June 13, 1939. C. MASSON 2,162,440

MACHINE FOR PRINTING DESIGNS ON FABRICS

Filed Oct. 6, 1937 10 Sheets-Sheet 1

Fig. 1A

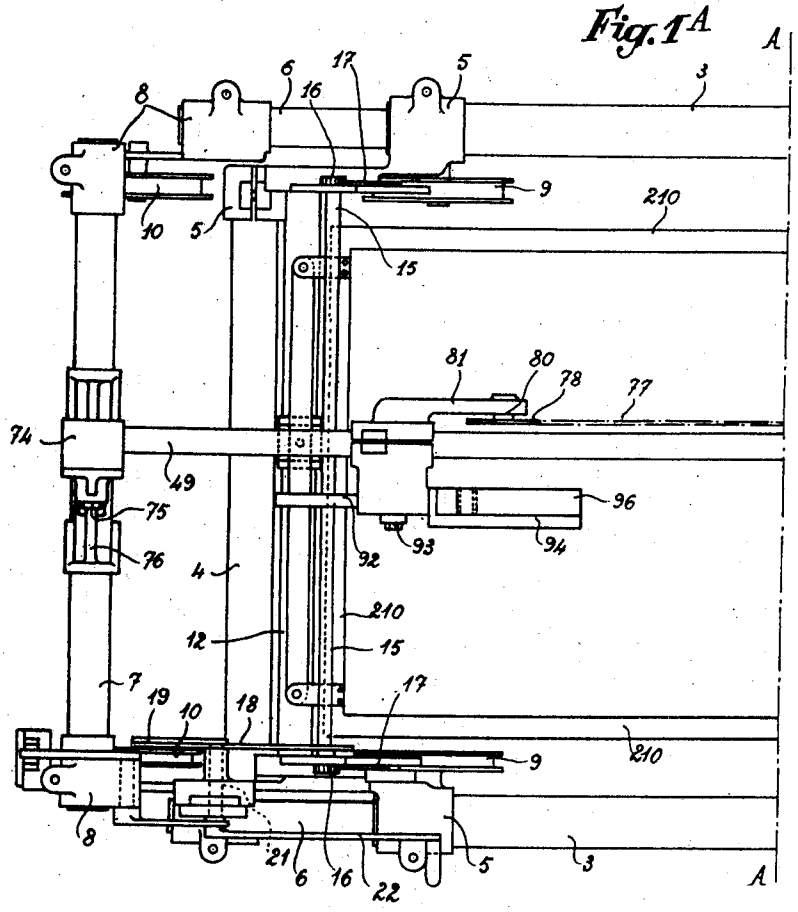
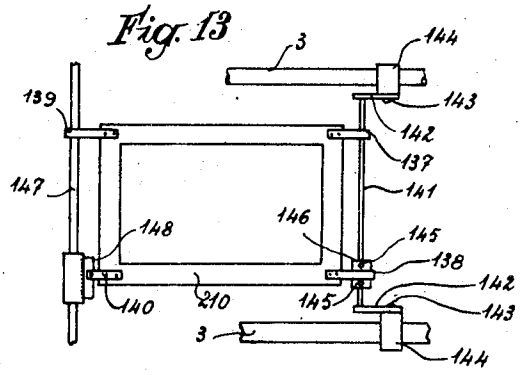


Fig. 13



Inventor:-
Claudius Masson
By Alexander Powell
Attorneys

June 13, 1939. C. MASSON 2,162,440

MACHINE FOR PRINTING DESIGNS ON FABRICS

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Fig. 1B

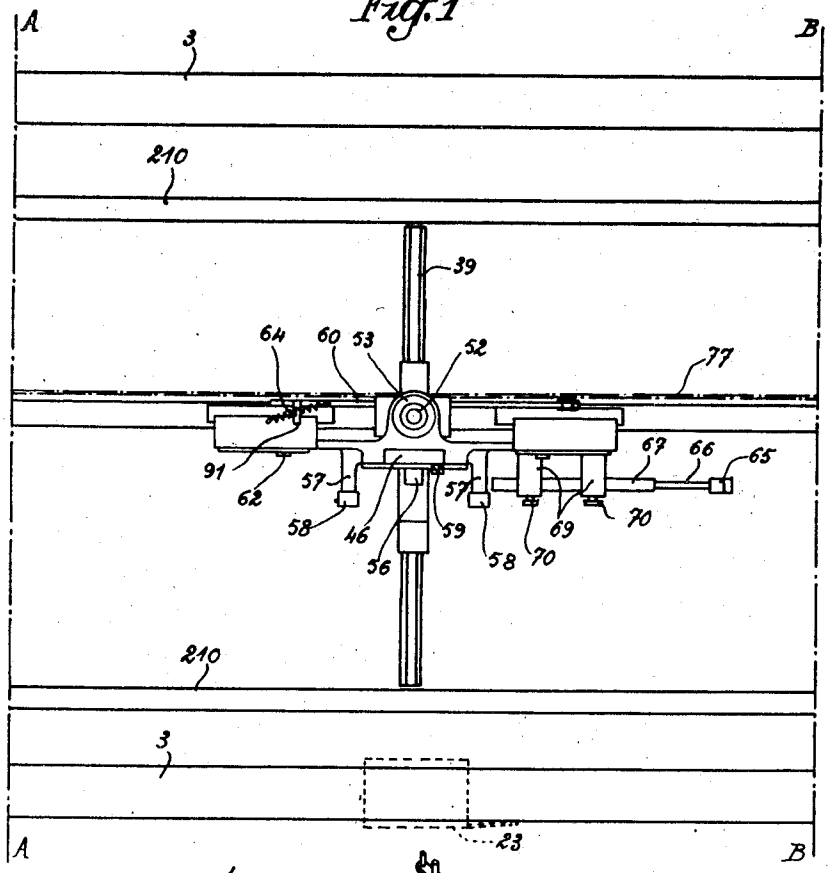


Fig. 14

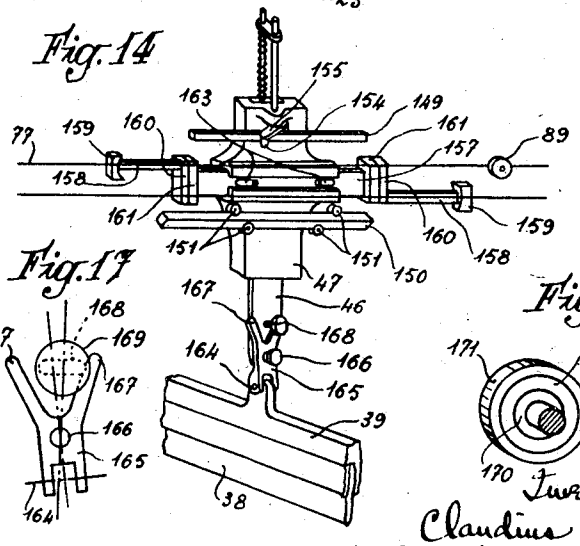


Fig. 16

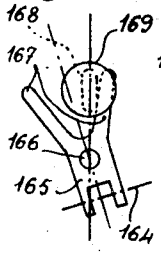


Fig. 17

Fig. 15

Inventor:—
Claudius Masson
By Alexander Powell
Attorneys

June 13, 1939. C. MASSON 2,162,440

MACHINE FOR PRINTING DESIGNS ON FABRICS

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Fig. 1C

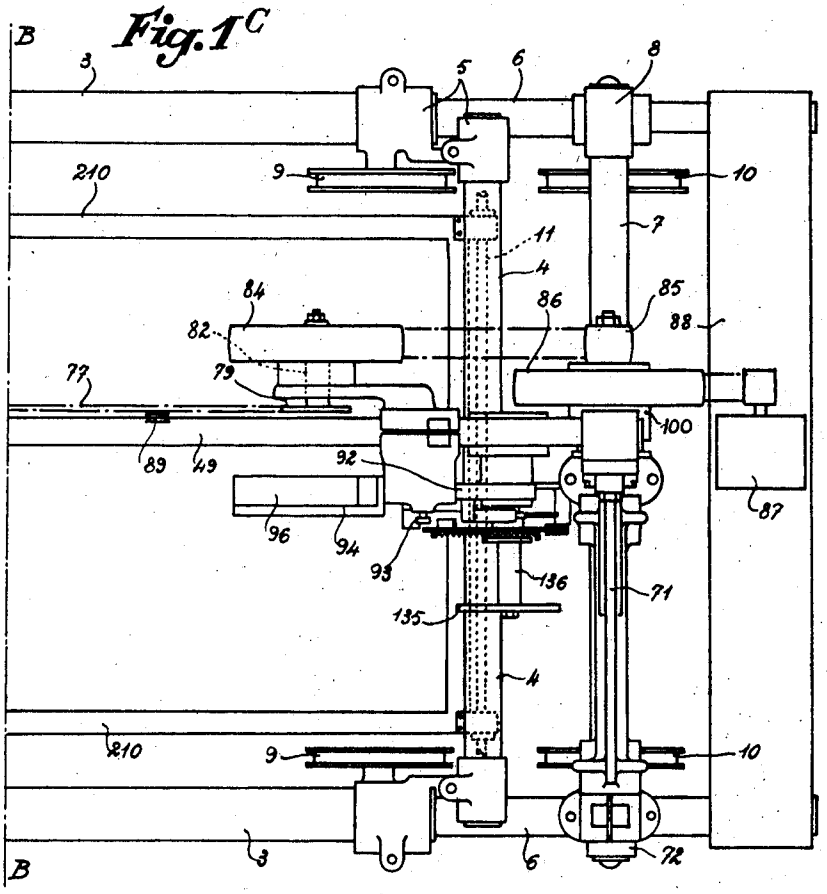


Fig. 24

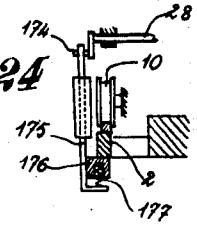


Fig. 22

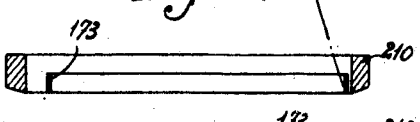
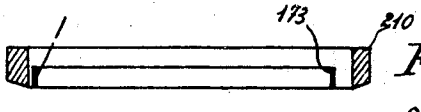


Fig. 23



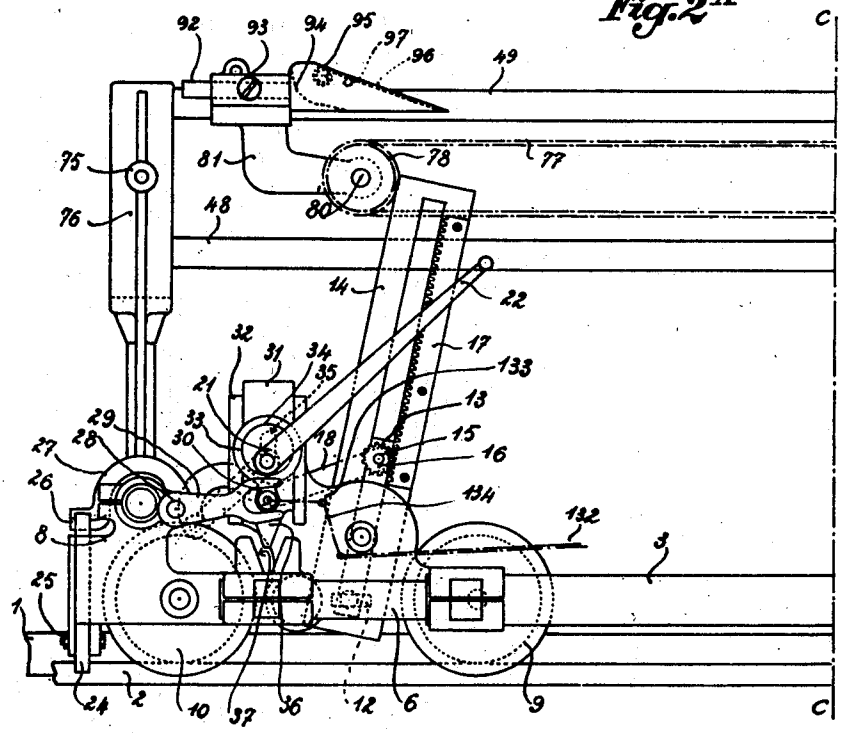
Inventor:—
Claudius Masson
By Alexander & Dodd
Attorneys

June 13, 1939. C. MASSON 2,162,440

MACHINE FOR PRINTING DESIGNS ON FABRICS

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Fig. 2A



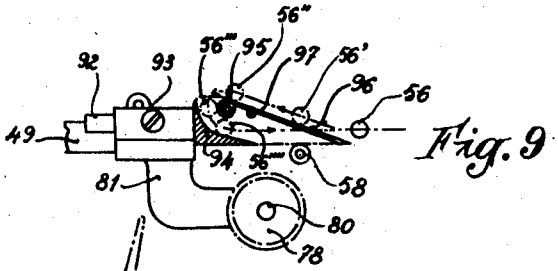


Fig. 9

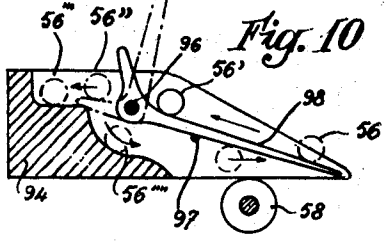
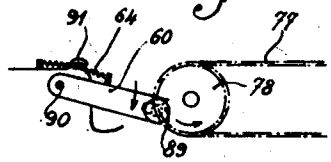


Fig. 10

Fig. 8



Inventor:-
Claudine Masson
By Alexander Mowell
Attorneys

June 13, 1939. C. MASSON 2,162,440

MACHINE FOR PRINTING DESIGNS ON FABRICS

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Fig. 2B

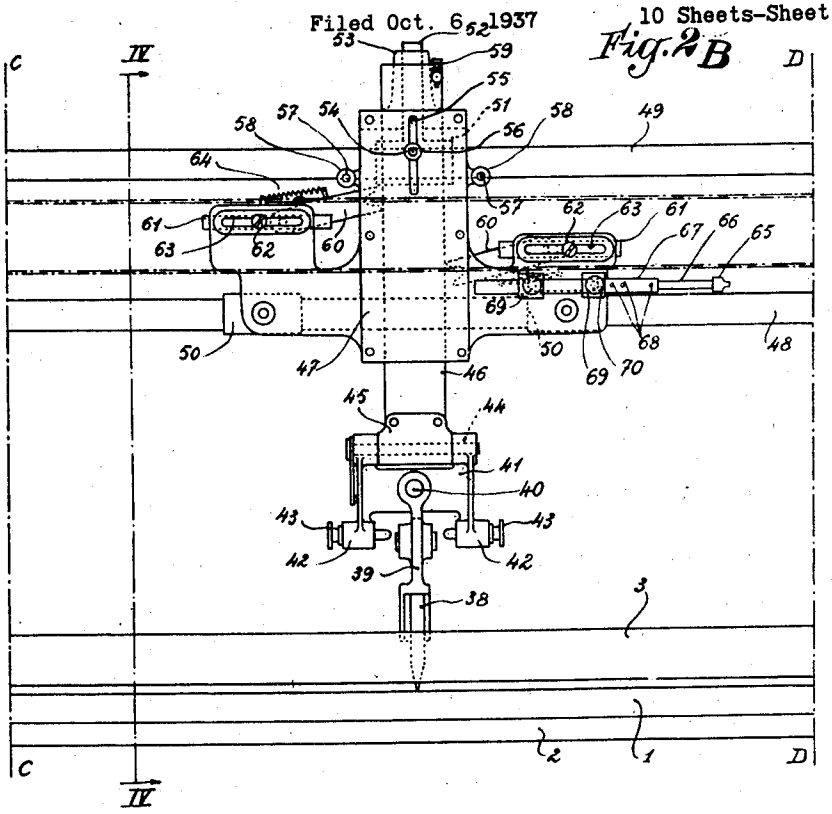
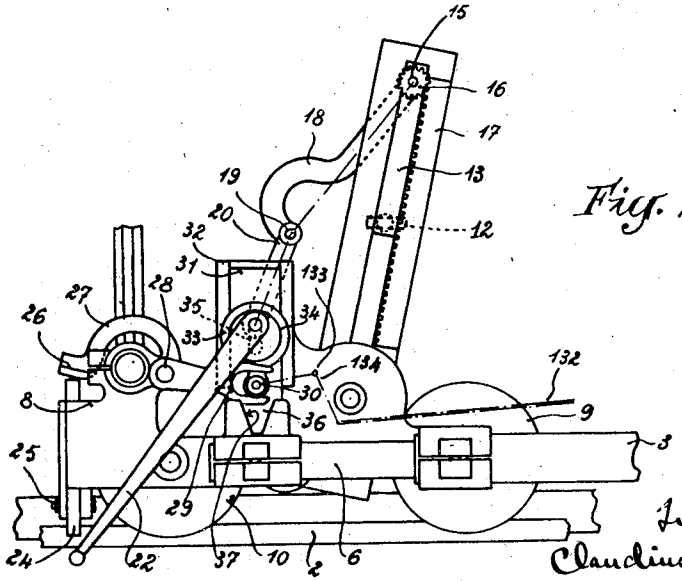


Fig. 7



Inventor:-
Claudine Masson
By Alexander & Dowell
Attorneys

June 13, 1939. C. MASSON 2,162,440

MACHINE FOR PRINTING DESIGNS ON FABRICS

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Fig. 2C

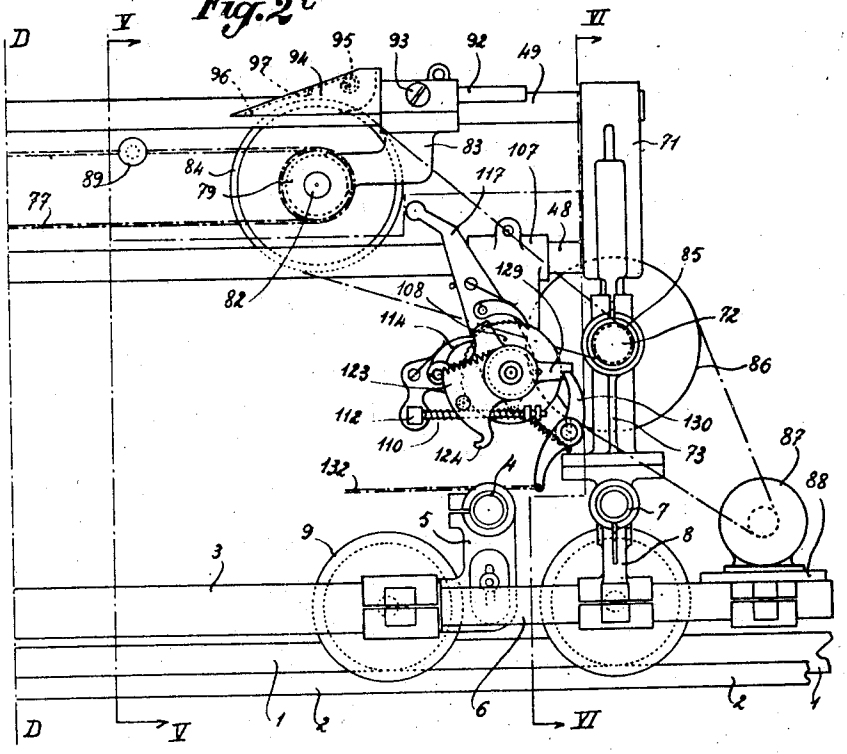


Fig. 21

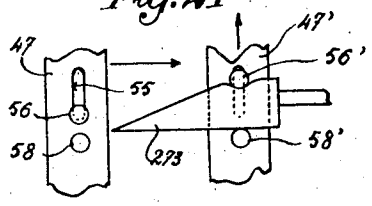


Fig. 18

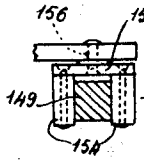


Fig. 19

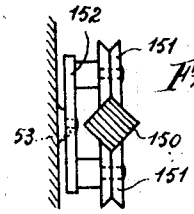


Fig. 25

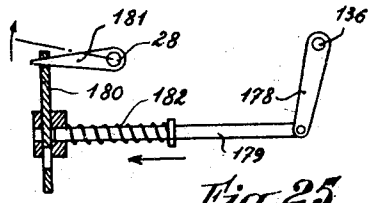
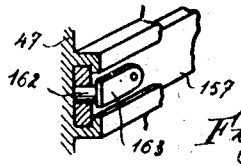


Fig. 20



Inventor:-
Claudius Masson
By Alexander Dowd
Attorneys

June 13, 1939. C. MASSON 2,162,440

MACHINE FOR PRINTING DESIGNS ON FABRICS

Filed Oct. 6, 1937 10 Sheets-Sheet 7

Fig. 5

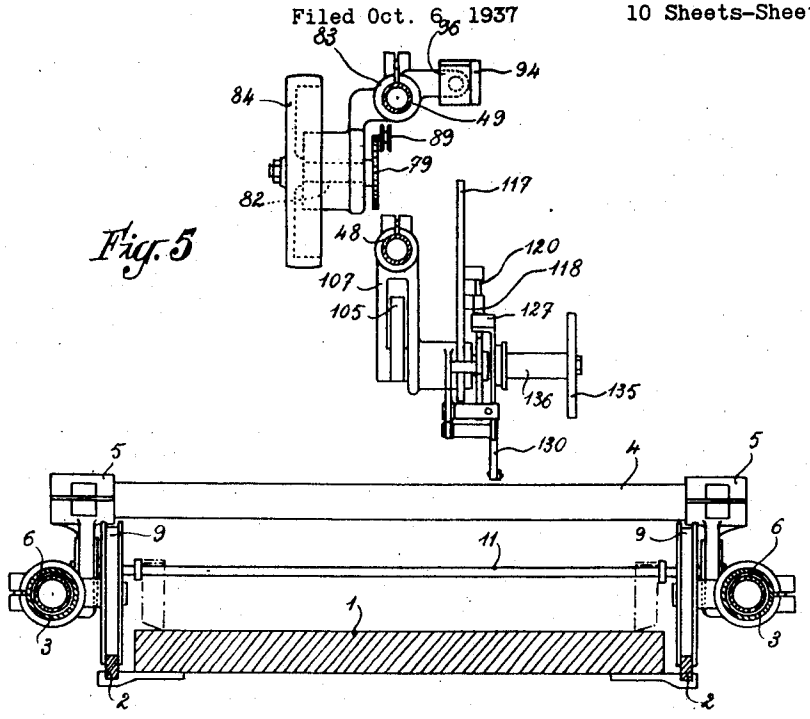
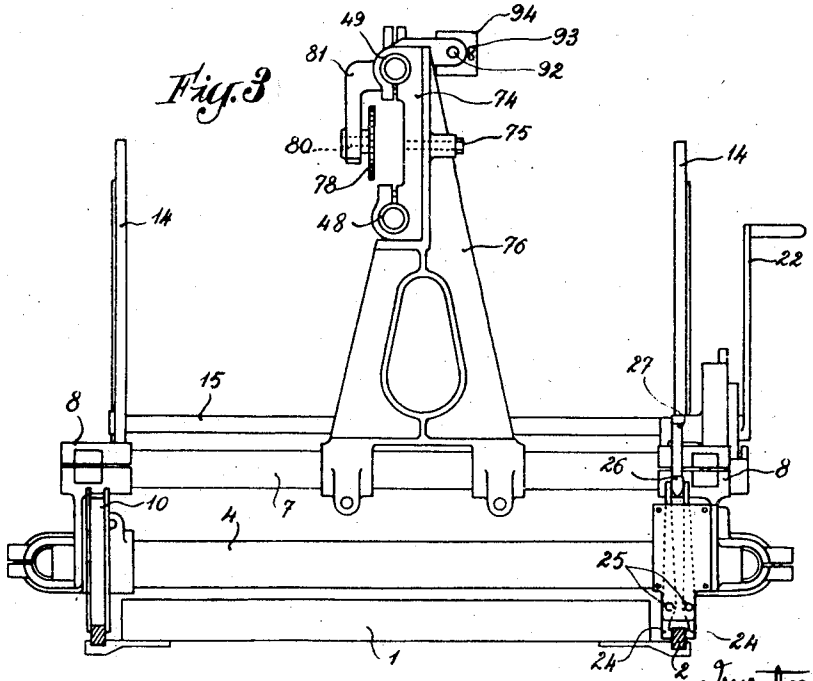


Fig. 3



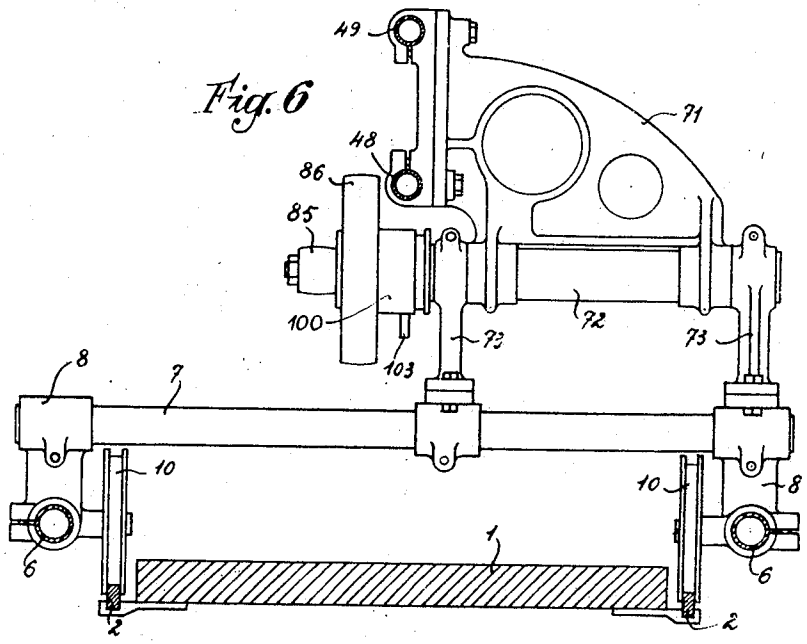
Inventor:-
Claudine Masson
By Alexander Dowell
Attorneys

June 13, 1939. C. MASSON 2,162,440

MACHINE FOR PRINTING DESIGNS ON FABRICS

Filed Oct. 6, 1937 10 Sheets-Sheet 8

Fig. 6



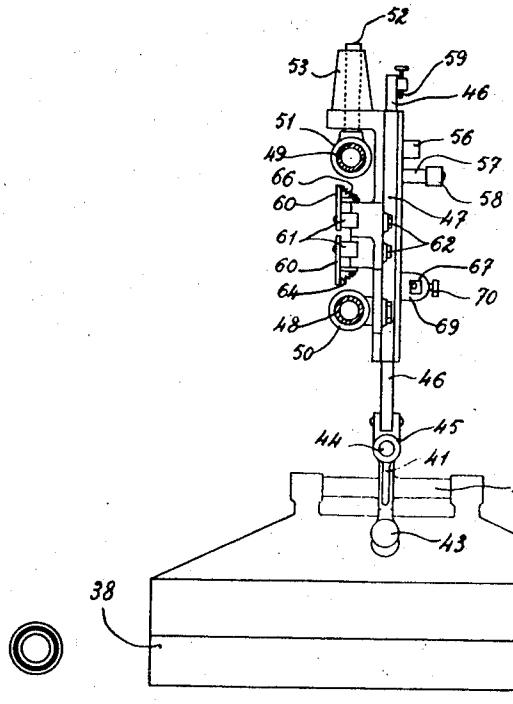


Fig. 4

Inventor:-
Claudius Masson
By Brandes & Dodell
Attorneys

June 13, 1939. C. MASSON 2,162,440

MACHINE FOR PRINTING DESIGNS ON FABRICS

Filed Oct. 6, 1937 10 Sheets-Sheet 9

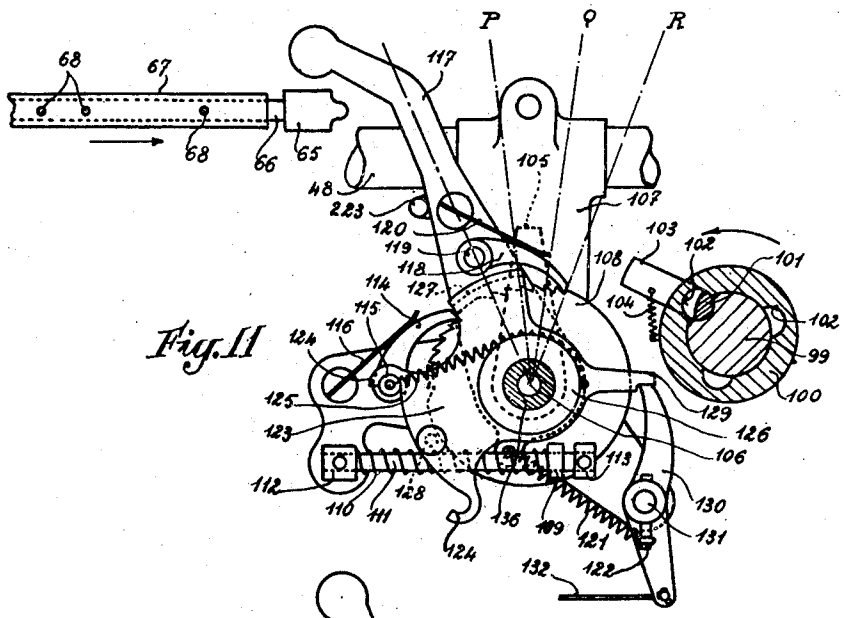


Fig. 11

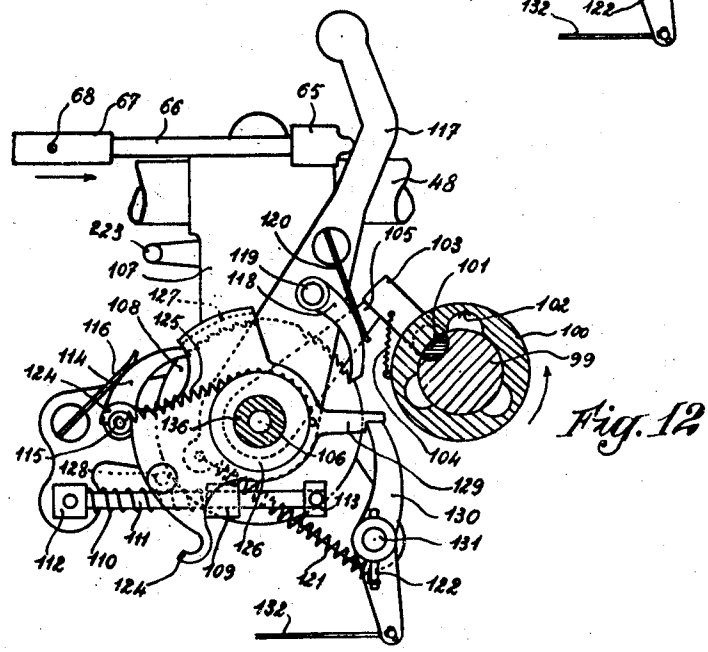


Fig. 12

Inventor:—
Claudius Masson
By Alexander & Dowell
Attorneys

June 13, 1939. C. MASSON 2,162,440

MACHINE FOR PRINTING DESIGNS ON FABRICS

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Fig.26

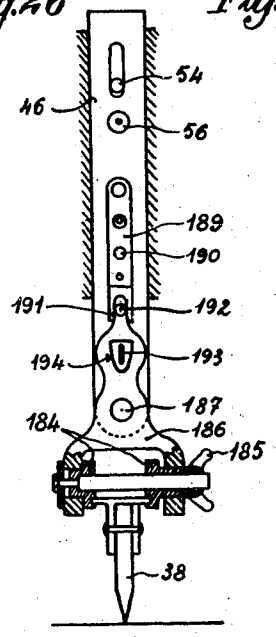


Fig.27

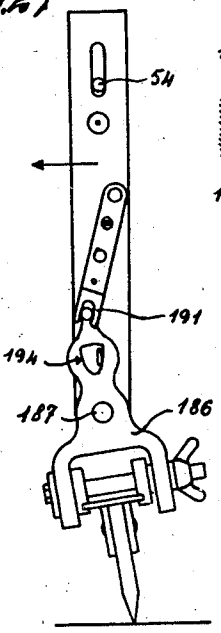


Fig.28

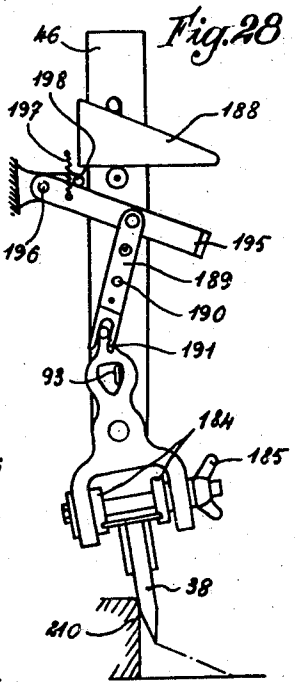


Fig.29

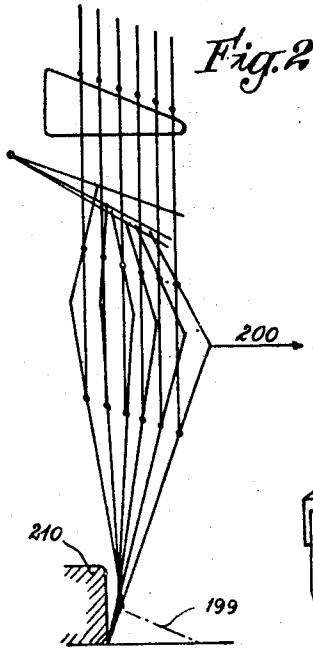
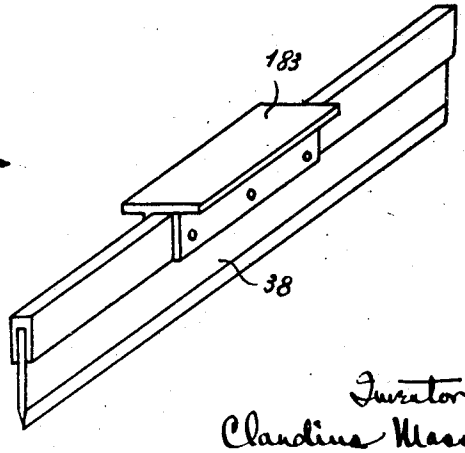


Fig.30



Inventor:—
Claudius Masson
By Alexander Dowell
Attorneys

Patented June 13, 1939 2,162,440

UNITED STATES PATENT OFFICE

2,162,440

MACHINE FOR PRINTING DESIGNS ON FABRICS

Claudius Masson, Lyon, France

Application October 6, 1937, Serial No. 167,626
In France October 9, 1936

14 Claims. (Cl. 101—123)

This invention relates to machines for printing designs on fabrics or papers by means of stencils or of perforated plates. It is known that this operation is generally performed by pinning the fabric, for instance, in a stretched condition on a printing table and printing successively throughout the length of the latter by means of a frame in which the perforated surface is stretched. When the frame is applied to a portion of the fabric, the operators spread the dye or ink on the stencil or perforated plate by means of a scraper.

In my prior Letters Patent No. 2,088,801 I have described a machine adapted to move the printing frame along the table and to apply automatically the same to the fabric at the desired places. But the operation of the scraper was still performed by hand and with large frames this operation is tiresome more particularly with viscous dyes which require a heavy pressure to penetrate through the perforated surface.

A first object of my invention is to provide a machine comprising a scraper and a mechanism for automatically driving the same. The dye is thus regularly applied whatever may be the dimensions of the frame and the viscosity of the dye.

Another object of my invention is to separate the scraper driving gear from the frame supporting carriage in order that the stresses resulting from the operation of the scraper may not be transmitted to the frame. This is obtained by forming two carriages combined with one another for running along the table, but independently secured in position for each printing operation.

Another object of my invention is to combine the means for connecting together the two carriages, with the means for separately securing the same in position along the table and also with the means for raising or lowering the printing frame on the fabric in such a way that the operator may have a single controlling handle to operate, thus avoiding any mistake.

Still another object of my invention is to provide means whereby, at the end of each stroke of the scraper, the latter may take again the more or less pasty mass of ink which has been scraped from the stencil during the stroke and spread it on the stencil or the like.

Further objects of my invention will be more clearly understood from the following description.

In the annexed drawings:

Figs. 1A, 1B and 1C form a general plan view of a machine according to my invention, Fig. 1A showing one end of the machine up to line A—A, Fig. 1B illustrating the middle portion thereof from line A—A to line B—B, and Fig. 1C representing the portion from line B—B to the other end.

Figs. 2A, 2B and 2C form in the same manner a general side view of the machine.

Fig. 3 is an end view corresponding to Fig. 2A.

Fig. 4 is a cross-section taken along line IV—IV of Fig. 2B.

Fig. 5 is a cross-section taken along line V—V of Fig. 2C, the end of the machine being omitted for the sake of clearness.

Fig. 6 is a cross-section taken along line VI—VI of Fig. 2C.

Fig. 7 is a partial side view showing the lower portion of the left end of the machine (Fig. 1A) at the raised position of the frame.

Fig. 8 is a diagram illustrating the reversing gear for the scraper driving carriage.

Fig. 9 is a diagram illustrating the raising gear for the scraper at the end of the stroke.

Fig. 10 shows a modification thereof.

Figs. 11 and 12 are enlarged detailed views showing the scraper controlling gear at two different positions.

Fig. 13 diagrammatically illustrates a modified mounting for the printing frame.

Fig. 14 is a perspective view of a modified scraper-driving carriage.

Fig. 15 is a perspective view of the driving roller for the scraper driving carriage.

Figs. 16 and 17 are diagrams illustrating the adjustment of the rocking motion of the scraper.

Fig. 18 is a cross-section of the upper guiding rail of Fig. 14.

Fig. 19 is a cross-section of the lower guiding rail.

Fig. 20 is a perspective view, with parts in section, of the sliding device supported by the carriage shown in Fig. 14.

Fig. 21 shows a scraper raising gear for the device of Fig. 14.

Figs. 22 and 23 diagrammatically illustrate an arrangement embodying an inner frame movable within the main printing frame to spread the dye.

Fig. 24 is a partial cross-section showing an additional brake for the carriage which supports the scraper mechanism.

Fig. 25 is a diagram showing a modified connection between the carriage braking gear and the mechanism controlling the reciprocating movement of the scraper.

Figs. 26 to 28 are side views illustrating a further modification of the scraper.

Fig. 29 is a diagram showing the operation thereof at the end of a stroke.

Fig. 30 is a perspective view of the scraper member.

The machine according to my invention is used in combination with a printing table 1 (Figs. 5 and 6) provided with lateral guiding rails 2 extending longitudinally thereof.

Rails 2 support a double carriage formed of two tubular frames having their longitudinal sides co-axial with one another. The first frame comprises two longitudinal tubes 3 (Figs. 1A, 1B and 1C) connected by transverse tubes 4 (Figs. 1A and 1C), the connections between the tubular members being effected by means of angle members 5. The second frame comprises two longitudinal tubes 6 extending through tubes 3 with a material radial play (Fig. 5) and connected by transverse tubes 7, the connections being effected by means of angle members 8. Each angle member 5 or 8 carries a roller 9 or 10. The two frames therefore form a combined carriage comprising two separate carriages having a limited degree of longitudinal freedom.

It is to be noted that in the drawings the width of the table and of the combined carriage has been considerably reduced.

The smaller carriage 3—4—5 supports the printing frame 210 carrying the stencil or the like (Figs. 1A, 1B, 1C), this frame being hinged on a transverse bar 11 (Fig. 1C) while its other end rests on another cross-bar 12 adapted to be raised or lowered (Fig. 1A). Bar 12 is supported at its ends by small carriages 13 (Fig. 2A) sliding along guides 14 fixed to the angle members 5 of the left end of the machine; carriages 13 also support a transverse shaft 15 provided at its ends with pinions 16 in mesh with racks 17 laterally fixed to guides 14. Owing to this arrangement carriages 13 move simultaneously along guides 14 when only one is driven by a rod 18 (Figs. 2A and 7) loose on shaft 15, the said rod being pivoted at 19 on the end of an arm 20 carried by a shaft 21 rotatably supported by member 5 and provided with the controlling handle 22.

The smaller carriage 3—4—5 also supports the means adapted to stop the said carriage at a number of determined positions along the table, such means comprising for instance a spring latch cooperating with detents adjustable in position along the table. In Fig. 1B there is shown in dotted lines a sleeve 23 adapted to support the latch and associated parts, not illustrated.

The longer carriage 6—7—8 is provided with a brake gear acting on a rail 2. This gear (Figs. 2A, 1A and 3) comprises a pair of jaws 24 pivoted at 25 on the next member 8 and adapted to clamp the rail 2; jaws 24 are operated by a wedge 26 carried by an arm 27 keyed on a shaft 28 (Fig. 2A) rotatably supported by member 8. Shaft 28 also carries a bifurcated lever 29 in mesh with a pin 30 fixed to a slide 31 vertically movable along a guide 32 fixed to the next member 5, i. e. to the smaller carriage. Slide 31 is operated by a rod 33 pivoted on pin 30 and driven by an eccentric 34 keyed on the above-described shaft 21. Of course slide 31 is provided with an elongated opening 35 to accommodate shaft 21.

The lower part of slide 31 is provided with a wedge-shaped tail 36 which fits into a corresponding recess 37 cut into member 8.

When the printing frame is applied to the fabric (Fig. 2A) slide 31 is at its upper position. Tail 36 is well above recess 37 and lever 29 has been raised while arm 27 has been lowered; wedge 26 clamps jaws 24 against rail 2. The two carriages 3—4—5 and 6—7—8 are independent from each other, the smaller one 3—4—5 being retained in position by its latch while the longer one 6—7—8 is secured by the action of jaws 24. When the printing operation is ended, the operator lowers handle 22 (Fig. 7). The printing frame is raised from the table by arm 20, rod 18, carriages 13 and bar 12. Lever 29 is lowered and arm 27 is raised; jaws 24 are thus released. Tail 36 fits into recess 37 and therefore both carriages are connected with one another thus forming a single unit which may be moved at will along the table.

The longer carriage 6—7—8 carries the scraper driving gear. The scraper proper is in the form of a plate 38 (Figs. 2B and 4) carried by a holder 39 in which it is clamped for instance by wedges. Holder 39 is loose on a transverse shaft 40 fixed to an intermediate plate 41 provided with two depending lugs 42 which receive screws 43 adapted to form adjustable abutments limiting the angular freedom of support 39. Plate 41 is itself supported by a longitudinal shaft 44 loose in a bearing 45 carried at the lower end of a vertical bar 46. The latter slides vertically in a driving carriage 47 which slides horizontally along longitudinal rods 48 and 49. As clearly shown, carriage 47 has two sleeves 50 adapted to slide on the lower rod 48 and there is provided on the upper bar 49 a third guiding sleeve 51 having a vertical tail 52 slidable through a guide 53 fixed to carriage 47. This arrangement ensures a perfect guiding of carriage 47 while making up for any possible lack of parallelism between rods 48 and 49. The latter are preferably tubular as illustrated.

Bar 46 carries a pin 54 projecting through an elongated opening 55 provided in carriage 47 and there is mounted on pin 54 a loose roller 56. Carriage 47 also carries two horizontally projecting pins 57 provided with loose rollers 58. And the downward movement of bar 56 is limited by a screw 59.

Carriage 47 also supports two abutting arms 60 pivoted on small slides 61 longitudinally adjustable by means of screws 62 passing through elongated openings 63. These arms are returned to the position shown in Fig. 2B by springs 64 as will be explained below. There is also provided on carriage 47 an abutment 65 supported by a rod 66 engaged into a tube 67 where it may be retained at three different positions by means of a pin driven through holes 68. Tube 67 is fixed at 69 by screws 70.

Rods 48 and 49 are fixed at one end to a rigid member 71 (Figs. 2C and 6) loose on a transverse rod 72 carried by supports 73 fixed on the transverse tube 7 of carriage 6—7—8. At the other end of the machine (Figs. 2A and 3) rods 48 and 49 are fixed to a base 74 which is itself fixed by a horizontal screw 75 to a support 76 clamped on the other transverse tube 7 of carriage 6—7—8. It is clear that by unscrewing screw 75 rods 48 and 49 and the parts associated therewith, including the scraper, may be raised by pivoting about rod 72 thus leaving free access to the printing frame.

The scraper driving carriage 47 is driven by an endless chain 77 (Figs. 1A, 1B, 1C, 2A, 2B and 2C) running on sprocket wheels 78 and 79. The first one (Fig. 2A) is loose on its shaft 80 carried by a bracket 81 clamped on rod 49. Sprocket 79 (Fig. 2C) is keyed on a shaft 82 also supported by a bracket 83 clamped on rod

49. Shaft 82 carries a pulley 84 (Figs. 2C and 5) which is driven by a belt from a driving pulley 85 (Figs. 2C and 6). The latter is connected, by means of a clutch, with a pulley 86 driven by an electromotor 87 carried by the longer carriage 6—7—8. It will be noted that pulleys 85 and 86 are co-axial to rod 72 which forms the pivot of the scraper gear; the transmission is therefore unaffected by the raising or lowering of rods 48 and 49.

Chain 77 carries a lateral projection 89 (Figs. 1C and 2C) adapted for co-operation with the above-described abutting arms 60 of the scraper driving carriage. It will be noted that projection 89 is normally engaged with an arm 60, the position illustrated being shown for the sake of clearness only. Projection 89 is provided with a circular groove adapted to receive the notched ends of arms 60. Starting from the position of Fig. 2C, projection 89 running to the left will push the upper arm 60 (Fig. 2B) and will therefore bring carriage 47 to the left. Projection 89 then passes on sprocket 78 (Fig. 8) lowering arm 60 about its pivot 90 against spring 64. Then it becomes disengaged and arm 60 is returned by spring 64 to its normal position determined by an abutment 91. Projection 89 then runs towards the right and cooperates with the lower arm 60 to return carriage 47 to the right end of the machine, and so on, the scraper thus being reciprocated on the printing frame.

When the scraper slides on the stencil it accumulates a more or less pasty mass of dye in front of itself and when its movement is reversed it is necessary that this mass be again spread on the stencil. This is obtained in the machine described by raising the scraper before the end of the stroke and then lowering it again when the stroke is ended. Brackets 81 and 83 (Figs. 2A and 2C) support rods 92 adjustably fixed in position by set screws 93 and each rod 92 carries a member 94 which is shown in section in Fig. 9, such member comprising a wedge-shaped head at the end of rod 92 and a laterally extending wing of triangular shape, which is particularly apparent in the plan view (Figs. 1A and 1C). A horizontal pin 95 is fixed to the wing of member 94 and pivotally supports a deflectable blade 96 normally resting against an abutting finger 97.

When the scraper reaches the end of its leftward stroke (for instance) the above-described rollers 58 pass under the horizontal side of the wing of member 94 (Fig. 9) while roller 58 runs up on the inclined blade 96 (Fig. 9) By considering Fig. 2B it will easily be understood that bar 46 is raised, whereby the scraper plate 38 clears the stencil (positions 56' and 56''). When roller 56 is beyond pin 95 it falls onto the head of member 94 (position 56''') and then returns to its normal level (position 56'''') the scraper then being again in contact with the stencil. It will be readily understood that the scraper thus passes over the mass of dye during the end of its leftward stroke and then resumes its normal position when its motion is reversed, thus pushing to the right the mass of dye which is again spread on the stencil. Blade 96 is of course raised by roller 56 during its rightward stroke.

Fig. 10 shows a modified construction in which instead of blade 96 there is used a bell-crank lever 98 which is rocked by roller 56 (position 56''). Member 94 has a recess which is reached by roller 56 (position 56''') when it terminates its leftward stroke beyond lever 98, the latter resuming its position. During the rightward stroke roller 56 therefore passes below lever 98 (position 56'''') which operates as a frog.

It will be readily understood that the devices of Fig. 9 or 10 operate as a wedge between rollers 56 and 58, the latter projecting beyond the former (Fig. 4) to come into contact with the triangular wing of member 94.

The machine comprises a mechanism for automatically controlling the movement of the scraper, i. e. for ensuring a determined number of strokes thereof. The electromotor 87 is not stopped and the control is effected by means of the clutch arranged between pulleys 85 and 86 (Figs. 1C and 6). Pulley 85 is keyed on an inner shaft 99, shown in cross-section in Figs. 11 and 12 and pulley 86 is in one with a sleeve 100 (Fig. 6) loose on shaft 99 (Figs. 11 and 12). Pulley 86 and sleeve 100 therefore rotate continuously. Shaft 99 houses a rotatable key 101 Figs. 11 and 12) which may either remain wholly housed in its groove without projecting from the outer periphery of shaft 99 (Fig. 12), or penetrate into one of a number of grooves 102 internally provided on sleeve 100 (Fig. 11). Key 101 is operated by a radially projecting finger 103 submitted to the action of a spring 104 tending to bring the key to the position of Fig. 11. This type of clutch is well-known in presses and the like and need not be further described.

The parts being in the position shown in Fig. 11, the declutching is ensured by a finger 105 carried by a shaft 106 rotatably supported by a support 107 clamped on rod 48. As shown in Fig. 5, this supporting member 107 is bifurcated, finger 105 being disposed between the two branches thereof. There is keyed on shaft 106 a ratchet wheel 108 (Fig. 11) carrying a pivoted lug 109 submitted to the action of a pressure spring 110 guided by a rod 111 fixed to a base 112 pivoted on an extension of member 107. Rod 111 carries an abutment 113 limiting the stroke of lug 109. Wheel 108 is retained against the action of spring 110 by a pawl 114 pivoted at 115 and pressed into engagement by a spring 116. There is also loosely mounted on shaft 106 a lever 117 carrying an actuating pawl 118 pivoted at 119 and pressed into engagement with wheel 108 by a spring 120. Lever 117 is returned by a spring 121 having its end fixed at 122, this movement being limited by an abutment 223.

Lever 117 is actuated by the above-described abutment 65 carried by the scraper-driving carriage 47 (see Fig. 2B). At the end of each rightward stroke lever 117 therefore rotates wheel 108 and shaft 106 for a given angle, until finger 105 is brought on the path of the rotating finger 103 (position of Fig. 12) when the clutch is disengaged. The angle through which lever 117 is oscillated at each stroke of the scraper, is adjusted at will by varying the position of rod 66 within tube 67 (Fig. 11). In the example illustrated three holes are provided transversely of tube 67; when the pin which connects tube 67 and rod 66 is disposed in the first hole, lever 117 is rocked to the position shown by axis P in Fig. 11 and the scraper is run three times over the stencil; with the second hole the angle of oscillation reaches axis Q and the scraper is run twice; with the third hole the angle reaches axis R and the scraper is just run one single time (i. e. from right to left and then from left to right). In Fig. 12 abutment 65 has been adjusted for the greatest angle.

To return wheel 108 and finger 105 there is provided a member 123 loose on shaft 106.

Member 123 carries two stops 124 cooperating with the projecting end of pivot 115 to limit the angle of oscillation. A spring 125, attached to pivot 115 acts on a pulley 126 in one with member 123 thus tending to rotate the same anticlockwise. Member 123 carries a screen 127 projecting over the teeth of wheel 108; this screen is normally behind pawl 118 (in a clockwise direction). Member 123 also carries a pin 128 projecting over wheel 108 behind pawl 114. When member 123 is rotated clockwise against spring 125, screen 127 raises and disengages pawl 118 at any point of the stroke thereof, while pin 128 disengages pawl 114. Wheel 108 is then returned by spring 110 together with finger 103.

There is also provided on member 123 a nose 129 which may be retained by a lever 130 pivoted at 121, the said lever being controlled by a rod 132 attached to the free end of a bell-crank lever actuated by the frame-raising mechanism. In Fig. 2A this lever is diagrammatically shown at 134 its pivot being 133. It is connected with pin 30. When the printing frame is applied to the fabric, pin 30 is raised and therefore rod 132 is pulled whereby lever 130 frees nose 129. Member 124 may be operated. But when the printing frame is raised nose 129 is retained by lever 130 and it is impossible to actuate member 123 to re-engage the clutch. Thus the operator is not liable to start the scraper when the frame is raised, which would be damageable for the stencil.

The actuation of member 123 is effected through a hand-wheel 135 (Fig. 5), supposedly suppressed in Fig. 2C, this hand-wheel being connected with the said member 123 by a hollow sleeve 136 (Figs. 11 and 12) loose on shaft 106.

The working is as follows:

Handle 22 being lowered, the printing frame is raised clear from the table; the two carriages 3—4—5 and 6—7—8 form a unit free to move along the table; the clutch between pulleys 85 and 86 is disengaged and keyed at this position by lever 130.

The operator brings the unit to a given position and locks the smaller carriage 3—4—5 by means of the usual latch and detents. He then raises handle 22; the printing frame is thus applied to the fabric and the carriages 3—4—5 and 6—7—8 become independent from each other, the latter being clamped on rail 2 by means of jaws 24; lever 130 releases nose 129.

The operator then actuates hand-wheel 135, which starts the scraper gear. The printing is thus regularly effected and the scraper stops after the appropriate number of strokes. The reactions of the scraper driving gear are supported by carriage 6—7—8 and do not affect carriage 3—4—5; the printing frame is not liable to move on the table even at high speeds or when the dye is viscous.

When the operation is ended, the operator actuates handle 22 and the carriages again form a unit free to be moved to the next printing position along the table.

The machine requires only one attendant, even with large printing frames, and the printing is always satisfactory, even with unskilled labour.

When it is desired to change or repair the printing frame or the scraper, rods 48 and 49 are easily raised.

Fig. 13 diagrammatically indicates a modified mounting of the printing frame. Frame 210 is provided with four lugs 137, 138, 139 and 140. The first one merely rests on a transverse rod 141 carried by arms 142 fixed by screws 143 to collars 144 clamped on tubes 3; the second lug 138 rests between pins 145 on a sleeve 146 adjustable on rod 141; lug 139 rests on a transverse rod 147 while the fourth lug 140 has a hole which is centered on a pin carried by a sleeve 148 adjustable along rod 147. This arrangement permits of adjusting at will the height of the fixed rod 141 and the position of the printing frame. Rod 147 is of course secured to the movable carriages 13 of Fig. 2A in lieu of bar 12.

Fig. 14 indicates a modified construction of the scraper driving carriage. The latter is guided by square rods 149 and 150, as shown in Figs. 18 and 19. The lower rod 150 is arranged with two opposed edges in the same vertical plane and it is comprised between two pairs of grooved rollers 151 having horizontal axes; each pair is carried by a support 152 (Fig. 19) adjustably fixed by a screw or bolt 153. Rod 149 only serves as a guide and its vertical faces are comprised between two cylindrical rollers 154 having vertical axes, this pair of rollers also being supported by a support 155 adjustably fixed by a central screw or bolt 156 (Fig. 18).

The carriage 47 (Fig. 14) slidably supports a longitudinal bar 157 carrying at both ends abutments 159 which project laterally so as to cooperate with projection 89 respectively during the leftward and rightward strokes thereof. In order to minimize the strain due to the sudden impact of projection 89 against an abutment 159, bar 157 is provided with gudgeons 162 (Fig. 20) of wood, leather or the like, strongly pressed against carriage 47 by springs 163 to form a sort of brake. The freedom of bar 157 is besides limited by shoulders 160 (Fig. 14) provided with a layer of rubber 161.

As in the case of Fig. 2B, carriage 47 slidably supports a vertical bar 46 carrying the scraper holder 39 with the scraper proper 38. The scraper holder 39 is here longitudinally pivoted at 164 on an intermediate member 165 which is transversely pivoted at 166 on bar 46, the angle of oscillation of the said member 165 being limited by a fork 167 and a pin 168. The latter has a circular head 169 (Figs. 16 and 17) but it is flat in cross-section in such a manner that by appropriately adjusting its angular position it may be possible to adjust the angle of oscillation of member 165 and of the scraper.

Projection 89 may be constructed as illustrated Fig. 15, with a hub 170 and a rim 171 assembled together by means of an annular mass 172 of rubber.

The arrangement ensuring the spreading of the dye accumulated in front of the scraper may be modified as follows.

The scraper is raised and lowered regularly at the end of each stroke by a wedge 273 (Fig. 21) without any particular device. On the other hand there is disposed within the printing frame 210 (Fig. 22) an auxiliary frame 173 resting on the stencil; this frame is somewhat smaller in length than frame 210.

At the end of its leftward stroke, for instance, the scraper pushes frame 173 to the left and it is then raised by wedge 273. The scraper driving carriage suddenly stops and starts in the reverse direction; owing to its inertia the scraper oscillates about its transverse articulation and its edge contacts the stencil beyond the accumulated mass of dye which is again spread over the stencil. At the end of its rightward stroke the scraper will push frame 173 to the right and the mass of dye

which might have escaped to the action of the scraper at the left end of the printing frame is somewhat displaced toward the right, which avoids an accumulation of dye against the sides of the printing frame.

It may be of advantage in some cases to clamp the longer carriage 6—7—8 on both rails 2. This may be obtained, as indicated in Fig. 24, by extending shaft 28 through the full width of the table; the end of the said shaft carries a crank 174 actuating a rod 175 which clamps a shoe 176 against the lower face of rail 2. There is also provided a light spring 177 to retain shoe 176 in position with only a small friction.

Fig. 25 shows a modification of the control means of the clutch between pulleys 85 and 86 (Fig. 6). It has been explained with reference to Figs. 11 and 12 that this control was effected by a handwheel keyed on a hollow shaft 136. This handwheel may be suppressed and shaft 136 may carry an arm 178 to which is attached a rod 179 extending along the machine and terminating in a guide provided with a slidable bolt 180 driven by an arm 181 keyed on the above-described shaft 28 (see Fig. 2A). When handle 22 is actuated, bolt 180 shows a hole in front of rod 179 and the latter may be moved by the operator, but when the carriages are free along the table, bolt 180 prevents any actuation of rod 179.

A spring 182 is provided to return rod 179 to its normal position.

Figs. 26 to 30 show a further modification of the scraper gear which derives from the arrangement described with reference to Figs. 21 to 23, the oscillation of the scraper being positively obtained by friction.

The scraper holder comprises a base 183 (Fig. 30) which is clamped between two jaws 184 by means of a flynut 185. Jaws 184 are carried by an intermediate support 186 transversely pivoted at 187 on the lower end of bar 46. There is provided on bar 46 a lever 189 pivoted at 190 and having its lower end in the form of a fork 191 in engagement with a pin 192 projecting from the tail of support 186. The angular motion of the latter is limited by an abutting pin 193 traversing an opening 194. The upper end of lever 189 is formed of two branches elastically pressed against one another and preferably coated with leather, fiber or the like.

At each end of the machine there is provided a blade 195 pivoted at 196 on the fixed parts (members 71 and 74) and retained against an abutment 198 by a spring 197.

The scraper is normally oblique, as shown in Fig. 27, owing to the friction against the stencil. At the end of its leftward stroke the scraper is raised by a wedge member 188, as in the case of Fig. 21, while blade 195 penetrates between the two branches of lever 189 tending to rock the same by friction; the scraper is thus retained at its oblique position (Fig. 28). When the movement of the scraper driving carriage is reversed, lever 189 is frictionally retained by blade 195 and is therefore oscillated anticlockwise while the scraper is oscillated clockwise, its scraping edge coming into contact with the stencil beyond the accumulated mass of dye.

Fig. 29 diagrammatically shows a number of positions of the mechanism. It will be seen that the edge of the scraper follows from right to left the path 199. The direction of the movement is then reversed and the scraper is progressively rocked, pin 192 moving in the direction of arrow 200, while bar 46 is progressively lowered. The scraping edge then follows almost a vertical line and comes down right into the angle of the printing frame. The mass of dye accumulated below line 199 is thus taken again and pushed over the stencil.

I claim:

1. A machine for printing designs on fabrics or the like comprising in combination a table whereon the fabric is fixed in a stretched condition; rails on both longitudinal sides of said table; a carriage guided and supported by said rails; means to stop said main carriage at a number of positions along said table; a perforated printing surface carried by said main carriage; means on said main carriage to lower said perforated printing surface on said table and to raise it therefrom; a dye scraper adapted to spread dye on said perforated printing surface; a scraper-driving carriage adapted to reciprocate said dye scraper across said perforated printing surface; guiding means on said main carriage for said scraper-driving carriage; driving means on said main carriage to reciprocate said scraper-driving carriage; and a pivotal connection between said scraper and said scraper-driving carriage, said connection being longitudinally disposed with respect to said guiding means for permitting self transverse adjustment of said scraper on said perforated printing surface.

2. In a machine as claimed in claim 1, means to clamp the main carriage on its guiding and supporting rails, said means being actuated by the same controlling member as the means to lower and raise said perforated printing surface.

3. In a machine as claimed in claim 1, said means to lower and raise the perforated printing surface comprising a frame on which said perforated printing surface is stretched; means to pivot said frame along one side thereof on said main carriage; a bar on which the opposed side of said frame is adapted to rest; slidable carriages fixed at both ends of said bar; substantially vertical guides for said slidable carriages; a shaft rotatably carried by said slidable carriages; a rack associated with each one of said substantially vertical guides; pinions keyed on said shaft and in engagement with said rack; and means to lower and raise one of said slidable carriages.

4. A machine for printing designs on fabrics or the like comprising in combination a table whereon the fabric is fixed in a stretched condition; rails on both longitudinal sides of said table; a main carriage guided and supported by said rails; means to stop said main carriage at a number of positions along said table; a perforated printing surface carried by said main carriage; a frame on which said perforated printing surface is stretched; means to pivot said frame along one side thereof on said main carriage; means to lower and raise the side of said frame opposed to the pivot; a dye scraper adapted to spread dye on said perforated printing surface; means on said main carriage to guide said dye scraper across said perforated surface transversely with respect to the side along which said frame is pivoted; driving means on said main carriage to reciprocate said scraper; and automatic controlling means to stop said scraper in the immediate vicinity of the side of said frame along which said frame is pivoted, after a determined number of strokes of said scraper.

5. In a machine as claimed in claim 4, a hand-actuated controlling member to start said means to reciprocate said scraper; and means to prevent actuation of said controlling member when said perforated printing surface is raised from said table.

6. In a machine as claimed in claim 1, said guiding means comprising hinged rods raisable to permit access to said perforated printing surface.

7. A machine for printing designs on fabrics or the like comprising in combination a table whereon the fabric is fixed in a stretched condition; rails on both longitudinal sides of said table; a main carriage guided and supported by said rails; means to stop said main carriage at a number of positions along said table; a perforated printing surface carried by said main carriage; means on said main carriage to lower said perforated printing surface on said table and to raise it therefrom; a dye scraper adapted to spread dye on said perforated printing surface; a scraper driving carriage adapted to reciprocate said scraper across said perforated printing surface; a bar vertically slidable on said scraper driving carriage; guiding means on said main carriage for said scraper driving carriage; driving means on said main carriage to reciprocate said scraper driving carriage; and a pivotal connection between the lower end of said bar and said scraper, said connection being longitudinally disposed with respect to said guiding means for permitting self transverse adjustment of said scraper on said perforated printing surface.

8. In a machine as claimed in claim 1, said driving means for the scraper driving carriage comprising an endless supple member; pulleys at both ends of said main carriage for said endless member; a stop carried by said endless member; two abutments on said scraper driving carriage, said abutments being adapted for cooperation with said stop respectively when the latter moves along one and the other run of said endless member between said pulleys; and means to rotate one of said pulleys continuously in the same direction.

9. A machine for printing designs on fabrics or the like comprising in combination a table whereon the fabric is fixed in a stretched condition; rails on both longitudinal sides of said table; a first carriage guided and supported by said rails; a perforated printing surface carried by said first carriage; means on said first carriage to lower said perforated printing surface on said table and to raise it therefrom; means to stop said first carriage at a number of determined positions along said table; a second carriage guided and supported by said rails; a dye scraper adapted to spread dye on said perforated printing surface; guiding means supported by said second carriage for said dye scraper; means to clamp said second carriage along said table; and automatic driving means on said second carriage to reciprocate said scraper across said perforated printing surface.

10. In a machine as claimed in claim 9, means to connect at will said first and second carriages with each other into a single unit.

11. In a machine as claimed in claim 9, means to connect at will said first and second carriages with each other into a single unit, said connecting means, said clamping means for said second carriage and said means to lower and raise said perforated printing surface being controlled in combination by a single common hand-actuated control member.

12. In a machine as claimed in claim 9 said first and second carriages being made of rectangular frames, the longitudinal sides of said second carriage passing with play through the longitudinal tubular sides of said first carriage.

13. A machine for printing designs on fabrics or the like comprising in combination a table whereon the fabric is fixed in a stretched condition; rails on both longitudinal sides of said table; a main carriage guided and supported by said rails; means to stop said main carriage at a number of positions along said table; a perforated printing surface carried by said main carriage; means on said main carriage to lower said perforated printing surface on said table and to raise it therefrom; a scraper driving carriage; a bar vertically slidable on said scraper driving carriage; guiding means on said main carriage for said scraper driving carriage; a dye scraper pivoted at the lower end of said bar along an axis perpendicular to said guiding means, the angle of rotation being limited by abutments, said scraper being adapted to spread dye on said perforated printing surface; a roller projecting laterally from said bar; a wedge-shaped member supported by said main carriage at the end of each stroke of said scraper driving carriage, said member being adapted for cooperation with said projecting roller to raise said dye scraper from said perforated printing surface; friction means to rock said scraper toward the next side of said perforated printing surface during the beginning of the next stroke; and means on said main carriage to reciprocate said scraper driving carriage.

14. In a machine as claimed in claim 13, said friction means comprising a lever pivoted on said vertically slidable bar and connected with said scraper so as to oscillate in opposite direction with respect thereto; and a fixed blade coming into frictional engagement with said lever at the end of each stroke of said scraper driving carriage.

CLAUDIUS MASSON.