

March 24, 1953

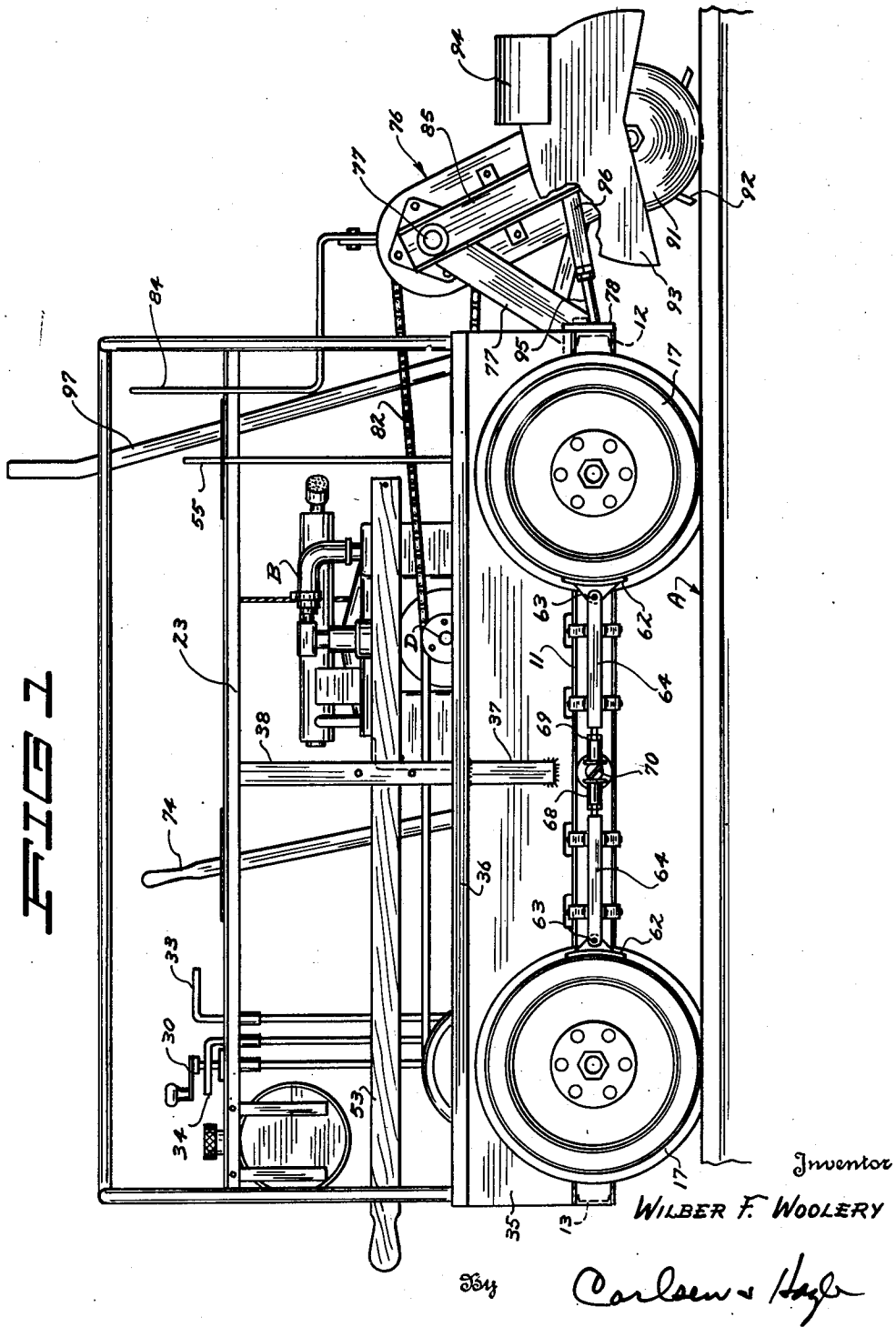
W. F. WOOLERY

2,632,404

SELF-PROPELLED RAILWAY MAINTENANCE CAR

Filed Nov. 26, 1948

4 Sheets-Sheet 1



March 24, 1953

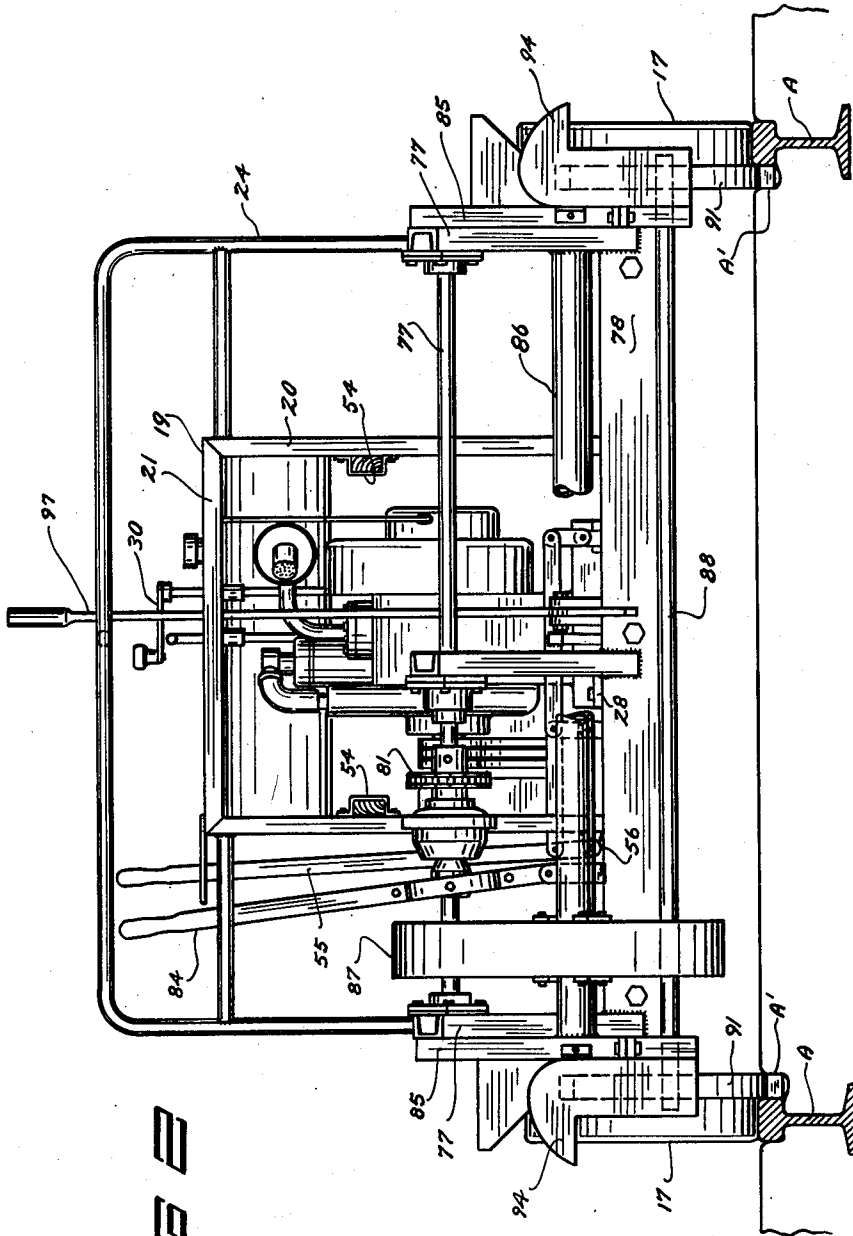
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FILE

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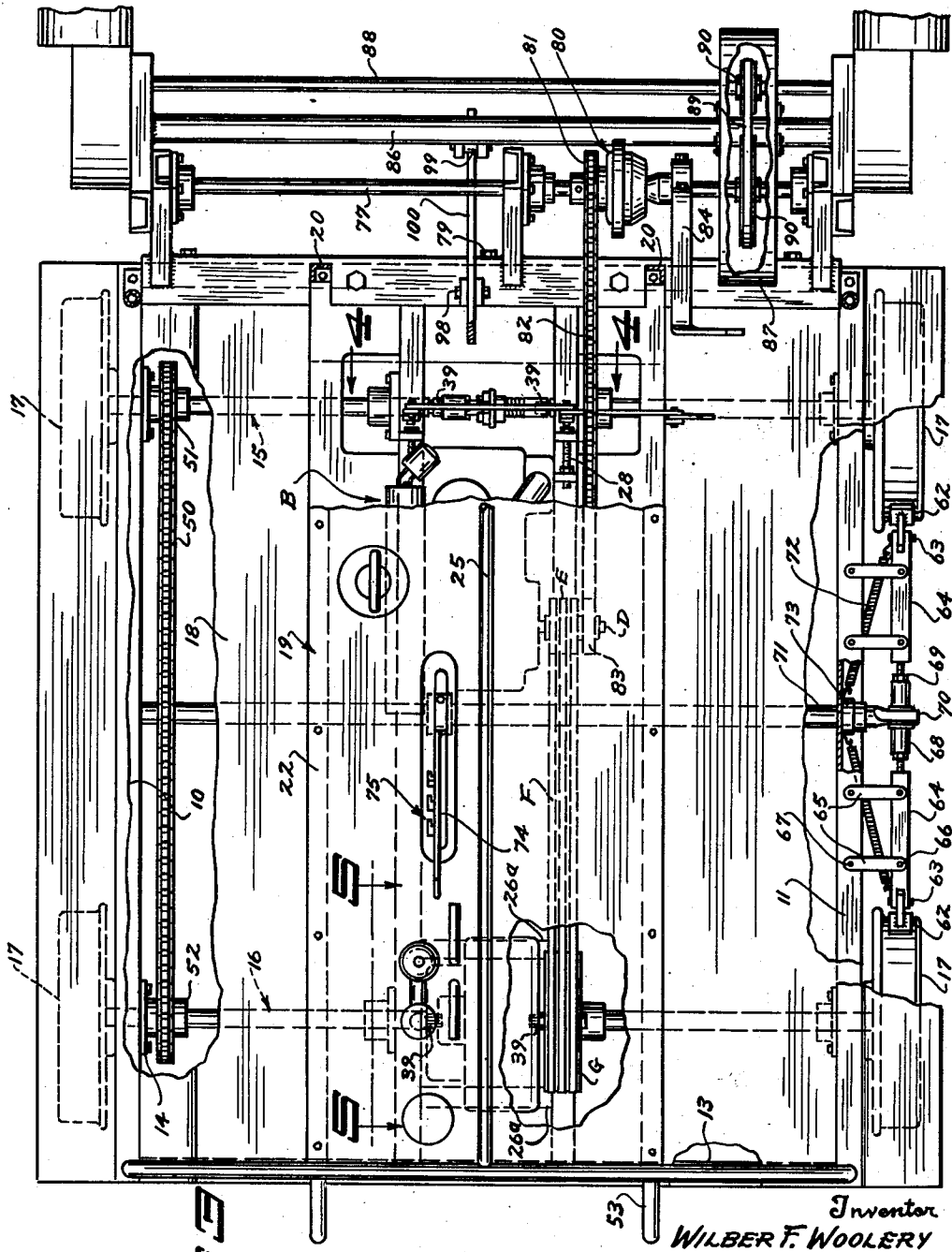
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SELF-PROPELLED RAILWAY MAINTENANCE CAR

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F I G 3

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SELF-PROPELLED RAILWAY MAINTENANCE CAR

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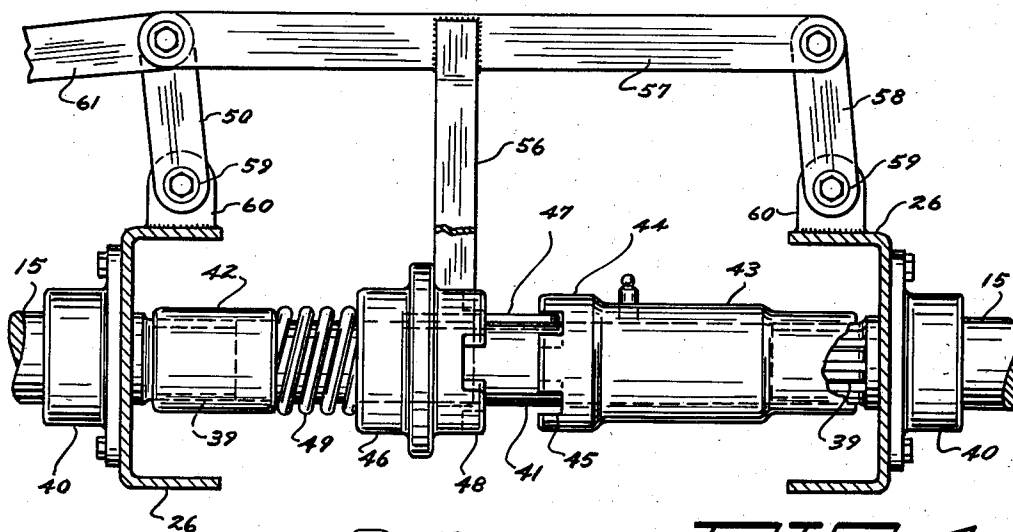


FIG 4

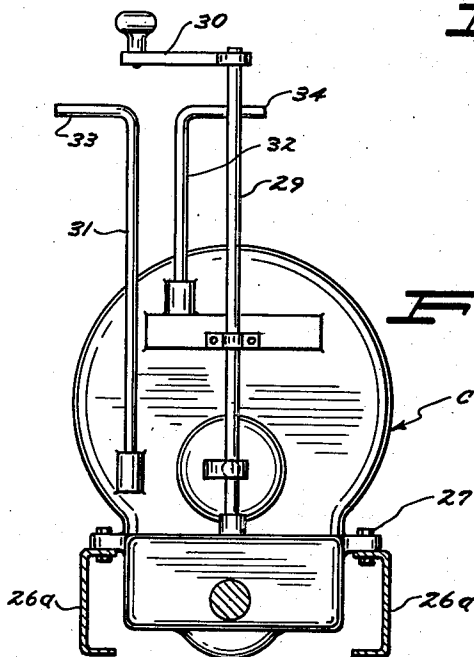


FIG 5

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UNITED STATES PATENT OFFICE

2,632,404

SELF-PROPELLED RAILWAY MAINTENANCE CAR

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9 Claims. (Cl. 105—101)

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This invention relates generally to improvements in railway maintenance equipment, and more particularly to a self-propelled maintenance car and flangeway cleaners for cleaning the flangeways inside the rails at street crossing and like locations.

The primary object of the invention is to provide an improved self-propelled maintenance or work car adapted for many uses upon the railroad and in connection therewith a flangeway cleaner embodying spaced vertically movable and rotary cutters provided at one end of the car and adapted to be run inside the heads of the rails in order to clear the flangeways at crossings, and like locations of accumulated debris.

Another object is to provide for maintenance equipment of this kind a novel and advantageous running gear including front and rear axles having wheels at their ends, and with drive mechanism so arranged as to drive all four of the wheels. The said front and rear axles, each comprise complementary half sections in order to facilitate replacement and at their adjacent inner ends these half sections are splined and connected together to operate and drive as a unit. For one axle, however, a clutch is provided by means of which the half sections may be disconnected to rotate independently, in such manner that by lifting the car up, so that it runs only on the wheels attached to these axle sections, a free wheeling effect may be obtained and the car may be manipulated readily in removing it from, or placing it upon, the track.

Still another object of my invention is to provide improvements in the driving and braking mechanism for the car, along with controls for all necessary operations, both of the car and of the flangeway cleaner.

These and other more detailed and specific objects will be disclosed in the course of the following specification, reference being had to the accompanying drawings, in which—

Fig. 1 is a side elevation of the maintenance car of my invention and showing the flangeway cleaner lowered into operative relation to the rails for cleaning the flangeways.

Fig. 2 is a front end view of the car as shown in Fig. 1.

Fig. 3 is a plan view with certain parts broken away to disclose structural details which would be otherwise hidden.

Fig. 4 is an enlarged and fragmentary sectional view taken along the line 4—4 in Fig. 3.

Fig. 5 is an enlarged end view of the transmission and gear shift unit taken substantially along the line 5—5 in Fig. 3.

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Referring now more particularly and by reference characters to the drawing, the maintenance car will first be described, and it comprises a frame assembly embodying as primary elements a pair of side sills 10 and 11 which are joined at front and rear ends by cross bars or channels 12 and 13. Adjacent the front and rear ends the side sills 10 and 11 are provided with bearings indicated throughout at 14 in and through which axles designated generally as 15 and 16 are journaled. These axles project outwardly beyond the frame and conventional flanged wheels 17 are secured to these extended ends. The wheels 17 are, of course, properly spaced to run upon the rails A of the railway track and while, of course, the car may run in either direction, the end thereof appearing at the right in Figs. 1 and 3 will be hereinafter referred to as the front of the car. A floor plate indicated at 18 covers the car frame just described, and in the center area of the car there is provided a seat and housing structure indicated generally at 19. This assembly 19 comprises front and rear upright posts 20 which are joined by cross bars 21 and covered by a seat plate 22. The posts 20 are, of course, further connected by longitudinally extending bars or angles 23 and the assembly is rigidly braced in such manner that men riding the car may be seated thereon, and leg room is of course provided at each side of the seat by the elongated exposed side portions of the floor plate 18. Front and rear railings 24 are provided at the ends of the car and these are of inverted U-shape as clearly shown and are joined centrally by a longitudinally extending hand rail 25 which the riders may grasp for safety sake.

The construction of the seat and housing structure 19, is such that a longitudinally extending space is provided therebeneath, and in this space I mount, adjacent to the forward end thereof, a conventional air cooled internal combustion engine designated at B. It will be noted that this position of the engine near the forward end of the space beneath the seat provides for adequate cooling, since a current of air will move through the space when the car is in motion, and the use of the air cooled engine, of course, is desirable since any danger of freezing during the winter months is thereby eliminated.

Also mounted in this space near the rear end thereof, is a conventional transmission and change speed unit which is indicated generally at C and for supporting this unit C and also the engine B parallel channels 26 are extended through the center of the car from front to rear,

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and are joined by short cross channels 26^a to which as best shown in Fig. 5, the unit C is bolted at 27. The engine mounting is indicated at 28 in Fig. 3 and also in Fig. 2. The power output shaft D of the engine B, extends out to one side and mounted thereon is a multiple groove belt pulley E which operates a series of belts F, which in turn run rearwardly over a corresponding pulley G on the drive shaft for the unit C. The transmission unit C embodies a conventional clutch which is operated by an upright shaft 29 equipped at its upper end with a handle 30, and the unit further has a gear shift shaft 31 and reversing shaft 32 which also extend upwardly and have handles 33 and 34. These control shafts all rise through the seat plate 22 so that the aforesaid control handles 30 and 33 and 34 are exposed for convenient manipulation by the men riding the car. Since the details of this transmission unit and engine are not of further importance to the present invention, they will not be described herein.

At the sides of the car inwardly of the wheels 17, I provide vertical side panels 35 which are flanged outwardly at their outward edges 36 to form running boards over the wheels. The aforesaid railings 24 may be affixed at lower ends to these flanged edges of the side panels. As will be noted in Fig. 1, there is provided a center brace 37 for each side, below the running board, and also in this view there appears a vertical center post 38 separating the center of the said structure 19. It will be apparent thus far, that I have provided a light and compact maintenance car which will find many uses, and which may be readily manipulated on and off the track as may be required. In connection with the latter, a clutch and drive arrangement is provided for the axles 15 and 16, which is of importance and will now be described.

Each of these axles 15 and 16 comprises an identical pair of one-half sections to the outer ends of which the wheels 17 are, of course, fastened. The inner extremities of the axle sections are splined, as indicated throughout at 39, and the length of the sections are such that these splined inner ends will stand some distance apart when the axle sections are inserted through the bearings 14 to proper positions. The respective sections of the rear axle 16 are inserted at their splined ends into complementarily splined drive sockets provided for their accommodation in the unit C and which sockets will, of course, be provided in the output shaft of the unit so that the axle sections will be driven under control thereof. The splined inner ends of the front axle sections extend inwardly through bearings 40 mounted upon the channels 26 as best shown in Fig. 4 and I provide a special clutching and connecting mechanism for connecting these ends of the axle. Such mechanism comprises a shaft 41 upon one end of which is a coupling 42 splined to receive and drive the end 39 of one section of the axle. A similar coupling 43 is rotatably mounted upon the shaft 41 at its opposite end and this coupling, or sleeve has a splined socket for the end 39 of the opposite axle section. The inner end of the coupling 43 is diametrically enlarged as indicated at 44 and the end face thereof is provided with radial clutch teeth or jaws 45. A clutch collar 46 is slidably keyed, as indicated at 47, upon the shaft 41, for limited axial movement toward and away from the jawed end of the coupling 43, and in its facing end this collar 46 has cooperating radial jaws 48. An expansion

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coil spring 49 is braced between the opposite end of the collar 46 and the coupling 42 and normally urges the collar toward coupling 43 in order to mesh the clutch jaws 45 and 48. Since the collar 46 is keyed to the shaft 41 it will be obvious that a driving connection will be established between the two sections of the axle 15 when these clutch jaws are thus engaged. It will be understood, therefore, that the front and rear axles 15 and 16 normally will operate as integral units even though made of one-half sections as just described, and in order to drive all four wheels 17, I provide a sprocket chain 50 which runs over sprockets 51 and 52 upon one end of each axle. It will further be readily apparent that the formation of these axles in half sections of identical length and construction not only facilitates their insertion and removal, whenever necessary for service, but also reduces the stock necessary for the supplier to carry in order to meet all requirements. This is a substantial advantage since storage space and stock expense is materially reduced.

The four wheel drive of the car is of distinct advantage in providing greater traction, with less wheel wear, and a reduction in the tendency for the car to weave when driven in either direction upon the track. However, all such cars of this type, must be frequently removed from the track, to clear approaching trains and must then be replaced, and for this purpose the car is provided with handles, or handle bars 53, which are slidably mounted within the sides of the seat structure 19 in brackets 54 provided for their accommodation. The handles 53 may be pulled out to the rear of the car so that it may be lifted up at its rear end, in order to clear the rear wheels 17 from the track and allow the car to be pulled or pushed about upon the front wheels. In order then to permit the car to free wheel while being so maneuvered, or to "wheel-barrow" as it is sometimes called, the front axle sections are de-clutched by means of a hand lever 55, which is pivoted at its lower end 56 to the frame to one side of the clutch mechanism. A shifter fork 56 is provided for the clutch collar 46 and it depends from a support bar 57 arranged over the clutch and carried upon links 58 pivoted at 59 to bracket 60 upon the channels 26. The fork 56 and bar 57 are thus supported for transverse shifting movements, and these assemblies are connected by a link bar 61 to the hand lever 55. It will be readily understood, therefore, that by manipulating the hand lever 55 the clutch collar 46 may be moved to the position shown in Fig. 4 to disengage the clutch jaws 45 and 48 and allow these respective sections of the front axle 15 to rotate individually. Thus the front wheels 17 may turn in any direction required when removing or replacing the car since while this operation is going on the clutch forming part of the unit C will be disengaged, the sprocket chain 50 connecting the one front axle section and the rear axle will not in any way interfere with the free wheeling of the car.

At each side of the car, I provide a brake mechanism comprising a pair of brake shoes for engaging the respective wheels 17 and pivotally mounted at 63 upon the opposite ends of longitudinally extending thrust bars 64. These bars 64 are supported between the wheels for forward and rearward movements by means of parallel carrier arms 65 which are pivoted at 66 to the bars and extend inwardly across and are pivoted at 67 upon the side sills 10 and 11. At their adja-

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cent ends the bars 64 carry adjustable heads 68 threaded into the bars and provided with lock nuts 69 as clearly shown. The said heads 68 are engaged by a flattened cam end 70 on a brake shaft 71, which shaft is journaled transversally through and between the sills to operate the brake mechanism at each side of the car. Coil springs 72 are stretched between the pivot connections 63 and a bearing 73 for the shaft 71 in such manner as to normally bias the brake shoes 62 away from the wheels 17. However, by turning the shaft 71, its flattened end 70 will obviously urge the thrust bars 64 apart against the tension of the springs 72 in such fashion as to thrust the shoes against the wheels and brake the car. For thus operating the shaft 71 it is provided near center with a hand lever 74 projecting upwardly through the seat plate 72 and having any conventional form of latching means, indicated generally at 75, for holding it in adjusted positions.

Removably mounted upon the front end of the car is a flangeway cleaning assembly, which is designated generally at 76, and comprises a countershaft 77, journaled in the upper and forward ends of transversally spaced carrier bars 77, the rear and lower ends of which are secured to a mounting angle or bar 78. This angle 78 is of such size and is so formed that it may be fitted over the upper and forward sides of the forward cross bar 12, and secured thereto by means of bolts or cap screws 79, the removal which will permit the entire assembly to be easily removed as a unit whenever required. The counter-shaft 77, is driven through a cone clutch indicated at 80 by means of a sprocket 81 over which is trained a sprocket chain 82 running rearwardly over a sprocket 83 upon the engine shaft D. For opening and closing the clutch 80 I provide a hand lever 84 extending rearwardly and then upwardly into the car for manipulation therein. Swingably mounted upon the opposite ends of the countershaft 77 are carrier bars 85 which extend forwardly and downwardly and are connected by a transversally extending torque tube 86 to swing and operate as a unit. The torque tube 86 passes through and supports guard housing 87 enclosing the countershaft 77, and further enclosing a cutter shaft 88 journaled between the lower ends of the bars 85. The said housing 87 is located at one end of tube 86 and inside the housing the respective shafts 77 and 88 are connected by a belt 89 running over pulleys 90 on the shafts.

The carrier bars 85 carry flangeways cleaners of the type shown in my prior co-pending application, Serial No. 48,070, filed September 7, 1948, and each of these cleaners comprises a rotary cutter 91 fastened to and driven by the cutter shaft 88, and carrying radially projecting cutting bits 92. Each cutter operates at its upper portion in a guard 93 which has an outwardly and downwardly opening spout 94 so that material dislodged by the cutting bits and thrown up into the guard will be directed by the spout out to one side of the track. The cutters 91 are so positioned as to run immediately inside the heads of the rails A in such manner as to clean out the flangeways indicated at A' in Fig. 2. For this purpose the cutters are lowered to reach the proper cutting depths, which lower position is determined by adjustable stop fingers 95 carried by arms 96 extending rearwardly from lower ends of the carrier bars 85. These fingers 95 contact the mounting angle 78 as clearly shown in Fig. 1, and so limit downward swinging movement of the assembly about the center of the control shaft 77,

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as will be readily understood. When not in use, the cutters are elevated by means of a lever 97 pivoted at 98 upon the mounting angle 78 and extending forwardly beneath the torque tube 86. A roller 99 carried by this tube rests upon this forward end 100 of the hand lever, and from the pivot mounting 98 the lever extends upwardly and rearwardly adjacent the seat, for convenient manipulation from within the car. Here also a latching mechanism, similar to that appearing at 75 for the brake lever 74, will be provided in order to hold the lever 97 in adjusted positions.

From the foregoing it will be apparent that I have provided a work car and associated flangeway cleaner by means of which the time consuming job of keeping the flangeways open, particularly during the winter months may be readily and rapidly carried out. When not in use over long periods of time the flangeway cleaning mechanism may be removed and stored away since it is quite light and compact, but it forms no particular obstruction to the every day use of the work car for other purposes even when left in place on the car.

It is understood that suitable modifications may be made in the structure as disclosed, provided such modifications come within the spirit and scope of the appended claims. Having now therefore fully illustrated and described my invention, what I claim to be new and desire to protect by Letters Patent is:

1. In a railway maintenance car having a frame, divided front and rear axles journaled on the frame and each comprising separate transversely spaced and extending axle sections, rail wheels on the outer ends of the axle sections, the inner ends of the axle sections being splined, a connecting unit for each axle, each connecting unit having complementarily splined couplings to receive the inner ends of the sections of the associated axle, power means for rotating the couplings of one of said connecting units to drive the car, and a clutch forming part of the other unit for disconnecting the axle sections associated therewith.

2. In a railway maintenance car having a frame and a motor thereon, front and rear pairs of rail wheels, a front axle journaled at its outer ends on the frame and connected to the wheels, said front axle having separate end sections, a clutch unit supported on the frame and having rotatable couplings connected to the inner ends of the front axle sections, a rear axle journaled at its outer ends on the frame and connected to the rear wheels, said rear axle having separate sections, a power transmission unit driven by the motor and supported by the frame, and said transmission unit having means connected to the inner ends of the rear axle sections.

3. In a railway motor car having front and rear rail wheels at each side, axle sections extending inwardly from each wheel and terminating short of meeting at their inner ends at equal distances to each side of the longitudinal center line of the car, a clutch unit connecting the axle sections of the front wheels, and a power operated transmission unit connecting the axle sections of the rear wheels, and both of said units having axle engaging means positioned at equal distances from the longitudinal center line of the car and all of said axle sections being of the same length.

4. A railway maintenance car running gear for supporting a car having a frame and a power

plant and transmission unit thereon, front and rear pairs of wheels at each side of the frame, front and rear axle sections attached to the wheels and extending inwardly toward the center of the car, the inner ends of the axle sections of one pair of wheels being connected to and driven by the said transmission unit, a clutch mechanism connecting the axle sections of the other pair of wheels, and drive means connecting one of the axle sections driven by the transmission unit to one of the axle sections connected by the clutch mechanism.

5. For a railway car of the character described having a frame, four wheels and a power plant and transmission unit on the frame, a running gear and four wheel drive, comprising in combination, an identical axle section extending from each of the four wheels toward the center of the car, two of the axle sections being detachably connected at inner ends to the transmission unit and driven thereby, a clutch detachably connecting the inner ends of the other two axle sections, and drive means connected from the transmission unit to at least one of the axle sections connected to the clutch.

6. In a railway maintenance car of the character described, a frame, front and rear wheels at each side of the frame, front and rear axles journaled on the frame and connected at outer ends to the respective front and rear wheels to rotate therewith, each axle comprising two identical sections spaced apart at their inner adjacent ends whereby any wheel and its attached axle section may be pulled out for replacement without disturbing the other wheels and axle sections, separate means detachably connecting the inner ends of the front and rear axle sections and causing them to rotate as a unit, and one of said means including a clutch for selectively disconnecting the axle sections connected to that means.

7. In a railway maintenance car of the character described, a frame, front and rear wheels at each side of the frame, front and rear axles journaled on the frame and connected at outer ends to the respective front and rear wheels to rotate therewith, each axle comprising two identical sections spaced apart at their inner adjacent ends whereby any wheel and its attached axle section may be pulled out for replacement without disturbing the other wheels and axle sections, separate means detachably connecting the inner ends of the front and rear axle sections and causing them to rotate as a unit, and power operated means for rotating all of the axle sections.

8. In a railway maintenance car of the character described, a frame, front and rear wheels at each side of the frame, front and rear axles journaled on the frame and connected at outer

ends to the respective front and rear wheels to rotate therewith, each axle comprising two identical sections spaced apart at their inner adjacent ends whereby any wheel and its attached axle section may be pulled out for replacement without disturbing the other wheels and axle sections, separate means detachably connecting the inner ends of the front and rear axle sections and causing them to rotate as a unit, a power plant, and means connecting said power plant to three of said axle sections.

9. In a railway maintenance car of the character described, a frame, front and rear wheels at each side of the frame, front and rear axles journaled on the frame and connected at outer ends to the respective front and rear wheels to rotate therewith, each axle comprising two identical sections spaced apart at their inner adjacent ends whereby any wheel and its attached axle section may be pulled out for replacement without disturbing the other wheels and axle sections, separate means detachably connecting the inner ends of the front and rear axle sections and causing them to rotate as a unit and said means including a clutch connecting one pair of axle sections, a power plant, and means connecting said power plant to one of the two axle sections connected by the clutch and to both of the other two axle sections.

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