Feb. 11, 1964 J. E. GAMMIE 3,120,819

RAIL THREADER

Filed June 16, 1960 6 Sheets-Sheet 1

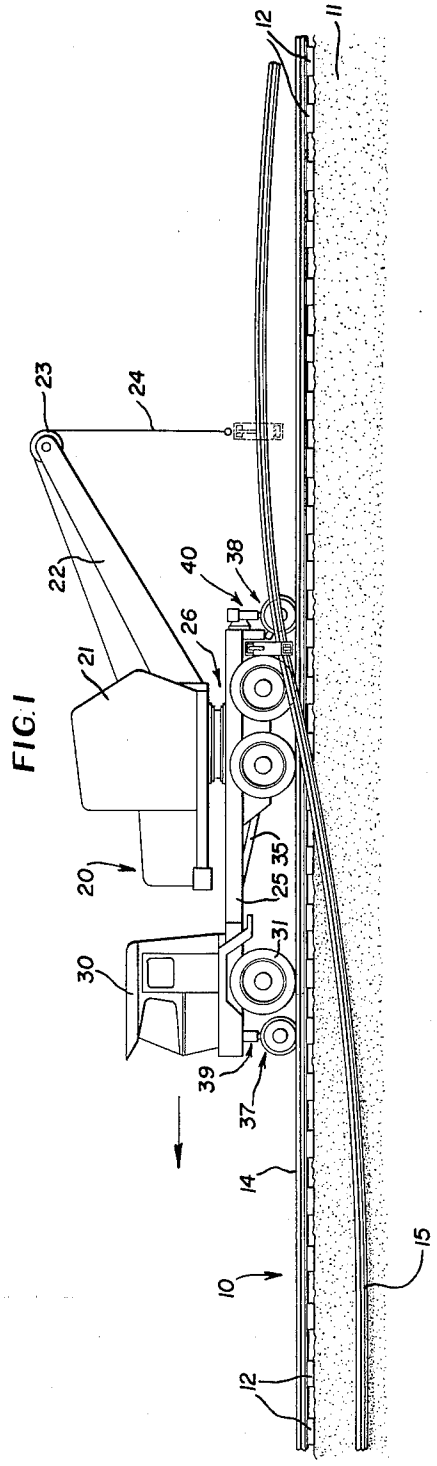


FIG. 1

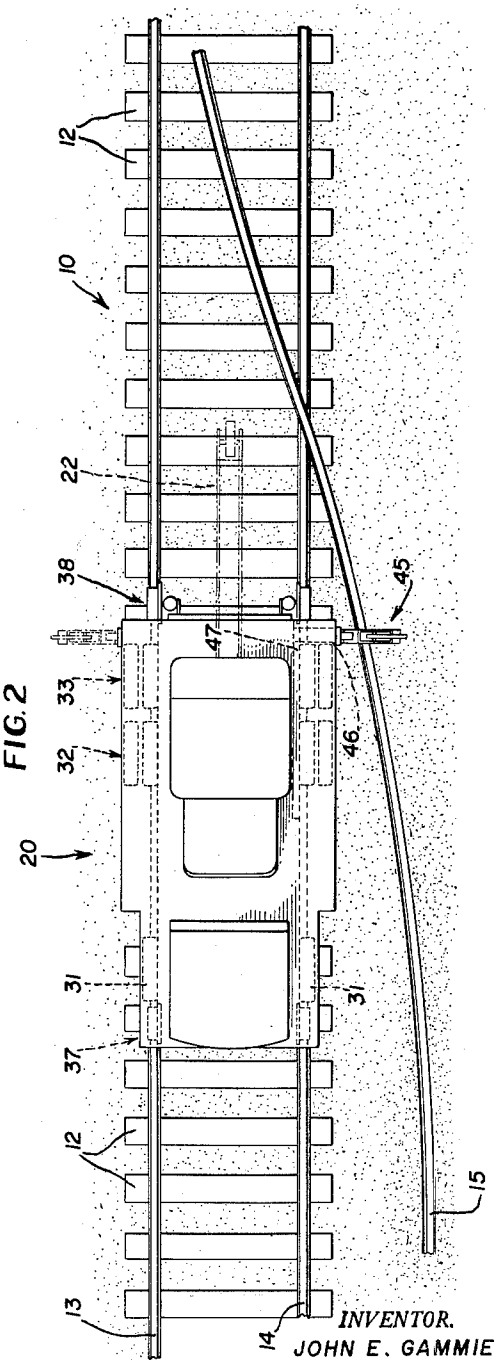


FIG. 2

INVENTOR.
JOHN E. GAMMIE

BY

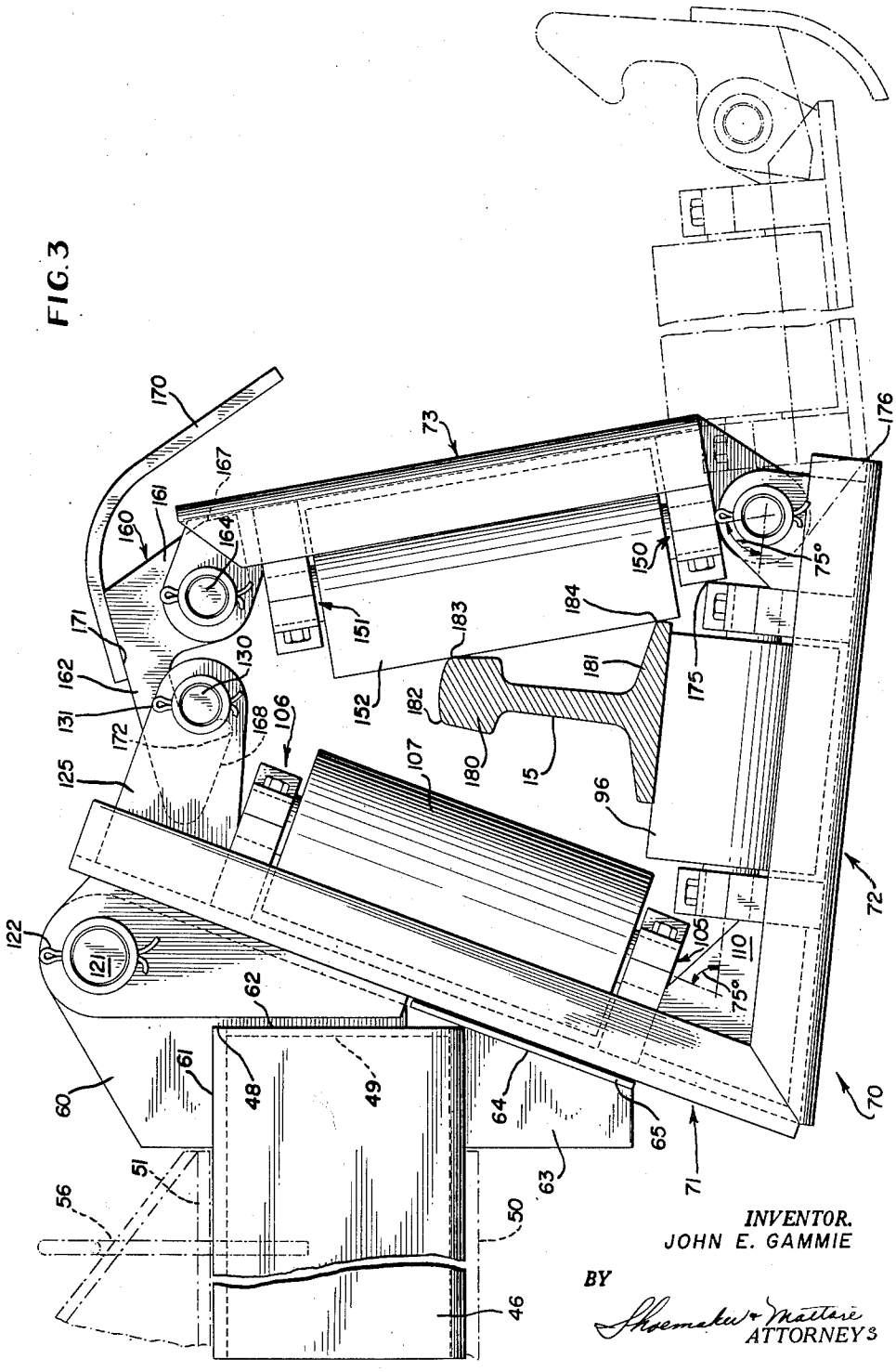
Isbemake & Mattare
ATTORNEYS

Feb. 11, 1964 J. E. GAMMIE 3,120,819

RAIL THREADER

Filed June 16, 1960 6 Sheets-Sheet 2

FIG. 3



INVENTOR.
JOHN E. GAMMIE

BY

Shoemaker & Mattare
ATTORNEYS

Feb. 11, 1964 J. E. GAMMIE 3,120,819

RAIL THREADER

Filed June 16, 1960 6 Sheets-Sheet 3

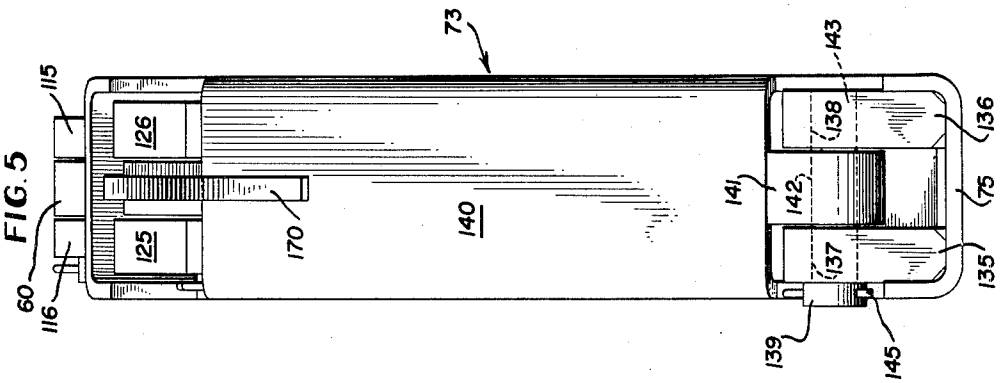


FIG. 5

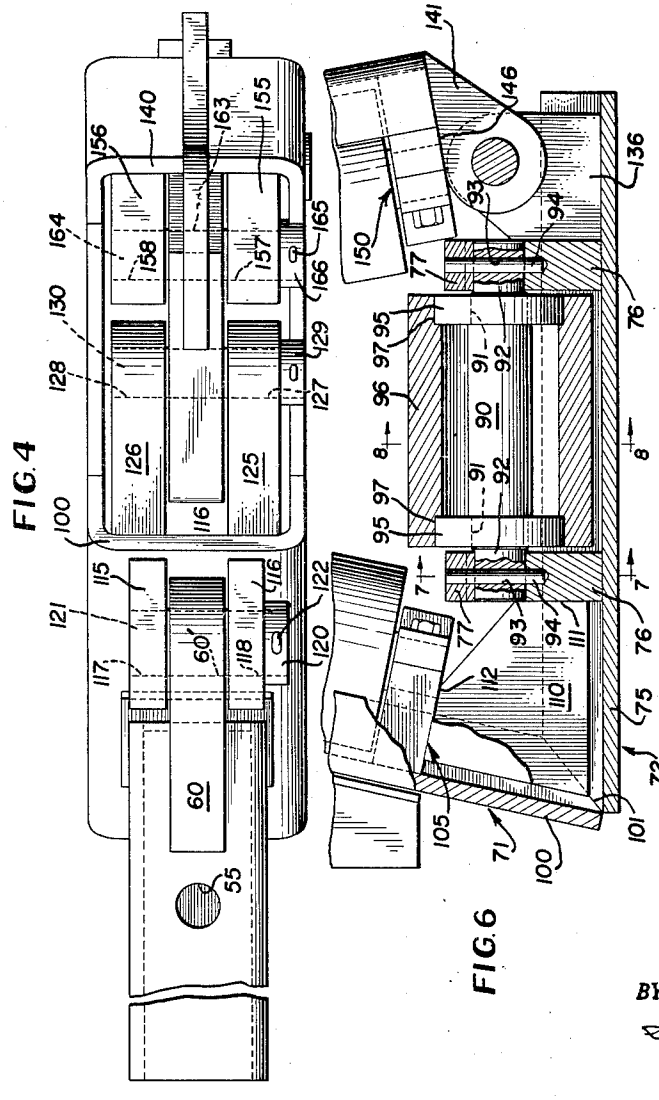


FIG. 4

FIG. 6

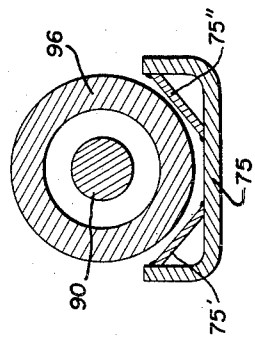


FIG. 8

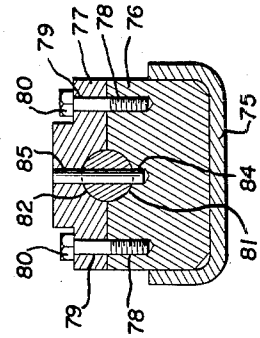


FIG. 7

INVENTOR.
JOHN E. GAMMIE

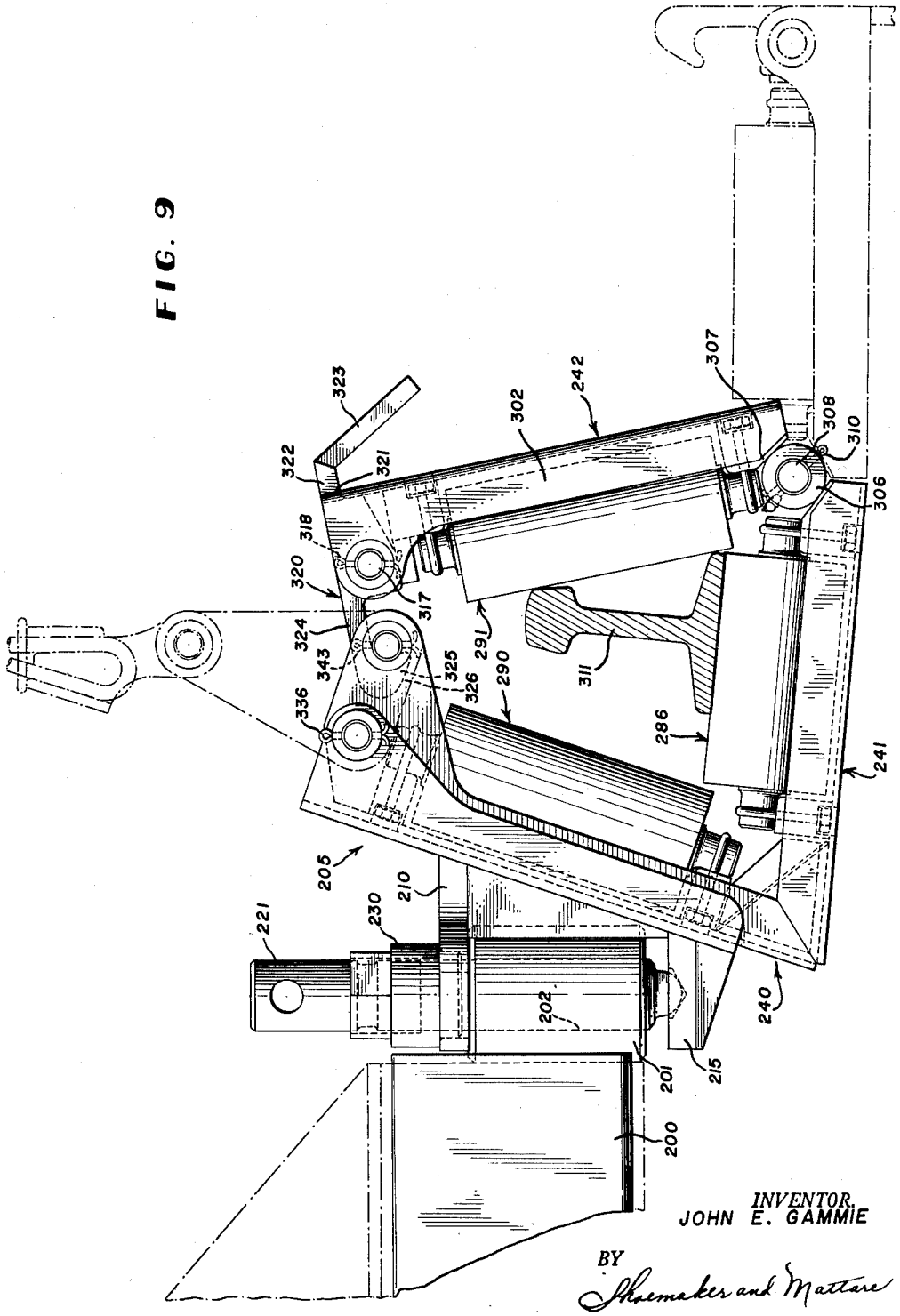
BY Shoemaker & Mattare
ATTORNEYS

Feb. 11, 1964 J. E. GAMMIE 3,120,819

RAIL THREADER

Filed June 16, 1960 6 Sheets-Sheet 4

FIG. 9



INVENTOR.
JOHN E. GAMMIE

BY Shoemaker and Mattare

ATTORNEYS

Feb. 11, 1964 J. E. GAMMIE 3,120,819

RAIL THREADER

Filed June 16, 1960 6 Sheets-Sheet 5

FIG. 11

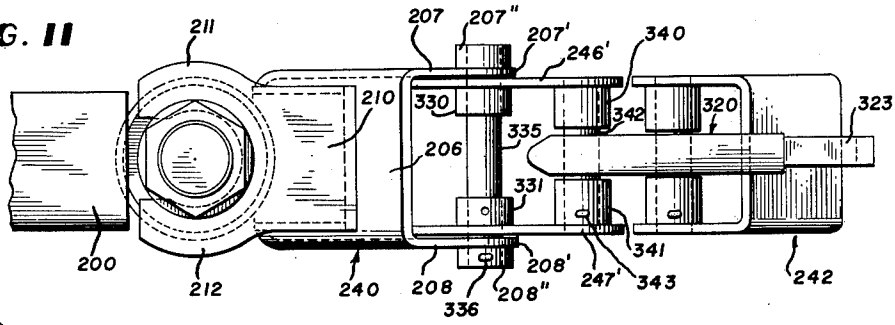
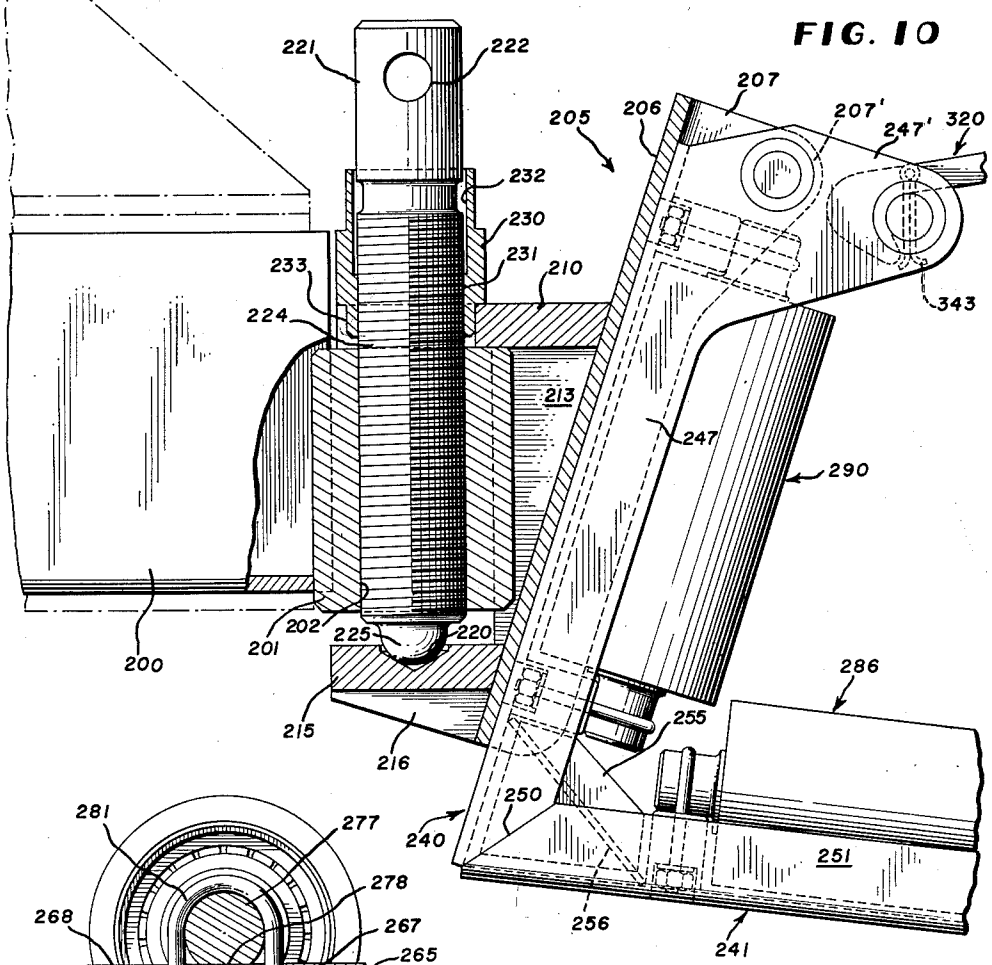


FIG. 10



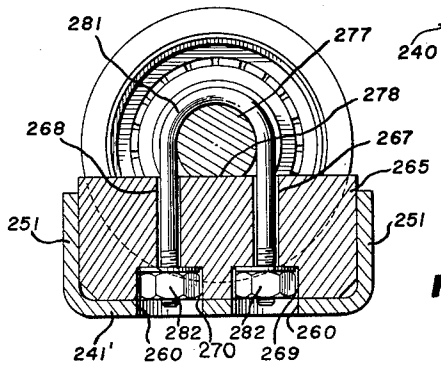


FIG. 16

INVENTOR.
JOHN E. GAMMIE

BY Shoemaker and Mattare

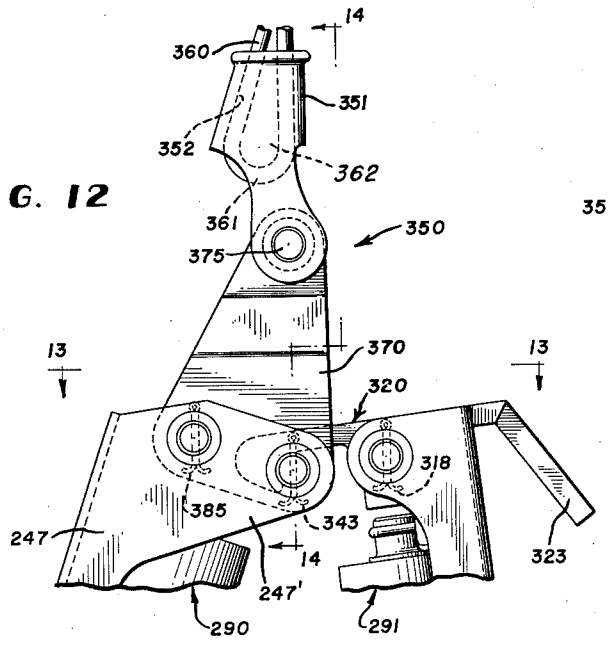
ATTORNEYS

Feb. 11, 1964 J. E. GAMMIE 3,120,819

RAIL THREADER

Filed June 16, 1960 6 Sheets-Sheet 6

FIG. 12



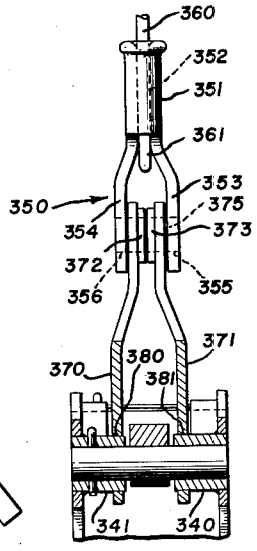


FIG. 14

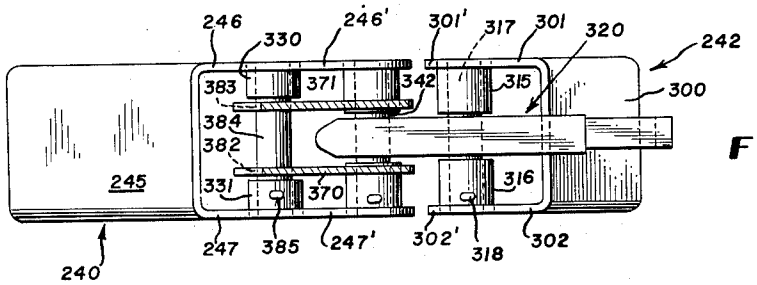


FIG. 13

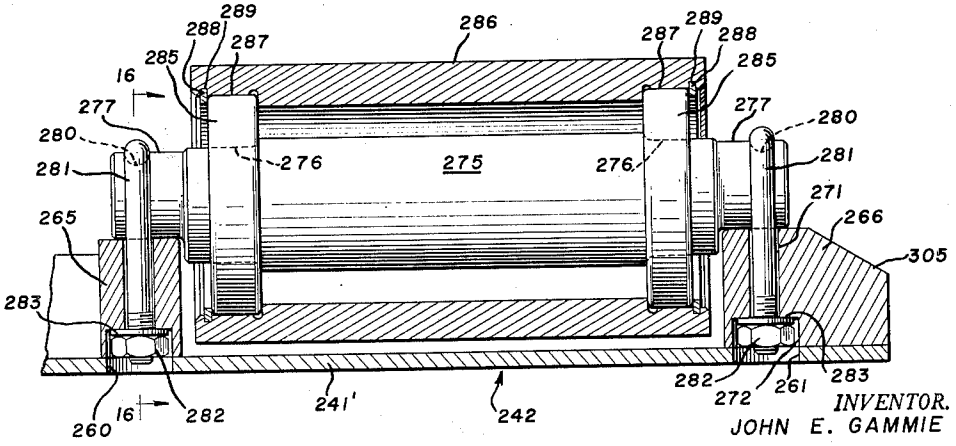


FIG. 15

INVENTOR.
JOHN E. GAMMIE

BY Hoelmaker and Mattare

ATTORNEYS

United States Patent Office 3,120,819 Patented Feb. 11, 1964

3,120,819
RAIL THREADER

John E. Gammie, Waterloo, Iowa, assignor, by mesne assignments, to Koehring Company, Milwaukee, Wis., a corporation of Wisconsin

Filed June 16, 1960, Ser. No. 36,653
3 Claims. (Cl. 104—5)

The present invention relates to new and novel rail threader apparatus and more particularly to a novel rail threader device mounted upon a vehicle movable over railway tracks.

The present invention is particularly concerned with the problem involved in laying so-called "ribbon rail" as is presently being widely employed on railway tracks throughout the country. For many years, railway tracks have been composed of main line rail or track in standard 39 ft. sections. The new type of so-called "ribbon rail" is welded into sections approximately 1400 ft. in length, and the problems involved in laying such rail are new and unique.

The common procedure is to dump or lay the elongated strip of ribbon rail adjacent the rail bed outwardly of the tracks, the rail being placed below the level of the existing tracks and sufficiently spaced outwardly thereof so that there is no danger that passing trains will catch or snag the ribbon rail due to engagement therewith by lines, cables or wheels of a passing railway vehicle.

When it is desired to place the strip of ribbon rail in position on the rail bed, the ribbon rail is first moved into the center of the track so that it can later be placed at proper gage. The old rail or track, tie plates and other attachment members are then removed. The spike holes in the ties are then plugged with wooden pegs or the like and the ties are refaced. New tie plates are then put down and the proper gage is estimated or semi-determined, a rail spike being driven partially in every fourth or fifth tie plate into the associated tie. The new strip of ribbon rail is then boomed or moved over against these spikes. The supporting vehicle is then driven over this new strip of rail whereupon a final check is made to ensure that the new ribbon rail is at the proper gage. The rail is then finally spiked down and clamped in operative position.

The main problem arising in this type of operation is the provision of a satisfactory means of lifting, guiding and controlling movement of the ribbon rail from outside the rail bed to the center of the track. It is, of course, unfeasible to lift the entire strip of track at one time bodily, due to its extreme length and flexibility, and accordingly, it is an object of the present invention to provide a so-called "threader" device which is adapted to move along the tracks to lift and thread or guide portions of the ribbon rail inwardly to the center of the track as the apparatus moves along the length of the rail.

In order to accomplish such results, the apparatus includes a vehicle which is adapted to move along railway tracks. The vehicle preferably employed according to the present invention is of the type which is adapted to move along paved road ways as well as railway tracks, thereby enabling the vehicle to have greater versatility.

Supported by the vehicle and extending laterally thereof is a novel threader device which supports the rail. The threader device is mounted at the lower portion of the vehicle, but is mounted such that the lower portion thereof is above the upper level of the supporting level in order that the threader device is adapted to move freely over switches, rail crossings, etc. which may extend laterally of the rails as the vehicle moves along conventional railway tracks.

As the vehicle moves along the old railway tracks, the threader device causes the elongated strip of ribbon rail to bend and due to its flexibility it is caused to move

inwardly to a point overlying the central portion of the track. After the rail has been initially placed in the threader device with the crane hook or other means and is in overlying position with respect to the track, the weight of the portion of the rail which has already been threaded over the track will cause the ribbon rail to lie down in the center of the track whereupon it can subsequently be moved into its final position. The rail is placed in the threader by opening up the threader in a manner which will hereinafter be apparent and then lowering the rail into place on one of the supporting rollers of the threader device. It will be understood that movement of the rail into its final position from the center of the track is a much simpler operation which can be handled by a road crew assisted by the hoist cable and boom of the crane mounted on the supporting vehicle which is generally necessitated by the weight and length of the ribbon rail, whereas the lifting of the ribbon rail from a position laterally of and below the track bed is a very difficult operation which the present invention accomplishes in a very effective and efficient manner.

The threader device itself consists of a framework which is suitably supported by the vehicle, the framework consisting of a plurality of leg portions, at least one of which is pivotally mounted for movement toward and away from another of the leg portions such that the ribbon rail may be inserted in operative position by dropping the rail through the top portion of the device.

An antifriction roller is journaled upon each of the leg portions with a novel compact arrangement which is especially adapted to withstand the heavy duty operations called for, and which is relatively maintenance-free during operation, yet which permits easy disassembly and replacement of parts when required.

The antifriction rollers permit the rail to be threaded through the device with a minimum of resistance and yet at the same time serve to guide and control the movement of the ribbon rail such that it is moved into the proper desired position.

At the same time, the threader device is so supported from the vehicle that it protects the vehicle and prevents the ribbon rail from engaging and damaging portions of the vehicle itself.

A latch mechanism is incorporated in the framework for locking the framework in its operative position for threading a rail, and the latch mechanism is so constructed that it can be quickly and easily released when desired. The ready release of the latching mechanism is additionally important since it may often be desirable to pass insulated rail sections or connected ribbon rail therethrough, such points on the rail being wider than the remaining portions of the rail thereby necessitating opening of the threader device in order to pass these wider portions therethrough. It has been found that by connecting the ribbon rail before placing it in the center of the track, a safer and faster overall track laying operation is obtained.

The entire framework itself is preferably pivotally supported from the vehicle such that it may be swung upwardly into inoperative position wherein it will not project as far laterally outwardly as it does when in operative position thereby reducing the clearance required for the vehicle.

An additional important novel feature of the invention is the particular angular relationship of the various rollers mounted on the leg portions of the framework. The rollers are so constructed and arranged that the lowermost roller is adapted to support the undersurface of the rail. The remaining two rollers are each inclined to the lowermost supporting roller at an angle to the lowermost roller such that the upstanding rollers will engage with an upper portion of the rail and a lower portion thereof

with substantially point contacts such that the rail will be effectively supported with a minimum of friction during operation. An even more important advantage of the angular relationship of the two rollers with respect to the lowermost roller is the fact that the wear on the rollers is thereby minimized providing a longer life expectancy for the rollers. This is, of course, important since relatively heavy rail is being employed, and it is desirable to reduce the friction and wear to a minimum in order that the power requirements for the vehicle are minimized, and further to facilitate rapid threading of the rail by the apparatus.

A modification of the apparatus provides an arrangement wherein the framework may be selectively secured either to a special mounting bracket which is adapted to be supported from the outrigger beam or from a suitable attachment designed to be secured to a cable. With this particular modified arrangement, the framework may be effectively supported either from the outrigger beam or from the cable of the railway vehicle. This modification also includes a different arrangement for securing and mounting the rollers in operative position.

An object of the invention is to provide new and novel rail threader apparatus which is adapted to move long lengths of rail from a point outside of a rail bed to the center of the track on which the rail is to be mounted. In addition, the apparatus may also be employed to move such long lengths of rail from the center of the track to a point outside of the associated rail bed in a reverse direction.

Another object of the invention is the provision of new and novel rail threader apparatus including a vehicle which is capable of movement along railway tracks and having supported thereon a threader device which is adapted to lift and guide a strip of rail toward the desired position, and at the same time which protects the vehicle itself from damage by the rail.

A further object of the invention is to provide rail threader apparatus which is arranged to provide a point contact between certain antifriction roller members of the device and the upper and lower lateral portions of a rail.

Yet another object is the provision of rail threader apparatus which is of heavy duty construction and which is relatively maintenance-free, and yet which can be easily disassembled when desired and furthermore which can be easily opened and closed for mounting a rail in operative position with respect thereto. The opening and closing arrangement of the apparatus also allows insulated or connected ribbon rail to readily pass through the device.

Another object of the invention is to provide a novel arrangement wherein the framework of the rail threader can be readily supported either from a special mounting bracket secured to an outrigger beam or from the cable of the rail vehicle.

A still further object of the invention is to provide rail threader apparatus which is quite simple and inexpensive in construction, and yet which is rugged and reliable in operation.

Further objects and many attendant advantages of the invention will become more apparent when considered in connection with the specification and accompanying drawings wherein:

FIG. 1 is an elevation of a railway track including the rail threaded apparatus according to the present invention and disposed in operative position relative to the track;

FIG. 2 is a top view of the apparatus shown in FIG. 1;

FIG. 3 is an enlarged front view of the threader device;

FIG. 4 is a top view of the device shown in FIG. 3;

FIG. 5 is a side view of the device shown in FIG. 3;

FIG. 6 is a view of the lower portion of the device

shown in FIG. 3 with certain parts broken away and in section to illustrate the details of construction;

FIG. 7 is a sectional view taken along line 7—7 of FIG. 6 looking in the direction of the arrows;

FIG. 8 is a sectional view taken along line 8—8 of FIG. 6 looking in the direction of the arrows;

FIG. 9 is a front view of a modified form of the threader device;

FIG. 10 is an enlarged view partly broken away of a portion of the device shown in FIG. 9;

FIG. 11 is a top view of the threader device shown in FIG. 9;

FIG. 12 illustrates the top portion of the modified threader device secured to a special attachment for supporting the device from a cable;

FIG. 13 is a sectional view taken along line 13—13 of FIG. 12 looking in the direction of the arrows;

FIG. 14 is a sectional view taken along line 14—14 of FIG. 12 looking in the direction of the arrows;

FIG. 15 is an enlarged sectional view illustrating the mode of mounting the rollers in the modified form of threader; and

FIG. 16 is a sectional view taken along line 16—16 of FIG. 15 looking in the direction of the arrows.

Referring now to the drawings wherein like reference characters designate corresponding parts throughout the several views, there is shown in FIGS. 1 and 2 a conventional railway track indicated generally by reference numeral 10 including a supporting road bed 11 upon which is supported a plurality of cross ties 12. Supported upon the cross ties 12 in a conventional manner are a pair of spaced rails 13 and 14 of conventional construction. It will of course be understood that the rails are supported upon conventional tie plates which are not shown for clarity of illustration purposes only. An elongated strip of so-called "ribbon rail" is indicated by reference numeral 15 and it will be noted that the strip of rail is illustrated at the left hand portion of these figures in the position where it is normally dumped or laid prior to being lifted onto the track for mounting thereon. The ribbon rail normally rests below the track and is spaced a substantial distance to the side thereof for reasons hereinbefore discussed.

The rail threader apparatus according to the present invention is illustrated in operative position in FIGS. 1 and 2 and includes a vehicle indicated generally by reference numeral 20 of a type which is adapted to move along paved roadways as well as railway tracks. This particular type of vehicle is illustrated and described in detail in copending application Ser. No. 830,948, filed July 31, 1959, now abandoned. This type of vehicle includes a crane cab structure 21 including a conventional crane 22 having a pulley 23 journaled at the outer end thereof with a cable 24 trained over the pulley. The crane cab structure is mounted upon the frame 25 of the vehicle body means on a turntable assembly indicated generally be reference numeral 26.

A cab assembly 30 is mounted at the forward end of the vehicle and houses the usual engine and transmission assembly (not shown). Mounted beneath the cab are conventional rubber tire steering wheels 31. Adjacent the rear portion of the vehicle frame are a pair of driving wheel assemblies indicated generally by reference numerals 32 and 33, there being a main drive shaft 35 extending to the differential unit of the driving wheel assembly 32 and there being a secondary driving shaft (not shown) extending between a differential assembly of wheel mechanism 32 to the differential assembly of driving wheel assembly 33. As pointed out in the aforementioned copending application, at least a pair of tires of each tire assembly is spaced apart a distance corresponding with the normal spacing between railway wheels such that the tires will ride along the railway tracks and preferably the inner wheels of the two assemblies 32 and 33 are so spaced. The engagement of the driving wheels with the

railway tracks provides a means for driving the vehicle along the track. Mounted at opposite ends of the vehicle frame are fore and aft railway wheel carrier assemblies indicated generally by reference numerals 37 and 38. These railway wheel carriers are mounted for raising and lowering movement with respect to the vehicle frame, the operating mechanism for assemblies 37 and 38 being indicated by reference numerals 39 and 40 respectively and being preferably gear-operated by a detachable handle for raising and lowering the railway wheels when desired.

This mechanism is illustrated in detail in the aforementioned copending application. The railway wheels preferably support approximately 25 percent of the gross weight of the vehicle under normal circumstances, the remaining weight being supported by the remaining wheels.

When it is desired to employ the present invention, the vehicle is driven on to the rails such that the tire wheels are in alignment with the rails whereupon the railway wheel assemblies 37 and 38 are lowered to engage the railway wheels. The vehicle can then be effectively driven along the track by the driving wheel assemblies 32 and 33 as will be well understood. As shown in the drawings, the vehicle will normally move to the left in the direction of the arrow as seen in FIG. 1 during the threading operation.

Referring now to FIG. 2, the threader device is indicated generally by reference numeral 45, the threader device being secured to an outrigger beam 46 which extends inwardly of the vehicle and is secured to an outer frame member 47 as by welding or the like such that the outrigger beam is rigidly supported from the frame of the vehicle. The threader device is shown in full lines at the lower portion of FIG 2 and indicates one operative position thereof when the rail 15 is positioned alongside the track as shown. It should also be understood that the threader device can also be mounted at the opposite side of the vehicle as shown in FIG. 2 when it is desired to thread a rail which lies on the opposite side of the track, or it may be mounted from a crane hook as shown in FIG. 1. It will also be understood that the threader device itself extends substantially normally to the longitudinal axis of the vehicle and the track.

Referring now particularly to FIGS. 3 and 4, the outrigger beam 46 extends outwardly and terminates at a point 48. The outrigger beam itself is preferably a hollow beam having a substantially rectangular cross section, the outer end of the beam being closed by a substantially rectangular end plate 49 which is secured as by welding within the end of the beam to form a flush surface for welding support member 60 to this end of the beam.

As mentioned previously, the outrigger beam may extend directly to a frame member of the vehicle and be welded thereto. Another desirable manner of mounting the outrigger beam is to provide an outrigger box support means which is welded to the frame of the vehicle, the support means being provided with an opening for receiving the outrigger beam such that the outrigger beam may be slipped into the opening in the support means into operative position. This modification is illustrated by the phantom lines in FIG. 3 wherein the support means includes a lower member 50 and an upper member 51, these members being joined by side members (not shown), the various members of the support means defining an opening of substantially rectangular cross section for receiving the outrigger beam. The outrigger beam itself may be provided with one or more openings in the upper surface thereof as illustrated by reference numeral 55 in FIG. 4, this opening or plurality of openings being adapted to receive a pin 56 mounted in the support means and extending through aligned openings therein, the pin serving to lock the outrigger beam in a desired operative position. It is apparent that when the outrigger beam is so mounted, it can be readily removed by pulling out pin 56 when desired.

A support member 60 is formed as a substantially flat plate, the support member being provided with a lower surface 61 which lies flush with the upper surface of the outrigger beam and is preferably secured thereto by welding. Support member 60 also includes a side surface 62 which lies flush with the end surface of plate 49 and is preferably secured thereto as by welding. It is accordingly evident that support member 60 is rigidly supported by the outer end of the outrigger beam. A gusset member 63 is secured as by welding to the under surface of the outrigger beam and is provided with a sloping surface 64. A plate member 65 is secured as by welding to sloping surface 64 and is disposed in angular relationship to the outer end of the outrigger beam.

The threader device includes a framework which is indicated generally by reference numeral 70, the framework including three interconnected leg portions 71, 72 and 73 of generally similar construction. Firstly, the lower leg portion as illustrated most clearly in FIGS. 6–8 will be discussed. As seen especially in FIGS. 7 and 8, leg portion 72 consists of a main body portion 75 which is substantially U-shaped in cross-sectional configuration thereby providing a rigid body portion.

Mounted within body portion 75 are a pair of spaced shaft support means of identical construction, each of the shaft support means including a lower shaft support member 76 and an upper shaft support member 77. The lower shaft support members 76 fit snugly within the upstanding walls of body portion 75 and the lower surface thereof engages the upper surface of body portion 75. The lower shaft support members 76 are secured to body portion 75 as by welding or the like and accordingly are rigidly affixed thereto.

A pair of gusset members 75′ and 75″ are provided, each of these gussets being positioned between the lower shaft support members 76 extending between the upstanding walls of body portion 75 and the upper surface of the lower wall thereof. It will be noted that the gussets extend at an angle downwardly from the upstanding side walls to the bottom wall of body portion 75 to provide sufficient clearance to permit free rotation of roller 96. The edges of gussets 75′ and 75″ are disposed flush with the adjacent walls of body portion 75 and are suitably secured thereto as by welding. These gussets serve to strengthen the leg portion 72 and permit the body portion of the leg to be made of lighter material thereby resulting in an overall weight reduction without reducing the strength of the device. It should be understood that similar gussets are provided in each of leg portions 71, 72 and 73 for the aforementioned purposes.

The upper shaft support members 77 have the lower surface thereof in flush contact with the upper surface of members 76. Members 76 and 77 are provided with aligned openings 78 and 79 respectively, and bolt members 80 extend through these aligned openings, the lower ends of the bolts 80 being threaded within threaded openings 78 in the lower shaft support members. Members 76 and 77 are also provided with complementary semicylindrical cut-out portions 81 and 82 respectively, these cut-out portions being disposed adjacent one another so as to cooperatively define a cylindrical opening. Members 76 and 77 are additionally provided with aligned openings 84 and 85 respectively which open into the semicylindrical cut-outs provided in the members.

As seen most clearly in FIG. 6, a shaft 90 is provided with a pair of shoulders 91 of reduced diameter which in turn are connected with reduced outer end portions 92 of the shaft. These reduced outer end portions are received within the cylindrical openings defined by the upper and lower shaft support members, the end portions 92 being provided with radial openings 93 extending therethrough. Pin members 94 extend through the aligned openings in the upper and lower shaft support members and the reduced end portions of shaft 90 to prevent the shaft from turning during operation.

As seen in FIG. 6, a pair of spaced sealed ball bearings 95 of conventional construction are mounted upon shoulder portions 91 of shaft 90. A hardened steel roller 96 of substantially cylindrical construction is provided with annular cut-out portions 97 at opposite ends thereof which receive the outer races of ball bearings 95. In this manner, the roller 96 is mounted for free rotation about shaft 90, and is adapted to support a portion of a rail which extends through the threader device whereby the roller serves as an antifriction means to reduce the friction imposed upon a strip of rail to a minimum as it moves with respect to the threader device.

Leg portion 71 includes a body portion 100 of similar construction to body portion 75, body portion 100 being of greater length. As seen especially in the left hand portion of FIG. 6, the adjacent ends of the two body portions 75 and 100 are cut away along line 101 and are welded together along this line to provide a rigid interconnection therebetween. A pair of space shaft support assemblies indicated by reference numerals 105 and 106 are of identical construction to the shaft support assemblies defined in connection with leg portion 72 and accordingly no further description thereof is believed necessary. Another hardened steel roller 107 is supported from shaft support assemblies 105 and 106 in a manner identical to that discussed in connection with hardened steel roller 96, and accordingly, the means of mounting roller 107 will be clearly understood.

In order to strengthen and rigidify the interconnection between leg portions 71 and 72, a pair of similar gusset plates 110 are provided, only one of which is visible in FIG. 6, each of these gusset plates including a first end surface 111 which abuts against the adjacent surface of the lower shaft support member 76. Each of plates 110 is also provided with an end surface 112 which abuts against the adjacent surface of the lower shaft support member of support assembly 105. The two gussets 110 are secured as by welding to the inside edges of the upstanding walls of the body portions of leg portions 71 and 72. It is evident that the gusset plates serve to additionally rigidly interconnect the leg portions 71 and 72 in a predetermined angular relationship.

A pair of space ears 115 and 116 are secured as by welding to the under surface of body member 100 of leg portion 71, these ears having aligned openings 117 and 118 respectively formed therein. Support member 60 is also provided with an opening 60' which is adapted to be aligned with openings 117 and 118. A collar 120 is rigidly secured to the outer surface of ear 116 and is also provided with a central opening therethrough. A pin member 121 extends through the aligned openings formed in the two ears and the support member 60. A radial opening is provided in the outer end of the pin, and a cotter pin 122 extends through the opening in the pin and aligned openings in collar member 120 for securing pin 121 in operative position. It will be noted that when the device is in operative position, the under surface of body portion 100 will normally engage against the face of plate member 64 supported from the outrigger beam for firmly supporting the threader device in operative position.

Another pair of spaced ears 125 and 126 are supported within body portion 100 and extend oppositely from ears 115 and 116. Ears 125 and 126 are provided with aligned openings 127 and 128 respectively, and a collar 129 is secured to the outer surface of ear 125. Collar 129 is provided with an opening for receiving the outer end of a latch pin 130 extending through the aligned openings in the ears 125 and 126. A cotter pin 131 extends through aligned openings in the collar and the pin for securing the pin in operative position.

As seen most clearly in FIG. 5, a pair of ears 135 and 136 are supported within body portion 75 of leg portion 72 at one end portion thereof, these ears being provided with aligned openings 137 and 138 respectively, a collar 139 having a central opening formed therethrough being secured to the outer surface of ear 135. The third leg portion 73 includes a portion 140 which is also of substantially U-shaped cross section. A hinge member 141 is secured to the end portion of body portion 140, the hinge member being provided with a central opening 142. A hinge pin 143 extends through the aligned openings in ears 135 and 136 and in the hinge member 141 for pivotally interconnecting leg portions 72 and 73. A cotter pin 145 extends through aligned openings in hinge 143 and collar 139 for securing the pin in operative position.

A first shaft support assembly 150 and a second shaft support assembly 151 are secured to the body portion 140 at spaced points therein, the construction of shaft support assemblies 150 and 151 being similar to those previously discussed. A hardened steel roller 152 is supported for free rotation by the shaft support assembly in a manner identical to that discussed in connection with roller 96 and as seen in FIG. 6. Accordingly, it is apparent that each of the hardened steel rollers 96, 107 and 152 is mounted for rotation in a similar manner whereby the rollers serve as antifriction means for guiding and supporting a strip of rail through the threader device. It will also be noted that hinge member 141 includes a surface 146 which is secured as by welding or the like to the lower shaft support member of support assembly 150 for more rigidly securing the hinge member 141 to leg portion 73.

It should also be noted that rollers 107 and 152 are identical to one another. This is advantageous since it permits each of the rollers to be interchanged with one another or turned end for end thereby considerably extending the useful life of each of the rollers.

A pair of spaced ears 155 and 156 are secured to the upper end of the body portion 140 as seen in the drawings, ears 155 and 156 being provided with aligned openings 157 and 158 respectively. A latch member 160 includes a first portion 161 and a second portion 162 extending angularly with respect to portion 161. Portion 161 is provided with an opening 163, and a pin 164 extends through the aligned openings formed in ears 155 and 156 and latch member 160. A cotter pin 165 extends through aligned openings in pin 164 and a collar 166 secured to the outer surface of ear 155 for securing pin 164 in operative position. It is accordingly apparent that latch member 160 is mounted for pivotal movement at the upper end portion of leg portion 73.

A curved handle member 170 is rigidly secured to the upper surface 171 of portion 162 of the latch member, and the outer end of portion 162 forms a hook portion 172, the hook portion being adapted to engage over the latch pin 130 whereby it is apparent that the latch member 160 will interconnect leg portions 71 and 73 in angular relationship with one another. It will be noted that when in latched position, the adjacent upper shaft portion members of the shaft support assemblies mounted on leg portions 72 and 73 will engage each other along a line 175 for limiting inward movement of leg portion 73 with respect to leg portion 72. It will be evident that when handle portion 170 is pushed down so as to lift hook portion 172 away from the latch pin 130, leg portion 73 can be swung outwardly into the dotted line position shown in FIG. 3, such outward movement being limited by engagement of hinge member 141 with the outer end portion of the body portion 75 of leg portion 72 along a line 176 as seen in FIG. 3.

It will be noted that hinge member 141 is so configured that it engages the outer end portion of body portion 75 so as to limit outward movement of leg portion 73 such that in the final open position, leg portion 73 extends out almost horizontally with respect to the apparatus. This particular arrangement is advantageous since it facilitates mounting of the rail in operative position within the apparatus due to the fact that the rail must only be lifted

to sufficient height to clear the leg portion 73 whereupon it can be swung inwardly onto roller 96. It is apparent that it is much simpler to mount the rail in position when the leg portion 73 is adapted to swing into such an open position.

The portion 161 of latch member 160 is provided with a flat edged portion 167 which is adapted to engage the adjacent surface of body portion 140 for limiting pivotal movement of the latch member. As seen in phantom lines in FIG. 3, portion 161 of latch member 160 engages the adjacent portion of the support assembly 151 to limit outward swinging of the latch member. As leg portion 73 is pivoted toward closing position, surface 167 will engage against the bottom wall of the associated leg to limit pivotal movement of the latch member with respect to the leg. Accordingly, when the leg portion 73 is swung toward the closed position as shown in solid lines in FIG. 3, the lower sloping edge 168 of latch 160 will ride along pin 130 thereby camming the latch upwardly and allowing it to drop into latched position to hold the components of the device in operative relationship. Due to this construction, it is unnecessary for an operator to handle the latch when closing the apparatus and it is only necessary to swing the arm member 73 toward latching position whereupon the latch will automatically be engaged.

Referring now particularly to FIG. 3, the rail 15 which is being threaded through the device is illustrated in cross section, the rail being of conventional construction and including a top portion 180 and a lower flange portion 181. The portion 182 of the top portion is commonly referred to as the ball of the rail, and it will be noted that when the rail is in contact with roller 152 while being supported on roller 96, a point contact is made at ponits 183 and 184 with the ball or top of the rail and the lower flange of the rail. This is highly desirable since this reduces the frictional contact of the rollers with the rail to a minimum, and also minimizes the wear on the rollers at the points of contact between the rollers and the rail. In a similar manner, the opposite roller 107 will also make a point contact with the upper and lower portions of the rail when the rail is in engagement therewith.

In order to accomplish such a point contact as described above, the axes of rollers 107 and 152 are each disposed with respect to the axis of roller 96 such that an angle of approximately 75 degrees is defined therebetween. These two angles are illustrated in FIG. 3 and are shown as lying between the intersections of the axes of rotation of the respective rollers.

Referring now to FIGS. 9–16 of the drawings, a modified form of the invention is illustrated which permits the framework to be readily attached either to a special mounting bracket supported from the outrigger beam or to a special attachment to be secured to a cable supported from the railway vehicle.

As seen particularly in FIGS. 9 and 10, the outer end of the outrigger beam 200 in this instance is provided with a substantially cylindrical supporting fitting 201 which is rigidly attached to the outer end of the outrigger beam as by welding or the like. Supporting fitting 201 is provided with a central bore 202 formed completely therethrough.

A special mounting bracket is employed in this modification, this mounting bracket being indicated generally by reference numeral 205 and including a main body portion 206 including integral upstanding substantially parallel walls 207 and 208 formed at the opposite longitudinal edges thereof thereby defining a substantially U-shaped cross-sectional configuration.

Walls 207 and 208 have ears 207′ and 208′ formed at one end thereof respectively, these ears having bosses 207″ and 208″ rigidly secured thereto. The ears and associated bosses have aligned openings formed therethrough for a purpose hereinafter described.

A first attaching ear 210 is secured to the back surface of body portion 206 and extends laterally thereof so as to be disposed substantially horizontally when in operative position as shown. Attaching ear 210 includes two arms 211 and 212 at the rear portion thereof which are bowed outwardly and the inner surfaces of which define a cylindrical surface for receiving an attaching member as hereinafter described.

A pair of supporting braces 213 have the upper edges thereof suitably secured to the back surface of attaching ear 210 as by welding, and also includes a downwardly sloping surface suitably secured as by welding to the back surface of the body portion 206 of the mounting bracket whereby brace 213 supports the attaching ear 210.

Another ear 215 is secured to the back surface of body portion 206 and extends laterally therefrom substantially parallel to attaching ear 210, the upper surface of each 215 also being secured to the lower surfaces of braces 213 for providing a rigid interrelationship of the two ears 210 and 215. An additional brace member 216 is secured as by welding to the under surface of ear 215 and also to the under surface of body portion 206. It will be noted that the upper surface of ear 215 is provided with a tapered recess 220, the purpose of which is hereinafter discussed.

In order to secure the mounting bracket 205 in operative position, an attaching pin 221 is provided, the pin having an opening 222 formed through the upper surface thereof to permit a suitable tool to be inserted therein for turning the screw. The main body portion 224 of the screw is threaded throughout its length and is adapted to cooperate with a corresponding thread provided in the bore 202 of the supporting fitting 201.

The lower end portion of pin 221 is provided with a rounded head portion 225 which is normally seated within the tapered recess 220 in ear 215. The pin is shown as being in operative position in FIGS. 9 and 10 and when in this position, the pin is threaded within supporting fitting 201 with the head 225 seated in the recess 220 in ear 215. A nut member 230 is provided with a first bore portion 231 formed therethrough which is provided with a thread and a second enlarged bore portion 232. Nut 230 is normally threaded on pin 221 as seen particularly in FIG. 10, and the outer surface 233 of the nut is adapted to fit within the inner surfaces of the arm portions 211 and 212 of the attaching ear 210 of the mounting bracket.

It will be apparent that when in the position shown in the drawings, the mounting bracket 205 is secured in operative position by means of the pin and nut assembly 221, 230 and is securely supported by the supporting fitting 201.

The framework of this modified form of the invention includes first and second interconnected legs indicated generally by reference numerals 240 and 241, a third leg 242 being pivotally interconnected with one end portion of leg 241 to permit opening and closing of the framework for the purposes hereinbefore described.

Leg portion 240 includes a main body portion 245 having upstanding integral walls 246 and 247 extending therefrom and substantially parallel to one another to define a substantially U-shaped cross-sectional configuration. Walls 246 and 247 are provided with laterally extending ear portions 246′ and 247′ at one end thereof. The opposite ends of the side walls are cut away along a line indicating by reference numeral 250 in FIG. 10. Leg 241 is also formed to have a substantially U-shaped cross-sectional configuration with spaced parallel sides 251, only one of which is visible in FIGS. 9 and 10. The two side walls 251 are also cut off along line 250 so as to abut against the cut-off end walls of leg portion 240. The side walls of leg portions 240 and 241 are permanently secured to one another as by welding along line 250 to maintain the two leg portions in fixed angular relationship to one another, the angular relationship being the same as that described previously in FIGS. 1–8 of the drawings.

In order to rigidly maintain the two leg portions 240 and 241 in the desired angular relationship, a pair of plates 255 are suitably secured as by welding to the inner surfaces of the adjacent wall portions of the two legs. In addition, a pair of gusset plates 256 extend between the inner surfaces of plates 255 and the upper surface of the lower wall of leg portion 241, these gussets being welded in position to provide a very sturdy reinforced structural arrangement.

The manner of supporting the hardened steel rollers is slightly different in this modification and the structural arrangement is illustrated most clearly in FIGS. 15 and 16. A first pair of openings 260 are provided through the lower wall 241' of leg portion 241, and a second pair of similar spaced openings 261 are provided at a point spaced a substantial distance longitudinally from the first pair of openings 260.

A first support block 265 is suitably secured as by welding within leg portion 241, and a second spaced block 266 is similarly secured within the leg portion 241. Block 265 is provided with two bores 267 and 268 formed therethrough, the bores being counterbored at 269 and 270 respectively. In a similar manner, block 266 is provided with a pair of bores 271 formed therethrough, the lower ends of the bores being counterbored at 272.

A roller support shaft 275 as seen especially in FIG. 15 is provided at each end with a first shoulder portion 276 and a second reduced shoulder portion 277. As seen especially in FIG. 16, the lower portion 278 of the reduced shoulder portion 277 is flattened and rests against the flat upper surface of the respective blocks 265 and 266.

Each of the reduced portions 277 at opposite ends of the supporting shaft 275 is provided with a groove 280 extending therearound, similar U-bolts 281 being received within the grooves 280 with the opposite legs of the U-bolts extending downwardly through the associated bores in the blocks 265 and 266. Nuts 282 are secured to the lower threaded ends of the opposite legs of each of the U-bolts and washers 283 are interposed between the nuts and the adjacent portions of the respective blocks. It is apparent that when in operative position as shown, the U-bolts will tightly clamp the support shaft 275 in position on the blocks 265 and 266 while positively preventing rotation of the shaft 275 with respect to the blocks.

Sealed roller bearings 285 are mounted on each of the reduced shoulder portions 276. A hardened steel roller 286 is provided with an annular recess portion 287 at each end thereof which receives the outer races of the ball bearings 285. The roller bearing and hardened steel roller assembly are maintained in operative position by a pair of snap rings 288 which are disposed within suitable grooves 289 formed in the inner surface of the hard steel roller 286 adjacent the opposite ends thereof.

It will be readily understood that hardened steel rollers 290 mounted on leg portion 240 and 291 mounted on leg portion 242 are supported in the same manner as roller 286 is supported by leg portion 241 and accordingly no further discussion of the details of construction in mounting these latter rollers is believed necessary since in each case the roller bearing supporting shafts are supported by a pair of blocks secured to the respective leg portions and held in place by a pair of U-bolts as hereinbefore described.

Leg portion 242 includes a main body portion 300 having integral upstanding side walls 301 and 302 formed along the opposite longitudinal edges thereof. Ear portions 301' and 302' are formed at one end of each of the side walls and project laterally therefrom.

Secured to the sloping surface 305 of block 266 are a pair of spaced substantially cylindrical hinge members 306 only one of which is visible in FIG. 9. Also secured to the sloping surface 307 of the block supported at the lower end of portion 242 is a similar cylindrical hinge member which is hidden from view in FIG. 9 and which fits between the two spaced hinge members 306 supported on leg portion 241. Each of the cylindrical hinge portions is provided with a bore extending longitudinally therethrough, the bores in the three hinge members being aligned with one another and a hinge pin 308 extending through the aligned bores. A cotter pin 310 extends through aligned openings formed in one of the hinge members 306 and the hinge pin 308 for retaining the hinge in operative position thereby pivotally interconnecting leg portions 241 and 242 to one another. Pivotal movement of leg portion 242 in the opposite directions is limited by engagement of the end surface of the block mounted at the lower portion thereof with the hinge members 306 supported on leg portion 241.

It should be noted that when the three leg portions are in operative position as shown in FIG. 9, the hardened steel rollers have the same angular relationship to one another as defined in connection with the modification shown in FIGS. 1–8, and that the rollers 290 and 291 will have point contacts with the rail 311 supported therein in the manner aforedescribed.

As seen particularly in FIG. 13, bosses 315 and 316 are secured to the inner surfaces of ears 301' and 302'. The bosses are provided with longitudinal bores therethrough which are aligned with one another and with similar holes formed in the ears. A pin 317 extends through these aligned bores and a cotter pin 318 extends through aligned openings in boss 316 and in the pin for securing the pin in operative position.

Pivotally supported upon pin 317 is a latch member indicated generally by reference numeral 320, a notch 321 being provided in the central portion of the upper end of the bottom wall of leg portion 242 for accommodating the outwardly projecting portion 322 of the latch member which is in turn connected with an angularly related handle portion 323 which is adapted to be manually grasped when operating the latch. The latch includes a forwardly extending portion 324 having a hook portion 325 formed at the outer end thereof. Hook portion 325 is also provided with a sloping portion 326 which serves the same general function as the sloping portion 168 of the latch member employed in the apparatus illustrated in FIGS. 1–8.

Referring particularly to FIG. 11 of the drawings, it will be noted that ears 246' and 247' are provided respectively with bosses 330 and 331 secured to the inner surfaces thereof. These bosses are provided with aligned openings formed therethrough. The ears 207' and 208' and associated bosses 207'' and 208'' are provided with openings therethrough which are adapted to be aligned with aligned openings provided through bosses 330 and 331 and ears 246' and 247'. As seen in FIG. 11, a pin 335 is inserted through all of these aligned openings and is maintained in operative position by means of a cotter pin 336, which extends through aligned radially extending openings formed in boss 208'' of pin 335. With this particular interconnection, the leg portion 240 and accordingly the entire triangular framework is pivotally supported from the supporting bracket 205 through the intermediary of the pin 335.

Also secured to the inner surfaces of ears 246' and 247' are bosses 340 and 341. Suitable aligned openings are provided through bosses 340, 341 and ears 246' and 247'. A pin 342 extends through these aligned openings and is maintained in operative position by means of a cotter pin 343 extending through radially aligned openings formed in boss 341 and pin 342. Pin 342 serves as a latch pin which is adapted to be engaged by the hook portion of the latch member 320, the interaction between the latch member and the latch pin 342 serving to hold leg portion 242 in operative position as shown.

Referring now to FIGS. 12 and 14, an attaching fitting for securing the framework to a cable is illustrated generally by reference numeral 350. The upper portion of

the fitting comprises a body having an enlarged upper part 351 which is open at both the top and bottom and includes a longitudinally extending bore 352 formed therethrough. A pair of spaced arms 353 and 354 extend downwardly from body portion 351 and are provided with aligned openings 355 and 356 formed through the lower portions thereof.

As seen in FIGS. 12 and 14, a cable 360 is shown as being provided with a looped bight 361 which is inserted within the bore formed in the upper part 351 of the fitting. The looped portion 361 is disposed about a wedge member 362. It is evident that the weight of the fitting and the framework supported therefrom will wedge the cable within the tapered bore provided within the fitting thereby preventing the fitting from becoming released from the cable.

Fitting 350 also includes a pair of hanger members 370 and 371, the lower ends of which are offset outwardly from the upper ends thereof. The upper portions of the hanger members are provided with bosses 372 and 373 respectively extending laterally therefrom. The bosses 372, 372 and the upper ends of hanger members 370 and 371 are provided with openings which are each aligned with one another and with the openings 355 and 356 formed in the legs 353 and 354 of the upper part of the fitting. A pin 375 is inserted through these last-mentioned aligned openings and is provided with an opening at either end to receive a cotter pin or retainer to hold pin 375 in operative position for maintaining members 353 and 354 pivotally interconnected with hanger members 370 and 371.

The lower ends of hanger members 370 and 371 are provided with first openings 380 and 381 which are adapted to fit over bosses 341 and 340 respectively. The lower ends of the hanger members 370 and 371 are also provided with openings 382 and 383 respectively, each of which is adapted to receive a pin 384 therethrough, the pin 384 being retained in operative position by a cotter pin 385 extending through aligned radially extending openings formed in boss 331 and the pin.

It is evident that when the attaching fitting 350 is in operative position shown in FIGS. 12, 13 and 14, arm portion 240 and consequently the entire triangular framework will be supported from the fitting 350. When it is desired to change from the supporting fitting 350 wherein the framework is supported from the cable to an arrangement wherein the framework is supported from the outrigger beam, the attaching fitting is first removed by taking out pins 384 and 342 and removing hanger members 370 and 371 therefrom. Pin 342 can then be reinserted and placed in operative position for engagement by the latch member.

The mounting bracket 205 may be, of course, first supported in operative position upon the supporting fitting 201 secured to the outrigger beam. Pin 335 is then inserted through the aligned openings in bosses 206", 207" supported by the mounting bracket and bosses 330 and 331 supported by arm portion 240. Pin 335 is then secured in operative position by means of cotter pin 336, and the framework is operatively supported from the outrigger beam. When it is desired to change from the arrangement wherein the framework is supported from the outrigger beam to the arrangement wherein the framework is supported from the cable, the procedure will be reversed such that the supporting fitting 205 is first removed from and then the attaching fitting 350 is then connected to leg member 240 of the framework.

It is evident that a particular advantage of the modification shown in FIGS. 9–16 is the fact that the framework structure can be readily employed either with a crane boom or an outrigger beam and the changes can be made from one arrangement to another, with a minimum of effort and expenditure of time.

Throughout the specifications, cotter pins have been disclosed as retaining certain of the components in operative position. It should be understood, however, that in each of these cases another type of pin such as a roll pin, groove pin, bolt, cap screw or similar fastener means may be employed as desired.

The apparatus includes a vehicle capable of movement along railway tracks, and the threader device is supported in a lateral direction from the vehicle in such position that it is adapted to lift and guide the rail into the desired position, and at the same time protects the vehicle itself from damage by contact with the rail. The arrangement of the present invention provides a particularly rugged heavy duty construction which is relatively maintenance-free due to the employment of a rigid supporting structure along with the employment of sealed ball bearings and hardened steel rollers. It is also evident that the device may be readily disassembled when necessary to remove or replace any of the components thereof. In addition, the device may be readily opened and closed by utilizing the pivotal latch means of the device. The apparatus is quite simple and inexpensive in construction and yet is sturdy and reliable in operation.

It will be noted that when the framework is supported laterally from the outrigger beam as seen in FIG. 1, the threader device extends a considerable distance laterally outwardly of the vehicle. If it is desired to reduce this lateral clearance, the threader device illustrated in FIGS. 1–8 may be pivoted upwardly about pin 121 into an inoperative position wherein the lateral extent of the apparatus will be considerably reduced.

The manner of supporting the threader device from a cable boom is illustrated schematically in FIG. 1 in phantom lines wherein the threader device is indicated as being supported at the lower end of cable 24. It is evident that the crane can be employed if desired for initially lifting the end portion of the rail to place it in operative position on the lower roller of the framework when the framework has been moved to the open position as illustrated in phantom lines in FIGS. 3 and 9.

It is apparent from the foregoing that there is provided a new and novel rail threader apparatus which is particularly adapted to move along lengths of rail from a location outside a rail bed to the center of a track.

As this invention may be embodied in several forms without departing from the spirit or essential characteristics thereof, the present embodiment is therefore illustrative and not restrictive, and since the scope of the invention is defined by the appended claims, all changes that fall within the metes and bounds of the claims or that form their functional as well as conjointly cooperative equivalents are therefore intended to be embraced by those claims.

I claim:

1. Rail threader apparatus comprising a vehicle capable of movement along railway tracks, said vehicle having a forward end and a rearward end, said vehicle being movable in one direction for threading rails into position in the center of a pair of railway tracks, said forward end facing in said one direction, said vehicle including an elongated rigid frame having a longitudinal axis, a threader device supported at a fixed point spaced laterally outwardly of said frame and adjacent thereto, said threader device extending laterally outwardly from said frame substantially normally to said axis, said threader device having a dimension parallel with said longitudinal axis which is only a minor portion of the length of said vehicle, said threader device being supported closely adjacent said rearward end of said frame at a lower portion of the vehicle to positively prevent impingement with the vehicle of a rail extending angularly through the threader device from a position outside a pair of railway tracks upon which the vehicle is positioned toward the central portion of such tracks, the lower portion of the threader device being rigidly fixed at a sufficient height to clear the supporting railway tracks at switches

and crossings, an outrigger beam fixed to the side portion of said frame and extending outwardly thereof, said threader device being supported at a fixed point at the outer end of said outrigger beam, said threader device including a framework comprising three interconnected leg portions of similar construction, each of said leg portions including spaced shaft support means, a shaft supported between each pair of shaft support means on each leg portion, bearing means supported on each of said shaft means, a roller drilled on said bearing means on each of said leg portions, whereby three rollers are provided, the rollers being mounted for free rotation about the respective shafts for supporting a portion of a rail which extends through the threader device to provide an antifriction means to reduce friction to a minimum, two of said leg portions being fixedly interconnected to one another at an angle of substantially less than 90°, a first one of said fixedly interconnected leg portions being connected with said outrigger beam, a third one of said leg portions being pivotally interconnected with the other of said leg portions which are fixedly interconnected with one another, the longitudinal axes of each of said rollers lying substantially in a plane, a latch pin supported by said first leg portion and extending in a direction substantially normally to said plane, a pin supported by said third leg portion and extending substantially normally to said plane, a latch member pivotally supported by said pin and lying substantially in said plane for pivotal movement in said plane, means connected with said latch member for manually amnipulating the latch member, one end portion of said latch member forming a hook portion adapted to engage over said latch pin, whereby upon such engagement the third leg portion will be held in operative relationship with respect to said other leg portions to define a substantially triangular shaped framework wherein said first leg portion and said third leg portion define substantially similar angles with said other leg portion, means for limiting pivotal movement of said third leg portion in opposite directions, said hook portion of said latch member including a lower sloping edge portion adapted to engage said latch pin when said third leg portion is moved into operative latched position to cause the latch member to be cammed upwardly and subsequently to drop into latched position behind said latch pin.

2. Apparatus as defined in claim 1, wherein the axes of the rollers mounted on said first leg portion and said third leg portion are each disposed with respect to the axis of the roller mounted on said other leg portion such that an angle of approximately 75° is defined with the axis of the roller on said other leg portion to thereby cause each of the rollers on said first and third leg portions to engage a rail extending through the threader device with a point contact at spaced portions of the rollers.

3. Rail threader apparatus comprising a vehicle capable of movement along railway tracks, said vehicle having a forward end and a rearward end, said vehicle being movable in one direction for threading rails into position in the center of a pair of railway tracks, said forward end facing in said one direction, said vehicle including an elongated rigid frame having a longitudinal axis, a threader device supported at a fixed point spaced laterally outwardly of said frame and adjacent thereto, said threader device extending laterally outwardly from said frame substantially normally to said axis, said threader device having a dimension parallel with said longitudinal axis which is only a minor portion of the length of said vehicle, said threader device being supported closely adjacent said rearward end of said frame at a lower portion of the vehicle to positively prevent impingement with the vehicle of a rail extending angularly through the threader device from a position outside a pair of railway tracks upon which the vehicle is positioned toward the central portion of such tracks, the lower portion of the threader device being rigidly fixed at a sufficient height to clear the supporting railway tracks at switches and crossings, said threader device including a framework comprising three leg portions, a first leg portion and a second leg portion being connected to each other in fixed angular relationship, a third leg portion being pivotally connected adjacent one end thereof to said second leg portion for movement toward and away from said first leg portion, latch means pivotally supported by the opposite end portion of said third leg portion, a latch pin supported by said first leg portion, said latch means being adapted to engage said latch pin, each of said leg portions having supported thereon a pair of spaced shaft support means, a shaft supported by each of said pair of shaft support means, a plurality of spaced antifriction bearings mounted on each of said shafts, and a roller supported by each of said plurality of antifriction bearings, said roller supported by said second leg portion being disposed lowermost when in operative position and being of less length than the other two rollers, said rollers being spaced from one another when in operative position to define a space for receiving a strip of rail, the rollers supported by said first and third leg portions extending when in operative position in a direction inclined substantially 75 degrees with respect to the roller supported by said second leg portion and having a substantial point contact with lateral portions of an associated strip of rail while the strip of rail is supported on the roller by said second leg portion, said latch means also including a latch member pivotally supported by said third leg portion, means limiting relative pivotal movement of said latch member with respect to said third leg portion, said latch member including a hook portion adapted to be operatively connected with said latch pin, said hook portion including a sloping edge portion for engaging said latch pin to cause the latch member to automatically engage the latch pin when said third leg portion is pivoted toward said first leg portion.

References Cited in the file of this patent

UNITED STATES PATENTS

315,034	Holman	Apr. 7, 1885
379,178	Moore	Mar. 6, 1888
508,868	Byers	Nov. 14, 1893
735,005	Ware	July 28, 1903
1,528,529	Chicoine et al.	Mar. 3, 1925
1,877,975	Robb	Sept. 20, 1932
2,559,703	Bergman	July 10, 1951

OTHER REFERENCES

Modern Railroads, February 1955, pages 59–66.

Railway Track and Structures, page 46 relied on (March 1957).