Aug. 15, 1933. R. B. ALDCROFTT 1,922,341

STENCIL PRINTING MACHINE

Filed Jan. 2, 1932 3 Sheets-Sheet 1

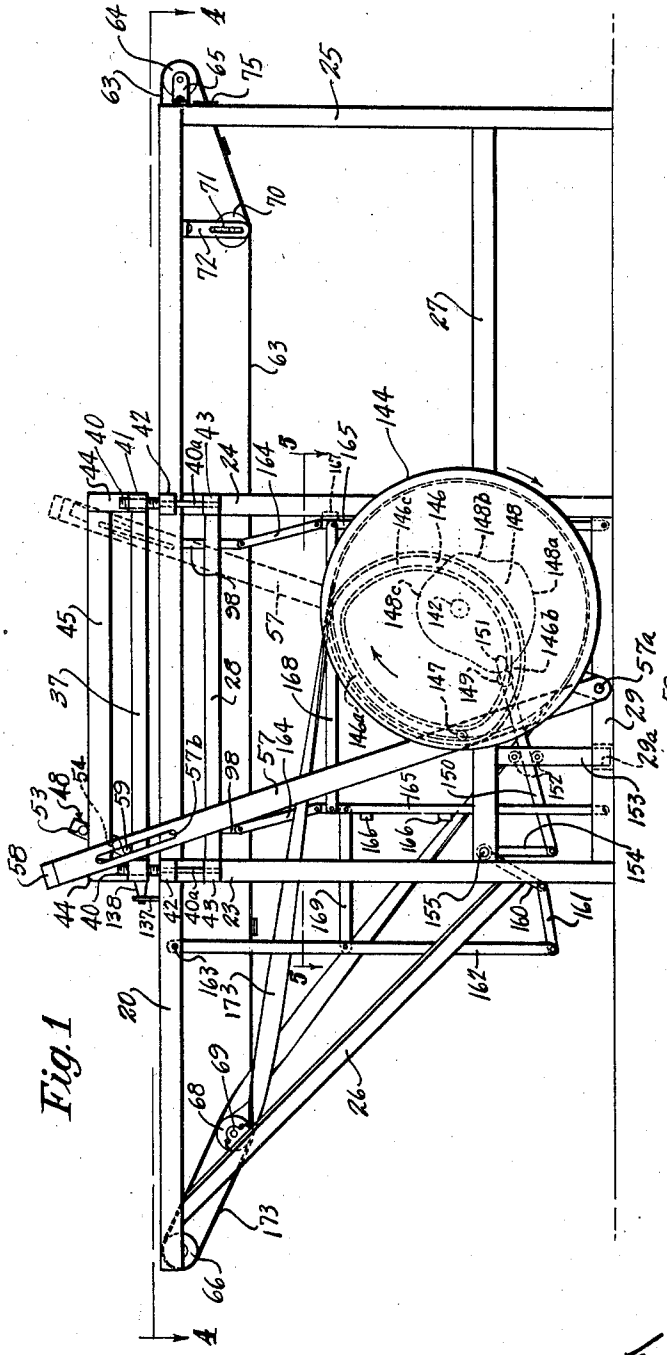

Fig. 1

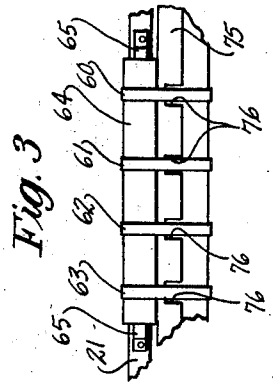

Fig. 3

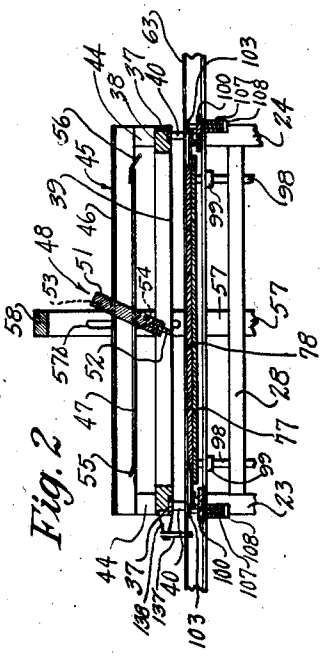

Fig. 2

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STENCIL PRINTING MACHINE

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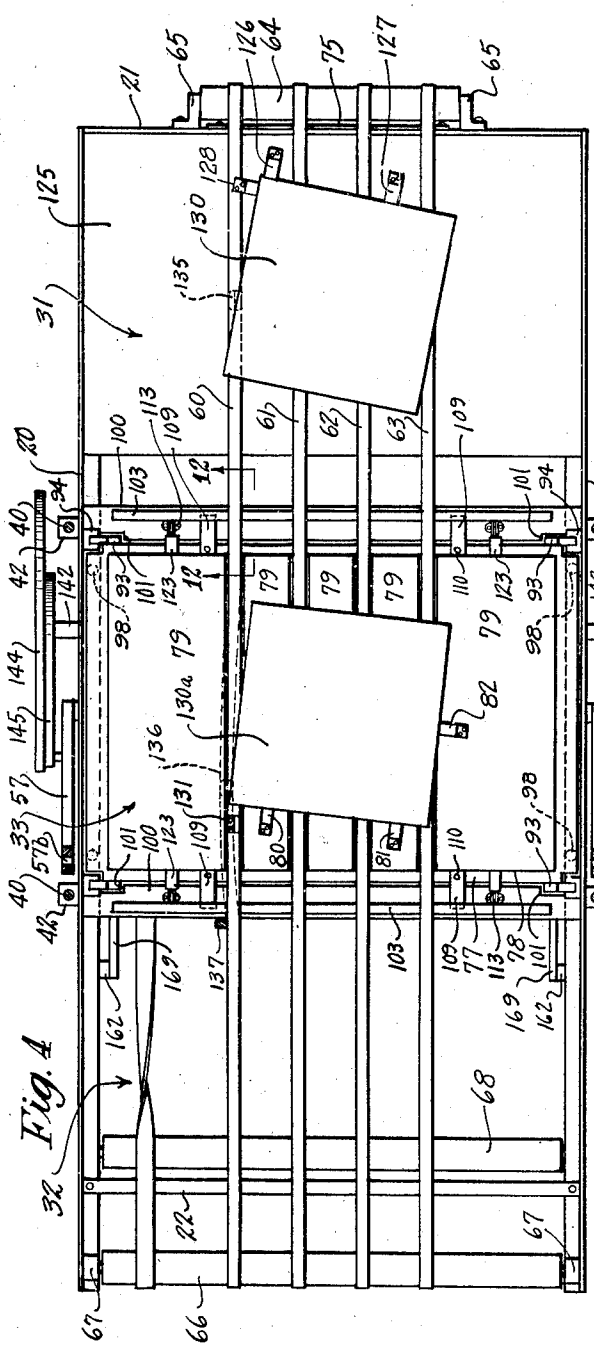

Fig. 4

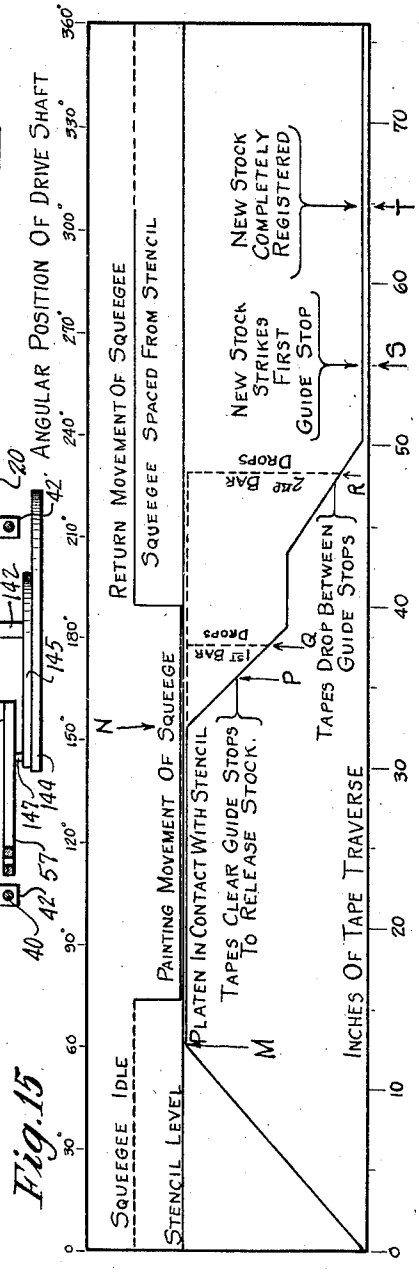

Fig. 15

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STENCIL PRINTING MACHINE

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Fig. 5

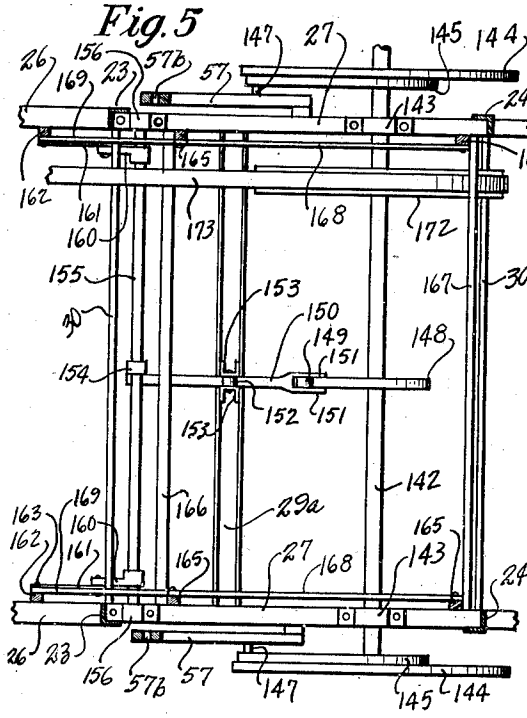


Fig. 13

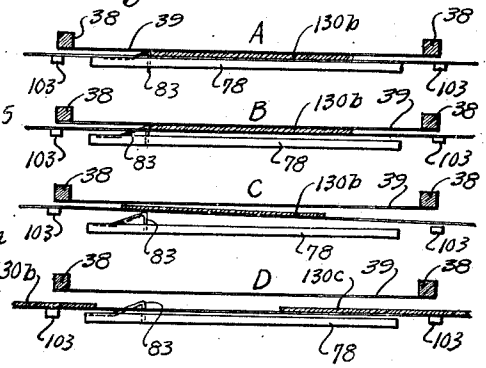


Fig. 14

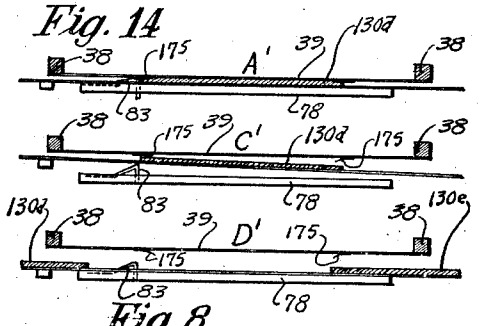


Fig. 6

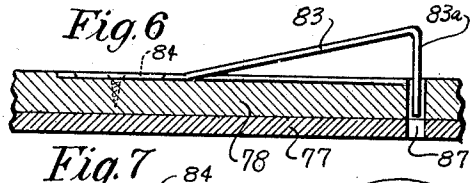


Fig. 7

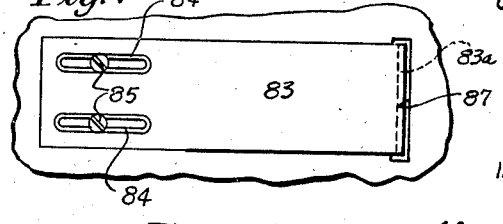


Fig. 8

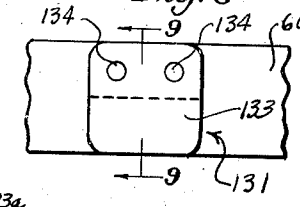


Fig. 9

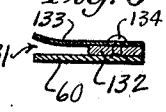


Fig. 10

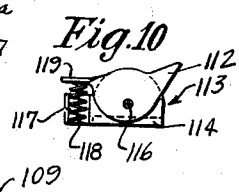


Fig. 11

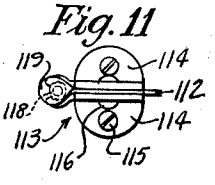
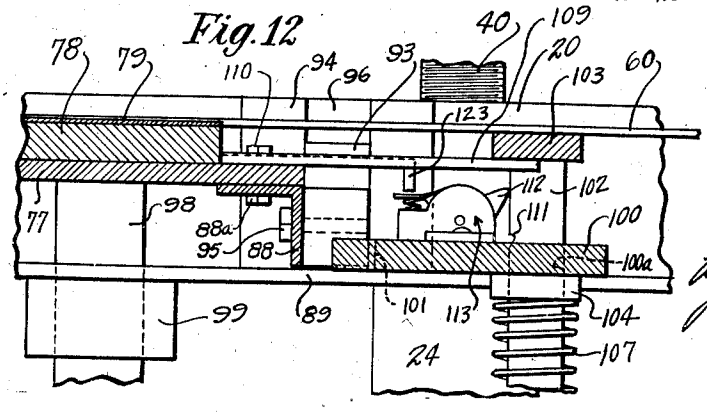


Fig. 12



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Patented Aug. 15, 1933 1,922,341

UNITED STATES PATENT OFFICE

1,922,341

STENCIL PRINTING MACHINE

Richard B. Aldcroftt, Los Angeles, Calif.

Application January 2, 1932. Serial No. 584,437

23 Claims. (Cl. 101—123)

My invention relates to printing devices, referring especially to mechanically fed printing machinery, and is directed to a novel construction particularly adaptable to stencil printing.

The two essential working parts of a typical printing machine are a platen to receive and support stock, and means cooperating with the platen to print the stock. In a machine for the stencil process of printing, the printing means comprises a stencil in combination with a squeegee adapted to force paint through the stencil to the stock. While it is to be understood that my invention, as a whole, is applicable to any type of printing machinery, and, in part, may be adapted to other types of machinery for processing substantially flat pieces of material, I shall, for the purposes of this application, confine my disclosure to a specific type of stencil printing machine.

A prime object of my invention, as so embodied, is to carry out the stencil printing process at a relatively high rate of production and, as one means to this end, I minimize the movement of these two essential working parts, the stencil and the platen. These members are relatively large and heavy, especially the platen. By reducing their range of movement, I not only make possible an increased rate of operation, but I also reduce power consumption and the stress and wear that necessarily accompany extensive movement of relatively heavy members. Extensive movement either of the platen or the stencil is usually required because of the necessity of providing sufficient clearance for feeding stock to the platen by hand. I avoid the necessity for such extensiveness of movement by introducing a mechanical feed or conveying means that requires relatively little clearance between the platen and the stencil. The conveying means is composed of relatively light parts and designed to operate continuously so that the necessity of repeatedly overcoming inertia is avoided.

Broadly described, my invention comprises a stationary stencil, a parallel platen under the stencil adapted to move against the stencil for a limited printing period, and conveyor means traversing the platen and cooperating in a novel manner with the platen to register stock for the printing operation.

Preferably, the conveying means comprises a plurality of spaced parallel belts moving in a plane across the platen. The platen has stops or guides to arrest the movement of the stock in suitable registry with the stencil prior to the printing period, and means is provided to release the stock to the conveyor subsequent to the printing period.

My conveyor system incorporates several novel features, including the principle of moving rectangular stock in a disalined or oblique position against guides in converging alinement on both sides of the leading corner of the stock. These features will best be explained in the detailed description to follow, wherein other objects and advantages of my invention will also become apparent.

In the accompanying drawings—

Fig. 1 is a side elevation of the stencil printing machine;

Fig. 2 is a fragmentary central longitudinal vertical section through the upper part of the machine;

Fig. 3 is a front end elevation of a portion of the machine;

Fig. 4 is a top plan view partly in section taken as indicated by the line 4—4 of Fig. 1;

Fig. 5 is a fragmentary horizontal section taken as indicated by the line 5—5 of Fig. 1;

Fig. 6 is an enlarged side elevation of a stop or guide;

Fig. 7 is an enlarged plan view of the same;

Fig. 8 is an enlarged plan view of a guide clip on a conveyor belt;

Fig. 9 is an enlarged section of the clip taken as indicated by the line 9—9 of Fig. 8;

Fig. 10 is an enlarged vertical section through a latch incorporated in my invention;

Fig. 11 is an enlarged plan view of the latch;

Fig. 12 is a fragmentary enlarged vertical section taken along the line 12—12 of Fig. 4 to show one end of the platen and parts cooperating therewith;

Fig. 13 is a series of diagrammatic sketches indicating the functional relationship of the conveyor means to the platen in the preferred form of my invention;

Fig. 14 is a similar series of diagrammatic sketches to indicate the corresponding relationship in a modified form of my invention; and

Fig. 15 is a graph or chart indicating the sequence of movements occurring in the preferred form of my invention.

In Fig. 1 the right and left ends, respectively, will be referred to as the front and rear of the apparatus. The supporting structure of my machine includes a rectangular horizontal frame comprising two side members 20 of angle iron joined at the front end by angle iron member 21 and near the rear end by bar 22. This frame is centrally supported by two pairs of legs 23 and

24, a pair of legs 25 at the front end, and a pair of diagonal braces 26 at the rear end anchored to legs 23. The three legs are connected on each side of the machine by longitudinal angle bar 27; and legs 23 and 24 are connected on each side of the machine near their tops by angle bars 28 and at the floor by angle bars 29. The two bars 29 are interconnected by a laterally positioned channel bar 29*a*. Legs 23 may be connected together by transverse bar 30 and legs 24 similarly joined by bar 30*a* (Fig. 5).

As seen from above (Fig. 4), the rectangle defined by angle bars 20 is divided into three panels, a feed panel 31 at the front end, a discharge panel 32 at the rear end, and a central panel occupied by the printing platen generally designated 33.

Spaced above and overlapping both ends of platen 33 is a horizontal rectangular frame 37 of angle iron, which seats the wooden frame 38 of stencil screen 39. Frame 37 is adjustably spaced from angle iron members 20 by means of supporting screws 40, which screw-threadedly engage vertical bores in blocks 41 at each corner of frame 37, and have reduced lower ends 40*a* journalled in blocks 42 mounted on angles 20 and blocks 43 mounted on legs 23 and 24. Screws 40 are diametrically bored at their upper ends to receive pins or other tools for adjusting the spacing of frame 37 relative to platen 33. Vertical bars 44 at each corner of frame 37 support a rail 45 on each side of the machine in parallel spaced relation to frame 37. This rail 45 is a channel bar with its flanges disposed inward to form an upper track 46 and a lower track 47, which tracks cooperate with a squeegee generally designated 48.

The squeegee's construction in functional relation to the tracks is substantially that described and claimed in my copending joint application filed February 11th, 1929, Serially Numbered 338,976, issued February 2d, 1932, as Patent Number 1,843,116, and entitled "Apparatus for producing screen printing," a spreader roller included in the prior disclosure being omitted in the present structure.

The squeegee's construction includes a transversely extending bar 51, to the lower edge of which a scraper 52 is attached for engagement with the top surface of stencil screen 39. Scraper 52 will preferably be formed of yielding material, such as rubber or the like. Pins secured to the opposite ends of bar 51 carry rollers 53 positioned to ride upon track 46 at each side of the machine. Likewise secured to the ends of bar 51 are control rollers 54, which, on each side of the machine, are positioned to coact with track 47. Tracks 46 and 47 and rollers 53 and 54 are so spaced that the squeegee 48 is maintained in a forwardly inclined position both during its forward and rearward movements. Track 47 terminates short of each end of track 46 and terminates at its rear end in an upwardly turned tongue 55 and at its forward end in a downwardly turned tongue 56. On the forward movement of the squeegee, roller 54 engages the lower surface of track 47, and on the rearward movement of the squeegee, roller 54 engages the upper surface of track 47, so that during the rearward movement scraper 52 moves in spaced relation to the stencil screen.

Reciprocating movement of the squeegee is accomplished by means of a pair of levers 57 pivotally mounted at their lower ends on studs 57*a* carried by bars 29 on both sides of the machine. Levers 57 are joined at their upper ends by means of a transversely extending bar 58, to insure uniform and simultaneous movement. They are operatively connected with the squeegee 48 by means of pins or studs 59, carried by the plate 51, the studs extending between members 37 and 45 into longitudinally extending slots 57*b* in the upper ends of levers 57. This form of connection permits swinging movement of the levers 57 to and from the position indicated by dotted lines in Fig. 1.

Disposed across the surface of platen 33 longitudinally is a plurality of belts or tapes, in this case four in number, 60, 61, 62 and 63. At the front end of the machine is a transverse roller 64, journalled in bearings 65 mounted on angle iron 21, and at the rear end of the machine is a similar roller 66 journalled in bearings 67 mounted on angle iron frame members 20. These two rollers carry the plurality of belts and are positioned so that the belts are substantially horizontal against the surface of platen 33 when the platen is at its lowermost position spaced from screen 39. A third transverse roller 68, journalled in bearings 69 mounted on brace members 26, guides the returning belts under the platen; and an idler roller 70, floatingly journalled in slots 71 of standards 72, depending from angles 20, serves to keep the belts taut as well as to guide them and, furthermore, provides for a certain degree of vertical flexibility of the belts, which, as will be apparent, is necessary in the operation of my machine. To maintain the required spacing between the parallel belts, a guide plate 75 is mounted across the two front legs 25. Four notches 76 are cut on the lower edge of this bar to guide, respectively, belts 60, 61, 62 and 63 (see Fig. 3).

Platen 33 has a metal base plate 77 carrying a layer or facing of wood 78 (Fig. 12). The conveyor belts lie flat against the facing 78 and are guided thereon by channels formed between five spaced cardboards 79 mounted on the layer of wood 78. Cardboards 79 are slightly less thick than the conveyor belts, so that a piece of printing stock laid flat on the cardboards 79 across the conveyor belts would be drawn across the platen by longitudinal movement of the belts. It is desirable that the difference in thickness between cardboards 79 and the conveyor belts be very slight, however, in order that substantially uniform pressure may be exerted against the under side of the stock when the platen is moved against stencil screen 39.

A guide-stop 80 extends above the surface of the platen between belts 60 and 61, and a similar guide-step 81 is positioned between belts 62 and 63, the guiding edges of the guide-stops being in slightly oblique alinement relative to the disposition of the conveyor belts. A third guide-stop 82 is positioned outside of belt 63 in perpendicular alinement to the oblique alinement of guide-stops 80 and 81, as may be understood by reference to Fig. 4.

The construction of these guide-stops is indicated by Figs. 6 and 7. Each member consists of a light spring clip 83, the base portion of which has two parallel beveled slots 84 receiving screws 85, by means of which the clip is secured to the upper surface of wood layer 78. Each clip is sprung upward from the base portion at an angle and terminates in a vertical portion 83*a* extending into apertures 87 provided through wood layer 78 and plate 77. Normally, the clips extend above the platen in the position shown in Fig. 6, but when the platen moves against screen

39, the screen forces the free ends of the clips through apertures 87 to such an extent that the clips extend above the platen only the thickness of the piece of stock interposed between the platen and the stencil screen.

To the under side of platen base plate 77, along the front and rear edges, respectively, are attached transverse angles 88 by suitable screws 88*a*, which angles may normally rest against the horizontal inwardly disposed flanges 89 of side angles 20. "Normally" refers to the position of the platen at the lower limit of its vertical range of movement. The means for guiding the platen in its vertical movement may comprise four L-shaped slides 93, one at each corner of the platen, positioned to coact with the vertical guides 94. One leg of each slide is attached to the outside face of angle 88 by means of bolts 95, the other leg being slidingly seated in the complementary vertical slot 96 of the corresponding guide 94. Guides 94 are metal blocks mounted within angles of angle irons 20, the corners of the platen base plate 77 being notched to clear the guides.

The platen is moved vertically by four vertical plungers 98, one abutting the under surface of plate 77 near each corner, each plunger slidingly extending through a suitable aperture in flange 89 of angle irons 20, a guide collar 99 mounted to the under surface of flange 89, and a suitable aperture through angle iron 28.

Adjacent each end of platen 33 a plate 100 spans the two angle irons 20, being mounted on flanges 89 and having notches 101 at each end to avoid slides 93 and guides 94. At two intermediate points, each plate 100 has suitable circular apertures 100*a* to slidingly receive plungers 102 that support a cross-bar 103. Preferably, short plates 104 are attached to the under side of plate 100 at each aperture 100*a* in order to provide material for extending the aperture axially, the better to maintain vertical alinement of the corresponding plunger 102.

A helical expansile spring 107 surrounding each plunger in compression between plate 104 at its upper end and a head 108 formed on the lower end of the plunger, continuously exerts pressure to urge plunger 102 downward. Two spaced fingers 109 attached to platen plate 77 by means of bolts 110 extend longitudinally from the front and rear edges of platen 33 to engage the under surface of cross-bars 103 and normally maintain the two cross-bars at the same level as wood facing 78 of the platen. It is apparent that fingers 109 oppose the pressure of springs 107. When the platen is displaced upward, cross-bars 103 rise with it as if they were an integral part therewith.

When the platen reaches its upper limit of vertical movement, a notch 111 in each plunger 102 is engaged by a latch member 112 of a latching means generally designated 113. The construction of this latching means is indicated by Figs. 10 and 11. Two small bracket pieces 114, attached to plate 100 by suitable screws 115, are placed back to back in spaced relation and joined by a pin 116 on which latch 112 is pivoted between the two bracket pieces. The bracket pieces 114 define a small cylindrical housing 117 for a coiled expansile spring 118, which spring presses upward against a tongue 119. Tongue 119 is integral with latch 112 and so positioned with reference to pin 116 that upward pressure on tongue 119 tends to press latch 112 against plunger 102 into engagement with notch 111.

It is apparent that when a cross-bar 103 is lifted sufficiently to effect engagement between latch 112 and plunger 102, the cross-bar will maintain its elevated position after the platen drops unless tongues 119 are depressed to release latches 112 from notches 111. Such release, in timed sequence to the beginning of the downward movement of the platen, is provided by a series of latch fingers 123, which are mounted on the front and rear edges of platen plate 77 in a similar manner as fingers 109. The free ends of latch fingers 123 are turned downward in vertical alinement with corresponding tongues 119. The latch fingers along the forward edge of the platen are dimensioned to trip the corresponding latches in advance of similar action on the part of latch fingers along the rear edge of the platen during the course of the downward movement of the platen. Initially, as the platen begins its downward movement, both cross-bars 103 remain stationary. During the course of the downward movement the cross-bar at the forward edge of the platen drops into contact with fingers 109 and then, in timed sequence to this movement, the cross-bar at the rear edge of the platen drops against its corresponding fingers 109.

Mounted on angle bars 20 to span feed panel 31 is a feed plate 125 having its upper surface in contact with the under surfaces of the conveyor belts. Near the forward edge of plate 125 are two guides, guide 126 between belts 60 and 61, and guide 127 between belts 62 and 63. These two guides have their guiding edges presented towards the rear of the machine in transverse alinement of somewhat greater obliqueness than the alinement of guide-stops 80 and 81 previously described. In perpendicular alinement with guides 126 and 127 is a third guide 128. These guides are of similar construction to clips 83, except that the free ends of the clips may rest upon plate 125, it not being necessary to provide for vertical retraction of the feed plate guides. These guides are adjusted for a given piece of stock 130, to position the stock with one longitudinal edge extending diagonally across belt 60, as shown in Fig. 4.

At intervals on belt 60 are mounted guide-clips 131, which are constructed as shown in Figs. 8 and 9. The clip comprises two pieces, a spacing member 132 narrower than belt 60, and alined with the outer edge thereof, and a metal tongue 133 of substantially the same width as the belt and flaring slightly upward towards its inner edge, rivets 134 extending through the tongue, spacer and belt.

The conveyor belts traverse the machine across the platen around roller 64 towards roller 66. Because of the oblique position of a piece of stock as shown at 130, a guide clip 131 will engage the outside edge of the stock, as indicated by the dotted line at 135 in Fig. 4. The operator, in feeding the machine, places a blank piece of stock on the conveyor belts and holds the piece of stock lightly against guides 126, 127 and 128 in opposition to friction from the belt until contact is made with the stock by a belt clip, as at 135. As soon as he feels the contact of the belt clip against the edge of the stock he releases the stock to the action of the conveyor belts.

The stock is carried along the belt in a position of greater obliqueness than the alinement of stop guides 80 and 81 on platen 33. As a result, the leading edge of the stock makes contact first with stop-guide 81. Further movement of the conveyor belt after such contact causes the piece of stock 130*a* (Fig. 4) to pivot on guide-

stop 81 until contact is made with guide-stop 80. Guide-stops 80 and 81 may be said to place the stock substantially in lateral alinement with the stencil, or, strictly speaking, with the stencil pattern, since the leading edge of the one is in alinement with the rearward edge of the other. At the instant the leading edge establishes contact with guide-stop 80 the piece of stock 130*a* is spaced from guide-stop 82, but further movement of belt 60 causes the belt clip to slide past the longitudinal edge of the stock, thereby exerting pressure to move the stock against guide-stop 82 to the final position shown in Fig. 4. In effect, the belt serves as a yielding means to move the stock laterally, the belt being displaced as indicated by the dotted lines at 136 (Fig. 4) when the clip passes over the rearward corner of the stock. This action of the clip may be said to aline the stock longitudinally with the stencil, thereby completing registration of the stock with the stencil. The principle of automatic registration involved may be expressed as that of moving rectangular stock obliquely against guides in converging alinement corresponding to an obliquely alined stencil pattern, the stock being fed against the guides in alinement more oblique than the guides.

I find it desirable, for the purpose of providing sufficient pressure by clip 131 against the edge of the stock, to provide a guide against the outside edge of belt 60 intermediate rollers 64 and 66. This guide may be conveniently provided by mounting a small vertical bar 137 on the rear edge of frame 37. In Fig. 2, I show the guide 137 mounted on a pin 138 to clear the adjacent cross-bar 103. Guide 137 is positioned adjacent to the normal alinement of conveyor belt 60 and serves to shorten the proportion of the belt displaced in moving stock against guide 82.

In the preferred form of my invention, the conveyor belts are in continuous motion. Contact of a blank piece of stock with guide-stops 80, 81 and 82 is effected while the platen is in its lowest position. After the stock is properly registered against the guide the platen moves upward against the under side of stencil screen 39, depressing the guide-stops as the stock contacts the under surface of the stencil screen.

The subsequent movement of the parts may be understood by reference to the diagrammatic views in Fig. 13, beginning with position A showing the platen against the stencil screen as just described. At position B the platen has dropped slightly but not sufficiently to release the latches associated with either cross-bar. At position C the platen has dropped away from the stencil screen a distance substantially greater than the extension of the guide-stop above the level of the platen. The forward of the two cross-bars 103 drops suddenly and the piece of stock 130*b* drops out of contact with stencil screen 39. The guide-stops 80 and 81 being below the plane of the conveyor belts, no longer operate to prevent movement of stock on the conveyor belts. When the stock has been carried along sufficiently to prevent interference with its progress upon return to normal relationship of the conveyor belts to the guide-stops, the second or rear cross-bar drops to position D, permitting the conveyor belts to drop, the guide-stops being then directly in the path of the oncoming new sheet of blank stock 130*c*.

Actuation of the various moving parts above described, in proper timed sequence, is accomplished by mechanism in the understructure of the machine, including a main drive shaft 142 suitably journalled in bearings 143 mounted on angle bars 27 (Fig. 5). This shaft may be driven by any suitable means such as a motor (not shown).

At opposite ends of this shaft, outside the frame proper of the machine, are keyed two cam disks 144. On the inner faces of each disk is a pair of continuous flanges 145 which define an irregular eccentric cam groove 146. The shape of this cam groove may be roughly described as triangular, approximately one-third of the cam groove being a concentric dwell at the outer edge of the disk as shown at 146*a*, the second third of the groove 146*b* moving inward, and a third section 146*c* moving radially outward as the disks 144 are moved clockwise (Fig. 1). Engaging groove 146 is a complementary follower or roller 147 mounted on the inner side of the adjacent squeegee lever 57. It is apparent that as the shaft 142 is revolved clockwise, squeegee lever 57 will go through the following cycle of movements: a period of rest at the rear edge of the stencil screen; a forward movement of the squeegee during substantially an equivalent interval of time; and a return movement of the squeegee in spaced relation to the stencil screen during a third period of time of substantially equal duration.

At a central position, an irregular cam plate 148 is keyed to shaft 142. Generally described, this cam plate has an outer dwell 148*a*, an intermediate dwell 148*b*, and an inner dwell 148*c*. The precise shape of the cam plate may be ascertained from the chart shown in Fig. 15 to be considered below.

A roller 149, adapted to follow the periphery of cam plate 148, is suitably journalled in the bifurcate end of a follower arm 150, the two spaced ends 151 of the arm 150 engaging the opposite faces of disk 148 as guides. Follower arm 150 is guided centrally by two spaced rollers 152 mounted between two channel iron standards 153, which in turn are mounted on frame member 29*a*. The opposite end of follower arm 150 is pivoted to a rocker arm 154 which is keyed to a rock shaft 155. Rock shaft 155 is suitably journalled in bearings 156 mounted on angle bar 27 and carries near each end in fixed angular relation to rocker arm 154, two parallel rocker arms 160. The outer ends of rocker arms 160 are connected by links 161 to the free ends of a pair of corresponding levers 162, which pivotally depend from suitable studs 163 mounted on frame members 20.

The lower ends of the plungers 98 that elevate the platen, are each pivotally connected to corresponding upper toggle links 164, which coact with corresponding lower toggle links 165, the lower toggle links being pivotally mounted at their lower ends to frame member 29. The rear pair of toggle links 165 are connected by a pair of horizontal spaced transverse bars 166 and the front two toggle links 165 are similarly connected together by cross-bars 167. Toggle links 165 move simultaneously by virtue of transverse bars 166, similar bars 167, and longitudinal links 168, one of the links 168 on each side of the machine connecting a front toggle link 165 to the corresponding rear toggle link 165. Movement is transmitted to the system of toggle and interconnecting links just described by means of a link 169 on each side of the machine interconnecting a rear toggle link 165 with the corresponding lever 162.

It is apparent that movements of follower arm 150 substantially radially inward and outward

from the center of rotation of cam plate 148 result in corresponding vertical movements of platen 33 by virtue of the toggles described. The angular relation of cam plate 148 to cam groove 146 is generally indicated in Fig. 1, and may be precisely ascertained from the chart in Fig. 15.

Keyed to shaft 142 is a pulley 172, which drives rollers 66 and 68 by means of a drive belt 173, the belt crossing as shown between roller 68 and drive pulley 172. The diameter of drive pulley 172 relative to the driven conveyor rollers, and the total length of the conveyor belts 60, 61, 62 and 63 are such that the conveyor belts move one-third their total length when drive shaft 142 makes one complete revolution, and three belt clips 131 are equally spaced on belt 60 in order that a new piece of blank stock may be fed to the platen during each cycle of movements occasioned by one revolution of the drive shaft.

Fig. 15 is a graph of one of such cycles of movements. The degrees of angular movement of the drive shaft are indicated at the top of the chart and the inches of belt traverse are indicated at the bottom. It is assumed that the belts travel 76 inches per revolution of drive shaft 142. Vertical distances represent the relative vertical movements of the various moving parts involved. The platen moves up while the squeegee is idle adjacent the rear edge of the stencil screen 39. When the platen reaches its uppermost level, corresponding to the point M in Fig. 15, the parts of the machine are in the position indicated by Fig. 1, follower 149 having just entered outer dwell 148*a* of cam plate 148. The platen is maintained in contact with the stencil screen for a limited period as indicated between the points M and N of Fig. 15, during which time squeegee 48 moves forward with scraper blade 52 in contact with stencil screen 39 and forces paint through the stencil onto the stock. At point P, the squeegee having passed beyond the open pattern on the stencil, the platen begins to drop to the position corresponding to intermediate dwell 148*b*.

At point P the guide-stops 80 and 81 have dropped out of range of the plurality of conveyor belts. At point Q the first or forward cross-bar 103 drops and the printed stock drops from the under surface of the stencil to the conveyor belts to move towards discharge panel 32 (see position C of Fig. 13). The platen soon starts to drop slowly towards a position corresponding to lower dwell 148*c*, and, after a sufficient period of time to permit the escape of printed stock past guide-stops 80 and 81, the second cross-bar 103 drops as indicated at point R. The belts then drop into the channels on the top surface of the platen defined by the spaced rectangular cardboards 79, and the guide stops 80, 81 and 82, associated with the platen, are again extended through the plane of the conveyor belts, thereby being in a position to register the next piece of blank stock, which registration is begun at the point S. Complete registration is accomplished at approximately point T. In the meantime, the squeegee has completed its return movement in spaced relation to the stencil screen and has come to rest near the rear edge of the screen for a period before the cycle is completed.

The portion of the cycle following on point T represents a margin of time sufficient to allow for belt slippage or belt creepage changing the relation in time of movement of clips 131 relative to other movements of the cycle. It is apparent that point T may shift to the 76'' point without causing trouble or delay. In practice, longitudinal adjustment of belt 60 is required at so infrequent intervals, and is so easily accomplished, that it is not found necessary to substitute sprocket drives for belt drives.

The machine may be constructed to function effectively with the front cross-bar 103 omitted. The action of such a construction may be understood by reference to Fig. 14. Position A' corresponds to position A of Fig. 13 above; the position C' corresponds with position C; and position D' corresponds with position D. At position D' a piece of printed stock 130*d* is moving away, and a piece of blank stock 130*e* is moving towards the platen. An important difference between the two actions is that in the case of the second construction the conveying belts drop away from the stencil screen at a relatively gradual rate, whereas in the first construction the belts drop away suddenly. I find that the employment of two cross-bars is preferable because the sudden drop of the belt seems to reduce the likelihood of a piece of printed stock clinging to the stencil sheet.

Mechanical elements may be incorporated in either or both forms of my invention as means to overcome such tendency. For instance, in Fig. 14 are indicated light leaf springs 175 mounted on the bottom surface of the stencil screen. The stock moves the springs against the stencil as indicated at position A', and when, subsequently, support is removed from under the stock, the springs tend to separate the stock from the stencil sheet as indicated at C'.

Fig. 15 reveals the detailed characteristics of the preferred cycle of movements, but it is not to be regarded as in any way limiting my disclosure to this particular cycle. This detailed description of my preferred embodiment of the invention, which is given for the purposes of complete disclosure and illustration of the principles involved, suggests a wide range of structural modifications and changes that may be made without departing from the spirit of my invention. I reserve the right to all such modifications and changes that properly come within the scope of my claims below.

Having described my invention, I claim:

1. An apparatus of the class described, having in combination: a frame; a stencil supported by the frame; a platen supported by the frame in spaced relation to the stencil, said stencil and platen being movable relative to each other; means to bring the stencil and platen together for a limited period; a squeegee movably associated with the stencil; means to move the squeegee across the surface of the stencil during said period; conveyor means continuously traversing the platen to carry stock across the platen; guides on the platen to stop and position stock in proper registry with the stencil prior to said period; and means to release the stock to the conveyor subsequent to said period.

2. An apparatus of the class described, having in combination: a frame; a stencil supported by the frame; a platen supported by the frame in spaced relation to the stencil, said stencil and platen being movable relative to each other; means to bring the stencil and platen together for a limited period; a squeegee movably associated with the stencil; means to move the squeegee across the surface of the stencil during said period; horizontal conveyor means continuously traversing the platen to carry stock across the platen; guides on the platen to stop and position stock in proper registry with the stencil prior to

said period; and means to provide vertical displacement of the conveyor relative to the guides to clear the guides subsequent to said period.

3. An apparatus of the class described, having in combination: a frame; a stencil supported by the frame; a platen supported by the frame in spaced relation to the stencil, said stencil and platen being movable relative to each other; means to bring the stencil and platen together for a limited period; a squeegee movably associated with the stencil; means to move the squeegee across the surface of the stencil during said period; horizontal conveyor means continuously traversing the platen to carry stock across the platen; guides on the platen positioned to stop stock in proper registry with the stencil, said conveyor means and guides being vertically movable relative to each other; and means to provide said vertical movement in timed sequence to said period whereby stock is stopped on the conveyor prior to said period and released subsequent to said period.

4. An apparatus of the class described, having in combination: a frame; a horizontal stencil member supported by the frame; a platen member supported by the frame under the stencil in spaced parallel relation thereto; one of said members being vertically movable against the other member; means to move the one member against the other member for a limited period; a squeegee movably associated with the stencil; means to move the squeegee across the surface of the stencil during said period; conveyor means to carry stock across the platen longitudinally; guide means associated with the platen to delay the longitudinal movement of the stock at substantially lateral alinement with the stencil during said period; a guide associated with the platen to abut stock at longitudinal alinement with the stencil; and means associated with the conveyor to shift the stock against said guide, thereby properly registering the stock with the stencil prior to said period.

5. An apparatus of the class described, having in combination: a frame; a horizontal stencil supported by the frame; a vertically movable platen supported by the frame under the stencil in parallel spaced relation thereto; means to move the platen upward against the stencil for a limited period; a squeegee movably associated with the stencil; means to move the squeegee across the surface of the stencil during said period; continuously operating conveyor means to carry stock across the platen, said means being adapted to be displaced upward with the platen; guides extending upward from the platen to engage stock on the conveyor in proper registry with the stencil during said period; and means to delay the lowering of the conveyor means after said period, thereby releasing stock from the guides to the conveyor.

6. An apparatus of the class described, having in combination: a frame; a stencil supported by the frame; a platen supported by the frame in spaced relation to the stencil, said stencil and platen being movable relative to each other; means to bring the stencil and platen together for a limited period; a squeegee movably associated with the stencil; means to move the squeegee across the surface of the stencil during said period; a continuous flexible stock-carrying conveyor means continuously traversing the platen in one direction; and means associated with the platen cooperative with the conveyor means to halt stock on the platen during said period.

7. An apparatus of the class described, having in combination: a frame; a horizontal stencil supported by the frame; a vertically movable platen supported by the frame under the stencil in parallel spaced relation thereto; means to move the platen upward against the stencil for a limited period; a squeegee movably associated with the stencil; means to move the squeegee across the surface of the stencil during said period; a continuous flexible stock-carrying conveyor means continuously traversing the platen longitudinally; guides on the platen to stop and position stock in proper registry with the stencil prior to said period; and means to provide vertical displacement of the conveyor relative to the guides to clear the guides subsequent to said period.

8. An apparatus of the class described, having in combination: a frame; a horizontal stencil supported by the frame; a vertically movable platen supported by the frame under the stencil in parallel spaced relation thereto; means to move the platen upward against the stencil for a limited period; a squeegee movably associated with the stencil; means to move the squeegee across the surface of the stencil during said period; a continuous flexible stock-carrying conveyor means continuously traversing the platen longitudinally; guide means associated with the platen to stop the longitudinal movement of stock at substantially lateral alinement with the stencil prior to said period; a guide associated with the platen to abut stock at longitudinal alinement with the stencil; means associated with the conveyor to shift the stock against said guide, thereby properly registering the stock with the stencil prior to said period; and means to flex the conveyor means out of range of said guide means subsequent to said period.

9. An apparatus of the class described, having in combination: a frame; a horizontal stencil supported by the frame; a vertically movable platen supported by the frame under the stencil in parallel spaced relation thereto; means to move the platen upward against the stencil for a limited period; a squeegee movably associated with the stencil; means to move the squeegee across the surface of the stencil during said period; a continuous flexible stock-carrying conveyor means continuously traversing the platen longitudinally, and adapted to be flexed upward by the upward movement of the platen; guide means associated with the platen to stop the longitudinal movement of stock at substantially lateral alinement with the stencil prior to said period; a guide associated with the platen to abut stock at longitudinal alinement with the stencil; means associated with the conveyor means to shift the stock against said guide, thereby properly registering the stock with the stencil prior to said period; and means to maintain the conveyor means in the flexed position for a short interval after the platen is lowered, thereby providing for release of stock from the guide means.

10. An apparatus of the class described, having in combination: a frame; a horizontal stencil supported by the frame; a vertically movable platen supported by the frame under the stencil in parallel spaced relation thereto; means to move the platen upward against the stencil for a limited period; a squeegee movably associated with the stencil; means to move the squeegee across the surface of the stencil during said period; a continuous flexible stock-carrying conveyor means continuously traversing the platen longitudinally; guides on the platen to stop and posi-

tion stock in proper registry with the stencil prior to said period; a cross-member associated with the platen and movable through substantially the same vertical range, the conveyor means being adapted to be flexed upward by the upward movement of the platen and cross-member; means associated with the platen to move the cross-member upward therewith; a latch to releasably hold the cross-member at its upper position; means to trip the latch after an interval from the time the platen lowers sufficiently to carry said guides out of engagement with the stock; and yielding means to lower the cross-member.

11. An apparatus of the class described, having in combination: a frame; a horizontal stencil supported by the frame; a vertically movable platen supported by the frame under the stencil in parallel spaced relation thereto; means to move the platen upward against the stencil for a limited period; a squeegee movably associated with the stencil; means to move the squeegee across the surface of the stencil during said period; a continuous flexible stock-carrying conveyor means continuously traversing the platen longitudinally; guides on the platen to stop and position stock in proper registry with the stencil prior to said period; a cross-member associated with the front edge of the platen and movable through substantially the same vertical range; a second and similar cross-member associated with the rear edge of the platen, the conveyor means being adapted to be moved upward by upward movement of the platen and the two cross-members; yielding means pressing both cross-members downward; means associated with the platen to move both cross-members upward therewith against pressure from said yielding means; a latch to hold the first cross-member at its upper position; a latch to hold the second cross-member at its upper position; means to trip the first latch when the platen lowers sufficiently to carry the guides out of engagement with the printed stock; and means to trip the second latch after the printed stock is carried substantially clear of the guide means.

12. An apparatus of the class described, having in combination: a frame; a horizontal stencil supported by the frame; a vertically movable platen supported by the frame under the stencil in parallel spaced relation thereto; means to move the platen upward against the stencil for a limited period; a squeegee movably associated with the stencil; means to move the squeegee across the surface of the stencil during said period; a continuous flexible stock-carrying conveyor means continuously traversing the planten longitudinally; a cross-member associated with the platen and movable through substantially the same vertical range, the conveyor means being adapted to be flexed upward by the upward movement of the platen and cross-member; guide means associated with the platen to stock the longitudinal movement of stock at substantially lateral alinement with the stencil prior to said period; a guide associated with the platen to abut stock at longitudinal alinement with the stencil; means associated with the conveyor to shift the stock against said guide, thereby properly registering the stock with the stencil prior to said period; means associated with the platen to move the cross-member upward therewith; a latch to releasably hold the cross-member at its upper position; means to trip the latch after an interval from the time the platen lowers sufficiently to carry said guides out of engagement with the stock; and yielding means to lower the cross-member.

13. An apparatus of the class described, having in combination: a frame; a stencil sppported by the frame, said stencil having a printing pattern positioned oblique to the alinement of the frame; a platen supported by the frame in spaced relation to the stencil, said stencil and platen being movable relative to each other; means to bring the stencil and platen together for a limited period; a squeegee movably associated with the stencil; means to move the squeegee across the surface of the stencil during said period; a conveyor to carry stock to the platen prior to said period and to remove stock therefrom subsequent to said period; and guides adapted to cooperate with the conveyor to register the stock with the stencil pattern, said guides being in converging alinement corresponding to the oblique position of the stencil.

14. An apparatus of the class described, having in combination: a frame; a stencil supported by the frame, said stencil having a printing pattern positioned oblique to the alinement of the frame; a platen supported by the frame in spaced relation to the stencil, said stencil and platen being movable relative to each other; means to bring the stencil and platen together for a limited period; a squeegee movably associated with the stencil; means to move the squeegee across the surface of the stencil during said period; conveyor means continuously traversing the platen to carry stock across the platen; and guides on the platen to stop and position stock in proper registry with the stencil prior to said period, said guides being in converging alinement corresponding to the oblique position of the stencil pattern.

15. An apparatus of the class described, having in combination: a frame; a stencil supported by the frame, said stencil having a printing pattern positioned oblique to the alinement of the frame; a platen supported by the frame in spaced relation to the stencil, said stencil and platen being movable relative to each other; means to bring the stencil and platen together for a limited period; a squeegee movably associated with the stencil; means to move the squeegee across the surface of the stencil during said period; horizontal conveyor means continuously traversing the platen to carry stock across the platen; guides on the platen positioned to stop stock in proper register with the stencil, said conveyor means and guides being vertically movable relative to each other; said guides being in converging alinement corresponding to the oblique position of the stencil pattern; and means to provide said vertical movement in timed sequence to said period whereby stock is stopped on the conveyor prior to said period and released subsequent to said period.

16. An apparatus of the class described, having in combination: a frame; a stencil supported by the frame; said stencil having a printing pattern positioned oblique to the alinement of the frame; a platen supported by the frame in spaced relation to the stencil, said stencil and platen being movable relative to each other; means to bring the stencil and platen together for a limited period; a squeegee movably associated with the stencil; means to move the squeegee across the surface of the stencil during said period; conveyor means continuously traversing the platen to carry stock across the platen; guides on the platen to stop and position stock in proper registry with the stencil prior to said period, said

guides being in converging alinement corresponding to the oblique position of the stencil pattern; and feed guides to position blank stock on the conveyor at greater obliqueness than the alinement of the platen guides.

17. An apparatus of the class described, having in combination: a frame; a stencil supported by the frame, said stencil having a printing pattern positioned oblique to the alinement of the frame; a platen supported by the frame in spaced relation to the stencil, said stencil and platen being movable relative to each other; means to bring the stencil and platen together for a limited period; a squeegee movably associated with the stencil; means to move the squeegee across the surface of the stencil during said period; horizontal conveyor means continuously traversing the platen to carry stock across the platen; guides on the platen positioned to stop stock in proper registry with the stencil, said conveyor means and guides being vertically movable relative to each other, said guides being in converging alinement corresponding to the oblique position of the stencil pattern; means to provide said vertical movement in timed sequence to said period whereby stock is stopped on the conveyor prior to said period and released subsequent to said period; and feed guides to position blank stock on the conveyor at greater obliqueness than the alinement of the platen guides.

18. An apparatus of the class described, having in combination: a frame; a horizontal stencil supported by the frame, said stencil having a printing pattern positioned oblique to the alinement of the frame; a vertically movable platen supported by the frame under the stencil in parallel spaced relation thereto; means to move the platen upward against the stencil for a limited period; a squeegee movably associated with the stencil; means to move the squeegee across the surface of the stencil during said period; continuously operating conveyor means to carry stock across the platen, said means being adapted to be displaced upward with the platen; guides extending upward from the platen to engage stock on the conveyor in proper registry with the stencil during said period, said guides being in converging alinement corresponding to the oblique position of the stencil pattern; means to delay the lowering of the conveyor means after said period, thereby releasing stock from the guides to the conveyor; and feed guides to position blank stock on the conveyor at greater obliqueness than the alinement of the platen guides.

19. The combination with a machine to process rectangular stock, of feeding means comprising: a stock conveyor traversing the machine; guides on the machine associated with the conveyor to position the stock for a limited period of processing, said guides being in oblique alinement converging on the path of the conveyor; and feed guides on the machine associated with the conveyor to position stock on the conveyor at greater obliqueness than the alinement of the first named guides.

20. The combination with a machine to process rectangular stock, of feeding means comprising: a stock conveyor continuously traversing the machine; guides on the machine associated with the conveyor to stop and position the stock for a limited processing period; said guides being in oblique alinement converging on the path of the conveyor; and feed guides on the machine associated with the conveyor to position stock on the conveyor at greater obliqueness than the alinement of the first named guides.

21. The combination with a machine to process rectangular stock, of feeding means comprising: a stock-conveyor continuously traversing the machine; a guide on the machine associated with the conveyor to abut the leading edge of the stock for a limited period in suitable lateral alinement for processing; a guide on the machine to abut a side edge of the stock in suitable longitudinal alinement for processing, said guides being in oblique alinement converging on the path of the conveyor; and feed guides on the machine associated with the conveyor to position stock on the conveyor at greater obliqueness than the alinement of the two first named guides.

22. The combination with a machine to process rectangular stock, of feeding means comprising: a stock-conveyor traversing a work-portion of the machine; and guides on the machine adapted in opposition to the conveyor to temporarily stop the stock in a position for processing, said guides being in oblique alinement converging on the path of the conveyor.

23. The combination with a machine incorporating means to process rectangular stock, of feeding means comprising: a stock-conveyor traversing a work-portion of the machine; guides on the machine adapted in opposition to the conveyor to stop the stock in a processing position oblique to the direction of travel of the conveyor, said guides converging on the path of the conveyor, said conveyor and said guides being movable relative to each other in a direction perpendicular to the plane of the conveyor, and means synchronized with the processing means to provide such relative movement between the conveyor and the guides.

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