Aug. 17, 1954 A. D. ROUBLOFF ET AL 2,686,413

TEXTILE PROCESSING MACHINE

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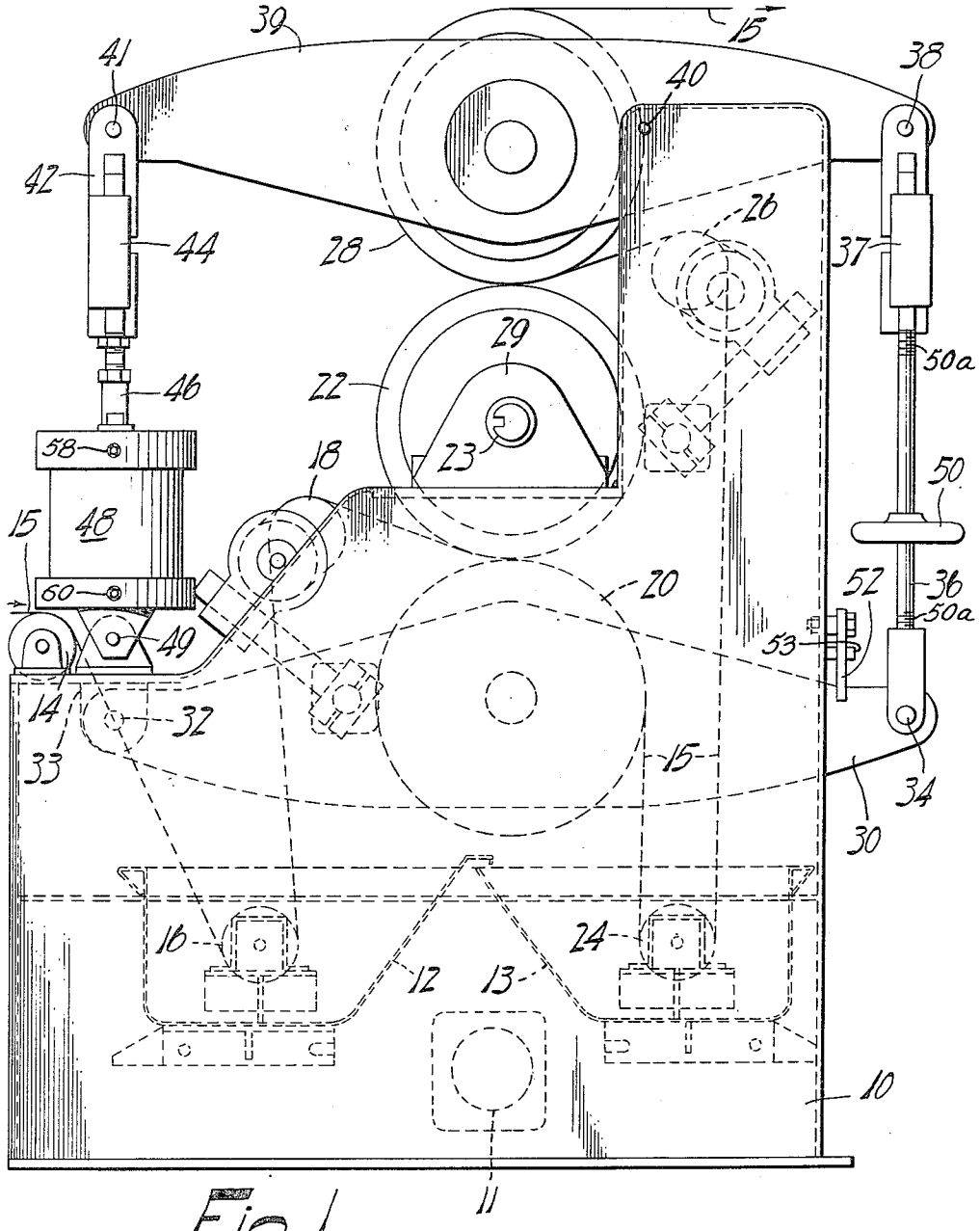


Fig. 1.

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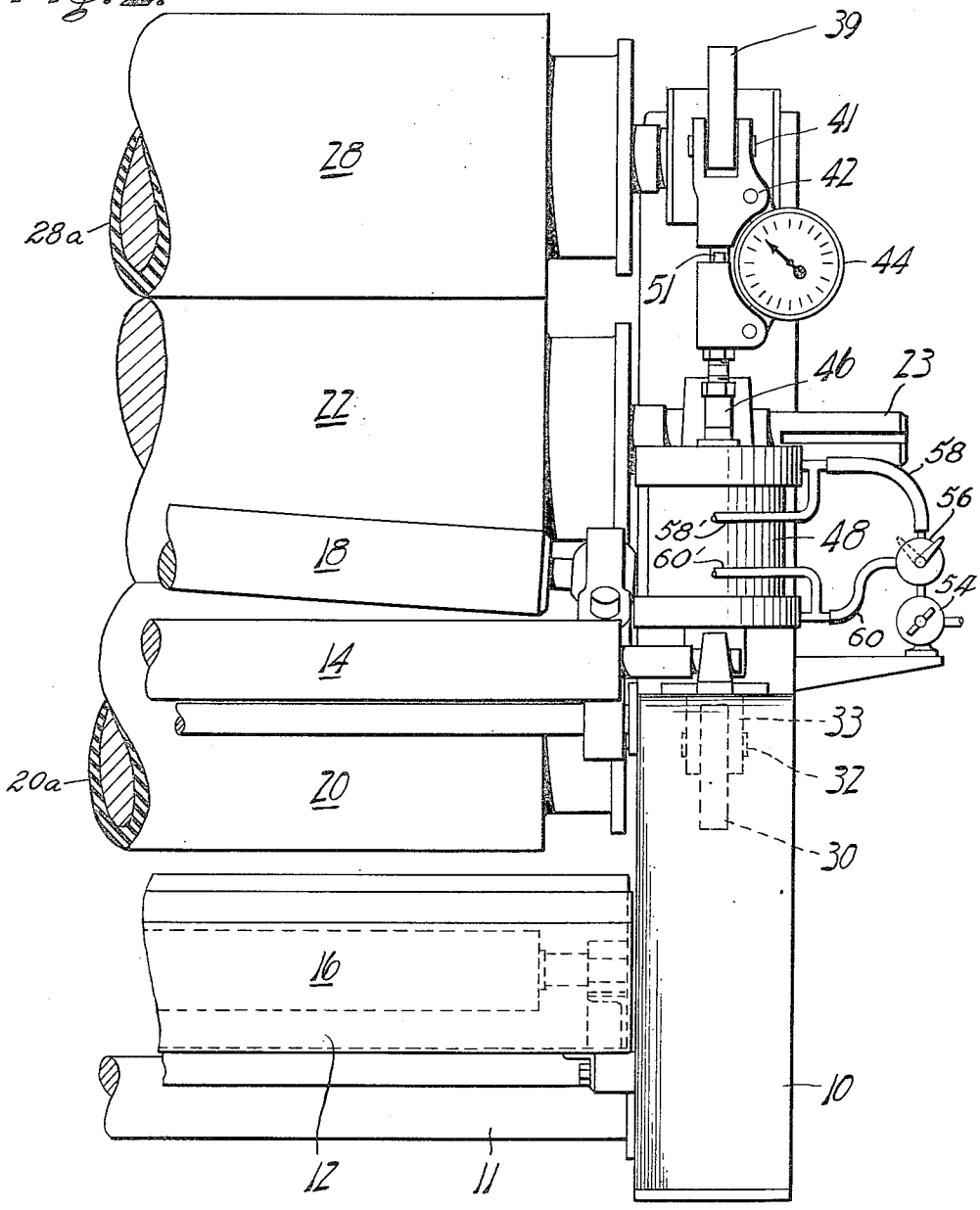
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Fig. 2.



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TEXTILE PROCESSING MACHINE

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4 Claims. (Cl. 68—258)

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This invention relates to textile processing machinery, and more particularly to machines of the type known as padders, extractors, and the like.

Machines of this class customarily employ multiple rolls through which a textile strand or ribbon passes for purposes such as "padding" dye materials into the fabric or for squeezing liquids out of a previously saturated fabric, incidental to dyeing or washing or other chemical treating processes. However, in the past considerable difficulty has been experienced with the problem of proper regulation of the pressures exerted by the different rolls of the machines, and the present invention has for its primary object the provision of an improved machine of the class described whereby the pressures exerted upon the textile strand at different passes thereof through the rollers of the machine may be selectively varied and accurately controlled in improved manner. Other objects and advantages of the invention will appear from the specification hereinafter.

In the drawing:

Fig. 1 is a side elevation of a machine embodying the invention partly broken away; and

Fig. 2 is a fragmentary end elevation thereof.

As shown in the drawing, the machine of the invention includes opposite end pedestals 10 which may be in the form of castings or weldments or the like, appropriately interconnected by tie rods as indicated at 11. While only one end portion is illustrated, it will be understood that the other end portion of the machine comprises companion parts which may be substantially like those shown, and accordingly various parts such as the pedestals 10 are referred to herein in plural although only one such part is shown. The machine illustrated in the drawing is of the "padder" type and therefore employs a pair of solution trays 12—13 for holding dye or other solutions to be "padded" into the textile strand running through the machine. A strand inlet guide roll is provided as indicated at 14 over which the incoming strand of textile fabric trains as indicated at 15. A roll 16 is mounted submerged in the tank 12 so that the fabric strip 15 trains thereunder and through the solution prior to running upwardly and over an "expander roll" 18, the longitudinal axis of which is inclined as indicated in Fig. 2 so that the textile strand training thereover is constantly biased so as to spread laterally. This is a conventional arrangement for maintaining the fabric width and preventing the textile strand from narrowing or "roping" together.

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From the expander roll 18 the strand passes between a lower padder roll 20 and an intermediate padder roll 22 arranged to be power driven as indicated at 23. After passing over the roll 20 the strand runs downwardly and under a second roll 24 which is submerged in the second solution tank 13, and thence upwardly and over a guide roll 26 which delivers it into the gap between the intermediate roll 22 and an upper roll 28. After passing around the upper roll 28 the strand passes on in the direction of the indicating arrow for delivery to the next operation.

Provision is made for regulation and control of the pressures exerted upon the strand 15 while the latter passes between the rolls 20—22, and between the rolls 22—28. To this end the intermediate roll 22 is positionally fixed by means of bearing blocks 29 at its opposite ends which are rigidly mounted upon the end pedestals 10—10 of the machine. The lower roll 20 however is mounted at its opposite ends upon rocker arms 30 which are fulcrumed at their front ends to the pedestals by means of pins 32 carried by fixed brackets 33. At their other ends the arms 30 pivotally connect as indicated at 34 with extensible-contractible tie rods 36 which include dynamometer connection devices as indicated at 37. The upper ends of the tie rods 36 pivotally connect as indicated at 38 to arms 39 which in turn provide bearing supports for the opposite ends of the upper roll 28. The arms 39 are fulcrumed upon the pedestals 10—10 as indicated at 40, and the forward ends of the arms 39—39 pivotally connect as indicated at 41 with the upper ends of tie rods 42 which include dynamometer connection devices 44 and terminate in connections with the piston elements 46 of pneumatic cylinder piston units 48 which pivotally mount as indicated at 49 upon the stationary pedestal members. The dynamometer devices 37—44 may be of any suitable type such as are presently furnished as standard articles of manufacture to comprise spring-loaded extensible link members mounting calibrated dials giving readings as to the pressures exerted between the respective pair of rolls.

Thus, it will be appreciated that adjustment of the lengths of the link members 36, as by means of the hand wheels 50 and oppositely threaded joints 50*a* adjustable thereby in a turnbuckle-like arrangement, will provide complete control of the pressures exerted by the top and bottom rolls respectively against the middle roll. For example, in view of the position of the fulcrums 40 mounting the top roller arms 39, if the links 36 are sufficiently shortened by manipula-

tion of the hand wheels **50** the bottom roll will be brought up into firm bearing relation against the middle roll and the upper arms **39** will be rocked upon the fulcrums **40** so as to force the top roller to lift clear of the middle roller, regardless of operation of the pneumatic cylinder **48**. On the other hand, if the link devices **36** are sufficiently lengthened as by means of manipulation of the hand wheels **50**, the previous upward pull of the links on the lower arms **30** will be released so that the bottom roll will tend to fall away from the middle roll while at the same time the upper arms **39** are biased upon their fulcrums **40** so as to force the upper roller to bear downwardly against the middle roll. Obviously, adjustments between the extended and retracted limits of the link devices **36** as explained hereinabove will provide a wide range of pressure adjustment relationships between the upper and bottom passes for the fabric between the machine rolls.

Also, it will be apparent that the dynamometer devices **37—44** will give readings of the pressures provided against the textile strand in the upper and lower passes of the machine. For example, assuming that the dynamometer dials are calibrated so as to compensate for the weights of the upper and lower rolls and their mounting arms, the dynamometer **37** will provide a direct visual indication of the pressure being exerted by the bottom roll upwardly against the middle roll; and the dynamometer **44** will indicate a total of the pressures exerted by both rolls upon the intermediate roll, and subtraction of the reading of the dynamometer **37** from the reading of the dynamometer **44** will therefore, give the pressure being exerted by the top roll against the middle roll modified by the mechanical advantage offered by the position of the fulcrums **40**.

As indicated at **51** (Fig. 2) a stop device is preferably arranged between the two relatively movable parts of each of the dynamometer devices so as to avoid compression damage to the instruments whenever the lever and link system operates to apply compression instead of tension forces thereon. Also, self-latching dog devices as indicated at **52** (Fig. 1) are provided to swing by gravity down from positions overlapping the arms **30—30** as shown into positions against stops **53—53** and above the arms **30—30** for abutting engagement with the latter whenever the cylinders **48—48** are reversed so as to open the top and bottom rolls relative to the center roll, thereby holding the rolls apart until the dogs **52** are manually released. This is useful to prevent the rolls from residing in pressure contact when the machine is not running, because otherwise such contact would result in deforming the rubber cover portions **20***a*, **28***a* of the rolls and thereby introducing "jumping" effects in the machine operation.

Thus, it is a particular feature of the present invention that an extremely compact machine of the class described is provided to include dual passes for the textile strand to be squeezed through employment of only three pressing rolls and a minimum of mounting and pressure regulating elements which are susceptible to easy and accurate fine adjustments at will, to provide any desired pressure forces upon the textile strand as it moves through the different passes of the machine. If desired, the air pressures in the cylinders **48—48** may be regulated so as to give proper "padding" pressures upon the textile strand, depending upon requirements in any given case for example an adjustable pressure regulator valve **54** may be disposed in the common air pressure supply line. Also, the reversal of the cylinders referred to may be conventionally accomplished, as by reversal of the pressure differential in the cylinders by means of a control valve **56** connected to the cylinders **48—48** by means of conduits **58**, **58'** and **60**, **60'** for admitting air pressure selectively to the upper or lower end of each of the cylinders and for simultaneously venting the opposite ends of the same.

Although only one form of the invention has been shown and described in detail it will be apparent to those skilled in the art that the invention is not so limited but that various changes may be made therein without departing from the spirit of the invention or the scope of the appended claims.

We claim:

1. A textile process machine for executing a two-stage strand pressing operation, comprising a positionally fixed intermediate roll, an upper roll and lower roll disposed above and below said intermediate roll respectively, upper lever means for rotatably supporting said upper roll, lower lever means for rotatably supporting said lower roll, link means connecting the ends of the upper and lower lever means at one side of the roll axes to adjust the relative pressures exerted upon the intermediate roll by the upper roll and the lower roll, the opposite end of said lower lever means being pivotally supported by said machine at the opposite side of the roll axis, the upper lever means being pivotally supported by said machine at a point between the point of attachment of said link means and the axis of the roll, and powered link means carried by said machine and pivotally attached to the opposite end of said upper lever means for cooperation with said link means for squeezing the textile strands between said intermediate and said upper and lower rolls at desired relative pressures.

2. A textile process machine for executing a two-stage strand pressing operation, comprising a positionally fixed intermediate roll, a first roll and a second roll disposed on opposite sides of said intermediate roll respectively, first lever means for rotatably supporting said first roll, second lever means for rotatably supporting said second roll, length-adjustable link means connecting the ends of the first and second lever means at one side of the roll axes to adjust the relative pressures exerted upon the intermediate roll by the first roll and the second roll, the opposite end of said second lever means being pivotally supported by said machine at the opposite side of the roll axis, the first lever means being pivotally supported by said machine at a point between the point of attachment of said link means and the axis of the roll, and powered link means carried by said machine and pivotally attached to the opposite end of said first lever means for cooperation with said link means for squeezing the textile strands between said intermediate and said first and second rolls at desired relative pressures.

3. A textile process machine for executing a two-stage strand pressing operation, comprising a positionally fixed intermediate roll, an upper roll and lower roll disposed above and below said intermediate roll respectively, upper lever means for rotatably supporting said upper roll, lower lever means for rotatably supporting said lower roll, length-adjustable link means connecting the ends of the upper and lower lever means at one

side of the roll axes to adjust the relative pressures exerted upon the intermediate roll by the upper roll and the lower roll, the opposite end of said lower lever means being pivotally supported by said machine at the opposite side of the roll axis, the upper lever means being pivotally supported by said machine at a point between the point of attachment of said link means and the axis of the roll, and powered link means carried by said machine and pivotally attached to the opposite end of said upper lever means for cooperation with said link means for squeezing the textile strands between said intermediate and said upper and lower rolls at desired relative pressures.

4. In a textile processing machine adapted for executing a two stage strand pressing operation, machine frame means, an intermediate roll and upper and lower rolls disposed above and below said intermediate roll respectively with the three roll axes substantially parallel to each other, said intermediate roll being fixedly journaled on said frame means, an upper lever fulcrumed on said frame means intermediately of its ends at a position out of line with the plane defined by the axes of the other two rolls and carrying said upper roll, a lower lever fulcrumed on said frame means at one of its ends out of line with the plane

defined by the axes of the lower two rolls and carrying said lower roll, length-adjustable link means interconnecting one free end of said upper lever and the free end of said lower lever with the fulcrum point of said upper lever between said link means and the axis of said upper roll, and separate power means coupled to said frame means and to said upper lever and arranged to rock the latter for cooperation with said link means for actuating the upper and lower rolls downwardly and upwardly, respectively, relative to said intermediate roll for squeezing the textile strand between said rolls.

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