

Oct. 30, 1962

C. W. E. WALKER
STOCK FLOW DISTRIBUTOR

3,061,008

Filed May 18, 1959

3 Sheets-Sheet 1

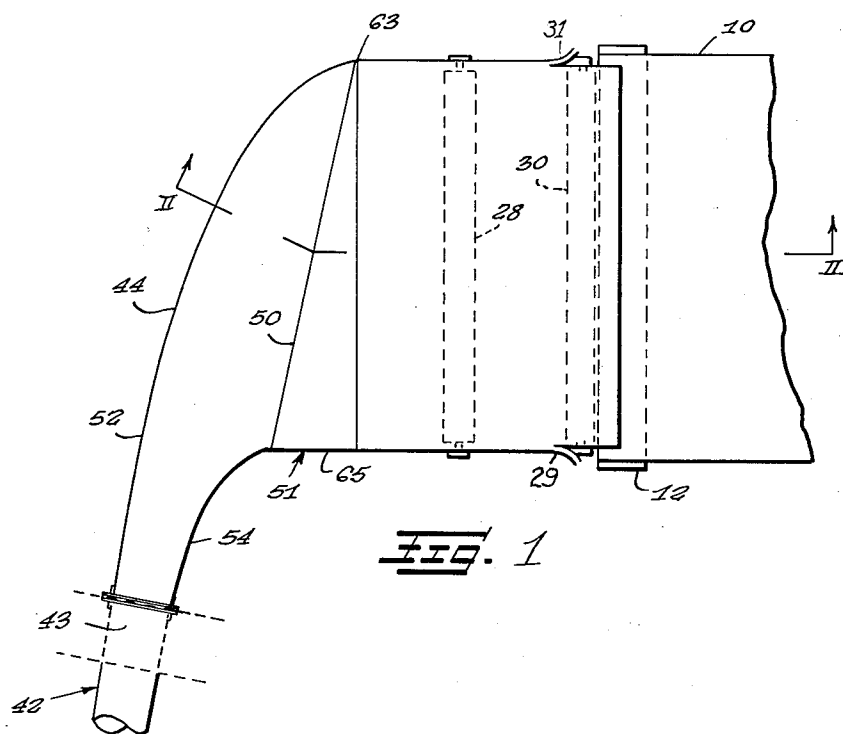


FIG. 1

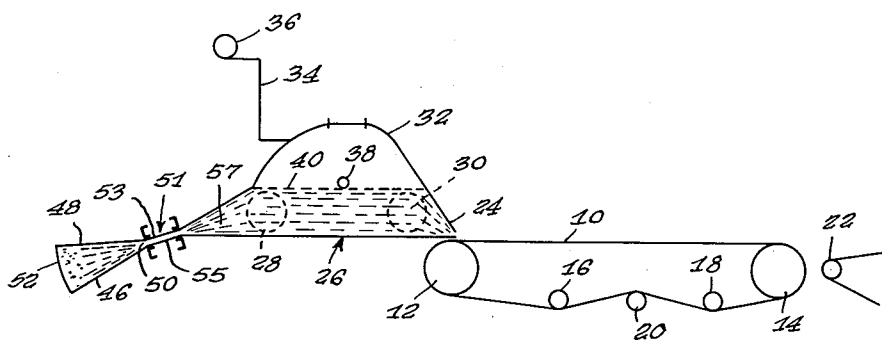


FIG. 2

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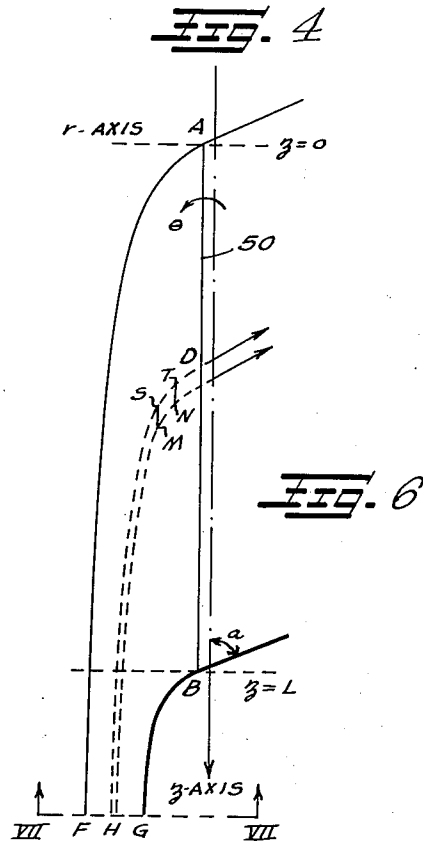
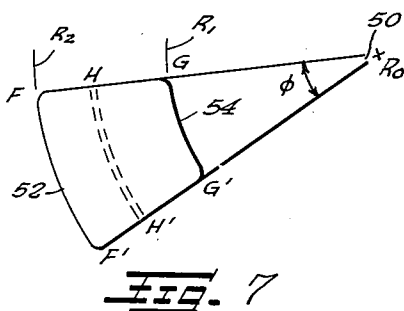
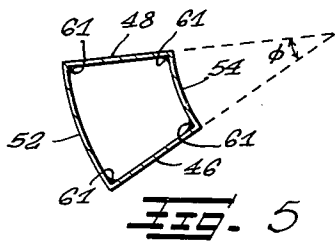
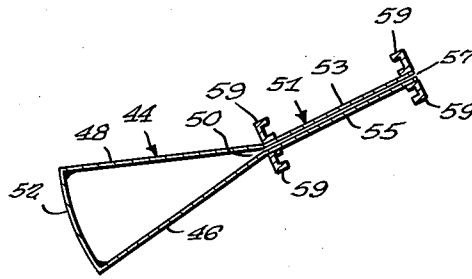
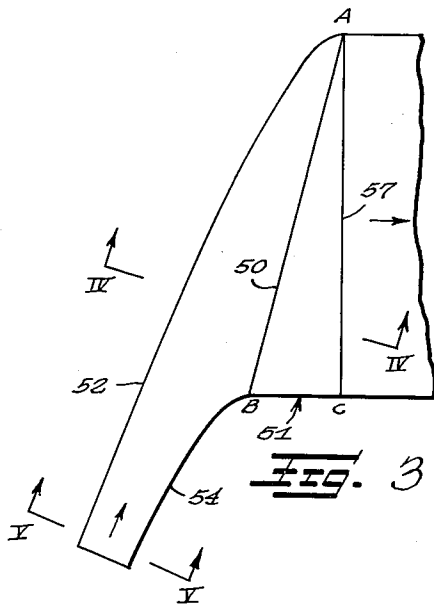
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STOCK FLOW DISTRIBUTOR

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3 Sheets-Sheet 2



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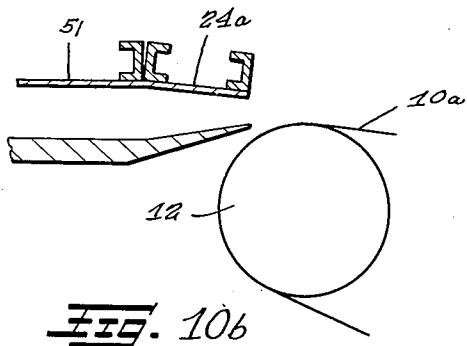
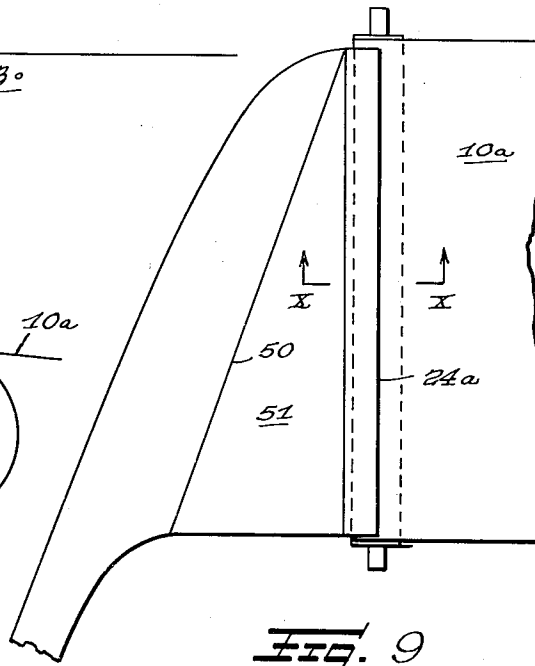
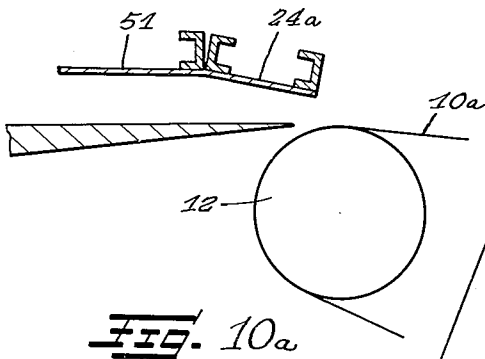
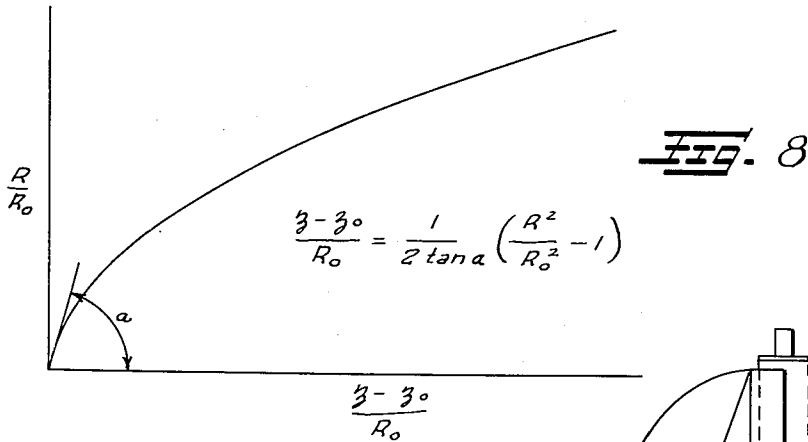
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C. W. E. WALKER
STOCK FLOW DISTRIBUTOR

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3 Sheets-Sheet 3



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3,061,008

STOCK FLOW DISTRIBUTOR

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11 Claims. (Cl. 162—338)

This invention relates generally to improvements providing uniformly distributed and directed flow in fluid systems and is particularly adapted to desirable uniform distribution in stock feed apparatus for paper making machines, and more particularly to an improved method and apparatus for controlling the flow of paper making stock to obtain completely uniform flow velocity across a flow area with an absence of lateral flow components to insure uniform flow conditions and fiber distribution across the entire width of a forming surface of a paper machine.

According to the present invention, the paper stock is fed directly or by a feeder onto a paper forming surface, such as in a Fourdrinier or cylinder type machine from a supply chamber or feed box. A supply of flowing stock is received from a stock supply conduit. Between the feeder and supply conduit is located a distributor which controls the flow velocity, flow rate and flow direction in such a manner as to obtain a flow stream for the feeder which has a uniform flow velocity over the width of the stream, has uniform quantity flow rate across the stream, and maintains flow with an absence of lateral velocity components across the flow to introduce the stock to the feeder for improved deposit on the forming surface. With these uniform flow conditions, an even fiber deposition occurs across the entire width of the paper making machine forming surface to obtain improved operation, and improved paper quality.

A feature of the machine is the provision of a distributor of the above described type which restricts the flow stream in a tapering wedge-shaped sector directing it through an arc toward the slot in a path, with the arc being formed by the curved back of the sector with the back having a curvature with the proper attenuation to obtain desirable flow velocities of the stock and control the velocities and accelerations throughout the cross-sectional area of the stream so that the stream will flow through the slot at uniform velocities and uniform quantity rates across the entire width of the slot, and with a complete absence of lateral or cross flow components through the slot, except for desirable micro turbulence.

It is, therefore, an object of the invention to provide an improved flow distributor for handling paper stock or the like which will obtain a controlled flow stream for a paper machine in which cross flow velocities and variances in velocities throughout the stream are eliminated, so that the stock subsequently introduced onto the forming surface of the paper machine takes place at a uniform, unidirectional velocity to insure an even fiber deposition across the entire face of the machine forming surface.

Another object of the invention is to provide an improved flow distributor capable of changing the cross-sectional configuration of a flow stream from a delivery conduit to a broad, elongated, level stream required for a stock feeder while obtaining uniform, unidirectional, even flow components across the broad stream for improved stock feeding.

A further object of the invention is to provide an improved apparatus and method for transferring a paper stock flow stream from a relatively rapid flowing supply conduit to a slow flowing feeder chamber by constricting and reducing the depth of the stream and by turning the stream through an arc while controlling the flow velocities across the stream an amount to obtain uniform velocities

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and by turning the stream in a path to obtain only forward components of flow, eliminating cross flow.

An additional object of the invention is to provide an improved flow distributor in which the stock is rapidly accelerated at the same time that its flow direction is changed thereby producing a strong deflocculating action just before the stock arrives at the stock feed apparatus to produce improved fiber distribution in the discharge from the feeder onto the forming surface of the paper making machine.

Other objects and advantages will become more apparent with the teaching of the principles of the invention in connection with the disclosure of the preferred embodiment in the description and showing of the specification, claims and drawings, in which:

FIGURE 1 is a plan view of a portion of a paper making machine embodying the principles of the present invention;

FIGURE 2 is a vertical sectional view taken along line II—II of FIGURE 1;

FIGURE 3 is a schematic plan view of a distributor employed in the apparatus of FIGURES 1 and 2;

FIGURE 4 is a schematic transverse sectional view taken substantially along line IV—IV of FIGURE 3;

FIGURE 5 is another schematic transverse sectional view taken substantially along the line V—V of FIGURE 3;

FIGURE 6 is a schematic showing in plan view of the distributor illustrating the development of the surfaces;

FIGURE 7 is a transverse sectional view in schematic form taken generally along the line VII—VII of FIGURE 6;

FIGURE 8 is a graph showing values which may be employed in determining the shape of the distributor;

FIGURE 9 is a schematic plan view of a portion of another paper making machine embodying the principles of the present invention; and

FIGURES 10a and 10b are transverse sectional views of the fluid delivery end of the distributor of the present invention, taken substantially along the line X—X of FIGURE 9.

As shown on the drawings:

FIGURES 1 and 2 illustrate paper forming mechanism and generally illustrate a Fourdrinier type of paper forming surface. A Fourdrinier wire 10 is carried on rolls 12 and 14 with additional guide rolls 16 and 18, and a tensioning roll 20. The paper web is removed from the wire 10 by a take off mechanism 22 and delivered to further paper treating mechanisms, such as presses, driers and the like, as will be appreciated by those skilled in the art.

The paper stock is deposited on the wire 10 by a feeder 24 in a uniform layer with the feeder being supplied with stock from a feeder chamber or head box 26.

The feeder chamber for the stock is illustrated as provided with rectifier rolls 28 and 30 which are driven in rotation by a suitable mechanism, not shown. The rectifier rolls agitate the stock in the direction of flow to reduce flocculation and act in a manner known to those skilled in the art. The feeder chamber is illustrated as being provided with an enlarged dome 32 forming an air chamber therein supplied with air through an air line 34 from an air pump 36. A level control 38 controls the air content in the dome 32 and controls the level of the upper surface 40 of the flowing stock in the feeder chamber 26.

As illustrated in FIGURE 1, the stock is supplied to the machine by a stock conduit 42. This conduit may be rectangular or circular in shape and supplies the stock at a rate of flow sufficient to keep the feeder chamber 26 supplied.

From the supply conduit 42 the stock is flowed through

a transformation member 43. This transformation member is required only to smoothly convert the cross-sectional shape from the square, rectangular or circular to the special shape of the distributor 44 which is best shown in FIGURE 5. In accordance with well understood hydraulic principles it is desirable that this transformation provide a small acceleration of the fluid. From the transformation member 43 the fluid is flowed smoothly into the distributor 44. The sector-shaped cross-section of the distributor 44 is terminated in a slot 50. To the slot 50 is joined a triangular section composed of upper 53 and lower 55 flat parallel plates forming a nozzle delivery section which conveys the flowing stock to an expanding channel 57 forming a part of the feeder chamber 26. This expanding channel permits the deceleration of the flowing stock thereby promoting a redistribution of the fiber content of the stock. In accordance with the principles of the present invention, the distributor changes the shape of the flow stream of stock and controls its flow and velocity to obtain a flow stream of the shape required to maintain uniform flow rate across the feeder chamber, and to eliminate cross-currents or lateral components of flow velocity.

The distributor 44 is formed in the shape of a sector and is illustrated with a lower flow confining wall 46 and an upper flow confining wall 48. These walls have flat smooth planar inner surfaces which taper toward each other to terminate section 51 (FIGURES 1, 2 and 3) consisting of upper 53 and lower 55 flat parallel plates which transmit flow to the feeder chamber 26 without changing the flow velocity or direction from that existing along the slot 50.

The upper wall 48 is preferably inclined upwardly to prevent the accumulation of air bubbles in the stock stream. Walls 46 and 48 which form the stream into a wedge-shaped flow sector are bounded by a curved back face or wall 52 to complete the sector. An incoming curved front face or wall 54 leads to the sector. These walls are shaped to guide the flow stream as it widens or broadens to the width of the slot 50 so that the velocities across the stream will be controlled to obtain equal velocities as the stream enters the slot 50. This is obtained by correct attenuation of the curved back wall 52 with respect to the front wall 54. The shape of the walls 52 and 54 is such that as the liquid turns through an arcuate path to enter the slot 50, the velocities along the slot will be parallel to the stream, and cross-velocities or lateral components of velocity will be eliminated.

In a preferred form of the shape of the distributor, the flow stream is controlled by the method of restriction and by walls having a shape in accordance with the relationship to be described.

The function of the triangular section 51 is simply to join the sector-shaped portion of the distributor 44 to the feeder chamber 26 and to carry the flow from the slot 50 to the chamber 26 without change of flow velocity or direction.

Referring now in FIGURES 3, 4 and 5, it will be observed that the line AB which is taken along the slot 50 is shown at an angle with the direction of flow issuing through the delivery outlet 57, shown along the line AC. The triangular-shaped member 51 is shown, in FIGURE 4, to be constructed of an upper flat plate 53 and a lower flat plate 55. These flat boundaries define a flow channel which receives the stock issuing from the slot 50 of distributor 44 in order that the direction of stock flow be precisely perpendicular to the width dimension of the paper machine forming surface. Typical stiffening members 59 are shown as structural support for the members 53 and 55.

The distributor is constructed by choosing a sector-shaped cross-section with the correct attenuation of the sector radius along the length of the distributor, as determined by the shape of the front and back walls 54 and 52, respectively. In its broadest sense, the stock flow dis-

tributor for the paper machine is required to accept stock flowing in a pipe of unspecified cross-section, but approximately as broad as wide (i.e. at least generally circular or square). The function of the distributor is to distribute is to distribute the flowing stock evenly across the full width of the paper machine which is of substantial width. Such machines at present are as wide as 30 feet. The flow quantity and velocity must be constant across the width and be uniformly and precisely directed at right angles to the machine width.

This will happen in the distributor 44 if there is no pressure gradient in the fluid along, or parallel to, the length of the slot 50 and therefore no change of momentum or velocity in this direction and if the velocity component at equal angles to the opening slot is everywhere independent of position along the slot. Considering the fluid flow paths through the distributor, they must all be of the same shape and have the same orientation relative to the slot.

In directions lying in a plane normal to the length direction of the slot, a sector-shaped cross-section can meet these velocity and path requirements and at the same time provide the conditions which satisfy both the mass continuity requirements of an incompressible fluid and the acceleration requirements of Newton's second law of motion. For the preliminary explanation, it is generally assumed that an ideal fluid is used without wall friction and viscosity and the effects of gravity are not considered.

With a sector-shaped cross-section, the distributor is best considered in a cylindrical coordinate system, as in FIGURE 6 in which the z axis lies parallel to the length of the length of the slot 50, the θ plane perpendicular thereto.

To meet the velocity and path requirements stated above, neighboring flow paths such as MN and ST must have constant spacing in the z direction so that $MS=NT=dz$ and each must lie wholly with an $r-z$ plane. These paths may be repeated through the sector angle ϕ by rotation of the whole paths around the z axis. Lines MS and NT will then sweep out areas $r\phi dz$ and $(r+dr)\phi dz$ respectively which will be successive cross-sections, normal to the radial direction, of an incremental flow tube. If h is the outward radial velocity component at a distance r from the z axis and is independent of the θ coordinate, mass continuity for an incompressible fluid within the sector requires that:

$$r\phi dz h = (r+dr)\phi dz (h+dh)$$

Therefore:

$$rh = \text{a constant}$$

and if w is the constant velocity component in the z direction

$$rh = Kw \quad (1)$$

where K is a constant, and since

$$\frac{dz}{dr} = \frac{w}{h}$$

Therefore:

$$r^2 = 2Kz + C \quad (2)$$

where C is a constant. This is the equation of every flow path through the distributor and therefore also the equation for the radii of the circumferential walls 52 and 54 of the distributor, represented by curves AF and BG in FIGURE 6.

With the distributor slot 50 at AB parallel to the z axis and a distance R_0 from it, where $R_0\phi$ is the depth of the slot, if L is its length and α the angle at which the fluid issues from the slot 50 then the equations for the radii R_1 and R_2 of the inner and outer circumferential walls become:

$$\frac{z - z_0}{R_0} = \frac{1}{2 \tan \alpha} \left(\frac{R^2}{R_0^2} - 1 \right) \quad (3)$$

when for inner wall 54

$$z=L; R=R_1$$

and for outer wall 52

$$z=0; R=R_2$$

The graph (FIGURE 8) gives a plot of Equation 3 for the dimensionless quantities

$$\frac{R}{R_0}$$

against

$$\frac{z-z_0}{R_0}$$

This may be used in the determination of the distributor shape. It will be noted that these curves are independent of flow velocity. The momentum requirements in the z direction are met because w is constant and pressure P is independent of z . In the radial direction Newton's second law of motion requires that:

$$-dP(r\phi dz) = \frac{d}{dt}(mh) = m \frac{dh}{dt}$$

where m is the mass of volume, $r\phi dz dr$, of fluid. If ρ is its density and since:

$$\frac{dr}{dt} = h$$

Therefore:

$$-dP = \rho h dh \quad (4)$$

This is in conformity with the energy requirements as expressed by Bernoulli's law by which

$$\frac{1}{2}\rho(w^2 + h^2) + P = \text{a constant}$$

Differentiating this for $w = \text{a constant}$ yields Equation 4.

Further analysis of the equations shows that the issuing flow velocity at the slot 50 is

$$\sqrt{w^2 + h^2} = w \sec a \quad (5)$$

and that there is therefor an acceleration of $\sec a$ in passing through the distributor which is coincident with this change of flow direction a . The form of the flow paths as shown in FIGURE 6 shows that the greater part of this acceleration and turning takes place within a short distance immediately before reaching the slot 50. A most important effect of this is in its deflocculating action on paper making stock of which full advantage is taken in the system illustrated in FIGURES 9, 10a and 10b in which the feeder 24a which feeds the stock onto the wire 10a is located only a short distance from the distributor slot 50 so that there is little time for the stock to reflocculate.

Another result arising from the acceleration and turning being mostly close to the slot 50 is that the ideally original input velocity and direction is nearly constant over the input cross-section FG (FIGURE 7) from the conduit 42, or put another way, uniform entering velocity over FG will result in only minimal disturbance in the distributor and only slight non-uniformity at the outlet slot.

The disturbing effects of wall friction can be seen by considering the flow paths through the distributor in conjunction with FIGURES 6 and 7. It will be noted that if the flow is laminar, flow streams through the distributor can be considered almost infinitely small but if small scale turbulence exists, which is more likely to be the case, they must be considered to have the same lateral dimensions as the scale of the turbulence. It is seen that the fluid stream which passes through the slot 50 at $z=0$ travels along the back face AF of the distributor (FIGURE 6), where it spreads over the whole face from F to F' (FIGURE 7). Similarly the stream leaving at $z=L$ flows along the inner face BG (FIGURE 6) and spreads over GG' (FIGURE 7). These two

streams therefore experience a considerable amount of wall friction, whereas all the remaining fluid streams take paths such as shown at DH in FIGURE 6 and HH' in FIGURE 7, following the same curve as given in FIGURE 8.

Thus a stream which leaves the sector-shaped portion 44 of the distributor over an area $R_0\phi dz$ of the slot 50 enters the distributor over HH' having an area of $r\phi dr$ such that $r\phi dr = R_0\phi dz$ and, except in the case of boundary streams along AF or BG, only contacts the distributor walls over the small width $2dr$; furthermore, the wall area contacted over the latter part of each stream is the same for all streams.

Apart from the triangular section 51, wall friction will, therefore, mainly have a disturbing effect on the fluid flowing out at the extreme ends of the slot at $z=0$ and $z=L$ which in a paper machine can be diverted either to the wire pit or otherwise back into the stock system, as is shown with the flow from the edges of the machine at 29 and 31 in FIGURE 1.

In the triangular section 51 (FIGURE 3) flow is between parallel plates in which the head loss due to friction and viscosity may be calculated by standard engineering formulae. Due to the small depth and higher flow velocity this loss is relatively greater than in other parts of the distributor, and since it is directly proportional to the length of the flow path through this section, is greater near C than A (FIGURE 3), the maximum difference being between flow paths leaving at C and at A. This difference can, however, be made as small as desired by increasing the depth of slot 50 and with it the depth of the triangular section 51.

Referring again to FIGURES 3 and 4, the upper flat triangular plate 53 and the lower flat triangular plate 55 form the parallel boundaries of a part of the distributor adapted to bring the issuing stock velocities into precise parallelism with the direction of movement of the paper making forming surface. Under conditions permitting a satisfactory depth of stock stream, as for example approximately 1 inch or more, it is found desirable to remove the top plate 53 entirely permitting the issuing stock to flow only on the lower plate 55. This has the effect of reducing the head loss previously mentioned by approximately half.

The only other assumption made was that the effect of gravity could be neglected. Its effect will be to produce small differences of pressure and hence small velocity differences throughout the distributor, but these will not exceed the differences which exist in the entering pipe which are only of the order of one equivalent pipe diameter of the fluid handled. With paper making stock, this is approximately 1 inch Hg.

Obviously the approach to the distributor inlet must not contain large scale turbulence. The required shape for the inlet could be approached by gradual transition from a round or rectangular pipe and thence to the required portion of a sector. This transition, as mentioned previously, preferably should be from 5 to 10 equivalent diameters of the flow channel and should provide for a small amount of fluid acceleration. This gradual change should only produce small scale turbulence. Sharp corners could be avoided here and throughout the distributor by rounding off as indicated in FIGURE 5. This again would produce only small scale disturbance which would quickly die out.

Collection of air in the distributor may be avoided by having the top side 48 slope upwardly with respect to the horizontal.

It will be apparent that this distributor could feed directly to a slice or sheet former. Alternatively it might feed through a chamber in which some fine scale turbulence is introduced as shown in FIGURES 1 and 2, to reduce flocculation.

It will not be noted that the basic design formula for the sector-shaped distributor, Equation 3, does not con-

tain the stock velocity, stock volume flow or any other operating variable. The design is specific only to machine width.

For simplicity, the two parts 44 and 51 of the apparatus have been described separately. It may be observed, however, that the sector or wedge-shaped member 44, and the flat channel triangular member 51 actually constitute a functional unit (although in normal practice would be manufactured as separate units to be joined in the erection of the paper machine feeder). Thus, the curvate wall member 52 is extended slightly, if at all, straight and tangent to form the end wall 63 of channel 51, while curvate wall member 54 is extended straight and tangent to form end wall member 65 of said channel.

From the foregoing, it is now clear that fluid delivered to the distributor preferably and necessarily is delivered to the distributor from a conduit or channel which is posed laterally beyond the length limits of the slot 50. The description sets forth a particular shape for a fluid distributor apparatus which depends only upon the shape of the outer containing walls for the desired control of flow quantity and velocity components. As discussed above, the angle α is related to the ratio of acceleration through the distributor in accordance with Equation 5. The foregoing considerations make it apparent that the angle α may range from something less than 90° to 45° or less. For the experimental work done to date, acceleration of approximately 4 to 1 was chosen arbitrarily resulting in a value of the angle α of 76° .

Head loss through the distributor will be small because the whole distributor represents only a short unobstructed flow distance through a relatively large channel.

From the point of view of construction it is noted that the back and front faces are complex shapes, with different curvatures at right angles, but that they are universal shapes dependent only on R_0 so that it is necessary only to cut off the required lengths and widths from a standard pattern.

Thus, it will be seen that I have provided an improved paper making machine having a flow distributor which meets the objectives and advantages above set forth. Flow velocity and quantity is effectively controlled with the device which is not expensive in manufacture, and which provides the advantages stated above.

I have, in the drawings and specification, presented a detailed disclosure of the preferred embodiments of my invention, and it is to be understood that I do not intend to limit the invention to the specific forms disclosed, but intend to cover all modifications, changes and alternative constructions and methods falling within the scope of the principles taught by my invention.

I claim as my invention:

1. A stock distributor for a paper machine controlling flow between a supply conduit and a feeder and comprising upper and lower sector defining walls tapering together in the direction of flow and defining a sector and terminating in an outlet slot of substantially uniform width, a curvate back wall facing the slot and leading from a lateral supply conduit to the far end of the slot, and a curvate incoming front wall leading to the near end of the slot, said front wall shaped substantially in accordance with the relationship

$$\frac{z-L}{R_0} = \frac{1}{2 \tan \alpha} \left(\frac{R_1^2}{R_0^2} - 1 \right)$$

and said back wall shaped substantially in accordance with the relationship

$$\frac{z}{R_0} = \frac{1}{2 \tan \alpha} \left(\frac{R_2^2}{R_0^2} - 1 \right)$$

wherein:

L = the length of the slot for the back wall and is equal to zero for the front wall
 z = coordinate of slot length
 R_0 = sector radius at the slot
 R_1 = sector radius at the front wall
 R_2 = sector radius at the back wall
 α = the angle between the issuing flow direction and the slot.

2. A stock feed system for a paper machine for supplying a flow of paper stock with an absence of velocity gradient across the machine comprising a horizontal longitudinally extending feeding means defining an opening for depositing liquid paper stock onto a forming member for a paper making machine, a supply conduit positioned to supply a flow of stock, and a flow distributor having chamber forming walls defining an inlet connected to said supply conduit and an outlet defining a slot leading to said feeding means, said walls including a flat upwardly tapered lower wall, a flat upper wall tapering toward said lower wall with said upper and lower walls terminating at said slot and defining a sector-shaped distributor chamber with the inner end of the sector formed by said slot, an inner wall at one side of the slot, and a curved outer wall extending across the slot and defining the outer limit of said sector and curved inwardly from said supply conduit to said slot to attenuate the sector radius along the length of the distributor and direct flow to said slot with substantially equal velocity and flow rate across the slot.

3. A stock distributor for a paper machine controlling flow from a supply conduit to a feeder and comprising upper and lower sector defining walls tapering toward each other in the direction of flow and defining a sector terminating in an outlet slot of uniform width, an arcuate back wall facing the slot and leading to the far end of the slot from a lateral inlet end, an arcuate incoming front wall leading to the near end of the slot from said lateral inlet end, and means defining a flat passageway triangular in shape connected to said slot and opening in a second slot from which flow is at right angles.

4. A stock feed system for a paper machine for supplying a flow of paper stock with an absence of velocity gradient across the machine comprising a supply line for carrying liquid paper making stock, a flow chamber for receiving the stock in uniform flow conditions, and a distributor chamber positioned to receive the stock from the supply line and having upper and lower enclosing walls defining a sector-shaped chamber with curved side walls shaped to distribute the flow from the supply line to obtain an equal flow across the width of said receiving chamber.

5. A stock feed system for a paper machine for improved paper manufacture comprising conduit means for supplying a continual flow of liquid paper stock, a broad horizontally extending feeder for depositing a layer of stock to form a paper web, a stock flow distributor connected between the conduit means and feeder and having curved walls to turn the full flow laterally through a turn from the conduit means to the feeder and obtain a substantially zero velocity gradient of the stock flow over the cross-sectional area of the feeder.

6. In a stock inlet for a paper making machine, the combination comprising a horizontal longitudinally extending feeding means defining an opening for depositing stock onto a forming member for a paper making machine, a supply conduit positioned to direct a flow of stock to said opening, and a flow distributor connected between the conduit and said feeding means having opposed upper and lower planar stock confining walls tapered toward each other and joining opposed curved lateral walls with said opposed lateral walls coacting to direct the flow to the feeding means in a flow having an absence of lateral velocity and having uniform velocity

and quantity of flow toward the feeding means at all locations in the feeding means.

7. A stock feed system for a paper machine for improved paper manufacture comprising a conduit means for supplying a continual flow of liquid paper stock, a broad horizontally extending feeder for depositing a layer of stock to form a paper web, a stock flow chamber extending from said conduit means and widening to form said feeder with side walls curved to control flow velocity and obtain substantially constant velocity over the width of the feeder, and an upper confining wall for said flow chamber slanting upwardly in the direction of flow to guide the flow and prevent the formation of air pockets in the stock as it approaches the feeder.

8. A stock feed mechanism for a paper machine having a horizontally extending movable paper forming surface comprising an elongated horizontally extending feeder positioned to deposit a layer of stock on a forming surface to form a paper web, a horizontal broad stock flow chamber extending for substantially the width of the feeder and connected to supply said feeder, conduit means for supplying a flow stream of stock and positioned laterally of the stock flow chamber, and a distributor extending from the conduit to the chamber and turning the flow gradually through a horizontal arc to guide and broaden the flow stream from the conduit at the side of the chamber across the entire width of the chamber and into the chamber.

9. A stock feed system for a paper machine for improved paper manufacture having a paper forming surface extending horizontally and adapted to receive a thin layer of paper stock, comprising a feeder slot extending across the forming surface and positioned to deposit the thin layer of paper stock on the forming surface, a horizontal flow chamber leading to said feeder slot and opening to the slot at its forward end, and a supply distributor connected to the rear end of the flow chamber and turning through a horizontal arc and having a single inlet positioned laterally of the supply chamber to connect to a supply conduit.

10. A stock feed mechanism for a paper machine having a moving paper forming surface comprising an elongated stock feeder slot for supplying paper stock to a forming surface, a broad horizontal stock chamber supplying said slot, and a single supply distributor for the

chamber having an inlet opening horizontally and lateral of said chamber and turning through an arc to guide a stock flow stream from said laterally opening inlet to turn and flow longitudinally into the chamber.

11. A stock feed system for a paper machine for supplying a flow of paper stock with uniform quantity and velocity distribution across the machine comprising longitudinally extending feeding means defining an opening for depositing liquid paper stock onto a forming member for a paper making machine, a supply conduit positioned to supply a flow of stock, a flow distributor having chamber forming walls defining an inlet connected to said supply conduit and an outlet defining a slot leading to said feeding means, said walls including a planar first wall, a planar second wall converging toward said first wall with said first and second walls terminating at said slot and defining a sector-shaped distributor chamber with the inner end of the sector formed by said slot, means enclosing a channel having the same width and depth as said slot for conducting the flow of stock from said flow distributor into said feeder, said channel enclosing means comprising a third wall member at one side of said slot, and a curvate outer wall extending across the slot and defining the outer limit of said sector and curved inwardly from said supply conduit to said slot to attenuate the sector radius along the length of the distributor and direct flow to said slot with substantially equal velocity and flow rate across said slot.

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