

Aug. 12, 1952

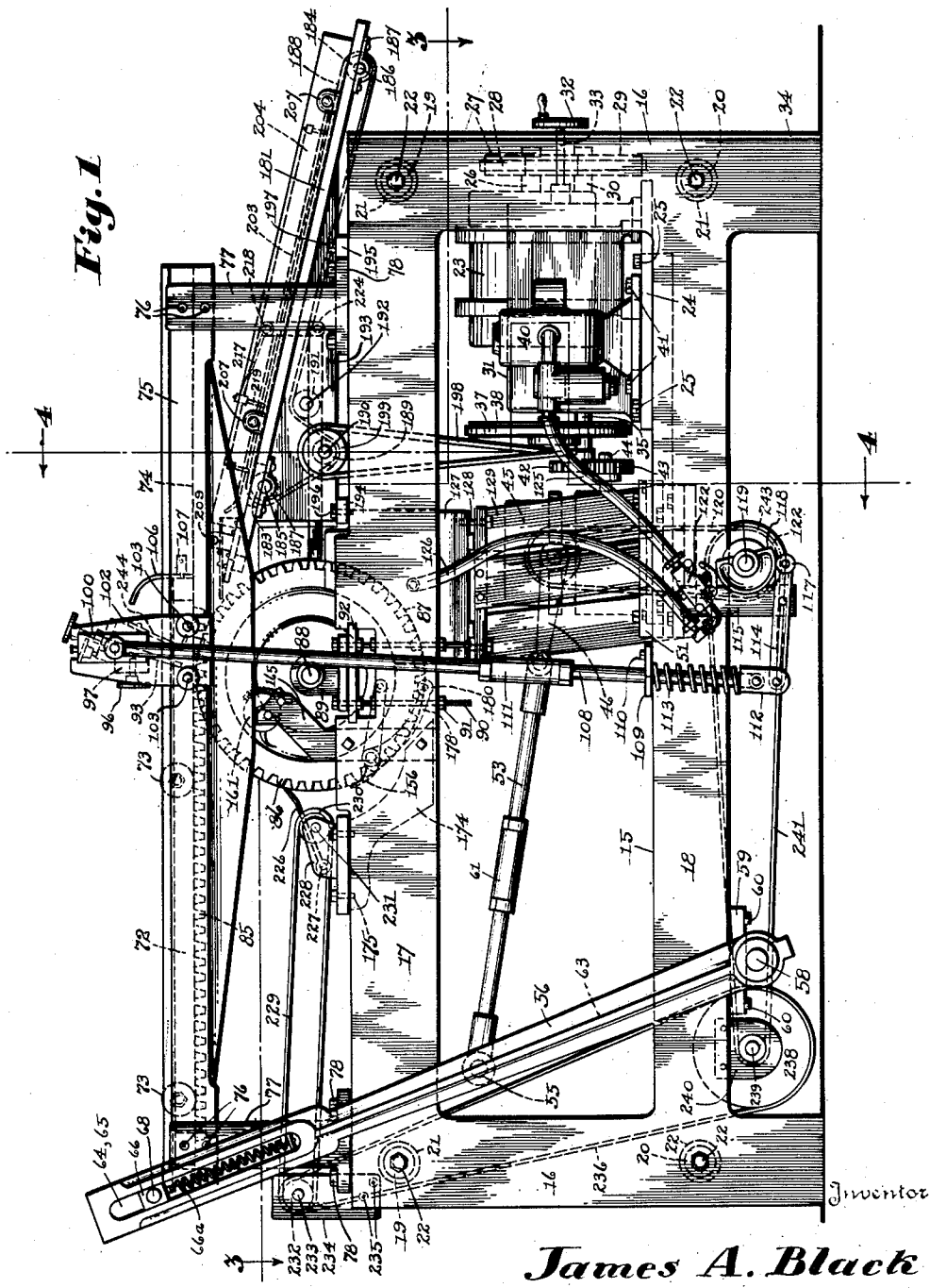
J. A. BLACK

2,606,492

SILK SCREEN STENCILING MACHINE

Filed June 12, 1948

8 Sheets-Sheet 1



James A. Black

ਵਿਅੰਸ਼

John S. Braddock

Attorney

Aug. 12, 1952

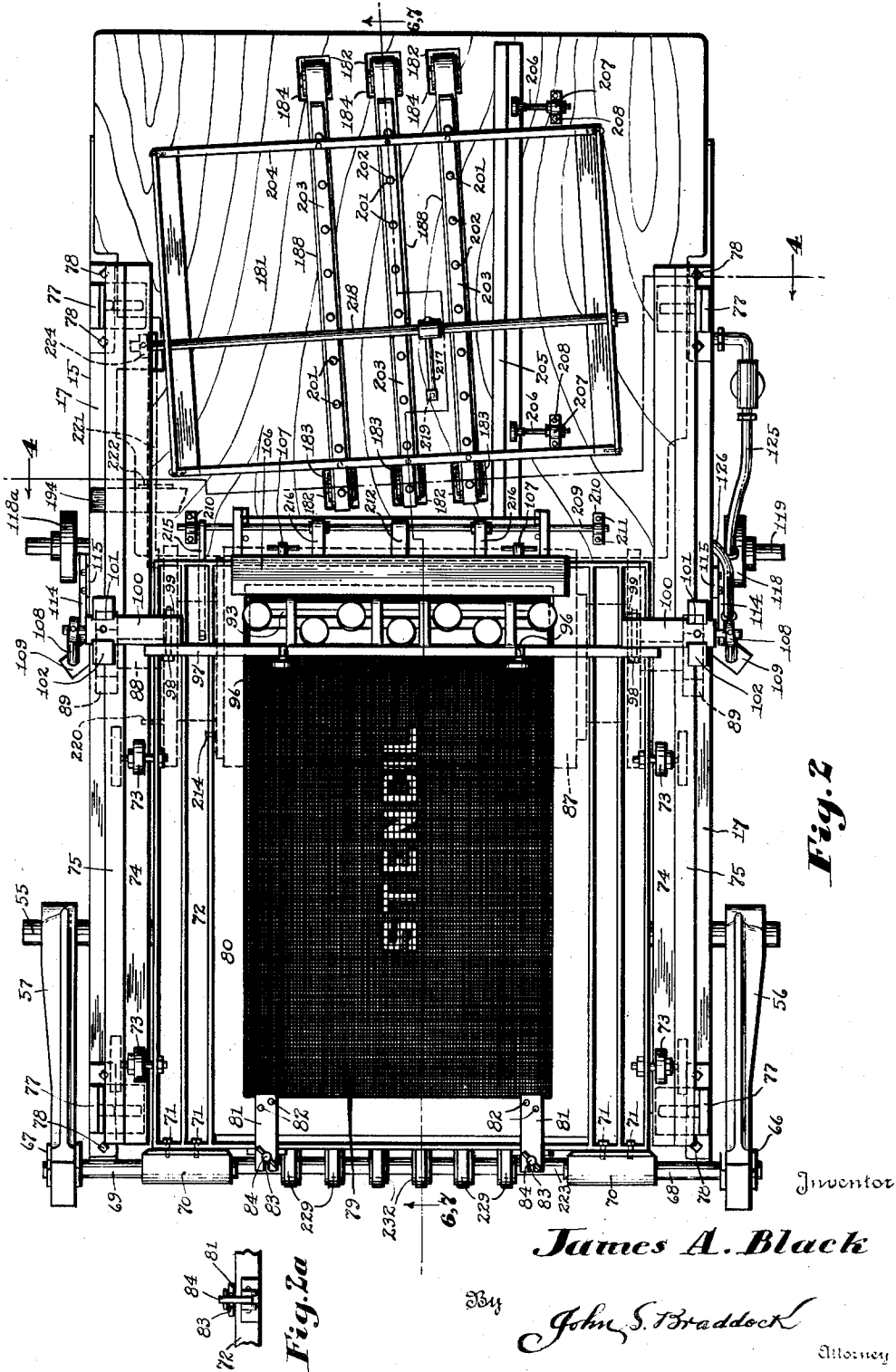
J. A. BLACK

2,606,492

SILK SCREEN STENCILING MACHINE

Filed June 12, 1948

8 Sheets-Sheet 2



Aug. 12, 1952

J. A. BLACK

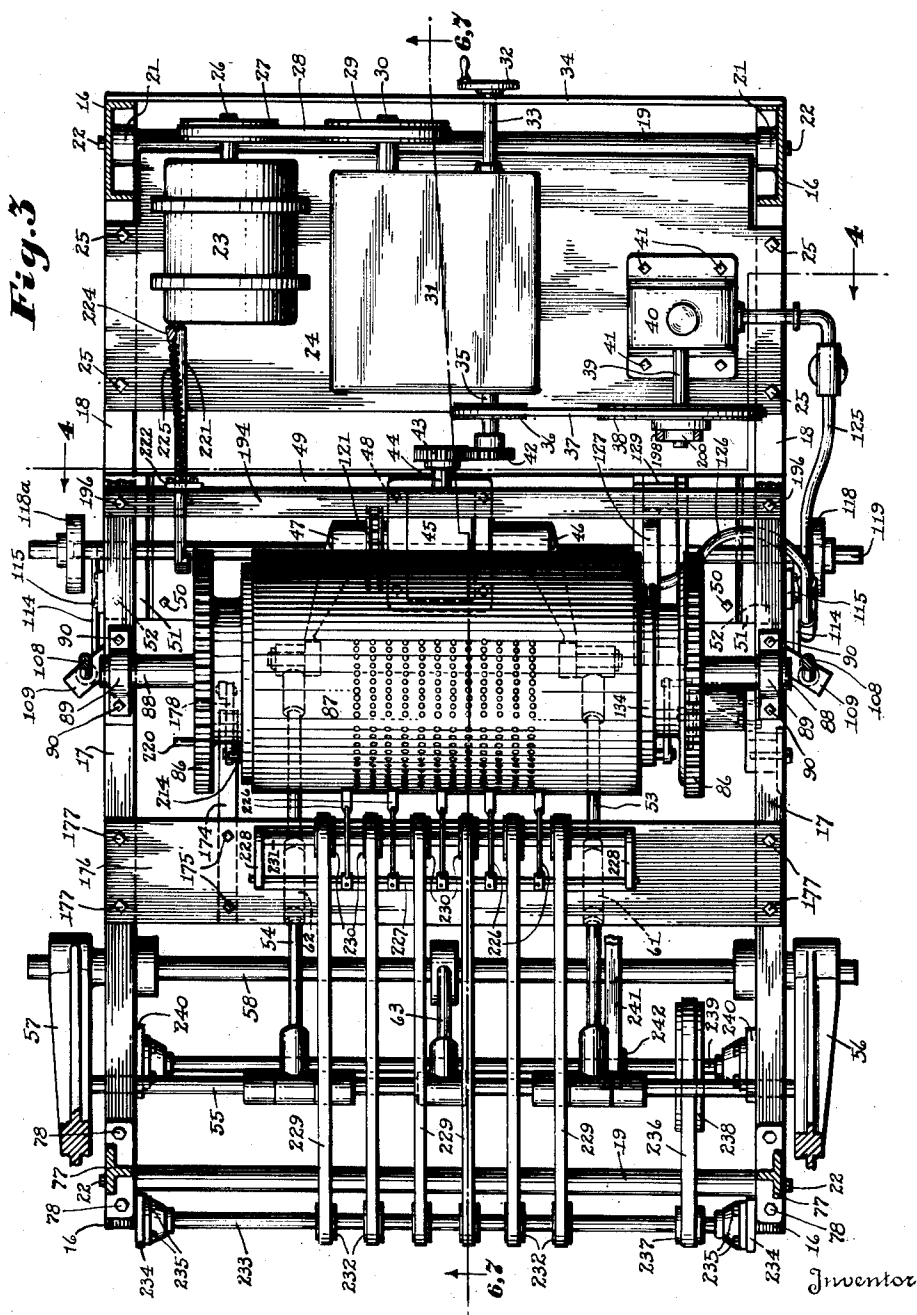
2,606,492

SILK SCREEN STENCILING MACHINE

Filed June 12, 1948

8 Sheets-Sheet 3

Fig. 3



James A. Black

By

John S. Braddock

Attorney

Aug. 12, 1952

J. A. BLACK

2,606,492

SILK SCREEN STENCILING MACHINE

Filed June 12, 1948

8 Sheets-Sheet 4

Fig. 4

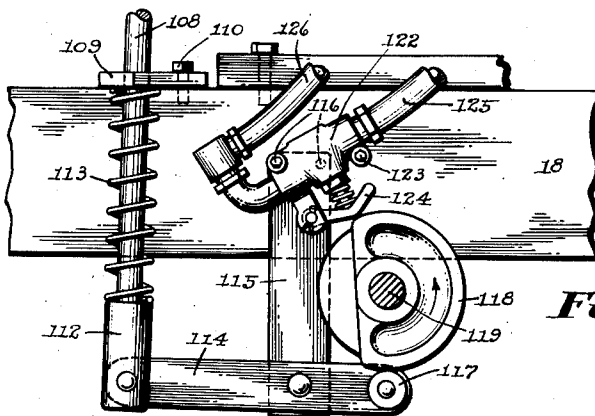
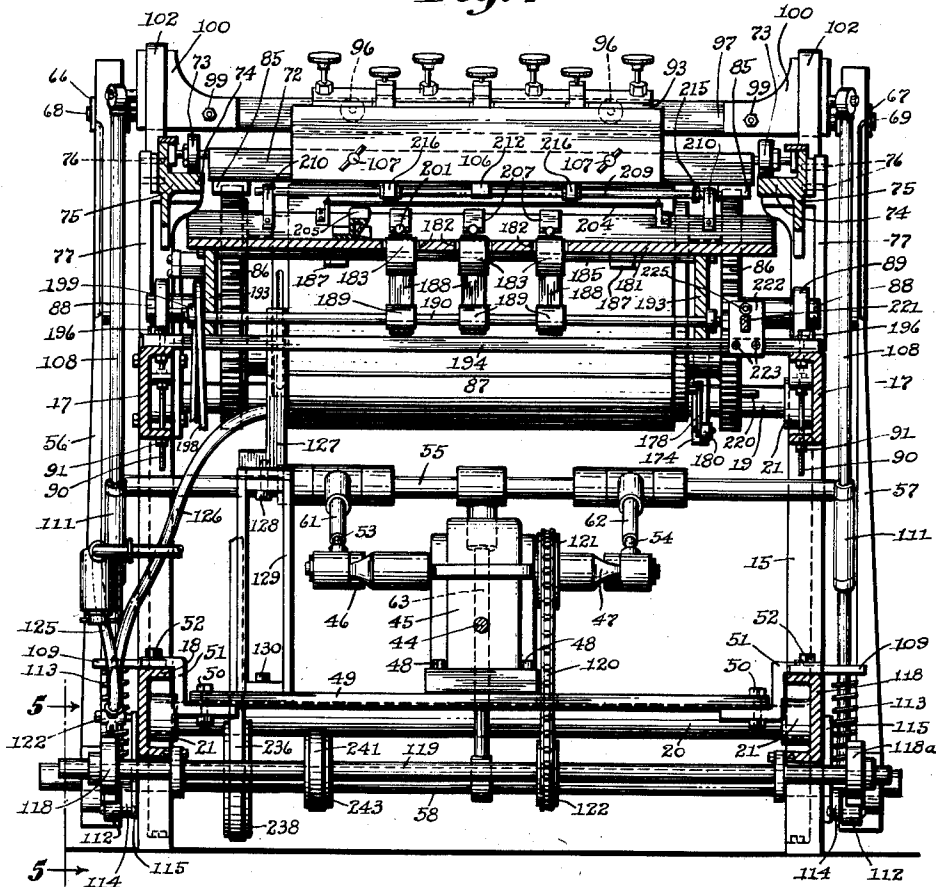


Fig. 5

Inventor

James A. Black

By *John S. Braddock*

Attorney

Aug. 12, 1952

J. A. BLACK

2,606,492

SILK SCREEN STENCILING MACHINE

Filed June 12, 1948

8 Sheets-Sheet 5

Fig. 6

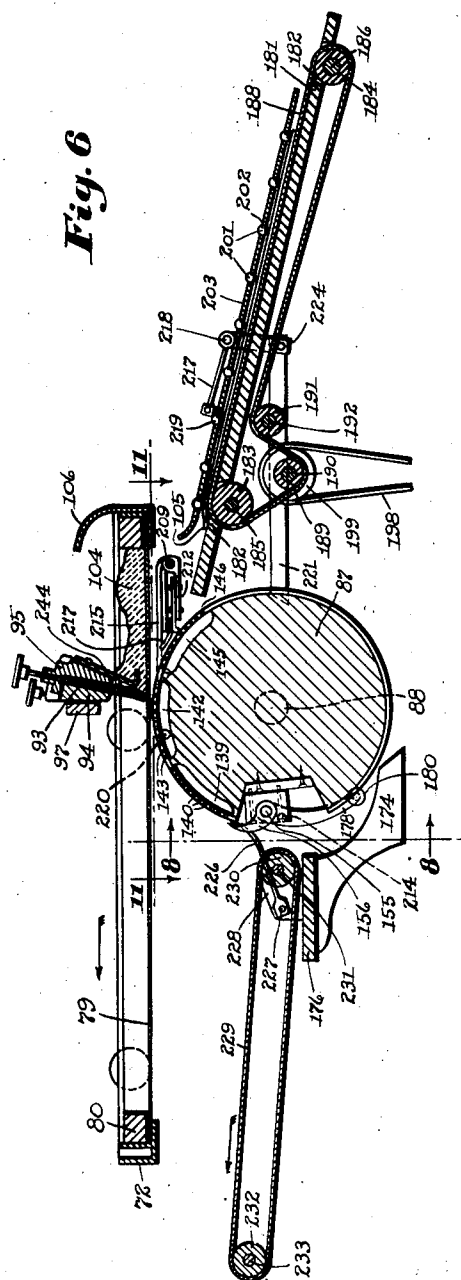
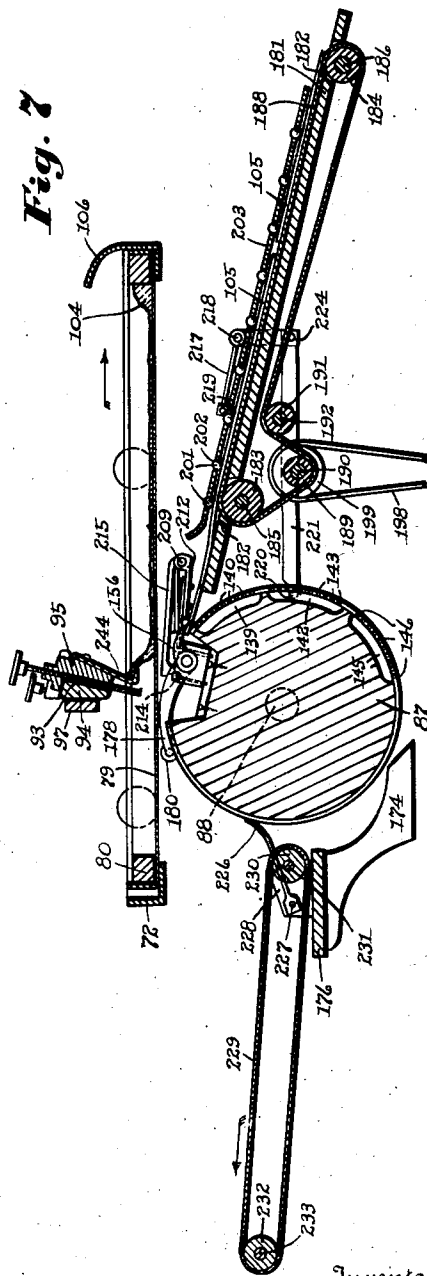


Fig. 7



Inventor

James A. Black

334

John S. Braddock

Attorney

Aug. 12, 1952

J. A. BLACK

2,606,492

SILK SCREEN STENCILING MACHINE

Filed June 12, 1948

8 Sheets-Sheet 7

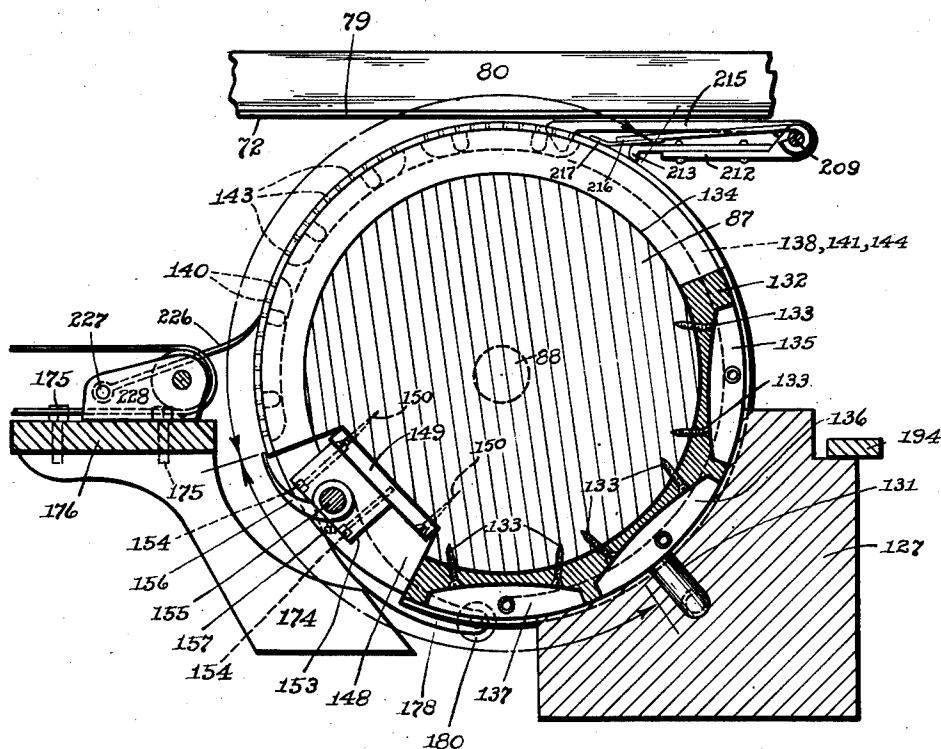


Fig. 10

Inventor

James A. Black

By *John S. Braddock*

Attorney

Aug. 12, 1952

J. A. BLACK

2,606,492

SILK SCREEN STENCILING MACHINE

Filed June 12, 1948

8 Sheets-Sheet 8

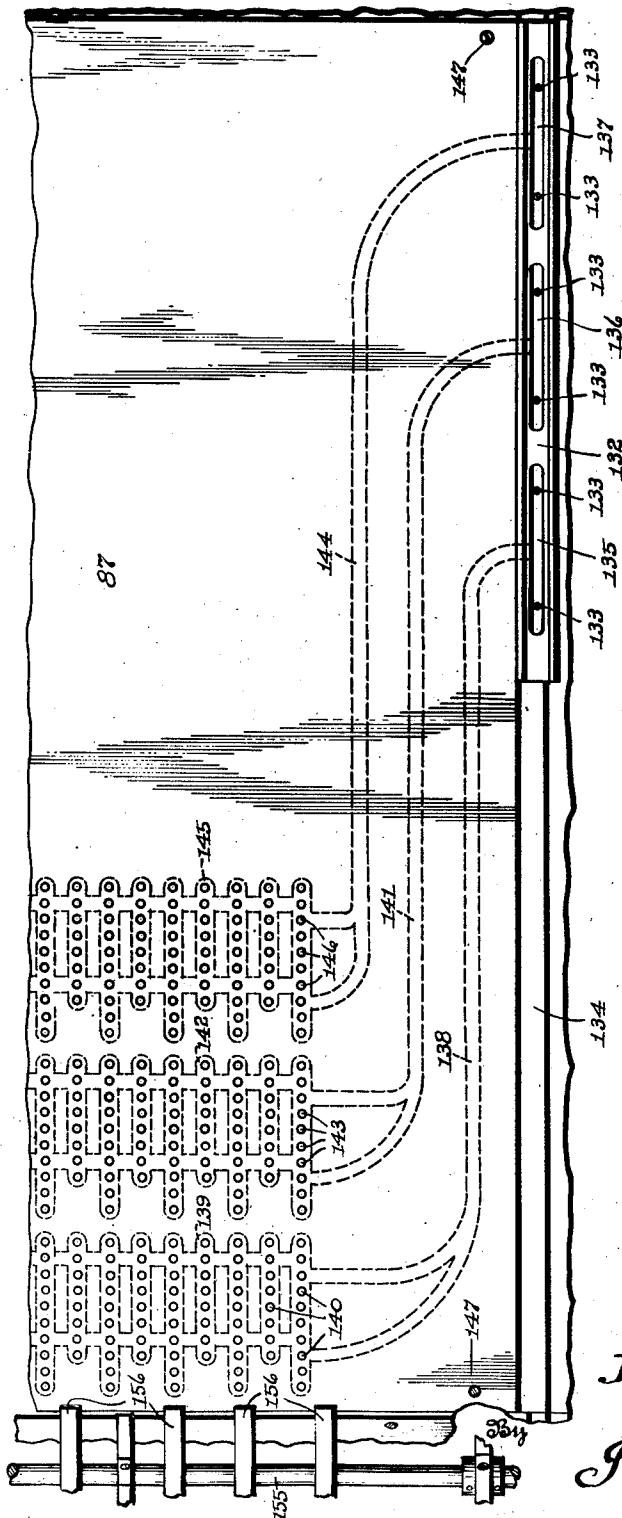


Fig. 11

Inventor

James A. Black

John S. Braddock

Attorney

UNITED STATES PATENT OFFICE

2,606,492

SILK SCREEN STENCILING MACHINE

James A. Black, Kent, Mich.

Application June 12, 1948, Serial No. 32,559

7 Claims. (Cl. 101—124)

1

The present invention relates to a silk screen stencilling machine, by means of which pigment paints, varnishes, shellacs, adhesives and other viscous or glutinous coating materials may be forced through a silk screen stencil onto flexible sheets of paper or other material for making posters, signs, decalcomanias or the like.

The primary objects of the invention are to provide a fully automatic machine of the type indicated, which is especially adapted for printing or otherwise processing with a coating material, successive flexible sheets; to provide such a machine which will operate at high speed and at the same time insure accurate positioning of the coating material on each sheet processed; to provide such a machine which is particularly well adapted to the production of multi-coated sheets, such as decalcomanias or multi-colored posters, wherein each coating or color must be in perfect registry with the other coatings or colors; to provide such a machine in which the sheets are supported beneath the processing means on a rotary platen or drum; to provide such a machine which is especially well adapted for coating flexible sheets by the silk screen stencil printing process, and wherein the movement of the sheets through the machine is perfectly coordinated with movement of the silk screen stencil so that a perfect image is obtained; to provide such a machine in which the sheets being processed are in contact with the silk screen stencil only at the actual point or area of processing, thus to prevent any smearing of the sheets, said results being accomplished by the co-ordinated movements of the stencil and the supporting drum for the sheets in such a manner that the sheets are rapidly advanced toward the stencil at a point where a fixed squeegee will force the coating material through the stencil onto the sheets, and in such a manner that the sheets are thereafter rapidly withdrawn from the stencil; to provide novel and effective means for feeding each sheet to be processed to the stock-supporting drum, novel and effective means for maintaining each sheet fast on the surface of the drum at the point of processing, novel and effective means for releasing each sheet from the surface of the drum after processing, and novel and effective means for stripping each processed sheet off the drum; to provide such a machine in which the squeegee for forcing the coating material through the silk screen stencil is moved into contact with the stencil for the print stroke, and out of contact with the stencil for the non-print stroke; and in general to provide such a ma-

2

chine which is smooth and efficient in operation, economical in construction, operation and maintenance, and operable by a single operator.

These objects are attained by, and the invention finds preferable embodiment in the structure hereinafter described in detail and illustrated by the accompanying drawings, wherein:

Figure 1 is a side elevational view of the machine, certain moving parts thereof being shown in the positions which they occupy just prior to a non-print stroke of the machine;

Figure 2 is a top plan view of the same;

Figure 2a is a fragmentary end elevational view of fastening means for securing the stencil frame in the stencil carriage of the machine;

Figure 3 is a horizontal sectional view of the machine taken on line 3—3 of Figure 1;

Figure 4 is a vertical sectional view of the same taken on lines 4—4 of Figures 1, 2 and 3;

Figure 5 is an enlarged fragmentary view of certain parts of the machine, shown principally in side elevation and with a driving shaft thereof shown in vertical section taken on line 5—5 of Figure 4;

Figure 6 is a diagrammatic view showing certain moving parts of the machine in vertical section taken on lines 6—6 of Figures 2 and 3, said parts being shown in positions which they occupy intermediate the beginning and the end of a print stroke of the machine;

Figure 7 is a diagrammatic view showing the same parts of the machine in similar vertical section on lines 7—7 of Figures 2 and 3, said parts being here shown in positions which they occupy intermediate the beginning and the end of a non-print stroke of the machine;

Figure 8 is an enlarged, fragmentary, elevational view of the machine's stock-supporting drum per se as viewed from the line 8—8 of Figure 6, the supporting frame of the machine being shown fragmentarily;

Figure 9 is an enlarged view of certain camming mechanism of the machine shown in vertical section taken on line 9—9 of Figure 8;

Figure 10 is an enlarged vertical sectional view of the stock-supporting drum of the machine and parts adjacent thereto, taken on line 10—10 of Figure 8; and

Figure 11 is a fragmentary view of the surface of said stock-supporting drum, developed into a plane.

Referring now in detail to these drawings wherein certain like parts are designated by the same numerals in the several views, the silk screen stencil machine there shown is mounted

3

on a frame designated 15, said frame being of generally rectangular paralleloiped formation, comprising corner posts 16, upper side rails 17 and lower side rails 18 at each of the opposite sides of the frame, connected by upper and lower cylindrical cross-rails 19 and 20 respectively having their ends mounted in bosses 21 in the corner posts 16 and secured therein by bolts 22.

The prime driving force for all of the moving parts of the machine hereinafter described, is an electric motor 23 mounted on a platform 24 which spans the space between the lower side rails 18 of the frame and which is secured to the frame by bolts 25 (see Figures 1 and 3), the motor 23 being provided with suitable electrical connections (not shown). The motor's shaft 26 has a pulley 27 which by means of a belt 28 is coupled to a pulley 29 on the drive shaft 30 of a speed regulating device 31 on the platform 24, and although the internal mechanism of this speed regulator 31 is not shown in the drawings it will be readily understood that manipulation of the hand-wheel 32 on the regulator's shaft 33 which extends through an end panel 34 on the frame of the machine, will vary the speed of the regulator's driven shaft 35 as desired, while the speed of the drive shaft 30 remains constant.

The driven shaft 35 of the speed regulator 31 carries a pulley 36 which is coupled by means of a belt 37 to a pulley 38 on the drive shaft 39 of an air exhaust pump 40 mounted by bolts 41 on the platform 24. The purpose of the air exhaust pump will hereinafter be described.

The driven shaft 35 of the speed regulator 31 is also provided with a gear 42 which meshes with a gear 43 on the drive shaft 44 of a differential mechanism 45, and the rotation of the drive shaft 44 is by this differential mechanism transmitted to crank arms 46, 47 to rotate these crank arms in a counter-clockwise direction as viewed in Figure 1. (See Figures 1, 3 and 4.) The differential mechanism 45 is mounted by means of screws 48 on a platform 49 which in turn is secured by bolts 50 to brackets 51 mounted by bolts 52 on the lower side rails 18 of the machine's frame 15. The outer ends of the crank arms 46, 47 are pivotally connected to the forward ends of connecting rods 53, 54, the rearward ends of which are pivotally connected to a horizontal cross-bar 55 the opposite ends of which are secured to rocker arms 56, 57 turnably mounted at their lower ends on the opposite ends of a cross-shaft 58 journaled in bearings 59 secured by screws 60 to the undersides of the lower rails 18 at opposite sides of the machine. The connecting rods 53 and 54 are desirably provided with turnbuckles 61, 62 in the middles thereof respectively, by means of which the length of said rods may be accurately adjusted. A strut 63 having its upper end pivotally connected to the middle of the cross-bar 55 and its lower end fixedly connected to the middle of the cross-shaft 58 is provided for adding rigidity to the structure.

The upper end portions of the rocker arms 56, 57 are provided with longitudinal keyways 64, 65 in which are disposed sliding blocks 66, 67 which are secured to the outer ends of stub shafts 68, 69 turnably journaled in bearings 70 (see Figure 2) which are secured by means of screws 71 to the opposite sides of the rearward end of a stencil carriage 72 having pairs of rollers 73 at the opposite sides thereof. These rollers 73 are movable forwardly-rearwardly on inwardly extending ways 74 formed in horizontal top rails

4

75 which are secured by screws 76 to the upper ends of posts 77 mounted by means of bolts 78 on the upper surfaces of the upper side rails 17 of the machine's frame 15. During the forward and rearward movements of the stencil carriage 72, smooth movement of the sliding blocks 66, 67 in the keyways 64, 65 is insured by the provision of tension springs 66a and 67a having their upper ends secured to the blocks 66, 67 and their lower ends secured at the bottoms of the keyways.

The stencil carriage 72 is of rigid angle iron construction, and is adapted to carry interchangeable stencils each comprising a silk screen 79 affixed to the underside of a rectangular, wooden stencil frame 80 removably mounted in the carriage 72 by means of plates 81 secured to the end of the stencil frame 80 by screws 82 and having slots 83 adapted to receive the shanks of anchor bolts 84 hingedly connected to the end of the stencil carriage (see Figures 2 and 2a).

The underside of the stencil carriage 72 is provided with gear racks 85 at the opposite sides thereof, which mesh with gears 86 at the opposite sides of a stock-supporting cylindrical platen or drum 87 which has trunnions 88 turnably mounted in bearing blocks 89 secured by bolts 90 having nuts 91 to plates 92 mounted in the upper side rails 17 of the machine's frame 15. The drum 87 is thus mounted for reciprocating rotary movements in co-ordination with reciprocating linear movements of the stencil frame 72.

The work-processing means comprises a squeegee 93 of rubber or the like vertically adjustably clamped between supporting bars 94, 95 and removably secured as by hand-screws 96 to a bar 97 having its opposite ends secured by bolts 98 having nuts 99 to blocks 100 which are vertically slidably disposed in keyways 101 in bearing members 102 mounted by screws 103 on the top rails 75 at opposite sides of the structure. The squeegee is thus mounted for vertical reciprocation into and out of engagement with the silk screen stencil 79. This movement is co-ordinated, by means hereinafter described, with the movements of the stencil carriage 72 and the drum 87, so that when the machine makes a print stroke the squeegee is in a lowered position against the stencil for forcing coating material 104 (see Figures 6 and 7) through the stencil and onto the flexible sheets of stock 105 as they are carried beneath the squeegee by the stock-supporting drum. A shield 106 mounted on the end of the stencil carriage 72 by means of hand-screws 107 prevents splashing of the coating material out of the stencil frame when the machine reaches the end of its print stroke. The mechanism whereby the squeegee is vertically reciprocated comprises a pair of substantially vertical rods 108 at opposite sides of the machine, the upper ends of which rods are pivotally connected to the blocks 100 and the lower end portions of which slidably bear in bearing plates 109 secured by screws 110 to the lower side rails 18 of the machine's frame 15. Turnbuckles 111 are incorporated in the rods 108 for accurate adjustment of the length of these rods. The extreme lower ends of the rods 108 are provided with knobs 112, and coiled compression springs 113 are interposed between the knobs 112 and the bearing plates 109 for normally urging the rods 108, and the squeegee, to a lowered position. (See Figure 5.) The knobs 112 are pivotally connected to the rearward ends of bars 114 which are pivotally mounted on depending plates 115 se-

cured by screws 116 to the lower side rails 18 of the machine's frame 15. The opposite ends of bars 114 are provided with rollers 117 which bear against the cammed surfaces of camwheels 118, 118a secured on the opposite outer ends of a cross-shaft 119 which is constantly rotated in a counter-clockwise direction as viewed in Figures 1 and 5 by means of a chain 120 passing over sprocket wheels 121 and 122 on the crankshaft 47 of the differential mechanism 45 and on the cross-shaft 119 respectively. (See Figure 4.)

The cammed surface of the camwheel 118 (on the near side of the machine as viewed in Figures 1 and 5) performs a dual function of reciprocating one of the rods 108 as hereinbefore described, and of intermittently opening and closing an air valve 122 secured by screws 116 and 123 (see Figure 5) to the adjacent lower side rail 18 of the machine's frame 15, said valve 122 having a spring-pressed operating arm 124 bearing against the camwheel 118. Suction created in the conduit or tube 125 which connects the air exhaust pump 40 to one side of the valve 122, is thus intermittently applied to the conduit or tube 126 which connects the other side of the valve 122 to a channelled block 127 secured by screws 128 to the upper end of a supporting frame 129 secured by screws 130 to the platform 49 on the machine's frame 15.

Referring now particularly to Figures 10 and 11 of the drawings, the channel 131 in the block 127 communicates with a chambered, arcuate transfer member 132 secured by screws 133 to an annular shoulder 134 at one side of the drum 87, said drum having preferably a wooden core and the screws 133 being, therefore, woodscrews. Reciprocating rotation of the drum brings the chambers 135, 136, and 137 into successive registry with the channel 131, and the suction created in the channel 131 is thus automatically transferred from one chamber to the next. Chamber 135 communicates through a passage 138 in the wooden core of the drum 87 with a labyrinthian duct 139 in the outer surface of the drum's wooden core, said duct 139 being in communicating registry with apertures 140 in one sector or area in the drum's outer metal shell which comprises the stock-supporting surface of the drum. Similarly, the chamber 136 communicates through passage 141 and duct 142 with apertures 143 in another, circumferentially spaced, area of the drum's exterior surface, and the chamber 137 communicates through passage 144 and duct 145 with apertures 146 in a third, circumferentially spaced area of the drum's exterior surface.

The opposite ends of the drum's outer metal shell, which is secured to the wooden core of the drum as by woodscrews 147 (see Figure 8), are spaced apart, and a cavity 148 is provided in the wooden core of the drum between the spaced ends of the shell. A metal plate 149 is secured in the bottom of the cavity 148 as by woodscrews 150, and three aligned, spaced apart bearing blocks 151, 152, and 153 are secured to the plate 149 by means of screws 154. A shaft 155 is journaled in the bearing blocks 151, 152 and 153. A series of grippers 156 is mounted on the shaft 155 by means of set screws 157, and the shaft is normally urged in a direction for causing the grippers 156 to engage the leading edge of the drum's metal shell—or of a flexible sheet of stock thereon—by means of a coiled compression spring 158 the opposite ends of which are secured to the bearing block 151 and a collar 159 mounted on the shaft 155. Other collars 160 are secured

on said shaft for retaining the shaft against longitudinal movement.

Means are provided for momentarily rotating the shaft 155 to release the ends of the grippers 156 from engagement with the drum at the end of the drum's turning movement in a clockwise direction as viewed in Figures 1 and 10. These means are best illustrated in Figures 8 and 9, and comprise a cam member 161 turnably mounted on a pin 162 threaded into a metal block 163 secured by screws 164 to the upper end of an arm 165 mounted on one upper side rail 17 of the machine's frame 15 by means of bolts 166 having nuts 167. The cam member 161 has a pointed finger 168 rigidly connected thereto and movable therewith. The finger 168 engages a crank pin 169 on the outer end of a crank arm 170 secured by a set screw 171 on the adjacent end of the shaft 155 near the end of the drum's travel in said clockwise direction (counter-clockwise as viewed in Figure 9). The crank pin 169 is thus caused to follow the path indicated by the arrows 172 in Figure 9, thus momentarily turning the shaft 155 and releasing the grippers from engagement with the drum. On the returning movement of the drum 87 from its extreme limit of travel in said direction, the crank pin 169 follows the path indicated by the arrows 173 of Figure 9, in which circular movement the crank pin 169 engages the finger 168 to slightly rotate the cam member 161 and thus permit the crank pin to pass freely by without turning the shaft 155. The cam member is then rotated to its original position illustrated in Figure 9, by means of a coiled tension spring 245 which has its opposite ends secured to the cam member 161 and the metal block 163.

Other means are provided for momentarily rotating the shaft 155 to release the ends of the grippers 156 from engagement with the drum 87 when the drum has rotated approximately ninety degrees in the opposite direction (counter-clockwise as viewed in Figures 1 and 10). These means comprise a cam plate 174 dependently secured by screws 175 to the underside of a cross plate 176 the opposite ends of which are secured by screws 177 to the upper side rails 17 of the machine's frame 15. A crank arm 178 secured by a set screw 179 on the opposite end of shaft 155 from the crank arm 170, has a roller 180 on its outer end adapted to engage the camplate 174 in the described phase of the drum's travel to momentarily disengage the grippers 156 from the leading edge of the drum's metal shell.

The sheet-feeding mechanism of the machine, shown best in Figures 1, 2, 6 and 7, comprises an inclined table 181 having slots 182 therethrough in which are disposed rollers 183, 184 mounted on cross-shafts 185, 185 journaled in bearings 187 (see Figure 1) secured to the underside of the table 181. Tapes 188 of fabric or the like pass over the rollers 183, 184 and also over rollers 189 on a rotating cross-shaft 190 and rollers 191 on a rotating cross-shaft 192, the cross-shafts 190 and 192 being journaled in side plates 193 mounted on cross-bars 194, 195 having their opposite ends secured by screws 196 and 197 respectively to the opposite upper side rails 17 of the frame 15. Cross-shaft 190, and the tapes 188, are driven by means of a belt 198 which operatively connects a pulley 199 on said cross-shaft with a driven pulley 200 (see Figure 3) on the shaft 39 of the air exhaust pump 40.

Sheets of stock fed onto the moving tapes 188 are weighted down by means of steel balls 201

disposed in through recesses 202 in bars 203 which are suspended over the tapes 188 from a rectangular frame 204 mounted on the table 181. It will be seen that as the sheets are fed onto the tapes by an operator standing at the forward end of the machine, the sheets will by reason of the slanting disposition of the tapes 188 automatically be moved towards the left, as viewed from the operator's position, against a guide 205 adjustably mounted on the table 181 by means of fittings 206 threadedly engaged in brackets 207 secured as by screws 208 to the table 181. (The guide is seen in cross-section in Figure 4.)

Means are provided for controlling the movement of the sheets of stock from the feeding tapes 188 to the drum 87 of the machine, which means comprise a rock-shaft 209 journaled in bearings 210 secured by screws 211 to the table 181. A stop arm 212 is rigidly secured on the rock-shaft 209 centrally thereof (see Figures 2 and 10), said arm's hooked end 213 being adapted to engage a sheet of stock and detain the same until the instant at which the sheet should be released to the drum, independently of the movement of the tapes 188 under the sheet. Properly timed raising of the arm 212 to release the sheet is effected by contact of a pin 214 with the cammed rearward end of a striker arm 215 rigidly mounted on the end of the rock-shaft 209. The sheets are weighted against the drum during the feeding operation by means of arms 216 loosely mounted on the rock-shaft 209 and having flexible fingers 217 which constantly bear against the fed sheets or against the surface of the drum when no sheet is in position thereon. Feeding of the sheets is further controlled by means of an arm 217 rigidly mounted on a shaft 218 journaled in the opposite side portions of the rectangular frame 204, said arm 217 having a depending finger 219 adapted to bear against the fed sheets. Raising movement of the arm 217 to release the sheets at the proper time, is effected by contact of a pin 220 on the drum 87 with a sliding bar 221 slidably disposed in a bearing plate 222 secured by screws 223 to the cross-bar 194, the sliding bar 221 being pivotally connected at its forward end to the lower end of an arm 224 depending from the shaft 218 and being normally urged toward a position for engagement with the pin 220 by means of a tension spring 225 having one end thereof secured to the bearing plate 222 and the other end thereof secured to the depending arm 224.

Means for removing the processed sheets from the drum 87 of the machine comprise a series of strippers 226 loosely mounted on a rod 227 which spans the space between a pair of uprights 228 mounted on the cross plate 176, said strippers having knife-like ends which constantly bear against the surface of the drum. These strippers peel the processed sheets off the drum and onto moving tapes 229 which pass over rollers 230 secured on a shaft 231 having its opposite ends journaled in the uprights 228 and which also pass over and are driven by rollers 232 secured on a shaft 233 journaled in bearing plates 234 secured as by screws 235 to the opposite sides of the machine's frame 15. The shaft 233 is driven by a belt 236 which passes around a pulley 237 on the shaft 233 (see Figure 3) and around a larger pulley 238 on a shaft 239 having its opposite ends journaled in bearings 240 depending from the lower side rails 18 of the machine's frame. The shaft 239 is in turn driven by a belt 241 which passes around a pulley 242 on the shaft 239 and

around a pulley 243 on the cross shaft 119, which is the same shaft that drives the camwheels 118, 118a and which is driven by chain 120.

Operation

The operation of the machine may best be understood by reference to Figures 1, 6 and 7 of the drawings.

Sheets of paper 105 or other flexible stock to be processed by the silk screening operation are fed onto the table 181 of the machine by an operator stationed at the right or rearward end of the machine as viewed in Figures 1, 2 and 3. Each sheet is moved forwardly, and laterally against the guide 205 (see Figure 4) by the constantly moving tapes 188, until the sheet abuts against the hooked end 213 of the stop arm 212 on the rock-shaft 209, where the sheet remains until the properly timed moment for its release to the stock-supporting drum 87.

As viewed in Figure 1, the machine is just commencing its non-print stroke. Rocker arms 64, 65 now move the silk screen stencil 79 and its frame 80 and carriage 72 to the right, during which movement the gear racks 83 on the stencil carriage meshing with gears 85 on the work-supporting drum 87 cause the drum to be rotated in a clockwise direction, and the squeegee 93 is in a raised position out of contact with the stencil 79 (see Figure 7). During this movement, the coating material 104 is distributed over the surface of the stencil by means of a spreader 244. When the parts reach their positions shown in Figure 7, the grippers 156 on shaft 155 are quickly moved out of contact with the drum 87 and then toward the drum for gripping the leading edge of the sheet 105. This movement of the grippers is effected by the action of cam 161 (see Figures 8 and 9) on the crank pin 169 of crank arm 170 on shaft 155. At the same time, arm 212 of shaft 209 is raised by contact of pin 214 on drum 87 with striker arm 215 on shaft 209, and arm 217 on shaft 218 is raised by contact of pin 220 on drum 87 with the sliding bar 221. The sheet of stock 105 is thus released to the drum for movement therewith in a counter-clockwise or forward direction, this being the print stroke of the machine and being best illustrated in Figure 6.

During the print stroke of the machine, the squeegee 93 is lowered into contact with the silk screen stencil 79 for forcing the coating material 104 therethrough and onto the sheet of stock, the lowering of the squeegee having been effected by the action of cam-wheels 118, 118a on bars 114 and the supporting rods 108 connected thereto.

As the sheet 105 passes with the drum 87 beneath the stencil 79, it is made to adhere to the stock-supporting surface of the drum by suction successively created in the apertured areas 140, 143 and 146 of the drum, the suction being transferred from one apertured area to the next by the transfer member 135 on the drum, as best shown in detail in Figures 10 and 11.

After processing, the roller 180 on crank arm 178 on shaft 155, contacts cam plate 174 thus rotating shaft 155 and causing the grippers 156 to release the leading edge of the sheet of stock 105. At this point, best shown in Figure 6, the processed sheet is peeled off the surface of the drum by the strippers 226 and is conveyed away from the drum by the constantly moving tapes 229. Suction is successively relieved from the apertured areas of the drum by the suction transfer member 135, thus releasing the sheet 105 from the stock-supporting surface of the

drum just prior to engagement of the leading edge of the sheet by the strippers 226.

When the stencil carriage 72 and the drum 87 reach the end of the print stroke, i. e. their extreme limits of movement to the left and counter-clockwise, respectively, as viewed in Figures 1 and 6, the squeegee 93 is again lifted out of engagement with the stencil 79 by the action of cam-wheels 118, 118a on bars 114 and rods 108, and the parts of the machine are again in position for commencement of the machine's non-print stroke.

Inasmuch as all of the moving parts of the machine are driven by the same motor 23, their movement is coordinated throughout, and the speed of the entire machine may be varied at the will of the operator by manipulation of the hand-wheel 32 on the speed regulator 31.

It will thus be seen that the machine of the present invention provides a rapid and efficient means for the silk screen processing of successive sheets of flexible stock, in the production of posters, decalcomanias and the like, and while but one specific embodiment of the invention has been herein shown and described it is to be understood that numerous details of the construction shown may be altered or omitted without departing from the spirit of the invention as the same is defined by the following claims.

I claim:

1. In a silk screen stencilling machine: a frame; a drum mounted on the frame for reciprocating rotary movements about a horizontal axis; a silk screen stencil mounted on the frame adjacent the drum for reciprocating, substantially horizontal, linear movements in co-ordination with the rotary movements of the drum whereby a portion of the stencil is always in registry with the corresponding portion of the exterior stock-supporting surface of the drum; means for feeding the leading edge of a stock sheet to the drum at the beginning of the drum's movement in one direction; suction means on the drum for temporarily effecting adherence of the sheet to the drum in the area of registry between the drum and the stencil; and means for forcing coating material through the stencil onto the sheet as said sheet passes the stencil.

2. In a silk screen stencilling machine: a frame; a drum mounted on the frame for reciprocating rotary movements about a horizontal axis and having a gear thereon; a silk screen stencil mounted on the frame adjacent the drum and having a rack thereon in engagement with the gear on the drum for imparting reciprocating, substantially horizontal, linear movements to the stencil and for co-ordinating the movements of the drum and the stencil in such a manner that a portion of the stencil is always in registry with the corresponding portion of the exterior stock-supporting surface of the drum; means for feeding the leading edge of a stock sheet to the drum at the beginning of the drum's movement in one direction; suction means on the drum for temporarily effecting adherence of the sheet to the drum in the area of registry between the drum and the stencil; and means for forcing coating material through the stencil onto the sheet as said sheet passes the stencil.

3. In a silk screen stencilling machine: a frame; a drum mounted on the frame for reciprocating rotary movements about a horizontal axis; a silk screen stencil mounted on the frame adjacent the drum for reciprocating, substantially horizontal, linear movements in co-ordina-

tion with the rotary movements of the drum whereby a portion of the stencil is always in registry with the corresponding portion of the exterior stock-supporting surface of the drum; means for feeding the leading edge of a stock sheet to the drum at the beginning of the drum's movement in one direction; means for temporarily effecting adherence of the sheet to the drum in the area of registry between the drum and the stencil, said means comprising circumferentially spaced apertures in the stock-supporting exterior surface of the drum and means for creating temporary suction at succeeding apertures as they pass said area of registry; and means for forcing coating material through the stencil onto the sheet as said sheet passes the stencil.

4. In a silk screen stencilling machine: a frame; a drum mounted on the frame for reciprocating rotary movements about a horizontal axis; a silk screen stencil mounted on the frame above the drum for reciprocating, substantially horizontal, linear movements in co-ordination with the rotary movements of the drum whereby a portion of the stencil is always in registry with the corresponding portion of the exterior stock-supporting surface of the drum; coating material on the upper surface of the stencil; means for feeding the leading edge of a stock sheet to the drum at the beginning of the drum's movement in one direction; suction means on the drum for temporarily effecting adherence of the sheet to the drum in the area of registry between the drum and the stencil; and a squeegee mounted on the frame for reciprocating vertical movements into engagement with the stencil during said drum's movement in said one direction for forcing the coating material through the stencil onto the sheet as said sheet passes beneath the stencil, and out of engagement with the stencil during said drum's movement in the opposite direction.

5. In a silk screen stencilling machine: a frame; a drum mounted on the frame for reciprocating rotary movements about a horizontal axis; a silk screen stencil mounted on the frame above the drum for reciprocating, substantially horizontal, linear movements in co-ordination with the rotary movements of the drum whereby a portion of the stencil is always in registry with the corresponding portion of the exterior stock-supporting surface of the drum; coating material on the upper surface of the stencil; means for feeding the leading edge of a stock sheet to the drum at the beginning of the drum's movement in one direction; means for temporarily effecting adherence of the sheet to the drum in the area of registry between the drum and the stencil, said means comprising circumferentially spaced apertures in the stock-supporting exterior surface of the drum and means for creating temporary suction at succeeding apertures as they pass said area of registry; and a squeegee mounted on the frame for reciprocating vertical movements into engagement with the stencil during said drum's movement in said one direction for forcing the coating material through the stencil onto the sheet as said sheet passes beneath the stencil, and out of engagement with the stencil during said drum's movement in the opposite direction.

6. In a silk screen stencilling machine: a frame; a drum mounted on the frame for reciprocating rotary movements about a horizontal axis and having a gear thereon; a silk screen stencil mounted on the frame adjacent the drum

11

and having a rack thereon in engagement with the gear on the drum for imparting reciprocating, substantially horizontal, linear movements to the stencil and for co-ordinating the movements of the drum and the stencil in such a manner that a portion of the stencil is always in registry with the corresponding portion of the exterior stock-supporting surface of the drum; means for feeding the leading edge of a stock sheet to the drum at the beginning of the drum's movement in one direction; means for temporarily effecting adherence of the sheet to the drum in the area of registry between the drum and the stencil, said means comprising circumferentially spaced apertures in the stock-supporting exterior surface of the drum and means for creating temporary suction at succeeding apertures as they pass said area of registry; and a squeegee mounted on the frame for reciprocating vertical movements into engagement with the stencil during said drum's movement in said one direction for forcing the coating material through the stencil onto the sheet as said sheet passes the stencil, and out of engagement with the stencil during said drum's movement in the opposite direction.

7. In a machine of the class described: a frame; a silk screen stencil on the frame; means on the frame for processing stock by forcing coating material through said stencil onto stock therebeneath; a stock-supporting drum mounted on the frame for rotary movement beneath said stencil for supporting the stock during the pro-

12

gressive processing thereof, said drum having circumferentially spaced apertured stock-supporting sections and a plurality of aeriform fluid chambers communicating with said apertured sections respectively; means for progressively feeding stock to the drum for rotation therewith past the stencil; means for successively exhausting the aeriform fluid from said chambers to maintain by suction successive sections of the stock in position on the rotating drum during the progressive processing thereof; and means for successively admitting aeriform fluid to said chambers to release successive sections of the stock from the drum after the processing thereof.

JAMES A. BLACK.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
513,212	Stackhouse	Jan. 23, 1894
1,107,254	Blackford	Aug. 18, 1914
1,668,999	Fallot	May 8, 1928
1,832,216	Johnston et al.	Nov. 17, 1931
2,126,804	Overly	Aug. 16, 1938
2,202,496	La Bombard et al.	May 28, 1940

FOREIGN PATENTS

Number	Country	Date
281,650	Italy	Jan. 19, 1931