

Sept. 5, 1967

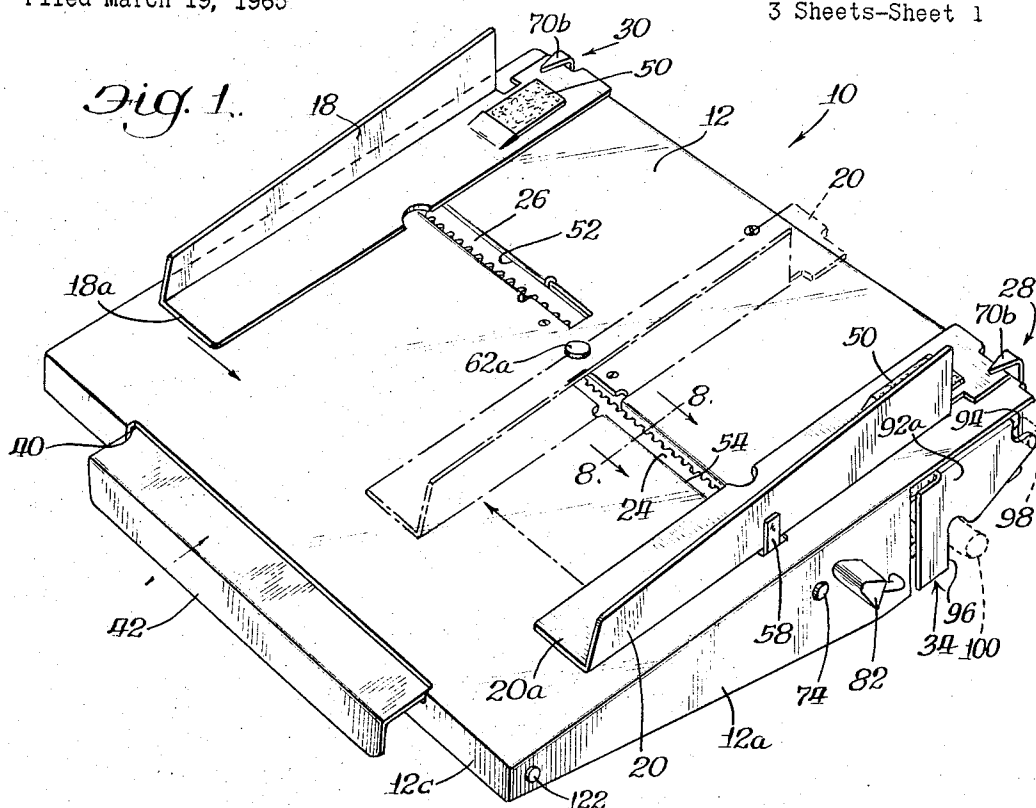
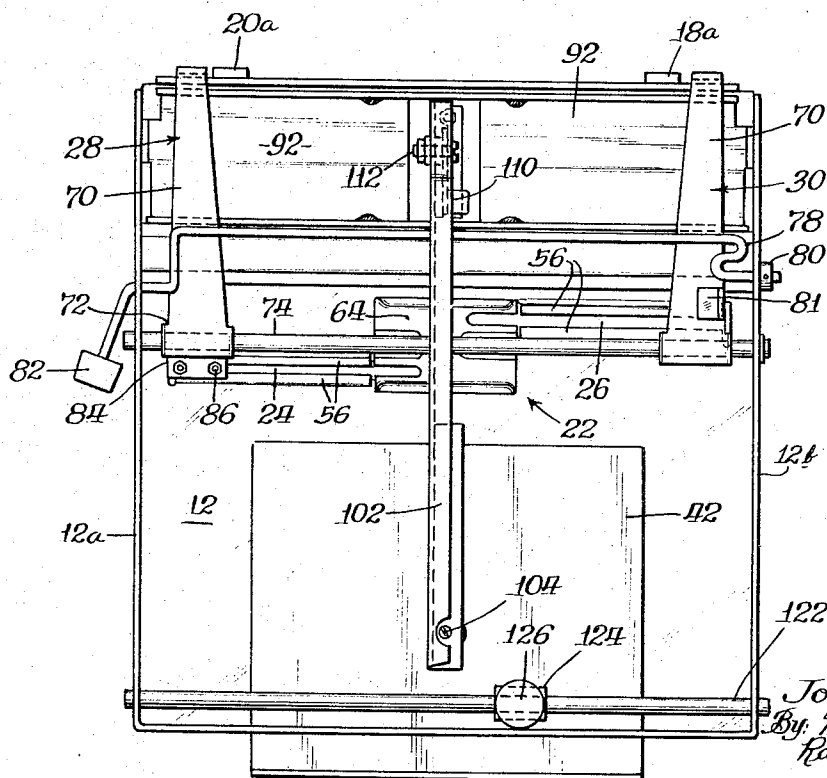
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3,339,916

SHEET FEEDING ASSEMBLY

Filed March 19, 1965

3 Sheets-Sheet 1



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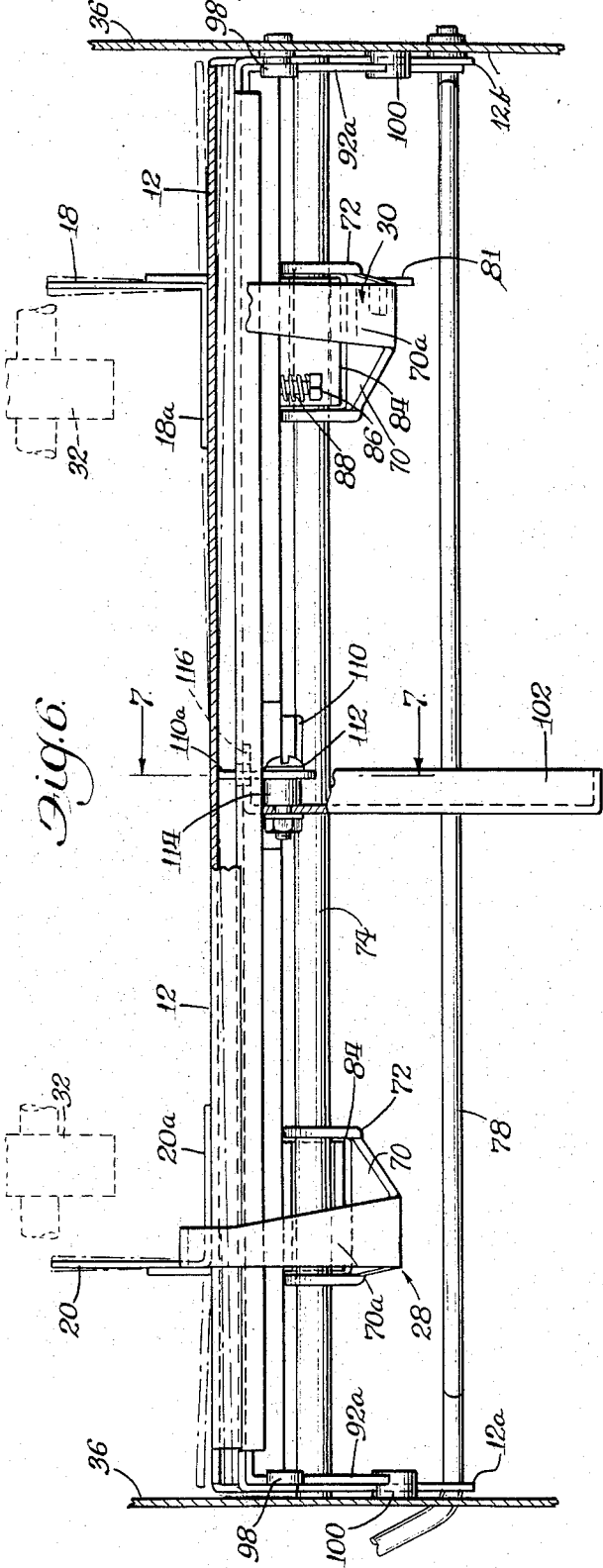
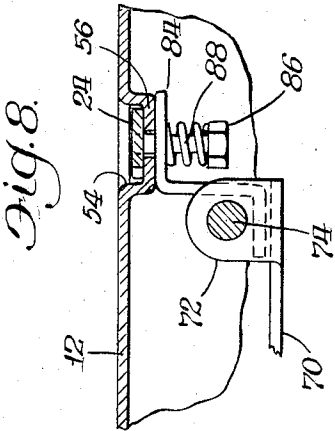
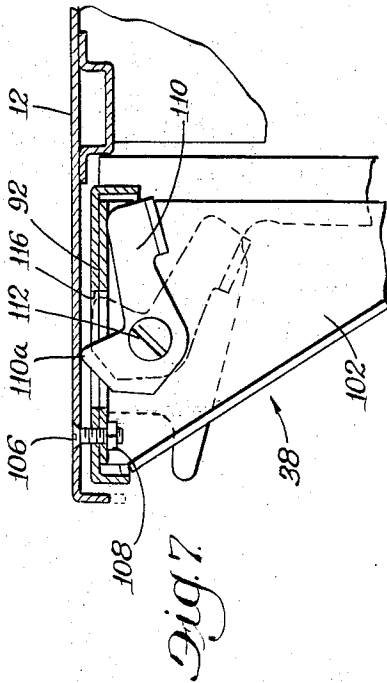
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3 Sheets-Sheet 3



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SHEET FEEDING ASSEMBLY

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12 Claims. (Cl. 271—36)

This invention relates to an assembly for automatically feeding individual sheets from a stack thereof and, more particularly, to means for automatically feeding sheets from a stack without skewing.

Devices for automatically feeding single sheets from a stack disposed in a stack receiving tray into various types of copying apparatus are well known. Such sheet feeding tray devices or assemblies frequently are equipped with a pair of driven friction wheels or rollers mounted in axially spaced positions on a shaft which is disposed transverse to the direction of movement of the sheet. The wheels or sheet engaging elements which rest on the top of the stack or which can be spring biased toward the stack are intermittently driven by suitable gearing or flexible connections to a drive means in the copying apparatus to feed individual sheets to the apparatus at time spaced intervals.

These sheet feeding devices are mounted on the frame of the apparatus adjacent the feed-in station in a fixed position. The table or platform of the stack receiving tray lies in a plane parallel to the plane passing through the contact points between the feed wheels and the top sheet. One of the major problems of known sheet feeding apparatus is the skewed feeding of the sheet into the copying apparatus. This skewed feeding frequently results from moving one side of the sheet at a faster speed than the other side. This causes the leading edge of the sheet to be presented at an angle to the feed-in station with the result that it frequently becomes fouled in the various transporting means within the apparatus. In severe cases, the copy sheet jams the transporting mechanism and requires the copying machine to be shut down to remove the fouled sheet. In those situations in which the apparatus is a copying or a duplicating machine, the image is placed in a skewed or offset position on the sheet and, in some circumstances, portions of the image are missing from the copy sheet.

There are a number of conditions in both the paper stack and the tray which cause skewed feeding. The condition and location of the feeder wheels can cause the defective feeding. As an example, a lack of uniformity in the wear of the wheel surfaces results in changing the peripheral speed of each of the wheels so that one side of the sheet is moved at a different speed than the other. If the wheels are not symmetrically placed along the transverse width of the sheet, improper feeding can occur. In addition, care must be taken to properly adjust the pressure of the side guides or rails on the lateral edges of the stack so that the edge of the top sheet is not unduly restricted in its sliding motion as it is fed forwardly from the top of the stack. Improper cutting of the sheets of the stack during the trimming operation can result in clinching one edge of the stack so that one sheet is coupled with the adjacent sheet beneath. The surface finish of the sheet bears an important relationship to the uniformity of feeding because the greater the coefficient of friction between the sheet surfaces, the more critical the

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adjustment of the feeder wheels. The stiffness and the basic weight of the sheet are important factors since limp stock or thin material will more readily yield and buckle along a line parallel to the direction of the movement of the sheet in response to improperly adjusted feeder wheels or side rails. Proper feeding of the sheet also requires means for assuring proper positioning of the sheet edge guide and separating means which permit only a single top sheet to be fed from the stack incident to each feeding operation.

Accordingly, one object of the present invention is to provide a new and improved sheet feeding assembly.

Another object is to provide a sheet feeding assembly including new and improved means for preventing skewed feeding of the sheets.

A further object is to provide a new and improved sheet feeding apparatus capable of feeding sheets of a wide range of basic weights and stiffness without skewing.

A further object is to provide a sheet feeding assembly including means for pivotally mounting the sheet receiving table or tray to prevent the feeding of sheets in a skewed position.

A further object is to provide a sheet feeding assembly including a fixed supporting structure and a sheet receiving tray or table mounted on the fixed supporting structure for limited pivotal movement about an axis extending generally parallel to the direction of movement of the sheet.

Another object is to provide a sheet feeding apparatus including a fixed supporting structure carrying a sheet receiving tray or table in combination with means for mounting the tray on the supporting structure in either a fixed position or for limited pivotal movement relative to the supporting structure.

Another object is to provide a sheet feeding assembly including means for movably mounting a sheet receiving tray to provide means for automatically compensating for differences in sheet feeding forces to insure proper rectilinear feeding of each sheet from a stack thereof.

Another object is to provide a sheet feeding assembly including new and improved means for controlling and effecting conjoint movement of sheet edge guides or rails and sheet separator means.

A further object is to provide a sheet feeding apparatus including coupled rack elements for maintaining proper spacing between sheet guiding and separating means when the apparatus is conditioned for use with different types and sizes of sheets.

In accordance with these and many other objects, a feed tray and separator assembly or apparatus embodying the present invention comprises a feed table having downwardly flanged opposite side edges. A pair of side rails or edge guides are movably mounted on the upper surface of the table and are connected to each other for conjoint movement by two rack elements. The rack elements are slidably mounted beneath the surface of the table and are connected to the side rails by means extending through spaced and transversely extending slots in the table. Toothed portions on the two rack elements mesh with a common pinion gear movably mounted beneath the surface of the table so that any adjustment of one of the side guide rails produces a corresponding movement of the other side rail.

To provide means for separating successive top sheets from a stack disposed between the side rails, a pair of

sheet separator assemblies are provided comprising a pair of arms which are individually pivoted at their rear ends on a rod extending between the flanged sides of the table. The forwardly extending portion of each arm underlies the forward portion of the table, and the forward portion of each of the arms includes a vertically extending portion providing a front stop adapted to be disposed in front of and in engagement with the leading edges of the sheets in the stack. One end of each of the front stops is provided with a rearwardly projecting or offset portion that is adapted to rest on the front corner of the top sheet. The uppermost sheet is fed from the tray by one or pair of resilient driver rollers or wheels movably mounted on either a cover for the assembly or the structure to which the sheets are to be fed. These rollers are intermittently actuated to pull the top sheet free from the separators and to feed the separated sheet into the utilizing apparatus. A crank mounted between the side walls of the table is manually actuated to lift the separator arms when a stack of sheets is to be inserted into the assembly.

To provide means for insuring feeding of the sheets from the stack without skewing, the sheet feeding and separating assembly includes a supporting structure adapted to be secured to the main apparatus in a fixed position. This fixed supporting structure and the table or tray include cooperating structures that are effective in a first setting of a control assembly to mount the tray on the fixed supporting structure for limited pivotal movement about an axis which extends generally parallel to the direction of movement of the sheet and which is disposed generally along the center line of the stack. It has been found that if the supporting table or tray is rendered freely tiltable in relation to the plane formed at the points of contact of the feeder wheels with the uppermost sheet in the stack, any skewed feeding of the sheets is eliminated. The amount of tilt imparted to the pivotally mounted supporting table or platform is dependent on and compensates for a difference in the forward driving forces developed between the two feeder wheels and the uppermost sheet in the stack. This adjustment removes or substantially reduces the criticality of the adjustment of the side guides and the location of the feeder wheels and makes the condition of the surface of the feeder wheels much less critical. In devices constructed in accordance with this invention, it has been possible to automatically feed, without skew, sheet material whose basic weights range from a nine pound substance to a thirty-two pound card stock substance.

Many other objects and advantages of the present invention will become apparent from considering the following detailed description in conjunction with the drawings in which:

FIG. 1 is a perspective view of a sheet feeding and separating assembly embodying the present invention;

FIG. 2 is a bottom plan view of the assembly shown in FIG. 1;

FIG. 3 is a side sectional view showing the assembly in relation to a fixed supporting structure and sheet drive means;

FIG. 4 is a bottom plan view of a controllable assembly for coupling side rails and sheet separating elements included in the assembly;

FIG. 5 is an enlarged sectional view taken along line 5—5 in FIG. 4 illustrating the coupling assembly;

FIG. 6 is an enlarged elevational view in partial section looking from a sheet utilizing means toward the sheet feeding and separating assembly;

FIG. 7 is a sectional view taken along line 7—7 in FIG. 6 illustrating a mechanism by which the support table or tray is held in a fixed position or is rendered capable of limited pivotal movement; and

FIG. 8 is an enlarged sectional view taken along line 8—8 in FIG. 1.

Referring now more specifically to FIG. 1 of the drawings, therein is illustrated a sheet feeding and separating

assembly which embodies the present invention and which is indicated generally as 10. The assembly 10 includes a generally uniplanar table or tray 12 for supporting a stack 14 (FIG. 3) of sheets 16 which are to be individually fed in sequence to a utilization device, such as a reproducing or copying machine. The stack 14 of sheets 16 is disposed between a pair of side rails or edge guides 18 and 20 (FIG. 1) which are slidably mounted on the top surface of the table 12 and which are coupled for conjoint movement by a coupling assembly 22 including a pair of rack elements 24 and 26 slidably mounted adjacent the lower surface of the table 12. A pair of sheet separator means 28 and 30 slidably mounted on the table 12 and coupled to the rack elements 24 and 26 for conjoint movement therewith provide means for locating the front edge of the stack 14 on the assembly 10 and for permitting only the top sheet 16 to be removed from the stack 14 when a plurality of friction wheels or rollers 32 (FIGS. 3 and 6) are actuated.

To provide means for automatically compensating for unequal feeding forces tending to produce skewed feeding of the sheet 16 to the utilizing apparatus, the assembly 10 includes a fixed supporting structure indicated generally as 34 (FIGS. 1 and 3) which is detachably mounted in a fixed position between spaced frame elements 36 (FIGS. 3 and 6) of the utilizing apparatus. A control assembly indicated generally as 38 (FIG. 7) interconnects the table 12 and the fixed supporting structure 34 so that the table 12 can be mounted in either a fixed position on the structure 34 or for tilting or pivoting movement relative thereto. When the assembly 38 is in a setting permitting limited tilting or pivoting movement, unequal forces applied to the top sheet 16 in the stack 14 by the drive wheels 32 which would tend to result in skewed feeding of the sheet 16 are automatically compensated by tilting movement of the table 12 about an axis passing generally parallel to the direction of movement of the sheet 16 along the center line of the table 12.

Referring now more specifically to the construction of the table 12, this table comprises a generally uniplanar top surface having a transverse dimension sufficiently wide to accept sheets 16 of all of the sizes to be fed by the assembly 10. The opposite side edges of the table 12 are provided with depending portions or side walls 12a (FIGS. 1 and 2) and 12b (FIG. 2). A short depending wall or lip 12c is provided at the rear edge of the table 12, and this wall is provided with an elongated slot or opening 40 in which an extensible leaf or table 42 is slidably mounted to extend the longitudinal dimension of the table 12 to accommodate sheets of greater length than can be supported on the table 12. The upper surface of the extension leaf 42 is held in sliding engagement with the lower surface of the table 12 by a resiliently biased washer 44 (FIG. 3) carried on a stud or collar 46 which is secured to the lower surface of the table 12 and which passes through an elongated slot 48 in the extension leaf 42.

The side rails 18 and 20 guide and confine the edges of the sheet 16 in the stack 14 and are slidably mounted on the upper surface of the table 12. Each of the side rails 18 and 20 is generally L-shaped in configuration and includes a horizontally extending portion 18a, 20a engaging the upper surface of the table 12 and having a friction pad 50 at its forward end. These two side rails are coupled for conjoint or simultaneous movement by the assembly 22. To accomplish this, the table 12 includes two struck-out portions defining a pair of slots 52 and 54 (FIG. 1). The portions of the table 12 displaced below the plane of the table 12 are separated to define a pair of slides or ways 56 (FIGS. 1 and 8) on which the rack elements 24 and 26 are slidably supported beneath the surface of the table 12. A pair of L-shaped elements 58 each includes a horizontally extending leg secured to one of the two racks 24 and 26 and a vertically extending leg welded or otherwise secured to the up-

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standing wall of one of the side rails 18 and 20. Thus, the racks 24 and 26 are each rigidly secured to one of the side rails 18 and 20.

To provide means for coupling the two rack elements 24 and 26 so that movement of one of these racks or one of the connected rails 18 and 20 produces a corresponding movement of the other rack and rail, the assembly 22 includes a gear element or pinion 60 (FIGS. 4 and 5) that meshes with the inwardly facing teeth on the rack elements 24 and 26. The gear element 60 is secured to a shaft 62 which is mounted for rotary and translatory movement in an aperture in the plate 12 and an aperture in a hemispherical protuberance 64a on a housing 64 that is bolted to the lower surface of the table 12. The lower end of the shaft 62 is provided with a retaining ring 66, and a compression spring 68 is interposed between the inner wall of the hemispherical portion 64a and a shoulder on the shaft 62 to normally bias the shaft 62 and the connected gear 60 to an upper position in which the teeth on the gear element 60 mesh with the teeth on the rack elements 24 and 26. Whenever one of the side rails 18 or 20 is adjusted transverse to the direction of movement of a sheet 16, the gear 60 transmits corresponding movement between the racks 24 and 26 so that conjoint movement of the side rails 18 and 20 takes place. As an example, if the edge guide 20 is moved to the left (FIG. 1) to produce a corresponding movement of the rack 24, the gear element 60 is rotated in a clockwise direction, viewed from the top, to produce right-hand directed movement of the rack 26 and the connected side rail 18.

Whenever it is desirable to adjust the relative positions of the rails 18 and 20, an enlarged button portion 62a on the shaft 62 is manually depressed to lower the shaft 62 and to move the gear element 60 to the position shown in dashed outline in FIG. 5. This moves the gear element 60 out of a meshed relation with the teeth on the racks 24 and 26 and permits these two racks and the connected side rails 18 and 20 to be adjusted to positions independently of each other. When the button portion 62a of the shaft 62 is released, the compression spring 68 moves this shaft and the gear element 60 upwardly into a meshed relation with the toothed portions on the racks 24 and 26. Thereafter, movement of either of the rails 18 and 20 produces a corresponding movement of the other side rail.

Each of the sheet separator assemblies 28 and 30, which locate the front edge of the stack 14 and which permit only the top sheet 16 to be removed from the stack 14, comprises a separator arm 70 having an elongated rearwardly extending portion connected to the bight of a U-shaped bracket 72. The two legs of each of the U-shaped brackets 72 are apertured to slidably receive a rod 74 which is secured between the side walls 12a and 12b of the table in a position beneath the lower surface of this table. The forward edge of each of the arms 70 includes a vertically extending stop portion 70a terminating in a rearwardly extending and somewhat triangular portion or lip 70b (FIG. 1) which rests on the upper surface of the top sheet 16 in the stack 14 adjacent the corner thereof. When a stack 14 is not disposed in the assembly 10, the triangular portion 70b rests on the forward portions of the lower walls 18a and 20a of the side rails 18 and 20.

When a stack 14 is to be inserted between the side rails 18 and 20, it is desirable to elevate the separator assemblies 28 and 30. To accomplish this, a somewhat eccentrically formed rod or crank 78 is pivotally mounted between the side walls 12a and 12b and is provided with a retaining collar 80 at one end and with a handle portion carrying a knob 82 at the other end. By depressing the knob 82, the rod 78 is pivoted in a clockwise direction (FIG. 3) so that it moves into engagement with the rearwardly extending portions of the arms 70 in the assemblies 28 and 30. Continuing movement of the crank 78 pivots

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the two arms 70 in a clockwise direction about the rod or shaft 74 to raise the front stop portions 70a and the separator lips 70b. The stack 14 of sheets 16 can then be inserted between the side rails 18 and 20 and advanced to a position in which its front edge engages the front stop portions 70a, as illustrated in FIG. 3. In this position, the separator lips 70b overlie the front corners of the sheet 16 in the stack. When the knob 82 is released or moved in a clockwise direction (FIG. 1), the rod 78 moves in a counterclockwise direction (FIG. 3) to permit the arms 70 in the assemblies 28 and 30 to drop until the lips 70b rest on the top sheet 16 in the stack 14. An L-shaped bracket 81 (FIGS. 2 and 6) is secured to a lower surface of the arm 70 in the assembly 30 to provide a stop for limiting movement of the crank 78 in the direction which elevates the separator assemblies 28 and 30.

It is desirable to provide concurrent adjustment of the separator assemblies 28 and 30 and the side rails 18 and 20 to maintain these components in proper relative positions for feeding the sheets 16. To accomplish this, each of the rack elements 24 and 26 is secured to a horizontally extending leg of a somewhat S-shaped bracket 84 (FIG. 8) by a pair of headed fasteners 86, a compression spring 88 being interposed between the head of each of the fasteners 86 and the adjacent surface of the horizontally extending leg of the bracket 84. The vertically extending leg and the other horizontally extending leg of each of the brackets 84 are disposed between the legs of one of the U-shaped brackets 72. Thus, whenever the racks are adjusted by movement of one or the other of the side rails 18 and 20, the brackets 84 are engaged by the U-shaped brackets 72 and slide the separator arms 70 along the rod 74 to corresponding positions. In this manner, the position of each of the separator assemblies 28 and 30 relative to one of the side rails 18 and 20 is positively maintained without requiring the provision of coupling structures adjacent the forward ends of the side rails 18 and 20.

As indicated above, the sheet feeding and separating assembly 10 is mounted on the frame elements 36 of the copying or other sheet utilizing apparatus by means of the supporting structure 34. This structure includes a transversely extending, rigid structure or member 92 (FIG. 2) disposed immediately beneath the forward portion of the table 12. The transverse member 92 includes opposite depending side walls 92a in which are formed a pair of notches or recesses 94 and 96. When the assembly 10 is to be mounted on the utilizing apparatus, the forward end of this assembly is inserted between the two laterally spaced frame elements 36 (FIG. 6), each of which carries two spaced studs or pins 98 and 100. The assembly 10 is inserted so that the two studs 98 are received in the two recesses 94, and the assembly is then pivoted downwardly so that the two studs 100 are received in the recesses 96. This rigidly but detachably connects the supporting structure 34 for the assembly 10 on the frame elements 36 of the copy utilizing means with the forward portion of the table 12 disposed beneath the rollers 32. Suitable means (not shown) are provided in the copy utilizing means for moving the rollers 32 into and out of engagement with a stack 14 carried on the table 12.

The rigid supporting structure 34, in addition to the transversely extending structure 92, also includes a rearwardly extending structure 102 disposed substantially along the longitudinal center line of the table 12. The rear end of the structure 102 includes a knife edge or pivot defining structure 102a projecting upwardly from a flange on the structure 102 to bear against the lower end of the collar 46 secured to the lower surface of the table 12. A threaded fastener 104 loosely connects the structure 102 to the collar 46 to prevent separation of the table 12 and the structure 102. The upper forward end of the structure 102 is rigidly secured to the lower surface of the transversely extending structure 92 (FIG. 7), as by spot welding. The supporting structure 34 and the table 12 are

loosely connected together at their forward ends by a bolt or machine screw 106 (FIG. 7) which is carried on the table 12 and which carries at its lower end a nut 108 whose upper surface bears against the lower surface of a flange on the structure 102. The forward portion of the structure 102 provides a support for the control assembly 38.

As indicated above, the control assembly or linkage 38 is operable to two alternate conditions or settings in which the table 12 is either firmly or rigidly mounted on the supporting structure 34 or is pivotally mounted thereon. The control assembly 38 includes an eccentrically formed lever 110 which is pivotally mounted on the structure 102 by a threaded fastener 112 with a sleeve 114 (FIG. 6) interposed between the lever 110 and the adjacent portion of the supporting structure 102. When the lever 110 is moved to the setting shown in dashed line in FIG. 7, the table 12 is lowered so that its bottom surface rests on and is supported by the upper surface of the structure 92 throughout the entire transverse dimension of the forward portion of the table. In this position, the table 12 is held against pivoting or tilting movement.

When the lever 110 is pivoted in a counterclockwise direction about the machine screw 112 from the position shown in dashed line to the position shown in solid line in FIG. 7, a nose or rounded portion 110a on the lever 110 cams into engagement with the lower surface of the table 12 and lifts this table from the transverse supporting structure 92. The table 12 is now supported at its forward end by engagement with the nose 110a and at its rear end by engagement with the knife structure 102a. Since the knife edge 102a and the nose portion 110a provide fulcrum points lying generally along the center line of the table 12, the table can be tipped or pivoted in clockwise and counterclockwise directions to the different positions shown in dashed outline (FIG. 6) to compensate for unequal forces applied to the sheets 16 in the stack 14 by the sheet feeding rollers 32. This tipping movement compensates for unequal sheet feeding forces and insures that the individual sheets 16 stripped from the top of the stack 14 are fed through a sheet conveying throat or guideway 120 (FIG. 3) on the copy utilizing machine without skewing.

To facilitate the compensation of any unequal sheet feeding forces, a rod 122 (FIGS. 2 and 3) is mounted between the side walls 12a and 12b toward the rear of the table 12. The rod 122 slidably supports a weight 124 in which a thumb screw 126 is threaded. By adjusting the weight 124 to different transverse positions with the control linkage or assembly 38 in a position in which the table 12 is pivotally mounted on the supporting structure 34, an unbalancing force can be provided which tends to tip the table 12 in one direction or another about its axis. This tipping compensates for differences in feeding forces developed by the two drive rollers 32 which are disposed on opposite sides of the center line of the table 12 or on opposite sides of the pivotal axis of this table, which axis extends generally parallel to the direction of movement of the sheets 16 along the center line. When the weight 124 has been disposed in a suitable position, it is secured in this position by tightening the thumb screw 126.

When the assembly 10 is to be placed in use, the assembly is inserted between the frame elements 36 on the sheet utilizing device, such as a copying machine, so that the studs 98 and 100 are received within the slots 94 and 96. Suitable means (not shown) on the machine are actuated to lift the driver rollers 32 to a position spaced above the table 12. By depressing the enlarged portion 62a on the shaft 62, the side rails or edge guides 18 and 20 can be adjusted to proper positions relative to each other to correct any possible lack of symmetry of these members relative to the center line of the table 12. When the shaft 62 is released, the gear element 60 couples the

rack elements 24 and 26, and the side rails 18 and 20 can then be adjusted to positions spaced to receive the stack 14 of sheets 16 to be fed. The knob or handle 82 is then depressed (FIG. 1) to pivot the crank 78 in a clockwise direction (FIG. 3) to elevate the arms 70 in the two separator assemblies 28 and 30. This permits the stack 14 of sheets 16 to be advanced along the top of the table 12 until the leading edge of the sheets engages the front stop portions 70a on the two arms 70. When the handle 82 is then released, the rearwardly projecting separator lips 70b in the two assemblies 28 and 30 drop to engage the top sheet 16 in the stack 14. The driver rollers 32 are then lowered into engagement with the top sheet 16 of the stack 14, and the assembly 38 is actuated by pivoting the lever 110 to the position shown in FIG. 7 in which the table 12 is mounted for limited pivoting or tilted movement about an axis extending generally along the center line of the table 12.

When the rollers 32 are rotated to feed a sheet 16 from the stack, the leading edge of the stack is slightly buckled to permit the corners to clear the separator lips 70b, and the sheet is then propelled forwardly through the entrance throat or guideway 120 into the machine. If the speed at which the copy sheet 16 is advanced by the two rollers 32 tends to be different, the table 12 is tipped in either direction about its pivotal axis so that essentially equal driving forces are applied to the sheet to prevent skewing thereof during its discharge into the entrance guideway 120. If it is desirable to mount the assembly 10 in a fixed position on the rigid supporting structure 34, as when sheets are deliberately to be fed to the apparatus from an off-center position on the table 12, the assembly linkage 38 is adjusted so that the lever 110 moves to the position shown in dashed line in FIG. 7, and the table 12 rests on and is supported throughout its entire transverse length by the rigid supporting structure 92. In this position, the table 12 is not capable of tipping or pivotal movement.

Although the present invention has been described with reference to a single embodiment, it should be understood that numerous other modifications and embodiments can be devised by those skilled in the art that will fall within the spirit and scope of the principles of this invention.

What is claimed and desired to be secured by Letters Patent of the United States is:

1. An assembly for supporting a stack of sheets adapted to be individually fed in a given direction from the top of the stack comprising sheet feed means, a supporting structure mounted in a fixed position relative to the feed means, a sheet receiving means for receiving a stack of sheets and for mounting the stack with the uppermost sheet disposed beneath and engaging the feed means, said sheet feed means including a pair of feed members engageable with the top of the stack at spaced regions along a line transverse to the direction of movement of the sheets, and structure interposed between the sheet receiving means and the supporting structure for mounting said sheet receiving means for limited pivotal movement about an axis between said regions and extending generally parallel to the direction of movement of the sheets, said sheet receiving member being pivotally moveable in response to unequal sheet feeding forces applied by said feed members, thereby to equalize said forces and to prevent feeding of sheets in a skewed position.

2. An assembly for supporting a stack of sheets adapted to be individually fed in a given direction from the top of the stack comprising feed means, a supporting structure mounted in a fixed position relative to the feed means, a sheet receiving means for receiving a stack of sheets and for mounting the stack with the uppermost sheet disposed beneath the feed means, said supporting structure including at least two portions spaced from each other along a line parallel to the direction of movement of the sheet and underlying the sheet receiving means,

said sheet feed means including a pair of feed members engageable with the top of the stack at spaced regions opposite sides of said line, and means at said two spaced portions engaging the sheet receiving means and providing pivotal supports for the sheet receiving means to provide limited pivotal movement of the sheet receiving means relative to the supporting structure about an axis defined by said line, said sheet receiving member being pivotably moveable in response to unequal sheet feeding forces applied by said feed members, thereby to equalize said forces and to prevent feeding of sheets in a skewed position.

3. An assembly for supporting a stack of sheets adapted to be fed from the stack in a given direction by driven means comprising a supporting structure mounted in a fixed position, said supporting structure including structural means extending generally transverse to the direction of movement of the sheets, a sheet receiving tray for receiving a stack of sheets, and adjustable means interconnecting the tray and the supporting structure, said adjustable means being operable to a first setting fixedly to mount the tray in a horizontal position relative to the direction of sheet movement by resting the tray on the structural means, said adjustable means also being operable to a second setting to lift the tray off of the structural means to mount the tray free for pivotal movement about an axis extending generally parallel to the direction of movement of the sheets.

4. An assembly for supporting a stack of sheets adapted to be fed from the stack in a given direction by driven feed means comprising a supporting structure mounted in a fixed position and including both a first part extending transverse to the direction of movement of the sheets and a second part extending rearwardly from the first part, a sheet receiving tray disposed above the supporting structure, fixed pivot means connecting the tray and the second part for pivotal movement, and adjustable pivot means adjustable to one setting to rest the tray on the first part to mount the tray in a fixed horizontal position relative to the direction of sheet movement and adjustable to a second setting to lift the tray off of the first part so that the tray can freely pivot about an axis formed by the fixed pivot means and the adjustable pivot means.

5. An assembly for feeding individual sheets from a stack by movement in a given direction comprising a supporting structure mounted in a fixed position, a sheet supporting tray overlying the supporting structure and adapted to receive a stack of sheets, and an adjustable linkage interconnecting the tray and the supporting structure, said adjustable linkage including a pivotally mounted member adjustable to a first setting in which the tray is supported on the supporting structure at generally aligned points that are spaced from each other in the direction of movement of the sheets and are disposed generally midway along the transverse dimension of the tray to permit the tray freely to pivot about an axis that is generally parallel to the direction of movement of the sheets, said member being pivoted into engagement with the tray at one of said points to lift the tray and provide a fulcrum about which the tray pivots, said pivotally mounted member being pivoted to a second setting in which the tray is lowered to engage the supporting structure at two points disposed on opposite sides of the axis to mount the tray in a fixed position.

6. An assembly for feeding individual sheets in a given direction from a stack thereof comprising a generally uniplanar stack supporting tray, a pair of rack elements slidably mounted on the tray and coupled with each other, a pair of side rails each secured to one of the rack elements, a pair of movably mounted sheet separator means each having a projecting portion adapted to rest on the upper sheet in the stack adjacent the leading edge considered in the given direction of movement, and means coupling each of the sheet separators to one of the rack elements for movement therewith so that adjustment of

one side rail is effective through the coupled rack elements to produce a corresponding adjustment of the other side rail and both of the sheet separator elements.

7. The assembly set forth in claim 6 in which the two rack elements are coupled by a common toothed element and including manually operable means for moving the toothed element into and out of a coupled engagement with the rack elements.

8. An assembly for feeding individual sheets in a given direction from a stack thereof comprising a stack receiving tray having a pair of slots, each of said slots extending extending transverse to the direction of movement of the sheets and only partially across the transverse dimension of the tray, a pair of side rails movably mounted on an upper surface of the tray opposite each other, said side rail means being elongated in the direction of movement of the sheets, a pair of rack elements coupled together and slidably mounted on a lower surface of the tray, each of said rack elements being connected to one of the side rail means through one of the slots, a pair of pivotally mounted sheet separator means each including a generally vertically extending front stop portion adapted to be disposed in front of the leading edges of the sheets in the stack and an offset portion adapted to rest on the top of the stack, each of the sheet separator means including a rearwardly extending portion, means coupling the rearwardly extending portion of each of the sheet separator means to one of the rack elements, a fixed supporting structure, and means mounting the tray on the supporting structure for pivotal movement about an axis extending generally parallel to the direction of movement of the sheets.

9. An assembly for feeding individual sheets in a given direction from a stack thereof comprising a stack receiving tray having a pair of slots, each of said slots extending transverse to the direction of movement of the sheets and only partially across the transverse dimension of the tray, a pair of side rail means movably mounted on an upper surface of the tray opposite each other, said side rail means being elongated in the direction of movement of the sheets, a pair of rack elements coupled together and slidably mounted on a lower surface of the tray, each of said rack elements being connected to one of the side rail means through one of the slots, a pair of pivotally mounted sheet separator means each including a generally vertically extending front stop portion adapted to be disposed in front of the leading edges of the sheets in the stack and an offset portion adapted to rest on the top of the stack, each of the sheet separator means including a rearwardly extending portion having an apertured portion, a rod mounted on the tray and both slidably and pivotally receiving the apertured portions of the sheet separator means to pivotally and movably mount the sheet separator means on the tray, and coupling means carried on each of the rack elements and engaging the rearwardly extending portions of the sheet separator means to couple the rack elements to the sheet separator means for conjoint movement.

10. The assembly set forth in claim 9 in which the apertured portions include a generally U-shaped structure and in which each coupling means includes an element received within the bight of the U-shaped structure.

11. An assembly for supporting a stack of sheets to be fed from the stack in a given direction to a sheet receiving means comprising a supporting structure mounted in a fixed position, a sheet receiving tray for receiving a stack of sheets, mounting means interconnecting the supporting structure and the tray to mount the tray for pivotal movement about an axis extending in said given direction, spaced sheet feeding means for engaging and feeding the uppermost sheet in said given direction, said mounting means being responsive to the unbalanced feeding of sheets to the receiving

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means to permit the tray to pivot about the axis to a position in which the sheets are fed in a straight line to the receiving means, and stop structures for limiting the pivotal movement of the tray to a predetermined range.

12. The assembly set forth in claim 11 including a weight carried on the tray and adjustable to different spaced positions in a direction transverse to the direction of movement of the sheets.

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