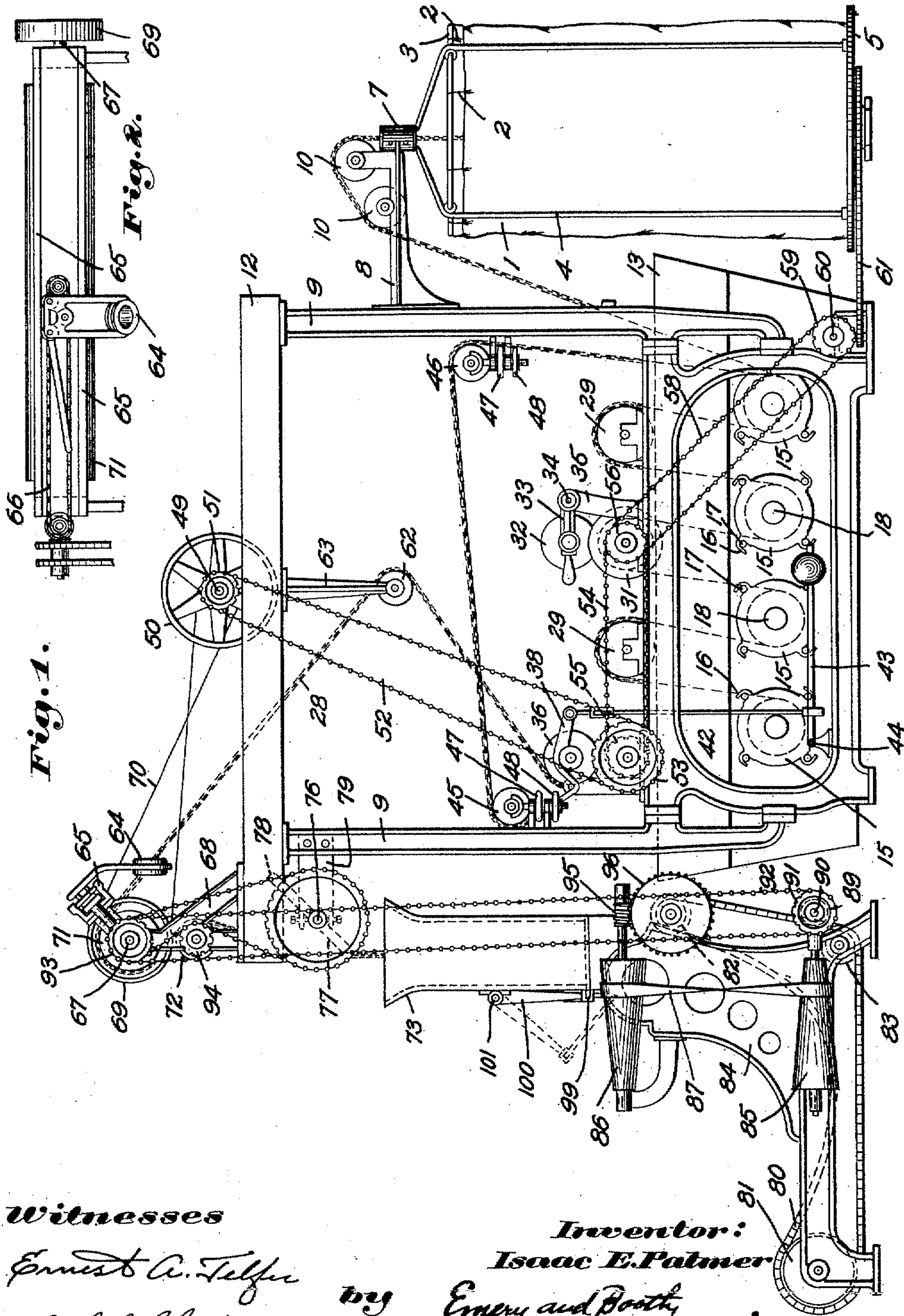


I. E. PALMER.
 APPARATUS FOR TREATING TEXTILE FABRICS.
 APPLICATION FILED SEPT. 8, 1908.

985,695.

Patented Feb. 28, 1911.

6 SHEETS-SHEET 1.



Witnesses

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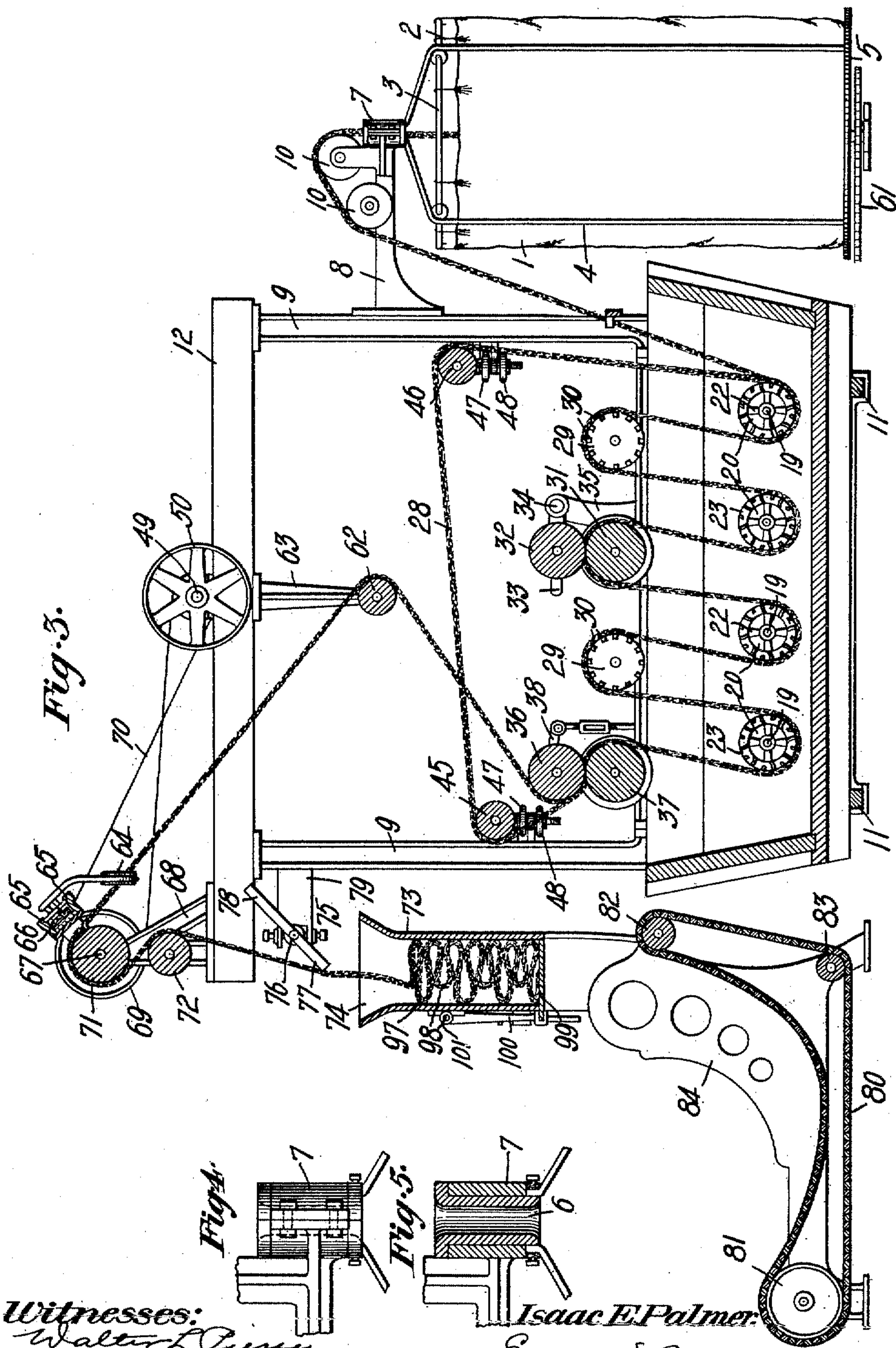
by Emery and Booth, Attys:

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5 SHEETS—SHEET 2.



Witnesses:
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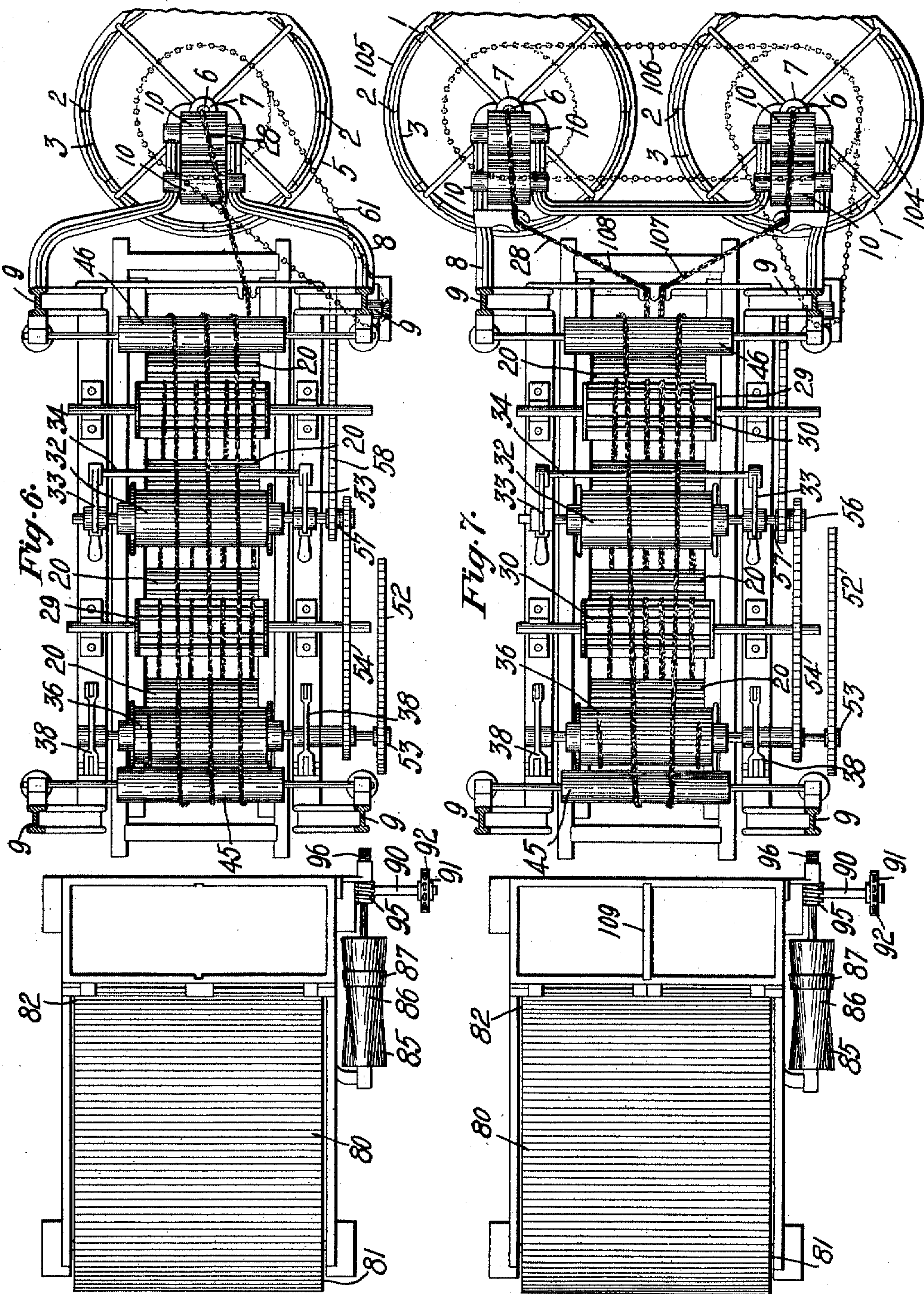
Isaac E. Palmer.
 by Emery and Booth, Attys.

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5 SHEETS—SHEET 3.



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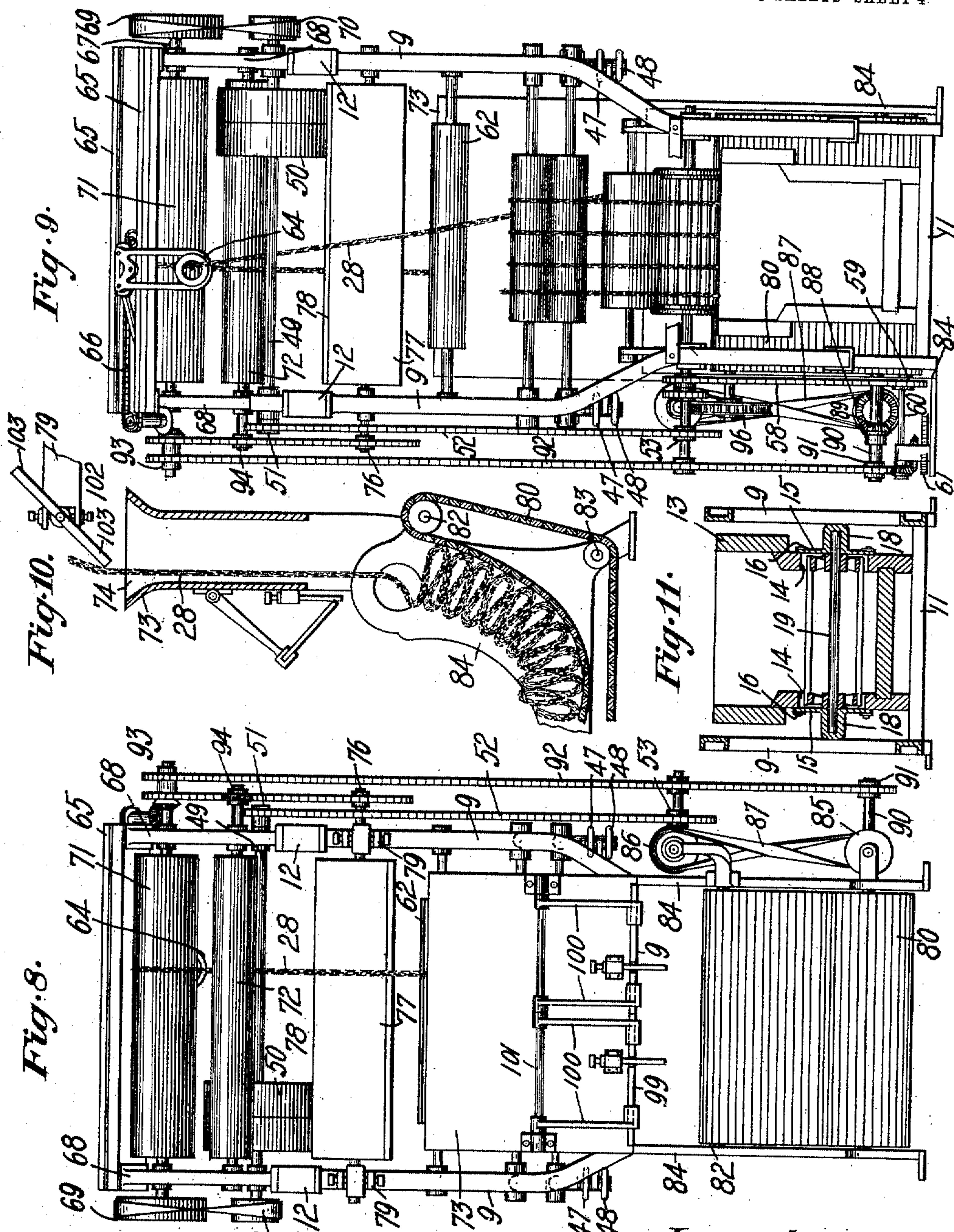
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APPARATUS FOR TREATING TEXTILE FABRICS.

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Patented Feb. 28, 1911.

5 SHEETS—SHEET 4.

985.695.



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 APPARATUS FOR TREATING TEXTILE FABRICS.
 APPLICATION FILED SEPT. 8, 1908.

985,695.

Patented Feb. 28, 1911.

5 SHEETS—SHEET 5.

Fig. 12.

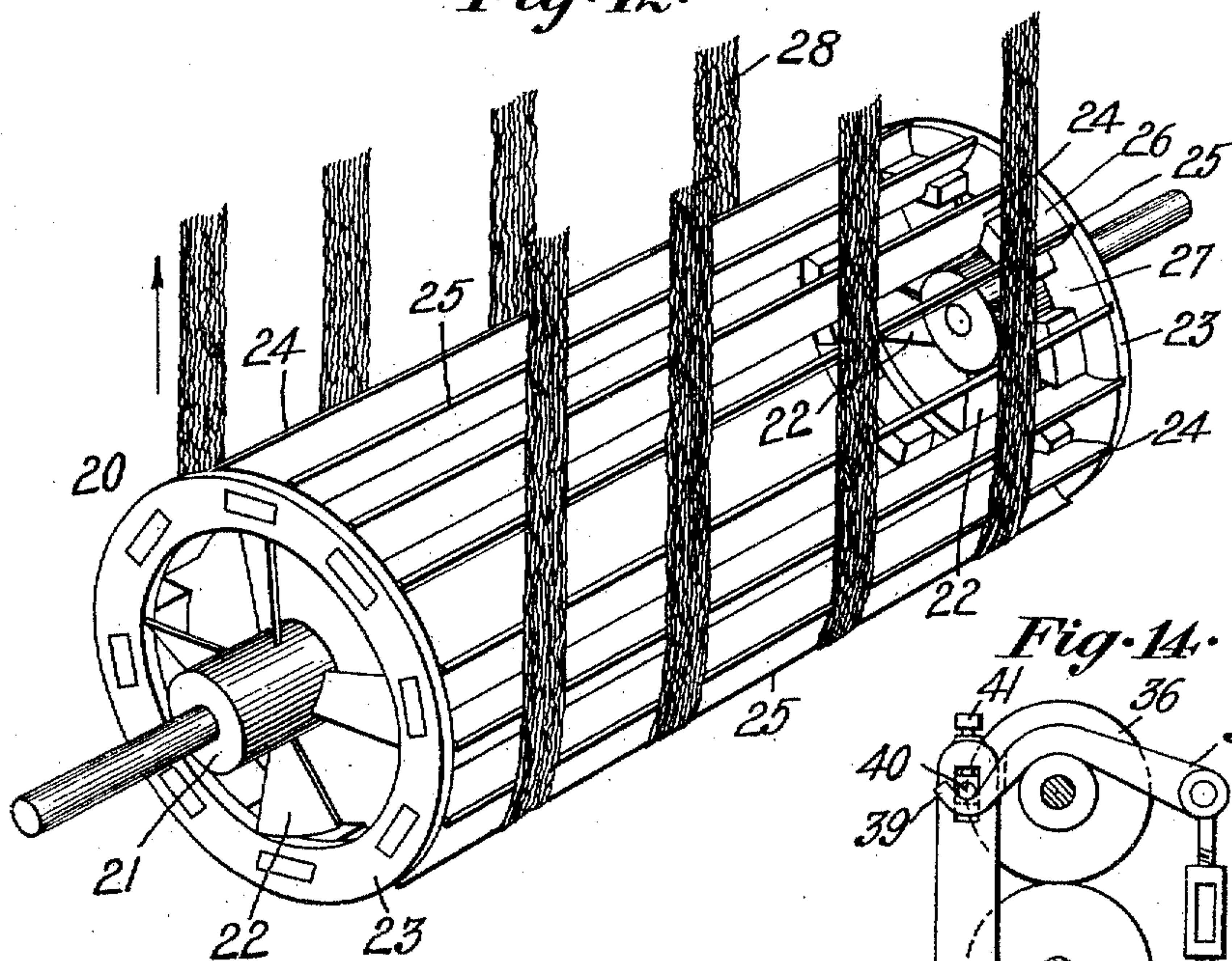


Fig. 14.

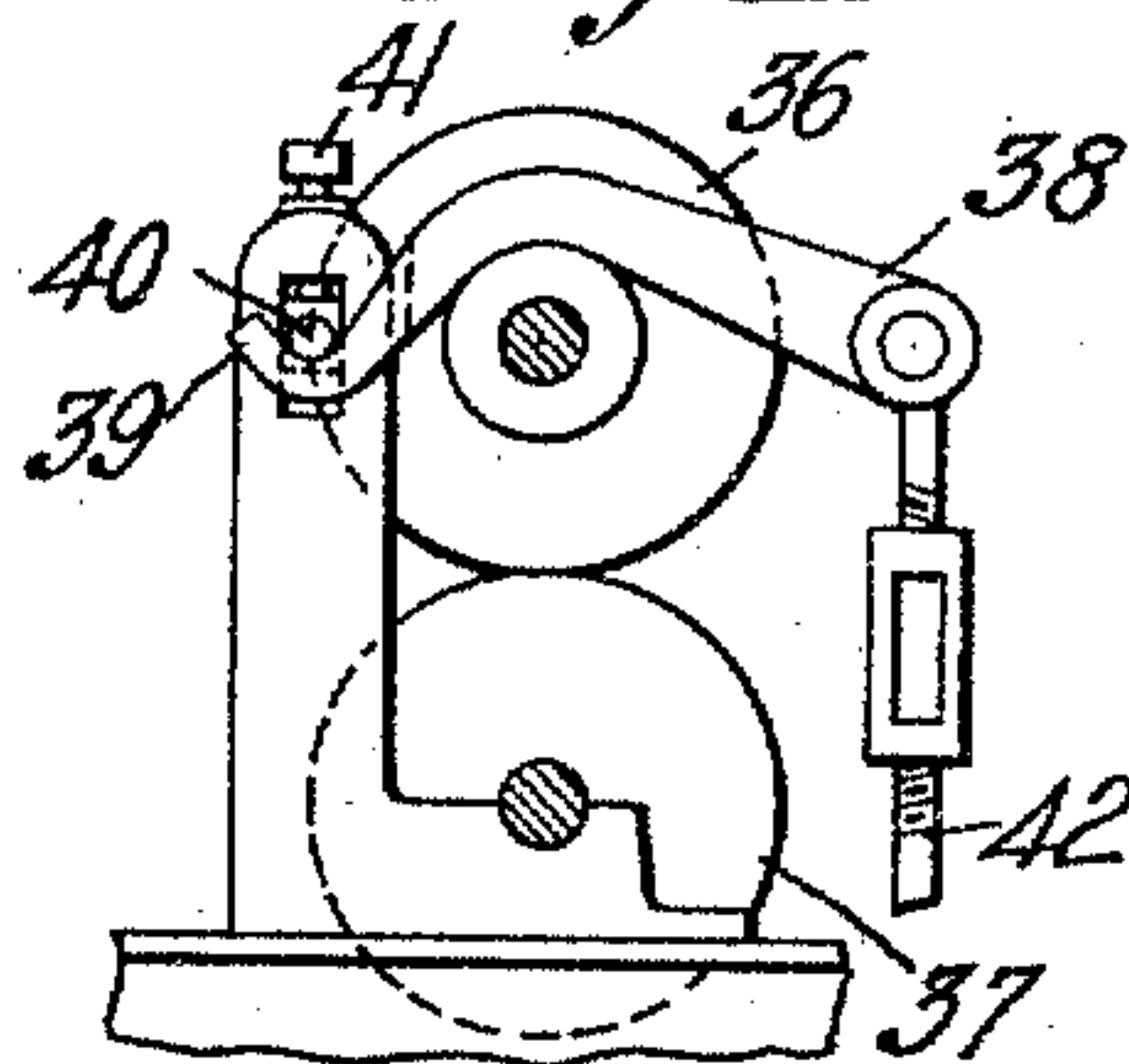
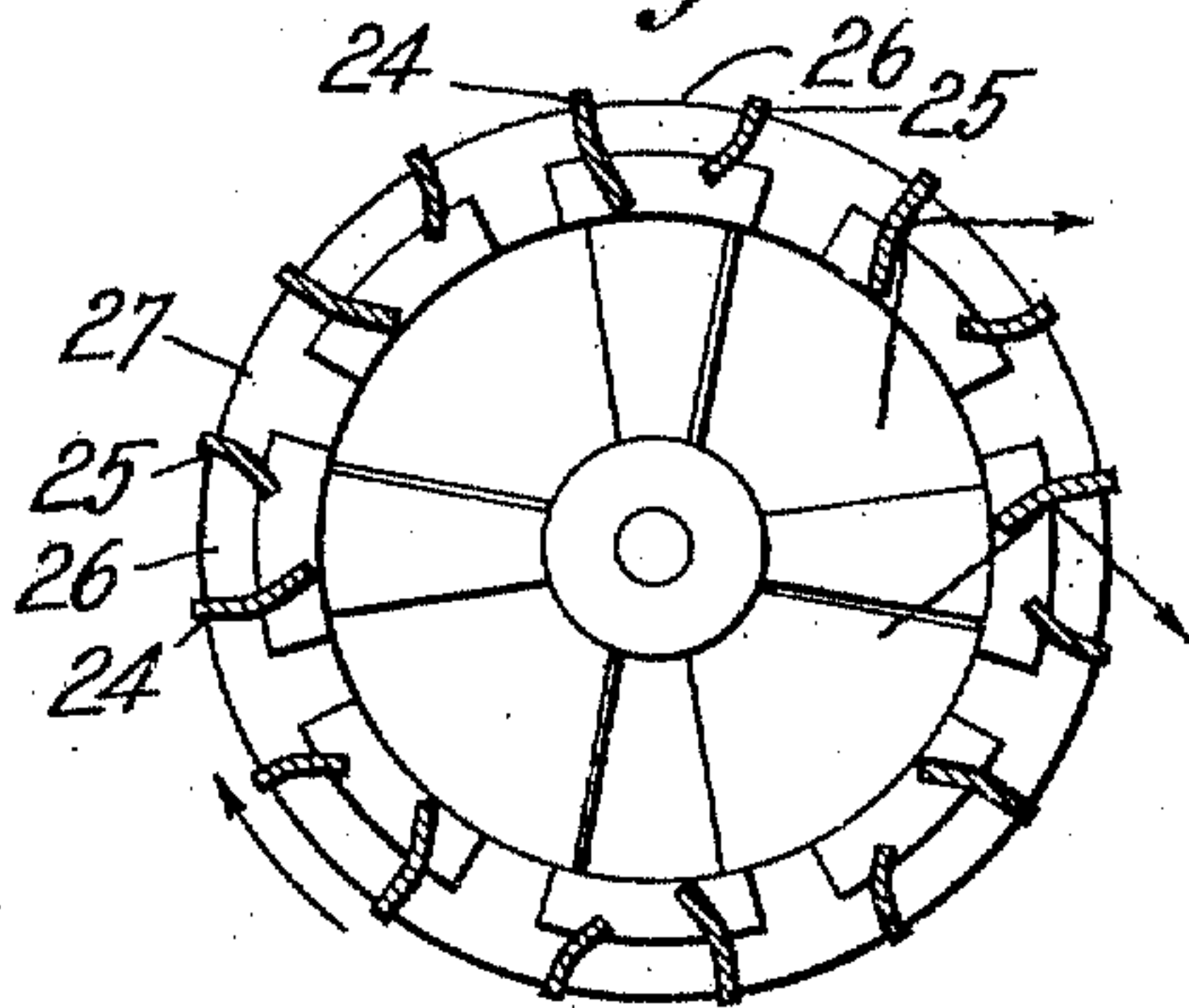


Fig. 13.



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UNITED STATES PATENT OFFICE.

ISAAC E. PALMER, OF MIDDLETOWN, CONNECTICUT.

APPARATUS FOR TREATING TEXTILE FABRICS.

985,695.

Specification of Letters Patent.

Patented Feb. 28, 1911.

Application filed September 8, 1908. Serial No. 452,134.

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 Fabrics, 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, and, while it may be of general application, is intended more particularly for use in dyeing, bleaching, washing or boiling material, which may be in the form of warp, either twisted or untwisted, or in the form of woven material, preferably passed through the apparatus in ropy form.

In order that the principles of the invention may be clearly understood, I have disclosed a single type or embodiment thereof in the accompanying drawings, wherein,—

Figure 1 is a side elevation of one form of apparatus embodying my invention; Fig. 2 is an elevation of one form of traversing mechanism that may be employed in connection with my invention; Fig. 3 is a longitudinal, vertical section taken through apparatus shown in Fig. 1; Figs. 4 and 5 are, respectively, a side elevation and a central vertical section of detail to be hereinafter referred to; Fig. 6 is a horizontal sectional view, taken through the apparatus above the squeezing rolls thereof; Fig. 7 is a similar view of a form of apparatus wherein material from separate sources may be simultaneously passed through the apparatus; Fig. 8 is a front elevation of the apparatus shown in Fig. 1; Fig. 9 is a rear elevation thereof; Fig. 10 is a detail in vertical section of a slightly modified form of apparatus; Fig. 11 is a transverse, vertical section taken through the vat and one of the liquid circulating rolls therein; Fig. 12 is a perspective view of one of said liquid circulating rolls; Fig. 13 is a transverse vertical section, taken through the liquid circulating roll

shown in Fig. 12; and Fig. 14 is a side elevation of the preferred form of adjusting means for a squeeze roll or rolls.

The apparatus herein disclosed is adapted for treating textile material which is passed through a vat, the character of liquor wherein depends upon the nature of treatment to which the material is to be subjected. If woven cloth is to be treated it is preferably passed through the machine in ropy form, but without twist. If warp is to be treated it may be passed through the machine either with or without twist. By twisting the warp, prior to or at the time of its delivery to the apparatus, the warp is preserved more perfectly for handling, and the use of a thread wrapped spirally about the warp is avoided. If the warp be twisted, the twist may be taken out after or before drying, or at the beamer. In the present embodiment of my invention I have represented an apparatus adapted to treat twisted warp, but it will be understood that if non-twisted warp or woven fabric be employed the same is delivered to the vat from any suitable and preferably stationary source.

Referring more particularly to the drawings, and first to Figs. 1, 3 and 6 thereof, the warp which is to be treated is preferably deposited in a bag 1, the upper edge whereof is supported by hooks 2 upon a ring 3 which is supported by upright rods 4 rising from a base plate 5, and after being passed about or suitably connected to the ring 3 are preferably removably connected to a sleeve 6 (see Figs. 4 and 5), rotatably supported in a split bushing 7 formed with or extending from a bracket 8 laterally extending from one of the uprights 9 of the apparatus, and preferably carrying one or more loosely mounted guide rolls 10.

The main or central portion of the apparatus is provided with a suitable base 11 (see Fig. 11) rising from which are the opposite uprights 9, connected overhead by a suitable cross member 12. Suitably supported upon the base 11, between the uprights 9, is a vat 13, of any suitable con-

struction, to which the material is delivered from the container 1 and wherein are mounted the liquid circulating rolls, the guide rolls and the squeeze rolls, to be more particularly described.

Preferably, a series of liquid circulating rolls is mounted in the vat 13 in such manner as to permit their removal through one or the other of the lateral walls of the vat. In Fig. 11 I have represented the lateral walls of the vat as provided with openings 14, closing which are suitable caps 15, provided if necessary upon their inner faces with suitable packing and so connected with the walls of the vat as to permit their ready removal therefrom. While this may be accomplished in any suitable manner, herein (see Fig. 1) I have represented each cap as having a plurality of ears 16, arranged concentrically with the center of said caps and adapted to engage screws 17 and to be disengaged therefrom by a slight circumferential movement of the cap. Preferably each of a pair of caps is provided with a bearing 18, wherein is received the shaft 19 of the liquid circulating roll 20 pertaining thereto, it being apparent that the openings 14 are of such size as to permit the removal of the liquid circulating roll through either wall of the vat upon removal of the cap.

While the liquid circulating rolls may be of any suitable character and construction, preferably, and as shown more clearly in Figs. 12 and 13, each roll is provided with end hubs 21 having spokes 22 radiating therefrom and connected with annular rims 23 which are connected to each other by sets of circulating blades 24, 25, arranged about the periphery of the roll and extending in a more or less radial direction from the axis thereof. The blades 24 and 25 are arranged in pairs, as clearly shown in Figs. 12 and 13, the blade 24 of each pair extending inwardly a greater distance from the periphery of the roll than the blade 25 and the inner ends of the two blades being inclined toward each other as they extend inwardly. The blades 24 and 25 of each pair are spaced from each other, leaving a passageway 26 for the liquid to pass between them, and the succeeding pairs of plates are also spaced from one another, leaving passageways 27 for the entrance of the liquid from the exterior of the roll to the space within its periphery. The spokes 22, which connect the hubs with the periphery, are flat and inclined in a lateral direction, for the purpose of inducing a current of liquid from without through the end of the roll to the space within its periphery. The spokes at one end of each roll are inclined in an opposite direction from the spokes at the opposite end, thereby tending to force the liquid in such opposite end while the separate pairs of blades tend to direct a current outwardly through the pe-

riphery. The inner end of each blade 24 tends to scoop the liquid within the periphery of the roll as the roll advances in the direction of the arrow shown in Fig. 13, thereby inducing a current of liquid outwardly through the space between the blades 24 and 25, and hence in contact with the inner surface of the rope, chain or strip of material 28 supported upon the periphery of the roll. The construction of parts is such that the liquid will readily flow in through the spaces 27 and will pass the blades 25 and be interrupted by the inner edges of the blades 24 and be caused to pass outwardly between the blades, thereby being forced into intimate contact with the face of the goods, and after passing around the fabric or warp will again be drawn inwardly and so will alternately pass outwardly and inwardly through the periphery of the roll as the latter is rotated in the liquid within which it is immersed.

Supported by the walls of the vat and above and preferably between the liquid circulating rolls 20 are suitable loosely mounted guide rolls 29, 29 which may, if desired, be provided with peripheral, axially extending slats 30, 30. Between the guide rolls 29, 29 I preferably provide a pair of squeeze rolls 31, 32, of suitable construction, the upper roll 32 being carried by arms 33 pivoted at 34 upon uprights 35 extending from the frame in such manner as to permit the upper squeeze roll 32 to be thrown backwardly and out of action, or lifted for manipulation of the goods. In advance of the forward guide roll 29 I preferably provide a pair of squeeze rolls 36, 37, of suitable construction, the upper roll 36 being held in peripheral engagement with the roll 37 in any suitable manner. Herein, for the purpose, the shaft of the roll is journaled for vertical yielding movement in the uprights 9, and, with the shaft of the roll at opposite ends thereof, engages levers 38, whose inner, hooked ends pass beneath pins 40 (see more particularly Fig. 14), serving as fulcrum and which may be vertically adjusted by set screws 41. The outer ends of said levers are pivotally connected by rods 42 with weighted levers 43, pivoted at 44 upon the uprights 9. The construction of parts is such that with the varying thickness of material the rolls 36 may automatically rise and fall while at the same time squeezing the liquor from the material, after its passage through the vat.

Preferably, in the use of the apparatus the material is passed repeatedly about the periphery of the liquid circulating rolls, as represented in Fig. 12, and about the guide and squeeze rolls, it being thus treated any desired number of times before it finally issues from the vat. In order to guide and direct the material after it has issued from the squeeze rolls 36 and 37, and to return the

with a worm wheel 96 carried by the shaft of the apron support and driving roll 82. In this manner the apron 80 is driven at preferably a low rate of speed, which may be varied as desired by shifting the belt 87 upon the cones 85 and 86 by any suitable belt shifter (not shown).

By the employment of a folder having long and short blades 77 and 78, the folds are alternately of unequal length, as represented at 97 and 98 in Fig. 3. This manner of folding the material permits it more readily to accommodate itself to the contour of the apron 80, as will readily be apparent.

Preferably, I provide a closure or cut-off for the lower end of the receiver 73, constituting means to interrupt the depositing of the material upon the apron 80. While any suitable means may be employed for this purpose, I have, in Figs. 1, 3 and 8, represented a gate or gates 99, carried by arms 100 pivoted at 101 upon the outer wall of the receiver 73. When the gates are swung into their outer position, as indicated in dotted lines in Fig. 1, they may be there held in such position in any suitable manner.

Were no means provided to interrupt the depositing of the material upon the apron 80, it would be necessary, if it were desired to redirect the material from the apron 80 back into the vat, to lead that end of the material first deposited upon the apron 80 back into the vat, with the objection that in such event the material would, upon its retreatment, pass through the vat in the same direction in which it passed therethrough upon its first treatment. Preferably, the material if it is to be retreated in the vat should be reversed in such retreatment, so as to equalize the action of the liquor thereon. This is desirable because of the fact that the liquor becomes gradually weaker and less effective upon succeeding portions of the material. It will be apparent that if it be desired to retreat the material issuing from the vat, or any desired portion thereof, the gate 99 may be closed (after severing the material) whereupon that end of the material last deposited upon the apron 80 may be redirected over the guide rolls 45 and 46 to the liquid circulating rolls and thence through the vat in the manner already described. In this manner I am enabled to reverse the direction of travel of the material without removing the same from the apron 80. The apparatus herein disclosed may also be used for flat goods. If it be desired to reverse such material, it is preferably carried back under the vat and thence up to the point of entrance and is again passed therethrough, after which it may be wound on a batch roll in the ordinary manner.

I have shown in Fig. 10 a modified form of the apparatus wherein is provided a

folder 102, having arms 103, 103, of equal length, which construction may be employed in connection with certain types of my invention, although it is not as efficient in action as the unequal armed folder 75.

If desired, I may provide means permitting the delivery of a plurality of ropes or chains of material simultaneously to the vat. In Fig. 7 I have represented means for accomplishing this purpose. Therein I have represented a pair of containers 104, 105, the latter being driven from the former by suitable sprocket mechanism 106. It will be understood that the containers may be suitably rotated if desired to twist the material in the event that it be warp. No change is required in the construction of the vat, nor parts coöperating therewith, excepting that the ropes 107, 108 are delivered centrally of the lateral walls of the vat, as represented in said figure, the rope 107 being gradually fed toward one end of the rolls and the rope 108 toward the opposite end thereof. In the event that a plurality of ropes of material are simultaneously treated by the vat, the receptacle 73 is provided with a preferably removable partition 109, thus providing two compartments in which the materials may be independently folded and traversed, by a plurality of suitably operated pot eyes. It is apparent that this system of treatment of textile material may be extended by providing means for simultaneously treating more than two chains or ropes of material. Preferably, a plurality of gates 99 are provided, as represented in Fig. 8, so as to permit the simultaneous treatment of a plurality of ropes or chains of material. It will be apparent that if two ropes of material be simultaneously treated one of them may be deposited upon the belt 80 and immediately drawn therefrom for further treatment in other apparatus, and that the other, after closure of its gate 99, may be redirected through the vat in a reverse direction.

Having thus described one type or 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 purpose of limitation, the scope of the invention being set forth in the following claims.

Claims.—

1. Apparatus for treating textile material comprising a vat, a container for the material to be treated, means to rotate said container, means to deliver the material from the container in the direction of the axis of rotation of said container, thereby to twist said material, and means to deliver the twisted material to the vat.

2. Apparatus for treating textile material comprising a vat, means for directing textile material thereto, one or more liquid cir-

same to the liquid circulating rolls, I have provided guiding means preferably in the form of rolls, and have so mounted the said rolls that in the event that undue slackness
 5 or tightness of the material in its passage through the vat tends to develop, I may readily correct the fault. While this may be accomplished in any suitable manner, I have, as shown in Figs. 1, 3 and 6, provided
 10 guide rolls 45 and 46, suitably supported by the uprights 9 and having at one end, and, if desired at both ends, means for inclining the axis of rotation thereof. In Fig. 1 I have represented adjusting and lock hand
 15 nuts 47, 48 for this purpose. If the material becomes too tight in its passage through the apparatus one end of either roll should be lowered, whereupon the material runs loosely. If the material becomes too loose,
 20 one end of either of the rolls should be raised.

Certain of the rolls may be driven in any suitable manner. Herein for the purpose I have represented a driving shaft 49, having
 25 thereon a pulley 50 receiving power from any suitable source, and a sprocket 51 about which passes a sprocket chain 52 passing about and driving a sprocket 53 carried by the squeeze roll 37. Preferably, the squeeze
 30 roll 31 is also driven, and for this purpose a sprocket chain 54 extends from a second sprocket 55 upon the squeeze roll 37 to and about a sprocket 56 upon the squeeze roll 31.

The container 1 may be rotated in any
 35 suitable manner, thereby to twist the warp as the same is delivered axially therefrom. Herein for the purpose I have provided the squeeze roll 31 with a second sprocket 57, connected by a sprocket chain 58 with a
 40 sprocket 59 upon a horizontal shaft 60, suitably mounted in the framing of the machine and connected by bevel gears or otherwise as shown in Fig. 1 with a short shaft having
 45 thereon a sprocket connected by sprocket chain 61 to the base 5 of the container 1, so as to rotate the same at the desired speed.

It will be apparent that the liquid circulating rolls 20 are rotated by the passage of
 50 the material about and in peripheral contact therewith, and that in their rotation they suitably circulate the liquor as previously described. After the material has been passed the desired number of times
 55 about the several rolls, it is directed from the vat and its rolls for further use. Preferably the material is folded and, at the same time, is traversed in a suitable receptacle. Herein, for the purpose, I have represented
 60 a guide roll 62, loosely mounted in hangers 63 depending from the cross member 12. The material, after passing about the guide roll 63, extends through the pot eye or ring
 65 64 of a suitable traversing apparatus, shown more clearly in Fig. 2, and which, if desired, may be of the type represented in my

Patent, No. 402,274, April 30, 1889, and which need not be particularly described. The pot eye and its support are mounted in
 suitable guideways 65, and are traversed by
 70 a sprocket chain suitably driven from a shaft 67 suitably mounted in uprights 68 rising from the cross member 12. Fast upon the shaft 67 is a pulley 69, receiving power
 75 from the shaft 49 by belt 70, it being apparent that in the traverse of the pot eye 64 the material, in ropy or chain-link form, is traversed back and forth over and is deposited into a suitable receptacle underneath. The material is conveyed and directed to the
 80 receptacle by means of a roll 71, fast upon the shaft 67. If desired, a guiding roll 72 may be located beneath the roller 71, and be driven in any suitable manner.

Any suitable receiver for the material may
 85 be employed. Herein I have shown a receptacle 73, having an open upper end 74, into which the material may be directed and be folded by a folder 75, which herein is
 90 formed as a blade, pivoted at 76 along a line at unequal distances from the longitudinal edges thereof, so as to present blades 77, 78, of unequal length, for a purpose to be
 95 more fully described. The folder is pivotally supported in suitable bearings in brackets 79, extending from one of the uprights 9.

Mounted beneath the receptacle 73, and, in effect forming a wall thereof, is an inclined carrier preferably formed as an end-
 100 less belt 80, upon which the material is deposited after its passage through the closed part of the said receptacle. The belt 80 is preferably mounted in such manner as to present a curved and forwardly extending
 105 traveling surface to the material, which is received thereon in folded form and from which it may be readily removed for further treatment in other apparatus or from which it may be returned to the vat for retreatment. Herein the belt or apron 80 is
 110 mounted upon rolls 81, 82, and 83, suitably supported in a framing 84, one or more of said rolls being driven in any suitable manner. Preferably, I provide means to drive the belt or apron 80 at different speeds. Herein,
 115 for the purpose, I have represented (see Fig. 1) oppositely arranged cones 85, 86, mounted in suitable bearings in the framing 84 and connected by a belt 87. The shaft of the cone 85 is provided, as shown in Fig. 9, with
 120 a bevel gear 88, meshing with which is a bevel pinion 89 upon a short shaft 90, whereon is fast a sprocket 91 about which passes a sprocket chain 92, extending from a sprocket 93 driven from the shaft 67 in any
 125 suitable manner, the said sprocket chain 92 also passing about a sprocket 94 upon the roll 72, whereby the latter may be positively driven if desired. The shaft of the upper cone 86 is provided with a worm 95, meshing
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culating rolls in said vat and with the periphery of which said textile material engages, said roll or rolls having circulation inducing peripheral blades arranged in pairs, and means for mounting said roll or rolls for removal through a lateral wall of the vat.

3. Apparatus for treating textile material comprising a vat having a cap removably mounted in one of the walls of the vat and covering an opening therein, said cap being provided with a bearing and a roll journaled in the bearing of the cap, and having its opposite end rotatably supported by the vat, said roll being removable through said vat opening.

4. Apparatus for treating textile material comprising a vat having opposite openings in the lateral walls thereof, caps removably covering said openings and provided with bearings, and a liquid circulating roll journaled in said bearings and removable through either of said openings upon removal of its cap, said roll having its periphery provided with circulation inducing blades.

5. Apparatus for treating textile material in band or rope form comprising in combination, a vat, a series of liquid circulation rolls positioned therein, means for introducing textile material into said vat to said rolls, guide rolls supported adjacent said circulation rolls, so that the textile material may be passed in a treatment path about said circulation rolls and said guide rolls, means whereby the material may be directed away from the vat for subsequent treatment or use, after having once passed in a treatment path about said circulation rolls and guide rolls, one or more transverse return guides supported above said circulation rolls and positioned to receive the material that has passed once through said treatment path and to redirect said material one or more additional times through said treatment path, and means to adjust said transverse return guide or guides at one end to permit the inclined positioning thereof, thereby momentarily to correct the tension of the said textile material in its repassage through the treatment path.

6. An apparatus for treating textile material comprising a vat, means for directing and conveying material therethrough, a receiver for the treated material, means to deliver material thereto from the vat, a material receiving apron forming a portion of one of the walls of said receiver, and means to vary the speed of travel of said apron.

7. An apparatus for treating textile material comprising a vat, means to guide and direct material therethrough, a receiver, means to direct material thereto from the vat, a material receiving traveling apron forming the bottom of said receiver, and

means to prevent delivery of material from the upper portion of said receiver to said apron.

8. An apparatus for treating textile material comprising a vat, means to guide and direct material therethrough, a receiver, means to traverse in folds in said receiver the material received from said vat, and a gate or gates to close the exit from said receiver.

9. An apparatus for treating textile material comprising a vat, means to guide and direct material therethrough, a receiver, means to traverse in folds in said receiver the material received from said vat, an apron whereon said material may be received from the receiver, and a closure or closures between the receiver and apron.

10. An apparatus for treating textile material comprising a vat, means for guiding and conveying material therethrough, a receiver into which said material may be entered from said vat, said receiver having a plurality of compartments, independently operable closures for the exits of said compartments, and conveying means adapted to receive the material discharged from said receivers, whereby the material from one or more compartments may be deposited upon said conveying means.

11. An apparatus for treating textile material comprising a receiver, and a distributing folder mounted above the same and having long and short arms, thereby to distribute the material in said receiver in folds of different extent.

12. An apparatus for treating textile material comprising a receiver, and rotary distributing means to deposit the material therein in folds of different lengths.

13. An apparatus for treating textile material comprising a receiver having an inclined material receiving wall, and means for depositing the material upon said wall in folds of alternating lengths.

14. An apparatus for treating textile material comprising a receiver, an inclined traveling apron whereon the material may be received therefrom, and a material guiding folder pivoted above said receiver and having a long and a short arm for depositing the material in alternating folds of differing lengths.

15. An apparatus for treating textile material comprising a receiver, an inclined traveling apron whereon the material may be received therefrom, and a material guiding folder pivoted above said receiver and having a long and a short arm for depositing the material in alternating folds of differing lengths, and means for traversing the material along said folder.

16. Apparatus for treating textile material in band or rope form comprising in combination a vat, a series of rolls therein and

positioned to subject the material passing thereabout to the liquor in the vat, one or more pairs of squeeze rolls adjacent said first mentioned rolls, means for introducing
 5 textile material into said vat to the said rolls so that the textile material may be passed once in a treatment path about and between said several rolls, means whereby the material may be directed away from the
 10 vat after having once passed in said treatment path about said rolls, and one or more transverse return guide or guides supported above said rolls and positioned to receive the material that has passed once through
 15 said treatment path and to redirect said material one or more additional times through said treatment path, and means to adjust said transverse return guide or guides at one end to permit the inclined positioning
 20 thereof, thereby momentarily to correct the tension of the said textile material in its re-passage through the treatment path.

17. An apparatus for treating textile material having a vat provided with an opening in a wall thereof, a cap closing said
 25 opening, and secured to the vat but removable therefrom, and a roll supported for rotation in said vat and removable therefrom through said opening upon removal of
 30 said cap.

18. An apparatus for treating textile material comprising a vat, means for directing and conveying said material therethrough, a receiver for the treated material, means to
 35 lay the material in folds in said receiver, means whereon the material may be discharged from said receiver, and a closure for the exit from said receiver, whereby the material may be redirected with either end
 40 foremost through said vat from said means whereon it is discharged from the receiver.

19. Apparatus for treating textile material comprising in combination a vat, a receptacle to receive in an untwisted mass the
 45 material to be treated, means to rotate said container, means to deliver the material from the container in the direction of the axis of rotation of said container, thereby to twist said material, and means to deliver
 50 the twisted material to the vat for passage therethrough.

20. Apparatus for treating textile material comprising in combination a receiver having a curved throat, and means to deposit material therein in folds of different
 55 extent.

21. Apparatus for treating textile material comprising in combination a receiver having a curved throat, and means to deposit and build up material therein in a folded condition with a greater number of folds at one built up face than at the opposite built up face.

22. Apparatus for treating textile material comprising a receiver, and means mov-

ing in a fixed path for delivering material to the receiver in folds of different extent.

23. An apparatus for treating textile material comprising a receiver and a distributing folder having long and short arms to
 70 distribute the material in said receiver in folds of different extent.

24. An apparatus for treating textile material comprising a vat, means for directing and conveying the material therethrough, a receiver for the treated material, an inclined carrier whereon the material may be discharged from said receiver and a closure for the exit from said receiver, whereby the material may be redirected with either
 80 end foremost through said vat from said carrier whereon it is discharged from the receiver.

25. Apparatus for treating textile material comprising a vat, means for directing
 85 textile material thereto, one or more liquid circulating rolls in said vat and with the periphery of which said textile material engages, said roll or rolls having circulation inducing peripheral blades, and means for
 90 mounting said roll or rolls for removal through a lateral wall of the vat.

26. An apparatus for treating textile material comprising a receiver, a distributing folder having long and short arms to distribute the material in said receiver in folds of different extent, and means to traverse the material along said folder.

27. Apparatus for treating textile material comprising, in combination, a vat, means
 100 for directing and conveying said material therethrough, a receiver for the treated material delivered from the vat, said receiver having an entrance and an exit, means whereon the material may be discharged through
 105 the exit from said receiver, and a closure for the exit from said receiver to intercept the supply of material delivered thereto from the vat.

28. Apparatus for treating textile material in band or rope form comprising in combination a vat, a series of liquid circulation rolls 20 positioned therein, means for introducing textile material into the vat to said rolls, guide rolls 29 supported adjacent said
 115 liquid circulation rolls, one or more pairs of squeeze rolls supported adjacent said circulation rolls, said several rolls being so located that the textile material may be passed in a treatment path about said circulation
 120 rolls, said guide rolls and between said squeeze rolls, means whereby the material may be directed away from the vat for subsequent treatment or use after having once passed in the treatment path about said circulation rolls and between said squeeze rolls, transverse guide rolls 45 and 46 supported above said several rolls and positioned to receive the material that has been passed once through said treatment path and to
 130

redirect said material one or more additional
times through said treatment path, and
means to adjust said transverse guide rolls
45 and 46 at one or both ends thereof, there-
5 by to permit them to be positioned at an in-
clination, momentarily to correct the tension
of said textile material in its repassage
through said treatment path.

In testimony whereof, I have signed my
name to this specification, in the presence of 10
two subscribing witnesses.

ISAAC E. PALMER.

Witnesses:

IRVING U. TOWNSEND,
MAY H. LOWRY.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents,
Washington, D. C."
