Feb. 29, 1944. R. MAYNE 2,342,953

FLEXIBLE TRACK

Filed July 12, 1941

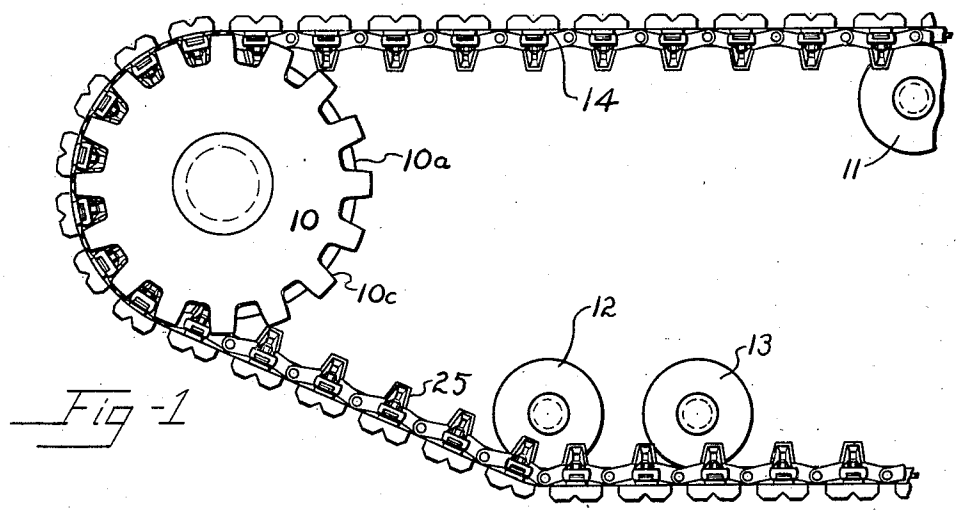


Fig -1

Fig -2

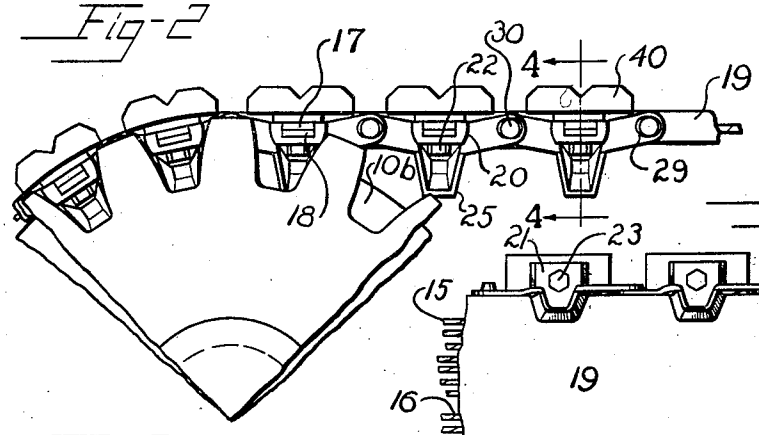


Fig -3

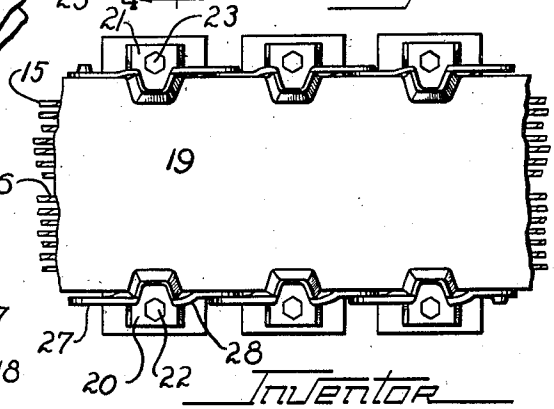


Fig -4

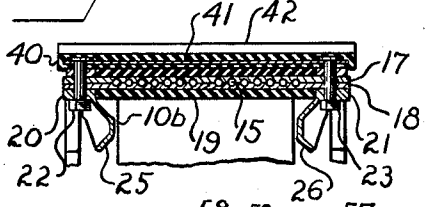
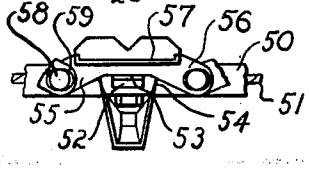


Fig -5



Inventor

Robert Mayne

By Willis J. Avery

Atty.

Patented Feb. 29, 1944 2,342,953

UNITED STATES PATENT OFFICE

2,342,953

FLEXIBLE TRACK

Robert Mayne, Akron, Ohio, assignor to The B. F. Goodrich Company, New York, N. Y., a corporation of New York

Application July 12, 1941, Serial No. 402,123

14 Claims. (Cl. 305—10)

This invention relates to flexible track for use of vehicles of the self-laying track type.

Vehicles of the self-laying track or crawler type have heretofore been provided with tracks comprising a plurality of spaced-apart flexible tension elements such as metal cables held in spaced-apart relation transversely of the track by cross-bars with which the cables are connected for stress transmission by intervening rubber cushioning material acting in shear stress between each bar and such cables so that the cross-bars are resiliently secured to the cables in positions to act as driving members for operating the track. The cables and parts of the cross-bars have been embedded in a body of rubber-like material presenting one face for ground-engagement and its opposite face for the support of bogie wheels.

In one type of such track, the center region of the cross-bars are exposed, and the ends thereof with the cables are embedded in a pair of laterally spaced-apart rubber bodies. In that type of track, it has been found, as shown in my Patent No. 2,107,490 of February 8, 1938, that sidewise and torsional forces tending to deflect the track may be overcome by overlapping metal flanges mounted on the driving cross-bars in such center region and cooperating with each other to stiffen the track against deflection sidewise.

In another type of track, the cables and cross-bars are embedded in a single body of rubber cushioning material with the ends of the bars projecting therefrom at the margins of the track for side-driving engagement. The drive wheels used with this type of track may have a drum face for supporting the rubber body and sprocket teeth at each flank thereof to engage wear members and guide flanges mounted on the ends of the cross-bars. In such an arrangement the spacing of the cross-bars may be relatively great so that overlapping guide plates secured to the ends of the cross-bars and simply sliding on each other have not always been effective in preventing lateral sway and torsional twist of the track.

The present invention aims to overcome the foregoing and other difficulties, and to provide an improved construction.

The principal objects of the invention are to provide for preventing lateral side sway and twist of the track under operating conditions, especially by means operating at the margins of the track, although features of the invention are applicable to other locations than at the margins, to provide for accurate guiding of the track, and to provide simplicity of construction and convenience of manufacture and assembly.

These and other objects will appear from the following description and the accompanying drawing.

Of the drawing:

Fig. 1 is a side elevation of a vehicle drive having a track embodying the invention, parts being broken away.

Fig. 2 is a view on a larger scale showing a portion of the drive wheel and the track, parts being broken away.

Fig. 3 is a plan view showing a portion of the track as seen from the inside face of the track.

Fig. 4 is a sectional detail view taken along line 4—4 of Fig. 2.

Fig. 5 is a side view of a modified construction.

In the illustrative embodiment the invention is incorporated in a track comprising longitudinally disposed wire cables held in spaced-apart relation by driving cross-bars located at spaced intervals and cushioned from the cables by rubber-like material effective to transmit driving force by sheer stress in the rubber-like material. In accordance with the invention overlapping arms are mounted upon the ends of the driving bars for sliding engagement of the arms with each other, and the arms are loosely pinned to each other so as to stiffen the track against lateral sway while the loose connections permit the cables to carry the stresses lengthwise of the track. In one form of the invention, the arms are integral with wear plates fitting over the ends of the driving bars and removable therefrom for replacement, which wear plates are adapted to engage the sprockets.

Referring to the drawing, the numeral 10 designates a drive wheel of a vehicle of the self-laying track type having a guide wheel 11, and bogie wheels 12, 13 about which the flexible track 14 is trained.

The track comprises a plurality of spaced-apart metallic cables 15 each enclosed by a resilient rubber or other rubber-like covering 16, the covered cables being held at intervals by cross-bar members 17, 18, and the rubber between the cables and the cross bars is preferably adhered to both for transmission of the driving force by shear stress in the rubber. The cables and cross-bars are enclosed by a resilient body 19 of rubber-like material, the ends of the driving cross-bars extending laterally beyond the body at the sides for driving purposes.

Removable wear plates 20, 21 are secured about the ends of the cross-bars by bolts 22, 23 extend-

ing therethrough. The wear plates are generally of shallow U-shape as seen from the side, and the sides of the U engage the sprocket teeth 10c of the drive wheel 10 in driving the track. Inwardly disposed guide flanges 25, 26, for engaging with the sides 10b of drum 10a of the drive wheel 10 and the guide and bogie wheels 11, 12 and 13 may be integral with the wear plates.

For preventing side sway and torsional distortion of the track in use, longitudinally extending ears 27, 28 are provided preferably though not necessarily integral with the wear plates. These ears extend forward and aft from the driving bars, and have such length as to overlap similar ears on the next cross bars, which they engage in close sliding relation on vertically disposed faces thereof. Of the overlapping ears, one is formed with an aperture 29, preferably a longitudinally disposed slot, the other is provided with an outstanding pin 30, adapted to enter the aperture loosely. The arrangement is such that the ears slide upon each other within the limits permitted by the pin-connections and restrict side-sway and twisting of the track, due to their close-sliding engagement and limited extensibility while driving tension is carried solely by the cables due to the loose fit of the pins 30 in the apertures, which are preferably located at the pitch line of the track and sprockets to permit minimum clearance of the pins and apertures.

To provide for replacement of the tread of the track, removable tread shoes 40 may be secured on the tread face and may comprise metal plates 41 having treads 42 of rubber-like material vulcanized thereto. The bolts 22, 23 may have their heads embedded in and bonded to the rubber of the treads 42 and extend through the plates 41, which are also bonded to the rubber, so that the tread shoes, the guide flanges 25, 26, and the ears 27, 28 are all secured together by a single bolt at each side of the track.

In the form of the invention shown in Fig. 5, the track body 50 of rubber-like material encloses the tension cables 51 held in spaced-apart relation by cross-bars comprising pairs of cross-bar members 52, 53 having their ends extending from the rubber body as in the embodiment just described. The wear plates 54 are mounted on the ends of the cross-bar members to engage the sprockets, but do not have the extending ears of the previously described form of the invention. Similar ears 55, 56 are provided, however, on the metal plates 57 of the removable wear shoes secured to the bars, and have cooperating loose pin and slot connections with the ears overlapping the ears of adjacent shoes in sliding engagement. The pins are designated by the numeral 58 and the slots by the numeral 59. The pins are preferably mounted on the pitch line of the track so that minimum clearance about the pins is required. Sufficient clearance is provided, however, to permit the cables to carry the entire tension load whereas the ears limit extensibility and act to prevent side-sway and twisting of the track.

In either form of the invention the resilient body of the track is adapted to contact with a plain driving drum and the sprockets flanking the driving drum engage the wear plates on the ends of the driving bars at the sides of the track. The interengaging ears for preventing side sway and twisting of the track are located adjacent the sprockets in position to clear the sprockets and the drum.

Variations may be made without departing from the scope of the invention as it is defined by the following claims.

I claim:

1. A self-laying track comprising longitudinally disposed flexible tension means, a plurality of cross-bars associated with said means at regular spaced apart intervals and adapted to engage drive sprockets at the sides of the track, and removable means comprising elements detachably carried by said cross-bars at the side of the track and engaging one another in sliding relation to limit lateral flexure of the track.

2. A self-laying track comprising longitudinally extending parallel strands of wire tension elements, cross-bars attached at spaced apart intervals to the cables solely by intervening rubber-like material, a body of rubber-like material surrounding said elements and enclosing mid-portions of said bars and attached to said bars and elements by a vulcanized bond, and removable means comprising detachable elements carried by said bars at the sides of the track and engaging each other in sliding relation to limit lateral flexure of the track.

3. A self-laying track comprising longitudinally extending reaches of wire cable, a plurality of metal cross-bars mounted upon the cables at regular spaced-apart intervals and adapted to engage drive sprockets at the sides of the track, and loosely interconnected detachable elements removably secured to the ends of said cross-bars at the margins of the track to limit lateral flexure of the track.

4. A self-laying track comprising longitudinally extending reaches of wire cable, a plurality of metal cross-bars mounted upon the cables at regular spaced-apart intervals and adapted to engage drive sprockets at the sides of the track, and loosely interconnected detachable elements removably secured to the ends of said cross-bars at the margins of the track to limit lateral flexure of the track, said interconnected elements comprising ears secured to successive cross-bars and overlapping each other in sliding engagement, one of the ears of a cooperating pair having an opening, and the other having a pin loosely engaging in the opening.

5. A self-laying track comprising longitudinal reaches of wire cable, a plurality of metal cross-bars mounted upon the cables at regular spaced-apart intervals and adapted to engage drive sprockets at the sides of the track, tread shoes removably secured to the cross-bars, and means comprising removable elements detachably carried by said tread shoes and loosely interconnected in sliding relation to each other for limiting lateral flexure of the track, said means comprising ears on successive tread shoes overlapping each other in sliding engagement, one of said ears having an opening, and the other having a pin loosely engaging in the opening.

6. A self-laying track comprising longitudinally disposed flexible tension means, a body of rubber-like material surrounding said tension means, and removable means comprising detachable elements spaced along said track at widely-spaced intervals and engaging one another in sliding relation to limit lateral flexure of the track, one element of each cooperating pair having an opening therein, and the other element of the pair engaging loosely in said opening.

7. A self-laying track comprising longitudinally disposed flexible tension means, a plurality of cross-bars associated with said means at

spaced apart intervals along the track, and removable means comprising detachable elements on said cross-bars and engaging one another in sliding relation to limit lateral flexure of the track, one element of each cooperating pair having an opening therein, and the other element of the pair having a pin engaging loosely in said opening.

8. A self-laying track comprising longitudinally disposed flexible tension means, a plurality of cross-bars associated with said means at spaced apart intervals along the track, and removable means comprising detachable elements on said cross-bars and engaging one another in sliding relation to limit lateral flexure of the track, one element of each cooperating pair having an opening therein, and the other element of the pair having a pin engaging loosely in said opening, some of said elements having wheel-engaging portions for guiding the track.

9. A self-laying track comprising longitudinally disposed flexible tension means, a plurality of cross-bars associated with said means at spaced-apart intervals along the track, a body of rubber-like material enclosing said tension means and portions of said cross-bars, and removable means comprising detachable elements on said cross-bars and engaging one another in sliding relation to limit lateral flexure of the track, one element of each cooperating pair having an opening therein, and the other element of the pair having a pin engaging loosely in said opening.

10. A self-laying track comprising longitudinally disposed flexible tension means, a plurality of cross-bars secured to said means solely by intervening rubber-like material and disposed at spaced-apart positions along the same, said cross-bars comprising sprocket-engaging means, and elements on said cross-bars at the margins of the track each comprising portions extending into the spaces between adjacent cross-bars in overlapping relation with extending portions of adjacent elements for limiting lateral flexure of the track.

11. A self-laying track comprising longitudinally disposed flexible tension means, a plurality of cross-bars secured to said means and disposed at spaced-apart positions along the same, said cross-bars comprising sprocket-engaging means, and elements on said cross-bars at the margins of the track each comprising portions extending into the space between adjacent cross-bars in overlapping relation with extending portions of adjacent elements for limiting lateral flexure of the track, said elements comprising wheel-engaging guide extensions integral therewith.

12. A self-laying track comprising longitudinally disposed flexible tension means, a plurality of cross-bars secured to said means and disposed at spaced-apart positions along the same, said cross-bars comprising sprocket-engaging means, and elements on said cross-bars at the margins of the track each comprising portions extending into the space between adjacent cross-bars in overlapping relation with extending portions of adjacent elements for limiting lateral flexure of the track, said elements comprising sprocket-engaging wear plates integral therewith.

13. A self-laying track comprising longitudinally disposed flexible tension means, a plurality of cross-bars secured to said means and disposed at spaced-apart positions along the same, said cross-bars comprising sprocket-engaging means, and elements on said cross-bars at the margins of the track each comprising portions extending into the space between adjacent cross-bars in overlapping relation with extending portions of adjacent elements for limiting lateral flexure of the track, said elements comprising wheel-engaging guide extensions and sprocket-engaging wear plates integral with said elements.

14. A self-laying track comprising longitudinally disposed flexible tension means, a plurality of cross-bars secured to said means solely by intervening rubber-like material and disposed at spaced-apart positions along the same, said cross-bars comprising sprocket-engaging means, and elements on said cross-bars at the margins of the track each comprising portions extending into the space between adjacent cross-bars in overlapping relation with extending portions of adjacent elements for limiting lateral flexure of the track, said elements comprising tread members integral therewith.

ROBERT MAYNE.