W. R. McKEEN, Jr.

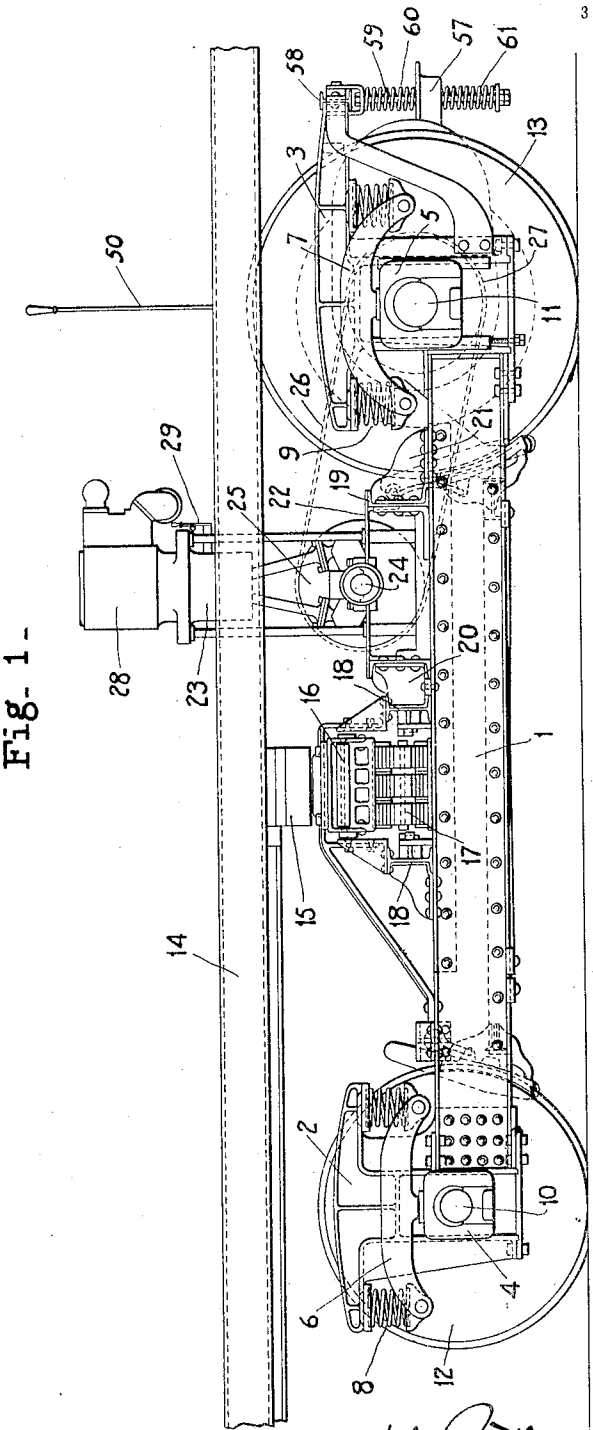
POWER TRANSMITTING APPARATUS.

APPLICATION FILED DEC. 19, 1905.

973,365. Patented Oct. 18, 1910.

3 SHEETS—SHEET 1.

Fig. 1.



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3 SHEETS—SHEET 2.

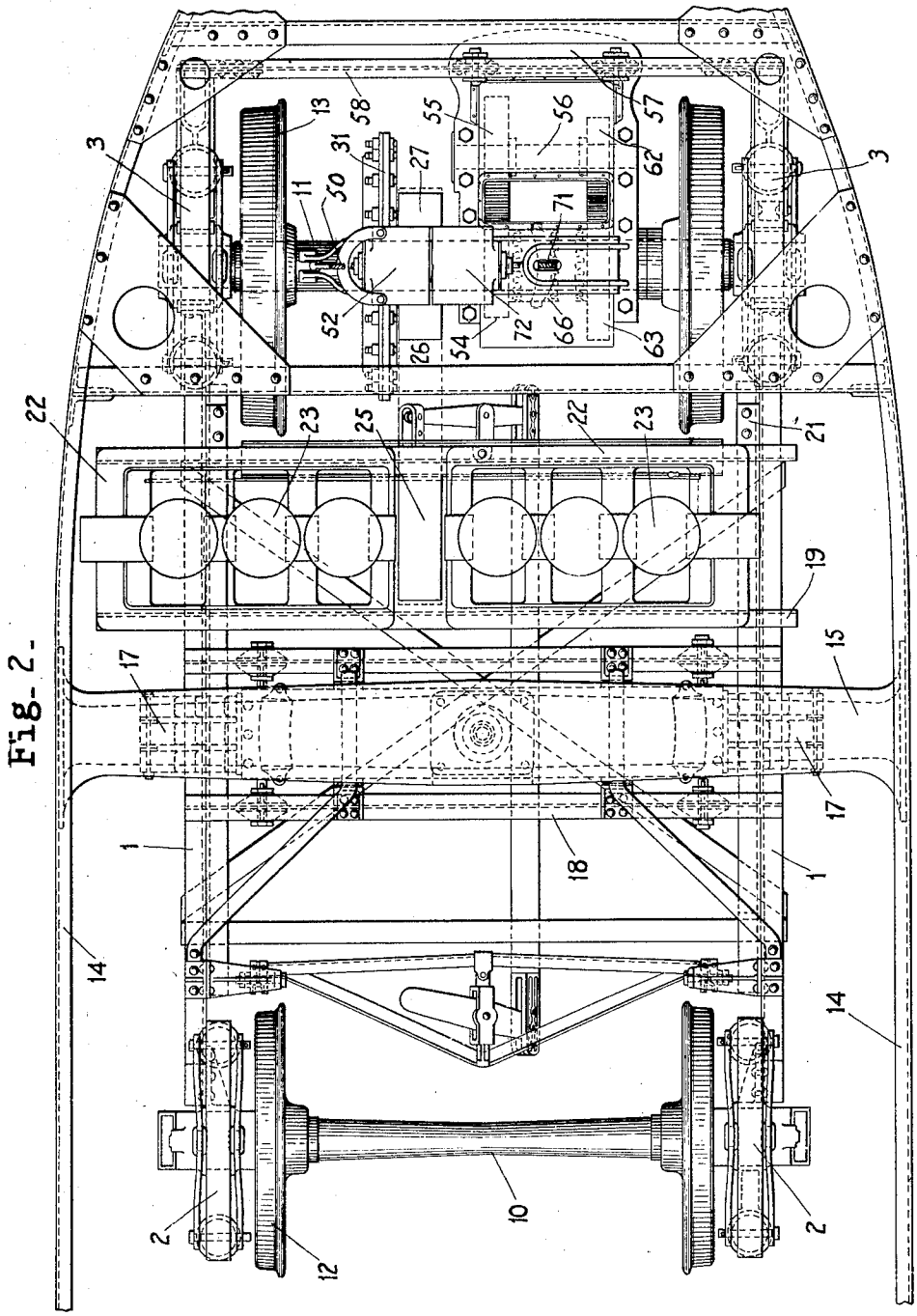

Fig. 2.

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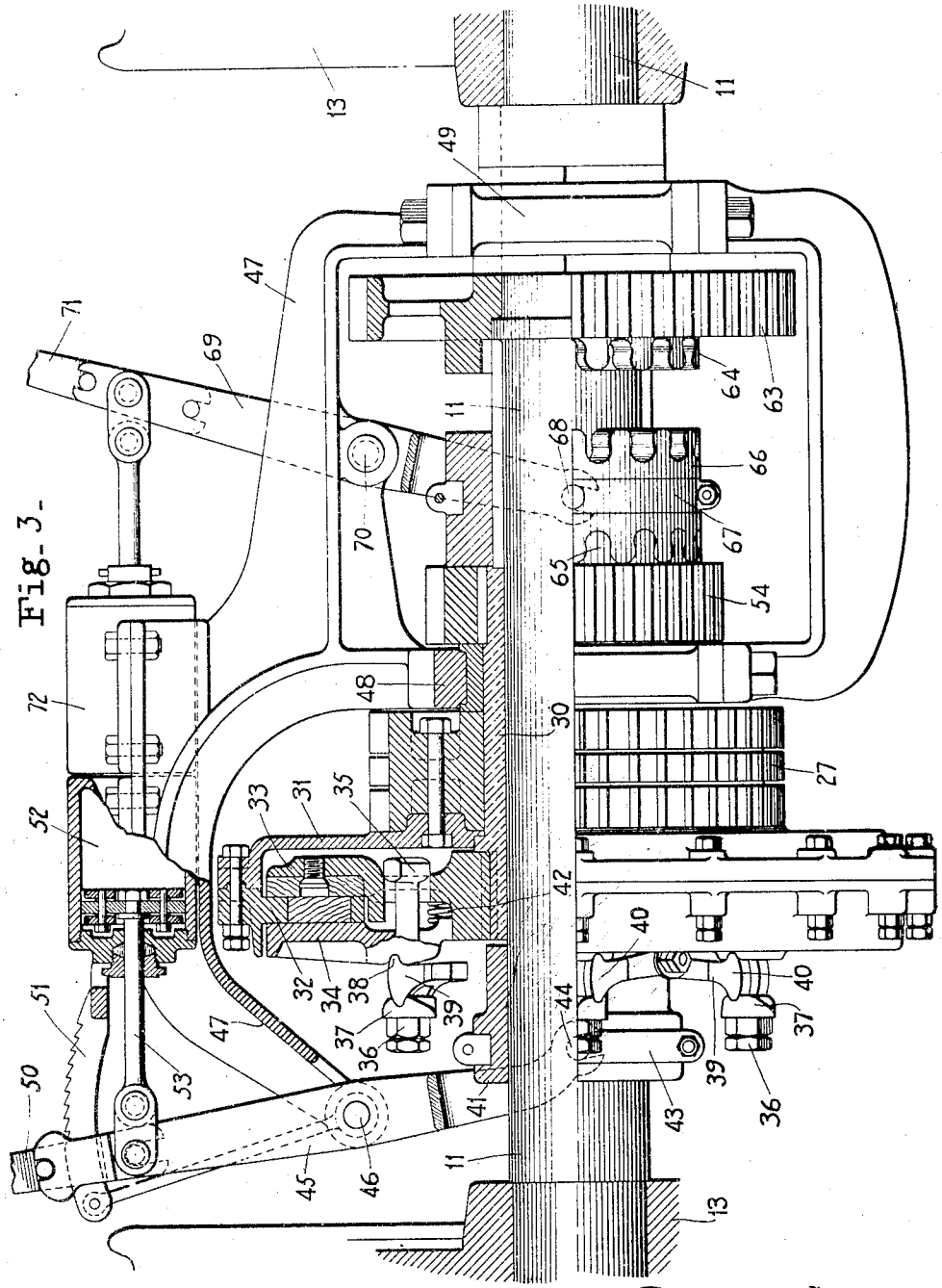
3 SHEETS—SHEET 3.

Fig. 3.



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UNITED STATES PATENT OFFICE.

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POWER-TRANSMITTING APPARATUS.

973,365. Specification of Letters Patent. Patented Oct. 18, 1910.

Application filed December 19, 1905. Serial No. 292,447.

To all whom it may concern.

Be it known that I, WILLIAM R. McKEEN, JR., residing at Omaha, in the county of Douglas and State of Nebraska, have invented certain new and useful Improvements in Power-Transmitting Apparatus, of which the following is a full, clear, and exact description, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to the transmission of power and, more particularly, to the application thereof to the propulsion of vehicles.

One of the objects of this invention is to provide practical means whereby power may be generated at a point closely adjacent, and efficiently transmitted to its point of final application.

Another object is to provide means of the above type in which both the generating and transmitting mechanism are so positioned as to be under convenient and complete control at all times.

Another object is to provide means in conjunction with clutch mechanism adapted to cushion the action of the parts.

Another object is to provide power-transmitting mechanism having a maximum of compactness consistent with efficiency of action and ease of control.

Another object is to provide means of the above types peculiarly adapted for use in connection with motor cars.

Other objects will be in part obvious and in part pointed out hereinafter.

The invention accordingly consists in the features of construction, combinations of elements and arrangement of parts which will be exemplified in the apparatus hereinafter described and the scope of the application of which will be indicated in the following claims.

In the accompanying drawings, wherein is shown one of various possible embodiments of my invention, Figure 1 is a side elevation of the same. Fig. 2 is a plan showing the floor-frame of a car body. Fig. 3 is a front elevation of transmitting mechanism.

Similar reference characters refer to similar parts throughout the several views of the drawings.

Preliminary to entering upon a description of the embodiment of my invention herein set forth and in order to render the full meaning of the same more readily grasped, it may here be noted that in the application of any source of power to accomplish work it is highly desirable that the point of generation of the power be as closely adjacent its point of final application as is consistent with efficient action and ready control. Among the advantageous features of a short transmission are the lessening of friction and chance of breakage and the lightness of and small space consumed by the transmitting apparatus. This is of peculiar value in the case of motor cars, in which relation this invention is especially adapted for use, as in this case light weight and an economical use of space are highly desirable and ready control is of paramount importance. It may also be noted that it is highly advantageous, in apparatus of the general nature of that with which this invention deals, that the parts be placed so as to group the mechanism requiring especial supervision or employed in controlling the power within convenient reach of a single operator in such manner as to reduce the labor of running the apparatus and place the same under convenient and complete control.

The above and other advantageous features are attained in constructions of the nature of that hereinafter described.

Referring now to Fig. 1 of the accompanying drawings, there are shown at 1 the side bars of a truck frame terminating in pedestals 2 and 3 respectively embracing the axle-boxes 4 and 5 and mounted thereon through equalizers 6 and 7 and equalizer-springs 8 and 9. Corresponding to the axle-boxes 4 and 5 are axles 10 and 11 respectively provided with wheels 12 and 13, the latter of which are preferably of larger diameter than those first mentioned for a purpose which will hereinafter be rendered obvious. A car body, the floor-frame of which is indicated at 14, is mounted upon the side bars 1 through bolsters 15 and 16, springs 17 and the transoms 18 from which these springs are suspended, the precise details of this construction not being herein shown or described as they form no part of the present invention. Side bars 1 are bridged

by heavy channel-members 19 held in place as by suitable brackets 20 and 21, and upon these cross-members is mounted an engine bed 22 and engine 23, preferably of the internal combustion type. Crank-shaft 24 of the engine is preferably provided with a sprocket-wheel 25 connected as by sprocket-chain 26 with a similar wheel 27 upon the axle 11, this form of transmitting mechanism being found peculiarly adapted for use in the relation shown, although other connections may be used and many of the advantageous features of my invention retained.

As shown in Fig. 1 of the drawings, the engine 23 projects within the body of the car through a suitable opening in the floor-frame thereof and the cylinders 28, with the controlling mechanism 29 mounted thereon, are thus brought within convenient reach of the engineer without sacrificing efficiency in the matter of the location of the crank-shaft, the opening in the floor frame being, as clearly shown in the drawings, sufficiently large to permit any desired relative movement of the engine with respect to the car-body. It may here be noted that the term "controlling mechanism," as used herein with relation to the parts diagrammatically represented at 29, is intended to cover any device or devices by which the action of any portion of the engine is modified. Upon axle 11 is loosely mounted a sleeve 30 upon which is loosely journaled the sprocket-wheel 27 having secured thereto what may be termed a "carrier" 31 extending in a plane transverse to the axle as shown in Fig. 3. Carrier 31 is provided with an inwardly directed flange 32 adapted to be gripped or clamped by the clutch-members 33 and 34 disposed upon each side thereof. Clutch-member 33 is keyed to the sleeve 30 and is provided with bolts 35 passing loosely through the clutch-member 34 and having held upon their outer ends as by lock-nuts 36 the recessed collars 37. Fitting within these collars and taking against recesses 38 in the clutch-member 34 are actuating levers 39, the outer end portions 40 of which are, in general, of the elliptical form shown and the inner ends of which are secured in any desired manner to a sleeve 41 loosely mounted on the axle. It will thus be seen that upon the sleeve 41 being reciprocated upon the axle, the levers 39 which lie in a plane substantially parallel to that of the carrier 31 are given a swinging movement, resulting in the elliptical ends 40 thereof moving apart, or permitting to draw together, the collars 37 and the opposite surface of the clutch-member 34. This movement, assuming the levers to be thrown in such direction as to bring the major axis of their elliptical ends more nearly into alinement with the bolts 35, will cause the clutch-member 34 to be thrown toward the flange 32 and the clutch-member 33 to be drawn outwardly toward the same part by means of the bolts, thus clamping this flange and completing the power-transmitting means from the sprocket-wheel 27 to the sleeve 30. Upon the actuating levers 39 being thrown by sleeve 41 in the opposite direction, however, the outward pressure upon the collars 37 is relieved and lost motion being taken up as by springs 42, the clutch-members 33 and 34 are forced apart, releasing the flange 32. The throwing of sleeve 41 is preferably accomplished by means of a loose band 43 fitted within a groove therein and provided with trunnions 44 lying within slots in the end of a forked lever 45, pivoted as at 46 to a rigid frame 47 loosely mounted upon the sleeve 30 at 48 and upon the axle 11 at 49. Lever 45 is provided with an extension 50 projecting up into the car and may, if desired, be actuated thereby and held in position as by a locking segment 51, although in the preferred use of my invention I mount a cylinder 52 upon the frame 47 and, by proper regulation of the pressure within the respective ends thereof, control through the piston-rod 53 the position of the lever. It will be seen that by the disposition of the parts as above set forth, the friction clutch extends, broadly speaking, in a plane transverse of the axle, and it is to be understood that expressions defining this disposition of the friction clutch are intended to be broadly construed as covering a general disposition of the parts in or near such a plane.

Fixed upon sleeve 30 upon the opposite side of sprocket-wheel 27 from the clutch mechanism above described is a gear 54 meshing with the gear 55 upon a counter-shaft 56 journaled within an extending portion 57 of the frame 47. This extension is resiliently mounted upon an end bar 58 of the truck-frame, as by means of the depending rods 59 passing therethrough, and the springs 60 and 61 disposed upon these rods. Mounted upon shaft 56 is a second gear 62 meshing with a gear 63 loosely mounted upon the axle 11 and provided with a clutch-member 64 oppositely disposed to a similar part 65 upon the first-mentioned gear 54. Keyed upon axle 11 between the opposing clutch-members 64 and 65, is a double-faced clutch-member 66 adapted in mid position to be free from either of those first mentioned, but, upon being swung in either direction, to engage and interlock with the corresponding parts upon the gears 54 or 63. The clutch-teeth formed upon these several clutch-members are preferably slightly undercut, as indicated in the drawings, so as to permit the members when thrown into engagement automatically to tend to hold themselves in operative relation one to another. The throwing of clutch-member 66

is accomplished by means of a ring or band 67 loosely clamped about the same and provided with trunnions 68 taking into slots in the end of a forked-lever 69 pivoted at 70 to the frame 47. Lever 69 is preferably provided with an extension 71 passing upwardly into the car-body and permitting these parts to be thrown by hand, but in the preferred use of my invention I provide a cylinder 72, mounted upon the frame 47, similar in construction and function to cylinder 52 above described.

The operation of the above-described embodiment of my invention and method of use of the several features thereof is substantially as follows:

Assuming the clutch-member 66 to be in mid position and the flange 32 to be free from the co-acting clutch-members, if it be desired to start the car, the engine is first put in motion and the clutch-member 66 thrown into engagement with either clutch-member 65 or clutch-member 64, according as high or low speed of driving is desired, it being understood that by means of the gearing upon shaft 56 the gears 54 and 63 are driven at different rates of speed. The friction-clutch is then thrown in, either by power or by a manual actuation of the lever 45, and power is thus transmitted from the engine through the sprocket-chain and friction-clutch to the sleeve 30 from which it passes through the gear 54 direct to member 66 and thence to axle 11 or through the counter-shaft and gears 55 and 63, according to the position of the double-faced clutch-member, and thence through the latter part to the axle 11 and wheels 13. When it is desired to change the speed, the friction-clutch is first thrown out and the speed changed by means of the positive clutch, whereupon the friction-clutch is again thrown in, thus greatly reducing the strain upon the teeth of the positive clutch by reason of the fact that the parts into engagemen with which it is thrown are either relatively stationary or their relative movement is that due to momentum only. The shock, moreover, is still further reduced by reason of the resilient suspension of the frame 47 whereby the counter-shaft 56 with the gears mounted thereon may swing to a slight extent about the axle as a center and thus further cushion the action of the parts. The vehicle may be brought to a standstill either by stopping the engine, throwing out the friction-clutch or throwing out the positive clutch, but is preferably accomplished by the second-mentioned means. By reason of the several ways in which the car may be brought to a standstill, however, it will readily be seen that this may be accomplished with a quickness and certainty which might be otherwise impracticable.

It will thus be seen that I have provided apparatus well adapted to accomplish the several objects of my invention and that this is of the simplest and most compact construction. The engine is resiliently mounted upon the axles, thus avoiding the excessive jar to the somewhat delicate mechanism thereof which would be occasioned by the absence of cushioning means between these parts. It is, nevertheless, so mounted with relation to the axle as not only to reduce the length of transmission to a minimum consistent with efficient action, but to be so disposed as to move only slightly with reference thereto. The cylinders of the engine, moreover, with their controlling mechanism project within the car so as to be instantly accessible to the engineer and yet do not interfere with the mounting of the car-body in such manner as to have the easiest riding qualities on account of the interposition of the springs 17 between the car-body and the truck-frame. The advantages of this feature are more clearly apparent in view of the difficulties which would arise in providing an efficient transmission between the axle and the car-body if the latter were mounted with sufficient resiliency to have the desired riding qualities and the engine were positioned within the car. The transmitting mechanism mounted upon the axle, moreover, is so compactly disposed as readily to be positioned upon a single driving axle and yet is of the most efficient character. On account of the controlling means projecting from the transmission upon the axle into the car, it will be seen that these parts are not only within convenient reach of the engineer, but are, together with the engine, so grouped that all features of the power-generating and controlling apparatus is within instant reach of a single man. Another feature to which attention should be called in this connection is the peculiar adaptability of the entire apparatus described for use in connection with a motor car adapted to travel upon rails and to be propelled at a high rate of speed. The entire apparatus is thus of the simplest and most efficient construction and, by reason of these features, together with its ease of control, is well adapted to meet the requirements of practical use in the above-noted relation.

As many changes could be made in the above construction and many apparently widely different embodiments of my invention could be made without departing from the scope thereof, I intend that all matter contained in the above description or shown in the accompanying drawings shall be interpreted as illustrative and not in a limiting sense. I desire it also to be understood that the language used in the following claims is intended to cover all of the generic and specific features of the invention herein

described and all statements of the scope of the invention, which, as a matter of language, might be said to fall therebetween.

Certain features herein shown and described are shown, described and claimed in my co-pending application, Serial No. 292,448, filed December 19th, 1905, and my Patent No. 862,186, granted August 6, 1907, and accordingly are not claimed herein.

Having described my invention, what I claim as new and desire to secure by Letters Patent, is:—

1. In apparatus of the class described, in combination, a car truck having a car body mounted thereon, an internal combustion engine mounted on said truck, power transmitting means leading from said engine to drive said truck, a clutch interposed in said power transmitting means, and fluid controlled means mounted on said truck and controlling said clutch.

2. In apparatus of the class described, in combination, a car truck having a car body mounted thereon, an internal combustion engine mounted on said truck, power transmitting means leading from said engine to drive said truck, a speed changing device interposed in said power transmitting means, and fluid controlled means mounted on said truck and controlling said speed changing means.

3. In apparatus of the class described, in combination, a car truck having a car body mounted thereon, an internal combustion engine mounted on said truck, power transmitting means leading from said engine to drive said truck, a clutch and a speed changing device interposed in said power transmitting means, and separate fluid controlled means mounted on said truck and respectively controlling said clutch and said speed changing device.

4. In apparatus of the class described, in combination, a truck comprising side-bars and two pairs of wheels, the wheels of one of said pairs being of greater diameter than those of the other of said pairs, an internal combustion engine mounted upon said side-bars and positioned nearer said wheels of greater diameter than said wheels of lesser diameter, and means adapted to drive said wheels of greater diameter from said engine, said means comprising a sprocket chain and a clutch mounted upon the axle of said wheels of greater diameter.

5. In an apparatus of the class described, in combination, a truck comprising side bars and wheels, cushioning means interposed between said side bars and said wheels, a rigid engine support bridged across and secured to said side bars and bracing said side bars, an internal combustion engine mounted upon said support, a car body mounted upon said truck and into which said engine projects, and means adapted to drive said wheels from said engine.

6. In apparatus of the class described, in combination, a car-truck comprising wheels and an axle, a driving member upon said axle, and a friction-clutch upon said axle comprising a flange disposed in a plane transverse of the axle and a pair of members positioned adjacent said flange and parallel thereto and adapted to grip said flange to transmit power from said driving member to said wheels.

7. In apparatus of the class described, in combination, a car-truck comprising wheels and an axle, a driving member upon said axle, a friction-clutch upon said axle extending in a plane transverse thereof and adapted to transmit power from said driving member to said wheels, and clutch-levers lying in a plane substantially transverse to said axle adapted to actuate said clutch.

8. In apparatus of the class described, in combination, a car-truck comprising wheels and an axle, a driving member mounted upon said axle, a clutch-member mounted upon said axle and connected with said driving member, clutch-members adapted to clamp said first-mentioned clutch-member and transmit power therefrom to said wheels, and levers controlling the position of said second-mentioned clutch-members lying in a plane substantially transverse to said axle.

9. In apparatus of the class described, in combination, a car-truck comprising wheels and an axle, a driving member, a gear upon said axle, a second gear upon said axle, gearing connecting said first-mentioned gears and adapted to drive the same at different rates of speed, a double-faced clutch-member through which said axle is adapted to be driven, and means adapted to throw said double-faced clutch-member into engagement with co-acting parts upon either of said first-mentioned gears, said gears being driven from said driving member.

10. In apparatus of the class described, in combination, a car-truck comprising wheels and an axle, a driving member, a pair of gears upon said axle, a shaft positioned parallel to said axle, a pair of gears upon said shaft respectively intermeshing with said first-mentioned gears and adapted to drive the same at different rates of speed, and a double-faced clutch-member mounted upon and adapted to drive said axle adapted to be thrown into engagement with co-acting parts on either of said first-mentioned gears, said gears being driven from said driving member.

11. In apparatus of the class described, in combination, a car-truck comprising wheels and an axle, a driving member, a pair of gears upon said axle, a shaft positioned par-

allel to said axle, a pair of gears upon said shaft respectively intermeshing with said first-mentioned gears and adapted to drive the same at different rates of speed, a double-faced clutch-member mounted upon and adapted to drive said axle adapted to be thrown into engagement with co-acting parts on either of said first-mentioned gears, and means adapted automatically to hold said clutch-member in engagement with the parts toward which it is thrown, said gears being driven from said driving member.

12. In apparatus of the class described, in combination, a car-truck comprising wheels and an axle, a driving member upon said axle, a friction-clutch upon said axle, a pair of gears upon said axle to one of which said friction-clutch is adapted to transmit power, gearing connecting said pair of gears adapted to drive the same at different rates of speed, and a double-faced clutch-member, positioned upon and adapted to drive said axle, adapted to be thrown into engagement with co-acting parts upon either of said first-mentioned gears, said friction-clutch being driven from said driving member.

13. In apparatus of the class described, in combination, a car-truck comprising wheels and an axle, a driving member upon said axle, a friction-clutch upon said axle, a pair of gears upon said axle to one of which said friction-clutch is adapted to transmit power, gearing connecting said pair of gears adapted to drive the same at different rates of speed, and a double-faced clutch-member, positioned upon and adapted to drive said axle, adapted to be thrown into engagement with co-acting parts upon either of said first-mentioned gears, said driving member being positioned between said friction-clutch and said first-mentioned gears and adapted to drive one of the same.

14. In apparatus of the class described, in combination, a car-truck comprising wheels and an axle, a driving member mounted upon said axle, a friction-clutch, said clutch comprising a flange and means adapted to clamp said flange, a pair of gears upon said axle one of which is adapted to be driven through said friction-clutch, gearing connecting said gears adapted to drive the same at different rates of speed, and a double-faced clutch-member positioned upon said axle and adapted to drive the same, adapted to be thrown into engagement with co-acting parts upon either of said first-mentioned gears, said friction-clutch being driven from said driving member.

15. In apparatus of the class described, in combination, a car-truck comprising wheels and an axle, a driving member mounted upon said axle, a friction-clutch, said clutch comprising a flange and means adapted to clamp said flange, a pair of gears upon said axle one of which is adapted to be driven through said friction-clutch, gearing connecting said gears adapted to drive the same at different rates of speed, and a doubled-faced clutch-member positioned upon said axle and adapted to drive the same, adapted to be thrown into engagement with co-acting parts upon either of said first-mentioned gears, said driving member being positioned between said friction-clutch and said gears and adapted to drive one of the same.

16. In an apparatus of the class described, in combination, a car-truck comprising wheels and an axle, a driving member, a gear upon said axle adapted to be driven from said driving member, a second gear upon said axle, gearing connecting said gears adapted to drive the same at different rates of speed, a supporting member upon which said gearing is mounted, means resiliently supporting a portion of said supporting member upon said truck, a double-faced clutch positioned upon said axle and adapted to drive the same, and means adapted to throw said clutch into engagement with co-acting parts upon either of said first-mentioned gears.

17. In apparatus of the class described, in combination, a car-truck comprising wheels and an axle, a driving member, a pair of gears upon said axle, one of which is adapted to be driven from said driving member, a frame mounted upon and adapted to swing about said axle, a shaft upon said frame, a pair of gears mounted upon said shaft respectively meshing with said first-mentioned gears and adapted to drive the same at different rates of speed, means resiliently mounting a portion of said frame upon the frame of the truck, a double-faced clutch-member positioned upon said axle and adapted to drive the same, and means adapted to throw said clutch-member into engagement with co-acting parts upon either of said first-mentioned gears.

18. In apparatus of the class described, in combination, a car body, a car truck, resilient means interposed between said car body and said car truck, an internal combustion engine comprising a plurality of cylinders mounted upon said truck and projecting into said car body, a crank shaft mounted upon said truck and extending transversely thereof and connected with the several cylinders of said engine, power transmitting means connecting said crank shaft with one of the axles of said truck and adapted to drive said truck and means within said car body controlling said power transmitting means.

19. In apparatus of the class described, in combination, a car-body, a car-truck, an internal combustion engine mounted upon said truck and adapted to drive the same, the cylinders of said engine projecting with-

in said car-body, and resilient means interposed between said car-body and said car-truck.

20. In apparatus of the class described, in combination, a car-body, a car-truck, an internal combustion engine mounted upon said truck and adapted to propel the same, the cylinders of said engine having mounted thereon controlling mechanism and projecting with said controlling mechanism within said car-body, and resilient means interposed between the truck-frame and said car-body and between the frame and axles of said truck.

21. In apparatus of the class described, in combination, a car-body, a car-truck comprising wheels and an axle, a driving member upon said axle, a friction-clutch upon said axle extending in a plane transverse thereof adapted to transmit power to said wheels, and means controlling said friction-clutch extending within said car-body said friction clutch comprising a flange lying in a plane transverse to said axle, and a pair of flat members positioned adjacent said flange and adapted to grip the same.

22. In apparatus of the class described, in combination, a car-body, a car-truck comprising wheels and an axle, a driving member, a pair of gears upon said axle, one of which is adapted to be connected with said driving member, gearing connecting said gears adapted to drive the same at different rates of speed, a double-faced clutch-member positioned upon and adapted to drive said axle, adapted to be thrown into engagement with co-acting parts upon either of said first-mentioned gears, and means controlling the position of said double-faced clutch extending within said car-body.

23. In apparatus of the class described, in combination, a car-body, a car-truck comprising wheels and an axle, a driving member upon said axle, a friction-clutch upon said axle, a pair of gears upon said axle, one of which is adapted to be driven through said friction-clutch, gearing connecting said gears adapted to drive the same at different rates of speed, a double-faced clutch-member positioned upon and adapted to drive said axle, adapted to be thrown into engagement with co-acting parts upon either of said first-mentioned gears, and means connected with and adapted to control said friction-clutch and said double-faced clutch-member extending within said car-body, said friction-clutch being driven from said driving member.

24. In apparatus of the class described, in combination, a truck comprising wheels and an axle, an engine mounted upon said truck, a member upon said axle driven from said engine, a gear upon said axle, a second gear upon said axle, gearing connecting said gears adapted to drive the same at different rates of speed, means connecting one of said gears with said first-mentioned member, a double-faced clutch through which said axle is adapted to be driven, and means adapted to throw said double-faced clutch-member into engagement with co-acting parts upon either of said gears.

25. In apparatus of the class described, in combination, a car-truck comprising wheels and an axle, an engine mounted upon said truck, a member upon said axle driven from said engine, a friction-clutch upon said axle, a pair of gears upon said axle to one of which said friction-clutch is adapted to transmit power from said first-mentioned member, gearing connecting said pair of gears adapted to drive the same at different rates of speed, and a double-faced clutch-member positioned upon and adapted to drive said axle adapted to be thrown into engagement with co-acting parts upon either of said gears.

26. In apparatus of the class described, in combination, a car-truck comprising wheels and an axle, an engine mounted upon said truck, a member upon said axle driven from said engine, a friction-clutch upon said axle, a pair of gears upon said axle to one of which said friction-clutch is adapted to transmit power from said first-mentioned member, gearing connecting said pair of gears adapted to drive the same at different rates of speed, and a double-faced clutch-member positioned upon and adapted to drive said axle adapted to be thrown into engagement with co-acting parts upon either of said gears, said first member being positioned upon said axle between said friction-clutch and said gears.

27. In apparatus of the class described, in combination, a car-truck, a car-body, cushioning means interposed between said truck and said body, an engine mounted upon said truck, an axle, a member upon said axle driven from said engine, a friction-clutch upon said axle, a pair of gears upon said axle to one of which said friction-clutch is adapted to transmit power from said driven member, gearing connecting said pair of gears adapted to drive the same at different rates of speed, and a double-faced clutch-member positioned upon and adapted to drive said axle adapted to be thrown into engagement with co-acting parts upon either of said gears.

28. In apparatus of the class described, in combination, a car-truck comprising wheels and an axle, an engine mounted upon said truck, a member upon said axle driven from said engine, a gear upon said axle connected with said driven member, a second gear upon said axle, gearing connecting said gears adapted to drive the same at different rates of speed, a supporting member upon which said gearing is mounted, means resiliently

supporting a portion of said supporting member upon said truck, a double-faced clutch positioned upon said axle and adapted to drive the same, and means adapted to throw said clutch into engagement with co-acting parts upon either of said gears.

29. In apparatus of the class described, in combination, a car-truck comprising wheels and an axle, an engine mounted upon said truck, a member upon said axle driven from said engine, a gear upon said axle connected with said driven member, a second gear upon said axle, gearing connecting said gears adapted to drive the same at different rates of speed, a supporting member upon which said gearing is mounted, means resiliently supporting a portion of said supporting member upon said truck, a double-faced clutch positioned upon said axle and adapted to drive the same, and means adapted to throw said clutch into engagement with co-acting parts upon either of said gears, said supporting member being mounted upon and adapted to swing about said axle.

30. In apparatus of the class described, in combination, a car-truck, a car-body mounted thereon, cushioning means interposed between said car-body and said car-truck, supporting means mounted upon said truck, an internal combustion engine mounted upon said supporting means and projecting within said car body, a crank shaft mounted upon said supporting means and connected with the cylinders of said engine, power transmitting means connecting said crank shaft with one of the axles of said truck, and upright members extending from said supporting means and connected adjacent the cylinders of said engine and adapted to brace the same.

31. In apparatus of the class described, in combination, a car-body, a car-truck comprising an axle, cushioning means interposed between said car-body and car-truck, a driving member mounted upon said axle, a friction-clutch upon said axle adapted to transmit power from said driving member to the wheels of said truck, means controlling said friction-clutch projecting within said car-body and an internal combustion engine mounted upon said truck and adapted to transmit power to said driving member, the cylinders of said engine being disposed within said car body adjacent said controlling means.

32. In apparatus of the class described, in combination, a car-body, a car-truck comprising wheels and an axle, a driving member upon said axle, speed-changing mechanism mounted upon said axle adapted to transmit power from said driving member to the wheels of said truck, and means controlling said mechanism projecting within said car-body.

33. In apparatus of the class described, in combination, a car-truck, a car-body mounted thereon, an engine mounted upon said truck and projecting within said car-body, a pair of gears on an axle of said truck, gearing connecting said gears and adapted to drive the same at different rates of speed, means connecting one of said gears with said engine adapted to drive said gear from said engine, a double-faced clutch-member from which said axle is adapted to be driven, means adapted to throw said double-faced clutch-member into engagement with co-acting parts upon either of said gears, a supporting frame mounted upon said axle and adapted to swing with respect thereto and having mounted thereon said gearing, and resilient means connecting said supporting frame with the frame of said truck.

34. In apparatus of the class described, in combination, a car-truck, a car-body resiliently mounted thereon, an internal combustion engine mounted upon said truck and projecting within said car-body, a member upon an axle of said truck adapted to be driven from said engine, and a friction-clutch upon said axle and adapted to transmit power from said driven member to the wheels of said truck.

35. In apparatus of the class described, in combination, a car-truck, a car-body resiliently mounted thereon, an internal combustion engine mounted upon the frame of said truck projecting within said car-body, a member upon an axle of said truck adapted to be driven from said engine, a friction-clutch upon said axle adapted to transmit power from said driven member to the wheels of said truck, and means positioned within said car-body adapted to control said clutch.

36. In apparatus of the class described, in combination, a car-body, a car-truck comprising wheels and an axle, an engine mounted upon said truck, a member upon said axle adapted to be driven from said engine, a pair of gears upon said axle one of which is connected with said driven member, gearing connecting said gears adapted to drive the same at different rates of speed, a double-faced clutch-member positioned upon and adapted to drive said axle adapted to be thrown into engagement with co-acting parts upon either of said gears, and means controlling the position of said double-faced clutch-member positioned within said car-body.

37. In apparatus of the class described, in combination, a car-body, a car-truck comprising wheels and an axle, an engine mounted upon said truck, a member upon said axle adapted to be driven from said engine, a friction-clutch upon said axle, a pair of gears upon said axle, one of which is adapted to be driven through said friction-clutch, gearing connecting said gears adapt-

ed to drive the same at different rates of speed, a double-faced clutch-member positioned upon and adapted to drive said axle adapted to be thrown into engagement with co-acting parts upon either of said gears, and means connected with and adapted to control said friction-clutch and said clutch-member extending within said car-body.

38. In apparatus of the class described, in combination, a car-body, a car-truck comprising wheels and an axle, an engine mounted upon said truck, a member upon said axle adapted to be driven from said engine, a friction clutch upon said axle, a pair of gears upon said axle, one of which is adapted to be driven through said friction-clutch, gearing connecting said gears adapted to drive the same at different rates of speed, a double-faced clutch-member positioned upon and adapted to drive said axle adapted to be thrown into engagement with co-acting parts upon either of said gears, and means connected with and adapted to control said friction-clutch and said clutch-member extending within said car-body, said friction-clutch extending in a plane transverse of said axle and being driven from said first member.

39. In apparatus of the class described, in combination, a car-body, a car-truck comprising wheels and an axle, an engine mounted upon said truck, a member upon said axle adapted to be driven from said engine, a friction clutch upon said axle, a pair of gears upon said axle one of which is adapted to be driven through said friction-clutch, gearing connecting said gears adapted to drive the same at different rates of speed, a double-faced clutch-member positioned upon and adapted to drive said axle adapted to be thrown into engagement with co-acting parts upon either of said gears, and means connected with and adapted to control said friction-clutch and said clutch-member extending within said car-body, a supporting frame mounted upon said axle having mounted thereon said gearing, and means resiliently connecting said frame with the frame of said truck, said friction-clutch being driven from said first member.

40. In apparatus of the class described, in combination, a car-body, a car-truck comprising wheels and an axle, an engine mounted upon said truck and projecting within said car-body, a member upon said axle adapted to be driven from said engine, a pair of gears upon said axle one of which is connected with said driven member, gearing connecting said gears adapted to drive the same at different rates of speed, a supporting frame having mounted thereon said gearing mounted upon and adapted to swing with reference to said axle, a double-faced clutch-member positioned upon and adapted to drive said axle adapted to be thrown into engagement with co-acting parts upon either of said gears, and means controlling the position of said clutch-member extending within said car-body.

41. In apparatus of the class described, in combination, a car-truck comprising wheels and an axle, an engine mounted upon said truck, means comprising a friction-clutch and a positive clutch adapted to transmit power from said engine to said wheels to propel said truck and a car-body resiliently mounted upon said car-truck.

42. In apparatus of the class described, in combination, a car-truck comprising wheels and an axle, an engine mounted upon said truck, and means comprising a friction-clutch and a positive clutch adapted to transmit power from said engine to said wheels to propel said truck, said friction-clutch and said positive clutch being mounted upon said axle.

43. In apparatus of the class described, in combination, a car-truck comprising wheels and an axle, an engine mounted upon said truck, and means comprising a friction-clutch and a positive clutch adapted to transmit power from said engine to said wheels to propel said truck, said friction-clutch and said positive clutch being mounted upon said axle and being serially connected with said engine in said order.

44. In apparatus of the class described, in combination, a car truck, an internal combustion engine mounted upon said truck, a car body resiliently mounted upon said truck into which the cylinders of said engine project, a friction clutch mounted upon said truck, and means adapted to transmit power from said engine to the wheels of said truck through said friction clutch.

45. In apparatus of the class described, in combination, a car truck, an internal combustion engine mounted upon said truck, a car body resiliently mounted upon said truck into which the cylinders of said engine project, a friction clutch mounted upon said truck, means adapted to transmit power from said engine to the wheels of said truck through said friction clutch, and means controlling said friction clutch and extending within said car body adjacent said cylinders.

46. In apparatus of the class described, in combination, a car truck, a car body resiliently mounted upon said truck, an internal combustion engine mounted upon said truck and projecting within said car body, speed changing means mounted upon said truck, means adapted to transmit power from said engine to the wheels of said truck through said speed changing means and means within said car body controlling said speed-changing means.

47. In apparatus of the class described, in combination, a car truck, a car body mounted upon said truck, an internal com-

bustion engine mounted upon said truck and projecting within said car body, a friction clutch mounted upon an axle of said truck, means adapted to transmit power from said engine to the wheels of said truck through said friction clutch, and means controlling said friction clutch and extending within said car body adjacent the cylinders of said engine.

48. In apparatus of the class described, in combination, a truck comprising a frame, a bolster, and a driving axle, a car body mounted upon said bolster, a rigid engine support mounted upon said truck frame and bridged across the side bars thereof between said bolster and said driving axle, an internal combustion engine mounted upon said support and projecting upwardly into said car body, and means adapted to drive said axle from said engine.

49. In apparatus of the class described, in combination, a car truck, a car body mounted upon said truck and comprising a pair of side sills and a pair of spaced members extending across from sill to sill at a point above said truck and formed to provide an unobstructed floor space forward of said cross-members, an engine support bridging the side-bars of said truck and bracing the same, a multi-cylinder internal combustion engine mounted upon said engine support and projecting upwardly into said car body between said cross-members, means adapted to transmit power from said engine to drive said truck, and means within said car body controlling said power transmitting means.

50. In apparatus of the class described, in combination, a truck, a car body mounted upon said truck having its floor framing formed to provide an opening over said truck, and unobstructed floor spaces both forward and at the rear of said opening, resilient means interposed between said car body and said truck, an internal combustion engine mounted upon said truck and projecting upwardly through said opening into the car body, and means adapted to drive said truck from said engine.

51. In apparatus of the class described, in combination, a truck comprising side bars, rigid means bridged across and secured to said side bars, an internal combustion engine mounted upon said rigid means and having its crank shaft disposed transversely of the truck, means comprising a friction clutch adapted to transmit power from said engine to drive said truck, and fluid-controlled means controlling said clutch.

52. In apparatus of the class described, in combination, a car body, a pair of supporting members mounted beneath said car body, an engine mounted upon said supporting members, a driving axle, a rigid support mounted upon said driving axle, means comprising a clutch adapted to transmit power from said engine to said axle, and a compressed air cylinder upon said support adapted to control said clutch.

53. In apparatus of the class described, in combination, a car body, a pair of supporting members mounted beneath said car body, an engine mounted upon said supporting members, a driving axle, a rigid support mounted upon said driving axle, means comprising a clutch adapted to transmit power from said engine to said axle, and a compressed air cylinder upon said support adapted to control said clutch, said support having a limited, cushioned swinging movement with respect to said axle.

54. In apparatus of the class described, in combination, a truck, a car body mounted upon said truck, an engine mounted upon said truck and projecting upwardly within said car body, a plurality of gears mounted upon an axle of said truck, means adapted to drive said gears from said engine at different rates of speed, and means comprising clutch elements adapted to make connection between said gears and said axle respectively.

55. In apparatus of the class described, in combination, a car body, a pair of supporting members extending longitudinally with respect to said car body, an engine mounted upon said supporting members, a driving axle, means adapted to make connection between said engine and said driving axle and comprising a sprocket-chain and a double-faced clutch member, and means adapted to slide said double-faced clutch member from one to another of two operative positions.

56. In apparatus of the class described, in combination, a truck, a car body mounted upon said truck, an engine mounted upon said truck and projecting upwardly into said car body, power-transmitting means comprising a friction clutch and a positive clutch interposed between said engine and the driving axle of said truck, and means extending within the same portion of said car body whereby said friction clutch and said positive clutch are controlled.

In testimony whereof I affix my signature, in presence of two witnesses.

WILLIAM R. McKEEN, Jr.

Witnesses:
ARTHUR H. FETTERS,
JAMES G. HOPE.