

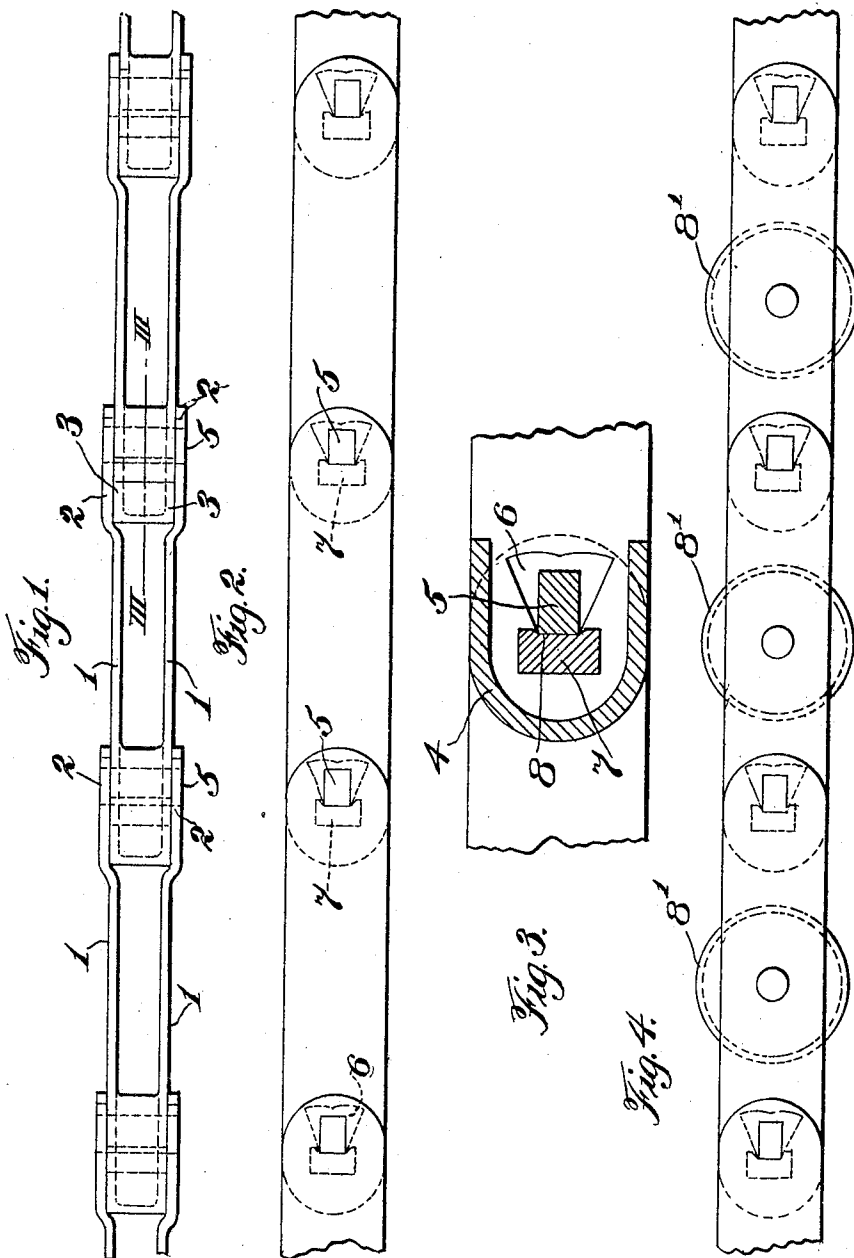
No. 856,528.

PATENTED JUNE 11, 1907.

W. T. JAMES.
CHAIN.

APPLICATION FILED SEPT. 4, 1906.

4 SHEETS—SHEET 1.



WITNESSES

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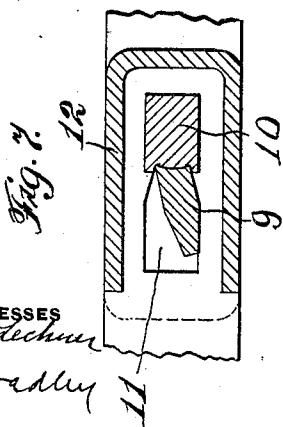
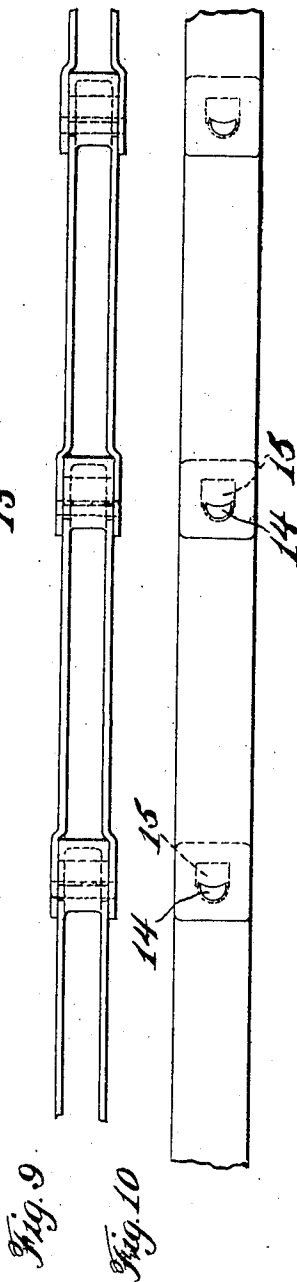
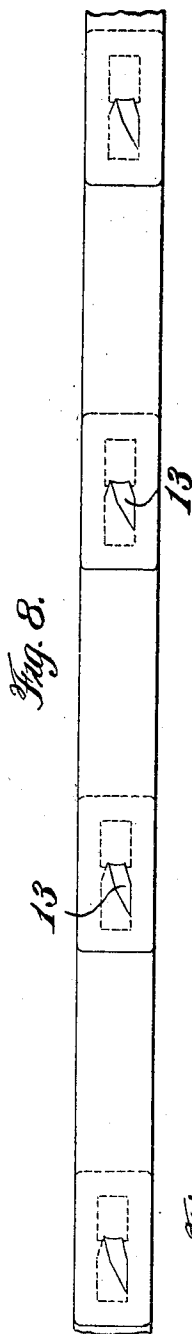
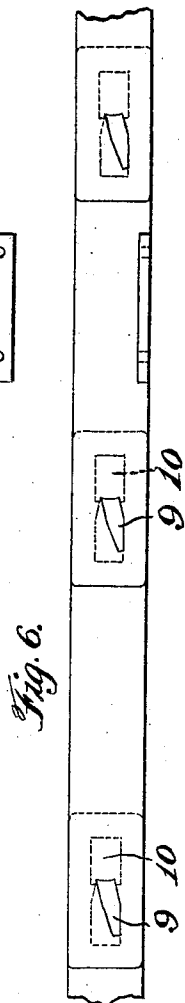
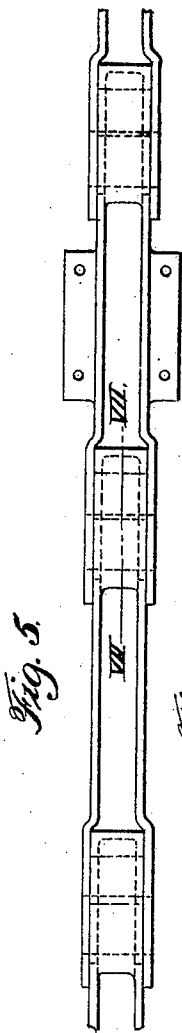
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4 SHEETS—SHEET 2.



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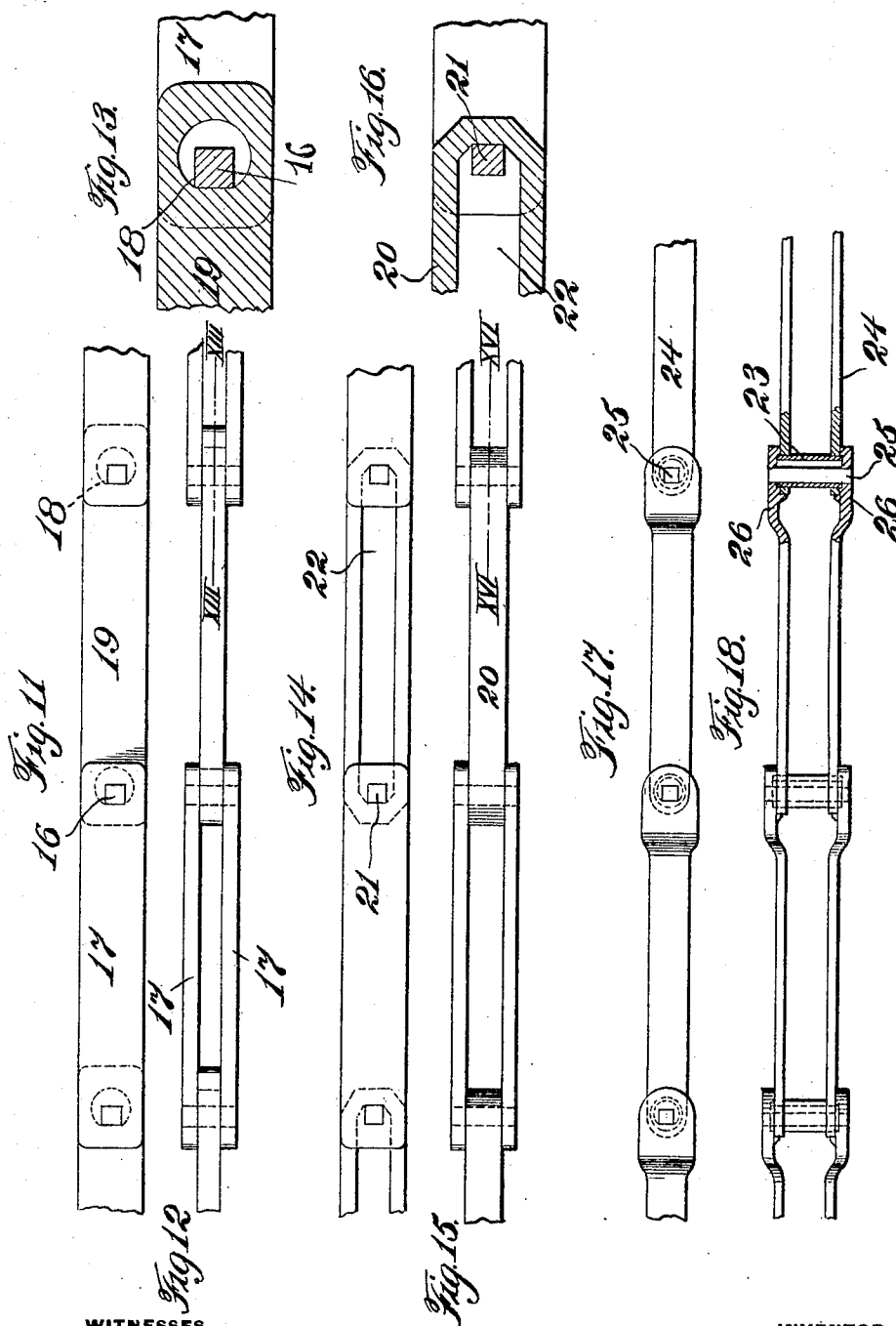
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4 SHEETS—SHEET 3.



WITNESSES

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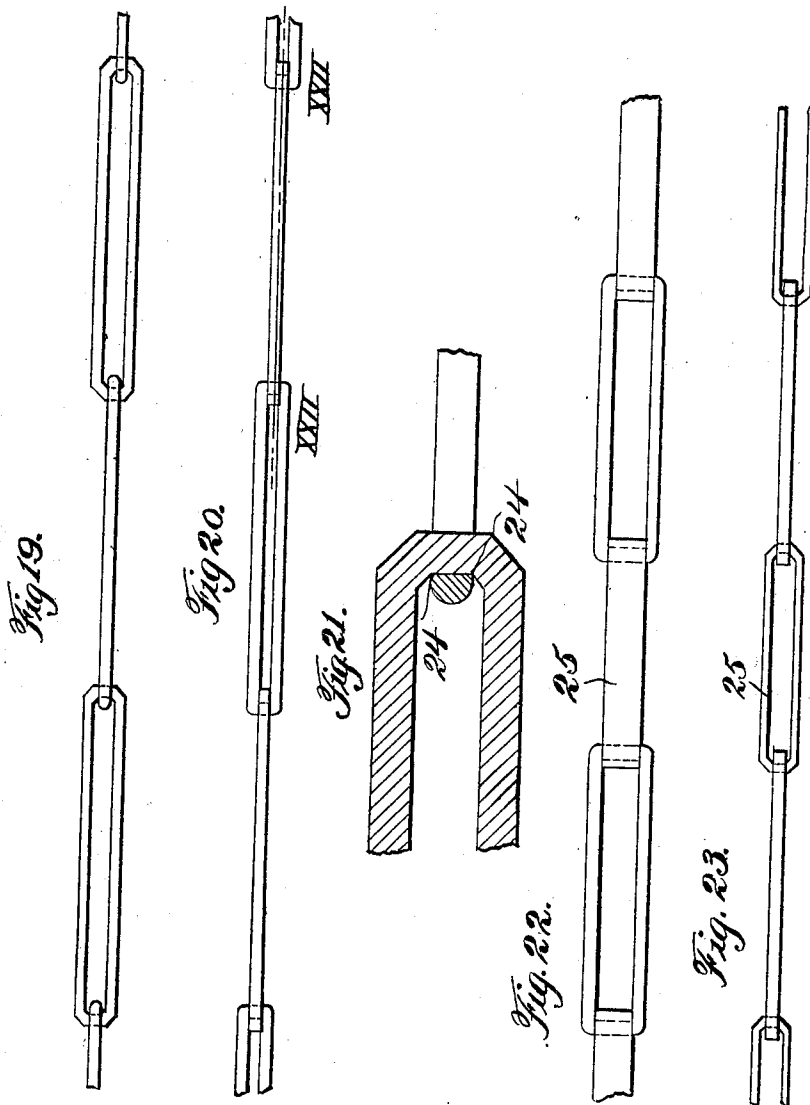
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4 SHEETS—SHEET 4.



WITNESSES

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UNITED STATES PATENT OFFICE.

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CHAIN.

No. 856,528.

Specification of Letters Patent.

Patented June 11, 1907.

Application filed September 4, 1906. Serial No. 333,037.

To all whom it may concern:

Be it known that I, WILLIAM T. JAMES, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Chains, of which the following is a specification.

My invention relates to chains, and especially to that type known as conveyer chains, and has for its objects; to provide a chain of this type with pivotal bearing members of an enduring character and in which the friction is reduced to a minimum; to provide a rocker joint for a chain of the above type in which the strain is taken for the most part by surfaces of considerable extent, but which in bending turns about a sharp edge with practically no sliding friction; to provide a chain in which the wear of the driving sprocket does not come upon the pivots, and in which the wear due to the engagement of the chain with the sprocket is greatly reduced; to provide a chain in which provision is made for a reduction of the sliding friction with the body over which the chain passes; and to provide a chain having means for protecting the pivotal bearing surfaces from dirt and injury.

One form of the invention is shown in the accompanying drawings, in which—

Figures 1 and 2 are a plan and side elevation respectively of the preferred form of chain;

Figure 3 is a section through the chain on the line III—III of Figure 1;

Figure 4 is a side elevation of a modified form of chain provided with rollers;

Figures 5 and 6 are a plan and a side elevation respectively of another modification;

Figure 7 is a section through the chain on the line VII—VII of Figure 5;

Figure 8 is a side elevation of a form of chain only slightly different from that of Figures 5 and 6;

Figures 9 and 10 are a plan and side elevation respectively of another modification;

Figures 11 and 12 are a side elevation and plan view of a modified form of chain;

Figure 13 is a section through the chain of Figure 12, on the line XIII—XIII;

Figure 14 and 15 are a side elevation and plan view of a form of chain slightly different from that of Figures 11 and 12;

Figure 16 is a section through the chain on the line XVI—XVI of Figure 15;

Figures 17 and 18 are a side elevation and plan view respectively of another modification;

Figures 19 and 20 are a side elevation and plan view respectively of a very simple form of the device;

Figure 21 is a section through the chain on the line XXII—XXII of Figure 20, and

Figures 22 and 23 are a plan and side elevation respectively of a form of chain slightly different from that of Figures 20 and 21.

Referring first to the preferred form of chain shown in Figures 1, 2, and 3, it will be noted that each of the links is composed of two opposing side members 1, 1, which side members are spread apart at the ends 2, 2, and at the other ends 3 are secured together by the shield 4 (Figure 3), which shield extends about the pivot points of the links and serves the double function of a stiffening or tie member and of a protector for preventing injury to the pivot members and excluding dirt. Securely riveted to the ends 2, 2, is the pivot block 5, which block in the present instance is made rectangular and has a flat front bearing face. The end 3 of the link has the clearance space 6 to provide for the oscillation of the member 5 when the chain passes over its sprocket, and a bearing block 7 is provided at the front end of such clearance space 6, which block is riveted securely in the ends 3, and is preferably rectangular in general cross-section with a recessed flat face 8 for engaging the flat face on the pivot block. It will be seen that the pivot block 5 serves as a tie member between the ends 2, 2, and the bearing block 7 serves as a tie member between the two opposing sides or ends 3. The members 5 and 7 of course take the driving strain on the chain and are consequently hardened to render them more durable. It will be observed that when the links are in alignment as shown in Figure 2, which position the chain assumes between its sprockets, the bearing members 5 and 7 engage each other throughout their flat bearing faces, but when the sprockets are reached and the chain bends, such bending will occur about the edge of the pivot block 5. The sharp edge of the pivot block 5 will therefore be in driving engagement during only a small part of the distance through which the chain drives, and the wear on such edge is consequently reduced to a minimum. In other words, the

applicant's device provides a flat driving pivot at all times except when the chain is passing over its sprocket, which construction not only increases the length of the life of the sharp edge, but also prevents a lengthening of the chain due to the wearing away of the pivotal engaging surfaces.

In Figure 4 a modified form of conveyer chain is shown, which modification differs from the chain of Figures 1 and 2 in that rollers 8' are provided intermediate the pivot points. These rollers are designed primarily to engage the teeth of the driving sprocket, thereby removing the driving strain and wear ordinarily incident to the engagement of the pivotal parts of the chain with the teeth of the sprocket. These rollers not only serve the purpose as above stated, but also decrease the resistance of the chain when being dragged along a guide or other supporting surface, as by means of such rollers the sliding friction is obviated and rolling friction substituted therefor.

In Figures 5 and 6 still another modification of the chain of Figures 1 and 2 is illustrated. As here shown, the principal difference from the preferred form resides in the shape of the pivot block 9 and the bearing block 10, the other general features of construction being substantially the same as in the preferred form. The bearing block 10 is of the cross section indicated in Figure 7 and has at its front bearing face a recess for engaging the end of the pivot block 9. The pivot block 9 has a slightly concave bearing face fitting the bearing recess in the block 10, and the rear portion of said pivot block is normally downwardly inclined to fit against the side of the recess 11 in the side of the chain link. It will be seen that this arrangement provides for the oscillation of the block 9 in only one direction, and hence that this chain will bend in only one direction and is not reversible as is the chain of Figures 1 and 2. The bearing members 9 and 10 are surrounded by a shield 12 corresponding to the shield 4 of Figure 3. Figure 8 illustrates another form of chain only slightly different from the form of chain shown in Figures 5, 6, and 7, the difference residing in the shape of the pivot block 13, which pivot block is pointed at its rear end.

Figures 9 and 10 show a further modification of the preferred form of chain, in which modification the pivot block 14 is semi-circular in cross section and has its bearing face concaved to fit a corresponding convexity in the bearing face of the bearing block 15. In other respects the general construction is similar to that of the preferred form.

Figures 11, 12, and 13, illustrate a modification of the preferred form of chain, which modification is simplified by the omission of the bearing block. The pivot block 16 is secured to the outer links 17, and bears at its

front face against the front side of the opening 18 in the link 19, the opening 18 being substantially circular in form and flattened at its front side to correspond to the flat front side of the member 16. It will be observed that in this form as well as in the preferred form, a flat bearing surface is presented when the links are in alinement, and such surface changes to an edge pivot when the link is bent about its sprocket. Figures 14, 15, and 16, illustrate a modification very similar to the form of chain shown in Figures 11, 12, and 13, the only difference being that the link 20 instead of being solid with a recess at each end for the pivot blocks 21, is entirely cut away, providing the open space 22.

Figures 17 and 18, present another modification, which modification consists in providing a short tube 23 in lieu of the bearing block of the preferred form. This tube 23 is secured in the links 24 and engages the pivot block 25, which pivot block 25 is riveted to the parts 26.

Figures 19 and 20 illustrate the simplest form of the invention. As illustrated in Figure 21, the material of the links is barstock flat on its inner side and half round on its outer side. The interfitting of the two links at their ends provides normally flat bearing surfaces which as heretofore set forth, constitutes an important feature of my invention. When the links are bent relative to each other, the sharp edges 24 will be in engagement with the opposing link. Figures 22 and 23 illustrate a modification differing from the chain of Figures 19 and 20 only in that the links are broader.

It will be apparent that even other modifications of the broad idea involved are possible, without departing from the spirit of the invention. Several forms of coacting bearing faces have been shown, but it is apparent that other forms might be used, it being only necessary that the contacting surfaces between the bearing members be of greater extent when the links are in alinement than when at an angle to each other, and that means be provided for preventing their lateral movement with respect to each other. The contacting surfaces need not be exactly flat, as portions might be cut away or made irregular and at the same time a greater bearing surface secured when the links are alined than when they are at an angle to each other. Changes of this type are obviously comprehended by my invention and are intended to be covered by the claims.

Having thus described my invention and illustrated its use, what I claim as new and desire to secure by Letters Patent, is the following:

1.—In combination in a chain, a pair of links having substantially flat coacting bearing surfaces, and means to prevent the bear-

ing surfaces from sliding laterally on each other.

2.—In combination in a chain, a pair of links having coacting bearing members adapted to engage at separated points on each member when the links are in alinement but at only one point when at an angle to each other, and means to prevent the bearing members from sliding laterally on each other.

3.—In combination in a chain, a pair of links and a pivot block secured to one of the links and having a bearing engagement with the other link, such block having separated bearing points lying in the same plane at right angles to the axis of the chain.

4.—In combination in a chain, a pair of links and a pivot block secured to one of the links and having a bearing engagement with the other link, such block having a substantially flat bearing face.

5.—In combination in a chain, a pair of links and a pair of engaging members for such links comprising a pivot block secured to one member and having a two-point bearing face and a bearing block in the other member having a face adapted to coact with such two-point bearing face.

6.—In combination in a chain, a pair of links and a pair of engaging members for such links comprising a pivot block secured to one member and having a substantially flat bearing face and a bearing block on the other member having a face adapted to coact with such flat bearing face, the parts being provided with clearance spaces adapted to permit of the oscillation of the bearing members but to prevent relative lateral movement of such members.

7.—In combination in a chain, an inside link comprising opposing side members with a substantially flat faced bearing member secured therein and having clearance spaces opposite the bearing member and an outside link comprising opposing side members with a substantially flat faced bearing member secured thereto and adapted to oscillate in the clearance spaces, and means for preventing the bearing members from sliding laterally on each other.

8.—In combination in a chain, an inside link comprising opposing side members with a bearing member having a two-point bear-

ing face secured therein and having clearance spaces opposite the bearing member, and an outside link comprising opposing side members with a bearing member secured thereto and adapted to coact with the two-point bearing face and oscillate in the clearance spaces, the clearance spaces being shaped to permit oscillatory motion but to prevent relative lateral motion of the bearing members.

9.—In combination in a chain, engaging links provided with opposing bearing members each of which engages the other at two points when the links are in alinement and pivots on one of such points when the links are at an angle, and means to prevent the bearing members from sliding laterally on each other.

10.—In combination in a chain, an inside link member comprising side links, a bearing member secured transversely of the ends of such side links, a shield extending around the end of such side links, and an outside link member comprising side links and a bearing member secured to such side links and adapted to coact with the other bearing member.

11.—In combination, a pair of links having bearing surfaces adapted to contact on a limited area when the links are at an angle to each other, and to contact on an increased surface when the links are in alinement, and means to prevent the bearing surfaces from sliding laterally on each other.

12.—In combination, a pair of links having primary bearing surfaces adapted to contact when the links are in alinement and secondary bearing surfaces adapted to contact when the links are at an angle to each other, and means to prevent the bearing surfaces from sliding laterally on each other.

13.—In combination in a chain, a pair of links having coacting bearing surfaces and a pivot point therefor lying in a plane to one side of the plane of the axis of the chain, and means to prevent the bearing surfaces from sliding laterally on each other.

In testimony whereof I have hereunto signed my name in the presence of the two subscribed witnesses.

WILLIAM T. JAMES.

Witness:

PAUL CARPENTER,
JAMES NICHOLAS LORENZ.