Sept. 20, 1949. M. CASSÊ 2,482,319

MACHINE FOR THE WET TREATMENT OF TEXTILE MATERIALS OR THE LIKE

Filed Jan. 3, 1944 3 Sheets-Sheet 1

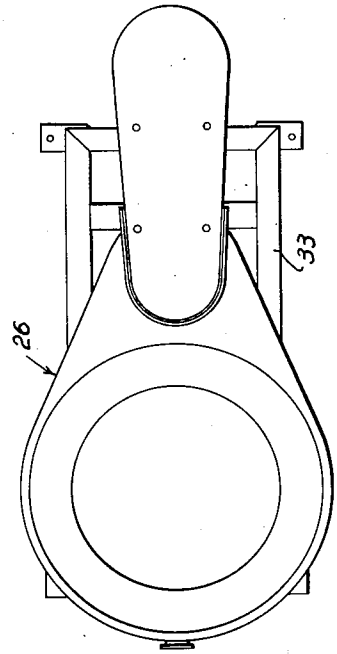


Fig-3.

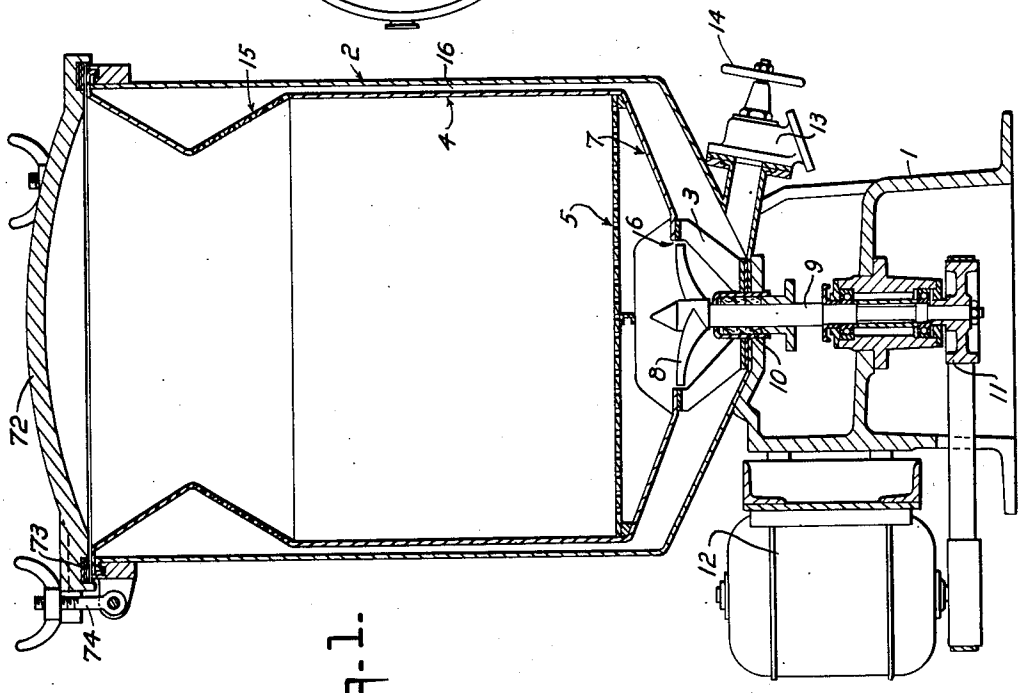


Fig-1.

INVENTOR
MARCEL CASSÊ
BY Louise O'Neil
ATTORNEY

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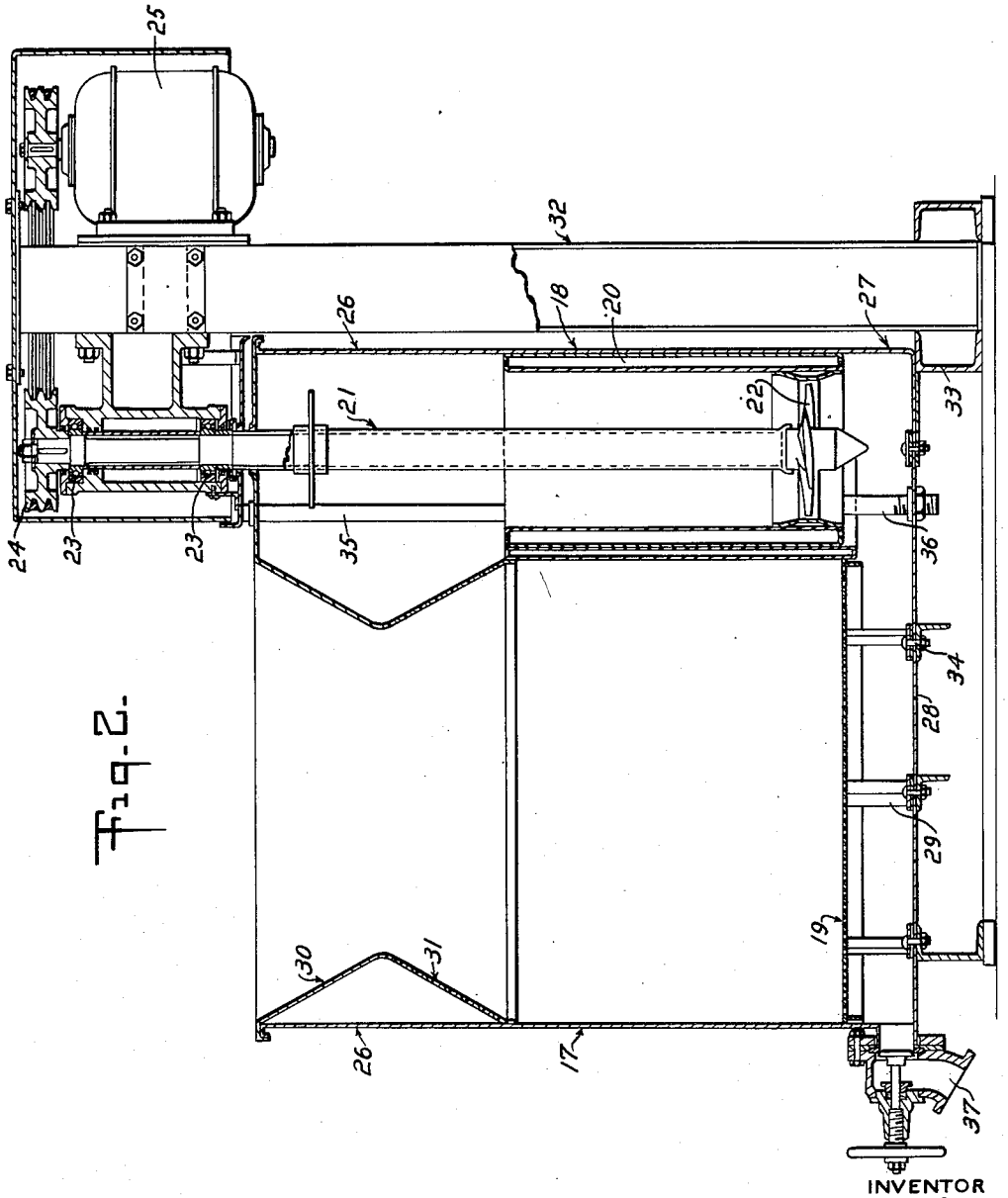


Fig. 2.

INVENTOR
MARCEL CASSÊ
BY Louise O'Neil
ATTORNEY

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Filed Jan. 3, 1944 3 Sheets-Sheet 3

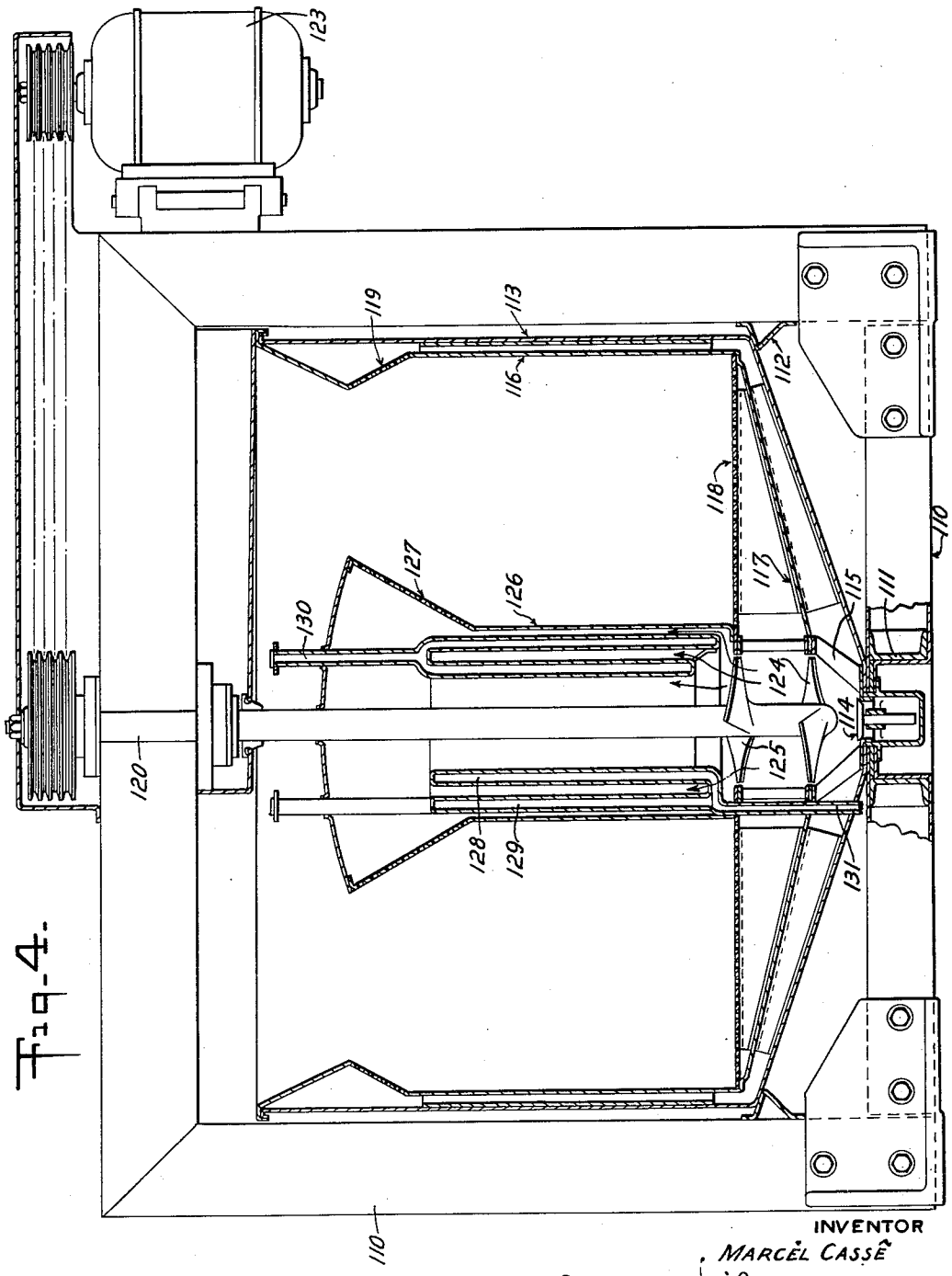


Fig-4.

INVENTOR
MARCEL CASSÊ

BY Louise O'Neil

ATTORNEY

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UNITED STATES PATENT OFFICE

2,482,319

MACHINE FOR THE WET TREATMENT OF TEXTILE MATERIALS OR THE LIKE

Marcel Cassé, Essonnes, France

Application January 3, 1944, Serial No. 516,892
In France June 7, 1941

Section 1, Public Law 690, August 8, 1946
Patent expires June 7, 1961

5 Claims. (Cl. 68—184)

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The present invention relates to machines for the wet treatment of textile materials or the like, and in particular to the washing, dyeing, bleaching, dressing thereof, or other similar operations.

In known machines of this type, the treatment bath is caused to circulate by means of a pump, propeller or similar mechanism, either in a constant direction, or alternately in reverse directions, through a closed circuit including a treatment vat containing the material to be treated and an axial funnel passing through the center of the vat and communicating with the latter through the medium of two sets of perforated partitions which cause the bath to pass respectively from the vat into the funnel and from the funnel into the vat, one of said perforated partitions constituting the bottom of the vat. When the direction of circulation is modified, there is produced:

1. For one of the directions of circulation, a suction under the perforated bottom of the vat and a delivery into the axial funnel, the bath pouring from the upper part of the funnel on to the articles contained in the vat;

2. For the reverse direction of circulation, a suction through the top of the funnel and a delivery under the perforated bottom of the vat, which lifts the articles being treated and changes the location thereof.

When there are many not very permeable articles to be treated, the circulation is slackened and the quantity of bath which pours out of the central funnel may be insufficient for submerging the articles which are located near the outer wall of the vat. Moreover, in machines of small dimensions, the central funnel constitutes a hindrance for placing the articles to be treated in the machine and for removing them therefrom.

The present invention is intended to remove the above inconveniences and relates to a machine for the wet treatment of textile material or the like, in which the treatment bath is caused to circulate in a closed circuit through a vat containing said material and through another enclosure communicating with said vat by means of perforated partitions, said machine being characterised in particular by the fact that said chamber or enclosure is arranged entirely outside the vat containing the materials being treated. Said enclosure can completely surround the periphery of the vat; it can also be constituted by one or more funnels or vessels arranged at one of the sides of the vat or distributed around the latter.

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This arrangement leaving the vat entirely free allows of designing said vat in such a manner as to facilitate its operation or of improving its construction, as will be shown in greater detail hereinafter, and for instance of rendering easier the treatment of articles liable to become entangled, such as skeins, stockings, etc.

A few embodiments of machines according to the invention are illustrated in the accompanying drawings, by way of example.

Fig. 1 is a vertical section of a first embodiment.

Figs. 2 and 3 are respectively a vertical section and a plan view of a second embodiment.

Fig. 4 is a vertical section of a third embodiment.

According to the embodiment illustrated in Fig. 1, the machine comprises a hollow base or frame 1 supporting an outer vat 2 and, through the medium of radial arms 3, an inner vat 4 provided with a perforated false bottom 5. In a central opening 6 formed in the bottom 7 of the inner vat 4, can rotate a propeller 8 carried by a shaft 9 which passes through a stuffing box 10 and on the lower end of which is rigidly secured a driving pulley 11 actuated by the reversible electric motor 12. A draining nozzle 13 connected to the outer vat 2 may be opened or closed by a valve 14.

The inner vat is provided at its upper part with a perforated zone 15 which, in the example illustrated, is of truncated shape, but might be cylindrical, and the entire surface of which has an area substantially equal to that of the surface of the perforated false bottom 5, so as to obtain similar conditions of operation for both directions of circulation of the treatment bath.

When the propeller 8 rotates in one of the directions of rotation, it sucks the treatment bath through the perforated bottom 5 and delivers it into the annular chamber 16 formed between the vats 2 and 4, from which the bath is again poured through the perforated zone 15 into the vat 4 which the bath must completely travel through in order to again pass through the opening 6.

When the propeller 8 rotates in the reverse direction, it sucks the bath from the chamber 16 formed between the vats 2 and 4 and delivers it through the perforated false bottom 5 into the vat 4 which the bath must completely traverse in order to return into the chamber 16 through the perforated zone 15.

It will be noted that, whatever may be the direction of circulation, the vat 4 is traversed by

the bath throughout all its parts. Moreover, no obstacle is encountered within said vat which might hinder the positioning or removal of the material to be treated.

It will also be noted that, since the perforated zone 15 is located on the lateral wall of the treatment vat, in order to have the same area as that of the perforated false bottom 5, said zone may be given a height appreciably less than that necessary for the central funnel of known machines having a central funnel.

A cover 12 can be placed on the upper opening of the vat of the machine; a packing 13 clamped by screws 14 allows of ensuring fluid-tightness and of either exerting a certain amount of pressure on the surface of the bath, or of working under a certain degree of vacuum. The existence of pressure on the surface of the bath allows the propeller to work efficiently and to sustain an active circulation even when the temperature approaches, reaches or even exceeds 100° centigrade. In fact, the existence of said pressure avoids the product of steam on the side of the orifice through which the propeller sucks the bath; the output of said propeller thus remains constant at all temperatures. This arrangement offers particular advantages for certain operations which must be effected at a temperature higher than 100° centigrade, such as the bleaching of cotton for instance. The working under vacuum on the contrary, is useful in some treatments, for instance for avoiding oxidation.

The form of construction illustrated in Figs. 2 and 3 comprises three vertically superposed sections. The central section is composed of two cylinders 17 and 18, the cylinder 17 which forms the treatment vat being provided with a perforated bottom 19 and the cylinder 18 being internally lined with a heating packet 20 and being traversed by a shaft 21 which carries the propeller 22 and the upper extension of which is supported by bearings 23 and carries the driving pulley 24 actuated by the reversible electric motor 25.

The upper and lower sections form two collectors 26 and 27 connecting the cylinders 17 and 18 and are laterally limited, in the example illustrated, by two planes tangent to the upper and lower extensions of the cylinders 17 and 18 and by the parts of said extensions located outside the tangential planes between said extensions, as shown in the plan view of Fig. 3. The lower section 27 is closed by a solid bottom 28 on which bear the struts 29 supporting the perforated bottom 19. The cylinder 17 extends into the upper section 26 as a tubular member which may have the shape of a perforated cylinder of the same diameter as cylinder 17, or the shape, illustrated in the drawing, of a double frustum, one inverted constituted by a solid wall 30 and the second 31 being perforated and fitting through its large base over the upper part of cylinder 17, the surface of the perforated frustum 31 being approximately equal to that of the perforated bottom 19.

The bearings 23 and the motor 25 are carried by an upright 32 secured on a shoe member 33 on which the machine rests, the bottom 28 being secured to the shoe 33 by bolts 34 which prevent it from distorting under the suction action of the propeller.

The heating of the bath can be ensured in the known manner by a direct admission of steam into the bath. Said heating may also be indirect and ensured by the jacket 20 constituted by two cylinders concentric with the propeller and joined

at their bases, the steam being admitted through the inlet pipe 35 and the condensed water being drained through the nozzle 36. The draining nozzle 37 allows of evacuating the bath from the machine.

The operation of the machine is obviously similar to that of the machine illustrated in Fig. 1.

This second embodiment allows of doing away with the stuffing-box of the example of Fig. 1, and of constructing a machine of lesser height, in which all the mechanical part is very accessible and does not risk being deteriorated by leakages of the bath.

As regards the reheating jacket 20, in addition to the known advantages of indirect heating (constant volume of the bath, etc.) it offers the further advantage of being easy to construct and of necessitating only a small exchange surface, owing to the speed of the bath, to its turbulence in the cylinder 18 and to the rapidity of the heat exchanges resulting therefrom.

Instead of a single cylinder 18, two or more cylinders similar to cylinder 18 might be distributed around the vat 17.

Finally, the embodiment of Fig. 4, more particularly intended for machines of large capacity, combines the known circulation through a funnel at the centre of the treatment vat with the circulation, according to the principle common to the examples described above, through a space on the outside of said vat. A frame 110 constituting the frame of the machine carries, on a central member 111 and on brackets 112, a vat 113 comprising at its lower part a draining valve 114. The central member 111 thus supports, through the medium of radial arms 115, the treatment vat 116 the solid bottom 117 of which is of frustum shape and which is moreover provided with a perforated false bottom 118. The lateral walls of the vat 116 have, near the upper part thereof, a perforated zone having for instance the shape of a frustum 119. A shaft 120 carried in bearings housed in the frame 110 and driven by the reversible electric motor 123 is arranged along the common axis of the vats 113 and 116 and carries, near the lower end thereof, two propellers 124 and 125 respectively housed in a central opening of the bottom 117 and in a central opening of the false bottom 118, the blades of these two propellers being inclined in reverse directions.

Above the perforated false bottom 118 is mounted in the known manner a solid central funnel 126 surmounted by a perforated cone 127. The total area of the perforated surface of said central cone 127 and of the surface of the perforated zone 119 is substantially equal to the surface of the perforated false bottom 118.

Two concentric heating bodies 128 and 129 are each constituted by two cylinders connected at their lower ends, as in the example of Figs. 2 and 3, the steam being admitted through the inlet pipe 130 and the condensed water being removed through the pipe 131.

For one of the directions of rotation of the motor 123 and consequently of shaft 120, the bath will be sucked from the space comprised between the bottom 117 and the false bottom 118 and delivered by the propeller 125 through the central funnel 126 and the perforated cone 127 and by the propeller 124 through the space comprised between the vats 113 and 116 and through the perforated zone 119 so as to fall on to the articles contained in the vat 116. For the reverse direction of rotation, the bath will be sucked from the vat 116 through the perforated zones 119 and 127

and will be delivered in the space comprised between the bottoms 117 and 118 and through the perforated false bottom 118, lifting thereby the articles located on said perforated false bottom.

The invention is obviously not limited to the embodiments described above and which have been given only by way of example, and modifications may be made thereto without departing from the scope of the invention. Thus, in the various embodiments, a cover can be applied on the machine in a manner similar to that illustrated in Fig. 1, for allowing the treatment to be effected under pressure.

Having now described my invention what I claim as new and desire to secure by Letters Patent is:

1. In a machine for treating textile material, comprising a vertically disposed cylindrical vat adapted to contain the material undergoing treatment, a housing enclosing at least a portion of said vat and having the inner wall surfaces thereof spaced from the outer wall surfaces of the vat at the enclosed portion to provide a chamber, said chamber communicating with the interior of the vat respectively only at the central lower end portion and at the upper peripheral portion of the vat whereby a bath circulating circuit is provided, perforated closure means of substantially equal passage areas in the circuit respectively at said points of communication, the perforated closure means at the upper peripheral portion having the shape of a frustocone and having the larger base thereof contiguous with the periphery of the vat, and means located within said housing for propelling the bath through the circuit in either direction.

2. In a machine for treating textile material, comprising a vertically disposed cylindrical vat adapted to contain the material undergoing treatment, a housing enclosing at least a portion of said vat and having the inner wall surfaces thereof spaced from the outer wall surfaces of the vat to provide an annular chamber, said chamber communicating with the interior of the vat respectively only at the central lower portion and at the upper peripheral portion of the vat whereby a bath circulating circuit is provided, perforated closures of substantially equal passage areas in the circuit at said points of communication, the perforated closure at the upper peripheral portion having the shape of a frustocone and having the larger frustoconical base thereof contiguous with the periphery of the vat, a tubular casing entering said vat through the perforated bottom closure, an inverted perforated frustocone forming the upper end of said casing, and centrally located means for propelling the bath through the circuit and through said tubular casing in either direction.

3. In a machine for treating textile material, comprising a vertically disposed cylindrical vat having a liquid-tight wall for a substantial distance above its bottom end to thereby form an enclosure adapted to contain the material undergoing treatment, a concentrically arranged enclosed cylindrical housing surrounding said vat and having an inside diameter greater than the outside diameter of the vat to provide an annular chamber, said chamber communicating with said enclosure within the vat respectively only at points above and below said liquid tight wall whereby a closed bath circulating circuit is provided, perforated closure means of substantially equal passage areas in the circuit respectively at said points of communication, the closure means above said wall comprising a perforated frustocone having the larger base thereof contiguous with the periphery of said wall, and the closure means below said wall comprising a horizontal perforated plate extending over the entire cross-sectional area of the vat, and liquid propelling means disposed concentrically of said vat and immediately below said perforated plate.

4. In a machine for treating textile material, comprising a vertically disposed cylindrical member having a liquid-tight wall for a substantial distance above its bottom end to thereby form an enclosure adapted to contain the material undergoing treatment, a second cylindrical member arranged outside of and substantially parallel to said first cylindrical member, conduit means respectively connecting the upper and lower ends of said cylindrical members whereby a bath circulating circuit is provided, perforated closure means of substantially equal passage areas in the circuit respectively above and below said liquid tight wall, the closure means above said wall comprising a perforated frustocone having the larger base thereof contiguous with the periphery of said wall, and the closure means below said wall comprising a perforated plate extending over the entire cross-sectional area of the first cylindrical member, and liquid propelling means disposed within said second cylindrical member.

5. In a machine for treating textile material according to claim 4, further comprising a hollow steam jacket surrounding said second cylindrical member and the propelling means disposed within the latter.

MARCEL CASSÉ.

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