Oct. 26, 1948. J. STADLER 2,452,399

STOCK AGITATING AND CIRCULATING ATTACHMENT FOR STOCK TANKS USED IN PULP AND PAPER MILLS

Filed July 9, 1945 3 Sheets-Sheet 1

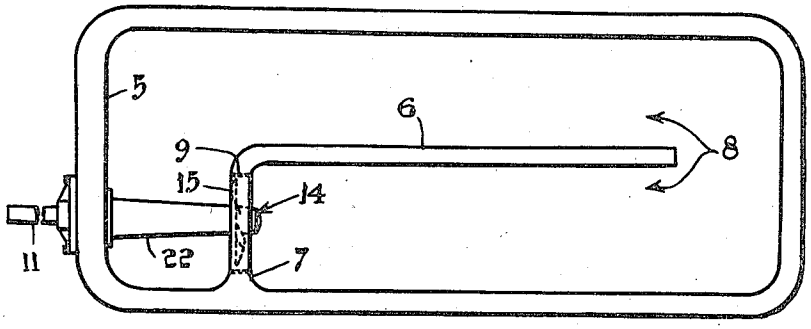


FIG. 1

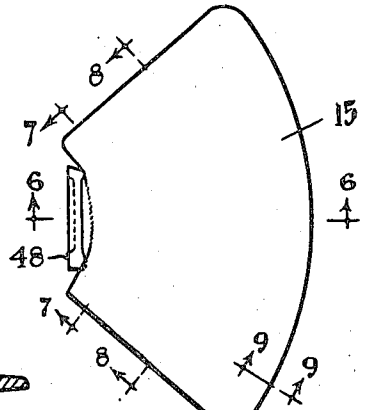


FIG. 5

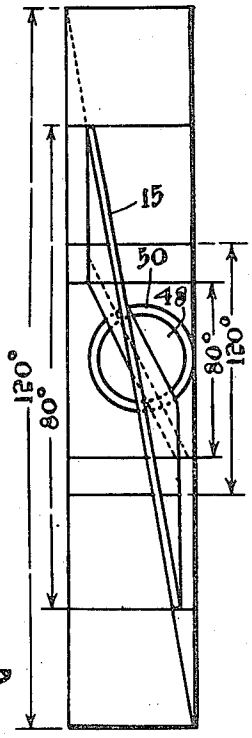


FIG. 10

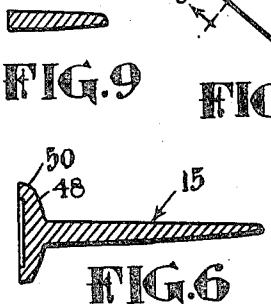


FIG. 6

FIG. 9



FIG. 7



FIG. 8

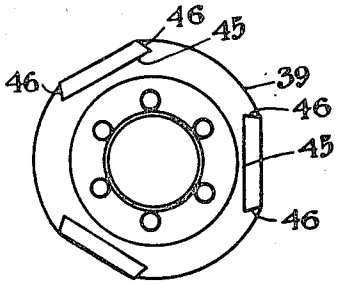


FIG. 13

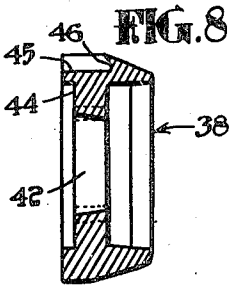


FIG. 14

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STOCK AGITATING AND CIRCULATING ATTACHMENT FOR STOCK TANKS USED IN PULP AND PAPER MILLS

Filed July 9, 1945 3 Sheets-Sheet 2

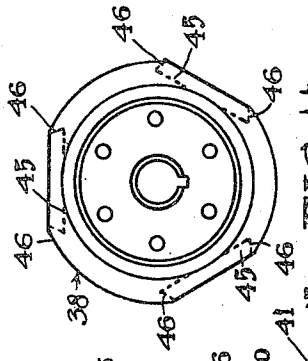


FIG. 11

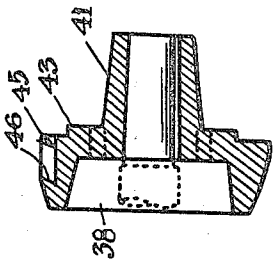


FIG. 12

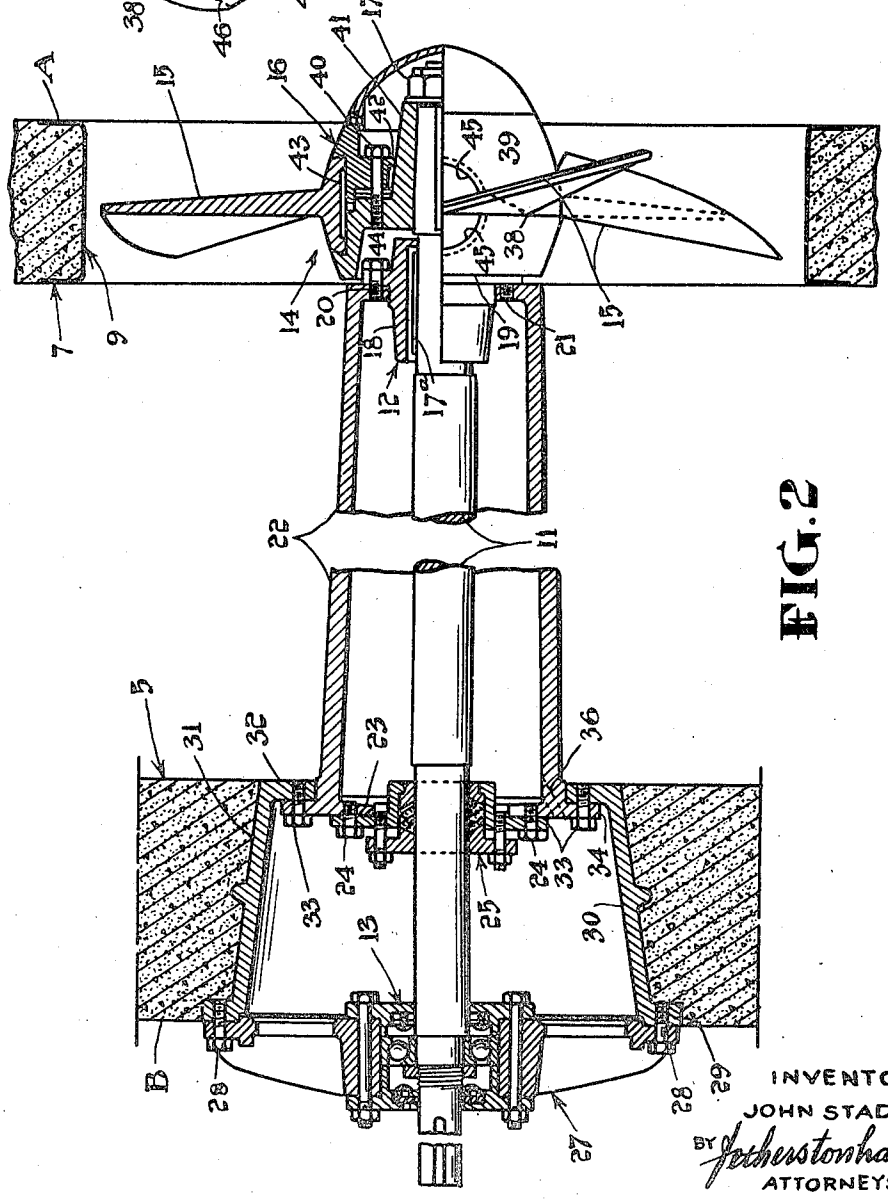


FIG. 2

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STOCK AGITATING AND CIRCULATING ATTACHMENT FOR STOCK TANKS USED IN PULP AND PAPER MILLS

Filed July 9, 1945 3 Sheets-Sheet 3

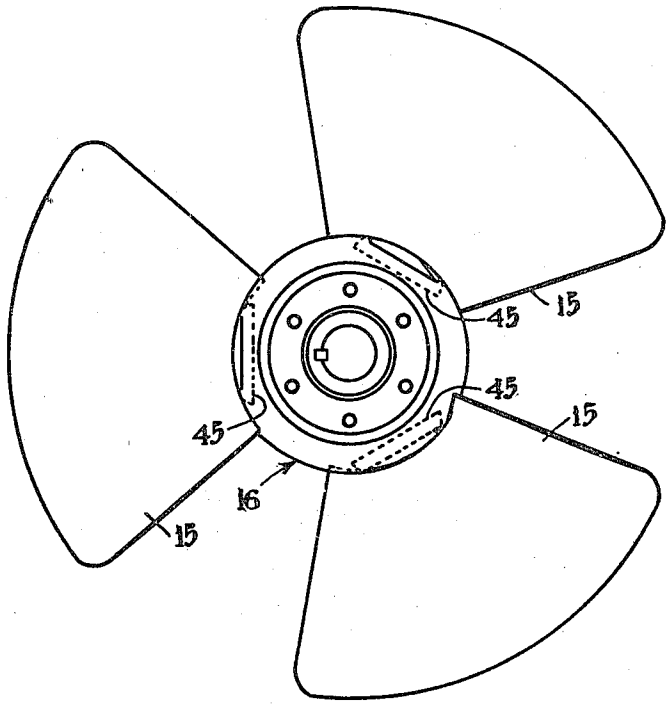


FIG. 3

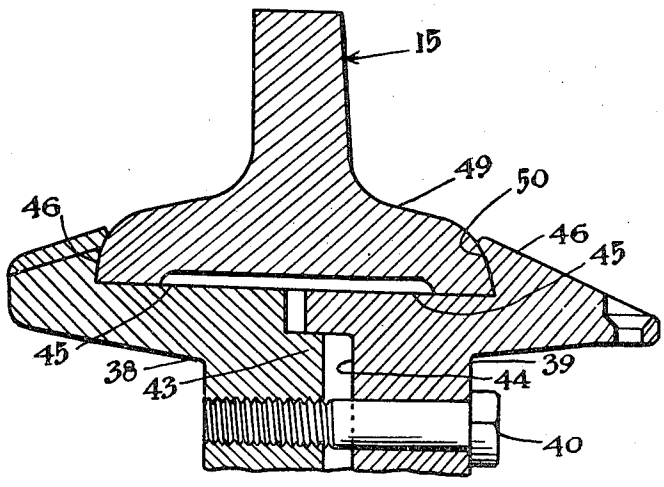


FIG. 4

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UNITED STATES PATENT OFFICE

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STOCK AGITATING AND CIRCULATING ATTACHMENT FOR STOCK TANKS USED IN PULP AND PAPER MILLS

John Stadler, Montreal, Quebec, Canada

Application July 9, 1945, Serial No. 603,948

3 Claims. (Cl. 259—109)

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This invention relates to an improved stock agitating and circulating attachment for stock tanks used in pulp and paper mills to prevent coagulation of the fibre bundles before the stock is delivered to the forming wire of a paper making machine.

Efficient agitation of the stock prior to its delivery to the forming wire of a paper making machine is essential to the manufacture of paper of uniform quality. This is now accomplished by the use of high speed propeller attachments arranged in a stock circulating tank to maintain the stock in a highly agitated circulating condition which effectively prevents coagulation of the fibres or fibre bundles. Very exact workmanship is now required in the design, manufacture and installation of these propelling attachments in order to ensure the maximum efficiency as regards agitation and circulation of the stock. In most cases where the results obtained are not entirely satisfactory the cause can be traced to defective assembly and/or installation of the attachment by careless or incompetent field workers.

At the present time propeller attachments for stock agitating and circulating tanks are installed in accordance with what may be termed open shaft practice. This consists in mounting an exposed propeller shaft in bearings carried by an outer wall of the tank and by a partition wall which is spaced from said outer wall and is provided with a flow opening in which the propeller blades operate. The bearing structure carried by the partition wall usually includes a spider or other shaft supporting means which, by obstructing the flow through the partition opening in which the propeller blades operate, interferes with effective agitation of the stock. Another undesirable feature of the so-called open shaft installation is that the shaft is exposed throughout a substantial portion of its length to chemical attack by the stock contained in the tank.

One object of the present invention is to provide a generally improved propelling attachment of the character described which is designed to reduce to a minimum the mechanical skill required on the part of the field workman entrusted with the task of installing the attachment.

Another object is the provision of a propeller attachment of the character described in which the design and assembly of the component parts is such that the complete assembly may be supported, on the cantilever principle, solely by the outer wall of the tank in a manner which eliminates the necessity of providing a spider or other

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flow-obstructing support at the partition opening in which the propeller blades operate.

A further object is to provide a self-contained propeller attachment of the character described in which the propeller shaft is carried by a tubular support which carries the shaft bearings, protects the shaft against chemical attack by the stock, and serves as a bearing-lubricant supply reservoir.

Other objects, advantages and characteristic features of the invention will be more readily understood from the following detailed description of the preferred embodiment shown in the accompanying drawings, in which—

Fig. 1 is a plan view of a stock tank equipped with a propeller attachment designed and installed in accordance with my invention.

Fig. 2 is an enlarged view of a portion of the tank and propeller assembly shown in Fig. 1. In this view the propeller attachment is shown partly in longitudinal section and partly in plan and the associated tank walls are shown in section.

Fig. 3 is an elevational view of the propeller blade and hub assembly forming part of the attachment shown in Fig. 1.

Fig. 4 is an enlarged detailed view showing the manner in which the propeller blades are adjustably clamped between sections of the propeller hub to provide for adjustment of the pitch-setting of the blades.

Fig. 5 is a detail view showing one of the propeller blades appearing in the preceding figures.

Fig. 6 is a sectional view taken along the line 6—6 of Fig. 5.

Fig. 7 is a sectional view taken along the line 7—7 of Fig. 5.

Fig. 8 is a sectional view taken along the line 8—8 of Fig. 5.

Fig. 9 is a sectional view taken along the line 9—9 of Fig. 5.

Fig. 10 is a development view of one of the propeller blades with data indicating the theoretical pitch.

Fig. 11 is an elevational view of the male propeller hub section.

Fig. 12 is a sectional view of the hub section shown in Fig. 11.

Fig. 13 is a view similar to Fig. 11 but showing the female hub section.

Fig. 14 is a sectional view of the hub section shown in Fig. 13.

In the present drawings my improved propeller attachment is shown installed in a conventional stock circulating tank including an outer wall 5, a central longitudinal partition or mid-feather

6 and a transverse partition 7 which conjointly provide a tortuous or reverse flow stock circulating channel 8. The transverse partition 7 extends across one-half of the tank at one end of partition 6 and is provided with a flow opening 9.

The propeller attachment provided in accordance with my invention comprises a propeller shaft 11 journalled in bearings 12 and 13 and equipped at one end with a propeller 14 comprising adjustable propeller blades 15 carried by a sectional propeller hub 16 which is secured to shaft 11 by fastening nut 17.

Bearing 12 is located adjacent propeller hub 16 and comprises a water-lubricated composition bearing-bushing 17*a* contained in a tubular bearing holder 18. A flange 19 projecting outwardly from holder 18 is fastened by bolts 20 to an inwardly directed flange 21 provided at the propeller end of a tubular shaft housing 22. The other end of shaft housing 22 is provided with an inwardly directed flange 23 which is fastened by bolts 24 to a stuffing box and gland assembly 25 through which shaft 11 extends.

Bearing 13 is an anti-friction thrust bearing of the angular contact type and is carried by a supporting spider 27 which is fastened by bolts 28 to an outwardly directed flange 29 provided at the outer and larger end of a conical tubular insert 30 which is anchored in an opening 31 of tank wall 5 in axial alignment with the flow opening 9 of partition wall 7. The inner end of insert 30 is provided with an inwardly directed flange 32 which is fastened by bolts 33 to an outwardly directed flange 34 of bearing housing 22.

The end of shaft 11 which projects beyond bearing 13 may have a V-belt pulley or a gear reducer coupling applied thereto to provide for power operation of said shaft.

The tubular shaft housing 22 is provided with a water inlet 36 to which a water supply pipe (not shown) is connected so that said housing serves as a lubricant supply reservoir for the water-lubricated bearing bushing 17*a*.

From the foregoing it will be evident that shaft housing 22 and insert 30 conjointly provide cantilever supporting means for supporting the entire propeller attachment from the tank wall 5, thereby eliminating the necessity of providing, at the partition 7, the usual shaft-supporting spider which, as previously stated, constitutes an undesirable obstruction of the flow opening 9.

In addition to serving as a lubricant reservoir and as a part of the cantilever shaft supporting means the tubular shaft housing 22 also serves to enclose and protect the shaft 11 against chemical attack by the stock contained in the stock tank. It will also be noted that shaft 11, together with bearings 12 and 13 and shaft housing 22, may be removed without disturbing the insert 30 by removing the fastening bolts 28 and 33.

It is desirable that propeller blades 15 be adjustably mounted on propeller hub 16 so that the pitch-setting of the blades may be varied in conformity with stock consistency and power requirements to ensure the maximum efficiency under the varying conditions encountered in mill operation. In my attachment this is provided for in a novel manner. Hub 16 is divided into two half sections comprising male section 38 and female section 39 fastened together by clamping bolts 40. Male section 38 is provided with a central sleeve extension 41 which projects through a central opening 42 of female section 39 and is mounted on shaft 11. Male section 38 is also formed with a projection 43 extending into a recess 44 provided in female section 39. The peripheral portions of hub sections 38 and 39 are provided with mating semi-circular recesses 45 having undercut side walls 46.

A relatively large disk-shaped base 48 is cast integral with the root portion of each propeller blade 15 and is fitted in opposing recesses 45 of the hub sections 38 and 39, the peripheral edge of said base being bevelled as indicated at 50 to fit the undercut recess walls 46. When the bolts 40 are tightened the base 48 of each blade 15 is tightly clamped between the walls 46 of the semi-circular recesses 45 in which it is fitted and is effectively held against turning movement relative to the hub. When it is desired to change the pitch-setting of the propeller blades this is easily accomplished by backing off the clamping bolts 40, turning the blades 15 relatively to the hub 16 in a pitch changing direction and then tightening the bolts 40 to clamp the blades in their new position.

It will be noted that the general design of the propeller attachment described herein enables the concentric machining of all concentric faces essential to correct alignment of the component parts to be taken care of in the shop by a skilled mechanic and the parts marked for correct field assembly so that the only field work requiring any skill on the part of field workmen is the comparatively simple task of correctly mounting the insert 30 in the outer tank 5. Other advantages are the protective enclosure of shaft 11 by shaft housing 22, the use of said housing as a lubricant reservoir for the water-lubricated shaft bearing 12 and the cantilever method of supporting the entire attachment in place so as to eliminate obstruction of the flow opening 9.

Having thus described what I now consider to be the preferred embodiment of my invention it will be understood that various modifications may be resorted to within the scope and spirit of the invention as defined by the appended claims.

I claim:

1. A stock propelling attachment for pulp stock tanks of the character described comprising a tapered, tubular member open at both ends and adapted to be fitted in an opening in the wall of the tank with the smaller end of the tubular member directed inwardly, an inwardly directed flange at the inner end of said tubular member, an outwardly directed flange at the outer end of said tubular member, an elongated tubular shaft housing provided with inwardly directed flanges at both ends and with an outwardly directed flange at one end, the last mentioned flange of the shaft housing being detachably secured to the outer side of the inwardly directed flange of said tubular member, a shaft bearing detachably secured to the inwardly directed flange at the free end of said shaft housing, a stuffing box detachably secured to the inwardly directed flange at the opposite end of the shaft housing, a spider detachably secured to the outwardly directed flange of said tubular member, a bearing supported by said spider in alignment with the first mentioned bearing and the stuffing box, a propeller shaft extending through said bearings and stuffing box and a propeller mounted on an end portion of the shaft projecting beyond the free end of the shaft housing.

2. A stock propelling attachment as set forth in claim 1, in which the component parts of said attachment are mounted on concentrically machined faces to ensure correct alignment of said

faces during field application of said propeller assembly to said tank.

3. A stock propelling attachment for pulp-stock tanks of the character described comprising a tubular member open at both ends and adapted to be fitted in an opening in the wall of the tank, a tubular shaft housing having one end detachably secured to one end of said tubular member, a shaft bearing detachably secured to the free end of said shaft housing, a stuffing box detachably secured to the opposite end of said shaft housing, a second shaft bearing detachably secured to the end of said tubular member remote from said shaft housing, a propeller shaft extending through said shaft bearings and said stuffing box and projecting beyond said shaft bearings and a propeller secured to a portion of the shaft projecting beyond the free end of said shaft housing.

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REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
725,877	Rommeny	Apr. 21, 1903
800,918	Hobart	Oct. 3, 1905
1,986,606	Schlimbach	Jan. 1, 1935
2,042,006	Jackson	May 26, 1936
2,360,145	Lansing	Oct. 10, 1944
2,382,535	Bauer	Aug. 14, 1945

FOREIGN PATENTS

Number	Country	Date
200,954	Switzerland	Mar. 16, 1939