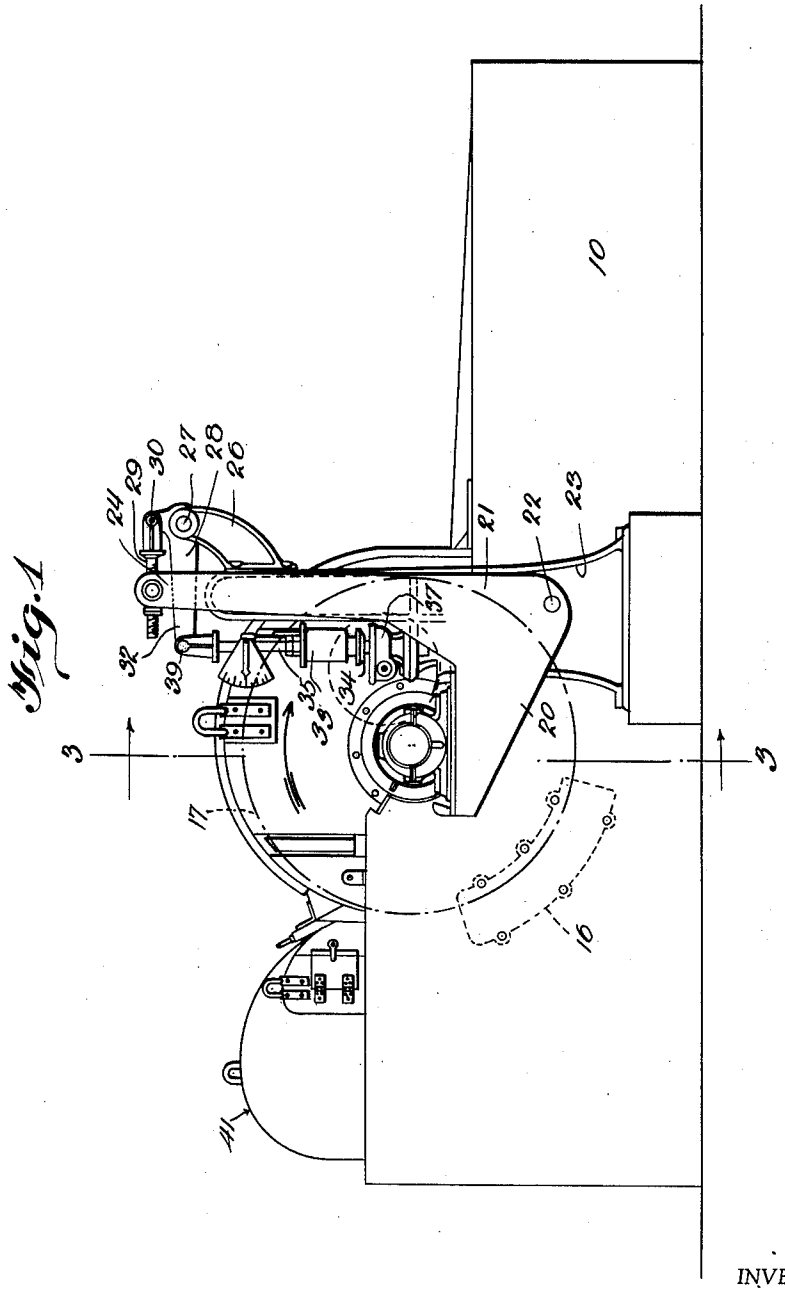
Nov. 24, 1931. W. THALER 1,832,882

APPARATUS AND METHOD FOR OPERATING ON PULP STREAMS

Filed Jan. 9, 1930 4 Sheets-Sheet 1

Fig. 1



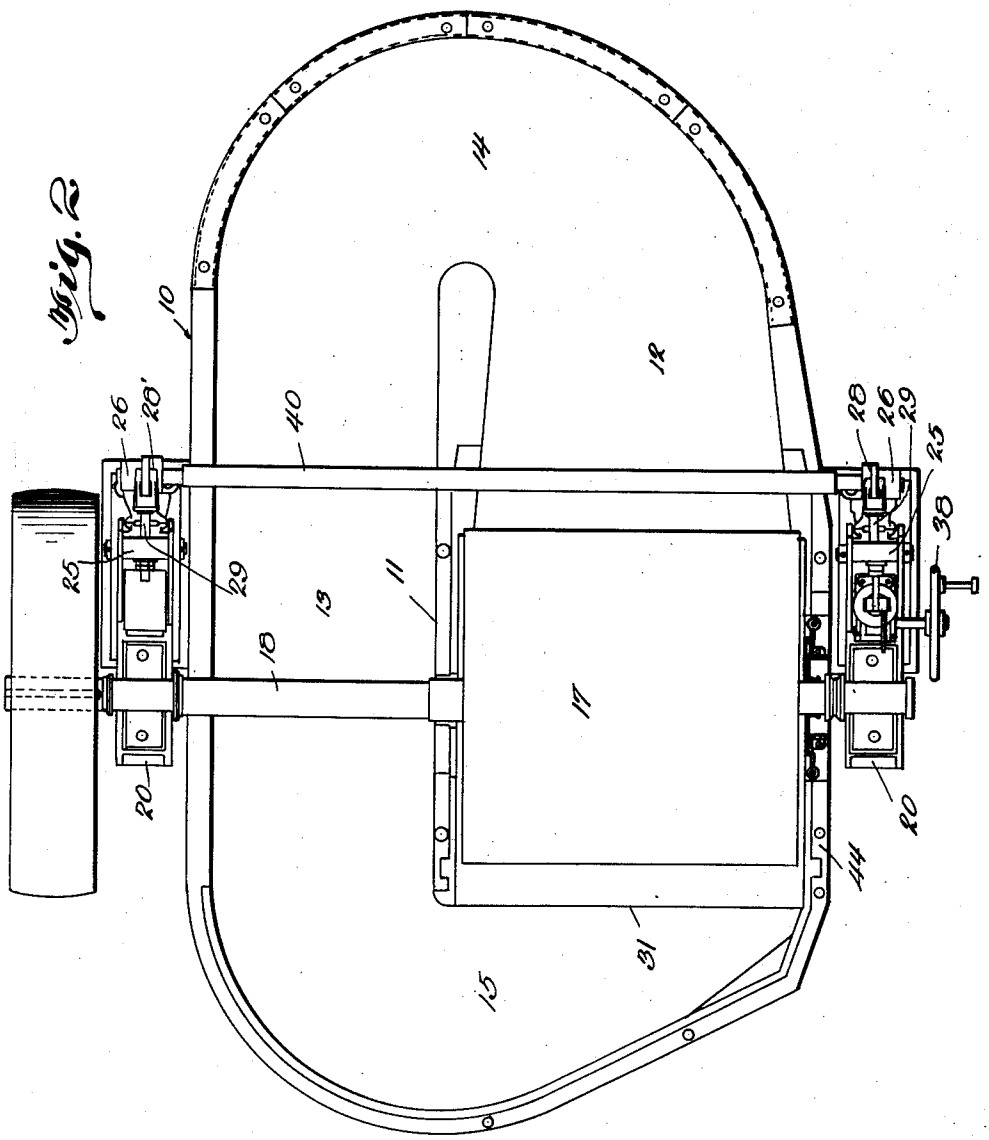
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APPARATUS AND METHOD FOR OPERATING ON PULP STREAMS

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Fig. 2



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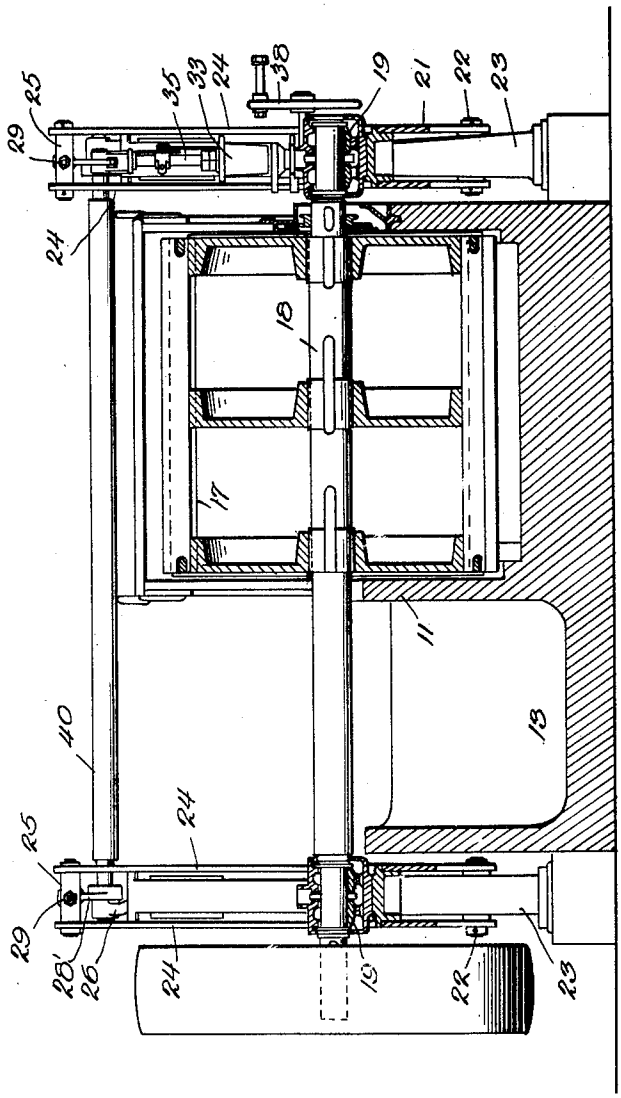
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APPARATUS AND METHOD FOR OPERATING ON PULP STREAMS

Filed Jan. 9, 1930 4 Sheets-Sheet 3

Fig. 3



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APPARATUS AND METHOD FOR OPERATING ON PULP STREAMS

Filed Jan. 9, 1930 4 Sheets-Sheet 4

Fig. 4

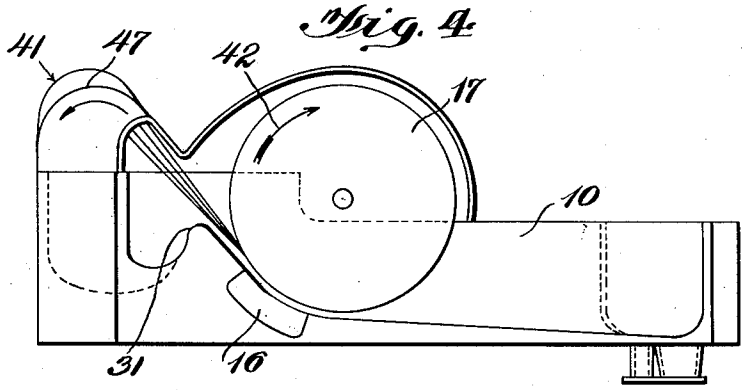
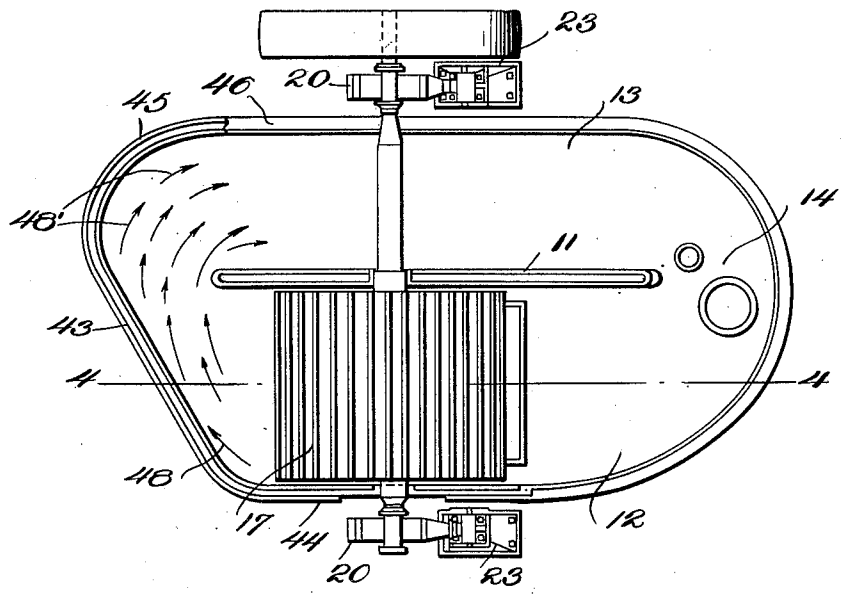


Fig. 5



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UNITED STATES PATENT OFFICE

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APPARATUS AND METHOD FOR OPERATING ON PULP STREAMS

Application filed January 9, 1930, Serial No. 419,565, and in Germany January 14, 1929.

The present invention relates to an improved apparatus and method for operating on pulp streams in the paper-making art, the invention being more particularly related to that type of apparatus involving a beat-engine for grinding, mixing and bleaching semi-finished and finished materials; and the invention has for an object the provision of an improved apparatus of this character, designed to effect a thorough and complete intermingling of the circulating pulp material and to reduce the same uniformly to a proper consistency in a less period of time than is required to accomplish the same or similar results by the apparatus and methods hitherto employed in the paper-making industry.

The invention has for an important object the provision of a construction whereby all the fibers or fiber bundles within the pulp stream will be completely turned against each other during each circulatory flow of the pulp stream around the vat, the improvements relating to a special end hood formation in conjunction with the discharging end of the head channel and the receiving end of the return channel, and to a tangential upstanding neck which coacts with the grinding cylinder to throw the pulp stream upwardly and outwardly into the hood. The turning and intermingling of the fiber or fiber bundles take place within the hood formation where the pulp stream is forced to cross over by a tangential course to the return channel, and by means of my improvements the pulp stream is raised upwardly over the upstanding neck by the action of the usual rotary grinding cylinder and in a manner to be thrown with high velocity both upwardly and forwardly into the hood formation. The form and shape of the channel and hood beyond the neck and of the hood above the neck and channel are such that the pulp stream, which is cast over the neck, is guided across the hood from adjacent the front or outer wall of the head channel to adjacent the inner wall of the return channel and from adjacent the inner wall of the head channel to adjacent the outer wall of the return channel.

A further object of the invention is the provision of an adjustable cylinder mounting whereby at will to adjust the position of the cylinder relatively to the neck.

With the above and other objects in view, the invention consists in the mode of treatment and in the improved apparatus, as well as in the form, construction and relative arrangement or arrangements of parts, as will be hereinafter more fully described, illustrated in the accompanying drawings, and particularly pointed out in the subjoined claims.

One simple and practical embodiment of the invention is illustrated in the accompanying drawings, which form a material part of this application, and in which—

Figure 1 represents a front elevational view of the improved beating apparatus;

Fig. 2 represents a top plan thereof, more or less diagrammatic in character, with parts shown in section;

Fig. 3 represents a vertical cross sectional view taken approximately on the line 3—3 of Fig. 1; and

Figs. 4 and 5 represent respectively sectional and top plan views, shown diagrammatically and illustrating the circulation of the pulp stream in conjunction with the mode of diverting portions of the stream and re-intermingling the same, the view of Fig. 4 being taken on the line 4—4 of Fig. 5.

The apparatus of my invention, in its preferred form of construction as illustrated in the accompanying drawings, comprises a vat or basin 10, oval shaped in its general formation and provided interiorly with a central longitudinally extending partition or wall 11 to produce a head channel 12 and a return channel 13 for the circulation of the pulp stream, the opposite ends of the partition terminating short of the corresponding ends of the vat so as to provide at the right-hand end of the structure for the flow of the pulp stream from the return channel to the head channel through the space 14, and at the left-hand end for the circulation of the pulp stream, in a manner as will be hereinafter more particularly pointed out, from the head channel to the return channel

through the opening 15. The pulp stream, therefore, as is customary in apparatus of this character, circulates continuously around the vat.

For operating in the head channel in cooperation with any suitable or approved shredding means or instrumentalities 16 to grind and shred the rag stock, is a rotary grinding cylinder 17 of any usual or approved construction. A driven axis shaft 18 carries the grinding cylinder and has its opposite ends exteriorly of the vat, journaled in bearings 19 secured upon the horizontal ledge portions 20 of the rocker-supports 21. Each of the rocker-supports is mounted by an axis pivot 22 to an upright standard 23, and it will be noted that the upright portions of each rocker-support include two arms 24 which come at opposite sides of the standard and extend upwardly well beyond the top end of the standard so as to support between them a head piece 25. Fixed on each standard near its top end is an upwardly curved bracket 26. To one of these brackets is pivoted at 27 a bell crank lever 28. In each head piece 25 is fixed an anchoring device 29. To one of these anchoring devices the short arm of the bell crank lever 28 is pivotally united at 30. In the construction at the opposite side of the vat, instead of employing a bell crank lever 28, a suitable arm 28′ pivotally connects the anchoring member 29 with an axis shaft 40. The pivot means 27 by which the bell crank lever 28 is united with the bracket 26 is in the form of the axis shaft 40 which extends entirely across the vat to constitute also the pivotal union between the arm 28′ and the bracket 26 on the opposite side. The purpose of this arrangement is to provide a simple construction of means whereby to support the grinding cylinder for rotation within the head channel and in a manner in which at will the said grinding cylinder may be bodily adjusted either toward or away from the cooperating instrumentalities 16, and as well toward or away from a neck or ridge structure 31 which curves upwardly and rearwardly from the shredding instrumentalities 16 and tangentially with respect to the grinding cylinder.

We have previously noted that the arms 24 of the rocker-supports are connected at their upper ends with the upper ends of the brackets 26; the means to this end at one side of the construction comprising the head piece 25, anchoring device 29, bell crank lever 28 and axis shaft 40, while the connections at the opposite side comprise the corresponding head piece 25, anchoring device 29 and the arm 28′. We have also noted that the ledge portions 20 of the rocker-supports support the grinding cylinder for rotation. To maintain the rocker-supports with the grinding cylinder thereon in the adjusted position desired, any suitable extensible means may be pivotally connected with the long arm 32 of the bell crank lever 28. In the present instance for this purpose, I show, in connection with the rocker-support and standard at one side of the vat, an extensible jack construction comprising a suitable cylindrical housing 33 in which are operatively arranged and united by screw threads (screw threads not shown) the lower and upper portions 34 and 35. The lower portion 34 is associated with a housing 36 secured upon a ledge 37 formed on the standard. The housing 36 contains gearing (not shown) with which is connected an operating hand-wheel 38. The upper portion 35 is pivotally united at 39 with the long arm 32 of the bell crank lever. By this arrangement, when the hand-wheel 38 is turned in one direction, the upper portion 35 of the jack construction will be projected upwardly causing the rocker arms 24 to be drawn toward the right hand end of the vat with the result that the grinding cylinder is bodily moved in an arc away from the parts 16 and neck construction 31. On the other hand, when the hand-wheel is turned in the opposite direction, the upper portion 35 of the jack construction is drawn downwardly with the result that the arms 24 of the rocker-supports are moved toward the left-hand end of the vat, thus moving the grinding cylinder closer to the parts 16 and neck construction 31.

According to an important feature of my invention, a tangential hood structure indicated generally at 41 constitutes the channel or passageway for the circulation of the pulp stream to the return channel; and it is to be noted in this connection that the grinding cylinder 17, which is rotated in the direction indicated by the arrow 42, throws the pulp stream upwardly and outwardly over the neck structure 31 and into the hood structure 41, as best illustrated in Fig. 4. Now, the hood structure 41, as best shown in Fig. 5, extends outwardly at 43 on a tangential line or course with respect to the head channel and return channel, the commencement of such tangential line or course being at the front wall 44 of the vat and the end thereof comprising the curved wall 45 which unites with the rear wall 46 of the vat. Said hood structure not only extends on a tangential line with respect to the head and return channels and therefore with respect to the grinding cylinder and neck structure, but also has an upwardly extending tangential course 47 which commences at the front wall 44 and terminates with the rear walls 45 and 46. With this construction, the hood structure, both in outward and upward directions, extends progressively away from the grinding cylinder and the neck structure, such progressive formations commencing at the front wall 44 at the end of the head channel and con-

stituting the space through which the upwardly thrown pulp stream is delivered into the return channel.

Inasmuch as from the front wall 44 to the back wall 46, the hood portions 43 and 47 extend outwardly and upwardly respectively, the pulp stream which is cast over the neck structure 31 is progressively, beginning adjacent the front wall 44 and continuing approximately to the rear wall 46, turned under, into and through itself so as to turn the fibers or bundles of fibers against each other and thoroughly intermix the same throughout the flowing stream. In other words, the portions of the fiber laden stream, which first strike in point of time against the hood portions 43 and 47 are turned under, into and through the fiber laden portions of the stream which last strike in point of time against the hood portions 43 and 47. A complete and homogeneous intermixing of the fibers is thus rapidly obtained. The stream portions as 48 which first strike against the hood portions 43 and 47 are diverted so as to flow more particularly along the inside of the partition wall 11 in the return channel, while the stream portions as indicated at 48′ are directed more to the rear so as to flow more particularly along the rear wall 46. The bottom of the channel under the hood is preferably inclined to feed into the return channel which in turn is downwardly and forwardly inclined to run the stream into the head channel. The size of the pulp stream thrown over the neck structure can of course be controlled through bodily adjustment of the grinding cylinder relatively to the neck portion.

While I have illustrated and described my invention as comprising a particular mode of treatment and as taking a special form, it will be understood that changes and alterations may be made in the particular details set forth without departing from the spirit of the invention, and hence I do not limit myself to the particular details set forth, but consider myself at liberty to make such changes and alterations as fairly come within the scope of the appended claims.

I claim:—

1. The method of working and intermingling the stock in a pulp stream which consists in throwing the pulp stream upwardly in the air at an angle, and then moving the stream projected in the air in a tangential path at a sufficient outward and upward course to cause substantially crosswise divergence and re-intermingling of portions of the stream, to bring about a substantially complete turning and re-intermingling of the stock before the falling movement of the stream is completed.

2. The method of working and intermingling the stock in a pulp stream which consists in throwing the pulp stream upwardly in the air at an angle, and then moving the stream projected in the air in a tangential path upwardly and outwardly at a sufficient angle to cause portions from the nearest angle to pass through and turn under the portions directed to the more remote angle, to bring about a substantially complete turning and re-intermingling of the stock before the falling movement of the stream is completed.

3. The method of working and intermingling the stock in a pulp stream which consists in throwing the pulp stream upwardly and outwardly in the air, and simultaneously subjecting the stream directed upwardly and outwardly in the air to a restraining force tangentially diverting both the upward and outward courses of the stream so as to cause the portions of the stream first engaged by the restraining force to pass into and under the portions of the stream last engaged by the restraining force.

4. A beating apparatus, comprising, in combination with a vat having a head channel and a return channel for the circulation of the pulp stream, and a beating cylinder operating in the head channel, a closed hood on the vat forming the discharging end of the head channel and receiving end of the return channel, an upstanding neck in the head channel tangential to the cylinder and in line with the interior of the hood, to cause the pulp stream to be thrown upwardly and outwardly into the hood by the cylinder, said hood extending both outwardly and upwardly at a tangent with respect to the course of the outwardly and upwardly directed stream so that the portions of the stream first striking the hood will be diverted crosswise into and through the portions last striking the hood.

5. A beating apparatus, comprising, in combination with a vat having a head channel and a return channel for the circulation of the pulp stream, and a beating cylinder operating in the head channel, a closed hood on the vat forming the discharging end of the head channel and receiving end of the return channel, an upstanding neck in the head channel tangential to the cylinder and in line with the interior of the hood, to cause the pulp stream to be thrown upwardly and outwardly into the hood by the cylinder, said hood extending both outwardly and upwardly at a tangent with respect to the course of the outwardly and upwardly directed stream so that the portions of the stream first striking the hood will be directed crosswise into and through the portions last striking the hood, and said hood continuing on a tangent, both outwardly and upwardly, entirely to the outer wall of the return channel to insure that the stream portions last striking the hood will be diverted to the outer wall of the return channel and to the outer side of the stream portions first diverted by the hood.

6. A beating apparatus, comprising, in

combination with a vat having a head channel and a return channel for the circulation of the pulp stream, and a beating cylinder operating in the head channel, a closed hood on the vat forming the discharging end of the head channel and receiving end of the return channel, an upstanding neck on the head channel tangential to the cylinder and in line with the interior of the hood, to cause the pulp stream to be thrown upwardly and outwardly into the hood by the cylinder, said hood extending both outwardly and upwardly at a tangent with respect to the course of the upwardly and outwardly directed stream so that the portions of the stream first striking the hood will be diverted crosswise into and through the portions last striking the hood, said cylinder being bodily adjustable relatively to said neck whereby to vary the size of the stream thrown over said neck and into said hood.

7. In a beating apparatus for the purpose set forth, a head channel with an operative beating cylinder, a return channel, a hood constituting the discharge end of the head channel and receiving end of the return channel, to direct the pulp stream from the head channel into the return channel, an upstanding structure in the head channel coacting with the cylinder to throw the circulating pulp stream upwardly and outwardly into the hood, said hood being at a tangent to both of the channels and extending tangentially outwardly and upwardly from the outer wall of the head channel to the outer wall of the return channel, whereby the stream portions first striking the hood will be diverted into and through the stream portions last striking the hood and with the stream portions last striking the hood directed to the outer wall of the return channel, while the stream portions first striking the hood are turned adjacent to the inner wall of the return channel.

8. A beating apparatus, comprising, in combination with a vat having a channel for the circulation of the pulp stream and a beating cylinder working on the pulp stream within the channel, an upstanding structure in the channel coacting with the cylinder to cause the latter to throw the stream upwardly over the structure, and means for bodily adjusting the cylinder for operating relatively to the structure comprising side standards, rocker-supports pivoted on the standards for adjustment relatively thereto, the axis of the cylinder being journaled on said rocker-supports, and means for making said supports rigid with said standards in a determinate position of adjustment.

9. A beating apparatus, comprising, in combination with a vat having a channel for the circulation of the pulp stream and a beating cylinder working on the pulp stream within the channel, an upstanding structure in the channel coacting with the cylinder to cause the latter to throw the stream upwardly over the structure, means for bodily adjusting the cylinder for operating relatively to the structure and comprising side standards, rocker-supports pivoted on the standards for adjustment relatively thereto, the axis of the cylinder being journaled on said supports, a connection, other than the axis of the cylinder, whereby to move and maintain the rocker-supports in unison, and means adapted to be adjusted at will for maintaining one of the rocker-supports in a determinate position of adjustment on its standard.

In testimony that I claim the foregoing as my invention, I have signed my name hereto.

WILHELM THALER.