

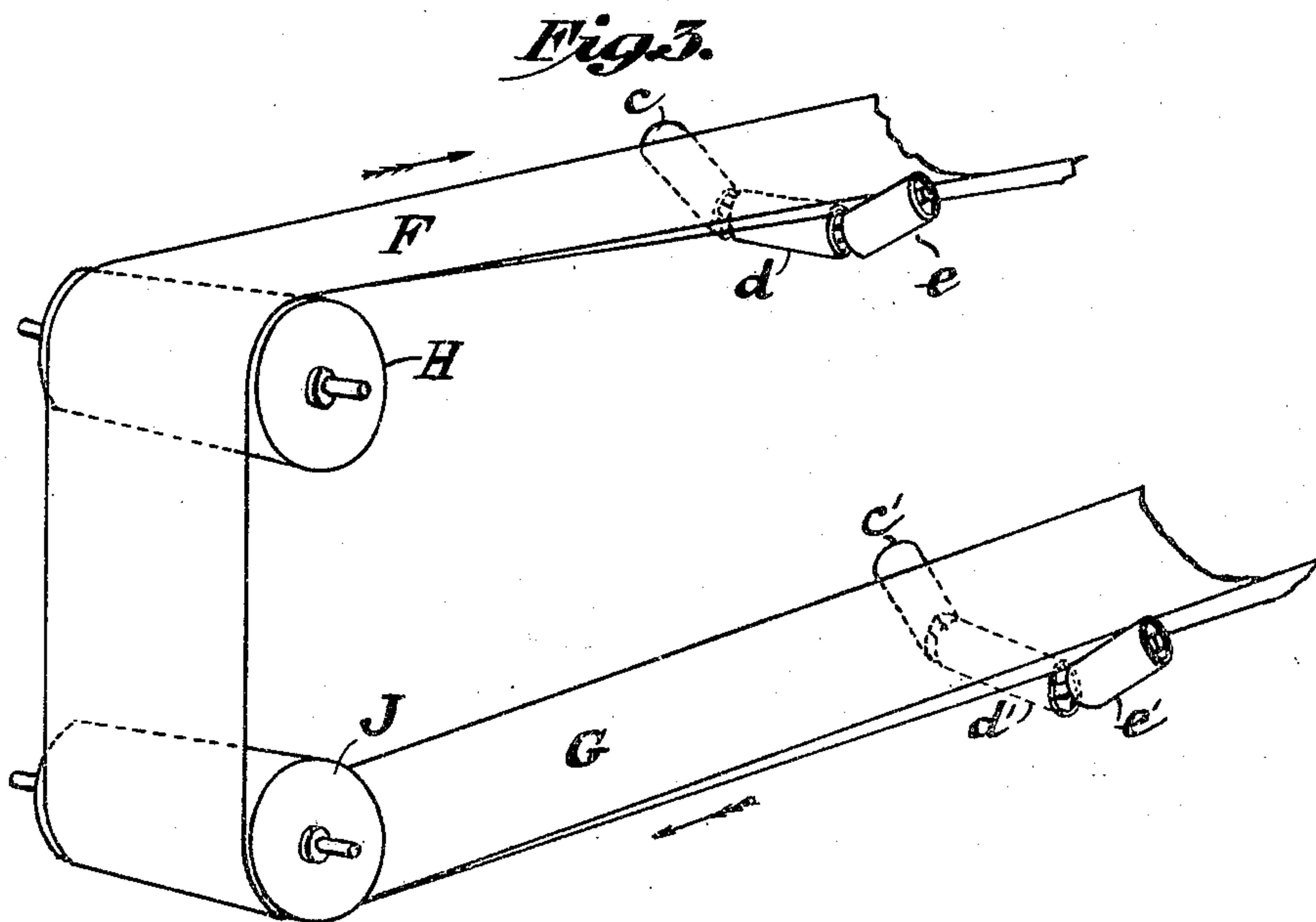
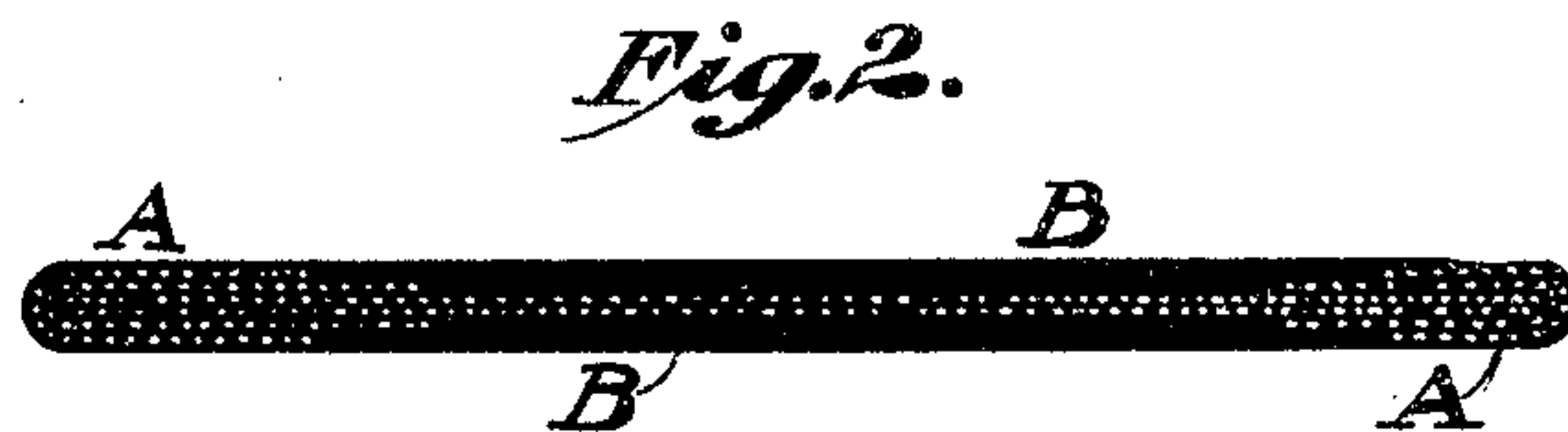
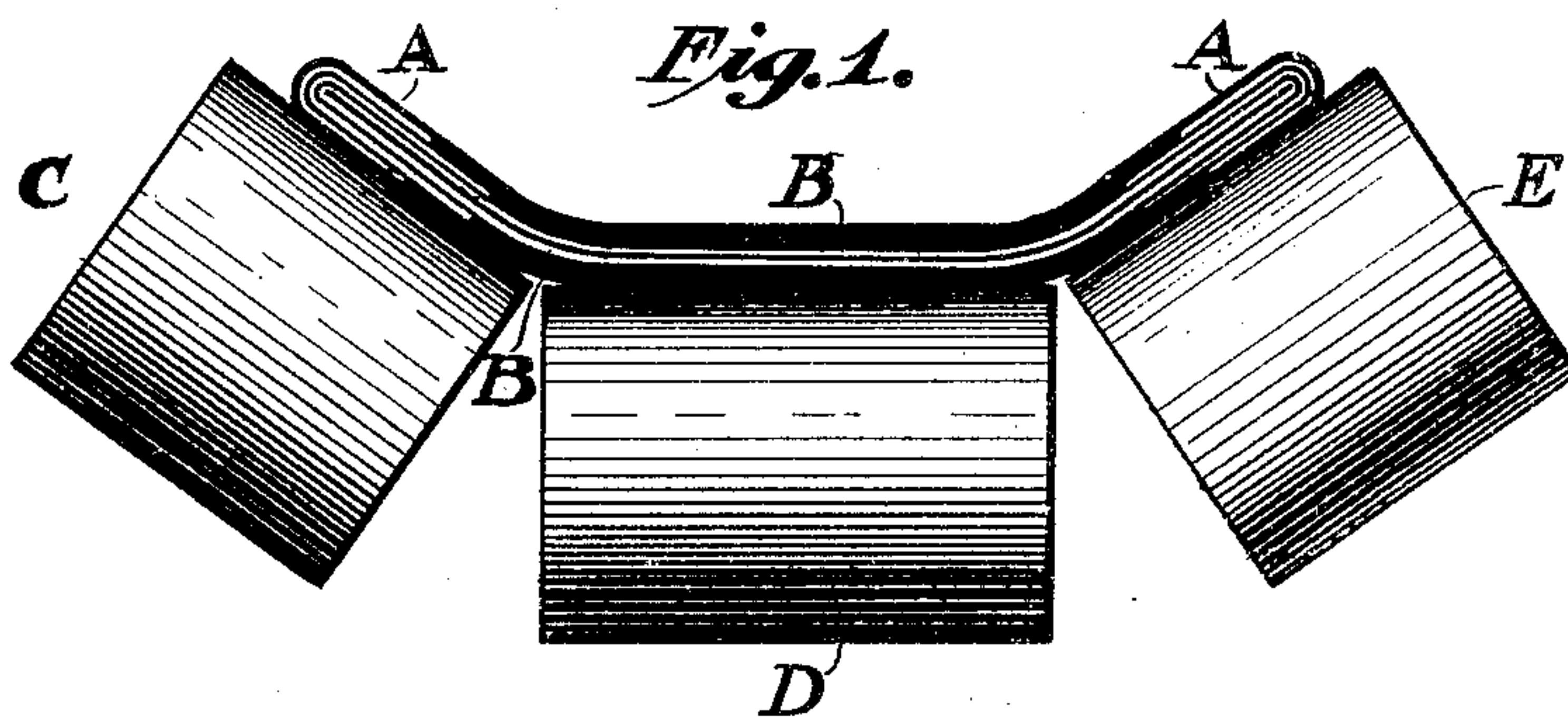
No. 794,381.

PATENTED JULY 11, 1905.

T. ROBINS, JR.
CONVEYER BELT.

APPLICATION FILED JULY 30, 1903.

2 SHEETS—SHEET 1.



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2 SHEETS—SHEET 2.

Fig. 4.

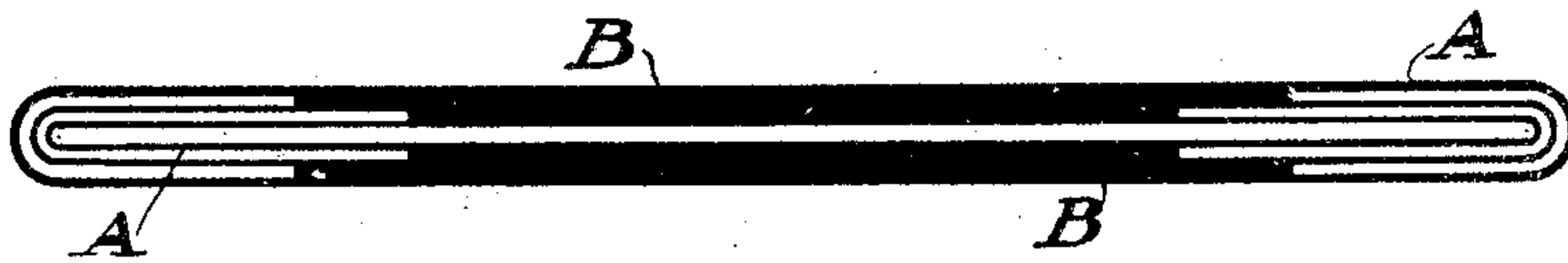


Fig. 5.



Fig. 6.

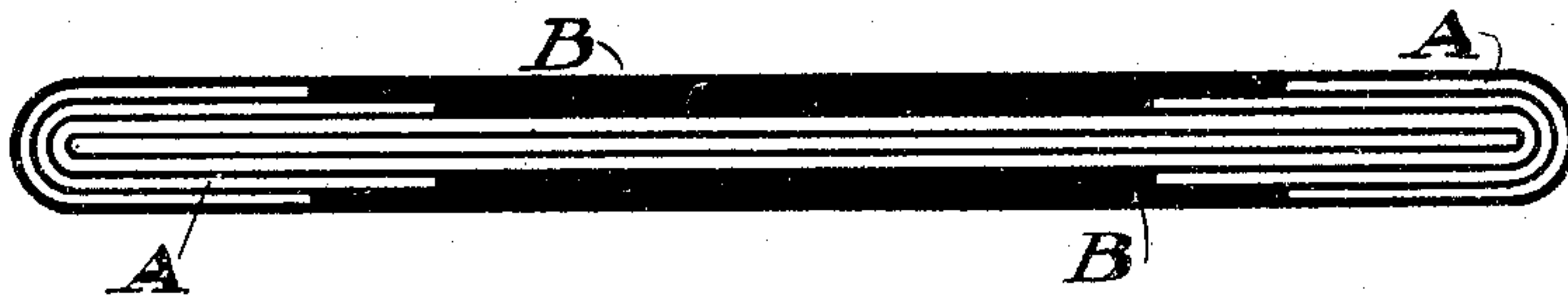
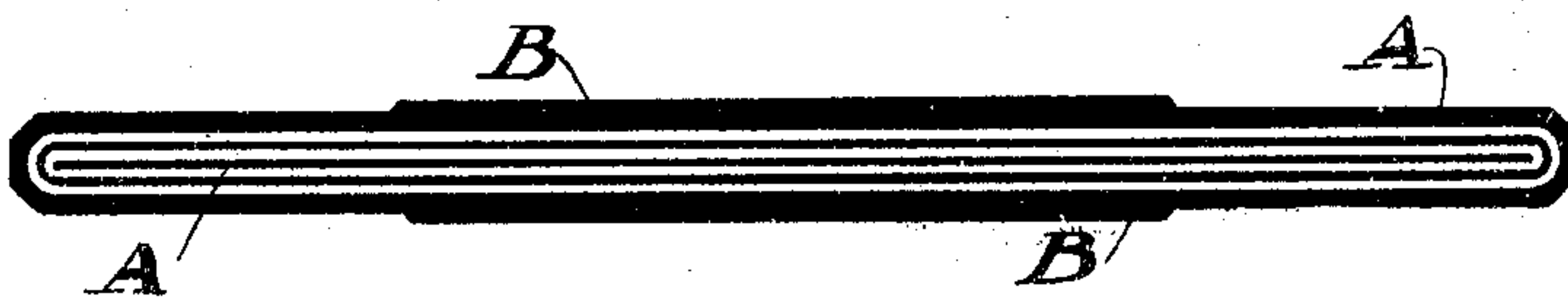


Fig. 7.



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UNITED STATES PATENT OFFICE.

THOMAS ROBINS, JR., OF NEW YORK, N. Y., ASSIGNOR TO ROBINS CONVEYING BELT COMPANY, OF NEW YORK, N. Y., A CORPORATION OF NEW JERSEY.

CONVEYER-BELT.

SPECIFICATION forming part of Letters Patent No. 794,381, dated July 11, 1905.

Application filed July 30, 1903. Serial No. 167,656.

To all whom it may concern:

Be it known that I, THOMAS ROBINS, Jr., a citizen of the United States, and a resident of the borough of Manhattan, city, county, and State of New York, have invented certain new and useful Improvements in Conveyer-Belts, of which the following is a specification accompanied by drawings.

My invention relates to belts for conveyers and analogous uses and is closely connected with my prior patents of June 13, 1893, No. 499,472, and November 17, 1896, No. 571,604, being, in a sense, an improvement on those patents.

The object of the invention is to provide a belt that is especially adapted to withstand the frictional wear of the pulleys over which it runs and the wear due to the impact and friction of the material carried by the belt and that has, moreover, both of its faces adapted for use as conveying-surfaces.

In my prior patent, No. 499,472, I describe a belt composed of canvas or other backing provided with a facing of rubber composition or other suitable elastic wearing material, presenting in cross-section a thick central portion and thinner or attenuated side portions, by means of which the durability and utility of the belt would be increased to a minimum. The wear on conveyer-belts comes more upon the center of the facing than upon its side portions, and, furthermore, the material carried is usually delivered with considerable velocity against the middle portion of the belt, and the greater elasticity of the thickened portion of the facing causes the material to be received with less injury to the belt than if the wearing-face were thinner, and consequently less yielding. I found, however, that in practice certain difficulties were presented in the use of a belt which is thicker at the center than at the side portions and I accordingly devised an improvement over this form of belt, which is described in my Patent No. 571,604 and which preserves all the advantages of my prior patent, since the belt is given a maximum thickness of the facing material at the center; but this is accomplished

without a variation in the thickness of the side and central portions of the belt itself. The canvas or other backing is made enough thinner at the center than at the sides to correspond with the greater thickness of the facing at the central portion than at the sides, and thus a cross-section of the complete belt shows the same thickness at all parts of its width. The greater thickness of the backing at the sides (it being stiffer than the facing) gives to the two edges of the belt a maximum rigidity, so that they are turned up by means of the side pulleys and form a trough with strong rigid upturned sides or edges and with a center which is tough yet yielding, and hence wear-resisting, and is sufficiently flexible to trough of its own weight. The rigidity of the edges causes the belt to extend from pulley to pulley with the minimum amount of sag.

Briefly, my present invention consists in applying one or the other of the forms of facing described in my prior patents, mentioned above, to both surfaces of the belt, so that in the event of one of the carrying-surfaces becoming worn the belt may be turned and the other surface used, or if it is desired to use both faces of the belt as carrying-surfaces at the same time they will be capable of equal amounts of wear, and, furthermore, the belt is given a maximum amount of flexibility and resistance to wear at the points where it bends upward from the center pulley to the side pulleys. It is obvious that in order to provide a belt of this type with two carrying-surfaces without its cost being prohibitive an arrangement must be devised whereby the required tensile strength, utility, and durability will be secured with a minimum amount of material, and, furthermore, the edge portions of the belt must be sufficiently rigid, but not excessively so, and the center must possess the required amount of flexibility and elasticity. The belt structure described herein has been found to meet the foregoing and other requirements and to be in many respects an improvement over the types of belt heretofore devised for the same or analogous uses.

The principal argument which has been advanced in favor of the use on belt-conveyers of troughing-pulleys which bell slightly toward their inner ends, so that the upper face of the center pulley is tangent to the upper faces of the outer pulleys, is that in the use of the belts heretofore devised an abrupt upward bend in the belt from the center to the side pulleys had a tendency to give the belt a permanent longitudinal crease at each side, and after a time the belt would break along those lines. The use of such pulleys, however, is undesirable because of their cost, the difficulty of manufacture, and the amount of belt slip which results from the difference in the peripheral speed of different parts of a bell-shaped pulley. By the use of my improved belt the possibility of a permanent crease or a break being developed in the belt along the lines on which it bends upward to the side pulleys is entirely avoided, since, as stated above, the part of the belt which is given maximum flexibility and wear resistance includes those lines.

Further objects of the invention will hereinafter appear, and to these ends the invention consists of apparatus for carrying out the above objects, which apparatus embodies the features of construction, combination of elements, and arrangement of parts having the general mode of operation substantially as hereinafter fully described and claimed in the specification and shown in the accompanying drawings, in which—

Figure 1 is an end elevation of the troughing-pulleys over which the belt runs, showing in diagram my improved belt thereon. Fig. 2 is a diagrammatic cross-section of my improved belt, showing arrangement of backing or core and facing. Fig. 3 is a perspective view showing the application of such a belt in which both faces are used at the same time as carrying-surfaces. Figs. 4, 5, and 6 are diagrams of different arrangements of the backing or core and the facing in the preferred form of my improved belt, and Fig. 7 is a diagram showing the arrangement of another form of double facing.

Similar letters of reference apply to similar parts throughout the several views.

Referring to the drawings, in Figs. 1 and 2 is shown one form of my improved belt, consisting of a backing or core A, made up of two plies of canvas and rubber suitably vulcanized together, and a facing B, of soft rubber vulcanized over the backing A, so as to form a wearing-surface for the belt on all sides. As shown, the backing is increased in thickness at each edge portion by the addition of two plies of canvas doubled over the edges of the center plies and vulcanized thereto. The facing B is comparatively thin at the edge portions of the belt, where the wear is least, but increases in thickness on both sides toward the center an amount corresponding

to the decrease in total thickness of the backing, so that the complete belt is of approximately the same thickness at all parts of its cross-section. C, D, and E are the troughing-pulleys, over which the belt runs. As shown, both surfaces of the belt are protected by the facing B from the center outward beyond the points where the belt is bent upward from the center pulley D to the side pulleys C and E, and thus the required flexibility is secured at those points without danger of the belt becoming creased longitudinally, and the portions of both surfaces on which the greatest wear comes are protected by the facing on both sides.

In Figs. 4, 5, and 6 are shown three of the many different arrangements of the backing or core A which may be resorted to in order to vary the flexibilities and tensile strengths of belts of the same or different lengths or widths. It is obvious that there are a great many possible arrangements of the backing A and facing B, based on the principles of construction described herein; but since they are merely alternative, and hence all come within the scope of my invention, I have not thought it necessary to illustrate or describe them.

In Fig. 7 the backing A is of the same thickness at all points, and the facing B is increased in thickness over the center portion of the belt. This arrangement of the backing and facing adds greatly to the wear-resisting qualities of both faces of the belt, and while this form of construction does not materially vary the flexibility of belts having a given thickness of backing it does vary the flexibility for a given total thickness of belt, since in making up the required total thickness flexible facing material is substituted for some of the more rigid backing.

Fig. 3 shows the application of one of my improved belts in which both faces are adapted to be used as carrying-surfaces. The portion of the belt lettered F travels in the direction of the arrow and is troughed by pulleys *c*, *d*, and *e*. The portion of the belt lettered G travels in the direction of the lower arrow and is troughed by pulleys *c'*, *d'*, and *e'*. The belt is reversed over bend-pulleys H and J, and the upper carrying-surface of the belt at F becomes the lower surface at G and the lower surface at F becomes the upper carrying-surface at G. I have not attempted to show in this figure the details of a conveyer adapted to use both faces of the belt for carrying-surfaces at the same time, but have merely outlined so much of such an arrangement as is required to show this application of my improved belt.

Obviously some features of my invention may be used without others, and the invention may be embodied in widely varying forms.

Therefore, without limiting my invention

to the construction shown and described nor enumerating equivalents, I claim, and desire to secure by Letters Patent, the following:

1. In a conveyer-belt, the combination, with
5 a facing which is alike on both surfaces of the belt, of a backing or core which is thinner at the central portion of the belt than at the side portions, substantially as described.

2. In a conveyer-belt, the combination, with
10 a backing or core which is thicker at the side portions of the belt than at the central portion, of a facing which is thicker at the central portion of the belt than at the side portions, over both surfaces of said backing, substantially as described.

3. In a conveyer-belt adapted to be bent along lines parallel to its length to form a trough, the combination, with a backing or core, of a facing which is similar on both surfaces of the belt, and which is thickened at
20 the center of the belt and along the lines of flexure, substantially as described.

4. In a conveyer-belt adapted to be bent along lines parallel to its length to form a
25 trough, the combination, with a backing or core, of a facing which is similar on both surfaces of the belt, and which is thickened at the center of the belt and along the lines of flexure, the backing being correspondingly thinner at these points, so that the belt is of approximately the same thickness throughout, substantially as described.

5. In a conveyer-belt, the combination, with a fabric backing or core, of an elastic, wear-resisting facing which is thickened over both
35 surfaces of the central portion of the belt, the backing being correspondingly thinner at that point, so that the belt is of approximately the same thickness throughout, substantially as described.

6. In a conveyer-belt adapted to be bent along lines parallel to its length to form a trough, the combination with a fabric backing or core, of an elastic, wear-resisting facing which is thickened over both surfaces of
45 the belt at its central portion and along the lines of flexure, substantially as described.

7. In a conveyer-belt adapted to be bent along lines parallel to its length to form a trough, the combination, with a fabric back-
50 ing or core, of an elastic, wear-resisting facing which is thickened over both surfaces of the belt at its central portion and along its lines of flexure, the backing being correspondingly thinner at those points so that the
55 belt is of approximately the same thickness throughout, substantially as described.

In testimony whereof I have signed this specification in the presence of two subscribing witnesses.

THOMAS ROBINS, JR.

Witnesses:

EMIL CHAS. EGER,
ROSCOE L. PETERSON.