May 18, 1954 J. B. LASLEY 2,678,483

TENTER FRAME WASHING SYSTEM FOR MERCERIZING RANGES

Filed May 28, 1952

6 Sheets-Sheet 1

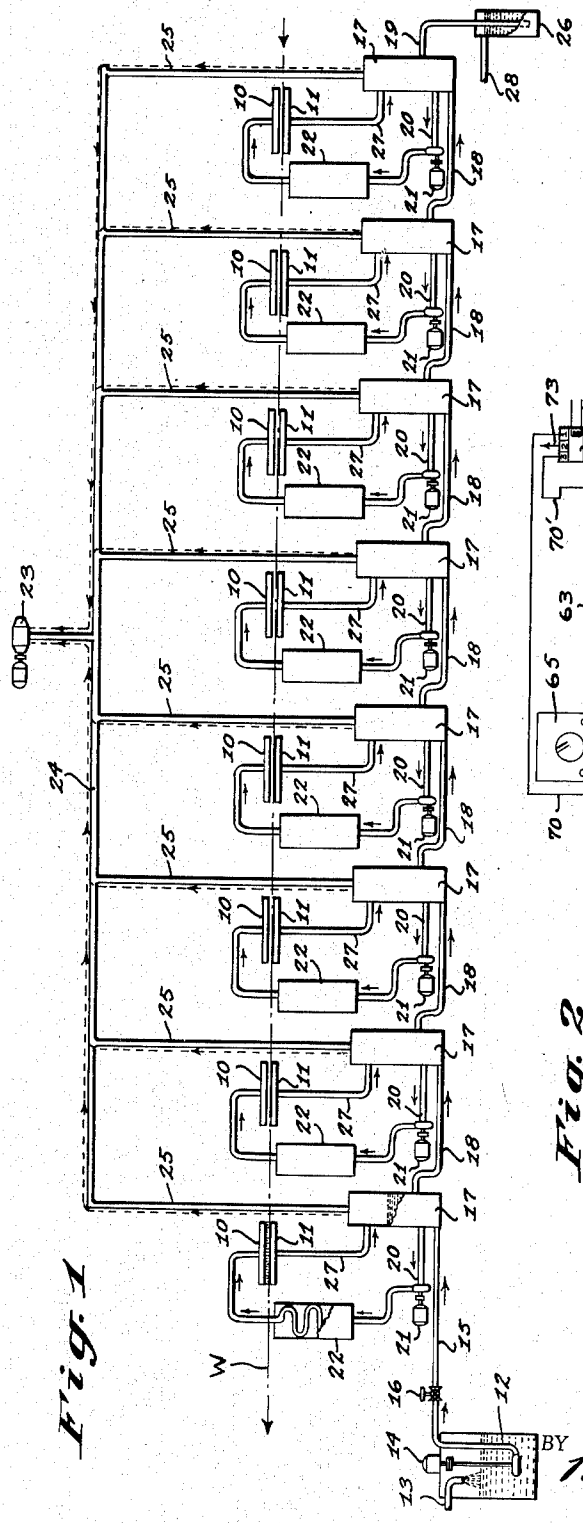


Fig. 1

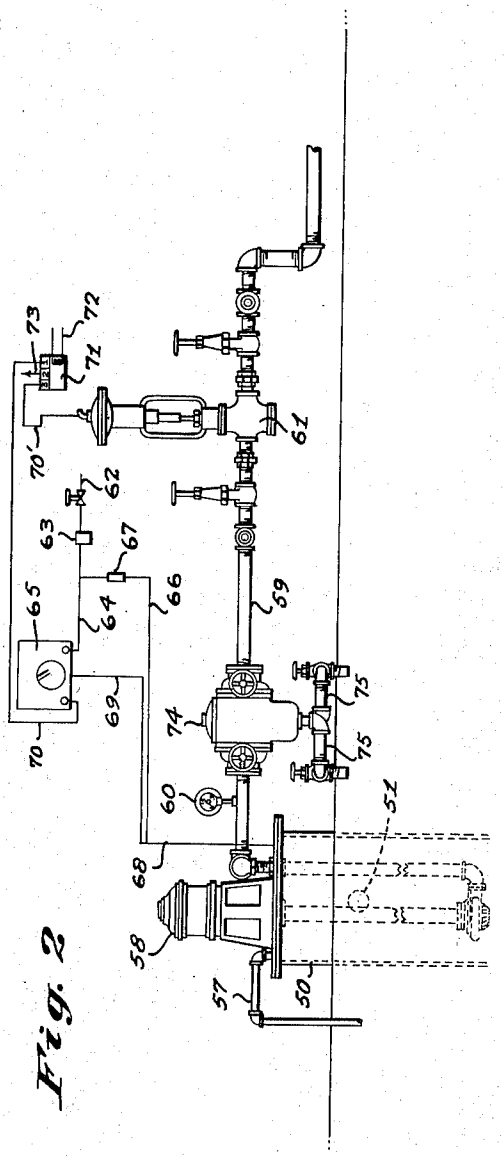


Fig. 2

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Fig. 3

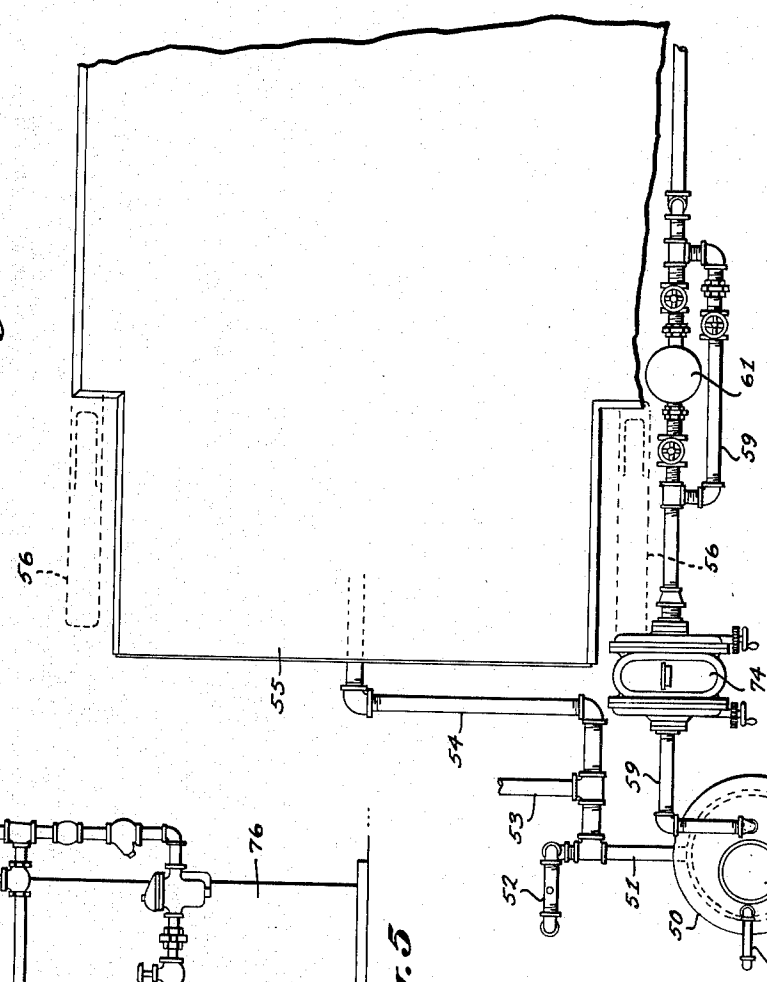
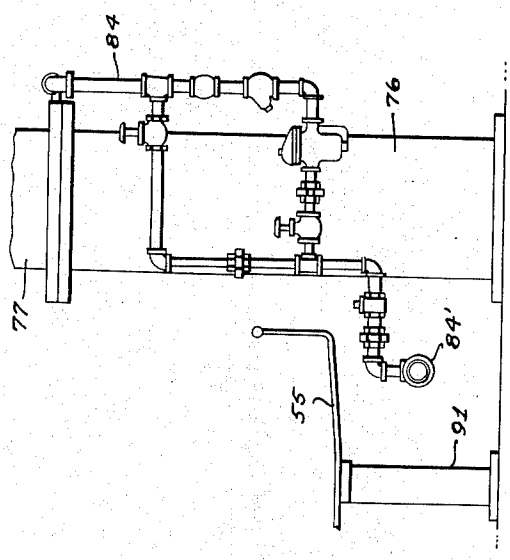


Fig. 5



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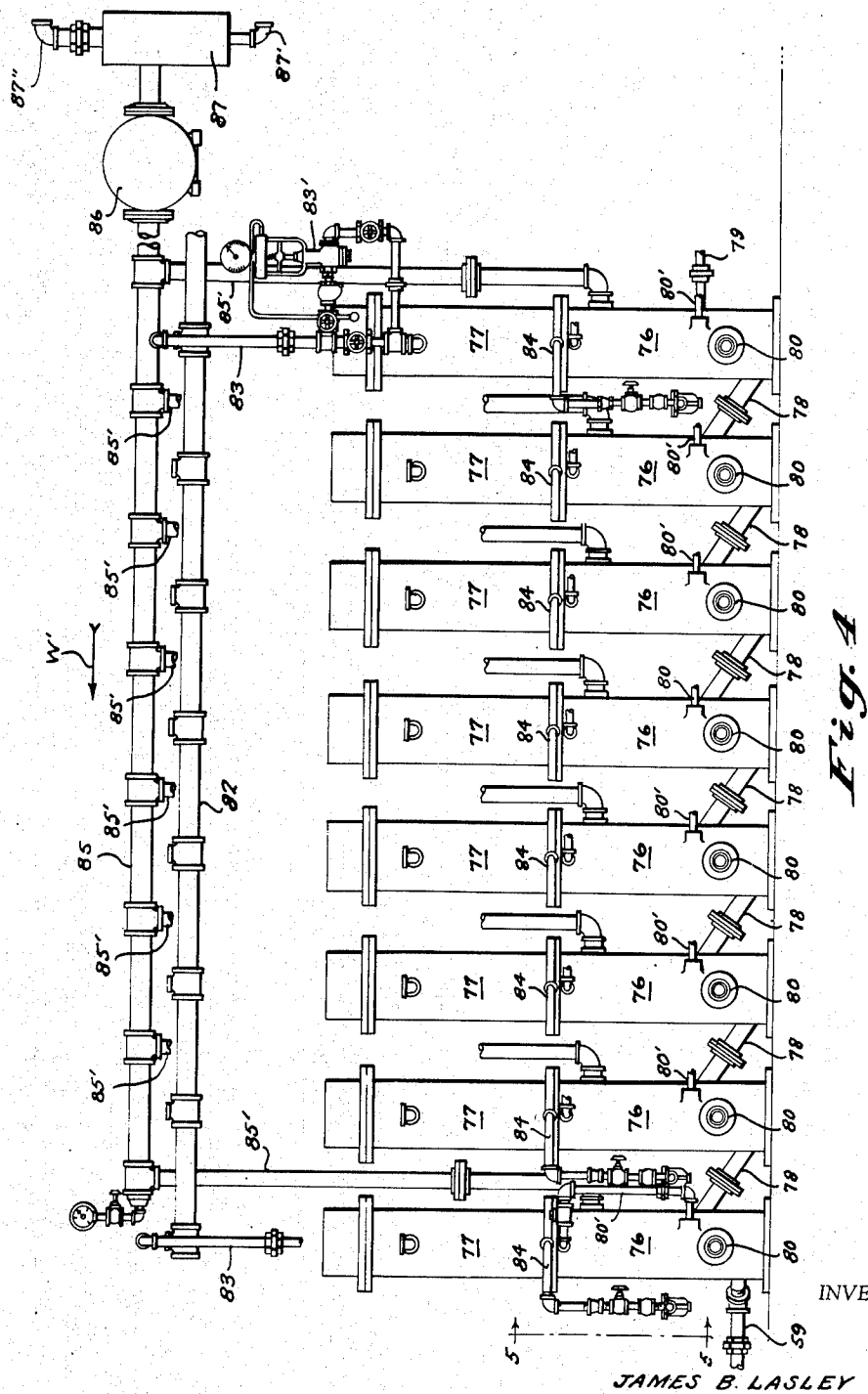


Fig. 4

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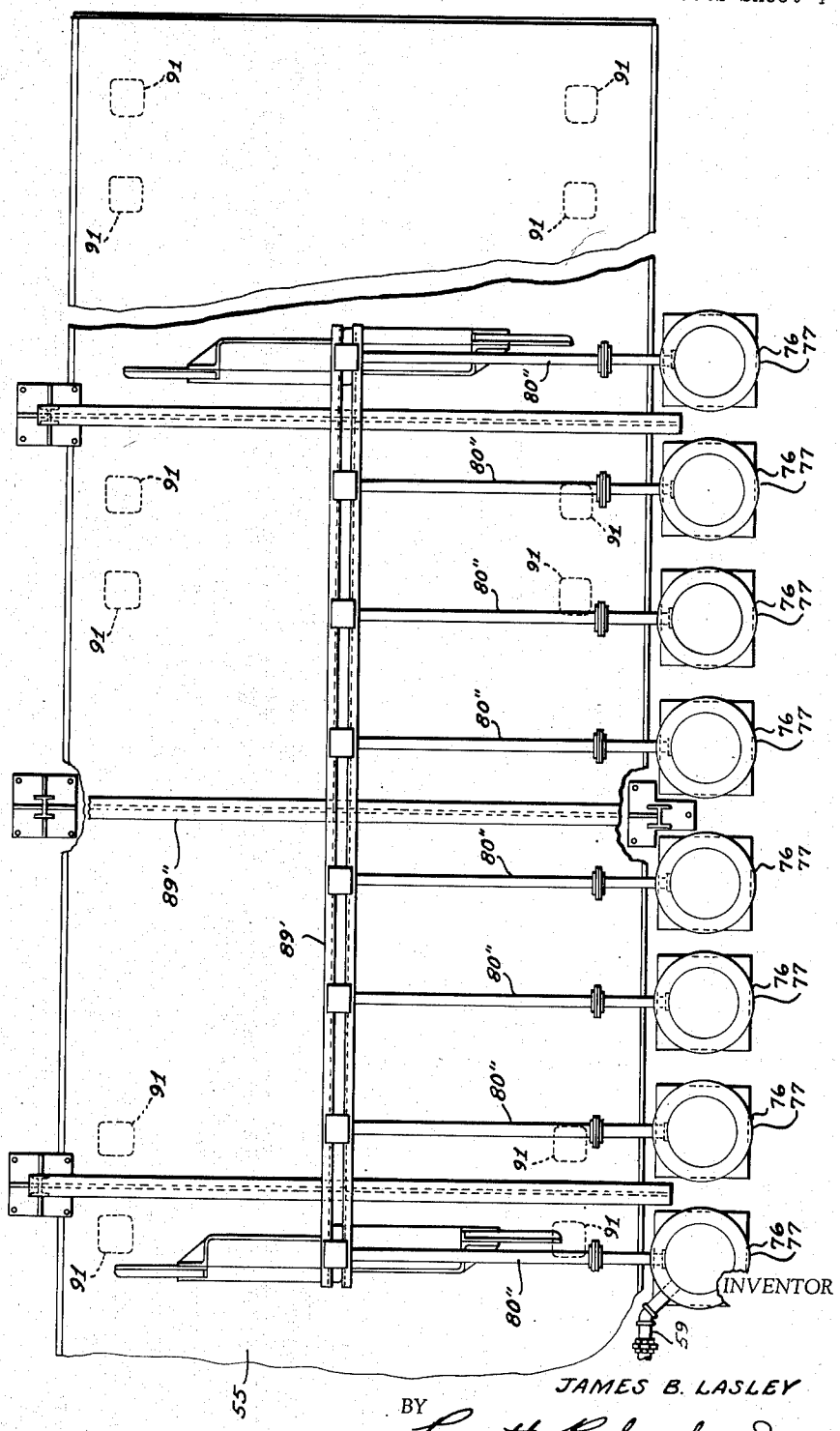
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Fig. 6



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Fig. 7

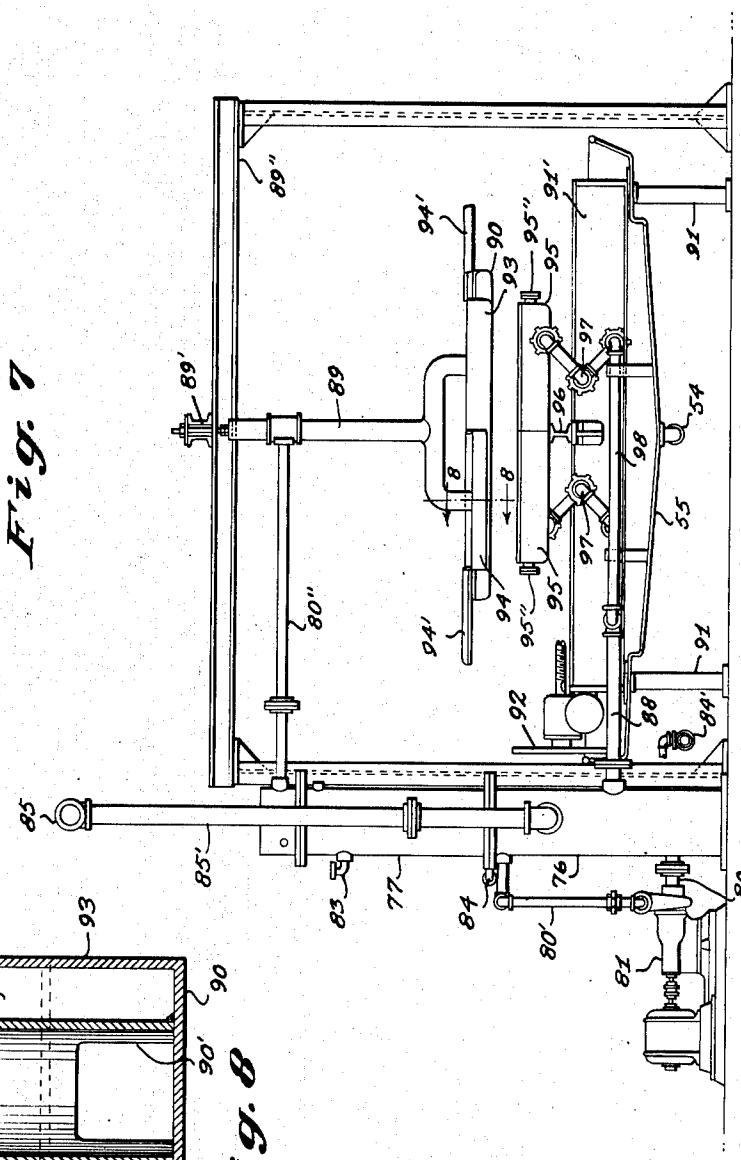
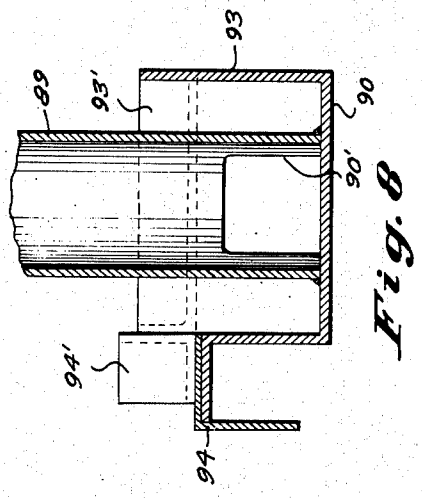


Fig. 8



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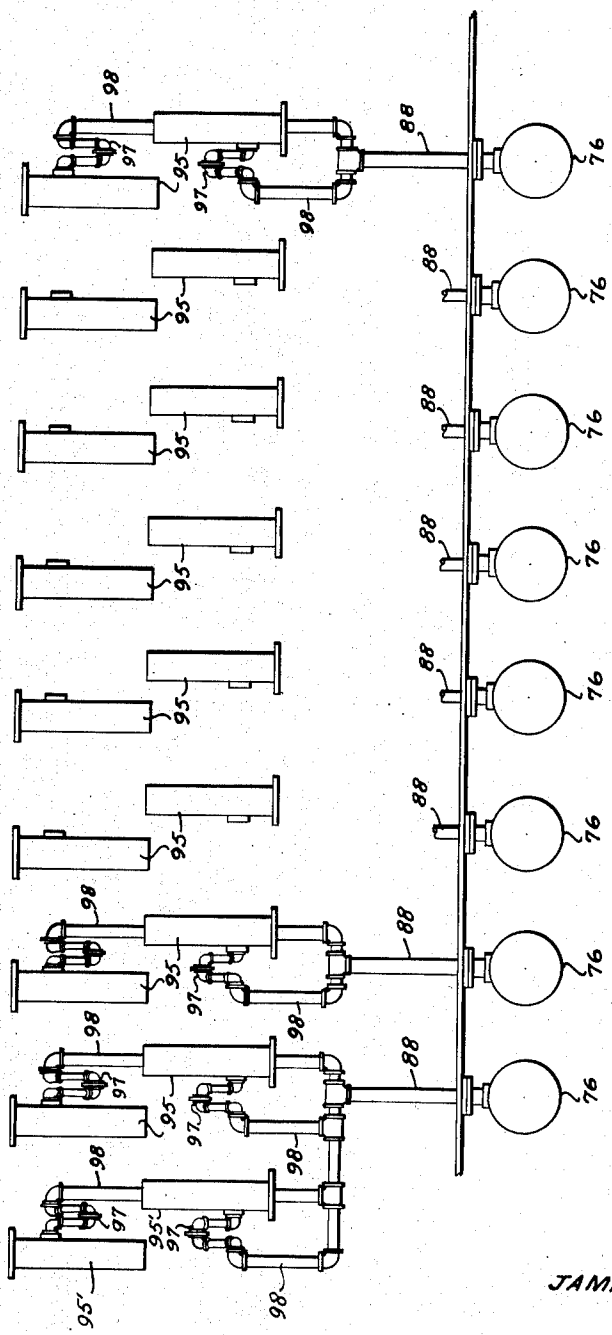


Fig. 9

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2,678,483

TENTER FRAME WASHING SYSTEM FOR MERCERIZING RANGES

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Application May 28, 1952, Serial No. 290,497

13 Claims. (Cl. 26—1)

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This invention relates to mercerizing apparatus, and more particularly to an improved washing system for removing mercerizing caustic from a cloth web while the web is carried on the tenter frame of a mercerizing range.

As is well known, mercerizing is the process by which a sheen is imparted to cotton fiber through treatment with caustic (i. e., sodium hydroxide). The action of the mercerizing caustic on the fiber is a purely physical one of changing the fiber from a more or less flat form to a cylindrical form more akin to that of synthetic filaments. However, even though the mercerizing process acts directly on the fiber (as distinguished from cloth constituted by the fiber), the process is commonly applied to cloth in web form, rather than initially to the fiber yarn, where it is a mercerized cloth product that is finally desired.

When the mercerizing is done at the cloth stage, the cloth web is conventionally handled in a mercerizing range incorporating a tenter frame to prevent shrinkage of the cloth by the mercerizing caustic, and the caustic must be washed from the cloth adequately before leaving the tenter frame in order to avoid this shrinkage. Accordingly, the cloth mercerizing ranges have heretofore also conventionally included a washing system by which wash water was applied on the top face of the cloth web at successive intervals through weir boxes spaced from the delivery end of the tenter frame, the wash water being recovered below each weir box by a suction box disposed at the bottom face of the cloth web and connected to deliver the recovered wash water serially to the succeeding weir box. These previously employed washing systems, however, have never been fully satisfactory for a number of reasons.

In the first place, because the wash water has been characteristically delivered serially through the weir boxes in these prior washing systems, a throughput of wash water corresponding to the capacity of any one weir box has necessarily been required which has meant that a relatively high wash water supply has been needed. Also, because the successive weir boxes have been supplied with wash water directly from a suction box at the preceding weir box, a substantial amount of entrained air has had to be dealt with which has made it necessary to use rather expensive and cumbersome displacement pumping means. In addition, because heat exchangers are commonly employed in the delivery line for each weir box in order to heat the wash water for better washing action, the entrained air from the suction boxes has had highly objectionable effects when passed through these heat exchangers in causing splashing and the like.

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Further, because it was common in the previously available washing systems to provide the weir boxes and suction boxes in a width that allowed them to extend transversely of the tenter frame for the maximum width of cloth web that could be handled, and to mount the weir boxes and suction boxes centrally of their length for rotation so that they could be angled to reduce their transverse extent when smaller widths of cloth were being handled, the washing action has not been properly adjustable for different widths of cloth, for the weir boxes would still remain at a constant capacity when rotated without any compensation for the difference in cloth width. Also, the angling of the suction boxes resulted in an undesirable tendency to channel the wash water to one side or the other of the cloth web, and the arrangement for angling the weir boxes and suction boxes imposed undue space requirements for the washing system that reduced substantially the effectiveness with which a given tenter frame could be used.

This latter factor of the effectiveness with which a given tenter frame may be used has a particularly important bearing on the efficiency with which the cloth mercerizing process is carried out, because the mercerizing strength or concentration of caustic must be maintained in the cloth for action on the constituent fibers for a given length of time in order to obtain effective results, and a given length of travel on the tenter frame before washing must therefore be provided at a given speed. Accordingly, the speed with which a cloth mercerizing process may be carried out is limited on a given tenter frame by the space required for the washing system provided, and undue space requirements for the washing system will limit unduly the speed at which a given tenter frame can be operated in a mercerizing range.

Finally, it should be noted that because the action of the mercerizing caustic is a purely physical one, the caustic used is not degraded in any respect and would be available for effective reuse if it were feasible to recover the caustic from the wash water. However, the serial application of wash water to the cloth web for removing the mercerizing caustic in accordance with prior practice is not adapted, because of the high wash water throughput required, for removing the caustic in high enough concentrations to make recovery of the caustic practicable, so that

the caustic has heretofore been routinely discharged with the wash water and lost.

According to the present invention, there is now provided an improved washing system for use with cloth mercerizing ranges of the type noted above, which is characterized by the independent recirculation of wash water at a plurality of washing stations in parallel from a common wash water supply having a relatively low throughput, and which results in very substantially more effective washing action than has heretofore been possible with prior systems. It is possible with the washing system of the present invention, for example, because of the low wash water throughput to obtain easily a wash water discharge containing a 10% concentration of mercerizing caustic, whereas the concentrations obtainable with prior systems have been of the order of not more than 3 to 5% at the most, which means that less than half of the amount of water per pound of caustic needs to be dealt with in recovering the caustic when employing the washing system of the present invention as compared with the prior systems.

Also, the washing system of the present invention is notable for the compactness with which it may be arranged. This is illustrated by an installation embodying the present invention that has actually been made and operated with excellent results on a mercerizing range incorporating a 70 foot tenter frame, and that provides 8 washing stations on the frame. In contrast, this installation was made side by side with a mercerizing range employing a representative washing system of the type previously available in which only 4 washing stations were provided on a 70 foot tenter frame, and which would have required a 90 foot tenter frame to make 8 washing stations available.

These and other features of the washing system of the present invention are described in further detail below in connection with the accompanying drawings, in which:

Fig. 1 is a more or less diagrammatic side elevation of a washing system arranged according to the present invention;

Fig. 2 is a fragmentary side elevation illustrating further a suitable actual embodiment of means for delivering a wash water supply to the washing system;

Fig. 3 is a fragmentary plan view corresponding generally to Fig. 2;

Fig. 4 is a further fragmentary side elevation of an actual embodiment of the washing system proper;

Fig. 5 is a fragmentary end elevation substantially as seen from the line 5—5 in Fig. 4;

Fig. 6 is a further fragmentary plan view illustrating the wash water weir box arrangement, and corresponding generally to Fig. 4;

Fig. 7 is a further end elevation substantially as seen from the right in Fig. 4;

Fig. 8 is a sectional detail taken substantially on the line 8—8 in Fig. 7; and

Fig. 9 is a further fragmentary plan view illustrating the wash water suction box arrangement and corresponding generally to Fig. 4.

Referring now in detail to the drawings, and more particularly at first to Fig. 1, the diagrammatic illustration in Fig. 1 indicates by a broken line at W the path of a cloth web as it would travel on the tenter frame (not shown) of a mercerizing range, following application of the mercerizing caustic, with the related disposition of a plurality of paired weir boxes 10 and suction

boxes 11 being represented schematically in accordance with an arrangement for a washing system embodying the present invention. As has already been noted above, these paired weir boxes 10 and suction boxes 11 would be spaced from the delivery end of the tenter frame to allow an adequate initial travel of the web W on the tenter from the receiving end thereof before washing out the mercerizing caustic commences.

For purposes of illustration, the weir boxes 10 and suction boxes 11 are represented in Fig. 1 extending in the plane of the drawing, although it will be understood that in an actual embodiment they would extend transversely of the cloth web W, as will appear in detail further below. The representation in Fig. 1 is purposely distorted in this manner to illustrate clearly at the outset the characteristic paired arrangement of the weir boxes 10 above the path of the cloth web W to deliver wash water on the top face thereof, and of the suction boxes 11 immediately beneath the bottom face of the web W to recover the delivered wash water, for the parallel recirculation of wash water as provided according to the present invention.

The wash water supply means is shown in Fig. 1 as comprising a sump 12 to which the wash water is delivered by any suitable means as at 13 from a fresh water supply; or from the overflow of a separate washer in which the web W may subsequently be treated after leaving the tenter frame; or from the spillage at the suction boxes 11; or from the wash water discharge of the washing system of the present invention; or from combinations of any of these sources as may be most advantageous in a particular instance.

The sump 12 is equipped with a sump pump unit 14 from which a wash water supply line 15, that preferably includes a suitable sump liquid level control valve as at 16, runs to a bottom level of a first wash water receiver 17 arranged adjacent the paired weir box 10 and suction box 11 disposed first adjacent the delivery end of the tenter carrying the cloth web W (i. e., first from the left as seen in Fig. 1). The receiver 17 is also provided with an overflow outlet at a higher level from which a connecting line 18 runs to a bottom level of an exactly similar second receiver 17 for the paired weir box 10 and suction box 11 at the second spaced washing station (from the left in Fig. 1), and so on through succeeding receivers 17 connected in the same manner for each of the paired weir boxes 10 and suction boxes 11 provided (eight as shown in Fig. 1, although any greater or lesser number desired might be provided), with the last receiver 17 having a discharge line 19 connected to its overflow outlet. As a result, a common wash water supply means is provided for all of the washing stations, the overflow arrangement at each receiver 17 trapping, in a progressive manner as will be noted presently, a supply of wash water at each washing station for recirculation in parallel through the paired weir boxes 10 and suction boxes 11 from the common supply means.

The recirculation of wash water at each washing station is accomplished through weir box delivery lines 20 connected to each receiver 17 at a level below the overflow outlets from which the previously mentioned connecting lines 18 run. Each of these delivery lines 20 is equipped with a pump unit 21, and preferably runs through a heat exchanger 22 supplied with a suitable

heating medium, such as steam, for heating the wash water to improve its washing action upon delivery at the top face of the cloth web W from the related weir box 10.

The wash water delivered in this manner is recovered by the suction boxes 11 arranged in paired relation below each weir box 10 and immediately beneath the bottom face of the web W. Recovery suction is provided at these suction boxes 11 by a closed arrangement of the receivers 17 and means for impressing a vacuum on them above the wash water level therein, such as a vacuum pump as indicated at 23 connected through a common header 24 by branch lines 25 running to a top level of the receivers 17 well above the overflow outlets therein. It should also be noted that the discharge line 19 from the last receiver 17 is arranged with a liquid seal at 26 which together with the sump 12 serves to maintain the vacuum impressed by the pump 23.

The suction thus obtained is applied at the suction boxes 11 through suction lines 27 running also to a top level of each receiver 17, and by which arrangement it will be noted that air entrained at the suction boxes 11 is immediately removed from the system through the action of the vacuum pump 23, which means that an air-free supply of wash water is always maintained for delivery to each weir box 10 so that only a simple delivery pump unit 21 of the centrifugal type is needed and the operation of the heat exchangers 22 is much simplified because of the absence of any entrained air passing through them.

With a washing system arranged according to the present invention as just described above, the wash water delivered from the supply sump 12 may be regulated at a throughput selected simply in relation to the amount of mercerizing caustic to be removed, the single limitation being the provision of a sufficient throughput to avoid a build-up of caustic concentration in the wash water beyond the point at which effective extraction from the cloth web W washed can be obtained. This is so because the parallel recirculation of wash water at the washing stations is carried out independently of the throughput to provide a relatively high volume of wash water flow through the cloth web W even though the throughput is regulated at a relatively low volume. For example, the actual installation of the present invention mentioned above has been operated typically and with excellent results at a throughput of 4 gallons per minute and a recirculation at each washing station of 25 gallons per minute. The result is a removal of the mercerizing caustic with a minimum of wash water and a consequent caustic recovery at high concentration that allows reclaiming and reuse of the caustic. A take-off line 28 is provided beyond the vacuum seal 26 in the discharge line 19 for recovery of the mercerizing caustic therefrom, or for returning the washing system discharge for use in the wash water make-up at the sump 12, as previously suggested, if this may be done advantageously in the particular washing operation being carried out.

The remaining figures of the drawings illustrate more in detail a suitable form for an actual embodiment of the washing system of the present invention. In Figs. 2 and 3, the wash water supply sump is shown at 50 with a feed line running thereto at 51 (as shown best in Fig. 3). This feed line 51 is fitted with an overflow riser

at 52 to prevent flooding of the sump 50, and with suitable connections as at 53 and 54 for receiving a wash water supply to be delivered to the sump 50 from any suitable source as previously explained above, the connection 54 being indicated in Fig. 3 as running from a drip pan 55 disposed below the mercerizing range tenter frame (the delivery end stands of which are represented by broken lines in Fig. 3 at 56) to catch the suction box spillage for return to the sump 50. The sump 50 is also preferably fitted with a vent line 57 for removing foam and the like from the wash water supply before it is delivered to the washing system.

The delivery pump unit for the sump 50 is shown in Fig. 2 at 58 connected to a delivery line 59 for the washing system. For suitable operating control, this delivery line 59 is preferably fitted with a pressure gage as at 60 and with a liquid level control valve 61 that may be arranged for automatic operation through any conventional actuating means, such as the air actuated system illustrated schematically in Fig. 2 as comprising an air supply line 62 running through a filter at 63 and branching through one connection as at 64 to a liquid level recording and controlling instrument 65, with a second branch 66 running through a bubble glass 67 to a dip pipe at the sump 50 arranged in the usual manner to sense the liquid level in the sump 50, through the reaction of the liquid level head on the air pressure supply from the branch line 66, and connected through a return line 69 to transmit this sensing to the control instrument 65.

Control of the liquid level valve 61 is then obtained from the control instrument 65 in terms of the dip pipe sensings through an actuating line 70 running from the instrument 65 through a relay 71 to the liquid level valve 61, the relay 71 being provided for operation through suitable electrical connections (as indicated at 72 in Fig. 2) from the drive for the mercerizing range so that the valve 61 will be closed automatically whenever the range is stopped. The relay 71 is represented in Fig. 2 as having a bleed port 73 that is opened to release the actuating air pressure on the valve 61 when the mercerizing range is stopped, and with a continuation of the actuating line 70 as at 70' running to the valve 61 for delivering actuating air pressure thereto under the control of the instrument 65 during normal operation of the mercerizing range. This liquid level control arrangement as just described above is simply representative and is conventional, and it may be replaced by any other comparable means desired, for even a simple float valve would accomplish the required purpose of maintaining a liquid level sufficient to provide a vacuum seal at the pump 50.

The wash water delivery line 59 should also preferably be fitted with a by-pass as at 59' around the valve 61 (compare Fig. 3), and with a strainer unit as at 74 having suitable drains as at 75.

Fig. 4 shows a fragmentary side elevation of the washing system proper as incorporated in an actual embodiment according to the present invention. The wash water delivery line 59 is shown in Fig. 4 at the lower left hand portion running to a bottom level of the wash water receiver for the first washing station (i. e., first from the left in Fig. 4, the direction of cloth travel on the tenter being indicated by the arrow identified by the reference character W' at the top of Fig. 4). The receivers in this embodiment

are arranged to comprise a lower wash water receiver portion 76 and an upper heat exchanger or heater portion 77 formed as a composite unit, and which arrangement allows exceptional compactness as will be seen from Fig. 4. The connecting lines between the succeeding spaced receivers 76 are shown in Fig. 4 at 78 having an inclined disposition to connect an overflow level of each receiver 76 with a bottom level of the next succeeding receiver, for the purpose already explaind above, the last receiver 76 having a discharge line 79 connected at its overflow level and this discharge line 79 would be connected according to the present invention through a vacuum seal (not shown) as has also previously been explained above.

The weir box delivery lines are connected from the receivers 76 at 80 through a pump unit 81 (see Fig. 7), with a continuation of this delivery line as at 80' running from the discharge outlet of the pump unit 81 to the heater portion 77 of the composite receiver units, from which the weir box delivery line continues as at 80'' to deliver the heated wash water as will be explained more in detail presently.

The heater portions 77 of the composite receiver units are supplied with heating medium suitably from a common steam header as at 82 having branch lines 83 running to each heater portion 77 with suitable indicating and control fittings arranged in each of these branch lines 83 as illustrated in Fig. 4 at 83'. Similarly, suitably fitted condensate drain connections 84 are provided from each of these heater portions 77 to a common condensate drain header 84' (compare Fig. 5).

The vacuum header for the receiver portions 76 is shown in Fig. 4 at 85 equipped with a vacuum pump at 86 arranged to discharge through a collection tank 87 from which any wash water entrained in the vacuum system may be returned to the drip pan 55 through a drain line 87', and which is fitted with an air discharge as at 87'' for the pump 86. The branch lines from the vacuum header 85 to each of the receiver portions 76 are shown in Figs. 4 and 7 at 85', and the suction box return lines are shown in Figs. 7 and 9 at 88.

The arrangement of the weir boxes for delivering the wash water at each washing station is illustrated in Figs. 6, 7 and 8, in which the delivery line connections 80'' from the heater portion 77 are shown extending with an overhead disposition to central down-comers 89 that are carried on a hanger rail 89' forming part of a frame structure 89'' for supporting the weir boxes 90 suitably above the path of travel of a cloth web being carried on an associated tenter frame, such as would have spaced supporting stands arranged as indicated at 91 in Figs. 6 and 7 carrying cross supports as at 91', and equipped with a width adjusting mechanism actuated from a hand wheel as at 92 (see Fig. 7). The down-comers 89 branch into two legs at their lowering ends and these branching lower ends are attached directly as by welding or the like to the weir boxes 90 so as to support them from the hanger rail 89'.

The weir boxes 90 are arranged in this manner according to the present invention with a fixed disposition extending transversely of the associated tenter frame and of the path of a cloth web carried thereon, but they are formed for adjustment readily in accordance with a particular width setting for the associated tenter frame and thereby for adjustment nicely to the washing requirements of a particular width of cloth web being mercerized. This adjustment is provided for through an arrangement of the weir boxes 90 with oppositely disposed halves, the down-comers 89 branching, as noted above, to deliver wash water to each of these halves through side openings 90' adjacent the ends at which they are attached to the weir boxes 90 (see Fig. 8). The respective halves of the weir boxes 90 are arranged with oppositely disposed back and side walls 93 and 93' and with weir lips 94 over which the wash water is delivered onto the top face of the cloth web being processed, and each of which lips is arranged with an adjustable dam element 94' riding thereon and arranged with any suitable adjustable securing means (not shown) for extension to dam partially the normal extent of the weir lips 94 and thereby restrict the capacity of each weir half in accordance with the tenter width setting as mentioned above. It would be possible, of course, to accomplish the same result with one continuous weir lip running across an entire side of the weir box 90 and fitted at each end with such dam elements, but the arrangement of opposed halves as described above allows delivery of the wash water in better conformance with the arrangement of the suction boxes for similar width adjustment as incorporated in the presently described embodiment and noted in detail just below.

The suction box arrangement of the present embodiment is illustrated in Figs. 7 and 9 of the drawings in which the suction boxes are shown at 95 arranged in related halves at each washing station (and at a supplemental recovery station as at 95' in Fig. 9) with each half adapted as at 95'' for bolting to the tenter frame side rails (not shown) and having their inner ends disposed to ride a central support rail 96 mounted on the previously mentioned tenter frame cross supports 91'. Width adjustment of the associated tenter frame, accordingly, results in sliding the halves of the suction boxes 95 (and 95') on the central support rail 95'' so that their inner ends overlap to the extent necessary for correspondence with the tenter frame width setting, and because the halves of the suction boxes 95 are arranged in staggered relation to allow this sliding adjustment on the central support rail 96, the above noted arrangement of the weir boxes 90 with oppositely disposed halves is employed so that the wash water is delivered on the top face of the cloth web being processed in better correspondence with the disposition of the suction box halves 95 beneath the bottom face of the web. The connection of these suction box halves 95 (and 95') to the previously mentioned suction box return lines 88 is made through extensible joints 97 for each suction box half 95 (and 95') to accommodate their sliding movement for adjustment, and through branch lines 98 running from each extensible joint 97 to a common junction with the return lines 88.

The present invention has been described above for purposes of illustration only and is not intended to be limited by this description or otherwise except as defined by the appended claims.

I claim:

1. In a mercerizing range for handling cloth in web form and incorporating a tenter frame for maintaining the cloth web stretched against shrinkage by the mercerizing caustic, a washing system for removing the mercerizing caustic from said cloth web while carried on said tenter

frame, said washing system comprising a wash water supply means, a plurality of weir boxes spaced from the delivery end of said tenter frame above the path of said web thereon and connected with said supply means in parallel for delivering wash water onto said web, and a corresponding plurality of suction boxes spaced below said weir boxes and beneath the path of said web for recovering said delivered wash water and likewise connected with said supply means in parallel for returning the recovered wash water thereto.

2. In a mercerizing range for handling cloth in web form and incorporating a tenter frame for maintaining the cloth web stretched against shrinkage by the mercerizing caustic, a washing system for removing the mercerizing caustic from said cloth web while carried on said tenter frame, said washing system comprising a plurality of paired upper weir box and lower suction box units spaced from the delivery end of said tenter frame and disposed with the weir boxes of said units above the path of the cloth web on said tenter frame and the suction boxes beneath said web, and a common wash water supply means arranged for delivering wash water to the weir boxes and for receiving recovered wash water from the suction boxes of said units in parallel.

3. The combination with a tenter frame in a mercerizing range for handling cloth in web form of a washing system for removing mercerizing caustic from said web while carried on said tenter frame, said washing system comprising a plurality of paired upper weir box and lower suction box units spaced from the delivery end of said tenter frame and disposed with the weir boxes of said units above the path of the cloth web on said tenter frame for delivering wash water onto the top face of said web and with the suction boxes immediately beneath the bottom face of said web for recovering said delivered wash water, a common wash water supply means, and means for recirculating wash water from said supply means independently through each of said units in parallel.

4. A washing system for removing mercerizing caustic from a cloth web while the web is carried on a tenter frame comprising a plurality of washing stations spaced from the delivery end of said tenter frame, each of said washing stations incorporating an upper weir box disposed for delivering wash water onto the top face of a cloth web carried on said tenter frame and a paired lower suction box disposed immediately beneath the bottom face of said web for recovering wash water delivered by said weir box, a common wash water supply means, and means for recirculating an effective volume of wash water from said supply means independently through each of said washing stations in parallel.

5. A washing system for removing mercerizing caustic from a cloth web while the web is carried on a tenter frame comprising a plurality of washing stations spaced from the delivery end of said tenter frame, each of said washing stations incorporating an upper weir box disposed for delivering wash water onto the top face of a cloth web carried on said tenter frame and a paired lower suction box disposed immediately beneath the bottom face of said web for recovering wash water delivered by said weir box, a common wash water supply means, means for regulating the throughput of wash water by said supply means in relation to the amount of mercerizing caustic to be removed, and means at each of said washing stations for recirculating an effective volume of wash water through said web in parallel from said supply means and independently of said throughput.

6. A washing system for removing mercerizing caustic from a cloth web while the web is carried on a tenter frame comprising a plurality of washing stations serially spaced from the delivery end of said tenter frame, a closed wash water receiver for each of said washing stations, each of said receivers being provided with an overflow outlet, a wash water supply line running to the receiver at the washing station first adjacent said tenter frame delivery end, successive connecting lines running from the overflow outlet of each of said receivers to the next succeeding receiver and to discharge from the final receiver, an upper weir box disposed for delivering wash water onto the top face of a cloth web carried on said tenter frame and a paired lower suction box disposed immediately beneath the bottom face of said web at each of said washing stations, means for supplying wash water to the weir box at each of said washing stations from the receiver therefor, means for impressing vacuum on said receivers above the wash water level therein, and means connecting said suction boxes to said receivers above said liquid level for recovering wash water and returning it to said receivers.

7. A washing system as defined in claim 6 and further characterized in that said wash water supply line or said connecting lines run to a bottom level of said receivers for supplying wash water thereto, said overflow outlets are disposed at a higher level, said weir box supply means are connected to said receivers at a level below said outlets, and said suction box connecting means and vacuum means are connected to said receivers at a top level above said outlets.

8. A washing system as defined in claim 6 and further characterized in that said weir box supply means comprises a pump unit having the inlet thereof connected to the receiver and the outlet thereof connected to run to said weir box through a heat exchanger unit.

9. A washing system as defined in claim 6 and further characterized in that the weir boxes and suction boxes at said washing stations are disposed transversely with respect to said tenter frame and are formed for extension and retraction in accordance with the width setting of said tenter frame.

10. A washing system as defined in claim 6 and further characterized in that the suction boxes at said washing stations are disposed transversely with respect to said tenter frame and are provided in staggered halves for extension and retraction in accordance with the width setting of said tenter frame, and said halves are adapted for securing to said tenter frame for extension and retraction automatically in accordance with the width setting thereof.

11. A washing system for removing mercerizing caustic from a cloth web while the web is carried on a tenter frame, comprising a plurality of washing stations spaced from the delivery end of said tenter frame, each of said washing stations incorporating means for delivering wash water onto the top face of a cloth web carried on said tenter frame and means for recovering said wash water, a common wash water supply means, means for regulating the throughput of wash water by said supply means in relation to the amount of mercerizing caustic to be removed, and means at each of said washing stations for

recirculating an effective volume of wash water through said delivering means onto said web and back through said recovering means in parallel from said supply means and independently of said throughput.

12. In a washing system for removing mercerizing caustic from a cloth web while the web is held under tension to counteract shrinking of the cloth by said mercerizing caustic and is moved through said washing system in a direction opposite to the throughput of wash water through said system, the improvement of a plurality of independently operable washing stations spaced along the course of travel of said cloth, a common wash water supply for furnishing a limited amount of water to each of the washing stations and effecting a throughput of relatively low volume of water through the system, and means at each of said washing stations for recirculating a relatively large volume of wash water in a relatively short time through the cloth web independently of said throughput and such that the wash water circulating through the cloth at each washing station is recycled at that station, whereby the concentration of the mercerizing caustic in the discharge of the throughput is substantially increased and to a point where recovery of the caustic from said wash water is economically feasible.

13. In a washing system for removing mercerizing caustic from a cloth web while the web is carried under tension to prevent shrinkage by the caustic, a plurality of independently operable washing stations arranged in parallel relationship and located at spaced intervals along the course of travel of said cloth web, means for furnishing a limited amount of water to each of the washing stations and maintaining a throughput of relatively low rate of water through said washing system, and means at each of said separate washing stations for recycling water at a relatively high rate through the cloth as it passes each of said stations for effective removal of caustic from the cloth.

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