July 26, 1938. A. P. LEE 2,125,167

DUPLICATING MACHINE

Filed April 7, 1939 2 Sheets-Sheet 1

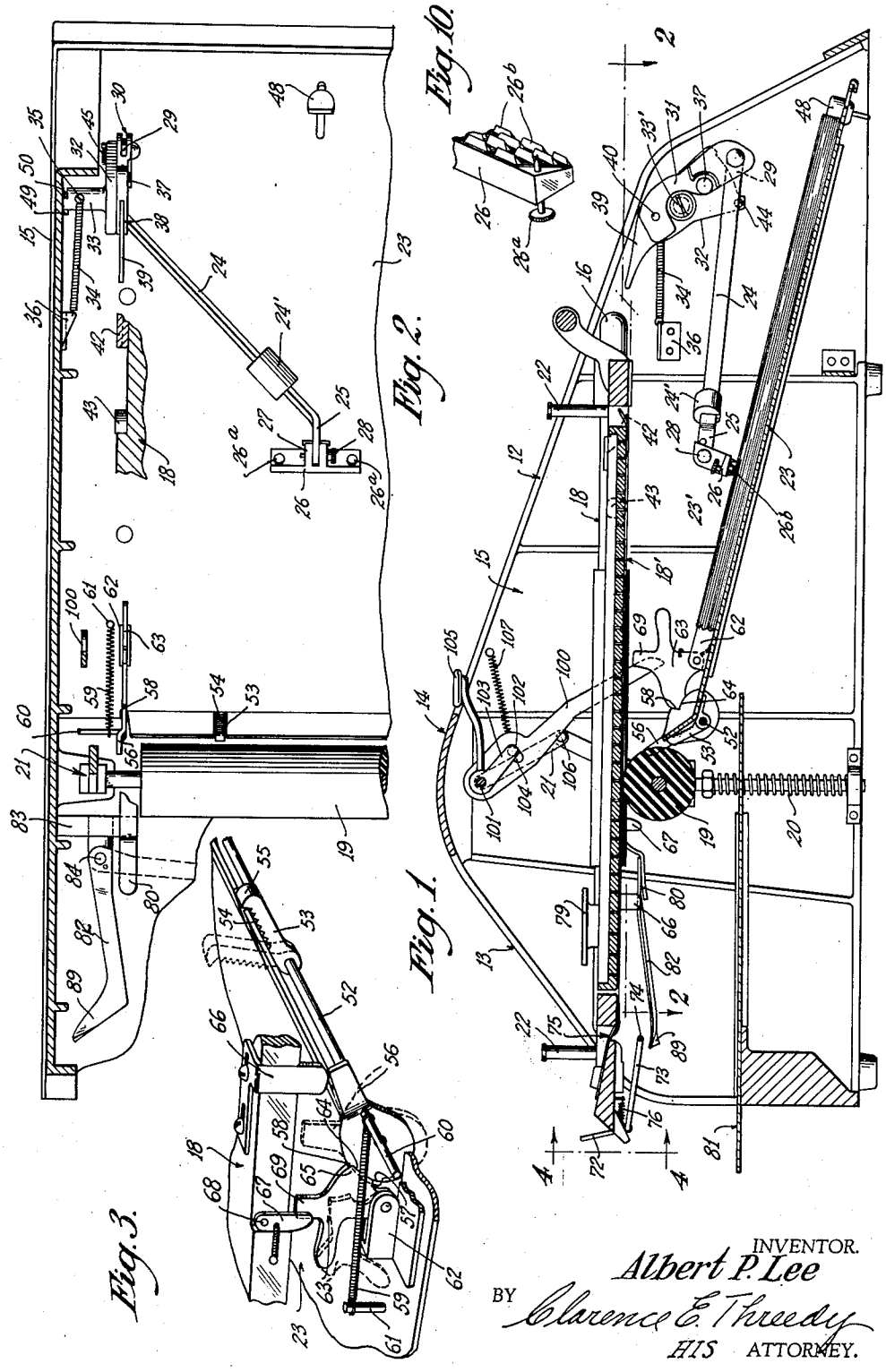


Fig. 1.



Fig. 2.



Fig. 3.



Fig. 10.

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Filed April 7, 1938 2 Sheets-Sheet 2

Fig. 4.

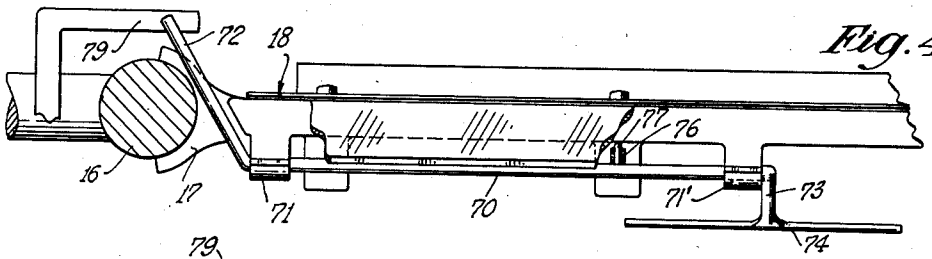



Fig. 5.

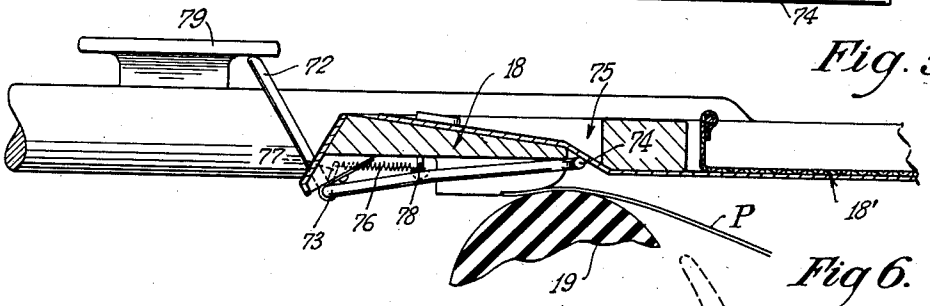



Fig 6.

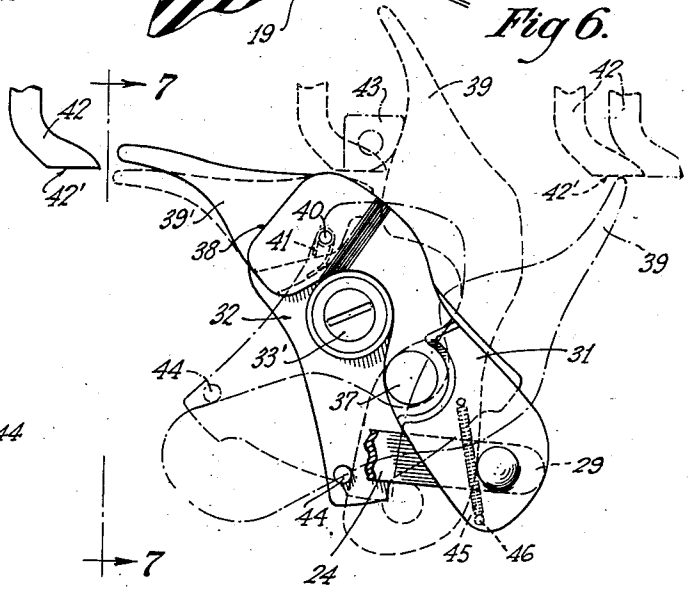



Fig. 7.

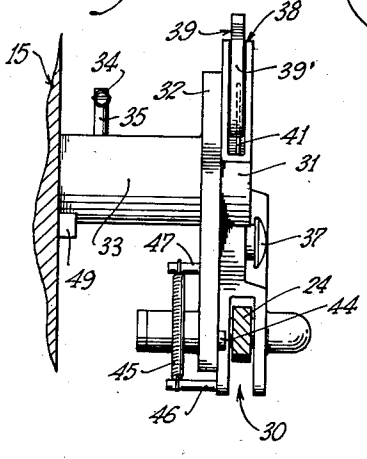



Fig. 8.

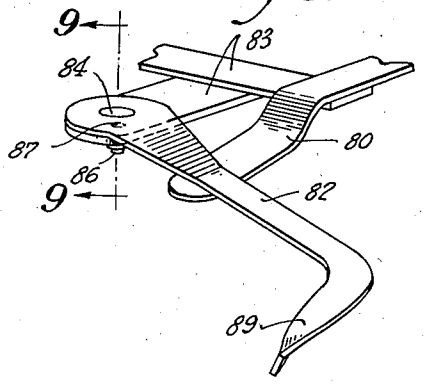
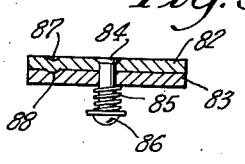



Fig. 9.




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# UNITED STATES PATENT OFFICE

2,125,167

## DUPLICATING MACHINE

Albert P. Lee, Chicago, Ill., assignor to Colorgraph Corporation, Chicago, Ill., a corporation of Illinois

Application April 7, 1938, Serial No. 200,601

20 Claims. (Cl. 271—42)

This invention pertains to duplicating machines, and more particularly to improvements in automatic paper feed and handling means of general application but particularly suitable for use with a type of duplicator described and claimed in my pending United States application, Serial No. 121,133.

One of the important objects of the invention is the provision in a duplicating machine of a type having an oscillable or reciprocable platen or printing carriage and mechanism operable thereby for snapping a platen roller into and out of printing engagement therewith, of a paper feeding mechanism including a reciprocable feed arm and special dog mechanism operable by the carriage for advancing the arm at a varying rate and thereafter permitting a partial restorative movement of the arm.

Another object is the provision of paper aligning kickers operably controlled by the platen or cylinder and adapted to engage the edge of improperly advanced or extra sheets and restore them to a normal position when the carriage or cylinder reaches a predetermined position.

Another object is the provision of a paper restoring or kicker mechanism as aforesaid and which is cooperable with the feeding arm and dog mechanism such that the return movement of the paper restoring or kicker means is effective during the partial restorative movement of the feed arm.

Another object is the provision of means for separating the printed sheet from the platen or cylinder as it advances through the printing stroke, said means being in the form of a depressing finger also operable by the platen carriage or cylinder in timed relation to the paper feeding dog and restoring means, and adapted to push the printed sheet away from the bottom of the platen.

Another object is the provision of a special paper feeding rocker having pin means and staggered friction fingers for securely engaging the paper stack during the advancing stroke.

A further object is the provision in a duplicating machine of the type described of an automatic paper restoring or kick-back mechanism for returning extra sheets of paper which may be accidentally fed with the top sheet due to static electrical attraction and other causes, the kick-back mechanism being arranged for operation by reciprocation of the platen carriage to operate at a particular instant relative to the operation of the special dog and feed arm mechanism aforesaid.

Another object is the provision of an automatic depressing finger operably controlled by the platen carriage for depressing the printed sheet as it issues between the platen roller and platen, the operation of this depressing mechanism being timed cooperably with the operation of the automatic kick-back and feeding means.

Still another and more particular object is the provision in a duplicating machine of the class described of a paper feeding arm and compound dog therefor engageable with the platen carriage and adapted to be moved by the operation of the platen to advance the feed arm while tensioning a return spring, and means for momentarily releasing the dog when the carriage reaches a predetermined position to permit a partial return stroke of the feed arm.

Still another particularized object is the provision of an automatic kick-back finger operated by the platen carriage and adapted to strike against the forward edge of an extra sheet underlying a top sheet previously advanced and quickly kick the extra sheet in a backward direction onto the stack at substantially the moment the feed arm makes its partial restorative movement.

Another particularized object is the provision of a spring-urged depressing finger adapted to be moved by the carriage into a position above a sheet being printed and adapted to be depressed by spring means when the carriage reaches a predetermined position so as to urge the sheet being printed away from the platen and toward certain guide fingers.

Other objects reside in the particular form and disposition of the various mechanisms for carrying out the aforesaid objects, all of which will become more apparent as the following description proceeds in view of the drawings, in which:

Fig. 1 is a vertical longitudinal section through the duplicating machine;

Fig. 2 is a fragmentary horizontal section along lines 2—2 of Fig. 1 with parts displayed in plan;

Fig. 3 is a fragmentary perspective of the kick-back finger and mechanism;

Fig. 4 is an enlarged vertical cross sectional detail through the platen carriage and carriage track as viewed along lines 4—4 of Fig. 1, particularly showing the depressing finger;

Fig. 5 is a fragmentary vertical longitudinal section through the depressor mechanism;

Fig. 6 is an enlarged operating detail of the automatic dog means;

Fig. 7 is a side elevation of the automatic dog

means viewed in the direction of lines 7—7 of Fig. 6;

Fig. 8 is an enlarged perspective detail of one of the adjustable paper guide fingers;

Fig. 9 is an enlarged sectional detail of the adjusting means for the guide fingers as seen along lines 9—9 of Fig. 8; while

Fig. 10 is a fragmentary perspective of the paper feed rocker.

A duplicating machine of the type described in detail in the aforesaid application is shown in Fig. 1 and as there seen includes an elongated housing having substantial openings 12 and 13 at its opposite ends with an intermediate hood portion 14. Disposed on opposite side walls 15 of the housing are horizontal rails or tracks 16 on which ride yoke-shaped arms 17 on the opposite longitudinal sides of the platen carriage 18 (see also Fig. 4).

The platen carriage 18 is provided with a flat inking face 18' which is adapted to be reciprocated over a platen roller 19 journaled within the housing below the platen carriage in special spring-urged journal means adapted for vertical movement and normally urged by spring means 20 tightly into printing engagement with the bottom 18' of the platen. A special automatic toggle mechanism 21 operable by pin means 22 at opposite ends of the carriage 18, automatically raises and lowers the platen roller 19 as the carriage 18 is slid back and forth by the operator. Thus as the carriage approaches one of its extreme positions (toward the left in Fig. 1) the toggle mechanism 21 would be operated by the pin means 22 to depress the platen roller 19 against the tension of springs 20 so that a sheet of paper theretofore gripped between the platen roller and platen would be released as the carriage approached the end of its printing stroke (toward the left), whereas by the time the carriage is restored to its opposite position (toward the right) there will have been automatically fed into position a fresh sheet of paper from the stack 23' disposed on an apron 23 into position to be gripped between the roller and platen when the carriage reaches its extreme right-hand position so that the toggle mechanism 21 will again be tripped by the pin means 22 preparatory to another printing stroke of the carriage, whereupon the foregoing cycle of operations would be repeated.

The automatic paper feeding mechanism of the present invention includes an offset feed arm 24 (Fig. 2) with a sliding weight 24' and having an end portion 25 disposed substantially in the middle of the stack 23 and having pivotally mounted at its end an especially designed rocking or feeding finger 26 provided with a bifurcation 27 embracing the end 25 of the arm and adapted to rock back and forth on pin means 28 therethrough.

Referring to Figs. 1, 2, 8, and 10, it will be observed that the feeding rocker 26 is provided at its opposite longitudinal ends with threadably adjustable pins 26*a* seated nearer the front (left, Fig. 1) longitudinal edge than the other and remote from the axial line through the pin 28. When the arm 24 advances (left, Fig. 1) the feed member 26 rocks the pins 26*a* into the paper and prevents slippage of the latter.

Additionally the rocker 26 is provided with a plurality of alternately staggered depending rubber or like friction fingers or tabs 26*b* (Fig. 10) which are also effective to engage the paper and slide it into proper position.

The opposite end 29 of the feed arm is pivotally attached in a slot or bifurcated formation 30 (Figs. 1 and 7 also) on an auxiliary dog 31 forming part of a compound dog structure which includes a main dog 32 having a stud pin 33 pivotally mounted by means 33' on the side wall 15 of the housing and normally urged in an anti-clockwise direction (Figs. 1 and 2) by means of a spring 34 connected as at 35 to the stud shaft 33 and anchored at its opposite end to a lug 36 on the housing.

The auxiliary dog 31 is pivotally mounted on the main dog 32 by means 37, and is provided with another bifurcation 38 (Fig. 7 particularly) in which is a dog finger 39 pivoted by pin means 40 therein and provided with a wire spring 41 normally urging the finger in an anti-clockwise direction (Figs. 1 and 2) for engagement with a primary lug 42 formed on the side of the carriage 18, and having a horizontal riding edge 42' called a "neutral point" because while the nose part of the finger 39 rides over it the dog and paper feed are motionless or "hesitate", allowing a short interval, before beginning the partly restorative or reverse movement, so that the automatic toggle mechanism may snap the platen against the paper and grasp the latter before the feed arm starts back.

Spaced apart from the primary lug 42 a short distance toward the opposite end of the carriage is a secondary lug formation 43 with which the spring-urged dog finger 39 may also engage when the carriage is moved to a predetermined position as will subsequently appear.

The auxiliary dog 31 may be moved in a clockwise direction a certain distance on its pivotal mounting 37 on the main dog and thereafter will engage a lateral pin 44 on the main dog and turn the latter in unison therewith against the tension of the spring 34. This movement corresponds to an advancing (toward the left) movement of the feed arm 24 and may be effected by retracting the carriage 18 to an initial position (toward the right in Fig. 1) so that the slow-motion cam edge 39' of the spring-urged dog finger 39 will first engage the primary lug 42 on the carriage and slowly turn the auxiliary dog 31 in a clockwise direction until the dog engages the lateral pin 44 on the main dog whereupon the dog structure will turn as a unit and with increasing speed due to the change in the length of the lever arm and pivot points and the slope on the cam edge 39'. At first the arm 24 will move forward slowly so as to give the feed rocker 26 a chance to rock and seat pins 26*a* and fingers 26*b* firmly on the paper, and thereafter the arm 24 will be completely advanced toward the left, causing the rocker feed finger 26 to bear down positively on the topmost sheet of the stack 23. The stroke of the arm 24 is such that the upper or left-hand edge of the advanced sheet will lie properly between the now depressed platen roller 19 and the bottom 18' of the platen.

However, it is of utmost importance to observe that after the feed arm 24 has been advanced through the major portion of its feeding stroke, the dog finger 39 will idle along the riding edge 42' thereof and then will disengage the primary lug 42 and be snapped forward by the spring 34 momentarily clear of the carriage while it pivots into engagement with the secondary lug 43.

When the carriage starts back and lug 43 permits the nose 39 and dog 31 to move, auxiliary spring means 45 (Fig. 7) anchored on a lateral pin 46 extending inwardly from the auxil-

iary dog 31 and at its opposite end on a lateral pin 47 extending inwardly from the main dog 32, will urge the auxiliary dog 31 in an anti-clockwise direction substantially into the normal position seen in Fig. 1, while the spring 34 will urge the main dog 32 in an anti-clockwise direction so that the arm 24 will be retracted with the feed finger 26 gliding over the topmost sheets, all of the sheets being restrained against retrograde movement by means of a bottom stop lug 48. The clockwise movement of the main dog structure 32—33 is limited by means of a lug 49 (Figs. 2 and 7) on the wall 15 of the housing which is engaged by a slotted portion 50 (not seen in Fig. 7) on the stud shaft 33 of the main dog.

It frequently happens that static electricity is generated in the stack of paper 23 causing one or more extra sheets to adhere to the topmost sheet and be dragged along with the latter as it is fed into position by the feed arm 24. Extra sheets are also occasionally carried along with the main sheet due to unevenly trimmed edges on the paper, so that it is essential to provide means for returning extra-feed sheets back into position against the lower stop 48 in order that they may be properly positioned on the platen roller 19 so that the printing will be properly registered on the sheet. To this end the invention provides an automatic kick-back mechanism shown in perspective in Fig. 3 and including a transverse rocker rod 52 journaled in the opposite side wall portions 15 of the housing and having spaced paper-engaging fingers 53 rotatable therewith and each provided along one of its longitudinal surfaces with a plurality of horizontal serrations 54, and each terminating in a curved end hook 55 which is adapted to glide beneath a properly fed top sheet and onto the edge of an underlying sheet.

At one end of the rocker shaft 52 there is a special dog mechanism including an arm 56 rotatable with the shaft 52 and provided with a peripheral edge porton 57 having a locking notch 58 at one of its extremities. The dog arm 56 is urged toward the left as viewed in Fig. 3 (and toward the right as view in Fig. 1) by means of a spring 59 attached to pin means 60 on the arm 56 and at its opposite end to pin means 61 on the machine.

Mounted in a bifurcated member 62 is a locking dog 63 having an arcuate edge portion 64 terminating in a nose 65 engageable in the locking notch 58 in the arm 56. The locking dog 63 is provided with sping means normally urging it in a clockwise direction as seen in Fig. 3 and into engagement with the edge 64 of the arm 56 so as to dispose its locking tooth 63 into the notch 58 of the arm 56.

An upwardly extending arm 69 on the locking dog 63 is engageable by an adjustable lug or nose formation 66, which depends from the carriage 18, when the carriage is moved toward the left as seen in Fig. 1. By such engagement the dog 63 is moved out of locking position with respect to the notch 58 on arm 56 freeing the latter and the shaft 52 for movement by the spring 59. This release action occurs substantially at the time the compound paper feed dog 31—32 makes its partial restorative movement when its finger 39 slips out of engagement with the primary lug 42 and into engagement with the secondary lug 43 and at a time when the feed arm 24 is making a retrograde or return motion so that the pressure from the feeding finger 26 is momentarily relieved.

In this manner the release of the locking dog mechanism 63—65—58 at this time permits the spring 59 to snap the kick-back finger 53 against the upper edge of any extra sheets of paper which may be improperly underlying the top sheet and kick such extra sheets back into position against the lower stop lug 48 in timed relation to the partial return movement of the arm 24 as aforesaid.

Upon the return stroke of the carriage 18 a tripping finger 67 (Fig. 3) pivoted as at 68 on the carriage frame will engage the upstanding end of the arm 56 (dotted lines, Fig. 3). Thus the arm 56 and shaft 52 will be rotated (clockwise) so as to tension the spring 59, the locking dog 63 being urged by its spring means to engage the nose formation 65 in the notch 58 on arm 56.

The platen toggle mechanism 20—21 (Fig. 1) is cooperable with the kicker mechanism by the provision of a release lever 100 pivotally mounted on a cross rod 101 and having a flare 102 with an elongated slot 103 into which extends an eccentric pin 104 extended from the cross rod 101.

On rod 101 there is a push lever 105 which may be depressed to pivot the pin 104 against the slot 103 to depress lever 100 and cause the lower end thereof to bear against the lateral pin 60 on the kicker arm 56 (Fig. 3) so as to pivot the latter into latched position (Fig. 3) and simultaneously lower the platen roller by causing the upper edge of the lever arm 100 to bear against the toggle pin 106. Thereafter, arm 100 is restored by a spring 107 out of the way of the dog and toggle mechanism.

As a final operation in establishing a positive paper feeding action in the duplicating machine, there is provided means for engaging a sheet being printed, therefore grasped between the platen roller 19 and platen bottom 18' for the purpose of separating the advancing edge of the sheet from the platen and carriage structure as soon as practicable after the printing operation has begun upon the forward or advancing movement (to the left in Fig. 1) of the platen carriage.

This last operation is accomplished by means of a special depressing finger structure which includes, as viewed particularly in Figs. 4 and 5, a rod 70 rotatably mounted in a bracket 71 near one of its outer offset ends 72 and near its opposite or inner offset end 73 in a bracket 71' at the middle of the carriage frame.

The inner offset end 73 of the rod 70 is provided with a T-shaped depressing formation 74 (Fig. 4) which is adapted to fit up in a recessed portion 75 of the carriage (Fig. 5) completely out of the path of the platen roller 19. However, the depressing T formation 74 is normally disposed in the lowered position seen in Fig. 4 by means of a spring 76 attached at one end to an offset pin 77 on rod 70, and at its opposite end to pin means 78 on the frame.

Mounted on the side of the carriage at which the outer offset end 72 of the depressing rod 70 is situated, is a cam formation 79 which is engaged by the end portion 72 of the depressing finger when the carriage is moved toward its initial position (toward the right in Fig. 5) to pivot the portion 72 in an anti-clockwise direction and raise the inner offset end portion and the T formation upwardly against the tension of the spring 76 out of the way of the platen roller 19 with the T formation disposed in the recess 75 so that the sheet of paper P may be fed into position as illus-

trated in Fig. 5 with the depressor finger above the sheet.

However, as soon as the carriage starts its reverse movement with a new sheet of paper P gripped between the roller 19 and the platen, the offset end 72 on the depressor rod will ride out of engagement with the camming member 79 so that the spring member 76 can urge the T portion 74 downwardly against the sheet during the remainder of the printing stroke of the carriage, thus progressively increasing the distance between the advancing sheet and the carriage as the latter approaches the end of its printing stroke.

The foregoing depression of the advancing sheet serves to position the sheet for quick and positive clearance of the roller and platen at the end of the stroke, the sheet being guided by guide arms 80 toward a position of rest on the adjustable receiving platform 81.

As a further means for assuring the proper separation of the printed sheet from the platen and rollers, there are provided the special picker fingers or arms 82 seen in detail in Fig. 8, there being one of these on either side of the housing mounted on the bracket means 83 which also separate the guides 80 on their respective sides of the machine. The picker arm 82 is pivotally mounted on the bracket 83 by pin means 84 (see also Fig. 9) extending therethrough and provided with a spring 85 and a headed lower end portion 86 adapted to permit axial displacement of the picker arm 82 relative to the bracket 83 for the purpose of permitting a boss 87 on the under side of the arm 82, near its pivotal mounting, to ride into and out of one or more adjusting notches 88 formed in the bracket 83.

At its free inner end, the picker arm or finger 82 has a substantially sharp nose portion 89 twisted substantially 90 degrees out of the plane of the arm so as to present the edge portion thereof as a riding surface against which the issuing sheet of paper will glide. These picker fingers 82 cooperate with the guides 80 and the depressing finger 74 to assure the positive and uniform separation of the printed sheet from the platen and roller, whether the tendency of the paper to resist such separation be due to static electrical attraction or the adhesive tendency of the ink or other causes, it being obviously essential to the proper operation of the described machine that the paper clear the roller and platen or cylinder in a uniform manner so that the timed operation of the several paper feeding, guiding and registering means herein set forth can cooperate in the intended manner.

For purposes of illustration, a preferred embodiment has been described herein in particular detail, but it will be understood that all modifications, changes and adaptations of the herein specifically described mechanism coming fairly within the spirit of the invention are intended to be included within the call of the appended claims.

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

1. In a duplicating machine having a platen carriage, paper feed mechanism including means for supporting a stack of paper sheets, means including a reciprocable feed arm engageable with the topmost sheet of said stack and movable in one direction to advance said sheet into a predetermined position, and means operable by said carriage for moving said feed arm in feeding operation when the carriage is moved in a particular direction, said last-mentioned means being further operable to effect automatic rapid return movement of said arm independently of said carriage when the latter is moved to a predetermined position.

2. The device of claim 1 in which there is additionally provided automatic kick-back means in the form of mechanism actuated by movement of said carriage and including a member quickly urged in a direction to engage a partially advanced sheet and return the same onto said stack, said member being moved by said mechanism during said return movement of the feed arm.

3. A duplicating machine including a reciprocable platen carriage, means supporting a stack of paper sheets in said machine and paper feed means including a reciprocable feed arm adapted to feed said paper one sheet at a time from said stack, a dog operable by movement of said carriage in a particular direction to move said feed arm in feeding operation, means cooperable with said dog for effecting restoring movement of said feed arm when said carriage is moved to a determined position, and means on said carriage and engaged by said dog for momentarily arresting said return movement of the feed arm until said carriage is moved past said determined position.

4. A duplicating machine in accordance with claim 3 and further including automatic kick-back means in the form of a reciprocable kicker, releasable spring mechanism controlled by said carriage for urging said kicker into engagement with a partly advanced sheet of paper and returning the latter back onto said stack, and releasing means controlled by said carriage for effecting the aforesaid returning operation of said kicker during the initial return movement of said feed arm prior to arrest of the latter.

5. In a duplicating machine, a reciprocable carriage, means for supporting a stack of paper sheets beneath said carriage, a reciprocable feed arm mounted for engagement with the topmost sheet of said stack and operable when moved in one direction to feed said sheet into a predetermined position relative to said carriage, means for reciprocating said feed arm and including a main dog pivotally mounted below the carriage, an auxiliary dog pivotally mounted on the main dog and having a finger engageable by said carriage when the latter is moved in one direction to pivot said auxiliary dog a predetermined distance for operative engagement with said main dog to pivot the latter, said feed arm being connected to said auxiliary dog and movable to feed paper from said stack as aforesaid when said carriage is moved in said one direction, spring means attached to said main dog and operable to restore the same to an initial position, said auxiliary dog being likewise restored to an initial position by said main dog, said finger on the auxiliary dog being adapted to disengage said carriage after the latter has been moved a determined distance in said one direction, whereby said main and auxiliary dogs may be restored by said spring means to an initial position.

6. In a duplicating machine, a reciprocable carriage, means for supporting a stack of paper sheets beneath said carriage, a reciprocable feed arm mounted for engagement with the topmost sheet of said stack and operable when moved in one direction to feed said sheet into a predetermined position relative to said carriage, means for reciprocating said feed arm and including a main dog pivotally mounted below the carriage, an auxiliary dog pivotally mounted on the main dog and having a finger engageable by said carriage when the latter is moved in one direction

to pivot said auxiliary dog a predetermined distance for operative engagement with said main dog to pivot the latter, said feed arm being connected to said auxiliary dog and movable to feed paper from said stack as aforesaid when said carriage is moved in said one direction, spring means attached to said main dog and operable to restore the same to an initial position, said auxiliary dog being likewise restored to an initial position by said main dog, said finger on the auxiliary dog being adapted to disengage said carriage after the latter has been moved a determined distance in said one direction whereby said main and auxiliary dogs may be restored by said spring means to an initial position, and means for restoring partially advanced paper sheets to said stack, said means including a finger journaled below said carriage adjacent said predetermined position into which the sheets are advanced by said feed arm, spring means normally urging said finger in a direction toward said stack for engagement with a partially advanced sheet thereon and further operable to restore said sheet to said stack, means on said carriage for turning said finger to tension said spring thereof when said carriage is moved in said one direction, automatic latching dog means adapted to hold said finger with said spring means under tension until said carriage is moved said determined distance, whereupon said latching dog mechanism is automatically released and said finger quickly moved toward said stack for engagement with a partly advanced sheet thereon.

7. In a duplicating machine of the type having a reciprocable platen carriage, mounting means therefor and a platen roller cooperable with said carriage, automatic paper feed and guiding mechanism including means for supporting a stack of paper sheets below said carriage, a main dog pivoted on said mounting means, an auxiliary dog pivotally mounted on said main dog and having a finger engageable by primary lug means on said carriage when the latter is moved in a particular direction for the purpose of pivoting said auxiliary dog, the latter being provided with a reciprocable feed arm pivotally joined thereto and adapted to engage the topmost sheet on said stack and feed said sheet to a position substantially between said platen roller and platen carriage when said auxiliary dog is pivoted by movement of said carriage in said particular direction, spring means normally urging said main dog into an initial position, means on said main dog engaged by said auxiliary dog when the latter is pivoted by the carriage as aforesaid, whereby said main dog will likewise be pivoted and said spring means tensioned after the auxiliary dog moves a predetermined distance as aforesaid, said finger on the auxiliary dog automatically disengaging said lug means on the carriage when the latter is moved to a predetermined position in said particular direction whereby said main and auxiliary dogs and said feed arm are rapidly restored to said initial position by said spring means.

8. Duplicating mechanism as called for by claim 7 and further including automatic kick-back mechanism in the form of a finger journaled on said mounting for reciprocable movement toward and away from said stack and adapted to engage a sheet partly advanced from said stack toward said platen roller and carriage, spring means normally urging said finger toward said stack for engagement with a partly advanced sheet as aforesaid to restore the same onto the stack, a member cooperably connected with said finger and engageable by lug means on said carriage for tensioning said spring means when the carriage is moved in said particular direction, automatic latch dog means engageable with said member to hold the same in spring tensioning position, tripping means on said carriage engageable with said latch dog means when the carriage is moved oppositely to said particular direction, whereby said member and finger may be released for movement by said spring means to engage and kick back a partly advanced sheet as aforesaid.

9. Duplicating mechanism in accordance with claim 7 and further characterized by the provision of automatic depressing means for guiding a sheet fed into position between said platen roller and carriage in a direction away from the carriage, said depressing means including an arm mounted on the carriage, spring means normally urging said arm away from said carriage toward a sheet of paper therebelow on said platen roller, and cam means for said arm and adapted to engage a member on said mounting when said carriage approaches said predetermined position in its movement in said particular direction for raising said arm up under said carriage for positioning above a sheet of paper fed between said roller and carriage, said cam means being effective when said carriage is moved oppositely to said particular direction to permit said spring means to urge said arm down onto the sheet of paper between the roller and carriage.

10. In a duplicating machine of the type having a reciprocable platen carriage, mounting means therefor and a platen roller cooperable with said carriage, automatic paper feed and guiding mechanism including means for supporting a stack of paper sheets below said carriage, a main dog pivoted on said mounting means, an auxiliary dog pivotally mounted on said main dog and having a finger engageable by primary lug means on said carriage when the latter is moved in a particular direction for the purpose of pivoting said auxiliary dog, the latter being provided with a reciprocable feed arm pivotally joined thereto and adapted to engage the topmost sheet on said stack and feed said sheet to a position substantially between said platen roller and platen carriage when said auxiliary dog is pivoted by movement of said carriage in said particular direction, spring means normally urging said main dog into an initial position, means on said main dog engaged by said auxiliary dog when the latter is pivoted by the carriage as aforesaid, whereby said main dog will likewise be pivoted and said spring means tensioned after the auxiliary dog moves a predetermined distance as aforesaid, said finger on the auxiliary dog automatically disengaging said lug means on the carriage when the latter is moved to a predetermined position in said particular direction whereby said main and auxiliary dogs and said feed arm are rapidly restored to said initial position by said spring means, said carriage having secondary lug means spaced from said primary means and engageable by said finger on the auxiliary dog when the same disengages said primary lug means, whereby said feed arm makes a partial return movement toward said initial position while said carriage continues to move in said particular direction, thereafter said finger automatically disengaging said secondary lug means for complete return of said dogs and feed arm to said initial position.

11. Duplicating mechanism of the type set forth in claim 10 and further characterized by the provision of automatic kick-back means in the form of a reciprocable finger and drive mechanism therefor cooperable with said carriage for effecting movement of said finger toward said stack for engagement with a partly advanced sheet therefrom to urge the sheet in a direction back onto said stack during the interval between the disengagement of said finger on the auxiliary dog with said primary lug means and engagement thereof with said secondary lug means.

12. In a duplicating machine of the type having a reciprocable carriage and carriage control means for feeding sheets of paper one at a time into printing position relative to said carriage, automatic kick-back means including a finger pivotally mounted for reciprocation below said carriage in a direction toward and away from a sheet fed into position as aforesaid, an arm operably connected with said finger and with spring means tensionable by pivoting said finger in a direction away from said sheet and a partly advanced sheet therebelow for the purpose of returning the finger toward said sheet or partly advanced sheet, means on said carriage engageable with said arm for pivoting the same and said finger to tension said spring means when the carriage is moved in one direction, a latch dog automatically engageable with said arm to hold the same against return movement by said spring, a tripping finger on said carriage and engageable with said latch dog to release said arm for return movement by said spring when said carriage is moved in an opposite direction, whereby said finger may engage the edge of a partly advanced sheet and urge the same back away from said predetermined position.

13. The combination with a duplicating machine of the type having a reciprocable or oscillable printing member and means for supporting a stack of paper to be fed, of a reciprocable paper feed arm driven by said printing member and constructed to hesitate momentarily during its return movement in one direction, automatic paper registering means including a kicker finger and snap-action operating mechanism therefor operably controlled by said printing member and arranged to be snapped back toward a partly fed or advanced sheet during the interval of time when said feed arm hesitates as aforesaid, and a depressing finger mounted on said printing member for movement toward the latter into a position above a sheet fed as aforesaid, and means controlled by the movement of said printing member and effective during printing operation of the latter to move said depressing finger in a direction away from said printing member against said fed sheet to urge the latter away from the printing member.

14. In a duplicating machine of the type having a reciprocable carriage and a platen roller cooperable therewith and over which a sheet of paper is moved by said carriage, depressing means for urging said sheet away from said carriage when the latter is moved in a particular direction, said depressing means including an arm pivotally mounted below said carriage for movement toward and away from the latter, spring means normally urging said arm downwardly away from the carriage, said arm having an offset member engageable with cam means in said machine when said carriage is moved in a direction opposite to said particular direction for pivoting said arm upwardly toward said carriage, whereby the arm may be positioned above said platen roller and a sheet thereon, said cam means being effective to cause lowering movement of said arm by said spring means and against said sheet of paper when said carriage is moved a determined distance in the particular direction aforesaid.

15. The combination, with a duplicating machine having a reciprocable carriage and means for supporting a stack of paper sheets, of paper feed means including a reciprocable arm and mechanism operable by movement of said carriage to reciprocate said arm to advance a sheet from said stack when moved in one particular direction, and kick-back means including a reciprocable kick-back finger and quick-action driving means therefor operably controlled by said carriage, said finger being adapted to move toward and engage a partly advanced sheet from said stack to kick the same back onto the stack during the return movement of said feed arm oppositely to said particular direction.

16. In a duplicating machine, in combination, a reciprocable carriage, a platen roller controlled by said carriage for movement into and out of printing position relative to the carriage as the latter approaches its extreme positions, means for supporting a stack of paper sheets to be fed between said roller and carriage, reciprocable paper feed arm driven by mechanism actuated by said carriage and operable when moved in a particular direction from an initial position to feed a sheet from the stack as aforesaid, said mechanism being effective to effect rapid return movement of said arm back to said initial position when said carriage is moved into a particular position, together with a reciprocable kick-back member operable in timed relation with the movement of said carriage and said feed arm to move quickly toward said stack from a position slightly in advance of said roller toward said stack to engage any partly fed or advanced sheet and move the latter back onto said stack during movement of said feed arm back toward said initial position.

17. The combination of claim 16 further including a depressing member pivoted below said carriage and reciprocating means for reciprocating said member into and out of a position close to said carriage above said roller when the carriage is substantially in one of said extreme positions whereby said member may be positioned above a sheet of paper fed as aforesaid, said member being moved by said reciprocating means down against said sheet to urge the same away from said carriage when the latter reaches a determined position upon movement toward its opposite extreme position.

18. In a duplicating machine, an oscillable platen member and means for feeding paper from a stack at one side of said platen member into a predetermined position below said platen member, said means including a reciprocable arm provided with means at one of its ends resting on said stack and adapted to engage a sheet therebelow and move said sheet into said predetermined position when said arm is advanced in one direction, dog mechanism for advancing said arm, spring means normally urging said arm into an initial retracted position, said dog means being engageable by said platen member to advance the feed arm as aforesaid when said platen member moves in a particular direction, said dog means being operatively disengaged as said platen member reaches a predetermined position in said particular direction whereby said spring means is

permitted to effect partial retraction of said arm, said dog means re-engaging said platen member to arrest the retractive movement thereof until said platen member is moved oppositely to said particular direction, whereupon said dog means is again disengaged by said platen member to permit completion of the retractive movement of said arm.

19. In a duplicating machine, an oscillable platen member and means for feeding paper from a stack at one side of said platen member into a predetermined position below said platen member, said means including a reciprocable arm provided with means at one of its ends resting on said stack and adapted to engage a sheet therebelow and move said sheet into said predetermined position when said arm is advanced in one direction, dog mechanism for advancing said arm, spring means normally urging said arm into an initial retracted position, said dog means being engageable by said platen member to advance the feed arm as aforesaid when said platen member moves in a particular direction, said dog means being operatively disengaged as said platen member reaches a predetermined position in said particular direction whereby said spring means is permitted to effect partial retraction of said arm, said dog means re-engaging said platen member to arrest the retractive movement thereof until said platen member is moved oppositely to said particular direction, whereupon said dog means is again disengaged by said platen member to permit completion of the retractive movement of said arm, together with paper registering mechanism including a kicker member pivotally mounted below said platen member for engagement with the advance edge portions of an advanced sheet, spring means normally urging said kicker member in a direction toward said edge of the advanced sheet for movement of the latter back toward said stack, said kicker member being moved by said platen member in a direction away from said advanced sheet to tension said spring means when said platen member is moved in said particular direction, releasable latch dog means operable to latch said kicker member with said spring means in tensioned condition, said latch dog means being automatically released by said platen member as the latter approaches said predetermined position to release said kicker member for movement back toward an advanced sheet during the interval of initial or partial retractive movement of said feed arm.

20. In duplicating machines, paper feeding mechanism including means for supporting a stack of paper sheets, a reciprocable feed arm having a free end portion adapted to rest on top said stack, a pivoted feed finger on said free end of the feed arm, means for reciprocating said feed arm, said pivoted feeding finger being in the form of a substantially elongated member disposed on its pivotal mounting transversely of said feed arm and having adjacent its longitudinal ends a depending pin member substantially pointed and engageable with an underlying sheet to move the latter when said feed arm is moved in a particular direction, said feed finger having a plurality of staggered flexible friction fingers disposed between said pin members and further engageable with said underlying sheet to insure engagement of the latter by said finger during movement of the arm in said particular direction.

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