Sept. 28, 1943. E. L. ALLEN ET AL 2,330,195

GUIDE FOR ENDLESS TRACKS

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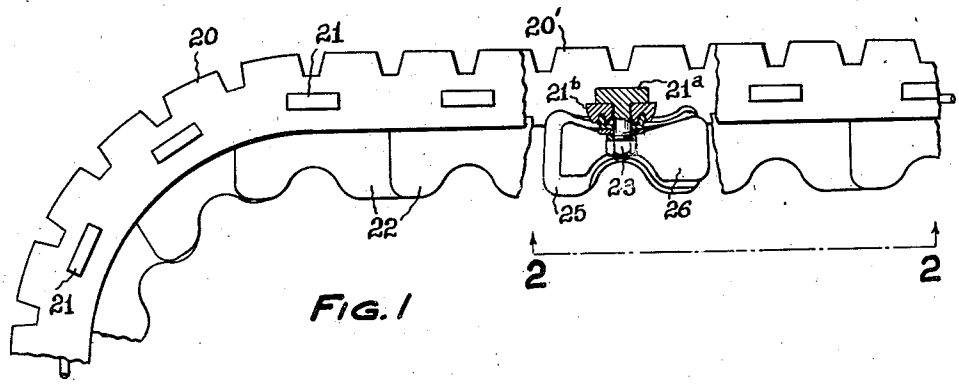


FIG. 1

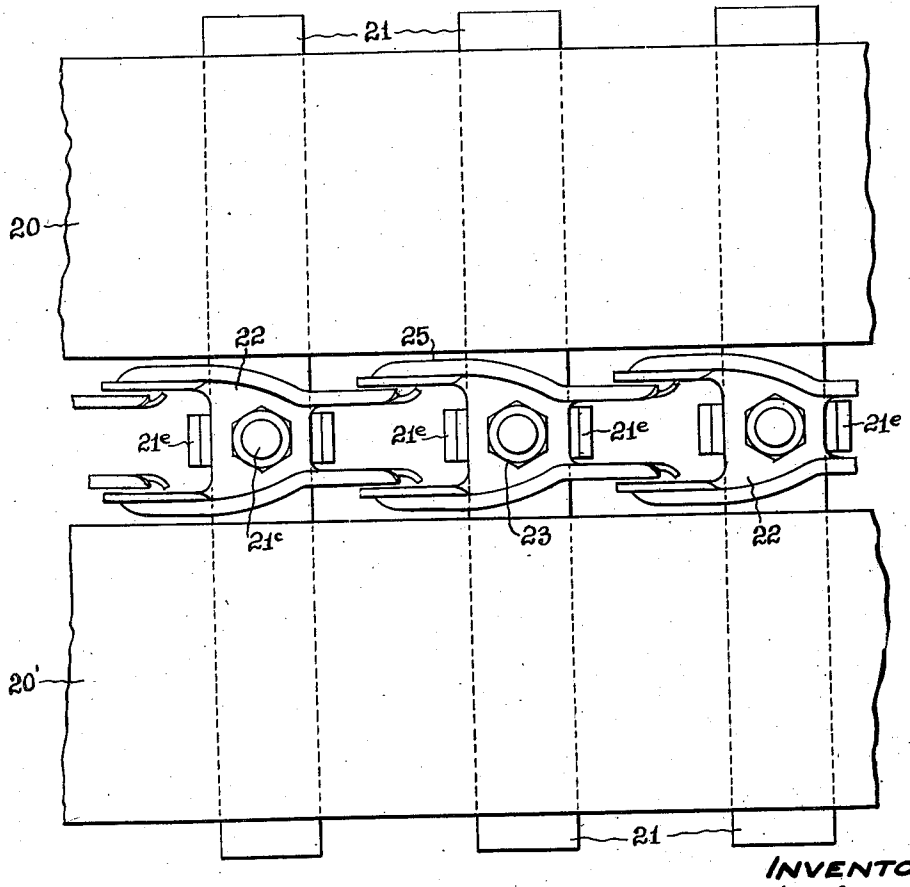


FIG. 2

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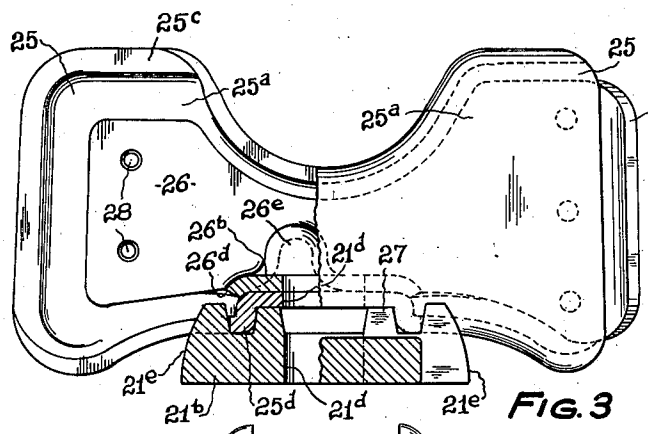


FIG. 3

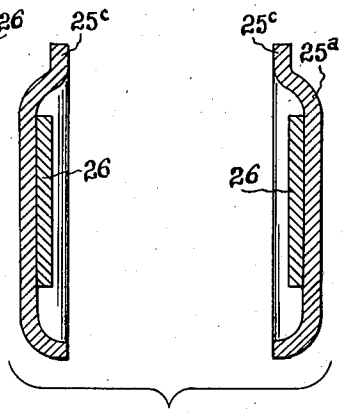


FIG. 6

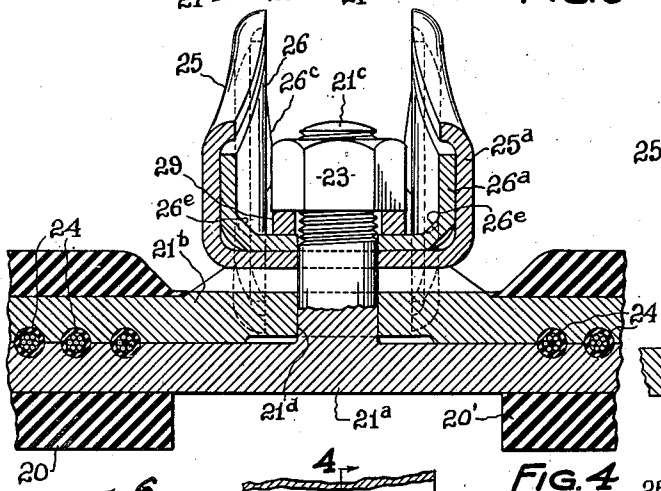


FIG. 4

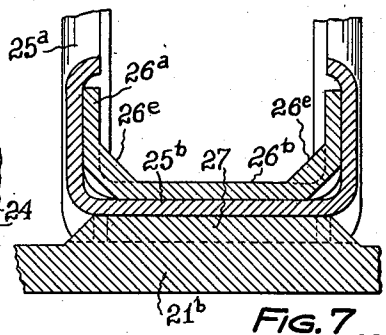


FIG. 7

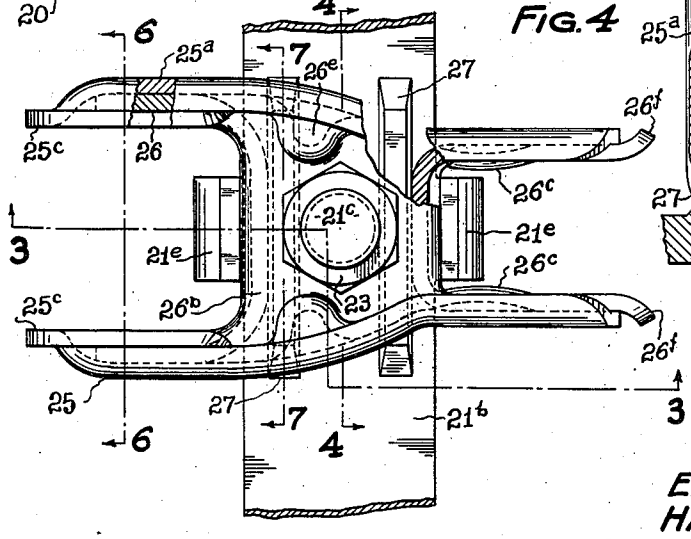


FIG. 5

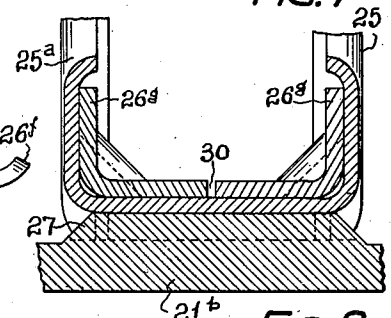


FIG. 8

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GUIDE FOR ENDLESS TRACKS

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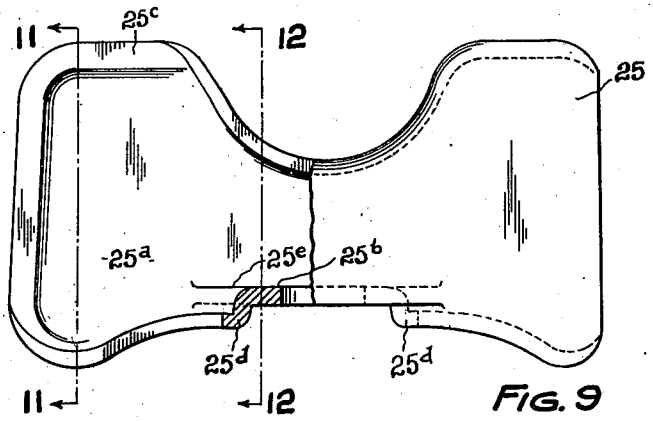


FIG. 9

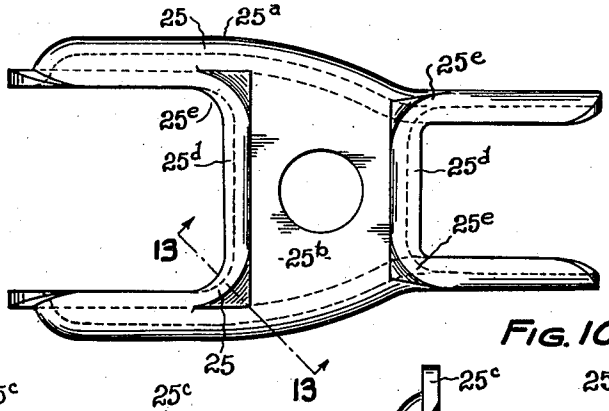


FIG. 10

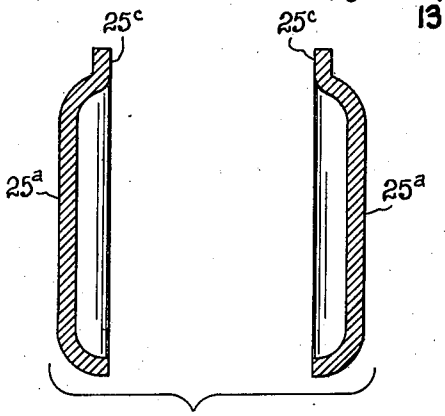


FIG. 11

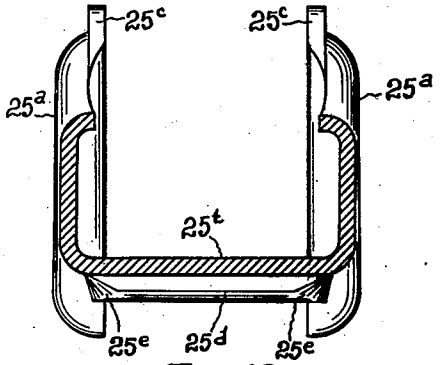


FIG. 12

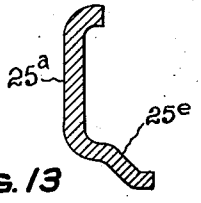


FIG. 13

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GUIDE FOR ENDLESS TRACKS

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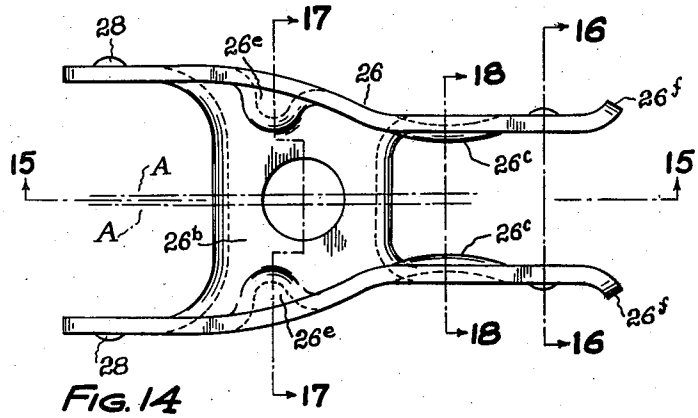


FIG. 14

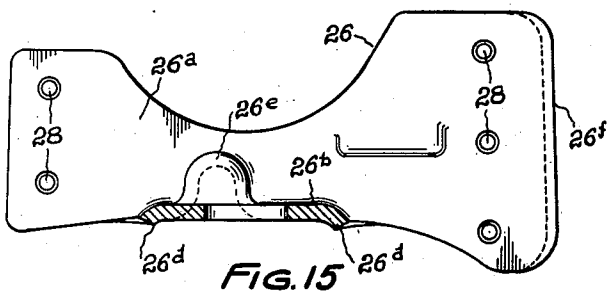


FIG. 15

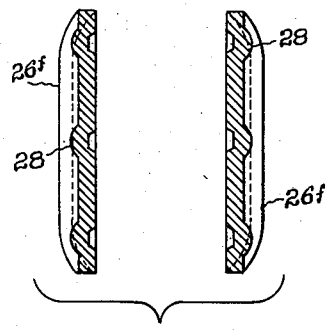


FIG. 16

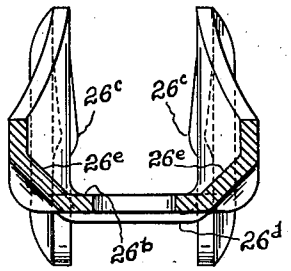


FIG. 17

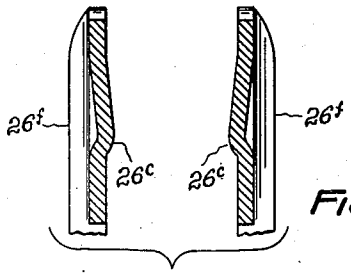


FIG. 18

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Patented Sept. 28, 1943

2,330,195

UNITED STATES PATENT OFFICE

2,330,195

GUIDE FOR ENDLESS TRACKS

Edwin L. Allen and Harold B. Muster, Cleveland Heights, Ohio, assignors to Rudolph I. Schonitzer, Shaker Heights, Ohio

Application November 24, 1941, Serial No. 420,182

11 Claims. (Cl. 305—10)

This invention relates to improvements in a guide especially adapted for use with a flexible endless self-laying track of a type used for tractors, trucks, tanks and the like.

This invention is an improvement of the guide disclosed and described in Patent No. 2,107,490 granted February 8, 1938, to Robert Mayne. The guide shown in this prior patent was adapted for production only by forging or casting, resulting in a number of objections and disadvantages. The production was relatively slow and costly. It was difficult to get the necessary hardness for resisting the abrasive action of sand and water encountered during the use of tracks of this type because the forging or casting had to be kept soft enough for subsequent machining operations and if treated for hardness after machining distortion would occur. Accuracy of shape and cross section and the small clearances desired could not be held within desirable limits due to the inherent characteristics of commercial forging and casting processes. Consequently vital sections of the guides were sometimes smaller than desired, thus increasing the likelihood of breakage in service. The surface of the forgings or castings was relatively uneven and rough, thus accelerating the cutting action of the abrasive materials encountered in service and leading to greater wear.

An object of the present invention is to overcome the above objectionable features and disadvantages. Our improved guide may be made of metal stampings so that the production is relatively rapid and inexpensive. Suitable hardness may be provided in the finished product because no machining is necessary after fabrication. Accuracy of shape and cross section can be held within the desired limits so that no weak sections are produced. The surface of the finished product is relatively even and smooth thus diminishing the abrasive action when the product is in service.

Another object of the present invention is to provide novel means for strengthening certain portions of the guide which are subject to the greatest strain in practical use.

Another object of the present invention is to provide a plurality of laminations formed of metal stampings and adapted to withstand the stresses and strains, particularly at the central portion of the guide.

Another object of the present invention is to so form a stamping as to provide novel means for keying the guide member to a flexible endless track.

Another object of the present invention is to so form the guide member as to provide additional wearing surfaces where coacting guide members overlap and engage each other.

Another object of the invention is to provide a novel arrangement of laminations of metal stampings reinforcing each other while at the same time maintaining such dimensions of the guide members that they may be used interchangeably with the forged guide members of the Mayne type.

Other objects and advantages of the present invention will appear from the accompanying description and drawings and the essential features thereof will be set forth in the claims.

In the drawings,

Fig. 1 is a fragmental elevational view of a portion of an endless track equipped with our improved guide members, a portion being broken away to more clearly disclose the method of attachment.

Fig. 2 is a fragmental bottom plan view of a portion of the flexible endless track of Fig. 1, somewhat enlarged.

Fig. 3 is an elevational view of our improved guide member, the left half of the view being in central longitudinal section to more clearly show the construction.

Fig. 4 is a sectional view taken along the line 4—4 of Fig. 5, this being a central transverse section through the guide member of Figs. 3 and 5.

Fig. 5 is a top plan view of the guide member of Figs. 1 to 4 showing a portion of the endless track crossbar to which the guide member is secured and portions of the guide member being broken away to more clearly show the construction.

Fig. 6 is a sectional view taken along the line 6—6 of Fig. 5.

Fig. 7 is a fragmental sectional view taken along the line 7—7 of Fig. 5.

Fig. 8 is a sectional view similar to Fig. 7 showing a modified form of guide member.

Figs. 9 to 13 show the outer plate member of the guide shown in Figs. 1 to 7, Fig. 9 being an elevational view with the left-hand portion in central longitudinal section, Fig. 10 being a bottom plan veiw, Figs. 11 and 12 being sectional views taken along similarly numbered lines of Fig. 9, and Fig. 13 being a sectional view taken along the line 13—13 of Fig. 10 but with the section turned upside down to place the top and bottom of the section in position similar to Figs. 11 and 12.

Figs. 14 to 18 are views of the inner plate mem-

ber of the guide of Figs. 1 to 7, Fig. 14 being a top plan view, and Figs. 15 to 18 being sectional views taken along similarly numbered lines in Fig. 14.

It has not been thought necessary to illustrate more of the endless track here involved that the portions shown in Figs. 1 and 2 for the reason that the present invention is applicable to a well-known type of endless track, such as that shown in the Mayne patent referred to above. Such a track comprises parallel flexible endless bands 20 and 20' connected together by metal crossbars 21 spaced at regular intervals and preferably embedded in the rubber of the endless bands so as to form a firmly united flexible endless self-laying track. This track as shown in the above referred to patent passes over suitable idlers and beneath load bearing wheels or rollers and is generally driven by a sprocket, the teeth of which engage between the endless bands in the spaces between the crossbars 21.

The present invention relates generally to improvements in the guide members indicated generally at 22 which are attached to the crossbars in the space between the bands 20 and 20'. The purpose of these guide members is to maintain alinement of the flexible track against localized thrust tending to move portions of the track transversely to the path of track movement. Such lateral thrust occurs when the vehicle is travelling on the side of a hill or when it hits obstacles tending to thrust a portion of the track sidewards.

The track construction and the crossbars are generally of the form shown in the above mentioned Mayne patent. Each crossbar as best seen in Fig. 4 comprises two portions 21*a* and 21*b* which are held together by any suitable means but here shown as connected by the stud 21*c* which extends from the portion 21*a* through an opening 21*d* in the portion 21*b* and all held together by the nut 23 which may also serve to clamp a guide member in position. The two portions of the cross bar clampingly engage the endless cables 24 which, as shown in the Mayne patent, form a part of the endless bands 20 and 20'. The crossbar portion 21*b* is preferably provided with sprocket engaging abutments 21*e*.

The guide member as shown in all of the figures except Fig. 8 comprises an outer plate member 25 and an inner plate member 26. Each of these plate members is generally of H-form having the sides 25*a* turned up substantially at right angles to the transverse portion 25*b*. The sides thus provide portions generally parallel to the general path of movement of the endless track, these side portions being more widely spaced at one end of the guide member and narrower at the other end so that in use, as best seen in Fig. 2, the narrower portion of one member overlaps and slidingly engages within the wider portion of an adjacent guide member. Certain of the guide members are always in engagement with the end sprockets and all of the guide members provide endless interengaging means which maintain longitudinal alinement of the straight portions of the endless track. The transverse portion 25*b* serves as a means of attachment of the guide member to a crossbar of the endless track as will presently appear.

It will be noted that the side portions 25*a* of the outer plate member are reinforced by edge flanges 25*c*. These edge flanges have been given a specific form to increase the wearing surface where their inner faces slidingly engage the narrower portions of coacting guide members. Referring to Fig. 6, the peripheral edges of the side plate portions 25*a* are first bent inwardly and then bent in a plane substantially parallel to the path of movement of the endless track to form the flattened flanges 25*c*. This provides considerable peripheral area for engagement with the narrower portion of the overlapping adjacent guide member.

The flanges 25*d* of the transverse portion 25*b* are bent downwardly substantially at right angles to the path of movement of the flexible track to provide means for keying the guide member to the track. The lower edges of the flanges 25*d* may be, if desired, and here are again turned at substantially right angles forming a Z section for added stiffness. Referring to Figs. 3 and 5 it will be noted that the crossbar 21*b* is provided with key members 27. The keys 25*d* engage these members 27 so as to firmly seat the guide member on the crossbar. Obviously the flanges 25*d* also serve to strengthen the transverse portion 25*b*.

Weak points in the guide member as thus far described occur at the corners where the transverse portion joins the side portions. At these places 25*e* the metal of the plate has been bent and drawn out of the plane of both the transverse portion and the side portions to provide curved flanged corners to resist rupture at these points. It will be noted in Fig. 10 that the metal at these corners at the right side or narrow end of the member has been eased out in a wide curve to aid in the necessary drawing of the metal. Referring to Figs. 10 and 12 it will also be noted that the deformation of the metal at the corners 25*e* is terminated along straight lines which are continuations of the keying surfaces of the flanges 25*d*. The effect of this particular construction is to give a keying effect across substantially the entire width of the bottom of the guide member.

The inner plate member 26 as best seen in Figs. 5 and 14 to 18 is also generally of H-form having side portions 26*a* bent up from a transverse portion 26*b* in planes generally parallel to the path of movement of the flexible track. The transverse portion 26*b* has its edges slightly bent downwardly at 26*d* to strengthen the transverse portion and so that the same will nest snugly on top of the transverse portion 25*b* as best seen in Fig. 3. The side plate portions at the narrow end of the guide member have portions 26*c* deformed inwardly to provide guide surfaces for insuring proper engagement of a sprocket tooth with the abutment 21*e* on the crossbar 21*b*. As best seen in Figs. 3, 4, 5, 14 and 15, at 26*e* the metal of the side portions 26*a* is deformed inwardly in a rib extending at substantially 45° between the portions 26*a* and 26*b* thus providing a strengthening deformation at the corners where the side portions join the transverse portion. At the narrower end of the inner plate member the end edges at 26*f* are flared outwardly again for providing proper engagement between a sprocket wheel tooth and a guide member entering into engagement therewith. For the purpose of providing a minimum thickness of the guide member at the narrower end thereof it will be noted that the flange 25*c* on the outer plate has been omitted at the narrower end so that the side plate portions 26*a* may lie against and parallel to the side plate portions 25*a* right up to the point where the flare 26*f* starts. This construction is clearly seen in Figs. 3 and 5.

In assembling the inner and outer plate members 26 and 25 in the form thus far described it will be apparent that they cannot be nested together in their final form. One way of assembling these parts therefore is to leave the side plate portions 25*a*, as viewed for instance in Fig. 4, flared outwardly from the position there shown and in a position where the inner plate member 26 can be placed with the transverse portion 26*b* resting tightly against the transverse portion 25*b*. Thereafter the side portions 25*a* may be bent in a die to the final position as shown in Fig. 4 thus holding the parts assembled.

It will be noted that in the assembled position the inner and outer plate members have their transverse portions respectively parallel and their side portions respectively parallel and in engagement. Preferably the side portions of the inner and outer plate members are welded together to obtain the full reinforcing effect. The transverse portions of the two plate members may or may not be welded together as desired. An easy manner of securing this welding engagement is the provision of small projections 28 on one of the plate members. Then when the plate members are assembled they are held under pressure in a jig with current applied which melts the projections 28 and welds them to the contacting portion of the adjacent plate member.

It will be noted that the above described form of the device provides two similar plate members both generally of H-form and providing two transverse portions 25*b* and 26*b* which are solid across the central portion of the member and provided with suitable openings through which the stud 21*c* may pass so that when the nut 23 is drawn down, preferably on a lock washer 29, the guide member is firmly secured on the crossbar 21 and an extremely strong construction is provided at the central portion of the guide member where the greatest strains occur in use.

Another way of forming our improved guide member is illustrated in Figs. 8 and 14. In this form the outer member 25 is exactly the same as previously described but the inner member is made in two parts best understood by reference to Fig. 14. If for instance the metal between the dot-dash lines A is removed there will be provided two identical halves adapted to be placed in the position shown at 26*g* of Fig. 8. It is necessary to provide the space between the two halves of the inner member as indicated at 30 so as to permit the insertion of the two halves in position with the welding projections 28 engaging the side plate portions 25*a* of the outer plate member. At this time of course there will be little or no gap at the point 30 but there will be a space between the side plate portions 26*a* and 25*a*. Then when the pressure and electric current are applied the side plate portions are welded together in the final position of Fig. 8 thus leaving the gap at the point 30. This form is secured to the crossbar by bolting on the stud 21*c* as described in connection with the first modification. In this case, however, the nut 23 provides the means for holding the two discontinuous parts of the transverse portion 26*b* in proper position on the stud. Otherwise this second modification has all of the features of the first described form.

Another manner of assembling our device where both transverse portions 25*b* and 26*b* are solid through the center is to form both outer and inner members 25 and 26 in their final form as shown in Fig. 4 and with the welding projections 28 as indicated. Then the side plate portions 25*a* are sprung outwardly sufficiently to place the member 26 in proper position. The elastic limits of the metal permit this without permanent distortion of the member 25. The projections will keep the sides 25*a* flared outwardly until pressure and electric current are applied to fuse the projections 28. Then the parts will return substantially to the position shown in Fig. 4.

What we claim is:

1. A guide member for assembly on a crossbar of a flexible endless track movable in a path, said member being arranged for conjoint use with other coacting guide members of like nature, said member having a sheet metal plate adapted to overlap and slidingly engage a portion of a coacting member generally in a plane parallel to said path, and said plate being cupped to provide a recess generally parallel to said plane and the peripheral edges of said cup being then bent substantially parallel to said plane, whereby to reinforce said plate and to provide a large wearing area for said sliding engagement.

2. A guide member for assembly on a crossbar of a flexible endless track movable in a path, said member being arranged for conjoint use with other coacting guide members of like nature, said member having two generally parallel sheet metal plates, each plate being generally of H-form with the sides bent up to provide generally parallel portions in planes substantially parallel to the plane of said path, each plate having an integral transverse portion connecting said parallel portions and providing means for securing said member to a track crossbar, at least one of said plates having edge portions bent and drawn out of the general plane of said side portions and of said transverse portion at the places where said transverse portion joins said side portions, and means securing said plates together so that one reinforces the other.

3. A guide member for assembly on a crossbar of a flexible endless track movable in a path, said member being arranged for conjoint use with other coacting guide members of like nature, said member comprising a metal plate generally of H-form with the sides bent up to provide generally parallel portions in planes substantially parallel to the plane of said path, said plate having an integral transverse portion connecting said parallel portions and providing means for securing said member to a track crossbar, and said plate having edge portions bent and drawn out of the general plane of said side portions and of said transverse portion at the corners where said transverse portion joints said side portions.

4. A guide member for assembly on a crossbar of a flexible endless track movable in a path, said member being arranged for conjoint use with other coacting guide members of like nature, said member comprising a metal plate generally of H-form with the sides bent up to provide generally parallel portions in planes substantially parallel to the plane of said path, said plate having an integral transverse portion connecting said parallel portions and providing means for securing said member to a track crossbar, and said plate having projections bent downwardly from said transverse portion and substantially at right angles to the planes of said parallel portions to provide key means for positioning said member on a crossbar.

5. A guide member for assembly on a crossbar of a flexible endless track movable in a path, said

member being arranged for conjoint use with other coacting guide members of like nature, said member comprising a metal plate having a side portion substantially parallel to the plane of said path, said side portion being adapted to overlap and coact with the side portion of an adjacent guide member, said plate having an integral portion extending transversely to said side portion and providing means for securing said plate to a track crossbar, and the edges of said transverse portion substantially at right angles to the plane of said side portion being bent downwardly to provide key means for positioning said plate on a crossbar.

6. A guide member for assembly on a crossbar of a flexible endless track movable in a path, said member being arranged for conjoint use with other coacting guide members of like nature, said member comprising a metal plate having a side portion substantially parallel to the plane of said path, said side portion being adapted to overlap and coact with the side portion of an adjacent guide member, said plate having an integral portion extending transversely to said side portion and providing means for securing said plate to a track crossbar, said transversely extending portion having side edges substantially at right angles to the plane of said side portion bent downwardly to provide rectilinear key flanges, and said plate having corner edge portions at the places where said transverse portion joins said side portion, each of said corner edge portions being deformed out of the general plane of said side portion and of said transverse portion, said deformation ending on a line alined with the adjacent key flange.

7. A guide member for assembly on a crossbar of a flexible endless track movable in a path, said member being arranged for conjoint use with other coacting guide members of like nature, said member comprising a metal plate generally of H-form with the sides bent up substantially at right angles to the plane of the transverse portion to provide generally parallel portions in planes substantially parallel to the plane of said path, said parallel portions being more widely spaced at one end than at the other, said parallel portions having edges deformed inwardly, such deformations being omitted at the end edges at the narrower end of said member, and inner plate members substantially parallel to and secured to said side parallel portions of said first named plate, said inner plate members lying within said deformed edges and extending at least to said end edges having no deformation.

8. A guide member for assembly on a crossbar of a flexible endless track movable in a path, said member being arranged for conjoint use with other coacting guide members of like nature, said member comprising a metal plate generally of H-form with the sides bent up substantially at right angles to the plane of the transverse portion to provide generally parallel portions in planes substantially parallel to the plane of said path, and two inner plate members each having a side portion substantially parallel to and secured to the sides of said first named plate, each of said inner plate members having an integral transverse portion parallel to and engaging the transverse portion of said first named plate.

9. In the combination of a flexible endless self-laying track movable in a path and having crossbars spaced along said track transversely to said path of movement, a plurality of guide members, one for each of said crossbars, each guide member having two generally parallel sheet metal plates, each plate being generally of H-form with the sides bent up to provide generally parallel lug portions in planes substantially parallel to the plane of said path, the lug portions of each guide member being in interfitting and relatively movable relationship with those of adjoining guide members but free of direct connection thereto, each plate having an integral transverse portion connecting said parallel side lug portions and providing means for securing said member to a track crossbar, and means securing said two plates of each guide member together so that one reinforces the other.

10. The combination of claim 9 wherein said last named means secures together said generally parallel side lug portions only of the two plates of each guide member.

11. A guide member for assembly on a crossbar of a flexible endless track movable in a path, said member being arranged for conjoint use with other coacting guide members of like nature, said member having a sheet metal plate adapted to overlap and slidingly engage a portion of a coacting member generally in a plane parallel to said path, and said plate having a peripheral edge bent at an angle to said plane and then bent substantially parallel to said plane, whereby to reinforce said plate and to provide a large wearing area for said sliding engagement.

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