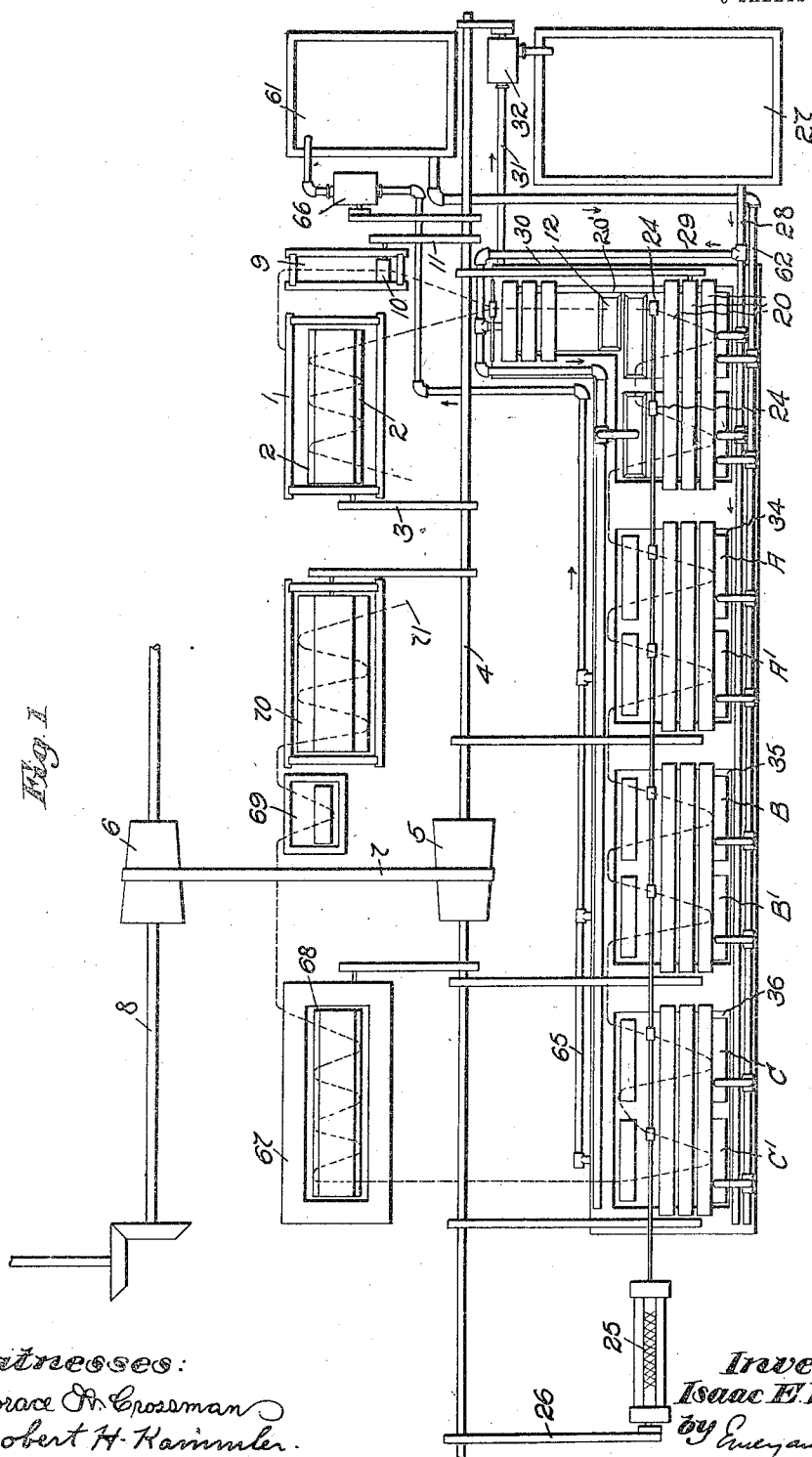


1,033,925.

I. E. PALMER.
APPARATUS FOR CONDITIONING TEXTILE MATERIAL.
APPLICATION FILED JULY 16, 1909.

Patented July 30, 1912.

5 SHEETS—SHEET 1.



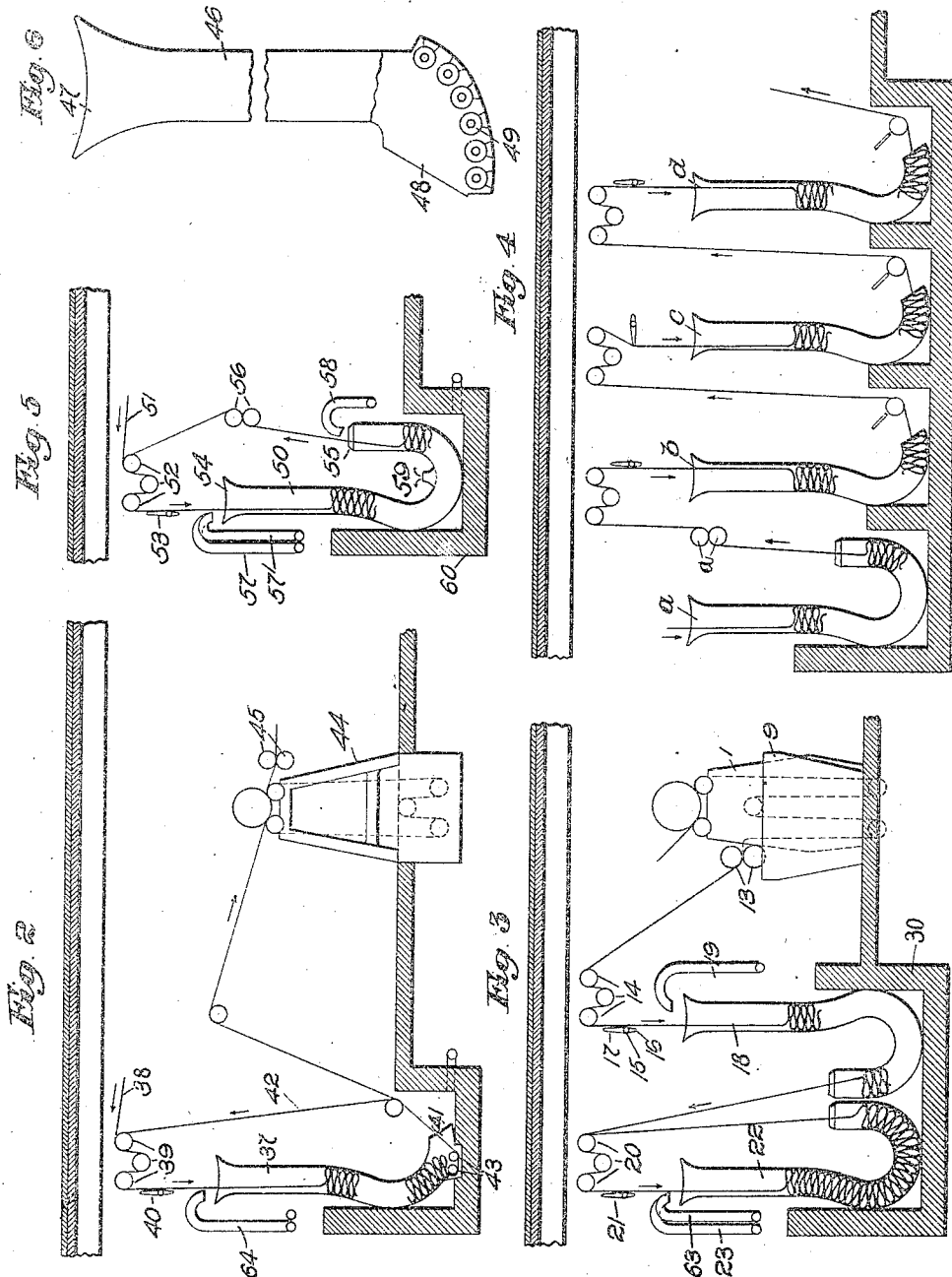
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 5 SHEETS—SHEET 2.



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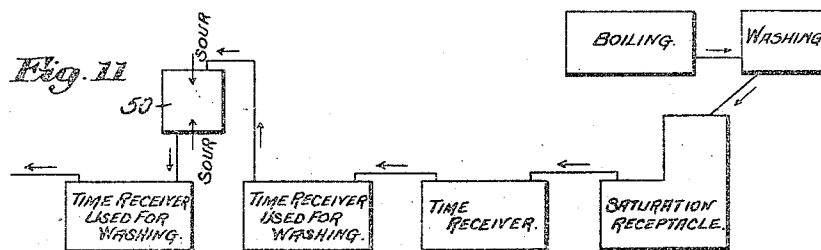
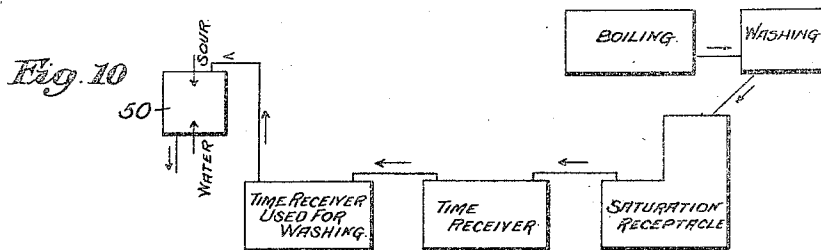
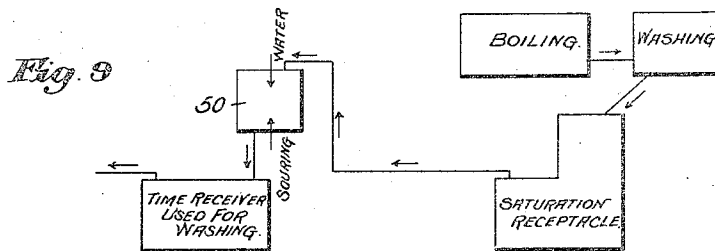
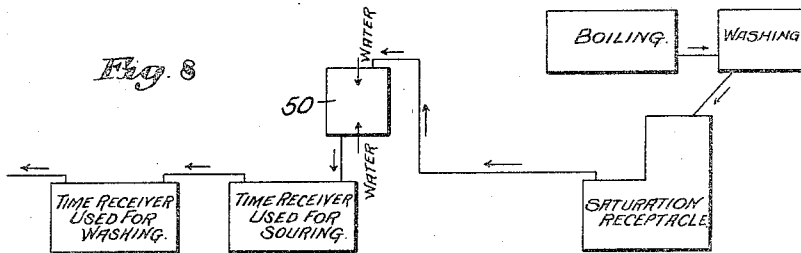
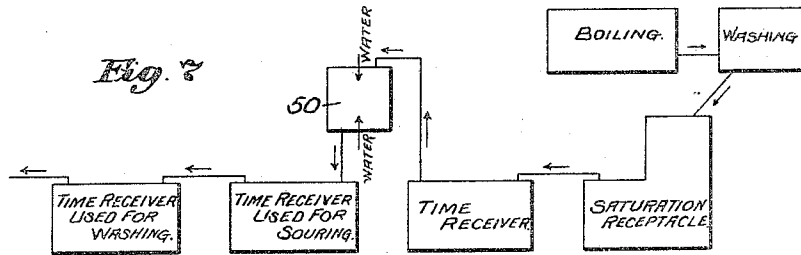
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5 SHEETS-SHEET 3.



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 APPLICATION FILED JULY 16, 1909.

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5 SHEETS-SHEET 4.

Fig. 15

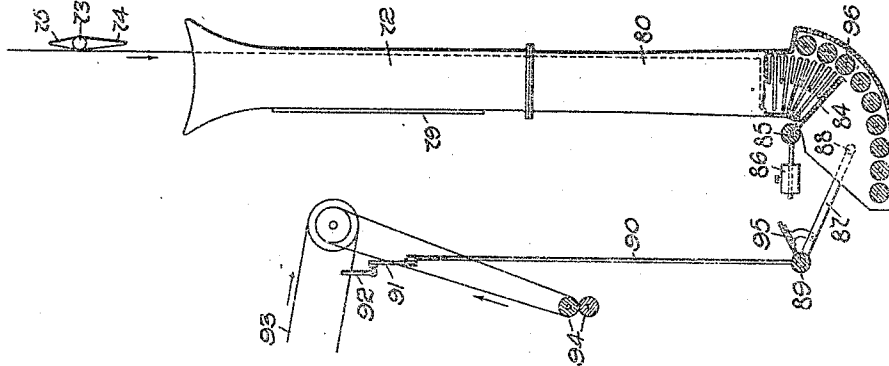


Fig. 13

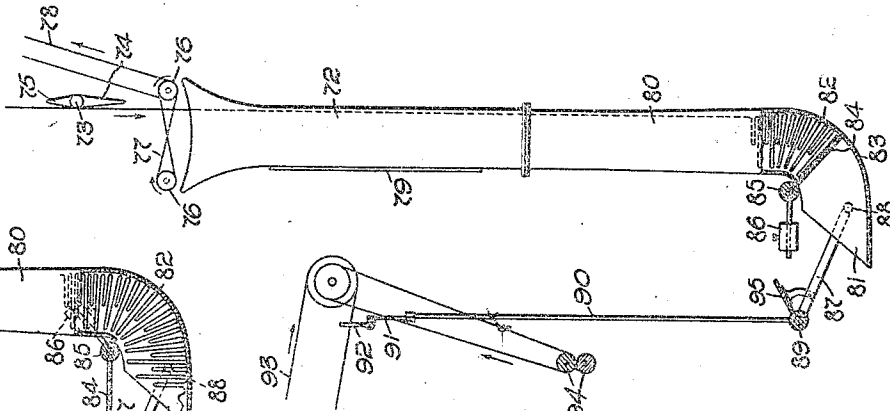


Fig. 14

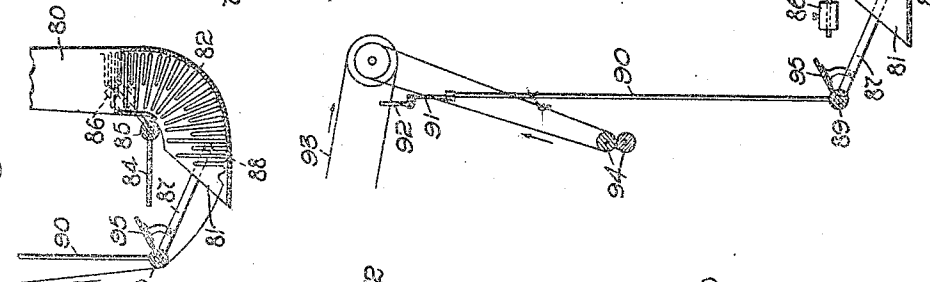
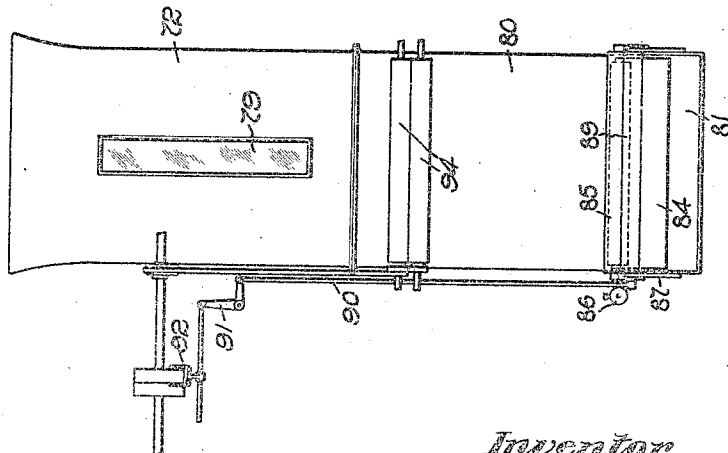


Fig. 12



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5 SHEETS—SHEET 5.

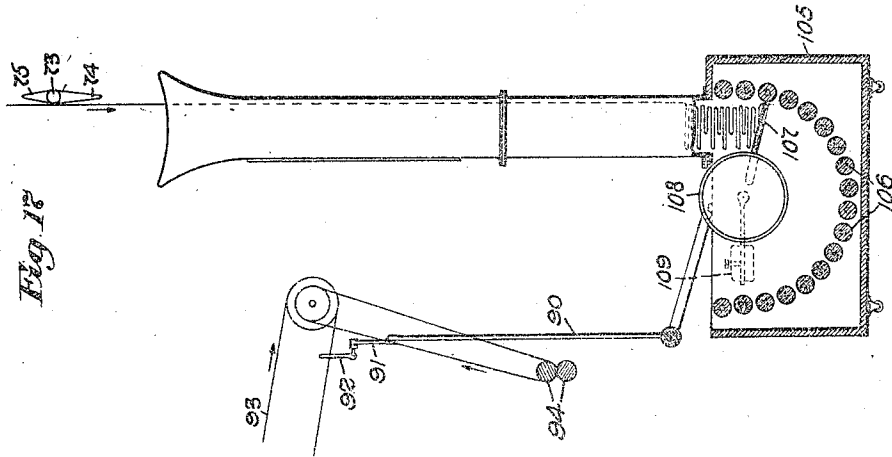


Fig. 17

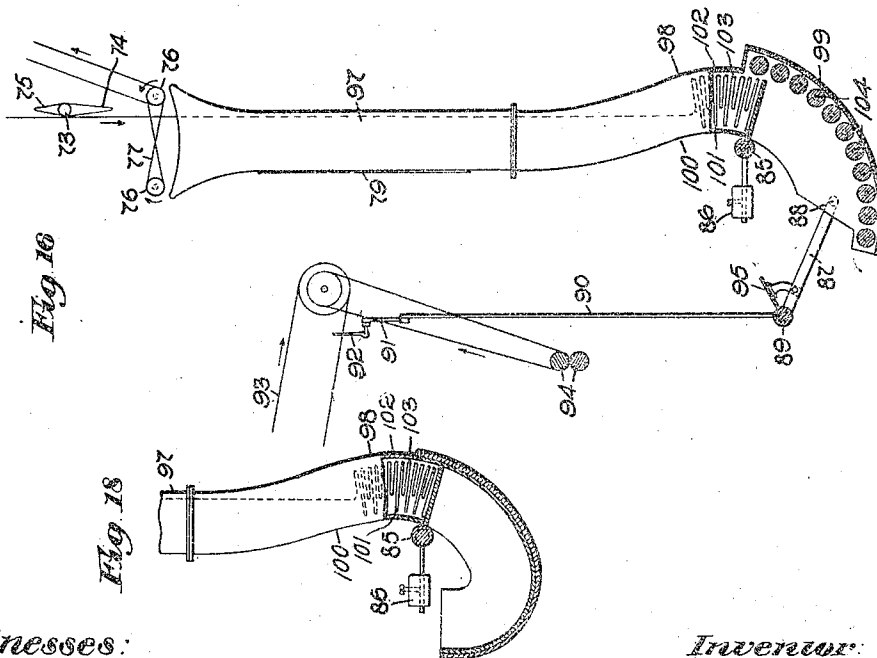


Fig. 18

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Inventor:
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UNITED STATES PATENT OFFICE.

ISAAC E. PALMER, OF MIDDLETOWN, CONNECTICUT.

APPARATUS FOR CONDITIONING TEXTILE MATERIAL.

1,033,925.

Specification of Letters Patent.

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Application filed July 16, 1909. Serial No. 507,952.

To all whom it may concern:

Be it known that I, ISAAC E. PALMER, a citizen of the United States, residing at Middletown, in the county of Middlesex and State of Connecticut, have invented an Improvement in Apparatus for Conditioning Textile Material, 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 conditioning textile material with a treating liquor which is preferably a bleaching liquor or other liquor involving the chemical treatment of the material and preferably involving the continued treatment of the material by an absorbed portion of the liquor after the material has been separated from the body of the liquor.

In order that the principles of the invention may be readily understood, I have disclosed a form of apparatus embodying the same in the accompanying drawings, wherein—

Figure 1 is a plan view of an apparatus for practising my invention; Fig. 2 is a view partly in vertical section and partly in side elevation of one form of receiver and coacting parts. Fig. 3 is a similar view of another form of the apparatus. Fig. 4 is a diagrammatic representation illustrating the manner of use of the saturating receptacle and so-called time receivers; Fig. 5 is a view partially in side elevation and partially in vertical section of a receptacle preferably employed in the practice of my invention; Fig. 6 is a side elevation of a casing or receiver which may be used in the practice of my invention; Figs. 7 to 11 inclusive are diagrams illustrating certain manners of use of the apparatus herein disclosed; Fig. 12 is a front elevation of a casing that may be employed in the practice of my invention; Fig. 13 is a side elevation thereof partially in section but disclosing also means for feeding the material thereinto; Fig. 14 is a detail in side elevation and vertical section representing the position of the parts when material is delivered from the casing; Fig. 15 is a side elevation and vertical sec-

tion of a casing embodying a slightly modified form of my invention; Figs. 16 and 17 are similar views of still further modified forms of my invention; and Fig. 18 is a detail representing the lower portion of a casing involving my invention.

The apparatus herein disclosed is intended for use in treating textile material in a woven condition or unwoven condition, in which latter case the material may be subjected to treatment as a warp chain or otherwise. The material whatever be its condition and whatever be its nature is passed through the apparatus in band form with the same end always foremost, the material being passed successively from one vat receiver or receptacle to another in any suitable manner. Preferably the material is subjected to a preliminary washing or boiling operation followed if desired by a cooling operation, after which the material is subjected to treatment in a saturation receptacle by a liquor of suitable nature, and which is preferably a bleaching liquor. After subjecting the material for the desired length of time to treatment in the bleaching liquor, the material is withdrawn from the receptacle containing such liquor and a portion of the liquor is preferably expelled from the material. In this condition; that is, either thoroughly or partially saturated, the material is conveyed to what I am pleased to term a time or storage receiver, through which the material passes while permitting the continued action upon the material of the residual liquor absorbed thereby, and thus conveyed from the saturation receptacle to the time receiver. If the material has not been sufficiently treated by the residual absorbed liquor when the material issues from the first time receiver, the material is thereupon conveyed through a second or any number of succeeding time receivers. Immediately upon the termination of the action of the bleaching or other treating liquor, whether this action terminate with the first or any succeeding time receiver, the material is thereupon washed and is thereafter preferably soured and subjected to a final washing.

As disclosed hereinafter, I have provided

means whereby the bleaching or other treating action may be terminated at any desired point or period. Preferably, I accomplish this result by providing means whereby the material may be flooded with water at the necessary time and point, whether this be in the saturation receptacle or in one or another of the time receivers. I have also provided means for conveying the material continuously through the apparatus at a speed which may be varied to suit the strength of the treating liquor and the weight of the goods being treated, or, in other words, the speed may be varied to conform to the effectiveness of the action of the feeding liquor. As the material is withdrawn from the saturation receptacle, preferably I forcibly expel a portion of the liquor from the material by squeeze rolls or otherwise so that the material is delivered or conveyed to a time receiver in but a partially saturated condition, although I may retain any desired portion or all of the absorbed treating liquor in the material as it is conveyed to the time receiver or receivers. The number of time receivers employed is determined by their size or time required for bleaching or other treatment, and the quantity of goods subjected to such treatment. Any suitable bleaching liquor may be employed, but preferably chlorine is used. Any suitable souring or acid wash may be employed, but preferably I use oil of vitriol or sulfuric acid.

As will be more fully disclosed hereinafter, I may use one of the time receivers for purposes other than above referred to. For example, if the bleaching be terminated in the first time receiver, the material may be washed in the next time receiver and subjected to a souring action in a succeeding time receiver, and again washed in still another time receiver if desired.

Intermediate two or more of the time receivers or otherwise suitably arranged in the system, I preferably interpose a receptacle through which the material is passed in one direction. In such receptacle I introduce a liquid or liquids both at the point where the material is entered into the receptacle and at the point where the material issues therefrom, so that both the incoming and outgoing materials are subjected to the action of a fresh liquid. The two incoming liquid streams may be of the same nature or different. For example, both streams may be water so that both the incoming and outgoing material may be subjected to fresh streams of water or one of the streams may be some suitable liquor, such for example as a souring liquor. Preferably in such case the souring liquor is introduced with the incoming material and the water is introduced to act upon the outgoing material. The stream introduced to act upon the outgoing mate-

rial travels in a direction contrary to the outgoing material, and preferably the two streams commingle and are discharged together from the receptacle at a point intermediate the preferably upright ends thereof.

Referring more particularly to the drawings, the vat or receptacle into which the material is preferably first introduced is represented at 1 in Fig. 1, the material being delivered thereto in any suitable manner. In said receptacle the material is preliminarily washed or boiled. The material is conveyed through said vat by passing it about any desired number of rolls 2—2 driven in any suitable manner, as by a belt 3 from the shaft 4 provided with a cone 5, about which and the companion cone 6 is passed a belt 7. The cone 6 is fast upon a shaft 8 deriving power from any suitable source. By shifting the belt 7 upon the cone pulleys 5 and 6, the speed at which the material is conveyed through the apparatus may be varied for the purpose heretofore stated.

The material may be traversed from end to end of the vat in any suitable manner, and as it issues therefrom may be passed if desired through a suitable cooling vat 9 having one or more rolls 10 therein driven by belt 11 from the shaft 4, and wherein the material may be washed, or instead the material may be delivered directly to the saturation receptacle 12. The saturation receptacle is preferably provided with a bleaching liquor. This receptacle may be of any suitable construction, but preferably I employ the form of receptacle illustrated in Fig. 3.

In Fig. 1, I have represented three upright saturation receptacles into which the material is conveyed in succession. Two of these receptacles are represented in detail in Fig. 3. As shown in the latter figure the material issuing from either the boiling vat 1 or the cooling receptacle 9 preferably passes between squeeze rolls 14. Preferably the material is folded as it is deposited in the receptacle and to that end I preferably provide a folder pivoted at 15 and having arms 16, 17 of unequal length whereby the material may be folded into the first saturation receptacle in folds of alternating length. Beneath the folder is positioned the first saturation receptacle 18, herein represented as having upright receiving and discharge ends, the height of either of which may of course be varied to suit the exigencies to which the apparatus is adapted.

In Fig. 3, I have represented a pipe 19 for introducing the treating liquor, of any suitable nature, into the saturation receptacle 18. The rollers 14 are driven from the shaft 4 or otherwise in any suitable manner. After issuing from the saturation re-

ceptacle 18, the material is then directed to and about the driven rolls 20 and is then by a folder 21 delivered into one end of the saturation receptacle 22 supplied with liquor by pipe 23. The material issuing from the saturation receptacle 22 is thence conveyed if desired to a third receptacle of similar construction and nature indicated in Fig. 1, by suitable means. The rollers 20 are driven in suitable manner and have associated therewith suitable means indicated at 20' in Fig. 1 to traverse the material from end to end of the receptacles.

In Fig. 1, I have indicated at 24 means to traverse the material to and fro in the second and third saturation receptacles.

At 25 in Fig. 1, I have indicated mechanism connected by belt with the shaft 4, whereby the material may be traversed to and fro not only in the saturation receptacles but in the various succeeding time receivers.

A storage vat for the bleaching or other liquor is represented in Fig. 1 at 27, pipes 28 and 29 connecting this vat with the three saturation receptacles indicated in Fig. 1. If desired, the several saturation receptacles there indicated may be positioned within a vat 30, into which the treating liquor may overflow from the saturation receptacles. I may, if desired, provide a pipe 31 connecting said vat and the supply vat 27 for returning the liquor to the latter, a pump 32 being provided if desired for this purpose. The pipe 28 is represented in Fig. 1 as extending adjacent to the several time receivers, though not connected thereto, in order that if it be desired to employ any of said receivers primarily as saturation receptacles, proper connections from the liquor vat may be made.

At 34, 35 and 36 in Fig. 1, I have represented vats, in each of which I position one or more so-called time receivers. In Fig. 1, I have represented each vat as containing two time receivers A A', B B' and C C' respectively, the material being delivered into and conveyed through said receivers in succession in substantially the manner that it was delivered into the saturation receptacle. Each of said receivers is provided with rollers for feeding or conveying the material therethrough and with suitable traversing means and folders for depositing the material in said receiver. While said receivers may be of any suitable structure, I have in Fig. 2 represented one of said receivers at 37. The material represented at 38 is delivered to the traversing mechanism and rolls 39 and thence past the folder 40 into the receiver 37, from which it issues at the lower end 41 and is redirected, as represented at 42 into the adjacent time receiver. The material is thus passed through any number of the time receivers, the number

used for this purpose being dependent upon the time necessary to permit the required action of the bleaching or treating liquor upon the material. If desired and as represented in Fig. 2, the discharge end of the several time receivers may be substantially horizontally directed and may be provided with idler anti-friction rolls 43 to assist the delivery of the material from the receiver. From the last time receiver of the series the material is conveyed to a washing vat represented in Fig. 2 at 44. This vat is provided with suitable rolls to convey the material therethrough and is preferably equipped with squeeze rolls 45, between which the material issues from the vat.

In Fig. 4, I have diagrammatically represented a saturation receptacle *a* and time receivers *b*, *c* and *d* respectively, the material being conveyed continuously through said several receptacles and receivers in the manner already described. Preferably I do not employ squeeze rolls in conjunction with the time receivers *b*, *c* and *d*, nor with those indicated in Fig. 1, using them only in conjunction with the saturation receptacle or receptacles, unless one of the time receivers be used for washing or souring, as herein-after specified. I may provide a pair of squeeze rolls *a'* by which the desired proportion of the bleaching liquor may be forcibly expelled from the material as it is withdrawn from the saturation receptacle *a* and conveyed to the first time receiver *b*. It will be understood, however, that the material may be conveyed in a thoroughly saturated or unsqueezed condition to the first time receiver.

In Fig. 6, I have represented a casing 46 preferably used as a time receiver, although it may be used for other purposes. It is provided with an upright receiving end 47 and a substantially horizontally directed discharge or outlet 48. The lower portion of the casing is provided with a series of idler anti-friction rolls 49 to receive the material directed into the receiver and to assist in discharging the same through the outlet 48.

In Fig. 5, I have represented a casing or receptacle 50 which may be interposed at any desired point in the system herein described and is indicated clearly in diagrams hereinafter referred to. The entering material is represented in said figure at 51, it passing about the rolls 52 and being delivered by the folder 53 as previously described into the adjacent upright end 54 thereof. The material is discharged or drawn from the opposite end 55 and is thence directed between the squeeze rolls 56 and then to the same rolls 52 or to other similar rolls to be conveyed to the next similar vat or receptacle, if a plurality thereof be employed. A stream of liquid is entered by pipe 57 into

the end 54 of the vat or receptacle, and another stream of liquid is entered by pipe 58 into the opposite end 55 of the said receptacle. In this manner both the incoming and the outgoing portions of the material encounter or are subjected to fresh streams of liquid. I may introduce the same liquid, as for example water, into the pipes 57 and 58 or may introduce different liquids thereat. For example, I may introduce a souring liquor and in some cases a bleaching liquid by one or both of said pipes. I may also and preferably introduce a souring liquid by one of said pipes and water by another of said pipes. Thus, by the same receptacle the material may be subjected both to a souring action and to a subsequent washing action.

In Fig. 5, I have represented a second pipe 57, so that either of two different liquids may be entered into the end 54 of the receptacle. Similarly I may provide a second pipe adjacent the pipe 58 for the same purpose. The streams of liquid entering through the opposite ends of the receptacle are preferably provided with a common outlet intermediate said ends. Herein I have represented the receptacle as provided with an outlet 59 having a grating or perforated covering conforming to the general curvature of the casing or receptacle. I contemplate the introduction of a flooding or neutralizing liquor into the system or apparatus so as to stop the bleaching or other action at any desired point. For that purpose, I contemplate discharging water into either the saturation receptacle or into one of the time receivers.

In Fig. 1, I have represented a water tank 61, from which leads a pipe 62 extending to points adjacent the several saturation receptacles and time receivers. At any desired point, I may extend branch pipes so that water may be flooded into said receptacles and receivers. For example, in Fig. 3, I have represented a branch pipe 63 for discharging water into the saturation receptacle 22, and if desired similar means may be provided to discharge flooding water into the saturation receptacle 18. In Fig. 2, I have represented a branch pipe 64 for discharging water for this purpose into the upper end of a time receiver 37. Preferably each of said time receivers is thus equipped. As represented in Fig. 1, I provide a pipe 65 which may be connected with the several time receivers, or a vat wherein each of them is positioned so that the flooding water if used may be returned by pump 63 to the tank 61.

After passing the material through the several time receivers as represented in Fig. 1, it is then directed to and passed through a washing vat 67 provided with a suitable number of driven rolls 68, after which it is

directed through a vat or vats 69 and 70, whereby it is subjected to a souring or acid wash, the said vats 69 and 70 being provided with suitable driven rolls. The material is finally discharged as indicated at 71 upon completion of the process.

As previously stated, the receptacle or vat 50 shown in Fig. 5 may be interposed if and where desired in the system, and also if desired one or more of the time receivers may be employed for washing or for souring or for both steps depending upon the requirements of the particular case.

In Figs. 7 to 11, I have represented different ways of connecting up and using the several parts of the apparatus or system described. It will be understood, however, that the several units or parts of the apparatus or system may be otherwise combined in any desired manner to direct the material therethrough.

In Fig. 7, I have represented the material as passing through the boiling vat and from thence into a washing vat and then into the saturation receptacle, from which it is delivered into the first time receiver acting as such. From this point, the material is delivered into the receptacle 50, into which water is introduced at both ends for washing. From this point the material is delivered into the second time receiver, herein used for souring, and then into the third time receiver herein used for washing. In the diagram shown in Fig. 8, the material, after issuing from the saturation receptacle, passes direct to the receptacle 50, whereinto water is introduced at both ends. The material is then passed to a time receiver, herein represented as used for souring, and to another time receiver, herein represented as used for washing. In the diagram represented in Fig. 9, the material passes from the saturation receptacle into the receptacle 50, whereinto water is introduced at one end and a souring liquid at the other end. From such receptacle the material is delivered into a time receiver used for washing. In the diagram shown in Fig. 10, the material passes from the saturation receptacle into a time receiver used as such, thence into a second time receiver used for washing, and thence into the receptacle 50 in which a souring liquor is introduced at one end and water for washing at the opposite end. In the diagram illustrated in Fig. 11, the material is passed from the saturation receptacle into a time receiver used as such, thence into a second time receiver used for washing, thence into the receptacle 50, whereinto two streams of souring liquor are introduced at opposite ends, whereafter the material is directed into another time receiver used for washing.

The receptacle 50 is of general application and may be used not only in the several

ways indicated, but may also be used as a saturation receptacle, in which case the bleaching or treating liquor is introduced at both ends to act upon the incoming and outgoing material. It will be noted that the several receptacles and receivers are provided with upstanding ends, or with at least one upstanding end, and that the material is delivered by power driven means through the various receptacles and receivers always with the same end foremost. Wherever the treating or bleaching action is terminated the washing action is immediately commenced, so that the washing action may commence in one of the time receivers or in a receptacle subsequent thereto. It will also be understood that in the time receivers I may wash, sour and again wash the material, provided the bleaching action has been previously terminated. In such case I provide squeezing rolls to act upon the material as it is discharged from the time receivers, then serving for washing, souring and washing. Generally speaking, the receptacle is or may be employed at the point where the bleaching is stopped, and in such case water is introduced thereinto at the receiving end thereof at least. It will further be understood that no treating liquor is introduced into the time receiver or receivers when used as such, excepting the liquor that is carried thereinto by the goods from the saturation receptacle.

In the practice of my invention, I contemplate the provision of means to receive the leading end of the material deposited in the casing and to form the same for proper delivery thereof. The casing referred to may be any of the receptacles previously described, such for example as the saturation receptacle, time receivers or washing receptacles. Preferably the material is folded into the casing, though within the scope of my invention it may be deposited therein in any suitable manner.

In Figs. 12, 13 and 14, I have shown one embodiment of the invention wherein is provided a preferably vertical stack 72 of suitable length to permit the accumulation of a considerable length and weight of material. Any suitable means may be provided to deposit the material into said casing. Herein for the purpose I have shown a rotary folder 73 having a long arm 74 and a short arm 75 whereby, as indicated, the material may be folded into the casing, in alternate long and short folds to facilitate the advance of the folded material through the curved or inclined portions of the casing. Preferably I provide means to prevent the material as it is deposited in the casing by the folder or otherwise from overlapping the walls of the casing or otherwise becoming obstructed. While for this purpose I may provide any suitable traveling device,

I have herein shown rolls 76 connected by belt 77 so as to travel in the same direction and driven by belt 78 from any suitable source of power, the said rolls being preferably driven at a rate of speed in excess of the rate of delivery of the material into the casing. Said rolls may serve also to govern the length of fold of the material.

Preferably I provide means to permit observation of the position of the material in the casing, such for example as an opening in one of the walls thereof through which the material may be observed. Such opening may be formed in the stack 72 or other part of the casing and is herein indicated at 79. Said opening may be covered with glass or other transparent material, or in certain cases, depending upon the nature of use of the casing, the opening or slit may be entirely uncovered or may be faced with on open mesh wire fabric or the like. In certain cases, the entire forward face of the casing may be omitted and an open mesh wire fabric substituted. Below the stack 72 and preferably connected thereto or communicating therewith is a chute 80 which may be of any of the forms heretofore described or of any suitable formation. It is provided with a discharge end 81 and a portion 82 intermediate the upright portion thereof and the discharge end, said intermediate portion being represented as curved in vertical section.

I have discovered that if the inner face of the intermediate portion 82 of the casing be composed wholly or in part of some suitable anti-friction material, such for example as porcelain, the delivery of the material through the casing is very greatly facilitated, and that without the employment of means to withdraw the material from the casing I may, merely by accumulating or stacking a sufficient weight and length of material in the chute 80 and stack 72, discharge the material through the forward end 81, this being true whether said forward end be upturned or horizontally directed, as indicated in Fig. 13. In said Fig. 13, the lower portion 83 of the inner curved face of the chute 80 is formed of porcelain or other suitable anti-friction material for the purpose stated.

In Fig. 18, I have represented the lower portion of a chute, the inner face thereof being formed of or lined with such anti-friction material. In said Fig. 18, I have represented the lower portion of a chute similar it may be in form to that indicated in Fig. 13, but not provided with means for withdrawing material from the discharge end thereof. I have represented, however, the discharge end of said chute as somewhat upturned. The curved portion of the chute is formed of or lined with porcelain or other similar material to facilitate the delivery

of the material therethrough, the weight alone of the material in the chute and stack being relied upon to discharge the material from the upturned delivery end. In certain cases I may provide more or less or even all of the upstanding receiving ends of the chute with an anti-friction facing or lining such as porcelain. This is true of each of the types or forms of casings herein disclosed. If desired, I may similarly provide the upturned delivery end with such facing or lining.

In each of the forms shown in the preceding figures, the discharge end of the receptacle, be it receiver, saturation receptacle or washing receptacle, may be upturned and may be provided with a lining or interior facing of porcelain or other anti-friction material to facilitate the passage of the textile material therethrough. I contemplate, as within the scope of my invention, the application of an interior facing or lining of anti-friction material to a receptacle, casing or receiver not provided with power driven means for drawing or discharging the material therethrough, in which event I rely merely upon the height and weight of the material stacked in the receptacle, the upper portion whereof forms a stack and the lower portion whereof forms a chute. In the same manner, a casing, receiver or receptacle through which material is to be fed merely by gravity or the weight of the stack of material therein may be provided with idler rolls, such as represented at 49 in Fig. 6.

I contemplate the use of a yielding former adapted to be positioned within the casing to form the leading end of the material as it is deposited therein in any suitable manner. In Figs. 13 and 14, I have indicated at 84 a former pivoted upon a rocking roll 85 provided with a weighted arm 86 to sustain the former in an elevated position within the casing during the formation of the lower portion of the piled material, the former being forced upward as the height and weight of the pile increases until it is forced or moved by hand into the position represented in Fig. 14, thus permitting the free delivery of the material. Preferably the material is folded into the casing, and were not a former provided the material would not lie in folds transversely of the casing at the lower curved end thereof, but would lie in irregular formations. By employing a former, not only may the material be deposited in regular folds but the outer or rear edges of the folds may be positioned in advance of the inner edges, as represented in Fig. 13, thus permitting the delivery of the material in substantially the manner indicated in Fig. 14. It is, of course, apparent that any suitable form of former may be provided.

In that form of my invention wherein the material is withdrawn by power driven means from the casing, I may provide means not herein claimed for interrupting or stopping such withdrawal in the event of the improper delivery of the material, as for example, when the material becomes entangled so that it is subjected to undue strain. While this result may be variously accomplished, I have in Figs. 12 and 13 indicated arms 87 pivoted upon the casing at 88 and provided at their forward ends with a roll 89. Leading from one of the arms is an upright rod 90 connected by bell crank lever 91 to a belt shifter 92, whereby the belt 93 may be shifted from the fast to the loose pulley, so as to interrupt the feeding movement of the rolls 94 of the mechanism or portion of the apparatus succeeding the casing 80, and to which the material is delivered therefrom. In the event of undue strain being imparted to the material as it is being delivered or withdrawn from the receptacle 8, the forward ends of the arms 87 are lifted, thereby stopping the feeding movement of the rolls 94. The arms 87 may be provided with a guard 95 to prevent the material after passing about the roll 89 from winding thereabout.

The construction shown in Fig. 15 is similar to that shown in Fig. 13, excepting that in lieu of providing an inner facing or lining of porcelain or other suitable anti-friction material for the lower or forward curved portion of the casing I provide a set of idler rolls 96.

It will be understood that in the form of my invention shown in Figs. 13, 14 and 15, as well as in the preceding forms of the receiver, casing or receptacle, the said parts are of gradually increasing cross sectional area toward the discharge end thereof, thus facilitating the delivery of material therethrough. Such gradual increasing area is provided in addition to the lower offset portion of the casing, shown in Figs. 6 and 15, and wherein the idler rolls are positioned.

In the forms of the invention shown in Figs. 12 to 15 as well as in the other forms thereof, the material may be deposited in the receptacles otherwise than by folding, if desired, though I prefer to fold the same as described. While I have not in Figs. 12 to 15 nor in certain other figures illustrated pipes for circulating liquid in or through the casing, receptacle or receiver, I desire it to be understood that I contemplate providing such pipes, which may in some cases be used even when the casing is used as a time receiver.

In that type of my invention wherein the material is folded into the casing, I contemplate the provision of suitable means for retarding the passage through the casing of the forward folded edges of the material

and the relative advance of the rear folded edges such as shown in Fig. 16 so as to permit the material to be discharged or delivered in substantially the manner already described in connection with Fig. 14. While this result may be variously accomplished, I preferably provide the casing 97 with a lower portion bent first rearwardly as indicated at 98 and then forwardly as indicated at 99. The front wall 100 of the rearwardly bent portion of the casing serves to hold back or retard the passage through the casing of the forward folded edges 101, while the rear wall 102 of such rearwardly bent portion permits the relative advance of the rear folded edges 103, as indicated by the position of the folds of the material in the lower portion of Fig. 16. In the form of my invention represented in Fig. 16, I may provide a former and means to prevent improper delivery of the material, and in lieu of the anti-friction idler rolls 104 I may provide a lining of porcelain or similar material.

In the form of my invention represented in Fig. 17, the lower portion of the receptacle is formed as a box 105 which may be readily moved from place to place and which is provided with a series of idler anti-friction rolls 106 placed in a suitable curve to constitute the bottom of the chute or casing. The material may be introduced by a folder or otherwise into the casing, and I may provide a former, herein represented as a blade 107, extending radially or otherwise from the periphery of a drum 108 mounted to rock upon suitable bearings and provided with a weighted arm 109, whereby the former may be yieldingly positioned against the leading end of the material. Instead of employing a weighted arm 109, the drum 108 may itself be suitably weighted for this purpose. When the piled material has sufficiently accumulated to commence the feeding action thereof the former 107 may be tipped by hand out of position, as already described. The material may be introduced into the system herein described in rope form, and if the material be woven the ends of the pieces may be sewed together in the usual manner. It will be observed that the material is preferably conveyed by power through the entire system herein disclosed, being drawn by rolls or otherwise from each receptacle, receiver or casing and delivered into the succeeding portion of the system.

Having thus described one illustrated 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.

Claims:

1. A receptacle for use in conditioning

textile material consisting of a continuous casing having an upstanding receiving end, and a deflected discharge end, and means to introduce conditioning liquid at both the receiving and discharge ends of said casing to act upon said material, said casing having an opening intermediate its said ends for the discharge of said liquid.

2. Apparatus for use in conditioning textile material consisting of a plurality of casings into each of which the material is introduced at one end and is discharged at the opposite end, means to introduce liquid at both the receiving and discharging ends of said casing, to act upon said material, means to discharge said liquid or liquids at a point intermediate the said ends of each casing, and liquid expelling means intermediate the discharge end of one casing and the receiving end of the next casing.

3. Apparatus for use in conditioning textile material comprising in combination a casing having an upturned receiving end and a lower, discharge end, means to feed the material into said receiving end, a roll positioned adjacent said receiving end, and means to drive said roll at a speed exceeding that of the material into the casing.

4. Apparatus for use in conditioning textile material comprising in combination a casing having an upturned receiving end and a lower discharge end, material folding means substantially over said receiving end and auxiliary means to engage the material between said folding means and said receiving end to assist in delivering the material into the casing.

5. Textile conditioning apparatus comprising in combination a casing having an upright receiving end, a lower discharge end and an intermediate portion curved in vertical section, a folder blade mounted upon a substantially horizontal axis to direct the material into said receiving end, said folder blade having long and short arms, and means to rotate said blade sufficiently to bring each of said arms periodically into folding engagement with said material, thereby to fold the same.

6. Textile conditioning apparatus comprising in combination a casing having an upright receiving end, a discharge end, and an intermediate portion curved in vertical section backwardly and forwardly.

7. Textile conditioning apparatus comprising in combination a casing having an upright receiving end, a lower discharge end, and an intermediate portion continuously curved in vertical section, a part of said intermediate portion being curved backward to the rear of said upright receiving end.

8. Textile conditioning apparatus comprising in combination a casing having an

upright receiving end, a discharge end and an intermediate portion curved backwardly in vertical section thereby to retard the passage of the forward or inner edges of the material relative to the rear or outer edges thereof.

9. Textile conditioning apparatus comprising in combination a casing having an upright receiving end, a discharge end and an intermediate portion having a rearwardly and forwardly extending bend compelling rearwardly downward inclination of the stacked material in the intermediate portion of the casing.

10. In an apparatus for treating cloth in rope form, a piling down stack of such cross sectional area as to adapt it to be progressively filled up when the rope is piled down thereon, a chute having two upwardly turned ends with one of which the stack communicates and from the other of which the cloth rope is withdrawn, said chute having its rear and bottom only provided with a series of closely placed, independent, freely revolving rollers, the opposite or upper surface of said chute presenting relatively greater frictional resistance to the onward movement of the material through the chute than said rollers, thereby to compensate for the greater length of the bottom by causing the relatively faster advance of the portion of the material contacting with said rollers.

11. 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 and having a series of closely placed, independent, freely revolving rollers and the top wall of said chute having between the intake end and the delivery mouth a stationary surface of substantial length presenting relatively greater frictional resistance to the onward movement of the material through the chute than said rollers, thereby to compensate for the greater length of the bottom of the chute by causing the relatively faster advance of the portion of the material contacting with said rollers.

12. 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 is provided with a series of closely placed, independent, freely revolving rollers thereby to present 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 rollers advances relatively faster through the chute than the portion of the material contacting with said top wall.

13. 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 an inner material contacting surface formed of a series of closely placed, independent, freely revolving rollers, 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.

14. 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 material contacting surface formed of a series of closely placed, independent, freely revolving rollers, 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.

15. 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, 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 intake 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 walls of said chute between the intake end and the delivery mouth being of greater length than the front and top wall thereof between said points and provided with a series of closely placed, independent, freely revolving rollers to present 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.

16. A system for conditioning textile material in lengths comprising in combination a receptacle to contain a textile treating liquor, feeding means to direct material in lengths therethrough, a chute having co act-

ing means for delivering the material from said receptacle thereto in loose folds, said 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 the intake end and the delivery mouth thereof being of greater length than the front and upper walls thereof between said points and having a series of closely placed, independent, freely revolving rollers and the top wall of said chute having between the intake end and the delivery mouth a stationary surface of substantial length presenting greater frictional resistance to the onward movement of the material through the chute than said rollers, thereby to compensate for the greater length of the bottom of the chute.

17. A system for conditioning textile material in lengths comprising in combination a washing receptacle, a receptacle to contain a textile treating liquor, feeding means to direct material in lengths therethrough, a chute having co-acting means for delivering the material from said receptacle thereto in loose folds with the same end always foremost, said 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 the intake end and the delivery mouth thereof being of greater length than the front and upper walls thereof between said points and having a series of closely placed, independent, freely revolving rollers, and the top wall of said chute having between the intake end and the delivery mouth a stationary surface of substantial length presenting greater frictional resistance to the onward movement of the material through the chute than said rollers, thereby to compensate for the greater length of the bottom of the chute.

18. A system for conditioning textile material in lengths comprising in combination a washing receptacle, a receptacle to contain a textile treating liquor, a chute having an upturned material intake end and a lower angularly directed discharge end having a delivery mouth and a second washing receptacle, means to feed the material in succession through said parts with the same end always foremost and including means to pile the material in loose folds in said chute, said chute having its rear and bottom wall between its intake end and delivery mouth of greater length than the front and upper wall thereof between said points and having a series of closely placed, independent, freely revolving rollers, and the top wall of said chute between the intake end and the delivery mouth having a stationary surface of substantial length presenting greater frictional resistance to the onward movement of

the material through the chute than said rollers, whereby the folds of the material in said chute may be fed in sequence to the second washing receptacle.

19. A system for conditioning textile material in lengths comprising in combination a washing receptacle, a receptacle to contain textile treating liquor, a chute having an upturned material intake end and a lower angularly directed discharge end having a delivery mouth, a receptacle to contain a souring liquor, a final washing receptacle, means to feed the material successively through said receptacles with the same end always foremost and including means to deposit and accumulate the material in said chute in loose folds, the rear and bottom wall of said chute between said intake end and the delivery mouth being of greater length than the front and upper wall thereof between said points and having a series of closely placed, independent, freely revolving rollers, and the top wall of said chute having between the intake end and the delivery mouth a stationary surface of substantial length presenting greater frictional resistance to the onward movement of the material through the chute than said rollers, whereby the loose folds of the material in the chute may be delivered in sequence to the subsequent receptacles.

20. A system for conditioning textile material in lengths comprising in combination a receptacle to contain a textile treating liquor, a chute having an upturned material intake end and a lower angularly directed discharge end having a delivery mouth, means to feed the material through said receptacle and chute with the same end always foremost and including means to deposit the material in loose folds in said chute, the rear and bottom wall of the chute between the intake end and the delivery mouth being of greater length than the front and upper wall thereof between said points, but presenting less proportional frictional resistance than said front and upper wall to the onward movement of the material through the chute.

21. A system for conditioning textile material in lengths comprising in combination, a receptacle to contain a textile treating liquor, a chute having an upturned material intake end and a lower angularly directed discharge end having a delivery mouth, means to feed the material through said receptacle and chute with the same end always foremost and including means to expel a portion at least of the treating liquor from the textile material between said receptacle and chute and also including means to deposit the material in loose folds in said chute, the rear and bottom wall of the chute between the intake end and the delivery mouth being of greater length than the front

and upper wall thereof between said points,
but presenting less proportional frictional
resistance than said front and upper wall
to the onward movement of the material
5 through the chute, and means positively to
withdraw the material through the delivery
mouth of said chute for further treatment.

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

ISAAC E. PALMER.

Witnesses:

IRVING U. TOWNSEND,
ROBERT H. KAMMLER.