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F. GRIFFITH

2,213,392

DISCHARGE DEFLECTOR FOR BELT CONVEYER SYSTEMS

Filed Nov. 13, 1937

FIG. 1

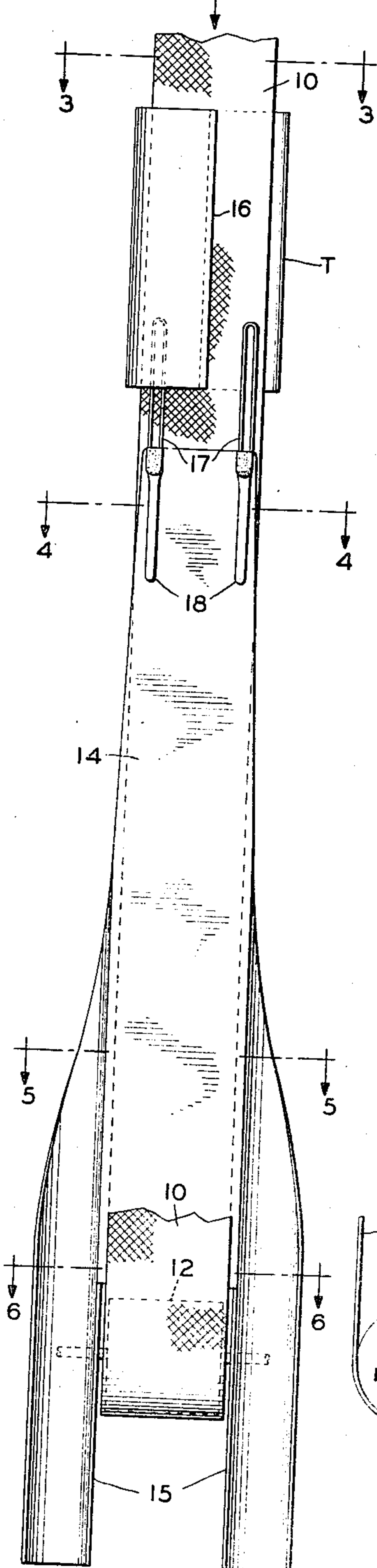


FIG. 2

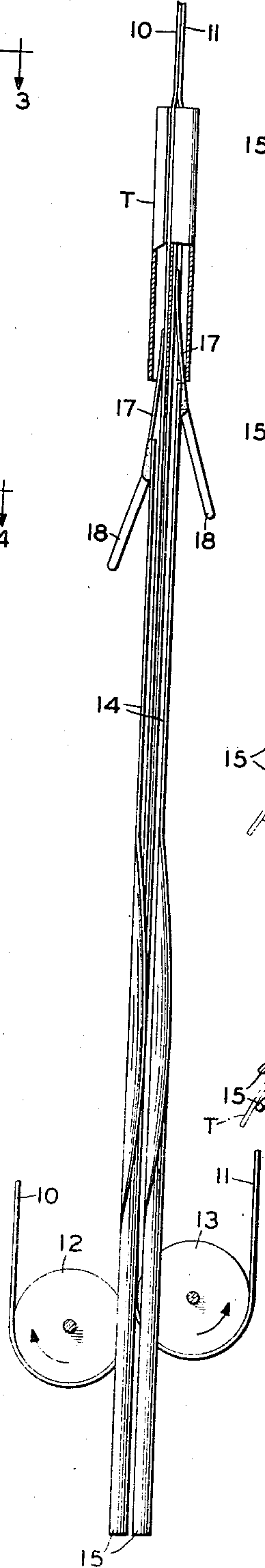


FIG. 3

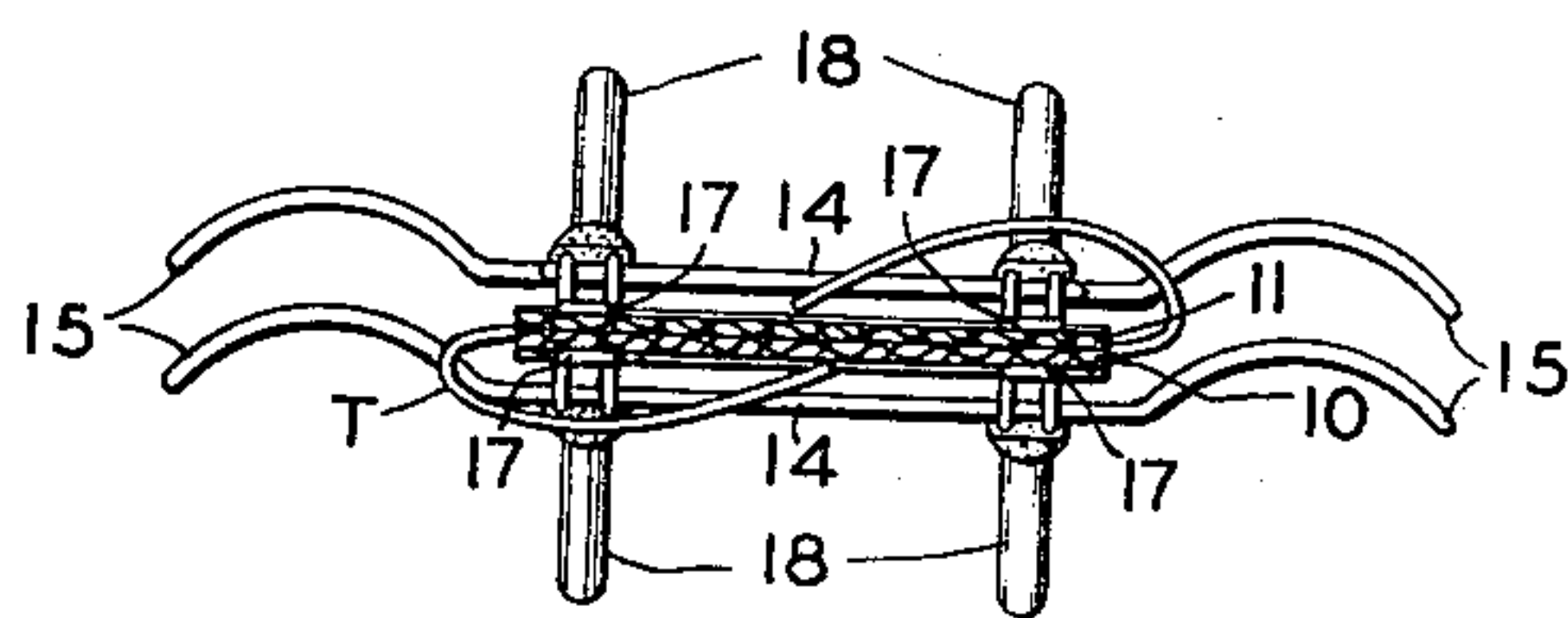


FIG. 4

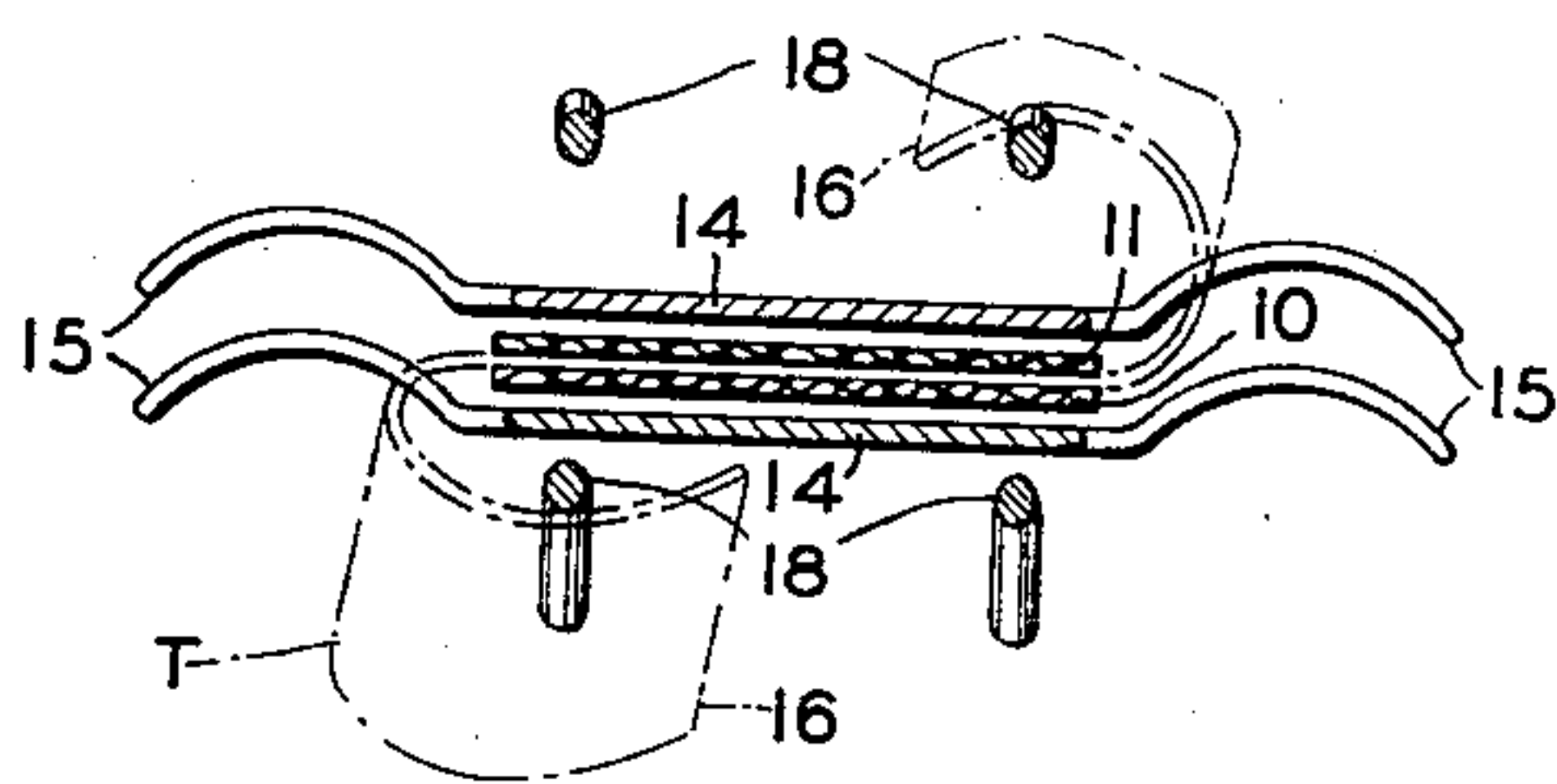


FIG. 5

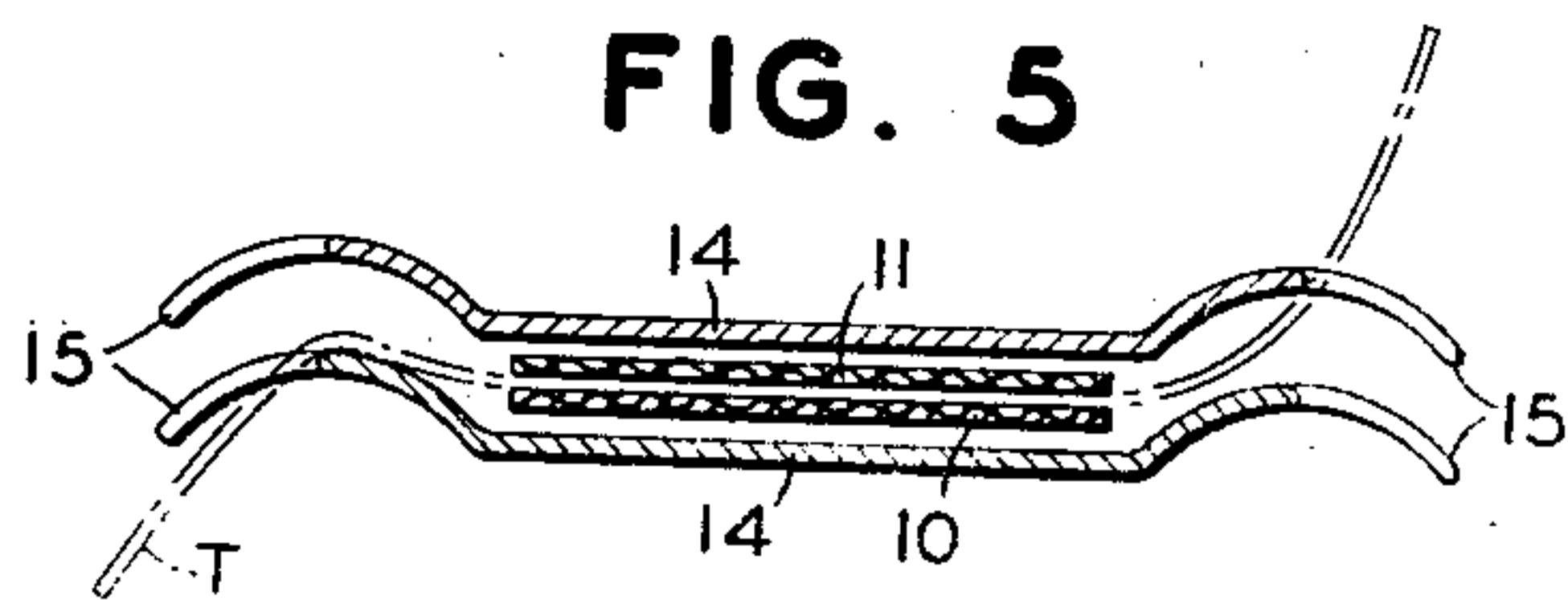
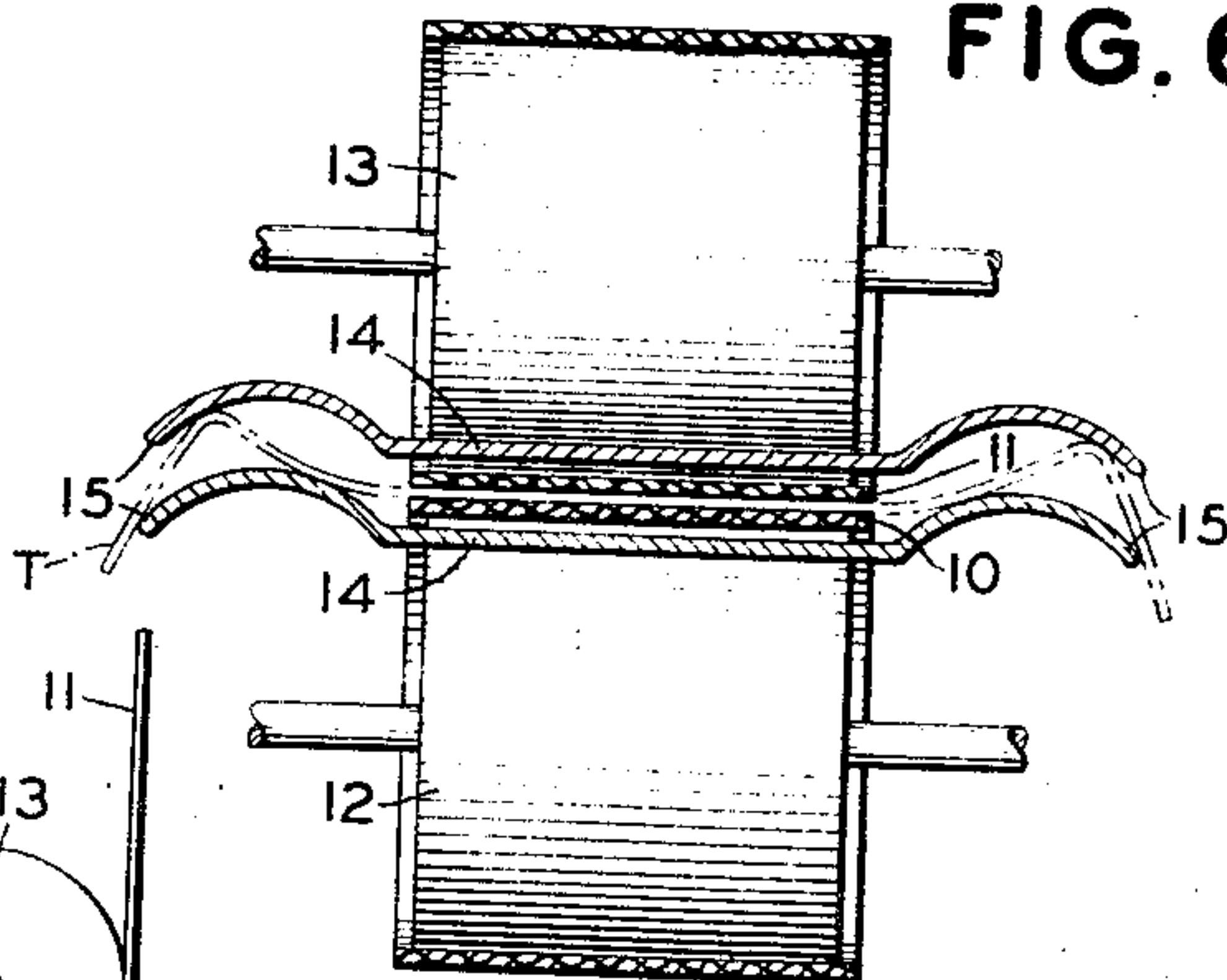


FIG. 6



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DISCHARGE DEFLECTOR FOR BELT
CONVEYER SYSTEMS

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8 Claims. (Cl. 198—165)

This invention relates to strap conveyer systems and has particular reference to means for discharging sheet material from such a system.

There are several forms of strap conveyers by which light sheet material such as telegrams, letters and the like is transported from one point to another. Among the more common forms is the double strap type in which the material is gripped between the contacting surfaces of a pair of belts or straps traveling adjacent one another. When it is desired to discharge the material from the conveyer, one or both of the straps are passed around a direction changing pulley or roller whereby the straps are separated allowing the sheet to be released by the belts and discharged from the system.

At such discharge or transfer points, it is the practice to utilize one of several forms of deflectors which serve as guides whereby the sheets are discharged from the conveyer in a substantially unfolded condition. These deflectors are disposed in planes which are substantially parallel to, but are not in contact with, the back or outside surfaces of the conveyer straps and extend from the discharge points back along the conveyer line for a certain distance.

Usually the smallest dimension of a sheet which is transported by such a conveyer is considerably greater than the width of the straps. If for any reason the overhanging portion of a sheet becomes wrapped or folded around one or both of the straps, it sometimes will not be properly engaged by the deflector. Consequently, it may be torn or otherwise mutilated, or it may be forced out from between the faces of the straps and prematurely discharged. Such conditions are prevalent particularly where the telegrams have been transported in carriers of a pneumatic tube conveyer where they have been creased or folded in order to insert them in the carriers. These telegrams, when transferred to a strap conveyer, very readily become wrapped around the traveling strap. Consequently, the folded portions of these telegrams often are not disengaged from the strap by the prior art deflectors and the telegrams are carried toward the discharge point in a folded condition resulting in their mutilation or loss.

Hence, one of the objects of this invention is to provide means to prevent telegrams or other sheet material from becoming lodged between the conveyer and a discharge deflector.

Another object of the invention is to provide means to disengage sheet material from the out-

side of a strap conveyer around which the material becomes folded.

Still another object of the invention is to unfold sheet material which has become tightly wrapped around the belts of a strap conveyer traveling at a comparatively high speed without dislodging said material from the conveyer.

A further object of this invention is to provide means adjacent the discharge point of a strap conveyer whereby added stiffness in the longitudinal dimension is imparted to sheet material passing therethrough to prevent adhesion of said sheet material to the straps as they pass around direction changing rollers.

The following description of a preferred embodiment of the invention is taken in connection with the accompanying drawing of which:

Fig. 1 is a front view of a portion of the conveyer adjacent the discharge point;

Fig. 2 is a side view of the conveyer system;

Figs. 3, 4, 5 and 6 are sectional views of the conveyer taken respectively on the lines 3—3, 4—4, 5—5 and 6—6 of Fig. 1 and illustrate in successive steps the passage of a sheet of material toward the discharge point.

The preferred embodiment of the invention is illustrated and described herein as employed with a double strap conveyer. Its application to other types of strap conveyers will be obvious to those skilled in the art.

Referring to Figs. 1 and 2 of the drawing, the two belts or straps 10 and 11 travel in contact with one another in the direction indicated by the arrow. Sheet material such as a telegram T is gripped by the contacting surfaces of the straps and is conveyed thereby. At a point where it is desired to discharge the telegram, the straps 10 and 11 are respectively passed around direction changing pulleys or rollers 12 and 13. In order to prevent the telegram from adhering to one of the straps and following it around the roller or from becoming fouled with the roller, a pair of deflectors is used to guide the telegram past the rollers in a substantially unfolded condition.

Each of the discharge deflectors comprises a flat body portion 14 which extends from a point slightly in advance of the discharge rollers backward along the path of the conveyer in a plane parallel to that of the strap 10. The deflector body has a width which, at the remote end, is less than the width of the straps and which gradually increases as the discharge point is approached. In the vicinity of the discharge point, the deflector body diverges laterally more rapidly to form a pair of wings or flanges 15 which are

extended for a distance beyond the discharge point. The surfaces of these flanges are curved transversely with corresponding flanges of the two deflectors bearing a nesting relation to one another.

In a double strap conveyer such as herein illustrated, two such deflectors are employed, one adjacent each strap. In most cases where the edges of the sheet material being transported are only slightly curled around the straps, a deflector having only the aforementioned features serves adequately as a guide. When the ends 16 of the telegram T, for example, are spaced from the outside surface of the strap sufficiently, they pass on the outside of the deflector body 14. The curled edges are then forced out laterally by the diverging flanges 15, so that by the time the telegram T reaches the rollers 12 and 13, it is held in a substantially unfolded condition. This state is maintained by the extended portions of the flanges until the telegram is released from the straps.

A certain minimum spacing between the outside strap surface and the inside deflector surface must be maintained in order that the conveyer may be operated efficiently and economically. Consequently, a message which becomes tightly wrapped around a strap may be carried into the space between the strap and the deflector, and as a result, be torn or otherwise mutilated. A more probable consequence, however, is that the relatively high velocity engagement of the tightly folded portion of the message with the diverging edge of the deflector, instead of opening the folded portion, may be the means whereby the message is discharged from the conveyer prematurely. Also, the advancing edge of a sheet of material may strike the end of the deflector body and be forcibly ejected from the conveyer and perhaps lost.

To preclude such eventualities the present invention provides a pair of resilient disengaging fingers 17 which are mounted at the corners of the narrow end of the deflector and the ends of which are held firmly against the outside surface of the strap. One form of finger may be fashioned from steel piano wire bent in the shape of a hairpin. The ends of the wire are inserted in one end of a tube 18 and soldered thereto. The junction point of the wire and the tube is, in turn, fastened to one of the aforesaid corners of the deflector in such a manner that the tube projects angularly from the outside surface of the deflector in the direction of travel of the conveyer and constitutes a preliminary unfolding or opening arm. The soldered joint should be made smooth in order to provide a gradual transition between the wire portion and the tube. The wire fingers are tensioned so that the loop ends thereof are held firmly against the strap. The fingers of the two deflectors are staggered longitudinally of the conveyer in order to minimize the wear on the straps.

Figs. 3, 4, 5 and 6 illustrate typical progressive steps in the functioning of a deflector equipped with disengaging fingers and preliminary unfolding arms. The fingers 17 are adapted to pry between the strap surface and a closely wrapped piece of sheet material. Fig. 3 shows an end view of the deflector at the instant that the tips of the fingers 17 disengage the forward edge of a telegram T which is folded around the strap. By positioning the fingers adjacent the edges of the straps, it will be apparent that better results can be obtained than if a single fin-

ger were centrally positioned laterally of the straps.

As previously indicated, merely guiding the folded portions of a sheet of material onto the deflector is not sufficient to insure the proper discharge of the sheet without mutilation. Hence, to obviate the difficulties encountered by relying on the diverging flanges of the deflector for unfolding the sheet material, the opening arms 18 are provided for unfolding the telegram sufficiently to prevent it from being cut or ejected from the conveyer by the deflector flanges, when engaged thereby.

Fig. 4 shows the telegram advanced to the point where the folded edges 16 have been deflected onto the arms 18 and the preliminary unfolding process started. It will be observed that the arms exert a force on the folded portions of the telegram which is normal to the surface thereof which is gripped by the straps. In this manner the preliminary unfolding is accomplished by means having no tendency to prematurely discharge the telegram.

The folded portions, having been opened substantially in passing successively over the disengaging fingers and the unfolding arms, are then in condition to be engaged by the diverging flanges. This stage is illustrated in Fig. 5 in which the continuation of the straightening process may be seen.

Fig. 6 illustrates the final stage in which the telegram T is being guided by the widest part of the flanges 15. When the telegram reaches this point, it is in a substantially unfolded condition, in which it may be properly discharged from the conveyer. Attempts to discharge the telegram in a perfectly flat condition often result in the central portion of the telegram following one of the straps around a direction changing pulley for the reason that the sheet of material is characterized by an insufficient stiffness, or because creasing and folding have removed most of whatever inherent stiffness it originally possessed. The nested curved flanges 15 of the deflectors serve to corrugate the edges of the telegram sufficiently to stiffen the telegram sheet longitudinally of the conveyer and thus effectively prevent its adhering to the straps passing around the direction changing pulleys.

The deflector described is not limited in its use to points of final discharge, but may be adapted for use in other parts of a strap conveyer system such as intermediate transfer points where the sheet material is transferred from one section of the conveyer to another. The deflector comprising the instant invention may also be adapted to single strap conveyer systems of the so-called drag type. Also, the essential attributes of the invention may be embodied in other forms which come within the scope of the appended claims.

That which is claimed is:

1. In a strap conveyer system for transporting sheet material, a discharge deflector characterized in part by a flat body portion extending in a plane parallel to the plane of the strap in advance of the discharge point, a plurality of resilient fingers having the tips thereof in registry with said strap and terminating in said deflector, said fingers constituting a guideway to divert from said strap to said deflector portions of said material which become folded around the strap, and a plurality of rigid arms terminating in said deflector and extending angularly therefrom in the direction of travel of said strap.

2. In a conveyer system for transporting sheet material, comprising a pair of juxtaposed straps adapted to grip said material between the adjacent surfaces thereof, a pair of discharge deflectors disposed adjacent to and in planes parallel to the remote surfaces of said straps, and means for disengaging folded portions of said material from said remote strap surfaces, said means including a plurality of spring members having one end of each in contact with one of said remote surfaces, each of said spring members extending in the direction of travel of said straps and terminating on said discharge deflectors, and a plurality of rigid members extending angularly from each of said discharge deflectors in the direction of travel of said straps.

3. In a strap conveyer system for transporting flexible sheet material which occasionally becomes folded around said strap, a discharge deflector characterized in part by a flat body portion extending in a plane parallel to the plane of the strap in advance of the discharge point, means for guiding said folded material from said strap to the body of said deflector, and means for subjecting said sheet material to a preliminary unfolding force applied normal to the plane of said conveyer.

4. In a strap conveyer system for transporting flexible sheet material which occasionally becomes folded around said strap, a discharge deflector characterized in part by a flat body portion extending in a plane parallel to the plane of the strap in advance of the discharge point, means for guiding said folded material from said strap to the body of said deflector, and secondary guiding means positioned on said deflector body in angular relation to the plane thereof and extending in the direction of travel of said strap.

5. In a strap conveyer system for transporting flexible sheet material, a deflector disposed adjacent a terminal of said system comprising means for guiding said material toward said terminal in a substantially unfolded condition,

and a plurality of nested flanges disposed at and extending on both sides of said conveyer to a point beyond said terminal.

6. In a strap conveyer system for transporting flexible sheet material, a deflector disposed adjacent a terminal of said system comprising means for guiding said material toward said terminal in a substantially unfolded condition, and a plurality of nested flanges having certain portions thereof inclined with respect to other portions, said flanges being disposed at and extending on both sides of said conveyer to a point beyond said terminal for effecting a longitudinally corrugated configuration of said sheet material.

7. In a strap conveyer system for transporting flexible sheet material, a deflector disposed adjacent a terminal of said system comprising means for guiding said material toward said terminal in a substantially unfolded condition, and a pair of nested transversely curved flanges extending on both sides of said conveyer at and beyond the terminal thereof.

8. In a strap conveyer system for transporting flexible sheet material which occasionally becomes folded around said strap, means adjacent a discharge point for unfolding said material which comprises a deflector having a body and flanged portions extending laterally of and beyond said discharge point substantially in the plane of said strap, and converging into said body portion in advance of said discharge point, said body also being tapered to a width slightly less than that of the strap and disposed in a plane parallel to the plane of said strap adjacent the outside surface thereof, a plurality of guide arms protruding angularly from said deflector in the direction of travel of said strap, and a plurality of diverting fingers extending from the narrow end of said deflector to engage the outside surface of said strap.

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