

June 12, 1951

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2,556,503

AUTOMATICALLY STEERED CARRIAGE FOR ROAD PAVING MACHINES

Filed Sept. 22, 1947

6 Sheets-Sheet 1

Fig. 1.

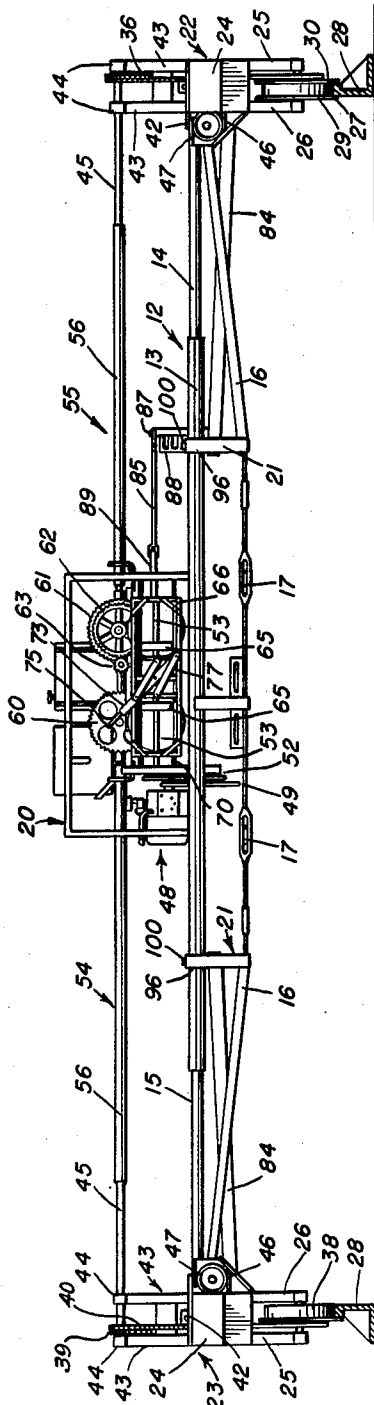


Fig. 10.

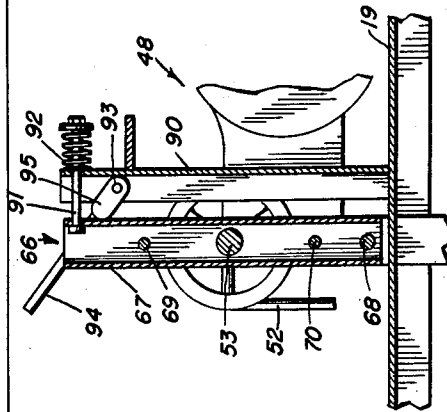
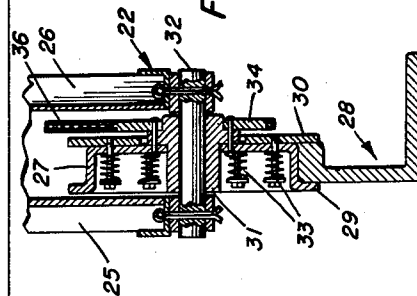


Fig. 9.



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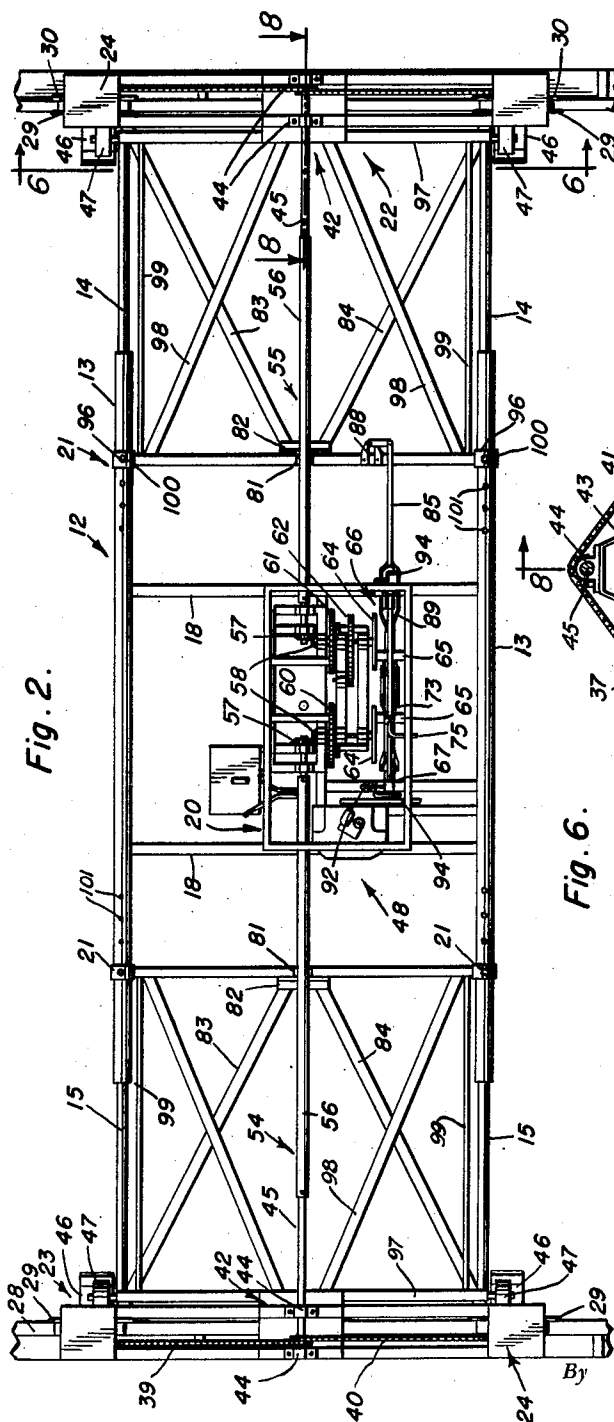
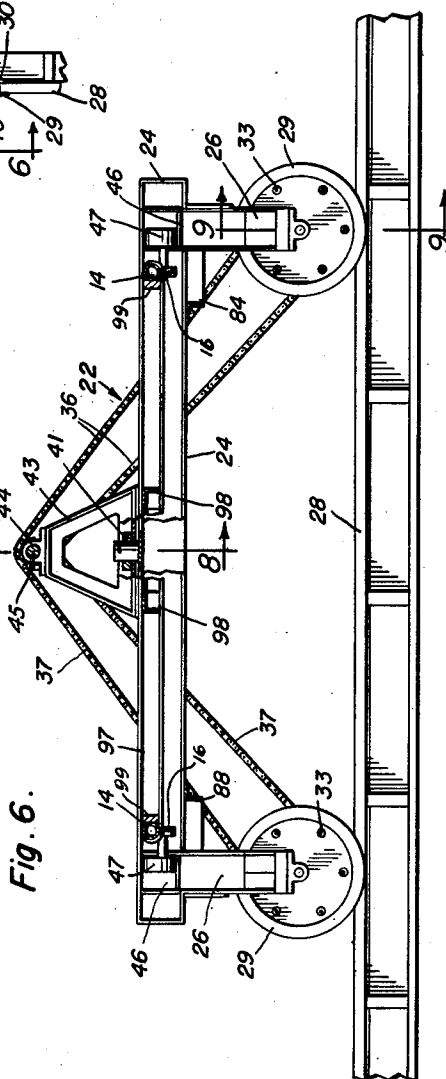
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6 Sheets-Sheet 2.



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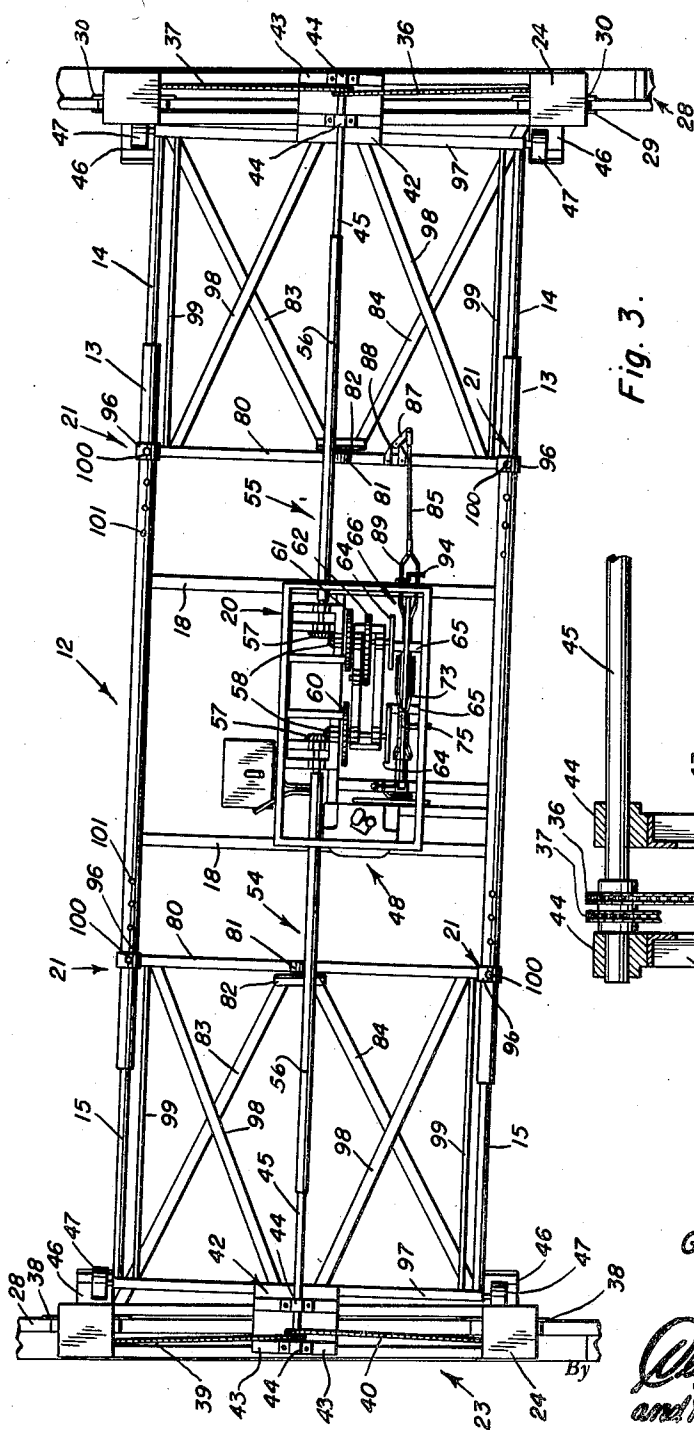


Fig. 3.

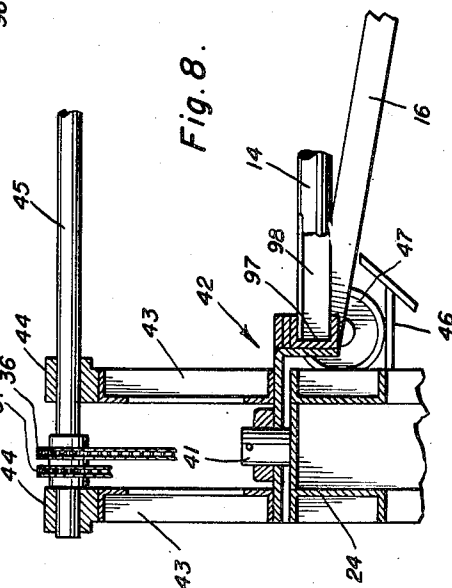


Fig. 8.

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6 Sheets-Sheet 4

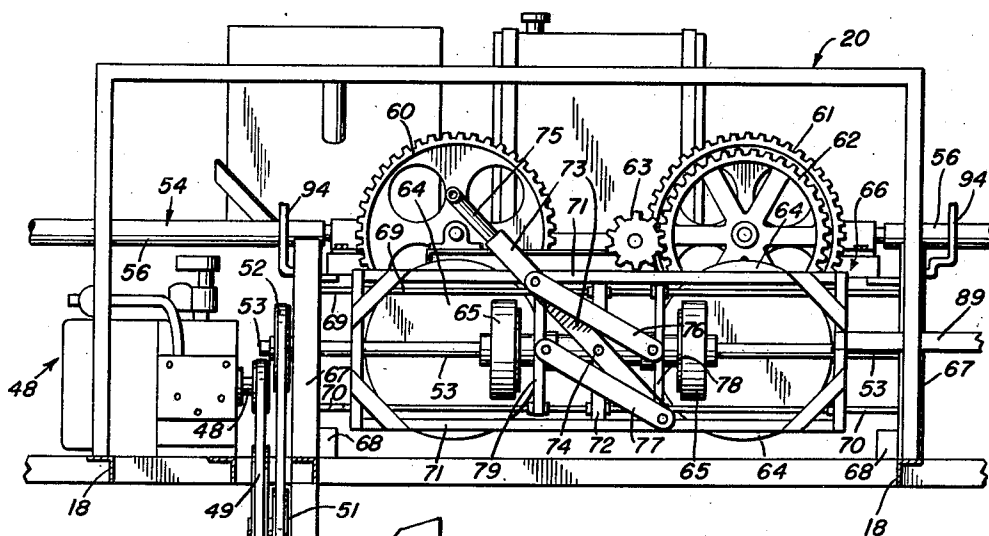


Fig. 4.

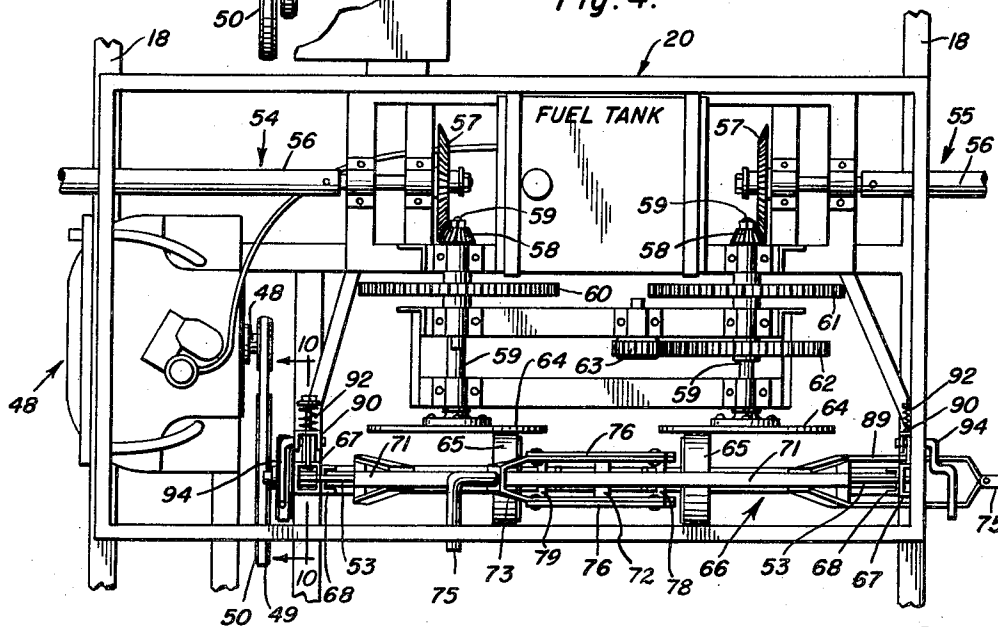


Fig. 5.

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6 Sheets-Sheet 5

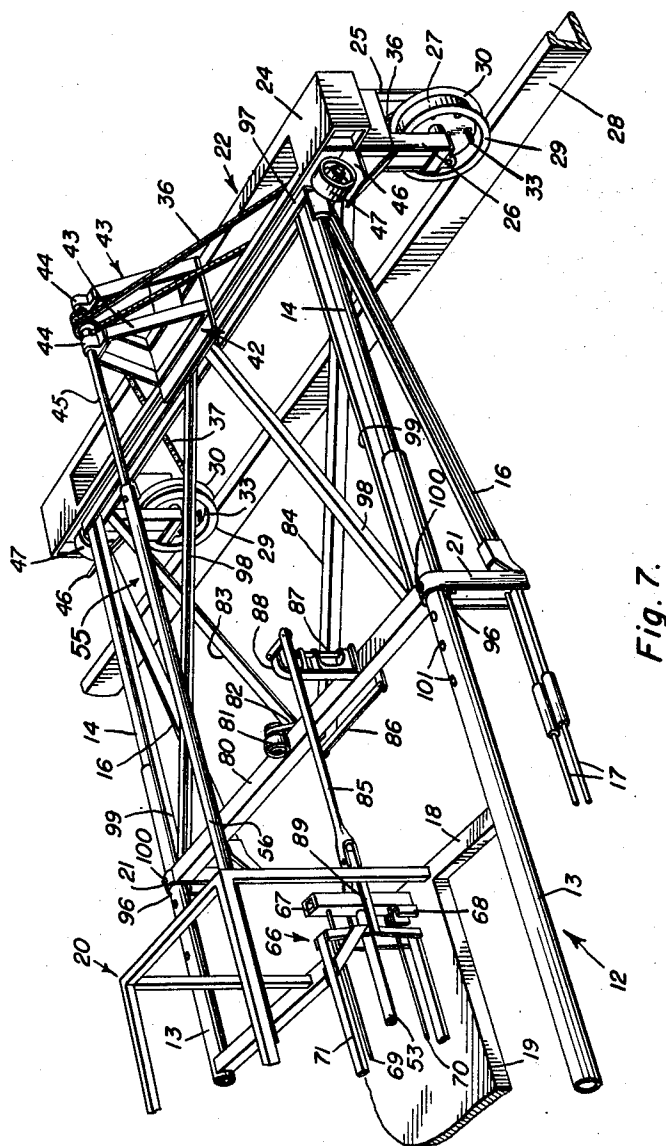


Fig. 7.

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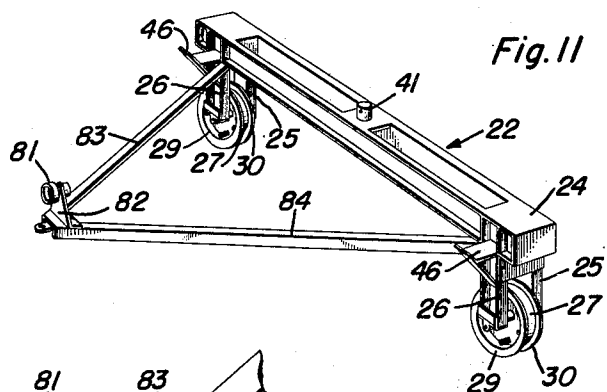
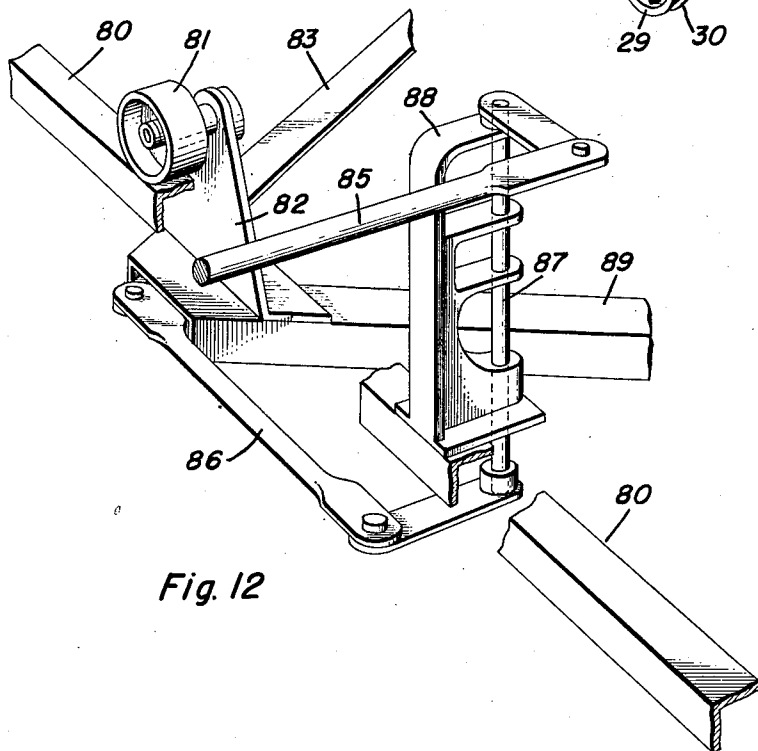
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AUTOMATICALLY STEERED CARRIAGE FOR ROAD PAVING MACHINES

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6 Sheets-Sheet 6



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UNITED STATES PATENT OFFICE

2,556,503

AUTOMATICALLY STEERED CARRIAGE FOR
ROAD PAVING MACHINES

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Application September 22, 1947, Serial No. 775,516

14 Claims. (Cl. 105—163)

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The present invention relates to a novel and improved road machine and has more particular reference to a horizontal elevated framework or equivalent carriage structure supported at opposite ends by wheeled trucks and adapted for incorporation in such a complete machine constituting a practical means for supporting an operator and workmen and further, for supporting and conveying street paving equipment such as smoothers, finishing devices, joint machines, markers, groovers and the like.

More specifically, in reducing to practice a preferred embodiment of the inventive concept, I have evolved and produced a structural arrangement which is characterized, broadly visualized, by a mobile carriage embodying a horizontally disposed framework and track wheel equipped vertically arranged and adjustably mounted trucks, these supporting the opposite outer end portions of the framework and being of dirigible form, that is, providing truck means at both ends which means is capable of being guided and steered on tracks, and said guiding and steering actions being substantially automatic.

More explicitly, an embodiment of the invention susceptible of attaining desired ends, which will be hereinafter enlarged upon, has to do with a horizontal suitably elevated framework which transversely spans the roadway, the same being supported on tracks, provided by the customarily employed concrete forms, by suitable track wheels, the track wheels being components of the afore-mentioned dirigible trucks and means being provided for delivering power from a prime mover on said framework to the wheels to attain the desired traction, and additional means being provided whereby one of the trucks develops the energy necessary in operating and controlling differential and speed change friction drive means in order that both trucks will be correctly related to the framework and the entire carriage caused to properly stay on the tracks regardless of variance in elevation of the respective track rails, inclinations up or down, or curves causing the tracks to deliver the carriage around corners and the like.

Another object of the invention is to provide structural means of the aforementioned style and form wherein suitable wheel means supports and guides the complemental vertical trucks on the tracks, one truck automatically governing and controlling novel friction drive speed transmitter means and said speed transmitter means being constantly on guard, through the medium of suitable translating connections to correct any varia-

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tions effecting the positions of the trucks with relation to the platform or horizontal framework which carries said platform.

In order to better appreciate the nature of the invention with which we are presently and hereinafter concerned, it is perhaps advisable to touch, in a general way, upon the state of the art as it currently appears. Considering machines which are currently being used in road work, such machines are, obviously, heavily loaded at times, pushing road building material, smoothing it out between forms which act also as a track on which the machines ride, by an excessive amount of material being dumped on one side of the road. These machines are known to slip and spin the wheels while one end of the machine, which is not overloaded, goes ahead. An operator rides this machine but often fails to notice the incorrect position of the machine in time to correct it so one corner, maybe two, falls off the track. Then, too, the track itself is pushed out of line and this causes considerable trouble even after the machine is put back on the track.

It is common practice for operators to run into difficulties in the installation, for example, of longitudinal contraction joints. In practice, this type of a joint runs along the center of the road and during installation operators try to guide and direct the installation as best they can. In this type of an installation job the machine is stopped at certain intervals along the road, approximately thirty feet apart, to construct the contraction joint which extends transversely across the road. It can be appreciated that the operator of the machine and attending men often run into unforeseen difficulties in keeping the machine running straight. Every time the machine gets off they have to make a correction and a kink or an offset in the center line obviously results. A lot of extra hard work is then required to straighten the joint once it has become crooked. When stopping for a transverse joint construction, which joint is supposed to be at a true ninety degree angle across the road, it is difficult to "square" currently used machines and to insure effective and accurate installation results. A very large square is often used at the present for bringing about desired results but its use is cumbersome and involves a needless expenditure of valuable time and labor.

It follows that it is an object of the invention to provide an automatically steered carriage of the type described wherein the attendants need not worry about straight longitudinal joints, for markers, groovers or the like carried by my car-

riage will be parallel in relation to the forms and at transverse intervals, for joints and marking. To this end, I merely stop the machine at the point of construction and the framework will then be setting at the angle required for construction and will stay right under virtually all circumstances. This result is attained through the provision of the afore-mentioned dirigible and automatically steering trucks and the other driving and driven facilities which coast with the trucks and the speed-responsive friction driven clutch or transmission means.

It is a matter of common knowledge in this line of endeavor that machines of types presently offered to the trade and used repeatedly keep running off the tracks. Also, when these types of machines get out of line, tremendous pressure is exerted between the flanges of the wheels and the tracks and if the operator fails to correct this haphazard attitude of the machine, the result is that the track is either twisted out of line or the wheels jump completely off the tracks. In keeping with my ideas and inventive concepts novelty is predicated upon the dirigible automatically steerable self-adapting trucks with single and double flanged track wheels, a prime mover, independently operable driven shafts for the wheels on the respective trucks at opposite ends and means controlled and operated by one of the trucks whereby due to differential and speed change actions of the automatically regulated friction disk drive means, the wheels on the respective trucks may be coordinated to keep the wheels on the tracks and the machine from jumping the tracks under virtually all circumstances.

Other objects and advantages will become more readily apparent from the following description and the accompanying illustrative drawings.

In the drawings, wherein like numerals are employed to designate like parts throughout the views:

Figure 1 is a front elevational view of an automatically steered carriage, for road paving and corresponding machines, the same constructed in accordance with my inventive ideas;

Figure 2 is a top plan view of the structure seen in Figure 1;

Figure 3 is also a top plan view wherein, instead of the trucks being squared, they are angled in relation to the ends of the frame to attain the desired automatic steering results;

Figure 4 is an enlarged elevational view detailing the construction and arrangement of parts which cover essentially the differential type friction drive and prime mover;

Figure 5 is a top plan view of Figure 4 to bring out both driving and driven shafts;

Figure 6 is a cross sectional view on the plane of the line 6—6 of Figure 2, looking in the direction of the arrows;

Figure 7 is a fragmentary perspective view of one end portion showing one of the dirigible or automatically steerable trucks;

Figure 8 is an enlarged vertical fragmentary sectional and elevational view on the line 8—8 of Figure 6, looking in the direction of the arrows;

Figure 9 is an enlarged fragmentary detail section on the line 9—9 of Figure 6, looking in the direction of the arrows; and,

Figure 10 is a section on the line 10—10 of Figure 5, looking in the direction of the arrows.

Figure 11 is a detail perspective view showing

the principal dirigible speed governing truck and the V-shaped yoke carried thereby;

Figure 12 is an enlarged fragmentary detail perspective view showing the manner in which the vertex of the V-shaped yoke is roller-supported on the framework and the link connection between same and the associated crank means.

Briefly summarized, the invention has to do with a self-propelled and self-steering road machine characterized by a mobile carriage adapted to travel on forms with the latter serving as a trackway; said carriage comprising a horizontally disposed framework adapted to transversely bridge a roadway, a pair of vertically disposed trucks having wheels adapted to roll forwardly or rearwardly on said forms, said trucks being pivotally connected by king pins to respective ends of said framework and serving to suspend latter in requisite elevated position over the roadway, a single prime mover mounted for operation on said framework, power take-off and motion-transmitting shafts on said framework for delivering motion from said prime mover to the respective truck wheels, a drive shaft operatively connected with said prime mover, synchronizing friction drive means interposed between the drive shaft and said motion-transmitting shafts, said drive means functioning to permit latter means to drive the wheels of one truck faster or slower than those of the other truck depending on the variable angular positions assumed by the trucks in relation to each other and said framework while steering themselves along on said trackway, and truck governed and actuated mechanical means between one of said trucks and said friction drive means for automatically translating the angular positions of the respective trucks to and for regulating and setting the speed change requirements of said drive means, whereby to regulate and synchronize the traveling speed of the respective trucks and to thus keep the framework substantially square with the trackway.

The main framework, generally visualized, is rectangular in plan and denoted by the reference character 12 in Figures 1, 2, 3 and 7. Inasmuch as is necessary to adapt a carriage of this type to varying widths of roads, the parts which go to make up the framework are of telescoping or extensible and contractable form, the main tubular members being denoted at 13 and the telescoping parts or rod, coaxing therewith by the numerals 14 and 15. As seen in Figure 7, appropriate under-framing truss members are provided as at 16 these having coaxing turnbuckle equipped truss members 17 coaxing therewith, as brought out in Figure 1. As shown in Figure 7, one of a pair of cross-pieces 18 supports one end of a base or platform 19 having an upstanding open-work cage structure 20 mounted thereon. This platform and cage arrangement is at the center of the framework 12. In Figure 7 the numerals 21 designate end-frame adapting and assembling fixtures to be hereinafter described.

As before stated, I provide two distinct but properly coordinated and complemental supporting and steering trucks for the respective transverse end portions of said framework. The principal controller truck at the right is denoted by the numeral 22 and the companion follower truck at the left, generally speaking, by the numeral 23. These trucks are substantially the same in construction but function differently. With-

out going into too much detail, each truck comprises horizontal longitudinally slotted frame for head means 24 having suitable vertical hangers 25 and 26 at opposite ends for flanged track wheels 27, said track wheels running on the coacting track 28. The track wheels for the truck 22 are double flanged and those for the truck 23 are single flanged. The double flanged wheels 27 have their inner flanges 29 riding the head of the rail and their outer flanges 30 straddling the rail head. Referring at this stage to Figure 9 it will be seen that the wheel means includes a suitable hub structure 31 with an axle 32, bolts serving to connect the wheel parts together and said bolts having cushioning and take-up springs 33 as shown whereby to permit the respective flanges to move toward and from each other to accommodate rail heads of varying cross sectional dimensions. These wheels are provided with sprocket members 34 to accommodate sprocket chains. The sprocket chains operate through the slot in the head or frame 24 on the truck 22 converge upwardly and are denoted by the numerals 36 and 37 (see Fig. 6). The single flanged track wheels on the truck 23 at the left are denoted by the numerals 38 to distinguish same from the other double flanged wheels and the sprocket chains in this arrangement are differentiated and denoted by the numerals 39 and 40.

The trucks 22 and 23 are very much the same in construction and for this reason the same numerals are employed to designate the same or like parts and reference is therefore had to Figure 8 where it will be seen that the head rail 24 of the truck is provided with a vertical fixed stud on king pin 41 which is hingedly connected to the fixture means 42 on the adjacent end of the main framework 12. This means includes inverted V-shaped mounts 43 having bearings 44 to accommodate the shaft members, that is the driven shaft members 45. These shaft members are provided with sprocket wheels to accommodate the adjacent coacting ends of the respective sprocket chains 36 and 37. Each truck head 24 is also provided with fixed outstanding shelf-like brackets 46 to accommodate idling and coupling rollers 47 carried on coacting end portions of the main framework. Thus, the wheel supported head 24 of the truck is swingable in a horizontal plane relative to the stationary mount 43, this by way of the vertical king pin 41.

It seems advisable, at this stage, to refer broadly to the power means as a prime mover and this is denoted by the numeral 48 and is of any appropriate construction (not detailed). As seen in Figures 4 and 5 for example, the shaft 48 of the prime mover drives a pulley which in turn drives a belt 49 trained over a speed reducing pulley 50 driving a coacting pulley 51 having a belt 52 coacting therewith and with a pulley on the main drive shaft 53 the latter being arranged to transmit power from the prime mover 48 to the driven shafts. The two driven shafts which are independent, one for each truck, are denoted by the numerals 54 and 55 (see Figure 1) respectively. It will be noted too, that these driven shafts are of an extensible type and the aforementioned driven shaft members 45 slide telescopically in complementary tubular portions 56, the latter having beveled gears 57 on their inner ends. The beveled gears 57 mesh with the coacting pinions 58 on short stub-shafts existing between the drive shaft 53 and driven shafts 54 and 55 and mounted for rotation in suitable bearings.

In this connection, reference should be had to Figure 5. The stub-shafts are denoted by the numerals 59 and are provided with a plurality of gears 60, 61, 62 and 63 all of which may be employed for the purposes in the manner (not shown) to drive various tools and appliances (not shown) employed by attendants working on the carriage. It is also visible from Figure 5 that the stub-shafts 59 are provided with friction drive disks 64. These receive power from friction rollers 65 which are slidably splined on coacting portions of the drive shaft 53.

The drive shaft structure is mounted in an assembly which may be unitarily referred to by the numeral 66. The structure 66 comprises a pair of longitudinally spaced posts 67 hingedly or pivotally mounted on brackets 68 fixed on the aforementioned platform 19 (see Figure 7). The end portions of the drive shaft 53 are mounted in bearings provided in said posts 67. The posts also support horizontal wires or rods 69 and 70 and a shiftable rectangular regulator frame 71 is slidably mounted on these rods 69 and 70. The frame 71 is also slidable in relation to the shaft 53. These rods 69 and 70 also support a relatively stationary cross-piece 72 (see Figure 4) and a yoke 73 has the median portions of its limbs pivoted on said cross-piece 72, as indicated at 74. The bight portion of the yoke is provided with an appropriate handle 75 which may be manually grasped for rocking the yoke back and forth, obviously. I also call attention to a pair of simultaneously actuatable toggle links 76 and 77, these being operatively connected with the limbs of the rockable yoke 73. Next, I call attention to a pair of vertical spaced parallel cross-heads 78 and 79 which are slidable on the rods 69 and 70 and which are fixed to and serve to shift and slide the friction drive rollers 65 toward and from each other. Obviously, by shifting the yoke either by hand or automatically, the toggle links 76 and 77 serve to move the cross heads 78 and 79 toward and from each other and this serves to shift the friction drive rollers 65 toward and from the respective axial and peripheral portions of the respective friction drive disks 64. In dotted lines in Figure 4 we see the drive rollers 65 shifted to the outer peripheral portions of said drive disks for purposes of enabling the operator of the carriage to either drive same forwardly or rearwardly whichever is desired. The automatically shiftable rectangular frame 71 is also operatively connected with the yoke 73 and toggle links 76 and 77 and constitutes a part of the automatic motion translating means, operable by the truck 22 for purposes of automatically changing the speed of power transmission between the prime mover and the respective power take-off or driven shafts 54 and 55. In this connection I call attention to Figure 7 wherein it will be seen that the main framework 12 includes a fixed horizontal cross member 80 which is in effect a rail for a roller 81 mounted atop a bracket 82 carried by the vertex of a V-shaped yoke embodying tie-rods 83 and 84 connected to the truck head 24. The roller 81 rides back and forth on the rail 80 and thus provides the desired self-adjusting suspension for said tie-rods. As the V-yoke thus swings in an arc back and forth in conjunction with the swing of the truck, the motion is imparted to a push-pull rod 85, a coacting link 86 and intervening crank means 87 on an adaptor and supporting bracket 88 fixed on said rail 80. It follows that since the push-pull rod 85 is attached by a yoke 89 to the sliding frame 71, the latter

frame is shifted in unison and works in conjunction with the truck 22. It follows too that the truck 22 provides motion which is transmitted by these various devices on to the frame 71 which in turn operates the yoke 73 and toggle links 76 and 77 and shifts the friction drive rollers 65 in relation to the friction drive disks to automatically change the relative speeds imparted to the respective driven shafts 54 and 55. By driving these shafts 54 and 55 at proper ratios the traction wheels on the respective trucks are regulated and a compensating result is had which enables one truck to catch up with the other one which provides the desired companion operative relationship between trucks 22 and 23 to insure that the carriage is at all times kept on the tracks.

At this time, I call attention to Figure 10 wherein it will be seen that the tiltable posts 67 at each end of the swingable friction roller shifter frame has associated therewith a fixed post 90, the latter of channel-shaped cross sectional form. This post serves to accommodate a connecting bolt 91 and a cushioning and return spring 92. A rocker shaft 93 is mounted in the fixed post 90 and is operated by a lever or rocker arm 94. The rocker shaft controls a cam 95 which presses against the swingable post 67 and swings it in a direction away from the friction disks. Thus, the friction rollers 65 are thrown out of contact with the friction disks whenever necessary or desired.

It is obvious that novelty is predicated upon the extensible and retractable frame structure and the complemental drive means which permits the source of power and transmission to conform to the extensible and contractable functions. This however, is secondary to most of the other phases and features of the invention.

I am essentially concerned with the compensating and correcting measures provided whereby a swingable truck at one end of the frame structure serves to operate mechanism which in turn controls friction drive rollers which rollers ride in and out in relation to the radial centers of the friction drive disks, thus providing an automatic speed change which results in proper ratio control of the driven shafts controlling the respective truck wheels.

In operation, power is supplied by the prime mover and is transmitted to the drive shaft 53 by the belts and pulleys as shown in Figure 4. The friction drive rollers 65 on said shaft are pressed by the spring means 92, as shown, against the disks 64. The disks 64 drive the stub-shafts 59 and these, in turn, drive the beveled gearing which then transmits motion to the driven shafts 54 and 55. The driven shafts operate the sprocket chains and wheels and the sprocket chains 36 and 37 in turn operate the traction wheels carried by the trucks, said traction wheels riding on the tracks to propel the entire carriage forward or backward, depending on the intentions and requirements of the operator or other attendant on the carriage. Also, and as before explained, the primary truck 22 is provided, as shown in Figure 11, with a V-shaped yoke whose members or tie rods 83 and 84 are joined to the truck frame 24. Since this yoke underlies the adjacent end portion of the framework 12 and since the truck 22 is swingable on the vertical king pin 41, said truck operates in a horizontal plane about the vertical pivot thus provided. As the truck 22 angles itself with respect to the adjacent end of the framework, the V-yoke

swings back and forth in an arcuate path and causes the suspension roller 81 to roll back and forth on the fixed rail 80. It will be plain from Figure 12 that this arcuate movement of the V-yoke causes the tie links 86 to oscillate the crank 87 in the bearings provided therefor on the fixture or bracket means 88. The upper crank arm, therefor, in turn operates the push-pull rod 85. Since the push-pull rod is operatively connected by way of the yoke 89 to the sliding frame, the latter is shifted in unison with said rod. Obviously, too, the reciprocation of the sliding frame 71 brings the toggle links 76 and 77 into play and since the latter are connected with cross-heads 78 and 79 which are connected with the fiber rollers 65, the latter are moved toward and from each other as shown in dotted lines. In this way, the differential speed of the power take-off shafts 54 and 55 is automatically regulated and the trucks 22 and 23 at opposite ends of the framework function automatically so that one truck catches up with the other one, and thus automatically maintains the desired operative relationship between the trucks and frame, whereby the frame is maintained straight across or at right angles to the longitudinal center of the road.

Reverting to parts 21 and structurally allied frame elements, it will be seen that part 21 is made up of 96 which is a pipe sleeve welded to the top end of an I-beam. Bar 16, at one end, is welded to the bottom end of said I-beam. This makes 21 sort of a stiff-leg at this point so when the rods 17 are tightened in between the legs 21, I have a truss to keep the machine from sagging down in the center. Rail 80 is a cross member welded in between and to the pipe sleeve 96 of 21. 97 is a cross member forming the end of the frame structure. 98 and 99 are bars welded in between the cross members as shown in the drawings. No. 16 bar is welded in as shown. No. 14, a round pipe member, is secured by welding to cross member 97, as shown, and the other end of 14 just telescopes into 13. As 96 is a pipe or sleeve fits loosely around 13, a pin 100 is inserted down through 96, 13 and 14 to hold the machine at any set width between the tracks on which the machine rides. By pulling these pins 100 and tightening or using shorter rods in between 21, the whole end structure can be slipped on 13 up to desired holes, thus narrowing the track gage of the machine. Without the pins in place, I could not tighten the rods 17 in between the members 21; the frame heads would keep sliding up on 13 as the rods tighten.

A careful consideration of the foregoing description in conjunction with the invention as illustrated in the drawings will enable the reader to obtain a clear understanding and impression of the alleged features of merit and novelty sufficient to clarify the construction of the invention as hereinafter claimed.

Minor changes in shape, size, materials and rearrangement of parts may be resorted to in actual practice so long as no departure is made from the invention as claimed.

Having described the invention, what is claimed as new is:

1. In a structure of the class described, a relatively stationary horizontally disposable framework, vertical trucks pivotally mounted one on each end portion of said framework, single flanged wheels carried by one truck and double flanged wheels carried by the remaining truck for cooperation with track rails, a prime mover, a

pair of speed changing shafts independently operating the wheels of the respective trucks, a single constant speed drive shaft operatively connected with said prime mover, stub-shafts between the drive and driven shafts and geared respectively to the driven shafts, friction rollers on said drive shaft, friction disks mounted on said stub-shafts, and a frame structure for supporting said drive shafts and friction rollers, said frame structure being hingedly mounted on said framework and having means for normally spring pressing the rollers into friction driving contact with said friction disks.

2. In a structure of the class described, a relatively stationary horizontally disposed framework, vertical trucks pivotally mounted, one on each end portion of said framework, a single flanged wheel carried by one truck and a double flanged wheel carried by the remaining truck for cooperation with track rails, a prime mover, a pair of speed changing driven shafts independently operating the wheels of the respective trucks, a single constant speed drive shaft operatively connected with said prime mover, stub-shafts between the drive and driven shafts and geared respectively to the driven shafts, friction rollers on said drive shaft, friction disks mounted on said stub-shafts, and a frame structure for supporting said drive shafts and friction rollers, said frame structure being pivotally mounted on said framework and having means for normally spring pressing the rollers into propelling contact with said friction disks, a hand lever pivoted on said framework having cam means for forcing the frame structure in a direction away from the disks for purposes of disconnecting the friction rollers from said disks.

3. In a structure of the class described, a horizontally disposable framework, vertical trucks pivotally mounted on end portions of said framework, single and double flanged wheels carried respectively by the respective trucks for cooperation with track rails, a prime mover carried by said framework, driven shafts operatively connected with the respective truck wheels, a single drive shaft operatively connected with said prime mover, stub-shafts disposed between the drive and driven shafts and geared respectively to the driven shafts, friction rollers slidably keyed on said drive shaft, friction disks fixed on said stub-shafts, a frame structure for supporting said drive shaft and friction rollers, said frame structure being hingedly mounted on the stated framework and having means for normally spring pressing the rollers into contact with said friction disks, lever operated cam means mounted on said framework for forcing said frame structure in a direction away from the disks for purposes of disconnecting the friction rollers from said disks, said frame structure including a reciprocable frame, and a push-pull operating connection between said reciprocable frame, friction rollers and one of said trucks, whereby motion is transmitted by way of said one truck to said reciprocable frame in a manner to actuate the friction drive rollers radially in relation to said friction disks.

4. In a machine of the class described, a frame structure, supporting track wheel equipped trucks for said frame structure, a prime mover on said frame structure, a drive shaft operating connection between said drive shaft and prime mover, a pair of posts pivotally mounted on said frame structure, said drive shaft being mounted for rotation in said posts, a pair of friction rollers

splined on said drive shaft, a pair of driven shafts, a pair of stub-shafts, operating connections between the stub-shafts and driven shafts, said stub shafts being provided with friction disks and said friction rollers being in contact with said friction disks.

5. In a machine of the class described, a frame structure, supporting track wheel equipped trucks for said frame structure, a prime mover on said frame structure, operating connections between said drive shaft and prime mover, a pair of posts hingedly mounted on said frame structure, said drive shaft being mounted for rotation in said posts, a pair of friction rollers splined on said drive shaft, a pair of driven shafts, a pair of stub-shafts, operating connections between the stub-shafts and driven shafts, said stub shafts being provided with friction disks, said friction rollers being in contact with said friction disks, stationary posts cooperable with said hinged posts, spring bolt connections between the respective hinged and stationary posts, a rocker shaft on each stationary post, a cam on said rocker shaft engaging the adjacent movable post, and an operating crank for said rocker shaft, whereby to provide a means for forcing said drive shaft and friction rollers clear of said friction disks.

6. In a structural arrangement of the class described, a framework, a prime mover mounted thereon, a carrier frame on said framework, a drive shaft mounted for rotation in said carrier frame, an operating connection between said drive shaft and prime mover, a pair of independent power take-off driven shafts mounted for operation on said framework, stub-shafts, operating connections between the stub-shafts and the driven shafts, friction disks on said stub-shafts, friction rollers splined on said drive shaft and having driving contact with said friction disks, a hand operated yoke on said carrier frame, and toggle operating means between the yoke and rollers for shifting the same in relation to the radial centers of the friction disks.

7. In a structural arrangement of the class described, a framework, a prime mover mounted thereon, a carrier frame on said framework, a drive shaft mounted for rotation in said carrier frame, and an operating connection between said drive shaft and prime mover, a pair of power take-off driven shafts mounted for operation on said framework, stub-shafts, operating connections between the stub-shafts and the driven shafts, friction disks on said stub-shafts, friction rollers splined on said drive shaft and having driving contact with said friction disks, a hand operated yoke on said carrier frame, toggle operating means between the yoke and rollers for shifting the same in relation to the radial centers of the friction disks, a reciprocable frame on said carrier frame operatively connected with said yoke, trucks on and supporting said framework, and a push-pull operating connection between one of the trucks and said reciprocable frame for operating the latter.

8. In a road machine of the class shown and described, a truck frame provided with track engaging wheels, said track engaging wheels being provided with sprocket wheels, a framework having an end portion resting upon said truck frame and hingedly attached by a vertical centrally disposed king pin to the truck frame and angularly swingable on the vertical axis of the king pin in a manner to allow the truck to travel along on a track rail and to follow the track rail

while allowing said framework to take a position at approximate right angles to the track rail, bearings fixedly mounted on said framework, a driven shaft mounted for rotation in said bearings, a pair of diverging sprocket chains connected with said driven shaft and also connected with the sprocket wheels on the respective track wheels, shelf-like brackets fixed to opposite end portions of said truck frame, idling rollers mounted on coacting corner portions of the framework and resting on said brackets, and a yoke embodying pair of converging members connected at their diverging ends to the truck frame and adapted for slidably supported connection at their converging ends on a coacting fixed rail carried by said framework.

9. As a component part of a road machine of the class shown and described, a truck adapted to support one end of a framework, said truck embodying a frame for horizontal disposition provided intermediate forward and rear ends with an upstanding king pin adapted to be hingedly connected with an end portion of the stated framework for joining the truck to the framework, a pair of shelf-like brackets mounted on end portions of the truck frame and adapted to accommodate supporting rollers on the stated framework, a pair of track engaging wheels mounted on said framework, each wheel having spaced parallel flanges, and spring-equipped bolts connecting said flanges together and allowing same to frictionally and yieldably engage the head of a rail and to move toward and from each other to accommodate the cross section of the rail head, a pair of push-pull members connected at corresponding ends to end portions of the frame of the truck and having the opposite ends converging and connected to each other; a supporting roller adapted to be rollably mounted on a rail on the stated framework, and a bracket connecting said roller to the converging ends of said push-pull members.

10. A self-propelled and self-steering road machine characterized by a mobile carriage adapted to travel on forms with the latter serving as a trackway; said carriage comprising a horizontally disposed framework adapted to transversely bridge a roadway, a pair of vertically disposed trucks having wheels adapted to roll forwardly or rearwardly on said forms, said trucks being pivotally connected by king pins to respective ends of said framework and serving to suspend the latter in requisite elevated position over the roadway, a single prime mover mounted for operation on said framework, power take-off and motion-transmitting shafts on said framework for delivering motion from said prime mover to the respective truck wheels, a drive shaft operatively connected with said prime mover, synchronizing friction drive means interposed between the drive shaft and said motion-transmitting shafts, said drive means functioning to permit the latter means to drive the wheels of one truck faster or slower than those of the other truck depending on the variable angular positions assumed by the trucks in relation to each other and said framework while steering themselves along on said trackway, and truck governed and actuated mechanical means between one of said trucks and said friction drive means for automatically translating the angular positions of the respective trucks to and for regulating and setting the speed change requirements of said drive means, whereby to regulate and synchronize the traveling

speed of the respective trucks and to thus keep the framework substantially square with the trackway.

11. A self-propelled and self-steering road machine carriage comprising a horizontally disposable framework adapted to transversely bridge a roadway, a pair of vertically disposed track supported trucks disposed transversely beneath end portions of the framework and connected to said end portions by king pins, said trucks having flanged track engaging wheels, a prime mover mounted for operation on said framework, a pair of longitudinally aligned driven shafts mounted for rotation on opposite end portions of said framework, an operating connection between each driven shaft and the coacting track wheels, a drive shaft operatively connected with said prime mover, a pair of stub shafts having corresponding ends geared with adjacent inner ends of said driven shafts, relatively large friction disks keyed on said stub shafts, friction rollers splined on said drive shaft and having friction driving contact with said friction disks, said friction rollers being shiftable along said drive shaft and being movable toward and from the radial centers of the coacting friction drive disks to drive the wheels of one truck faster or slower than those of the other truck, depending on the varying angular positions assumed by the trucks in relation to each other and said framework and while steering themselves along on said trackway, and truck governed and actuated structural means between and partly carried by one of said trucks and operatively connected with said friction rollers, whereby angling of said truck in respect to the framework serves, by way of said means, to automatically control the cooperative relationship of the friction rollers and friction disks and to synchronize the operation of one truck to the other and to allow the framework to span the roadway at a ninety degree angle in relation to the stated trackway.

12. A self-propelled and self-steering road machine carriage adapted to travel on side forms with latter serving as a trackway, said carriage comprising a pair of end trucks, each truck provided with flanged wheels adapted to have traction engagement with said side forms, an elongated horizontally disposable framework having transverse end portions supported on and hingedly attached to central upper portions of the trucks and allowing the trucks to swing in horizontal planes on vertical axes and to angle themselves to follow the trackway whether on a straightaway stretch or a curved section, a pair of independent driven shafts mounted on said framework and having outer end portions disposed above the respective trucks, sprocket wheels and chains affording operating connections between the respective driven shafts and respective coacting track wheels on the respective trucks; a prime mover mounted for operation on said framework, a drive shaft operatively connected with said prime mover and also mounted on said framework, variable speed friction disk drive assemblies also mounted on the framework and providing an operating connection between the drive and driven shafts, and an operating connection between one of said trucks and said drive assemblies whereby the drive assemblies may be speeded up or slowed down to synchronize the operation of the respective trucks and to permit the latter to adapt and adjust themselves to trackway requirements while at all times maintaining

the framework at approximately ninety degrees in respect to the trackway.

13. A road machine of the class shown and described comprising a framework, a wheeled truck having a frame with a centralized king pin, said framework having one end portion resting on said frame and hingedly connected with said king pin, permitting the truck to support the framework and to swing angularly in a horizontal plane on the vertical axis provided by the king pin connection between truck and framework, said framework being provided with a rail, a roller mounted for operation on said rail, said roller being provided with a bracket, a V-shaped motion-transmitting yoke, the diverging ends of the members of the yoke being rigidly connected with end portions of the truck, the converging ends being connected with said bracket, a push-pull rod, and an operating connection between the push-pull rod and the vertex end of said yoke.

14. A self-propelled and self-steering road machine of the class shown and described comprising a carriage adapted to travel on side forms with the latter serving, in such circumstances, wheel supported trucks, the wheels thereof being adapted to ride along on the stated side forms, a framework adapted to span the roadway, the transverse ends of said framework being supported on and hingedly connected to the trucks, said trucks being swingable in horizontal planes on vertical axes provided by said hinged connections, a prime mover mounted on said framework,

a variable speed friction disk drive means supported on said framework and connected with said prime mover and including disks and coasting rollers in contact with the disk and movable, according to speed demands, from the central to the marginal portions of the respective disks, operating connections between said disks and wheels on the respective trucks, said framework being provided with a transverse rail, one truck having a V-shaped yoke rigidly connected thereto and underlying the framework and provided at its converging ends with a roller-equipped bracket, said roller operating on said rail, and an operating connection between said roller and said rollers, whereby to regulate the positions of the latter in respect to the disks depending on the angular position of said one truck to said framework.

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