

May 29, 1934.

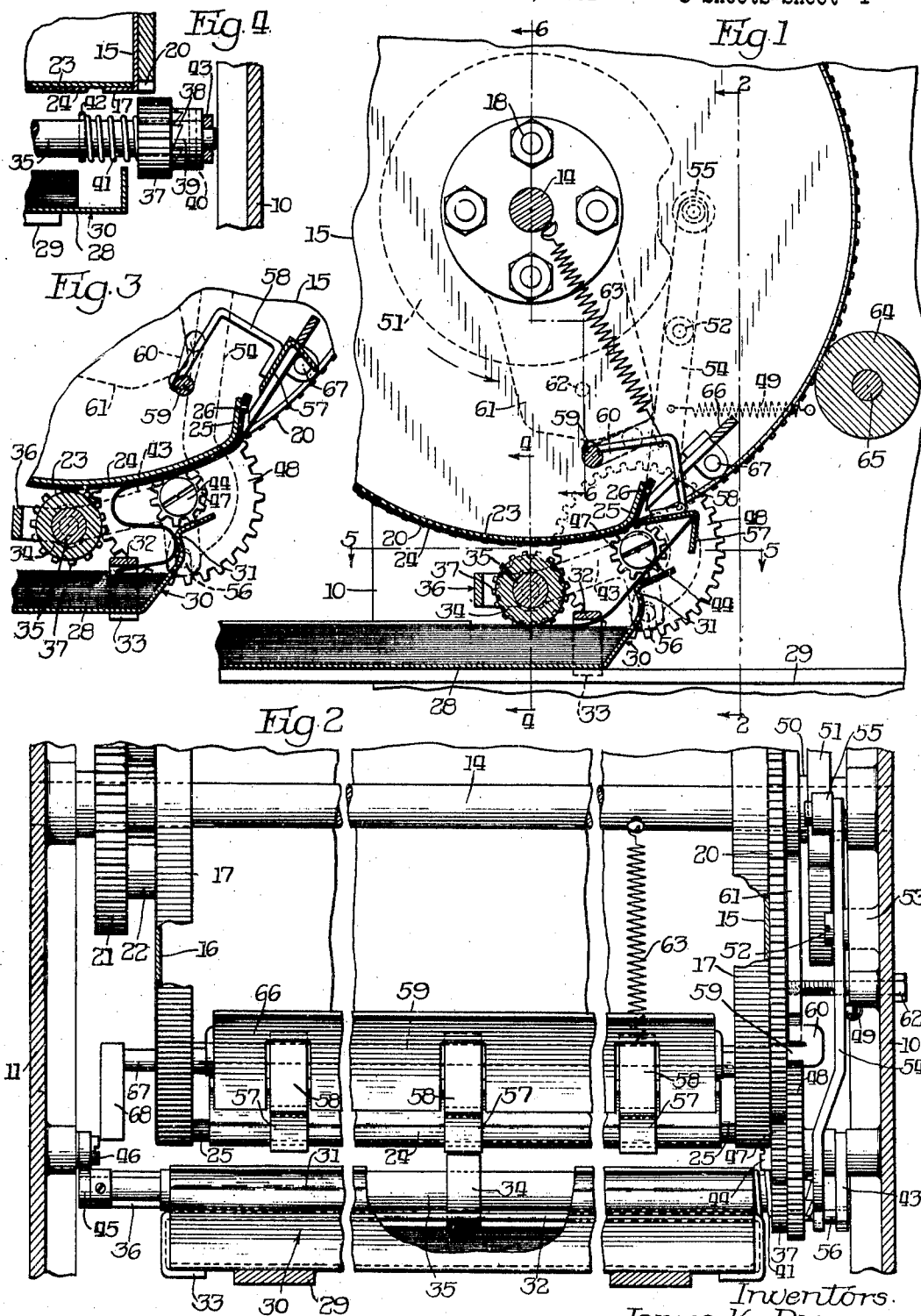
J. K. DUNCAN ET AL

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FEEDING MECHANISM FOR ROTARY DUPLICATORS

Filed Dec. 31, 1931

3 Sheets-Sheet 1



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May 29, 1934.

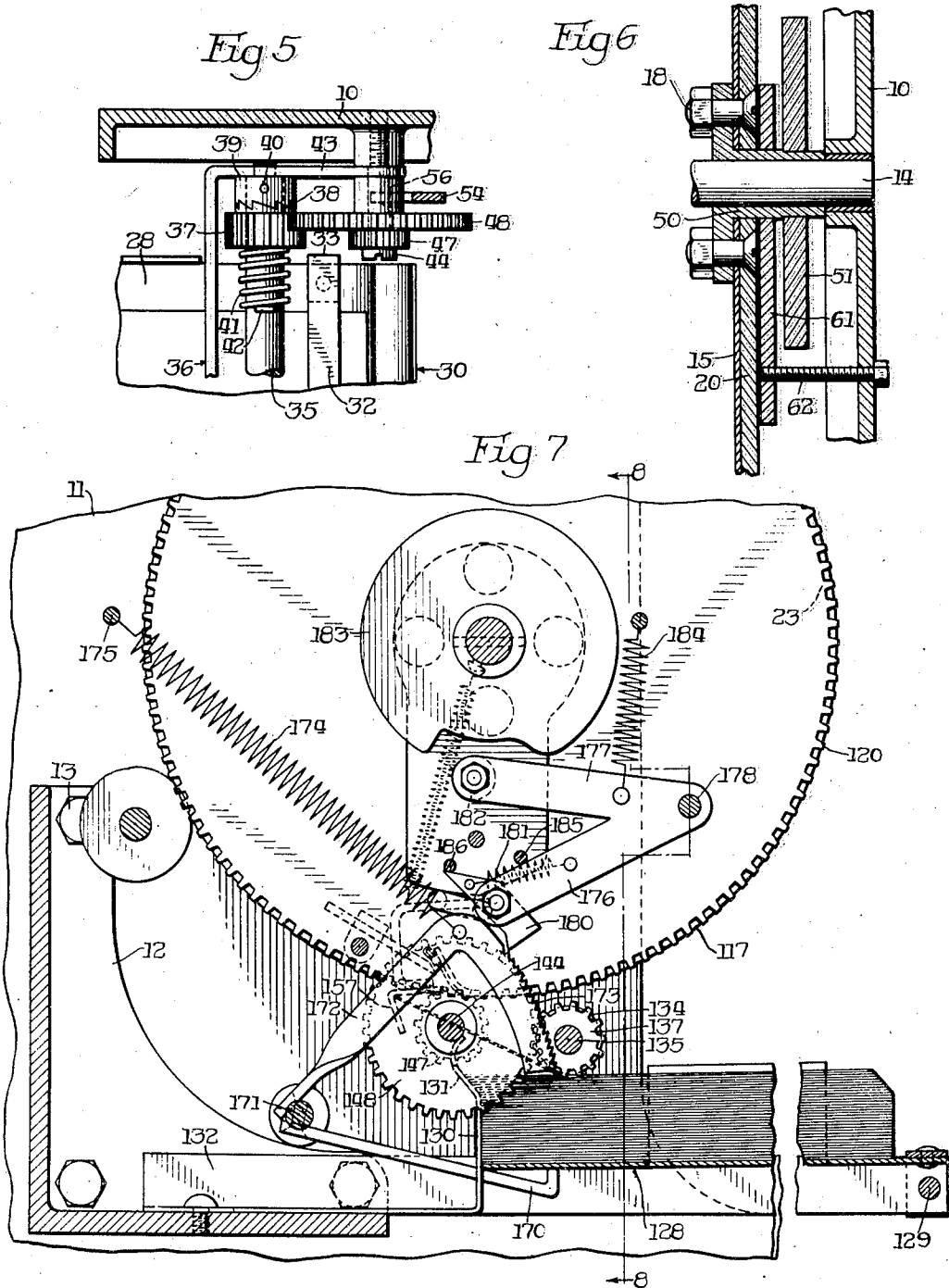
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FEEDING MECHANISM FOR ROTARY DUPLICATORS

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3 Sheets-Sheet 2



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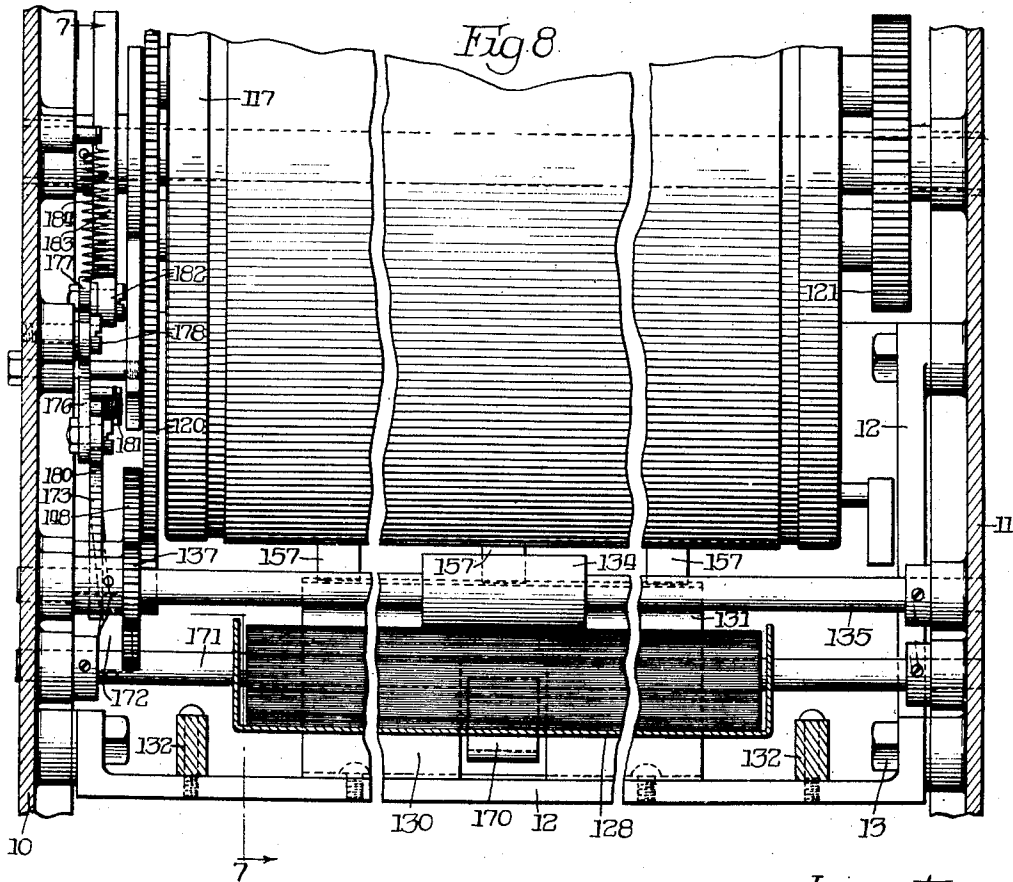
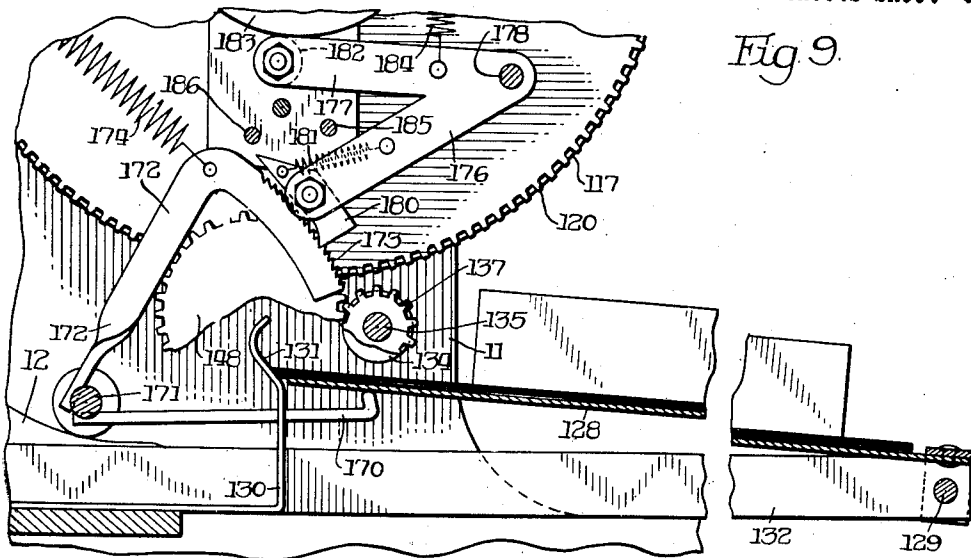
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FEEDING MECHANISM FOR ROTARY DUPLICATORS

Filed Dec. 31, 1931

3 Sheets-Sheet 3



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UNITED STATES PATENT OFFICE

1,960,482

FEEDING MECHANISM FOR ROTARY
DUPLICATORS

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cago, Ill., assignors to Ditto, Incorporated,
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Application December 31, 1931, Serial No. 584,082

10 Claims. (Cl. 101—132)

The invention relates to rotary duplicators em-
ploying a duplicating surface for receiving an
impression from a master sheet and for imparting
the same to blank sheets subsequently impressed
thereon. The invention is concerned more par-
ticularly with feeding mechanism for the type of
duplicators disclosed in the co-pending applica-
tion of James K. Duncan and Clifford N. John-
son, Serial No. 582,901, filed December 24, 1931
and has for an object to provide devices func-
tioning intermittently to separate the top sheet
of paper from the stock on the tray and to pre-
sent the same to a rotating cylinder for initiating
a duplicating operation.

In order to adhere the presented sheet to the
duplicating surface on the cylinder, the devices
have an additional function producing a buckle in
the sheet, automatically causing the leading mar-
ginal edge to contact the leading portion of the
surface. Since the margin stop in the present
disclosure rotates with the cylinder it is necessary
in order to accomplish the above objects to feed
the sheet with a speed substantially greater than
the peripheral speed of the cylinder.

A further object is to provide a feeding roller
driven by a positive drive from the rotating cylin-
der when rotated in the proper direction to cause
feeding of the sheets to the cylinder but
which incorporates means for disengaging the
drive when the cylinder is rotated in the reverse
direction.

Another object is the provision of a paper stop
for association with the paper tray and which
will co-operate with the feeding roller in such a
manner as to facilitate in the separation of the
top sheet from the remaining sheets on the tray
and particularly the sheet next adjacent to the
top sheet.

A more specific object is to provide a paper stop
of special formation including an abutment por-
tion at an angle to the horizontal against which
the paper stock engages, and a shoulder por-
tion functioning in connection with the abutment
to separate the fed sheet from the remaining
sheets.

In the arrangement of feeding devices wherein
the tray is movable vertically an additional fea-
ture for aiding in the separation of the sheets
is included, comprising the provision of a paper
stop that is stationary with respect to the mov-
able tray. As the leading marginal edges of the
sheets are maintained in contact with the stop,
movement of the paper tray with respect thereto
provides an additional means for separating the
sheets.

Another object of the invention is to provide a
rotary type duplicator with instrumentalities lo-
cated on the cylinder which will operate to pro-
vide a margin stop against which the fed sheet
may engage, the stop being actuated in timed re-
lation to the feeding mechanism in any manner
such that no interference to the impression roller
and other mechanism results.

Operation of the above described feeding and
positioning devices, in accordance with the pres-
ent invention, results in the contacting of the
leading margin of the fed sheet with the lead-
ing portion of the duplicating surface which, by
reason of the adherent nature of the surface,
causes the sheet to adhere thereto. The impres-
sion of the sheets on the surface for duplicating
purposes is subsequently accomplished by an im-
pression roller.

Still another object of the invention is to pro-
vide a margin stop which will register the fed
sheet, insuring exact aligning of the leading edge
with that of the duplicating surface. A feature
of the invention in this connection is the location
of the stop on the cylinder where its relation with
respect to the duplicating surface is constant, re-
sulting in registration of a character providing
the same margin on all duplicated copies.

A further object is to provide improved feed-
ing mechanism for association with a movable
tray supporting the paper stock, the mechanism
including novel means for automatically adjust-
ing the height of the tray with respect to the
feeding roller to compensate for the diminish-
ing of the stock which occurs during continuous
operation of the device.

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

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

Figure 1 is a fragmentary sectional view taken
longitudinally of the machine and showing a ro-
tary duplicator equipped with feeding means in
accordance with the present invention;

Figure 2 is a vertical sectional view taken sub-
stantially on the plane indicated by line 2—2 of
Figure 1;

Figure 3 is a fragmentary sectional view show-
ing the feeding mechanism of Figure 1 in another
position of operation wherein the fed sheet has
been presented to the duplicating surface;

Figure 4 is a fragmentary vertical sectional view taken on line 4—4 of Figure 1 and showing the clutch arrangement on the feeding roller shaft;

5 Figure 5 is a horizontal sectional view taken on line 5—5 of Figure 1 and showing the drive construction for the feeding roller;

10 Figure 6 is a fragmentary vertical sectional view taken on line 6—6 of Figure 1 and showing the mounting of the cylinder within the side frames and the relative positioning of the cam members;

15 Figure 7 is a fragmentary sectional view taken longitudinally of a rotary duplicator and showing feeding mechanism constructed according to the present invention for association with a movable paper tray;

Figure 8 is a vertical sectional view taken along the plane indicated by line 8—8 of Figure 7, and

20 Figure 9 is a fragmentary sectional view showing the feeding mechanism of Figure 7 in inoperative position.

The feeding mechanism forming the present invention is associated with a type of rotary duplicator such as disclosed in the application above identified and which consists essentially of a pair of spaced frame members 10 and 11 suitably held in spaced relation by means of a supporting member 12, Figure 7, positioned substantially centrally of the members and secured to the respective frames by bolts 13. The frames are positioned upon any suitable base and provide journalling means for a rotary cylinder suitably mounted within the frames by means of the central shaft 14.

35 As shown in Figures 2 and 4 the cylinder comprises a pair of spaced end members 15 and 16, each being formed with a flange 17 on their peripheries and being rotatably or non-rotatably secured in spaced relation to the central shaft 14. End member 15 has suitably secured thereto by bolts 18 a driving gear 20 substantially the size of the cylinder, while end member 16 has secured by means of similar bolts a smaller gear 45 21 held in spaced relation from the end member by spacers 22. By means of the gear 21 the cylinder is adapted to be suitably rotated from a driving pinion having meshing engagement with the gear and which in turn is driven through means of a manually rotated crank handle or by means of an electric motor. To complete the cylinder the same is provided with an arcuate platen member 23 which extends from points diametrically opposite each other on the cylinder 50 and provides the supporting surface for the duplicating band 24, suitably secured at its ends to the inwardly directed end portions 25 of the platen by means of the upstanding studs 26. The duplicating band is supported on the arcuate platen in stretched condition and is readily detachable therefrom so that a used band can be easily removed and replaced by a new band.

75 The frame members support in position below the cylinder a paper tray 28 by means of the longitudinally extending supporting members 29, formed integral with the tray at its feeding end is a paper stop designated in its entirety by 30, which is provided at its upper end with a curved formation, providing a shoulder 31. Also associated with the tray is a paper retaining bar 32 of yoke form which extends horizontally across the tray, having its ends 33 bent inwardly and upwardly against the bottom of the tray, which forms securing means, maintaining the bar in position thereon.

A feature of the present invention is the provision of feeding devices which will function intermittently to separate the top sheet of paper from the stock positioned on the tray 28 and to present the same to the rotating duplicating cylinder for initiating a duplicating operation. One of the above mentioned devices includes a feeding roller 34, suitably mounted on shaft 35 80 journaled at its ends in the supporting yoke designated in its entirety by 36 and having provided at one end, as shown in Figures 4 and 5, the driving pinion 37. The pinion is loosely mounted on shaft 35 having formed on one face the clutch portions 38 adapted to engage the co-operating clutch members 39, non-rotatably secured to the right hand end of the shaft by means of the pin 40, the clutch members being held in engagement with each other by the coil spring 41 mounted on the shaft and confined between the pinion 37 and the stud 42 extending 85 through the shaft. The above clutch structure is provided for the purpose of forming a positive drive for the shaft 35 and thus the feeding roller 34 when the same is rotated in a counter-clockwise direction, as viewed in Figures 1 and 3, but to permit slippage between the pinion 37 and the shaft to take place when the former is rotated in a clockwise direction as viewed in Figures 1 and 3. Should rotation of the feeding roller occur in a clockwise direction it will be readily seen, Figure 1, that the sheets of paper would be fed from the tray in the wrong direction, that is, outwardly to the left, and in order to prevent such operation a preferred form of clutch construction as shown in Figure 4 is located in the feed roller drive. 90 95 100 105 110

The yoke 36 which journals the feeding roller is provided at its right hand end with an arm 43 of bell crank shape, which is pivotally secured to the frame 10 by means of the supporting stud 115 44. The other arm 45 of the yoke is also pivotally secured to the frame member 11 by means of stud 46 so that the construction mounts the yoke for rotation within the frame members, the rotation being such that the feeding roller 120 has vertical movement with respect to the paper tray. To complete the feed roller drive the pinion 47 is rotatably mounted on stud 44 and is adapted to have meshing engagement with gear 20 carried by the printing cylinder. Either 125 formed integral with pinion 47 or preferably non-rotatably secured to the pinion shaft is the gear 48 which in turn meshes with the pinion 37 mounted on the feeding roller shaft 35. It will be seen from the above that the feeding roller is continuously rotated from the printing cylinder and is also permitted to have limited vertical movement in a direction toward and away from the paper supporting tray 28. The dual movements of the feeding roller are rendered possible by the pivoting of the yoke within the frame members by studs 44 and 45, and by the fact that the former provides a bearing shaft for mounting the pinion 47 and the gear 48. 130 135 140

As more particularly shown in Figure 6, the right hand end of the printing cylinder by means of the trunnion portion 50 secured by the bolts 18 to the end member 15, has non-rotatably secured thereto the cam 51. The cam serves to actuate the feeding roller in a vertical direction in timed relation to the cylinder and for the purpose there is provided at 52 to stud 53, provided on member 10, a lever 54 having an arcuate portion at its lower end for passing around the supporting stud 44 and a roller 55 at its upper end for con- 145 150

facting the gear 51. Operative connection between the lever 54 and the yoke 36 which journals the feeding roller is accomplished by pivotal securement of the bell crank arm 43 with the lowermost end of the lever as by the securing bolt 56. The cam is designed so that it has contacting relation with roller 55 for the greater portion of its periphery, functioning to rock the lever outwardly in a direction to the right at its upper end, Figure 1, and toward the left at its lower end to in turn impart rocking movement to the yoke, maintaining the feeding roller out of contact with the paper on the tray. When the recess provided in the cam is positioned adjacent the roller 55 the lever 54 will be allowed to rotate by reason of spring 49 so that its lower end has movement in a direction to the right, whereupon the yoke is lowered, allowing the feeding roller to contact the top sheet for feeding purposes.

In order to secure more efficient separation of the top sheet through contacting the same with a rotating feeding roller a paper stop 30 of particular form has been provided. The upper arcuate shoulder portion 31 serves to provide the necessary resistance to the fed sheet to cause separation of the same from the next adjacent sheet. Movement of the top sheet in a direction toward the shoulder 31 is caused by engagement of the same with the rotating feeding roller, but this movement of the top sheet also tends to cause movement of the next adjacent sheet since friction exists between the two. The shoulder provides sufficient resistance to overcome the friction and as the top sheet is positively fed it continues to ride over the shoulder and to be subsequently presented to the printing cylinder as will be more particularly described. The stop is so designed as to present a relatively long arcuate shoulder for the purposes described in order to insure efficient and positive separation of the sheets. The base angle of the stop is determined particularly in relation to the arcuate shoulder 31 and so as to secure an abutment which provides the necessary resistance for the paper stock against which the sheets engage when deposited on the tray.

In accordance with the present invention the duplicating cylinder is provided with a plurality of margin stops 57 which form a margin bar for positioning the leading edge of the fed sheet with relation to the duplicating surface. The stops 57 are suitably secured to a supporting bar 58 of angular form, rotatably mounted within the end members 15 and 16 by means of shaft 59. The right hand end of the margin bar supporting shaft projects outwardly beyond the member 15, providing a portion 60 which is located in the path of the stationary cam 61. As shown in Figure 6 the cam is loosely mounted on the trunnion 50 and is held to the frame member 10 by means of the bolt 62. As the margin stops are carried by the cylinder it will be seen that upon each revolution thereof engagement will take place between the stationary cam 61 and the projecting end 60 of the shaft 59. The parts are so positioned as to cause rotation of the shaft in a clockwise direction to position the margin stop outwardly of the periphery of the cylinder. This actuation of the stops takes place when this portion of the cylinder is substantially over the feeding roller so that as the fed sheet leaves the paper stop 30 its leading edge is directed into the margin stops. It will be seen that the actuation of the same has lowered the margin stops so that

they are in a position to receive the fed sheet before a substantial amount of the sheet has been fed by the roller. As the cylinder continues its rotation the portion 60 of shaft 59 will pass out of contact with the stationary cam 61 to permit the margin stop to be withdrawn into the cylinder, as shown in Figure 3, the actuation being accomplished by the coil spring 63.

In addition to the above described feeding and presenting of the leading edge of the sheet to margin stops carried by the rotating cylinder the present feeding mechanism also functions to adhere the leading portion of the fed sheet to the duplicating band attached to the platen 23 of the cylinder. Since there is relative movement between the margin stops and the fed sheet it will be clear that in order to cause the latter to engage the stops it is necessary to impart more rapid movement to the fed sheet than would otherwise be necessary. The feeding operation is speeded up to an even greater degree than necessary for engaging the leading edge with the stops, and as a result the leading portion of the sheet is caused to buckle at points between the margin stops and the paper retaining bar 32. The buckling is of course the result of the excessive feeding of the sheet which, however, causes the leading portion of the sheet to be automatically urged into contact with the leading portion of the duplicating surface. Due to the adherent nature of the surface the sheet readily adheres thereto, although the same is presented to the surface yieldingly and by a force no greater than is inherent in the fed sheet, due to its buckled condition.

After the presenting of the sheet to the duplicating surface, as above described, has been completed the feeding roller is raised out of contact with the sheet and the same is removed from the tray by the rotation of the printing cylinder. For impressing the sheet upon the duplicating surface an impression roller 64 is provided suitably mounted on shaft 65 journaled within the frame members.

In order to facilitate the stripping of the duplicated sheet from the surface the printing cylinder has suitably journaled therein a stripping plate 66 which has spaced slots formed therein for accommodating the margin stops 57. The stud shaft 67, extending outwardly of end member 16 and having operative connection with the stripping plate, is provided with a depending cam 68 adapted to engage at the proper time in the rotation of the cylinder a pin projecting from frame 11, to cause actuation of the stripping plate to locate the end positioned adjacent the edge of the duplicating band outwardly of the periphery of the cylinder. This rocking of the stripping plate will carry with it the leading marginal edge of the duplicated sheet, causing the edge to leave the margin stops and to be projected outwardly of the cylinder. This functions to locate the edge in the path of a pair of stripping rollers for completing the stripping operation.

Operation of the above described feeding and positioning devices results in the contacting of the leading marginal edge of the fed sheet with margin stops carried by the cylinder and of the leading portion of the sheet with the duplicating surface which functions to adhere that portion of the sheet thereto. As the margin stops are carried by the cylinder they function to register the fed sheet so as to insure exact aligning of the edge with that of the duplicating surface, and as the relation of the parts is constant the registra-

tion is constant, providing the same margin on all duplicated copies.

In Figures 7, 8 and 9 a modified arrangement of feeding mechanism is disclosed, wherein the paper tray is movable with respect to the printing cylinder and to the feeding roller. The same construction of duplicator is employed having frame members 10 and 11 for journalling the duplicating cylinder formed of end members 15 and 16 and providing a platen surface 23 for supporting the usual duplicating band 24.

The feeding mechanism is particularly designed for association with a movable paper tray 128 pivotally supported at its right hand end as at 129 to longitudinal supporting members 132 suitably secured to the transverse support 12. Associated with the movable tray 128 at its left hand side is a stationary paper stop 130 provided with an arcuate formation forming the shoulder 131. The paper stop aids in the separation of the sheets by reason of the provision of the arcuate shoulder portion and also due to the fact that the tray and the sheet supported thereon have relative movement with relation to the stop.

The feeding roller 134 in this modification is journaled by means of shaft 135 within the frame members 10 and 11, the latter having non-rotatably mounted thereon a pinion 137 meshing with gear 148. As was the case in the drive disclosed in Figure 1, gear 148 has suitably associated therewith pinion 147 meshing with the large gear 120 carried by the cylinder and being rotatably mounted together with gear 148 upon the stud shaft 144 projecting from the frame member 10. The feeding roller is thus continuously driven from the rotating printing cylinder and is caused to contact the top sheet of the paper stock through movement upwardly of the paper tray.

The tray is supported at its end adjacent the paper stop by means of the supporting lever 170 rigidly secured to shaft 171 rotatably mounted within the frame members. Also secured to the shaft, as shown in Figure 8, is a ratchet member 172 of bell crank formation having ratchet teeth 173 formed on the depending leg thereof. The coil spring 174, secured at one end to pin 175 and at its other end to ratchet member 172, serves to hold the member, the supporting lever 170 and the paper tray in raised position. An actuating member of V formation, having arms 176 and 177, is pivoted to frame member 10 at 178 and pivotally carries on its lower arm the pawl 180 resiliently urged in a clockwise direction by means of the coil spring 181. The upper arm 177 has mounted thereon the roller 182 for engaging with cam 183 carried by the rotating cylinder, which, due to its particular formation, maintains the actuating member in depressed position against the tension of coil spring 184 for the greater portion of the revolution of the cylinder. When the recessed part of the cam is positioned opposite roller 182 the actuating member is permitted to travel upwardly until arm 176 contacts the stop 185. This upward movement of the arm also causes engagement between the bevelled upper end of pawl 180 and stop 186, automatically rocking the pawl and throwing the same out of engagement with the ratchet teeth 173.

When the above disengagement of pawl 180 and ratchet member 172 takes place it will be seen that the spring 174 is free to exert tension upon the member, rotating shaft 171 and causing the supporting lever 170 to impart upward movement

to the paper tray contacting the top sheet of paper with the feeding roller 134. The operation of the roller in separating the top sheet and feeding the same into engagement with the margin stops 157 is the same in all respects to the operation of the mechanism shown in Figure 1. Upon the completion of the feeding of the sheet, that is, when the same have been presented to the duplicating surface of the printing cylinder in a manner to adhere the leading portion of the same thereto, it is desirable to terminate the contact of the feeding roller with the sheet and accordingly the paper tray is lowered to inoperative position. This is accomplished by engagement of cam 183 with the roller 182, depressing the actuating member and causing the pawl to engage the teeth of the ratchet member. This engagement operatively connects the actuating member with the supporting lever for the paper tray and further downward movement of the member will cause similar movement to be imparted to the tray, locating the same in lowered inoperative position.

A feature of the invention is the provision of feeding mechanism which in addition to functioning as above described will also automatically adjust the height of the tray with respect to the feeding roller so as to compensate for the diminishing of the stop which occurs during continuous operation of the device. This diminishing of the paper stock is taken care of by the coil spring 174 which in all instances will impart sufficient upward movement to the tray to contact the top sheet with the feeding roller. By the present arrangement of pawl and ratchet member, engagement between the parts can be accomplished in a plurality of positions of the ratchet member, which is necessitated by the various heights that the paper stock may assume.

Under all conditions, whether the stock is of maximum height, as shown in Figure 7, or consists only of a few last sheets as shown in Figure 9, the same degree of downward movement is imparted to the tray, since the degree of actuation of arm 177 by cam 183 is constant. The present structure therefore results in an efficient mechanism operating to cause raising and lowering of a paper tray for the purpose of initiating and terminating a feeding operation. The present device also has the added feature that the actuation of the parts is the same under all conditions the mechanism automatically adjusting itself to suit the height of the stock on the tray.

It is to be understood that we 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.

We claim:

1. In a rotary duplicator, spaced frames, a cylinder journaled in said frames, a paper tray pivoted at one end in the frames, a feeding roller journaled therein between the cylinder and tray, a ratchet arm journaled in the frames and resiliently supporting the free end of the tray, cam means on said cylinder, a member pivoted to one frame and having contact with said cam means on the cylinder, a pawl pivoted to the member, a coil spring for forcing the pawl into contact with the teeth on the ratchet arm, and an abutment whereby engagement of the pawl therewith causes said pawl to be forced out of contact with the teeth on the ratchet arm.

2. In a rotary duplicator, a rotatable cylinder provided with a duplicating surface, a paper stop carried by the cylinder, means for feeding sheets of paper to said cylinder while it is rotating, means actuated in synchronism with said cylinder for displacing said stop into and out of its functionally operative position and means actuated in synchronism with the cylinder for actuating said feeding mechanism to feed said paper against said stop and bring it into contact with said duplicating surface.

3. In a rotary duplicator, a rotatable cylinder provided with a duplicating surface, a paper stop carried by the cylinder, means actuated in synchronism with said cylinder for displacing said stop into and out of its functionally operative position, means for feeding sheets of paper to said cylinder while it is rotating, and means actuated in synchronism with the cylinder for actuating said feeding mechanism to feed said sheets of paper at a higher speed than the surface speed of said cylinder, whereby the leading edges of said sheets are advanced against said stop and buckled into contact with said duplicating surface.

4. In a rotary duplicator, a rotatable cylinder provided with a duplicating surface, a paper stop carried by the cylinder, means actuated in synchronism with said cylinder for displacing said stop into and out of its functionally operative position, means for feeding sheets of paper to said cylinder at a speed higher than the speed of said duplicating surface, and means actuated in synchronism with the cylinder for actuating said feeding mechanism to buckle said paper into contact with said duplicating surface.

5. In a rotary duplicator, a rotatable cylinder provided with an adhesive duplicating surface, a paper stop carried by the cylinder, means actuated in synchronism with said cylinder for displacing said stop into and out of its functionally operative position, means for feeding sheets of paper to said cylinder at a speed higher than the speed at which said duplicating surface travels, and means actuated in synchronism with the cylinder for actuating said feeding mechanism to buckle said paper into contact with said adhesive duplicating surface.

6. In a rotary duplicator, a rotating cylinder provided with a duplicating surface, a paper tray for supporting sheets of paper to be duplicated, means actuated in synchronism with said cylinder for raising and lowering said tray, a combined paper stop and sheet separator located at one end of said tray and movable therewith when it is raised and lowered, said combined paper stop and sheet separator comprising a projection extending above said sheets of paper, and a driven feed roller engageable with the top sheet of the stock

on the tray when the tray is in its uppermost position, said feed roller serving to feed said top sheet to said duplicating surface.

7. In a rotary duplicator, a rotating cylinder provided with a duplicating surface, a paper tray for supporting sheets of paper to be duplicated, means actuated in synchronism with said cylinder for raising and lowering said tray, a bent plate located at one end of said tray and constrained to move therewith, said bent plate serving as a paper stop and a sheet separator, and a feed roller engageable with the top sheet of the stock on the tray when the tray is in its uppermost position, said feed roller being frictionally engageable with said top sheet to advance it to said duplicating surface.

8. In a rotary duplicator, a rotating cylinder provided with a duplicating surface, a paper tray for supporting sheets of paper to be duplicated, a feeding roller operating to contact a top sheet of the stock on the tray and to feed the same into contact with the duplicating surface, means for causing relative motion between said feeding roller and said tray to move them towards and away from each other, and a member extending over said paper tray and between said feeding roller and said duplicating surface, said member being positioned to engage one side of said paper as it is advanced to said duplicating surface whereby said paper buckles toward said duplicating surface during the feeding operation.

9. In a rotary duplicator, a rotating cylinder provided with a duplicating surface, a paper tray for supporting sheets of paper to be duplicated, a feeding roller operating to contact a top sheet of the stock on the tray and to feed the same into contact with the duplicating surface, means for causing relative motion between said feeding roller and said tray to move them towards and away from each other, and a member extending over said paper tray and between said feeding roller and said duplicating surface, said member being positioned to engage one side of said paper as it is advanced to said duplicating surface whereby said paper buckles in an S-shaped formation during the feeding operation.

10. In a rotary duplicator, a rotating cylinder provided with a duplicating surface, a paper tray for supporting sheets of paper to be duplicated, a paper stop provided at one end of the tray, a driven feed roller engageable with the top sheet of the stock on the tray to feed the same into contact with the duplicating surface, and a member disposed above the tray and between said feeding roller and said paper stop, said member co-operating with said paper stop to bend the paper into an S-shaped formation in the feeding operation.

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