July 10, 1934. J. K. DUNCAN 1,965,827

FEEDING MECHANISM FOR DUPLICATING MACHINES

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Fig 1.

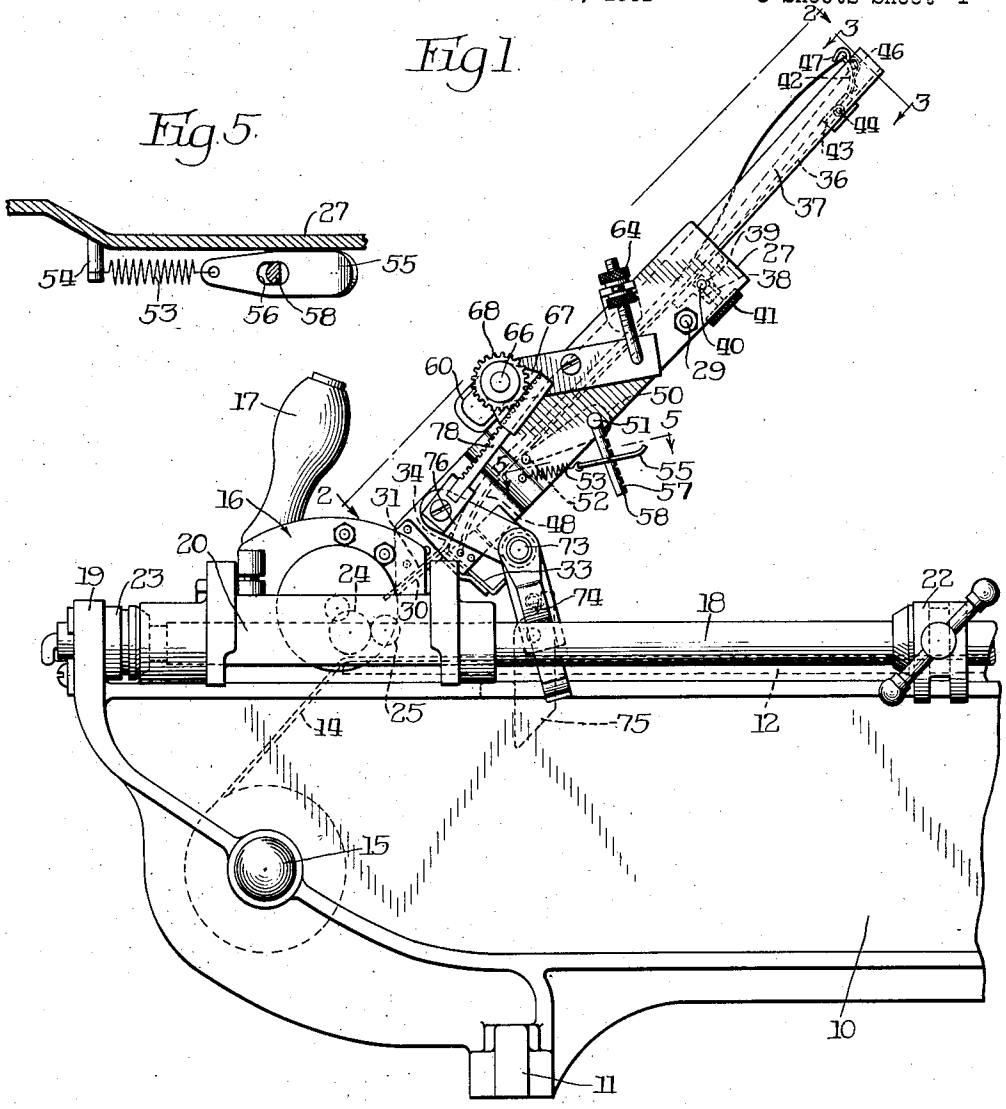
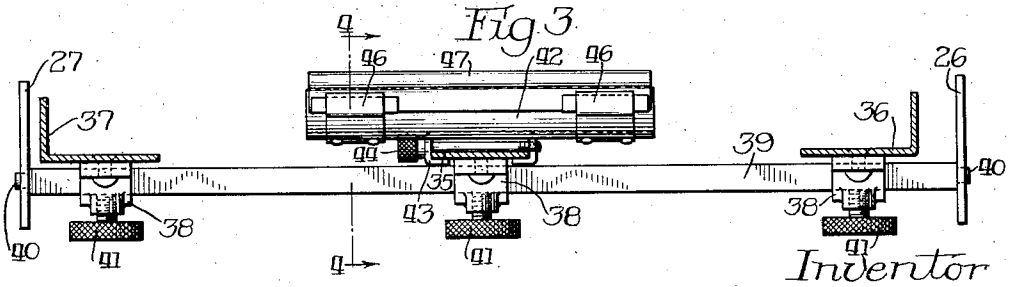


Fig 5.

Fig 3.



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Fig 2.

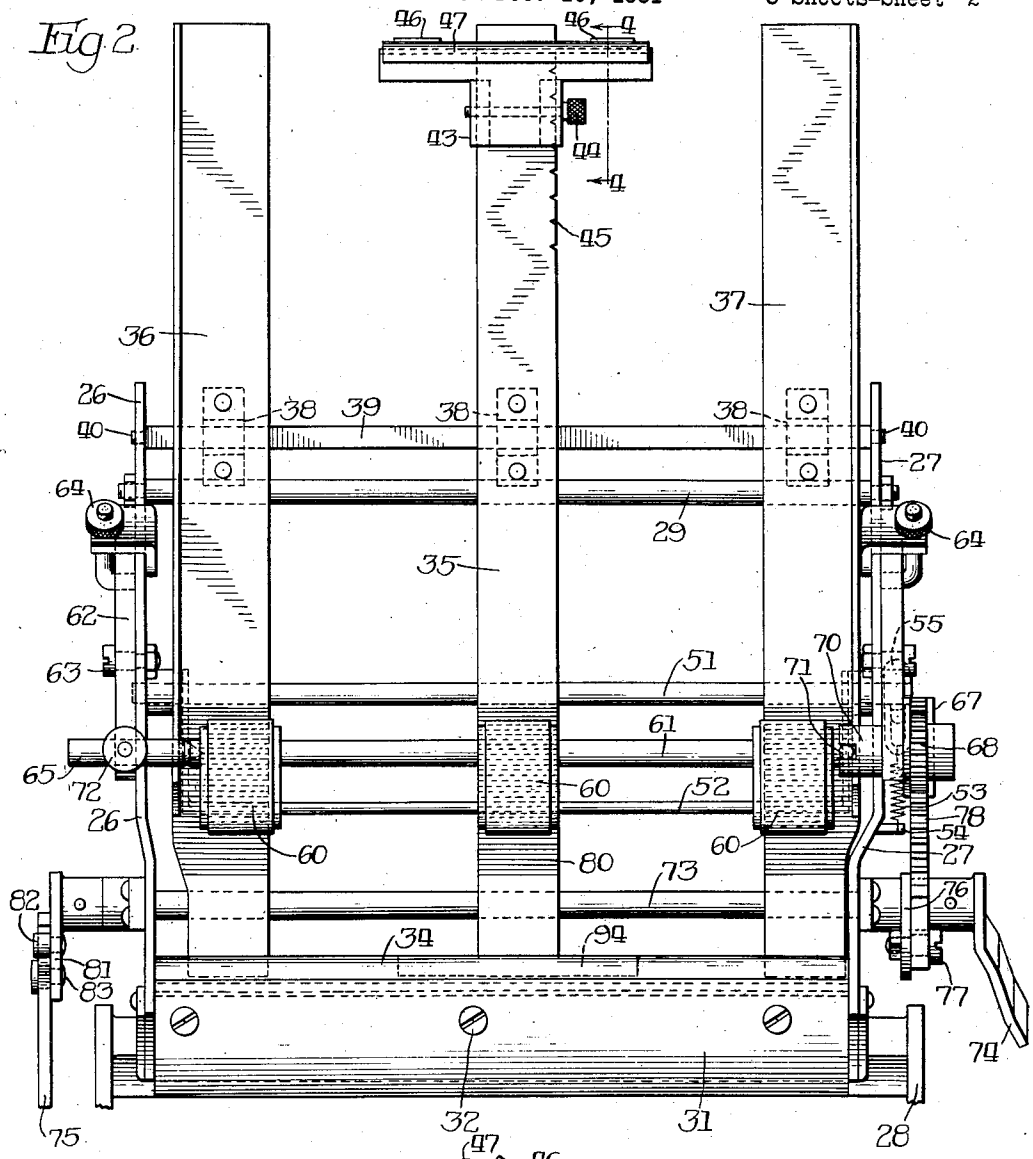
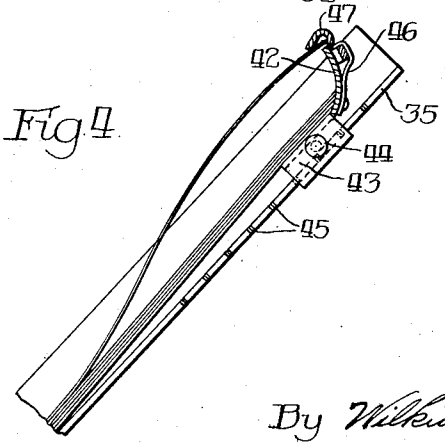


Fig 4.



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Fig. 6.

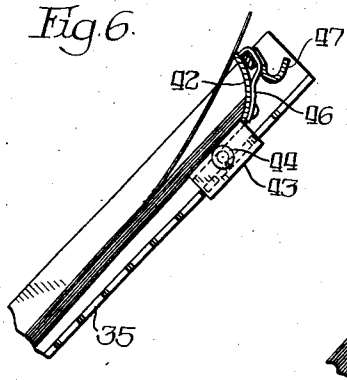


Fig. 7

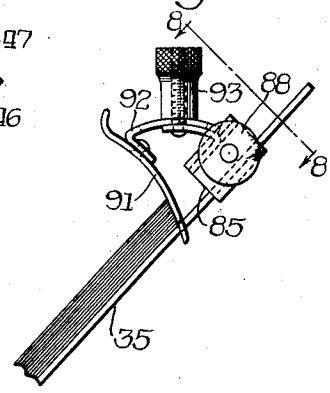


Fig. 8.

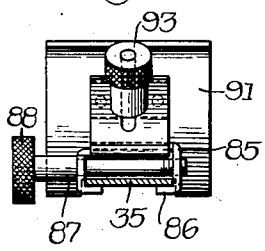


Fig. 9

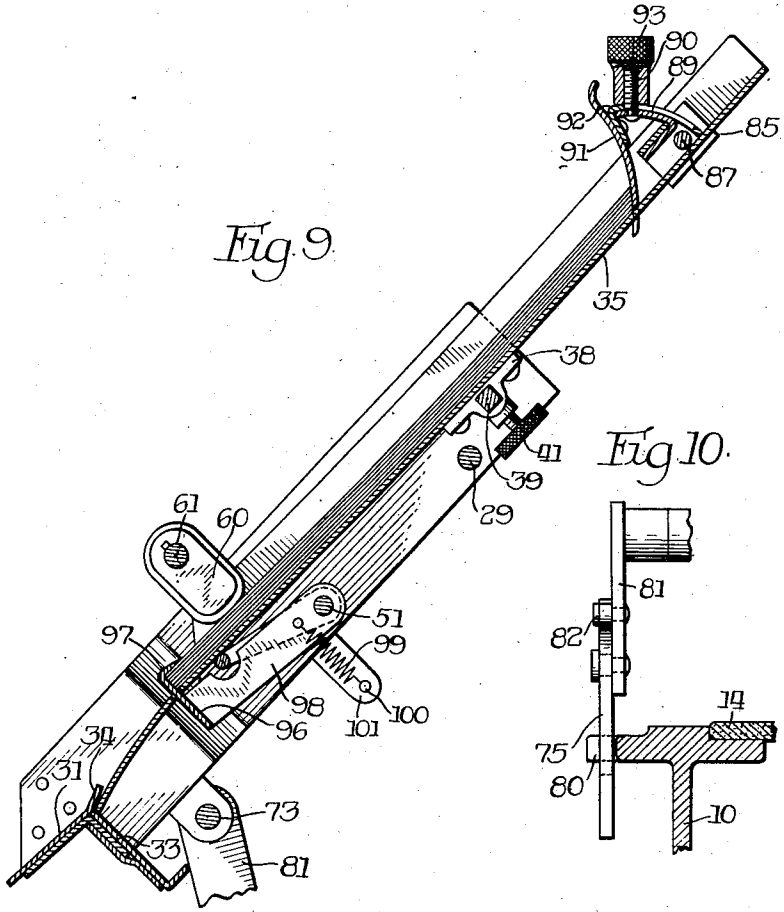
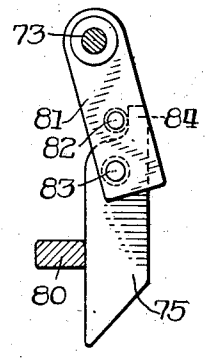


Fig. 10.

Fig. 11



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Patented July 10, 1934

1,965,827

UNITED STATES PATENT OFFICE

1,965,827

FEEDING MECHANISM FOR DUPLICATING MACHINES

James K. Duncan, Chicago, Ill., assignor to Ditto, Incorporated, Chicago, Ill., a corporation of West Virginia

Application December 10, 1931, Serial No. 580,035

25 Claims. (Cl. 101—130)

The invention relates to automatic paper feeding mechanism for association with duplicating machines and has reference more particularly to an improved device over that disclosed in the copending application of James K. Duncan, Serial No. 548,114, filed July 1, 1931.

An object of the invention is to provide improved means for supporting a sheet of paper and for automatically feeding said sheet to the impression roller as the carriage reaches its forward position.

Another object is to provide a device that will operate without interference to the operator while removing a copy from the carriage and which will also incorporate the desirable feature of being interchangeable with a standard copy holder.

A further object is to provide feeding mechanism which will operate efficiently to release the top sheet of paper from the pile supported by the tray during the initial stroke of the carriage and to forcibly eject the sheet downward onto the margin bar in position for engagement by the impression roller at the completion of the return stroke of the carriage.

A still further object is to provide the tray with a novel form of adjustable stop which will facilitate separation of the top sheet from the pile by the feeding mechanism and which can be rotated out of operative position when not needed as when cardstock is being duplicated.

A further object is the provision of a paper supporting tray for hectograph machines having members adjustable to various sizes of commercial paper within the capacity of the machine and provided with novel means for preventing the last few sheets from being fed together.

A further object is to provide improved means for effecting adjustment of the resilient support which engages the lower ends of the tray and resiliently urges the sheets supported thereby into contact with the feeding arms.

With these and various other objects in view, the invention may consist of certain novel features of construction and operation as will be more fully described and particularly pointed out in the specification, drawings and claims appended hereto.

In the drawings which illustrate an embodiment of the device and wherein like reference characters are used to designate like parts—

Figure 1 is a side elevational view of a portion of a hectograph machine illustrating the association therewith of the tray and paper feeding means of the present invention;

Fig. 2 is a top plan view taken on line 2—2 of Figure 1 and showing the construction of a tray and feeding means;

Figure 3 is a sectional view taken on the line 3—3 of Figure 1 and showing an adjustable paper stop;

Figure 4 is a sectional view taken on the line 4—4 of Figure 3;

Figure 5 is a detail sectional view taken on the line 5—5 of Figure 1 and showing the adjustment member for manually varying the tension on the resilient support for the tray.

Figure 6 is a sectional view showing the adjustable paper stop with the cover rotated to inoperative position;

Figure 7 is a side elevational view of a modified form of paper stop rotatably mounted with respect to the tray;

Figure 8 is an end view of the same;

Figure 9 is a longitudinal sectional view showing the paper tray equipped with means for accommodating cardstock;

Figure 10 is a fragmentary sectional view showing the sectional construction of the left actuating member; and

Figure 11 is a side elevational view of the same.

A form of duplicating machine with which the present invention may be associated is shown in Figure 1 as comprising spaced frames 10 provided with supporting lugs 11 at the lower ends and having mounted between their upper ends a flat platen 12 having supported thereon a portion of the gelatin band 14 which forms the printing surface, the band being wound at the respective ends of the machine upon spindles 15.

The frame supports a carriage designated in its entirety by 16, adapted to be worked back and forth over the printing surface by handle 17 to perform a printing operation. For guiding the carriage a guide rod 18 is fixedly mounted in lugs 19 integral with one of the frames and extends longitudinally of the frame for slidably supporting a member 20 suitably connected to the carriage 16. An adjustable stop 22 is positioned on rod 18 for limiting the travel of the carriage in one direction while the member 20 and buffing ring 23 serve to limit the travel of the carriage in the opposite direction.

The carriage has suitably journaled therein an impression roller 24 and a pressure roller 25, the former being rocked by handle 17 to position the same in spaced relation with respect to roller 25 for receiving a sheet of paper. When the handle is actuated in the opposite direction the impression roller cooperates with roller 25 to engage the sheet and to impress the same upon the sur-

face of the gelatin as the carriage travels over the same in its rearward direction and to strip the duplicated sheet from the gelatin surface when the carriage travels in its forward direction. As the above structure is well understood in the duplicating art further description as to detail and mode of operation is considered unnecessary.

A copy holder or tray for containing the blank sheets to be duplicated is mounted in spaced frames 26 and 27, Figures 2 and 3, suitably secured at one end to a portion 28 of the carriage and being held in spaced relation at the end opposite their securement by a spacer rod 29. Also secured to portion 28 of the carriage is a right angled plate 30 and a separator plate 31, the plates being detachably mounted upon the member by bolt 32. Backed against the depending arm of plate 30 is a retaining member 33 which forms with the separator plate 31, a retaining lip 34 under which the forward edge of the sheets are held until withdrawn by the feeding means to be presently described.

The paper supporting tray includes a center resilient strip 35 and two marginal strips 36 and 37, respectively, of right angled form for the greater part of their length, each strip being provided at its upper ends with securing members 38 which serve to adjustably but non-rotatably mount the strips on a supporting shaft 39 of square cross section and which is rotatably mounted by means of bearings 40 in spaced frames 26 and 27. By tightening the screws 41 the strips forming the tray are held in adjusted position on shaft 39, the chosen positions being determined by the size of paper to be supported while the particular construction of shaft mounts the strips in correct alignment with each other and pivotally supports them in spaced frames 26 and 27. It is thus seen that only one point of support is provided for the tray which rotatably mounts the same with respect to the carriage and in order to secure more uniform action of the feeding mechanism associated with the tray it has been found desirable to non-rotatably mount each strip on the supporting shaft. As the tray accommodates various sizes of commercial paper within the capacity of the machine a rear stop for the sheets is provided, adjustably mounted on the center strip 35 and including an arcuate wall 42, Figures 3 and 4, having formed integral therewith depending inturned flanges 43 forming a passageway for receiving the center strip, the flanges being provided with a securing screw 44 which when rotated in one direction will draw the flanges together, causing them to grip the strip and thus be retained thereon in adjusted position. Notches 45 are provided along one edge of the center strip to which the stop can be positioned for any particular size of paper. Pivotally secured by means of spring clips 46 is a cover member 47 which, when in raised operative position, provides a stop for the sheet separated from the pile by the feeding mechanism, which stop can be rotated into inoperative position when not needed as when card stock is being duplicated. The arcuate wall 42 presents its concave surface to the sheets supported by the tray and as the sheets are engaged by the feeding mechanism and thus travel upwardly their upper marginal edges readily slide on the curved surface until the same abut the cover 47.

The marginal strips 36 and 37 are of right angled form, Figure 3, for the greater portion of their length, the sides terminating near the lower ends of the strips to permit the ends to be curved as at 48 and, as is also the case with strip 35, for permitting the ends to be located under the retaining lip 34 of the separator plate 31. A resilient support for the lower portions of the strips is provided by means of arms 50 fixedly mounted on the shaft 51 journaled in the spaced frames 26 and 27. The arms are connected by a rod 52 having contacting engagement with the strips forming the tray and serve to resiliently urge the strips upwardly and thus the paper supported thereby into contact with the feeding mechanism. The coil spring 53 secured at one end to pin 54, projecting from the frame 27, and at its other end to a member 55 provides the necessary tension for the rod 52, the member being provided with a slot 56 for engaging in notches 57 provided in the arm 58 rigidly secured to shaft 50. The member provides a lip which can be grasped by the operator whereby the same can be conveniently removed from one notch and located in another notch, which in effect, varies the tension exerted by the coil spring 53 on the rod 52.

By this structure the paper supported by the strips is held in engagement at all times with the retaining lip 34 of the separator plate and is urged upwardly so that the top sheet can be engaged by the feeding arms, the adjustment of the resilient support being readily effected from time to time as the thickness of the pile decreases by actuation of the member 55, as described.

The feeding means proper includes feeding arms 60 adjustably mounted on shaft 61 supported from the spaced frames 26 and 27 by means of supporting arms 62 pivoted to the frames at 63 and adjustable so as to vary the position of the feeding arms with relation to the tray by means of the threaded members 64. Adjustably positioned in one of the supporting arms 62 is a stud 65 formed with a pointed end for engaging the counter-sunk end of shaft 61, the other supporting arm rotatably mounting the stud 66 having loosely mounted thereon, to one side of the arm, a U-shaped member 67 and having fixedly secured thereto a pinion 68, the latter being located between the arms of the U-shaped member. On the stud 66, on the other side of the supporting arm, there is fixedly secured a hub 70 having diametrically aligned slots for receiving pins 71 provided in the end of the shaft 61. The shaft is thus counter-sunk for receiving stud 65 and provided with pins 71 for operatively connecting the shaft with the hub 70, the shaft in this manner being detachably mounted within the arms 62 but having rotation in accordance with the rotation of hub 70. Removal of the shaft is accomplished by releasing the stud 65 through rotation of the set screw 72 and withdrawing the stud, thus removing one of the supporting means for the shaft.

As shown in Figure 1 the frames 26 and 27 provide supports for journaling an actuating shaft 73 having secured to its respective ends depending members 74 and 75, the right hand member 74 being adapted to engage the adjustable stop 22 as the carriage reaches the end of its initial stroke, while the left hand member 75 is adapted to engage a stop formed on frame 10 as the carriage reaches the end of its return or forward stroke. As will be clear, engagement of member 74 with the adjustable stop will cause rotation of shaft 73 in a clockwise direction, while engagement of member 75 with the stop on the frame will cause rotation of the shaft in a counter-

clockwise direction. The feeding arms 60 are in turn actuated from shaft 73 by means of a lever 76 secured to shaft 73 and which has pivotally secured to its upper end, as at 77, a rack bar 78, supported within the U-shaped member 67 and having meshing engagement with the pinion 68.

As well known in hectograph construction the carriage and parts rigidly associated therewith are rotatable on the guide rod 18 so as to permit access to the duplicating surface and in certain rotated positions it has been found that the depending actuating member 75 was in direct alignment with the stop 80 provided on the frame. In order to prevent damage to the parts in case the operator would attempt to return the carriage to its operative position with the member and stop in alignment the member is sectionally constructed as shown in Figure 11. Rigidly secured to the shaft 73 is arm 81 having the stud 82 projecting therefrom and pivotally secured to the end of arm 81 as at 83 is the actuating member 75 provided at its upper end with the integral lug 84 and having its opposite end tapered as represented. The pivotal construction of the parts prevents any damage being done should the member and stop engage during the rotation of the carriage to locate the same in operative position upon the duplicating surface, and engagement of the stud with the integral lug operatively associates the parts so that engagement of the member and stop during reciprocation of the carriage in its return or forward stroke serves to rotate the shaft 73 as described.

Figures 7 and 8 show a modified construction of paper stop including a support 85 having integral inturned flanges 86 forming a passageway for receiving the center strip 35 of the tray, the flanges being released or caused to tightly grip the center strip by means of a securing screw 87 having a knurled head 88, whereby the support is adjustable longitudinally of the strip. Secured to the support, as shown in Figure 9, is an arcuate portion 89 having projecting therefrom the threaded stud 90. The paper engaging stop proper includes the arcuate member 91, the lower end of which intersects the plane of the tray and depends below the tray and which has secured to its upper end portion 92 slotted as shown, the slot receiving the threaded stud 90. With the parts associated as shown in Figure 9, it will be seen that the member 91 is adjustable with respect to the support and can be maintained in adjusted position by the nut 93 threaded to the stud 90. Portion 89 is made of such a curvature whereby adjustment of the paper engaging member thereon serves to rotate the member with respect to the paper tray, the rotation taking place around a pivotal axis, the same being the intersection of the paper engaging face of the member and the plane of the tray. The relation of the member with respect to the tray and its operation as described is necessary and results in many decided advantages since rotation can be accomplished to secure the desired angular position of the member without altering the position of the support.

The operation of the feeding means is as follows:

It will be assumed that the parts are in position as shown in Figure 1 where the rollers 24 and 25 have closed to engage a sheet and to impress the marginal edge of the same upon the gelatin. The carriage is then given a forward movement away from the operator, which rotates the impression roller to cause feeding of the sheet and impressing of the same on the gelatin surface. The stop 22 is so located as to prevent further travel of the carriage in a rearward direction after substantially all of the sheet has been so impressed and as the carriage reaches the end of this initial stroke the depending member 74 will engage the stop to cause rocking of the arm and rotation of shaft 73, the rotation being transmitted through lever 76 and rack bar 78 to the feeding arms 60 which are rotated in a counter-clockwise direction. This rotation of the feeding arms causes engagement between their lower ends and the top sheet of paper supported by the tray, resulting in an upward movement being given to the sheet, causing the release of its lower marginal edge from under the retaining lip 34 and engagement of its upper marginal edge with cover 47. Due to the arcuate wall 42 upward movement of the sheet is permitted as the upper marginal edge will ride along the wall until the sheet abuts the cover. This facilitates the action of the feeding arms and consequently the separation of the top sheet from the pile, movement of the sheet, however, being arrested so as to cause a slight buckling of the sheet, the condition being subsequently utilized in accentuating its downward movement when the same is fed to the feeding rollers mounted in the carriage.

The feeding means remains in this position until the next or forward stroke of the carriage is practically completed. During this feeding stroke the sheet of paper impressed upon the gelatin is withdrawn and fed outwardly between the rollers 24 and 25. As the carriage reaches the end of the stroke actuating member 75 will engage a stop on the frame 10, causing rotation of the actuating shafts 73 in a counter-clockwise direction, which movement is imparted to the pinion to rotate shaft 61 and the feeding arms in a clockwise direction. The top sheet of paper is held in its upward released position as shown in Figures 1 and 4 by engagement of the same with the feeding arms. Rotation of the arms in a clockwise direction will forcibly eject the paper downwardly for insertion of the sheet between the rollers 24 and 25, which are previously positioned in spaced relation for receiving the sheet. At the completion of this operation the operator rocks handle 17 to grip the paper between the rollers, whereupon the parts are in readiness for beginning another printing stroke.

In order to facilitate the feeding of the last few sheets supported by the tray the strips are knurled as at 80' opposite the feeding arms to provide a friction surface. The sheet of paper adjacent the strips is thus prevented from inadvertent movement by contact with the knurled surfaces and the structure results in the proper separation of each sheet by the feeding arms and the feeding of the same to the rollers even to the very last sheet on the tray.

For increasing the efficiency of the feeding operations above described, especially when certain paper stock is used, it has been found necessary to position the strips forming the tray in different horizontal planes, that is, with the center strip 35 in a plane slightly above the marginal strips 36 and 37. This construction is necessitated by the fact that when feeding certain kinds of paper stock the adhesion existing between the sheets is so great as to materially interfere not only with the operation of the sheets but also in their travel downward toward the feeding rollers. Thus in order to minimize this adhesion it is desirable that the sheets while supported on the tray be

separated to as great extent as possible. Positioning the center strip above the marginal strips supports the stock so that the marginal edges present a fan-like formation, each sheet being separated a slight distance from the other. With the stock supported in this manner the feeding arms are able to efficiently separate the top sheet since the adhesion between the sheets is reduced to a minimum, and the ejection of the same toward the feeding rollers takes place without interference. With the center strips 35 supporting substantially the entire weight of the stock it is desirable to increase the width of the strip at its lower end under the retaining lip 34 as represented in Figure 2. The extensions 94 on the end of the strip materially increase the area provided for supporting the stock and also serve to distribute the pressure which maintains the leading edge of the stock between the tray and the retaining lip.

The invention also contemplates additional structure for adapting the same for card stock and the like, since sheets having a material thickness offer too great resistance to the bending at their lower ends required to locate the leading edge of the same under the retaining lip. As shown in Figure 9 the retaining means for the card stock includes members 96 positioned between the strips forming the tray and projecting above the plane of the tray, being formed with a retaining lip 97 substantially parallel with the tray. Arms 98 serve to pivotally mount the members on the transverse shaft 51, the arms being loosely mounted thereon so as to have rotation independent of the shaft. Coil springs 99 secured at one end to the arms and at their other end to rod 100, extending transversely of the tray and being supported by depending supports 101, resiliently urge the members in a direction to retain the leading edge of the card stock between the tray and the retaining lip 97. The feeding arms 60 operate in the same manner as described to first release the top sheet and then by reason of clockwise rotation of the arms to forcibly eject the same downward toward the feeding rollers.

The structural improvements particularly described result in feeding mechanism for duplicating machines which will operate effectively to feed a sheet of paper to the rollers simultaneously with the discharge therefrom of the duplicated sheet. The paper stop is readily adjustable to suit various sizes of paper and by the arcuate construction of the same separation of the top sheet from the pile is facilitated while the location of the cover is such as to reduce the extent to which the sheets buckle while retaining sufficient tension on the sheets for insuring their downward movement towards the feeding rollers.

It is to be understood that I do not wish to be limited by the exact embodiment of the device shown, which is merely by way of illustration and not limitation, as various and other forms of the device will of course be apparent to those skilled in the art without departing from the spirit of the invention or the scope of the claims.

I claim:

1. In a duplicating machine, the combination of a printing bed, a carriage movable over said bed, a tray carried by and movable with the carriage for supporting sheets of paper to be printed, feeding means associated and movable therewith and operative to feed a sheet to the carriage, and a paper stop mounted on said tray, said stop facilitating the separation of the sheets by the feeding means.

2. In a duplicating machine, the combination of a printing bed, a carriage movable over said bed, a tray carried by and movable with the carriage for supporting sheets of paper to be printed, feeding means associated and movable therewith and operative to feed a sheet to the carriage, and a paper stop carried by said tray, said stop including an angular wall for facilitating the separation of the sheets by the feeding means.

3. In a duplicating machine, the combination of a printing bed, a carriage movable over said bed, a tray carried by and movable with the carriage for supporting sheets of paper to be printed, feeding means associated and movable therewith and operative to feed a sheet to the carriage, and an adjustable paper stop carried by said tray, said stop including an angular wall for facilitating the separation of the sheets by the feeding means.

4. In a duplicating machine, the combination of a printing bed, a carriage movable over said bed, a tray carried by and movable with the carriage for supporting sheets of paper to be printed, feeding means associated and movable therewith and operative to feed a sheet to the carriage, and an adjustable paper stop carried by the tray, said stop including a concave wall and a cover therefor, the wall serving to reduce the extent of buckling of the sheets caused by the feeding means.

5. In a duplicating machine, a printing bed, a carriage movable back and forth over said bed, a paper supporting tray carried by the carriage, said tray including a plurality of strips positioned in spaced relation, a backing member adjustably mounted on one of said strips, and means on said strip for indicating the position of said member for various size papers.

6. In a duplicating machine, a printing bed, a carriage movable back and forth over said bed, a paper supporting tray carried by the carriage, said tray including a plurality of strips positioned in spaced relation, a backing member adjustably mounted on one of said strips, and including an arcuate wall and a cover pivotally mounted thereon.

7. In a duplicating machine, a carriage movable back and forth over a printing bed, a paper supporting tray carried by said carriage, said tray including a plurality of strips positioned in spaced relation, feeding means supported by the carriage and cooperating with the tray to feed sheets thereon to the carriage, and roughened surfaces provided on the strips to prevent the feeding of the last few together.

8. In a duplicating machine, a carriage movable back and forth over a printing bed, a paper supporting tray carried by said carriage, said tray including a plurality of strips positioned in spaced relation, feeding means supported by the carriage and cooperating with the tray to feed sheets thereon to the carriage, and knurled surfaces formed on the strips to provide the necessary friction for preventing inadvertent movement of the sheet adjacent the strips.

9. In a duplicating machine, a printing bed, a carriage movable over said bed to perform a printing operation, a paper supporting tray carried by said carriage, means for feeding sheets of paper from the tray to the carriage, said means including feeding arms supported in spaced relation to the tray and movable therewith, and means formed on the surfaces of the tray adjacent the feeding arms for facilitating the feeding operation.

10. In a duplicating machine, a carriage movable back and forth over a printing bed, a paper supporting tray carried by said carriage, feeding arms associated and movable with the tray, resilient means for urging the paper supported by the tray into contact with the feeding arms, said means including a pivotally supported member contacting the tray, springs urging the member into contact therewith, and a finger grasping member for varying the tension of the springs.

11. In a duplicating machine, a printing bed, a carriage movable back and forth over said bed, spaced frames secured to the carriage, and a paper supporting tray carried by the carriage, said tray being secured to a supporting member rotatably mounted in the spaced frames.

12. In a duplicating machine, a printing bed, a carriage movable back and forth over said bed, spaced frames secured to the carriage, a paper supporting tray carried by the carriage and including a plurality of strips, a supporting member to which the strips are non-rotatably secured, and means mounting the member rotatably in the spaced frames.

13. In a duplicating machine, a printing bed, a carriage movable back and forth over said bed, spaced frames secured to the carriage, a paper supporting tray carried by the carriage and including a plurality of strips, a supporting shaft of square cross-section to which the strips are adjustably but non-rotatably secured, and means journaling the member in the spaced frames.

14. In a duplicating machine, a printing bed, a carriage movable back and forth over said bed, a paper supporting tray carried by said carriage, and including a plurality of strips positioned in spaced relation, a paper stop adjustably mounted on the center strip for accommodating paper stock of varying size, said stop also being rotatable to vary the angular relation of the stop with respect to the tray.

15. In a duplicating machine, a printing bed, a carriage movable back and forth over said bed, a paper supporting tray carried by said carriage, a paper stop adjustably positioned at one end of the tray, said stop being longitudinally adjustable to accommodate paper stock of varying size, and being rotatable to vary the angular relation of the stop with respect to the tray.

16. In a duplicating machine, a printing bed, a carriage movable back and forth over said bed, a paper supporting tray carried by said carriage, a paper stop adjustably positioned at one end of the tray, said stop being longitudinally adjustable to accommodate paper stock of varying size, and being rotatable to vary the angular relation of the stop with respect to the tray, the pivotal axis comprising the intersection of the plane of the tray with the paper engaging face of the stop.

17. In a duplicating machine, a printing bed, a carriage movable back and forth over said bed, a paper supporting tray carried by said carriage, a paper stop for the tray including a support adjustably secured to one end of the tray, a paper engaging member adjustably secured thereto, said member extending below and intersecting the plane of the tray, whereby adjustment of the member on the support serves to rotate the member with respect to the tray, the pivotal axis being the intersection of the paper engaging face of the member with the plane of the tray.

18. In a duplicating machine, a printing bed, a carriage movable back and forth over said bed, a paper supporting tray carried by the carriage and including a plurality of spaced strips, and a supporting member to which the strips are secured, said strips being supported in different horizontal planes to so support the paper stock as to minimize the adhesion between sheets.

19. In a duplicating machine, a printing bed, a carriage movable back and forth over said bed, a paper supporting tray carried by the carriage and including a plurality of spaced strips, and a supporting member to which the strips are secured, the center strips being supported in a horizontal plane above that of the end strips, whereby the paper stock is supported by the tray in a manner to substantially minimize the adhesion between sheets.

20. In a duplicating machine, a printing bed, a carriage movable over said bed to perform a printing operation, a paper supporting tray associated with the carriage, said tray including a plurality of strips positioned in spaced relation, feeding arms supported in position above the tray, a paper retaining member located between the strips and projecting above the tray in the vicinity of the arms, and means urging the member in a direction to hold the leading edge of the paper stock against the tray.

21. In a duplicating machine, a printing bed, a carriage movable over said bed to perform a printing operation, a paper supporting tray associated with the carriage, said tray including a plurality of strips positioned in spaced relation, feeding arms supported in position above the tray, paper retaining members located between the strips and having a retaining lip projecting above the tray in the vicinity of the arms, and means urging the members in a direction to hold the leading edge of the stock between the lip and the tray.

22. A duplicating machine comprising, in combination: a frame; a printing bed carried by said frame; a carriage mounted to move on said frame over said bed; a paper supporting tray movable with said carriage for holding a pile of paper; paper feeding mechanism movable with said tray including a projecting actuating member; stationary means carried by said frame to be contacted by said member during movement of the tray to cause actuation of the feeding mechanism, said paper feeding mechanism including means to separate the paper and feed it sheet by sheet.

23. A duplicating machine comprising, in combination; a frame, a printing bed carried by said frame; a carriage reciprocable on said frame over said bed; a paper supporting tray movable with said carriage; paper feeding means movable with said tray, including downwardly projecting actuating means; and stop means carried by the frame to be contacted by said actuating means adjacent each limit of reciprocation of the carriage and tray.

24. A duplicating machine comprising, in combination: a frame; a printing bed carried by said frame; a guide mounted on said frame; a carriage slidable on said guide and over said bed, mounted to pivot about said guide away from the bed; a paper supporting tray movable with said carriage in its sliding and pivoting movements; paper feeding mechanism carried by the tray including an actuating arm having a stop contacting member pivoted thereupon; a fixed stop carried by the frame in the path of movement of said member; said member beveled at its lower end to be deflected by downward contact with said stop and yieldable in one direction about its pivot

to evade the stop; and means carried by the arm to hold the member rigid with the arm in one direction of movement of the tray.

25. In a duplicating machine, a platen, a carriage movable back and forth over the platen, a platen roll carried by said carriage and cooperating with said platen, a tray carried by said carriage to hold a pile of paper, and feeding means carried by said carriage to feed the sheets one by one to said platen roll, said tray having a rough surface to engage the bottom sheet of paper in said pile whereby the last few sheets will not be fed at one time to said platen roll.

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