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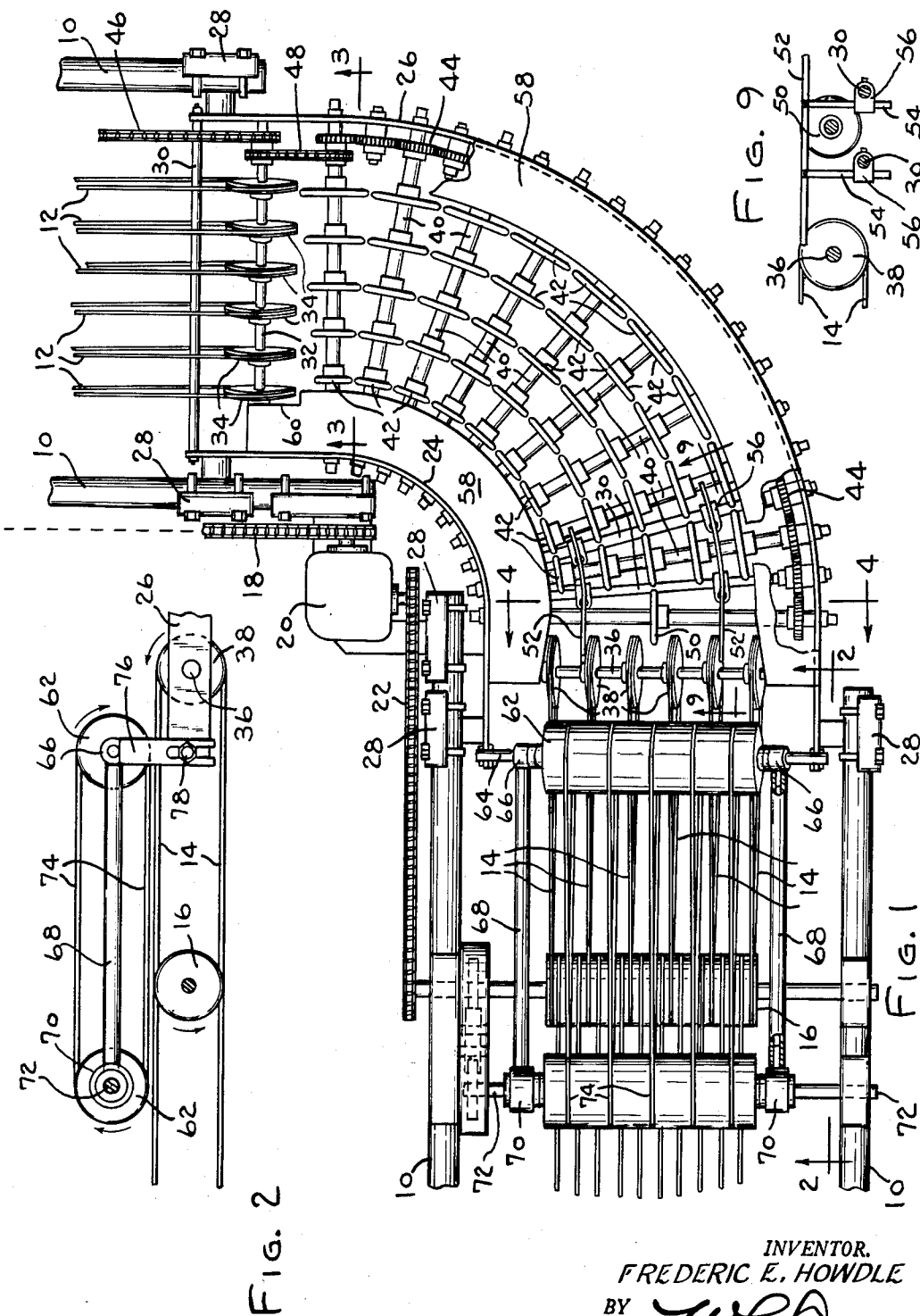
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2,729,324

HORIZONTAL TURNS FOR CONVEYERS

Filed Oct. 30, 1952

2 Sheets-Sheet 1



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2 Sheets-Sheet 2

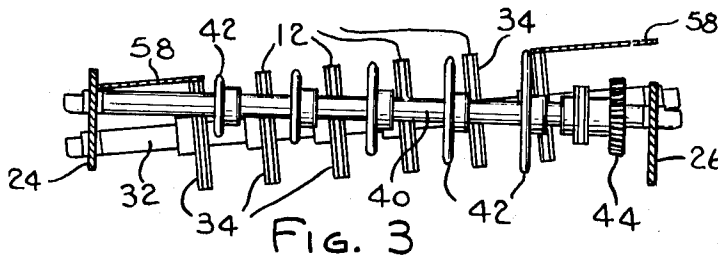


FIG. 3

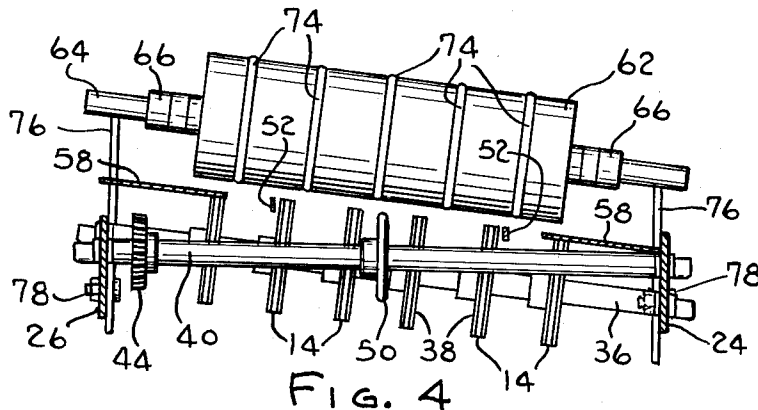


FIG. 4

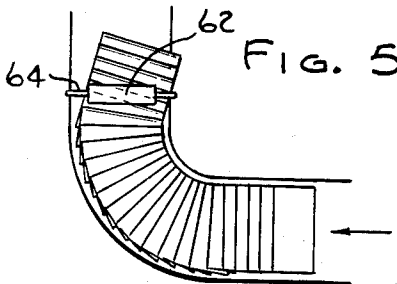


FIG. 5

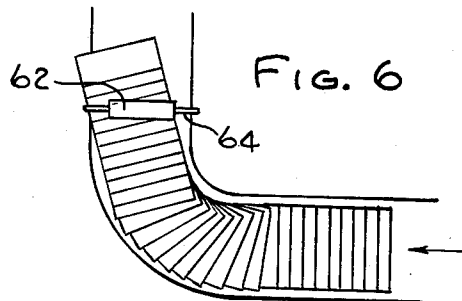


FIG. 6

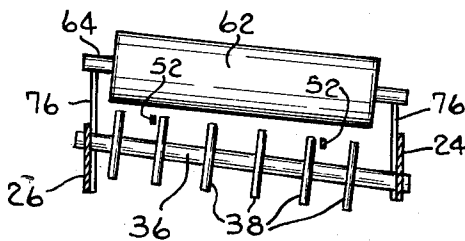


FIG. 7

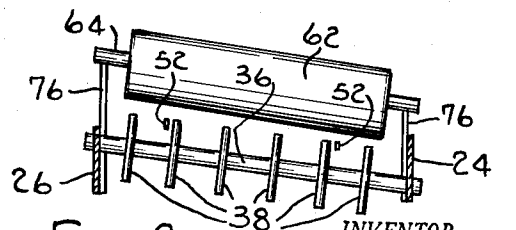


FIG. 8

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1

2,729,324

HORIZONTAL TURNS FOR CONVEYERS

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12 Claims. (Cl. 198—167)

This invention relates to improvements in conveyers for materials such as newspapers or other items sometimes carried in overlapped state and more particularly to horizontal turns for such conveyers.

Horizontal turns for such conveyers are disclosed in the patent to G. B. Reisbach, et al., No. 1,508,351 of September 9, 1924. The turn therein described, as well as other turns presently known, have no provision for quick adjustment to compensate for variations in the stream material transported by the conveyer. For example, newspapers may be delivered with each following paper on top of the preceding paper. As this so-called direct delivery passes through the turn the stream tends to bend more sharply than the turn. Newspapers may also be delivered with each leading paper on top a following paper. As this so-called indirect delivery passes through the turn the stream tends to bend less sharply than the turn. If the horizontal turn has been adjusted to compensate for a direct delivery, the present turns require considerable shut-down time to readjust for an indirect delivery and vice versa. Furthermore, when the presently known horizontal turn is adjusted for material of a definite thickness or a prescribed speed, it is likewise necessary to utilize considerable shut-down time to adjust such turn for handling material of different thickness or a different speed.

It is an object of this invention, therefore, to provide a horizontal turn of this type which is easily adjustable for compensation to such variations in the stream of material handled.

This object is obtained principally by the use of a driven roller adjacent and above the receiving end of the output belts of the horizontal turn, which is adjustable to vary the distance between such belts and such roller. If the leading edge of the material in the stream is angled with respect to the direction of the conveyer leading away from the horizontal turn, the roller may be adjusted so that it is closer to the output belts at that end in alignment with the advanced corner of the material. The roller will slow down or retard the advance of such advanced corner while the forward motion of the following material and the action of the turn moves the retarded corner forwardly until the leading edge is substantially aligned with the axis of the roller and at right angles to the proper direction of travel.

It is also a feature of this invention to incline downwardly toward the inside of the turn the lines contacting the tops of the turning wheels on each shaft and the top of the input and output belts. This helps to offset the action of centrifugal force as the stream passes through the turn.

Another feature of this invention is the use of relatively wide inner and outer guide plates. This permits wider variation in the fanning action of the material in the stream without losing support for such stream and makes each adjustment usable under a wider variety of changes in thickness and speed.

The novel features, which are considered characteristic

2

of the invention, are set forth with particularity in the appended claims. The invention itself, however, both as to its organization and its method of operation, together with additional objects and advantages thereof, will best be understood from the following description of a specific embodiment when read in connection with the accompanying drawings, in which:

Fig. 1 is a plan view of a horizontal turn embodying the present invention;

Fig. 2 is a fragmentary view in side elevation taken from the line 2—2 of Fig. 1;

Fig. 3 is a fragmentary sectional view taken on the line 3—3 of Fig. 1;

Fig. 4 is a fragmentary sectional view taken on the line 4—4 of Fig. 1;

Fig. 5 is a diagrammatic view illustrating the action of a stream of papers arranged in direct delivery;

Fig. 6 is a diagrammatic view showing the action of a stream of papers arranged in indirect delivery;

Fig. 7 is a schematic view illustrating the roller adjustment necessary to compensate for direct delivery;

Fig. 8 is a schematic view showing the roller adjustment necessary to compensate for indirect delivery; and

Fig. 9 is a fragmentary sectional view taken on the line 9—9 of Fig. 1.

Referring to the drawings, a horizontal turn embodying the invention is shown, for sake of example, connected between two conveyer sections of the standard type commonly used for transporting a stream of newspapers. In such conveyers the newspapers are supported on a plurality of spring belts extending between rollers supported on a frame illustrated at 10. Standard sections of these conveyers are connected by section joints including driven rollers provided with grooves for guiding the spring belts. In the application illustrated, input spring belts 12 extend from a roller (not shown) of a standard section joint and the output spring belts 14 extend to a roller 16 of another standard section joint. Power is transferred from the first section joint to the second section joint by a chain 18 connected to an angle gear drive 20 and by a chain 22 connecting such drive with such second section joint. The horizontal turn has an inner supporting bar 24 and an outer supporting bar 26 secured by frame supports 28 to the frame 10. Tie-rods 30 may be used to properly space the inner and outer supporting bars. In order to connect the horizontal turn with the input spring belts, an input shaft 32 having single grooved pulleys 34 over which the input spring belts 12 travel is rotatably carried by the bars 24 and 26. At the output end a similar output shaft 36 with single grooved pulleys 38 over which the output spring belts 14 travel is rotatably carried by such bars. As is clearly shown in Figs. 3 and 4, both input and output shafts are tilted so that the ends at the inside of the turn are lower than the ends at the outside of the turn. Thus the lines contacting the tops of such pulleys slope downwardly toward the inside of the turn.

Extending from the input shaft to the output shaft are a number of turning elements 40. These elements are of standard design and are mounted in suitable bearings adjustably carried in the inner and outer supporting bars 24 and 26. The turning wheels 40 of these elements vary in diameter as shown and the axes of rotation of such elements are horizontal so that the lines contacting the tops of such wheels slope downwardly toward the inside of the turn at the same pitch as similar lines contacting the tops of the pulleys on the input and output shafts. Each of the turning elements 40 is driven through gearing 44 receiving power from the preceding standard section joint by chain 46 passing over a sprocket on input shaft 32 and by a chain 48 extending between sprockets on such input shaft and the first of the turning elements 40. The

downward slope of the pulleys 34 and 38 and the turning wheels 42 pitch the path of material passing through the turn so as to counteract centrifugal force and thus keep the material from sliding off the outer edge of the turn.

It has been pointed out that one feature of this invention is the use of only one centrally located driving wheel 50 on the last of the turning elements 40. By driving the material with only one wheel each unit, such as a folded paper, may be more easily swung to vary the angularity of the leading edge and properly aline such edge. To prevent sagging of the papers there are provided on opposite sides of the central wheel 50 bridges 52 which are vertically adjustable. These bridges (see Fig. 9) are carried by legs 54 mounted in adjusting clamps 56 on the tie-rods 30 and extend from the third from last turning element to the output belts 14.

As the material travels along the horizontal turn, it is desirable to provide a wide support at both the inner and outer edges of the turn. Such wide support permits a larger variation in the conditions of the material for each adjustment of the turn. The turn is therefore provided with substantially wide guide plates 58, the outer one of which also constitutes a gear guard. These plates are notched or cut away at 60 to accommodate the outer grooved pulleys 34 and 38.

As previously pointed out, the adjustment provided by the bridges 52 and central wheel 50 is not effective if conditions of the material vary beyond relatively narrow limits. For example, if the material were newspapers in direct delivery and the change was to indirect delivery, a new adjustment would have to be accomplished involving a trial and error setting of the bridges. The same would be true of a change from daily to Sunday editions. The principal feature of this invention is to have an adjustment which may be made and tried and remade while the material is passing through the turn to quickly reach the proper setting. To accomplish this a wooden roller 62 is adjustably carried over the output spring belts 14 near the output shaft 36. This roller has internal bearings by which it is rotatably carried on an adjustable shaft 64. The shaft 64 is mounted in links 66 having pins fitting within the ends of spacer tubes 68. Sleeves 70 rotatably mounted on an upper shaft 72 of a section joint have pins fitting within the other ends of the tubes 68. Spring belts 74 extend from a standard section roller 71 on shaft 72 to the wooden roller 62, the latter being provided with belt grooves. The links 66 are held assembled on the tubes 68 by the action of the spring belts 74. This arrangement provides top spring belts which overlie the output spring belts 14 and material on such output spring belts is carried therebetween. However, another function of the top spring belts 74 is to drive the wooden pulley 62 at conveyor speed. The wooden roller 62 may be swung about the axis of shaft 72 without changing the tension of spring belts 74 to effect the adjustment of such roller with respect to the output spring belts 14. The outer ends of the adjustable shaft 64 rest on adjustable stops 76 which are slotted to slide on bolts 78 in the supporting bars 24 and 26 and clamped in desired location by nuts on such bolts.

Assuming that newspapers are entering the turn in direct delivery, as illustrated in Fig. 5, the tendency is for the stream to bend inwardly of the turn. The action of the turning wheels takes place over the entire bottom of the first newspaper to increase the fanning out in the turn. When this condition exists, the roller 62 is adjusted so that the outer end of the roller is closer to the output spring belts 14 than the inner end, as is diagrammatically illustrated in Fig. 7. When the outer leading corner of each newspaper reaches the roller 62 it will be momentarily held by the roller while the frictional action of the stream and of the central turning wheel 50 causes the inner corner to catch up and substantially aline the edge of the newspaper with such roller. The edge of the newspaper will then be substantially perpendicular to the

desired line of travel and the paper will pass on under the roller 62 and top spring belts 74.

Assuming that with the roller so adjusted a stream of newspapers now enters the turn by indirect delivery, such stream will not bend as sharply as the turn, as is illustrated in Fig. 6 and will tend to run off the outer side of the turn. This is because the turning wheels 42 act on only a small part of the bottom of each newspaper and hence the fanning out is substantially lessened. To counteract this condition, the roller 62 is adjusted so that its inner end is closer to the spring belts 14 than its outer end, as is illustrated in Fig. 8. The roller 62 will then momentarily hold the leading inner corner of each newspaper while the outer corner is advanced by the frictional action of the stream. The newspaper, upon alinement of its leading edge with the roller, will advance and be carried away by the spring belts 14 with its leading edge substantially perpendicular to the line of travel.

Both of these adjustments may be made while the stream is passing through the turn. Another advantage resulting from the use of the wooden roller for such adjustments is that its compensating effect will not be changed by a variation in the speed of delivery or in the thickness of the material. In the latter case, its retarding effect remains proportionally the same.

Although only one embodiment of the invention is shown and described herein, it will be understood that this application is intended to cover such changes or modifications as come within the spirit of the invention or scope of the following claims:

I claim:

1. In a horizontal turn for a conveyor for material such as newspapers or other items sometimes travelling in overlapped relation, an output belt at the output end of said turn, a roller above said output belt adapted to engage such material on said belt, and means for adjusting said roller so that one end thereof may be nearer and the other end thereof may be farther from said belt to assert a momentary retarding action on the leading corner of an item of such material upon reaching said roller.

2. A horizontal turn as defined in claim 1 in which there is means rotating said roller at the speed of said output belt.

3. A horizontal turn as defined in claim 1 in which said means comprises an axle for said roller, means guiding said axle in a substantially vertical path, and vertical adjustable stops on which the ends of said axle rest.

4. In a horizontal turn for a conveyor for material such as newspapers or other items sometimes travelling in overlapped relation, a frame, driven turning elements carried by said frame and operative to fan out items of such material, the output end one of said turning elements having a single turning wheel centrally located, and vertically adjustable bridges carried by said frame on opposite sides of said wheel and adapted to contact the under side of items of such material.

5. In a horizontal turn for a conveyor for material such as newspapers or other items sometimes travelling in overlapped relation, a frame, driven turning elements carried by said frame and operative to fan out items of such material, the output end one of said turning elements having a single turning wheel centrally located, vertically adjustable bridges carried by said frame on opposite sides of said wheel and adapted to contact the under side of items of such material, an output belt adjacent said single turning wheel, a roller above said output belt adapted to engage such material on said belt, and means for adjusting said roller so that one end thereof may be nearer and the other end thereof may be farther from said belt to assert a momentary retarding action on the leading corner of an item of such material upon reaching said roller.

6. In a horizontal turn for a conveyor for material such as newspapers or other items sometimes travelling in overlapped relation, a frame, driven turning elements

5

carried by said frame and operative to fan out items of such material, the output end one of said turning elements having a single turning wheel centrally located, an output belt adjacent said single turning wheel, a roller above said output belt adapted to engage such material on said belt, and means for adjusting said roller so that one end thereof may be nearer and the other end thereof may be farther from said belt to assert a momentary retarding action on the leading corner of an item of such material upon reaching said roller.

7. In a horizontal turn for a conveyer for articles such as newspapers or the like, a frame, driven turning elements carried by said frame, an output shaft carried by said frame, pulleys on said shaft for carrying the spring belts of an output conveyer, a roller engaging with articles delivered by said turn, a shaft on which said roller is carried, bearing supports for said roller shaft on opposite ends of said roller mounted for pivotal movement about an axis above and parallel with said output shaft, said bearing supports each being rotatable about an individualized axis perpendicular to the roller shaft, and adjustable stops carried by said frame and engaging the respective ends of said roller shaft to limit the downward movement thereof.

8. A horizontal turn as defined in claim 7 in which said roller has spring belt grooves and both said pulleys and said roller are driven by spring belts connected to a conveyer in which said turn is placed.

9. In a horizontal turn for conveyors of newspapers and the like, a series of turning elements having substantially horizontal axes arranged radially with respect to a common center and having turning wheels of varied diameter increasing from the inside to the outside of the turn so that a straight line over the tops of said wheels slopes downwardly toward the inside of said turn, and an

6

input shaft having identical sized single groove pulleys thereon adapted to guide spring belts, said shaft having its end toward the inside of said turn lower than the end towards the outside of said turn so that a straight line over the tops of said pulleys slopes downwardly toward the inside of said turn at the same pitch as the line through the tops of said turning wheels.

10. A horizontal turn as defined in claim 9 in which there is an output shaft having identical size single groove pulleys thereon adapted to guide spring belts, said shaft having its end toward the inside of said turn lower than the end toward the outside of said turn so that a straight line over the tops of said pulleys slopes downwardly toward the inside of said turn at the same pitch as the line through the tops of said turning wheels.

11. A horizontal turn as defined in claim 10 in which there are guide plates at both the inner and outer edges of said turn extending inwardly from said edges to closely adjacent the outer of said turning wheels.

12. A horizontal turn as defined in claim 11 in which the outer ones of said single grooved pulleys are spaced outwardly of the outer ones of said turning wheels and said guide plates have notches accommodating said outer pulleys.

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