

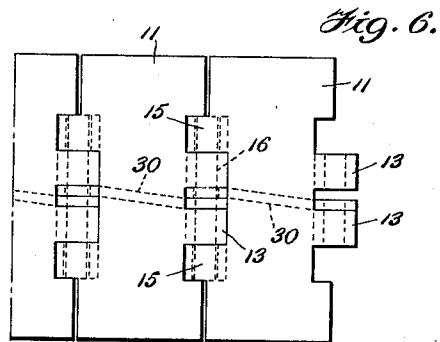
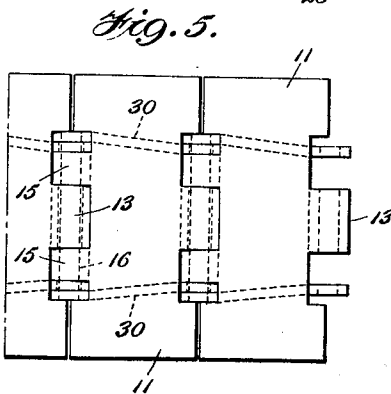
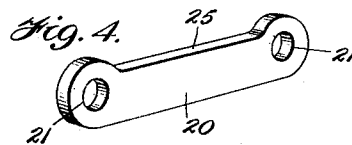
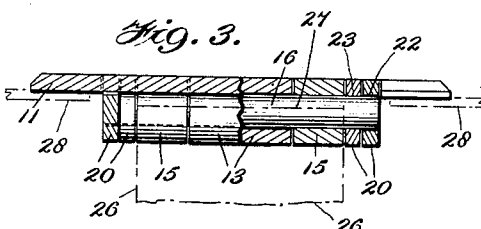
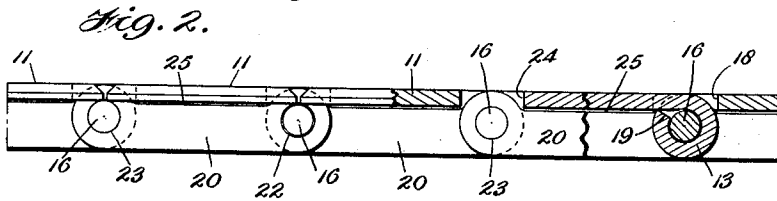
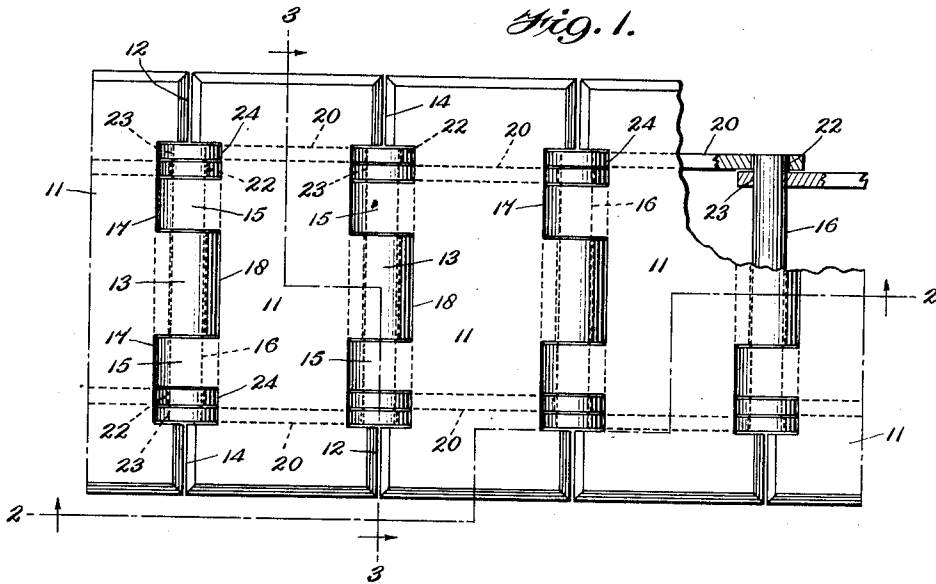
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CONVEYER CHAIN

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CONVEYER CHAIN

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7 Claims. (Cl. 198—195)

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The invention relates to power driven conveyers, and more especially to a light duty sprocket chain type thereof known as "flat-top" conveyers, which find extensive use in food processing industries such as dairies, canneries, bottling plants, meat packing plants, etc., for carrying cans, bottles or like containers from station to station in the course of washing, filling, capping, pasteurizing, sealing, labelling and/or other operations.

Several forms of such conveyers have been heretofore proposed, one of which comprises a series of longitudinally adjacent sheet metal links of generally rectangular form, the adjoining edge portions of which are provided with integral curled interfitting knuckles which are alined to form tubular barrels in which chain pins are disposed and retained, thus providing articulating joints between the adjacent links. The links may be identical, thus enabling economical production, and may be conveniently formed by stamping generally rectangular blanks from sheets of suitable metal of say one-eighth inch in thickness, which blanks have spaced longitudinal tongues projecting from the opposite transverse edges thereof. The tongues along one edge of a blank are staggered relative to those along the opposite edge, and when curled by an appropriate bending operation to form tubular knuckles disposed below the under surface of the links, may be interfitted or mated with those of the adjacent links to produce the barrels into which the chain pins are inserted. These barrels are received between the teeth of the sprockets about which the chain is trained, and constitute the projections by means of which it is driven. Since the knuckles are so formed that no portion thereof extends above the outer face of the links, between the sprockets the chain presents a substantially continuous flat surface free from projections or obstructions, and thus is particularly well adapted to have cans, bottles and the like slid to and from position thereon and to transport them from one point to another without tilting, upsetting or spilling their contents.

Ordinarily the barrels formed by the interfitting knuckles are of a length less than the width of the chain so that the lateral edge portions of the latter extend beyond the ends of the barrels and present flat under surfaces free from projections. Generally the upper or operative run of the conveyer is provided with spaced longitudinally extending fixed supports or tracks which are slidably engageable by such lateral portions of the chain links, whereby sagging of this run

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of the chain is prevented and a substantially true planar article supporting surface is preserved. In most cases the lower or return run of the chain is not guided or supported, except that idler rolls may be provided at spaced points between the sprockets to prevent excessive sag of this run of the chain.

The sprockets about which the chain travels are usually of a width substantially equal to the length of the barrels, and in many instances are provided with shrouds at their ends engageable by the ends of the barrels as they pass around the sprocket whereby to guide and prevent misalignment of the chain at this point.

Conveyer chains as above described may be constructed at relatively moderate cost and will give satisfactory performance under many conditions. It not infrequently happens however, for example in the case of unusually long conveyer runs, that the chains may encounter abnormal conditions such as excessive loads, excessive side flex (especially in the lower or return run), unequal or off-center loading, etc., with attendant abnormal stresses and strains which may result in rapid wear, looseness of the parts, and stretching of the chain. Such abnormal conditions may also cause the curled knuckles to be pulled at least partially open, and may even produce fatigue and failure of the metal of the knuckles, particularly at the juncture thereof with the body portion of the links.

Because of the simplicity and relatively low cost of manufacture of this type of chain, it is highly desirable that its general structure be preserved while at the same time it be so strengthened as to prevent or materially reduce the above mentioned consequences of abnormal operation, and it is the principal object of the present invention to provide such a flat top conveyer chain.

In the accompanying drawing forming a part of this specification several forms of the invention have been illustrated for purposes of disclosure but not of limitation.

In the said drawing:

Figure 1 is a plan view of a small portion of a conveyer chain of the type above mentioned, equipped with one form of strengthening member in accordance with the invention;

Fig. 2 is an elevational view thereof, partly in longitudinal section on approximately the planes indicated by the line 2—2 of Fig. 1;

Fig. 3 is a transverse sectional view on approximately the planes indicated by the line 3—3 of Fig. 1, looking in the direction of the arrows;

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Fig. 4 is a perspective view of one of the strengthening members; and

Figs. 5 and 6 are plan views similar to Fig. 1, illustrating two slightly modified forms of the invention.

Referring first to Figs. 1-4, the conveyer chain there shown comprises a series of plate-like links 11 of generally rectangular shape, one longer edge 12 of each of which is provided with a medially disposed knuckle 13 while the opposite longer edge 14 has a pair of spaced knuckles 15 disposed for the reception of the knuckle 13 of an adjacent link between them to form a tubular barrel into which a chain pin 16 may be inserted to complete an articulating joint between the links. The edges 12 of the links are cut back or recessed, as at 17, to accommodate the knuckles 15, while the edges 14 are recessed as at 18 to accommodate the knuckles 13. As above indicated the links are stamped from metal sheets, and the knuckles 13 and 15 are formed by bending or curling longitudinally extending tongues of the link blanks to annular form below the plane of the body of the link. The pins 16 may be retained in position by heading each end thereof, but preferably the knuckles 15 are so formed that the pins are a press fit in them, while the knuckles 13 are formed to have a running fit with the pins.

The ends 19 of the tongues from which the knuckles are formed, while being brought into contact or proximity to the under face of the link body as indicated at the right of Fig. 2, are not rigidly secured to such body, and the knuckles retain their cylindrical form only through the rigidity of the metal of the bent tongues. Under normal conditions this is sufficient to prevent distortion or enlargement of the knuckles, but if the chain be subjected to abnormal stresses and strains as mentioned above, the metal of the knuckles may yield and the knuckles become enlarged, resulting in looseness of the parts, excessive wear, stretching of the chain, possible working out of the chain pin, and perhaps fatigue and rupture of the metal of the knuckles.

The present invention overcomes this difficulty by providing one or more strengthening members beneath each link which prevent such distortion of the knuckles. In the form shown in Figs. 1-4 the pins 16 are extended somewhat beyond the outer ends of the respective knuckles 15 and strengthening bars 20 having pin receiving apertures 21 are mounted on such extensions, perpendicular to the link bodies and extending beneath each link to the next adjacent pin. The bars under each link have a running fit with one pin, as indicated at 22, and a press fit with the other pin, as indicated at 23, whereby free articulation of the joints is preserved while at the same time the bars are retained in operative position. The recesses 17 in the edge portions 12 of the links are extended somewhat to accommodate the ends of the bars 20, while the edge portions 14 of the links are provided with recesses 24 for like purpose; and the bars themselves are cut away as at 25 to permit them to underlie the link bodies. If by any chance the press fit 23 between a bar 20 and a pin 16 should be destroyed, the bar still will not be displaced by reason of the disposition of its end portions in the recesses 17 and 24.

The bars 20 in effect constitute reach members between adjacent chain pins 16 which, by taking the tension strains tending to separate the links, preserve the pitch of the chain, i. e. the spacing of the pins, and prevent opening or distortion

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of the knuckles 13 and 15 constituting the primary joint bearings under such strains, which would produce looseness of the parts and excessive lateral flexing of the chain. The bars also provide additional bearing surfaces in the joints, thus decreasing the bearing loads per unit of surface therein; and while connected to the links only through the chain pins 16, in their positions underlying the links the bars also prevent undue bending of the link bodies themselves under excessive loads.

As indicated in broken lines in Fig. 3, a sprocket 26 about which the chain may be trained is still of a width substantially equal to the length of the barrels formed by the knuckles 13 and 15. However, since the teeth 27 of the sprocket project up between the bars 20 the latter, through engagement with the ends of the teeth, will guide and prevent misalignment of the chain as it passes around the sprocket, which therefore need not be shrouded.

The spaced longitudinal tracks or supports for the lateral edge portions of the upper run of the chain, referred to above, are indicated in broken lines in Fig. 3 at 28.

The form of the invention shown in Fig. 5 is similar to that already described, with the exception that here the reach bars 30, instead of being straight as in Fig. 1, are laterally offset to bring one end of each pair of bars inside the ends of the next adjacent pair, instead of alternating the ends as in Fig. 1.

In Fig. 6 only one offset bar is employed beneath each link, these being disposed substantially along the median line of the chain. This form will require the use, either of two spaced sprockets one to either side of the line of bars, or of a single sprocket having a circumferential groove to accommodate the bars.

What is claimed is:

1. A "flat top" conveyor chain adapted to be trained about a sprocket wheel, said chain comprising a series of aligned plate-like sheet metal links providing in the operative run of the conveyer a substantially continuous planar load-supporting surface, the adjacent edge portions of said links having integral transversely staggered interfitting knuckles providing barrels adapted to engage the sprocket teeth and constituting the bearings of articulating joints between the links; a chain pin disposed in each set of interfitting knuckles to complete such joints; and longitudinal-strain resisting members disposed beneath the links intermediate the lateral edges thereof and interconnecting adjacent chain pins whereby to take longitudinal strains tending to distort the links and alter the pitch of the chain, said members also engaging the sprocket as the links travel thereabout, to prevent transverse displacement of the chain relative to the sprocket.

2. A chain for "flat top" conveyers, adapted to be trained about a sprocket wheel and comprising a series of contiguous plate-like links providing in the operative run of the conveyer a substantially continuous planar load-supporting surface, the adjacent edge portions of said links being provided with transversely staggered interfitting curled knuckles adapted to engage the sprocket teeth and constituting the bearings of articulating joints between the links; a chain pin engaging and retained in each set of said knuckles to complete such joints; and a longitudinally extending reach bar disposed beneath each link adjacent the knuckles and interconnecting the chain pins thereof, whereby to re-

lieve the links strains acting longitudinally of the chain which tend to distort the knuckles and loosen the parts, said reach bars also engaging the sprocket as the links travel thereabout, to prevent transverse displacement of the chain relative to the sprocket.

3. In a conveyer chain, a series of alined plate-like sheet metal links providing a substantially continuous planar load supporting surface, the adjacent edge portions of said links being provided with integral interfitting knuckles constituting the bearings of articulating joints between the links; a chain pin disposed in each set of interfitting knuckles and frictionally engaging certain thereof whereby it is retained in position; and a reach bar extending between and interconnecting each pair of pins for resisting longitudinal strains tending to distort the knuckles and loosen the parts, one end of each bar being rigidly connected to one pin of the pair and the other end of such bar having a running fit with the other pin of the pair.

4. In a conveyer chain, a series of alined sheet metal links having planar body portions providing a substantially continuous planar supporting surface, the adjacent edge portions of said links having interfitting curled knuckles constituting the bearings of articulating joints between the links; a chain pin disposed in each set of interfitting knuckles, said pins projecting beyond the ends of the outermost knuckles; and reach bars underlying the planar body portion of each link, extending between and interconnecting said projecting ends of adjacent links, for resisting strains tending to distort the link elements.

5. In a conveyer chain, a series of alined sheet metal links having planar body portions providing a substantially continuous planar supporting surface, the adjacent edge portions of said links having interfitting curled knuckles constituting the bearings of articulating joints between the links; a chain pin disposed in each set of interfitting knuckles, said pins projecting beyond the

ends of the outermost knuckles; and reach bars underlying the planar body portion of each link, extending between and interconnecting said projecting ends of adjacent links, for resisting strains tending to distort the link elements, one end of each bar being rigidly connected to one of its pins and the other end of such bar having a running fit with the other of its pins.

6. A conveyer chain according to claim 5, characterized by the chain pins having a press fit in certain knuckles of each set and a running fit with other knuckles thereof, and the planar body portions of the links being recessed to accommodate the end portions of the reach bars.

7. In a conveyer chain adapted to be trained about a sprocket, a series of alined plate-like sheet metal links having planar body portions providing a substantially continuous planar supporting surface, the adjacent edge portions of said links being provided with interfitting curled knuckles constituting the bearings of articulating joints between the links; a chain pin disposed in each set of interfitting knuckles; and a series of reach bars disposed along the median line of the chain, one beneath each link, each such bar extending between and interconnecting the chain pins connecting its link to the next adjacent link, whereby to resist longitudinal strains tending to distort the link elements, said bars also engaging the sprocket as the links pass thereabout, to prevent transverse displacement of the chain relative to the sprocket.

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