May 5, 1970 L. BENTZMAN 3,510,124

COPY MACHINE FEED TABLE

Filed March 18, 1968 2 Sheets-Sheet 1

FIG. 5

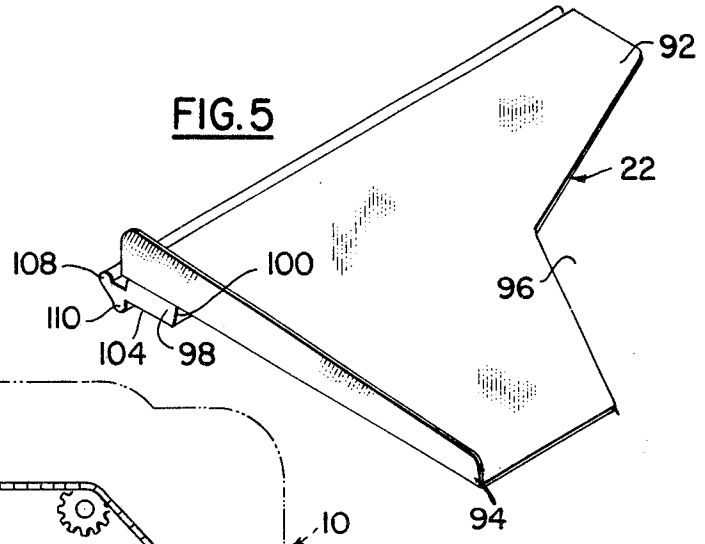


FIG. 7

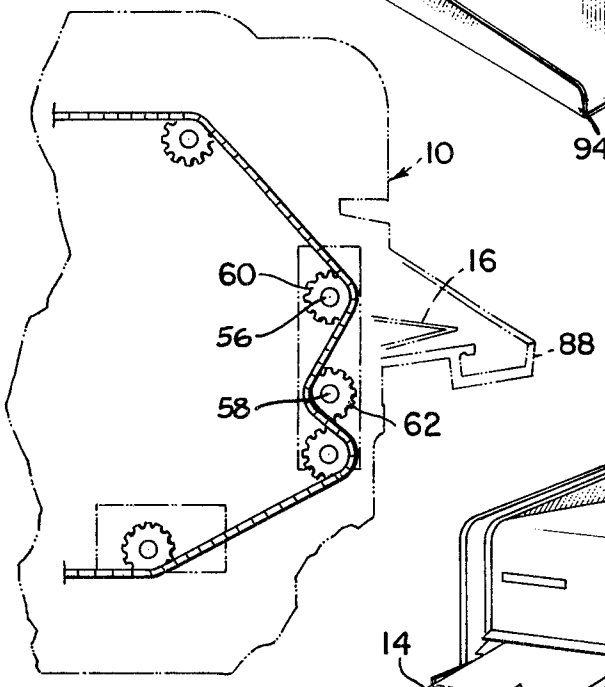


FIG. 1

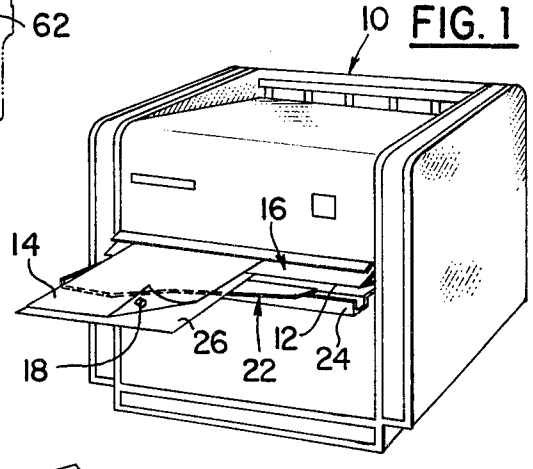
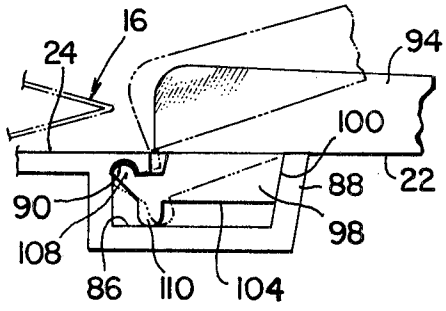


FIG. 6



INVENTOR.
LOUIS BENTZMAN
BY Karl L. Spivak
ATTORNEY

May 5, 1970 L. BENTZMAN 3,510,124

COPY MACHINE FEED TABLE

Filed March 18, 1968 2 Sheets-Sheet 2

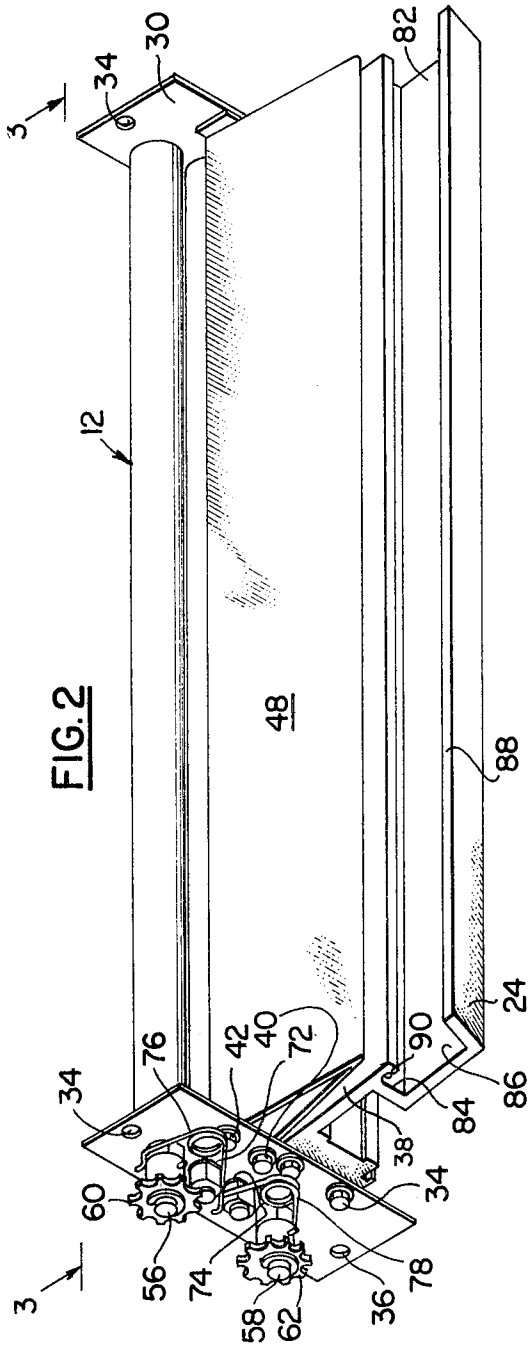


FIG. 2

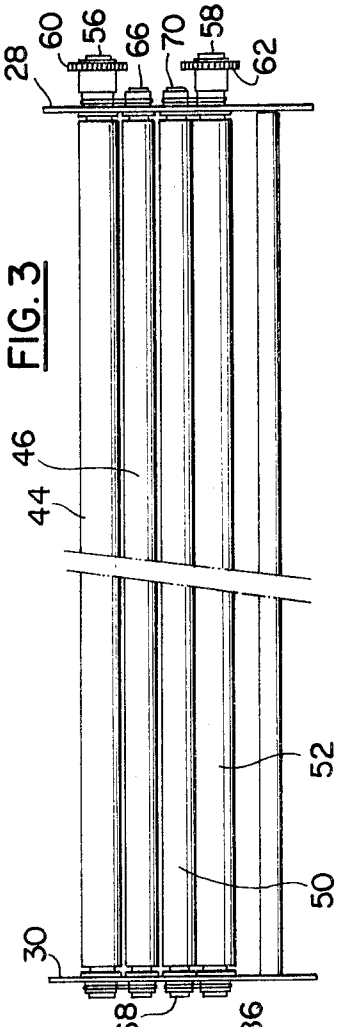


FIG. 3

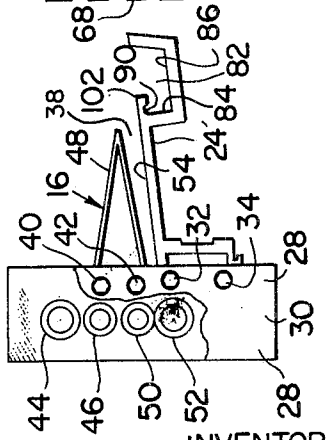


FIG. 4

INVENTOR
LOUIS BENTZMAN
BY Karl L. Spivak
ATTORNEY

United States Patent Office 3,510,124
Patented May 5, 1970

3,510,124

COPY MACHINE FEED TABLE

Louis Bentzman, Philadelphia, Pa., assignor to Electrocopy Corporation, Philadelphia, Pa., a corporation of Pennsylvania

Filed Mar. 18, 1968, Ser. No. 718,299
Int. Cl. B65h 1/04
U.S. Cl. 271—8 13 Claims

ABSTRACT OF THE DISCLOSURE

A feed table for use in an electrostatic photo copy machine incorporating a stationary table affixed to the machine below a protruding paper separator and a paper guide removably connected to the front of the fixed table in a readily laterally adjustable and separable transverse connection.

The present invention relates in general to the broad field of office copying machines and is more particularly directed to a novel paper feed system and mechanism for use in conjunction with such office copying equipment.

In the electrostatic method of reproducing or copying printed or written matter contained upon a sheet of paper, the original sheet and a surface treated transfer sheet must be fed into the copy machine. Most presently known machines are equipped with lens systems or reflecting systems and sometimes both to project an image of the original being copied upon the previously charged surface of the transfer sheet. By utilizing the principles of electrostatic reproduction, an electrostatic image of the original may be formed upon the charged surface of the transfer sheet. The transfer sheet is then introduced into a toner bath, wherein the toner particles adhere to the surface of the transfer sheet in proportion to the retained electrostatic charge to produce a visible toned image.

Accordingly in the electrostatic copying process, it is of utmost importance that means be provided whereby both the original sheet and the transfer sheet may be fed simultaneously and straightforwardly into the machine itself. Also, in view of the fact that paper of varying widths must be copied from time to time, it is necessary that electrostatic copying machines be provided with readily adjustable means to compensate for the size of the original sheet being introduced into the machine. Machines as presently employed for electrostatic copying purposes are more or less complicated in design at the paper entrance portions of the machine and complicated machinery including belts, gears, chains, and other constructions have been employed to assure that papers feed correctly into the internal working portions of the copying machine. Such constructions have generally performed satisfactorily, but the complicated design has resulted in increased machine costs and therefore in increased sales costs.

Prior art machines have also been plagued with trouble at the paper feed entrance channels in those instances where paper has been introduced incorrectly or wherein the paper itself is folded, curled or otherwise imperfect. Such imperfections often result in paper blockages in the paper feed channel. Prior art machines required extensive servicing and maintenance procedures in order to open the machine sufficiently to reach the blockage in the paper entrance channels, thereby creating operating and maintenance problems that could not be handled by the usual office personnel of the purchaser.

It is therefore, an object of the instant invention to provide an improved copy machine feed table of the type set forth.

It is a further object of the instant invention to provide a novel copy machine feed table incorporating a reduced

number of operating parts which thus function to reduce the probability of malfunction.

It is another object of this invention to provide a novel copy machine feed table designed and constructed especially for simple, easy operation, even by persons unskilled in the art of electrostatic copying.

It is a further object of this invention to provide a novel electrostatic machine feed table incorporating readily openable construction so that the interior rollers may be easily exposed in the event of a paper jam.

It is another object of the instant invention to provide a novel copy machine feed table capable of feeding paper absolutely straight into the machine interior, thereby eliminating the need for auxiliary paper straightening devices such as belts.

It is another object of the instant invention to provide a novel copy machine feed table including paper feed rollers designed for operation at constant uniform speed.

It is another object of the instant invention to provide a novel copy machine feed table wherein a movable section may be readily adjustable by simple operations to speedily center original sheets of various transverse dimensions for optimum copying results.

It is a further object of the instant invention to provide a novel elecrostatic copy machine feed table incorporating unique separating construction to direct the original and transfer sheet through respective separate channels.

It is another object of the instant invention to provide a copy machine feed table incorporating a novel paper guide removably connected to the front of the table and designed to provide easy lateral adjustments.

It is another object of this invention to provide a novel, electrostatic copy machine feed table that is simple in construction, inexpensive in manufacture and troublefree in operation.

Other objects and a fuller understanding of the invention will be had by referring to the following description and claims of a preferred embodiment thereof, taken in conjunction with the accompanying drawings, wherein like reference characters refer to similar parts throughout the several views and in which:

FIG. 1 is a front perspective view of photocopy machine incorporating a feed table in accordance with the instant invention.

FIG. 2 is a front perspective view of the fixed portion of the feed table.

FIG. 3 is a rear elevational view thereof showing the position of the feed rollers.

FIG. 4 is a side elevational view, partially broken away to expose interior construction.

FIG. 5 is a perspective view of the movable portion of the feed table.

FIG. 6 is a side elevational view showing the interlocking relation of the fixed and movable portions of the feed table.

FIG. 7 is a side elevational view showing the chain drive arrangement.

Although specific terms are used in the following description for the sake of clarity, these terms are intended to refer only to the particular structure of my invention selected for illustration in the drawings, and are not intended to define or limit the scope of the invention.

Referring now to the drawings, I show in FIG. 1 a photocopy machine **10** incorporating a copy machine feed table **12** in accordance with the instant invention. As indicated, the original sheet **14** feeds into the photocopy machine **10** on top of the separator **16** with the copy containing surface **18** facing downwardly. The transfer sheet **20** aligns with the original sheet **14** and feeds into the copy machine **10** below the separator **16** utilizing the movable guide **22** in conjunction with the fixed table **24**

for aligning purposes. As indicated, the coated surface **26** of the transfer sheet **20** faces upwardly as it feeds into the copy machine for cooperation with the original sheet in the usual electrostatic copy process.

Referring now to FIGS. 2, 3 and 4, it can be observed that the feed table **12** includes the fixed table **24** which extends forwardly to receive and cooperate with the movable guide **22**, as will hereinafter be more fully set forth. The fixed table **24** terminates rearwardly at the transversely spaced mounting brackets **28, 30** which are rigidly secured to the fixed table **24** by a plurality of mounting screws **32**. Each bracket **28, 30** is provided with top and bottom mounting holes **34, 36** for affixing to the structural members of the frame of the photocopy machine **10** using conventional fastening devices in well-known manner. In order then to remove the entire feed table assembly **10** from the copy machine **10**, all that is required is to remove the fastening devices **32** from the mounting holes **34, 36** and the entire assembly can then be readily disengaged from the structural members of the machine. In this manner, paper jams may be easily and simply cleared without major disassembly of operating parts and the expenditure of undue time and effort in this regard.

The paper separator **16** is substantially triangular in cross-sectional configuration and transversely mounts above the fixed table **24**, leaving a horizontal space **38** which serves as the transfer sheet intake opening. The separator **16** fixedly connects between the brackets **28, 30** through the use of mounting screws **40, 42**. It is thus seen that the brackets **28, 30**, the paper separator **16** and the fixed table **24** respectively rigidly join together to form a sturdy, functional, unitary, operating assembly for paper intake purposes.

The original sheet intake rollers **44, 46** journal within the brackets **28, 30** for rotative movement and are positioned with respect to the upper surface **48** of the separator **16** to nip the leading edge of the original sheet **14** when it feeds into the machine along the surface **48**. Similarly, the transfer sheet intake rollers **50, 52** journal between the brackets **28, 30** for rotative movement and are positioned with respect to the upper surface **54** of the fixed table **24** to positively nip the leading edge of the transfer sheet **20** when it feeds into the intake slot **38** along the upper surface **54** of the fixed table during the initial phases of the copying operation.

As best seen in FIGS. 2 and 7, the rollers **44** and **52** turn upon shafts with extended ends **56, 58** to which are pinned or otherwise connected the driving sprockets **60, 62**. The idler roller bearings **64, 66, 68** and **70** are substantially obround in external configuration and ride within the elongated slots **72** which are provided to allow limited vertical adjustment. The spring clips **76, 78** bias between the respective bearings of the original sheet intake rollers **44, 46** and the transfer sheet intake rollers **50, 52** and urge the idler rollers **46, 50** into horizontal rolling contact with the respective adjacent driving rollers **44** and **52**. It can thus be seen that when the driving chain **80** engages the driving sprockets **60, 62**, the driving rollers **44** and **52** are caused to turn at the same speed. The idler rollers **46** and **50** also turn at the same speed, inasmuch as they are urged into rolling engagement with the respective driving rollers **44** and **52** through the action of the spring clips **76, 78**. It is thus demonstrated that the single chain drive **80** serves to drive both the original sheet intake rollers **44, 46** and the transfer sheet intake rollers **50, 52** at the same rotative speed and therefore, the transfer sheet **20** and the original sheet **14** travel into the interior of the photocopy machine **10** at the exact same rate of speed.

As can be observed in FIGS. 2 and 4, the fixed table **24** extends outwardly from the front of the photocopy machine **10** and terminates forwardly in a horizontal, transverse, shallow through **82**. A vertical wall **84** rises at the rear of the trough **82** and connects with the trough floor **86** in a continuous transverse joint. The front **88** of the trough is defined by a wall **84** which radially extends at an angle of greater than ninety degrees from the trough floor **86** to provide for easy interlocking and lateral adjustment of the movable guide **22** as will hereinafter be more fully set forth. A transverse overhanging lip **108** overlies a portion of the rear of the trough **82** and defines the front of a downwardly facing, transverse, arcuate depression **90** which functions to engage and interact with the movable guide **22** as hereinafter more fully described.

Referring now to FIGS. 5 and 6, the movable guide **22** comprises a flat, paper holding surface **92** and terminates at one transverse edge thereof in a vertical ninety degree bend **94** which serves to align the original and transfer sheets **14, 20** as the papers first feed into the copy machine **10** above and below the separator **16**. The opposite transverse edge of the guide **22** is substantially cut away to provide a convenient paper holding area **96** to facilitate the paper guiding process. It can be seen that the original sheet and the transfer sheet feed to the rollers above and below the separator **16**, with the respective left edges aligned along the vertical guide **94**. Both papers can be conveniently grasped by the hand of the operator (not shown) in the open area **96** to thereby assure proper insertion of both sheets simultaneously into the copy machine. A transverse adjusting and locking bar **98** affixes to the underside of the rearward edge of the guide **22** in well-known manner, as by spot welding, and serves to lock the guide in any desired position within the trough **82** formed in the fixed table **24**. The locking bar **98** comprises a transverse length of solid material which preferably may be aluminum or steel and terminates forwardly in an inclined face **100** which radially extends from the bottom surface **104** of the bar **98** at an angle greater than ninety degrees to cooperate with the front **88** of the trough **82** as hereinafter more fully explained. The bar **98** terminates rearwardly in a transverse slot **106** which serves to reecive the lip **108** when the guide is in locked position, as indicated in full lines. The slot **106** terminates rearwardly in an upwardly extending, transverse, engaging nose **118** that is substantially semi-circular in cross-section and which functions to engage within the transverse depression **90** in interlocking relation. The bar **98** is spaced from the bottom **86** of the trough **82** by a transverse, depending foot **110** which also serves as a pivot about which the guide **22** may be pivotally raised to disengage both the nose **118** from the depression **90** and the inclined face **100** of the bar **98** from the inclined front wall **88** of the trough **82**.

As can best be seen in FIG. 6, the movable guide **22** readily engages with and disengages from the trough **82** of the fixed table **24** through the operation of the locking bar **98** within the trough construction. When the guide **22** is placed in horizontal position, the inclined guide front face **100** urges against the similarly inclined front **88** of the trough **82** and serves to lock the construction in place. In addition, the transverse guide nose **118** pivots about the foot **110** and removably engages the transverse overlying depression **90** formed at the rear of the trough **82**. It is thus seen that both the front and rear portions of the locking bar **98** serve to transversely lock the movable guide **22** in any desired transverse position. When it is necessary to transversely move the guide **22**, as when employing papers of varying widths, all that is required is to simply lift the front edge of the movable guide by hand, thereby radially rotating the guide with respect to the fixed table about the pivot foot **110**. In this manner, the similar radially inclined surfaces **100, 88** disengage without binding and the nose **118** swings clear of the depression **90** also without binding. With the locking bar **98** thus disengaged from the fixed table construction, it is easy to transversely relocate the movable guide with respect to the fixed table and then again lock it in position simply by rotating the movable guide downwardly about the pivot foot **110** until the surfaces **90, 118**, and **100, 88** are once again respectively engaged.

Although I have described my invention with a certain degree of particularity, it is understood that the present disclosure has been made only by way of example and that numerous changes in the details in construction and in the combination and arrangement of parts may be resorted to without departing from the spirit and scope of the invention.

I claim:

1. In a copy machine feed table for removable attachment to the structural members of an electrostatic copy machine, the combination of

(A) fixed table means,

(1) said fixed table means transversely terminating in spaced attaching means,

(a) said attaching means being removably affixed to the said structural members,

(2) said fixed table means terminating forwardly in guide receiving means;

(B) paper separating means affixed to the said attaching means,

(1) said paper separating means being spaced above the said fixed table means to define a first paper intake slot therebetween,

(2) said paper separating means defining a second paper intake slot between the top of said paper separating means and portions of the said copy machine;

(C) paper feed roller means roatively carried by the said attaching means,

(1) said paper feed roller means being located interiorly of the said paper separating means,

(2) said paper feed roller means including spaced pairs of rollers respectively aligned with said first and second paper intake slots;

(D) and movable paper guide means cooperating with said guide receiving means,

(1) said paper guide means having pivotal movement with respect to said guide receiving means and

(2) said paper guide means having transverse movement with respect to said guide receiving means.

2. The invention of claim 1 wherein the said guide receiving means include a transverse trough, said trough terminating forwardly in a wall inclined at an angle of greater than ninety degrees.

3. The invention of claim 1 wherein the said guide receiving means include a transverse trough, said trough terminating forwardly in a wall inclined at an angle of greater than ninety degrees, and said paper guide means including a transverse locking bar, said bar having pivotal engagement within the said trough.

4. The invention of claim 1 wherein the said guide receiving means include a transverse trough, said trough terminating forwardly in a wall inclined at an angle of greater than ninety degrees, and said paper guide means including a transverse locking bar, said bar having pivotal engagement within the said trough, and said locking bar having one edge thereof inclined at the same angle as the said inclined trough wall.

5. The invention of claim 1 wherein the said pairs of rollers each include a driving roller with end bearings rotatively journalled in the said attaching means, a driven roller with end bearings journalled in the said attaching means, said driven rollers having vertical adjustment with respect to the said driving rollers and means urging said respective driving and driven rollers into rotative engagement.

6. The invention of claim 1 wherein the said pairs of rollers each include a driving roller with end bearings rotatively journalled in the said attaching means, a driven roller with end bearings journalled in the said attaching means, said driven rollers having vertical adjustment with respect to the said driving rollers and means urging said respective driving and driven rollers into rotative engagement, said means comprising spring clips biasing said respective pairs of driving and driven rollers together at the bearings thereof.

7. The invention of claim 1 wherein the said guide receiving means include a transverse trough, said trough terminating forwardly in a wall inclined at an angle of greater than ninety degrees, said trough terminating rearwardly in an overlying, downwardly facing, transverse depression.

8. The invention of claim 1 wherein the said guide receiving means include a transverse trough, said trough terminating forwardly in a wall inclined at an angle of greater than ninety degrees, said trough terminating rearwardly in an overlying, downwardly facing, transverse depression, said paper guide means including a transverse locking bar having pivotal engagement within the said trough, said locking bar having one edge thereof inclined at the same angle as the said inclined trough wall, said locking bar terminating rearwardly in a transverse nose, said nose being pivotally engageable within the said transverse depression.

9. The invention of claim 1 wherein the said guide receiving means include a transverse trough, said trough terminating forwardly in a wall inclined at an angle of greater than ninety degrees, said trough terminating rearwardly in an overlying, downwardly facing, transverse depression, said paper guide means including a transverse locking bar having pivotal engagement within the said trough, said locking bar having one edge thereof inclined at the same angle as the said inclined trough wall, said locking bar terminating rearwardly in a transverse nose, said nose being pivotally engageable within the said transverse depression, and said locking bar being spaced from the bottom of the said trough by a transverse, depending foot.

10. The invention of claim 1 wherein the said pairs of rollers each include a driving roller with end bearings rotatively journalled in the said attaching means, a driven roller with end bearings journalled in the said attaching means, said driven rollers having vertical adjustment with respect to the said driving rollers and means urging said respective driving and driven rollers into rotative engagement, said means comprising spring clips biasing said respective pairs of driving and driven rollers together at the bearings thereof, and drive means capable of rotating all driving and driven rollers at the some rotative speed.

11. In a copy machine feed table for removable attachment to the front of an electrostatic copy machine, the combination of

(A) fixed table means,

(1) said fixed table means transversely terminating in spaced attaching means,

(a) said attaching means being removably affixed to the said electrostatic copy machine,

(2) said fixed table means terminating forwardly in guide receiving means;

(B) paper separating means affixed to the said attaching means,

(1) said paper separating means being spaced above the said fixed table means to define a first paper intake slot therebetween,

(2) said paper separating means defining a second paper intake slot between the top of said paper separating means and portions of the said electrostatic copy machine;

(C) movable paper guide means cooperating with the said guide receiving means,

(1) said paper guide means having transverse motion with respect to the said guide receiving means to accommodate papers of various widths, said paper guide means incorporating locking means to secure the paper guide means within the said guide receiving means,

(a) said locking means including wedging interaction between portions of the said paper guide means and said guide receiving means.

12. The invention of claim **11** wherein the said guide receiving means include a tranverse trough, the said trough terminating forwardly in a paper guide locking wall, said wall being inclined from the bottom of said trough at an angle greater than ninety degrees.

13. The invention of claim **11** wherein the said guide receiving means include a transverse trough, said trough terminating forwardly in a wall inclined at an angle of greater than ninety degrees with the bottom of said trough, said trough terminating rearwardly in an overlying, downwardly facing, transverse depression, said paper guide means including a transverse locking bar having pivotal engagement within the said trough, said locking bar having one edge thereof inclined at the same angle as the said inclined trough wall, said locking bar terminating

rearwardly in a transverse nose, said nose being pivotally engageable within the said transverse depression, and said locking bar being spaced from the bottom of the said trough by a transverse depending foot, whereby the said paper guide means may be transversely, adjustably, speedily locked and unlocked within the said guide receiving means.

References Cited

UNITED STATES PATENTS

2,558,046	6/1951	Geib	271—61 X
3,408,064	10/1968	Johnson	271—61

RICHARD A. SCHACHER, Primary Examiner

U.S. Cl. X.R.

271—51, 61