Feb. 24, 1931.

F. E. D'HUMY ET AL

1,793,953

DRAG CONVEYER

Filed Jan. 20, 1930

4 Sheets-Sheet 1

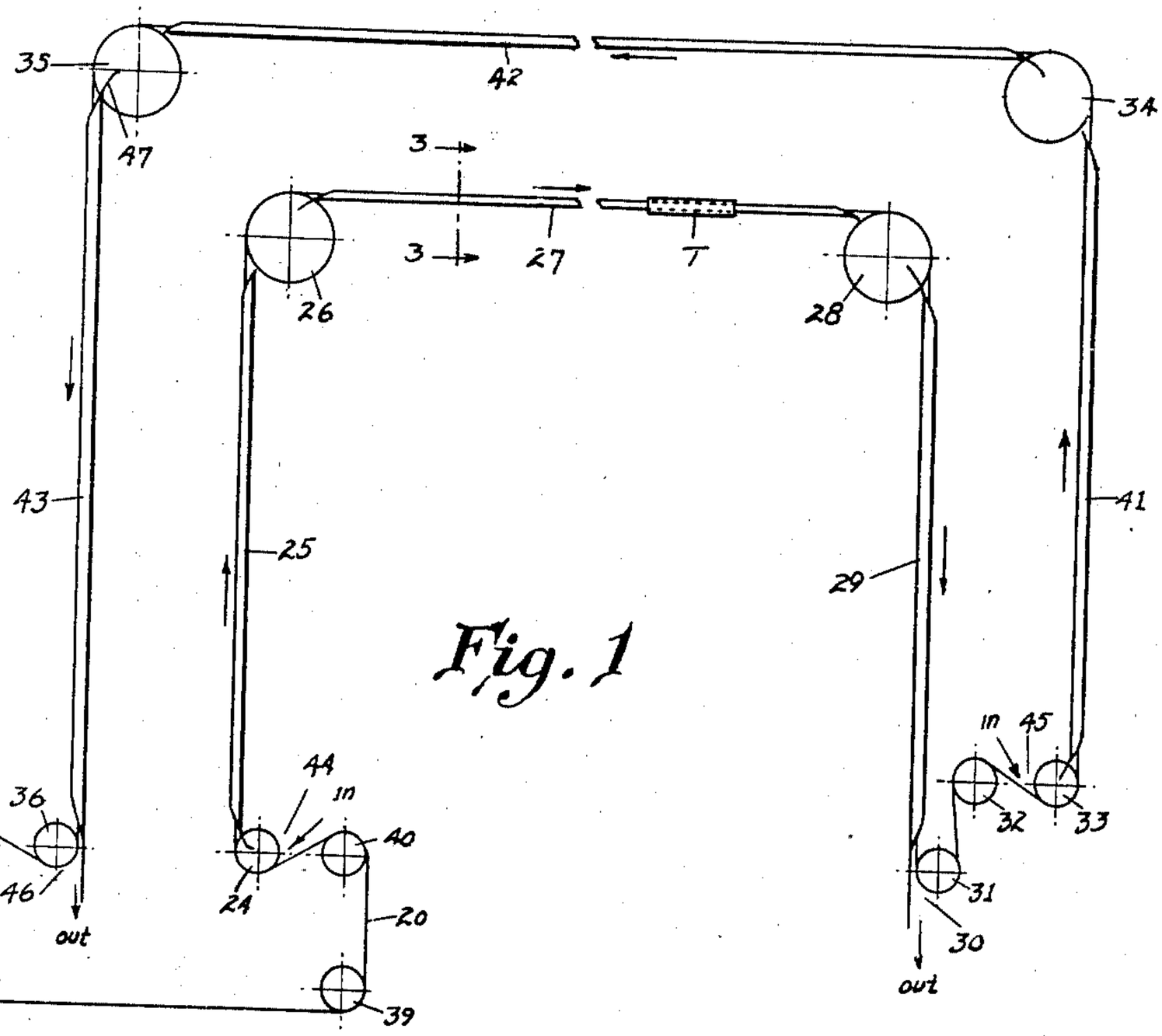

Fig. 1

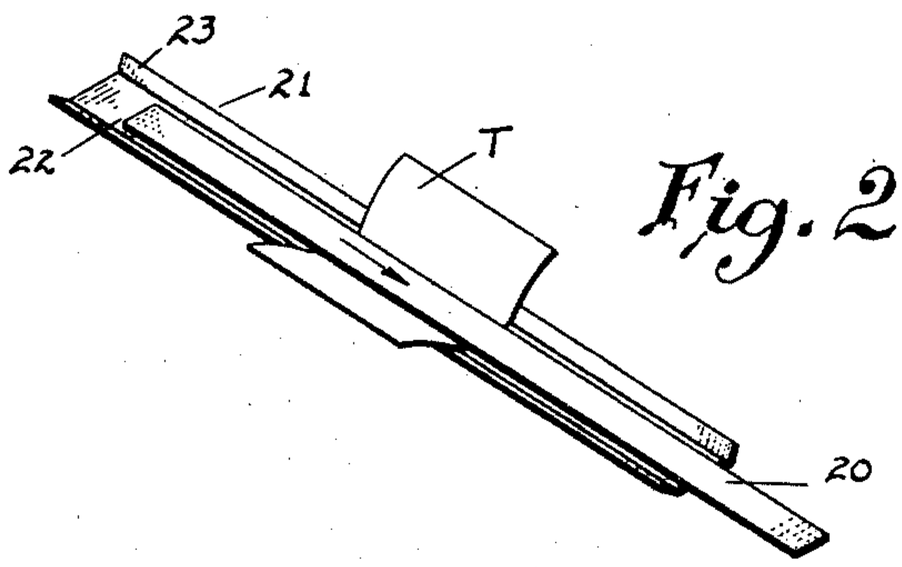

Fig. 2

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DRAG CONVEYER

Filed Jan. 20, 1930 4 Sheets-Sheet 2

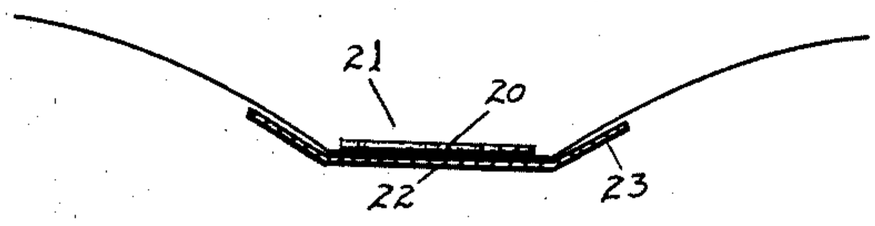

Fig. 3

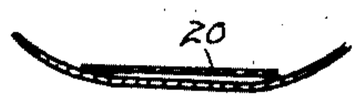

Fig. 5

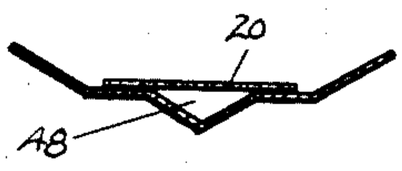

Fig. 4

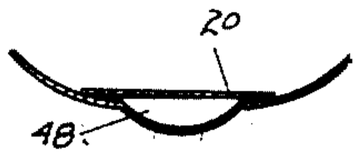

Fig. 6

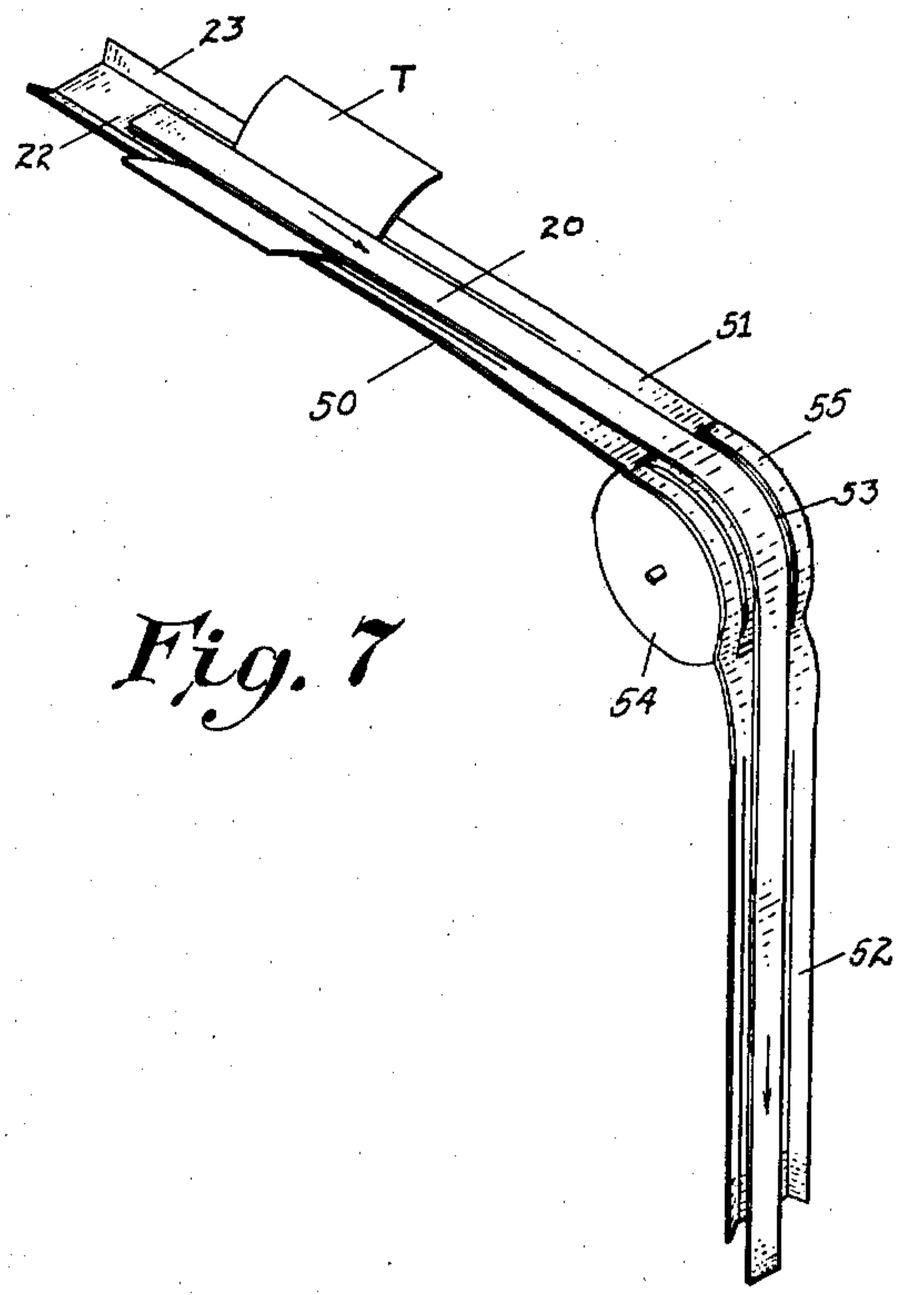

Fig. 7

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DRAG CONVEYER

Filed Jan. 20, 1930 4 Sheets-Sheet 3

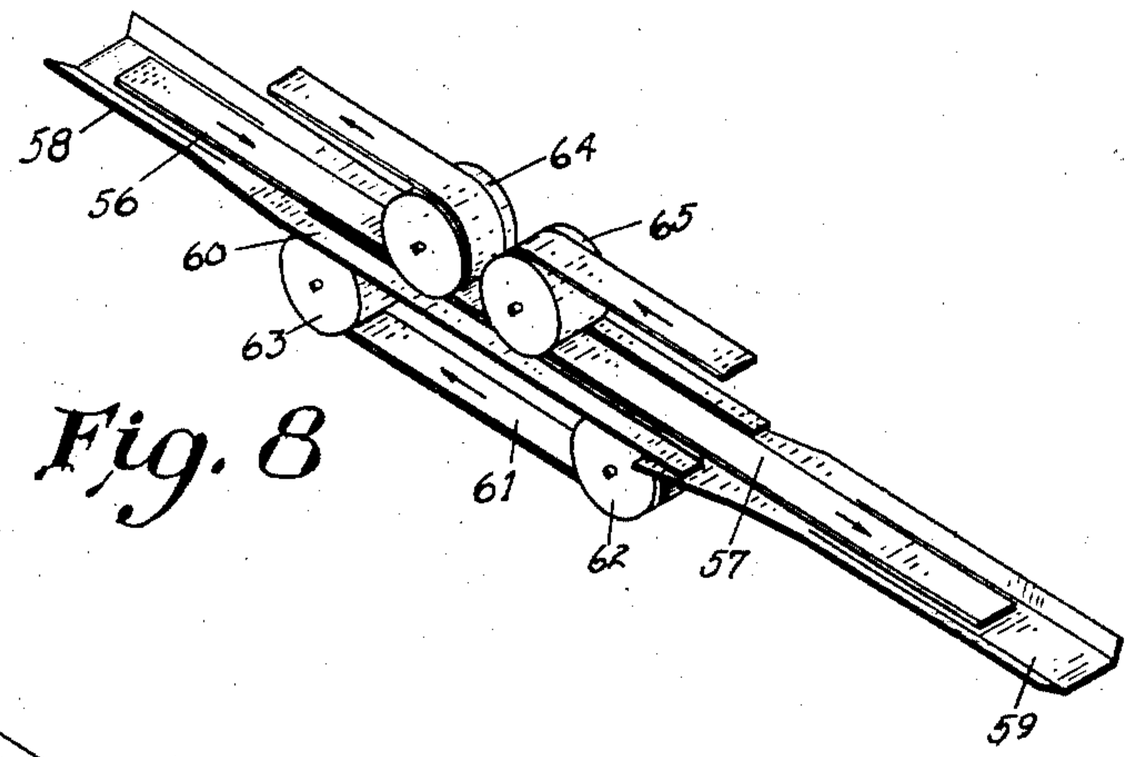

Fig. 8

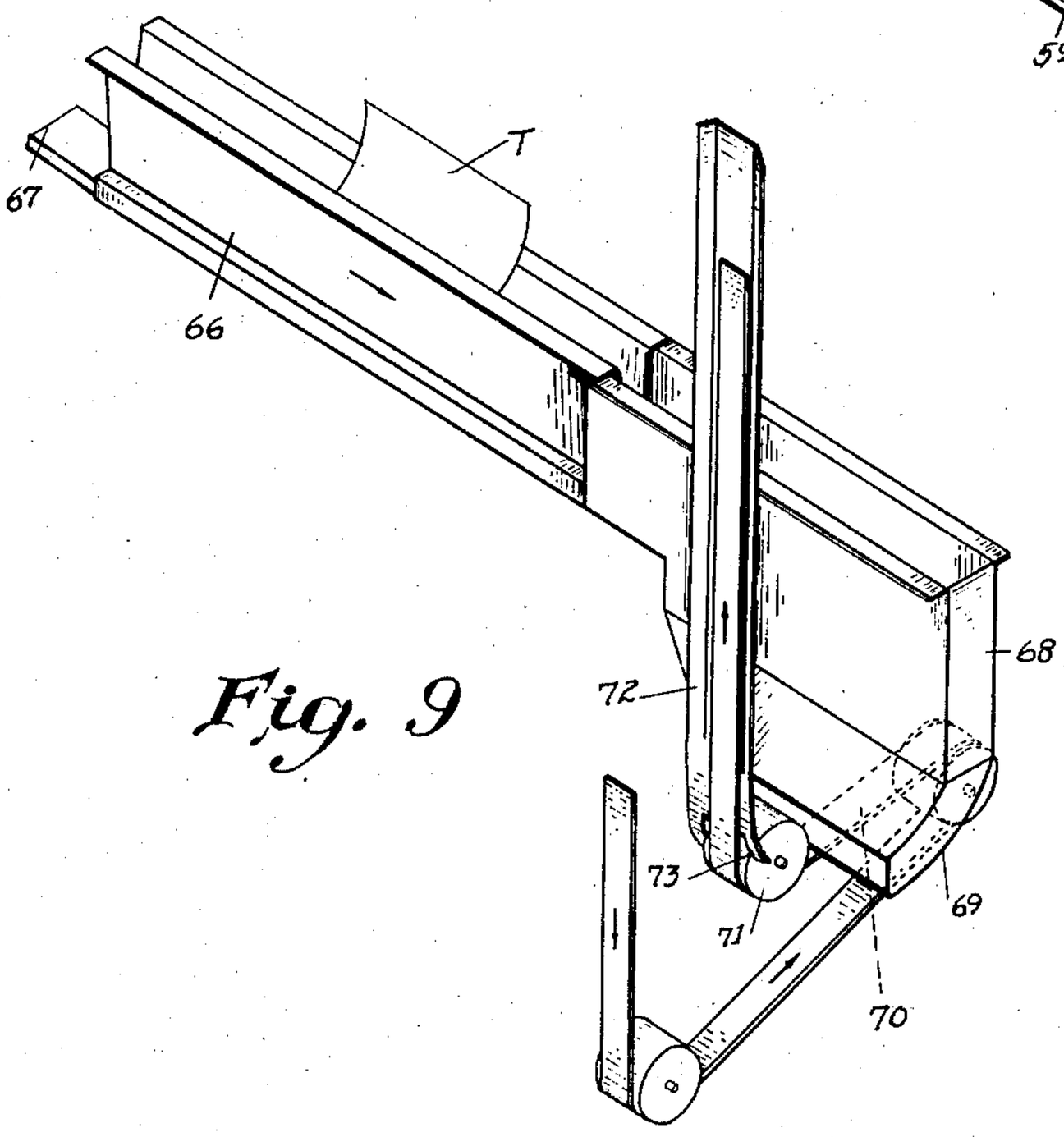

Fig. 9

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DRAG CONVEYER

Filed Jan. 20, 1930 4 Sheets-Sheet 4

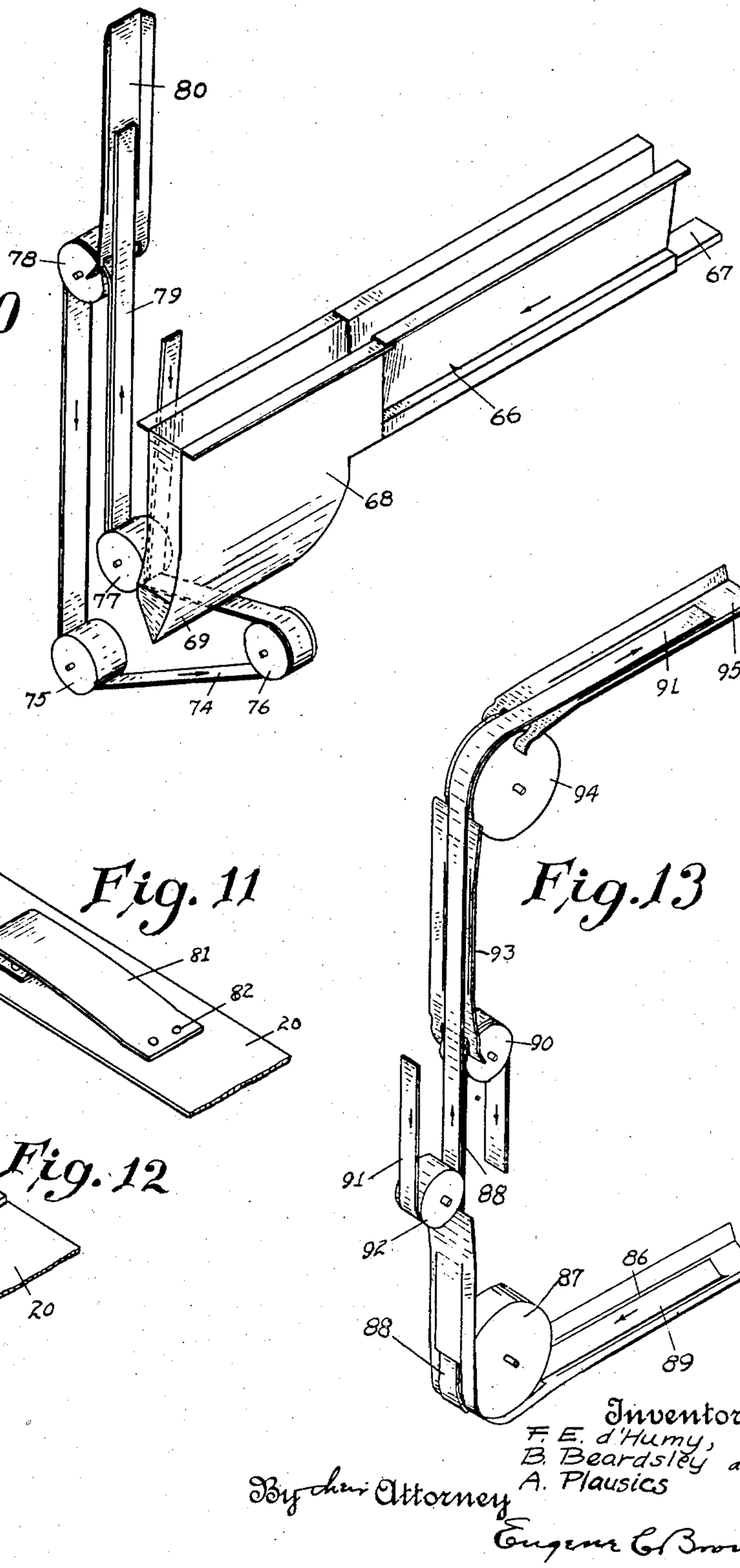

Fig. 10

Fig. 11

Fig. 12

Fig. 13

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UNITED STATES PATENT OFFICE

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DRAG CONVEYER

Application filed January 20, 1930. Serial No. 422,126.

This invention relates to an endless belt conveyer, particularly for transporting sheet material, such as letters, telegrams, and the like.

In large telegraph offices it is customary to route the telegram blanks from one part of the office to another by means of endless belt conveyers. The conveyers may comprise a flat horizontal wide belt upon which the telegrams are carried in a flat or horizontal position, a V-trough conveyer in which they are transported in a vertical or on edge position, a double strap conveyer having contact surfaces between which the telegrams are conveyed, or a multiple cord conveyer having the alternate cords disposed on opposite sides of the message blank. All of these conveyer systems have been used extensively, together with means for automatically transferring the telegram blanks from a conveyer of one type to a conveyer of another type.

The present invention relates to still another type of conveyer particularly adapted for this service, one of the objects being to provide an endless conveyer which is less expensive to manufacture and install than said foregoing systems, which may be operated at a high speed, which permits sheet material to be conveyed in a vertical, horizontal, or inclined direction and in which the direction of travel may be readily changed.

Another object is to provide a conveyer employing but a single belt for conveying sheet material by frictional engagement therewith and in which the material to be conveyed is maintained in contact with the belt, in whatever direction it may be conveyed.

Another object is to provide, in a belt conveyer, means for guiding the belt and for maintaining the material being conveyed in contact with the belt over relatively long runs.

Another object is to provide a conveyer system employing a single belt in which both the main and return runs of the belt may be employed for conveying the articles in opposite directions.

Another object is to devise means for introducing sheet material into the conveyer or for transferring sheet articles from another type of conveyer into our present conveyer system or from one part of the present system to another.

Other objects and advantages will appear from the following description taken in connection with the drawings and the appended claims.

In accordance with our invention we employ a single endless belt and we drag the belt along its main or operating run against a stationary support, the material being conveyed between the belt and the support. The support is so shaped or other means provided for bending the sides of the sheet material out of the plane of the belt in such direction as to cause the mid portion of the sheet material to be pressed into engagement with the belt, so as to maintain it in continuous frictional engagement with the belt over horizontal, vertical, or inclined runs. The bending of the sides of the paper or other sheet material out of the plane of the belt also prevents the material from shifting laterally with respect to the belt and hence working out from between the belt and support over long runs. The support may be so shaped or auxiliary means provided for guiding the belt over extended runs. In the preferred embodiment, we employ a belt of a width considerably less than the width of the sheet material to be conveyed and drag the belt along a narrow stationary flat trough having outwardly flaring sides.

The flaring sides of the trough serve to keep the sheet articles from working out from under the belt at either side thereof, and to distort the material from a flat plane in to a concave form and thereby increase the friction or grip between the belt and the articles. The trough also serves as a guide and support for the belt.

Whenever it is desired to change the direction of travel of the conveyer, the flaring sides of the trough are bent into the plane of the base of the trough, slightly in advance of the bend, and the base of the trough is cut away at the bend to enable the belt to engage with a direction changing pulley or roller.

The belt may be provided at intervals with

clearing out members which engage any of the articles which may have become temporarily stuck along the conveyer, as by static or by meeting an obstruction, and to advance such articles along to the end of the conveyer.

The articles may be fed into the conveyer from a chute or another conveyer of the same or different type, and they may be delivered from the conveyer into a tray or into another conveyer.

In order that the invention may be more fully understood, reference will be had to the accompanying drawings in which:

Figure 1 is a diagrammatic illustration of a conveyer system embodying my invention;

Figure 2 is a perspective view of a straight portion of the conveyer;

Figure 3 is a sectional view of the conveyer taken on the line 3—3 of Figure 1;

Figures 4, 5 and 6 are similar sectional views, showing modifications of the cross section of the trough;

Figure 7 is a perspective view of the conveyer at a right angle bend;

Figure 8 is a perspective view showing a break occurring in the belt of the conveyer system, illustrating the method of transferring the articles from one portion of the conveyer to another;

Figure 9 is a perspective view illustrating the manner of transferring the sheet articles from a V-trough conveyer into the drag conveyer;

Figure 10 is a view similar to Figure 9 and showing an intermediate double strap conveyer between the V-trough conveyer and the drag conveyer;

Figures 11 and 12 are perspective views of a fragment of the belt having clearing-out members attached thereto; and

Figure 13 is a perspective view showing an arrangement for reversing the position of the channel and sheet article relative to the belt.

Referring first to Figures 2 and 3, it will be seen that the conveyer comprises a belt 20 traveling in a trough or channel 21, having a base 22 and outwardly diverging side walls 23. The telegram blanks T are deposited in the conveyer between the belt 20 and the channel, the belt being of a width considerably less than that of the telegram blanks, and the sides of the telegram blanks extending over the flaring or diverging side walls 23 so as to assume a concave shape. The trough forms a support and a guide for the belt and, as stated before, the flaring sides 23 prevent the articles from working out from beneath the belt, as they are carried along thereby.

In Figure 1, the conveyer system comprises the belt 20, of endless form, which, starting at the roller 24, passes, in the direction of the arrows, vertically upward in the trough 25, thence around a roller 26 and horizontally in the trough 27, thence around a roller 28 and vertically downward in the trough 29, to the outlet end 30 of the system. The belt then continues a return path around the pulleys 31 to 40, to the pulley 24. The return length of the belt may be guided in and be supported by the trough sections 41, 42 and 43. The inlet end of the conveyer, for articles passing from left to right, is at the point 44 between the belt 20 and the roller 24, and the articles introduced at this point are dragged along the troughs 25, 27 and 29 by the belt and discharged from the conveyer at the point 30. The articles to be transported from right to left may be introduced into the conveyer between the belt 20 and the roller 33, at the point 45, and be similarly dragged along the troughs 41, 42 and 43 and discharged from the opposite end of the conveyer, at the point 46.

The troughs are deformed adjacent to the direction changing rollers 26, 28, 34 and 35 to facilitate the passage of the telegrams or other articles around the rollers. This deformation is indicated at 47, in Figure 1 and is shown in detail in Figures 7, 9, 10 and 13, as will appear more fully hereinafter.

The base of the trough may be flat and in contact with the belt through its entire width, as shown in Figure 3, or it may have the central portion thereof provided with a groove or channel 48, as shown in Figures 4 and 6, in order to reduce the area of contact of the belt with the trough and thereby reduce the friction between them.

In Figure 5 the trough is shown with a concave cross section so that the belt contacts therewith only at the margins of the belt. Obviously, other cross sectional forms of the conveyer may be employed and the conveyer may be provided with ribs or similar means for reducing the area of contact thereof with the belt. The forms of construction shown in Figures 4, 5 and 6 also reduce the friction between the articles to be conveyed and the trough so that they are more easily moved along by the traveling belt.

When it is desired to change the direction of travel of the conveyer, as for instance, to form a right angled bend in the conveyer, the side walls 23 of the trough 50 are gradually flattened out from a point in advance of the bend, into the plane of the base as shown at 51 in Figure 7 and the trough section may terminate at such point, being continued around the bend by an adjoining trough section 52. The section of trough 52 has the base portion thereof cut away as at 53 to enable a feed roller 54 to contact with the belt 20. The spaced side flanges of the trough 52 adjacent to the cut away portion 53 are flattened out and bent into an arcuate surface coinciding with that of the face of the roller 54. The terminating end of the conveyer section 51 is disposed over the arcuate ends 55 of the channel 52. The channel 52 beyond the

bend has the side flanges 23 gradually bent into their normal diverging position.

In long conveyer systems, it is not advisable to employ a single belt extending from end to end of the system and returning upon itself, due to the power required to drive the same, the strength of the belt required, expansion and contraction of the system, and the like, and it is customary, therefore, to break up the conveyer belt into a number of shorter lengths. At the point where two of such lengths adjoin, it is necessary to provide some means for feeding the blank or other article across the gap between the adjacent terminating belt lengths, and in Figure 8 we have shown an arrangement for this purpose. The two adjoining belt sections are indicated in this figure at 56 and 57, the articles being transferred from the belt 56 to the belt 57. The trough may be continuous past the break, but we have shown same as consisting of two separate sections 58 and 59. The section 58, with which the belt 56 cooperates, has its side flanges flattened out, at 60, slightly in advance of the end of the belt 56 and the base of the channel 58 is cut away from a point in advance of the end of the belt 56 to a point beyond the adjacent end of the belt 57. An auxiliary belt 61, passing around pulleys 62 and 63, is arranged beneath the trough so as to travel in the cut-away portion of the base in contact with the straps 56 and 57. The belt 61 serves to carry the telegram blank across the break occurring between the belts 56 and 57, and to convey the same in between the belt 57 and the trough. The end of the trough section 59 is flattened out and disposed beneath the end of the trough section 58. The belts 56 and 57 pass around direction reversing pulleys 64 and 65 and return parallel to their operating runs.

In Figure 9 we have shown an arrangement for transferring the telegraph blanks from a V-trough conveyer to the drag conveyer. The V-trough conveyer consists of a trough 66 having a substantially V-shaped cross section with a belt 67 traveling along the base thereof, the articles being conveyed along the trough in a vertical position. At the end of the conveyer a downwardly extending chute 68 is provided through which the articles drop, the outlet end, 69 of the chute being curved so as to discharge the articles in an inclined direction upon the belt 70 at the point of contact thereof with a pulley 71, so that the articles are carried around the pulley and fed into position between the belt and the channel 72 of the drag conveyer section. It will be noted that the side walls of the trough 72 are flattened out and extended beyond the base portion thereof and curved along the ends of the pulley 71, at 73, so as not to interfere with the movement of the articles in between the trough and the belt.

If desired, the chute 68 may discharge into a double strap conveyer as shown in Figure 10, which in turn feeds into the drag conveyer. The double strap conveyer comprises an endless strap 74, passing around pulleys 75, 76, 77 and 78 and a second belt 79 which passes around the pulley 77 and then vertically upward in contact with a portion of the belt 74. The belt 79 continues upwardly in contact with the trough 80 and forms a part of the drag conveyer. The articles discharged from the chute 68 are engaged by the belts 74 and 79 and carried thereby up to the lower end of the trough 80 and thence along the trough by the belt 79.

The articles sometimes adhere to the trough, due to static or friction, and in order to force such articles to the end of the conveyer, we may provide, at intervals along the belt, a clearing-out member which may take one of various forms, two of which are shown in Figures 11 and 12. The clearing-out member shown in Figure 11 comprises a strap 81, of leather or other similar material, riveted as at 82, or otherwise secured to the belt 20 on the side thereof in contact with the trough. The clearing-out member shown in Figure 12 consists of a cleat or strap 83, of suitable material, such as leather, extending crosswise of the belt and secured thereto, as by some adhesive material, or by being sewed thereto, as shown at 84. The clearing-out members engage any of the articles stuck in the conveyer and push them through the conveyer to the end thereof.

It is obvious that along horizontal runs of the conveyer, the belt should rest upon the top side of the trough, in order that the trough may serve as a support for the belt and so that the belt will remain in frictional contact therewith. It will also be evident that where two right angle bends are made in the conveyer so as to produce a vertical portion intermediate two horizontal portions extending parallel to each other and in the same direction from the intermediate portion, that the belt would be disposed above the trough section of one horizontal portion and below the trough section of the other horizontal portion. In Figure 13 we have shown an arrangement for enabling the channel to be reversed relative to the belt and thus permit two such right angle bends to be formed in the conveyer system with the belt resting upon both trough sections. The lower horizontal portion of the conveyer has a trough 86 bent vertically at the roller 87, the base of the trough being cut away at 88 and the back of the trough facing to the left. The belt 89 passes around the roller and vertically upward in contact with the vertical portion of the trough section 86. The belt 89 is continued beyond the end of the trough 86, around a roller 90 and thence back parallel to itself. A second belt 91 passes around a roll-

er 92 and vertically upward in contact with the belt 89, between the rollers 90 and 92 and thence in contact with a trough 93, having the front side thereof facing the left. The belt continues over the roller 94 into contact with the upper horizontal trough 95. It will be noted that this construction permits the belts 89 and 91 to be disposed along the horizontal runs above the channels 86 and 95.

In the foregoing specification and in the claims where the term "sheet material" is employed, it is to be understood as including either a single sheet, a plurality of superimposed sheets, either loose or secured together, or enclosed in an envelope or other wrapping, or to any object of the same general nature.

It is obvious that various other changes, modifications, and adaptations of the system will occur to those skilled in the art, and we desire to include all such changes within the scope of our invention as come within the terms of the appended claims.

What we claim is:

1. A drag conveyer comprising a stationary channel having a base and outwardly flaring sides and a belt of a width less than the width of said channel, positioned in said channel and arranged to travel therein in frictional contact with the base, to convey sheet material along said channel, beneath said belt.

2. A conveyer for sheet material comprising a stationary longitudinally extending support, a belt supported upon said support and adapted to travel in contact therewith, whereby said sheet material may be conveyed intermediate said belt and support by frictional engagement with said belt and means for causing said sheet material to assume a non-planiform shape transversely of said support.

3. A conveyer for sheet material comprising a stationary trough having outwardly flaring sides, a belt having a width substantially less than the width of said sheet material arranged within said trough between said sides, whereby, when said sheet material is introduced into said conveyer between said belt and trough, the ends of said material projecting beyond the sides of said belt will be bent out of the plane of the belt, said belt being adapted to travel in said trough and to convey said material along the trough by frictional contact with the belt.

4. A conveyer for sheet material comprising trough sections disposed at an angle to each other and having an end of one section adjacent the end of another, a direction reversing roller at the junction of said trough sections, a belt passing around said roller and disposed within said trough sections and adapted to travel therein, the sides of said trough sections being bent substantially into the plane of the belt adjacent said roller.

5. A conveyer for sheet material comprising a stationary trough and a belt arranged to travel therein in frictional contact with said trough between which said sheet material may be conveyed, a roller for said belt disposed at one end of said trough, said trough having outwardly flaring sides remote from said roller and said sides being bent substantially into the plane of the belt adjacent said roller.

6. A conveyer system for sheet material comprising an endless belt having a main run and a return run, a stationary trough for each of said runs in which said belt is adapted to travel, means for introducing sheet material into both said main and return runs between said troughs and belt, and means for discharging said sheet material from each of said runs.

7. A conveyer for sheet material comprising a stationary trough, an endless belt having an operating run adapted to travel in said trough, the sides of said trough extending beyond the sides of said belt, a roller for said belt adjacent an end of said trough, the sides of the trough terminating adjacent the ends of said roller, within the periphery thereof, whereby when said sheet material is introduced between the belt and the roller it will be conveyed intermediate said belt and trough.

8. A conveyer for sheet material comprising a stationary longitudinally extending support, having a base and outwardly extending sides, a belt resting upon said support intermediate said sides and adapted to travel thereon for conveying sheet material along said support by frictional contact with said belt, means adjacent one end of said conveyer for introducing sheet material between said belt and support, and means at the opposite end of the conveyer for discharging said sheet material from between said belt and support, said belt being of a width substantially less than the width of the material to be conveyed, whereby said material will extend beyond the sides of said belt over the sides of said support.

9. A conveyer system for sheet material comprising a pair of trough sections disposed end to end at an angle to each other, a roller positioned at the junction of said trough sections, an endless belt passing around said roller and adapted to travel in said trough sections, means for introducing sheet material into said conveyer at one end thereof between said belt and one of said trough sections, said trough sections being shaped adjacent said roller to permit said material to be conveyed from one trough section to the other.

10. A conveyer for sheet material comprising a trough having a base and outwardly flaring sides, a roller disposed at each end of said trough, a belt arranged in said trough

and adapted to travel in frictional contact therewith, the base and sides of said trough being continuous between said rollers and said base being cut away adjacent said rollers to permit the rollers to contact with said belt, the sides of said trough extending beyond said base.

11. A conveyer for sheet material comprising a stationary trough having a base and diverging sides, a belt arranged to travel in said trough in frictional contact with said base for conveying sheet material between the belt and base, said base being continuous longitudinally of said belt and contacting with a portion only of said belt transversely thereof.

12. A conveyer system for sheet material comprising two trough sections disposed at an angle to each other, a roller positioned at the junction of said trough sections with the base of said sections substantially tangent to the periphery of said roller, a belt arranged in said trough sections with the sides of said trough extending outwardly therefrom and passing around said roller, the base of one of said trough sections being cut away adjacent the roller and the sides of said trough extending partially around the roller at the sides thereof substantially in the plane of the belt and terminating adjacent the sides of the other trough sections.

13. A conveyer for sheet material comprising two trough sections arranged end to end, a belt positioned in each of said sections in frictional contact therewith, said troughs each having a base and two outwardly diverging said walls, one of said trough sections having the base cut-away adjacent the adjoining trough section and having the side walls bent into the plane of the belt and extending over the side walls of the adjoining trough section, and means protruding through said cut-away portion adapted to move therein for assisting the conveyance of said material from one trough section to the other.

14. A conveyer for sheet material comprising two endless belts having end rollers disposed side by side in spaced relation, a trough having a base and side walls, in which said belts are adapted to travel, for conveying sheet material intermediate said belts and trough, said base being cut away to form an elongated aperture between said end rollers, and means extending through said aperture for conveying said sheet material from one belt to the other.

15. A conveyer for sheet material comprising two endless belts having end rollers disposed side by side in spaced relation, a trough having a base and side walls in which said belts are adapted to travel, for conveying sheet material intermediate said belts and trough, said base being cut away between said end rollers to form an elongated aperture, and an auxiliary belt extending through said aperture for conveying said sheet material from one belt section to another, said side walls adjacent said aperture being bent substantially into the plane of the auxiliary belt.

16. A conveyer for sheet material comprising a trough having a base and outwardly extending side walls, a roller disposed at one end of said trough, the side walls of said trough extending beyond said base longitudinally of the trough and projecting along each end of the roller, within the periphery thereof, a belt disposed in said trough between said side walls and passing partially around said roller, and means for introducing sheet material into said conveyer between said belt and roller, whereby said material will be carried into said trough beneath said belt, said means comprising a second conveyer having an outlet adjacent the junction of the belt and roller.

17. A conveyer for sheet material comprising a trough having a base and outwardly extending sides, a belt disposed in said trough and adapted to travel in frictional contact with said base for conveying sheet material along the trough, said belt extending longitudinally beyond the end of said base, and a second belt extending parallel to and in contact with said extended portion of the first mentioned belt, whereby sheet material discharged from the end of said trough will pass in between said contacting belts.

18. A conveyer for sheet material comprising a pair of trough sections, an endless belt in each trough section in frictional contact therewith, means for introducing sheet material between one of said belts and trough sections, said trough sections being in longitudinal alignment and spaced apart, and each of said belts extending beyond the spaced ends of said trough sections in frictional contact with each other, whereby said sheet material may be conveyed from one trough section to the other.

19. A conveyer for sheet material comprising a pair of trough sections, each having a base and outwardly diverging sides, an endless belt in each trough section in frictional contact therewith, means for introducing sheet material between one of said belts and one of said trough sections, said trough sections being in longitudinal alignment and spaced apart with the diverging sides of one trough reversed with respect to those of the other, each of said belts extending beyond the spaced ends of the trough sections in frictional contact with each other, whereby said sheet material may be conveyed from one trough section to the other with its position reversed relative to said trough sections.

20. A conveyer for sheet material compris-

ing a stationary trough, a belt adapted to travel in said trough, the interior surface of the trough being free from obstructions, whereby said sheet material may be conveyed intermediate said belt and trough by frictional engagement with the belt, said belt, at spaced intervals, having means on its contacting surface for engaging said sheet material to move it through said trough.

21. A drag conveyer for sheet material comprising a stationary longitudinally extending support having flanges extending along the sides thereof and a belt supported upon said support and adapted to travel in frictional contact therewith for conveying sheet material intermediate the belt and support by friction with the belt, said flanges engaging said sheet material to maintain the sides thereof out of the plane of the belt.

22. A drag conveyer comprising a stationary longitudinally extending support having a belt adapted to travel on said support in frictional contact therewith, whereby sheet material may be conveyed intermediate the belt and support, said support being shaped so as to cause the sheet material to assume a non-planiform shape transversely of the support.

23. A conveyer for sheet material comprising a stationary trough, a belt arranged to travel in said trough in frictional contact therewith for conveying sheet material between the belt and trough, said trough having a channel extending longitudinally thereof beneath said belt, whereby a portion only of the belt contacts with said trough.

24. A conveyer for sheet material comprising a stationary support, a belt arranged to travel on said support in frictional contact therewith for conveying sheet material between the belt and support by friction with the belt, the transverse cross section of said support, beneath the belt, being of non-planiform shape.

25. A conveyer for sheet material comprising a trough, a roller disposed at one end of said trough, a belt disposed in said trough and passing partially around said roller, and means for introducing sheet material into said conveyer between the belt and roller whereby said material will be carried into said trough beneath said belt, said means comprising a chute having an outlet adjacent the junction of the belt and roller.

26. A drag conveyer comprising a stationary support member and an endless traveling member supported thereon and adapted to travel in frictional contact therewith, whereby sheet material may be conveyed between said members, said members cooperating with each other and being so shaped as to cause said sheet material to assume a non-planiform shape transversely of said support.

27. A drag conveyer comprising a stationary longitudinally extending supporting member and an endless traveling member supported thereon and adapted to travel in frictional contact therewith, one of said members being of substantially trough shape, whereby sheet material interposed between said members will be carried along the stationary member in a non-planiform shape.

28. A drag conveyer comprising a stationary support, conveyer means adapted to travel in frictional contact with said support whereby sheet material may be conveyed between said conveyer means and support, the support and conveyer means co-acting to cause said sheet material to assume a non-planiform shape transversely of the support.

29. A drag conveyer for sheet material such as telegram blanks, comprising a stationary longitudinally extending support, having a width materially less than said sheet material, a belt adapted to travel in contact with said support for conveying sheet material between the belt and support by frictional engagement with the belt, rollers around which said belt passes and means intermediate said rollers for preventing said sheet material from shifting laterally with respect to said support.

30. A drag conveyer for sheet material, such as telegram blanks, comprising a stationary longitudinally extending support, having a width materially less than said sheet material, a belt adapted to travel in contact with said support for conveying sheet material between the belt and support by frictional engagement with the belt, rollers around which said belt passes and means intermediate said rollers for guiding said belt along the support.

31. A conveyer for sheet material comprising an endless conveyer belt and a stationary longitudinally extending support for said belt, said support having side flanges arranged to guide the belt upon the support and said support being of a width less than that of the material to be conveyed whereby the sides of said material will extend outwardly over said flanges.

32. A drag conveyer for sheet material of at least a predetermined width, comprising a stationary longitudinally extending support, a belt arranged to travel in contact with said support for conveying said sheet material between the belt and support, said support being of a width materially less than said predetermined width of the sheet material whereby the sides of said material extend outwardly a substantial distance beyond said support.

In testimony whereof we affix our signatures.

FERNAND E. D'HUMY.
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