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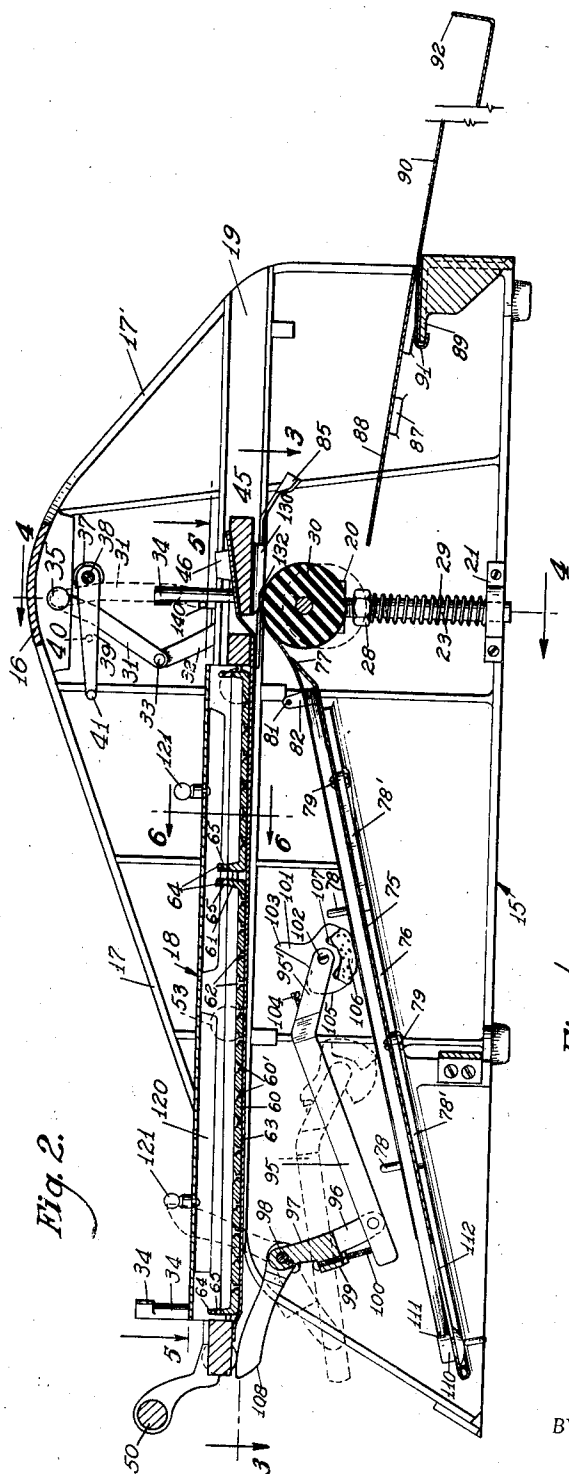
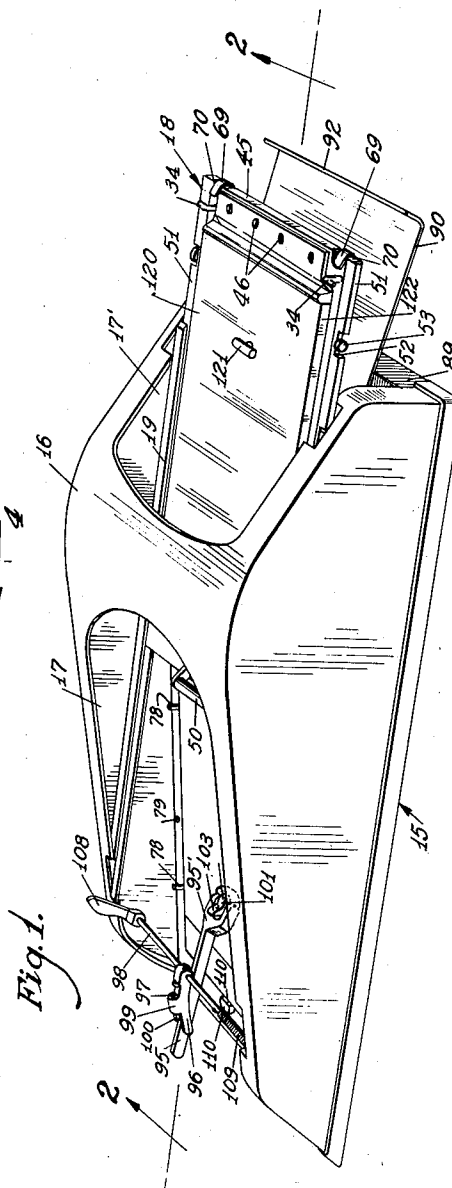
A. P. LEE

2,212,347

DUPLICATING MACHINE

Filed Jan. 18, 1937

3 Sheets-Sheet 1



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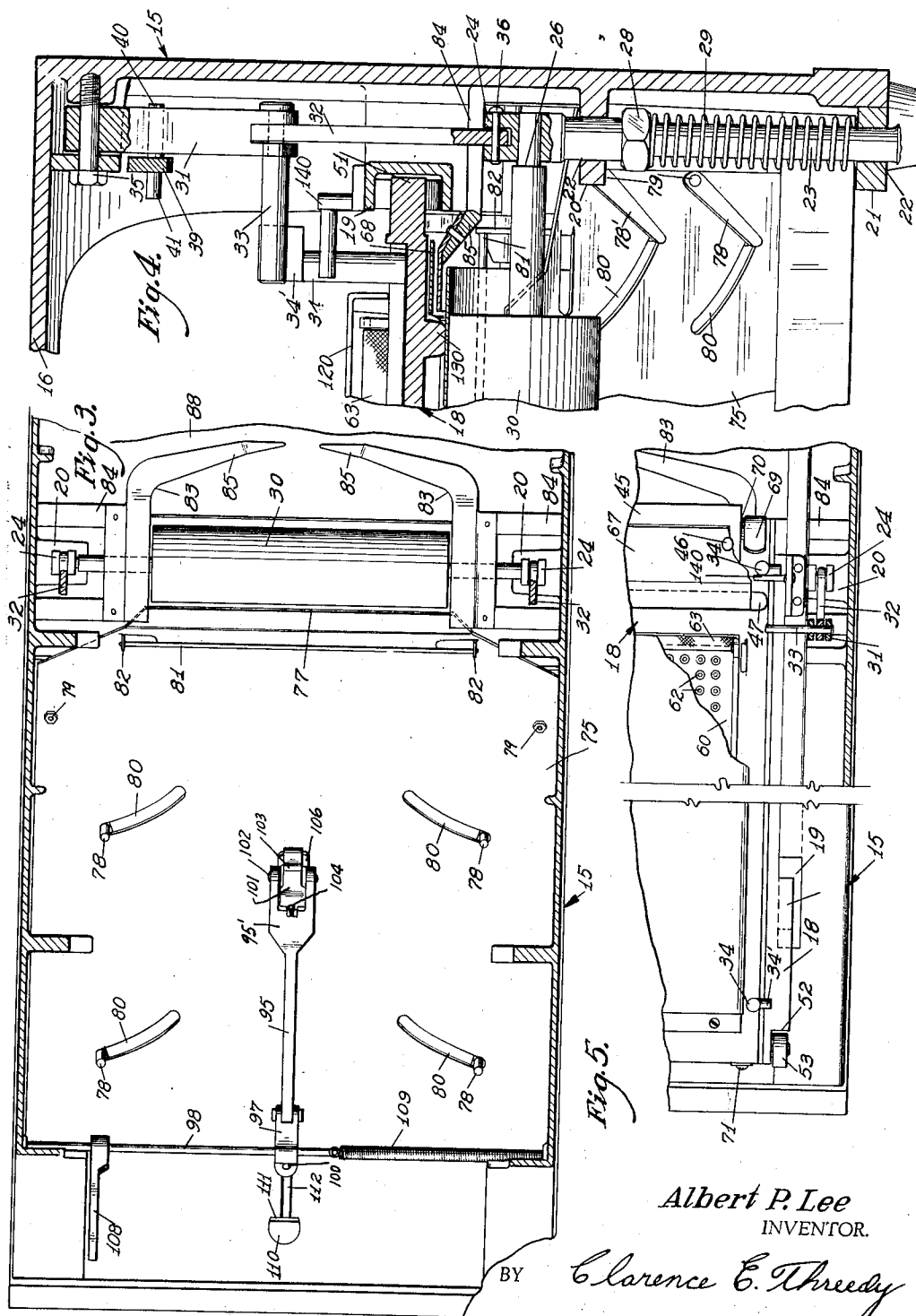
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3 Sheets-Sheet 2



UNITED STATES PATENT OFFICE

2,212,347

DUPLICATING MACHINE

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Application January 18, 1937, Serial No. 121,133

14 Claims. (Cl. 101—114)

This invention relates to duplicating devices, and more particularly to an improved form of multigraphing machine particularly adapted for reproducing copy in several colors.

One of the important objects of the invention is the provision of a device of the class described having a reciprocable carriage provided with a plurality of removable inkwells or trays, which in turn are provided with a plurality of tapered apertures communicating to the bottom side thereof and each having an ink-absorbing blanket disposed over the bottom side to receive ink from said apertures, and means for positioning a stencil or the like against said blanket to receive various colored inks from said wells.

A further object is the provision of a housing member having a reciprocable carriage as aforesaid, arranged therein for manual operation and having a novel form of automatic paper feeding means disposed below the carriage and operable to position one sheet at a time in printing position for each reciprocation of the carriage.

Still another object is the provision in a device of the class described, including the housing, reciprocable carriage, the automatic paper feed means aforesaid, and having an impression roller disposed below said carriage and normally urged toward the same to press a sheet of paper into printing engagement with the stencil on the carriage, and means for automatically retracting said roller from printing engagement with the bottom of the carriage when the latter reaches a predetermined position.

Other objects reside in the provision of mechanism for properly positioning a supply of paper for automatically feeding one sheet at a time into printing position and properly gauging the position of said sheet relative to the aforementioned impression roller, so as to assure a proper register of the copy within the area of the sheet.

Still other novel aspects of construction and operation will appear as the following particular description proceeds in view of the annexed drawings, in which:

Fig. 1 is a perspective of the improved machine; Fig. 2 is a vertical section taken along lines 2—2 of Fig. 1;

Fig. 3 is a fragmentary top plan view with the frame in section, and showing the paper apron, impression roller, paper feed, and discharge guides, taken along lines 3—3 of Fig. 2;

Fig. 4 is a fragmentary vertical section through the housing, showing a portion of the roller control mechanism, and taken along lines 4—4 of Fig. 2;

Fig. 5 is a fragmentary horizontal section through the housing and showing a portion of the carriage in plan, the view being taken along lines 5—5 of Fig. 2;

Fig. 6 is an enlarged vertical sectional detail of the carriage structure, taken along lines 6—6 of Fig. 2;

Fig. 7 is a longitudinal vertical section through the carriage, taken along lines 7—7 of Fig. 6;

Fig. 8 is a top plan view of the carriage proper;

Fig. 9 is a top plan detail of one form of ink tray assembly or combination;

Fig. 10 is an enlarged vertical fragmentary sectional detail through an ink tray, taken along lines 10—10 of Fig. 9, and illustrating the ink feeding means;

Fig. 11 is an enlarged perspective detail of the paper registering rollers; while

Fig. 12 is a fragmentary vertical section through the center of the machine and showing the automatic paper feed and paper registering rollers in detail.

In general, the improved duplicating machine as seen in Fig. 1, comprises an elongated housing 15 having a hood portion 16 with cut-away or open sloping end portions 17 and 17', and a manually reciprocable carriage 18 movable within the housing longitudinally relative to its open end portions.

The housing 15 may be an integrally cast or assembled member preferably of metal, and provided with a pair of oppositely disposed longitudinally extensive channel or track members 19 secured to its inner vertical wall portions (Figs. 1, 2, and 4). Extended laterally from both inner vertical wall portions of the housing, substantially below the hood portion 16 thereof and the rails 19, are a pair of overlying bosses 20 and 21 having vertically aligned openings 22 through which extend in a vertical direction a rod-like roller supporting member 23 (Figs. 2 and 4), terminating at their upper extremities in an enlarged head portion 24 having a transversely directed opening 25 in which the shouldered end portions 26 of the impression roller shaft 27 are received to provide a pivotal or bearing support for the roller.

The roller supporting members 23 are two in number, one on each side of the housing, and are partly threaded near their head portions 24 to receive tensioning nuts 28 between which and the inner surface of the lower boss or lug 21 are extended compression springs 29 disposed on the supporting rods in such manner as to bear against their respective tensioning nuts 28 and urge the

supporting shafts or rods 23 and the impression roller 30 supported thereby, in an upward direction. It will thus appear that the roller 30, in its horizontal disposition across the interior of the housing, is reciprocally movable in a vertical direction against the tension of springs 29, the roller being in position for printing or impression relationship with the carriage 18 when the roller is in its uppermost position in which condition it is normally held by springs 29.

However, means are provided for moving and holding the roller 30 downwardly in a lowered position away from the bottom of the carriage 18, and hence out of printing engagement with the latter. The foregoing roller control means includes a pair of toggle arms 31 and 32, pivotally joined at their inner extremities by an elongated pin or stud 33 which extends in a direction toward the center of the housing, above the tracks 19, for contacting engagement with the enlarged head portions 34' of upstanding pins 34 (Fig. 4) carried on both upper sides of the carriage 18. The toggle rod 31 is pivotally attached, as at 35, to a suitable lug formation on the inner surface of the housing below the hood 16, while the lowermost extremity of the toggle rod 32 is pivotally secured by means of a pin 36 in a slotted upper end portion of the head 24 of lift rods 23.

Each of the vertical side walls of the housing 15 is provided, on their inner surfaces at a point just below the hood 16, with laterally extending and oppositely disposed bosses 37 (Fig. 2) having laterally extended central apertures which receive the corresponding end portions of a transverse rod 38 which carries a pair of roller-control lever arms 39 adjacent each of the bosses 37 (Fig. 2) each having laterally extended pins 40 disposed for engagement against the longitudinal edges of the upper toggle arms 31 on each side of the carriage. Each of the control arms 39 may be provided with an inwardly directed handle part 41 engageable by the user to pivot the arms downwardly to cause the pins 40 thereon to bear against the upper toggle arms 31, and thus pivot the toggle levers 31 and 32 into and past dead or over center position to move and hold the roller 30 in a lowered position relative to the carriage 18 and against the tension of springs 29. It should be observed that the laterally extending bosses 37 are so positioned as to limit the forward movement (that is toward the right in Fig. 2) of the toggle arms when the same have been urged an adequate distance past dead center, thus assuring that the roller 30 will not snap back into raised position. The toggle mechanism is a form of quick, snap-action or over-center means for moving the roller quickly into and out of position for properly timed movement in cooperation with the paper feeding and releasing features.

The carriage, which is generally indicated at 18 in Fig. 8, comprises a quadrangular frame having a laterally extensive head bar 45 provided with a plurality of upstanding bosses 46 spaced apart laterally across the frame to register with the usual openings in the stencil sheet headband. The innermost edge of the head bar 45 is separated from the rest of the frame by a laterally extensive stencil sheet opening 47 through which the stencil passes to the underside of the ink trays or platens. The opposite lateral cross-member of the carriage is provided with handle means 50, while the longitudinal sides of the carriage are provided with track flanges 51 receivable freely in the channels or tracks 19 on the housing. At suitably spaced intervals along the flanges 51 are

notched or cut-out areas 52, in which are positioned rollers 53 adapted to move in the channels or tracks 19 so that the carriage 18 may be freely reciprocated by manipulation of handle 50.

In order to limit the reciprocal movement of the carriage in both directions, a stop lug 140 is provided on the upper surface of the tracks or rails 19 (Figs. 2 and 5) closely adjacent the toggle pivots and adapted to be engaged by the upstanding stop lugs 34 at both ends of the carriage 18 so as to stop the same at an instant after the toggle has been set or tripped, whichever.

On the underside of the head bar 45, opposite to the side on which stencil lugs 46 are situated, are a plurality of spaced, elongated buffer bosses 130 (Figs. 2, 4, 7), each having a paper register notch 132 (Fig. 7) adapted to engage the forward or upper edge of a sheet of paper that has been advanced too far and urge the same backwardly on the stack against the register rollers 113 just before the roller 30 is tripped or snapped into position against the buffer bosses 130 to grip the newly advanced sheet between the roller and platen as the carriage approaches the limit of its return stroke. Register rollers 113 are hereinafter more fully described.

The main carriage frame opening lies between the lateral cross-member which supports the handle 50 and the lateral stencil opening 47, and as seen in Fig. 7 particularly, the undermost body portions of the longitudinally extensive frame members, indicated at 54, are cut away upwardly so as to provide a slanting longitudinal inner bottom surface 55 which slants upwardly from the handle end of the carriage toward the head 45 thereof. Formed adjacent the respective longitudinal extremities of the slanting surface 55, are ledges 56 against which the respective longitudinal extremities of a tray clamping bar 57 rest so as to be spaced from the surface 55 a distance corresponding to the thickness of the tray flanges 58, the bars 57 being secured in place by means of screws 59 for example, so as to bear against the tray flanges and secure the trays or platens in place in the manner shown particularly in section in Fig. 6.

The ink trays or platens are provided preferably in the rectangular forms shown in Fig. 9, there being desirably a number of these trays adequate to fill the open central areas or well of carriage 18. The trays are also dimensioned and partitioned variously so that a variety of tray compartments may be had, each compartment being provided with a different colored ink in such manner that a single impression will print the stencil copy in a number of colors corresponding to the number of colors provided in the several platens or compartments, and by variously re-arranging the combination and disposition of these trays novel and varied color schemes may be achieved.

As seen in Figs. 2, 6, 9, and 10, the trays are of rectangular form preferably of metal and have a flat bottom portion 60 bordered by upstanding wall portions 61 so as to form a shallow tray as seen in the sectional views of Figs. 2 and 6, for example. The bottom portions 60 are provided with a plurality of uniformly spaced funnel- or conically-shaped ink feeder openings 62 (Fig. 10), disposed with their widest openings in the upper bottom of the trays 60 and their narrower openings in the bottom of the trays 60' for communication with the ink absorbing blanket 63 stretched over the bottom by means shortly to be described.

Where a number of trays or platens are ar-

ranged in side by side relation, they are provided with spacing lugs 125 (Figs. 7 and 9) disposed on their lateral lower edge portions so as to space individual trays from one another in a direction across the carriage, the individual trays 127 being differentiated from the double or multiple well type indicated at 126, the latter, it will be recalled, being provided with integrally formed longitudinally extensive spacing channels 66 (Fig. 10).

The blankets 63 are preferably of an ink absorbing fabric especially prepared and adapted to retain considerable quantities of ink without danger of leakage from the tray, while at the same time presenting an adequately inked surface for printing and impression purposes, the ink being retained on the inner tray surface and seeping downwardly through the tapered opening 62 into the blanket 63 and quickly spreading through the latter in a uniformly distributed manner.

Each tray or platen is preferably provided with its own inking blanket 63, since a variety of colored inks are used, and these blankets are secured against the bottom portions of each platen by means of laterally extended cross rods 64 (Figs. 7 and 10) seated in upstanding bosses or brackets 65 provided adjacent the corner portions of each tray, so that one such bar 64 is provided at each longitudinal end of each tray compartment with the blanket 63 stretched over the bottom of the tray and looped around the bars 64 and secured in place by sewing or similar means.

Where a plurality of compartments are provided in one tray 126, as in Figs. 8 and 9 for example, the trays may be provided with partition walls 61' and, as seen in Fig. 10, the bottom side of the tray is then provided with a longitudinally extensive slot or channel 66 extended beneath the partition wall so as to prevent the seepage or capillary movement of ink from one tray across the bottom to the blanket of the next one, and it will be observed that the blanket-supporting rod may be conveniently extended all the way across the tray through an apertured bracket or boss 65' formed on the wall 61'. At this juncture, it is thought appropriate to call attention to the disposition of the stencil sheet 67 against the blanket 63 on the bottom of the trays, as seen especially in Fig. 10.

The stencil sheet 67 may be of any commonly available type, and after having the copy impressed thereon is placed in printing position on the carriage by inserting its bottom edge into the lateral opening 47 and passing the sheet toward the left on the bottom side of the platens or ink trays (Figs. 1 and 7), and thereafter positioning the headband 67' on the head bar 45 of the carriage with the stencil mounting studs 46 disposed in the usual headband openings.

It should be observed that when the several platens or trays and their respective blankets are in place in the carriage, the blanketed bottoms thereof lie in a plane disposed at an angle to the horizontal corresponding to the slope of the inclined surface 55 (Fig. 7), the bottommost surfaces of the blankets being covered by the stencil sheet 67 and the latter extending to the handle end of the carriage, while the longitudinal side portions hang over the outer marginal longitudinal edges of the blanket where they are clamped down against the carriage frame by means of longitudinally extensive straps 68. The straps 68 may be of metal and are preferably flexible, and

have one longitudinal extremity 69 (Fig. 7) bent back upon themselves so as to hook over a suitably slotted portion 70 of the frame in the edge of the stencil mounting member 45. At their opposite extremities, the straps 68 are turned up to overlie a vertical edge portion of the frame cross member which carries the handle 50, and are secured to the same by means of screws or the like 71. By this means the longitudinal edge portions of the stencil sheet 67 are drawn tightly over the corresponding edges of the blankets and away from the printing or impression plane, so that in addition to trimming in the edge portions of the stencil sheet the latter is tightly stretched over the ink blankets, thus assuring a uniformly disposed impression surface, and avoiding creeping of ink around the side edges of the stencil.

The improved duplicator includes a novel means for supporting a stack of paper and feeding the same one sheet at a time into printing position. This latter means, as seen in Fig. 2, includes an inclined paper supporting apron 75 which rests upon and is secured to inclined flanges 76 formed on opposite inner side walls of the housing and inclined upwardly so that the inner terminal upturned edge 77 of the apron is positioned close to the roller 30, in such manner that a sheet of paper resting upon the apron may be slid upwardly onto the roller 30 in a position to be pressed between the latter and the bottom portion of the carriage 18 when the latter is moved forwardly.

As seen in the top plan view of Fig. 5, the apron 75 is provided with paper guide means in the form of a plurality of upstanding studs or bosses 78 on arms 78' (see bottom view of Fig. 4) which are pivotally attached, as at 79, on the underside of the apron. The bosses 78 protrude from the underside of the apron upwardly through arcuate slots 80 which are curved inwardly toward the center line of the latter, so that paper stock of varying widths may be disposed between the several studs 78 by moving the same inwardly and outwardly. At the upper end of the apron just back of the upturned apron lip or edge 77, is a cross rod or roller 81 supported between upstanding bracket members 82 and spaced above the surface of the apron a distance adequate to permit the free movement of a sheet thereunder onto the upturned apron lip 77 so as to be in proper position, for movement toward and onto the peripheral portion of the roller 30.

The pivotal disposition of bosses 78 is important since it permits turning the stack of paper sideways out of normal position in the event the stencil is not straight. Also, it should be observed that there is no other obstruction on the upper apron surface and the paper stack can lie perfectly flat.

The printed sheet is guided in its movement off of the roller 30 by a pair of guide wings 83 disposed at the axial extremities of the roller 30, and secured for vertical adjustment relative to the housing and roller by means of brackets 84 (Fig. 4) provided with vertically elongated slots having set screws threaded into the frame or housing wall (not shown). Each of the wings 83 has an inturned finger portion 85 suitably curved toward the central axis of the moving sheet and spaced a distance adequately away from the roller to direct the moving sheet downwardly without exerting any appreciable pressure on the same, it being observed that the roller 30 is of a length sufficient to leave a margin of paper extending beyond its axial extremities, and the

guiding wings 83 are positioned close to the axial extremities of the roller and at a level near to the upper periphery of the roller so that the marginal portion of the paper will overhang the axial end of the roller and pass beneath the guiding wings 83 and finger portions 85 thereof.

As seen in Fig. 2, the inner vertical surface portions of the housing are provided with downwardly inclined bosses or flanges 87 to which is attached an inclined discharge apron 88 terminating at its lower extremity at the right-hand opened lower end portion of the housing opening 17'. Extended centrally from a lower cross-wise vertical wall portion of the housing is a ledge 89 upon which rests a slidable apron having an inner lateral edge portion bent back upon itself, as at 91, to engage the inner edge portion of the shelf bracket 89 so as to limit the outward sliding movement of the adjustable apron or tray 90. The outermost lateral edge portion of the adjustable paper tray or apron 90 is turned up to provide a combination handle and paper stopping abutment 92.

An automatic paper feed means is provided in the form of a reciprocably movable arm 95 (Figs. 1 and 2) pivotally supported between the bifurcated end portion 96 of an offset arm 97 rotatable with a cross rod 98 extended between the vertical side walls of the housing above the lower end of the paper apron 75. The offset arm 97 has a boss 99 into which is threaded an adjustable stopping pin 100, the outermost end of which is adapted to bear against a lateral edge of the feed arm 95 to pivot the latter upwardly about the shaft 98 after the latter has been turned a predetermined distance, depending also upon the adjustment of the pin 100 (see also Figs. 2 and 12).

The inner end of the feed arm 95 has an offset bifurcation 95' and has a peculiarly shaped paper sliding member 101 pivotally mounted therein, as at 102, this member having a radial tail portion 103 adapted to bear against an adjustable screw member 104 threadable into the end of the arm 95. The member 103 also has a rocking surface 105 disposed radially of the axis of pivotation 102 in a direction substantially opposite to the tail portion 103. Likewise disposed radially of the axis of pivotation and divergent relative to the tail portion 103 and the rocking surface 105, is a claw-shaped cut-out portion 106 which is adapted to wedgely hold a compressible friction pad 107 in the form of a wad of sponge rubber for example.

The cross shaft 98 is provided adjacent one inner extremity with a cam arm 108 (Figs. 1, 2, and 3) disposed in the path of movement of carriage 18, so as to be engaged by the latter to pivot the rod 98 in an anti-clockwise direction against the tension of a return spring 109 anchored at its respective extremities to shaft 108 and to a portion of the housing wall. While the operation of the paper feed will be described in detail hereafter, it will be observed that the rearward or return movement of the carriage 18 causes the latter to strike the arm 108 and pivot the shaft 98 to urge the feed arm 95 in a forward direction to the right. This effects a movement of the paper feed member 101 to move a single sheet into printing position.

At the lower extremity of the apron 75, as seen in Figs. 2 and 3, is a screw stud 110 having a flat vertical face portion 111 against which the lower lateral edge portions of a stack of paper are adapted to bear. The stud is adjustably slidable

in an elongated slot 112 in the apron, so that the stack of paper may be moved upwardly on the apron to positions of varying proximity to the upper end thereof.

In some instances I find it desirable to position the uppermost edge portion of the paper very accurately relative to the roller 30, and for this purpose I have provided twin rollers 113 (Fig. 11) rotatable on a bifurcated or yoke-like end portion 114 of an arm 115 which is pivoted at its free extremity in the slot portion of a lug 116 upstanding from the apron at a point corresponding to the desired lower edge position of the paper stack, the member 116 serving to retain the stack on the apron. While the operation of these gauging or positioning rollers 113 will be described in detail, it may be observed here that they are adapted to engage the lower edge of a single sheet to limit backward movement of the same after it has been positioned by the feed arm 95, because sometimes the top sheet will carry the next underlying sheet with it a short distance, and when the underlying sheet is thereafter advanced, it will be too far ahead of the desired position.

Operation

In operation the machine may be used by placing a stack of paper on the inclined apron 75 beneath the feed arm 95, and between the arcuately movable studs 78 with the lower edge of the paper stack bearing against the face 111 of the adjustable stopping screw 110. It may be assumed that a number of trays or ink platens, each filled with a particular color of ink, are positioned in the carriage 18 in the manner previously described, and that the ink has seeped through the constricted apertures in the bottoms 60 of the trays and into their respective blankets 63, to seep into the stenciled configurations in the stencil sheet 67. If desired, a cover plate 120 (Fig. 1) having handles 121 and depending side wall portions 122, may be fitted loosely onto the top portions of the trays or platens to keep the ink clean.

The discharge tray 90 may be pulled out into the position shown in Fig. 1, and the operator may grasp the handle 50 of carriage 18 and draw the latter toward and into the position shown in Fig. 2, at which time the forward upstanding tripping pins 34 will bear against the laterally extending toggle pins 33 and release the toggle arms so as to cause springs 29 to urge the roller 30 with quick movement upwardly into printing position.

As the carriage moves backwardly the portion adjacent the handle 50 bears against the cam arm 108, pivoting the shaft 98 in an anti-clockwise direction and urging the feed arm 95 forwardly into the position shown in Figs. 2 and 3, this movement being effected against the tension of the coil spring 109. As the arm 95 moves forwardly the feeding member 101 (Fig. 12) pivots about its axis 102 to bring the frictional feed member 107 into contact with the uppermost sheet of paper, and as the arm continues forwardly into its full stroke position the underlying sheet is slid upwardly toward roller 30. At this juncture the carriage is in the position shown in Fig. 2, and the uppermost edge of the newly positioned sheet of paper is engaged with the roller 30, so that upon a forward movement of the carriage by the operator the sheet will be caught between the roller and the forward (right-hand) undermost surface portion of the stencil, and as

the carriage continues its forward movement the paper will be drawn with it and pressed tightly against the stencil during such movement.

Meanwhile, the carriage movement permits the cam arm 108 and its shaft 98 to rotate in a clockwise direction back to normal position under the urge of spring 109, so as to retract the arm 95. At the beginning of this retractive movement, the feed member 101 pivots in an anticlockwise direction and moves the friction member 107 out of contact with the underlying sheet of paper and permits the feeding member to slide backwardly on the surface 105 thereof until the feed arm is in its normal position. In other words, as the arm 95 is reciprocated by the carriage, the feed member 101 rocks in the yoke-like end portion of arm 95 and alternately presents the friction member 107 and the sliding surface 105 to the surface of the underlying sheet of paper.

At the end of the forward stroke of the carriage, the printed sheet will have passed beneath the guide wings 83 and fingers 85 thereof (Fig. 3) and be directed downwardly onto the discharge apron 88 and the adjustable tray or apron 90, the rearward toggle tripping pins 34 having meanwhile engaged the toggle pins 33 and moved the toggle members into and past dead or over center position, so as to urge the roller supporting rods 23 downwardly against springs 29 and move the roller 30 out of the printing plane at substantially the moment when the printed sheet reaches the end of its forward movement with the carriage 18. Thus the clamping engagement between the roller 30 and bottom of the carriage is released so that the printed sheet is free to be discharged onto the discharge apron.

As previously pointed out, the platens are mounted in the carriage 18 in a manner to have their bottom, ink portions disposed in a plane sloping upwardly from the rearward or handle end of the carriage toward the front end thereof. This provision results in moving the roller 30 downwardly against its springs 29 into position which makes the toggle action quick and easy, since the distance through which the toggles would have to be moved and the effort required to move them would constitute an appreciable and sudden shock or impediment to the forward movement of the carriage as it neared the end of its printing stroke.

Where the unprinted sheet is to be positioned accurately, the register rollers of Figs. 11 and 12 are employed instead of the end stud 110. In this case the lower end of the paper stack lies against the slotted stud 116 and the rollers 113 ride on the topmost sheet. As the latter sheet moves forwardly with the advance of arm 95, its forward or upper edge will assume a particular position on roller 30, and at the same time, the lower edge of this sheet will pass from beneath rollers 113, and should there be any slight tendency of the advanced sheet to move backwardly as the feed arm 95 begins its retractive movement, the lower edge of the advanced sheet will bear against the peripheries of rollers 113 and the surface of the next sheet below, and backward movement of the advanced sheet is prevented since rollers 113 are too heavy to be raised by the sheet.

Moreover, as already mentioned above, the topmost sheet may sometimes carry with it a short distance the sheet immediately below, due to static electrical charges set up between the sheets. Obviously, when the thus displaced under-sheet

is advanced by the feed arm it would already be slightly ahead of its normal position. Thus, when this sheet is fed forward, its upper edge will lie too far forward on the roller 30. However, this sheet will be properly positioned by a return movement of the carriage. Just before the roller 30 is snapped against the buffer lugs or bosses 130, the notches 132 in the latter will engage the forward edge of the pre-advanced sheet and slide it back into proper position, and this backward movement is stopped at the right point by the register rollers 113 in the manner previously pointed out.

While I have described in detail specific means for accomplishing the several objects of the invention, I do not desire to be restricted to such details but intend to avail myself of all modifications, variations, and combinations of the novel duplicating apparatus defined by the annexed claims.

Having thus described my invention, what I claim as new and desire to protect by Letters Patent is:

1. A duplicating machine including a reciprocable carriage, a platen positioned therebelow, means for stretching a stencil across the bottom of said platen, and the latter having means of feeding ink to the stencil, a roller below said carriage, yieldable means normally urging said roller against said platen and a stencil thereon, toggle mechanism arranged for operation by said carriage when the same approaches the limit of movement in one direction to position said roller out of engagement with said platen stencil thereon, and means for feeding paper one sheet at a time into position between said roller and platen, said means including an inclined platform, a feed arm reciprocably mounted thereabove, yieldable means normally urging said arm into retracted position, lever means cooperable with said arm for operation by said carriage to advance said feed arm, and means for frictionally engaging a sheet of paper on said platform and moving the same toward said roller when said feed arm is advance, said means including a feed member supported for rocking movement on said feed arm, said member being adapted to ride on a sheet of paper therebelow and having a friction surface adapted to bear against said sheet when said arm is advanced, and a gliding surface presented to the said sheet when said feed arm is retracted.

2. A duplicating machine including an elongated housing having a hood part and portions cut out adjacent its longitudinal extremities in said hood part, a carriage having stencil-engaging means and stencil-inking means, said carriage being longitudinally reciprocable in said housing, roller means below said carriage and spring means urging the same for printing engagement with the bottom region of said carriage and a stencil thereon so as to press a sheet against the same, said roller being movable downwardly away from said carriage against the action of the spring means aforesaid, toggle means for moving said roller against the action of said spring means out of printing engagement as aforesaid, means on said carriage operatively engageable with said toggle means when the carriage approaches one extreme position to move and hold said roller away from the carriage, and means on the carriage operable when the latter approaches its limit of movement in an opposite direction to operate said toggle means and so as to permit said roller to be urged toward

said carriage and stencil, together with means operable by said carriage in its movement for feeding paper, one sheet at a time, into position to be engaged between said roller and the

5 bottom of said carriage.

3. In a duplicating machine having a reciprocable carriage, paper feeding means in the form of an inclined platform, a printing roller at the upper end of said platform and adapted to bear
10 against the bottom region of said carriage, a feed arm supported for reciprocable movement above said platform, mechanism operable by reciprocation of said carriage to reciprocate said feed arm, and a feed device in the form of a rocking member pivotally carried by said feed arm and having
15 a gliding surface disposed substantially radially of its axis of pivotation, a stop portion substantially opposite to said rocking surface and engageable with a part on said arm to limit the rocking movement of said member, and the latter
20 having friction means disposed adjacent said gliding surface and substantially radial to said axis of pivotation, the said member being adapted to lie on the upper sheet of a stack on said platform and being operable when said feed arm is
25 advanced by movement of said carriage to rock in a direction to position said friction means against said sheet and urge the latter in the direction of advancing movement of said feed arm
30 and toward said roller, said rocking member pivoting to cause its said gliding surface to bear against said sheet when said feed arm is retracted and moves back in the reverse direction, whereby
35 paper may be fed sheet by sheet from a said stack toward and between said roller and the bottom region of said carriage.

4. In a duplicating machine having a reciprocable carriage, paper feeding means in the form of an inclined platform, a printing roller at the
40 upper end of said platform and adapted to bear against the bottom region of said carriage, a feed arm supported for reciprocable movement about said platform, mechanism operable by reciprocation of said carriage to reciprocate said feed arm, and a feed device in the form of a rocking member pivotally carried by said feed arm and having
45 a gliding surface disposed substantially radially of its axis of pivotation, a stop portion substantially opposite to said rocking surface and engageable with a part on said arm to limit the rocking movement of said member, and the latter
50 having friction means disposed adjacent said gliding surface and substantially radial to said axis of pivotation, the said member being adapted to lie on the upper sheet of a stack on said platform and being operable when said feed arm
55 is advanced by movement of said carriage to rock in a direction to position said friction means against said sheet and urge the latter in the direction of advancing movement of said feed arm
60 and toward said roller, said rocking member pivoting to cause its said gliding surface to bear against said sheet when said feed arm is retracted and moves back in the reverse direction, paper
65 guide means on said platform, and register means in the form of a second arm having a pivotal support on said platform and against which support the lower edge portions of said stack are adapted
70 to rest, said second arm having a pair of register rollers normally resting on the upper sheet of the stack and having their peripheral surfaces disposed in a substantially tangential sense relative to the line of movement of said sheets toward
75 said printing roller, whereby retrograde move-

ment of an advanced sheet is limited when said feed arm is retracted as aforesaid.

5. In a duplicating machine, ink feed and impression means including a frame, means supporting said frame for reciprocal motion, a tray-like platen member having a flat bottom portion
5 with ink holes communicating therethrough, means for supporting said platen in said frame with the outer surface of said bottom disposed at an angle to the plane of movement of said
10 frame, an ink absorbing member disposed over said outer bottom surface to receive ink from said holes, the lower or outer surface of said absorbing member being somewhat below said
15 frame, means on said frame for holding a stencil sheet against said absorbing member, and roller impression means below said frame and arranged to bear yieldingly against a stencil held against
20 said absorbing means on said platen so as to press a sheet of paper against said stencil when said frame is moved over said roller.

6. In a duplicating machine, a platen carriage reciprocable between an initial and an advanced position, a retractable impression roller over
25 which said carriage moves to print or impress a sheet of paper positioned therebetween, feed mechanism operable by said carriage when the same approaches said initial position to automatically position a sheet of paper between said
30 roller and said carriage, over-center lever means coacting with said carriage for automatically retracting said roller from printing engagement with said carriage when the latter approaches
35 said advanced position whereby a printed sheet may be freed from between the platen carriage and roller when the carriage reaches the end of its printing stroke, said retracting means being
40 constructed and arranged to restore said roller into printing position, at substantially the moment of the return of said carriage from advanced position to initial position, and after said feed mechanism has positioned a sheet as aforesaid.

7. In a duplicating machine, a relatively stationary impression roller, a carriage and platen
45 means thereon arranged to move over said roller and carry a paper sheet thereover, and guide means in the form of laterally directed end wing members positioned at the axial extremities of
50 said roller and having a surface extended laterally of the axis of the roller and closely adjacent the upper periphery of said roller, said wings further having finger portions turned inwardly toward the central line of a sheet moving over said
55 roller, and said fingers being curved downwardly in such manner that only their respective inward finger extremities engage the moving sheet.

8. In a device of the class described having a movable platen member, impression means including an impression roller mounted for movement
60 into and out of engagement with said platen, yieldable means normally urging said roller into engagement with the platen, quick-acting over-center mechanism arranged to move
65 said roller quickly into and out of engagement with the platen and arranged for cooperation with said movable platen to effect movement of the roller as aforesaid responsive to movement of said platen into predetermined positions.

9. In a duplicating machine, a tray-like carriage arranged for reciprocable movement and having an apertured bottom portion constituting
70 a platen with tray portions thereabove constituting an inkwell, means for securing an ink-

receiving stencil below said platen, an impression roller mounted for reciprocable movement into and out of engagement with said platen, snap-action mechanism for moving said roller quickly into and out of engagement with the platen, said snap-action mechanism being constructed and arranged for actuation by said carriage when the latter moves toward predetermined positions to effect movement of the roller as aforesaid, and paper feeding mechanism arranged for operation by said carriage in timed relation to movement of the latter so as to feed an impression-receiving substance into position substantially between said roller and the platen substantially at the time said roller is moved away from the platen as aforesaid, together with manually operable mechanism for actuating said snap-action mechanism.

10. In a duplicating machine, a printing platen arranged for back and forth movement, an impression roller, a pair of supporting arms one at each axial end of the roller and rotatably supporting the same, said arms being mounted for reciprocable movement to move said roller toward and away from said platen, spring means normally urging said arms to dispose said roller toward said platen, a pair of pivotally connected toggle levers for each of said supporting arms, one of said levers of each pair having pivotal connection with a relatively stationary part of said machine and the other said lever having pivotal connection with one of said supporting arms, said pairs of levers being jointly movable in opposite directions to effect joint movement of said supporting arms to move said roller toward and away from said platen, and means having connection with the common pivotal juncture of the levers of each pair and arranged for engagement by said platen when the latter is in predetermined positions for effecting movement of said levers to move the roller in the manner aforesaid responsive to movement of said platen.

11. In a duplicating machine, a printing platen arranged for back and forth movement, an impression roller, a pair of supporting arms one at each axial end of the roller and rotatably supporting the same, said arms being mounted for reciprocable movement to move said roller toward and away from said platen, spring means normally urging said arms to dispose said roller toward said platen, a pair of pivotally connected toggle levers for each of said supporting arms, one of said levers of each pair having pivotal connection with a relatively stationary part of said machine and the other said lever having pivotal connection with one of said supporting arms, said pairs of levers being jointly movable in opposite directions to effect joint movement of said supporting arms to move said roller toward and away from said platen, and means having connection with the common pivotal juncture of the levers of each pair and arranged for engagement by said platen when the latter is in predetermined positions for effecting movement of said levers to move the roller in the manner aforesaid responsive to movement of said platen, together with manually operable mechanism for moving said pairs of toggle levers back and forth

jointly to effect selective movement of the roller in the manner set forth.

12. In a device of the class described including a reciprocable carriage, paper feeding means including an inclined apron below said carriage, an arm mounted for reciprocation in the direction of inclination of said apron, said apron being adapted to support a stack of paper thereon beneath said arm, a rocker mounted on said arm and having a smooth surface and a friction surface adjacent thereto, said rocker being adapted to bear on the topmost sheet of said stack, mechanism actuated by said carriage for reciprocating said rocker, said rocker being rocked by movement of said arm in one direction to cause said friction surface to bear against said topmost sheet to effect advance of the latter by movement of said arm in said direction, said rocker being rocked to present said smooth surface to the underlying sheet when said arm is moved in an opposite direction.

13. In a device of the class described, register means for paper feeding mechanism, said means including an inclined apron arranged to support a stack of paper, the topmost sheet of which is to be advanced in a particular direction off of the stack, an arm mounted for pivotal movement about an axis transverse to the direction of movement of said advanced sheet, said arm having roller means mounted thereon remote from its pivotal axis and being mounted near the lower end of said apron with said roller means bearing against the topmost sheet of the stack at a point in advance of the lowermost edge of the stack in such manner that when the topmost sheet is advanced as aforesaid, the lower edge thereof will be advanced from beneath said roller means and be prevented by the latter from retrograde movement back beneath the roller means.

14. In a duplicating machine, in combination, a stencil carrier movable back and forth between opposite terminal positions, an impression roller, mechanism for moving and holding said roller against or away from said carrier into and out of impressing relationship relative thereto, means actuated by the carrier when the same approaches one terminal position for operating said roller moving and holding mechanism to move the roller out of impressing relationship with the carrier and hold the roller in such condition during movement of the carrier back toward the opposite terminal, means for positioning a stack of paper sheets adjacent said opposite terminal, feeding means for moving sheets one at a time from said stack in beneath the carrier, and driving means operated by the carrier for actuating said feeding means so as to advance and dispose a sheet beneath the carrier prior to arrival of the latter at said opposite terminal, said roller being held as aforesaid away from the carrier so as to underlie said advanced sheet, said carrier being arranged to operate said roller moving and holding mechanism to dispose the roller back into impressing position as the carrier moves into said opposite terminal whereby the advanced sheet will be pressed by the roller toward the carrier and against the stencil thereon.

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