

May 13, 1952

R. W. SMITH

2,596,919

BAND TRACK

Filed March 23, 1948

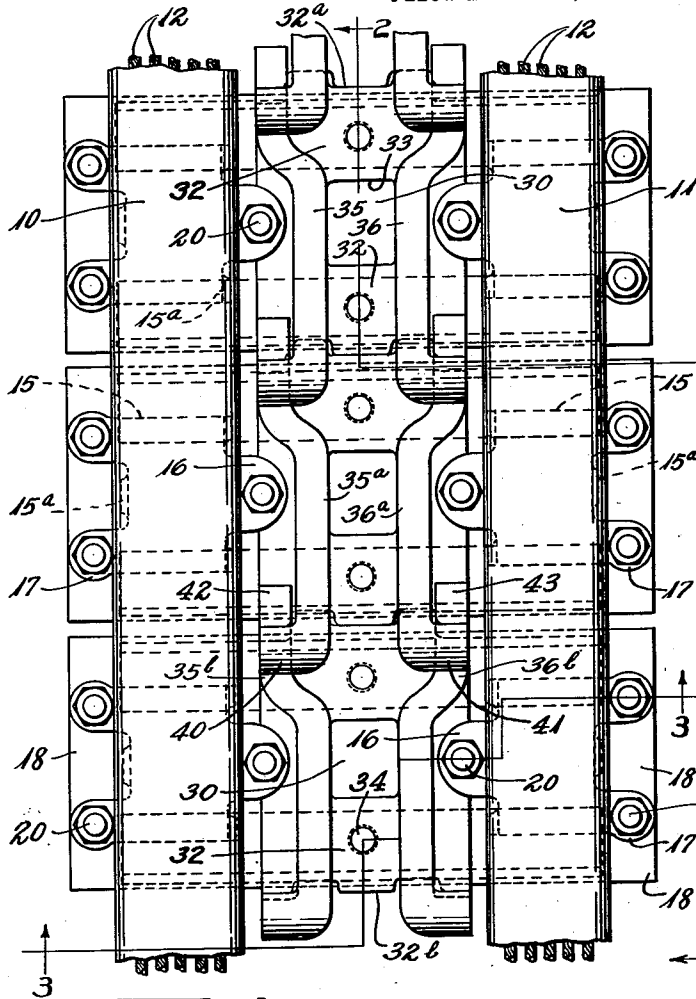


FIG-1

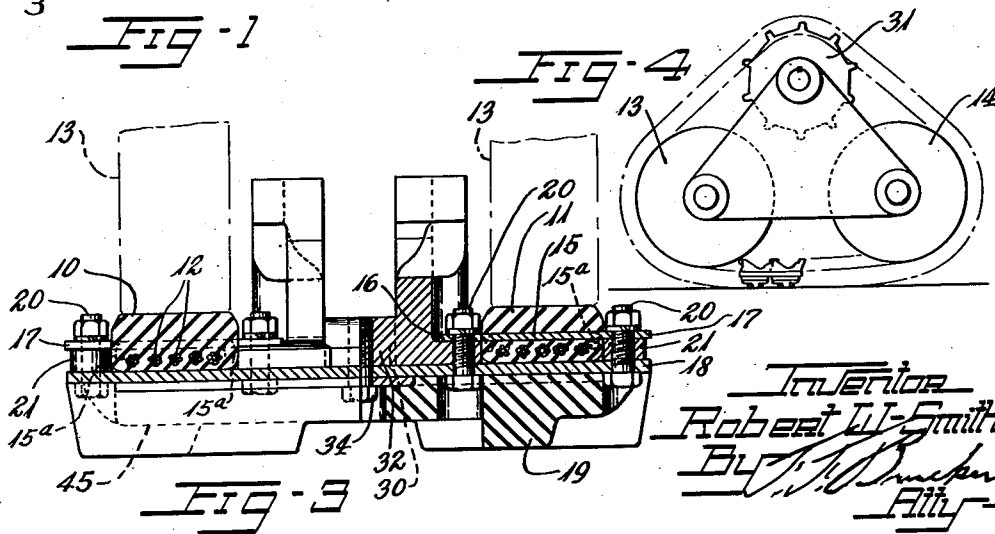
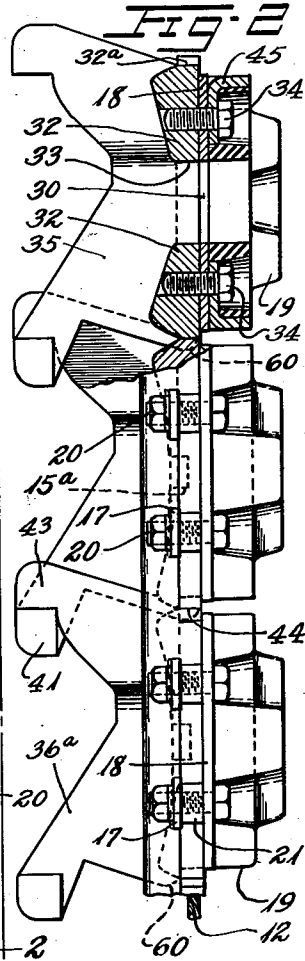


FIG-3

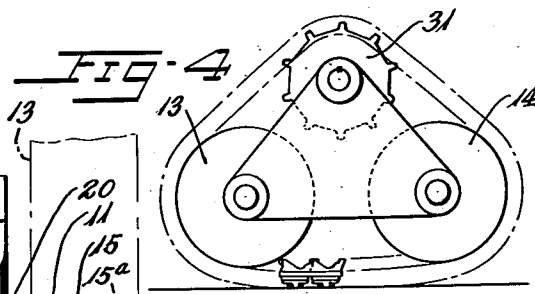


FIG-4

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Patented May 13, 1952

2,596,919

UNITED STATES PATENT OFFICE

2,596,919

BAND TRACK

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Application March 23, 1948, Serial No. 16,539

8 Claims. (Cl. 305—10)

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This invention relates to band tracks for self-laying track-type vehicles and is especially useful for farm tractors although the invention is also useful on military and other vehicles.

Tracks proposed heretofore for resisting bending in one direction and thereby reducing the number of bogie wheels by supporting the vehicle upon the reach of track between relatively widely spaced guide wheels have had the disadvantage of being formed of metallic blocks or links hinged to each other by pins in transverse openings in the links or blocks, and it has been found that due to the fact that high shear stresses were present at the hinge pins and also excessively high bearing pressures, lubrication of the pins has been difficult and rapid wear of the pins has objectionably lessened or destroyed the bridging ability of the track. The wear of the hinging parts has resulted in objectionable lengthening of the track and separation of the parts.

It is an object of the present invention to overcome the foregoing and other difficulties.

Other objects are to provide a track in which no hinge pins are required, to provide a flexible band track having truss-like resistance to bending in one direction, to provide for maintaining this truss action effectively despite ordinary wear of track parts, to provide for convenient replacement of worn or defective parts, and to provide effective cushioning of the track against shock forces.

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

Of the drawings,

Fig. 1 is a plan view of a portion of the track showing the wheel-contacting face thereof.

Fig. 2 is a side elevation thereof, partly in section taken on line 2—2 of Fig. 1.

Fig. 3 is a cross-sectional view thereof taken on line 3—3 of Fig. 1.

Fig. 4 is a side elevation of the track on the vehicle.

Referring to the drawings which show a track constructed in accordance with and embodying the invention, the numerals 10, 11 designate flexible bands, which may be endless, of soft vulcanized rubber or other rubber-like material each having a layer of flexible tension elements 12 embedded therein in spaced-apart relation and bonded thereto. The tension elements are preferably of wire cable and completely surrounded by rubber-like material to protect them from moisture and to cushion them from each other and from the bogie wheels 13, 14 and other parts of the track.

Embedded in the bands 10, 11 at equally spaced apart intervals therealong, are metal straps 15 having ears 16 extending therefrom toward the center of the track and ears 17 extending outwardly toward the margins of the track. The straps 15 may also have tabs 15a

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bent away from the strap toward the cables at the sides thereof for laterally confining the cables. Shoes, each comprising a metal plate 18 and a rubber tread 19 bonded thereto at one face thereof, are provided at spaced-apart intervals longitudinally of the track, and extend cross-wise thereof.

Each shoe is attached to the pair of bands 10, 11 by means of bolts 20 which clamp the ears 16, 17 to the plate 18, spacers 21 being provided about the bolts between the plate 18 and the ears 16, 17 to prevent undesirable compression of the rubber-like material of the bands. The straps 15 are located above the tension members 12 so that these and the rubber-like material which surrounds them are confined between the straps 15 and the plate 18 with the rubber-like material surrounding them under slight compression sufficient to hold the shoes in the desired spacing while at the same time the tension elements are each cushioned by surrounding rubber-like material. The cables 12 and the metal straps are connected to the rubber-like material by a vulcanized bond for transmission of driving forces between them without undue relative movement.

For strengthening the track against side-wise deflection, and for driving the track, each plate 18 has a clearance opening 30 at its center for receiving a tooth of a drive sprocket 31, and a wear plate 32 having a corresponding opening 33 in alignment therewith, is secured to each plate 18 by bolts 34. Each wear plate 32 has a pair of upstanding guide flanges 35, 36 flanking the opening 33. The guide flanges have sprocket-flanking portions 35a, 36a and laterally offset portions 35b, 36b to provide sliding engagement with the portions 35a, 36a of adjoining flanges which they overlap and thereby steady the track in use against undesirable sidewise deflection. The offset portions of flanges 35, 36 are of opposite hand.

For providing resistance against reentrant bending of the track, the flange portions 35a, 36a are provided with laterally projecting lugs 40, 41 extending toward the side margins of the track and the flange portions 35b, 36b are provided with lugs 42, 43 adapted to engage lugs 40, 41 at a position where the tread face of the track is slightly convex longitudinally, as shown in Fig. 4, and the wear plates are made of such span as to contact each other successively, as at 44, with edge faces rounded toward the wheel-contacting face of the track to provide rolling engagement with each other when the wheel contacting face is bowed in a convex manner to pass about the wheels. As the lugs 40, 41, 42, 43 are well spaced from the tension members of the track, they carry the tension component of the bending stress of the track while the compression component is carried by the contacting wear plates, leaving the cable tension members to carry the driving forces.

The end faces of the wear plates 32 have in-

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terlocking notches 32a and the lugs 32b to provide against lateral shifting relative to each other. Also the abutting faces of the wear plates are arranged so that a flange 36a of one overhangs the base of the adjoining wear plate as at 60 causing the wear plates to be interlocked vertically and preventing shifting under shear stresses.

The lugs 40, 41, 42, 43 preferably have flat contacting faces providing a broad area for reducing unit stress and abrasive wear. As the wear plates and their flanges are bolted to the plates 18 they may be individually removed and replaced in case of wear or breakage.

For strengthening the shoes and stiffening the treads thereof, bars 45 of angular cross section may be embedded in the rubber-like material of the treads extending cross-wise of the track and secured to the plates 18 by the bolts 34 which secure the wear plates.

The construction is such that by virtue of the flexible tension-resisting elements extending longitudinally of the track continuously from truss member to truss member and secured to the truss members the truss members are flexibly hinged to each other and the use of hinge pins subject to rapid wear, due to high unit bearing pressure, is avoided, while at the same time the rubber-like material about the tension elements cushions them against sudden application of shock loads. The contact of the wear plates in abutting engagement with each other holds them at the proper spacing while the notches and lugs thereon together with the overhang of the wear plates interlocks them against lateral shifting and thin overlapping flanges prevent side sway of the track. Also the provision of the tension elements in groups enclosed by the rubber-like material facilitates manufacture and replacement of parts.

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

I. claim:

1. A band track for disposition about fore and aft spaced wheels of a self-laying track-type vehicle to provide a ground-contacting reach of the track free of bogie-wheel contact between the wheels for supporting the vehicle from the ground, said track comprising a substantially inextensible flexible band extending longitudinally of the track and having a surface for directly engaging said wheels, said band having flexible tension-resisting elements for resisting stretch of the band, a series of plates secured to and mounted upon said band in abutting contact one with another in succession at the plane of the tension-resisting elements to sustain longitudinal compression loads on the track, guide flanges upstanding from said plates at the inner face of the track for guiding engagement with said wheels; said guide flanges having portions overlapping each other in succession to prevent sidesway of the track in the reach between the wheels, and laterally extending lugs on said plates for limiting upward bowing of said track at said ground-contacting reach by abutting engagement of lugs on successive guide flanges throughout said reach to provide a trussed reach of the track from wheel to wheel, said track being bendable in the opposite direction with separation of said lugs to permit travel of the track about said wheels.

2. A band track for disposition about fore and aft spaced wheels of a self-laying track-type

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vehicle to provide a ground-contacting reach of the track free of bogie-wheel contact between the wheels for supporting the vehicle from the ground, said track comprising a pair of substantially inextensible flexible bands extending longitudinally of the track in spaced-apart relation and having a surface for directly engaging said wheels, said bands each having flexible tension-resisting elements embedded therein for resisting stretch of the band, a series of plates secured to and mounted upon said bands in abutting contact one with another in succession at the plane of the tension-resisting elements to sustain longitudinal compression loads on the track, guide flanges upstanding from said plates at the inner face of the track for guiding engagement with said wheels; said guide flanges having portions overlapping each other in succession to prevent sidesway of the track in the reach between the wheels, and laterally extending lugs on said plates for limiting upward bowing of said track at said ground-contacting reach by abutting engagement of lugs on successive guide flanges throughout said reach to provide a trussed reach of the track from wheel to wheel, said track being freely bendable in the opposite direction with separation of said lugs to permit travel of the track about said wheels.

3. A band track for disposition about fore and aft spaced wheels of a self-laying track-type vehicle to provide a ground-contacting reach of the track free of bogie-wheel contact between the wheels for supporting the vehicle from the ground, said track comprising a pair of substantially inextensible flexible bands extending longitudinally of the track in spaced-apart relation and having a surface for directly engaging said wheels, said bands each having flexible tension-resisting elements for resisting stretch of the band, a series of plates secured to and mounted upon said bands in abutting contact one with another in succession at the plane of the tension-resisting elements to sustain longitudinal compression loads on the track, said plates having rounded edges for rolling engagement one with another, guide flanges upstanding from said plates between said bands at the inner face of the track for guiding engagement with said wheels, said guide flanges having portions overlapping each other in succession to prevent sidesway of the track in the reach between the wheels, and laterally extending lugs on said plates for limiting upward bowing of said track at said ground-contacting reach by abutting engagement of lugs on successive guide flanges throughout said reach to provide a trussed reach of the track from wheel to wheel, said track being freely bendable in the opposite direction with separation of said lugs to permit travel of the track about said wheels.

4. A band track for disposition about fore and aft spaced wheels of a self-laying track-type vehicle to provide a ground-contacting reach of the track free of bogie-wheel contact between the wheels for supporting the vehicle from the ground, said track comprising a pair of substantially inextensible flexible bands extending longitudinally of the track and having a surface for directly engaging said wheels, said bands having flexible tension-resisting elements for resisting stretch of the bands, a series of plates secured to and mounted upon said bands in abutting contact one with another in succession at the plane of the tension-resisting elements to sustain longitudinal compression loads on the track, said

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plates having rounded edges for rolling engagement one with another, ground-engaging shoes secured to said plates, guide flanges upstanding from said plates at the inner face of the track for guiding engagement with said wheels, said guide flanges having portions overlapping each other in succession for sliding engagement to prevent sideway of the track in the reach between the wheels, and laterally extending lugs on said plates for limiting upward bowing of said track at said ground-contacting reach by abutting engagement of lugs on successive guide flanges throughout said reach to provide a trussed reach of the track from wheel to wheel, said track being freely bendable in the opposite direction with separation of said lugs to permit travel of the track about said wheels.

5. A band track for disposition about fore and aft spaced wheels of a self-laying track-type vehicle to provide a ground-contacting reach of the track free of bogie-wheel contact between the wheels for supporting the vehicle from the ground, said track comprising a substantially inextensible flexible band extending longitudinally of the track and having a surface for directly engaging said wheels, said band having flexible tension-resisting elements for resisting stretch of the band, a series of plates secured to and mounted upon said band in abutting contact one with another in succession at the plane of the tension-resisting elements to sustain longitudinal compression loads on the track, flanges fixed to and upstanding from said plates at the inner face of the track and comprising stop surfaces on said plates for limiting upward bowing of said track at said ground-contacting reach by abutting engagement of said stop surfaces on successive flanges throughout said reach to provide a trussed reach of the track from wheel to wheel, said track being bendable in the opposite direction with separation of said stop surfaces to permit travel of the track about said wheels.

6. A band track for disposition about fore and aft spaced wheels of a self-laying track-type vehicle to provide a ground-contacting reach of the track free of bogie-wheel contact between the wheels for supporting the vehicle from the ground, said track comprising a substantially inextensible flexible band extending longitudinally of the track and having a surface for directly engaging said wheels, said band having flexible tension-resisting elements for resisting stretch of the band, a series of plates secured to and mounted upon said band in abutting contact one with another in succession at the plane of the tension-resisting elements to sustain longitudinal compression loads on the track, flanges upstanding from said plates at the inside face of the track, said flanges having portions overlapping one another in sliding engagement for limiting sideway of the track and stop surfaces for limiting upward bowing of the track at said ground-contacting reach by abutting engagement of said stop surfaces on successive flanges throughout said reach to provide a trussed reach of the track from wheel to wheel, said track being bendable in the opposite direction with separation of said stop surfaces to permit travel of the track about said wheels.

7. A band track for disposition about fore and aft spaced wheels of a self-laying track-type vehicle to provide a ground-contacting reach of the track free of bogie-wheel contact between the wheels for supporting the vehicle from the ground, said track comprising a substantially in-

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extensible flexible band extending longitudinally of the track and having a surface for directly engaging said wheels, said band having flexible tension-resisting elements for resisting stretch of the band, a series of plates secured to and mounted upon said band in contact one with another in succession at the plane of the tension resisting elements to sustain longitudinal compression loads on the track, said plates having rounded meeting surfaces in rolling engagement one with another, flanges upstanding from said plates at the inside face of the track, said flanges having portions overlapping one another in sliding engagement for limiting sideway of the track in the reach between the wheels and stop surfaces for limiting upward bowing of the track at said ground-contacting reach by abutting engagement of said stop surfaces on successive flanges throughout said reach to provide a trussed reach of the track from wheel to wheel, said track being bendable in the opposite direction with separation of said stop surfaces to permit travel of the track about said wheels.

8. A band track for disposition about fore and aft spaced wheels of a self-laying track type vehicle to provide a ground-contacting reach of the track free of bogie-wheel contact between the wheels for supporting the vehicle from the ground, said track comprising a substantially inextensible flexible band extending longitudinally of the track and having a surface for directly engaging said wheels, said band having flexible tension-resisting elements for resisting stretch of the band, a series of plates secured to and mounted upon said band in contact one with another in succession at the plane of the tension-resisting elements to sustain longitudinal compression loads on the track, flanges upstanding from said plates at the inner face of the track, said flanges each extending longitudinally of the track and having portions in alignment with one another and portions laterally offset therefrom to engage the succeeding flange in sliding overlapping engagement therewith for limiting sideway of the track, laterally projecting lugs on said offset portions having stop surfaces for engaging lugs on the succeeding adjacent flange for limiting upward bowing of the track at said ground-contacting reach by abutting engagement of said stop surfaces on successive flanges throughout said reach to provide a trussed reach of the track from wheel to wheel, said track being bendable in the opposite direction with separation of said stop surfaces to permit travel of the track about said wheels.

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