March 13, 1951 J. DUNGLER 2,545,075

MACHINE FOR TREATING FABRICS AT FULL WIDTH IN LIQUID BATHS

Filed Aug. 31, 1946 3 Sheets-Sheet 1

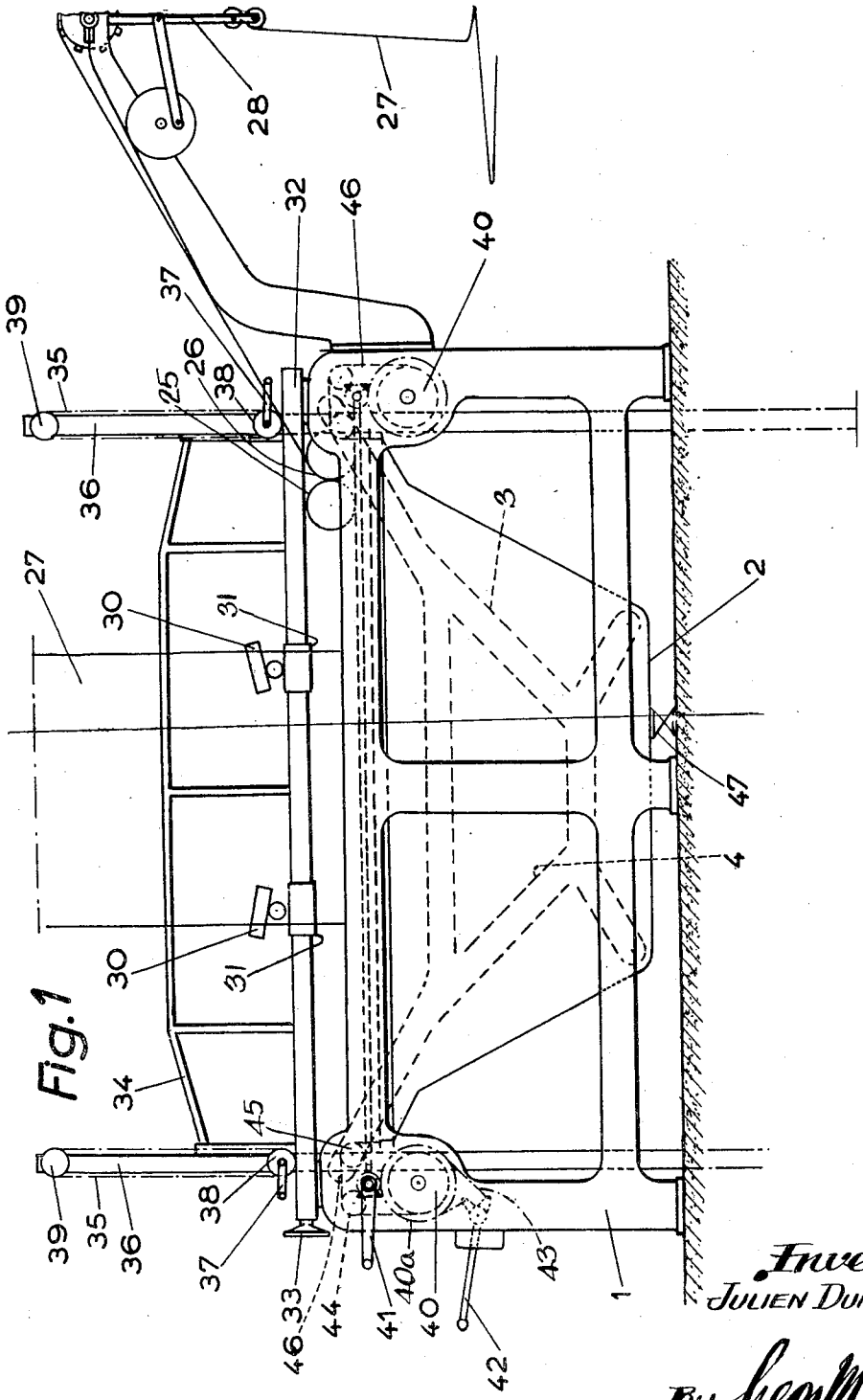


Fig. 1

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Fig.5

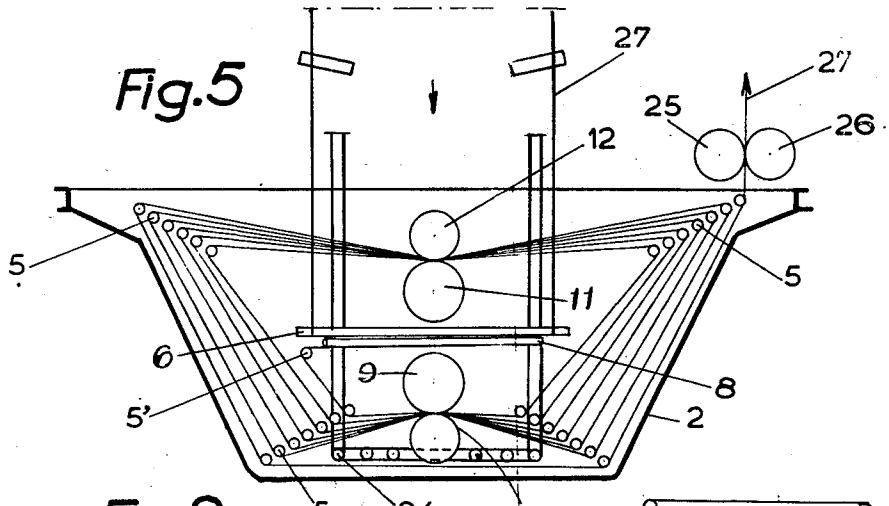
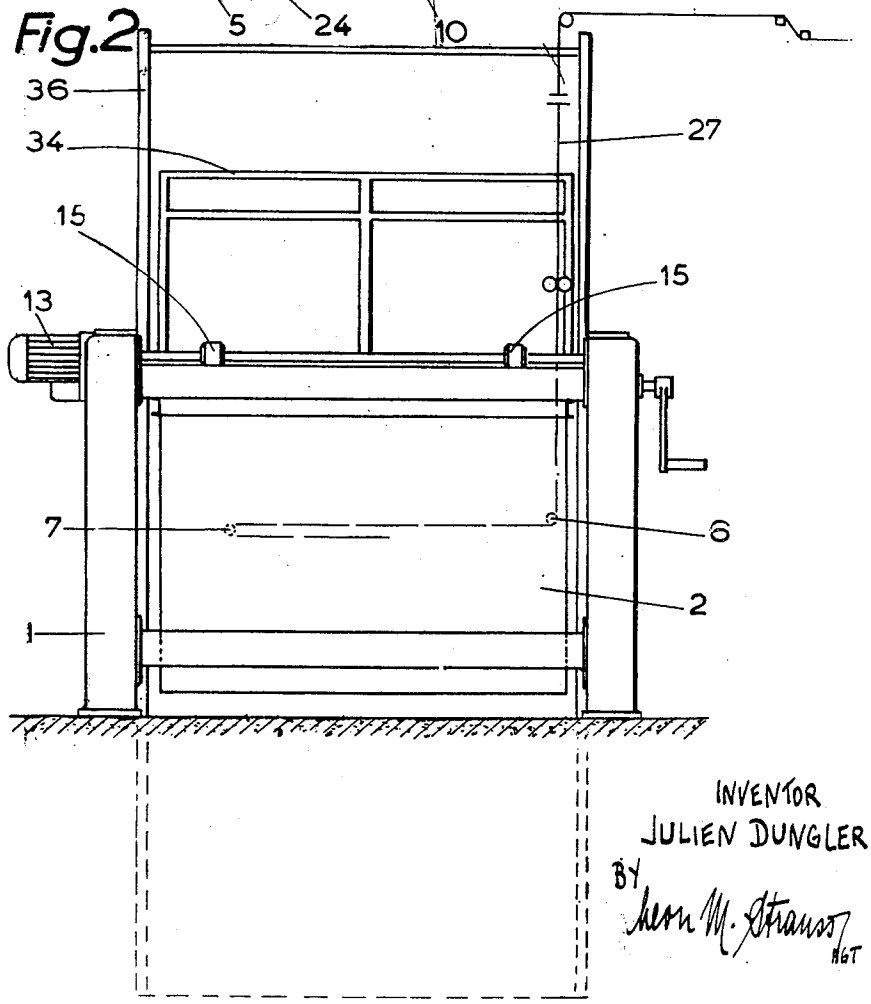


Fig.2



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Fig. 3

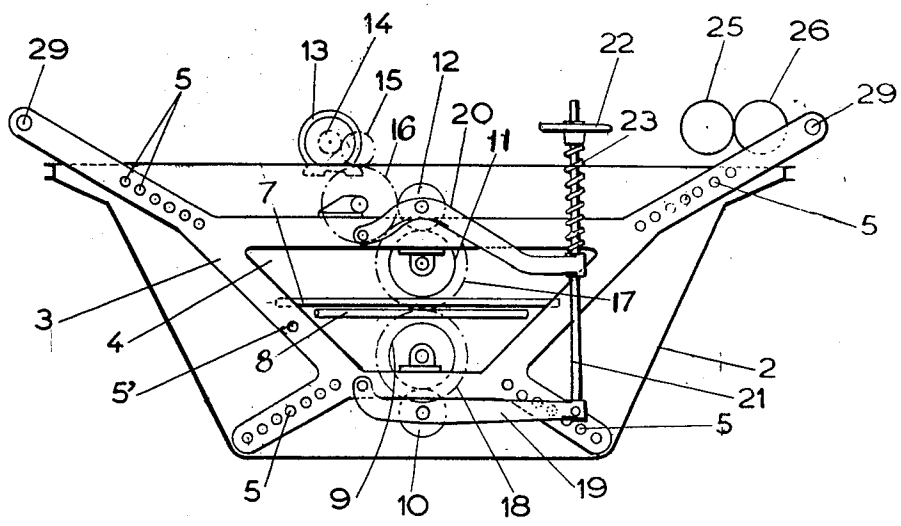
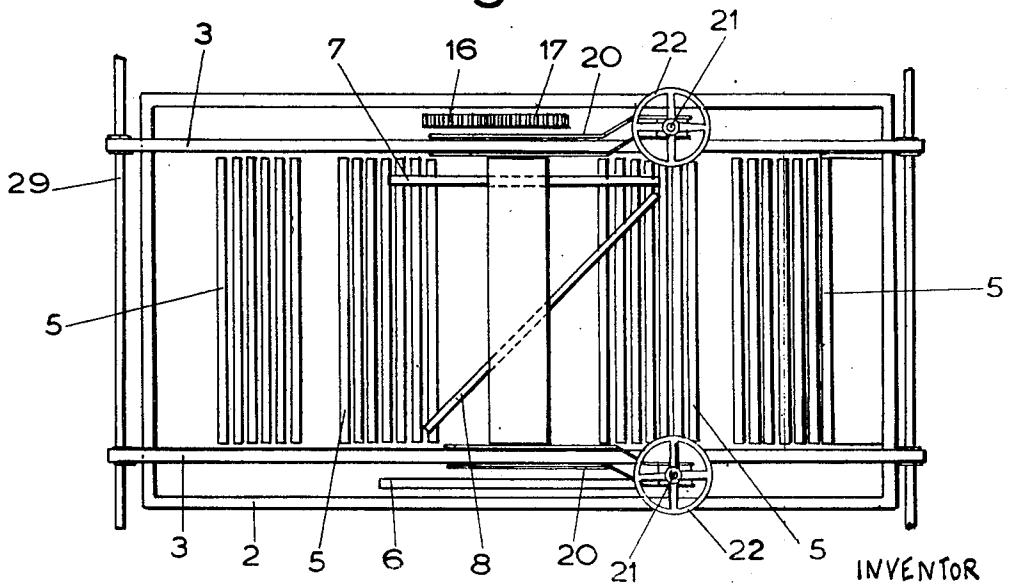


Fig. 4



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MACHINE FOR TREATING FABRICS AT FULL WIDTH IN LIQUID BATHS

Julien Dungler, Basel, Switzerland

Application August 31, 1946, Serial No. 694,272
In France April 3, 1946

5 Claims. (Cl. 68—99)

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The invention relates to a machine for the continuous treatment of pieces of fabric at full width in liquids, for instance, for the unsizing, boiling, bleaching, and more particularly for dyeing operations.

It is one of the objects of the invention to provide means enabling in a simple manner, numerous movements of the fabric in one direction and in the opposite direction through a treating liquid or bath, such as they are produced in jiggers for obtaining a protracted immersion of the fabric in the bath.

The machine, according to the invention is characterized, in principle, by the fact that it comprises means affording guidance of the fabric at full width within a trough and in a spiral course with a plurality of revolutions around a central space which is left free and which has a zone of greater width than that of the fabric, so that the inlet of the fabric will be effected at this latter zone in which are furthermore provided guiding and direction changing means which cause the incoming fabric to start its spiral course or travel.

The machine furthermore comprises means causing the fabric to be subjected, at least once during each revolution, to a squeezing action within the bath.

According to an embodiment of the invention, the machine comprises, in combination with the trough, an independent and removable unit which forms a support for guiding the fabric and which, for this purpose, comprises a plurality of sets of superposed horizontal guide rollers arranged in stepwise formation to each other so as to enable the fabric to follow a spiral course; and further comprises rollers which extend likewise in horizontal direction, but at right angles to the aforesaid guide rollers, and further a diagonal direction changing roller, said guiding support being furthermore provided with an opening through which the inlet of the fabric is effected.

Preferably, the unit forming the fabric guiding support comprises a trestle with two side-frames having a central opening and radial arms, between which arms the sets of guide rollers are horizontally mounted in the manner of stays supporting beams or traversers, one of the frames furthermore carrying, externally and parallel to its face, a guide roller facing its central opening, the arrangement being such that said face of the frame is located at some distance from the corresponding wall of the trough and that said guide roller is consequently immersed in the bath liquid at the same time as the fabric guiding support to which it is connected.

The fabric guiding support is, furthermore, provided with sets of squeezing rollers, through each of which simultaneously pass the superposed convolutions of the fabric, an electric motor, and means for transmitting the drive to the control

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rollers for the said sets of rollers being also provided on the guiding support.

These main characteristics, and also other secondary ones not stated, will moreover become more clearly apparent from the ensuing description of an embodiment which is given merely by way of a non-limitative example and which is diagrammatically illustrated in the accompanying drawings in which:

Fig. 1 is a view in front elevation of the general arrangement of the machine made in accordance with the invention;

Fig. 2 is a side elevation thereof;

Fig. 3 is a view in longitudinal section of the trough with an elevational view of the fabric guiding support;

Fig. 4 is a plan view of Fig. 3; and

Fig. 5 is a diagrammatic sectional view, showing the spiral course of the fabric inside the trough.

In these drawings, 1 denotes a framework carrying a vat or trough 2 which is movable with respect to the framework in vertical direction.

Within the trough 2 there is arranged a trestle or roller supporting unit comprising two vertical side-frames 3 having a central channel or opening 4, the radial arms of said frames accommodating the end journals of two sets of upper and two sets of lower horizontal guide rollers 5. The upper horizontal guide-rollers and the lower horizontal guide-rollers are arranged in stepwise formation to each other, so as to converge toward the center of vat 2. These guide-rollers 5 brace and connect together the corresponding arms of the side frames 3, a guide roller 5', parallel to the former ones, being provided near the medial horizontal plane of the opening 4.

At their upper extremities, the two frames 3 are connected together by cross bars 29 which are used to fix said frames 3 to framework 1.

One of the side-frames 3 acts as a support for a roller 6 which is also horizontal, but at a right angle to the rollers 5 and which is located outside the frame, in front of the channel or opening 4, and above the level of the roller 5', the respective dimensions of the supporting unit and of the trough being such that the roller 6 is also housed inside said trough.

The opposite side frame 3 acts as a support for a roller 7 which is parallel to and which is located at a slightly lower level than roller 6, but inside the frame (Fig. 4).

A diagonal roller 8 is located between the two frames 3 at an angle of 45° relatively to the rollers 5, 5', 6 and 7, below the level of the roller 7 and above that of 5'.

The supporting unit also comprises two sets of squeezing rollers 9—10, 11—12. The control rollers 9 and 11 are retained in the vertical direction and are mounted in bearings supported by the frames, rollers 9 and 11 being rotated by a motor 13 through the intermediary of gears 14, 15, 16,

17, 18. The pressure rollers 10 and 12 are movable in position and the pressure is exerted, for instance by mounting said rollers between pivoted levers 19—19 and 20—20 respectively, which are connected to shafts 21 threaded at their upper end and each carrying a hand-wheel 22, a spring 23 providing the necessary flexibility.

The treating liquid may be heated, for instance by a steam coil 24.

The machine may be completed by a set of presser rollers 25, 26 which squeeze the fabric 27 as it comes out of the bath, which fabric may then pass, for instance, into a mechanical cloth lapping device 28 which distributes it on a trolley.

Finally it is possible to provide, at the inlet of the machine, a selvedge guiding head the function of which is to ensure a correct feeding which is necessary owing to the great length of fabric circulating inside the trough 2. This device may comprise, for instance, in accordance with a known type, two guide-heads 30 carried by sliders 31 sliding on a rail 32, the adjustment of the distance between the heads being obtained by operating a hand-wheel 33 fast on the end of a spindle housed inside the rail 32 and provided with threads of opposite pitch on each of which moves a nut secured to the corresponding slider 31.

The operation of the machine will be readily understood:

The fabric 27, which is inserted in the trough between the frame 3 carrying the roller 6 and the wall of the trough, engages inside the guiding support by passing through the opening 4, passes from there on to the roller 7 round which it travels, then over the diagonal roller 8 round which it also travels and which changes its direction by 90°. It then passes over the roller 5', then successively, in a spiral course, as shown diagrammatically in Fig. 5, over the various guide rollers 5. Each time the fabric travels in horizontal direction between the upper and lower guide-rollers of its spiral course, the horizontally extending fabric portions pass between the pressure rollers 9—10 and 11—12, respectively. Finally it comes out, by passing through the squeezing rollers 25—26.

The trough 2 is covered by a lid 34 formed by a metal frame covered with glass panes. This lid is provided, on either side, with a chain-driven mechanism 35 held by uprights 36 which enables the lid to be lifted by acting on the crank 37 operating the chain pulley 38 facing the return pulley 39.

The mechanism effecting the upward and downward movement of the trough 2 may be designed in various ways. In the embodiment shown, a cable device has been provided comprising sets of drums 40 over which the cables are trained; the crank 41 serves to operate said drums. The cable 46 is guided by rollers 44 and 45. A band brake, which is intended to enable the downward movement of the trough to be slowed down, comprises a lever 42 acting on a leaf spring 43 surrounding a brake drum 40a.

An emptying cock 47 is fixed to the bottom of the trough 2.

It is an easy matter, despite the small number of intermediate rollers, to double or treble the number of paths. For this purpose, it is only necessary to pass the fabric over each set of intermediate rollers before passing on to the next set of rollers.

If each circuit is formed by two or three superposed layers of fabric, the time during which the fabric remains in the machine may thus be doubled or trebled.

It is of course understood that, without exceeding the scope of the invention, it is possible to imagine variants and improvements of details, and also to contemplate the use of equivalent means.

It is possible, for instance, to contemplate the spiral course of the fabric, not starting from the central zone, and with convolutions moving farther and farther away therefrom, but on the contrary starting from the outside and with convolutions moving nearer and nearer to the central zone, i. e. with a reverse direction of circulation to that shown.

Having thus described the invention, what is claimed as new and desired to be secured by Letters Patent, is:

1. In a machine for treating lengthy piece of fabric at full width and in a continuous manner within a bath liquid, for dyeing, unsizing, bleaching and like purposes; a framework, a vat for said bath liquid mounted on said framework, a support placed in said vat and carrying a plurality of spaced apart sets of upper horizontal guide-rollers and a plurality of spaced apart sets of lower horizontal guide-rollers, respectively, said upper guide-rollers and said lower guide-rollers being arranged in stepwise formation with respect to each other so as to converge toward the center of said vat, a pair of squeeze-rollers positioned intermediate said upper sets of guide-rollers, another pair of squeeze-rollers disposed intermediate said lower sets of guide-rollers, and roller means within said vat for deviating incoming fabric to said lower and then to said upper sets of guide-rollers, said lower squeeze-rollers and said upper squeeze rollers, respectively, pressing fabric portions together which extend in horizontal direction between said upper sets of guide-rollers and said lower sets of guide-rollers.

2. In a machine according to claim 1, wherein said support together with said guide-rollers, squeeze-rollers and deviating roller means is removably disposed within said vat.

3. In a machine according to claim 1, wherein at least one of said deviating roller means is disposed at a location between said squeeze-rollers in said vat.

4. In a machine according to claim 1, including means supporting one squeeze-roller of each pair of said squeeze-rollers, and a control member operatively connected to said squeeze-roller supporting means for regulating pressure exerted by said squeeze-rollers, respectively, on said fabric portions.

5. In a machine according to claim 1, including means supported by said framework and movably connecting said vat relatively to said framework.

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