

No. 728,005.

PATENTED MAY 12, 1903.

G. C. PLUMMER.
SUPPORT FOR CONVEYER BELTS.

APPLICATION FILED FEB. 11, 1903.

NO MODEL.

4 SHEETS—SHEET 1.

Fig. 1.

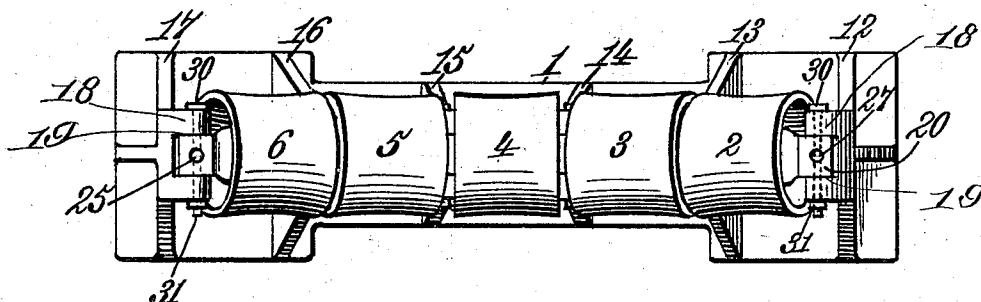


Fig. 2.

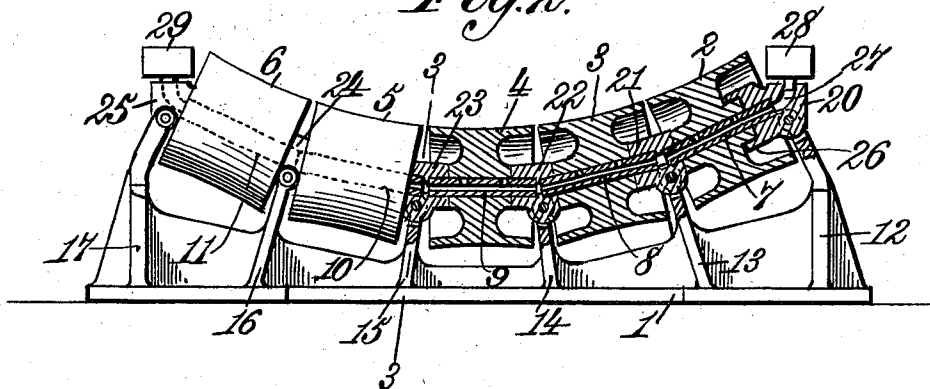
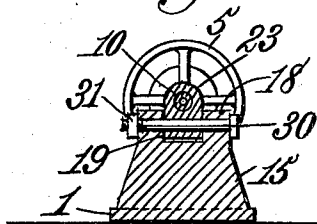


Fig. 3.



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4 SHEETS—SHEET 2.

Fig. 4.

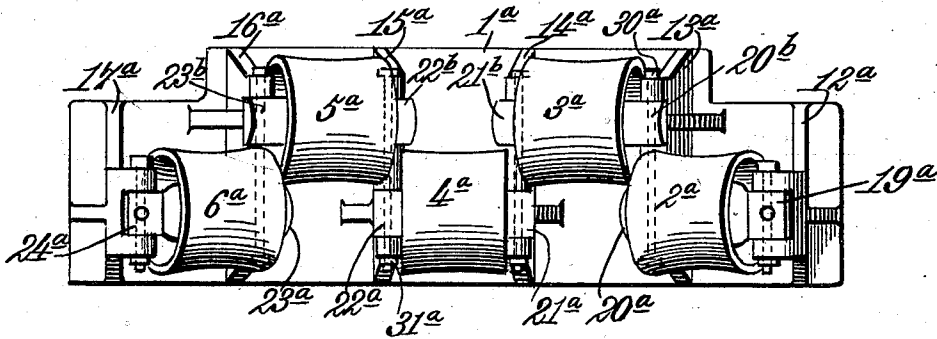


Fig. 5.

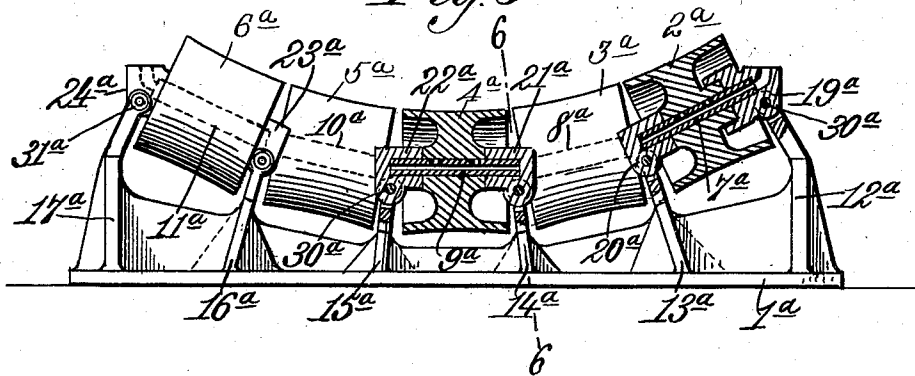
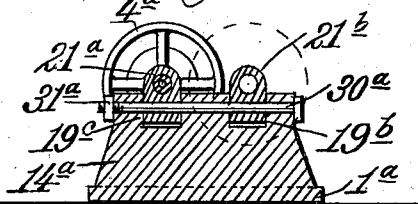


Fig. 6.



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4 SHEETS—SHEET 3.

Fig. 7.

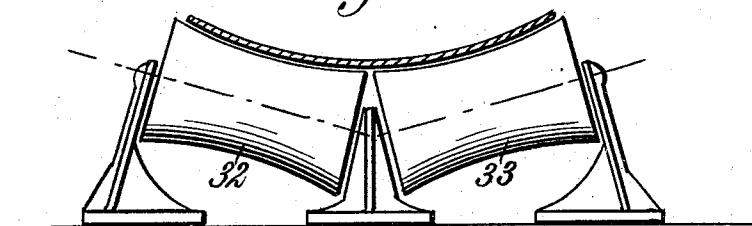


Fig. 8.

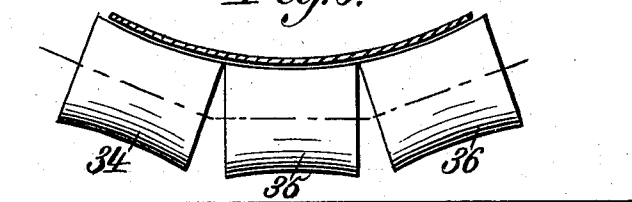


Fig. 9.

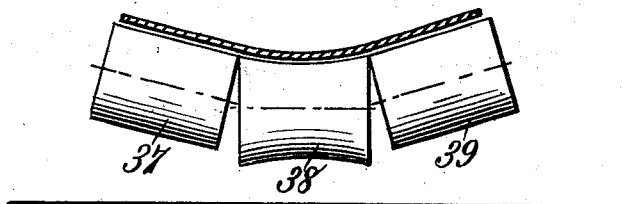
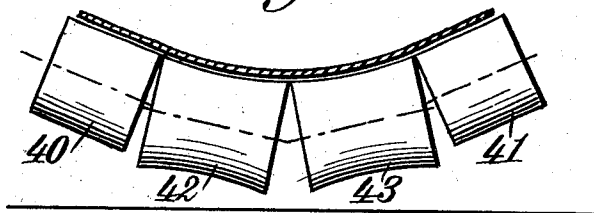


Fig. 10.



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4 SHEETS—SHEET 4.

Fig. 11

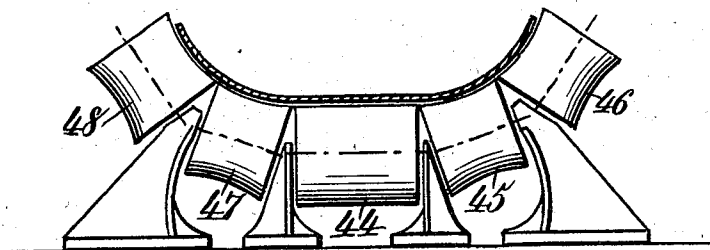


Fig. 12.

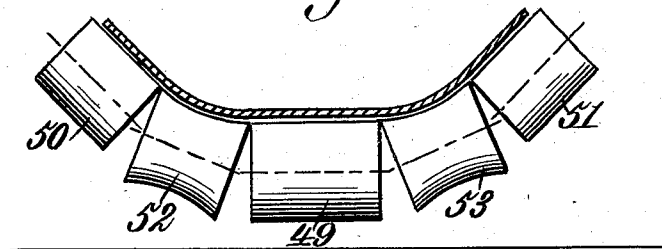
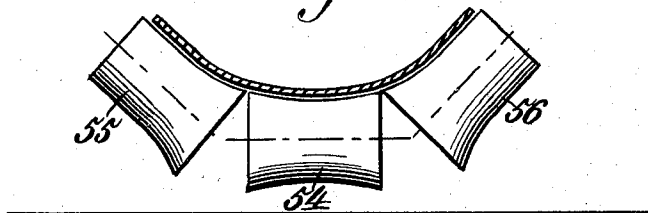


Fig. 13.



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UNITED STATES PATENT OFFICE.

GEORGE C. PLUMMER, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR TO
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SUPPORT FOR CONVEYER-BELTS.

SPECIFICATION forming part of Letters Patent No. 728,005, dated May 12, 1903.

Application filed February 11, 1903. Serial No. 142,887. (No model.)

To all whom it may concern:

Be it known that I, GEORGE C. PLUMMER, a citizen of the United States, residing at Philadelphia, Pennsylvania, have invented certain new and useful Improvements in Supports for Conveyer-Belts, of which the following is a specification.

My invention relates to supports for conveyer-belts of that class in which a series or group of angularly-arranged rollers or pulleys is employed, the object of the invention being to provide a uniform and continuous support for a troughed belt across its width which does not produce any abrupt or angular changes of direction in the bend of the belt. The use of the usual troughing-rollers results in undue wear of the belt, either from a slippage between certain parts of the supported belt and parts of the rollers beneath it or from a cracking of the belt along certain lines which have no direct support from the rollers beneath, and which are strained unduly, both from this lack of support and from the belt's effort to get down to where support can be found. With the usual angularly-disposed rollers, moreover, there is also undue wear on account of the load's being concentrated for the most part along a narrow strip of the belt's middle part, this being the only part usually touching the roller under the load, the result being that finally the center of the belt wears through if the belt is not discarded earlier on account of the cracking above referred to. In addition to this wear of the belt the central roller of each group eventually cuts through, so as to be useless. Wear takes place, therefore, from slippage and from lack of support in some parts and concentration of load in others. My invention is designed to overcome these objections; and it consists of a conveyer-belt support comprising a plurality of angularly-arranged rollers having the supporting-surfaces thereof conforming to the natural curvature of the belt thereon and the supporting-surface of each roller merging easily and without angular abruptness into the supporting-surface of the adjacent roller or rollers.

The invention also consists of certain fea-

tures and details of construction and combinations of parts, which will be hereinafter more fully described and claimed.

In the drawings forming part of this specification, Figure 1 is a plan view of a conveyer-belt support constructed in accordance with my invention. Fig. 2 is a sectional elevation of the same. Fig. 3 is a section on the line 3 3 of Fig. 2. Fig. 4 is a plan view of a modified construction. Fig. 5 is a sectional elevation of the same. Fig. 6 is a section on the line 6 6 of Fig. 5, and Figs. 7 to 13 are detail views showing modifications in the shape and arrangement of the supporting-rollers.

As above stated, my invention belongs to that type or class of roller-supports in which the rollers have their axes angularly arranged with respect to each other. In all of the supports of this class which have come to my attention the faces of the rollers are also disposed angularly with respect to each other. Consequently a surface touching these rollers clear across the faces thereof along lines in the planes of their axes would be a broken surface—that is, a surface which abruptly changes its direction at certain points. A belt which is bent transversely, however, naturally takes a curved form, having no abrupt changes in direction. Former efforts with angularly-arranged rollers have been directed toward making the naturally continuous or unbroken lines of the belt-surface conform as well as possible to the broken lines of the roller-surfaces. According to my invention the surfaces of the angularly-arranged rollers are made to conform to the natural lines or curve of the belt.

Referring in detail to the drawings, in which like reference-numerals indicate like parts, it will be seen that my improved support has been shown as being made up of a base 1 and a series of rollers 2, 3, 4, 5, and 6, mounted upon angularly-disposed shafts or axles 7, 8, 9, 10, and 11. The base 1 is made in a single piece and is provided with the uprights 12, 13, 14, 15, 16, and 17. Each of these uprights is provided with a forked or bifurcated upper end 18, and in the socket or recess 19 between the branches of each fork is mounted an axle

or shaft bearing. Six of these bearings have been shown in the drawings, the same being indicated by the reference-numerals 20, 21, 22, 23, 24, and 25. The bearing 20 is mounted upon the upper end of the upright 12 and is formed with the socket 26 for the reception of the hub of the roller 2. Said bearing 20 is also provided with a port or passage 27, extending therethrough, with which communicates the discharge end of an oil-cup 28. The bearing 25 is mounted upon the upper end of the upright 17 and is similar in construction to the bearing 20, the same being provided with a port or passage therethrough having an oil-cup 29 communicating therewith. The bearings 21, 22, 23, and 24 are mounted, respectively, upon the upper ends of the uprights 13, 14, 15, and 16, are similar in construction to each other, and are provided with passages therethrough. All of the axle-bearings referred to are adjustable in the uprights in which they are mounted, the adjustment being effected by means of the bolts 30, extending through the bifurcated upper ends of said uprights and the nuts 31 on the ends of said bolts. The shafts or axles 7, 8, 9, 10, and 11 are angularly disposed, as shown, and all of the same are made hollow, so as to form a conduit for the passage of oil or other lubricating material from the oil-cups 28 29 to the different rollers which go to make up the support. The shaft or axle 7 is mounted in the bearings 20 and 21, the shaft or axle 8 is mounted in the bearings 21 and 22, the shaft or axle 9 is mounted in the bearings 22 and 23, the shaft or axle 10 is mounted in the bearings 23 and 24, and the shaft or axle 11 is mounted in the bearings 24 and 25. As said shafts or axles are hollow and as the bearings in which they are mounted are also hollow, it will be seen that a free passage is provided for the lubricating material from one end of the support to the other. Said shafts or axles are preferably fixed in position, with the rollers mounted to turn thereon. It is obvious, however, that the rollers may be fastened to their respective shafts and the shafts mounted for rotation in their bearings.

The upper or supporting faces of the rollers 2, 3, 4, 5, and 6 are tangent to each other—that is, if the lines of all were extended they would either coincide or be tangentially disposed. In other words, the upper faces of said rollers form together a continuous line as distinguished from a line which has abrupt or sudden changes in direction. In Figs. 1, 2, 4, 5, 7, and 8 of the drawings all of the rollers which go to make up a single support are provided with concave supporting-surfaces. These surfaces are preferably cut upon circular arcs, the lines of each roller-surface running smoothly and continuously into the lines of the next adjacent roller-surface. In this way a roller-support is provided which conforms exactly to the natural curvature of a belt which is bent transversely to form a trough.

In Figs. 1, 2, and 3 of the drawings a construction is shown in which all of the rollers which make up a single group or constitute a single support have their axles or shafts lying in the same vertical plane. It is not necessary, however, that the shafts of all the rollers be in the same vertical plane. They may be in different parallel planes. Such a construction is shown in Figs. 4, 5, and 6 of the drawings. In this form of my invention a slightly-modified form of base 1^a is employed, adapted for the support of the rollers 2^a, 3^a, 4^a, 5^a, and 6^a and the angularly-arranged shafts 7^a, 8^a, 9^a, 10^a, and 11^a in different vertical planes. All the different rollers are mounted in separate bearings 19^a 20^a, 20^b 21^b, 21^a 22^a, 22^b 23^b, 23^a 24^a. These bearings are mounted in uprights, as before, rising from the base 1^a. The end uprights 12^a and 17^a support the bearings 19^a and 24^a and are similar in construction to the uprights 12 and 17, heretofore referred to. The intermediate uprights 13^a, 14^a, 15^a, and 16^a, however, are formed with two sockets or recesses 19^b and 19^c, as clearly shown in Fig. 6 of the drawings. The bearings 20^a and 20^b are adjustably mounted in the socketed upper end of the upright 13^a, the bearings 21^a and 21^b are adjustably mounted in the socketed upper end of the upright 14^a, the bearings 22^a and 22^b are adjustably mounted in the socketed upper end of the upright 15^a, and the bearings 23^a and 23^b are adjustably mounted in the socketed upper end of the upright 16^a. The adjustment of these bearings is effected by means of a bolt 30^a, which extends through the projecting upper end of each of the different uprights and a nut 31^a thereon. It is obvious, however, that this adjustment of parts may be effected in any other way without departing from my invention.

While I have shown five rollers for each support in Figs. 1, 2, 4, 5, 11, and 12 of the drawings, I do not limit myself to this particular number, as more may be used or a smaller number may be found sufficient. For example, in Fig. 7 of the drawings I show but two rollers 32 and 33, the concave faces of which are formed upon the same circular arc. Also in Fig. 8 of the drawings I show three rollers 34, 35, and 36, whose concave faces are formed upon a simple circular arc. In Fig. 9 of the drawings three rollers 37, 38, and 39 are shown for the support of the belt, the central roller 38 being concave and the outer rollers 37 and 39 having straight faces. In Fig. 10 of the drawings two outer straight-faced rollers 40 and 41 are shown with two intermediate concave rollers 42 and 43. In Fig. 11 of the drawings a central straight-faced roller 44 is employed with outer rollers 45, 46, 47, and 48 on each side thereof, the faces of each of which are concave. In Fig. 12 a central straight-faced roller 49 is employed in connection with two outer angularly-disposed straight-faced rollers 50 and 51 and two intermediate angularly-disposed

concave rollers 52 and 53. In Fig. 13 a central concave roller 54 is employed in connection with two outer rollers 55 and 56, the faces of which are cut upon a compound curve—that is to say, the ends of the rollers 55 and 56 which lie adjacent to the roller 54 are concave, whereas the remaining portions of said rollers are straight.

In all forms of my invention, however, the upper surfaces of the different rollers lie in continuous unbroken lines and serve to support the belt which moves thereon at all points throughout its width. The rollers themselves are shaped to conform to the natural bend or curvature of the belt instead of making the belt conform to the shape of the rollers.

The same results that I obtain by my invention have been sought heretofore by the use of solid concave rollers and of sectional concave rollers whose different sections are mounted upon the same shaft. With both these old forms of devices, however, if the belt be curved to any material degree, the slippage between the belt and the roller is very considerable. The same results have also been sought by the use of comparatively narrow straight-faced rollers, the number of the rollers used and the relative inclinations of their axes producing a group or series whose faces approximate a curve corresponding to the natural curvature of the belt. The faces of all of these rollers, however, are straight and are angularly disposed with respect to each other.

According to my invention the rollers which constitute the support have their axes angularly arranged with respect to each other, but their faces tangentially disposed each with respect to its neighbor—that is, while the line of the faces of any two of the old forms of angularly-disposed conveyer-rollers would, if extended, intersect at an angle, the lines of the faces of any two of the rollers constructed according to my invention would, if extended, be tangent to each other or would do that which is practically the same thing, would become coincident with each other. My device, therefore, will support a belt having proper flexibility, such as troughed conveyer-belts are presumed to have, across its whole width and at all parts of its width instead of only along narrow strips of its width, as it is supported by the usual type of angularly-arranged rollers now in use.

It will be noted that I employ a plurality or series of rollers, some with concave surfaces and others with flat surfaces, each set, however, forming, in effect, a continuous support, the supporting-surface of any one roller merging easily and without any angular abruptness whatever into the supporting-surface of its neighbors, and that the axes of these various rollers are angularly disposed with respect to each other. By my arrangement of rollers I overcome practically all of

the wear on a belt due to non-support of certain parts, which is a serious fault with the ordinary style of angularly-disposed straight-faced rollers. I also overcome the fault of having the major part of the load on a troughed belt concentrated along a narrow strip of belt. Furthermore, by my arrangement of rollers I overcome the greater part of the slippage of a belt running on the ordinary concave solid roller and of a belt running on a sectional roller on the single shaft. According to my invention there would be a certain slippage of the belt on the concave rollers I employ; but as my arrangement of the axes of the rollers and of their surfaces permits the use of rollers of comparatively slight concavity, while still obtaining the effect of a deep concavity, there is not nearly the slippage with my device as there is with any of the effective concave rollers placed on a single axis.

While my invention has been described as a continuous-roller support for a troughed conveyer-belt, the continuity of the support is necessarily broken by the short spaces between the ends of each adjacent pair of rollers. The effect, however, is of a continuous supporting-line as contradistinguished from a discontinuous line or surface. When the term "continuous" or any other expression of similar import is used, therefore, applied to the supporting-surface of the support, it is intended to convey the idea of a surface in which no angular or abrupt changes in direction are met with.

Having now described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. A support for a conveyer-belt, comprising a plurality of angularly-arranged rollers, having the supporting-surfaces thereof conforming to the natural curvature of the belt thereon.

2. A support for a conveyer-belt, comprising a plurality of angularly-arranged rollers supporting the belt thereon continuously throughout its width, the supporting-surface on each roller merging easily and without angular abruptness into the supporting-surface of the adjacent roller or rollers.

3. A support for a conveyer-belt, comprising a plurality of angularly-arranged rollers having the supporting-surfaces thereof in continuous or unbroken lines.

4. A support for a conveyer-belt, comprising a plurality of angularly-arranged rollers having the supporting-faces thereof lying tangent to each other at their adjacent ends.

5. A support for a conveyer-belt, comprising a plurality of rollers having their axes angularly arranged and their supporting-faces lying in lines which if extended would become coincident with each other.

6. A support for a conveyer-belt, comprising a plurality of rollers, the axes of which are angularly arranged with respect to each other, and the surfaces of which are concave.

7. A support for a conveyer-belt, comprising a plurality of rollers, the axes of which are angularly arranged with respect to each other and the supporting-surfaces of which
5 are concave and unitedly conform to the transverse curvature of the belt thereon, whereby said belt is supported continuously throughout its width.

8. A support for a conveyer-belt, comprising a plurality of rollers, the axes of which are angularly arranged with respect to each other, and the supporting-surfaces of which are disposed in the same circular arc.

9. A support for a conveyer-belt, comprising a base having uprights rising therefrom,
15 a plurality of rollers, angularly-arranged shafts or axles for said rollers, hollow bearings in which the ends of said shafts or axles fit, the said bearings having tailpieces thereon, and means coöperating with said tailpieces for adjustably securing said bearings
20 to said uprights.

10. A support for a conveyer-belt, comprising a base having uprights rising therefrom
25 which are provided with sockets or recesses at their upper ends, a plurality of rollers, angularly-arranged shafts or axles for said rollers, and hollow bearings in which the ends of said shafts or axles fit, the said bearings be-

ing adjustably supported in the sockets or
30 recesses in said uprights.

11. A support for a conveyer-belt, comprising a base having uprights rising therefrom which are provided with sockets or recesses at their upper ends, a plurality of rollers,
35 angularly-arranged shafts or axles, for said rollers, hollow bearings in which the ends of said shafts or axles fit, the said bearings having tailpieces which fit within said sockets or recesses, and bolts extending transversely
40 through said uprights and said tailpieces for adjustably securing said bearings in place.

12. A support for a conveyer-belt, comprising a base having uprights rising therefrom, a plurality of rollers, angularly-arranged
45 hollow shafts or axles for said rollers, hollow bearings for said shafts or axles adjustably mounted on said uprights, and oil-cups communicating with the end bearings, as and for the purpose set forth.
50

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

GEORGE C. PLUMMER.

Witnesses:

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W. T. PLUMMER.