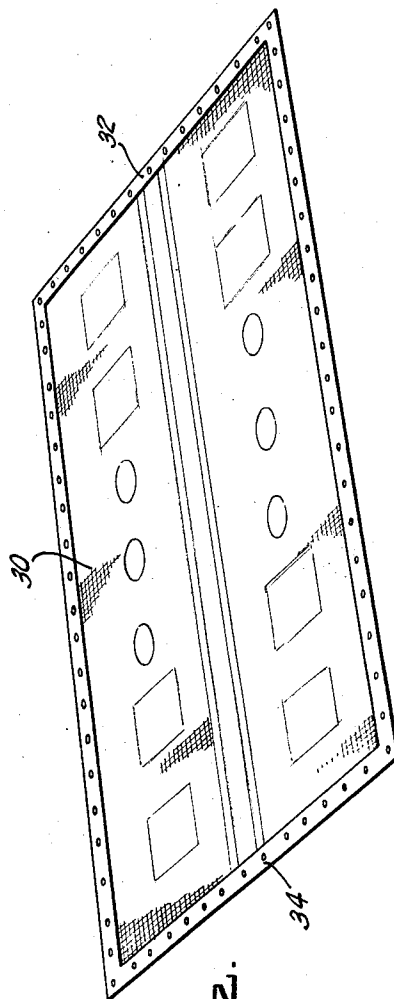
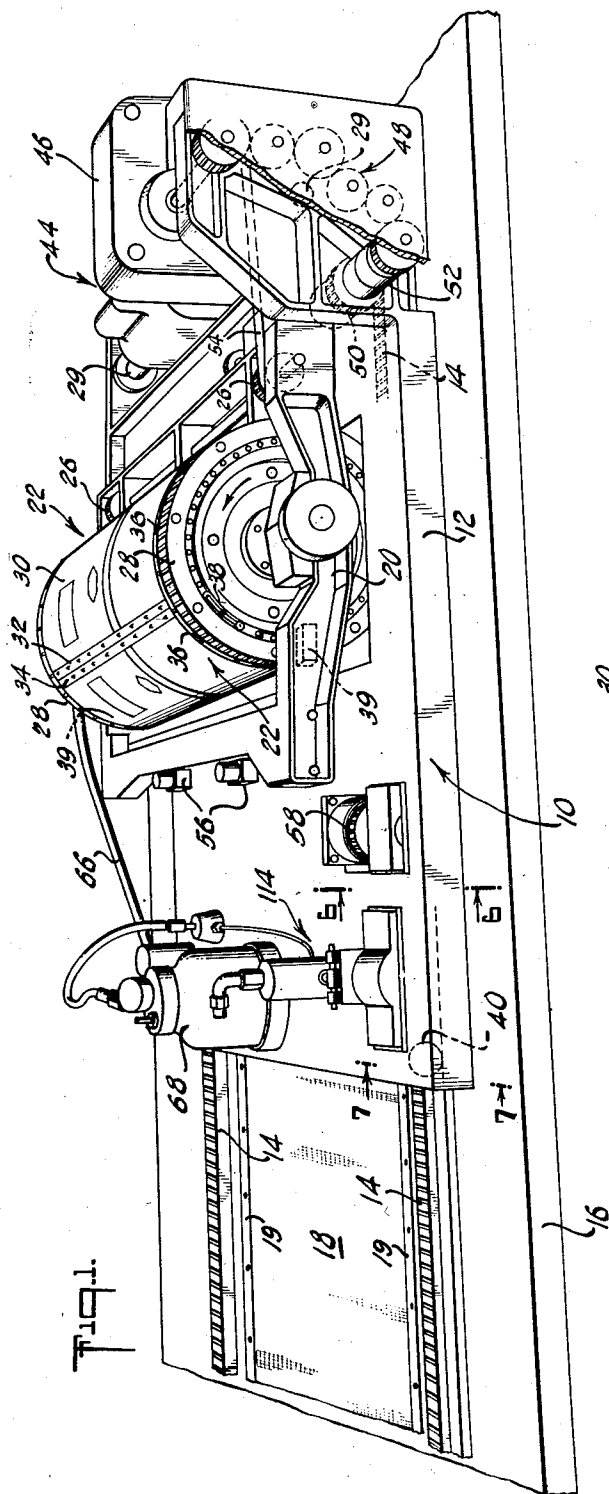


Filed March 21, 1957

TEXTILE PRINTING MACHINE

6 Sheets-Sheet 1



INVENTORS:
MAX STEIN
LOUIS WERNER
BY
Curtis, Morris & Pafford
ATTORNEYS:

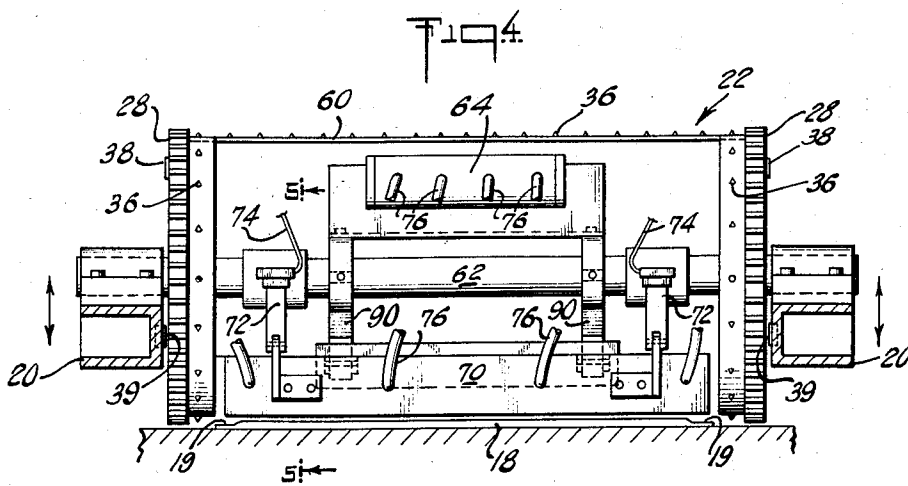
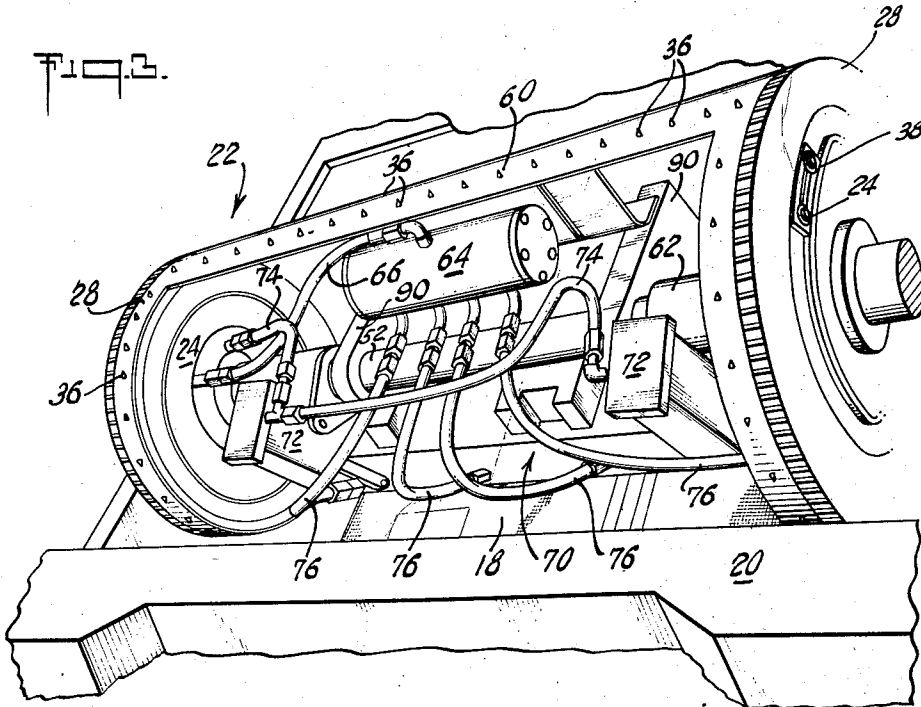
March 15, 1960

M. STEIN ET AL
TEXTILE PRINTING MACHINE

2,928,340

Filed March 21, 1957

6 Sheets-Sheet 2



INVENTORS:
MAX STEIN
LOUIS WERNER
BY
Curtis Morris & Safford
ATTORNEYS:

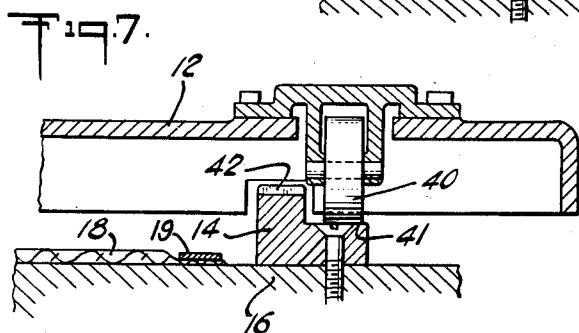
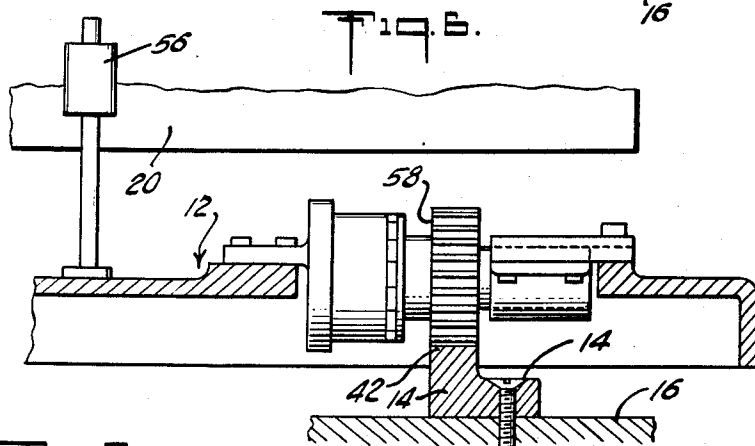
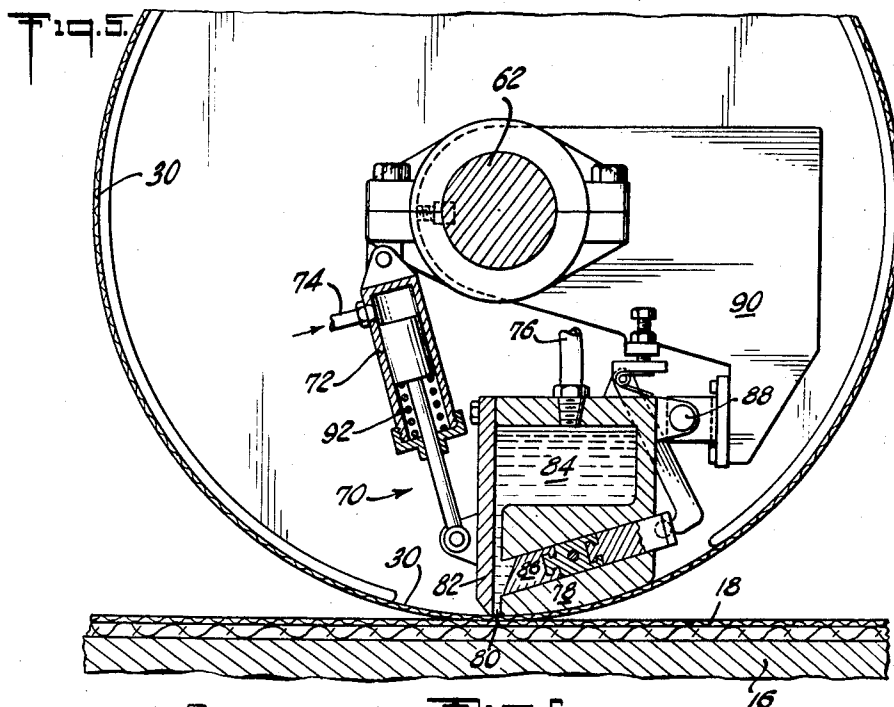
March 15, 1960

M. STEIN ET AL
TEXTILE PRINTING MACHINE

2,928,340

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6 Sheets-Sheet 3



INVENTORS:
MAX STEIN
LOUIS WERNER
BY
Curtis, Morris & Safford.
ATTORNEYS:

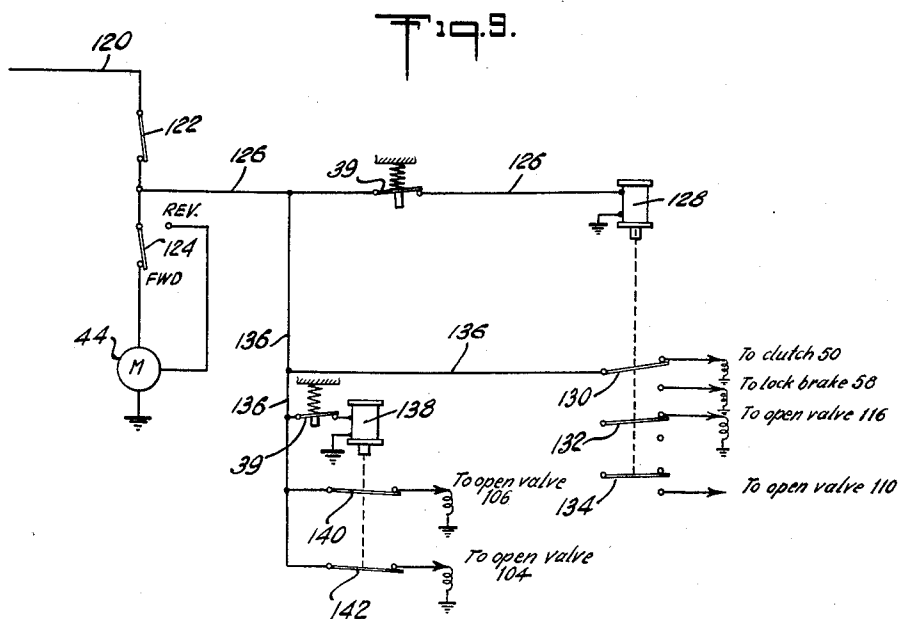
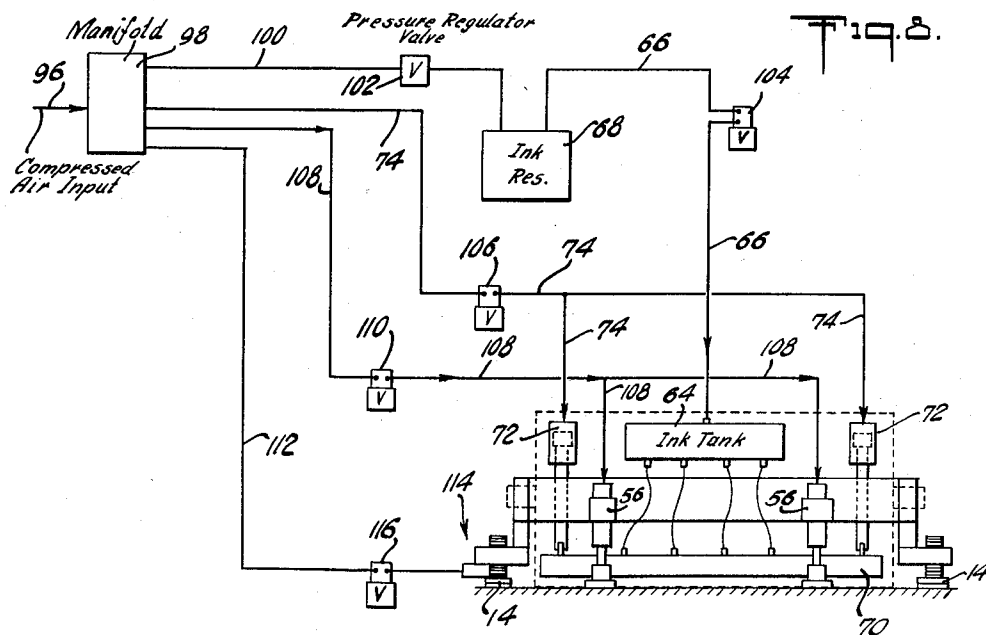
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M. STEIN ET AL
TEXTILE PRINTING MACHINE

2,928,340

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6 Sheets-Sheet 4



INVENTORS:
MAX STEIN
LOUIS WERNER
BY
Curtis, Morris & Clifford
ATTORNEYS:

March 15, 1960

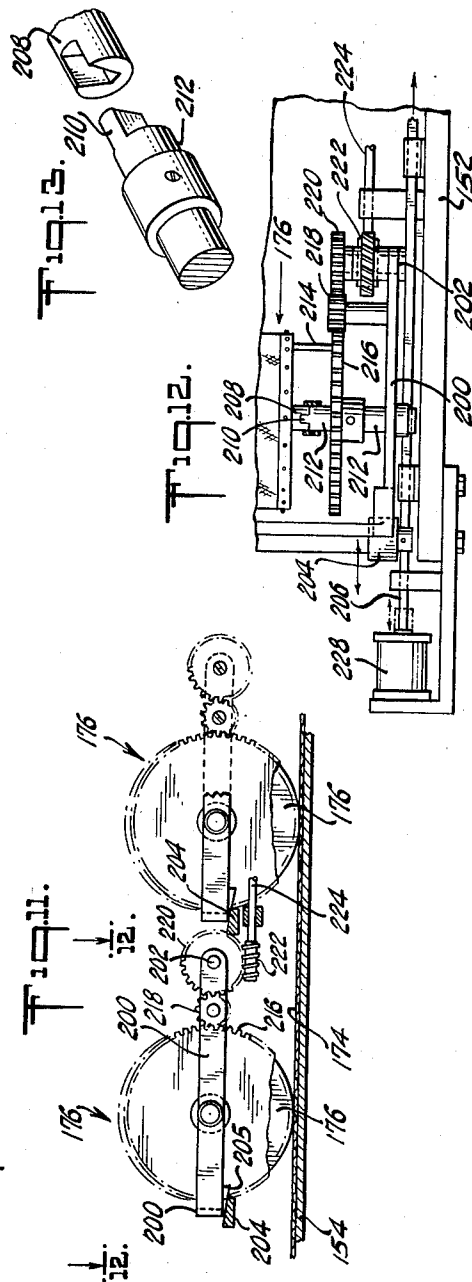
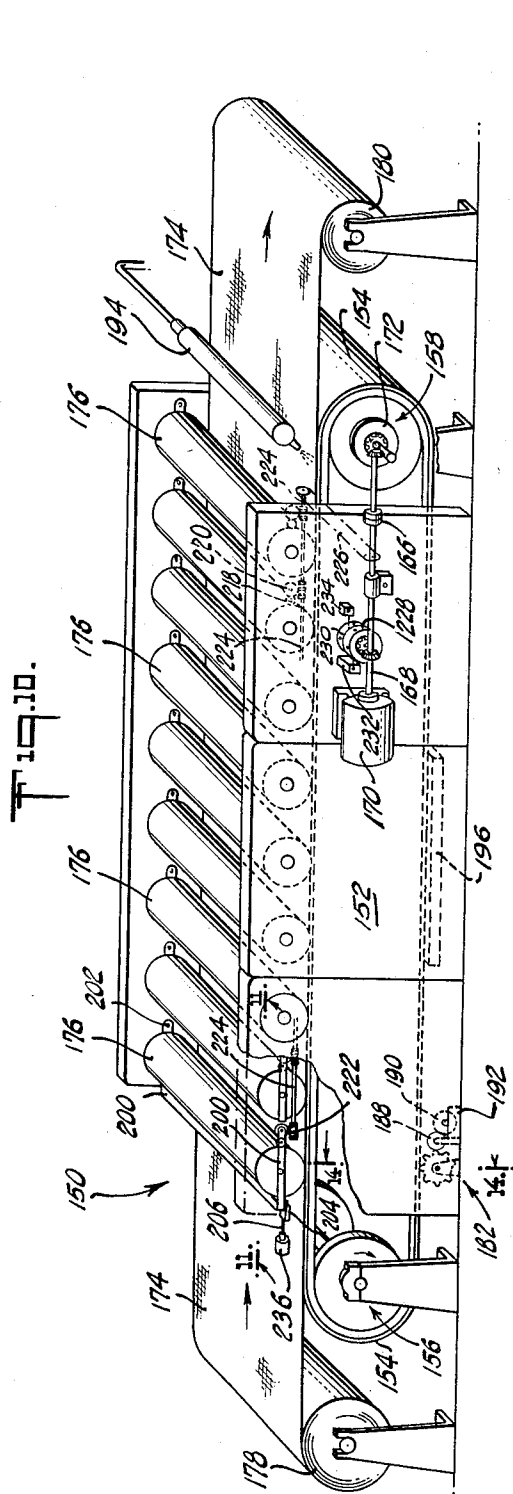
M. STEIN ET AL

2,928,340

TEXTILE PRINTING MACHINE

Filed March 21, 1957

6 Sheets-Sheet 5



INVENTORS:
MAX STEIN
LOUIS WERNER
BY
Curtis, Morris & Safford
ATTORNEYS:

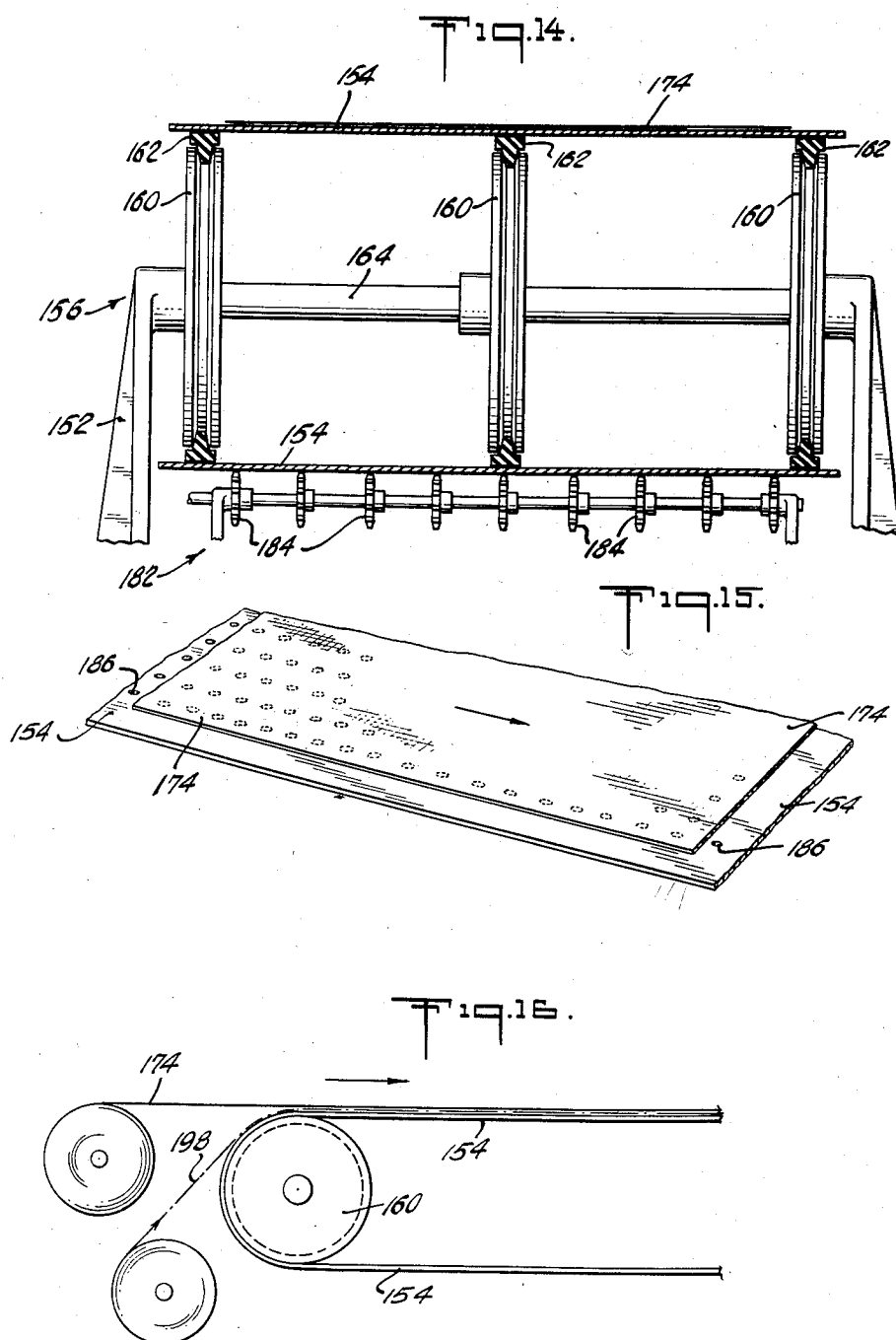
March 15, 1960

M. STEIN ET AL
TEXTILE PRINTING MACHINE

2,928,340

Filed March 21, 1957

6 Sheets-Sheet 6



INVENTORS:
MAX STEIN
LOUIS WERNER
BY
Curtis, Morris & Safford
ATTORNEYS:

1

2,928,340

TEXTILE PRINTING MACHINE

Max Stein, East Paterson, and Louis F. Werner, Saddle River, N.J.; said Werner assignor to said Stein

Application March 21, 1957, Serial No. 647,599

10 Claims. (Cl. 101-120)

This invention relates to a machine for printing on or applying designs to textiles, fabrics, paper, plastics, rubber and the like.

An object of the invention is to provide a machine of the above kind having greatly improved versatility in printing different designs.

Another object is to provide such a machine able to operate automatically and with great precision to print a number of different colors of a pattern.

A further object is to provide such a machine which can print patterns using inexpensive silk screens of ordinary kind and which are commercially available.

Still another object is to provide a machine of this kind which can readily be adjusted to print with uniformly high quality using one of a variety of printing substances of various viscosities and drying times upon any one of a variety of different materials.

A further object is to provide such a machine which is inexpensive to manufacture and which can be operated at low cost and with great saving of labor.

These and other objects will be in part understood from and in part pointed out in the description given hereinafter.

In silk screen printing of textiles, for example, it is still frequent practice, in spite of the many machines which have been developed in the past, to apply the printing ink through the screen to the textile by hand using a squeegee. An important reason for this is that even though labor costs are high, these are more than offset by the low investment in equipment which is possible with hand operation, by the fact that relatively very inexpensive silk screens can be used, and by the higher quality of the printing which can be obtained in comparison to the usual machine operation.

Previous machines for screen printing textiles have frequently required expensive screens of metal, for example, which are relatively difficult to produce and which to recoup the initial investment must be used to produce a fairly large amount of printed goods. However it often is desirable to produce only a very limited amount of goods printed with a given pattern. Under such conditions the high initial cost of setting up a machine able to take the place of hand operation is not justified. Again, where highest quality in the printing on the goods is required there previously has been no completely satisfactory substitute for hand printing. This is true because of the difficulty of using certain printing inks and dyes. Some inks are more easily applied than others and are more easily applied at one time than another time depending on temperature and humidity, for example. Prior textile printing machines have been difficult to control in regard to the amount and uniformity of ink applied to the goods and in regard to printing in exact registry a pattern in one color over another color already printed on the goods. The present invention seeks to avoid these difficulties with prior machines and to provide a textile printing machine which is able to use ordinary silk screens such as are commonly available for hand operation to

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give high quality printing with a relatively very small cost each time in setting up the machine to run a given pattern.

In accordance with the present invention there is provided a nearly completely automatic machine for printing designs upon textiles and the like, this machine having one or more uniquely mounted and driven hollow drums each of which is adapted to carry a flat rectangular silk screen held in cylindrical form. Each drum of this machine is adapted to rotate its respective silk screen in contact along a tangent line against a strip of material being printed upon. Provision is made so that each drum can automatically be controlled during at least once each revolution to raise the screen out of contact with the material, to rotate the screen to an index point, and then again to lower the screen into printing contact. Thereafter, the strip material and drum are moved relatively to one another lengthwise of the strip, and the drum is rotated at a peripheral speed equal to the relative speed of translational movement of the strip and drum so that the pattern carried on the silk screen is printed upon the material.

Within each screen-supporting drum of this machine there is provided a distributor head for the ink or other printing substance to be applied through the screen onto the strip material. The distributor head and its associated parts do not rotate with the drum. Flow of ink from this head onto the silk screen is turned on or off in accordance with whether the drum is in printing or non-printing position. When the drum is in printing position, this distributor head is pressed against the inside surface of the silk screen and acts as a squeegee to force the ink through the screen. The force with which the distributor head bears against the silk screen, which in turn determines the force of the screen against the strip material, can readily be adjusted while the machine is in operation so that it is very simple to obtain optimum transfer of ink through the silk screen onto the strip material. The ink supplied to the silk screen from the distributor head is supplied under pressure which can be adjusted while the machine is in operation so that regardless of temperature and humidity variations, uniform high quality of printing is obtained.

The repeat length of a pattern printed by this machine is not restricted to the circumferential length of the silk screen mounted on its supporting drum but can be any fraction or sub-multiple of this length. In other words, a pattern can be repeated in less than one revolution of the drum.

In one specific embodiment of the invention nine separate screen supporting drums and their associated screens are mounted in a row extending over and along the line of travel of an endless belt conveyor along which moves a strip of material to be printed with a vari-colored pattern. Each drum has the same circumference as the others and each is spaced from the adjacent drum or drums on each side by a distance equal to one-half the circumference of the drum. Thus the beginning line of the color pattern printed by each drum will not coincide with the beginning line of the pattern for the adjacent drum and this helps to minimize any slight irregularities which may occur in the positions of these beginning lines.

The endless conveyor which carries the material being printed upon is advantageously made of sheet metal, such as thin steel. The material is held from slipping on this belt by a unique arrangement of adhesive spots which are applied to the belt and warmed and cooled alternately to grip and to release the material. In addition, the belt itself is heated somewhat to speed the drying of the printing ink applied to the material carried on top of the belt, thus simplifying the printing of one color immediately upon another in a continuous operation.

The nine drums of this specific embodiment of the

invention are each separately mounted for rotation in unison with the other drums and also mounted for up and down movement in unison with each other out of and into contact with the material to be printed upon. Each drum is individually removable from the machine but its mounting is indexed so that each time the drum is inserted into the machine, it will occupy a given position relative to the other drums.

A better understanding of the invention together with a fuller appreciation of its many advantages will best be gained from a study of the following description given in connection with the accompanying drawings in which:

Figure 1 is a side perspective view of a single drum embodiment of a textile printing machine incorporating features of the invention;

Figure 2 shows a flat rectangular silk screen mounted in a flexible metal frame so that it can be mounted in cylindrical form on the support drum of the machine in Figure 1;

Figure 3 is a perspective view taken from a point somewhat above and to one side of the machine of the support drum with screen removed;

Figure 4 is a front view of the drum somewhat reduced in scale and broken away to show the interior of the drum with the ink distributor head in raised position;

Figure 5 is an enlarged side section view of the support drum and distributor head taken as indicated by lines 5—5 in Figure 4;

Figure 6 is an enlarged view of the carriage track and brake taken along lines 6—6 in Figure 1;

Figure 7 is an enlarged view of a carriage supporting wheel in engagement with the track taken as indicated by lines 7—7 in Figure 1;

Figure 8 is a block schematic diagram of the air pressure lines which are connected to the machine and which energize certain of its operations;

Figure 9 is a schematic circuit diagram of the electrical switches which control air pressure in the various lines shown in Figure 8 and which also control the electric drive of the machine;

Figure 10 is a side perspective view of another embodiment of the invention showing a machine adapted to print up to nine different colors of a pattern on a strip of material which is carried through the machine on the top run of an endless conveyor belt;

Figure 11 is an enlarged side view taken as indicated by lines 11—11 in Figure 10 showing two of the screen-supporting drums and the means for rotating and for lifting them;

Figure 12 is a top view taken as indicated by lines 12—12 in Figure 11 of one end of the drive rolls;

Figure 13 is an enlarged detail of the shaft support for one of the drums showing how it is indexed;

Figure 14 is an enlarged section view taken as indicated by lines 14—14 in Figure 10;

Figure 15 is a perspective view of a portion of the strip of material and the belt conveyor showing the spots of adhesive which temporarily unite the two; and

Figure 16 is a side view of the input end of the machine of Figure 10 showing a modified arrangement where an intermediate layer of absorbent material such as paper is interposed between the conveyor belt and the material to be printed upon.

Referring first to Figure 1, the machine 10 includes a self-propelled carriage 12 adapted to ride along the geared tracks 14 fixed to a long support table 16. Between the tracks and stretching down the length of table 16 is a strip of material 18, such as cloth, which is to be printed with a pattern by machine 10. This strip is attached to the table along its edges at 19. Rotatably mounted in a yoke 20 carried on machine carriage 12 is a silk screen supporting drum 22 which is adapted to roll along in contact with material 18 and to print a pattern thereon. The drum 22 (but not the parts located within the drum) is rotatably mounted in the end bear-

ings 24 which are in turn supported by the yoke 20. The drum is provided at its opposite ends with ring gears 28 by means of which it is positively rotated at all times during operation of the machine by a pair of gears 26 which engage the ring gears and are driven in a manner described below. Yoke 20 is pivoted at its right end to carriage 12 at points 29 and its left end is movable up and down to raise or lower the drum out of contact with the strip of material 18.

The cylindrical portion of drum 22 comprises a silk screen 30 that is wound into a cylindrical configuration. As shown in Figure 2, this screen is held in a rectangular frame of flexible metal strips having two end strips 32 and 34 which, as seen in Figure 1, are held edge to edge together on drum 22. The metal strips which hold screen 30 are perforated and fit on the mounting pins 36 disposed around each end of drum 22.

Each ring gear 28 on its outer face carries one or more index cams 38 which cooperate with switches 39, mounted on each side of yoke 20, to signal when drum 22 reaches a given angular position. Cams 38 can be set at different angular positions around gears 28, for example one cam on the right gear 28, and another on left gear 28, thereby to establish index points at any desired angular positions of drum 22.

During operation of machine 10, carriage 12 is driven along the tracks 14 being supported by the four freely rotatable wheels 40, each wheel being mounted near a respective corner of carriage 12 as shown in Figure 7. Each wheel 40 bears against a flat portion 41 of a rail 14, the toothed portion 42 of the rail being engaged by parts mounted on the carriage in the following manner. Motive power for the carriage is supplied from the motor 44, mounted on the right end of carriage 12 as seen in Figure 1, through the gear speed reducer 46 and the gear train generally indicated at 48 to the clutch operated gear 50. This gear meshes with the toothed portion 42 of track 14 and when the gear rotates the carriage is driven along the track. Gear 50 is connected to or disconnected from gear train 48 by the electrically operated clutch 52.

While the carriage is moving, drum 22 is rotated by gears 26 which in turn are driven through a belt 54 from one of the continuously rotation pinions of gear train 48. Assuming that carriage 12 is moving to the right in Figure 1, drum 22 would be rotated clockwise so that it rolls but does not slide in contact with material 18. When the frame strips 32, 34 have rotated on drum 22 just to the point of contacting the material, one of the index cams 38 on ring gear 28 actuates a switch 39. This switch in turn controls the air pressure acting on a pair of pneumatic cylinders 56 positioned on carriage 12 on the left end of yoke 20. These cylinders then raise the yoke and thus move drum 22 out of contact with material 18. Simultaneously, carriage 12 is locked to tracks 14 by the electrically operated brake gear 58, which mates with toothed portion 42 of track 14 as indicated in Figure 6. At the same time drive gear 50 is temporarily disconnected from the motor 44 by de-energization of clutch 52. In this condition drum 22 continues to rotate until strips 32, 34 can no longer contact material 18. Thereupon a cam 38 actuates another electric switch 39 which causes drum 22 to be lowered and carriage 12 once again to be driven along tracks 14. During the times that drum 22 is raised, no ink is applied, and the ink distributor head is withdrawn from contact with the screen. This withdrawal permits the ink-impervious end strips 32 and 34 and their supporting member to rotate freely past the distributor head which does not itself rotate.

Drum 22 is shown in Figure 3 with screen 30 removed. Joining ring gears 28 is a rib 60 which carries a number of the pins 36 adapted to engage with the holes in strips 32, 34 on screen 30. Non-rotatably mounted on a fixed axle 62 that extends through the drum is an ink supply tank 64 which is connected via the single line 66 to an

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external ink reservoir 68 seen in Figure 1. Axle 62 is fixed to yoke 20 and does not rotate.

As seen in Figure 4, an ink distributor head 70 is suspended from axle 62. It is spring urged upward to the position shown so that there is clearance for rib 60 to rotate beneath it. Head 70 is moved down to printing position by the two air cylinders 72 which can be adjusted in the downward force they exert by the magnitude of air pressure applied to them. Cylinders 72 are energized by the air lines 74 from an external air supply. Ink is supplied to head 70 from tank 64 by the four lines 76.

Figure 5 shows head 70 in cross section. The bottom part of the head is formed by a curved plate 78 which is adapted to bear against the inside of screen 30 to apply ink thereto. This plate acts as a squeegee. A narrow central slit 80 runs the length of plate 78 between it and the front wall 82 of the head. This slit permits the ink to pass under pressure from an inside chamber 84 within head 70 to the screen. Slidably mounted with plate 78 is a blade 86 which can be adjusted externally to control the amount of ink passing through slit 80 for a given pressure.

Head 70 at its rear is pivotally supported at points 88 by two spaced plates 90 (see also Figures 3 and 4) which are rigidly fixed to the non-rotating axle 62. The front end of the head is adapted to be pushed down by air cylinders 72 when they are energized. When they are not energized, a compression spring 92 in each cylinder acts to lift the head upward from the position shown in Figure 5 out of contact with screen 30. It should be remembered that ordinarily when the head is lifted, drum 22 will also be lifted.

The air supply lines which control many of the functions of machine 10 are shown schematically in Figure 8. These lines are all connected at the left to a main supply line 96 via the manifold 98. The first line, line 100, leading from the manifold is connected via the manually controlled pressure regulator 102 to the main ink reservoir 68. Ink supply line 66 leads from the reservoir to supply tank 64, as previously explained, the flow of ink through it being turned on or off by the electrically operated solenoid valve 104, which when energized is open.

Also leading from manifold 98 is air line 74 which controls the head lowering cylinders 72 within drum 22. Line 74 is opened or closed by the electric solenoid valve 106, open when energized, so that when air pressure is applied to cylinders 72 the ink distributor head is pressed downward into contact with screen 30. Valve 106 is manually adjustable externally of drum 22 so that the pressure of head 70 against screen 30 can be varied if desired while the machine is in operation.

A third air line 108 leading from manifold 98 controls the lift cylinders 56 which raise or lower yoke 20. When air pressure is applied through line 108 cylinders 56 raise yoke 20. This air pressure is turned on when the electric solenoid valve 110 in line 108 is energized.

The fourth line from manifold 98, line 112, controls the air-operated brake generally indicated at 114 mounted on carriage 12 and which is also shown in Figure 1. This brake is provided in addition to electric brake 58; it is unlocked when there is air pressure in line 112 and locked when there is no pressure therein, this pressure being turned on or off by the electric solenoid valve 116.

Figure 9 shows schematically the electric control circuit for the motor drive, the brake and the solenoid valves of machine 10. Electricity is supplied to the machine from a power line 120 through the main switch 122. Drive motor 44 is connected to the power line through switch 122 and the reversing switch 124 which can be set for forward or for reverse operation as indicated. Connected to the motor side of switch 122 is the lead 126 which runs to one of the switches 39, normally closed, and to the energizing coil of the relay 128. This relay

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controls the single pole double throw switch contacts 130, 132 and 134. When relay 128 is energized, switches 130, 132 and 134 are held up in the position shown. They are let down to their lower position when relay 128 is de-energized by the opening of the switch 39 in lead 126.

Connected to lead 126 is a lead 136 which connects through the other switch 39 to the relay 138. When this relay is energized it holds the switches 140 and 142 up thereby opening, respectively, the air valve 106 and the ink valve 104. With both relays 128 and 138 energized, machine 10 will operate to print on material strip 18.

The two cams 38, one carried on each end of rotating drum 22, are adjusted so that the two switches 39 operate to de-energize relay 128 and 138 approximately at the same time. Thus carriage 12 will be stopped, yoke 20 raised, head 70 raised and the ink feed cut off in the proper sequence and for the length of time necessary for drum 22 to rotate to its starting position. Thereupon, the switches 39 will be permitted to close and the machine will resume printing.

Figure 10 is a right side perspective view of another printing machine, machine 150, embodying features of the invention. This machine has a stationary frame 152 on which is mounted an endless belt conveyor 154. The ends of this conveyor belt are supported respectively by the left and right pulley arrangements 156 and 158. Each of these arrangements includes grooved wheels, such as wheels 160 seen in Figure 14, which engage corresponding drive belts of rubber or the like vulcanized to the underside of the conveyor belt. The wheels 160 in arrangement 156 are mounted on a freely rotatable axle 164 supported from the frame of the machine. The wheels in arrangement 158 are similarly mounted on an axle but this axle is positively driven through a mechanical drive clutch 166, the drive shaft 168 and the hydraulic motor 170. Pulley arrangement 158, during operation of the machine, can be started and stopped periodically and can be locked in stop position by the electrically controlled brake 172.

As belt conveyor 154 rotates clockwise as viewed in Figure 10, its top run draws along with it a strip 174 of a textile fabric or the like and carries this strip successively beneath the nine printing drums 176. Each of these drums can be substantially like drum 22 seen in Figure 1 but with suitable modifications to be described. Each drum 176 is adapted to print a different color of ink, for example, so that in one pass through machine 150, the fabric or material 174 can be imprinted with the pattern having up to nine different colors. Material 174 is unrolled from a supply cylinder 178 at the left end of the machine and is taken up on a receiving reel 180 at the right.

When the fabric or material 174 comes into contact, at the left end of machine 150, with the top run of conveyor belt 154, which advantageously is a thin band of metal such as steel, the strip is temporarily though firmly anchored to the conveyor by means of adhesive previously applied to the outer surface of the belt. Shown in Figure 10 just to the right of left pulley assembly 156 near the bottom of the machine, and shown also in greater detail in Figure 14 is an arrangement 182 for applying these spots of adhesive, which advantageously is heat activatable. Included in this arrangement are a number of toothed wheels 184 of a material such as felt suitable for daubing the adhesive onto the belt in spots. Each wheel 184 rotates in contact with conveyor belt 154 being frictionally driven thereby and in turn applying, as seen in Figure 15, spots 186 of adhesive to the belt. The wheels 184 are charged with adhesive from the drum rollers 188 and 190, roller 190 running partly immersed in a trough 192 containing the adhesive in liquid form. The adhesive to be applied to the belt is maintained heated to tacky consistency in the manner

indicated below. As the belt rotates around and comes in contact with strip 174, the spots of adhesive grip it and draw it forward under the drums 176. To release, or part strip 174 from belt 154 after the strip has passed beneath drums 176, near the right end of the machine just above strip 174 is positioned a blower head or air nozzle 194 which directs downward a stream of cold air onto the strip. This causes a sudden cooling of the adhesive spots 186 and renders them non-tacky whereupon the strip 174 can be separated from the belt by pulling the strip straight forward while the belt is returned down over pulley 158 back to the left end of the machine. During its return to the left end of the machine, the belt is heated by the electric radiator 196 positioned just beneath and lying across the lower run of the belt. The heat supplied by radiator 196 warms the belt enough so that the adhesive spots 186 remain tacky as the top run of the belt passes beneath the drums 176. In addition, the heat supplied to belt 154 warms strip 174 from beneath and quickly drives off water or liquid contained in the inks being applied from the drums 176. This heating accelerates the drying of the ink and insures that a pattern of one color can be printed immediately on top of another color without smearing or smudging.

When working with a strip of material 174 through which the ink or printing substance being applied by the drums 176 tends to bleed, it may be desirable to provide between non-pervious belt 154 and the material a layer or strip of absorbent material. An arrangement for doing this is shown in Figure 16 wherein a paper strip 198 is pulled from a supply roll being positioned between the material 174 and the belt 154. Any ink which may bleed through strip 174 will then be absorbed by the paper strip 198.

Each of the drums 176 can have an internal structure substantially the same as that of drum 22 seen in Figures 3, 4 and 5, for example, and can have mounted around its periphery a silk screen similar to silk screen 30. During operation of the machine 150, each of the drums 176 is rotated in unison with the other and is raised or lowered in unison with the others in co-operation with the intermittent forward movement of the strip 174 through the machine. Each drum 176 as seen in Figures 10, 11 and 12, is rotatably mounted on a yoke 200 on each side of the machine to the frame at points 202. The front or left end of each yoke 200 is adapted to be raised or lowered by a wedge block 204 which bears against a cam surface 205 on the underside of the yoke. Each of the wedge blocks 204 is mounted on a common shaft 206 which when pushed to the right, as indicated in Figures 11 and 12, raises the yokes 200 and lifts each of the drums 176 out of contact with strip 174. While in raised position each drum continues to rotate until it returns to a predetermined angular position.

As seen in Figure 12, each drum 176 is supported at each end by a non-rotatable stub axle 208 which is notched, as shown in Figure 13, to mate with the tongue 210 of a shaft 212 non-rotatably mounted on yoke 200. This arrangement permits the quick removal of each of the drums 176 so that its silk screen can be replaced as desired and provides positive indexing of the distributor head within each drum relative to the frame of the machine. The outer periphery of each drum 176, upon which is mounted its respective silk screen, is rotatably driven in a way similar to ring gears 28 of drum 22, through the dog 214 which joins the outer rim of each drum with a respective one of the continuously rotating gears 216, each of which idles on the shaft 212 of its respective yoke. Each gear 216 is driven in unison with the others through a corresponding idler wheel 218 and a gear 220 which in turn is driven from the worm shaft and worm gear 222, these worm shafts being all carried on the single rotating shaft 224.

Referring to Figure 10, the right end of shaft 224 is

rotated through the drive chain 226 from the drive shaft 168 and the main drive motor 170. Also driven from shaft 168 are the two control drums 228 and 230 which revolve in synchronism with the drums 176 and which control the microswitches 232 and 234 to start and stop the machine in the same way that machine 10 is controlled by the switches 39.

During operation of machine 150 the strip of material 174 is drawn to the right through the machine, being contacted by the drums 176 which roll in contact with it. When the drums 176 have completed a pre-determined portion of a revolution, depending on the repeat length of the particular pattern being printed, the switches 232 and 234 are actuated whereupon clutch 166 which drives belt 154 is de-energized, brake 172 is energized to positively stop the belt, wedge blocks 204 are pushed to the right by the solenoid 236 acting on the left end of shaft 206, and the ink distributor head within each drum is raised out of contact with its respective silk screen. The drums 176 then continue to rotate for an amount determined by the rotation of the drums 228 and 230 after which the switches 232 and 234 are again actuated causing the drums 176 and their ink distributor heads to be lowered and conveyor belt 154 once more to be driven clockwise.

The above description is intended in illustration and not in limitation of the invention. Various changes or modifications in the embodiments shown may occur to those skilled in the art and these can be made without departing from the spirit or scope of the invention as set forth.

We claim:

1. A textile printing machine of the character described comprising, in combination, means for supporting a length of material to be printed with a pattern, a machine carriage positioned closely adjacent a portion of said material, a screen supporting drum mounted on said carriage and rotatably and orthogonally movable, said drum having an opening in its periphery and including means to support therearound in cylindrical form a rectangular thin flexible cloth-like member such as a silk screen carrying a pattern to be printed on said material, a distributor head non-rotatably mounted within said drum and adapted to move toward or away from said material to press said cloth-like member against and to transfer a printing substance therethrough onto said material, said head having a squeegee plate adapted to contact the inside of said cloth-like member and having at least one printing substance feed aperture therethrough, means to move said carriage and said length of material longitudinally past each other, means to rotate said drum, means to move said drum toward or away from said material into and out of printing contact, means to move said head against said cloth-like member to press its into printing contact with said material, means to supply printing substance to said head, and means coordinating said above named means so that at least once each revolution of said drum, said material and carriage are held from moving relative to each other, said head is moved out of contact with said cloth-like member, the flow of printing substance to said head is turned off, and said drum is rotated a certain amount whereupon said drum is lowered to put said cloth-like member in contact with said material, said head is moved into contact with said cloth-like member, the flow of printing substance is turned on, and said carriage and material are again moved relative to each other.

2. The combination of elements as in claim 1 wherein said drum has two rotatable end members rigidly joined by a rib upon which the two ends of said cloth-like member are fastened and wherein said coordinating means includes at least one switch-engaging cam carried on one of said end members and adapted to actuate a switch when said drum reaches a predetermined angular position.

3. The combination of elements as in claim 1 wherein said squeegee plate is a convexly curved plate adapted to slidably bear against the inner surface of said cloth-like member, said plate having a lengthwise slit cut in it through which the printing substance is adapted to be forced.

4. The combination of elements as in claim 2 wherein said coordinating means includes a multiple-switch relay controlled by the position of said switch-engaging cam and in turn controlling a plurality of electric solenoid valves to energize or de-energize said other means.

5. In a machine of the character described, in combination, drum means for supporting a flat rectangular silk screen in the form of a cylinder, said drum means including two circular end members rigidly joined by a transverse rib upon which the two ends of said screen are adapted to be fastened, means for supporting in close proximity to said drum means a portion of a long strip of material to be printed on, means for rotating said drum means with said screen tangentially and non-slidably in contact with said material, an ink distributor head non-rotatably mounted within said drum means and adapted to press against the inside of said screen to apply ink thereto and to act as a squeegee in transferring the ink to said material in accordance with the pattern on said screen, means to retract said head out of contact with said screen to permit said rib to pass between said head and said material each revolution of said drum means, means to retract said drum means from said material during passage of said rib between said head and said material, means coordinated with said retracting means for holding said material and said drum means in their same longitudinal positions when said drum means is retracted, and means to supply ink to said head when it presses against said screen and to stop said supply when said head is retracted.

6. The combination of elements as in claim 5 in further combination with external means to control said means to supply ink to adjust the flow of ink while said machine is in operation whereby the best quality of printing can be obtained under a variety of temperature and humidity conditions and using inks of various compositions.

7. A textile printing machine arrangement comprising a flat long table, two parallel tracks positioned thereon, a strip of material to be printed upon positioned on said table between said tracks, a self-propelled carriage mounted on said tracks and adapted to travel therealong, a silk screen supporting drum, a yoke pivotally mounted on said carriage and supporting said drum rotatably, the unpivoted end of said yoke being movable toward and away from said carriage, a flat rectangular silk screen supported in the form of a cylinder on said drum, a distributor head non-rotatably mounted in said drum within the cylinder enclosed by said silk screen and adapted to slidably press against the inside of said screen to force it into contact

with said material and to apply ink to said screen, means to move said head into contact with said screen during a printing operation and alternatively to raise it out of contact in order not to print, ink supply means at least partly within said head adapted to supply ink when said head is in contact with said screen and to stop said supply when said head is not in contact with said screen, means to move the unpivoted end of said yoke toward or away from said carriage to move said drum into or out of contact with said material to print or not print as desired, means to move said carriage longitudinally along said material and simultaneously to rotate said drum in non-sliding contact with said material, means periodically at least once each revolution of said drum to stop said carriage and to permit said yoke to be moved out of contact with said material, said head to be moved out of contact with said screen, said drum to be rotated a given amount and thereafter said drum to be moved into contact with said material, said head to be moved into contact with said screen and to move said carriage longitudinally.

8. The combination of elements as in claim 7 wherein said drum includes two parallel-spaced ring gears and a screen supporting rib laterally joining said gears rigidly together, said rib being adapted to rotate between said head and said material once each revolution of said drum.

9. A machine for printing on a continuous strip of fabric or the like a multi-color pattern having any given repeat size within a wide range, said machine comprising a frame, an endless metal band conveyor belt having a top run and a bottom run, a plurality of printing drums spaced apart in a row over the top run of said conveyor, means to supply a continuous strip of material to be drawn by said conveyor belt along the top run thereof beneath said printing drums, means to drive said conveyor belt in one direction, means to rotate said drums in unison, each drum being mounted for movement into or out of contact with the top run of said conveyor belt, each drum supporting a screen pattern in the form of a cylinder containing within it an ink distributor head which is non-rotatably mounted for movement into or out of contact with the inside of said screen pattern, means for holding said strip firmly against said belt along the top run thereof, and means to drive said conveyor belt forward when said drums bear against said conveyor and to stop said conveyor belt when said drums are raised therefrom.

10. The combination of elements as in claim 9 wherein each drum is mounted on a yoke pivoted to the frame of said machine, and wherein the free end of said yoke is raised or lowered by a slidable wedge.

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