H. S. RIDDLE.

MOTOR TRUCK.

APPLICATION FILED APR. 14, 1906.

1,054,314.

Patented Feb. 25, 1913.

3 SHEETS—SHEET 1.

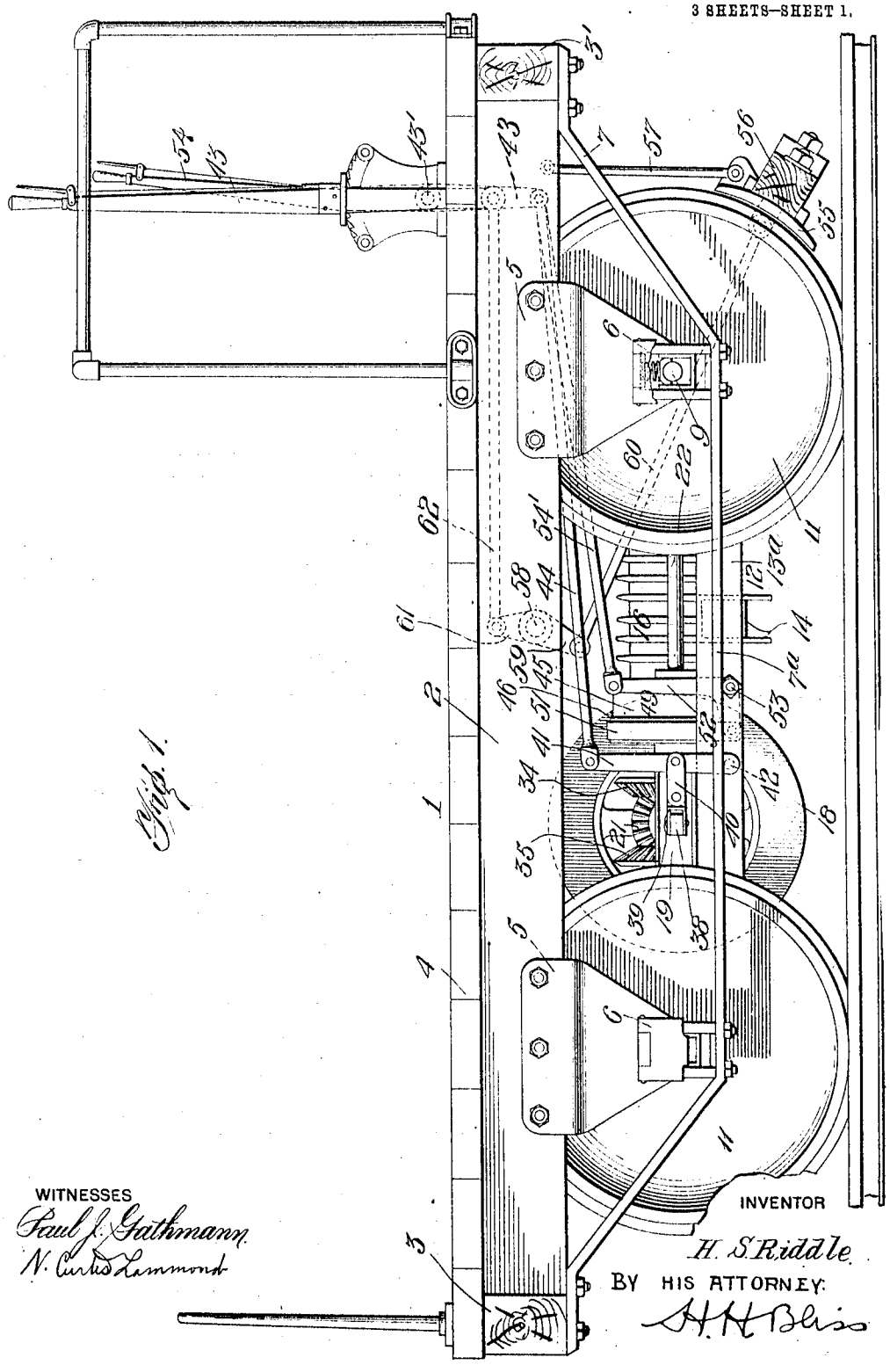

Fig. 1.

WITNESSES

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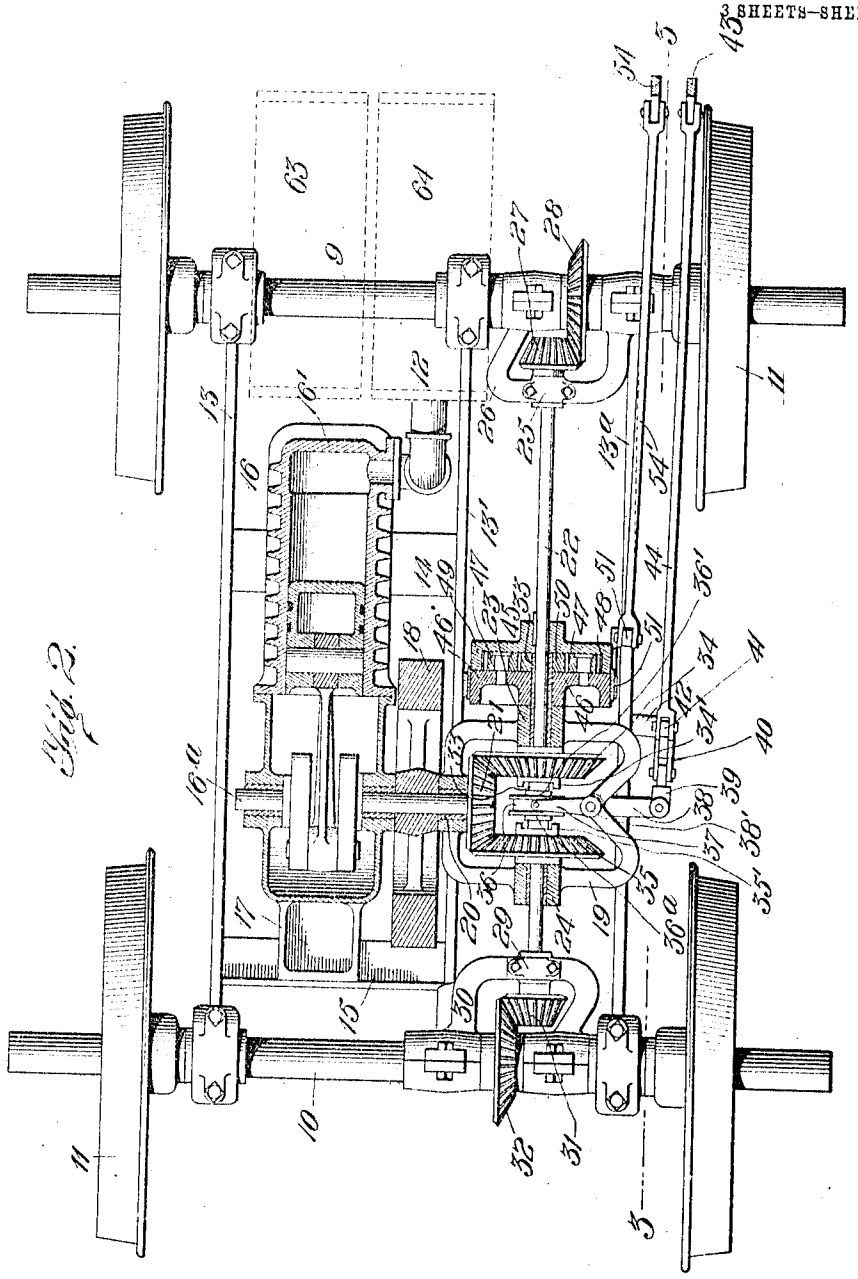

Fig. 2.

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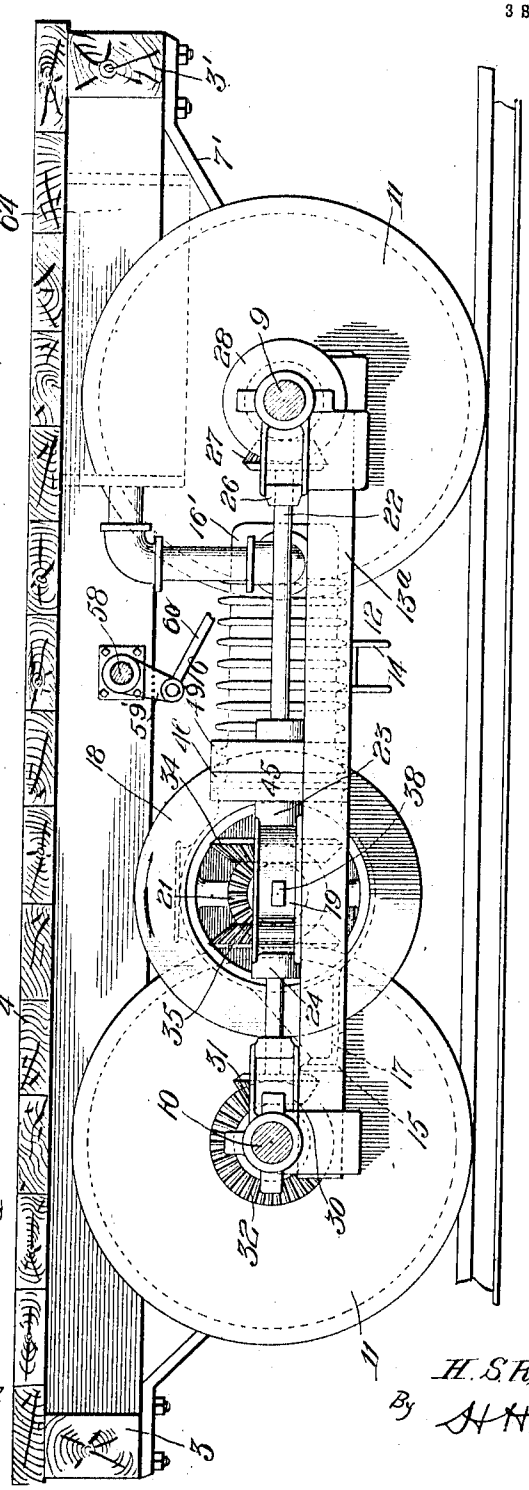

Fig. 5.

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UNITED STATES PATENT OFFICE.

HOWARD S. RIDDLE, OF COLUMBUS, OHIO, ASSIGNOR, BY MESNE ASSIGNMENTS, TO THE JEFFREY MANUFACTURING COMPANY, A CORPORATION OF OHIO.

MOTOR-TRUCK.

1,054,314. Specification of Letters Patent. **Patented Feb. 25, 1913.**

Application filed April 14, 1906. Serial No. 311,627.

To all whom it may concern:

Be it known that I, HOWARD S. RIDDLE, a citizen of the United States, residing at Columbus, in the county of Franklin and State of Ohio, have invented certain new and useful Improvements in Motor-Trucks, of which the following is a specification, reference being had therein to the accompanying drawing.

This invention relates to an improvement in motor trucks employing hydrocarbon motors for power-generating purposes.

It pertains particularly to yard trucks of the type generally used for hauling either material or both material and cars in and about manufacturing plants, and for similar purposes.

My object has been to devise a simple, inexpensive truck having its parts all readily accessible and having a platform relatively low down and substantially unobstructed by any of the mechanical parts.

In the drawings—Figure 1 is a side elevation of a motor truck embodying my improvements. Fig. 2 is a view partly in plan and partly in horizontal section of the same. Fig. 3 is a section on the line 3—3, Fig. 2.

In the drawings, 1 indicates as an entirety the main frame. This preferably consists of longitudinal side beams 2, 2′, and end pieces 3, 3′, rigidly secured to the side beams. For the purpose of lightness, cheapness, and resilience of frame structure, I prefer that these longitudinal and transverse members of the main frame should be made of wood, although they may be made of steel, or wood reinforced by steel, if desired. 4 indicates a platform which is arranged upon the said frame. It may consist of any suitable material and may be secured in position in any desired manner.

5 are plates depending from the longitudinal members 2, 2′, arranged near either end thereof and adapted to hold in position the journal boxes 6 for the front and rear axles. These journal boxes may be of any well known kind, but I find most suitable the type in which wearing pieces bear upon the axle and have interposed between them and an adjacent portion of the frame a spring or springs which allow the requisite vertical play of the frame relative to the axles.

The main frame at either side is preferably trussed by means of the truss rods or bars 7, 7′, each having the horizontal members 7^a to which the journal boxes carried by the plates 5 are secured, the journal boxes and their carrying plates 5 serving as the tie bars or struts between the truss rods and beams 2, 2′. This construction insures a rigid bracing of the frame and at the same time a simple and efficient arrangement of the journal boxes.

9, 10, indicate front and rear axles respectively, and 11 the track wheels thereon. As the truck is adapted for use upon a track and is relatively short coupled, it is not necessary to make either of the axles steering axles.

The motor and the transmission interposed between it and the axles are preferably supported on a supplemental rigid frame 12 arranged beneath the main frame of the truck and comprising longitudinally parallel bars or rods 13, 13′, 13^a, secured at either end in a suitable manner to the adjacent axles. In fact the axles may be considered as a part of the supplemental frame. At suitable intervals transverse bars or braces 14, 15, extend between the longitudinal beams 13, 13′, and are secured to them so as to form a framework on which the motor 16 is mounted. This motor 16 is preferably a hydrocarbon motor and may be of any suitable or well known type. Its cylinder 16′ rests upon the cross brace 14 which is preferably curved as indicated to accommodate it to the shape of the side walls of the cylinder. At its front end the motor is secured to an angle plate or bracket 17 which in turn is secured to the cross brace 15 which, as indicated, is preferably an angle plate with its walls arranged horizontally and vertically so that the said bracket 17 rests upon the horizontal wall and bears against the vertical wall. The crank shaft 16^a is arranged transversely of the machine at points between the front and rear braces 14 and 15. 18 is a fly wheel secured to said crank shaft at points between the crank case and the longitudinal bar 13′.

19 is a gear frame extending between the

beams 13′ and 13ª and preferably secured rigidly thereto. This frame is open at its center, as indicated, and carries the horizontal transverse bearing 20, through which the crank shaft 16ª of the engine extends and in which it is mounted. 21 is a bevel gear rigidly secured to the said crank shaft inside the said gear frame. 22 is a longitudinally arranged drive shaft extending through bearings 23, 24, in the said gear frame 19. Near its front end this drive shaft 22 is mounted in a bearing 25 carried by a bracket 26 suitably secured to the supplemental frame 12. 27 is a bevel pinion rigidly secured to the front end of said drive shaft and 28 is a bevel gear rigidly secured to the front axle 9 and arranged to mesh with said bevel pinion. Near its rear end this drive shaft 22 is mounted in a bearing 29 carried by a bracket 30 which is also suitably secured to the supplemental frame 12. 31 is a bevel pinion rigidly secured to the rear end of said drive shaft and arranged to mesh with a bevel gear 32 rigidly secured to the rear axle 10.

33 is a sleeve loosely mounted upon the drive shaft 22 and within the bearings 23 and 24, it extending forward beyond said front bearing 23 for some distance. This sleeve is free to turn within the bearings and also relatively to the said drive shaft. 34 is a bevel gear loosely mounted upon said sleeve and arranged to mesh with the bevel pinion 21 on the crank shaft. 35 is a bevel gear of the same pitch diameter as the bevel wheel 34. It also is loosely mounted upon said sleeve 33 but is arranged to mesh with said bevel pinion 21 on the opposite side thereof from the bevel gear 34.

34′ is a clutch jaw or element rigidly secured to the bevel gear 34, and 35′ is a clutch element rigidly secured to the gear wheel 35.

36 is a double acting movable clutch element splined to the sleeve 33 and carrying the forward extending jaw 36′ which is adapted to engage with the jaw 34′ on the bevel gear 34, and the rearwardly extending jaw 36ª which is adapted to engage with the jaw 35′ on the bevel gear 35. This movable clutch element 36 preferably has a collar with a grooved periphery, with the side walls of which groove, at diametrically opposite points, the arms of a yoke 37 engage. This yoke 37 is carried by a swinging arm 38 which is pivotally connected at 38′ intermediate of its ends to the gear frame 19. At its outer end this lever 38 is pivotally connected to a yoke arm 39. 40 are links flexibly connecting the said yoked arm to a swinging lever 41 pivoted at 42 to the beam 13ª.

43 is a hand lever extending from a point above the platform on the car, and within easy reach of the operator, downward through the said platform, this lever being pivotally mounted at 43′ in any suitable manner. 44 is a link connecting the lower end of the said lever 43 to the upper end of the lever 41. By shifting the said hand lever 43 it is possible to connect either the gear 34 or the gear 35 to the sleeve 33 in such manner as to cause the crank shaft 16ª to rotate the said sleeve either in one direction or the other.

45 indicates as an entirety a planetary transmission gear. Any of the well known systems of planetary gearing is adaptable for use in this mechanism at this point. For the purpose of illustration I have indicated the planetary gear system as comprising a drum 46 loosely mounted upon the sleeve 33 and carrying at its front surface the pinions 47. These pinions mesh with an internal gear 48 carried by a shell 49 which is rigidly secured to the drive shaft 22.

50 is a gear rigidly secured to the sleeve 33 within the shell 49 and adapted to mesh with the pinions 47 carried by the drum 46.

51 is a brake band fitted about the drum 46 and adapted to be clamped thereto to hold the drum stationary and to cause the operation of the planetary gears to transmit motion from the sleeve 33 to the drive shaft 22 in the well known manner. This brake band is operated by a bell crank lever 52 pivoted at 53 to the adjacent longitudinal beam of the supplemental frame.

54 is a hand lever for operating the planetary gear 45. It is arranged with its handle above the platform of the car within easy reach of the operator; it is pivoted at 53′ and extends downward through the platform and has its lower end connected to the bell crank lever 52 by means of a link 54′. I have found it desirable to employ the same lever both for controlling the operation of the planetary gear and the application of brakes for stopping the travel of the truck.

55 indicate brake shoes carried by a swingable cross beam 56 suspended from the main frame 1 by means of hangers 57.

58 is a transversely arranged shaft secured at either end to the beams 2, 2′, of the main frame. 59, 59′, are lever arms rigidly secured to the said transverse shaft 58 near either end thereof and each connected to the swingable brake-shoe-carrying beam 56 by means of links 60. 61 is an arm rigidly secured to the said shaft 58 at the same side of the machine as the gear-controlling lever 54 to which it is connected by means of a link or bar 62. It will be noted that the arrangement of the levers and connections between the hand lever 54 and the planetary gear-controlling devices and the brake shoe are such that when the lever 54 is thrown in the direction to cause the planetary gear to operate, the brake shoes 55 are caused to travel away from the peripheries of the front driv-

ing wheels, while when the said hand lever is thrown in the opposite direction to render inactive the planetary gearing, the brake shoes are caused to approach the periphery of their respective track wheels and if the lever is forced far enough in this direction the brake shoes will be applied to stop the rotation of the front driving wheels.

In the drawings, the motor shown is supposed to be an air-cooled one and consequently no water tank is necessary. The tank 63 for hydrocarbon and the muffler 64 may be supported from the supplemental frame 12 in any suitable manner.

The operation of the mechanism is as follows: Assuming that the motor is in operation and the fly wheel is rotating in the direction indicated by the arrow in Fig. 3, it will be noted that when the double acting clutch element 36 is in the neutral position shown in Fig. 2, that the engine will run idle and that the sleeve 33 will remain idle. If it is desired to drive the truck forward, the hand lever 43 is shifted in such manner as to cause the clutch jaw 36′ on the double acting clutch element 36 to engage with the clutch element 34′ carried by the bevel gear 34. This will cause the rotation of the sleeve 33 in anti-clockwise direction looking at it from the right in Fig. 2. The sleeve will drive the gear 50 in anti-clockwise direction. Now, if the operator shifts the hand lever 54 so as to apply the brake band 51 to the drum 46 of the planetary gear, thus holding the pinions 47 from bodily rotation about the axis of the drive shaft 22, then the gear 50 will drive the said pinions 47 in clockwise direction and they will drive the internal gear 48 in clockwise direction so as to rotate the main drive shaft 22 in the same direction and the bevel pinions 27 and 31 on the said drive shaft will rotate the bevel gears 28 and 32 on the front and rear axles respectively in such manner as to cause the forward travel of the truck.

In order to cause the reverse or rearward travel of the truck, the movable clutch element 36 should be shifted by the hand lever 43 so as to cause the engagement of its jaw 36″ with the jaw 35′ upon the bevel gear 35. This will cause the rotation of the sleeve 33 in an opposite direction from which it is rotated by the gear wheel 34, when the latter is in operation, and consequently when the planetary gear is rendered active it will rotate the main drive shaft 22 in a direction opposite to that first described and consequently the truck will move rearward.

It will be noted that the motor and transmission is so arranged that power is applied for driving both the front and rear axles in either direction and through a planetary system of gearing which permits the locomotive to be started in either direction without sudden jerks or strains and which will afford compensation in the transmission where undue strains are encountered when the locomotive is running.

I claim—

1. In a motor truck, the combination of a main frame, truss work for the longitudinal members of the main frame, having vertical struts or tie pieces carrying bearing boxes, axles mounted in said bearing boxes, track wheels rigidly secured to said axles, a supplemental frame comprising three parallel longitudinal beams each loosely mounted at either end upon the adjacent axle, cross pieces connecting said parallel beams together, a motor supported by and between the middle one of said longitudinal members and one of the outside ones, and power transmitting mechanism interposed between said motor and said axles and supported by and between said middle longitudinal member and the other outside one.

2. In a motor truck, the combination of a pair of axles, wheels secured thereto, a longitudinally arranged drive shaft, gearing between the opposite ends of the said shaft and the said axles, arranged to turn both axles and wheels simultaneously in the same direction, a motor mounted upon the truck with its shaft positioned transversely, gearing interposed between the motor and the said drive shaft, and means for operatively connecting the motor with the drive shaft arranged to be adjusted to cause rotation of the latter in one direction or the other at will, substantially as set forth.

3. In a motor truck, the combination of a pair of axles, track wheels rigidly secured thereto, a framework loosely mounted on said axles and connecting them together, a reciprocating motor secured on said framework and having its crank shaft arranged parallel with said axles, a main drive shaft arranged at right angles to said crank shaft, gearing interposed between either end of said main drive shaft and the adjacent axle, planetary gearing arranged on said main drive shaft, and power transmitting mechanism interposed between said crank shaft and said planetary gearing and adapted to be adjusted to actuate said planetary gearing so as to cause it to rotate the said main drive shaft in either direction.

4. In a motor truck, the combination of a pair of axles, track wheels rigidly secured thereto, a framework loosely mounted on said axles and connecting them together, a reciprocating motor secured on said framework and having its crank shaft arranged parallel with said axles, a main drive shaft arranged at right angles to said crank shaft, gearing interposed between either end of said main drive shaft and the adjacent axle, a sleeve loosely mounted on said drive shaft, a bevel gear secured to the outer end of said crank shaft, a pair of bevel gears loosely

mounted upon said sleeve and each adapted to mesh with said bevel gear on the crank shaft at one side thereof, double acting means for connecting either of said bevel gears to the sleeve, and planetary gearing interposed between said sleeve and said drive shaft.

5. In a motor truck, the combination of a pair of axles, wheels secured thereto, a longitudinally arranged drive shaft, gearing between the opposite ends of the said shaft and the said axles arranged to turn both axles and wheels simultaneously in the same direction, a motor mounted upon the truck with its shaft extending transversely, a bevel gear on the motor shaft, two bevel gears rotatably mounted on the drive shaft and meshing with the gear on the motor shaft at opposite sides thereof, and means for operatively connecting with the drive shaft either of the bevel gears mounted thereon.

6. In a motor truck, the combination of a pair of axles, track wheels rigidly secured thereto, a framework mounted on the axles and connecting them together, a motor secured on the frame work with its shaft arranged parallel with the axles, a main drive shaft arranged at right angles with the motor shaft and with the axles, gearing between the drive shaft and each axle for causing the simultaneous rotation of the axles in the same direction, an element rotatable independently of the motor shaft and of the drive shaft, gearing between the motor shaft and the said element adapted to be adjusted to cause the rotation of the said element in either direction, and change speed gearing between the said element and the drive shaft.

7. In a motor truck, the combination of a pair of axles, track wheels rigidly secured thereto, a frame-work mounted on the axles and connecting them together, a motor mounted on the frame-work with its shaft arranged transversely, a longitudinally arranged drive shaft, gearing between the ends of the drive shaft and the axles for causing the simultaneous rotation of the axles in the same direction, a sleeve rotatable on the drive shaft, gearing between the motor shaft and the sleeve adapted to be adjusted to cause the rotation of the sleeve in either direction, and planetary gearing interposed between the sleeve and the drive shaft.

8. In a motor truck, the combination of a pair of axles, track wheels rigidly secured thereto, a framework mounted on the axles and serving to connect them together, a motor, power transmitting mechanism between the motor and the axles, the said power transmitting mechanism comprising planetary gearing, a brake, a hand lever, and connections between the hand lever and the planetary gearing and between the hand lever and the brake, whereby the gearing may be made operative and the brake simultaneously released or the brake may be applied and the gearing simultaneously made inoperative.

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

HOWARD S. RIDDLE.

Witnesses:
F. C. BOZENHARD,
S. J. WHITE.