

Aug. 28, 1928.

1,682,453

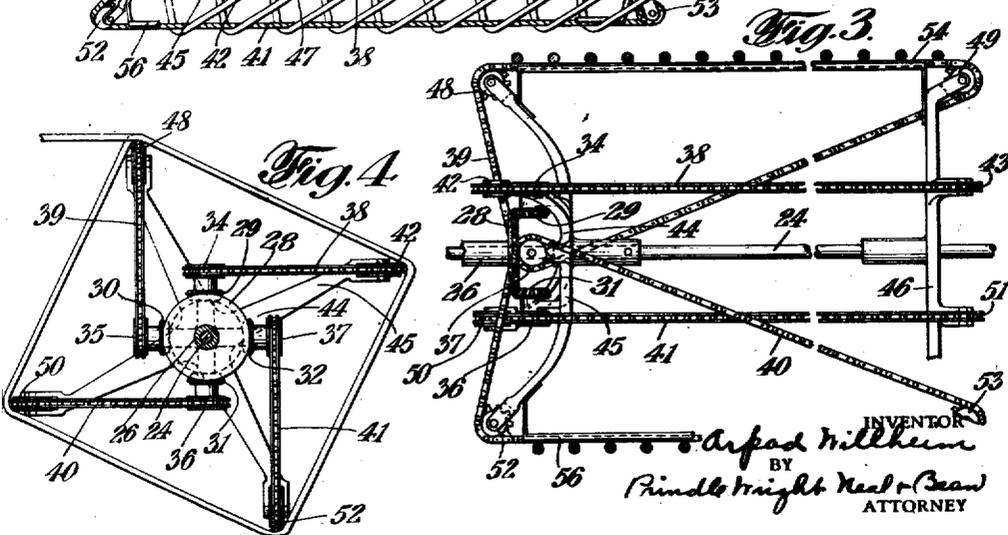
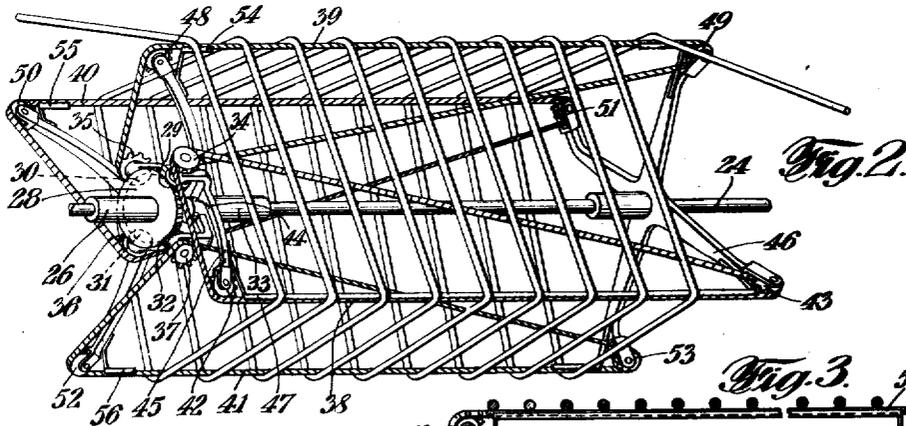
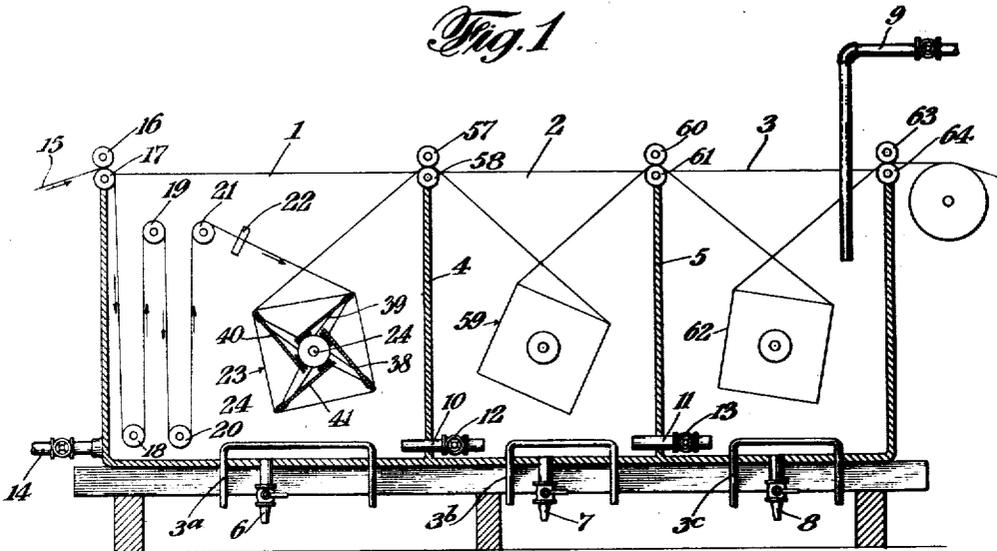
A. WILLHEIM

PROCESS AND APPARATUS FOR TREATING FABRICS

Filed May 19, 1927

2 Sheets-Sheet 1

Fig. 1



Aug. 28, 1928.

1,682,453

A. WILLHEIM

PROCESS AND APPARATUS FOR TREATING FABRICS

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2 Sheets-Sheet 2

Fig. 5.

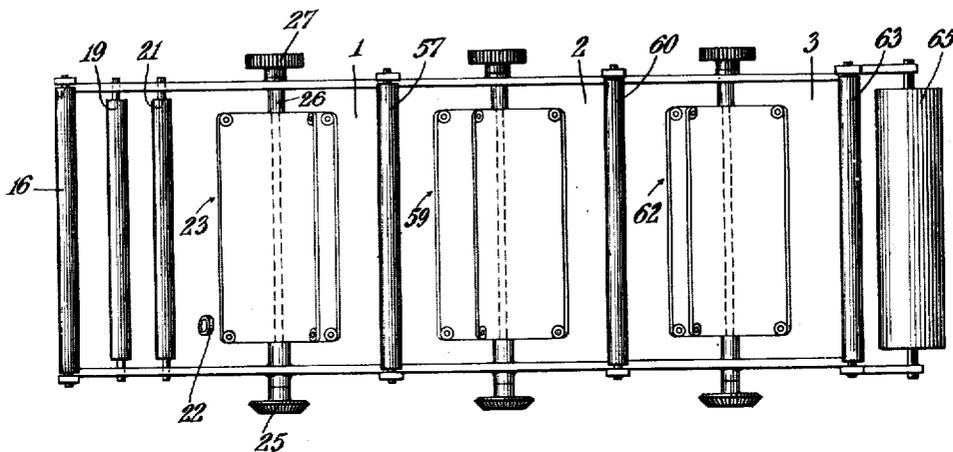


Fig. 6.

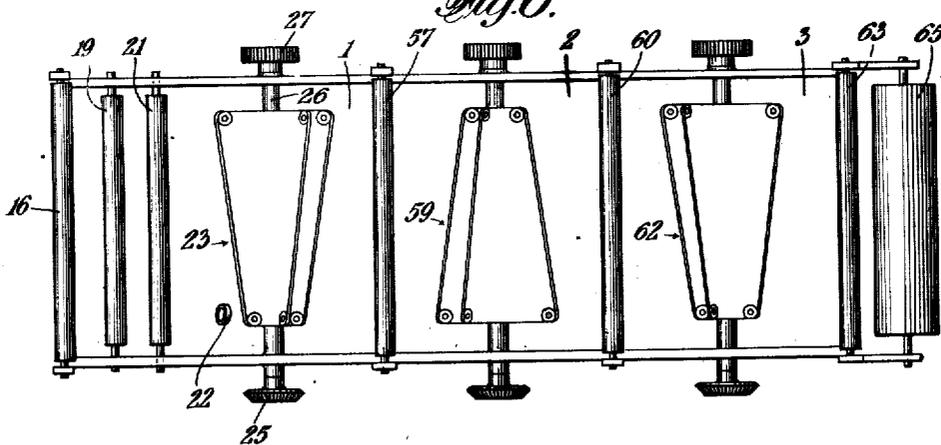
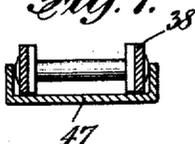


Fig. 7.



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PROCESS AND APPARATUS FOR TREATING FABRICS.

Application filed May 18, 1927. Serial No. 192,233.

My invention relates particularly to a process and apparatus by means of which fabrics may be subjected to any desired treatment, as, for example, in degumming, bleaching or dyeing. The object of my invention is to provide a process and apparatus by means of which the treatment of fabrics may be advantageously carried out especially in the process of degumming, bleaching or dyeing fabrics. A further object of my invention is to subject the fabric to the treatment while forming the fabric into rope form, thus giving the fabric a maximum of agitation while submerged in the liquor and while continuously passing through the same without subjecting the same to undue tension and without the chafing or rubbing of the goods, so as thus to very much accelerate the treatment and economize in the quantity of the liquor needed for the treatment. A further object is to provide an apparatus with which this can be attained by providing reels which have laterally conveying means thereon so as to continuously move the fabric into a rope form. Further objects of my invention will appear from the detailed description of the same hereinafter.

While my invention is capable of embodiment in many different forms, for the purpose of illustration I have shown certain forms of my invention in the accompanying drawings, in which—

Figure 1 is a vertical section through an apparatus which may be used in carrying out my invention;

Figure 2 is a perspective view of one of the reels carried therein;

Figure 3 is a plan view of one of the reels;

Figure 4 is an end view of the same;

Figure 5 is a plan view of the entire apparatus;

Figure 6 is a plan view of a modified form of the apparatus; and

Figure 7 is a section through one of the chains with its supporting guideway.

In the drawings, I have shown an apparatus which may be used for any desired treatment of fabrics, but which may be used, for example, in degumming silks, comprising a series of vats 1, 2 and 3, provided with steam heating coils 3^a, 3^b and 3^c, having partitions 4 and 5 between the same. The vats are provided, respectively, with valved draw-off pipes 6, 7 and 8 for enabling any liquor, as, for example, olive oil soap solution, or any

other suitable material, such as alkali, etc., used in degumming silk, which has been used in the process, to be drawn off therefrom, if desired. The liquor used in the treatment is conveyed continuously into the apparatus by means of a valved inlet pipe 9 and the liquor passes progressively through the series of vats by passing through connecting passageways 10 and 11 having hand-operated valves 12 and 13, respectively, located in the partitions 5 and 4. The hand-operated valves 12 and 13 are positioned so as to be readily operable from the outside of the vats by projecting through the sides of the same. The spent liquor continuously passes out of the vat 1 through a valved pipe 14. The silk or other fabric to be treated, as, for example, in the degumming operation, is fed in the form of a web 15 through a pair of rollers 16 and 17 supported above the vat 1 and which may be driven, if desired, from any suitable source of power at the desired speed. The web 15 passes around a succession of submerged idler rolls 18, 19, 20 and 21 in the vat 1 and thence through a ring 22 which is, also, submerged therein. From the ring 22 the fabric passes over a reel 23 located in the vat 1, the reel 23 being so constructed as to give the fabric a lateral movement while being moved forward, due to the laterally-conveying means for the fabric provided on the reel. For this purpose, the reel is constructed with a shaft 24 supported in any suitable bearings in the vat 1, and having a driving gear 25 located on the outside of the vat adapted to be driven from any suitable source of power. At the other end of the shaft there is provided a sleeve 26 which is adapted to be rotated at any desired speed and direction relative to said shaft 24, the said sleeve having a gear 27 thereon which may be driven from any suitable source of power. At its inner end the sleeve 26 has a gear 28 secured thereto which is submerged in the liquor and which is arranged to drive a number of planetary beveled gears 29, 30, 31 and 32, carried on a tight collar 33 located on the outside of the shaft 24. The gears 29, 30, 31 and 32 drive, respectively, sprocket wheels 34, 35, 36 and 37 over which flexible conveyors or chains 38, 39, 40 and 41 are adapted to pass. The flexible conveyor 38 also passes over sprocket wheels 42 and 43 carried by a frame 44 supported by spiders 45 and 46 supported from the main shaft 24. It will also

be noted that the said chain 38, at the point located between the sprockets 42 and 43, is supported in a straight line by means of a channel member 47 which is connected to the spiders 45 and 46. The other chains 39, 40 and 41 are supported in the same manner by sprockets 48, 49, 50, 51, 52 and 53, guideways 54, 55 and 56 being provided to support these chains in the same manner as the chain 38 is supported by the guideway 47. These guides 47, 54, 55 and 56 may be located parallel to the axis of the wheel, as shown in Figure 5, but may, if desired, be tapered in form as shown in Figure 6, in order to take care of any shrinkage which might occur in the fabric in the process of treatment, and due to the progressive winding of the fabric into rope form. From the reel 23 the fabric passes out of the vat 1 through a pair of rollers 57 and 58 which may or may not be driven from any desired source of power, and thence the fabric passes over a reel 59 in the vat 2 constructed in the same manner as the reel 23, but which may have its tapered end as shown in Figure 6, located in the opposite position. From this point the fabric leaves the reel 59 and passes over rollers 60 and 61, which may be driven from any suitable source of power, and thence to a reel 62 located in the vat 3, which is constructed like the other reels previously described, but with the tapered end opposite to the reel 59 in the form of the invention shown in Figure 6. From the reel 62 the fabric passes out through rollers 63 and 64, which may be driven, also, from any suitable source of power, if desired, and thence finally over an idler roll 65 from which the fabric may be delivered and subjected to any further operation that is desired.

In the operation of my invention it will be understood that the sheet of fabric of any desired kind, as, for example, silk, passes into the vat 1 where it is softened by the liquor therein, and thence passes on to the reel 23 where the fabric is not only fed forwardly by the rotation of the reel, but is given a lateral movement so as to cause the fabric to be wound in rope-like form spirally around the reel. In the fabrics where shrinkage takes place due to the treatment, the reel may be tapered, as shown in Figure 6. In this way the fabric is given a maximum amount of contact with the liquor in the vat 1 and finally passes out of the same into the vat 2, where it is subjected to the liquor therein in a similar manner and fed laterally to the other end of the vat where it is conveyed out of the same to the vat 3 and given a similar treatment therein so that the fabric finally passes out over the idler roll 65 for dyeing or any other treatment desired. The fabric is thus subjected to the liquor of increasing strength as the latter passes in counter-current direction to the direction of feed of the

fabric through the series of vats. However, one vat may be used for a plurality of the reels.

While in the above described apparatus sprocket chains have been mentioned it is, of course, understood that any other kind of conveying means may be used, if desired. Also, it will be understood, of course, that the various parts of the apparatus may be driven at any desired relative speeds suitable to the particular fabric and suitable to the treatment to which it is being subjected so as to maintain just the proper amount of tension thereon. Also, it will be understood that the fabric may be subjected to any other preliminary treatment just before it is conveyed into the apparatus above described, for treatment therein.

Again, it will be realized that this process and apparatus may be applied to the bleaching and dyeing of the fabric. In bleaching any desired bleaching agent may be introduced into the vats, for example, peroxide of hydrogen and silicate of soda, or lime, or chlorine, etc. Furthermore, in using the process in connection with dyeing it will be found especially applicable to dyeing with vat colors or aniline colors.

While I have described my invention above in detail I wish it to be understood that many changes may be made therein without departing from the spirit of the same.

I claim:

1. The process which comprises subjecting a fabric to treatment by a fluid while feeding the fabric in rope form spirally through the same while giving the fabric a movement laterally and at right angles to the axis of the spiral relative to the fluid.

2. The process which comprises subjecting a fabric to treatment by a degumming liquor while feeding the fabric in rope form spirally through the same while giving the fabric a movement laterally and at right angles to the axis of the spiral relative to the liquor.

3. The process which comprises subjecting a fabric to treatment by a fluid while feeding the fabric in rope form spirally through the same, and thence in a similar manner through a succeeding body of fluid in the opposite direction laterally while giving the fabric a movement laterally and at right angles to the axis of the spiral relative to the fluid.

4. The process which comprises subjecting a fabric to treatment by a degumming liquor while feeding the fabric in rope form spirally through the same, and thence in a similar manner through a succeeding body of degumming liquor in the opposite direction laterally while giving the fabric a movement laterally and at right angles to the axis of the spiral relative to the liquor.

5. The process which comprises subjecting a fabric to treatment by a fluid while feeding the fabric in rope form spirally in a curve

of a decreasing radius through the same.

6. The process which comprises subjecting a fabric to treatment by a degumming liquor while feeding the fabric in rope form spirally in a curve of a decreasing radius through the same.

7. The process which comprises subjecting a fabric to treatment by a fluid while feeding the fabric in rope form spirally in a curve of a decreasing radius through the same, and thence in a similar manner through a succeeding body of fluid in the opposite direction laterally.

8. The process which comprises subjecting a fabric to treatment by a degumming liquor while feeding the fabric in rope form spirally in a curve of a decreasing radius through the same, and thence in a similar manner through a succeeding body of degumming liquor in the opposite direction laterally.

9. The process which comprises subjecting a fabric to treatment by a fluid while feeding the fabric over a series of idlers, thence through a ring, in rope form spirally in a curve of a decreasing radius through the same, and thence in a similar manner through a succeeding body of fluid in the opposite direction laterally, the fluid being fed in countercurrent to the direction of movement of the fabric.

10. The process which comprises subjecting a fabric to treatment by a degumming liquor while feeding the fabric over a series of idlers, thence through a ring, in rope form spirally in a curve of a decreasing radius through the same, and thence in a similar manner through a succeeding body of degumming liquor in the opposite direction laterally, the degumming liquor being fed in countercurrent to the direction of movement of the fabric.

11. An apparatus for supporting a fabric during treatment, comprising a rotatable reel having means therein for moving the fabric laterally after having been received on the reel.

12. An apparatus for supporting a fabric during treatment, comprising a rotatable reel having means therein for moving the fabric laterally after having been received on the reel, comprising a laterally moving conveyor.

13. An apparatus for supporting a fabric during treatment, comprising a rotatable reel having means therein for moving the fabric laterally after having been received on the reel, comprising a laterally moving chain.

14. An apparatus for supporting a fabric during treatment, comprising a rotatable reel having means therein for moving the fabric laterally after having been received on the reel, comprising a laterally moving chain having a supporting channel member.

15. An apparatus for supporting a fabric

during treatment, comprising a rotatable reel having a plurality of means peripherally arranged therein for moving the fabric laterally after having been received on the reel.

16. An apparatus for supporting a fabric during treatment, comprising a rotatable reel having a plurality of means peripherally arranged therein for moving the fabric laterally after having been received on the reel, comprising a laterally moving conveyor.

17. An apparatus for supporting a fabric during treatment, comprising a rotatable reel having a plurality of means peripherally arranged therein for moving the fabric laterally after having been received on the reel, comprising laterally moving chains.

18. An apparatus for supporting a fabric during treatment, comprising a rotatable reel having a plurality of means peripherally arranged therein for moving the fabric laterally after having been received on the reel, comprising laterally moving chains having a supporting channel member.

19. An apparatus for supporting a fabric during treatment, comprising a rotatable reel having a plurality of means peripherally arranged therein for moving the fabric laterally after having been received on the reel, comprising laterally moving conveyers, said conveying means having their ends arranged to approach one another in the direction of movement thereof.

20. An apparatus for supporting a fabric during treatment, comprising a rotatable reel having a plurality of means peripherally arranged therein for moving the fabric laterally after having been received on the reel, comprising laterally moving chains, said means having their ends arranged to approach one another in the direction of movement thereof.

21. An apparatus for supporting a fabric during treatment, comprising a rotatable reel having a plurality of means peripherally arranged therein for moving the fabric laterally after having been received on the reel, comprising laterally moving chains having a supporting channel member, said means having their ends arranged to approach one another in the direction of movement thereof.

22. In combination, a plurality of vats having located for countercurrent treatment therein in each of said vats an apparatus for supporting a fabric during treatment, comprising a rotatable reel having a plurality of means peripherally arranged therein for moving the fabric laterally after having been received on the reel.

23. In combination, a plurality of vats having located for countercurrent treatment therein in each of said vats an apparatus for supporting a fabric during treatment, comprising a rotatable reel having a plurality of means peripherally arranged therein for moving the fabric laterally after having been

received on the reel, comprising a laterally moving conveyor.

24. In combination, a plurality of vats having located for countercurrent treatment therein in each of said vats an apparatus for supporting a fabric during treatment, comprising a rotatable reel having a plurality of means peripherally arranged therein for moving the fabric laterally after having been received on the reel, comprising laterally moving chains.

25. In combination, a plurality of vats having located for countercurrent treatment therein in each of said vats an apparatus for supporting a fabric during treatment, comprising a rotatable reel having a plurality of means peripherally arranged therein for moving the fabric laterally after having been received on the reel, comprising laterally moving chains having a supporting channel member.

26. In combination, a plurality of vats having located for countercurrent treatment therein in each of said vats an apparatus for supporting a fabric during treatment, com-

prising a rotatable reel having a plurality of means peripherally arranged therein for moving the fabric laterally after having been received on the reel, comprising laterally moving chains, the first of said vats having a plurality of idlers and a ring through which the fabric is adapted to pass before being received by the reel therein.

27. In combination, a plurality of vats having located for countercurrent treatment therein in each of said vats an apparatus for supporting a fabric during treatment, comprising a rotatable reel having a plurality of means peripherally arranged therein for moving the fabric laterally after having been received on the reel, comprising laterally moving chains having a supporting channel member, the first of said vats having a plurality of idlers and a ring through which the fabric is adapted to pass before being received by the reel therein.

In testimony that I claim the foregoing, I have hereunto set my hand this 28th day of April, 1927.

ARPAD WILLHEIM.

CERTIFICATE OF CORRECTION.

Patent No. 1,682,453.

Granted August 28, 1928, to

ARPAD WILLHEIM.

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction as follows: Page 2, line 66, after the word "However," insert the words "it is to be understood that, if desired, only"; page 3, line 66, claim 15, for the misspelled word "tratment" read "treatment"; and that the said Letters Patent should be read with these corrections therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 2nd day of October, A. D. 1928.

(Seal)

M. J. Moore,
Acting Commissioner of Patents.

received on the reel, comprising a laterally moving conveyor.

24. In combination, a plurality of vats having located for countercurrent treatment therein in each of said vats an apparatus for supporting a fabric during treatment, comprising a rotatable reel having a plurality of means peripherally arranged therein for moving the fabric laterally after having been received on the reel, comprising laterally moving chains.

25. In combination, a plurality of vats having located for countercurrent treatment therein in each of said vats an apparatus for supporting a fabric during treatment, comprising a rotatable reel having a plurality of means peripherally arranged therein for moving the fabric laterally after having been received on the reel, comprising laterally moving chains having a supporting channel member.

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