May 9, 1933. L. KRIEGER 1,908,368

DEVICE FOR CHANGING THE DIRECTION OF TRAVEL, APPLICABLE TO BELT CONVEYERS

Filed Oct. 4, 1930

Fig. 1

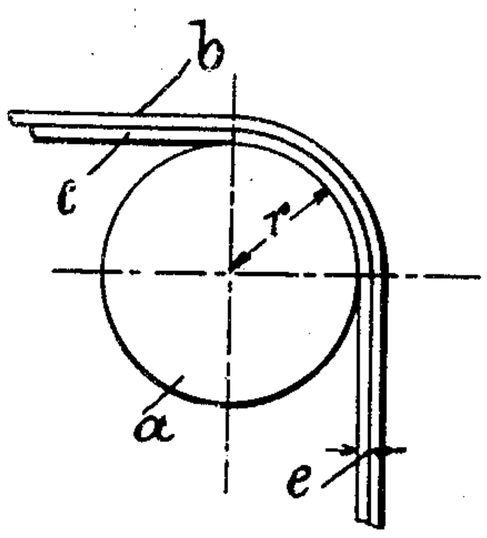


Fig. 2

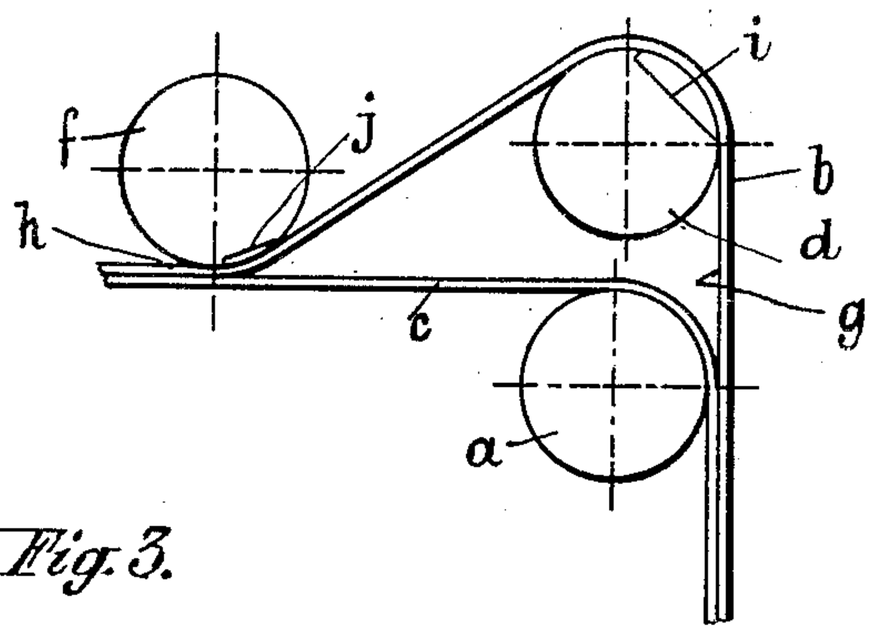


Fig. 3.

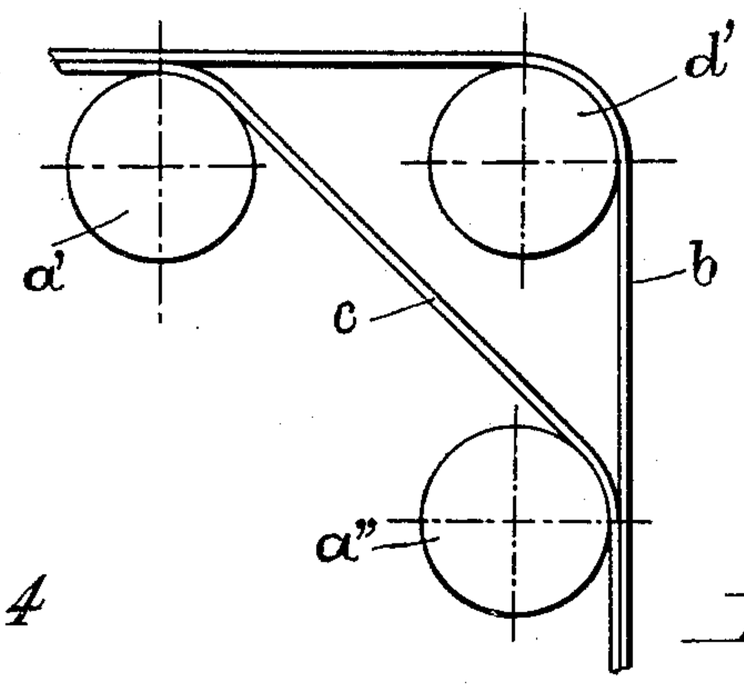


Fig. 4

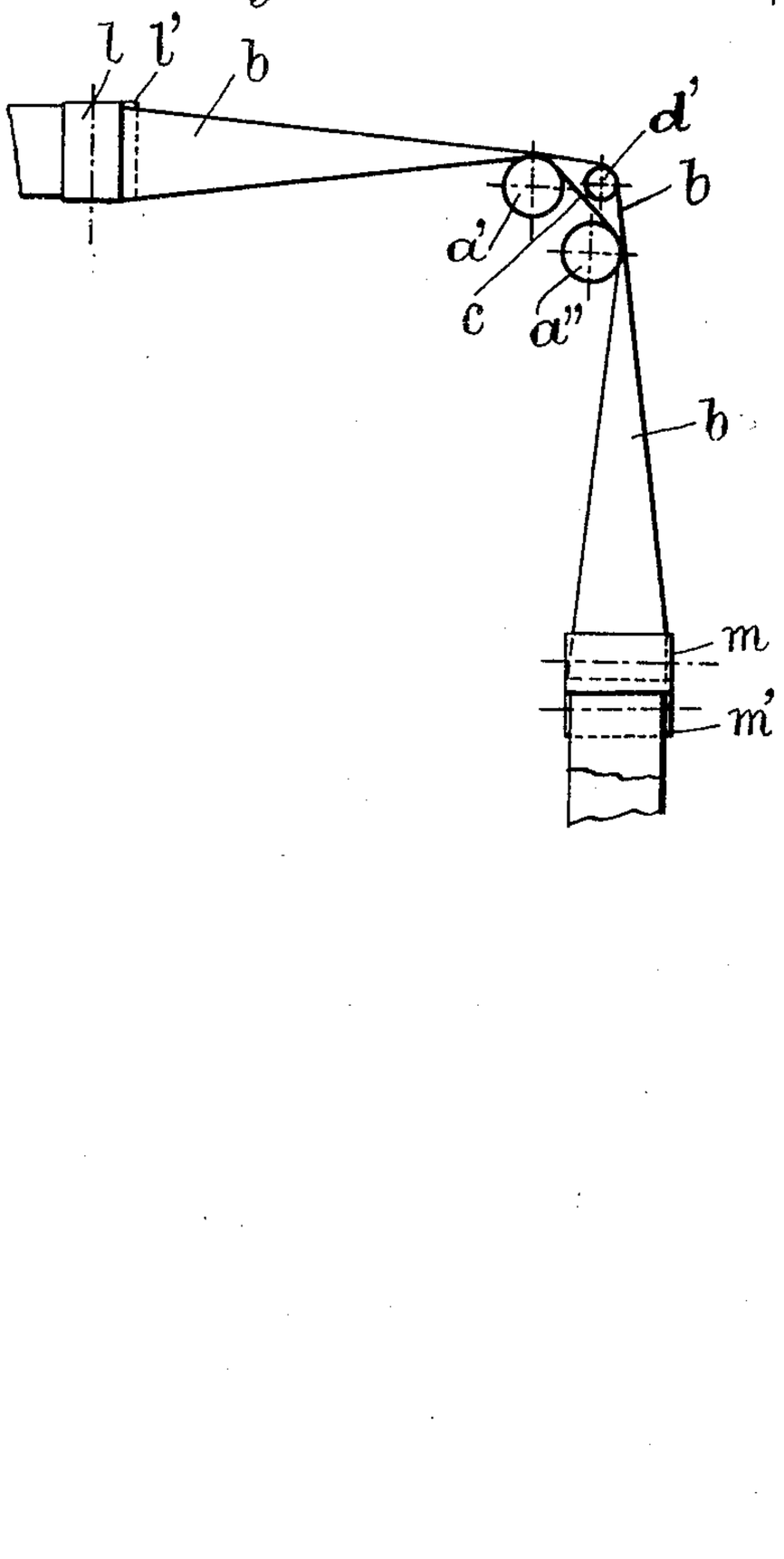
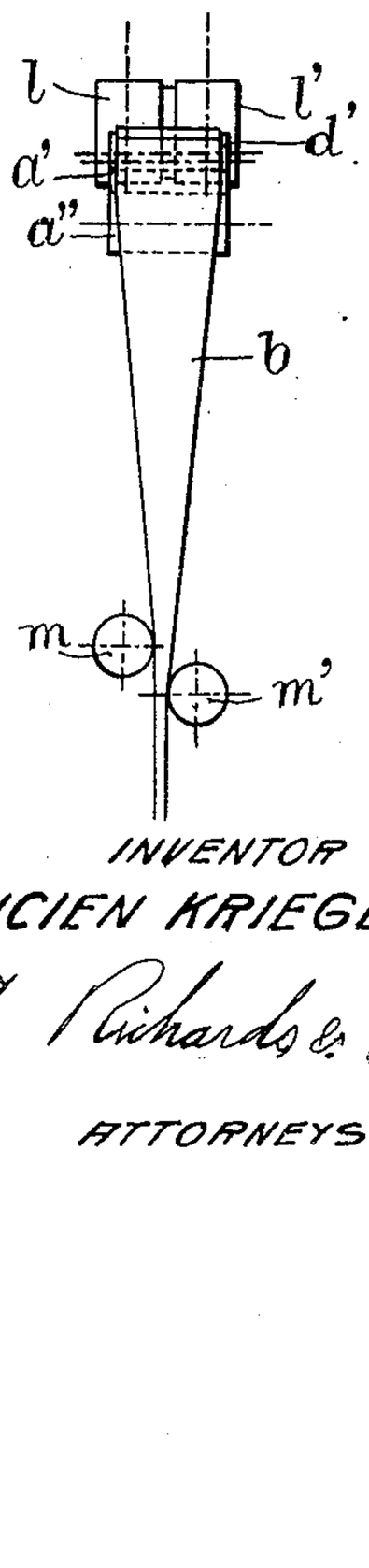


Fig. 5.



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UNITED STATES PATENT OFFICE

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DEVICE FOR CHANGING THE DIRECTION OF TRAVEL, APPLICABLE TO BELT CONVEYERS

Application filed October 4, 1930, Serial No. 486,329, and in France October 8, 1929.

The present invention is applicable to conveyers employed for the transportation of relatively small-sized objects between two endless bands.

It has for its object to obviate all drawbacks due to the difference of linear speed between the two bands when the direction of travel is changed. It maintains a uniform linear speed for the two bands, thus reducing the traction stress by eliminating the slipping effect, and it obviates to a great degree the electrifying of the objects (such as papers) which are inserted between the bands.

For this purpose, in the curved part of the path, the outer band is deflected, and it is only applied against the other band after the curve has been cleared.

In the accompanying drawing:

Fig. 1 shows the manner in which the direction is changed, in the known conveyers of the type under consideration.

Fig. 2 shows a form of the apparatus in conformity to the invention.

Fig. 3 is a modification of the same.

Figs. 4 and 5 are a respective plan view and side view showing the use of said modification with a conveyer in which the bands are twisted in order to change their direction in a horizontal plane.

In the known devices (Fig. 1) when passing over a direction-changing roller a, the outer band b is applied against the inner band c which draws it forward at a speed greater than the speed of travel in the straight parts of the line of travel. For this purpose, since the inner band has a certain thickness e, when it is upon the roller a its surface in contact with the outer band will thus have a linear speed $\omega(r+e)$ in which r is the radius of the roller and ω its angular speed. As the inner belt has a linear speed ω the difference between the linear speeds of the two bands will be ωe.

In the case of two successive and inverse changes of direction (Z shape), the outer belt, during one change of direction will become the inner belt in the succeeding change of direction. The difference between the linear speed of the bands is thus annulled, but this causes a necessary slipping which produces a stress depending upon the tension of the bands and upon the wear of these latter. When there are several successive changes of direction of travel in the same direction (C shape) the differences in the speeds will be added together, thus producing a relative slipping of the two bands on the straight path. As the said bands usually consist of cotton, their friction produces charges of static electricity on the paper articles transported, which cause them to adhere to the bands and hinders their expulsion at the discharging points. In conformity to the invention, these drawbacks are obviated by so arranging the apparatus that each of the bands will change its direction independently of the other.

In the example shown in Fig. 2, the roller a serves only to change the direction of the inner band c, whilst the outer band b will change its direction upon another roller d. It will then make contact with the other band while passing below a third roller f.

In the arrangement shown in Fig. 3, the roller for changing the direction of the inner band is replaced by a pair of rollers a' a'' which are symmetrical with reference to the roller d' upon which the outer band has now changed its direction.

One can note that, for each changement of direction, vertical or inclined, the distance between the axes of the rollers or which pass the bands is less than the largest size of the papers or element to transport.

In the form of construction shown in Figs. 4 and 5, the bands which are to change their direction horizontally are first twisted in such manner that their plane becomes vertical.

They change their direction upon a set of vertical rollers a' a'' and d', analogous to the ones shown in Fig. 3. They are then brought into the horizontal position when they have assumed their new direction. At the points at which their torsion commences and ceases, the bands travel between two rollers l and l', m and m'.

Obviously, the invention is not strictly limited to the constructions herein described

and represented, and is susceptible of various modifications.

I claim:

1. Belt conveyer, comprising a plurality of partly superposed bands, the objects to be transported being held between said bands, and parallel rollers for changing the direction of travel of said bands, said bands being in contact with each other only when the direction of travel of said bands is a straight line, and passing over separate rollers while the change of the direction of travel takes place, said rollers being so disposed that each of them may change the direction of travel of only one band.

2. A belt conveyer according to claim 1 in which the rollers are disposed substantially at right angles to the plane of said bands, whereby said bands are first twisted when coming in contact with the first roller, and again twisted when leaving the last roller so as to be brought back into the plane they occupied before passing through said rollers.

3. In a belt conveyer of the type described comprising at least two endless bands superposed to each other along a part of their path of travel, a system for changing the direction of travel of both bands which comprises in combination, a roller adapted to cooperate along a part of its periphery with one of said bands so as to change the direction of travel thereof and adapted to cooperate tangentially with the other band, superposed to the first mentioned one, so as to guide it in a straight line, another roller adapted to cooperate along a part of its periphery with one of said bands so as to change the direction of travel thereof and adapted to cooperate tangentially with the other band, superposed to the last mentioned one, so as to guide it in a straight line, and means, adapted to cooperate with only one band, for guiding said band from the first mentioned roller to the second mentioned one.

4. In a belt conveyer of the type described comprising two endless bands superposed to each other along a part of their path of travel, a system for changing the direction of travel of both bands, which comprises in combination a roller adapted to cooperate along a part of its periphery with one of said bands so as to change the direction of travel thereof and adapted to cooperate tangentially with the other band, superposed to the first mentioned one, so as to guide it in a straight line, another roller adapted to cooperate along a part of its periphery with the first mentioned band so as to again change the direction of travel thereof and adapted to cooperate tangentially with the second mentioned band, superposed to the first mentioned one, so as to guide it in a straight line, and a third roller adapted to cooperate along a part of its periphery with only the second mentioned band for guiding said second mentioned band from the first mentioned roller to the second mentioned one.

5. In a belt conveyer of the type described comprising two endless bands superposed to each other along a part of their path of travel, a system for changing the direction of travel of both bands which comprises in combination a roller adapted to cooperate along a part of its periphery with one of said bands so as to change the direction of travel thereof and adapted to cooperate tangentially with the other band, superposed to the first mentioned one, so as to guide it in a straight line, another roller adapted to cooperate along a part of its periphery with the second mentioned band so as to change the direction of travel thereof and adapted to cooperate tangentially with the first mentioned band, superposed to the second mentioned one, so as to guide it in a straight line, and a third roller adapted to cooperate with only the second mentioned band for guiding said second mentioned band from the first mentioned roller to the second mentioned one.

6. A system for changing the direction of travel of the bands of an endless belt conveyer according to claim 3 in which the axes of said rollers make a certain angle with the plane in which said bands travel before and after the change in their direction of travel.

7. A system for changing the direction of travel of the bands of an endless belt conveyer according to claim 4 in which the axes of said rollers make a certain angle with the plane in which said bands travel before and after the change in their direction of travel.

In testimony whereof I affix my signature.

LUCIEN KRIEGER.