

1,977,886

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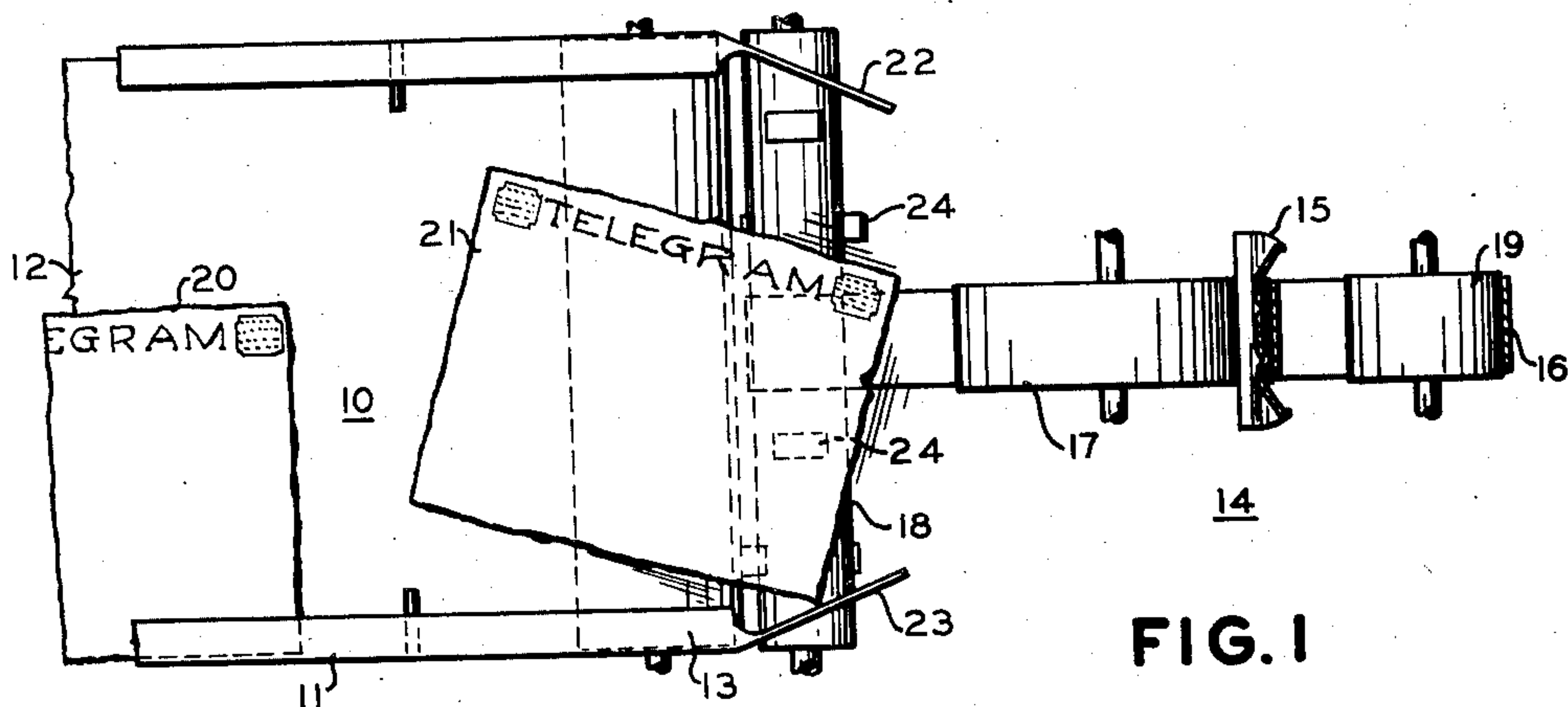


FIG. 1

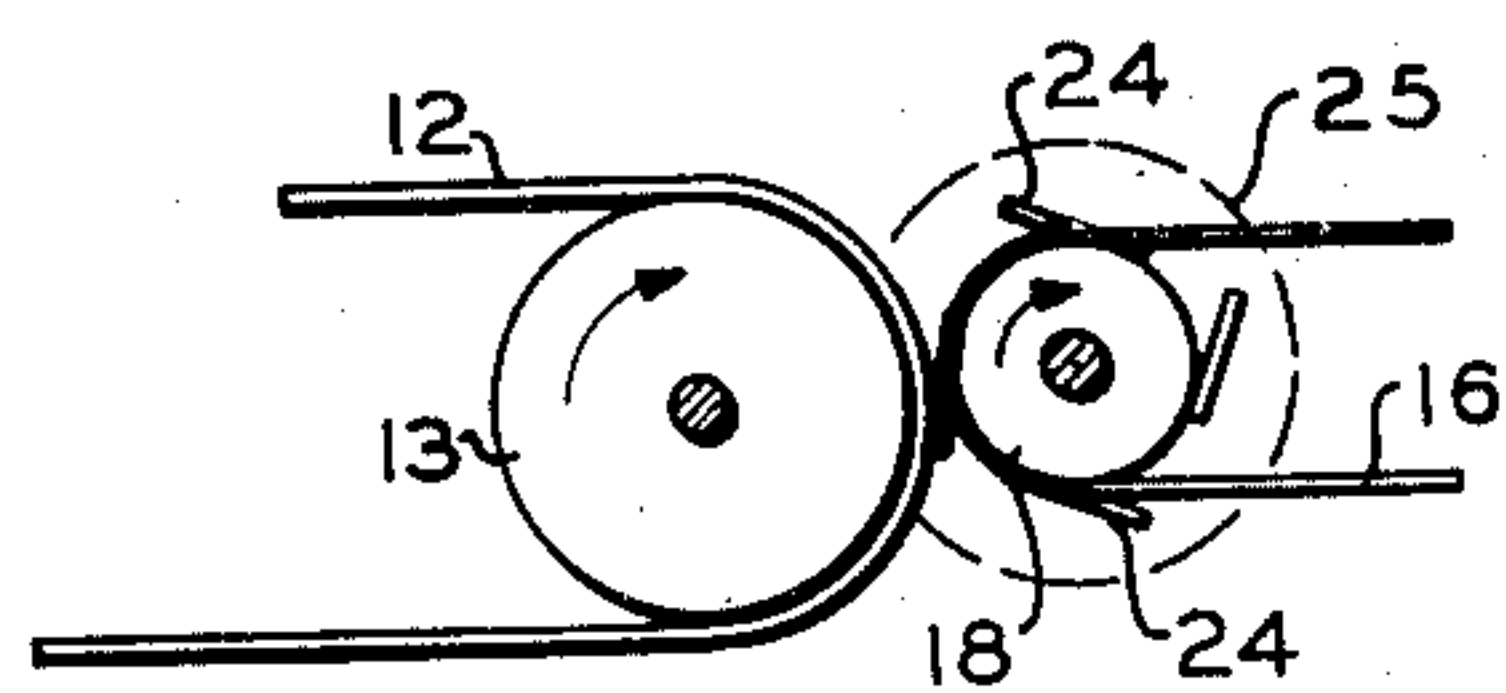


FIG.3

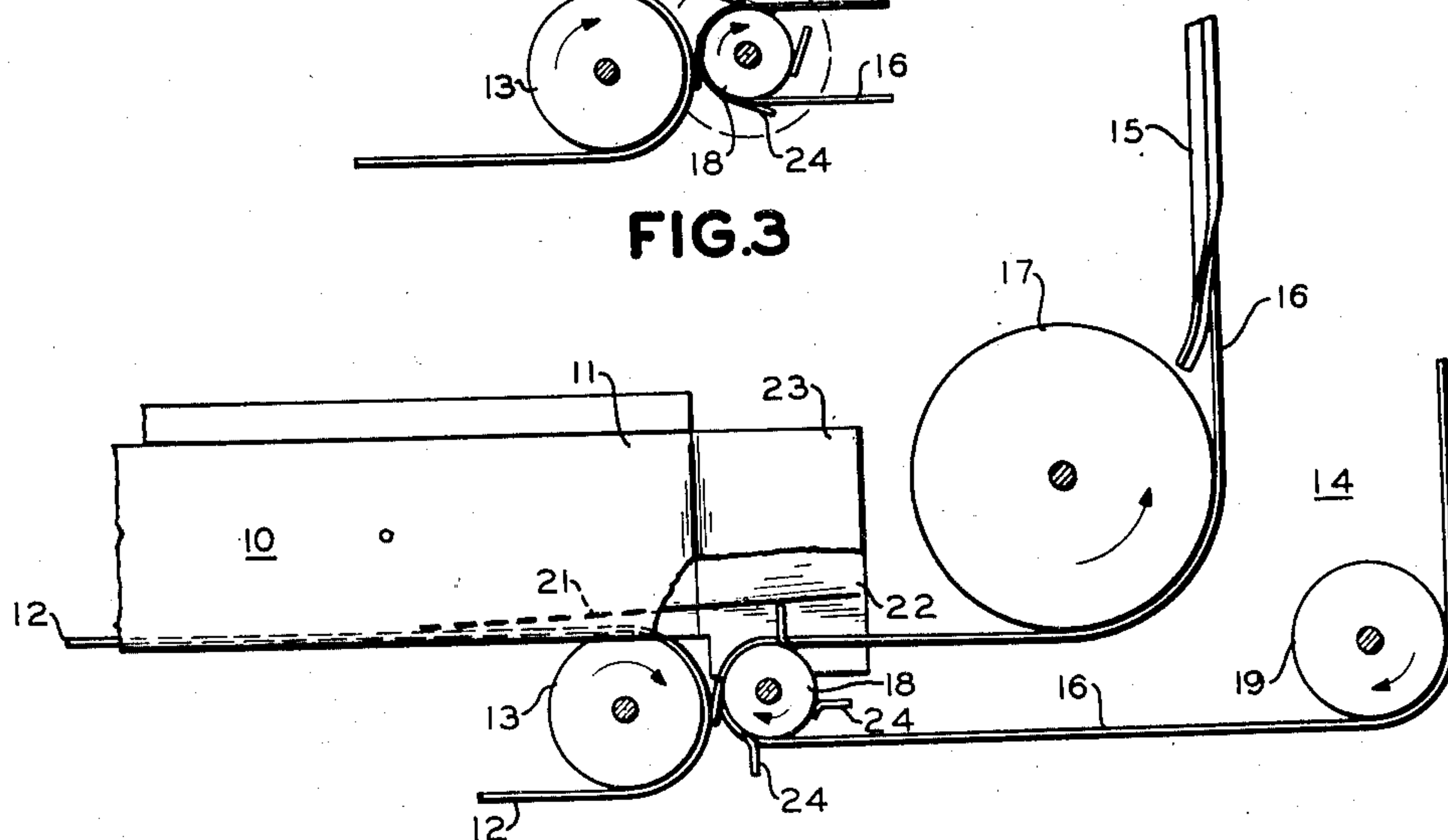


FIG. 2

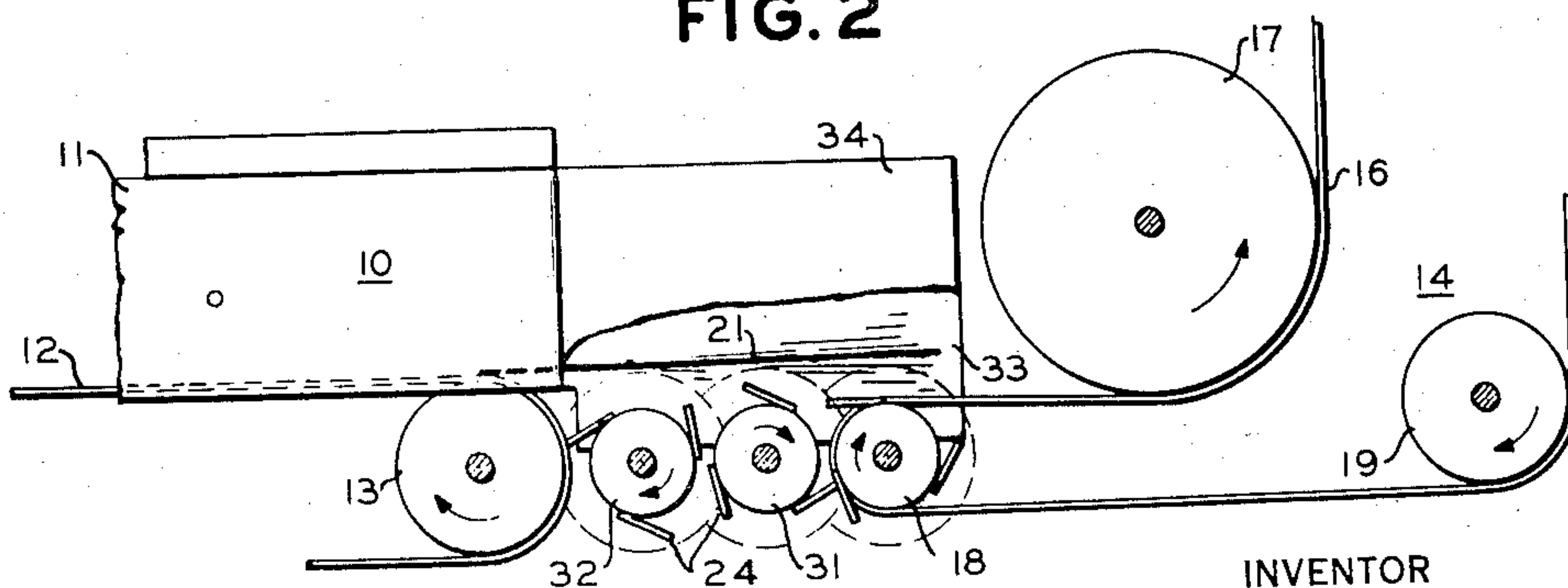


FIG.4

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BELT CONVEYER

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Application May 26, 1933, Serial No. 673,065

10 Claims. (Cl. 198—160)

This invention relates to belt conveyers, more particularly belt conveyers arranged to transport sheet material resting openly on a flat belt traveling along a trough support provided with side walls for keeping the sheets of material on the belt.

This invention has particular reference to means for facilitating the passage of material along a flat belt conveyer from a portion of the conveyer having a predetermined transverse width to a portion of the conveyer having a constricted or decreased transverse width.

In certain types of conveyer systems which have been developed for handling sheet material such as telegrams and the like, a number of conveyers of the drag type wherein the messages are conveyed between a moving belt and a stationary support have their discharges concentrated at a certain point for the purpose of transferring the material from a plurality of the drag conveyers to a single drag conveyer for further transporting the material from the several conveyers along a single route. It has been found very expedient to employ a conveyer of the broad flat belt type at the concentration point for receiving the material from the several incoming conveyers by arranging said conveyers to drop the material on the flat belt at suitably spaced points therealong. The material is then conveyed by the flat belt to the inlet of the single drag conveyer over which the material is to be continued to a designated point.

It has been found that, for the best handling of the sheets along the flat belt conveyer, it is desirable that this conveyer shall have a width not less than the longest dimension or the diagonal of the sheets of material being handled. Ordinarily, telegraph blanks are rectangular in form and have dimensions of approximately six and a half by eight inches. A message blank of this size has a diagonal of approximately ten and a quarter inches. This means that the flat belt conveyer for handling this type of sheet would be not less than say ten and a half inches. However, the practice in the modern telegraph office is not to use the standard size blank altogether, but to use blanks of a size which will best accommodate the message or other purpose for which it is employed. Therefore, a considerable portion of the blanks being conveyed through the conveyer system may be of smaller dimensions. For instance, a blank of approximately five by eight inches is used for certain types of relay messages.

The drag type of conveyer, referred to above,

into the inlet of which the material from the flat belt conveyer is discharged, employs a relatively narrow belt, approximately two inches in width, arranged to engage the blanks so that the outer edges overhang the belt and the channel along which the belt travels. In this type of conveyer it is desirable that the belt engage the message substantially across its center. In other words, in order for the message to be conveyed along this type of conveyer traveling at a relatively high speed, it is desirable that the same amount of the message blank be exposed at both sides of the conveyer channel to prevent air resistance against unequal overhanging side portions causing the message to work out at one side of the conveyer. When we come to the transfer of the message blanks from the flat belt conveyer to the drag conveyer, it will be seen that if a blank having a width of five inches was traveling endwise with its side substantially in engagement with the side of the flat belt trough when it reached the discharge end of the conveyer, it would barely be caught by the belt of a drag conveyer disposed with its inlet central of the flat belt. Therefore it is necessary to provide deflectors at the side of the flat belt trough for deflecting message blanks traveling along one side of the wide conveyer toward the center of the belt in order that they may be properly guided into the inlet of the drag conveyer. A simple deflector or wing disposed at the belt return roller of the discharge end of the flat belt would accomplish the centering of the messages were it not for the fact that the paper employed for message blanks is relatively thin and limp and also that static accumulations on the flat belt cause the paper to adhere to the belt.

According to this invention means has been supplied for raising message blanks from the flat belt as they reach the discharge end and imparting a fluttering movement to the blank or sheet thereby enabling the deflectors to properly accomplish their result. It is the principal object of this invention therefore to provide means for imparting a fluttering movement to sheets of material being conveyed to the discharge end of the belt conveyer so that they may be transversely deflected at a certain point along the conveyer path.

Another object of this invention is to provide a flat belt conveyer with a constricted transverse portion for centering sheets of material being conveyed therealong so that the sheets may be properly discharged into a conveyer of narrower cross section and means cooperating with the

centering means to impart a fluttering movement to the message so that it may more readily be moved by the centering means.

These and other objects of this invention will appear from the description and the drawing forming a part thereof in which,

Fig. 1 represents a plan view of a flat belt conveyor embodied in this invention, discharging message blanks into the inlet of a drag conveyor.

Fig. 2 is a view in elevation showing the means for imparting the fluttering action to the sheets.

Fig. 3 is a view in elevation of details embodied in Figs. 1 and 2, and

Fig. 4 is a side elevation of a modification of the invention.

Referring to the drawing the preferred embodiment comprises a flat belt conveyor 10 having a trough 11 along the bottom of which a relatively wide belt 12 travels. At the discharge end of the trough a return roller 13 is provided for guiding the belt in the return direction. Centered in front of the discharge end of the conveyor 10 is a conveyor 14 of the drag type comprising a channel or support member 15 along which a belt 16 travels. The belt 16 travels in continuous engagement with the bottom of the channel and conveys the sheets therealong by frictional engagement therewith substantially in the manner described in Patent No. 1,793,953 granted on February 24, 1931, to F. E. d'Humy et al. The inlet for said conveyor is provided by passing the belt 16 around an inlet roller 17 and horizontally to return rollers 18 and 19. The return roller 18 is substantially equal in length to the return roller 13 provided for the flat belt of the conveyor 10. This roller is disposed adjacent the roller 13 at a suitable elevation to cooperate with roller 17 to locate the inlet of the conveyor 14, provided at the meeting point of the belt 16 with the roller 17, immediately in front of the flat belt discharge. With this relative arrangement the sheets from the end of the wide belt are conveyed along the upper horizontal section of the belt 16 until they are engaged between the latter and the roller 17.

As soon as they reach the roller 17 they are carried around the same and fed in between the belt and the drag support 15.

Referring particularly to Figs. 1 and 2, telegram blanks 20 and 21 are shown traveling along the conveyor 10. Observing the relative position of the flat belt conveyor 10 and the drag belt conveyor 14, it can be seen that if the telegram blank 20 which is resting at the nearest extreme side of the conveyor 10 passes forward without shifting its relative position toward the center, it would be engaged substantially along one edge between the belt 16 and channel member 15 as it enters the drag conveyor and the entire overhanging portion of the blank would extend to the one side of the drag conveyor. In this position, if the latter conveyor were traveling at a relatively high speed, air resistance would be exerted on one side of the blank only, which would tend to cause the blank to be pulled out of the conveyor. If the telegram blank 20 were smaller than the standard size blank it might not extend far enough to be engaged between the conveying elements of the drag conveyor as it is discharged from the flat conveyor.

In order to move such blanks as happen to rest on the flat belt 12 toward a central position before they are discharged into the inlet of the drag conveyor, the deflector plates 22 and 23 are provided at the discharge end of the trough 11 and

arranged to extend inwardly toward the center of the conveyor. Theoretically the plates 22 and 23 might be disposed at any convenient point along the flat conveyor 10 and move the blanks riding along the sides of the conveyor toward a central position before reaching the discharge end.

However, the conveyor belts and paper sheets sliding along the troughs or supports accumulate surprisingly large static charges which attract and hold the sheets to the surface of the conveyor belt with some tenacity. As a result a deflector member placed in the path of the sheets in most instances merely curls or bends up the edge or corner when they come against the deflector without moving the body of the blank. For overcoming this difficulty the features now to be described and forming the novel portion of this invention were developed.

According to this invention means is provided for dislodging or disengaging the sheets from the belt as they approach the discharge end of the conveyor and for imparting a fluttering movement to the sheets so that they may be more susceptible to the action of the deflector members in guiding them towards a central position with respect to the conveyor belt. This means comprises swinging flapper strips or kicker members 24 secured at one end to the surface of the roller 18 and arranged so that as the roller is rotated by belt 16 of the receiving conveyor 14, they swing outwardly due to centrifugal force. The outer tips of the swinging strips follow a circular path, substantially as indicated in the dotted circular outline 25, illustrated in Fig. 3. It will be observed that in following this path the strips are caused to strike with a brushing movement against the surface of the curved portion of the belt 12 of the flat conveyor as it passes around the return roller 13. The strips also impinge upon or kick against the under surface of sheets as they pass over the roller 18 in their path of travel.

The roller 18 with its flapping strips 24 accomplishes at least two results. The first of these spring from the brushing action of the strips against the surface of the belt 12 which is effective to disengage the leading edge of any telegram blank that might be adhering to the belt with sufficient tenacity to follow the belt around the return roller. The leading edge having been dislodged the second result is accomplished by the action of the flapper strips in striking against or kicking the under surface of the sheets as they pass over the roller thereby imparting a fluttering movement thereto. In other words, the effect of the rotating strips is to provide the action of an enlarged roller having a surface of such a nature as to furnish a means for imparting an intense vibration to the sheets and upon which they ride in much the same manner as though they were floating freely in the air. With this sort of vibration the deflectors 22 and 23 can very effectively accomplish their action of directing the sheets toward a central position and thereby cause them to properly enter the inlet of the receiving conveyor 14. In other words, the sheets are directed to a central alignment before they are engaged between the belt 16 and the roller 17 so that the overhanging portions of the sheets as they travel along the relatively narrow receiving conveyor will be substantially balanced. As heretofore stated, it is highly desirable that this balanced condition of the overhanging portions of the sheets be main-

tained so that there is a minimum tendency for air resistance to the sheets travelling at a rapid rate to cause the same to fall out of the latter conveyer.

It should be observed that it is not necessary that the sheets or telegram blanks be aligned with their edges parallel with the direction of travel. The only important point is that the overhanging portions of the sheets as they enter the narrow conveyer are not too greatly out of balance. The outlet between the deflector plates 22 and 23 is of such a width as to permit the sheets to pass freely between the same even though they are not aligned. The deflectors are also arranged to direct the blanks sufficiently towards a central position to insure that blanks of a width less than the standard or average width are engaged by the receiving conveyer.

When the provision for a discharge of a wide to a narrow conveyer is constructed according to this invention a major difficulty is overcome. Heretofore no means has been provided for insuring that the blanks would be freed from adherence to the delivery conveyer belt during the period of deflector action. In other words, the blank would merely strike against the deflector and curl or roll up along one edge without moving the remote edge out of its original position. As a result it would in some instances fail entirely to be engaged in the inlet of the receiving conveyer, whereupon it would be lost from the conveyer system and would have to be restored by persons whose duty it was to inspect the general progress of the conveying system. The improvement provided according to this invention has largely eliminated the necessity for inspection at this point. It thus greatly increases the ability of the conveyer to handle large amounts of message blanks of sizes widely differing from the standard size for which the conveyer was designed to handle.

Referring to Fig. 4 a modified form of the invention is illustrated. Under certain circumstances it may be desirable to increase the amount of agitation or vibratory movement imparted to the sheets of material as they proceed through the constricted portion of the conveyer path provided by the deflectors. When this is desired, it may be provided by employing additional rollers 31 and 32 disposed between the agitator roller 18 and the conveyer belt return roller 13. Each of these rollers may be provided with flapper strips 24 similar to that provided for the roller 18 and secured thereto in substantially the same manner.

With the use of additional agitating rollers it is also desirable to increase the length of the deflector plates adjacent the agitator rollers. As shown in Fig. 4 the deflector plates 33 and 34 extend from the end of the conveyer channel 11 proper to embrace the three agitator rollers. When longer deflector members are thus employed the angle of deflection will ordinarily be less and the outer or delivery end of the constricted portion of the conveyer path may be maintained substantially the same. On the other hand, if it is desired to obtain an alignment of the sheets within closer limits than is provided in the embodiment illustrated in Figs. 1 to 3, the outer end of the deflector plates may be drawn closer together and still maintain the deflector plates positioned at an angle less than that shown in the embodiment previously described. When a plurality of agitator rollers are employed and a decreased angle of deflection incorporated in the embodiment, the

sheets of material upon leaving the conveyer belt 12 will be considerably more agitated than in the previous embodiment due to the fact that the points of contact or impingement by the flapper strips will be multiplied and spread over a larger area. This combined with the more gentle angle of deflection of the deflector or guide plates 33 and 34 acts to more perfectly align the sheets in a central position with respect to the conveyer belt before they are discharged into the inlet of the narrow conveyer 14. Generally speaking a heavier or greater number of sheets can be handled when the number of agitating rollers are increased than with an embodiment employing only one roller.

From the foregoing description it will be observed that an improved arrangement has been provided for discharging sheet material from a relatively wide delivery conveyer in which the sheets may travel along the edge of the conveyer in a substantially off center position to a conveyer of a relatively narrow width where it is essential that the sheets be substantially centered with respect to the narrow conveyer. It is to be understood that this invention is not restricted in its application to the handling of small light weight sheets of paper such as telegram blanks but may be applied to handling any other type of material which would readily respond to vibration imparting elements substantially of the type provided herein. While various types of means for imparting the vibrating movement to the sheets may be employed such as a group of reciprocating elements or the like suitably arranged to strike upwardly against the sheets, the vibration imparting element of this invention should be clearly distinguished from what might be termed a clearing or dislodging brush presenting a substantially continuous and uniform surface to a sheet of material riding on the brush. It is essential that the elements be sufficiently sparsely distributed and that the rate of the successive impacts be suitable to impart a substantial impact or shock to the sheet as it rides over the same. This shock or impact when provided according to this invention will effectively be transferred to the entire body of the sheet and with a surprising degree of efficiency dislodging the sheet by overcoming the static charge therein. Other forms and modifications of the arrangement will occur to those skilled in the art which will fall within the scope of this invention.

While this invention is shown in but two forms, it will be apparent to those skilled in the art that it is not so limited but is susceptible to various changes and modifications without departing from the spirit thereof and it is desired therefore that only such limitations shall be placed thereon as is imposed by the prior art or set forth in the appended claims.

What I claim is:

1. In a belt conveyer, a relatively wide trough member arranged to provide a path along which sheet material is to be conveyed, conveying means arranged to travel along the bottom of said trough for conveying sheet material deposited thereon, means for providing a transverse constriction in the path at a point along said trough, and means disposed to impart a fluttering movement to the sheets as they approach said path constriction.
2. In a belt conveyer, a relatively wide trough member arranged to provide a path along which sheet material is to be conveyed, a belt arranged to travel along the bottom of said trough member and convey sheet material deposited on its upper

face, deflector means projecting inwardly from the sides of said trough for providing a transverse constriction of the conveyer path at a point therealong, and means arranged to strike against the under side of the sheets for imparting a fluttering movement thereto as the sheets approach said deflector means.

3. In a belt conveyer, a relatively wide trough member arranged to provide a conveyer path, a belt arranged to convey sheet material along the bottom of said trough member and deliver the same at the discharge end of the trough, means for providing a transverse constriction in the path at the discharge end, and means at said end for imparting a fluttering movement to the sheets as they approach said path constriction.

4. In a conveyer for sheet material a relatively wide trough member, a belt arranged to convey material along the bottom of said trough member and deliver the same at the discharge end of the trough, deflector means projecting inwardly from the sides of the trough for providing a transverse constriction of the path at the discharge end and means arranged adjacent said deflector means for striking against the said sheets at a plurality of points for vibrating the sheets to render the guiding action of the deflector means more effective.

5. In a flat belt conveyer for sheet material, a discharge end, a belt guide roller at the discharge end, a belt upon the upper face of which sheets are carried, said belt being arranged to pass around said roller in a return direction, and a roller having swinging flapper strips secured at one end to its surface, said roller being disposed in position for said flappers to brush against the curved portion of the belt in a direction opposite to the belt travel for disengaging the forward edge of any sheets that may tend to adhere to the belt and for imparting a fluttering movement to the sheets so as to entirely free each sheet from the belt in order that it may be readily discharged.

6. In a flat belt conveyer for sheet material having a stationary support member embodying upstanding side walls, said conveyer being provided with a discharge end, a belt guide roller at the discharge end, a belt upon the upper face of which sheets are carried, said belt being arranged to travel upon said support and pass around the guide roller in a return direction, deflectors adjacent the discharge end and disposed to project inwardly from the sides of said support member for directing the sheets toward a central position on the belt, and a roller having swinging flapper strips secured at one end to its surface, said roller being disposed adjacent the deflector and in position for the flapper strips to brush against the surface of the belt as it passes around the return roller for dislodging any sheets that may tend to adhere to the belt and for striking against all of the sheets as they approach the deflectors to impart a fluttering movement thereto for entirely freeing each sheet from the belt and rendering it more susceptible to the deflector action.

7. In a flat belt conveyer for sheet material having a stationary support member embodying upstanding side walls, said conveyer being provided with a discharge end, a belt guide roller at the discharge end, a belt upon the upper face of which sheets are carried, said belt being arranged to travel upon said support member and pass around the guide roller in a return direction, de-

flectors disposed adjacent to the discharge end and arranged to project inwardly from the sides of said support member for directing the sheets towards a central position on the belt, and a plurality of rollers having swinging flapper strips secured at one end to the surface, said rollers being disposed in spaced relation substantially in the plane of the conveyer and along the portion of the conveyer path embraced by said deflectors, said rollers cooperating to lift the forward edge of each sheet as it approaches the deflectors and impart a fluttering movement to the sheet by means of the flapper strips striking the under surface thereof for rendering the sheet more susceptible to the guiding action of the deflector.

8. In a conveyer system for handling sheet material, a delivery conveyer having a discharge end and a receiving conveyer having an inlet disposed to receive sheets discharged from the delivery conveyer, said delivery conveyer having a belt of substantially greater width than the sheets upon which the latter ride freely without regard to their position with respect to the center line of the belt, said receiving conveyer being relatively narrow and arranged to transport the sheets most effectively when they are disposed in a central position with respect thereto, and means adjacent to the discharge end of said delivery conveyer for moving said sheets toward a substantially central position, said means comprising deflectors extending inwardly from the sides of the delivery conveyer and means disposed adjacent to the deflectors to strike the sheets for agitating the same to increase the facility with which the sheets yield to the deflector action.

9. In a belt conveyer system for sheet material, a horizontally disposed support member having a relatively greater width than the sheets and having upstanding side walls arranged to provide a path along which the sheets are conveyed, a flat belt disposed to travel along said support between said side walls for conveying sheets along the conveyer to a discharge at one end, a narrow conveyer comprising a relatively narrow channel and means arranged to convey sheets along the channel with the lateral portions thereof overhanging the sides of the channel, said conveyer being provided with an inlet disposed adjacent the discharge end of the wide conveyer in a central position with respect thereto, deflectors disposed to project inwardly from the side walls of the wide conveyer at its discharge end for directing any sheets travelling along the sides of the conveyer inwardly toward a central position for aligning them with the inlet of the narrow conveyer, and means disposed adjacent the discharge deflectors comprising one or more rollers carrying agitating means for imparting a vibratory movement to the sheets, whereby they more readily respond to the action of the deflectors.

10. In a conveyer system, a delivery conveyer having a discharge end and a receiving conveyer having an inlet disposed substantially in alignment with the delivery conveyer to receive sheets discharged therefrom, said delivery conveyer having a width greater than the receiving conveyer, and means adjacent to the discharge of the delivery conveyer for constricting the conveyer path adjacent the discharge end and means disposed adjacent said path constriction for agitating the material to facilitate the passage of the same through said path constriction.

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