I. E. PALMER.

APPARATUS FOR TREATING TEXTILE MATERIAL IN LENGTHS.

APPLICATION FILED MAY 23, 1910.

971,778. Patented Oct. 4, 1910.

2 SHEETS—SHEET 1.

Fig. 1.

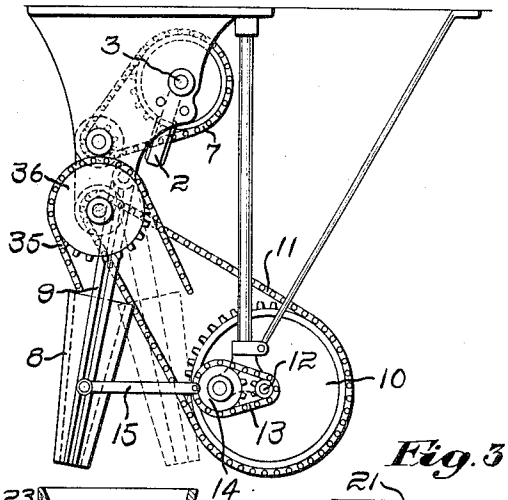


Fig. 2.

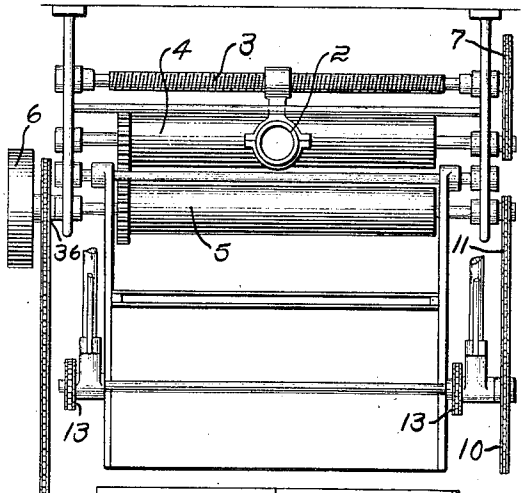
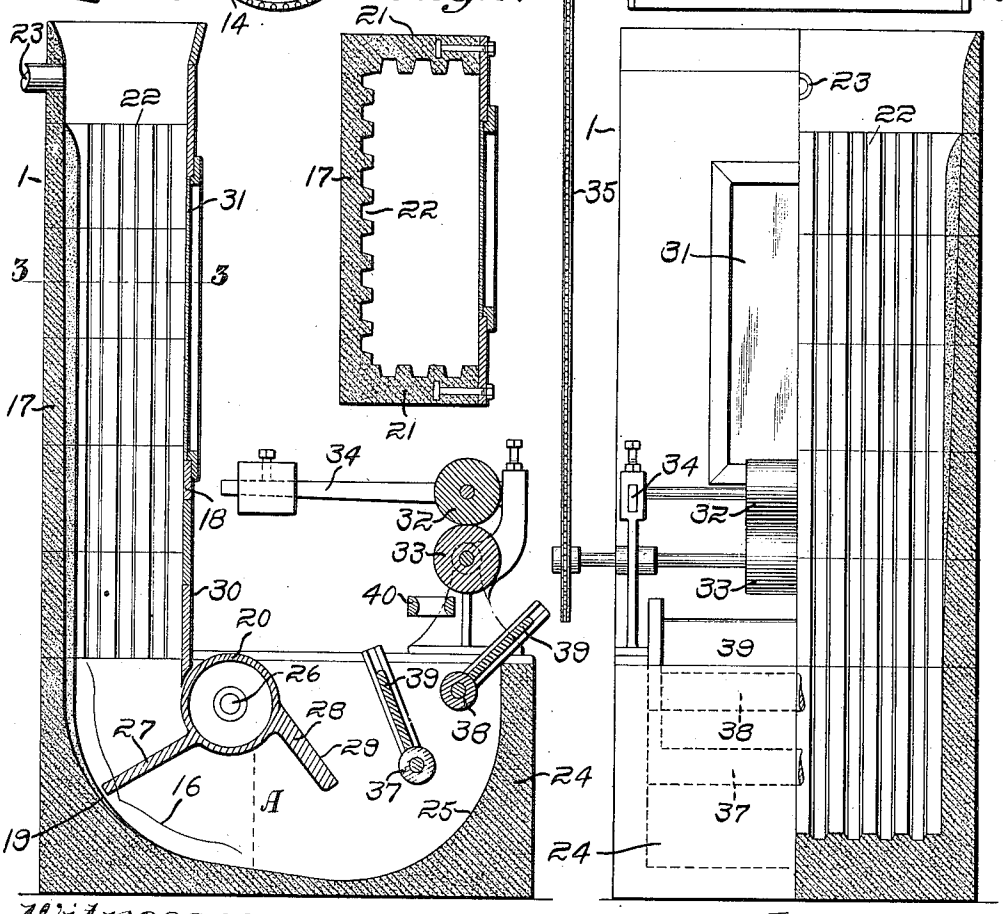


Fig. 3.



Witnesses:
Horace A. Crossman
Carl L. Choate.

Inventor:
Isaac E. Palmer.
by Emery, Booth, Janney and Varney
Attys.

I. E. PALMER.

APPARATUS FOR TREATING TEXTILE MATERIAL IN LENGTHS.

APPLICATION FILED MAY 23, 1910.

971,778. Patented Oct. 4, 1910.

2 SHEETS—SHEET 2.

Fig. 4.

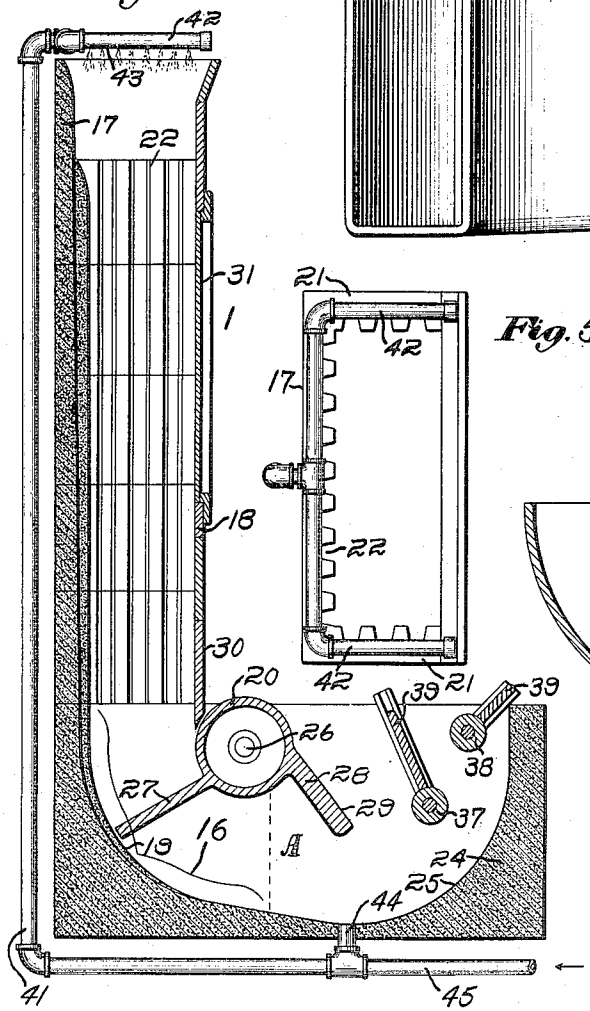


Fig. 9.

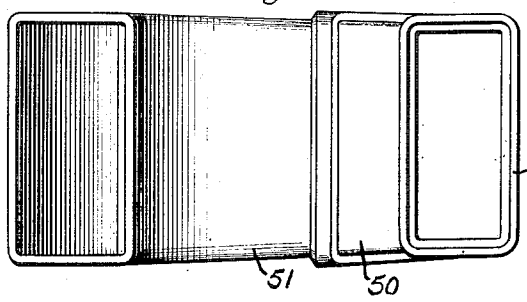


Fig. 5.

Fig. 8.

Fig. 6.

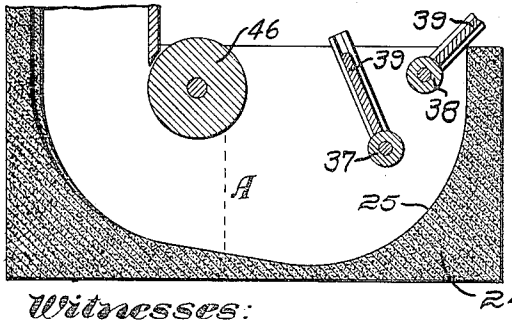
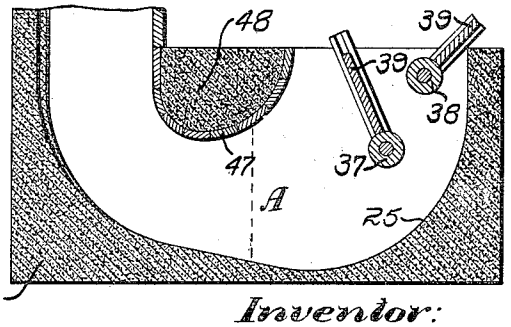


Fig. 7.



Witnesses:
Carl L. Choate.
Horace A Crossman

Inventor:
Isaac E. Palmer.
by Emery, Booth, Janney and Varney.
Attys.

UNITED STATES PATENT OFFICE.

ISAAC E. PALMER, OF MIDDLETOWN, CONNECTICUT.

APPARATUS FOR TREATING TEXTILE MATERIAL IN LENGTHS.

971,778. Specification of Letters Patent. Patented Oct. 4, 1910.

Application filed May 23, 1910. Serial No. 562,851.

To all whom it may concern:

Be it known that I, ISAAC E. PALMER, a citizen of the United States, and a resident of Middletown, in the county of Middlesex and State of Connecticut, have invented an Improvement in Apparatus for Treating Textile Material in Lengths, of which the following description, in connection with the accompanying drawings, is a specification, like letters on the drawings representing like parts.

This invention relates to apparatus for treating textile material in lengths, and is an improvement upon the constructions shown in my Patents No. 408,388, August 6, 1899, and No. 653,485, July 10, 1900.

In order that the principle of the invention may readily be understood, I have disclosed certain embodiments thereof in the accompanying drawings, wherein—

Figure 1 is a view, partially in side elevation and partially in vertical section, of an apparatus embodying my invention; Fig. 2 is a view, partially in front elevation and partially in vertical section, of the apparatus shown in Fig. 1; Fig. 3 is a transverse section upon the line 3—3 in Fig. 1; Fig. 4 is a view similar to Fig. 1 of a slightly modified form of my invention; Fig. 5 is a plan view of the upper end of the apparatus shown in Fig. 4; Figs. 6 and 7 are vertical sections of the lower ends of slightly modified forms of my invention; Fig. 8 is a vertical section of a still further modified form of my invention; and Fig. 9 is a plan view of the construction shown in Fig. 8.

As shown in my patents above referred to, textile material in lengths, such, for example, as cloth or yarn, has been piled or folded into the open, upper ends of J or U shaped chutes, the material being treated either prior to or during its passage through said chute to the action of some suitable liquor, such for example as a bleaching, dyeing or other conditioning liquor. As disclosed in said Patent, No. 408,388, the front and rear walls of said chute were made of power driven aprons to facilitate the passage of the material therethrough. As shown in said Patent No. 653,485, I have facilitated the passage of the material through the chute by maintaining a flow of liquid sufficient to float the material therethrough.

In the present application, I disclose improved and simplified means for facilitating the passage of the material through the chute and in such manner as to prevent tangling of the material and to result in the discharge of the material in folds preferably extending transversely of the chute and substantially normal to the walls thereof. In other words, the material is discharged without entangling or binding.

Referring more particularly to the drawings, I have therein shown a chute having an upturned material intake end 1. The material is delivered into the chute in any suitable manner, but preferably it is folded or piled therein by suitable feeding mechanism arranged to move to and fro above the in-take end of the chute. In Figs. 1 and 2, I have indicated suitable mechanism for this purpose and intended more particularly for delivering goods in arrow or rope like form, and consisting of a pot eye 2, to which said material is delivered, said pot eye being mounted for to and fro movement upon a threaded shaft 3 mounted in suitable brackets and provided with suitable reversing mechanism, not herein necessary to illustrate. Mounted adjacent said pot eye 2 are rolls 4, 5, geared together as shown and driven by a pulley 6 from any suitable source of power. The threaded shaft 3 is shown as driven from the roll 4 by sprocket chains 7. Below the rolls 4, 5 is a feeding member 8 suspended for to and fro movement by arms 9 suitably pivoted to the frame work. Suitably mounted in hangers is a sprocket gear 10 driven by sprocket chain 11 from the roll 5 and coaxial with the gear 10 are sprocket pinions 12, which drive through the sprocket chains 13 sprocket gears 14. Suitably attached to the sprocket chains 13 and to the feeding member 8 are a pair of links, of which one is shown at 15.

It will be apparent that upon the rotation of the gears 10 and 12 the sprocket chains 13 are continuously driven in one direction, so as to impart through the links 15 a to and fro movement to the feeding member 8, as indicated in dotted lines. Owing to the fact that the gears 14 are of larger diameter than the pinions 12 the feeding member 14 moves relatively slower when at and near the rear wall of the chute 1; that is to say, when in substantially the position indicated in full lines. The result of this operation is to accumulate the goods to a somewhat greater degree at the rear wall of the chute than at the front wall thereof. Any other

suitable means for feeding the material to the chute may be employed.

The material in-take end of the chute is preferably substantially upright and the material is piled or folded therein as described and is gradually delivered through the chute. The chute is provided with a forwardly extending discharge portion indicated by the bracket 16 in Fig. 1, said discharge portion terminating in a delivery mouth at substantially the dotted line A in said figure. The rear wall of the upturned material in-take end of the chute is indicated at 17 and the front wall at 18. The said rear wall gradually merges into the inclined or curved wall 19, which forms the bottom wall of the chute, and the front wall of the chute is continued in this form of the invention by the peripheral surface of a member 20 which has a slow movement during the commencement of the piling operation in order to effect the proper formation of the leading end of the material but which thereafter is stationary.

The bottom wall 19 of the chute is of some suitable anti-friction material, preferably impervious to the action of the bleaching, dyeing or other liquor, such, for example, as cement or porcelain. If desired, the rear wall 1 of the upturned material in-take end may be of the same or similar material, and for convenience of construction the side walls 21—21 may be of the same material and preferably integral therewith, as indicated in Fig. 3. If desired, the said rear and side walls may be vertically grooved, as indicated at 22, for the downward flow of the treating liquor, which may be introduced through the pipe 23 near the upper end of the chute as indicated in Fig. 1.

The discharge end of the chute may be formed in or as a portion of the base member or part 24. The delivery mouth of the discharge end terminates at substantially the dotted line A in Fig. 1, and beyond that point the base 24 may be of any suitable shape. It is here shown as upwardly curved or inclined as at 25 in substantial continuation of the bottom wall 16 of the discharge end. The discharge end may be of gradually increasing diameter in the direction of the onward movement of the material through the chute in order to facilitate its delivery. In the construction shown in Fig. 1, the said discharge end is shown as increasing somewhat in cross sectional area adjacent the delivery mouth. For convenience of construction, and because it is desirable to construct this portion of the apparatus of material impervious to the treating liquors, the inner surface of the base portion 24 beyond the line A of the delivery mouth is preferably of cement.

The member 20 is herein shown as a roll mounted to turn upon a spindle 26 when sufficient weight of material to be treated has accumulated in folds upon the former 27 extending laterally therefrom substantially normal to the walls of the chute and so as substantially to close the lower end thereof and receive the material as deposited thereon. The said roll 20 is provided with a weight 28 acting at the commencement of the feeding operation to elevate the former 27 in the chute to yield as the material accumulates upon the former in folds. The roll 20 rotates slowly during the accumulation of the material upon the former 27 until the face 29 of the weight 28 contacts with the lower portion 30 of the front wall of the chute, thereby preventing further rotative movement of the roll 20. When the weight 28 has reached the point indicated, the former 27 has sufficiently cleared the bottom of the chute to permit the material being drawn thereunder. It will therefore be apparent that when sufficient material has accumulated in the chute to move the former 27 into the forward position described, thereafter and throughout the introduction of the material into the chute and its movement therethrough the said roll 20 becomes a fixed or stationary member. In other words, the roll rotates only during the initial use of the chute. The surface of said roll 20 is preferably of wood, and in any event is of a material presenting greater frictional resistance to the onward movement of the material under treatment through the chute than does the opposite or rear and bottom walls 17, 19.

It will be apparent that the material accumulates upon the former 27 in folds extending substantially normal to the walls 17, 18, the folded edges of the material preferably contacting with both walls. As the roll 20 rotates, owing to the weight of the material upon the former 27, the said substantially normal position of the folds of the material with respect to the walls of the chute is maintained, owing first to the action of the former 27, and after the said former has passed beyond the line A at the delivery mouth of the chute, then by reason of the fact that the rear and bottom wall of the chute presents less frictional resistance to the onward movement of the material than does the now stationary front and upper wall constituted by the roll 20.

It will be evident that the length of the rear and bottom wall between the in-take end and the line A of the delivery mouth is greater than the length between the same points of the front and top wall, and if both walls presented the same frictional resistance to the onward movement of the material, then the material would become displaced from the folded condition substantially normal to the walls as described and would be-

come gradually tangled and packed in the chute. The said greater length of the rear and bottom wall of the chute is compensated for by the fact that it opposes less frictional resistance to the material contacting therewith than does the front and top wall of the chute. It will be apparent that particularly in the curved portion of the chute, the weight of the material accumulates more and more upon the rear and bottom wall until finally the entire weight is borne thereby. This increases the frictional resistance opposed to the onward movement of the material, and it is therefore important that this rear and bottom wall present relatively less frictional resistance than the said top wall. In this embodiment of the invention, this effect is secured in a simple manner by forming said wall of anti-friction material as previously described. Within the scope of my invention, the said rear and bottom wall might be a non-driven surface movable, however, under the weight and onward movement of the material. I prefer, however, to accomplish the same result more satisfactorily and at less expense by rendering the wall stationary and making it of a suitable anti-friction material.

The front wall 18 of the chute may be of any suitable material and is preferably of wood. If desired, and as shown, it may be provided with a transparent pane 31 permitting observation of the material within the chute. As previously stated the material may be treated prior to its admission into the chute and may be withdrawn therefrom at any desired rate, or, on the other hand, I may introduce the treating material as through the pipe 23 and withdraw it from the lower end of the chute in any suitable manner, not herein indicated.

The material is preferably drawn through the chute in some positive manner, as, for example, by the squeeze rolls 32, 33, the upper one of which is provided with a weighted arm 34. One or both of these rolls is driven by means of the sprocket chain 35 carried by the sprocket gear 36 co-axial with the driving pulley 6. If desired, I may provide between the delivery mouth and said squeeze rolls, guide rolls 37, 38, adjacent which may be provided transverse guards 39 to prevent any tangles in the material which may possibly occur, from falling back into the base portion of the chute. If desired, adjacent said squeeze rolls I may provide a pot eye 40.

In Figs. 4 and 5, I have shown a slightly modified form of my invention. Therein I have provided an upright pipe 41 terminating in a transverse portion 42 having a number of discharge jet orifices 43, whereby the treating liquor may be introduced into the upper end of the chute. The said liquor, after percolating through the material and reaching the bottom of the chute, is discharged through a pipe 44 into the lower end of the pipe 41, where it meets a steam jet introduced through the pipe 45, thereby forcing said treating liquor to return through the pipe 41 and to be re-discharged into the open upper end of the chute. Otherwise the construction of the chute is substantially the same as that indicated in Figs. 1 and 2.

In Fig. 6, I have indicated still another slightly modified form of my invention, and wherein I have omitted the former and have provided a roll 46 normally stationary. The surface of this roll is of wood and possesses the same frictional resistance to the onward movement of the material through the chute as does the construction described in Fig. 1. If, however, the material should for some reason become packed and entangled in the chute, the said roll 46 may move slightly from time to time to facilitate the discharge thereof. After the discharge of the packed material, the roll again becomes and is normally stationary for the purpose stated.

In Fig. 7, I have indicated a still further modified form of my invention, wherein the roll is replaced by a fixed wall or surface 47. This surface is preferably of wood or some equivalent material presenting greater frictional resistance to the onward movement of the material under treatment than does the opposite wall. For convenience of construction, the portion 48 of the chute exterior to said wall 47, may be of the same material as the base of the chute. For the purpose of the invention, however, the surface 47 should be of wood or some equivalent material.

It will be apparent viewing Figs. 4, 6 and 7, that the lower portion of the chute is of gradually increasing cross sectional area in the direction of the movement of the material through the chute.

In Figs. 8 and 9, I have indicated still another form of my invention. Therein I have provided a chute composed of a suitable number of sections 49, 50, 51 suitably connected and of gradually increasing cross sectional area, as more clearly indicated in Fig. 9. The entire inner surface of said chute, and in fact the entire chute, may be formed of some suitable anti-friction material, such as cement or porcelain, but in this case the front or upper wall of the chute should be faced upon its inner surface with some suitable frictional material, such as wood, as indicated at 52. In this case the rear and bottom walls of the sections 50, 51 present less frictional resistance to the material than does the facing 52, so that the material is delivered in the manner heretofore described. If desired, treating liquor may be introduced into the chute shown in Fig. 8, in any suitable manner, and means may be provided similar to that shown in

Fig. 1, for folding material therein and for withdrawing it therefrom.

It will be apparent from the foregoing description that I have provided an inexpensive yet effective means for treating textile material in lengths and have so constructed the chute that the material is delivered thereto without substantial tangling or undue packing, owing to the difference in the frictional resistance presented to the onward movement of the material by the opposite wall of the chute.

Having thus described one illustrative embodiment of my invention, I desire it to be understood that although specific terms are employed, they are used in a generic and descriptive sense and not for purposes of limitation, the scope of the invention being set forth in the following claims.

1. Apparatus for treating textile material in lengths comprising a chute having an upturned material intake end and a lower angularly directed discharge end having a delivery mouth, the rear and bottom wall of said chute between said intake end and delivery mouth being of greater length than the front and upper wall thereof between said points but having a material contacting surface presenting less frictional resistance to the onward movement of said material through the chute than the said front and upper wall, thereby to compensate for said greater length by causing the relative faster advance of the portion of the material contacting with said rear and bottom wall.

2. Apparatus for treating textile material in lengths comprising a chute having a substantially upright receiving portion terminating in an open upper end and a lower forwardly extending discharge portion forming a continuation of said receiving portion and having a delivery mouth, said discharge portion having top and bottom curved walls, whereof the bottom curved wall is the longer and has a material-contacting surface presenting less frictional resistance to the onward movement of the material through the chute than the said top wall, whereby the portion of the material contacting with said bottom wall advances relatively faster through the chute than the portion of the material contacting with said top wall.

3. Apparatus for treating textile material in lengths comprising a chute having a substantially upright receiving portion terminating in an open upper end and a lower forwardly extending discharge portion forming a continuation of said receiving portion and having a delivery mouth, the rear and bottom wall of said chute between said intake end and said delivery end being of greater length than the front and upper wall thereof between said points, the rear and bottom wall of said discharge portion of said chute having a material-contacting, inner, stationary surface composed of an anti-friction substance, presenting less frictional resistance to the onward movement of said material through the chute than the front and upper wall.

4. Apparatus for treating textile material in lengths comprising a chute having a substantially upright receiving portion terminating in an open, upper end and a lower forwardly extending discharge portion forming a continuation of said receiving portion and having a delivery mouth, said chute having a material-contacting, inner, stationary surface composed of an anti-friction material, said chute having its point of least cross sectional area anterior to the deepest portion of said chute and of subsequently increasing cross sectional area, in the direction of the passage of the material through said chute.

5. Apparatus for treating textile material in lengths comprising a chute having a substantially upright receiving portion terminating in an open upper end and a lower forwardly extending discharge portion forming a continuation of said receiving portion and having a delivery mouth, said discharge portion having top and bottom curved walls, whereof the bottom curved wall is the longer and has a material-contacting stationary surface composed of an antifriction material, the said top wall having a material contacting surface presenting relatively greater friction to the advancing material than the said bottom wall.

6. Apparatus for treating textile material in lengths comprising a chute having a substantially upright receiving portion and a lower discharge portion inclined with respect to said receiving portion and having a delivery mouth, said chute having its point of least cross sectional area anterior to the deepest portion of said chute and of subsequently increasing cross sectional area, in the direction of the passage of the material through said chute.

7. Apparatus for treating textile material in lengths comprising a chute having a substantially upright receiving portion and a lower discharge portion inclined with respect to said receiving portion and having a delivery mouth, said chute having an inner surface of anti-friction material, said chute having its point of least cross sectional area anterior to the deepest portion of said chute and of subsequently increasing cross sectional area, in the direction of the passage of the material through said chute.

8. Apparatus for treating textile material in lengths comprising a chute having a substantially upright receiving and a lower discharge end, and a movable former normally positioned in said casing in a path at

substantially right angles to the rear wall thereof, to receive thereagainst and form the leading end of the material.

9. Apparatus for treating textile material in lengths comprising a chute provided with an upturned material in-take end having its inner surface grooved for the downward flow of textile treating or other liquid, said chute having a discharge end inclined with respect to the said in-take end and having a delivery mouth.

10. Textile conditioning apparatus comprising in combination a casing having an upright receiving end and a lower dicharge end inclined thereto, and a movable former positioned in said casing and closing the said discharge end to receive and form the leading end of the material therein.

11. Textile conditioning apparatus comprising in combination a casing having an upright receiving end and a lower discharge end angularly inclined with respect thereto, a movable former positioned in said casing to receive and form the leading end of the material therein, and a weight coacting with said former to resist the onward movement of the material through the chute.

12. Apparatus for treating textile material in lengths comprising a chute having an upturned material in-take end and a lower angularly directed discharge end having a delivery mouth, said chute having front and rear walls merging into top and bottom walls respectively, and means to lay the material in transverse folds in the in-take end of said chute, so that the folded edges contact with the said walls in the passage of the material through the chute, the rear and bottom wall of said chute between the in-take end and delivery mouth being of greater length than the front and top wall thereof between said points, but having a material contacting surface presenting less frictional resistance to the onward movement of the material through the chute than the said front and top wall, thereby to compensate for said greater length by causing the relatively faster advance of the portion of the material contacting with said rear and bottom wall.

In testimony whereof, I have signed my name to this specification, in the presence of two subscribing witnesses.

ISAAC E. PALMER.

Witnesses:
FRED E. FOWLER,
IRVING U. TOWNSEND.