flights 50B, 52B do not blend into the pumping faces 58B, the location of the trailing portions and the base 48B of the conical body 42B combine to provide a continuous path for the paper stock which guides the stock directly to the pumping faces 58B of the vanes 38B.

While the forms of apparatus herein described constitute preferred embodiments of the invention, it is to be understood that the invention is not limited to these precise forms of apparatus, and that changes may be made therein without departing from the scope of the invention as defined in the appended claims.

Claims

1. A rotor (28) for use in pulping paper making stock at high consistencies of the type having a rotor body (30) adapted for mounting on a vertically extending drive shaft, vane means (36, 28) attached at root portions (48) thereof to said rotor body (30) and extending generally radially outwardly therefrom, and a feed screw (40) having a conical body (42) mounted centrally of said rotor body (30) and extending upwardly therefrom, and screw flight means (50, 52) extending along said conical body (42) for guiding pulp downwardly and outwardly toward said vanes, characterised by: said conical body (42) having a base (46) with an outer periphery immediately adjacent to said root portions (48) such that pulp guided downwardly by said screw flight means (50, 52) is urged outwardly by said conical body (42) to engage said root portions (48) and be propelled by said vane means (36, 38).

2. A rotor as claimed in Claim 1, characterised in that said screw flight means (50, 52) includes trailing edge means (54) terminating adjacent said periphery of said base (46) for urging pulp downwardly and guiding pulp outwardly to said root portions (48).

3. A rotor as claimed in Claims 1 or 2, characterised in that said screw flight means (50, 52) terminates adjacent said root portions (48), thereby forming a substantially continuous guiding surface therefrom, such that accumulations of pulp on an upper surface of said rotor are reduced.

4. A rotor as claimed in Claim 3, characterised in that a trailing edge (54) of said flight means (50A, 52A) tapers in width to substantially a point (64).

5. A rotor as claimed in Claims 1 or 2, characterised in that said vane means (36) includes substantially vertically extending face means (58), said screw flight means (50, 52) includes flat underside means (56), and a trailing portion (54) of said screw flight means is contiguous with said face means (58) such that said underside means (56) and said face means (58) form substantially continuous guide surface means whereby material disposed downwardly and outwardly by said screw (40) is guided to said vane means (26, 28) along said guide surface means.

6. A rotor as claimed in any preceding claim characterised in that said conical body (42) has a rounded top (44).

7. A rotor as claimed in Claim 6, characterised in that said flight means includes leading edge means positioned adjacent said rounded top (44).

8. An apparatus for pulping paper making stock at high consistencies of the type having a tub (10) having a bottom wall (14, 16) and a cylindrical side wall (12) extending upwardly therefrom, a rotor body (30) mounted for rotation on a vertical axis in the center of said bottom wall, vane means (36, 38) extending generally radially outwardly from said rotor body at root portions (48) thereof and constructed to impel high consistency pulp stock toward said side wall, and a feed screw (40) having a conical body (42) mounted centrally of said rotor body and extending upwardly therefrom and screw flight means (50, 52) extending along said conical body (42) for guiding pulp downwardly and outwardly toward, said vanes, characterized by: said conical body (42) having a base (46) with an outer periphery immediately adjacent to said root portions (48) such that pulp guided downwardly by said screw flight means (50, 52) is urged outwardly to engage said root portions (48).
portions and be propelled by said vane means (36, 38).

Patentansprüche

1. Rotor (28) für das Zerfasern von Stoff hoher Konsistenz für die Papierherstellung der Type mit einem für die Festlegung an einer vertikal angeordneten Antriebswelle ausgebildeten Rotorkörper (30), mit an den Fußbereichen (48) des Rotorkörpers (30) ansetzenden und sich generell radial nach außen erstreckenden Schaufelelementen (36, 38), und einer Zuführschnur (40) mit einem mittig des Rotorkörpers (30) angeordneten und sich nach oben erstreckenden konischen Körper (42), und Schneckenwindungen (50, 52) entlang dieses konischen Körpers (42) für das Fördern und Leiten des Papierstoffs nach unten und nach außen zu den Schaufelelementen, dadurch gekennzeichnet, daß der konische Körper (42) eine Basis (46) aufweist, deren äußerer Umfang unmittelbar an die Fußbereiche (48) angrenzt, derart, daß der durch die Schneckenwindungen (50, 52) nach unten geführte Papierstoff durch diesen konischen Körper (42) nach außen gedrängt, von den Fußbereichen (48) erfaßt, und von den Schaufelelementen (36, 38) vorwärtsbewegt wird.

2. Rotor nach Anspruch 1, dadurch gekennzeichnet, daß die Schneckenwindungen (50, 52) Ausrücksstaken (54) einschließen die vorn dem Umfang der Basis (46) enden, die den Papierstoff nach unten drängen und nach außen zu den Fußbereichen (40) leiten.

3. Rotor nach Anspruch 1 oder 2, dadurch gekennzeichnet, daß die Schneckenwindungen (50, 52) nächst der Fußbereiche (48) enden, wobei eine im wesentlichen kontinuierliche Führungsfäche mit diesen ausgebildet wird, darst, daß die Lösungen von Papierstoff an einer oberen Fläche des Rotors reduziert werden.

4. Rotor nach Anspruch 1, dadurch gekennzeichnet, daß eine Ausrücksstake (54) der Schneckenwindungen (50A, 52A) sich im wesentlichen zu einer Spitze (64) verbügelt.

5. Rotor nach Anspruch 1 oder 2, dadurch gekennzeichnet, daß die Schaufelelemente (38) im wesentlich vertikal sich erstreckende Flächen (58) aufweisen, die Schneckenwindungen (50, 52) flache Unterseiten (59) einschließen, und eine hinderte Rothe (54) dieser Schneckenkörpers angrenzend den Flächen (58) darst zu liegen kommt, daß die Unterseiten (59) und die Flächen (58) eine weitgehend durchgehende Führungsfäche ausbilden, wobei das durch diese Schnecke (40) nach unten und nach außen verdrehte Material entlang dieser Führungsfäche zu den Schaufelelementen (36, 38) geleitet wird.

6. Rotor nach einem der vorstehenden Ansprüchen, dadurch gekennzeichnet, daß der konische Körper (42) ein abgerundetes Kopfende (44) aufweist.

7. Rotor nach Anspruch 6, dadurch gekennzeichnet, daß die Schneckenwindungen eine Eintrittskante in Position angrenzend dem Kopfende (44) aufweist.

8. Apparat für das Zerfasern von Stoff hoher Konsistenz für die Papierherstellung der Type mit einer aus Bodenwandung (14, 16) und einer von dieser sich nach oben erstreckenden Seitenwandung (12) bestehenden Wanne (10), einen durch Drehung auf einer vertikalen Achse mittig der Bodenwandung angeordneten Rotorkörper (30) vom Rotorkörper (30) an dessen Fußbereichen (48) generell radial sich nach außen erstreckenden Schaufelelementen (36, 38) und konstruktiv ausgelegt, Ganzstoff hoher Konsistenz zur Seitenwandung hin zu treiben, und einer Zuführschnur (40) mit einem mittig des Rotorkörpers angeordneten und sich nach oben erstreckenden konischen Körper (42), und Schneckenwindungen (50, 52) für die Förderung des Papierstoffs nach unten und nach außen zu den Schaufelelementen (36, 38) hin, dadurch gekennzeichnet, daß der konische Körper (42) eine Basis (46) aufweist, deren äußerer Umfang unmittelbar an die Fußbereiche (48) angrenzt, derart, daß der durch die Schneckenwindungen (50, 52) nach unten geführte Papierstoff durch diesen konischen Körper (42) nach außen gedrängt, von den Fußbereichen (48) erfaßt, und von den Schaufelelementen (36, 38) vorwärtsbewegt wird.

Revendications

1. Rotor (28) destiné à être utilisé pour réduire en pâte de consistance élevée un matériau pour faire du papier, du type ayant un corps de rotor (30) adapté à être monté sur un arbre d’entraînement s’étendant verticalement, des aubes (36, 38) attachées audit corps de rotor (30) sur des portions de base (48) de celui-ci et s’étendant généralement radialement à l’extérieur à partir de celui-ci, une vis d’alimentation (40) ayant un corps conique (42) monté au centre dudit corps (30) de rotor et s’étendant vers le haut à partir de celui-ci et une averse de convoyer (50, 52) s’étendant le long dudit corps conique (42) pour guider la pâte vers le bas et vers l’extérieur en direction des aubes aubes, caractérisé par le fait que le corps conique (42) a une base (46) ayant une périphérie extérieure immédiatement adjacent aux aubes de base (48) de sorte que la pâte guidée vers le bas par ladite averse de convoyer (50, 52) est poussée vers l’extérieur par ledit corps conique (42) pour s’engager dans les aubes de base (48) et être propulsée par les aubes aubes (36, 38).

2. Rotor selon la revendication 1, caractérisé en ce que ladite averse de convoyer (50, 52) comporte un bord de fuite (54) qui se termine en contiguity de ladite périphérie de ladite base (46) pour pousser la pâte à papier vers le bas et pour guider la pâte à papier vers l’extérieur en direction des aubes de base (48).

3. Rotor selon la revendication 1 ou 2, caractérisé en ce que ladite averse de convoyer (50, 52) se termine en contiguity des aubes de base (48), formant ainsi une surface de guidage sensiblement continue avec elles de sorte que des accumulation de pâte sur une surface supérieure dudit rotor sont réduites.
4. Rotor selon la revendication 3, caractérisé en ce que un bord de fuite (54) de ladite spire convoyeuse (50A, 52A) diminue en largeur jusqu'à être réduit sensiblement à un point (64).

5. Rotor selon la revendication 1 ou 2, caractérisé en ce que lesdites aubes (38) comportent une face (58) s'étendant sensiblement verticalement en ce que ladite spire convoyeuse (50, 52) comporte un dessous plat (56) et en ce qu'une portion de fuite (54) de ladite spire convoyeuse est contiguë à ladite face (58) de sorte que ledit dessous (56) et ladite face (58) forment une surface de guidage sensiblement continue, le matériau déplacé vers le bas et vers l'extérieur par ladite vis (40) étant guidé vers lesdites aubes (26, 28) le long de ladite surface de guidage.

6. Rotor selon une des revendications précédentes caractérisé en ce que ledit corps conique (42) a une tête arrondie (44).

7. Rotor selon la revendication 6, caractérisé en ce que ladite spire convoyeuse comporte un bord d'attaque disposé en contiguité de ladite tête arrondie (44).

8. Appareil pour réduire en pâte de consistance élevée un matériau pour faire du papier, du type comportant un bac (10) ayant une paroi de fond (14, 16) et une paroi latérale cylindrique s'étendant vers le haut à partir de la paroi de fond, un corps de rotor (30) monté pour tourner autour d'un axe vertical au centre de ladite paroi de fond, des aubes (36, 38) s'étendant généralement radialement vers l'extérieur à partir du dudit corps de rotor sur des portions de base (48) de celui-ci et construit de façon à pousser le matériau de pâte de consistance élevée vers ladite paroi latérale, et une vis d'alimentation (40) ayant un corps conique (42) monté au centre dudit corps de rotor et s'étendant vers le haut à partir de celui-ci et une spire convoyeuse (50, 52) s'étendant le long dudit corps conique (42) pour guider la pâte vers le bas et vers l'extérieur en direction desdites aubes, caractérisé par le fait que ledit corps conique (42) a une base (46) dont la périphérie extérieure est immédiatement contiguë auxdites portions de base (48) de sorte que la pâte guidée vers le bas par ladite spire convoyeuse (50, 52) est guidée vers l'extérieur pour s'engager dans lesdites portions de base et être propulsée par lesdites aubes (36, 38).