

Jan. 5, 1932.

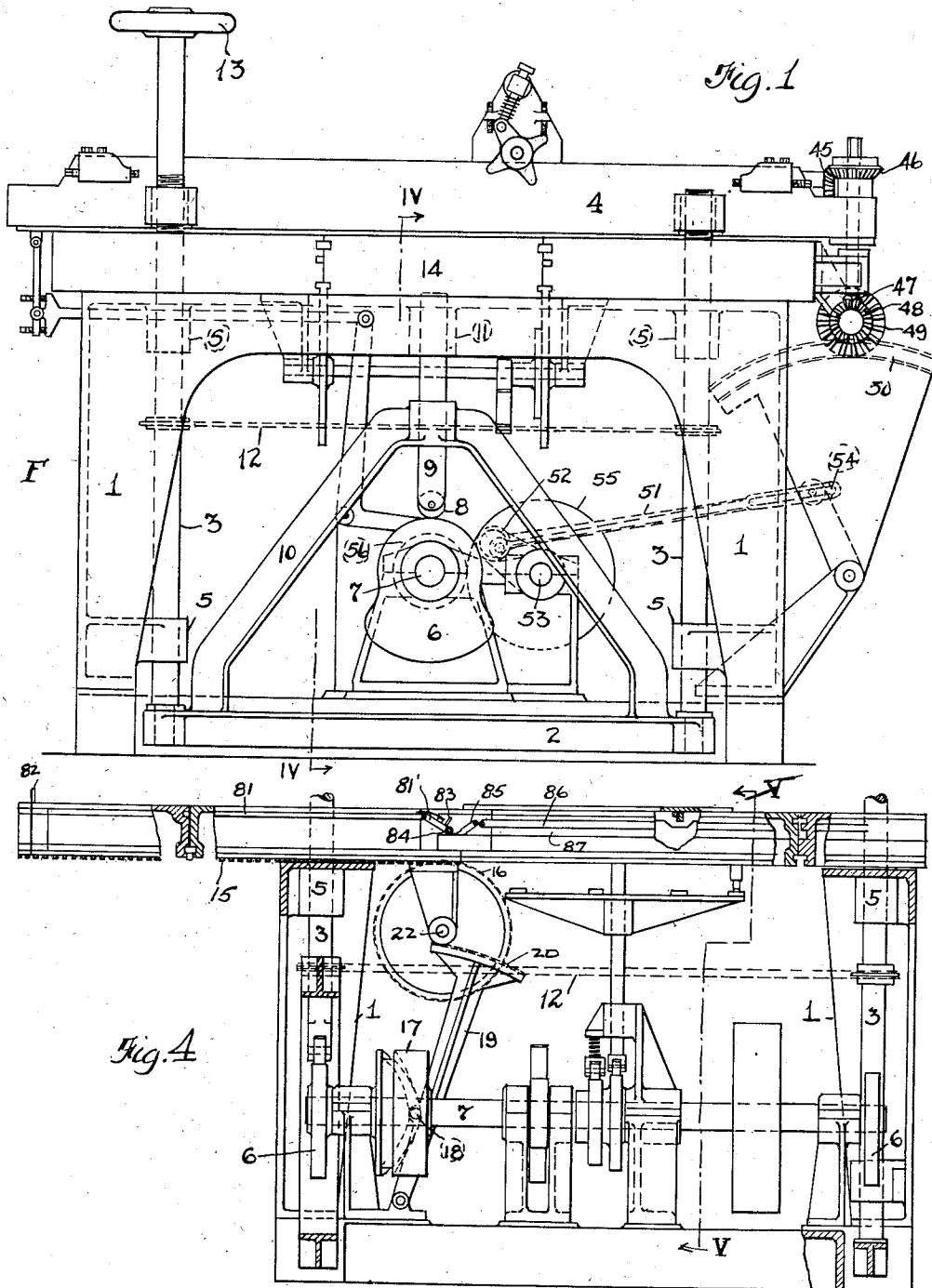
W. K. WILLIAMS

1,840,073

STENCIL PRINTING MECHANISM

Filed Nov. 19, 1926

5 Sheets-Sheet 1



INVENTOR. Warren K. Williams
BY Day, Oberlin & Day ATTORNEYS

Jan. 5, 1932.

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STENCIL PRINTING MECHANISM

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5 Sheets-Sheet 2

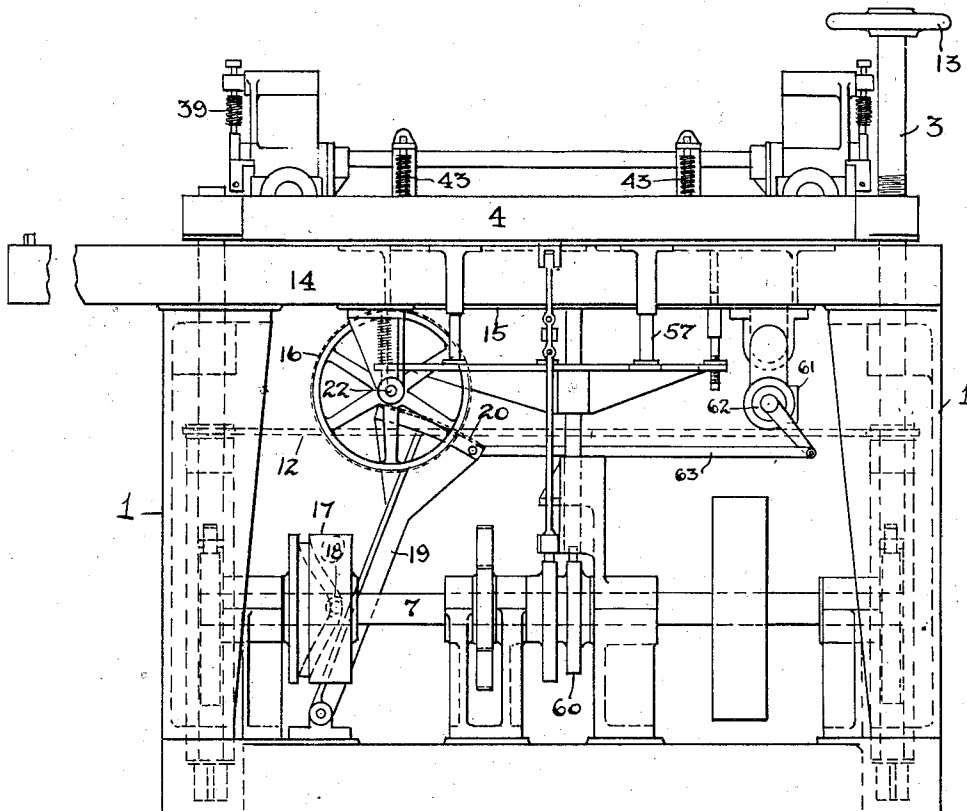


Fig. 2

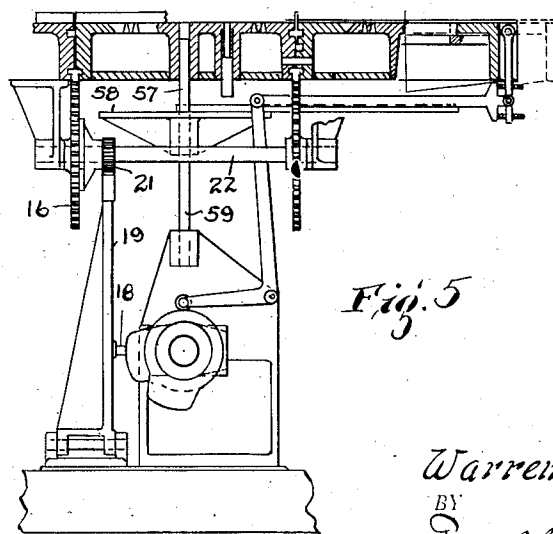


Fig. 5

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STENCIL PRINTING MECHANISM

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5 Sheets-Sheet 3

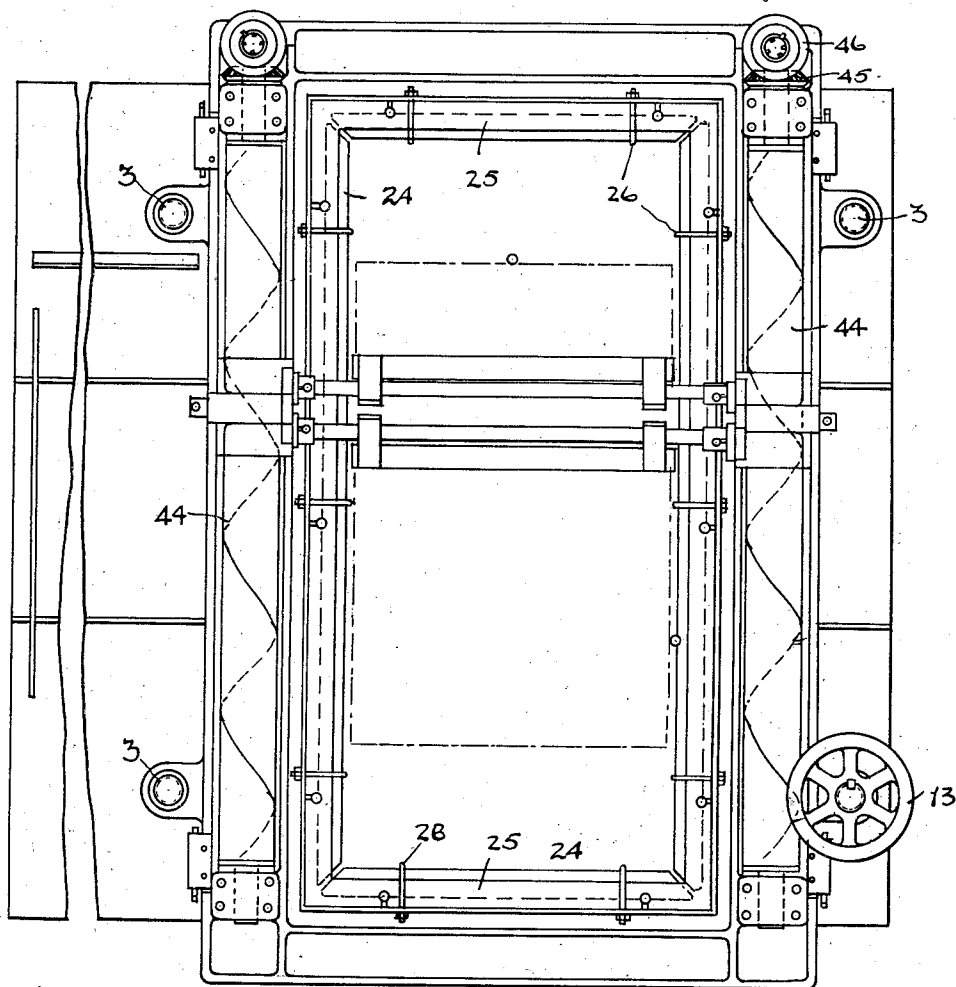


Fig. 3

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5 Sheets-Sheet 4

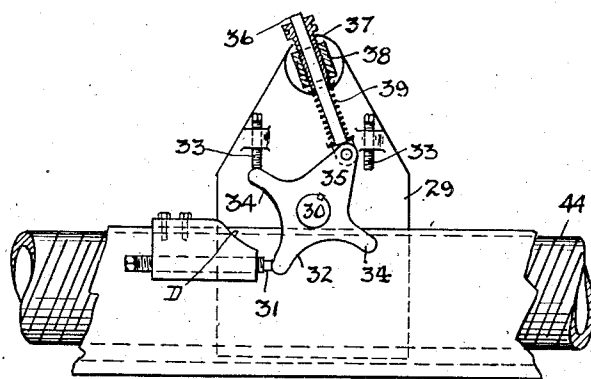


Fig. 6

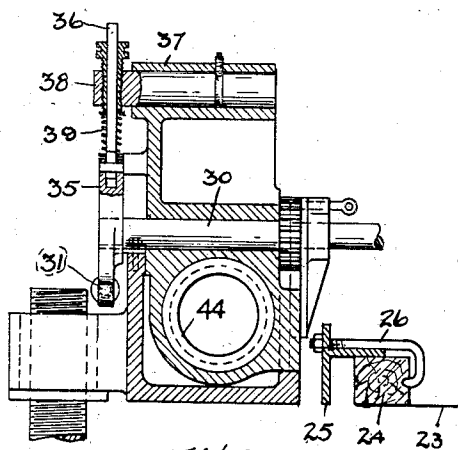


Fig. 8.

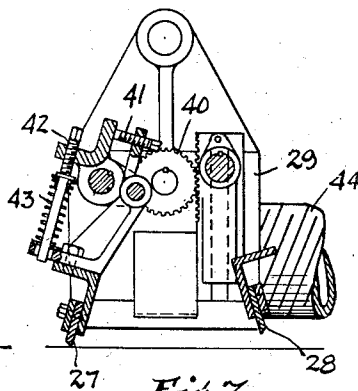


Fig. 7

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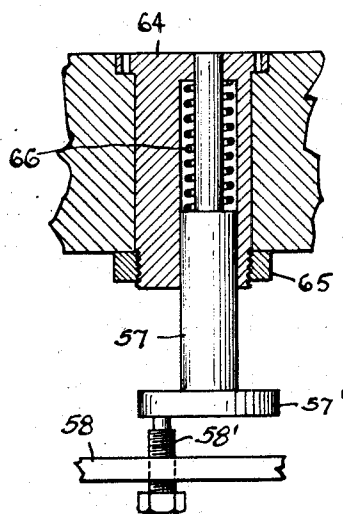
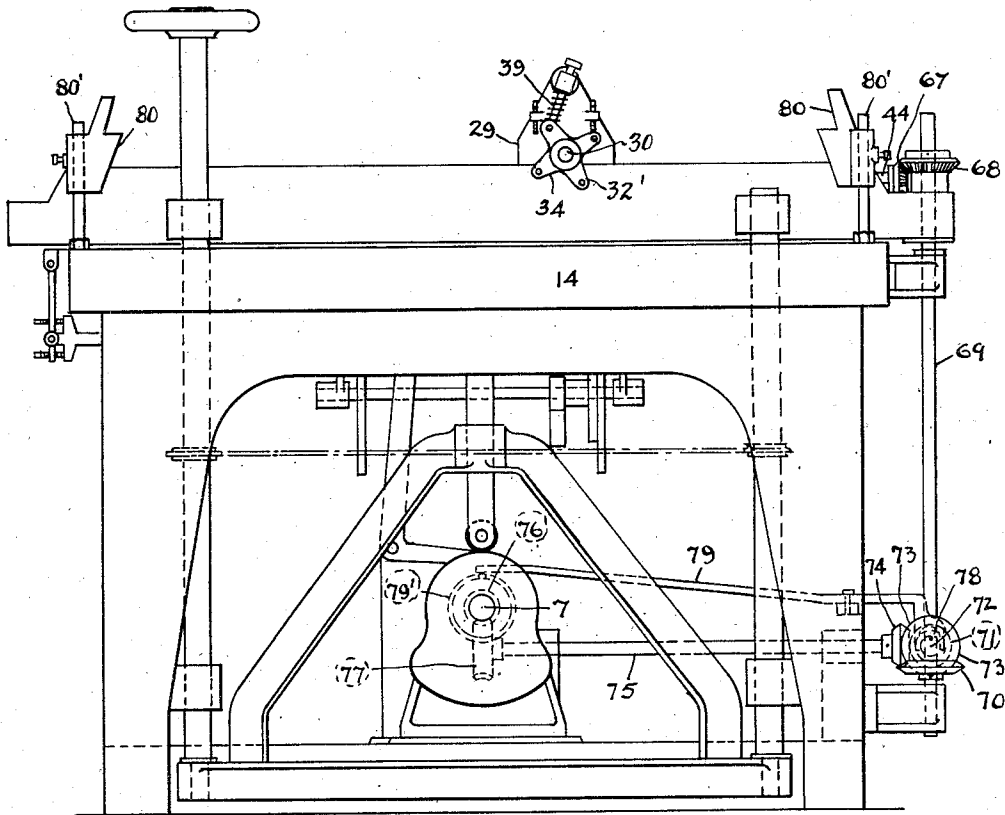
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STENCIL PRINTING MECHANISM

Filed Nov. 19, 1926

5 Sheets-Sheet 5



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UNITED STATES PATENT OFFICE

WARREN K. WILLIAMS, OF CUYAHOGA FALLS, OHIO, ASSIGNOR OF TWENTY-FOUR AND ONE-HALF ONE-HUNDREDTHS TO EDWARD J. HENLE, OF LOS ANGELES, CALIFORNIA, AND FIFTY-ONE ONE-HUNDREDTHS TO L. A. VAUGHN, OF CUYAHOGA FALLS, OHIO

STENCIL PRINTING MECHANISM

Application filed November 19, 1926. Serial No. 149,336.

This invention relating, as indicated, to printing mechanism, has more particular reference to printing by the use of a stencil, the ink or the like being applied by wiping or scraping mechanism traversing the stencil form; and it is among the objects of the invention to provide sponsors or scrapers that can be adjusted independently for angle and for pressure, also to provide a stencil carriage that automatically raises and lowers in correlation with sponsor travel, feed actuation, discharge, and registering mechanism. Other objects will appear as the description proceeds.

To the accomplishment of the foregoing and related ends, the invention, then, consists of the means hereinafter fully described and particularly pointed out in the claims, the annexed drawings and the following description setting forth in detail certain mechanism embodying the invention, such disclosed means constituting, however, but one of various mechanical forms in which the principle of the invention may be used.

In said annexed drawings:—

Figs. 1 and 2 are end and side elevations respectively of a machine embodying the present invention; Fig. 3 is a plan view; Fig. 4 is a fragmentary sectional view taken on the plane approximately indicated by line IV—IV, Fig. 1; Fig. 5 is a fragmentary sectional view taken on the plane approximately indicated by line V—V, Fig. 4; Figs. 6 and 7 are details of the sponsor mounting; Fig. 8 is a detail in section taken on the plane in general at right angles to Fig. 6; Fig. 9 is an end elevation of a modification; and Fig. 10 is a longitudinal vertical section of the register-guide.

The reference character F in the drawings designates a frame, which may be made up for instance of a base portion and legs 1. Within the frame, a pair of cross heads 2 is mounted for vertical reciprocation, upstanding arms 3 in pairs supporting the screen carrying frame 4, the arms being slidable in guide bearings 5 on the legs. For imparting reciprocation, cams 6 on shaft 7 are arranged to co-operate with rollers 8 on studs 9 secured to the yokes 10 of the cross heads, the

studs preferably extending sufficiently thereabove to slide in guide bearings 11. Connecting the arms 3 is a sprocket chain coacting with sprockets secured to the respective arms, and the arms are screw threaded where engaging the screen carrying frame 4 and rotatably mounted in the cross heads 2, so that on turning the hand-wheel 13 for adjustment, all arms move equally and the extent of throw of the stencil carrying frame 4 with respect to the table 14 can be regulated as desired. In this table a feed bar 81 having feed-fingers 82 and 83 is mounted for reciprocative longitudinal movement, the range of excursion being such that the table can receive a sheet of material to be printed and the finger 82 bring it under the stencil carrying frame to receive the imprint and then the finger 83 push it to discharge. Conveniently, this motion may be provided by rack and pinion set 15, 16, the pinion being actuated from the shaft 7 by means of a slot-cam 17, slot-traveler 18 on lever 19, toothed segment 20 and small pinion 21 on the shaft 22 which carries the pinion 16.

Within the stencil-carrying or screen-carrying frame 4 is a stencil or screen 23, this being preferably adjustable, such as by the frame strips 24 to which the stencil or screen is secured being slidably movable in the T-section support or outer framing 25, adjusting hook-bolts 26 allowing of the desired takeup and release. Usually the stencil 23 will be in the form of a more or less open-mesh fabric having the ground or non-printing portions blocked out by a filler material, and thus leaving only the design area open for the passage of the ink or the like. Where applying the ink or paint or the like, wiper or scraper mechanism is arranged to reciprocate across the back of the stencil or screen, the ink or the like being between the wiper knives or scrapers 27, 28, and these being set down alternately as the scraper carriage 29 moves back and forth across the stencil. The wipers or scraper knives are moved in and out of operating position by a control shaft 30 which is actuated by means of an adjustable tappet 31 at each end of the path of the carriage 29, an arm 32 being secured to

the shaft to be engaged by the tappets alternately. The extent of turning of the control shaft may be regulated by stop-screws 33 in the path of arms 34 which like arm 32 are secured to the shaft, preferably all these arms being integral in the form of a star wheel, one arm 35 of which is arranged to receive spring pressure, a stem 36 being pivoted to the arm and projecting through a sleeve 37 screw threadedly adjustable in an oscillatory spindle 38 so as to allow regulation of the compression of a spring 39 against the arm. Secured to the control shaft is a pinion 40 at one or both ends which meshes with another pinion or a rack supporting in turn the wiper or scraper knife. An adjusting stop-screw 41 may be provided near the ends to regulate the angle of inclination of the wiper or scraper, and a stem 42 may be screw threadedly mounted with a compression spring 43 to regulate the pressure of the wiper blade.

The carriage 29 may be given its traversing movement by screw feed shafts 44, preferably hollow, and driven beveled gears 45, 46 and 47, 48, a pinion 49 adjacent the latter being arranged to mesh with a rack segment 50. A connecting rod 51 and crank 52 on the shaft 53 provide actuation for the rack segment 50, a slot 54 in the rod 51 allowing a dwell at such times as the stencil and feed are in relative motion. On the shaft 53 is a gear 55 meshing with the pinion 56 on the drive shaft 7.

The table 14 is more or less hollow or chambered, if desired, and may have openings or slits through the top and pneumatic means may be provided in connection therewith for retaining sheets to be printed. Conveniently this may include a pipe 61 connecting the table with a suitable source of vacuum and having a valve 62 actuated by a link 63 attached to the lever 19 so as to be moved back and forth. The application of the vacuum will thus be timed so as to be effective to hold the sheet while being stenciled and allow release in time for the discharge.

Registering pins 57 are arranged within the table, or reciprocally mounted to be projected thereabove. A desirable form includes an adjustable mounting, as shown more in detail in Fig. 10, the pin being mounted eccentrically in a bushing 64, which may be turned to position the pin as required, a spanner wrench being used for the purpose, and the bushing is then locked by means of a threaded collar or nut 65. A spring 66 serves to normally depress the pin and the lifter 58 effects the raising. It is desirable to interpose an adjusting screw 58' between the lifter plate 58 and the head 57' of the pins 57. The lifter is actuated by a cam 60. The cam is so laid out that the registering pins 57 are projected above the table at the

time the sheet is to be placed in feed position.

In the form of traverse mechanism shown in Fig. 9, the feed shafts 44 in screw-threaded relation with the carriage of the scraper or sponsor are turned through the intermediary of bevel gears 67, 68, the latter splined on shafts 69 which carry bevel gears 70 driven in turn by gears 71 on cross-shaft 72. Loosely mounted on the cross-shaft 72 is a pair of bevel gears 73, one at each side of and in mesh with a bevel gear 74 fixed to shaft 75, which is driven from the main shaft 7 by a worm and worm-gear 76, 77. The cross-shaft 72 is rotated in first one direction and then the other by means of a small splined clutch 78 between the gears 73, being thrown into engagement with a clutch-face on each in turn. This alternate clutching and re-clutching is provided by a clutch-shift lever 79 having a fork engaging the clutch, the lever being pivoted and extending thence into engagement with a cam-groove on a cam 79' carried by the shaft 7.

The operation of the machine will be clear. The stencil carrying frame being reciprocated up and down by means of the cross heads and the cams 6, while the feed bar 81 is reciprocated in a horizontal plane by means of the rack and pinion mechanism 15, 16, actuated from the slot cam 17, a sheet or piece to be printed or stenciled is placed upon the table in front of feed-finger 82 as it is at the outer end of its excursion. With further turning of the shaft 7, the rack and pinion actuating cam 17 and segment 20 carry the bar 81 under the stencil frame and bring the sheet into printing position. At the same time finger 82 starts forward the finger 83 carried by the jointed portion 81' of the bar 81 is raised in front of the sheet printed during the previous cycle. This is accomplished by the roller-pin 84 riding up on the pivoted switch or gate 85 and thence on top of the rail 86. With the further movement of the finger 83 the printed sheet is discharged. After the sheet being discharged passes from under the stencil, and before the new sheet or card in front of finger 82 reaches its proper printing position, the registering pins 57 are projected upward by cam 60 so as to stop the new card in its proper place. The stencil frame is then lowered by means of the cams 6 and the cross heads to make contact of the stencil with the sheet or piece of material to be printed. The carriage carrying the wipers now makes traverse across the back of the stencil and the ink or paint or the like is thus wiped or pressed through the open portions of the design. During this time the bar 81 and fingers have returned to their original positions, the finger 82 clearing the frame 4 before it lowers onto the table and finger 83 returning beneath the top of the table by reason of the roller-pin 84 having

run off below the rail 86 so as to return in the groove 87 under it. While the carriage and wipers are making the print, the operator places a fresh card in front of finger 82 ready for the next cycle. With the further turning of the shaft 7, the stencil carrying frame 4 is raised and the cycle repeated, this time with the other wiper brought into action as the carriage traverses the stencil on the reverse run. It will be noticed that at each end of the run of the carriage 29, the arm 32 on the control shaft is rocked back into position to set the other wiper or scraper down into relation with the stencil, and in this manner the ink or paint or the like is carried back and forth across the stencil, first by one knife and then by the other, the two thereby acting as confining and applying means for the mass of ink or paint charged. In the form of actuation shown in Figs. 1 and 3 the knife-control shaft 30 is rocked by the arm 32 striking the tappet 31 at each end of the traverse. In the form shown in Fig. 9, the projecting pin 32' engages against the cam 80, and since this is held by a support 80' fastened to the table 14, the screen-carrying frame 4 on raising carries the scraper carriage up so that the pin 32' rides up along the cam and is crowded back until the spring 39 can take charge and throw the star-wheel and scrapers to the other position. It will be noticed that neither of the scrapers or knives press against the screen while it is away from the card on the table. When the carriage 29 has completed its excursion and the star wheel turns, the arm 34 rests against the cam surface D (Fig. 6) and in this position both scrapers 27 and 28 are away from the screen 23 and at this moment the frame 4 rises and there is no pressure exerted on the screen. When the frame 4 is lowered onto the next sheet, the carriage 29 moves back on the next excursion and arm 34 is lowered along cam surface D and the scraper comes in contact with the screen. The same result is obtained by the vertical cams (Fig. 9), the pin projecting from the arms of the star wheel engaging the cam surface and being guided thereby for the dwell necessary.

In order to compensate for different thicknesses of sheets or other material to be printed, the hand wheel 13 is turned as necessary and thereby through the sprocket chain connection 12, causes all of the arms 3 to equally raise or lower the stencil carrying frame 4 and thus adjustment can be readily made as required.

Other modes of applying the principle of the invention may be employed, change being made as regards the construction herein shown, provided the means stated by any of the following claims or the equivalent of such stated means be employed.

I therefore particularly point out and distinctly claim as my invention:—

1. In mechanism of the character described, the combination of a stencil carrier, and a pair of wiper blades both generally directed downwardly and at a slight angle to each other and adapted to alternately cooperate with said stencil carrier.

2. In mechanism of the character described, the combination of a stencil carrier, a pair of wiper blades both generally directed downwardly and at a slight angle to each other, and means to traverse said blades alternately along the back of said carrier.

3. In mechanism of the character described, the combination of a stencil carrier, a pair of wiper blades both generally directed downwardly and at a slight angle to each other, means to alternately traverse said blades along the back of said carrier, and means for independently adjusting the angle of said blades.

4. In mechanism of the character described, the combination of a stencil carrier, a pair of wiper blades both generally directed downwardly and at a slight angle to each other, means to traverse said blades alternately along the back of said carrier, and means for independently adjusting the pressure of said blades.

5. In mechanism of the character described, the combination of a stencil carrier, a pair of wiper blades both generally directed downwardly and at a slight angle to each other, means to traverse said blades alternately along the back of said carrier, means for independently adjusting the angle of said blades, and means for independently adjusting the pressure of the said blades.

6. In mechanism of the character described, the combination of the stencil support, a carriage adapted to be reciprocated along the back of said stencil support, spaced rock shafts in said carriage, a wiper blade supported by each said shaft, a control shaft for moving the blades alternately into operating positions, and means for actuating the control shaft.

7. In mechanism of the character described, the combination of a stencil support, a carriage adapted to be reciprocated along the back of said stencil support, rock shafts in said carriage, wiper blades supported by said shafts, a control shaft for moving the blades alternately into operative position, a star wheel on said control shaft and cams for alternately engaging said star wheel and turning it as the carriage is raised.

8. In mechanism of the character described, the combination of a stencil carrier, a downwardly directed pair of wiper blades set at an angle to each other, adapted to alternately cooperate with said stencil carrier, and means for holding both blades away from the carrier.

9. In mechanism of the character described, the combination of a stencil carrier,

a downwardly directed pair of wiper blades set at angles to each other, means to traverse said blades alternately along the back of said carrier, and means for holding both blades
5 away from the carrier at the end of each traverse.

10. In mechanism of the character described, the combination of a stencil carrier, a downwardly directed pair of wiper blades,
10 means to alternately traverse said blades along the back of said carrier, and cam means for holding both blades away from the carrier at the end of each traverse.

Signed by me, this 14th day of October,
15 1926.

WARREN K. WILLIAMS.

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