

Sept. 8, 1936.

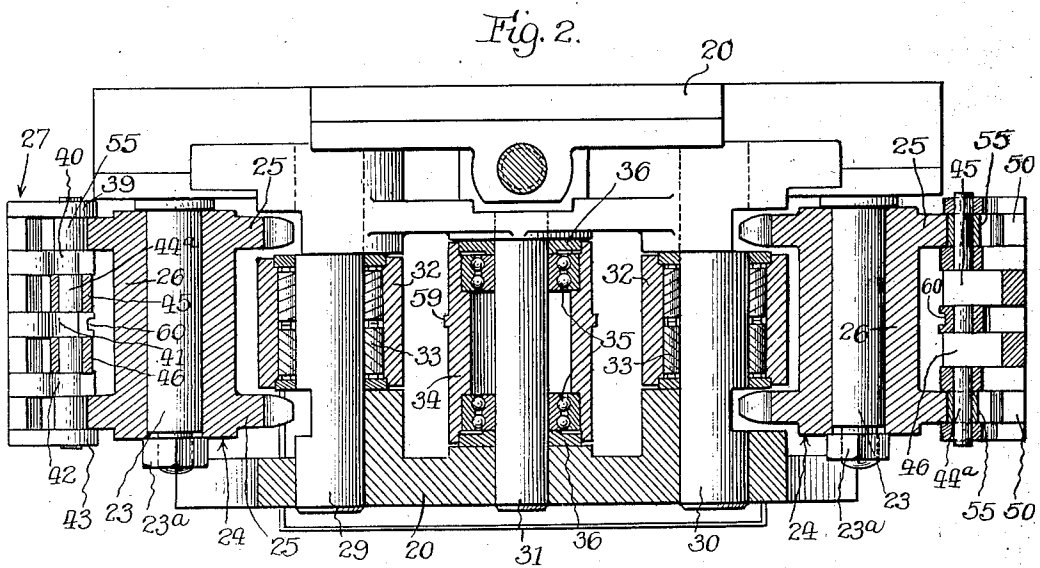
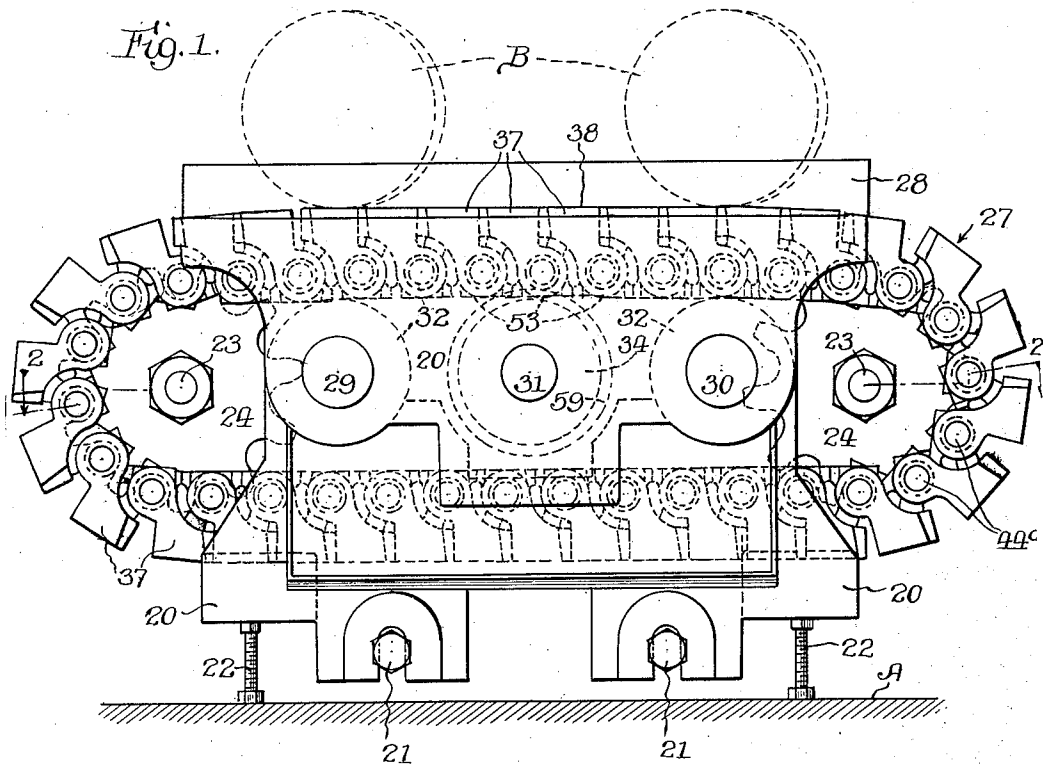
C. L. MATTISON

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FEEDING MECHANISM OR THE LIKE

Original Filed July 12, 1930

2 Sheets-Sheet 1



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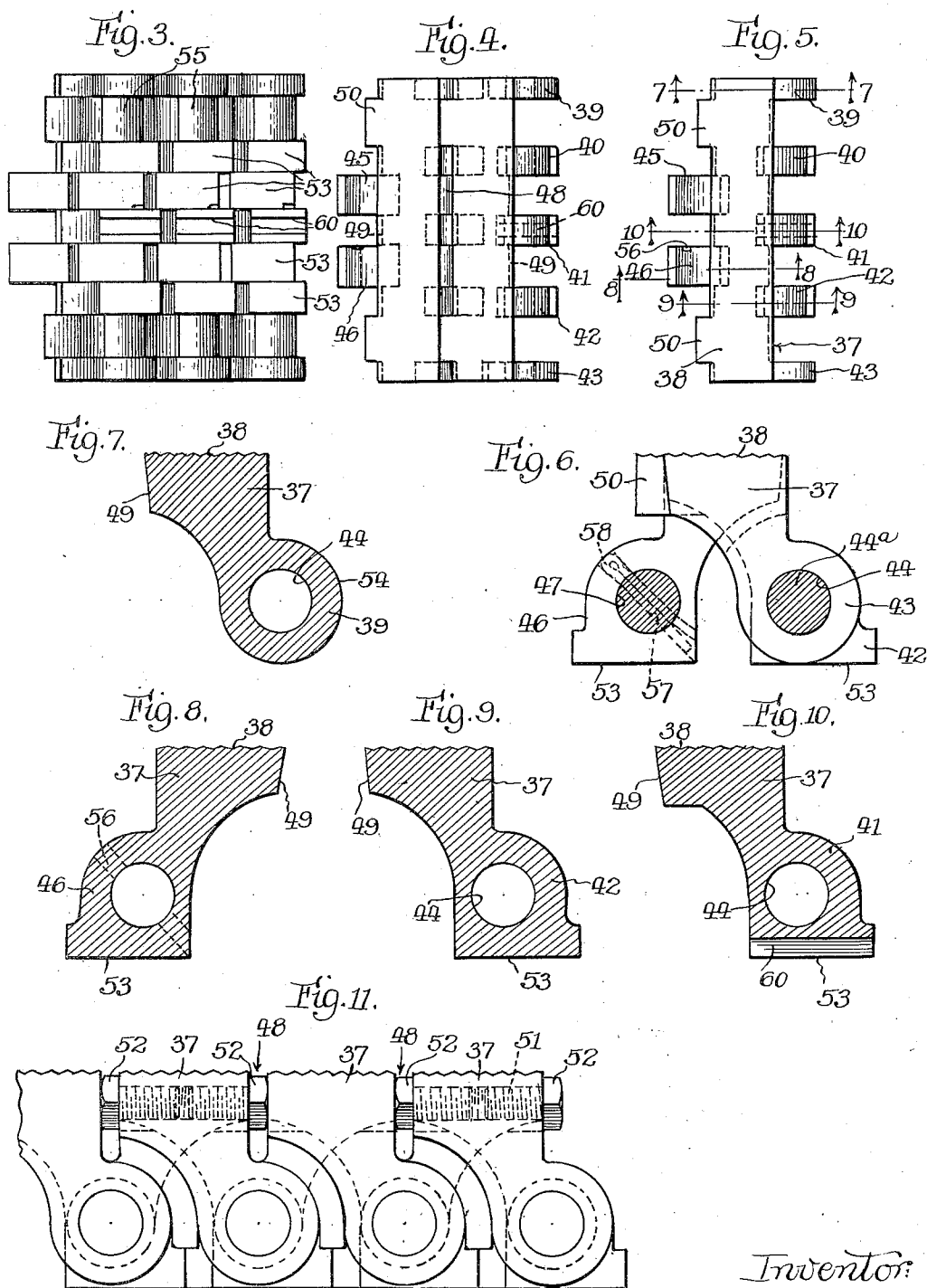
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UNITED STATES PATENT OFFICE

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FEEDING MECHANISM OR THE LIKE

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9 Claims. (Cl. 198—189)

The invention has reference to a mechanism for feeding articles to be operated upon to certain types of operating machines such as moulders or the like.

5 An object of the invention is to provide a new and improved mechanism of this character which is simple and sturdy in construction, efficient in operation and which feeds the articles steadily and accurately to the operating machine.

10 Another object of the invention is to provide a mechanism of this character which embodies a constantly moving chain of novel construction, for feeding the articles, in combination with improved means for supporting said chain in the
15 feeding movement thereof.

Another object of the invention is to provide a mechanism of this character which may be formed as an integral part of the machine with which it is to be used or which may be separately
20 constructed as an attachment for presently existing machines.

Another object of the invention is to provide a novel mechanism embodying pressure-applying means, supporting rolls and an interposed moving
25 feed chain all arranged and constructed to withstand heavy pressure while maintaining a level feed bed for engaging and conveying the articles.

More specifically stated, it is an object of the invention to provide a feeding mechanism which
30 includes an endless feed chain, adapted to engage and transfer articles to an operating machine, and means for supporting the article-engaging run of the chain comprising a plurality of rollers underlying and supporting said chain at
35 strategic points where the strain on the chain is greatest.

Another object is to provide an improved means for guiding the feed chain or in other words for preventing lateral displacement of the chain under strain. In the present instance, this
40 object is attained by a novel relationship of interfitting grooves and guide ribs provided on the chain and an underlying roller.

A further object of the invention resides in the
45 provision of a feed chain of new and improved construction.

Still another object is to provide a feed chain which presents a level article-conveying surface and an opposed, substantially-continuous support-engaging surface intermediate the chain
50 sprockets.

Another object of the invention is to provide a feed chain composed of separable links embodying a novel construction which includes an inter-
55 engagement between successive links adapted to

prevent relative pivotal movement therebetween in one direction beyond a point at which the article-engaging faces of the links form a plane, level surface.

A further object of the invention is to provide, in a device of this character, a new and improved feed chain adapted to be self-supporting or non-sagging intermediate the sprockets over which it travels; said chain being further adapted for engagement with said sprockets with a minimum of frictional resistance and wear.

Another object is to provide a feed chain wherein the hinge lugs extend inwardly from opposite edges of the links whereby to produce a chain wherein the links are unusually short longitudinally of the chain; and in such a chain to form the inner end of the lugs to provide a substantially continuous surface in the upper run of the chain for engagement by a supporting means.

Other objects and advantages will become apparent in the following description and from the accompanying drawings, in which:

Figure 1 is a side elevation of a feeding mechanism embodying the features of the present invention.

Fig. 2 is a longitudinal section through the device taken substantially along the line 2—2 of Fig. 1.

Fig. 3 is a bottom plan view of a section of the feed chain.

Fig. 4 is a top plan view of a similar section of the feed chain.

Fig. 5 is a top plan view of one of the feed chain links.

Fig. 6 is an end elevation of one of the links.

Figs. 7, 8, 9, and 10 are side elevations of individual pivot lugs taken as indicated by the lines 7—7, 8—8, 9—9, 10—10, respectively, of Fig. 5.

Fig. 11 is a side elevation of a portion of the feed chain showing a modified form of abutment between adjacent links.

While the invention is susceptible of various modifications and alternative constructions, I have shown in the drawings and will herein describe in detail the preferred embodiment, but it is to be understood that I do not thereby intend to limit the invention to the specific form disclosed, but intend to cover all modifications and alternative constructions falling within the spirit and scope of the invention as expressed in the appended claims.

The present invention, as herein illustrated, is used in connection with machines arranged to operate upon a succession of articles fed thereto, such as certain types of wood-working machines,

of which the machine known to the trade as a moulder is a characteristic example. A feeding mechanism, as used with such a machine, is mounted at the front side of the bed of the machine and embodies mechanism by which a succession of articles to be operated upon, such as pieces of wood, may be fed steadily, rapidly and accurately into the machine. The present organization is adapted to be built into the machine with which it is to be used during the construction of the machine or may be applied to a machine already in existence without material alteration or change in the structure of the mechanism.

Referring more particularly to the drawings, 20 designates generally a frame arranged to be secured, as by the bolts 21, to the machine with which the mechanism is to be used. Such devices as set screws 22, bearing between the frame 20 and a part of the machine A, may be employed accurately to adjust the frame relative to the machine. The frame is somewhat elongated and supports a pair of shafts 23 which, in this instance, extend horizontally and parallel from opposite ends of the frame. Each of the shafts 23 carries a sprocket assembly 24 secured thereon as by a nut 23^a, which assembly herein comprises a pair of spaced sprockets 25 connected by a hub 26. One or the other, or both of the sprocket assemblies is driven in any suitable manner to impart movement to a feed chain assembly 27 which passes about said sprockets. The particular construction of the feed chain assembly will be hereinafter described.

The arrangement of the frame, the sprockets, and the feed chain is such that one run of the chain (herein the upper run) between the sprockets will be in alinement with the bed of the machine. Consequently, articles will be fed into the machine by the upper run of the chain. In order to insure a positive, steady, and accurate feed, a well-known type of means is employed for holding the articles securely against the bed surface of the chain. This means is diagrammatically illustrated in Fig. 1 as being presser rolls B disposed above and adjacent the upper run of the chain and inwardly thereof from the axial centers of the sprockets. Accuracy of feeding is obtained by providing an elongated guide 28 (Fig. 1) which is secured to the frame 20 and extends along one side of the upper run of the feed chain.

The presser rolls B or other pressure applying means are usually slightly canted with respect to the direction of travel of the feed chain so that an article passing between the presser rolls and the feed chain will be forced sideways on the chain until it engages the guide 28. Normally, the presser rolls B are adapted to exert a considerable force against an article passing therebeneath, in consequence whereof tremendous strains, caused by this force as well as by the laterally directed force produced by the canted relationship of the presser rolls, are transmitted to the feed chain. Means is, therefore, provided for supporting the article-conveying or upper run of the chain.

The chain supporting means, which is preferably employed, comprises (see Fig. 2) a plurality, in this instance three, of spaced parallel shafts 29, 30, and 31 mounted in the frame. The axes of these shafts are parallel and extend horizontally of the frame at substantially regularly spaced intervals between the shafts 23. Two of

shafts 29 and 30, underlie and are in substantially vertical alinement with the axes of the respective presser rolls B. Idle supporting rolls 32 are rotatably mounted on the shafts 29 and 30 and the assemblies thereof preferably include interposed roller elements 33. The size of the rolls 32 and the position thereof on the shafts 29 and 30 is such that the surface of the roll engages the inner surface of the upper run of the chain between the sides of the chain. Due to the position of the shafts 29, 30 with respect to the presser rolls B, the rolls 32 engage and support the chain at the points where the presser rolls B apply the greatest force thereto.

The shaft 31 likewise carries an idle supporting roll 34 arranged to engage the inner face of the upper run of the chain at a point substantially intermediate the sprockets to support the central portion of the chain at the point where a work-performing tool (not shown) operates on the work, said tool usually exerting considerable downward pressure on the work. Suitable roller bearings 35 are interposed between the roll 34 and the shaft 31 and the assembly also provides such means as washers 36, or the like, at each end of the roll as thrust bearings to prevent axial movement of the roll.

The chain construction preferably employed in connection with the previously described organization is of the endless type comprising a plurality of similar links, each arranged to have a complementary interfitting relationship with adjacent links to form the chain. The present chain, while being constructed to cooperate with the supporting means on the frame, is, in itself, so fashioned that it adds to and materially enhances the sturdiness and rigidity of the entire mechanism.

Referring particularly to Figs. 5 and 6, a description of one of the links will suffice for all. Each link comprises a unitary structure, preferably formed of cast metal, having an elongated body portion or member 37 of approximately rectangular shape. One face of the body portion, here shown as the outer face and designated 38, constitutes an article-engaging face of the link of relatively short dimension in the direction of travel, which face may, if desired, be serrated or otherwise roughened positively to engage the article to be conveyed. The body member has a plurality of transversely extending lugs projecting from the inner face thereof in a direction opposite to the article-engaging face 38. Five of these lugs, designated 39, 40, 41, 42, and 43, are shown in the present embodiment and the preferred arrangement spaces the lugs at substantially regular intervals between the opposite ends of the body member. The lugs have alined apertures 44 formed therein for receiving a pivot pin 44^a.

The opposite side of the body member carries a pair of similarly formed lugs 45 and 46 extending in the same manner, but in the opposite direction, from the body member. These lugs 45 and 46 are positioned in intermediate or staggered relation to the centrally located lugs 40, 41 and 42 on the other side of the body member and are somewhat heavier and more substantial in construction. The two sets of lugs on each link are so spaced from each other in the direction of travel that a gap is formed therebetween. The lugs 45 and 46 are also provided with alined apertures 47 for pivot pins 44^a. It will be apparent that by this construction the lugs 45 and 46 on one side of the link may be inserted between lugs

40, 41 and 42 on an adjacent link to provide an interfitting relationship in which the apertures 47 on the lugs 45 and 46, and the apertures 44 on the lugs 40, 41 and 42, are aligned to receive the pin 44^a for securing the links together.

As is shown clearly in Fig. 6, the lugs are substantially elongated transversely of the link, or in the direction of travel of the chain, and that the major portions of the lugs are positioned laterally beyond the side edges of the article-engaging face. Moreover, the pivotal centers or axes of the aligned apertures 44 and 47 are likewise located beyond the edges of the face so that, when the links are combined to form a chain, a gap or space 48 (Fig. 4) of substantial width is provided between the sides of adjacent links. These gaps or spaces permit foreign matter to pass freely through the chain during the operation thereof.

It is, however, contemplated that there might be a tendency for particles of unusual size to become wedged between the side faces of adjacent links, and to overcome this difficulty the side faces, as shown at 49 in Figs. 7, 8, 9, and 10, are undercut or otherwise formed to slope inwardly of the body member from the article-engaging face 38.

This sloping face may be continuous, or as has been found advantageous, those portions of the side face adjacent the lugs may be cut away thus providing alternating sloped surfaces on opposed faces of adjacent links. In consequence, as the chain passes about the sprocket, during which passage the space between the links first increases and then decreases, the sloping surfaces exert a wedging force on particles of foreign matter to eject said particles from between the links.

Means are provided for limiting the relative pivotal movement of the links in one direction to a point in which the links will be positioned in substantially the same level plane, whereby a chain is provided which is self-supporting and cannot sag when straightened intermediate the centers of the sprockets over which it passes. To this end, (see Figs. 4, 5, and 6), one side face of the body member of the link is provided with a pair of laterally extending lugs or abutments 50. These lugs are preferably positioned adjacent the ends of the link, and, as shown in Fig. 5, will generally be disposed in intermediate relation to the outer pairs of lugs 39, 40 and 42, 43 on the opposite side of the body member.

The abutments 50 are so formed that positive engagement thereof with the side of the next adjacent link is produced when the article-engaging faces 38 of said links are flush or are in the same plane. By virtue of this abutment, therefore, the relative pivotal movement of adjacent links is limited in one direction to a position in which the article-engaging faces are level and, as a result, the upper run of the chain will extend in a straight line directly between the sprockets at each end thereof, thereby providing a flat, level and sturdy article-conveying surface.

A modified form of limiting abutment is shown in Fig. 11. In this modification, the body members of alternate links are provided with laterally extending, longitudinally spaced, screw-threaded bores 51 arranged to receive headed bolts 52. The heads of the bolts form the abutment for engagement with the side face of the adjacent link to limit the relative pivotal movement of the links in the manner previously described.

Another feature of the invention resides in the

arrangement of parts by which a substantially flat continuous surface is provided on the chain on the side thereof, opposite the article-engaging face, for engagement with the supporting rollers. As may be seen in Figs. 6, 8, 9, and 10, the free ends of certain of the lugs, in this instance the centrally located lugs 40, 41, 42, 45, and 46, each present an elongated flat face 53, which faces are in a plane paralleling the article-engaging face 38. The links are so arranged that the faces 53 of certain lugs of at least one of the two links on the respective sides of a given link are in contact with a supporting roll during the time when the article-engaging face 38 of said given link is passing the point of pressure.

The relationship of the pivotal centers of the lugs to the faces is such that the major portion of the faces lie on the outer side of the axis. Preferably, the proportions are such that, when the links are connected together, the gap between the sets of lugs on any given link is spanned by lugs on the two links on opposite sides of said given link and the lugs on said two links extend past each other. Thus, the side faces of each lug of any given link extend alongside the lugs of the next two adjacent links at the side of said given link on which said lug is positioned. Moreover, each lug on any given link is spaced longitudinally of the chain from the corresponding lug of the adjacent link to provide a gap therebetween to permit of relative movement of the two links, while a third link next adjacent one of said two links has a lug spanning said gap. It will also be noted that each lug of any link extends alongside a lug of a separately pivoted link. Hence, as may be seen in Fig. 3, a continuous level surface is provided on the under side of the chain (which is the side opposite the faces 38) when the chain is in a straight line position.

While the two outer lugs 39 and 43, which are generally formed flush with the ends of the link, may present flat faces similar to the faces 53, these lugs are preferably rounded, as shown at 54 (Fig. 7), in order to eliminate exposed sharp corners on the chain. The two outer pairs of lugs 39, 40 and 42, 43, in the present embodiment, do not receive therebetween any complementary lugs on adjacent links, such space being left open to permit the teeth on the sprockets 25 to engage the pivot pins 44^a for driving the chain. Preferably, antifriction rollers 55 (Figs. 2 and 3) are carried by each pivot pin 44^a between the lugs 39, 40 and 42, 43 to lessen the resistance of the chain in passing about the sprocket. It should be noted that the lugs are of substantial length and that the pivot pins are near the outer ends of the lugs. The teeth of the sprockets 25, therefore, can only engage the rollers 55 and cannot contact the inner surface of the body member.

The pivot pin is maintained against axial movement by simple means which is readily detachable in order to permit any of the links to be separated. To this end, one of the pivot lugs (in this instance the lug 46) has a groove or recess 56 (Fig. 8) extending across one side face thereof. The pivot pin 44^a is radially bored, as at 57, at a point which registers with the groove 56 when the parts are assembled so that a suitable member, such as the cotter pin 58 (Fig. 6) may extend through the bore 57 with the ends positioned in the recess to prevent displacement of the pin.

In considering the operation of the mechanism, it will be seen that when the device is combined with a machine, either as a permanent part there-

of, or as an attachment, the upper run of the feed chain presents a flat, level surface for conveying articles toward the machine. This, in large part, is due to the inherent nature of the chain wherein the upper or article-conveying run thereof can not assume any other position than that in which the article-conveying faces 38 are flush and level. While this structure, in itself, would, in all probability, operate satisfactorily, the underlying supporting rollers 32 and 34, which have a constant and substantially frictionless supporting engagement with the continuous level surface formed by the faces 53 on the lugs, produce a construction capable of withstanding the tremendous pressures to which the chain is subjected during operation, thereby materially increasing the life of the chain.

Means is provided for guiding the article-conveying run of the chain, which means operates to prevent lateral displacement of the chain by the effect and force of the canted presser rolls B. For this purpose, one of the idle supporting rolls, preferably the center roll 34, carries an annular outwardly extending rib 59 (Fig. 2). On the chain, one of the lugs (in this instance the central lug 41) has an elongated groove 60 (Figs. 3, 5, and 10) formed in the face 53 thereof to engage said rib. These grooves 60 will, of course, be aligned longitudinally of the chain when the chain is complete and as the chain passes from one sprocket to another the interfitting rib and groove relationship guides the chain and prevents lateral movement thereof. Obviously, the same result would be effected by reversing the position of the rib and groove.

It will be apparent from the foregoing that the present invention provides a mechanism having a level article-conveying bed or surface which is capable of unyieldingly withstanding the stresses and strains incident to the operation thereof and which accurately and evenly conveys articles to an operating machine.

I claim as my invention:

1. A feed chain formed of a plurality of links pivotally connected together, each of said links including a plurality of lugs on opposite sides of the link, said lugs on one side being staggered with respect to the lugs on the other side to provide a complementary interfitting relationship of lugs on adjacent links, means for pivotally securing interfitting lugs together, said lugs having flat faces thereon arranged in one pivotal relationship to occupy the same plane, said lugs being offset longitudinally of the direction of travel of the chain for such a distance that the lugs of the two links on opposite sides of any given link extend longitudinally past each other and span the longitudinal gap between the opposed lugs of said given link to provide on the inner side of the chain a substantially continuous surface.

2. A link for a feed chain, comprising a body member having an outer face, a plurality of lugs extending from said member in a direction opposite from said outer face, said lugs having substantially flat faces thereon which are elongated transversely of the link and are positioned in substantially the same plane, one of said lugs having a guide groove therein.

3. A feed chain formed of a plurality of links pivotally connected together, each of said links including one or more lugs on each of the opposite sides of the link interfitting with lugs on adjacent links, the lugs on one side of any given link being spaced longitudinally of the chain from the

lugs on the opposite side of said link, and means for pivotally securing interfitting lugs together, the lugs of the various links having flat faces thereon arranged in one pivotal position to lie in the same plane, the lugs of the two links on opposite sides of said given link extending longitudinally of the chain past each other to span said space between the lugs on opposite sides of said given link to provide a substantially continuous surface in said plane.

4. A feed chain comprising, in combination, a plurality of similar links, each link having a plurality of lugs on opposite sides of the link, the lugs on one side being staggered with respect to the lugs on the other side to provide a complementary interfitting relationship of lugs on adjacent links, and means for pivotally securing the lugs on one side of each link to the interfitting lugs on the next adjacent link, each lug extending alongside lugs of the next two adjacent links at the side of said link on which said lug is positioned.

5. A feed chain comprising, in combination, a plurality of similar links, each link having one or more lugs on the respective sides of the link and on one face of the chain, the one or more lugs on one side being staggered with respect to the one or more lugs on the other side to provide a complementary interfitting relationship of lugs on adjacent links, and means for pivotally securing the one or more lugs on one side of each link to the interfitting lugs on the next adjacent link, each lug of any given link being spaced longitudinally of the chain from the corresponding lug of the adjacent link to provide a gap therebetween to permit relative movement of the two links, a third link next adjacent one of said two links having a lug spanning said gap to provide on said face of the chain a substantially continuous surface.

6. A feed chain comprising, in combination, a plurality of links, and a plurality of pivots serially connecting said links, each of said links having a portion extending alongside a portion of a separately pivoted link, the faces of said portions of all of the links thereby together forming an uninterrupted flat surface on one face of the chain.

7. A feed chain comprising, in combination, a plurality of links, and a plurality of pivots serially connecting said links, each of said links having a portion extending alongside a portion of the adjacent link and alongside a portion of the next link beyond said adjacent link, said portions of all of the links having corresponding faces together forming an uninterrupted flat surface on one face of the chain.

8. An endless chain carrier comprising a plurality of connected links, each link comprising a body portion having a rectangular carrying surface of relatively short dimension in the direction of travel, and a plurality of lugs extending inwardly from the body portion and both ways in the line of travel, the lugs extending one way being staggered in relation to the lugs extending the other way to interfit with and be pivoted to the lugs on adjacent links, the body portion being adapted to abut against the body portions of adjacent links when the chain is straightened to limit the bending of the chain only to one side of its straightened position, said lugs having flat inner faces aligning with the faces on lugs of adjacent links when the chain is straightened, said faces having sufficient length in the line of travel

to provide an uninterrupted flat surface on the inner face of the chain.

5 9. A feed chain comprising a plurality of links, each link having a plurality of lugs interposed between and pivotally connected to lugs on adjacent links, said lugs having alined faces constituting a supporting surface, the lugs of the vari-

ous links being so positioned relative to each other that when a line transverse to the direction of travel of the chain on said supporting surface lies on the faces of the lugs of only one link, said line is longitudinally beyond both pivotal connections of said one link with the adjacent links. 5

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