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(54) **Sheet decurling apparatus.**

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Description

This invention relates generally to an apparatus for decurling sheet material, particularly for use in an electrophotographic machine.

Generally, electrophotographic printing comprises charging a photoconductive member to a substantially uniform potential so as to sensitize the surface thereof. The charged portion of the photoconductive surface is exposed to a light image of the original document being reproduced. This records an electrostatic latent image on the photoconductive member which corresponds to the informational areas contained within the original document. The latent image is developed by bringing a developer material into contact therewith. In this way, a powder image is formed on the photoconductive member which is subsequently transferred to a sheet of support material. The sheet of support material is then heated to permanently affix the powder image thereto.

As the sheet of support material passes through the various processing stations in the electrophotographic printing machine, a curl or bend is frequently induced therein. Occasionally, this curl or bend may be inherent in the sheet of support material due to the method of manufacture thereof. It has been found that this curl is variable from sheet to sheet within the stack of sheets utilized in the printing machine. The curling of the sheet of support material causes problems of handling as the sheet is processed in the printing machine. Sheets delivered in a curled condition have a tendency to have their edges out of registration with the aligning mechanisms employed in the printing machine. In addition, curled sheets tend to frequently produce jams or misfeeds within the printing machine. In the past, this problem has been resolved by utilizing bars, rollers or cylinders which engage the sheet material as it passes through the printing machine. Frequently, belts or soft rollers are used in conjunction with a hard penetrating roll to remove the curl in a sheet. However, systems of this type have disadvantages. For example, the size of the decurler is not necessarily consistent with that required in some electrophotographic printing machines. In addition, decurlers of this type generally have a high running torque necessitating significant power inputs to operate successfully. Moreover, on many occasions, in electrophotographic printing, devices previously employed smeared the powder image. Also, a conventional decurler, which most often is of the belt/pinch roll type, has a single paper path. Although multiple bending can be set along the paper path, the single paths is only effective in reducing paper curls that are primarily in one direction; it is not effective in reducing large curl in the other direction. In other words, if a conventional decurler is designed for flattening dominant TI (toward image) curls, it would not be able to reduce large AI (away image) curls significantly, and vice versa. For this reason, a single path decurler would fail to decurl thin papers as they exhibit both strong AI and TI curls (depending on which side is on the hot fuser roll) at high moisture content.

A sheet decurler in which an incoming paper sheet is directed into one of two paths depending on the degre of curl in the sheet is described in US-A 4505695. However, like the conventional decurler referred to above, this apparatus is intended to reduce paper curls in one direction only.

Various approaches have been devised to improve sheet decurler to answer the above-detailed problems.

US-A 4077519 describe a curl detector and separator wherein a paper sheet is passed through the nip of a rotating roll and charging roll, and thereafter the sheet is stripped from the rotating roll by a vacuum stripper which allows the sheet to pass between the nip of a subsequent transport roll pair.

US-A 4326915 discloses a sheet decurler apparatus wherein a sheet is pressed into contact with a rigid arcuate member in at least two regions. The sheet moves about the arcuate member or rod in a curved path to remove curl in the sheet. The sheet is bent in one direction by a first rod and in another direction by a second rod.

US-A 4360356 discloses an apparatus for removing curl from continuous web material during its travel through engagement bars that can be adjusted to remove AI or TI curl.

US-A 4475896 describes a curling/decurling mechanism that combines a compliant roller with a soft outer layer in a curling roller to form a penetration nip with the compliant roller. Moveable plates are employed to control the angle of sheets as they exit from the nip.

According to the present invention there is provided an apparatus for decurling sheet material, including first and second guide baffles for receiving sheets to be decurled; and partition means positioned within said first and second guide baffles for directing sheets received by said first and second baffles into one of at least two paths characterized in that the partition means is arranged to directs sheets into one of the said at least two paths depending on the direction and amount of curl in the sheets; and in that there is provided, for each of two of said paths, respective decurling means for reverse bending sheets, each decurling means being arranged to reverse bend sheets in opposite directions.

In one embodiment, there is provided a tri-pass baffle decurler apparatus that decurls lightweight papers and is equally effective in reducing TI and AI image curls. The apparatus includes partition baffles that guide sheets into one of three paths depending on the direction and amount of curl in the sheets and each decurling means comprises spring loaded bending baffle means adapted to work in conjunction with idler roll means to reverse bend sheets directed thereto by said partition baffles. Sheets having TI curls are led into a first path and sheets having AI curls are led into a second path. Sheets with predetermined curl, for example flat sheets are led between the partition baffles in a third straight through path.

In accordance with an alternative aspect of the present invention, there is provided a dual-pass baffle decurler apparatus that decurls lightweight and thick papers and is equally effective in reducing TI and AI image curls. The partition means of this apparatus has dual beveled surfaces that direct sheets into one of two paths depending on the direction and amount of curl in the sheets. Sheets having TI curls are led into a first path and sheets having AI curls are led into a second path. Off-set nips receive the sheets within either path and decurl the sheets by driving them at predetermined angles toward output baffles each of which has a beveled edge adapted to work in combination with the respective off-set nip means to apply reverse bending to sheets as they are driven into the beveled edge.

Other aspects of the present invention will become apparent as the following description proceeds and upon reference to the drawings, in which:

Fig. 1 is an elevational view illustrating schematically an electrophotographic printing machine incorporating the features of the present invention therein;

fig. 2 is a 90° clockwise rotated elevational view showing the de-curling apparatus of the present invention used in the printing machine of fig. 1, and

fig. 3 is a 90° clockwise rotated alternative embodiment of the present invention that is usable in the printing machine of fig. 1;

fig. 4 is an elevational view illustrating schematically an electrophotographic printing machine incorporating the features of the present invention therein;

fig. 5 is a 90° clockwise rotated elevational view showing the decurling apparatus of the present invention used in the printing machine of fig. 4, and

fig. 6 is an enlarged partial view of the apparatus in fig. 5 showing an idler roll spring loaded against a drive roll.

While the present invention will hereinafter be described in connection with preferred embodiments thereof, it will be understood that there is no intention to limit the invention to those embodiments.

For a general understanding of the features of the present invention, reference is made to the drawings. In the drawing like reference numerals have been used throughout to designate identical elements. Fig. 1 schematically depicts the various components of an illustrative electrophotographic printing machine incorporating the decurling apparatus of the present invention therein in accordance with one aspect thereof. It will become evident from the following discussion that the decurling apparatus is equally well suited for use in a wide variety of printing machines and is not necessarily limited in its application to the particular embodiment shown herein. In addition, the location of the decurling apparatus, as depicted in the fig. 1 electrophotographic printing machine, may be varied. The decurling apparatus may be positioned intermediate any of the processing stations within the printing machine. In the printing machine depicted in fig. 1, the decurling apparatus is positioned after the fusing station prior to the catch tray so as to straighten the final copy sheet prior to removal from the printing machine by the operator. However, this location is merely illustrative of the operation of the de-curling apparatus and may be varied.

Inasmuch as the art of electrophotographic printing is well known, the various processing stations employed in the fig. 1 printing machine will be shown hereinafter schematically and their operation described briefly with reference thereto.

As shown in fig. 1, the electrophotographic printing machine employs a belt 10 having a photoconductive surface 12 deposited on a conductive substrate 14. Preferably, photoconductive surface 12 comprises a transport layer having small molecules of m-TBD dispersed in a polycarbonate and a generation layer of trigonal selenium. Conductive substrate 14 is made preferably from aluminized Mylar which is electrically grounded. Belt 10 moves in the direction of arrow 16 to advance successive portions of photoconductive surface 12 through the various processing stations disposed about the path of movement thereof. Belt 10 is entrained about stripping roller 18, tension roller 20, and drive roller 20. Drive roller 22 is mounted rotatably and in engagement with belt 10. Roller 22 is coupled to motor 24 by suitable means such as a belt drive. Motor 24 rotates roller 22 to advance belt 10 in the direction of arrow 16. Drive roller 22 includes a pair of opposed, spaced edge guides. The edge guides define a space therebetween which determines the desired path of movement of belt 10. Belt 10 is maintained in tension by a pair of springs (not shown) resiliently urging tension roller 20 against belt 10 with the desired spring force. Both stripping roller 18 and tension roller 20 are mounted to rotte freely.

With continued reference to fig. 1, initially a portion of belt 10 passes through charging station A. At charging station A, a corona generating device, indicated generally by the reference numeral 26, charges photoconductive surface 12 to a relatively high, substantially uniform potential.

Thereafter, the charged portion of the photoconductive surface 12 is advanced through exposure station B. At exposure station B, an original document 28 is positioned facedown upon transparent platen 30. Lamps 32 flash light rays onto original document 28. The light rays reflected from original document 28 are transmitted through lens 34 forming a light image thereof. Lens 34 focuses the light image onto the charged portion of photoconductive surface 12 to selectively dissipate the charge thereon. This records an electrostatic latent image on photoconductive surface 12 which corresponds to the informational areas contained within original document 28.

Next, belt 10 advances the electrostatic latent image recorded on photoconductive surface 12 to development station C. At development station C,

a magnetic brush development system, indicated generally by the reference numeral 36, transports a developer material into contact with photoconductive surface 12. Preferably, the developer material comprises carrier granules having toner particles adhering triboelectrically thereto. Magnetic brush system 36 preferably includes two magnetic brush developer roller 38 and 40. These developer rollers each advance the developer material into contact with the photoconductive surface 12. Each developer roller forms a chain-like array of developer material extending outwardly therefrom. The toner particles are attracted from the carrier granules to the electrostatic latent image forming a toner powder image on photoconductive surface 12 of belt 10.

Belt 10 then advances the toner powder image to transfer station D. At transfer station D, a sheet of support material 42 is moved into contact with the toner powder image. The sheet of support material is advanced to transfer station D by a sheet feeding appartus 44. Preferably, a sheet feeding apparatus 44 includes a feed roll 46 contacting the uppermost sheet of stack 48. Feed roll 46 rotates to advance the uppermost sheet from stack 48 into chute 50. Chute 50 directs the advancing sheet of support material into contact with photoconductive surface 12 in registration with the toner powder image developed thereon. In this way, the toner powder image contacts the advancing sheet of support material at transfer station D.

Transfer station D includes a corona generating device 52 which sprays ions onto the backside of sheet 42. This attracts the toner powder image from photoconductive surface 12 to sheet 42. After transfer, the sheet continues to move in the direction of arrow 54 onto a conveyor (not shown) which advances the sheet to fusing station E.

Fusing station E includes a fuser assembly, indicated generally by the reference numeral 56, which permanently affixes the transferred toner powder image to sheet 42. Preferably, a fuser assembly 56 includes a heated fuse roller 58 and a back-up roller 60. Sheet 42 passes between fuser roller 58 and back-up roller 60 with the toner powder image contacting fuser roller 58. In this manner, the toner powder image is heated so as to be permanently affixed to sheet 42. After fusing, sheet 62 guides advancing sheet 42 to the decurling apparatus, indicated generally by the reference numeral 100. At this time, the sheet of support material has undergone numerous processes and very frequently contains undesired curls therein. This may be due to the various processes through which it has been subjected, or to the inherent nature of the sheet material itself. Decurling apparatus 100 bends the sheet of support material so that the sheet material is strained to exhibit plastic characteristics. After passing through decurling apparatus 100, the sheet of support material is advanced into catch tray 66 for subsequent removal from the printing machine by the operator. The detailed structure of decurling apparatus 100 will be described hereinafter with reference to figs. 2 and 3.

Invariably, after the sheet of support material is separated from photoconductive surface 12 of belt 10, some residual particles remain adhering thereto. These residual particles are removed from photoconductive surface 12 at cleaning station F. Cleaning station F includes a pre-clean corona generating device (not shown) and a rotatably mounted fiberous brush 68 in contact with photoconductive surface 12. The pre-clean corona generating device neutralizes the charge attracting the particles to the photoconductive surface. The particles are then cleaned from photoconductive surface 12 by the rotation of brush 68 in contact therewith. Subsequent to cleaning, a discharge lamp (not shown) floods photoconductive surface 12 with light to dissipate any residual electrostatic charge remaining thereon prior to the charging thereof for the next successive image cycle.

It is believed that the foregoing description is sufficient for purposes of the present application to illustrate the general operation of an electrophotographic printing machine incorporating the features of the present invention therein.

Referring now to the subject matter of one aspect of the present invention, fig. 2 depicts an embodiment 100 of the decurler apparatus of the present invention in detail. The decurling apparatus 100 features two paths for reverse bending Al (away from image) and TI (toward image) curls (paper path self-determined by direction of fuser curl) and one straight path for flatter papers. De-curler 100 requires no adjustment and is capable of reliably handling 13# paper through 110# papers with a wide latitude of moisture content. The decurler is cost effective because no belts or stepped rolls for belts are used as in conventional decurlers. As heretofore mentioned, a conventional decurler has a single path and uses multipled bends along the path to accomplish decurling. However, the single path is effective in removing curl in only one direction. In order to overcome this limitation, the decurler apparatus 100 incorporates three paper paths. These paper paths take advantage of the fact that fused papers already show clear TI or Al curl tendency in a short distance (about 0.5 inches) from the fuser nip. Capitalizing on the well developed curl direction, partition baffles 105 and 106 are positioned to guide the lead edges of papers into three paths. As shown in fig. 2, papers (or sheets of any kind) having TI curls are led into a first path defined by guide baffle 101 and partition baffle 106 for reverse bending (Al) by a spring loaded baffle 110 having a small radius and working in conjunction with idler roll 112. Similarly, papers having Al curls are guided for reverse bending (TI) in a second path defined by guide baffle 102 and partition baffle 105 that directs the papers into curved support 115 and subsequently into spring loaded baffle 111 that has a small radius and works in conjunction with idler roller 113 to decurl the sheets. Guide baffles 101 and 102 have end por-

tions adjacent fuser 56 that serve as stripper fingers to insure that severely curled sheets do not continue around either rolls 58 or 60. Also, flatter papers leave fuser 56 and are directed by inner surfaces of partition members 105 and 106 into an opening in the center of the decurler apparatus formed by flat surfaces 117 and 118 of support block 116 and 115, respectively. This straight through path directs papers into transport or take away rolls 61 and 62.

Partition baffles 105 and 106 are wedge baffles or have spring loaded fingers for deflecting sheet material as it leaves fuser 56. Reverse bending baffles 110 and 111 are spring loaded for self-adjustment of bending level for thick and thin sheets. Thick sheets will force the baffles to open more so that less bending will act on the sheets. Preferably, the radius of bending baffles 110 and 111 is about 6.4 mm (0,25") which is effective for reverse bending. Idler rolls 112 and 113 are employed to reduce friction at the bends. Alternatively, as shown in fig. 3, pinch rolls 150 and 160 could be placed at the bends for active driving of sheets through the bends if necessary.

Referring now to the subject matter of an alternative embodiment of the present invention, figs. 4 and 5 depict an embodiment 200 of the decurler apparatus of the present invention in detail in a printing apparatus as shown in and described heretofore in reference to fig. 1. The decurling apparatus 200 features two paths for reverse bending Al (away from image) and TI (toward image) curls (paper path self-determined by direction of fuser curl). Decurler 200 requires no adjustment and is capable of reliably handling 13# through 110# papers with a wide latitude of moisture content. The decurler is cost effective because no belts or stepped rolls for belts are used as in conventional decurlers. As heretofore mentioned, a conventional decurler has a single path and uses multiple bends along the path to accomplish decurling. However, the single path is effective in removing curl in only one direction. In order to overcome this limitation, the decurler apparatus 200 incorporates two paper paths. These paper paths take advantage of the fact that fused papers already show clear TI or Al curl tendency in a short distance (about 0.5 inches) from the fuser nip. Capitalizing on the well developed curl directions, partition baffle 209 has surfaces 211 and 212 that are positioned to guide the lead edges of papers into two paths. As shown in fig. 5, papers or sheets of any kind having TI are led into a first path defined by guide surface 211 of partition member 209 and baffle 201. Baffle 201 also serves as a stripper means to prevent sheets from wrapping around roll 58. In this first path, sheets continue toward an off-set nip formed between rolls 210 and 213. Drive roll 210 and idler roll 213 drive the curled sheets at a predetermined angle (reverse bending) against a slanted or beveled surface 204 of output baffle 203 and subsequently into the output nip formed by rolls 221 and 222 for transport into output tray 66. The baffle 203 with surface 204 reverse bends the sheets for straightening. As shown in fig. 6, the nip comprises a drive roll 210 and idler roll 213 that is spring loaded by spring 230 against drive roll 210. The drive roll drives the sheets at a predetermined angle toward output baffle 203 through a drive force provided by belt 217. Belt 217 is connected to provide drive force to rolls 210, 215, 216, and 221.

Similarly, sheets having Al curls are guided for reverse bending (TI) in a second path defined by guide 202 and beveled surface 212 of partition member 209 into an off-set nip formed between drive roll 215 and idler roll 214. The sheets are driven out of the off-set nip against slanted surface 206 of output baffle 205 for reverse bending and straightening and are straightened into output nip 221, 222 for transport toward catch tray 66.

In recapitulation, it is apparent that a decurler apparatus has been disclosed in which a sheet chooses one of three paths and baffles depending on the amount and direction of the curl. The apparatus is designed such that an insignificantly curled sheet passes straight through a center path in the decurler undeflected. The baffles located in the other two sheet paths are spring loaded to adjust for degree of curl and paper weight to reverse bend a sheet deflected into either of the two paths for straightening of lightweight or thick sheets. In addition, a decurler apparatus has been disclosed in which a sheet chooses one of two paths for decurling depending upon the amount and direction of the curl. The decurler includes off-set nips from a vertical plane that in combination with output baffles apply reverse bending to the sheets in order to straighten them. The nips comprise drive rolls and idler rolls that are biased against the drive rolls. The drive rolls drive the sheets at a predetermined angle toward the output baffles.

It is, therefore, evident that there has been provided, in accordance with the present invention and apparatus for decurling a sheet of support material being used in an electrophotographic printing machine. This apparatus fully satisfies the aims and advantages hereinbefore set forth. While this invention has been described in conjunction with specific embodiments thereof, it is evident that many alternatives, modifications, and variations will be apparent to those skilled in the art. Accordingly, it is intended to embrace all such alternatives, modifications, and variations as fall within the scope of the appended claims.

Claims

1. An apparatus for decurling sheet material, including:

first and second guide baffles (101, 102; 201, 202) for receiving sheets to be decurled, and

partition means (105, 106; 209) positioned within said first and second guide baffles for directing sheets received by said first and second baffles into one of at least two paths characterized in that the partition means is arranged to direct sheets into one of the said at least two paths depending

on the direction and amount of curl in the sheets; and in that there is provided, for each of two of said paths,

respective decurling means (110, 111; 204, 206) for reverse bending sheets, each decurling means being arranged to reverse bend sheets in opposite directions.

2. An apparatus as claimed in claim 1, in which the partition means comprises: first and second partition baffles (105, 106) positioned within said first and second guide baffles and adapted to direct sheets received by said first and second baffles into one of the three paths depending on the amount and direction of curl in the sheets; and each decurling means comprises spring loaded bending baffle means (110, 111) adapted to work in conjunction with idler roll means (112, 113) to reverse bend sheets directed thereto by said partition baffles.

3. An apparatus as claimed in claim 2, wherein sheets with predetermined curl are directed by said partition baffles into a straight path between said first and second partition baffles.

4. An apparatus as claimed in claim 2 or claim 3, including pinch drive rolls (150, 160) for driving sheets through said spring loaded bending baffle means.

5. An apparatus as claimed in claim 1, in which:

said partition means has dual beveled surfaces (211, 212) adapted to direct sheets received by said first and second guide baffle means into one of two paths depending on the direction and amount of curl in the sheets; and each decurling means comprises off-set nip means (210, 213; 214, 215) for receiving sheets being transported in the respective path and driving the sheets at a predetermined angle; and output baffle means (203, 205) positioned adjacent said off-set nip, said output baffle means having a beveled edge (204, 206) adapted to work in combination with said off-set nip means to apply reverse bending to sheets as they are driven into said beveled edge of said output baffle means by said off-set nip means.

6. An apparatus as claimed in claim 5, wherein said off-set nip means comprises a drive roll (210) and an idler roll (213) with said idler roll being spring biased (230) against said drive roll.

7. An apparatus as claimed in any preceiding claim, wherein said first and second guide baffle means includes sheet stripping means.

8. A printing machine adapted to produce copies on sheets fed through a plurality of processing stations in the machine, the machine having a sheet decurling apparatus as claimed in any preceding claim for removing curl in sheets before they exit the machine.

9. A printing machine adapted to produce copies on sheets fed through a plurality of processing stations in the machine including a fuser, the machine having a sheet decurling apparatus as claimed in any one of claims 1 to 7 for removing curl in the sheets after they have left the fuser.

10. A machine as claimed in claim 9, wherein one of the paths through the decurling apparatus is automatically selected as the sheet material leaves the fuser.

Patentansprüche

1. Gerät zum Glätten blattförmigen Materials mit:

zwei Leitblechen (101, 102; 201, 202) für eine Aufnahme zu glättender Blätter und

einer Trennvorrichtung (105, 106; 209) die innerhalb der beiden Leitbleche so gelegen ist, daß von den beiden Leitblechen empfangene Blätter in eine von mindestens zwei Bahnen gelenkt werden, dadurch gekennzeichnet, daß in Abhängigkeit von der Richtung und einem Kräuselmaß der Blätter die Trennvorrichtung aufgrund ihrer Anordnung diese auf eine der mindestens zwei Bahnen lenkt, und daß für jede der beiden Bahnen ein Glättungshilfsmittel (110, 111; 204, 206) zum Zurückbiegen von Blättern derart angeordnet ist, daß diese in entgegengesetzten Richtungen rückgebogen werden.

2. Gerät, wie im Anspruch 1 beansprucht, bei dem die Trennvorrichtung zwei Trennstücke (105, 106) aufweist, die innerhalb der beiden Leitbleche angeordnet sind und in Abhängigkeit von dem Kräuselungsmaß und der Kräuselungsrichtung der Blätter nach ihrer Aufnahme durch die beiden Leitbleche in eine von drei Bahnen lenken, und daß jedes Glättungshilfsmittel eine Biegung dienende, federbelastete Umlenkmittel (110, 111) enthält, die zu einem Zusammenwirken mit Leerlaufrollen (112, 113) geeignet sind, von den Trennstücken auf sie zu gelenkte Blätter zurückzubiegen.

3. Gerät, wie im Anspruch 2 beansprucht, bei dem Blätter mit einer vorherbestimmten Kräuselung von den Trennstücken in eine geradlinige Bahn zwischen den beiden Trennstücken gelenkt werden.

4. Gerät, wie im Anspruch 2 oder Anspruch 3 beansprucht, mit angetriebenen Quetschrollen (150, 160), um Blätter durch die federbelasteten Umlenkmittel zu treiben.

5. Gerät, wie im Anspruch 1 beansprucht, bei dem die Trennvorrichtung zwei abgeschrägte Flächen (211, 212) besitzt, von denen in Abhängigkeit von der Richtung und dem Maß einer Kräuselung der von den beiden Leitblechen empfangenen Blätter diese auf eine der beiden Bahnen lenkbar sind, bei dem ferner jedes Glättungshilfsmittel Abzweige-Klemmvorrichtungen (210, 213; 214, 215) zur Aufnahme von auf der jeweiligen Bahn beförderten Blätter und zu ihrem Antrieb unter einem vorherbestimmten Winkel enthält, und bei dem Ausgabe-Leitstücke (203, 205) einen abgeschrägten Rand (204, 206) zum Zusammenwirken mit den benachbarten Abzweige-Klemmvorrichtungen für eine Rückbiegung von Blättern aufweisen, wenn diese von den Abzweige-Klemmvorrichtungen auf den abgeschrägten Rand der Ausgabe-Leitstücke getrieben werden.

6. Gerät, wie im Anspruch 5 beansprucht, bei dem die Abzweige-Klemmvorrichtung eine Antriebsrolle (210) und eine Leerlaufrolle (213) ent-

hält, die gegen die Antriebsrolle von einer Feder (230) belastet ist.

7. Gerät, wie in einem vorhergehenden Anspruch beansprucht, bei dem die beiden Leitbleche Blätter abstreifende Hilfsmittel enthalten.

8. Druckmaschine, von der Kopien auf Blättern herstellbar sind, die durch mehrere Bearbeitungs-Stationen der Maschine eingegeben werden, mit einem Glättungsgerät für die Blätter, wie in einem beliebigen, vorhergehenden Anspruch beansprucht, zum Entfernen einer Kräuselung der Blätter, bevor diese aus der Maschine austreten.

9. Druckmaschine, von der Kopien auf Blättern herstellbar sind, die durch mehrere Bearbeitungs-Stationen der Maschine einschließlich einer Heizrolle eingeführt werden, mit einem Glättungsgerät für die Blätter, wie in einem der Ansprüche 1 bis 7 beansprucht, zum Entfernen einer Kräuselung der Blätter, nachdem sie die Heizrolle verlassen haben.

10. Maschine, wie im Anspruch 9 beansprucht, bei der eine der Bahnen durch das Glättungsgerät selbsttätig gewählt wird, wenn das blattförmige Material die Heizrolle verläßt.

Revendications

1. Dispositif pour la suppression des boucles d'un matériau en feuille, comprenant:

des premier et second déflecteurs de guidage (101, 102; 201, 202) pour recevoir des feuilles dont on doit supprimer les boucles, et

des moyens de cloison (105, 106; 209) placés à l'intérieur des premier et second déflecteurs de guidage pour diriger les feuilles reçues par les premier et second déflecteurs afin de les entrer dans l'un d'au moins deux trajets, caractérisé en ce que le moyen de cloison est agencé de manière à diriger les feuilles pour les faire entrer dans l'un desdits au moins deux trajets en fonction de la direction et de l'importance des boucles dans les feuilles; et en ce qu'on prévoit, pour chacun des deux trajets,

un moyen respectif de suppression des boucles (110, 111; 204, 206) pour cambrer de manière inverse les feuilles, chaque moyen de suppression des boucles étant agencé de manière à cambrer inversement les boucles dans des directions opposées.

2. Dispositif selon la revendication 1, dans lequel le moyen de cloison comprend: des premier et second déflecteurs formant cloison (105, 106) placés à l'intérieur des premier et second déflecteurs de guidage et destinés à diriger les feuilles reçues par les premier et second déflecteurs pour les faire entrer dans l'un de trois trajets en fonction de l'importance et du sens des boucles dans les feuilles; et chaque moyen de suppression des boucles comprend un moyen de déflecteur pour cambrage, rappelé par ressort (110, 111) destiné à travailler en conjonction avec un moyen de rouleau fou (112, 113) pour cambrer inversement les feuilles dirigées par les déflecteurs formant cloison.

3. Dispositif selon la revendication 2, dans lequel les feuilles avec des boucles prédéterminées sont dirigées par les déflecteurs formant cloison pour entrer dans un trajet rectiligne entre les premier et second déflecteurs formant cloison.

4. Dispositif selon la revendication 2 ou la revendication 3, comprenant des rouleaux d'entraînement à pincement (150, 160) pour entraîner les feuilles à travers les moyens de déflecteur de cambrage chargés par ressort.

5. Dispositif selon la revendication 1, dans lequel:

le moyen de cloison comporte des surfaces chanfreinées doubles (211, 212) destinées à diriger les feuilles reçues par les premier et second moyens de déflecteur de guidage pour les faire entrer dans l'un de deux trajets en fonction du sens et de l'importance des boucles dans les feuilles, et chaque moyen de suppression des boucles comprend des moyens à étranglement décalé (210, 213; 214, 215) pour recevoir les feuilles transportées dans le trajet respectif, et entraîner les feuilles à un angle prédéterminé; et des moyens de déflecteur de sortie (203, 205) placés à un endroit contigu à l'étranglement décalé, le moyen de déflecteur de sortie ayant un bord chanfreiné (204, 206) destiné à travailler en combinaison avec le moyen d'étranglement décalé pour appliquer une cambrure inverse aux feuilles alors qu'elles sont entraînées dans le bord chanfreiné du moyen de déflecteur de sortie par le moyen d'étranglement décalé.

6. Dispositif selon la revendication 5, dans lequel le moyen d'étranglement décalé comprend un rouleau d'entraînement (210) et un rouleau fou (213) avec le rouleau fou rappelé par ressort (230) contre le rouleau d'entraînement.

7. Dispositif selon l'une quelconque des revendications précédentes, dans lequel les premier et second moyens de déflecteur de guidage comprennent un moyen de détachement des feuilles.

8. Machine d'impression destinée à produire des copies sur des feuilles introduites dans une multitude de postes de traitement de la machine, la machine comportant un dispositif de suppression des boucles des feuilles selon l'une quelconque des revendications précédentes pour éliminer les boucles des feuilles avant qu'elles sortent de la machine.

9. Machine d'impression destinée à produire des copies sur des feuilles introduites dans une multitude de postes de traitement de la machine comprenant un dispositif de fusion, la machine ayant un dispositif de suppression des boucles des feuilles selon l'une quelconque des revendications 1 à 7 pour éliminer les boucles des feuilles après qu'elles ont quitté le dispositif de fusion.

10. Machine selon la revendication 9, dans laquelle l'un des trajets à travers le dispositif de suppression des boucles est choisi automatiquement alors que la feuille quitte le dispositif de fusion.

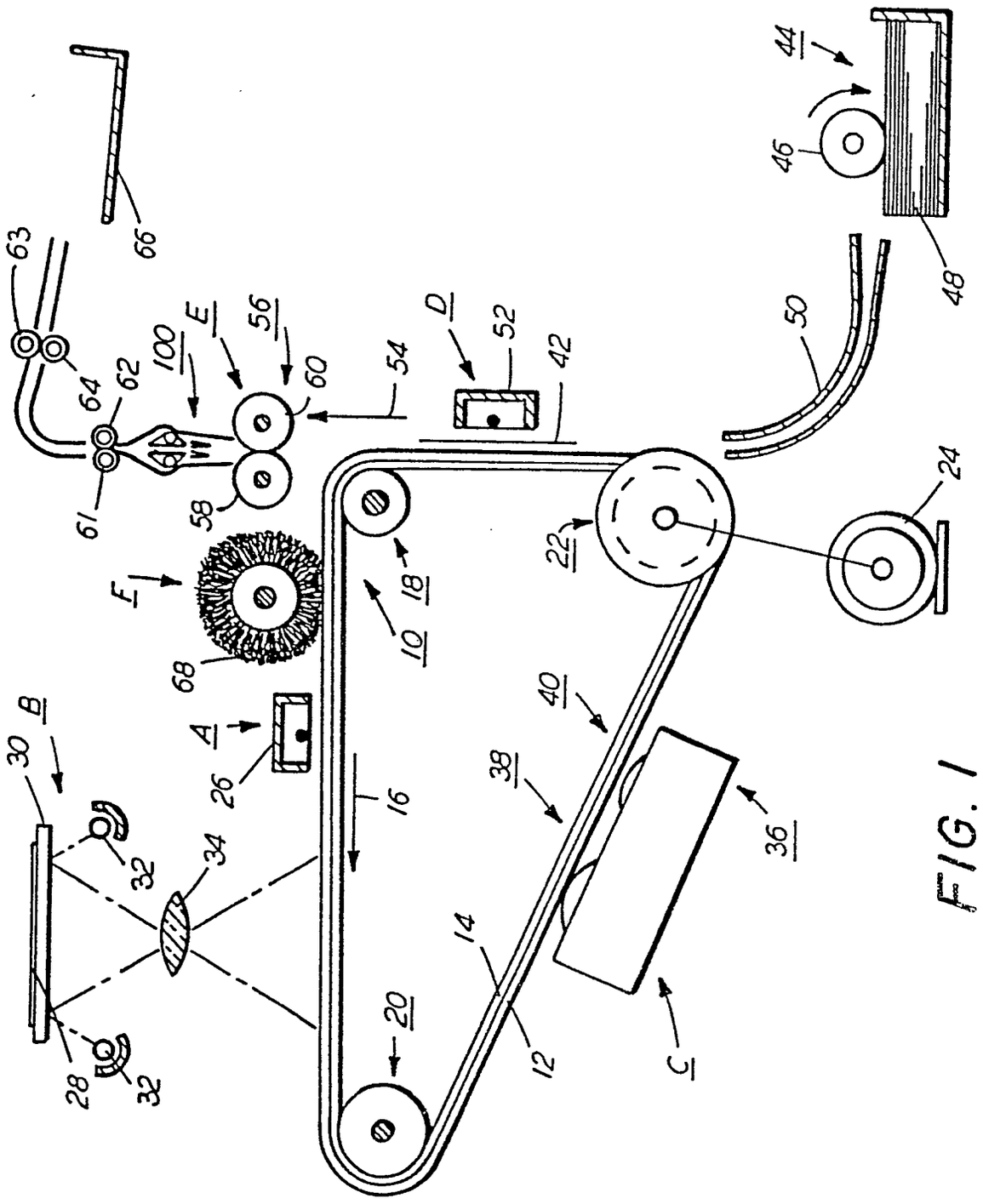
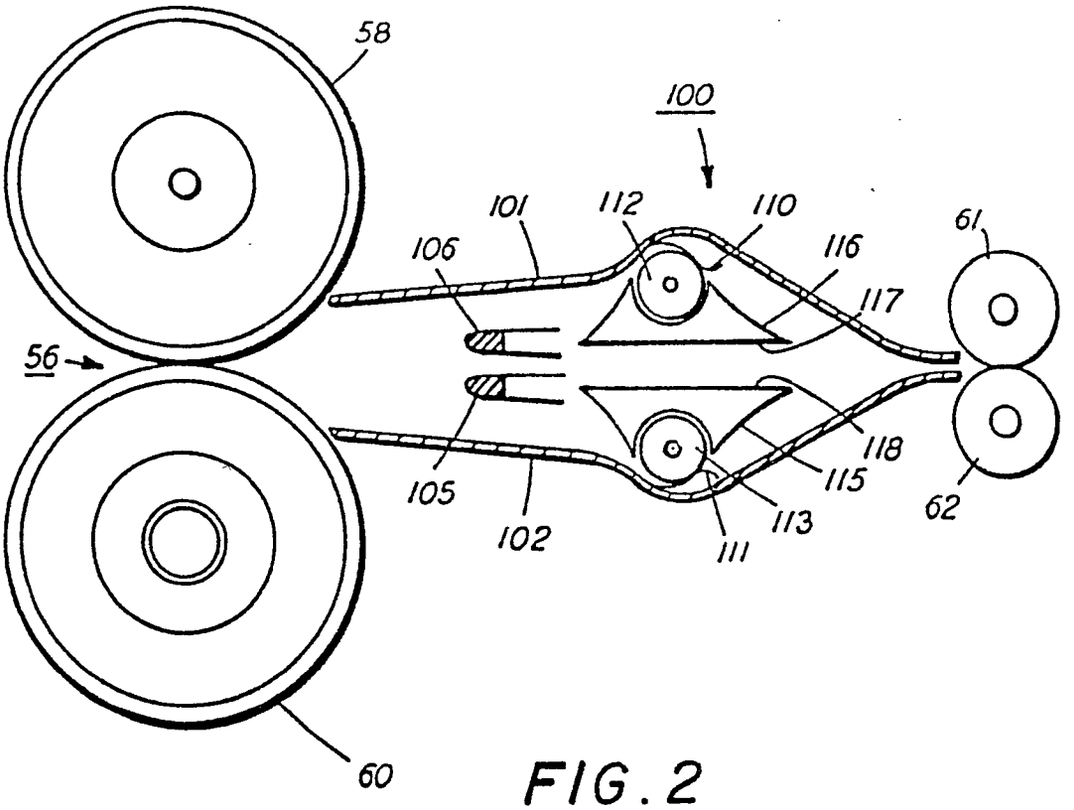

63
66
64
62
100
E
56
60
54
D
52
42
44
46
48
50
61
58
F
68
10
18
22
24
A
26
16
40
38
36
B
30
32
34
28
32
14
12
20
C

FIG. 1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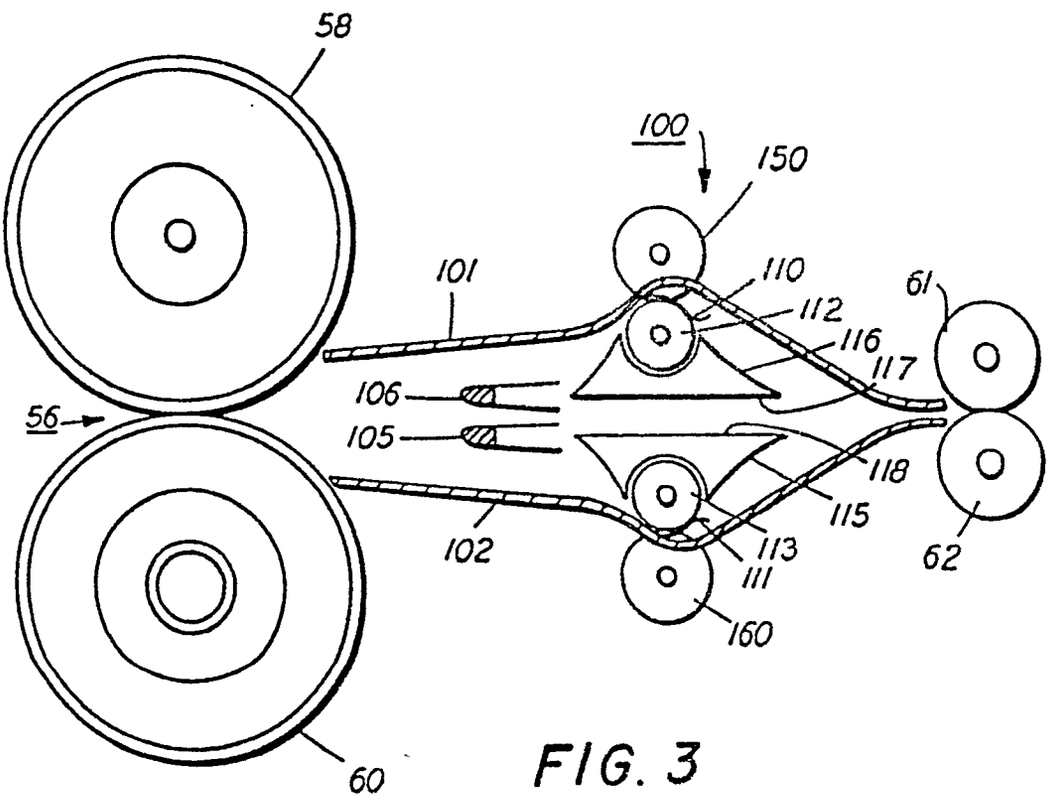
112
110
61
106
116
117
56
118
115
105
113
62
102
111
60

FIG. 2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150
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61
112
116
117
106
56
105
118
115
102
113
62
111
160
60

FIG. 3

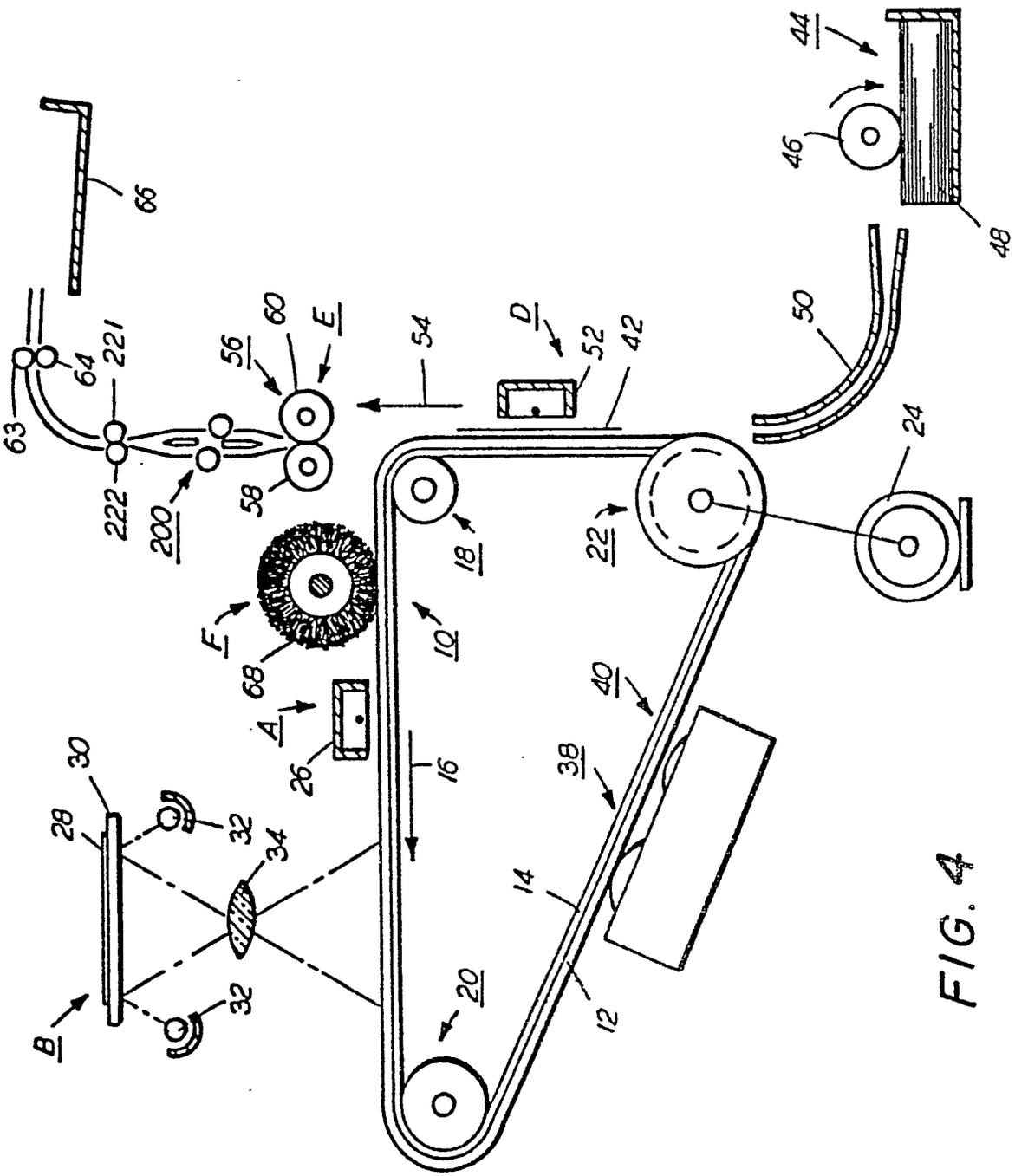
44
46
48
66
50
63
64
221
56
60
E
54
D
52
42
24
222
200
58
18
22
F
68
10
40
A
26
16
38
30
28
32
34
14
B
20
12

FIG. 4

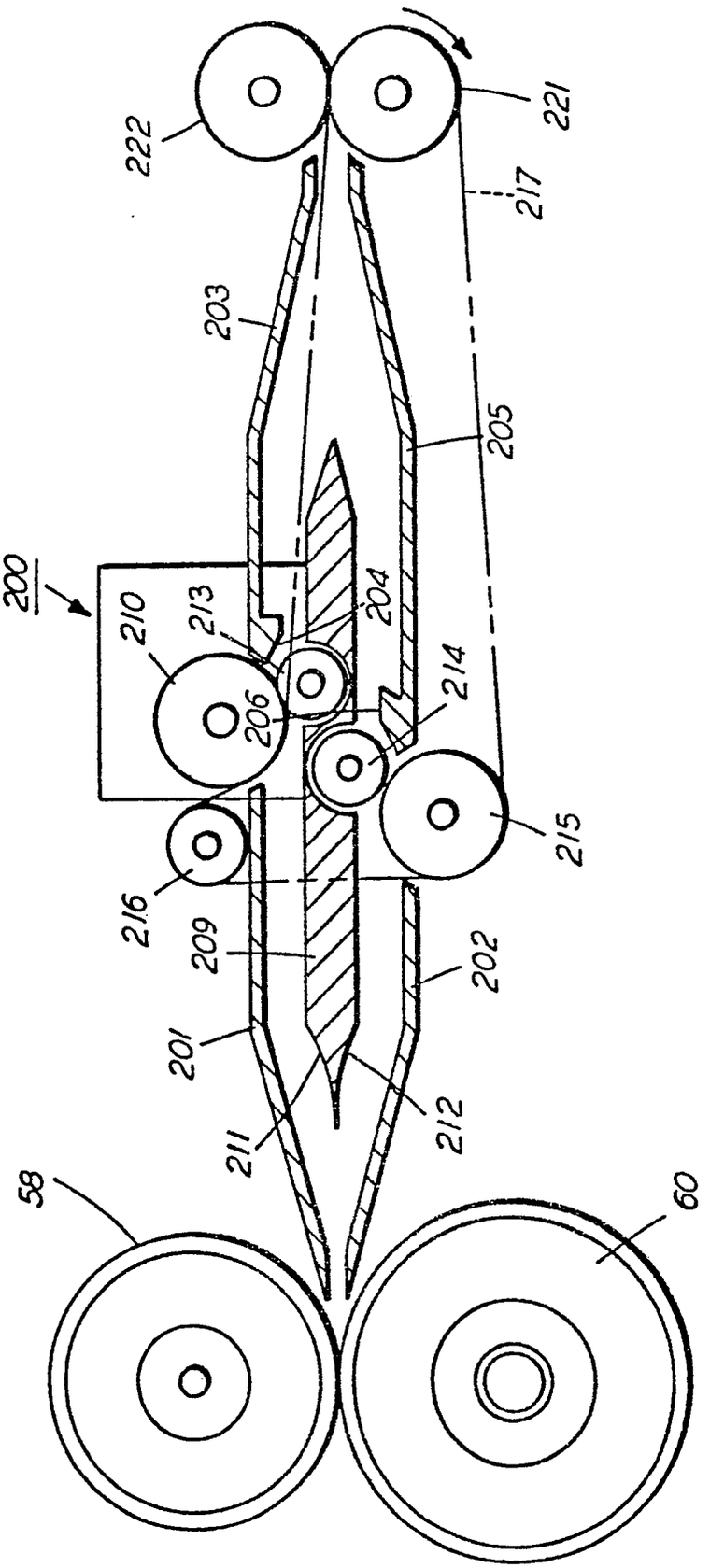
222
221
217
203
205
200
210
213
204
214
206
215
216
209
202
201
211
212
58
60

FIG. 5

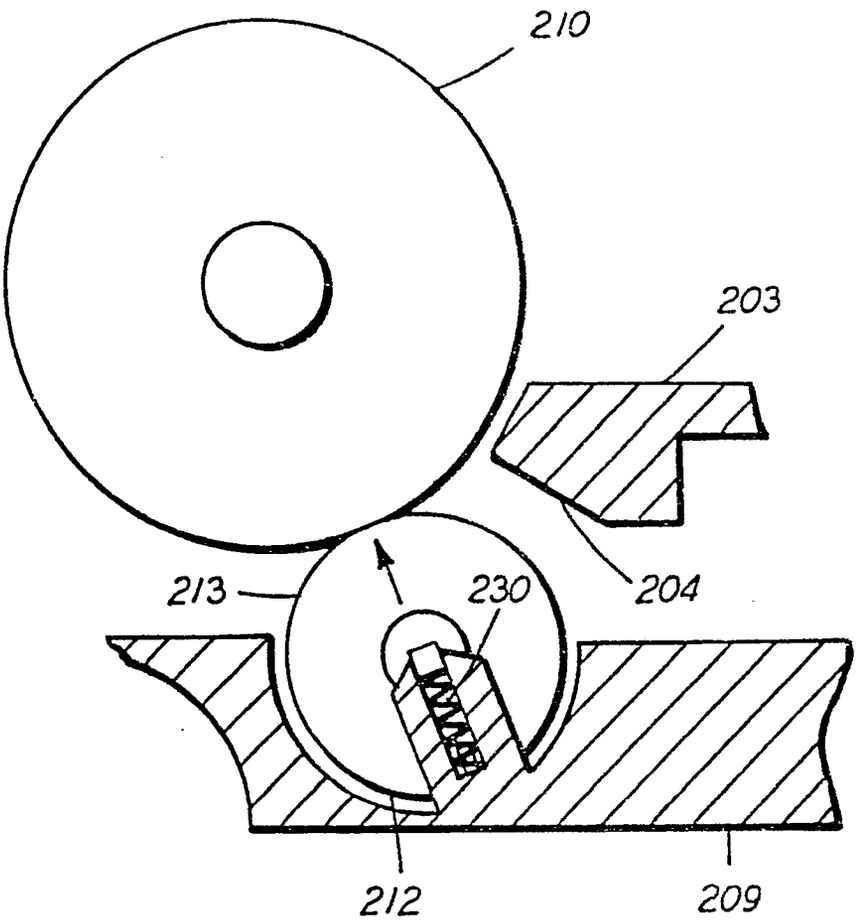

FIG.6