

Oct. 16, 1951

L. F. D'AUTREMONT
STENCIL PRINTING MACHINE

2,571,685

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2 SHEETS—SHEET 1

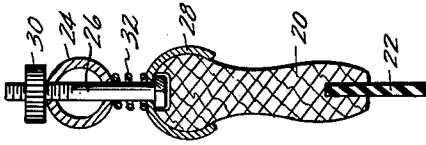


Fig. 2

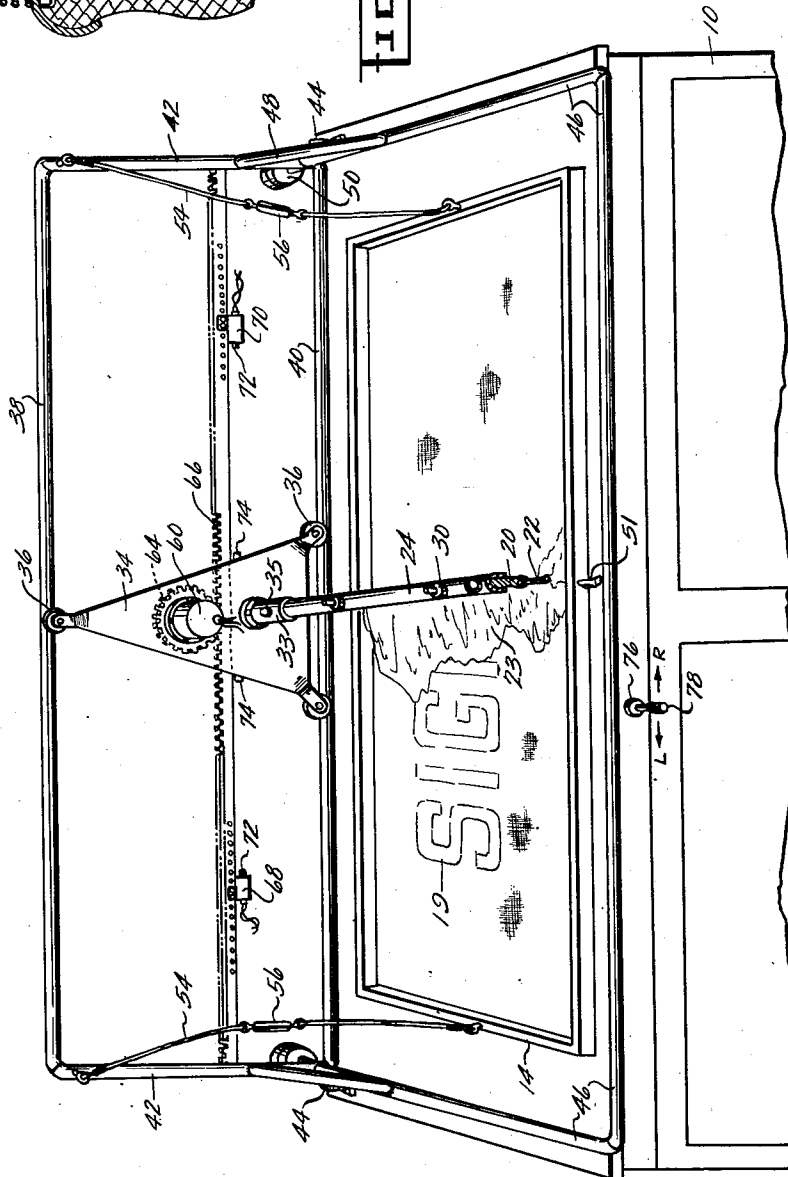


Fig. 1

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2 SHEETS—SHEET 2

Fig 4

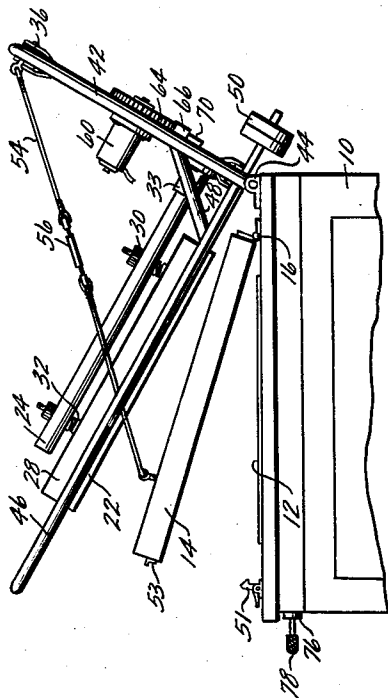


Fig 5

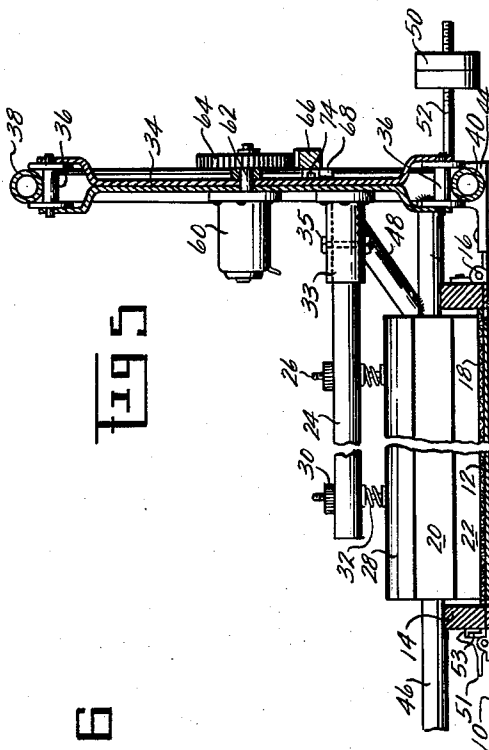


Fig 3

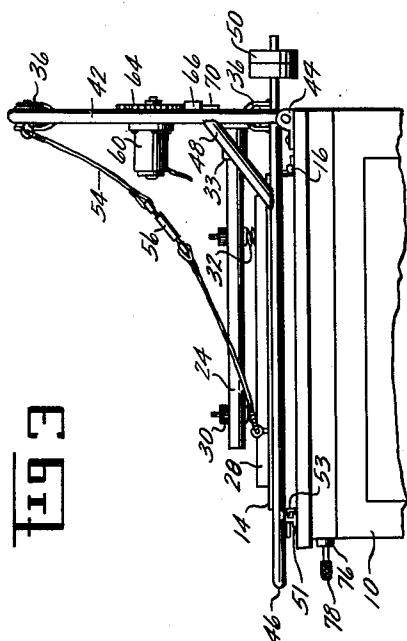
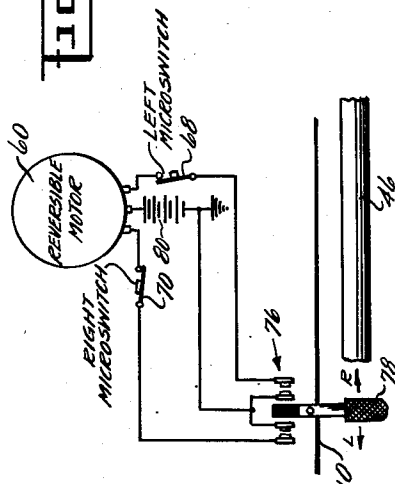


Fig 6



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STENCIL PRINTING MACHINE

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3 Claims. (Cl. 101—123)

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This invention relates to stencil printing machines and more particularly to a squeegee operating and control mechanism for such machines.

In the past it has been customary to carry out screen-process printing operations on printing tables of the conventional type to which the screen frame or a master frame is attached by hinges in order that it may be elevated while the finished work is being removed and the fresh material inserted. In this type of apparatus, the printing color is generally worked through the screen by means of a hand-operated squeegee, although in recent years machines have been developed for mechanically operating the squeegee back and forth across the screen. These machines have been found helpful in relieving the workmen of the tiresome labor of working the squeegee back and forth across the screen on long runs or where a number of pieces are to be run from a large stencil. These machines have proved fairly successful and on large runs have operated at speeds of two or three thousand impressions per hour as against two or three hundred impressions per hour for hand operated equipment. In the case of jobs involving small runs, i. e., less than one thousand pieces, it has not proved feasible to use the process printing machines since the cost of setting up the job is greater than the savings effected through the use of the high speed equipment. Furthermore, none of the machines now on the market have been designed to enable the operator to vary the pressure on the squeegee as required during the course of the run. For example, it is a well known fact that as the run proceeds, the paint tends to become thick and gummy and more pressure must be applied to the squeegee in order to force the paint through the screen.

Accordingly, it is an object of my invention to provide a relatively simple and inexpensive process printing machine which may be easily and quickly set up for each run, and hence is as feasible for use on small runs as on large ones.

It is another object of my invention to provide a process printing machine in which the pressure of the mechanically operated squeegee on the screen plate is under the control of the operator at all times during the run.

It is a further object of my invention to provide a mechanically operated squeegee which may be raised or lowered at the will of the operator after each wiping movement back and forth across the screen plate.

It is still a further object of my invention to provide in an apparatus employing a mechani-

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cally operated squeegee, a single control member which may be manipulated by the operator to both raise the squeegee off of the screen and also to elevate the screen frame above the printing table so as to permit the printing material to be removed and inserted.

A further object of my invention is to provide in a mechanically operated squeegeeing apparatus, a single control member by means of which the operator may at all times control the pressure of the squeegee against the screen as it passes over the screen plate and also lift the squeegee off of the screen and elevate the screen frame above the printing table so as to permit the removal of the finished work or the insertion of fresh printing material.

Still a further object of my invention resides in the provision of a novel electrical drive means for operating the squeegee back and forth across the screen.

With these and other objects in view which will become apparent as the following description proceeds, the invention includes certain novel features of design and combinations of parts, the essential elements of which are set forth in the appended claims and a preferred form or embodiment of which is hereinafter described with reference to the drawings which accompany and form a part of this specification.

In the drawings:

Figure 1 is a perspective view of my new stencil printing machine as it appears when mounted on the top of a conventional type of printing table.

Figure 2 is a cross-section through the squeegee and the bar which supports it.

Figure 3 is a right side elevation of my novel apparatus with the squeegee and the screen frame in their operating positions.

Figure 4 is a view similar to Figure 3 but showing the squeegee and the screen frame in their raised or elevated positions.

Figure 5 is a sectional elevation through the squeegee carriage, the track therefor, and the screen frame.

Figure 6 is a wiring diagram of the motor circuit and the control switches.

A preferred form or embodiment of my invention is shown in the accompanying drawings in which Figure 1 illustrates the general arrangement and construction of my novel apparatus. As herein shown, the mechanism is adapted to be supported on a printing table 10 of conventional design which may, if desired, be provided with a heavy plate-glass working surface on which the printing material 12 (Figs. 4 and 5) may be

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placed. An ordinary screen frame 14 is hinged along its rear edge to the table top by means of removable-pin hinges 16 (Figs. 4 and 5), this frame having stretched thereon the usual silk or metal screen 18 (Fig. 5) which carries the stencil for forming the design 19 (Fig. 1) to be printed.

A squeegee 20 (see also Fig. 2) having the usual rubber blade 22 is arranged, in a manner hereinafter to be described, to cooperate with the screen for the purpose of working the printing color 23 (Fig. 1) through the screen and onto the printing material in the well-known manner. As shown in the figures, the squeegee is attached to a supporting bar 24 by means of bolts 26 which have their heads anchored to the squeegee by means of a metal retaining strip 28 secured to the handle portion of the squeegee. The threaded ends of the bolts are passed through suitable apertures provided in the bar 24 and are supplied with thumb screws 30 on their upper ends which may be run down against the upper surface of the bar so as to load compression springs 32 which are inserted between the bar and the strip 28. With this arrangement it is possible to adjust the lower edge of the blade 22 with relation to the horizontal so as to cause the blade to bear evenly against the screen 18 when the parts are in the positions shown in Figure 5 and also to control the stiffness of the springs 32 and thereby increase or decrease the flexibility of the connection between the squeegee and the supporting bar.

In order to enable the squeegee to be traversed to and fro across the screen, the inner end of the bar 24 is slidably received within a tubular socket 33 which is rigidly attached to a triangularly shaped carriage 34 (Figs. 1 and 5). The bar 24 is retained within the socket by means of a bolt 35 which passes through holes provided therefor in the socket and in the tube which constitutes the bar 24. The holes in the tube are preferably made somewhat larger in diameter than the bolt in order that the squeegee may rotate in the socket to a limited extent and thereby enable the corners on the bottom edge of the blade 22 to bear against the screen. On the carriage 34 are pivotally mounted three grooved rollers 36, one at each of the apices of the triangle. These rollers cooperate with an upper rail 38 and a lower rail 40 consisting of pieces of metal tubing which are held in a spaced and parallel relationship by means of short lengths of tubing 42 welded thereto. The ends of the lower rail 40 are permitted to extend slightly beyond the tubes 42 to thereby form trunnions which are journaled in bearing blocks 44 secured to the top of the printing table. The resulting track structure consisting of the rails 38 and 40 and the end pieces 42 is thus pivotally supported on the table top so as to enable the squeegee to be raised or lowered relative thereto.

The tilting or pivoting of the track may be manually controlled by the operator of the machine by means of a U-shaped control bar 46 which is rigidly secured at either end to the end pieces 42 a short distance above the table top. The attachment of the control bar to the track structure is strengthened and rendered more rigid by means of reinforcing struts 48 extending diagonally between the bar 46 and the end pieces 42.

The pivotally supported structure consisting of the control bar, the track, the carriage and the squeegee, is adapted to be counterbalanced by means of counterweights 50 which are ad-

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justably mounted on the ends of threaded rods 52 (Fig. 5) which are welded to the rail 40. The turning moment produced by the counterweights should be sufficiently large to lift the squeegee and the screen frame off of the table when the control bar is released. The screen frame is normally restrained against such upward movement by means of a spring operated latch 51 which is adapted to engage with a catch 53 (Fig. 4) secured to the frame 14.

In order to facilitate the removal of the finished work from beneath the screen frame 14 and the insertion of fresh printing material thereunder, the control bar and the frame are connected with one another by means of a pair of flexible cables 54 which are made adjustable as to length by means of turnbuckles 56. A certain amount of slack is left in the cables so that the squeegee may be lifted clear of the screen before the frame will be affected, thereby enabling the squeegee to be lifted over the supply of printing color at the end of each stroke of the squeegee. With further elevation of the control bar, the screen frame may also be lifted after the latch 51 is released, as shown in Figure 4, in order to provide access to the printing material lying beneath the frame.

The squeegee is adapted to be driven back and forth across the stencil by means of a reversible electric motor 60 which is bolted to the carriage, as shown in Figures 1 and 5. The motor is preferably of the type having suitable reduction gearing incorporated within the motor housing so as to drive the shaft 62 thereof at reduced speed. Mounted on the end of the motor shaft 62 is a spur gear 64 which meshes with the teeth of a rack bar 66 supported between the end pieces 42. Adjustably mounted on the rack bar are microswitches 68 and 70 having the usual operating buttons 72 which are adapted to be engaged by projections 74 mounted on either side of the carriage. The microswitches are of the closed circuit type, the circuit therethrough being broken when the buttons 72 are contacted by the projections 74.

The direction of rotation of the motor shaft is arranged to be controlled by a single pole-double throw toggle switch 76 which is preferably mounted on the front of the printing table in any desired fashion. The switch is adapted to be manually operated so as to reverse the motor by means of a thumb lever 78 projecting outwardly from the table so as to be within easy reach of the operator.

The wiring diagram of the motor 60 and the switches 68, 70, and 76 is shown in Figure 6. As herein shown, a source of electric current of any suitable type such as a battery 80, is connected between the center terminal of the motor and ground. The center terminal of the reversing switch 76 is also connected to ground while the outer terminals thereof are connected through the microswitches to the outer terminals of the motor. Thus, when the thumb lever 78 is moved to the left as viewed in Figure 6, the circuit to the motor through the left microswitch 68 is closed and the carriage will be moved toward the left-hand side of the printing table as viewed in Figure 1. However, when the projection 74 on the left-hand side of the carriage strikes against the button 72 of the switch 68, the circuit through the motor will be broken and the carriage will stop. After a fresh piece of printing material has been inserted beneath the screen, the thumb lever may be moved to its right-hand position to

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thereby close the circuit through the right micro-switch 70 and the carriage will be driven toward the right-hand side of the table. Movement of the carriage in this direction will continue until the projection 74 on the right-hand side of the carriage strikes against the button 72 of the switch 70 which will cause the circuit through the motor to be broken and the carriage to stop. Continued traversing movement of the carriage back and forth across the screen may be controlled by suitable manipulation of the switch lever 78.

The operation of my machine in performing stencil printing operations is as follows:

A suitable amount of printing color 23 is placed on the screen 18. The latch 51 is then released so as to permit the counterweights 50 to raise the screen frame 14 above the table as shown in Figure 4. A piece of fresh printing material is then placed under the screen, the bar 46 lowered to the position shown in Figure 3, and the frame 14 latched down. Assuming that the squeegee is in its extreme right-hand position, the thumb lever 78 is moved to the left to thereby cause the carriage to be driven in a left-hand direction across the screen plate. The printing color will thus be forced through the screen onto the printing material and the pressure exerted on the control bar by the operator will regulate the sharpness of the impression. Just before the squeegee reaches its extreme left-hand position, the control bar may be released so as to allow the squeegee to be lifted above the body of printing color and enable it to move over the color to its left-most position where it will be stopped by the microswitch 68. The latch 51 may then be released so as to permit the screen frame to be lifted above the table so that the finished work may be removed and a fresh piece of material inserted. The bar is then lowered, the frame latched down, and the switch lever 78 moved toward the right. Inasmuch as the squeegee has now moved down behind the mass of printing color, the latter will be pushed ahead of the squeegee during its right-hand travel across the screen. As in the preceding operation, the control bar may be released after the squeegee has passed the end of the stencil so as to enable the squeegee to move over the color and at the same time to urge the frame 14 off of the table. The latch 51 is then released so as to permit the frame 14 to rise and the finished work is then removed and a new piece of material inserted and the above-described procedure continued throughout the remainder of the run.

Although I have described my new and improved machine in considerable detail and have therefore utilized certain specific terms and language herein, it is to be understood that the present disclosure is illustrative rather than restrictive and that changes and modifications may be resorted to without departing from the spirit or the scope of the claims which follow.

What I claim as new and desire to secure by Letters Patent is:

1. A process printing machine comprising a printing table, a screen-frame arranged for movement toward and away from said table, a

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control frame supported for movement relative to said table, a track on said control frame, a carriage mounted on said track for traversing movement thereon, a squeegee secured to said carriage, a handle on said control frame for enabling the operator to move said frame relative to said table and thereby raise or lower said squeegee, and a lost motion device for connecting said control frame with said screen-frame so as to cause said screen frame to be moved away from said table after said squeegee has been raised a predetermined distance above said table to thereby enable printing material to be inserted or removed from beneath said frame.

2. A process printing machine comprising a printing table, a screen-frame hinged to said table, a control frame pivotally supported on said table for rotation about an axis parallel to the hinge axis of said screen-frame, a track on said control frame, a carriage arranged for movement along said track, a squeegee secured to said carriage, a handle on said control frame for enabling the operator to rock said frame on said table and thereby raise or lower said squeegee, and a lost-motion connection between said control frame and said screen-frame so as to cause said screen frame to be moved away from said table after said squeegee has been lifted clear of said stencil to thereby enable printing material to be inserted or removed from beneath said frame.

3. A process printing machine comprising a printing table, a screen-frame pivotally secured to said table so as to enable said frame to be lifted off of said table or lowered into contact therewith, a control frame pivotally supported on said table for rotation about an axis parallel to the axis of rotation of said screen-frame, a track on said frame, a carriage adapted to travel back and forth along said track, power-operated means for moving said carriage in one direction or another along said track, a squeegee mounted on said carriage for movement therewith, a handle on said control frame for enabling the operator of the machine to rock said frame on said table and thereby raise or lower said squeegee, and a lost-motion connection between said control frame and said screen-frame so as to cause said screen frame to be lifted off of said table after said squeegee has been lifted clear of said stencil to thereby enable printing material to be inserted or removed from beneath said frame.

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