May 6, 1952 R. M. SCHULTZ 2,595,710

GARMENT STARCHING MACHINE

Filed June 2, 1950 9 Sheets-Sheet 1

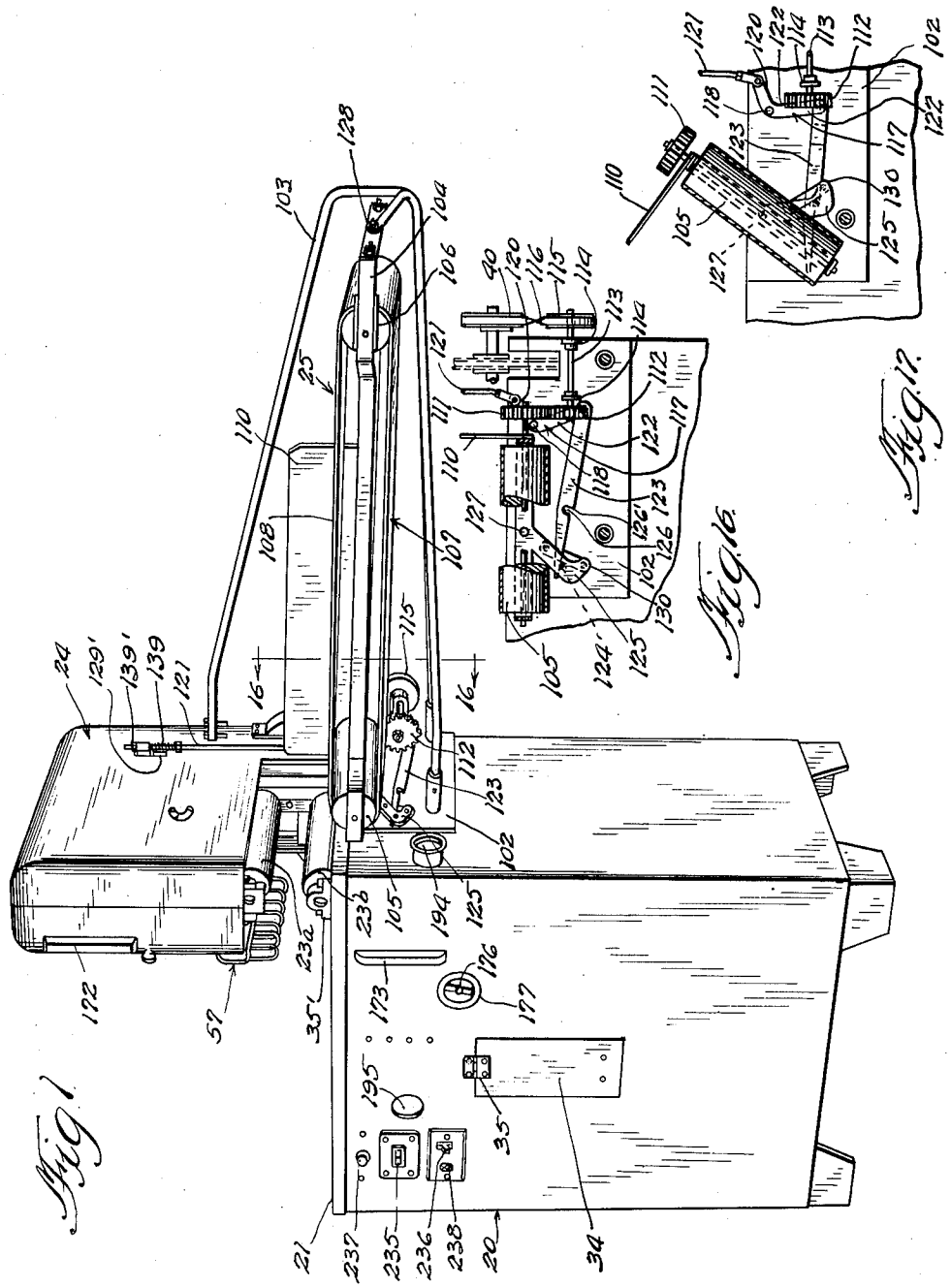


Fig. 1.

Fig. 12.

Fig. 16.

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GARMENT STARCHING MACHINE

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Fig. 2.

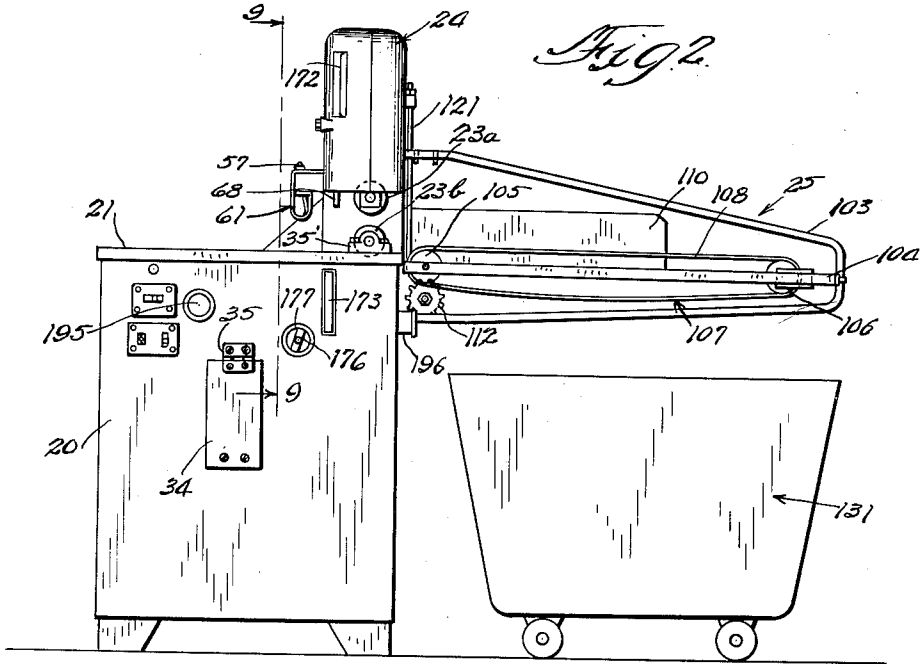


Fig. 3.

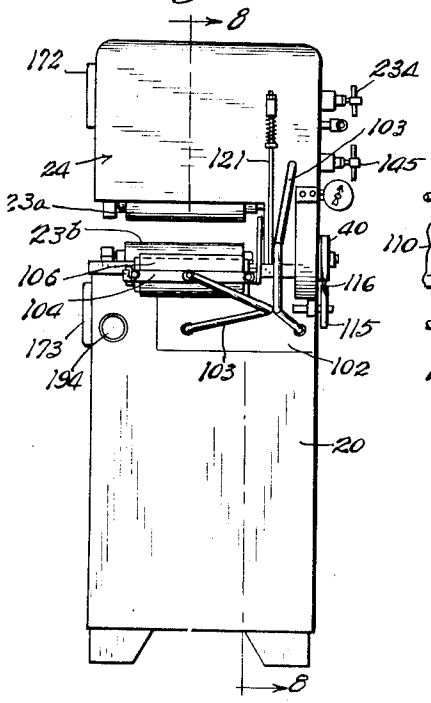
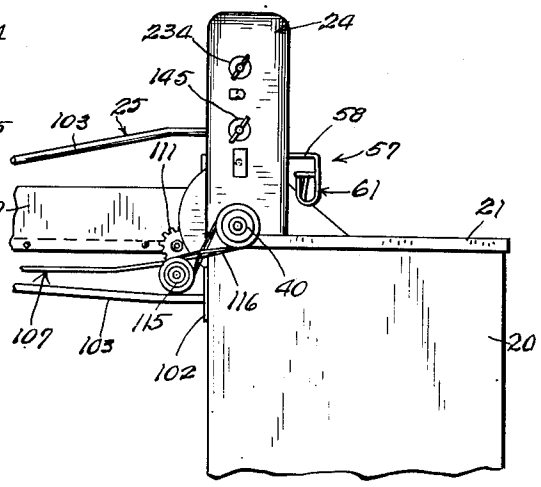


Fig. 4.



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GARMENT STARCHING MACHINE

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Fig. 5.

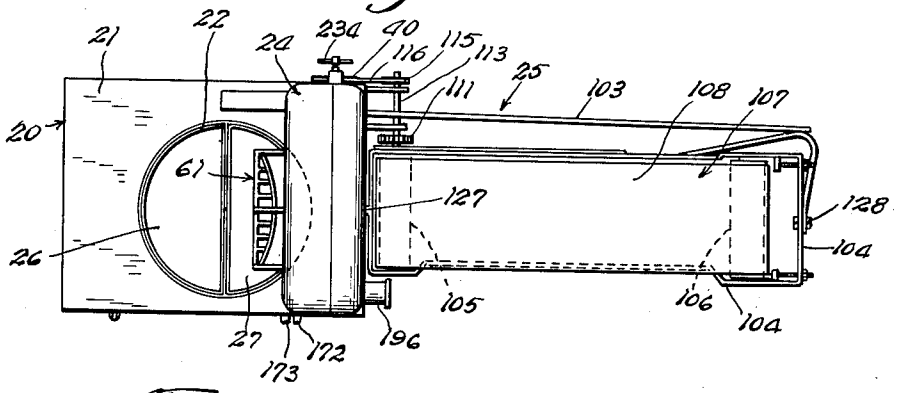


Fig. 6.

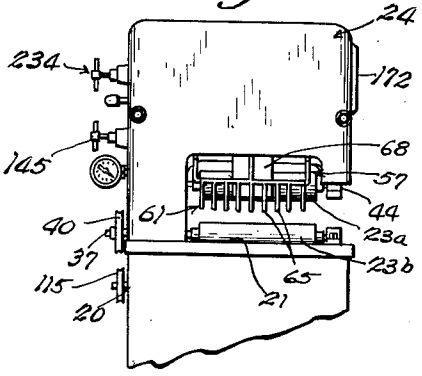
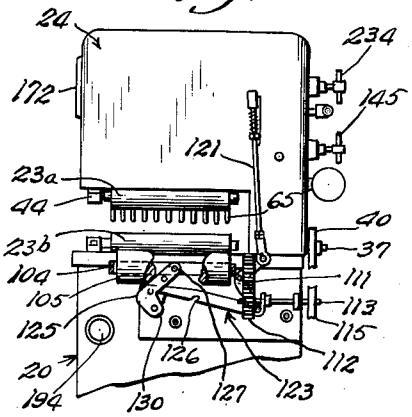


Fig. 7.



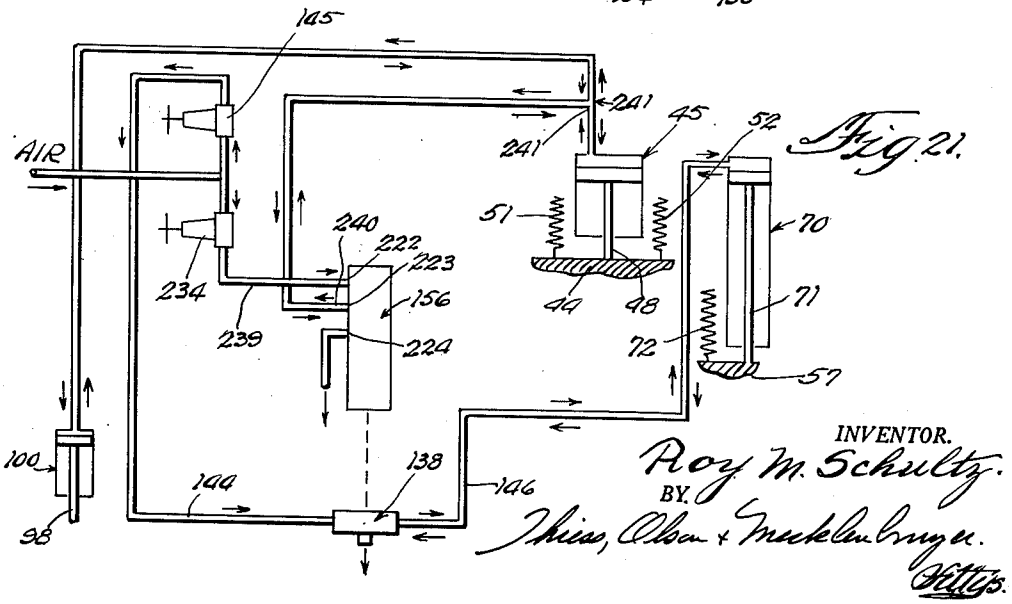


Fig. 21.

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GARMENT STARCHING MACHINE

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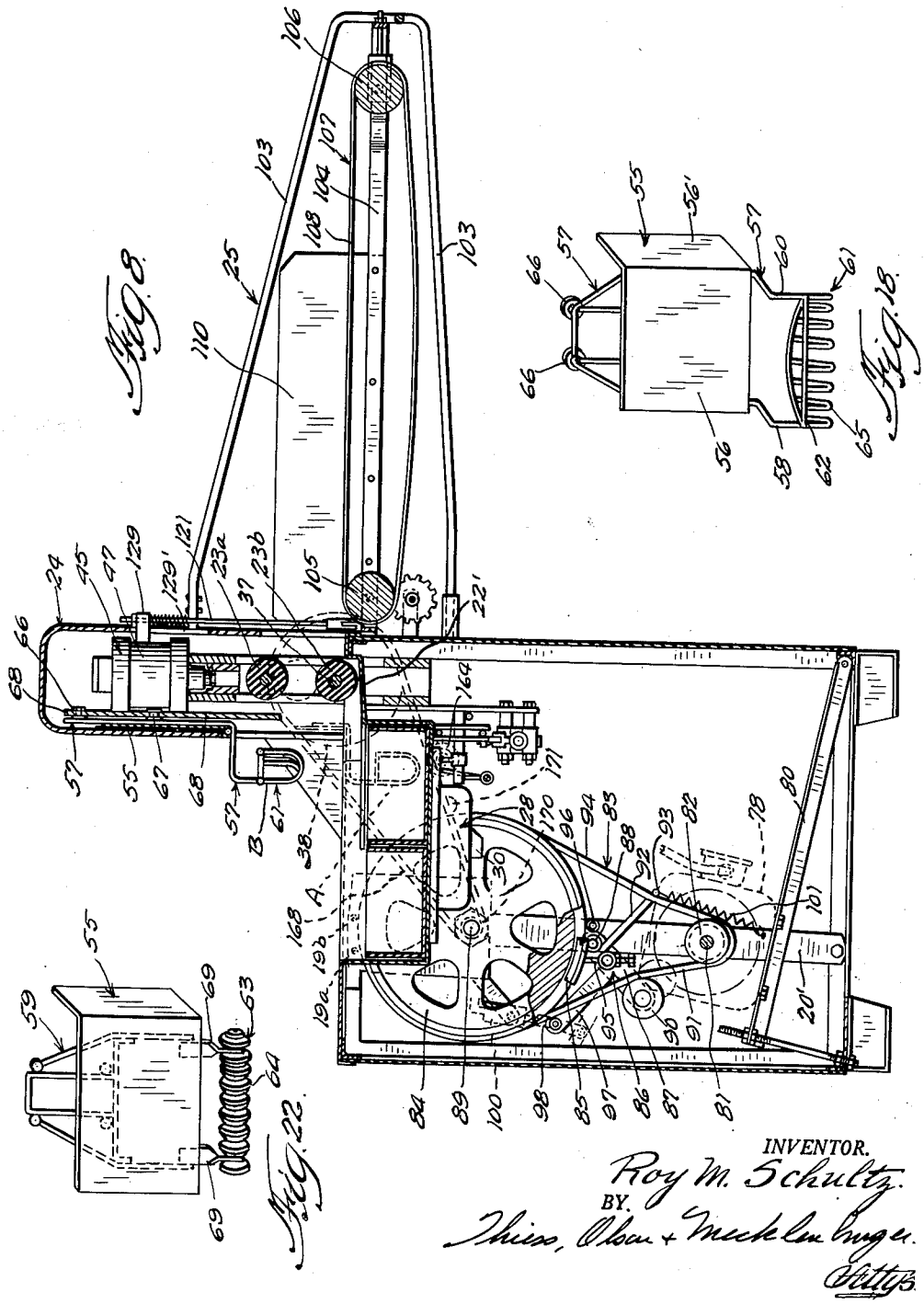


Fig. 8.

Fig. 18.

Fig. 22.

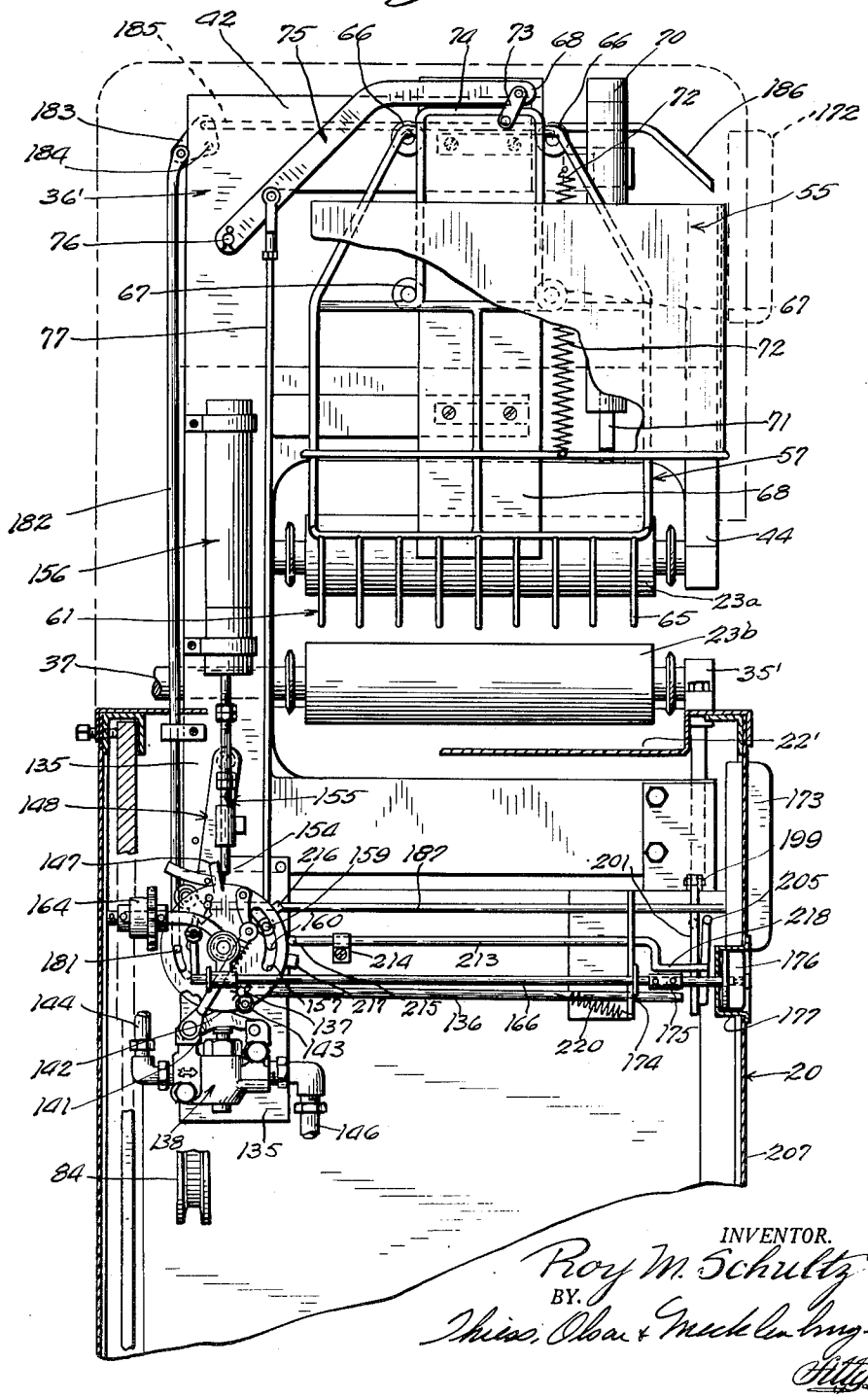
INVENTOR.
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GARMENT STARCHING MACHINE

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Fig 9.



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GARMENT STARCHING MACHINE

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Fig. 10.

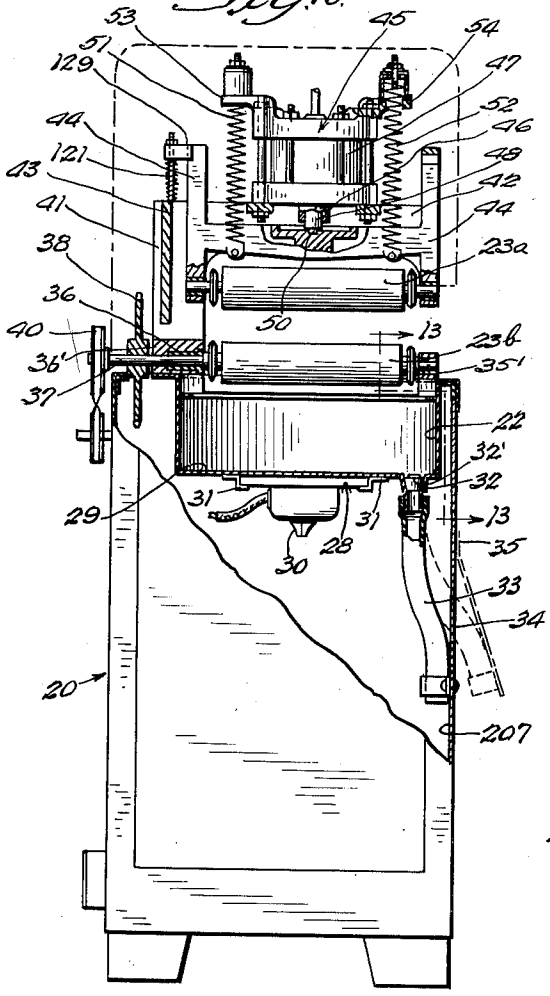


Fig. 15.

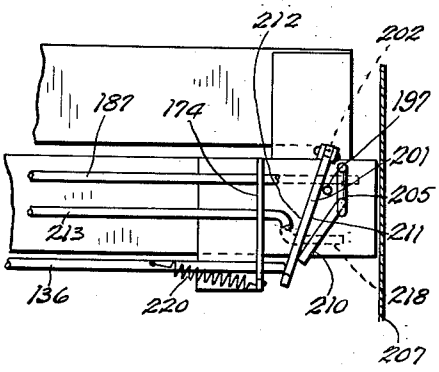


Fig. 14.

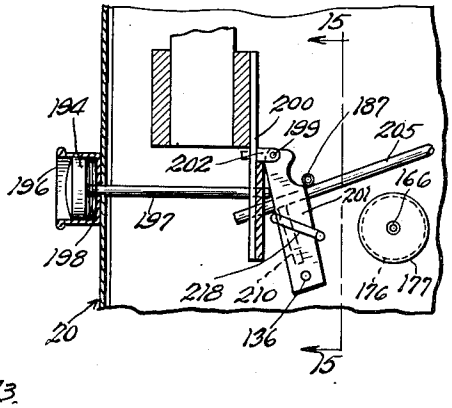
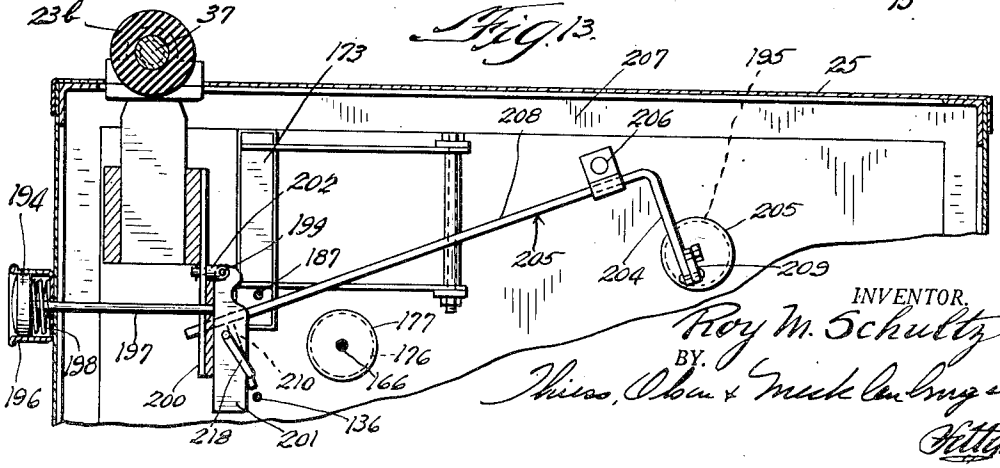


Fig. 13.



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GARMENT STARCHING MACHINE

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Fig. 12.

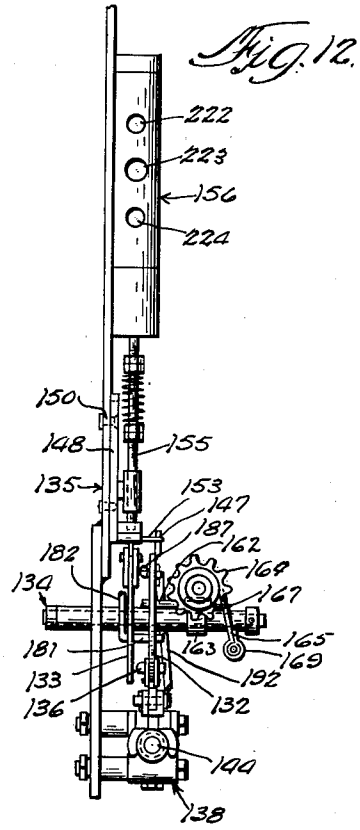
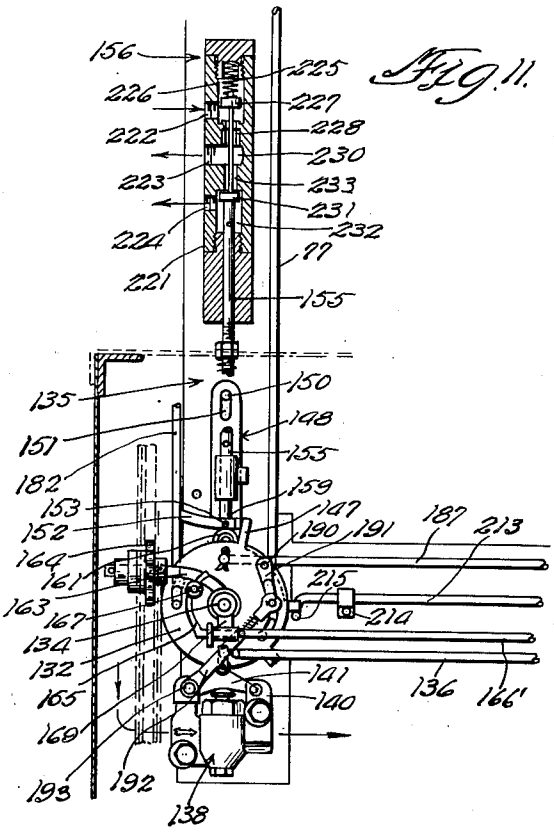


Fig. 11.



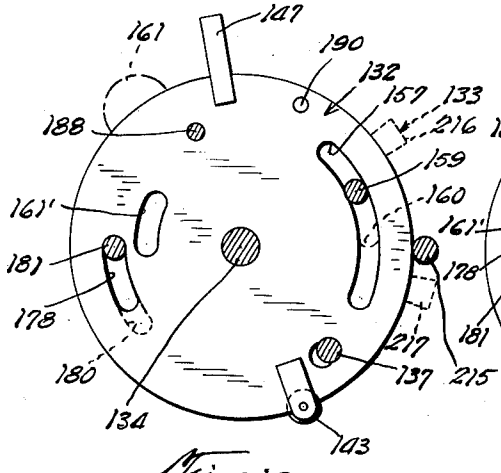


Fig. 19.

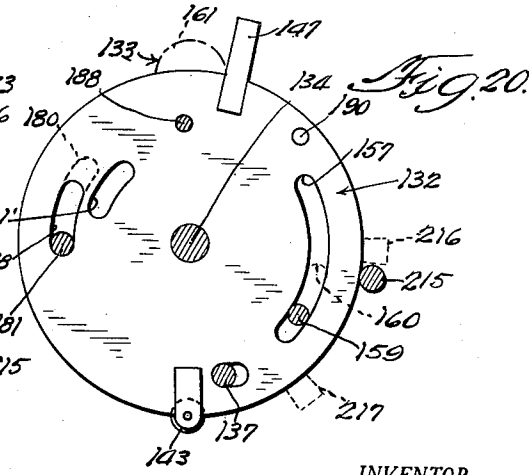


Fig. 20.

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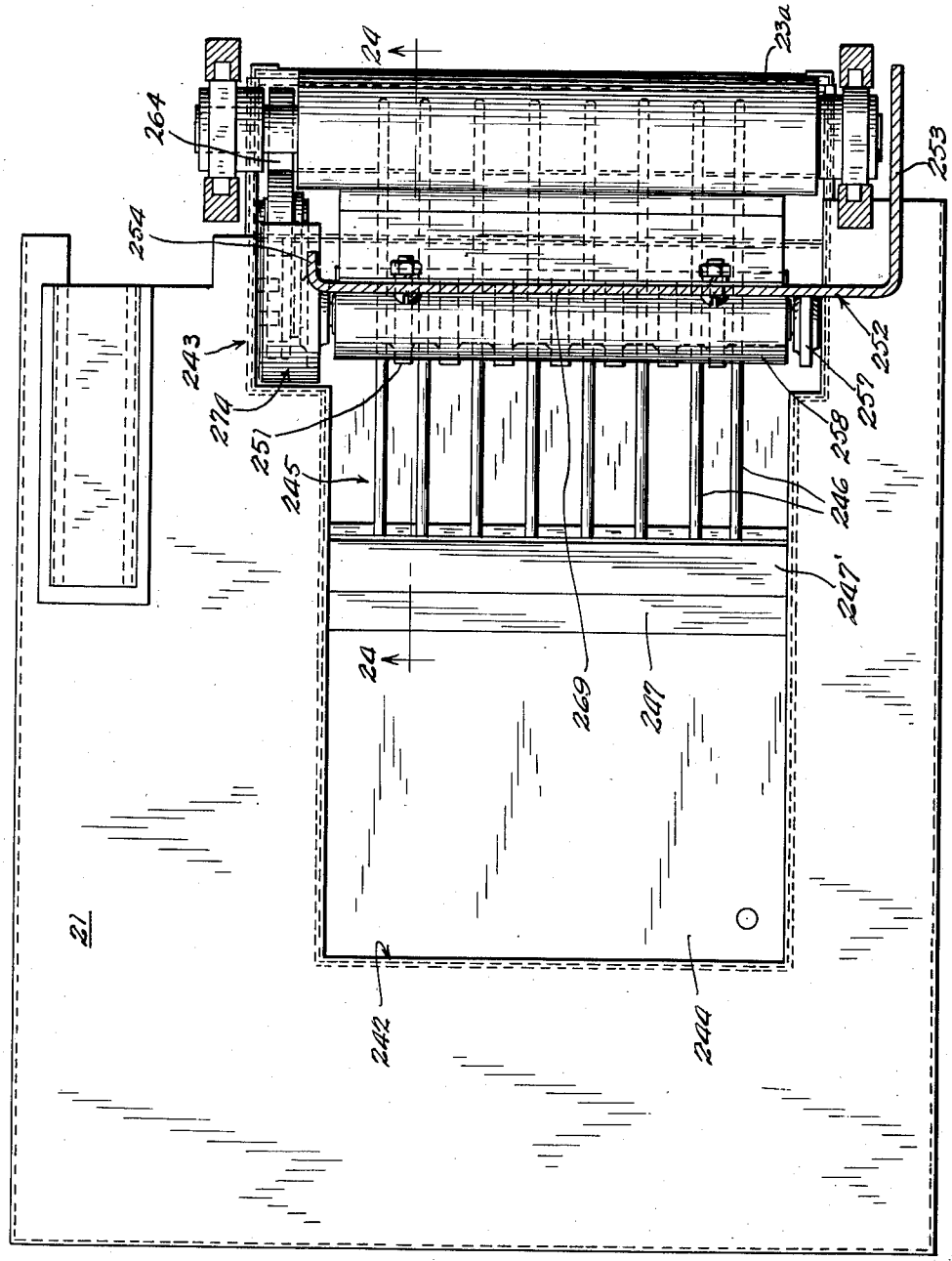


Fig. 23.

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GARMENT STARCHING MACHINE

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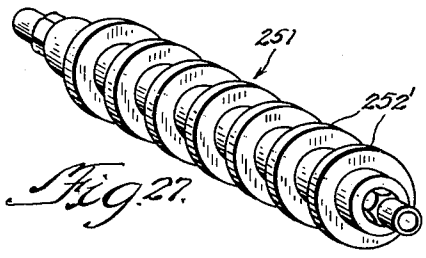


Fig. 27.

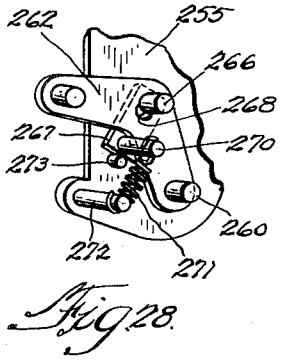


Fig. 28.

Fig. 24.

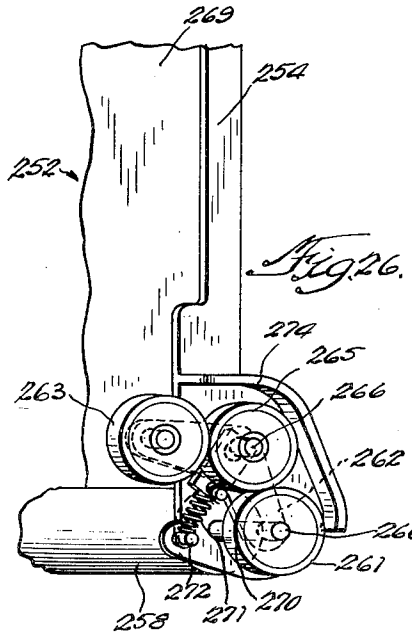


Fig. 26.

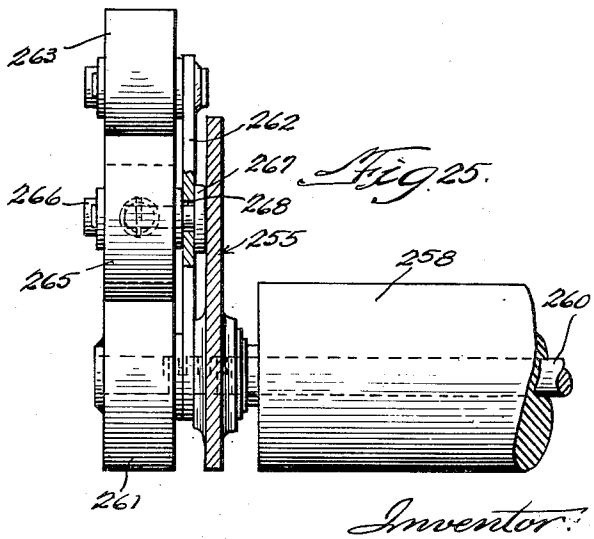


Fig. 25.

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Patented May 6, 1952

2,595,710

UNITED STATES PATENT OFFICE

2,595,710

GARMENT STARCHING MACHINE

Roy M. Schultz, Chicago, Ill., assignor to G. H. Bishop Company, Chicago, Ill., a corporation of Illinois

Application June 2, 1950, Serial No. 165,849

19 Claims. (Cl. 118—12)

1

This invention relates to laundry equipment and more particularly to a machine for starching garments and the like.

Various machines of this type have heretofore been proposed which are of such a design as to require a skilled person to effectively operate the machine and cause unnecessary delay in the starching operation. Furthermore these machines fail to provide necessary safety features and are not readily adapted to accommodate garments or articles of various types and sizes.

Thus it is one of the objects of this invention to provide a machine which may be readily operated by one not possessed of any particular skill in the method of starching garments and the like.

It is a further object of this invention to provide a machine which is possessed of adequate foolproof safety devices.

It is a further object of this invention to provide a machine incorporating a revolvably-mounted container for starcheous solutions which enables the operator to select either a dilute or highly concentrated starch solution in which a portion of the article to be starched is immersed.

It is a further object of this invention to provide a machine having a detachably mounted thermostatically controlled heating unit for maintaining the starchy solutions at a predetermined temperature.

It is a still further object of this invention to provide a machine having means for regulating the extracting pressure to be exerted on the starched article.

It is a still further object of this invention to provide a machine which is adapted to effectively starch articles of various types and sizes.

It is a still further object of this invention to provide a machine which will automatically dispose of the article subsequent to its being starched and extracted.

Further and additional objects will appear from the description, accompanying drawings and appended claims.

In accordance with one embodiment of this invention a machine is provided for starching garments and the like comprising a supporting frame having a substantially flat top. Revolvably mounted on and recessed from the top is a container for solutions of variable starch concentrates. Mounted on the top adjacent the container is an open-sided housing within which is mounted extracting and feeding means. Slidably mounted on said housing is a protective gate which when in its operative position is interposed

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between the container and the extracting and feeding means and partially encloses the latter. The protective gate is power actuated and causes the extracting and feeding means to operate only when it is partially enclosed by the gate. Dual hand controls for actuating the gate into its operative position are mounted on the frame and remotely positioned with respect to the gate and the extracting and feeding means. The controls must be simultaneously manipulated by both hands of the operator to set the machine in operation.

For a more complete understanding of this invention reference should now be made to the drawings, wherein:

Fig. 1 is a perspective view of the machine shown in its inoperative position;

Fig. 2 is a side elevational view of the front or operator side of the machine shown in Fig. 1;

Fig. 3 is a right end view of the machine shown in Fig. 2;

Fig. 4 is a fragmentary rear elevational view of the machine shown in Fig. 1.

Fig. 5 is a top plan view of the machine shown in Fig. 1;

Fig. 6 is a fragmentary left end view of the machine shown in Fig. 2;

Fig. 7 is a fragmentary right end view of the machine shown in Fig. 2;

Fig. 8 is a sectional view of the machine taken along line 8—8 of Fig. 3;

Fig. 9 is a fragmentary sectional view of the machine taken along line 9—9 of Fig. 2;

Fig. 10 is a fragmentary left end view of the machine shown in Fig. 2 with a portion of the housing and frame cut away;

Fig. 11 is a fragmentary view of the operating cam and valve assembly, as seen from the left side of the machine shown in Fig. 2;

Fig. 12 is an end view of the assembly shown in Fig. 11;

Fig. 13 is an enlarged fragmentary sectional view of the frame taken along line 13—13 of Fig. 10;

Fig. 14 is an enlarged fragmentary view of the linkage assembly for the dual hand controls;

Fig. 15 is a fragmentary view of the linkage assembly taken along line 15—15 of Fig. 14;

Fig. 16 is a fragmentary view of stacker assembly taken along line 16—16 of Fig. 1;

Fig. 17 is like Fig. 16 but showing the stacker assembly in a tilted or discharging position;

Fig. 18 is a perspective view of one form of the gate and garment immersing member;

Fig. 19 is a diagrammatic view of the relative

positions of the cams when the machine is inoperative;

Fig. 20 is like Fig. 19 but shows the relative positions of the cams when the extracting rollers are extracting;

Fig. 21 is a schematic diagram of the pneumatic system for the machine;

Fig. 22 is a perspective view of a modified form of protective gate and garment immersing member;

Fig. 23 is a fragmentary top plan view of a modified form of recessed basin for a starchy solution and a protective gate and garment feeding assembly;

Fig. 24 is a fragmentary section of the modified basin and protective gate and garment feeding assembly taken along line 24—24 of Fig. 23;

Fig. 25 is a fragmentary view of the drive mechanism for the protective gate and garment feeding assembly taken along line 25—25 of Fig. 24;

Fig. 26 is a fragmentary perspective end view of the mechanism shown in Fig. 25;

Fig. 27 is a perspective view of the bottom roller of the garment feeding assembly shown in Figs. 23 and 24; and

Fig. 28 is a fragmentary perspective view of a part of the mechanism shown in Fig. 26.

Referring now to the drawings or more particularly to Figs. 1 and 5 a starching machine for use in commercial laundries and the like is shown embodying the following basic parts; a supporting frame 20 having a flat top 21, a recessed basin 22 formed in said top, a pair of elongated extracting rollers 23*a* and 23*b* positioned adjacent and to one side of said basin, an open-sided housing 24 for the rollers and associated mechanism mounted on said top and extending vertically therefrom and a conveyor-type table or stacker unit 25 supported by said frame and housing and extending laterally therefrom.

One type of recessed basin 22, as more clearly shown in Figs. 5 and 10 is circular in form and is adapted to receive a pair of cooperating semi-cylindrical containers 26 and 27. Container 26 holds a highly concentrated starch solution and container 27 holds a dilute starch solution. Thus, depending on the type garment to be starched, the operator selects the appropriate solution by merely rotating the containers until the desired one is adjacent the rollers. A spill-way 22', see Fig. 8, is provided beneath roller 23*b* to catch and return to the container the solution as it is extracted from the garment by the rollers. Formed in the bottom 29 of the basin, see Fig. 10, is a spout 32 for allowing any starch solution which has collected in the basin to be removed therefrom. A flexible hose 33 is provided having one end thereof connected to spout 32 and the other end thereof secured to a flap 34 which is hingedly mounted at 35 to the side of the frame 20. When the stopper 32' is removed from the spout for draining the basin, the operator pulls out the flap 34, as shown in dotted lines in Fig. 10, so as to enable the excess solution to be discharged into a suitable receptacle, not shown.

A heating element 28 is detachably mounted on the underside of the basin and is held thereagainst by means of spaced guides 31. The heating element is provided with a thermostat control 30, so that the operator may maintain the starch solutions at a predetermined temperature.

The rollers 23*a* and *b* as heretofore mentioned are positioned adjacent and to one side of the basin 22. Roller 23*b* is the driven roller and assumes a relatively fixed transverse position with respect to top 21 and substantially tangential with respect to circular basin 22. The ends of roller 23*b* are rotatably mounted in bearings 35' and 36. Bearing 36 is mounted within a unit 36' which serves as a support for the upper roller assembly to be described more fully hereinafter. Shaft 37 for roller 23*b* extends longitudinally through bearing 36 and unit 36' and terminates outside of the housing 24. Keyed to shaft 37 adjacent unit 36' and within housing 24 is a sprocket 38 through which driving power for the roller is transmitted. A pulley wheel 40 is keyed to the terminating end of shaft 37 and serves to transmit power to the stacker unit 25. The function of sprocket 38 and pulley wheel 40 will be described in more detail later.

Unit 36', as before mentioned, supports the upper roller assembly and comprises a vertically extending section 41 and an overhanging section 42, as seen in Figs. 9 and 10. Section 42 and the upper portion of section 41 are bifurcated and a block 43 holds the side portions thereof in proper spaced relation. Roller 23*a* is rotatably mounted in a yoke member 44 which is slideable in a vertical plane between the spaced side portions of section 42 of unit 36'. Roller 23*a* is disposed in vertical alignment with respect to roller 23*b*. Roller 23*a* and yoke member 44 move as a unit and are actuated by an air cylinder assembly 45 which is mounted on overhanging section 42 of unit 36'. An opening 46 is provided in the bottom of the cylinder 47 through which the piston rod 48 extends. The end 50 of the rod 48 is reduced in size and is seated in a suitable opening provided in the upper side of yoke member 44. The yoke member is held in suspension between the spaced side portions of sections 41 and 42 by a pair of coil springs 51 and 52. The upper ends of the coil are secured to arms 53 and 54 which form part of the cylinder body 47 of the actuating air cylinder assembly 45. The spaced side portions of section 42 serve as guides for the suspended yoke member 44. The upper roller 23*a* is normally held in its open, non-operative position, as shown in Fig. 10 by springs 51 and 52.

Positioned on the basin side of the rollers 23*a* and *b* and within housing 24 is a vertically adjustable protective gate or shield 55. The gate is substantially L-shaped as seen in Fig. 18, and adapted when in its down position to partially enclose the basin side and operator-end of the rollers. Thus the operator is protected from accidentally having his hands or sleeve caught between the rollers while they are extracting. The side 56 of the gate 55 adjacent the basin 22 is mounted by welding or any other suitable means on a garment immersing member 57.

Spaced arms 58 and 60 of garment immersing member 57 extend laterally and downwardly from the bottom edge of side 56 of the gate, as seen in Fig. 18. Secured to the terminating ends of arms 58 and 60 and positioned between them is a horizontally disposed basket-like element 61. The element 61 is formed of a rim 62 comprising straight and arcuate portions. Secured to rim 62 and extending downwardly therefrom are horizontally spaced, U-shaped grilles 65. The basket-like element 61 serves a dual purpose: (*a*) it immerses the garment in the solution when it is in its down position A, see Fig. 8, and (*b*) as the garment is withdrawn from the starch solution by the extracting rollers 23*a* and *b*, the garment will tend to be squeezed between the grilles 65 and cause the solution to

be impregnated more evenly throughout the submerged portion of the garment.

The upper portion of the garment immersing member 57 extends above the upper edge of side 56 of gate 55, as seen in Figs. 8 and 9. A pair of spaced wheels 66 are rotatably mounted on the upper portion of member 57. Disposed beneath wheels 66 and rotatably mounted on the middle portion of member 57 and behind gate 55 is a second pair of spaced wheels 67. Wheels 66 and 67 are adapted to embrace two sides of a vertically extending guide plate 68 which is mounted on the cylinder housing 47 of air cylinder assembly 45. Thus plate 68 insures that the gate 55 and immersing member 57 move in only a vertical direction.

A modified form of garment immersing member 59 is shown in Fig. 22. A corrugated roller 63 formed in this instance of a plurality of disc-like elements 64 arranged in side by side relation on a common shaft, replaces the basket-like element 61 heretofore described for member 57. A pair of depending arms 69 are provided on which roller 63 is rotatably mounted. Roller 63 serves the same purposes as above enumerated for basket-like element 61.

Immersing member 57 is actuated by air cylinder 70 which is secured to section 42 of the unit 36'. The piston rod 71 of cylinder 70 is secured to the middle portion of member 57. A single coil spring 72 positioned adjacent cylinder 70, serves to normally hold the gate 55 and member 57 in an up or open position B, see Fig. 9. The upper end of the spring 72 is secured to section 42 of the unit 36'.

A lever 75 is secured by means of a link 73 to a cross piece 74, which is positioned intermediate wheels 66. The lever is pivotally mounted to unit 36' at point 76, see Fig. 9. Connected to lever 75 and adjacent pivotal point 76 is a downwardly extending rod 77 which cooperates at its lower end with a cam mechanism which will be discussed more fully hereinafter.

A uni-directional, constant speed electric motor 78 is mounted on suitable brace members 80 at the lower portion of the supporting frame 20 for supplying driving power to the extracting roller 23b and stacker unit 25. Keyed to the exposed end of motor shaft 81 is a pulley wheel 82 which cooperates with a belt 83 to drive wheel 84. Wheel 84 is keyed to shaft 89 which in turn is rotatably mounted on arm 20'. Normally, belt 83 is slack and does not transmit power from pulley wheel 82 to wheel 84. When the belt is slack, the wheel 84 is held fast by a brake shoe 85 which forms part of a brake and belt tightening mechanism 86, see Fig. 8.

The mechanism 86 comprises a lever 87, which is pivotally mounted at point 88 on a vertically extending arm 20'. The arm 20' is pivotally connected at its bottom to frame 20 and is adjustably secured at its top to the frame 20 by holding bolts 19a and b. The arm 20' is pivotally adjustable to allow the drive chain 168 to be properly mounted on the cooperating sprocket wheels 38 and 170. The chain mechanism will be discussed more fully hereinafter. Rotatably mounted on the free end of the lever 87 is a roller 90 which is adapted to engage the left hand leg 91 of the belt 83, as seen in Fig. 8. Extending laterally from lever 87 and adjacent pivotal point 88 is an arm 92, the end 93 of which normally engages and deflects slightly the right-hand leg 94 of the belt and prevents the belt from becoming disengaged from pulley wheel 82 when in its slack position. Mounted on lever 87 intermediate roller 90 and arm 92 is an adjustable stop 95 which is adapted to normally hold brake shoe 85 in engagement with the outer periphery of wheel 84. It is to be noted that brake shoe 85 is pivotally connected to arm 20' at point 96 and adapted, when not held in engagement with wheel 84 by stop 95, to fall away from the periphery of the wheel due to gravitational force and release the braking action on the wheel. Extending laterally from lever 87 and in a direction opposite from arm 92, is a control arm 97, the free end of which is connected to the piston rod 98 of an air cylinder 100 mounted on arm 20'. When rod 98 is actuated to its extended position the mechanism 86, which is normally held in braking position by means of a coil spring 101 secured to the free end 93 of arm 92, is moved in a counter-clockwise direction about point 88 to a position whereby brake shoe 85 is released and the left hand leg 91 of the belt 83 is tightened by roller 90. Power is then transmitted from the motor 78 to wheel 84.

The stacker unit 25, see Fig. 1, as heretofore mentioned, is supported by the frame 20 and housing 24 and extends laterally therefrom. The unit comprises a supporting plate 102, which is mounted on the side of the frame 20, and associated supporting brace elements 103. Tiltably mounted between the plate 102 and the outer end of the brace elements 103 is an elongated substantially rectangular shaped framework 104. Enclosed within and rotatably mounted on framework 104 are a pair of parallel, laterally spaced reels 105 and 106. Cooperating with the reels is a wide conveyor belt 107, which is adapted to receive on its upper side 108 a garment subsequent to its having been extracted by rollers 23a and b and move the garment away from the housing 24. Mounted along the backside of framework 104 and extending upwardly therefrom is an elongated guard 110, which prevents the garment, when it is fed onto the belt 107, from slipping off the backside of the framework.

Keyed to the shaft of reel 105 and positioned outside of framework 104 is a spur gear 111 which, when the framework is in its horizontal position, meshes with a second gear 112 mounted therebeneath as seen more clearly in Fig. 16. Gear 112 is keyed to a shaft 113 which is rotatably mounted on supporting plate 102 by bearings 114. To the outer end of shaft 113 is keyed a pulley wheel 115 which is operatively connected to pulley wheel 40, heretofore described, by means of a belt 116.

To effect tilting of the framework a mechanism is provided comprising a bell-crank lever 117, which is pivotally mounted at point 118 to plate 102, see Figs 16 and 17. To the shorter leg 120 of lever 117 is pivotally connected a push rod 121, which extends upwardly along the side of housing 24, see Fig. 1, and will be discussed more fully later. To the longer or downwardly extending leg 122 of lever 117 is pivotally connected a notched arm 123 which extends in substantially a horizontal direction therefrom. The free end of the arm rests on a transverse pin 124 which is mounted on a downwardly extending finger-like portion 125 formed at the corresponding end of framework 104. A notch 126, formed in the bottom-edge of arm 123 and disposed slightly to the left of center of the arm, as seen in Fig. 16, is adapted, when the push rod 121 is actuated

downwardly and arm 123 is moved to the left, as viewed in Fig. 16, to engage the pin 124. Prior to the notch 126 engaging pin 124, gears 111 and 112 are in light meshing relation. As notch 126 engages pin 124, the depending edge 126' of the notch abuts the pin and causes a clockwise force to be exerted on framework 104 thereby effecting a more positive meshing of gears 111 and 112. Upon subsequent upward movement of push rod 121, the framework 104 is caused to move in a counterclockwise direction about an axis formed by pivotal connections 127 and 128, see Figs. 1 and 16. Upon the framework 104 having rotated about pivotal connections 127 and 128 to a substantially vertical position, the tip 130 of finger-like portion 125 abuts against the bottom edge of arm 123 and causes the arm to move upwardly and the notch 126 to disengage the pin 124. The framework 104, due to the unbalancing effect of the guard 110, returns to its normal horizontal position whereby gear 111 once again meshes with gear 112.

Push rod 121 which has the lower end pivotally connected to lever 117 is secured at its upper end to an upwardly and laterally extending arm 129 formed on yoke 44, see Fig. 10. The movement of rod 121 therefore is controlled by air cylinder 45. An elongated slot 129' is formed in housing 24 through which arm 129 extends. The downward force exerted on push rod 121 by arm 129 is transmitted through a coil spring 139 which embraces rod 121. The lower end of the spring is secured to rod 121 and the upper end of the spring engages the underside of arm 129. A collar 139' is mounted on the end of the rod 121 which engages arm 129 upon upward movement thereof and causes rod 121 to move upwardly.

As will be seen in Fig. 2 the area beneath the stacker unit 25 is unobstructed and thus enables a truck or movable receptacle 131 to be positioned therebeneath and receive the garments as they fall from the conveyor belt 107 upon tilting of the framework 104.

The sequence of operation of the various parts of the machine, as hereinbefore described, is determined by a pair of cams 132 and 133 which are rotatably mounted on a common shaft 134, see Figs. 11 and 12. The shaft 134 extends horizontally from a brace 135 which extends downwardly from bearing unit 36', heretofore described. The cams are substantially disc-shaped and are provided with various slots and projecting lugs to be hereinafter discussed. Front cam 132 normally assumes a position as shown in Figs. 9 and 19. To commence operation of the machine, the cam 132 is actuated in a clockwise direction approximately 20 degrees by a rod 136 which is pivotally connected at point 137 to the front face of the cam. Disposed beneath cam 132 and secured to brace 135 is a conventional type, pilot air valve 138. Pivotally mounted on the housing 140 of valve 138 is a lever 141 which when depressed causes the valve 138 to open. A notch 142, formed in the upper edge of lever 141, is adapted when the lever is depressed, to receive a roller 143 mounted on the outer periphery of cam 132 as the cam is rotated by rod 136. The means by which rod 136 is actuated will be described more fully later. The notch 142 prevents the roller 143 from slipping off lever 141 until sufficient counterclockwise force is exerted on the cam 132 to unseat the roller 143 from notch 142. The intake side of valve 138 is connected by tubing 144 to a gate pressure control valve 145 mounted on the side of housing 24. The valve 145 regulates the pressure of the air supplied to the machine. The outlet side of pilot valve 138 is connected by tubing 146 to air cylinder 70 which controls the downward movement of gate 55 and garment immersing member 57, see Fig. 21.

Projecting radially from the outer periphery of cam 132 and approximately diametrically opposed from roller 143 is a lug 147 which serves as a step for a gravity type spacer member 148. The member 148 is adapted to pivot about a pin 150 which is transversely mounted on brace 135 and extends through an elongated slot 151, see Fig. 11, formed in the upper portion of the member. A laterally extending arm 152 is provided at the lower portion of member 148 and serves to unbalance the arm such that when the lug 147 of cam 132 is rotated clockwise, the member 148 swings counterclockwise about pin 150 until it finds its normal position as shown in Fig. 11. Extending transversely from the lower portion of member 148 is a finger 153 which is adapted to be engaged by lug 147 of cam 132, see Fig. 12. When member 148 is in its normal position, a portion of arm 152 of member 148 is disposed intermediate the outer periphery of cam 133 and the bottom 154 of piston rod 155 of the main extracting roller control valve 156, see Figs. 9, 11 and 12. Valve 156 will be described more fully later.

An arcuate slot 157 is formed in cam 132, see Fig. 9, through which the lower offset end 159 of rod 77 extends. End 159 likewise extends through an arcuate slot 160 formed in cam 133. Slots 157 and 160 are the same radial distance from shaft 134, however, slot 160 is less than half the length of slot 157, as seen in Fig. 19. When the machine is inoperative slot 160 is approximately centered in slot 157 and the end 159 of rod 77 abuts the upper end of slot 160 as seen in Fig. 19. When cam 132 is rotated clockwise until roller 143 is seated in notch 142, the end 159 of rod 77 likewise abuts the upper end portion of slot 157. Thus before rod 77 can rotate rear cam 133 and cause roller 161, formed on the outer periphery of cam 133, to engage arm 152 of spacer member 148 and push upwardly piston rod 155 of control valve 156, the end 159 of rod 77 must first travel the length of slot 160 as seen in Fig. 20. This results in a delayed action and thus causes gate 55 to lead extracting roller 23*a* while they are being lowered. By having the gate 55 lead roller 23*a*, the operator cannot readily engage the upper roller 23*a* with his hand and thus affords greater protection to the operator. The relative positions of the cams 132 and 133, when the machine is inoperative and when extracting, are shown in Figs. 19 and 20 respectively.

A second arcuate slot 161' is formed in cam 132 which is adapted to receive a pin 162 only when the pin is in its extended position, see Fig. 12. Pin 162 is slidably mounted on an arm 163 which at one end is pivotally mounted on shaft 134 and at the other, or free, end has rotatably mounted thereon a sprocket 164. The arm 163 is spring biased in a clockwise direction, see Fig. 11, about shaft 134. Pin 162 is adapted to be moved in a transverse direction with respect to arm 163 by the offset end 165 of control rod 166 which is rotatable about its longitudinal axis. Offset end 165 engages a loop 167 formed in the adjacent end of pin 162. Control rod 166 extends transversely across the frame 20, as seen in Fig. 9, and is supported at one end by a bearing 169 mounted on shaft 134 and at the other end by

a bearing bracket 174. A splicing element 175 for rod 166 is provided to aid in positioning the rod when assembling the machine. A control knob 176 is mounted on the end of rod 166, which is disposed in a recess 177 formed in the side of frame 20, see Figs. 1 and 9. Sprocket 164 is adapted to engage a taut chain 168, see Fig. 8, which cooperates with two other sprockets 170 and 38. The former sprocket 170 is keyed to shaft 89, which as heretofore mentioned, is driven through a pulley and belt combination by motor 78. Sprocket 38, as heretofore mentioned, is keyed to the shaft 37 of extracting roller 23b. A cam link 171 has been substituted for one of the links of chain 168. The cam link 171, as seen in Fig. 8, is provided with a downwardly extending nub. Thus as the taut chain 168 passes over sprocket 164 mounted on arm 163, the nub, formed on the cam link 171, engages the teeth of sprocket 164 and causes the latter to yield a slight amount. The arm 163, on which the sprocket 164 is mounted, in turn is caused to move a slight amount in a counterclockwise direction about shaft 134, whereupon the cam 132, when pin 162 is extended and disposed within slot 161', is rotated in a counterclockwise direction as shown in Fig. 20 and automatically returns the machine to its inoperative position. When the pin 162 is in its retracted position—that is to say withdrawn from slot 161'—the extracting rollers remain in continuous operation and must be rendered inoperative by the operator tripping one of the safety releases 172 and 173, which will be more thoroughly discussed later.

A third arcuate slot 178 is provided on cam 132, see Figs. 19 and 20, which is diametrically opposite from slot 157 and approximately the same radial distance from shaft 134. A slot 180 of slightly greater length than slot 178 is formed in cam 133 and is in registration with slot 178. The offset end 181 of a vertical trip rod 182 extends through slots 178 and 180. The upper end of trip rod 182 is pivotally connected to a bell-crank lever 183 which in turn is pivotally mounted on unit 36' at point 184, see Fig. 9. Likewise pivotally connected to lever 183 is a horizontally extending push rod 185. The free end 186 of rod 185 is bent downwardly a slight amount and is disposed adjacent safety release 172. The release 172 is spring held in a suitable opening formed in the upper portion of housing 24. When the gate 55 is in its up or inoperative position, the release is prevented from being pushed in by the operator because of the side portion 56' of the gate, which encloses the ends of the rollers when in its down position. If for any reason, the operator desires to release the rollers from their extracting position, he may merely push in safety release 172 with his forehead or shoulder which will cause cams 132 and 133 to move from the position shown in Fig. 20 to the position shown in Fig. 19 by reason of the pushing force being transmitted to the cams through rods 182 and 185.

A second trip rod 187 is pivotally mounted, on cam 132 at point 188 and extends horizontally therefrom across the frame 20. The rod 187 terminates adjacent safety release 173 and is adapted to be actuated thereby. Safety release 173 is spring held within a suitable opening formed in the side of the frame and is positioned beneath release 172 and may be actuated by the thigh or knee of the operator. Rod 187 when it is actuated by release 173 has the same effect on cam 132 as rod 182, heretofore described.

Pivotally mounted on cam 132 at point 190 is a lever 191 which is actuated in a counterclockwise direction by a spring actuated extensible rod 192. The lower end of rod 192 is pivotally mounted at point 193 to the housing 140 for pilot valve 138. The upper end of rod 192 is pivotally connected to lever 191. As the cams 132 and 133 are rotated to a position as shown in Fig. 20, lever 191 is caused to rotate counterclockwise by rod 192, until the lower end of the lever is aligned with slot 157 of cam 132, see Fig. 11. The offset end 159 of rod 77, which is actuated by the gate 55 and garment immersing member 57, cannot slide upwardly in slots 157 and 160, once the cams have been rotated to the positions shown in Fig. 20, without striking lever 191 and thereby cause the cams to be rotated counterclockwise and open the gate and the extracting rollers. Thus the operator by pulling up on the basket element 61 of garment immersing member 57, may stop the extracting rollers and open the gate.

To start the machine, as heretofore mentioned, requires simultaneous two hand operation. Right and left handed buttons 194 and 195 respectively are arranged on the side and front surfaces respectively of the frame 20 as seen in Fig. 1. Button 194 is positioned within a cup 196 and is secured to the outer end of an actuating rod 197 which extends through suitable openings formed in the side of the frame and bottom of the cup. A spring 198 within cup 196 normally holds the rod and button in the position shown in Fig. 13. The rod 197 is slidably mounted on a brace 200 and the inner end of the rod abuts the edge of an arm 201 whose upper end is hingedly mounted at point 199 on a post 202 which in turn is swivelly mounted on brace 200.

Button 195 is disposed in a recess 203 formed in the operator side of the frame and is secured by a linkage 209 which extends through a suitable opening formed in the bottom of the recess, to one leg 204 of a substantially U-shaped rockably mounted rod 205, see Fig. 13. The rod 205 is disposed obliquely with respect to the top 21 of the frame 20 and is supported at its upper end by a strap 206 which is mounted on the adjacent vertical side 207 of the frame. At the lower end of the U-shaped rod 205, the web portion 208 thereof extends beyond the lower leg 210 and is supported by brace 200. The rod is adapted to rotate about the web portion 208 as an axis thereby causing the lower leg 210 of the rod to engage the back surface 211 of arm 201 and pivot the arm about post 202 as an axis, when the operator depresses button 195, see Fig. 15. In the starting of the machine a definite sequence of operation must be followed in depressing the buttons 194 and 195. First button 194 is depressed causing arm 201 to pivot about point 199 thereby resulting in the free end of actuating rod 136 being properly aligned with respect to the front surface 212 of the arm. While the arm is held in this position, button 195 is depressed causing U-shaped rod 205 to rotate about its web portion 208 as an axis and cause the lower leg 210 to engage the back surface 211 of the arm 201 and to turn the latter about post 202 as an axis and exert a longitudinal force on rod 136 which in turn effects a clockwise rotation of cam 132.

An elongated rod 213, positioned above and parallel to rod 136, extends across the frame 20, see Figs. 9 and 13 through 15, and is adapted to move arm 201 back to the position shown in Fig. 13 when the cam 133 is rotated in a clockwise direction. Rod 213 is supported at its inner end by a strap 214 and at its other end by a brace 174

both of which are mounted on the frame. The inner end 215 of rod 213 is offset at substantially a right angle and is adapted to be engaged by either of lugs 216 or 217 which are mounted on the outer periphery of cam 133, see Fig. 9. The outer end 218 of rod 213 is substantially Z-shaped and engages the edge of arm 201 opposite from that engaged by actuating rod 197. As cam 133 is rotated in a clockwise direction, lug 216 engages inner end 215 and causes the ends of the rod 213 to be moved downwardly. As Z-shaped end 218 swings downwardly it causes arm 201 to pivot in a clockwise direction about point 199 to the position shown in Fig. 13. When the arm 201 is so positioned, push rod 136 and arm 201 are out of alignment with respect to each other. When cam 133 returns to its normal rest position lug 217 engages the inner end of rod 213 and swings it upwardly.

Thus it will be seen that both hands of the operator are required to manipulate the buttons and cause the machine to operate. This dual hand control cannot be circumvented by the operator tying down one of the buttons. For example, if button 194 is tied down, the abutting adjacent edge of the arm 201 is prevented from properly aligning itself with the corresponding inner end of actuating rod 197, see Fig. 15; thus, the arm could not be subsequently pivoted again about point 199. If button 195 is tied down the same effect results, namely the inner end of actuating rod 197 could not subsequently abut the corresponding edge of arm 201.

A small spring 220 is provided, see Fig. 9, having one end secured to brace 174 and the other end secured to rod 136, to insure positive engagement of the end of the rod by the front surface 212 of arm 201.

The main extracting roller control valve 156, as heretofore mentioned, is actuated by the spacer member 140 and the roller 161 formed on the outer periphery of cam 133. As seen in Figs. 11 and 12 the valve housing 221 is substantially cylindrical in shape and is provided with three vertically spaced ports 222, 223, and 224. The valve rod 155 is slidably mounted within housing 221 and extends through an opening formed in the bottom of the housing. Rod 155 is normally forced downwardly by a coil spring 225 disposed within the upper cavity 226. Cavity 226 is adjacent port 222. A disc 227 mounted on the upper end of rod 155 and disposed within cavity 226 is adapted to be normally seated and close off the passage 228 to the center cavity 230 which is adjacent port 223. A second disc 231, mounted on rod 155, is disposed within a lower cavity 232 formed in housing 221 adjacent lower port 224. Disc 231 is adapted to close off a connecting passage 233 from center cavity 230 to lower cavity 232, when rod 155 is pushed upwardly by cam 133. Port 222 is connected by means of suitable tubing, 239, see Fig. 21, to a pressure regulating valve 234, which is mounted on housing 24 above gate pressure valve 145, see Figs. 6, 7 and 21. Regulating valve 234 controls the extracting pressure exerted on the garment or article by the upper extracting roller 23*a*, heretofore described. The middle port 223 is connected by suitable tubing 240 to a T connection, 241 which has one leg leading to air cylinder assembly 45 and the other leg leading to air cylinder 100, see Fig. 21, the latter which controls the operation of the braking and belt-tightening mechanism, as heretofore described. Bottom port 224 is an exhaust port for bleeding off the air from cylinders 45 and 100 when cam 133 is rotated in a counterclockwise direction.

As seen in Fig. 1, two hand switches 235 and 236 are mounted on the operator side of the machine. The former is for supplying electric power to motor 78 which drives the extracting roller 23*b*. An indicator light 237 is positioned above switch 235 to indicate when power is being supplied to the motor. Swith 236 is provided for heating element 28, which maintains the starcheous solutions at the desired temperature. An indicator light 238 is likewise provided for this switch.

To simplify understanding of the machine, the steps of operation will be hereinafter indicated. (1) Switches 235 and 236 for the motor 78 and heating element 28 are turned on. (2) The operator selects the desired starcheous solution and rotates the containers 26 and 27 until the appropriate one is adjacent housing 24. (3) The garment or article to be starched is positioned between the extracting rollers with the portion thereof to be starched submerged within the starcheous solution. The remainder of the garment is laid out on the upper side 108 of conveyor belt 107 of the stacker unit. (4) Control knob 176 is adjusted by the operator for either intermittent or continuous operation. (5) Pressure control valves 145 and 234 are properly set. (6) The right and left hands of the operator are placed on buttons 194 and 195, respectively, and button 194 is first momentarily depressed and while so depressed, button 195 is depressed causing the gate 55 and member 57 to move downwardly into operative position slightly ahead of the upper extracting roller 23*a*. (7) As the gate 55 and garment-immersing member 57 and upper roller 23*a* commence this downward movement, the operator releases buttons 194 and 195. (8) The belt tightening mechanism 86 is actuated by cylinder 100, as gate 55 drops, thereby causing the lower roller 23*b* to rotate. Simultaneous with the actuation of mechanism 86, the air pressure is transmitted to cylinder 45 thereby causing the upper roller 23*a* to drop until it engages lower roller 23*b*. The pressure initially developed in cylinder 45 is relatively small and must only be sufficient to overcome the opposing force of springs 51 and 52. Thus the initial contact or extracting engagement of upper and lower rollers 23*a* and *b* respectively is light thereby preventing overload of roller 23*b* as roller 23*a* engages it and commences to rotate. Subsequent to upper roller 23*a* commencing to rotate, the pressure in cylinder 45 builds up until full extracting pressure is developed between the rollers; the garment is then fed through the rollers onto the stacker unit. (9) After the entire garment is fed onto the stacker unit, and cam link 171 has engaged sprocket 164 and depressed the same. The gate 55 and garment-immersing member 57, and the upper roller 23*a* are then raised and the driving power to roller 23*b* is cut off by the belt-tightening mechanism 86 returning to its normal belt slackening position. Simultaneous with the raising of these members, the framework 104 of the stacker unit 25 is tilted to a substantially vertical position and the garment is deposited into the truck 131 which is disposed therebeneath. Steps 3,6–9, afore-enumerated must be repeated for each subsequent garment or article to be starched.

Where the portion of the article or garment to be starched is of considerable length, the operator sets the machine for continuous operation. After the starched portion of the garment has

passed through the extracting rollers and onto the starcher unit, the operator can raise the gate, garment-immersing member, and upper roller, and cause the framework of the stacker unit to tilt by either tripping one of the safety releases 172 and 173, pulling up on the gate manually, or turning the control knob 176 to intermittent operation. By turning knob 176 to intermittent operation there might be a slight delay before they raise, depending on the relative position of the cam link 171 with respect to sprocket 164.

Figs. 23 through 27 show a modified form of recessed basin 242 and a gate and feeder assembly 243, which enables the machine to starch an entire garment in one continuous operation.

The basin 242 in this instance is substantially rectangular in shape and has one end thereof slightly enlarged to accommodate the gate and feeder assembly 243. It is to be understood, of course, that the modified basin is not necessarily limited to a rectangular shape, but may be of any other desired shape.

Mounted crosswise and approximately centrally of the floor 244 of basin 242 is a ramp 245. The ramp comprises a plurality of transversely spaced grilles or rods 246. Mounted on floor 244 adjacent the lower end of ramp 245 is a fender plate 247. A portion 247' of the fender plate covers over the lower ends of the grilles 246 and thus prevents any part of the garment from being caught and torn by the ends of the grilles while the garment is being drawn through the extracting rollers 23*a* and 23*b*. Furthermore portion 247' snugly holds the ends of the grilles down against floor 244. The ramp extends angularly upwardly from the floor 244 rising to a peak 248' and then the other ends of the grilles extend downwardly and rest on a supporting plate 248 which is mounted on the upper surface 249 of a step 250 formed in the enlarged end of the basin 242. The extracting roller 23*b* is positioned above upper surface 249 of the step 250. Surface 249 thus provides a spill-way for the rollers 23*a* and *b*.

Mounted on floor 244 adjacent step 250 are a pair of upwardly extending bearing members 259 on which is rotatably mounted an elongated corrugated roller 251. The roller 251 is disposed transverse with respect to basin 242 as seen in Fig. 23, and has the axis of rotation thereof positioned beneath the ramp 245. The longitudinally spaced ridges 252', see Fig. 27, formed on the periphery of roller 251 protrude between the adjacent grilles 246.

The gate and feeder assembly 243 replaces the gate 55 and garment-immersing member 57, heretofore described. The assembly which is mounted for vertical movement relative to basin 242 comprises a gate member 252. One side edge of gate member 252 is offset at substantially a right angle to form a flange 253 which encloses the ends of the extracting rollers 23*a* and *b* which are adjacent the operator, when the assembly is in its down position as shown in Fig. 24. The opposite side edge of the gate member is likewise offset at substantially a right angle to form a small flange 254. Flange 254 gives added rigidity to the gate member 252. Formed at the lower end of flange 254 is an enlarged bearing plate 255, to be hereinafter more fully described. Mounted along the bottom edge of the middle or center portion 269 of gate member 252 and extending upwardly and inwardly therefrom towards extracting rollers 23*a* and *b* is a deflecting plate 256.

Extending downwardly and outwardly from one end of middle portion 269 of gate member 252 is a bearing bracket 257. Rotatably mounted between bracket 257 and bearing plate 255 is an elongated feed roller 258. The roller 258, when the assembly 243 is in the down position shown in Fig. 24, frictionally engages the ridges 252' of roller 251 and imparts rotational movement thereto. The means for effecting rotation to roller 258 will be hereinafter more fully described. The shaft 260 of feed roller 258 extends through a suitable opening formed in bearing plate 255 and has keyed to the end thereof a friction wheel 261. Pivotally mounted on shaft 260 and intermediate wheel 261 and plate 255 is a substantially L-shaped member 262. Rotatably mounted on the other end of member 262 is a drive wheel 263 which is adapted to frictionally engage a collar 264 formed on the extended shaft 37 of extracting roller 23*b*, when the assembly 243 is in its down position, see Fig. 24. Disposed intermediate wheels 261 and 263 and slidably mounted on L-shaped member 262 is an idling wheel 265. Wheel 265 is rotatably mounted on a stud 266 which in turn is mounted on a slide piece 267. Stud 266 extends through an elongated slot 268 formed in L-shaped member 262 approximately equidistant from wheels 261 and 263. Piece 267 is disposed on the opposite side of the L-shaped member 262 from the wheel 265. The lower end of piece 267 extends beneath member 262 and has transversely mounted thereon a second stud 270. The free end of stud 270 is embraced by a coil spring 271. The lower end of spring 271 is fastened to a finger 272 which is mounted on bearing plate 255. Projecting transversely from plate 255 and above finger 272 is a stop 273 which is adapted to engage the lower end of slide piece 267. Coil spring 271 causes the idling wheel 265 to normally engage the peripheries of wheels 261 and 263.

When the assembly 243 is in its up position, as shown in dotted lines in Fig. 24, the L-shaped member 262 due to gravitational force is caused to pivot in a clockwise direction about shaft 260 of feed roller 258. As the assembly is moved to its down position, drive wheel 263 engages collar 264 causing L-shaped member 262 to pivot in a counterclockwise direction about shaft 260 and tend to force idling wheel 265 up. Because of the force exerted by coil spring 271 counteracting this upward force, idling wheel 265 is caused to more positively engage the peripheries of wheels 261 and 263 and thereby increase the frictional drive between the wheels 261 and 263. The rotation of extracting roller 23*b* is thus transmitted to feed roller 258. An arcuate cover 274 extends transversely from bearing plate 255 and partially surrounds wheels 261, 263, and 265.

When employing the modified basin 242 and assembly 243, the operator causes the assembly to be moved to its down position by depressing buttons 194 and 195 as heretofore described whereupon the operator immerses the whole garment in the basin and directs an end of the garment between feed roller 258 and corrugated roller 251. The remainder of the garment then passes between these rollers, and the ramp 245 and deflector plate 256 direct the garment to pass between extracting rollers 23*a* and *b* and onto the stacker unit 25.

Thus it will be seen that a starching machine has been provided which has numerous foolproof safety features. Secondly, the machine is simple in construction and does not necessitate persons

possessed of any particular skill to operate. The availability of solutions of variable starch concentrates and the continuous and intermittent operating feature of the machine enables a wide variety of articles or garments to be effectively starched thereby. Furthermore a starching machine has been provided which enables the operator to readily adjust the extracting pressure exerted on the starched article or garment.

While a particular embodiment of this invention is shown above it is to be understood, of course, that the invention is not to be limited thereto, since many modifications may be made, and it is contemplated, therefore, by the appended claims to cover any such modifications as fall within the true spirit and scope of this invention.

I claim:

1. A machine for starching garments and the like comprising a supporting frame having a substantially flat top, a container for a starchy solution mounted on said top, garment-extracting means mounted on said top adjacent said container for movement into and out of extracting relation, and dual control means mounted on said frame and operatively connected to said garment-extracting means for actuating the latter into extracting relation only upon simultaneous manipulation of said control means.

2. A machine for starching garments and the like comprising a supporting frame having a substantially flat top, a container for solutions of variable starch concentrates revolvably mounted on said top, garment-extracting and feeding means mounted upright on said top adjacent said container for movement into and out of extracting relation, and remotely placed hand-operated control means mounted on said frame and operatively connected to said extracting and feeding means for actuating the latter into extracting relation only upon simultaneous manipulation of said control means.

3. A machine for starching garments and the like comprising a supporting frame having a substantially flat top, a partitioned container having compartments for solutions of variable starch concentrate revolvably mounted on said top and recessed with respect thereto, garment-extracting and feeding elements mounted on said top adjacent said container for movement into and out of extracting engagement with respect to one another, and remotely disposed dual-hand operated control means mounted on said frame and operatively connected to said elements for actuating the latter into extracting engagement only upon simultaneous manipulation of said control means.

4. A machine for starching garments and the like comprising a supporting frame having a substantially flat top, a container for a starchy solution mounted on but recessed from said top, garment-extracting means mounted on said top adjacent said container for movement into and out of extracting relation, a vertically movable protective gate mounted on said frame adjacent said extracting means, said gate when in a down position being disposed intermediate said container and said means and partially enclosing the latter, and dual-hand operated control means mounted on said frame and operatively connected to said extracting means and said gate for actuating said extracting means into extracting relation and effecting downward movement of said gate only upon simultaneous manipulation of said control means.

5. A machine for starching garments and the like comprising a supporting frame having a substantially flat top, a container for starchy solutions revolvably mounted on said top and recessed with respect to the plane of said top, a pair of elongated rollers, one of said rollers being rotatably mounted on said top adjacent said container and the other of said rollers being mounted on said frame and disposed thereabove and movably vertically into and out of extracting relation with respect to said first-mentioned roller, power means mounted on said frame and operatively connected to said second-mentioned roller for effecting vertical movement of said latter roller into extracting relation, and dual-hand control means mounted on said frame and operatively connected to said power means and remotely disposed with respect to said rollers for actuating said power means only upon simultaneous manipulation of said control means.

6. A machine for starching garments and the like comprising a supporting frame having a substantially flat top, a container for a starchy solution mounted on but recessed from said top, power-actuated garment-extracting means mounted on said top and adjacent said container for movement into and out of extracting relation, and dual-hand manipulated control means mounted on said frame and operatively connected to said extracting means for effecting movement of the latter into extracting relation; said control means being remotely disposed with respect to said extracting means and requiring simultaneous manipulation of said control means to effect movement of said extracting means.

7. A starching machine comprising a supporting frame having a substantially flat top, a container for a starchy solution detachably and revolvably mounted on but recessed from said top, power actuated garment-extracting means mounted on said top adjacent said container for movement into and out of extracting relation, means mounted on said frame and operatively connected to said extracting means for regulating the extracting pressure thereof, and control means mounted on said frame and remotely positioned with respect to said extracting means and operatively connected thereto for effecting movement of said extracting means into extracting relation only upon simultaneous two-hand manipulation of said control means.

8. A machine for starching garments and the like comprising a supporting frame having a substantially flat top, a container for a starchy solution mounted on but recessed from said top, cooperating extracting elements mounted on said top adjacent said container, one of said elements being movable vertically into and out of extracting relation with a second element, a vertically movable protective gate mounted on said top and when in a down position being disposed intermediate said container and extracting means and partially enclosing the latter when in extracting relation, and a vertically movable garment-immersing member operatively connected to said gate.

9. A machine for starching garments and the like comprising a supporting frame having a substantially flat top, a partitioned container for solutions of variable starch concentrates revolvably mounted on but recessed from said top, power-actuated garment-extracting and feeding means mounted on said top adjacent said container for movement into and out of extracting relation, a power-actuated, vertically movable

protective gate mounted on said top adjacent said extracting means and when in a down position being disposed between said container and extracting means and partially enclosing the latter, a laterally and downwardly extending garment-immersing member mounted on said gate, and dual-hand control means mounted on said frame and remotely positioned with respect to said gate and extracting means and operatively connected thereto for actuating the same, only upon simultaneous two-hand manipulation of said control means.

10. A machine for starching garments and the like comprising a supporting frame having a substantially flat top, a recess formed substantially centrally of said top, a circular shaped container for solutions of variable starch concentrate revolvably mounted within said recess, said container having a compartment-forming partition, power-actuated garment-extracting means mounted on said top adjacent said recess, and dual control means mounted on said frame and remotely positioned with respect to said extracting means and operatively connected thereto for effecting movement thereof only upon simultaneous manipulation of said control means.

11. A machine for starching garments and the like comprising a supporting frame having a substantially flat top, a container for a starchy solution mounted on but recessed from said top, power-actuated garment-extracting and feeding means mounted on said top adjacent said container for movement into and out of extracting and feeding relation, power-actuated garment-receiving and conveying means mounted on said frame adjacent said extracting means but on the side thereof opposite from said container and operatively connected to said garment-extracting and feeding means.

12. A machine for starching garments and the like comprising a supporting frame having a substantially flat top, containers for starchy solutions arranged in abutting relation with respect to one another and mounted on but recessed from said top, garment-extracting and feeding means mounted upright on said top adjacent said container for movement into and out of extracting and feeding relation, and garment-receiving and conveying means mounted on said frame adjacent said extracting means and on the side thereof opposite from said container, said second-mentioned means comprising an elongated conveyor type table extending laterally from said frame and aligned substantially with the plane of said top, said table being tiltable to substantially a transverse plane when said extracting and feeding means assumes a nonextracting and nonfeeding relation.

13. A machine for starching garments and the like comprising a supporting frame having a substantially horizontal top, a container for a starchy solution mounted on and recessed from said top mounted upright on said frame for movement into and out of extracting relation, garment-extracting means, a vertically movable protective device mounted on said frame and above said top and when in a down position being disposed between said container and extracting means and partially enclosing the latter when in an extracting relation, and a tiltable horizontally disposed conveyor type garment-receiving table mounted on said frame and extending laterally therefrom and being tiltable to a substantially vertical plane when said extracting means moves out of extracting relation.

14. A machine for starching garments and the like comprising a supporting frame having a substantially flat top, a container for a starchy solution mounted on said top, operable garment-extracting means mounted on said top adjacent said container for movement into and out of extracting relation, and an adjustable extracting means-operating device mounted on said frame and operatively connected to said extracting means whereby when in one position of adjustment said extracting means is in continuous extracting relation and when in a second position of adjustment said extracting means is in extracting relation for only a predetermined length of time.

15. A machine for starching garments and the like comprising a supporting frame having a substantially flat top, a pair of semicircular containers for a starchy solution arranged in abutting relation and detachably mounted on and recessed from said top, garment-extracting means mounted upright on said top adjacent said container for vertical movement into and out of extracting relation, a vertically movable protective device mounted upright on said frame and adjacent said means, said device when in a down position being positioned intermediate said container and said means and partially enclosing the latter, and a garment-immersing element mounted on said device and movable therewith and adapted to be disposed within said container when in a down position.

16. A machine for starching garments and the like comprising a supporting frame having a substantialy flat top, a recessed basin for a starchy solution formed in said top, garment-extracting rollers mounted on said top adjacent one side of said basin for movement into and out of extracting relation, a rotatably mounted corrugated roller disposed within said basin along the side thereof adjacent said extracting rollers, an angularly disposed ramp mounted within said basin and extending over said corrugated roller, said ramp being provided with an opening through which a portion of the periphery of said corrugated roller protrudes, a vertically movable gate mounted on said top and operatively connected to one of said extracting rollers and when in a down position being disposed intermediate said basin and said extracting rollers and partially enclosing the latter, and means mounted on said gate and engaging said corrugated roller and one of said extracting rollers when said gate is in its down position to effect simultaneous rotation of said corrugated and extracting rollers.

17. A machine for starching garments and the like comprising a supporting frame having a substantially flat top, a recessed basin for a starchy solution formed in said top, power-actuated garment-extracting means mounted on said top adjacent one side of said basin for vertical movement into and out of extracting relation, an elongated element rotatably mounted within said basin adjacent said one side of said basin, a vertically movable gate mounted on said top and adapted, when in its down position, to be disposed intermediate said basin and extracting means and partially enclose the latter, garment-feeding means mounted on said gate and engageable with said elongated element only when said gate is in a down position, and means mounted on said gate and rotatably engageable with said garment-feeding means and said garment-extracting means for drivingly interconnecting the same only when said gate is in a down position.

18. A machine for starching a garment com-

prising a supporting frame having a substantially flat top, a recessed basin for a starchy solution formed in said top and having one side portion thereof stepped, an elongated roller rotatably mounted within said basin adjacent said stepped portion and positioned in substantially parallel relation therewith, a ramp mounted within said basin and extending angularly upward therefrom over said elongated roller, said ramp being provided with an elongated opening through which a portion of said elongated roller protrudes, power-driven garment-extracting means mounted on said top above the stepped portion of said basin for movement into and out of extracting relation, a vertically movable gate mounted on said top and operatively connected to said extracting means and when in a down position partially enclosing said extracting means, a feeder element rotatably mounted on the lower portion of said gate and being frictionally engageable with the protruding portion of said elongated roller when said gate is in said down position, and feeder element drive means mounted on said gate and operatively connected to said feeder element and being drivingly engageable with said power-driven extracting means only when said gate is in said down position.

19. A machine for starching garments and the like comprising a frame having a substantially horizontal top, a container for a starchy solution

mounted on and recessed from said top, an upright, open-sided housing mounted on said top adjacent said container, power-actuated garment-extracting means mounted on said housing for movement into and out of extracting relation, a power-actuated shield mounted for vertical movement on said housing and when in a down position being disposed intermediate said container and extracting means and partially enclosing the latter, dual-hand control means operatively connected to said extracting means and said shield, said extracting means and shield being actuated downwardly only upon simultaneous manipulation of said control means, and safety releases mounted on said frame and housing and operatively connected to said extracting means for effecting movement of the latter out of extracting relation upon manipulation of any of said releases.

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