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CLOTH FINISHING

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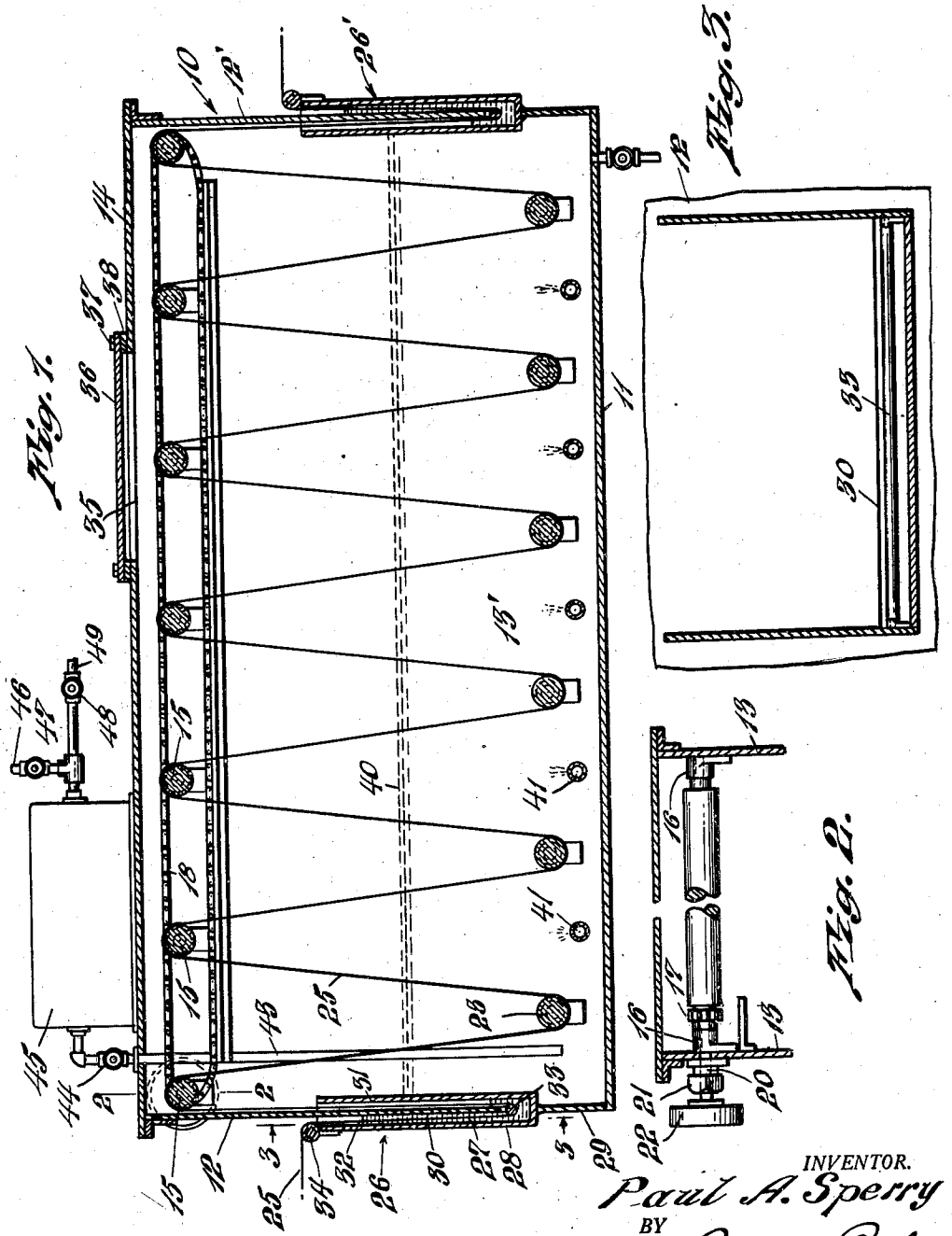


Fig. 1.

Fig. 3.

Fig. 2.

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CLOTH FINISHING

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2 Claims. (Cl. 8—151)

This invention relates to a kier used in the finishing of textile fabrics; and has for one of its objects the provision of a kier in which cloth may be treated under pressures substantially above atmospheric pressure by a continuous passage of the work through the kier.

Another object of the invention is the provision of a seal for a chamber at a pressure substantially above atmospheric pressure, such for instance as two atmospheres, which will enable fabric to pass from the surrounding area at atmospheric pressure into and through the chamber and emerge therefrom without breaking the seal for such chamber.

Another object of the invention is the utilization of a seal which will be of such a character that it will not be depleted or require replenishing by the passage of work through it.

Another object of the invention is the provision of a kier which will avoid the necessity of tedious and careful loading to prevent a channeling action.

Another object of the invention is the utilization of a liquid seal which will be of a liquid sufficiently heavy to occupy but a minimum volume and height that economy of space may be had.

Another object of the invention is the provision of a kier which will enable the work to be inspected as it emerges from the kier so that should anything go wrong with chemicals or the like in the kier the same may be quickly detected that the loss of an entire kier load such as is now usual will be prevented.

With these and other objects in view, the invention consists of certain novel features of construction, as will be more fully described, and particularly pointed out in the appended claims.

In the accompanying drawing:

Fig. 1 is a sectional view largely diagrammatic of a kier illustrating my invention;

Fig. 2 is a sectional view on line 2—2 of Fig. 1;

Fig. 3 is a sectional view on line 3—3 of Fig. 1.

The usual type of kier in operation today is loaded in rope form with a quantity of fabric such for instance as fifteen thousand yards. The fabric must be carefully packed in the kier to prevent channeling by a tedious operation, and the kier is then sealed and boiled with chemicals for a considerable length of time at approximately fifteen pounds pressure or substantially two atmospheres to accomplish a certain desirable treatment of the fabric. Should anything be wrong as to the chemicals, tendering or oxi-cellulose condition of the goods may occur or because of some impurities a staining of the goods may occur and the entire fifteen thousand yards of the kier may be lost. A pressure is desirable to reduce the length of time necessary for the treatment of the goods, it being easier to break down the motes under this pressure than to treat fabrics such as in a dye jig at atmospheric pressure which takes many times longer to perform the same result.

I have eliminated these undesirable conditions by providing a kier which may be operated at two or more atmospheres pressure or the usual fifteen pounds per square inch pressure and the goods operated upon in open form as distinguished from the rope form in which they are usually handled which enables the motes to be broken down even quicker and the fabric treated more evenly than heretofore; and I accomplish this by use of a seal in the form of a U-shaped liquid column of mercury through which the goods pass and which being heavy need but only a fraction of the over-all height of the kier to balance the pressure of the fifteen pounds per square inch in the kier and which being of a heavy nature will permit the goods to pass without adhering to the goods and thus will not itself become depleted or exhausted by reason of the travel of thousands of yards through the kier. In fact, this liquid permits the goods to be passed through it in substantially a dry state or the state in which the goods are before entering the U-shaped column; and the following is a more detailed description of the present embodiment of this invention, illustrating the preferred means by which these advantageous results may be accomplished:

With reference to the drawing, I have shown largely diagrammatically a kier designated generally 10 having a bottom wall 11 and end walls 12, 12', side walls 13 and a top wall 14. Within the kier there will be rolls 15 each supported in suitable bearings 16 at the upper portion of the kier provided with a gear 17 on the shaft of the roll which will be driven by a sprocket chain 18 from the roll at one end which has its shaft 20, passing through the side wall 13 and then is equipped with a stuffing box 21 enabling this shaft to be driven by a belt or pulley 22. Thus, each of the upper rolls is rotated in unison. Lower rolls 23, spaced at intervals between the vertical planes of the upper rolls 15, are also provided in suitable bearings for the disposition of the fabric 25 over these rolls in a zigzag fashion so as to spread the same out in open web formation in the kier.

The opposite end walls 12, 12' are provided

with liquid seals which are designated 26, 26' and consists of a U-shaped column of liquid 27 which is formed by a trough-shaped container 28 mounted upon the lower section 29 of the end wall with the upper section 30 of the end wall extending into the trough so as to divide the liquid into two columns 31 and 32, the liquid being preferably mercury or some heavy liquid which will maintain a minimum volume when subjected to a pressure of fifteen pounds within the sealed kier 10. This liquid of course will be higher in the column 32 than in the column 31 the difference in height representing the weight of the mercury necessary to balance the pressure within the kier and the atmospheric pressure without. This U-shaped column of mercury will be of a width to accommodate the full width of the web which is passed into the kier and will be equipped with some rounded surface or anti-friction device 33 at the lower end of the wall portion 30, while there will be an anti-friction roll 34 at the upper edge of the seal 26 over which the web of work 25 will pass in entering the seal to extend down below the guide 33 and thence upwardly over the first roll 15, then downwardly over the first roll 23 and so on in a zigzag fashion through the kier while it will emerge through a similar seal 26' in the opposite end wall 12'.

The length of the kier and the timing of the travel of the work through the kier will be such as to permit of goods requiring the longest treatment to remain in the kier a sufficient length of time. Usually heavy goods require the longer treatments. If, however, thinner or frail goods are treated their passage through the kier may be speeded up or their weaving in a zigzag manner over the rolls 15 and 23 may be changed so that a less quantity of the goods are within the kier at a given time. For instance, every other roll 15, 23 might be skipped were goods to be passed through the kier in half the time or a variation of this character might readily be worked out.

The kier is provided with an opening 35 which is sealed with a cover 36 by means of bolts 37 and gasket 38 so that one may enter the kier for initial loading or repair purposes. The loading, however, is accomplished in a very simple manner as compared with that of kiers in the present general use.

The goods are treated in a liquor which may have a height in the kier substantially to the dotted line 40. This liquor is kept in a boiled state by the entrance of steam through conduits 41 distributed at suitable points along the lower part of the kier which causes the liquid to be boiled and by its turbulent or fountain action continually treats the goods not only during their passage through the liquid but also by the vapors above the liquid and the turbulent action of the liquid continually boiling during treatment. It is estimated that the goods will be treated in the kier from thirty to forty-five minutes where the same goods would require four or five hours' treatment heretofore in rope form.

For replenishing the chemicals of the treating liquor a conduit 43 extends into the kier having a valve 44 which communicates with the chamber 45. A quantity of the treating liquor may be passed through conduit 46 controlled by valve 47 into the chamber 45 while the valve 44 and valve 48 in the steam line 49 are closed, then valve 48 and valve 44 may be opened and the charge of chemicals in the chamber 45 driven into the treating liquor. By calculation it may be readily determined the amount of liquor required from time to time, this being a usual practice in supplying treating liquors which become exhausted. It will, of course, be apparent that the steam pressure in the line 49 must be above the pressure in the kier 10.

Although the invention does not contemplate the use of any particular chemical those usually used in kier boils of this character are caustic, Turkey red oil and pine oil.

The foregoing description is directed solely towards the construction illustrated, but I desire it to be understood that I reserve the privilege of resorting to all the mechanical changes to which the device is susceptible, the invention being defined and limited only by the terms of the appended claims.

I claim:

1. A cloth treating apparatus comprising a sealed chamber for treating the work, U-shaped columns of mercury affording an entrance to and an exit from said chamber for the work, said mercury maintaining a seal when the pressures within the chamber are substantially above atmospheric pressure and also exerting pressure on the work as it passes therethrough, whereby work may enter the chamber free from moisture.

2. The method of continuously passing a web of fabric into a sealed chamber and at the same time reducing the passage of moisture thereinto which consists in forming a seal of mercury for the chamber and passing the web through the mercury into the chamber whereby at the same time moisture or other liquids of lesser specific gravity than the seal are squeezed from the web.

PAUL A. SPERRY.