May 9, 1933. F. N. WOODMAN 1,907,636

LINK CONVEYER BELT

Filed Jan. 20, 1932

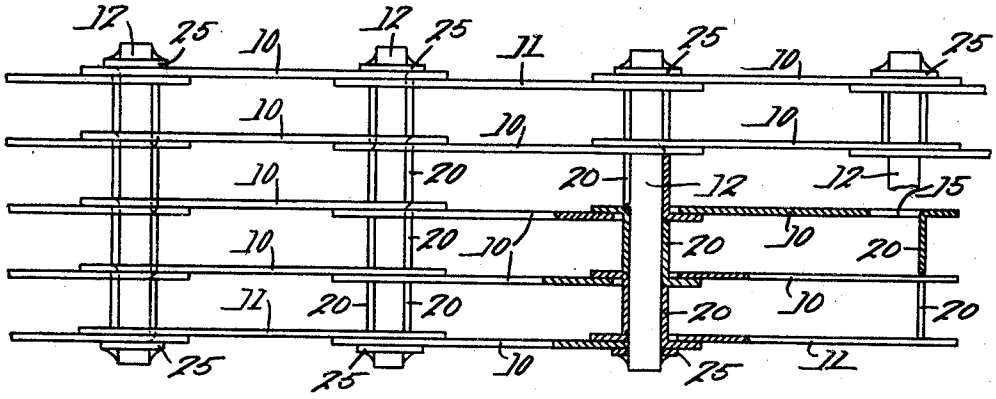

Fig. 1.

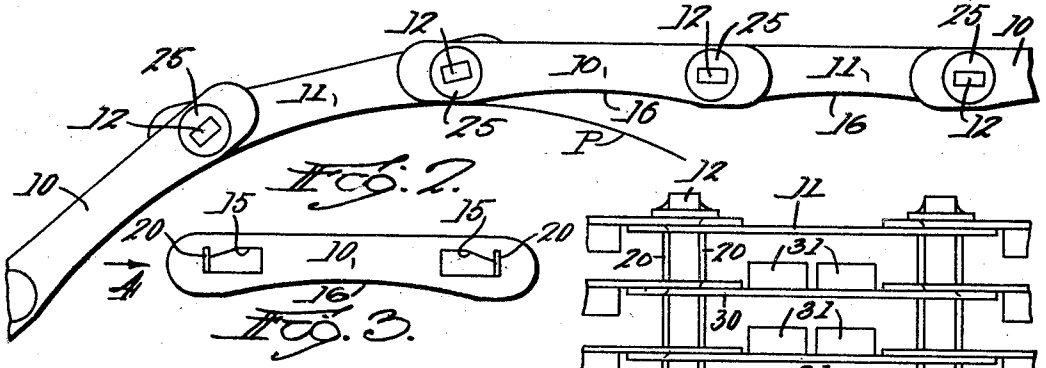

Fig. 2.

Fig. 3.

Fig. 7.

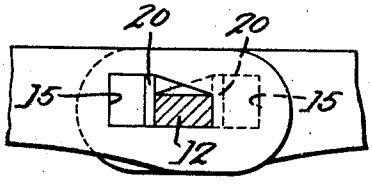

Fig. 5.

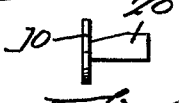

Fig. 4.

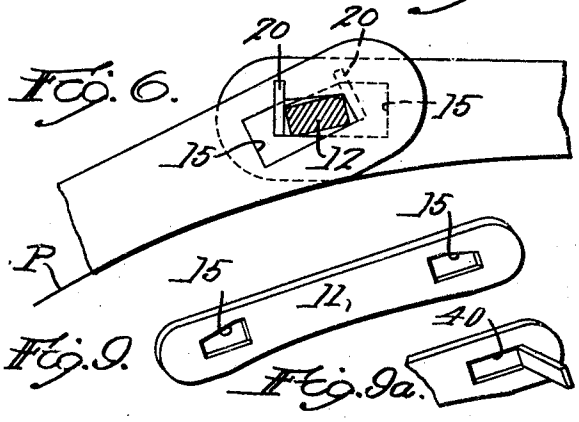

Fig. 6.

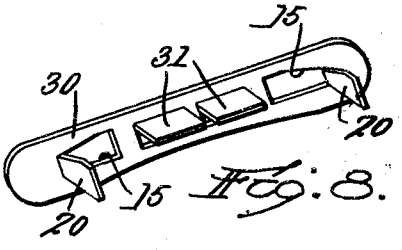

Fig. 8.

Fig. 9.

Fig. 9a.

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Patented May 9, 1933 1,907,636

UNITED STATES PATENT OFFICE

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LINK CONVEYER BELT

Application filed January 20, 1932. Serial No. 587,785.

This invention relates to conveyer belts formed of sheet metal links and is well adapted for general conveying purposes.

My improved belt is particularly designed, however, for conveying machine parts or other material through heat treatment furnaces, or for otherwise operating under high temperature conditions.

It is the general object of my invention to improve the construction of such conveyer belts and to simplify the manufacture thereof. A further object is to provide an improved pivotal connection between adjacent links by which flexing of the belt is facilitated.

My invention further relates to arrangements and combinations of parts which will be hereinafter described and more particularly pointed out in the appended claims. Preferred forms of the invention are shown in the drawing in which,

Fig. 1 is a plan view, partly in section, of a portion of my improved belt;

Fig. 2 is a side elevation thereof;

Fig. 3 is a side elevation of one of the links of my improved belt;

Fig. 4 is an end view of the link, looking in the direction of the arrow 4 in Fig. 3;

Fig. 5 is an enlarged side elevation illustrating my improved pivotal connection;

Fig. 6 is a similar view but showing the parts in a different position;

Fig. 7 is a partial plan view of a slightly modified belt connection;

Fig. 8 is a perspective view of one of the links shown in Fig. 7;

Fig. 9 is a perspective view of one of the side links; and

Fig. 9*a* is a fragmentary view of a further modification.

Referring to the drawing, my improved belt comprises spacer links 10, side links 11 and cross bars 12, assembled in the general relation indicated in Fig. 1. The links 10 and 11 are provided with openings 15 at their opposite ends and are also preferably concavely recessed along one edge, as indicated at 16 in Fig. 3.

The cross bars 12 are preferably rectangular in cross section, and the openings 15 are of irregular shape, the height of each opening at its outer end being substantially equal to the thickness of the cross bar 12. Each opening 15 is widened gradually toward the inner end of the opening, where it is substantially wider than the thickness of the cross bar, all as clearly shown in Fig. 5.

The openings 15 in the side links 11 are formed by punching out and entirely removing the stock from the openings 15, but in the spacer links 10 this stock is severed on three sides only and is then bent at right angles to form a spacing lug 20, as shown in Figs. 4 and 8.

The openings 15 are made substantially longer than the width of the cross bars 12, so that there is substantial clearance for readily assembling the parts.

The links 10 and 11 and cross bars 12 are assembled as indicated in Fig. 1, with the lugs 20 of each link 10 engaging the side of the next parallel link 10 thus holding all of the links in a desired and predetermined spaced relation.

A side link 11 is assembled in the belt at one side of each transverse series of links 10, so that there may be no lugs 20 projecting from the side of the belt. The cross bars 12 extend through the openings 15 between adjacent series of links 10 and 11, and the cross bars 12 are preferably held in place by washers 25 secured on the ends of the cross bars in any convenient manner, as by depositing metal outside of the washers by a welding operation.

Having described the construction and method of assembling of my improved belt, I will now describe the operation of the parts during the flexing of the belt, as when the belt

travels over the surface of a drum or pulley P as indicated in Figs. 2 and 6.

When the belt is straight, the cross bar 12 is engaged on its opposite edge faces by the straight outer end walls of the openings 15 and by the inner side faces of the lugs 20. When the belt is running straight, the edge faces of the cross bars are squarely engaged with the adjacent bearing surfaces and in full contact therewith, as indicated in Fig. 5.

When the belt is flexed, however, as indicated in Figs. 2 and 6, the cross bars 12 are rocked about their upper corner edges against the outer end walls of the openings 15 and against the inner side surfaces of the lugs 20. The cross bars assume the positions indicated in Fig. 6, during flexing but return to the position indicated in Fig. 5 as the belt is straightened.

It will thus appear that I have provided a knife-edge bearing for turning purposes between the cross bars 12 and the links 10 and 11. And it will further appear that the cross bars 12 are entirely free in the opening 15 in each link, except for engagement with the straight transverse outer end surface of the opening and with the lug 20 adjacent thereto.

Consequently I have obtained the advantages of a knife-edge bearing and also of an open-sided bearing, while at the same time the cross bars 12 may be of very substantial cross section. The cross bars and links normally engage over the full thickness of the cross bar, and with a given weight of metal, a cross bar of rectangular cross section will have substantially greater strength to resist shearing than the ordinary hinge pin of circular cross section and of equal weight.

In Figs. 7 and 8, I have indicated a slightly modified form of link 30 which may be adopted when it is desired to reduce the area of openings through the belt. For this purpose, flanges 31 may be blanked from the middle portion of the belt and extending laterally therefrom to partially close the openings through the belt between the links 10 and 11 as indicated in Fig. 7. Obviously, by decreasing the relative length of the lugs 20 the links 30 may be spaced more closely together, so that the flanges 31 will substantially engage adjacent links, thereby still further reducing the openings through the belt.

While I have preferably formed the openings 15 at each end of the links 10 and 11 with the irregular outline shown in Fig. 3, it will be obvious that one end of each link may be formed with a rectangular opening 40 (Fig. 9*a*) substantially fitting the cross bar 12. This construction is available where the belt is not required to bend to very sharp curvatures, but for general purposes the construction shown in Figs. 3 and 9 is preferred.

It is also obvious that a relatively heavy belt may be made entirely of links 11 without projecting lugs, while retaining the advantages of my improved pivotal connection.

A further and very important advantage of my invention resides in the unit construction by which belts of any desired width may be built up out of standard parts.

Having thus described my invention and the advantages thereof, I do not wish to be limited to the details herein disclosed, otherwise than as set forth in the appended claims, but what I claim is:—

1. A link conveyer belt comprising a series of metal links and a plurality of cross bars each connecting a plurality of adjacent and successive links, said links being mounted edgewise in said belt and having non-circular bearing openings at both ends thereof, and each opening having a transverse outer bearing end surface, and said cross bars extending loosely through said bearing openings in adjacent and successive links and each having two opposed flat edge faces both engaging transverse bearing surfaces of assembled links and said links rocking thereon about edge corners of said cross rods.

2. A link conveyer belt comprising a series of metal links and a plurality of cross bars each connecting a plurality of adjacent and successive links, said links being mounted edgewise in said belt and having bearing openings therein at both ends thereof and each opening having a straight transverse outer end bearing surface, and said cross bars being of substantially rectangular cross section and having two opposed flat side edges which engage straight end bearing surfaces of a plurality of successive links, said links rocking about the edge corners of said bars as the belt is flexed.

3. A link conveyer belt comprising a plurality of side links, spacer links and cross bars, said spacer links having bearing openings therethrough for said cross bars, and the stock displaced from said openings forming laterally projecting spacing lugs at the sides of said links and at the outer ends of said openings.

4. A link conveyer belt comprising a plurality of side links, spacer links and cross bars, said spacer links having bearing openings therethrough for said cross bars, and the stock displaced from said openings forming laterally projecting spacing lugs at the outer ends of said openings, said lugs also providing extended bearing surfaces for engagement by said cross bars.

5. In a conveyer belt, a link having non-circular bearing openings, each with a straight outer transverse bearing surface, and said link having a laterally projecting spacing lug positioned adjacent said transverse bearing surface.

6. In a conveyer belt, a link having non-circular bearing openings, each with a straight outer transverse bearing surface and

said link having integral spacing lugs projecting laterally therefrom.

7. In a conveyer belt, a link having non-circular bearing openings, each with a straight outer transverse bearing surface and said link having integral spacing lugs projecting laterally therefrom and having laterally projecting load-supporting side flanges.

In testimony whereof I have hereunto affixed my signature.

FRANCIS N. WOODMAN.