

May 31, 1955

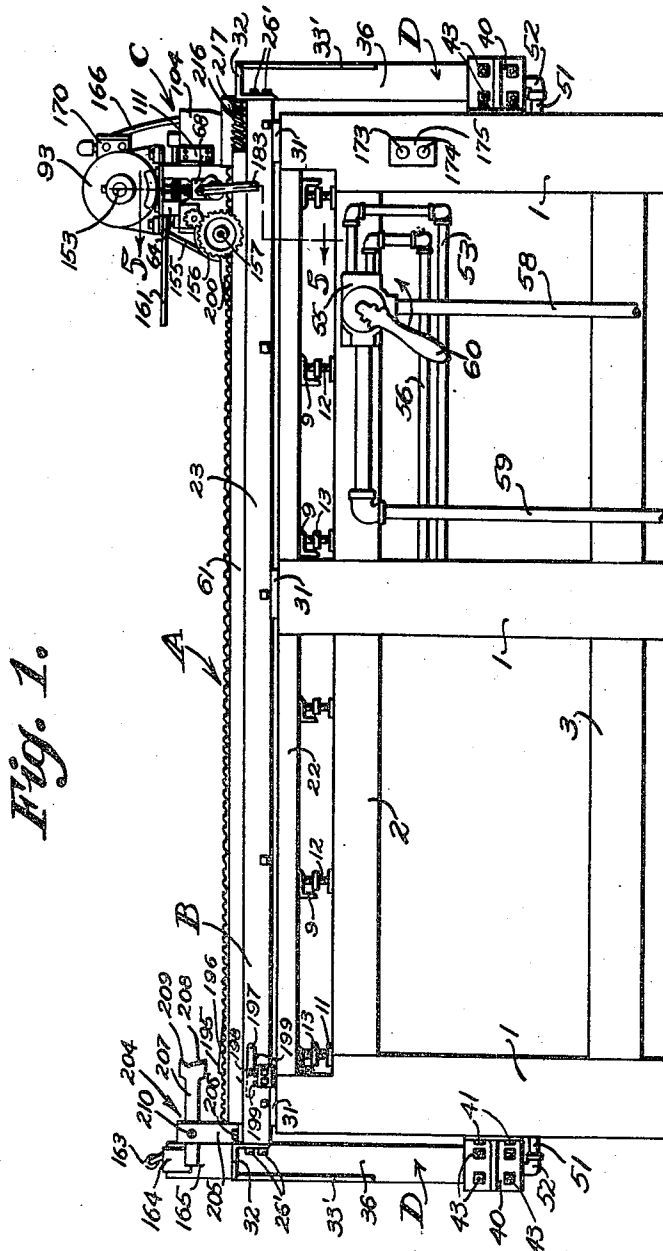
J. H. STOKES

2,709,404

STENCIL PRINTING MACHINE

Filed Jan. 23, 1951

10 Sheets-Sheet 1



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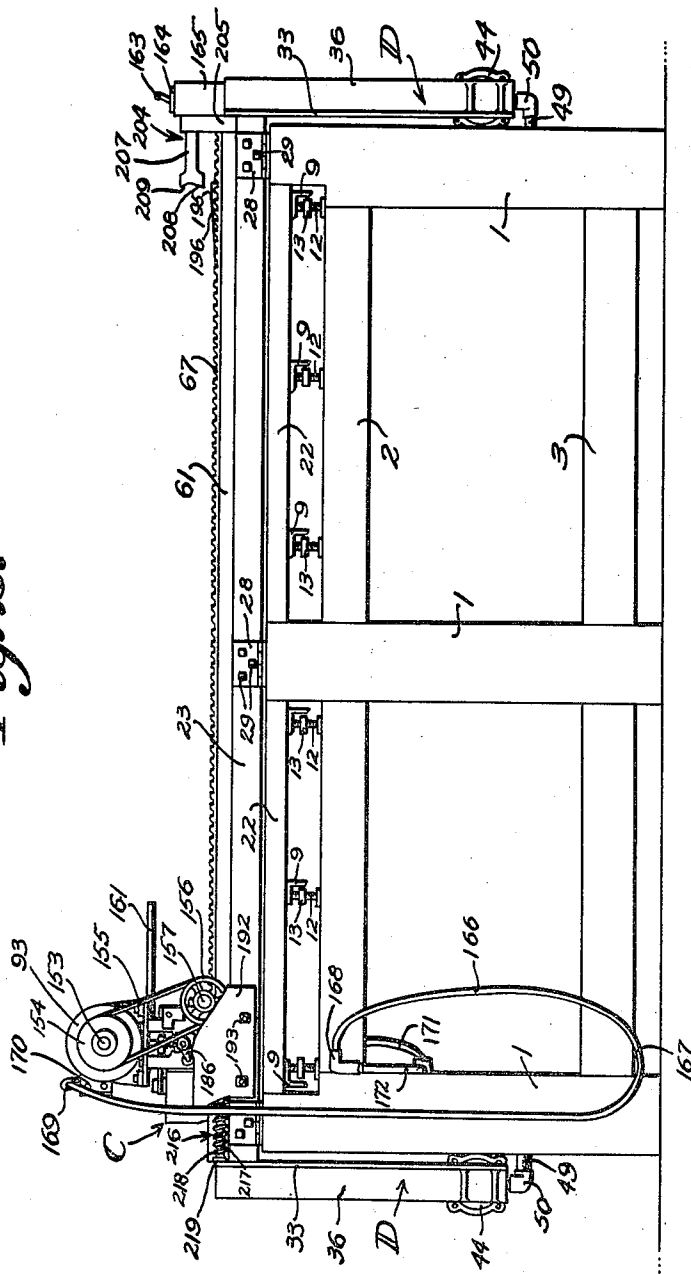
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Fig. 2.



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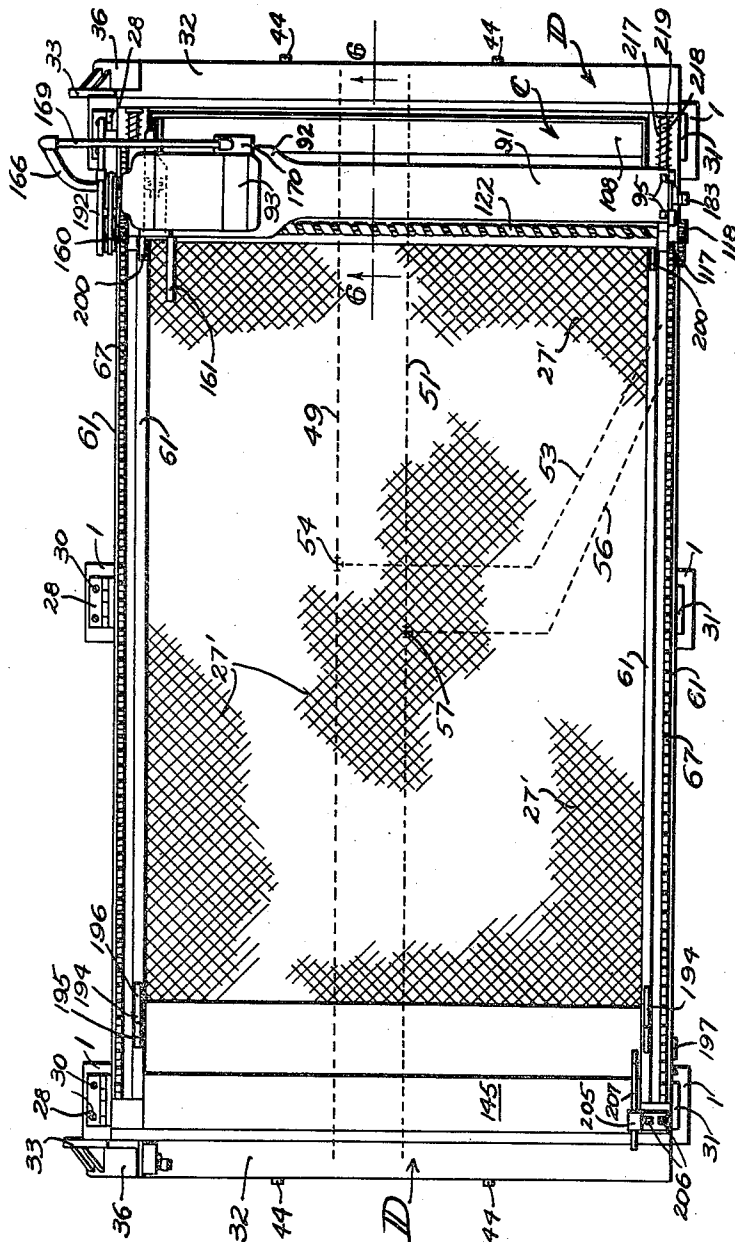
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STENCIL PRINTING MACHINE

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10 Sheets-Sheet 3



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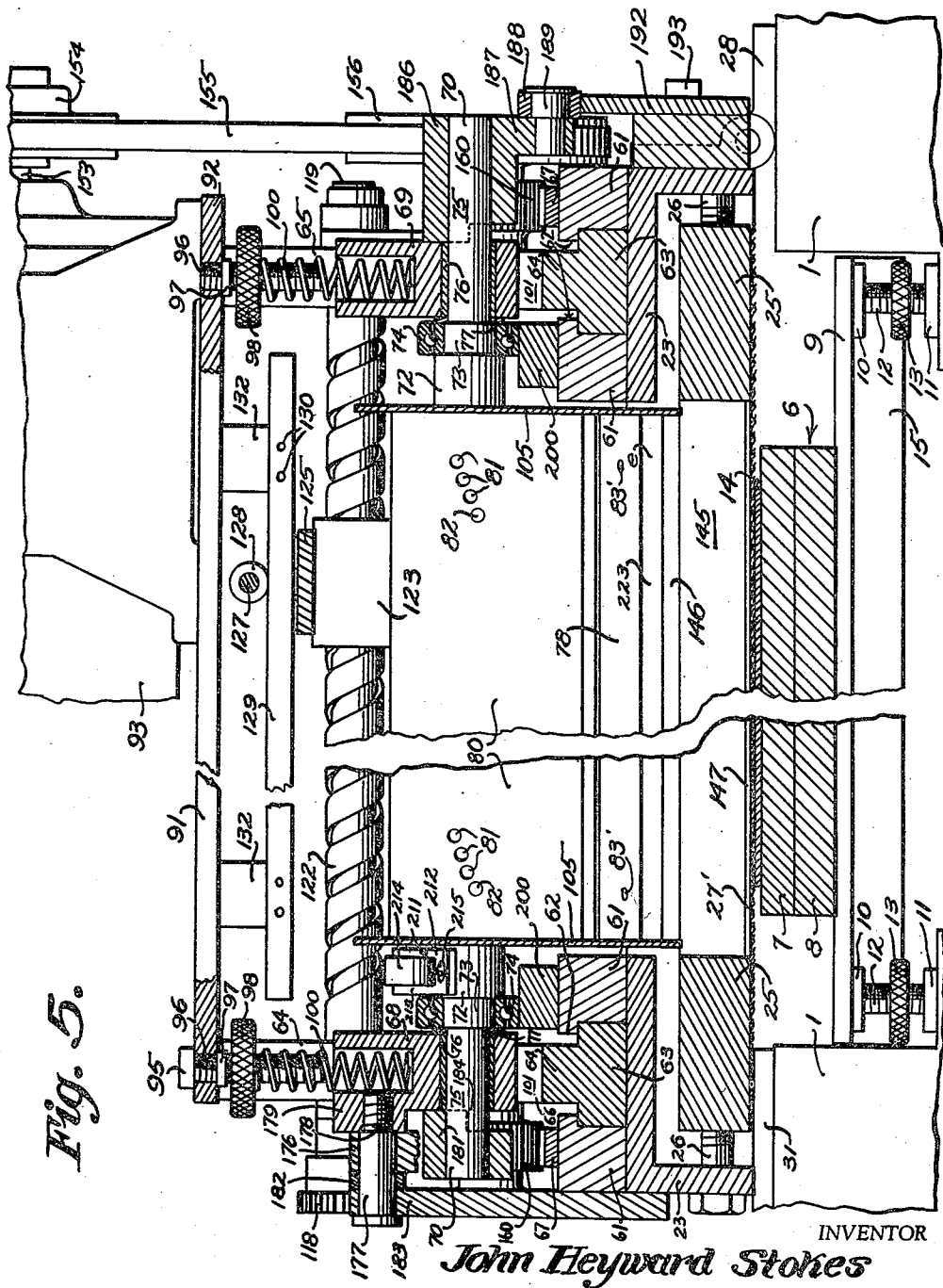
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STENCIL PRINTING MACHINE

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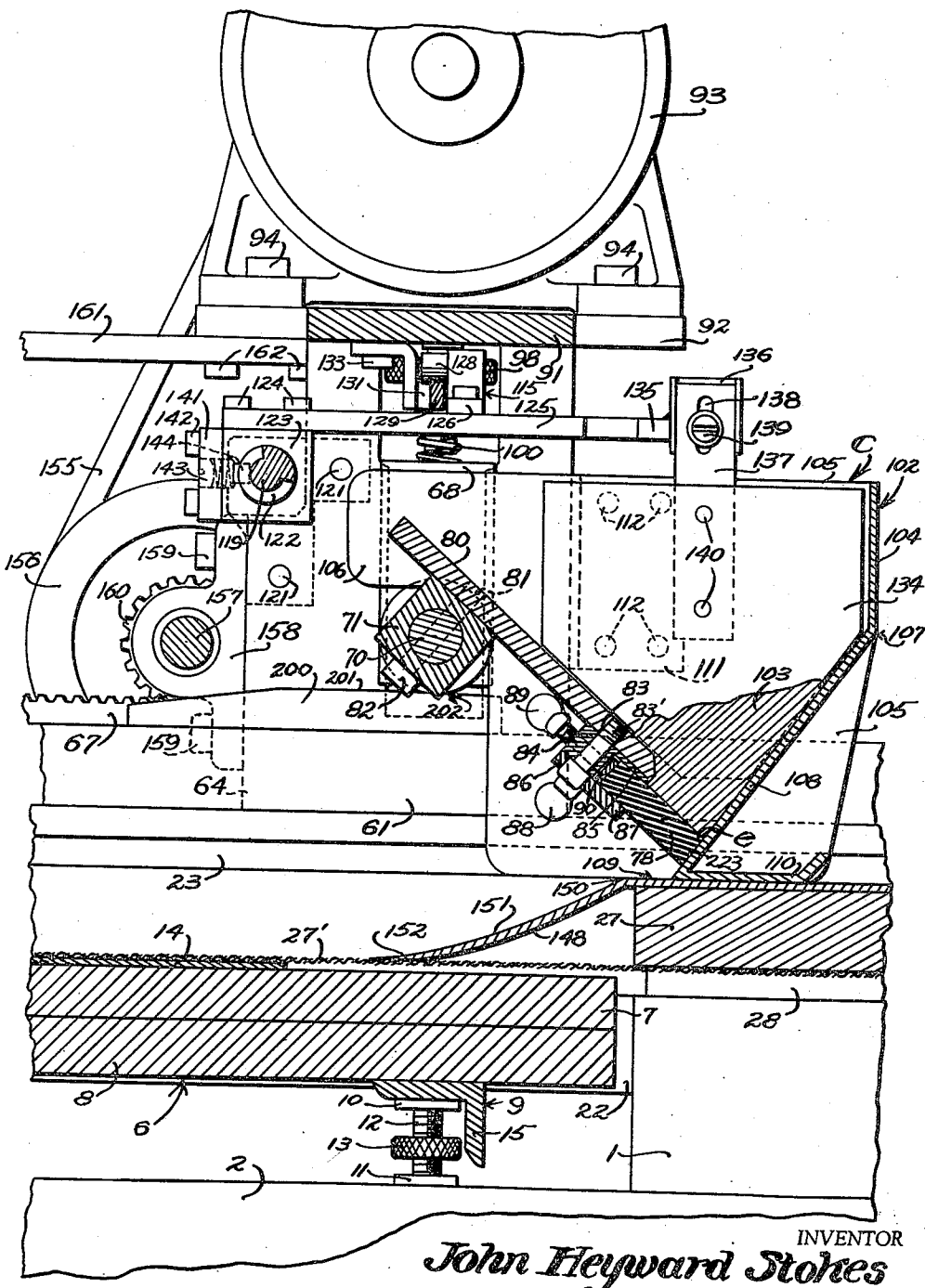


Fig. 6.

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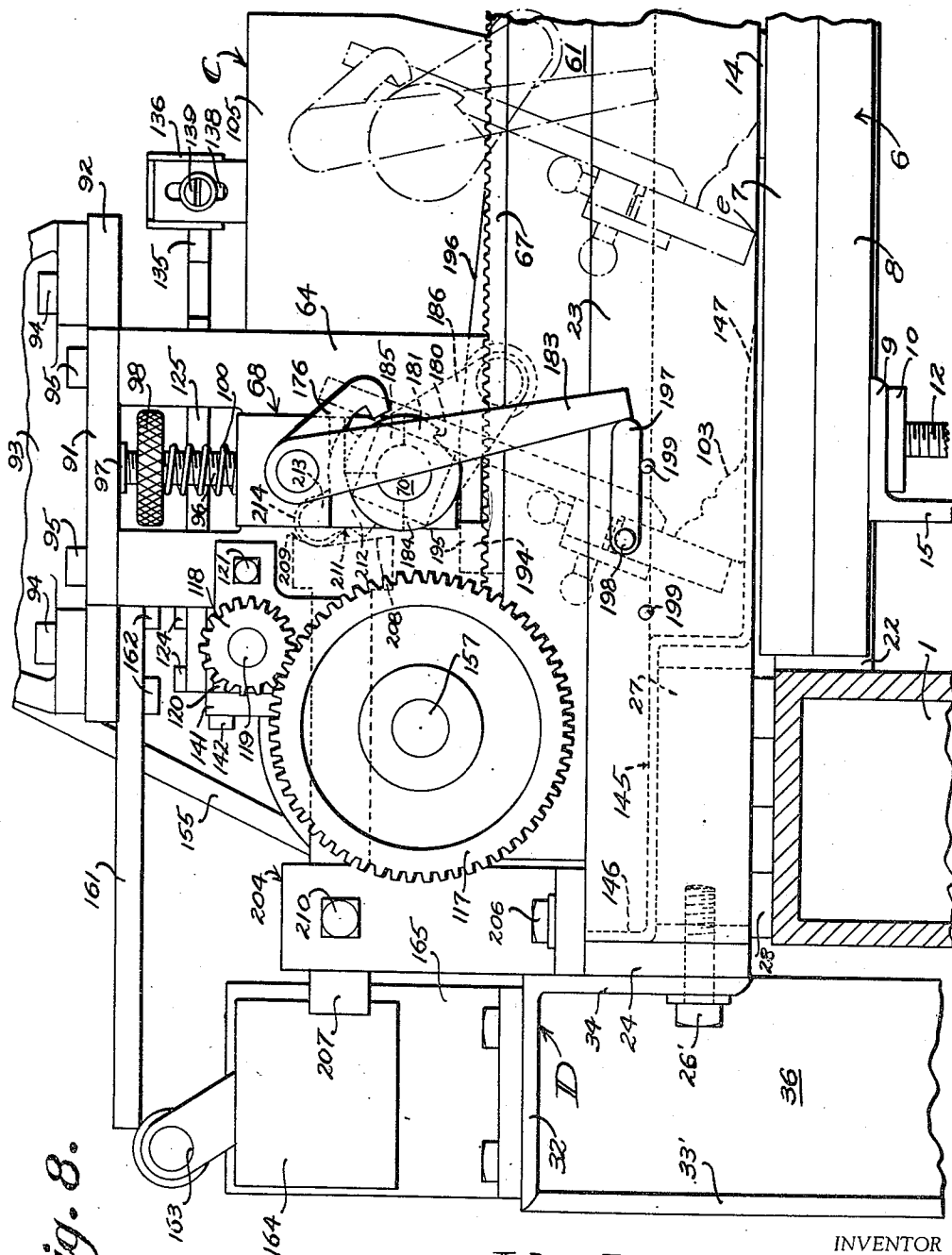
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STENCIL PRINTING MACHINE

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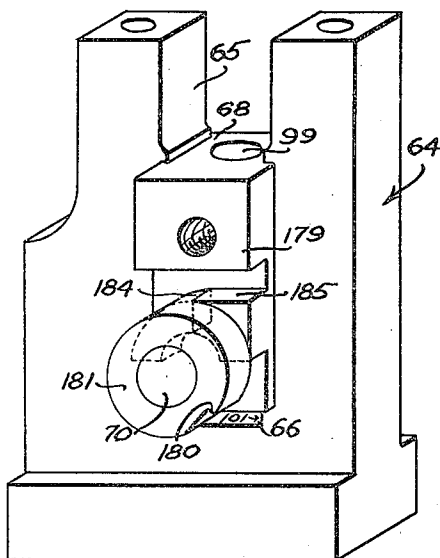


Fig. 9.

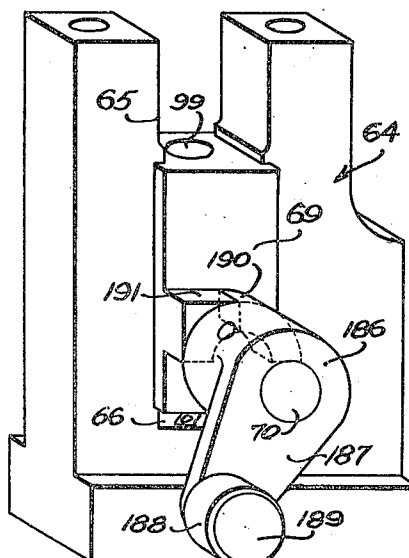


Fig. 10.

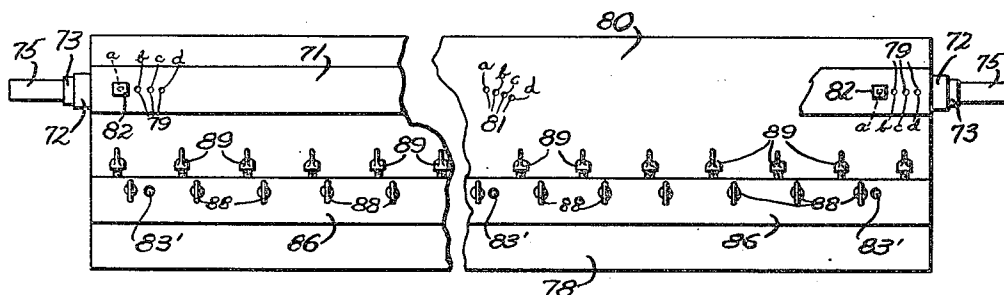


Fig. 11.

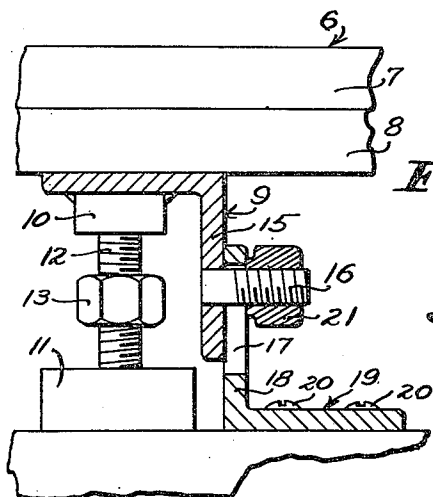


Fig. 12.

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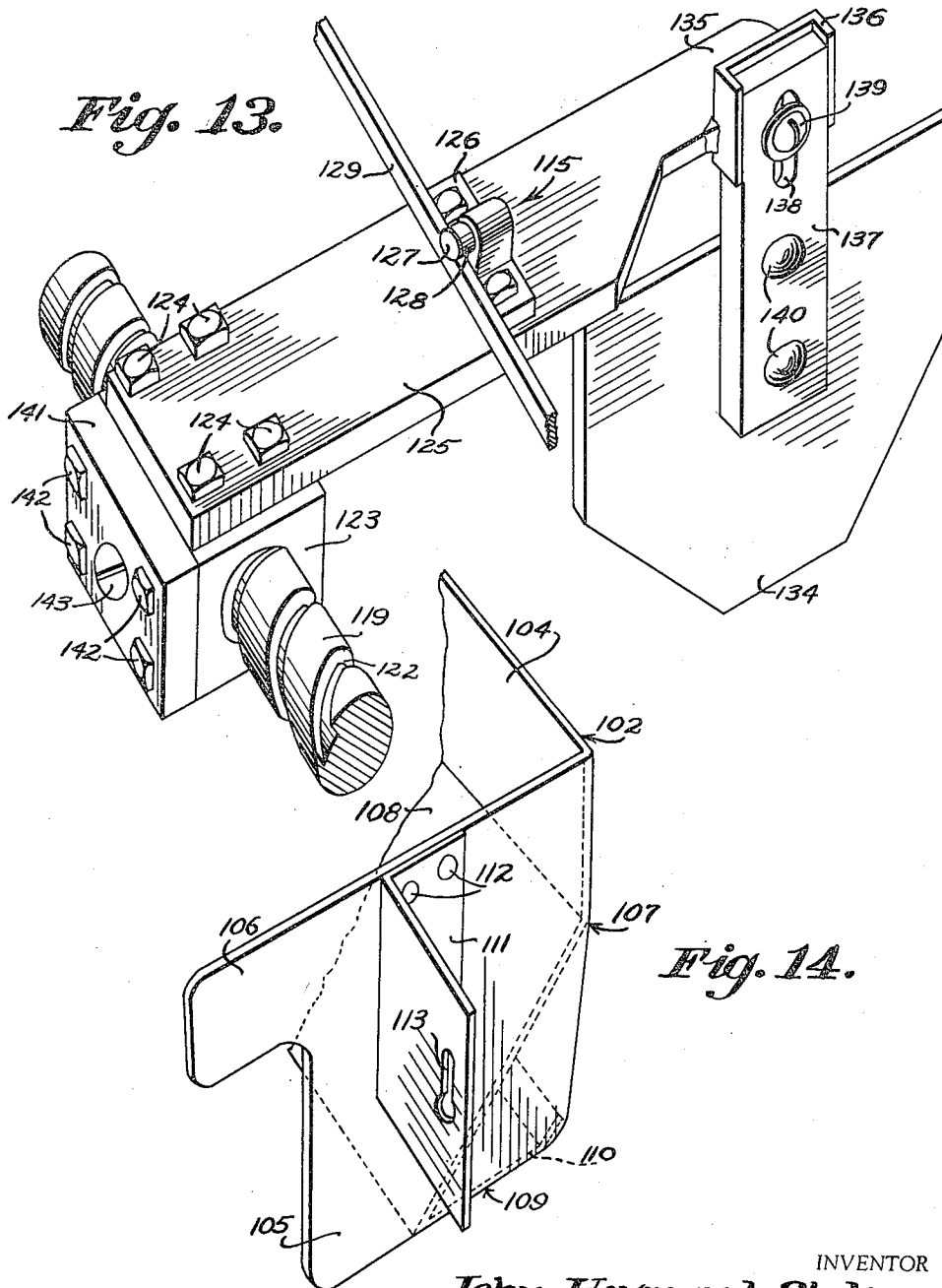
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10 Sheets-Sheet 10



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2,709,404

STENCIL PRINTING MACHINE

John Heyward Stokes, Atlanta, Ga.

Application January 23, 1951, Serial No. 207,281

19 Claims. (Cl. 101—123)

Generically this invention relates to printing machines, and more especially to such a machine for effecting by the silk screen process designs or solid colors on practically all types of materials whether flexible or rigid.

One of the principal objects of this invention is the provision of a machine of this character comprising a table-like flat base adapted to support the material upon which a color design is to be produced, and a printing frame including a pressure device within the frame and operable to uniformly distribute the paint, ink or like material over and through a stencil silk screen, thereby effecting a uniform imprint of the color design to be produced.

Another important object of this invention is the provision of a stencil printing machine comprising a squeegee carriage including a squeegee assembly including a paint reservoir sealed by said squeegee in traveling over said frame above a silk or the like screen in non-printing direction and automatically operable to effect movement of the squeegee into printing contact position with said screen to uniformly distribute the contents of said reservoir over and through said screen to produce the desired design on the material to be printed during movement of the squeegee in reverse printing direction, and means at the end of its printing travel to operate said squeegee to remove the excess paint into and effect sealing of said reservoir as in the first instance, and means in connection with said frame for coacting with and automatically effecting the reversing of the travel of said carriage and squeegee.

Another important object of this invention is the provision of a stencil silk or the like screen printing machine adapted to produce color designs by distributing the color material over a printing area of a dimension not heretofore possible by any of the machines of this character now in use.

In the well known manually operated silk screen process it is impossible for a hand operator to impart the same pressure to the applicator of the printing material uniformly throughout the printing surface of a print and to each succeeding print, and while many attempts have been made to obtain the desired results mechanically, they have been attended with imperfect results, so that even at the present time largely the output of the industry is still obtained by the manually operated process. Therefore, one of the principal objects of this invention is the provision of a stencil silk or the like screen printing machine adapted to produce color designs on various flexible materials such as a sheet of paper, posters, signs, and the like, and from delicate textiles to rigid materials such as metals, wood and plastics, ranging in size from areas of small dimensions to increased dimensions not heretofore mechanically possible.

A further object of this invention is the provision of a stencil printing machine of this character comprising a surface for the article to be printed, a frame structure hingedly connected to said surface, and a motorized carriage and squeegee assembly carried thereby including a paint reservoir normally sealed by the squeegee, means

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for elevating said frame to permit a placing of the material to be printed on said surface, and during the lowering of the frame to screen contact and printing position, the squeegee is adapted to complete its forward motion thereover, and as it approaches the end of its forward travel, and at substantially the same time, said squeegee is caused to assume its printing position with respect to said screen, and at substantially the same time is automatically operated to release the paint onto the screen, and to paint distributing position as the carriage begins its reverse travel in printing direction, and as the carriage reaches the end of its reverse or printing travel the squeegee is automatically operated to remove the remaining paint from the screen into said reservoir and sealing the same therein.

Another important object of this invention is the provision of a color screen printing machine of this character comprising a flat supporting surface for the stock to be printed including a frame structure comprising a stencil screen bottom, and including a self-contained transversely mounted motorized squeegee carriage comprising a squeegee assembly including a squeegee, and a paint or color material well for reciprocating travel over said frame, the squeegee being automatically operable to maintain the paint in the well during the travel of the carriage in non-printing direction, and as the carriage approaches the end of its travel the squeegee is automatically operated to dump the paint contents of the well on the screen and to assume paint distributing position with respect to the screen, at which time the direction of travel of the carriage is automatically reversed, and as it approaches its limit of travel in reverse or printing direction the squeegee sweeps the remaining color material into the well and seals the same for forward travel of the carriage, as in the first instance.

Another important object of this invention is the provision of a stencil screen printing machine comprising a screen frame, a squeegee carriage mounted for forward and reverse reciprocal travel over the said frame, said carriage including horizontally slidably frame members, a squeegee assembly including blocks floatingly mounted in said frame members, a squeegee shaft journaled in said blocks, and a rubber or the like squeegee member adjustably secured to said shaft, and during the reverse or printing travel of said carriage, said squeegee assembly is supported by the contact of said squeegee member with said screen, so that said blocks are out of supporting contact with said frame and freely floatable therein, the pressure of the squeegee on the screen normally being the weight of said assembly, and manually controlled members in connection with said blocks for exerting additional pressure on said squeegee member during its printing travel, if desired.

With these and other objects in view, which will become apparent as the description proceeds, the invention resides in the construction, combination, and arrangement of parts, hereinafter more fully described and claimed, and illustrated in the accompanying drawings, in which like characters of reference indicate like parts throughout the several figures, of which:

Fig. 1 is a front elevational view of the machine.

Fig. 2 is a rear elevational view of Fig. 1.

Fig. 3 is a top plan view of the machine.

Fig. 4 is an end elevational view looking at the right hand side of Fig. 1.

Fig. 5 is a longitudinal fragmentary sectional view taken on the line 5—5 of Fig. 1.

Fig. 6 is a cross-sectional view taken on the line 6—6 of Fig. 3.

Fig. 7 is an end elevational view of the squeegee unit at the starting end of the machine showing the squeegee in different operating positions.

Fig. 8 is a similar view to Fig. 7 with the squeegee unit at the opposite end of the machine.

Fig. 9 is a perspective view of left hand carriage frame member (Fig. 5).

Fig. 10 is a perspective view of right hand carriage frame member (Fig. 5).

Fig. 11 is an elevational view of the squeegee and shaft assembly.

Fig. 12 is a sectional view of the adjustable table locking device.

Fig. 13 is a fragmentary perspective view of the paint distributor unit.

Fig. 14 is a fragmentary perspective view of the paint reservoir.

In the illustrated embodiment characterizing this invention there is shown an adjustable supporting base or table assembly A, a stencil frame structure B mounted on said table structure adapted for elevational movement with respect thereto, and a carriage or squeegee unit C which includes a squeegee assembly, freely movable with respect to said carriage (said unit being hereinafter referred to generally as unit C, carriage unit C or squeegee unit C), said assembly including an ink or paint well and a squeegee member coating with said well to sealingly maintain the paint in the well until predeterminedly released, and unit C being mounted on frame B for reciprocating travel thereover.

Table assembly

The table assembly comprises, in the present instance, six legs 1, said legs on each side being connected adjacent to their upper and lower ends by the longitudinal bars 2 and 3, respectively. Within the space defined by said legs and adjacent to their upper ends is a table top 6 having preferably, a work surface 7 of Masonite or the like suitably combined with an under portion of plywood 8 which has secured to its under surface a series of transverse angle bars 9 and to the under surface of which are secured blocks 10. Mounted on the side bars 2 in vertical spaced relation with respect to the blocks 10 are the blocks 11, and mounted intermediate the blocks 10 and 11 are the adjusting screws 12 including the knurled adjusting nuts 13 for effecting raising and lowering of the table top 6 in accordance with the thickness of a respective article 14 to be printed supported thereby, as will directly more fully appear.

With respect to the Masonite table top surface upon which the paper or other material to be printed is placed, it will be noted that when printing thin paper the table top is flush with the bottom of the silk screen frame, but if it is desired to print thicker material, for instance, one-half inch thick, the table may be adjusted downwardly by operating the nuts 13 to effect turning of the adjusting screws 12 in blocks 10 and 11. Also the adjusting screws 12 are operable to effect the leveling of the work supporting surface 7, in instances where the machine supporting floor is uneven or not level.

In order to insure the positive maintenance of and to lock the table top 6 and the article 14 in proper adjusted printing position, at each end of (Fig. 12) the respective outer angle bars 9, with one end secured through the depending portion 15 thereof, is a bolt or stub shaft 16 which extends through and beyond slot 17 formed in the vertical portion 18 of angle member 19 in overlapping engagement with said angle portion 15, said member 19 seating on side bar 2 and secured thereto by bolts or screws 20. It will therefore be noted that the ends of the outer angle bars 9 and the anchored angle members 19 are fastened together by the tightening of the knurled nuts 21 threadably mounted on stub shafts 16 for locking the printing table structure in adjusted position. It will be further observed that the upper ends of legs 1 are cut back to form shoulders on which are seated the surmounting side bars 22.

Stencil screen frame structure

The stencil screen frame structure B comprises (Fig. 5) in the present instance, a pair of side angle bars 23, welded or otherwise connected at their ends to the end plates 24, and underlying said bars in downwardly and inwardly spaced relation are a pair of wooden side members 25 supportingly attached to said angle bars by a series of threaded bolts 26, said members being suitably interconnected adjacent their ends by the intermediate wood end members 27, by a series of bolts 26'. Suitably secured to the under surface of said members 25 and 27 is a stencil screen of silk, rayon, copper or other suitable material 27' constituting the bottom of the frame and through which ink, paint, or other color substance is forced by a squeegee onto the surface of the article being printed.

The screen frame is provided at its rear edge with hinges 28 (Fig. 2) secured to the rear angle bar 26 by bolts or other fastening means 29, the respective hinges being secured to the upper ends of the legs 1 by screws 30 so that the frame may be elevated to position and remove the work 14 prior to and subsequent to the printing operation as will hereinafter be more fully described. In order to compensate for the thickness of the hinges 28 the frame at its front edge is provided with spaced blocks 31 (Fig. 1).

In order to effect raising and lowering of said frame B there is arranged at each end thereof an arm D comprising angle sections 32 and 33. The section 32 (Fig. 4) is mounted with its depending portion 34 secured to the end plate 24 by bolts 35 and its other portion 36 extending laterally outward from its upper edge, and the section 33 extends downwardly and outwardly with its upper end welded to the rear end of section 32 and the lateral portion 36, forming in effect a continuation of the edge 36 but with its other edge corresponding to portion 34 extending upwardly from its rear edge. A triangular web brace member 33' is welded or otherwise secured to the lateral portions 36 of sections 32 and 33, and mounted on the lateral portion 36 at the free end of section 33 by bolts 37 is a bifurcated anchor member 38.

Mounted on a cross bar 39 secured to legs 1 (Fig. 4) at each end of the frame B, and adjacent each front leg is an angle plate 40 secured by bolts 41 and mounted on its lateral projecting portion is a pivot member 42 secured by bolts 43 and pivotally connected to each of said members is a fluid cylinder 44 secured by a pivot pin 45 and the free end of piston rod 46 of the cylinder is adjustably connected to a connector 47 which latter is connected to anchor block 38 by pivot pin 48. A fluid pipe 49 (Fig. 3) is connected at one end of the cylinder 44 as at 50 (Fig. 4) at the right hand end of the machine and the other end connected to the same end of a cylinder 44 at the left hand end of the machine. Said fluid pipe 51 is connected at one end to the opposite end of the cylinder 44 as at 52, and its other end similarly connected to the cylinder 44 at the other end of fluid pipe 51. Fluid pipe 53 at one end is connected to pipe 49 (Fig. 3) substantially central of its length by a T-connection 54 and the other end to a fluid control valve structure 55 (Fig. 1), and a similar fluid pipe 56 is connected at one end to pipe 51, by a T-connection 57, and the other end to said control valve structure 55, and a fluid supply pipe 58 is connected at one end to said valve structure and the other end to a source of fluid pressure supply (not shown). Also connected to said valve structure 55 is a fluid exhaust pipe 59.

The valve unit 55 (Fig. 1) is a two-way valve structure of conventional construction whereby the movement of the handle 60 to the right permits a fluid under pressure, in the present instance air, to pass through said valve and pipe 53 to connection 54, and in opposite direction through pipe 49 to the cylinders 44 to cause piston rods 46 to pull the arm sections 33 in cylinder direction to

elevate the screen frame B, and then move said handle to the left to perpendicular or neutral position to maintain the frame elevated so as to permit the work 14 to be placed on the table top surface 7, and then the handle is moved completely to the left which cuts off the fluid supply and permits the fluid in the cylinders to be exhausted through pipe 59, the frame B at the same time returning to its printing position, and following the printing operation the operating handle is moved as in the first instance so as to effect elevation of the frame.

Carriage and squeegee assembly

Mounted on each of the angle bars 23 (Fig. 5) which extend substantially the length of frame B are a pair of guide rails 61 having inwardly extending flanges or shoulders 62 beneath which is slidably mounted a supporting slide T-portion base 63 of a main squeegee frame member 64. The flange portions 62 may be detachably secured to the rails 61 if desired. Said member 64 is formed with an upper cut out portion 65 terminating in a reduced portion 66. Pinion racks 67 are mounted on the outer rail members 61 by means of which the squeegee unit C is caused to move from end to end of frame B. Mounted in the respective cut out portions 66 of frame members 64 (Figs. 9 and 10) are the slide block members 68 and 69, and journaled in the lower end of said slide blocks is a squeegee shaft 70 formed with a central portion 71 square (Fig. 6) in cross-section, and at each end of which is a reduced rounded shaft portion 72, a further reduced portion 73 on which is mounted a ball-bearing roller 74 and a further reduced portion 75 extending through and beyond the bushing 76. Spacer washers 77 are mounted intermediate the inner raceways of the ball-bearing rollers 74 and said slide blocks and bushings to permit free movement of said rollers.

More particularly referring to the squeegee (Figs. 6 and 11) assembly of the unit C and the manner of adjustably mounting the rubber squeegee 78 on its shaft 70, it will be noted that the square squeegee section 71 is provided, in the present instance, with three spaced sets of holes 79, *a*, *b*, *c* and *d* of each set extending through the square section 71, the holes of each set being closely spaced, and mounted on a flat surface of said section is a plate 80 provided with longitudinal arranged sets of holes 81 corresponding to holes 79. These holes 81 are similar to holes 79 except that as to each set, and with respect to holes *a*, *b*, *c* and *d* thereof, each succeeding hole is one-eighth of an inch lower than its preceding hole. The plate 80 is adapted to be secured to shaft 70 by bolts 82 each extending through a hole of each set in square section 71 and a selected complementary hole of each set of holes 81 so as to compensate for the wear of the squeegee 78. Said bolts 82 threadedly engage in plate 80 so that when tightened their ends are flush with the surface of the plate. It will thus be apparent that the stepped holes 81 are adjusting holes to compensate for the wear of the rubber squeegee so that when the rubber becomes worn too short to effectively print, the said squeegee must be lowered as above shown, and when the edge (*e*) is worn too much to be highly effective, the worn end can be squared before being lowered to renew the sharp paint distributing edge (*e*) and a flat paint well sealing end surface, as in the first instance.

The plate 80 is provided (Fig. 6) spaced from its lower edge, with a longitudinal series of threaded holes 83 to receive a corresponding number of bolts 83' extending through and securing to plate 80, the thickened bar member 84 which is formed with a depending jaw portion 85 forming a continuation of one face, and a retaining plate member 86 which has a series of openings of a sufficient size to receive the heads of the bolts 83' is secured to the opposite face of said member, the lower portion of which constitutes a jaw section 87 corresponding to jaw 85. A

series of thumb screws 88 extend through plate 86, and threadedly engage in member 84, and the tightening of which screws clamps said squeegee between the jaws 85 and 87. The inner surface of said jaws may be serrated or roughened as desired. A series of thumb screws 89 are threadedly mounted in said member 84 at right angles to thumb screws 88 and engage a steel strip 90 which constitutes a backing for the squeegee, and adjustment for mounting the rubber squeegee for length is obtained by adjusting said thumb screws 89 and then tightening said first mentioned thumb screws 88 for clamping the squeegee in adjusted position. It will therefore be apparent that adjustment of the squeegee is readily effected by adjustment of the series of thumb screws 88 and 89.

Mounted on the upper ends of the frame members 64 (Figs. 1 and 8) is a top plate 91, said plate having a widened portion 92 at its rear end on which is mounted an electrically driven reversing motor 93 secured by bolts 94, and said plate 91 is secured to the members 64 by bolts 95. A threaded bolt 96 (Fig. 5) above each of the slide blocks 68 and 69 is threadedly engaged in top plate 91 by a nut 97 and threadedly mounted on said bolts are the adjusting knurled nuts 98, and mounted on said bolts and seating against said knurled nuts and the bottom of the openings 99 in the upper ends of said slide blocks 68 and 69 are the compression springs 100. By reason of the floating arrangement of the blocks 68 and 69 which carry the squeegee shaft 70 and connected parts, the weight of such assembly is normally imparted to the rubber squeegee 78 supported on the silk screen 27', and causing said blocks during the printing stroke to float in said frame members 64 of the carriage, in applying pressure to the squeegee. However, an additional pressure may be obtained by adjusting the knurled nuts 98 to compress the springs 100 in accordance with operating requirements. It will thus be seen (Figs. 9 and 10) that the slide blocks 68 and 69 freely float and are reciprocal within the openings 66 or they can move independently with respect to each other, thereby compensating for any misleveling of the table top since it will be noted that said blocks do not seat against the bottom of openings 66 during the printing motion of the squeegee, as indicated by the clearance spaces 101, at the bottom of openings 66, Fig. 5.

Mounted on the right hand side of the carriage C is a paint well or reservoir 102 (Figs. 6 and 14) for the reception of color material 103 to be applied to the work 14 to be printed and which is formed of sheet metal, such as brass and the like. Said well is formed with a side wall 104 and parallel end walls 105, the free edges of the end walls adjacent their upper edges are formed with wing extensions 106, to prevent any excess of paint escaping beyond the squeegee plate 80. The side wall 104 extends downwardly from a point 107 (Fig. 6) providing a downwardly inclined section 108 extending to the bottom edges 109 of ends 105, then rearwardly terminating in an upturned edge and forming a slide base 110, said section 108 constituting a bottom section for said paint well. Mounted adjacent to the top edge of each end member 105 is an angle member 111 secured by bolts 112, and the portions of said angle members extending at right angles to said end members are formed with bayonet slots 113. Said bayonet slots are adapted to receive the projecting portions of bolts 114 (Fig. 4) attached to frame members 64 and by means of which said well is detachably secured to the carriage unit. It will be noted that when the squeegee structure, which includes its mounting plate 80, has reached its limit of motion in reverse or printing direction and has been brought to rest with its free end in sealing engagement with portion 108 of the paint well (Fig. 6), it forms in conjunction therewith a paint retaining bottom for said well until the squeegee structure has reached the limit of its downward movement, and has been automatically

oscillated out of well sealing position, as will directly be more fully explained.

In order to insure a substantially even distribution of the color contents 103 within the paint well 102, a color or paint distributor mechanism 115 is provided (Figs. 6 and 13) as follows:

On the opposite or free end of shaft 157 exterior of the rack 67 is secured a relatively large gear 117 (Fig. 8), meshing with gear 118 on the end of the worm or endless screw shaft 119 journaled in frame members 120 secured to frame 64 by bolts 121. Mounted on the worm or endless screw 122 (Figs. 5 and 13) is a worm block 123 and to which is secured by bolts 124 one end of an arm 125, and positioned on the paint distributor arm 125 is a bearing mounting 126 in which is suitably secured a stub shaft 127 which carries a roller 128 adapted to travel on a rail 129 (Figs. 4, 5, 6 and 13) attached by bolts 130 extending therethrough and through spacer washers 131 and the lower ends of the angle brackets 132, the latter being secured to the under surface of the top plate 91 by bolts 133 (Figs. 4 and 6). This structural arrangement supports the arm 125 carrying the paint distributor paddle 134 and permits said arm to reciprocatingly move the paddle from end to end of the paint well.

The arm 125 is cut back to form the narrow portion 135 to which is suitably welded or otherwise vertically secured a channel block 136 in which is adjustably mounted a strip member 137 formed with an elongated opening 138 through which extends a wing bolt, or the like 139. The paddle 134 is attached to said strip by bolts or rivets 140, and is formed with a tapered lowered portion to substantially conform to the configuration of the bottom of the well formed by the inclined wall section 108 and the complementally positioned squeegee structure when in paint retaining engagement as shown in Fig. 6.

The worm-block 123 mounted on the endless screw 122 carries a block or plate 141 attached by screws or the like 142 and has suitably mounted thereon and secured as at 143 a follower 144 (Fig. 6) engaging in the spiral or endless screw 122, and the speed of shaft 119 being such that when ratioed with that of the squeegee unit for effecting its forward and reverse travel, the paddle 134 will move from the rear end 105 to the front end of the paint well 102 during the forward non-printing travel of the squeegee unit and back to the rear end during its reverse or printing movement, for a purpose hereinafter more fully described.

Positioned within and suitably secured at the left hand end of the frame B (Fig. 8), is, in the present instance, a brass pan 145 with one end 146 suitably attached to the frame end member 24, is fitted over cross frame member 27, the silk screen 27', and with its end 147 tapering down to said screen. This pan is adapted to substantially receive the paint 103 dumped from the paint well 102 as the squeegee unit C reaches the limit of its forward movement.

Arranged and suitably secured, somewhat similar to pan 145, at the right hand end of frame B is, in the present instance, a brass scoop 148 with its vertical end 149 secured to the end frame member 24 (Fig. 7), and which extends in seating engagement with cross bar 27 horizontally to a point 150 and thence arcuately downwardly as at 151 to a tapered edge 152 engaging the screen 27', said arcuate section 151 being so arranged that during the reverse or printing motion of the squeegee 78 when it reaches the edge 152 it will start to move up said arcuate portion carrying with it the residue of the paint remaining from the printing operation, reaching point 150 at the same time the inclined bottom wall 108 of the paint well is passing such point, and at which time said squeegee moves onto said portion 108 and predeterminedly upward in almost sealing engagement therewith as will hereinafter be described in further detail.

Mounted on the drive shaft 153 (Fig. 2) of the electric

motor 93 is a pulley 154 driving, by belt 155, the pulley 156 mounted on one end of shaft 157 journaled in the forwardly projecting members 158 mounted on frame members 64 by the threaded bolts 159 (Fig. 6). The pinions 160 on shaft 157 mesh with the racks 67 completing the drive from the reversing motor 93 to said racks. When the carriage is moving in non-printing direction, and as it approaches the forward or left hand end of frame B the forwardly projecting switch arm 161 secured to the under surface of cap plate 91 by bolts 162 (Fig. 8) engages the trigger arm 163 of the motor and drive reversing switch 164 mounted on an angle member 165 on the arm D at the left hand end of the frame B, causing the carriage C to move in the reverse or printing direction, and as the carriage reaches the limit of its travel at the right hand end of frame B, upon completion of the printing cycle the motor is automatically stopped by a power cut off switch mechanism (not shown).

The motor power for effecting operation of the machine, with the exception of the raising and lowering of the silk screen frame B, is said electric motor 93 (Figs. 2 and 4) which is connected to a source of electric energy (not shown) by the power line 166 the slack loop 167 of which is supported by a fitting 168 on the rear frame member 2. Said line 166 also extends through and is supported, so as to have freedom of movement during the reciprocatory travel of the motor during the printing cycle, by a pipe section 169, said section and power line are suitably attached to the motor as at 170. This manner of mounting said power line 166 with the loop 167 is necessary to prevent its twisting off by reason of the reciprocating travel of the carriage C. A lead off line 171 is connected to the power line 166 as at 172 and the other end is in operative (Fig. 1) connection with the start push button 173 and stop button 174 mounted in face plate 175 on frame leg 1 for controlling the operation of said motor.

On the front end of the squeegee assembly (Figs. 5 and 7) is a toothed pawl 176 mounted on stub shaft 177 having a reduced threaded end 178 adapted to threadedly and supportingly engage in the projection or hub-like portion 179 formed on slide block 68 at its upper end, said pawl adapted to coast with tooth 180 of the ratchet member 181 mounted on the front end of shaft 70. Also mounted on said stub-shaft 177 is a spacer member 182 and a trip finger 183, which parts are united with said pawl by welding. Said trip finger is adapted to effect disengagement of the pawl from ratchet tooth 180 to permit the dropping and swinging of the squeegee structure 78 beyond vertical position as the carriage C approaches the end of its forward travel, and which oscillating movement is arrested by the engagement of the jaw portion 184 of the ratchet member 181, with the integral jaw 185 on the slide block 68, to position the squeegee structure 78 for its reverse travel or printing stroke as shown in Fig. 8 of the drawings.

Mounted on the opposite end of the squeegee shaft 70 from the ratchet 181 is a tubular cam member 186 (Figs. 5 and 10) formed at one end with a cam arm 187 carrying at its free end a cam roller 188 mounted on the enlarged portion of stub-shaft 189, said member 186 at its other end having a projecting jaw 190 adapted for locking engagement with jaw 191 formed on slide block 69, and which action takes place simultaneously with the engagement of the ratchet jaw 184 with jaw 185 of slide block 68, to prevent torsional strain on shaft 70 and to stabilize the positioning of the squeegee. Said member 186 is fixedly mounted on the rear end of the squeegee shaft 70 to rotate said shaft to effect predetermined positioning of the squeegee 78, as its cam roller 188 travels over cam 192 at the end of the reverse travel of the squeegee unit C, said cam 192 being attached to a spacer block and the rear angle member 23 by bolts 193.

Mounted on each of the inner guide rails 61 (Figs. 3 and 8) spaced from the forward end of frame B is a cam

block 194 having a horizontal surface 195 and an inclined cam surface 196, said cams coacting with the ball-bearing rollers 74 to elevate the squeegee carriage or unit C as it reaches the limit of its forward travel to permit oscillative movement of the squeegee member 78 in a forward direction beyond a vertical position without engaging the screen 27'. About the same time or as the squeegee is elevated by said cams 194 the trip finger 183 engages the stop member 197 which effects disengagement of pawl 176 from ratchet 181 thereby permitting the squeegee to drop by its own weight and swing to a position beyond the vertical as shown in dotted lines (Fig. 8). Said stop member 197 is rotatably mounted on stub shaft 198 secured in frame member 23. Positioned on each side of said shaft is a pin 199 adapted to support said stop, and when the stop is positioned to point to the left it will not be engaged by said pawl and the squeegee will remain in paint well sealing position. A pair of cams 200 similar to cams 194 (Figs. 3 and 7) but facing in the opposite direction are similarly mounted on said inner guide rails spaced from the other or right hand end of said frame to perform a similar function to that of said cams 194 upon engagement of said rollers 74 therewith as the carriage C approaches the limit of its travel in reverse or printing direction, except that each of the horizontal surfaces 201 has a slight arcuate decline 202 and as the roller 74 drops to the lower surface level 203 the squeegee assembly is dropped for a purpose directly more fully appearing.

As the carriage approaches the limit of its forward travel and the squeegee assembly starts to be elevated by the cams 194 loosening the sealing contact with side 108 of the paint well and when the rollers 74 are on said cams and pawl 176 is disengaged from ratchet 181 releasing the squeegee to fall by gravity and swing to the position out of contact with the silk screen 27' as shown in Fig. 8. However, should the squeegee unit fail to fall or to the extent required, a positive trip mechanism 204, for effecting its movement to the desired position and at the same time constituting a stop for the further travel of the squeegee unit in forward direction, is provided.

The trip mechanism 204 comprises an angle standard 205 mounted on frame angle member 23 at its forward end and secured by bolts 206, and a cam bar 207 having an enlarged head formed with an upwardly and inwardly cam face 208, said face extending abruptly and outwardly constituting a stop surface 209, said bar 207 being horizontally supported on said standard and secured by bolt 210 (Figs. 1, 2 and 8). Mounted on the squeegee shaft 70 pointing in the direction of and in alignment with cam surface 208, when the squeegee is in the position shown in Fig. 7, is a cam member 211 (Figs. 5 and 8) having an arcuate base 212 formed with an arm 213 projecting outwardly therefrom and with a roller 214 mounted in its free end. Said base 212 is secured to shaft 70 by set screws 215. If, when the squeegee as it approaches the limit of its forward travel upon being released, falls by gravity to the position shown in Fig. 8, then the mechanism 204 will not function, but should the squeegee not properly fall by gravity when released, then as the squeegee unit C is lifted by the engagement of rollers 74 with the cams 194 the roller 214 engages cam face 208 of cam bar 207, and as it rides up said cam it oscillates said squeegee to the position shown in Fig. 8 and as it engages stop 209 further forward travel of the squeegee unit is prevented.

Mounted in the lower ends of base members 63 of the carriage frame members 64 (Figs. 1, 2 and 4) are the bumpers 216 comprising compression springs 217 mounted on rods 218 having rubber or the like bumper heads 219, said rods being slidable in said members 63, and said springs may be fastened at one end to said heads and the other ends to members 63. These bumpers are adapted to engage the angle member 34 of the arm D at the end of reverse travel of the squeegee, as will be apparent from Fig. 4.

While the construction of the instant printing machine and the description and operation of its component parts have been substantially described, it would seem to be of advantage, in connection with any remaining parts to include their description in the more detailed description of the operation of the machine and reference to the salient features of the invention.

Operation

Initially, in effecting operation of the printing machine, a fluid control handle 60 is moved to the right which permits the fluid under pressure to flow through supply pipe 58 and the piping connections to the cylinders 44 causing retraction of the connecting rods 46 and the ends of arm sections 33, and thereby raising the hinged silk screen printing frame B (Fig. 4). Then the movement of handle 60 to the left to perpendicular or neutral position cuts off the fluid flow to the cylinders and exhaust therefrom, and maintains the frame elevated during the placing of the material 14 to be printed on the bed or table surface 6, and following completion of which the handle 60 is moved completely to the left cutting off the fluid flow to said cylinders, the trapped fluid exhausting through pipe 59, permitting the screen frame to resume its lowered or printing position, and as it starts its downward movement push button 173 is depressed permitting the electric current to flow from the source of power through conduit 166, starting motor 93 which propels the squeegee carriage forward and as it approaches its limit of travel the trip finger 161 operates trigger 163 of the reversing switch 164 reversing direction of the current through said motor and starts the travel of said carriage and squeegee in reverse or printing direction.

Further, at the time the unit C begins its forward travel the squeegee 78 is in sealing position with bottom section 108 of the paint well 102; forming therewith a bottom to retain the paint or color material contents in said well during the forward movement of said squeegee unit C. As above stated, the forward travel of the squeegee unit takes place when the frame B is in elevated sloping position, so that the paint in the well tends to flow to the lower or rear end of the well and the worm driven paint distributor paddle 134 is adjacent to said lower or rear end of the well. The motor and worm drives are so ratioed that as the squeegee unit moves forward the paddle moves upwardly, so that as the squeegee approaches the limit of its forward movement the paddle has reached the opposite or front end of the well, thereby effecting distribution of the paint therein so that it will be substantially evenly distributed across the screen when dumped from the well. As the squeegee unit or carriage approaches the end of its forward motion the ball-bearing rollers 74 start up the inclines 196 of cams 194 lifting the carriage and releasing the pressure of the squeegee on section 108. At about this time, finger 183 engages stop member 197 disengaging pawl 176 from ratchet 181 and causing the squeegee structure 78 to drop by gravity dumping the paint upon the pan 145, the squeegee 78 and its supporting plate 80 oscillating slightly beyond the vertical as shown spaced from pan 145 in Fig. 8. The paint as distributed across the screen is now ready to be pushed over and through the screen and upon the material to be printed during the reverse and printing motion of the squeegee. It might be well to state at this point that while the squeegee structure is intended to fall from the paint well by gravity, should it fail to fall or to the extent required, the roller 214 on cam member 211 mounted on squeegee shaft 70 will ride up on cam surface 208 on bar 207 of structure 204 positively oscillating the squeegee structure 78 to the required position, as shown in Fig. 8, and as it engages stop 209 further forward travel of the squeegee unit is prevented.

In this connection it is important to refer to the integral jaw 185 on the slide block 68 and its complementary jaw

184 on ratchet member 181, and to note that as the squeegee unit approaches the limit of its forward travel in the position shown in Fig. 7 these jaws are separated, but when the trip finger 183 effects the disengagement of pawl 176 by engagement with stop 197 allowing the squeegee to fall, and as it oscillates to the position shown in dash lines Fig. 8, the ratchet jaw 184 moves into locking engagement with jaw 185 preventing the squeegee unit from further forward movement (Fig. 8), and irrespective of whether the squeegee falls by gravity or is impelled by the engagement of cam roller 214 with cam face 208 of the structure 204. About the time this action is taking place the finger 161 on squeegee unit C operates reversing switch 164, thus automatically causing the unit to start its travel in the reverse or printing direction.

As the carriage begins its reverse movement and as the rollers 74 start down the inclined surfaces 196 the squeegee 78 is lowered and engages the pan 145, and as the rollers descend the said inclined surfaces the squeegee follows down the taper or incline 147 of the pan and into contact with the silk screen 27'. The squeegee is now at such a predetermined angle that only its sharp edge *e* (Fig. 8) engages the silk screen, and as it pushes the body of paint, it evenly and uniformly distributes it over and through the stencil screen onto the material 14 to produce a clear uniform print, whether the material is paper, cardboard, wood, metal, or the most delicate textile, and whether of a small printing area or one of a dimension heretofore impossible of being printed by any of the machines of the character now in use.

The squeegee in the position above noted is impelled by the said unit throughout the printing operation and as the unit approaches the end of its reverse travel and as the rollers 74 start up the inclined surfaces of cams 200 the squeegee 78 starts to be lifted from the silk screen so that it can be oscillated without exerting pressure on the screen, the start of which movement is effected by the roller 188 of cam 192 as it climbs up the incline surface 220 of said cam. The upwardly inclined surfaces of the cams 200 and 192 are so related that the resultant path of the rubber squeegee 78 and the arcuate incline 151 of scoop 148 are the same, and as the carriage C continues its reverse motion the squeegee is lifted clear of the screen when the ball-bearing rollers 74 arrive on the first horizontal surfaces 201, the pawl 176 is disengaged from the ratchet tooth 180 but is engaged as said cam roller 188 climbs up the surface 220 of cam 192, causing the squeegee to oscillate, and as section 108, by the continued motion of the carriage unit C passes point 150, the squeegee with slight clearance moves from the scoop 148 onto and up said section 108, sweeping with it into said paint well the residue of the paint 103 from the printing operation, and simultaneously as the rollers 74 drop down the inclines or dips 202 to the lower horizontal surfaces 203, the cam roller 188 drops down the incline or dip 221 to the horizontal surface 222 of cam 192, which drops the squeegee unit C, thereby causing squeegee 78 to drop at right angles to and with its flat end 223 forced into sealing engagement with bottom member 108, thereby sealing said paint well against paint leakage, and which completes the reverse motion and the squeegee unit cycle. The desired amount of paint, which term includes ink or color material of the proper consistency, may now be deposited in said well. Said unit C is now in position to start its forward non-printing travel as in the first instance.

The above described stencil printing machine is semi-automatic since, in the present instance, the work is manually placed on the table top or bed surface and removed therefrom, and the fluid control for raising and lowering the printing frame is manually controlled, although a complete printing cycle of the carriage and squeegee unit is automatic, and to duplicate the reversing switch at the other or right hand end of the stencil screen frame would not depart from the scope and

spirit of the invention, and similarly as to a cooperating automatic fluid control for raising and lowering the stencil frame. Also, while in the present instance the fluid used is air, other suitable fluids such as oil may be used as desired.

From the above it will be apparent that I have provided a stencil printing device capable of uniformly distributing a color material over and through a stencil for rapidly effecting a uniform imprint of a color design to be produced, and equally uniform multiples thereof, and irrespective of the types of material on which printed, whether flexible or rigid, and of dimensions heretofore not possible by machines of this character now in use. Said dimensions being of a range up to 3' x 6' and to 5' x 12', and of a limit depending only upon the capacity of the particular machine desired, and which is one of the important features of this invention.

It will also be apparent that I have provided a machine of this character including a bed surface for the work, a stencil frame structure hingedly connected to said surface, a motorized carriage and frame including an incomplete paint reservoir carried thereby, a paint distributing mechanism operable in said reservoir, and a squeegee assembly floatingly mounted in said frame constituting a pressure paint distributing device during the reverse and printing travel of said carriage from the left hand end of the stencil frame, the structural arrangement of said stencil frame and the automatic operation of said assembly in cooperation therewith being such, that during the reverse terminal movement of said carriage, the squeegee, following the printing operation, sweepingly moves the paint residue from said stencil up and into said reservoir as it effects completion thereof, to sealingly retain the paint therein during the forward or non-printing movement of said carriage to the forward or left hand end of said stencil frame, and which completes a printing cycle and travel of said carriage.

It will be further observed that in cooperatively effectuating the above printing cycle, cam means is provided in connection with the left hand end of the stencil frame, coaxing with means carried by the squeegee assembly to elevate the latter as the carriage approaches the limit of its forward travel, and at about the same time, stop means on said frame engages trip means for disengaging the pawl from the squeegee supporting ratchet, permitting the squeegee by its own weight to oscillate about its supporting axis out of engagement with said reservoir, dumping the paint therefrom, and jaw means on said ratchet and carriage frame coaxing to limit said oscillating movement and position the squeegee for its reverse or printing stroke.

Substantially similar cam means adjacent to the reverse or right hand end of the stencil frame lift the squeegee out of contact with the stencil as it approaches said frame end, and as the carriage continues its reverse terminal motion, additional cooperating cam means imparts an oscillating movement to the squeegee to effect sweeping of the residual paint as above described up and into said reservoir or well, said elevating and last mentioned cams being so constructed as to effect, when the squeegee reaches a predetermined position with respect to said well, a slight drop of the assembly forcing the squeegee into paint sealing engagement with a portion of said reservoir and at the same time effecting its completion as above described.

It will be evident that I have designed a stencil printing device of this character including a squeegee carriage adapted for reciprocating travel over a stencil frame and including a paint well having a movable paint distributor therein, said carriage adapted to start its forward travel as the stencil frame starts its closing movement, the speed of the carriage and paint distributor being in such timed sequence that they both will substantially reach the limit of their forward movements at substantially the same time the frame reaches the limit of its closing

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movement, and also at which time, the carriage is reversed and starts its reverse travel or printing stroke, such operation eliminating the time lag ordinarily incident to the forward or non-printing travel of said carriage.

From the above it is obvious that I have designed a stencil printing device of varied capabilities in its adaptive use, such as providing color designs on different types of materials and of dimensions heretofore not possible by machines of this character, and whether such designs are in the form of posters, signs, textile prints or the like, yet a machine adapted to effect a maximum output at a minimum expense, manufacturable at a reasonable cost, simple in construction, and efficient for the purposes intended.

Although in practice it has been found that the form of the invention illustrated in the accompanying drawings and referred to in the above description as the preferred embodiment is the most efficient and practical, yet realizing that conditions concurrent with the adoption of the invention will necessarily vary, it is well to emphasize that various minor changes in details of construction, proportion and arrangement of parts, may be resorted to within the scope of the appended claims without departing from or sacrificing any of the principles of the invention.

Having thus described the invention, what I desire protected by Letters Patent is as set forth in the following claims.

I claim:

1. A machine of the character described comprising a work-supporting bed surface, a stencil frame mounted for movement relative to said surface, a stencil carried by said frame, a carriage reciprocally mounted relative to said frame and having a forward and reverse movement, said carriage including a paint reservoir provided with a normally open paint chute, a squeegee carried by said carriage, a mounting for said squeegee, means for pressing the squeegee into contact with the stencil during the reverse movement of the carriage, and additional means for causing the squeegee to close and seal the normally open paint chute of said paint reservoir as the carriage reaches the limit of its reverse movement said means including cam means carried by the bed surface for elevating the carriage, and additional cam means coacting with a cam roller connected with the squeegee mounting to cause said squeegee to oscillate and at a predetermined point in its oscillatory movement to drop into sealing engagement with the reservoir.

2. A machine of the character described comprising a work-supporting bed surface, a stencil frame mounted for movement relative to said surface, a stencil carried by said frame, a carriage reciprocally mounted relative to said frame and having a forward and reverse movement, said carriage including a paint reservoir provided with a normally open paint chute, a squeegee carried by said carriage, means for pressing the squeegee into contact with the stencil during the reverse movement of the carriage, and additional means causing the squeegee to sweep the residue of the paint from the stencil into said reservoir and at the same time actuating the squeegee into closing and sealing relation with respect to the normally open chute of said reservoir as the carriage reaches the limit of its reverse travel said means including cam means carried by the bed surface for elevating the carriage, and additional cam means coacting with a cam roller having connection with the squeegee to cause said squeegee to oscillate and at a predetermined point in its oscillatory movement to drop into sealing engagement with the reservoir.

3. A machine of the character described comprising a work-supporting bed surface, a stencil frame mounted for movement relative to said surface, a stencil carried by said frame, a carriage reciprocally mounted relative to said frame and having a forward and reverse movement, said carriage including a paint reservoir provided

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with a normally open paint chute, a squeegee unit mounted in said carriage, said unit including a floatably supported mounting, a squeegee carrier carried by said mounting, a squeegee affixed to said carrier, means for causing said squeegee to exert uniform pressure upon said stencil during the reverse movement of said carriage without regard to variations in the plane of said bed surface, and additional means for lifting the squeegee out of contact with the stencil at the limit of the reverse movement of said carriage, and positioning said squeegee in closing and sealing relation relative to the normally open chute of said paint reservoir said means including cam means carried by the bed surface for elevating the carriage, and additional cam means coacting with a cam roller connected with the squeegee mounting to cause said squeegee to oscillate and at a predetermined point in its oscillatory movement to drop into sealing engagement with the reservoir.

4. A machine of the character described comprising a work-supporting bed surface and mounting, a stencil frame connected to said mounting and movable relative to said surface, a stencil carried by said frame, a carriage mounted for returnable movement over said frame, said carriage including a paint reservoir provided with a discharge opening, a squeegee unit carried by said carriage, said unit including a yieldable mounting, a squeegee carrier connected with said mounting, a squeegee affixed to said carrier, said carrier and squeegee being operable into closing and sealing relation relative to the opening of said reservoir, means for locking said squeegee in its closing and sealing position, means for actuating said carrier and squeegee to a position releasing said paint from said reservoir as the carriage approaches the limit of its forward travel, means for reversing the direction of travel of said carriage, and means for gradually lowering the squeegee into pressure contact with the stencil immediately after the carriage starts its reverse travel.

5. A machine of the character described comprising a work-supporting bed surface, a stencil frame mounted for movement relative to said bed surface, a stencil carried by said frame, a carriage mounted for forward and reverse movement over said frame, said carriage including a paint reservoir provided with a discharge opening, a squeegee unit carried by said carriage, said unit including a yieldable mounting, a squeegee carrier connected with said mounting, a squeegee affixed to said carrier, said carrier and squeegee being operable into closing and sealing relation relative to the opening of said reservoir, means for locking said squeegee in its closing and sealing position, means for unlocking the squeegee as it approaches the limit of its forward travel and discharging said paint, and means for gradually lowering the squeegee into pressure relation with respect to said stencil subsequent to the start of the carriage on its reverse travel.

6. In a device of the character described comprising a work-supporting bed surface, a stencil frame mounted for movement relative to said bed surface, a squeegee carriage mounted on said frame for forward and reverse travel thereover, a paint well mounted on said carriage, a paint distributor mounted for forward and reverse travel in said well, means operable to effect the raising and lowering of said frame with respect to said bed surface, means for driving said carriage, said means being operative, at the starting of the lowering movement of said stencil frame, to start simultaneously the forward movement of the carriage and paint distributor, the time sequence of the carriage, paint distributor and frame being such that they will reach their respective limits of travel at substantially the same time.

7. A machine of the character described comprising a work-supporting bed surface, a stencil frame mounted for movement relative to said bed surface, a stencil carried by the frame, a carriage mounted for forward and reverse movement over said frame, said carriage being

provided with a partially open paint reservoir, a paint distributor mounted for forward and reverse travel in said reservoir, a squeegee means oscillatively mounted on said carriage, means for actuating said squeegee means into a position completing said partially completed paint reservoir as the carriage reaches the limit of its reverse movement, said last mentioned movement of said squeegee means sweeping the residue paint from the stencil into said reservoir, driving means for the carriage and paint distributor, said means operable to simultaneously start the forward movements of the carriage and paint distributor, their time sequence being such that the distributor will about reach the limit of its forward movement as the carriage approaches the limit of its forward movement, means operable about the same time to release said squeegee from its paint reservoir completing position discharging the said paint from said reservoir, means for reversing the direction of travel of said carriage and paint distributor, and means for angularly positioning said squeegee means in pressure contact with the stencil subsequent to the start of the carriage and distributor on their reverse travel.

8. In a machine of the character described, comprising a work-supporting bed surface, a stencil frame mounted for movement relative to the bed surface, a stencil carried by the frame, a carriage including a frame, an incomplete paint reservoir carried by the frame, a paint distributor mounted for forward and reverse movement within said reservoir, said carriage having forward and reverse movement relative to the stencil frame, a squeegee assembly including the squeegee and its mounting floatingly mounted in said carriage frame, said assembly constituting a self pressure paint distributing device during the reverse movement of said carriage, the construction and arrangement of means on said stencil frame and that of coacting means on said assembly being such, that as the carriage approaches the limit of its reverse movement, the squeegee sweepingly moves the paint residue from said stencil up and into said reservoir and sealingly completes said reservoir as the carriage reaches the limit of its reverse movement.

9. In a machine of the character described, comprising a work-supporting bed surface, a stencil frame mounted for movement relative to the bed surface, a stencil carried by the frame, a carriage including a frame, an incomplete paint reservoir carried by the frame, a paint distributor mounted for forward and reverse movement within said reservoir, said carriage having forward and reverse movement relative to the stencil frame, a squeegee assembly including the squeegee and its mounting floatingly mounted in said carriage frame, said assembly constituting a self pressure paint distributing device during the reverse movement of said carriage, the construction and arrangement of means on said stencil frame and that of coacting means on said assembly being such, that as the carriage approaches the limit of its reverse movement, the squeegee sweepingly moves the paint residue from said stencil up and into said reservoir and sealingly completes said reservoir as the carriage reaches the limit of its reverse movement, means for simultaneously starting the forward movement of the carriage and paint distributor, the speed of the carriage and distributor being so ratioed that the distributor and carriage will complete their forward movements substantially at the same time, means for discharging the paint contents of said reservoir as the carriage approaches the limit of its forward movement, means for automatically reversing the direction of travel of said carriage as it reaches the limit of its forward movement, and means for angularly positioning the squeegee into pressure contact with said stencil subsequent to the start of the carriage on its reverse travel.

10. A machine of the character described, comprising a work-supporting bed surface, a stencil frame, a stencil carried by the frame, said frame being mounted for move-

ment relative to the bed surface, a carriage mounted on said frame and having forward and reverse movements thereover, said carriage including opposite frame members, a partially complete paint reservoir carried by said frame members, a squeegee assembly, said assembly including block members floatingly mounted in said frame members, a squeegee carrier oscillatingly mounted in said blocks and a squeegee adjustably mounted on said carrier, means on the stencil frame adapted to coact with means on said carrier mounting, the construction and arrangement of said coacting means being such, that as the carriage approaches the limit of its reverse movement, the carrier and squeegee is operated to sweepingly move the paint residue from the stencil up and into said reservoir and to sealingly complete the same as the carriage reaches the limit of its reverse movement, means in connection with said carrier mounting coacting with means carried by said frame to effect release of the squeegee from its reservoir sealing position to discharge the paint as the carriage approaches the limit of its forward movement, and means for angularly positioning the squeegee into pressure contact with said stencil subsequent to the start of the carriage on its reverse travel.

11. An apparatus of the character described, comprising an adjustable work-supporting bed surface, a mounting for said bed surface, a stencil frame hingedly connected to said mounting and adapted to be raised and lowered relative to said surface, a carriage mounted for forward and reverse movements over said stencil frame, said carriage including a pair of laterally spaced frame members slidably mounted in the stencil frame, each frame member including a pair of vertical guides, a block floatably positioned within each of said guides, a shaft supported adjacent to its end by said blocks, a squeegee carrier affixed to said shaft, a squeegee adjustably attached to said carrier, a paint reservoir in connection with said carriage, said reservoir including an open portion adapted to be closed by the squeegee carrier and squeegee, means for imparting reciprocal movement to said carriage, camming means for elevating said blocks, squeegee carrier and squeegee as the carriage approaches the end of its reverse movement, additional camming means for oscillating said squeegee carrier and squeegee during such movement of the carriage to sweep the paint into said reservoir, said additional means including means for locking and sealing the carrier and squeegee in a position closing and sealing said reservoir as said carriage reaches the limit of its reverse movement, camming means coacting with said blocks, carrier and squeegee, means for unlocking the carrier and squeegee and distributing said paint from the reservoir as the carriage approaches the end of its forward travel, means for automatically reversing the travel of the carriage, and means for angularly positioning the squeegee for printing contact with the stencil during the reverse movement of said carriage.

12. An apparatus of the character described comprising an adjustable work-supporting bed surface, a mounting for said bed surface, a stencil frame hingedly connected to said mounting, means for hydraulically raising and lowering said stencil frame relative to said bed surface, a carriage, said carriage including a partially complete paint reservoir, means for causing said carriage to move in a forward and reverse movement over said stencil frame, means for automatically reversing the movement of said carriage at the end of its forward movement, said carriage including a pair of laterally spaced frames slidable in said stencil frame, each of said frames embodying a pair of vertically disposed laterally spaced guide members, a block mounted for vertical movement within each of said guide members, a shaft supported adjacent its ends by said blocks, a squeegee carrier adjustably attached to said shaft, a squeegee adjustably affixed to said carrier, means for elevating and oscillating said shaft as the carriage approaches the end of its reverse movement whereby to sweep the squeegee and

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its carrier from the stencil into a position completing said reservoir, said sweeping movement of the squeegee carrying with it the paint residue in advance of the squeegee, camming means for elevating the carriage, and means for effecting removal of the carrier and the squeegee from its sealing position and simultaneously discharging the paint from said reservoir as the carriage approaches the limit of its forward movement, and means for angularly positioning the squeegee for pressure contact with the stencil during the reverse movement of said carriage.

13. An apparatus of the character described comprising an adjustable work-supporting bed surface, a mounting for said bed surface, a stencil frame hingedly connected to said mounting, means for hydraulically raising and lowering said stencil frame relative to said bed surface, a carriage, said carriage including a partially complete paint reservoir, means for causing said carriage to move in a forward and reverse movement over said stencil frame, means for automatically reversing the movement of said carriage at the end of its forward movement, said carriage including a pair of laterally spaced frames slidable in said stencil frame, each of said frames embodying a pair of vertically disposed laterally spaced guide members, a block mounted for vertical movement within each of said guide members, each of said blocks formed in their upper ends with countersunk openings, pressure means seating in said openings and manually operable means for effecting adjustment of said pressure means with respect to said blocks, a shaft supported adjacent its ends by said blocks, a squeegee carrier adjustably attached to said shaft, a squeegee adjustably affixed to said carrier, means for elevating and oscillating said shaft as the carriage approaches the end of its reverse movement, whereby to sweep the squeegee and the carrier from the stencil into a position completing said reservoir, said sweeping movement of the squeegee carrying with it the paint residue in advance of the squeegee, camming means for effecting removal of the carrier and its squeegee from its sealing position and simultaneously discharging the paint from said reservoir as the carriage approaches the limit of its forward movement, and means for angularly positioning the squeegee for pressure contact with the stencil during the reverse movement of said carriage.

14. An apparatus of the character described comprising an adjustable work-supporting bed surface, a frame structure supporting said bed surface, a stencil frame hingedly connected to said supporting frame for the bed structure, manually controlled hydraulic means connected with the stencil frame for raising and lowering the latter relative to the bed surface, a carriage mounted for forward and reverse movement over said stencil frame, said carriage including a partially complete paint reservoir and a paint distributing mechanism mounted within and operable lengthwise of said reservoir, said carriage being supported by a pair of frame members slidably mounted in the stencil frame, each of said frame members including a pair of vertical guides, a squeegee unit including a squeegee carrier, a squeegee adjustably affixed to the carrier, a shaft supporting said carrier and a pair of blocks mounted on the shaft adjacent its extremities, said blocks being floatably mounted in said guide members, camming means coacting with said squeegee unit to elevate said unit as the carriage approaches the end of its reverse movement, said camming means including additional camming means for oscillating the unit whereby to impart a sweeping movement to the carrier and squeegee to sweep the residue paint into said reservoir and to complete the latter, and additional camming means in connection with the last mentioned camming means for locking and sealing the squeegee as the carriage attains the limit of its reverse movement, means for releasing the carrier and squeegee from its sealing position and discharging said paint upon the stencil as the carriage approaches the end of its forward travel, and means for

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angularly positioning the carrier and squeegee relative to the stencil subsequent to the start of its reverse movement.

15. An apparatus of the character described comprising an adjustable work-supporting bed surface, a frame structure supporting said bed surface, a stencil frame hingedly connected to the supporting frame for said bed structure, manually controlled hydraulic means connected with the stencil frame for raising and lowering the latter relative to the bed surface, a carriage mounted for forward and reverse movement over said stencil frame, means for automatically reversing the forward travel of the carriage, said carriage including a partially complete paint reservoir and a paint distributing mechanism mounted within and operable lengthwise of said reservoir, said carriage being supported by a pair of frame members slidably mounted in the stencil frame, each of said frame members including a pair of vertical guides, a squeegee unit including a squeegee carrier, a squeegee adjustably affixed to the carrier, a shaft supporting said carrier and a pair of blocks mounted on the shaft adjacent its extremities, said blocks being floatably mounted in said guide members, camming means coacting with said squeegee unit to elevate said unit as the carriage approaches the end of its reverse movement, said camming means including additional camming means for oscillating the unit whereby to impart a sweeping movement to the carrier and squeegee to sweep the residue paint into said reservoir and to complete said reservoir, and additional camming means in connection with the last mentioned camming means for locking and sealing the squeegee in reservoir completing and sealing position as the carriage attains the limit of its reverse movement, means operable to cause said carrier and squeegee to drop by gravity to a position beyond a plane normal to that of the stencil as the carriage approaches the limit of its forward movement, and means for lowering the squeegee into pressure contact with the stencil subsequent to the starting of the reverse movement of the carriage.

16. An apparatus of the character described, comprising an adjustable work-supporting bed surface, a frame structure supporting said bed surface, a stencil frame hingedly connected to the supporting frame for said bed structure, manually controlled hydraulic means connected with the stencil frame for raising and lowering the latter relative to the bed surface, a carriage mounted for forward and reverse movement over said stencil frame, said carriage including a partially complete paint reservoir and a paint distributing mechanism mounted within and operable lengthwise of said reservoir, said carriage being supported by a pair of frame members slidably mounted in the stencil frame, each of said frame members including a pair of vertical guides, a squeegee unit including a squeegee carrier, a squeegee adjustably affixed to the carrier, a shaft supporting said carrier and a pair of blocks mounted on the shaft adjacent its extremities, said blocks being floatably mounted in said guide members, camming means coacting with said squeegee unit to elevate said unit as the carriage approaches the end of its reverse movement, said camming means including additional camming means for oscillating the unit whereby to impart a sweeping movement to the carrier and squeegee to sweep the residue paint into said reservoir and to complete said reservoir, and additional camming means in connection with the last mentioned camming means for locking and sealing the squeegee in reservoir completing position as the carriage attains the limit of its reverse movement, means operable to cause said carrier and squeegee to drop by gravity to a position beyond a plane normal to that of the stencil as the carriage approaches the end of its forward movement, means for locking said carrier and squeegee when it attains a predetermined position relative to the stencil, and means for lowering the squeegee into pressure con-

tact with the stencil subsequent to the starting of the reverse movement of the carriage.

17. An apparatus of the character described comprising an adjustable work-supporting bed surface, a frame structure supporting said bed surface, a stencil frame hingedly connected to the supporting frame for said bed surface, manually controlled hydraulic means connected with the stencil frame for raising and lowering the latter relative to the bed surface, a carriage mounted for forward and reverse movement over said stencil frame, said carriage including a partially complete paint reservoir, said carriage being supported by a pair of frame members slidably mounted in the stencil frame, each of said frame members including a pair of vertical guides, a squeegee unit including a squeegee carrier, a squeegee adjustably affixed to the carrier, a shaft supporting said carrier and a pair of blocks mounted on the shaft adjacent its extremities, said blocks being floatably movable in said guide members, camming means coacting with said squeegee unit to elevate said shaft as the carriage approaches the end of its reverse movement, said camming means including additional camming means for oscillating the unit whereby to impart a sweeping movement to the carrier and squeegee to sweep the residue paint into and to complete said reservoir, and additional camming means in connection with the last mentioned camming means for locking and sealing the squeegee in reservoir completing position as the carriage attains the limit of its reverse movement, means operable to cause said carrier and squeegee to drop by gravity to a position beyond a plane normal to that of the stencil as the carriage approaches the end of its forward movement, means for automatically positioning the carrier and squeegee in angular relation with respect to the stencil, should said carrier and stencil when it drops by gravity fail to assume its proper angular position relative to the stencil, and means for lowering the squeegee into pressure contact with the stencil subsequent to the starting of the reverse movement of the carriage.

18. An apparatus of the character described comprising an adjustable work-supporting bed surface, a frame structure supporting said bed surface, a stencil frame hingedly connected to the supporting frame for said bed surface, manually controlled hydraulic means connected with the stencil frame for raising and lowering the latter relative to the bed surface, a carriage mounted for forward and reverse movement over said stencil frame, said carriage including a partially complete paint reservoir, said carriage being supported by a pair of frame members slidably mounted in the stencil frame, each of said frame members including a pair of vertical guides, a squeegee unit including a squeegee carrier, a squeegee adjustably affixed to the carrier, a shaft supporting said carrier and a pair of blocks mounted on the shaft adjacent its extremities, said blocks being floatably movable in said guide members during the reverse printing movement of said squeegee, camming means coacting with said squeegee unit to elevate said shaft as the carriage approaches the end of its reverse movement, said camming means including additional camming means for oscillating the unit whereby to impart a sweeping movement to the carrier and squeegee to sweep the residue

paint into and to complete said reservoir, and additional camming means in connection with the last mentioned camming means for locking and sealing the squeegee in reservoir completing position as the carriage attains the limit of its reverse movement, and means for lowering the squeegee into pressure contact with the stencil subsequent to the reverse starting movement of the carriage, the weight of said squeegee unit providing the pressure of the squeegee on the stencil during the reverse printing movement of the carriage.

19. An apparatus of the character described comprising an adjustable work-supporting bed surface, a frame structure supporting said bed surface, a stencil frame hingedly connected to the supporting frame for said bed surface, means connected with the stencil frame for raising and lowering the latter relative to the bed surface, a carriage mounted for forward and reverse movement over said stencil frame, said carriage including a partially complete paint reservoir, and a paint distributing mechanism mounted within and operable forward and reverse of said reservoir, said carriage being supported by a pair of frame members slidably mounted in the stencil frame, each of said frame members including a pair of vertical guides, a squeegee unit including a squeegee carrier, a squeegee adjustably affixed to the carrier, a shaft supporting said carrier and a pair of blocks mounted on the shaft adjacent its extremities, said blocks being floatably movable in said guide members during the reverse and printing movement of said squeegee, camming means coacting with said squeegee unit to elevate said shaft as the carriage approaches the end of its reverse movement, said camming means including additional camming means for oscillating the unit whereby to impart a sweeping movement to the carrier and squeegee to sweep the residue paint into and to complete said reservoir, and additional camming means in connection with the last mentioned camming means for locking and sealing the squeegee in reservoir completing position as the carriage attains the limit of its reverse movement, means for starting the forward movement of said carriage at the same time said stencil frame is started on its lowering movement, the time sequence of said carriage and stencil frame is such that they will complete their forward and lowering movements at substantially the same time, means for lowering the squeegee into pressure contact with the stencil subsequent to the starting of the reverse movement of the carriage, the weight of said squeegee unit providing the pressure of the squeegee on the stencil during the reverse printing movement of said carriage, and manually controlled means coacting with said squeegee unit for supplementing the pressure afforded by said squeegee unit.

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