WEB CUTTING AND FEEDING APPARATUS

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ABSTRACT

Apparatus for cutting and feeding cut sheets of material from a continuous web to a remote processing station. A first set of feed rollers are arranged to advance the web at a predetermined rate under a cutting means and then into a second set of feed rollers. The second set of feed rollers, in turn, are arranged to forward the web material delivered therein at a rate slower than that of the first set of feed rollers so that a buckle is formed in the web between the cutting means and the second set of rollers. When a desired amount of material has been advanced past the cutting means, the first feed rollers are inactivated and, simultaneous therewith, the cutter activated to sever a sheet of material from the leading edge of the web. The severed sheet is forwarded to a subsequent processing station by the continually driven second feed rolls.

2 Claims, 9 Drawing Figures
WEB CUTTING AND FEEDING APPARATUS

This invention relates to a web cutting and feeding apparatus and, more particularly, to an apparatus which cuts individual sheets from a web while continuously feeding the leading edge of the sheet from the cutting station to a remote location.

When large quantities of sheet paper or the like are being used, it is often convenient to supply the paper in roll form and cut individual sheets from the roll as needed. Rolls of paper are particularly advantageous in high-speed copying systems in which individual sheets of paper must be fed to the copier system quickly and efficiently. Among the advantages of supplying paper in roll form is that the roll can be stored on a reel which takes up very little room, the continuous web of paper can be fed easily from the reel to the point where it is used, and the roll can be handled easily during replacement.

In copying systems where copy paper is supplied to the system in the form of a continuous web and used by the system in the form of individual sheets, it is necessary to cut the sheets from the web before feeding them into the copier. In addition to cutting the sheets to a desirable size, the movement of the sheet ordinarily must be timed correctly with respect to the copier system as it is fed to it in order that proper registration is maintained between the sheet and the image being placed on it.

In prior art systems individual sheets are cut from the web by first feeding the web to a cutting device where the web is stopped while cutting takes place and then feeding the cut sheet into the copier. The cutting action is usually not instantaneous and it is necessary to stop the web during cutting so that the paper is not torn or otherwise mutilated by the cutting device.

When the feeding of the web is stopped during the cutting step the movement of the web must be accurately timed twice in order to have the sheet reach the copier at a desirable time. The movement of the web is timed for the first feeding step and then timed again after the cutting operation is completed and it is fed to the copier. The timing of the movement of the web and sheet have been controlled by electrical signals at precisely the desirable moment with respect to the copier system.

A drawback to the cutting and feeding apparatus described above is that the feeding means does not maintain positive driving contact with the paper throughout both cutting and feeding operations. Without such continuous positive contact, the paper may slip relative to the feed rollers and throw off the timing. In addition, there is a chance that the paper will tear or otherwise be mutilated when the feeding means starts it on its way after cutting. A further disadvantage to such a system is that the electrical circuitry used to control the timing is generally an expensive part of the system.

The timing control in the present invention is mechanical in nature rather than electrical making it less expensive to build as well as more durable than the electrical system. The present invention also affords positive control over the sheet during the entire cutting and feeding operation since the leading edge of the web is not stopped during the cutting operation. In addition, the leading edge of the web is fed in an accurately timed relationship with the copier throughout the operation of the apparatus thereby making it more likely that the sheet will remain in registration with the copier at all times.

The present invention feeds a web of paper or the like from a roll through a cutting station and onto a remote location such as the transfer station in a copier. As the paper passes through the cutting station an individual sheet is cut from the leading portion of the web. Once the leading edge of the paper starts moving from the roll towards the copier it is fed without interruption in a timed relationship to the copier during the entire cutting and feeding operation.

Accordingly, it is an object of the invention to improve web feeding and cutting apparatus.

It is a further object of the invention to improve apparatus for cutting a continuous web material into individual sheets and feeding each sheet to a copier.

It is a further object of the invention to improve apparatus wherein the leading edge of the web material is fed without interruption while an individual sheet is being cut from the web material.

It is a further object of the invention to improve apparatus for cutting individual sheets to be used in a copier from a continuous web material by stopping only that portion of the web material that is going to be cut while the leading edge of the web material continues to move toward the copier during the cutting operation.

It is a further object of the invention to mechanically control the timing of the movement of the leading edge of a paper web relative to a copier in a web cutting and feeding apparatus which supplies the copier with paper sheets.

It is a further object of the invention to improve apparatus for web cutting and feeding by maintaining continuous driving contact between the feeding means and web during the cutting operation.

The present apparatus feeds web material from a roll to a cutting station where an individual sheet is cut from the web, and then, feeds the sheet to a remote location such as to a copier. The cutting station is located along a web guide between a first rotatable feed roller and a second rotatable feed roller.

In operation, the leading edge of the web is initially fed through the cutting station by the first feed roller and then is engaged by the second feed roller. Due to the fact that the second roller drives the web at a speed slower than the first roller, the portion of the web between the two rollers, after being engaged by the second roller, buckles because more web is fed into the cutting station by the first roller than fed out of the cutting station by the second roller.

The buckle in the web is located primarily in the vicinity of the cutting means. After the desirable length of web has been fed through the cutting station, the first feed roller is stopped and the cutting apparatus is activated to sever the leading portion of the web from the rest of the web material. During this time the second feed roller continues to feed the leading edge of the sheet out of the cutting station. After the first roller is stopped and before the sheet is severed from the web by the cutting apparatus the leading edge of the web can continue to be fed by the second roller from the excess of web in the buckle area between the two rollers whereby avoiding the possibility of tearing the web before the individual sheet is cut from it.

BRIEF DESCRIPTION OF THE DRAWINGS

For a better understanding of the invention as well as other objects and further features thereof, reference is had to the following detailed description to be used in conjunction with the accompanying drawings, wherein:

FIG. 1 is a schematic illustration of the invention.
FIG. 2 is a schematic illustration showing the apparatus just before the cutting means is activated.
FIG. 3 is a detailed side view of the feed rollers, cutting means and guide members in the invention.
FIG. 4 is a side view of the clutch activating arm and cam arrangement used to start and stop the first feed roller.
FIG. 5 is a top view of the apparatus which controls the time at which the first feed roller is started and stopped.
FIGS. 6a and 6b are schematic illustrations of the toggle latch mechanism which activates the cutting apparatus.
FIGS. 7a and 7b are schematic illustrations of the cam arrangement for controlling the toggle latch mechanism.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

The cutting and feeding apparatus described herein can operate by itself as a means to sever individual sheets from a web material or, in the alternative, can be employed as a component of a larger system wherein web material is cut into individual sheets before being fed into a copier system. Since the invention adapts itself very well to supply individual sheets to a copier system, it is described within this environment.
FIG. 1 shows the cutting and feeding apparatus in combination with a xerographic copying system. The copying system has a drum 60 with five stations arranged about its periphery which carry out the operational steps of the copying process. These stations include charging station 10, exposing station 20, developing station 30, transfer station 40, and cleaning station 50. Apparatus 70, which is located adjacent the transfer station and employs the present invention, is adapted to cut individual sheets from the web material and feed them to the transfer station.

An electrostatic image is formed on the surface of the drum by passing it through charging station 10 and exposing station 20. The drum is covered with a photoconductive material such as vitreous selenium, overlying a conductive material, which dissipates the charge in response to light. The charging station consists of any suitable means for placing a uniform charge on the drum such as a corona-charging device. At exposure station 20 a light pattern conforming to the image to be reproduced is projected onto the drum and causes selective charge dissipation on elemental areas of the drum thereby forming a latent electrostatic image on the drum.

After the formation of the latent electrostatic image on the drum, the drum passes through developing station 30. In the developing station a finely divided, pigmented resinous material such as toner which bears a charge is brought into contact with the drum and adheres to the drum surface in the configuration of the latent electrostatic image. Any suitable material can be used to develop the drum.

Following the development step, the drum passes through the transfer station 40 where the developed image is transferred from the drum surface onto sheet 44. Sheet 44 is fed to the transfer station in registration with the developed image by cutting and feeding apparatus 70 which is described in greater detail below. Transfer of the image to the sheet is accomplished by corona-charging device 42 which applies an electrostatic charge to the sheet having a polarity opposite to that on the toner particles.

After the developed image is transferred to the sheet, the sheet is separated from the drum by any suitable device such as puffer device 43 which severs the sheet from the drum by a jet of air. The sheet is then guided onto conveyor 90 by guides 84. Conveyor 90, driven in the direction shown by the arrow and supported by rollers 88 and 89, carries the sheet under fuser 85 which heats the toner particles and permanently bonds them to the sheet. After the toner image is fused to the sheet, the sheet is carried into tray 41 where it is retained. The final station shown in FIG. 1 is a cleaning station 50 at which any toner remaining on the drum surface is removed from the drum. After a new cycle. Any suitable cleaning means can be used to remove residue toner from the surface of the drum such as soft brush which sweeps the toner from the drum surface. The various stations mentioned above are only described functionally since any suitable apparatus can be used to carry out their respective functions.

The cutting and feeding apparatus is represented generally by reference number 70. A supply of sheet material, or web 71, is fed through the cutting and feeding mechanism where an individual sheet, such as sheet 44, is severed from the web 71, and fed onto transfer station 40 of the copier. The web 71 is stored on a rotatable reel 73 and fed from the reel towards and through cutting station 100 by a first feed roller 79, and, then, is fed by a second feed roller 78. The web, which can be any suitable material upon which the image can be transferred such as paper, plastic, etc., is supported by guide 77 while being driven by the feed rollers. Feed rollers 78 and food rollers 79 are arranged in such a manner as to allow each other in order that their motion is maintained between the rollers during feeding of the web. The web is first fed between blades 81 and 82 by rollers 79 and then is engaged by feed rollers 78. Feed rollers 78 feed the web into guide 70 which, in turn, guides the sheet that is severed by the action of the cutter to the transfer station 40.

Guide 74 has an outer support member 75 and an inner support member 76 which together guide the sheet to the transfer station.

The web is fed initially by rollers 79 and supported by guides 75 and 77 until it is engaged by feed rollers 78. Feed rollers 78 rotate at a slower speed than feed rollers 79, and, as a consequence, after the leading edge of the web has been engaged by rollers 78 the web begins to buckle or curl. The buckling action forces the portion of the web between the pairs of rollers away from guide 75 in the vicinity of rollers 78, the slower pair of rollers. The buckle in the web, which is shown in FIG. 2, allows the leading edge of the web to continue to be fed towards the transfer station by rollers 78 even after rollers 79 have been stopped. It also renders the portion of the web in the area of the cutting blades stationary so that the web can be severed in a sharp, clear, and accurate cut. By virtue of a control mechanism, such as the type which is described below in conjunction with FIGS. 3-7, the cutting means is activated and upper cutting blade 81 is dropped through the web after feed rollers 79 stop feeding. As the upper blade closes upon stationary cutting blade 82, the web is severed thereby defining the trailing edge of the sheet and the length of the sheet. As was mentioned above, the leading edge of the sheet continues to be fed towards the transfer station by rollers 78 as cutting takes place.

After a sheet has been severed from the web by the cutting means, it is fed completely through guide 74 and onto the drum 60 where the action of the corona device 42 causes the sheet to be electrostatically tacked to the drum surface. The distance that the web travels between rollers 78 and transfer device 42 should be less than the length of the sheet in order that the roller 78 maintains a driving relationship with the sheet until after the drum gains a driving relationship with the sheet. Otherwise, the sheet will get caught in the guide 74 without a driving means to convey it into contact with the drum.

Referring to FIG. 1, cutting blade 82 is maintained in a fixed position with its sharp edge just below the path of the web which is supported on guide 77. Upper cutting blade 81 is adapted to drop towards lower blade 82 when the cutting means is activated thereby bringing the two blades together in a cutting action. Control means, which are described in detail below, stop feed rollers 79 and then activate the upper blade of the cutting means so that it drops through the web to make a clean, sharp cut between the portion of the web to the left of the blades and the remaining web supply to the right of the blades.

FIGS. 3-7 show control devices for the cutting and feeding apparatus in detail. In FIG. 3, two feed rollers, such as rubber roller 109 on shaft 107 and rubber roller 136 on shaft 134 act to drive the web (not shown). Adjacent feed roller 109 and in contact with it is tension roller 110 which is free to rotate about shaft 108. The tension roller is held in intimate contact with feed roller 109, except when the web is being fed between rollers 109 and 110, by spring 111 which urges roller 110 towards roller 109. Guide 106 carries and supports the web between its supply reel (not shown) and the cutting station 100.

In similar fashion to feed roller 109, roller 136 has a tension roller, roller 137, which is freely supported on shaft 135. Shaft 135 is held by arm 138 which pivots about shaft 139 and urges the tension roller towards feed roller 136. Spring 141 forces arm 138 in the clockwise direction and is kept in tension as a result of stop 140. Tension roller 137 maintains contact with feed roller 136 only when the web is not being fed by roller 136. The purpose of tension 138, like tension roller 110, is to enable the feed rollers to feed the web through the drum in the correct direction.

Upper cutting blade 113 is supported for movement from the raised position into contact with fixed cutting blade 112. Cutting blade 113 is securely mounted on cutting blade arm 114 which, in turn, is freely rotatable about shaft 125. When arm 114 rotates in the clockwise direction cutting blade 113 is brought down onto and through the web.

The movement of arm 114 is controlled by toggle latch 115. Toggle latch 115 is activated by pusher 155 which is mounted on arm 154. (The movement of arm 154 is described in more detail in conjunction with FIGS. 4 and 5). Spring 124 urges
arm 114 in the clockwise direction and when arm 114 is allowed to rotate in the clockwise direction the spring 124 assures that the cutting blade 113 is dropped quickly through the web. Spring 118 assists the movement of latch member 116 when pusher 155 activates the latch mechanism. Spring 118 is secured to latch member 116 and pin 119, and slides in the elongated slot 121.

The action of toggle latch 115 can best be seen in FIGS. 6a and 6b which shows the position of the latch in the "standby" and "activated" conditions, respectively, of the cutting blade 113 (not shown) which is mounted on arm 114. In the standby condition, arm 114 is in its most extreme position in the counterclockwise direction and the upper cutting blade is maintained in a raised position where it is ready to be quickly dropped through the web. In the standby condition, members 116 and 117 assume a substantially parallel alignment relative to one another, and arm 154, which carries pusher 155, assumes a position in which the pusher does not contact any part of the toggle latch. Latch members 116 and 117 are joined by pin 123 which allows the two latch members to swing freely with one another. Pin 119 supports latch member 116, and pin 120 links latch member 117 to arm 114. While the upper blade is in the standby condition, toggle latch members 116 and 117 are maintained in substantially aligned position by virtue of stop 122 (extending behind member 116) which is part of latch 117 and upon which latch 116 rests. This stop prevents member 116 from moving any further in the counterclockwise direction than shown in the standby position shown in FIG. 6a.

When the upper blade is to be activated, a camming arrangement, which is explained below in conjunction with FIGS. 4 and 5, causes arm 154 to move in the clockwise direction so that pusher 155 strikes the toggle latch and forces it downward. This action, in turn, causes arm 114 to rotate in the clockwise direction thereby allowing the upper cutting blade to move downward and through the web to cut it. The activated condition of the upper blade illustrated in FIG. 6b shows the position of the toggle latch mechanism when arm 114 reaches its most extreme clockwise position. In this position the upper cutting blade makes intimate contact with the stationary cutting blade. As can also be seen from FIGS. 6a, 6b, the toggle latch assumes a V-like condition, the two latch members 116 and 117 moving counterclockwise and clockwise, respectively, to lessen the distance between pin 119 and pin 120.

As was mentioned above, spring 118 in FIG. 3 enables latch member 116 to move freely in the counterclockwise direction about pin 119. When the toggle latch is in the standby position latch member 116 actually rests against stop 122 in such a manner that members 116 and 117 are not precisely parallel; that is, the latch members are not in a "dead center" relationship, but are rather in the relationship that is just above the "dead center" position. As a consequence, the toggle latch is prevented from opening on its own without being activated by pusher 155. When pusher 155 activates the toggle latch it must first push the latch from its standby position through the "dead center" position and then into the V-like shaped shown in FIG. 6b. It is when the latch moves between its standby position and "dead center" position that spring 118 urges member 116 in the counterclockwise direction. Once the "dead center" position is obtained the pusher alone continues to force the toggle latch into the V-like shape to reach the activated condition.

Referring to FIG. 3, the cutting and feeding apparatus commences operation by roller 109, in combination with tension roller 110, feeding the web into cutting station 100 where it passes between cutting blade 112 and 113. Under normal operation of the cutting and feeding apparatus chute 126 assumes a stationary position in alignment with guide 106 so that the web is fed in a smooth continuous path between feed rollers 109 and 116. If it is desired to assure that the leading edge of the web is straight and free of any undesirable mutilation, the cutting means can be activated manually in conjunction with the revolution of chute 26 to cut off the leading edge of the web. When it is desirable not to feed the first cut sheet to the copier, such as when a new supply of web is placed in the apparatus and the operator of the copier wants to be certain that the leading edge of the first cut sheet and fed to the copier has a suitable leading edge, the cutting means can be operated manually to sever the leading portion of the web from the supply roll and purge that portion from the apparatus through chute 126. A manual activation of the cutting means can be activated by a means 133 which rotates chute 126 in the counterclockwise direction to place the chute in an orientation shown in the dotted lines. As the piston device is activated piston rod 131 moves to the left and frame 127 and chute 126 rotate in the counterclockwise direction thereby allowing the severed section of the web to fall from the chute due to gravity. Frame 127 is mounted on piston rod 131 through pin 132, and chute 126, in turn, is secured to the bottom of frame by pin 129.

During the ordinary operation of the apparatus, that is, when sheets are successively being cut from the web and fed to the transfer station of the copier, chute 126 maintains its position as shown in unbroken lines in FIG. 3. When a signal is received to feed a sheet to the copier, feed roller 109 is activated thereby feeding the web between feed rollers 110 and 116 and towards feed roller 136. At this time the positions of arm 114 and toggle latch 115 keep upper cutting blade 113 in the standby condition allowing the leading edge of the web to pass across chute 126 and between feed roller 136 and tension roller 135. The periphery of the feed roller 136 rotates at a speed that is slower than that of the feed roller 109. Thus, after the leading edge of the web has passed between feed roller 136 and tension roller 137 a buckle of excess web material occurs in the web in the vicinity of roller 136 as feeding continues. This buckle necessarily occurs although feed rollers are feeding at the same time because roller 109 feeds the web faster than roller 136.

Feeding by both rollers continues until enough web to make a sheet has been fed between the cutting blades. At this time roller 109 is stopped while feed roller 136 continues to rotate thereby allowing the leading portion of the web to continue towards the transfer station. Since there is an excess of web material between the two feed rollers in the form of the buckle, continued travel by the leading edge of the web is possible even though roller 109 has stopped. After roller 109 has stopped, pusher 155 activates the toggle latch causing the upper cutting blade 113 to fall across the web and sever the leading portion of the web from the web supply to make an individual sheet.

FIGS. 4 and 5 are schematic illustrations of the mechanism which controls the movement of feed roller 109 and pusher 155. In FIG. 5 frames 144 and 145 support the control mechanism. The movement of roller 109 (shown in FIG. 3) is controlled by clutch 146 which, in turn, is controlled by a clutch actuator pin which is operated by the movement of arm 147. The mechanism shown in FIG. 5 provides the cutting and feeding apparatus with the capability of cutting individual sheets in a number of different sizes. The length of the sheet being severed from the web depends on the location of follower 151 relative to the cams supported by shaft 156; that is, cams 158, 159, 160, 161 and 162. Cam 157 determines when the feed roller 107 commences feeding regardless of the length of the sheet. Depending upon how many cams follower 151 contacts, the length of sheet cut can be determined.

Cam follower 151, the position of which can be regulated along shaft 152 by a manual control (not shown) which is external to the apparatus but free to move along shaft 152 and can contact any number of cams, for instance, if the cam follower only contacts cams 157 and 158 one length of sheet will be cut whereas if it is in contact with cams 157, 158, and 159 a second length of sheet is cut and so on. The length of an individual sheet is ultimately controlled by the composite shape of the cams the follower 151 contacts.
Assuming that the movement of cam follower 151 is influenced by cams 157 and 158, as shown in FIG. 5, clutch 146 is activated as follows: referring to FIG. 4, when the cam follower 151 is positioned in the extreme clockwise position it contacts that portion of the periphery of the cam which is furthest removed from the center of rotation of the cam. In this position, clutch 146 (shown only in FIG. 5) is engaged and feed roller 109 rotates to feed the web through the cutting station. As the cam follower 151 is rotated clockwise from its extreme counterclockwise position by cam follower 151 is shaft 150 which moves the cam follower, one end of shaft 150 being connected through a portion of arm 148 (shown in FIG. 5). Arm 145 is mounted on frame 145 through pin 149, but is free to rotate about the pin. As shaft 150 is moved in the counterclockwise direction by follower 151, arm 148 rotates in the counterclockwise direction as viewed in FIG. 4. On one end of arm 148 there is attached clutch actuator pin 147, and as arm 148 rotates in the clockwise direction, actuator pin 147 causes the clutch to engage thereby starting feed roller 109 to rotate and feed the web through the cutting blades.

Shaft 152 is rotatably mounted in bushing 153 which, in turn, is mounted on frame 145. Shaft 152 is biased in the counterclockwise direction by spring (not shown) which keeps the follower arm in continuous contact with the cam. When the cam combination moves spring follower 151 in the clockwise direction, shaft 150 causes actuator pin 140 to disengage the clutch thereby stopping feed roller 109. Between the time actuator pin 147 engages the clutch and disengages the clutch the desired length of web is fed through the cutting blades.

The movement of arm 154 depends on the position of shaft 150 since shaft 150 is joined through arm 154. As can follower 151 rotates in the clockwise direction, arm 154 rotates in the clockwise direction causing pusher 155 to move in the clockwise direction also. When pusher 155 is so rotated its action, in combination with the toggle latch, causes arm 114 to move thereby dropping the upper cutting blade through the web. Then, when the follower 151 rotates in the counterclockwise direction arm 154 rotates in the counterclockwise direction thereby carrying pusher 155 with it. Cam follower 151, shown in FIGS. 4 and 5, is located so that it helps arm 154 rotate back into the standby position thereby providing clearance for cam follower 151 to slide axially along the rollers. A spring (not shown) biases the arm 114 in the standby position.

Referring to FIGS. 7a and 7b, there are two positions of follower 151 and cam 157 shown. In FIG. 7b the cam 151 is rotating clockwise and cam follower 151 moves in the clockwise direction passing through position A. It is at this position that the clutch is disengaged through the linkage described above. As the cam continues to rotate in the clockwise direction driving the follower, the follower reaches position B which is shown in FIG. 7a. At this time the roller 155 causes the toggle latch to release and the upper cutting blade to drop through the web. The delay between the time feed roller 109 is stopped and the time the upper cutting blade is activated is desirable to assure that the web has completely stopped before the cutting operation is carried out. This delay period is equivalent to the time it takes follower 151 to travel between points A and B on the cam.

The copier and feeding apparatus can be driven by a single power source. For instance, if a single motor (not shown) drives the main shaft of the machine, rotation of the drum as well as the operation of the mechanisms employed at the various stations arranged around the drum surface can be driven off the main shaft. This motor, through appropriate gear systems, can also drive the two feed rollers as well as the cam shaft in the cutting and feeding control mechanism. In addition, any suitable electrical control devices can be employed in the machine to assure that it operates in the manner described above.

Referring to FIG. 1, the leading edge of the sheet cut from the web should arrive at the transfer station at the same time that the leading edge of the image on the drum arrives at the transfer station so that the image is transferred to the sheet with proper registration. For this purpose any suitable control device can be used to start the rollers 79 feeding the leading edge of the web towards the transfer station at a predetermined period of time before the leading edge is to contact the drum at the transfer station. The leading edge of the web is fed by rollers 79 at a first speed until it makes contact with rollers 78 at which time rollers 78 then drive the leading edge of the web towards the transfer station at a slower second speed. The total amount of time taken to place the leading edge of the web at the transfer station then is the amount of time to feed it from the cutting blades to the rollers 78 plus the amount of time to feed it to the drum after rollers 78 have engaged it. This total amount of time should be equal to the time it takes the leading edge of the image to get to transfer station 40.

In order to travel smoothly from the cutting area to the transfer station, sheet 44 must be driven continuously between these points. If only one pair of feed rollers, such as feed rollers 78 in FIG. 1, are used between the cutting station and the transfer station, the distance the sheet travels between the rollers 78 and the transfer device 41 should be less than the length of the sheet. If, on the other hand, it was desirable to have a longer path of travel for sheet 44, more than one pair of feed rollers 78 could be placed along the path of the sheet between the cutting blades and transfer station to effect continuous, uniform feeding all the way to the transfer station.

In addition to the apparatus outlined above, many other modifications and/or additions to this invention will be readily apparent to those skilled in the art upon reading this disclosure, and these are intended to be encompassed within the invention disclosed and claimed herein.

What is claimed is:

1. In an apparatus for copying a document including a movable image-recording member, means to move the surface of the member at a predetermined speed, means to form a latent electrostatic image on the surface of the member, means to develop said electrostatic image with toner particles, a transfer station adjacent the member at which a sheet of support material is brought adjacent the surface of the member and the toner image thereon transferred to the sheet, means to feed a sheet adjacent the surface of the member said transfer station in registration with said toner image, and means to remove said sheet from said member after said toner is transferred to the sheet, an improved sheet-cutting feeding means comprising:
a. cutting means adapted to sever the sheet form said web;
b. first feeding means for forwarding the leading portion of said web past said cutting means so said transfer station at a first speed, said first feeding means being activated at a time relative to the formation of the latent image to enable the sheet to be placed adjacent the electrostatic drum in said transfer station in registration with the toner image thereon;
c. second feeding means adapted to feed a portion of said web between said cutting means and said transfer station at a second speed, the second speed being slower than said first speed whereby a buckle forms in said web between said cutting means and second feeding means and said web is being fed by both feeding means; and
d. means to stop said first feeding means after the desired length of web is fed past said cutting means and to activate said cutting means while said buckle portion of said web continues to be fed by said second feeding means.

2. The apparatus in claim 1 further including means to prevent a sheet severed from said web from being fed to said transfer station.