

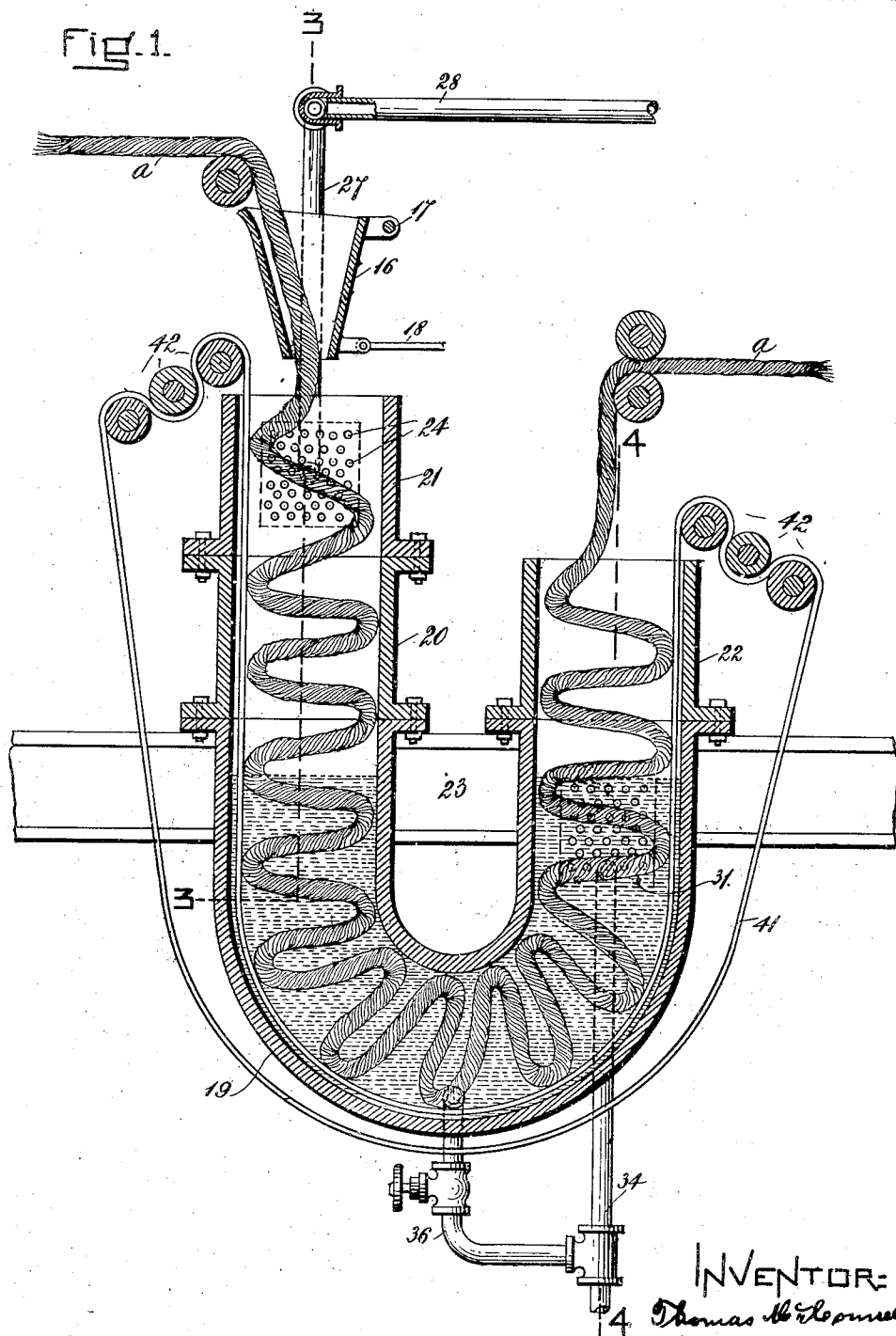
June 24, 1930.

T. McCONNELL
APPARATUS FOR BLEACHING

1,766,716

Filed Dec. 8, 1925

4 Sheets-Sheet 1



By

INVENTOR:
Thomas McConnell
breckinridge
ATTORNEYS:

June 24, 1930.

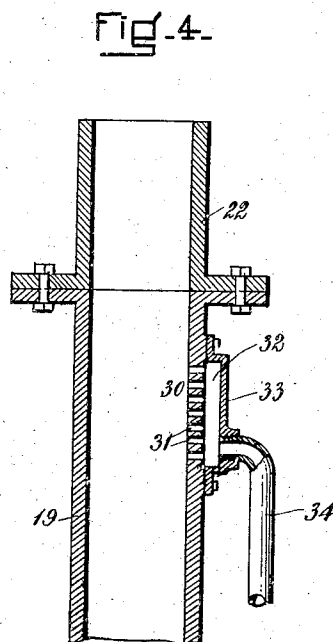
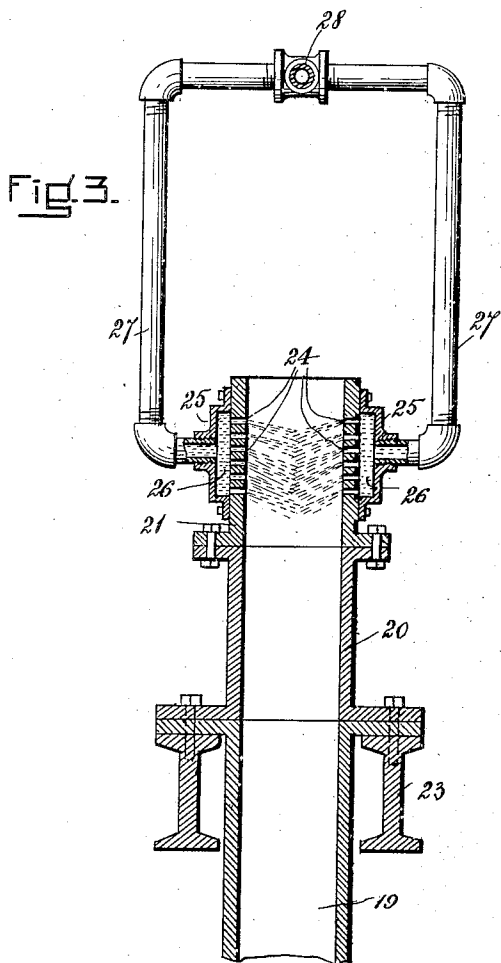
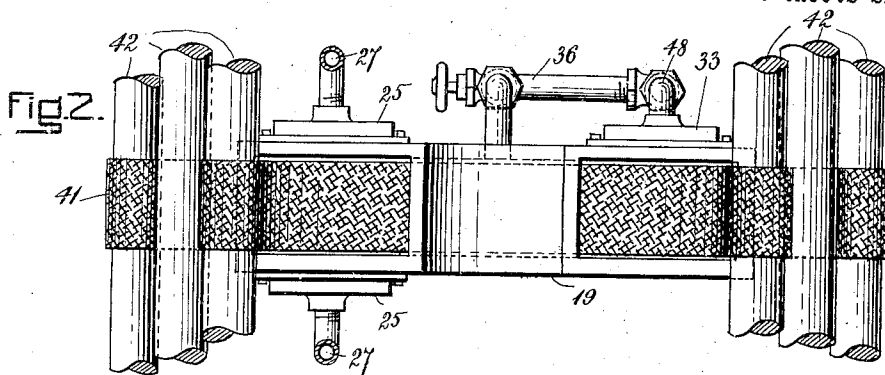
T. McCONNELL

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APPARATUS FOR BLEACHING

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4 Sheets-Sheet 2



INVENTOR:
Thomas McConnell
By *Boon & Hays*
ATTORNEYS:

June 24, 1930.

T. McCONNELL

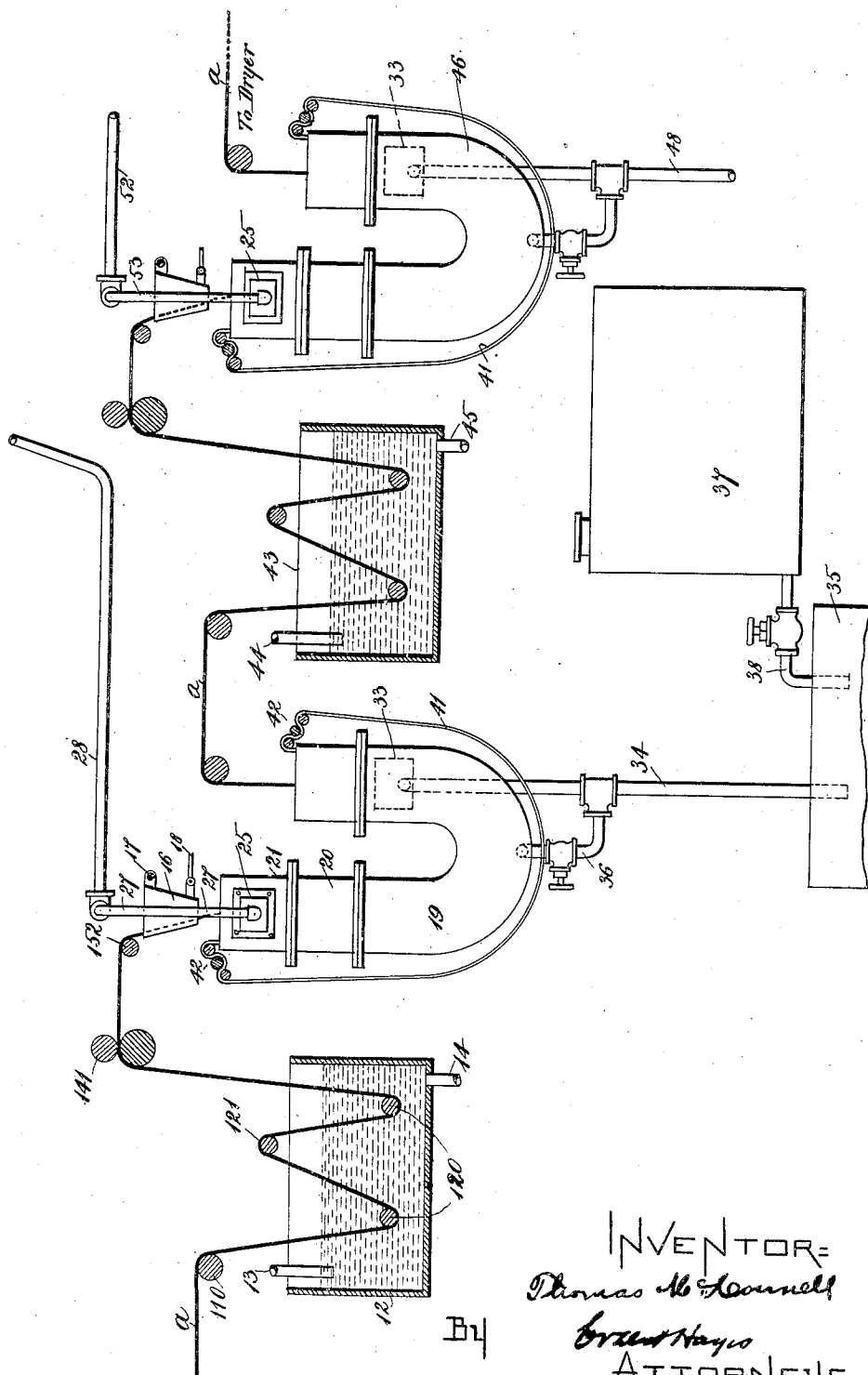
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Fig. 5.



INVENTOR:
Thomas McConnell
Brent Hayes
ATTORNEYS:

June 24, 1930.

T. McCONNELL
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4 Sheets-Sheet 4

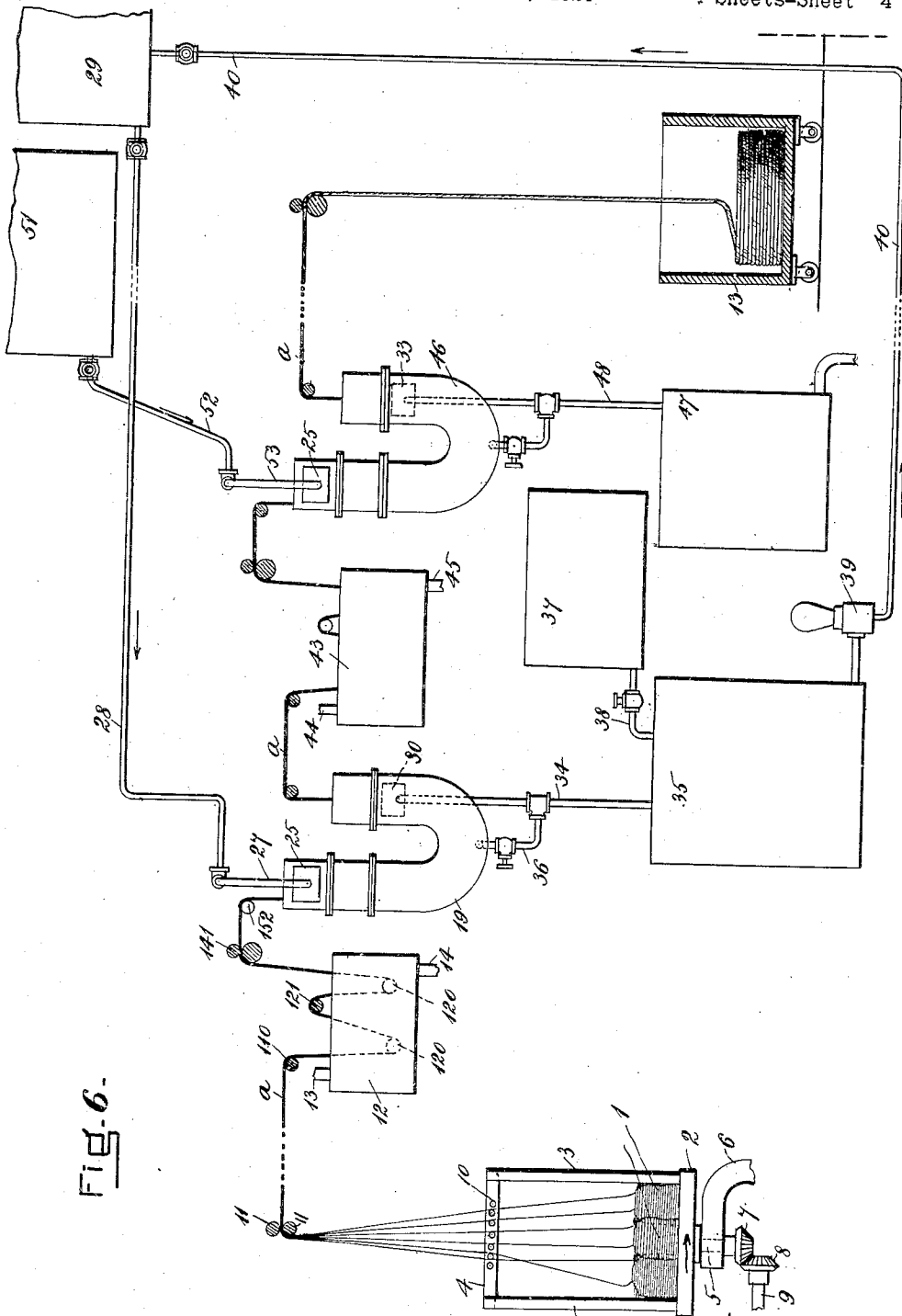


Fig. 6.

By

INVENTOR:
Thomas M. McConnell
By *John A. Hayes*
ATTORNEYS:

UNITED STATES PATENT OFFICE

THOMAS McCONNELL, OF EASTHAMPTON, MASSACHUSETTS, ASSIGNOR TO F. COIT JOHNSON, JAMES W. LANE, OLIVER L. JOHNSON, THOMAS McCONNELL, AND HUGH McCONNELL, TRUSTEES, DOING BUSINESS AS HAMPTON COMPANY, OF EASTHAMPTON, MASSACHUSETTS

APPARATUS FOR BLEACHING

Application filed December 8, 1925. Serial No. 74,035.

The bleaching of cotton in strands or in other form has heretofore been a very long process, taking many hours to carry it through and produce goods in proper condition for the further steps in finishing and manufacturing. I have found that this process can be shortened considerably by the use of apparatus, some of it devised by me and peculiarly arranged in sequence to enable the fibres to be thoroughly treated and delivered in good condition for future use. The apparatus and arrangement which I have devised is shown in its preferred form, more or less diagrammatically, in the drawings, in which—

Figure 1 is a vertical section of a tank showing the way in which the material lies in the tank and the means of feeding it there-through.

Fig. 2 is a plan of the tank shown in Fig. 1.

Fig. 3 is a vertical fragmentary section of the entering arm of the tank taken on line 3—3 of Fig. 1 to show the delivery of caustic thereto.

Fig. 4 is a fragmentary section taken on line 4—4 of Fig. 1 showing the overflow from the tank.

Fig. 5 is a diagrammatic assembly view showing the arrangement of the bleaching mechanism, and

Fig. 6 is an elevation showing the various parts in convenient sequence for carrying through the bleaching process.

This apparatus is more particularly adapted for bleaching cotton strands though it has other uses. The strands to be bleached are made into suitable bundles or coils 1 and a number of these coils are placed upon the turntable 2. This turntable has two uprights 3, one on each side thereof, connected by parallel crossbars 4 at the top. The turntable is mounted on a shaft 5 carried in a bracket 6 and having at its lower end a beveled gear 7 in mesh with another beveled gear 8 mounted on the end of a power shaft 9. The crossbars 4 are connected by partitions or guides 10, these guides being arranged so as to form guide passages through each of which a strand from one of the several bundles 1 may be passed, thus keeping the several strands separate from each other at that point. By rotating the turntable 2, for example in the direction of the arrow, the strands are twisted together so that they are delivered from this mechanism as a rope α to the two-power driven feed rolls 11. Mechanism for this purpose is described in my application No. 74,036 filed contemporaneously herewith. 110 is a guide roll over which the rope is carried to a tank 12. This tank contains a hot caustic alkaline solution which is fed to it through the pipe 13, 14 being a drain pipe provided with a stop cock (not shown). Through this tank the rope is passed slowly for the purpose of allowing it to become saturated more or less with the said alkaline solution, and in practice the rope is kept in this tank only so long as is necessary for this purpose. The tank may be provided with rolls 120 near its bottom together with the guide roll 121 around which the rope is passed. From this tank the rope of warps is carried between feed rolls 141 actuated by a suitable gearing from a power shaft (not shown) and over a guide roll 152 through a trumpet 16 (not shown in Fig. 6; see Figs. 1 and 5) into the U-shaped lye tank 19. This trumpet 16 is pivoted at 17 to a support (not shown) and has connected thereto a reciprocating rod 18 by which its lower end is reciprocated somewhat around the pivot 17 so that it may lead the rope α into the caustic alkaline solution tank or kier 19 in serpentine or zigzag form as shown in Fig. 1. This kier is shown in detail in Fig. 1, and it comprises a U-shaped tubular member 19 having as part of it at its inlet end an extension 20 above the desired normal liquid level on which is mounted a second extension 21 having inlets for the

caustic alkaline solution liquor. Its outlet end also has an extension 22. 23 are beams by which this tank is supported. It will be understood that the member 19 and the extensions 20 and 22 may be integral but as shown the construction is simplified.

The section 21 of this kier is perforated on opposite sides with small perforations as at 24 and over each perforated portion is a cap 25 which encloses a chamber 26 connected by a pipe 27 and 28 with the lye reservoir 29 which is provided with means (not shown) for heating the lye to a proper temperature. The reservoir should be located sufficiently above the level of the tank to cause the lye to flow through the perforations 24 under considerable pressure so as to ensure thorough contact by impact with the fibres of the roving or rope *a*. If necessary, a pump (not shown) may be inserted in pipe 28 to ensure the necessary pressure. By this means the thorough impregnation of the rope of warps is secured.

30 is an overflow formed preferably by perforations 31 in the wall of the kier 19 which perforations connect with the chamber 32 formed by a cap 33 connected by a pipe 34 with a mixing tank 35. The kier 19 also has a draw-off pipe 36 leading to the tank 35. The liquor in the tank 35, which has been more or less exhausted in cleansing the rope, may be brought up to the proper strength by concentrated liquor from a tank 37 which is connected to tank 35 by the pipe 38. From the tank 35 connection is made with a pump 39 by which the contents of the tank 35, after it has been brought up to the proper strength, may be delivered through the pipe 40 into the tank 29 to be used over again. The pipes leading to and from the several tanks are provided with suitable valves.

An endless slack conveyor belt 41 if desirable may be provided preferably to extend down into and through the kier 19 for the purpose of assisting in the movement of the rope of warps *a* through this member. The rolls 42 over which this conveyor passes are given proper movements to feed the rope slowly through the kier by gearing or in any desired way. This movement should be slow to give proper feed so that the rope may be thoroughly treated by the liquor. It will be noted that the inner part of the inner roll of each set of rolls 42 is substantially in alignment with the inner surface of a vertical part of an outer wall of a kier, so that said conveyor belt will travel closely adjacent said outer wall, and will also, due to the weight of the material resting thereon, travel adjacent the bottom of the kier. This conveyor belt is made preferably of some loosely woven material so that it may engage the rope and not in any way prevent access of the liquor to all parts of the roving. It

is desirable to use such a conveyor as it engages the rope and to some extent at least tends to hold its parts by frictional contact from engaging each other or dropping by gravity to the bottom of the kier. It may not always be necessary. From the kier the rope *a* is carried to a washing machine 43 of any known character, the purpose of which is to wash out the lye from the rope and also any impurities which it may contain. This washing machine is fed by a pipe 44 and the liquor is withdrawn from it by the pipe 45. It will be understood that these pipes as well as those feeding liquor to and withdrawing it from the saturating tank may be provided with valves as is usual. From this washing tank the rope *a* is led to a bleaching kier 46 in all respects like the kier 19. It is preferably fed with the bleaching solution by means such as is shown in connection with kier 19 from a tank 51 connected to the kier 46 by suitable pipe connections 52 and 53 like the pipe connections 27 and 28 to the kier 19, and a tank 47 is provided to which the overflow and the draw-off are carried by the pipe 48 as in the case of the kier 19.

From the tank 46 the rope *a* may be washed and then be deposited in a car to be taken for drying and finishing as desired.

The kiers above described have proved themselves of great value in this process because the rope is left loose to expose its entire body successively to the lye or other liquid, with the additional feature that the warps are loosely twisted into the rope so that the liquid will penetrate the rope and each fibre will be reached by the liquid.

Moreover the delivery of the liquid into the kier across the path of the rope and in finely divided streams assists materially in this penetration. The passing of the rope through the bleaching system should be sufficiently slow to ensure the effective contact of the liquids with the fibres to perform their several functions.

While this apparatus is especially designed for warp or other threads, it may be used in slightly modified form for treating other textile material by other liquors than a caustic alkaline solution if desired.

What I claim as my invention is:—

1. In a bleaching apparatus, the combination with a U-shaped kier adapted to contain a caustic alkaline solution, of an endless slack conveyor belt of loosely woven material, means for depositing material to be treated and maintaining it adjacent to the outer walls and bottom thereof, and means, comprising two sets of driving rolls, for carrying said belt through said kier.

2. In a bleaching apparatus, the combination with a U-shaped kier adapted to contain a caustic alkaline solution, of an endless slack conveyor belt of loosely woven ma-

terial, means for depositing material to be treated and maintaining it adjacent to the outer walls and bottom thereof, and means, comprising two sets of driving rolls, for carrying said belt through said kier, the inner roll of each set of driving rolls being arranged substantially in alinement with the insides of the vertical parts of the outer wall of said kier.

THOMAS McCONNELL.