

July 27, 1926.

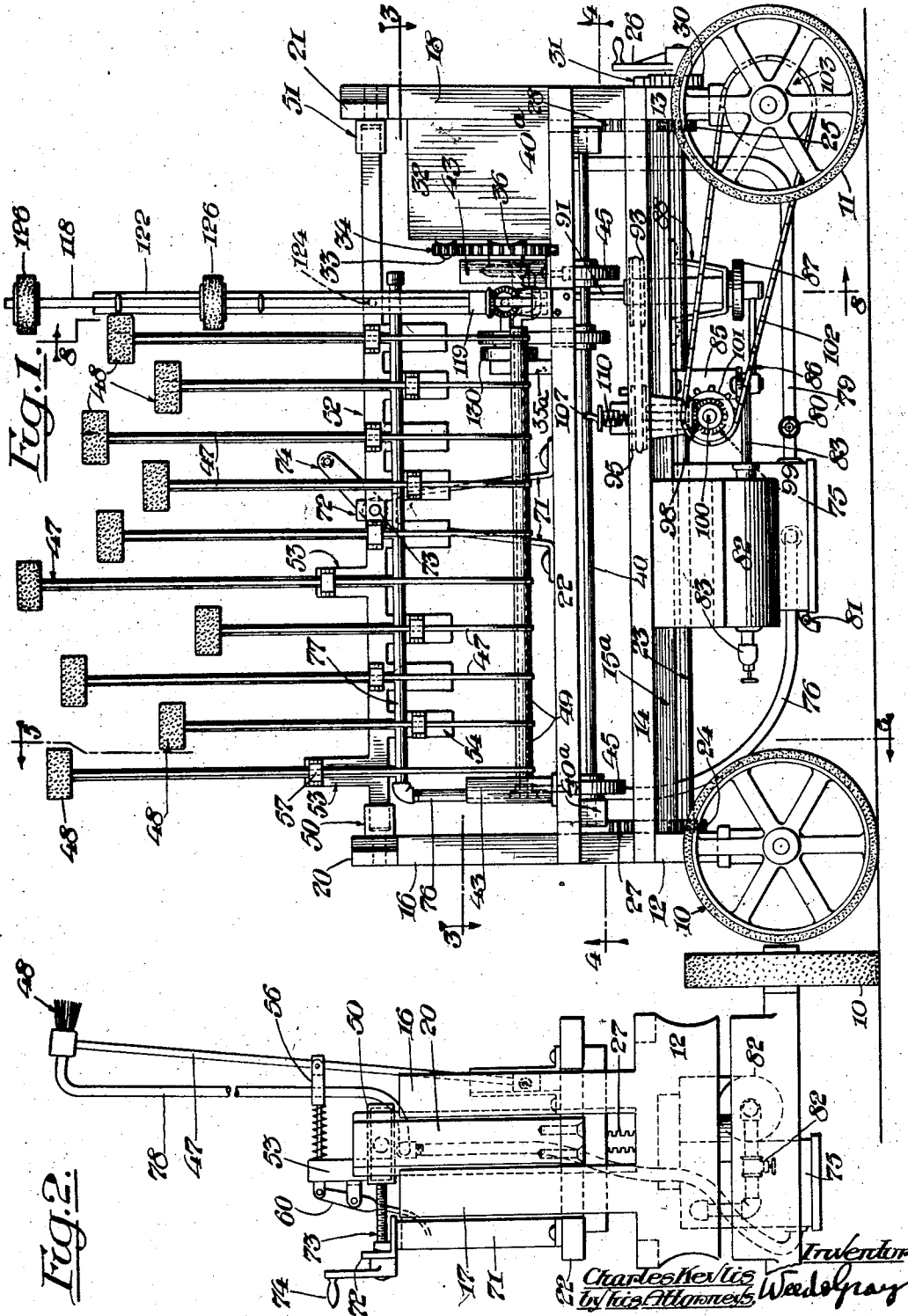
1,593,976

C. KEVLIS

CAR WASHING MACHINE

Filed March 3, 1925

3 Sheets-Sheet 1



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3. Sheets-Sheet 2

The image contains two technical drawings of a printing press mechanism, labeled Fig. 1 and Fig. 2.

Fig. 1 is a side elevation view of the mechanism. It shows a horizontal frame with a central shaft (16) and a crank (17) at the right end. A long connecting rod (20) is attached to the crank and extends to the left, where it is connected to a lever (22). The lever is pivoted at its left end (24) and has a curved end (23) that interacts with a component (29). A gear (27) is mounted on the lever's pivot. A long arm (43) is pivoted at its left end (44) and has a curved end (45) that interacts with a component (46). A long rod (48) is pivoted at its left end (49) and has a curved end (50) that interacts with a component (51). The mechanism is shown in a position where the lever and the long arm are both in a horizontal position.

Fig. 2 is a top plan view of the mechanism. It shows the same components as Fig. 1 from a different perspective. The central shaft (16) and crank (17) are at the bottom. The connecting rod (20) extends upwards and to the left. The lever (22) is pivoted at its left end (24) and has a curved end (23) that interacts with a component (29). The gear (27) is mounted on the lever's pivot. The long arm (43) is pivoted at its left end (44) and has a curved end (45) that interacts with a component (46). The long rod (48) is pivoted at its left end (49) and has a curved end (50) that interacts with a component (51). The mechanism is shown in a position where the lever and the long arm are both in a horizontal position.

The drawings are labeled with various numbers indicating different parts of the mechanism. The numbers are as follows:

- Fig. 1: 10, 16, 17, 20, 22, 23, 24, 27, 29, 43, 44, 45, 46, 48, 49, 50, 51.
- Fig. 2: 10, 16, 17, 20, 22, 23, 24, 27, 29, 43, 44, 45, 46, 48, 49, 50, 51.

At the bottom right of the image, the text reads:

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3 Sheets-Sheet 5

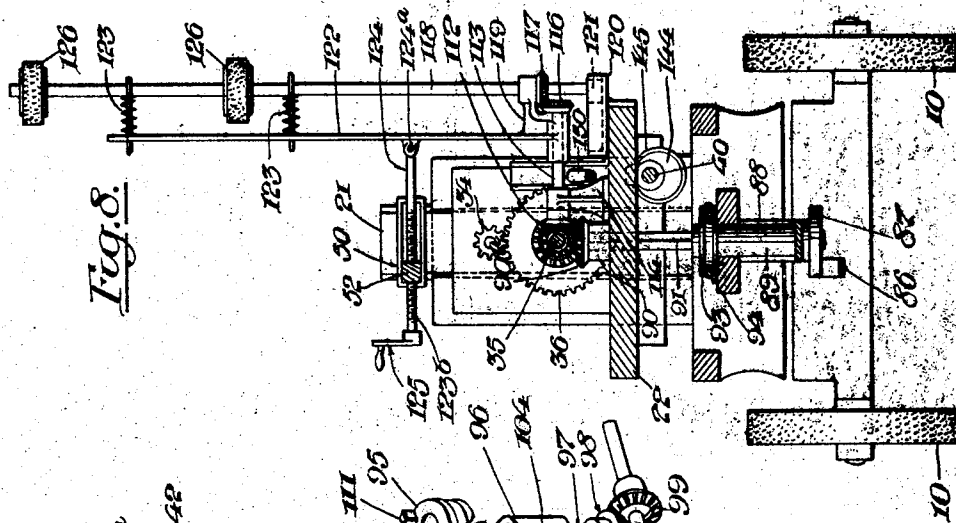
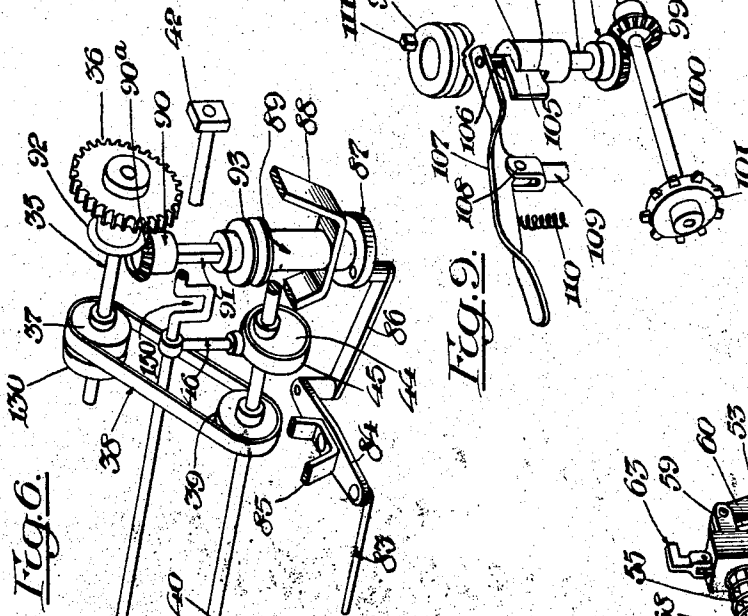
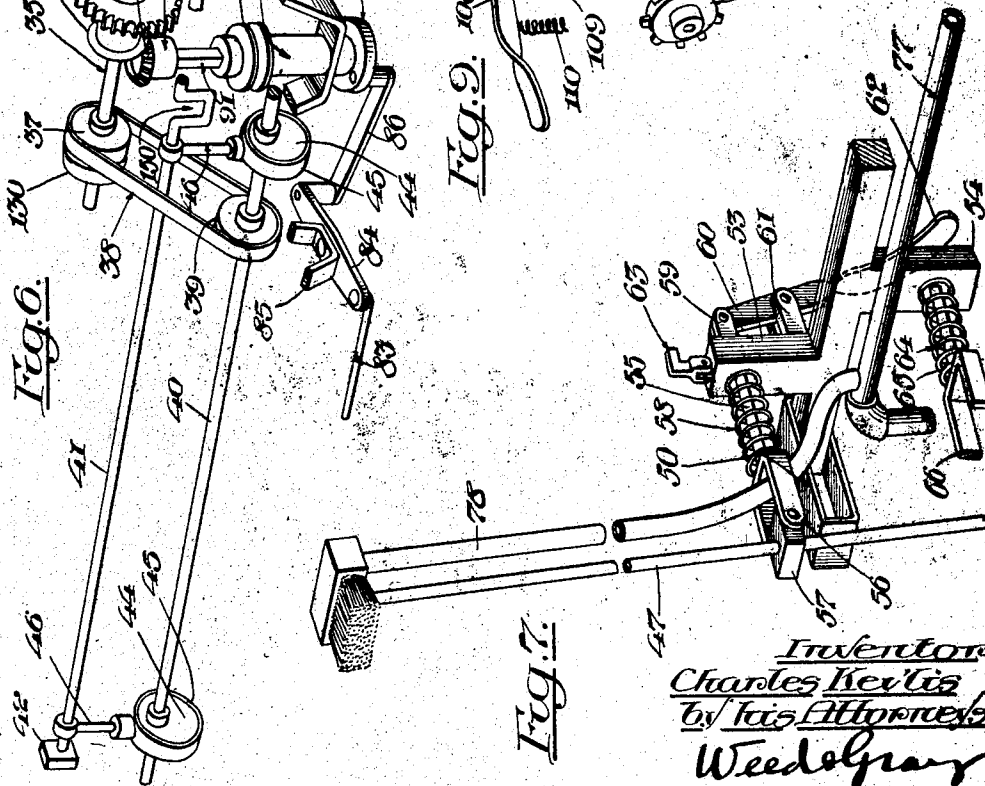
Fig. 8.

Fig. 9.

Fig. 7.

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UNITED STATES PATENT OFFICE.

CHARLES KEVLIS, OF LONG ISLAND CITY, NEW YORK.

CAR-WASHING MACHINE.

Application filed March 3, 1925. Serial No. 12,818.

This invention relates particularly to a machine for automatically washing or scrubbing the sides of cars, railway coaches, etc., an object of the invention being to provide a complete unified mechanism so controlled, operated and adjusted that the entire side of a car as well as a series of cars may be entirely and efficiently washed or scrubbed or otherwise treated in a relatively short space of time and at a considerable reduction in the labor cost than heretofore.

A further object is to provide a machine having a series of shiftable brush or scrubbing members or the like, automatically operated from a power unit, in which the mechanism is carried by a wheeled truck and is such that the truck will be caused to travel at a predetermined speed along the side of the car or object to be washed simultaneously with the operation of the brush or scrubbing members whereby the side of the car will be progressively washed or scrubbed from end to end.

A further object of this invention is to provide a machine having a series of tiltable or swinging brush carrying rods, in which means is provided for simultaneously reciprocating all of the rods, wherein means is provided for simultaneously adjusting vertically the rods, simultaneously adjusting laterally all of the rods, independently adjusting each rod relatively to the others and also means for locking each rod out of operative position.

A further object of this invention is to provide a machine having a series of vertically reciprocating brush carrying members having brushes mounted in staggered relation lengthwise of the machine, and in which the machine is provided with a vertical rotary shaft carrying one or more brushes adjusted on the shaft in predetermined position and adapted to rotate with the shaft, the construction being such that during the travel of the machine relatively to the car or object to be washed, the rotary brush or brushes will act in conjunction with the reciprocating brushes to wash or scrub the entire sides of the car, the rotary brushes being preferably adjusted so as to act on any surfaces not reached by the reciprocating brushes.

Other objects of this invention will appear in the following description and appended claims, reference being had to the

accompanying drawings forming a part of this specification wherein like reference characters indicate corresponding parts in the several views and wherein Fig. 1 is a side elevation illustrating a machine embodying my invention; Fig. 2 is a fragmentary left-hand end elevation of the same; Fig. 3 is a sectional plan view taken substantially on line 3—3 of Fig. 1; Fig. 4 is a bottom plan view taken substantially on lines 4—4 of Fig. 1; Fig. 5 is a sectional elevation taken substantially on lines 5—5 of Fig. 1; Fig. 6 is a detail perspective view showing certain of the operating mechanism; Fig. 7 is a detail perspective view showing the manner in which each brush rod is adjusted; Fig. 8 is a sectional elevation taken substantially on lines 8—8 of Fig. 1, and Fig. 9 is a detail perspective view showing the driving connections and clutch for the traction wheels of the truck.

Before explaining in detail the present improvement and mode of operation thereof, I desire to have it understood that the invention is not limited to the details of construction and arrangement of parts which are illustrated in the accompanying drawings, since the invention is capable of other embodiments, and that the phraseology which I employ is for the purpose of description and not of limitation.

Heretofore it has been the practice in order to scrub or wash the sides of railway coaches, Pullman cars, etc., to employ a gang of workmen to accomplish this by hand labor. Not only did it require considerable time to accomplish this, but it also resulted in a very considerable labor expense. The present invention overcomes the difficulties and disadvantages incident to the employment of hand labor to wash or scrub the sides of cars, and as a result of this invention I have provided a complete machine which will accomplish everything heretofore done by labor and in a very great saving in labor cost as well as enabling the work to be done more rapidly, and in fact more efficiently.

Referring to the drawings wherein I have illustrated a present preferred form of my invention, it will be seen that the mechanism is mounted upon and carried by a wheeled truck comprising a pair of front steering wheels 10 and a pair of rear driving or traction wheels 11. Supported by the axles of the

front and rear wheels are a pair of transverse supports 12 and 13 upon which are mounted and secured lengthwise extending side bars 14 and 15. Extending vertically from the cross bar or support 12 of the truck are a pair of standards 16 and 17 spaced apart and constructed to form a guideway, and extending vertically from the cross piece 13 at the rear of the vehicle are a similar pair of guide standards 18 and 19. A vertical guide member 20 extends into and cooperates with the guideway formed by the members 16 and 17 and in like manner at the rear of the vehicle a vertical guide 21 cooperates in the guideway formed by the members 18 and 19. An upper platform 22 is secured at opposite ends to the vertical guides 20 and 21, this platform being vertically adjustable as hereinafter described. A lower platform 15^a extends lengthwise of the vehicle between the side bars 14 and 15 and is secured at opposite ends to the cross pieces 12 and 13.

Beneath the fixed platform 15^a extends lengthwise of the truck a shaft 23 which is journaled at opposite ends of the cross pieces 12 and 13. At its front end a gear 24 is fixed to the shaft 23, and at its rear end a similar gear 25 is mounted thereon. The shaft 23 at the rear of the vehicle projects through the cross piece 13 and is provided with a handle 26 for rotating the shaft. A ratchet 30 is secured to the shaft 23 against the outer face of the cross piece 13, and a suitable pawl 31 cooperates with the teeth of the ratchet. A pair of racks 27 and 28 are secured to the platform 22 at the front and rear ends thereof, these racks projecting downwardly and having the teeth thereof cooperating with the teeth of the gears 24 and 25. A gear 29 mounted on a suitable stud engages teeth on the opposite sides of each rack 27 and 28 so as to hold the racks in proper position, these racks extending through suitable slots in the platform 15^a as shown in Fig. 5.

From the foregoing, it will be understood that by turning the crank 26 the shaft 23 will be rotated, and through the medium of the rack and gear construction, the platform 22 will be raised or lowered, the ratchet and pawl 30 and 31 respectively, acting to lock the platform in any of its adjusted positions.

Mounted on the rear end of the upper platform 22 is a suitable motor 32, herein shown as an internal combustion engine. The drive shaft 33 of the engine carries a gear 34 meshing with a larger gear 36 on a shaft 35 having at one end a suitable bearing in the engine housing and at its opposite end being journaled in a bearing member 35^a mounted on the platform 32. Secured to the shaft 35 is a pulley wheel 37 connected by a suitable belt 38 with a pulley wheel 39 secured to a rotary shaft 40 ex-

tending lengthwise beneath the platform 22 and journaled at opposite ends in suitable boxes 40^a secured to the underside of the platform. The shaft 40 is located at one side of the centrally located shaft 35, and the belt 38 passes through a slot 38^a in the platform and extends diagonally to the pulley wheel 39. Located above the shaft 40 and also extending lengthwise of the vehicle and above the platform 22 is a shaft 41. Secured to each end of this shaft is a slide block 42 which is housed within a vertical slideway 43^a formed in a vertical standard or guide 43. By means of the slide blocks 42 at the opposite ends of the shaft 41 and the guides 43, it will be seen that the shaft may be reciprocated vertically.

Adjacent to each slide member 42 and secured to the shaft 41 are a pair of cranks 46 pivotally connected to the shaft. These cranks extend downwardly through the platform 22 and are each connected to an eccentric band 45 mounted on an eccentric 44 secured to the shaft 40. From this construction, it will be noted that upon rotating the shaft 40 from the shaft 35 through the belt and pulleys, the cranks 46 at opposite ends of the shaft 40 will reciprocate thereby reciprocating vertically the shaft 41.

Carried by the shaft 41, which may be herein termed the brush shaft, are a series of upwardly extending brush carrying rods 47. Each of these rods is pivoted at its lower end to the shaft 41 between suitable sleeves 49 mounted on the shaft, and each rod at its upper end is provided with a brush or scrubber 48.

Secured to the inner upper side of the slide members 20 and 21 are a pair of guides 50 and 51 respectively having guideways 50^a (see Fig. 5) within which are housed the opposite ends 53 of a longitudinally extending bar 52. This bar is thus mounted so as to slide laterally within the guide boxes 50 and 51, and the brush rods 47 are all yieldingly connected and supported intermediate their ends by means of the top bar 52. The bar 52 is provided with a series of upwardly or downwardly extending lugs 53 and 54 which are spaced apart in accordance with the spacing of the rods 47.

Referring particularly to Fig. 7, it will be noted that the upwardly extending lug 53 at the front end of the machine is bored to slidably receive a transversely extending plunger 55, having at its forward end a crotched member 56, between the bifurcated ends of which is swiveled a block 57, this block having a bore through which extends the brush rod 47. A compression spring 58 is mounted on the plunger 55 and is housed between the lugs 53 and the crotch 56. The rear end 59 of the plunger is bifurcated to receive the upper end of a

lever 60 which is pivoted thereto. Intermediate its ends, the lever is pivoted to a bracket 61 and the lever is provided with a handle 62, which when forced inwardly will retract the plunger 55 against the action of the spring 58, thereby swinging the brush rod 47 rearwardly about the axis of the shaft 41. In addition to the foregoing construction, a pawl 63 may be pivoted to the top of the lug 53 and when the plunger 55 is retracted, the end of the pawl may be swung down so as to catch behind the bifurcated portion 59 and lock the plunger in its rearward position.

The foregoing construction enables each brush rod 47 to be swung or adjusted rearwardly independently of the others, and this construction is applied to each of the brush carrying rods, and therefore a detailed description of each similar construction is not deemed necessary. For instance, referring to Fig. 7, a plunger 64 carrying a compression spring 65 extends through the downwardly extending lug 54. A crotched member 66 is secured to the outer end of this plunger and a block similar to swivel block 57 engages the brush rod adjacent to the brush rod hereinbefore described. In like manner, by means of a similar lever 60, the plunger 64 may also be retracted.

Referring to Figs. 1 and 2, extending from the platform 22 at one side of the slide bar 52 are a pair of legs 71 having at the upper end thereof a bearing member 72. The rear end of a screw 73 is journaled in this bearing member and carries a handle 74, the screw being threaded into a tapped bore in the slide bar 52. Thus, by turning the handle 74, the slide bar 52 may be shifted laterally within the guide blocks 50 and 51 thereby simultaneously swinging all of the brush rods 47 on the shaft 41. This mechanism therefore, enables all of the brush rods to be simultaneously adjusted laterally with respect to the car to be washed or scrubbed.

Carried beneath the platform 15^a of the truck is a fluid carrying tank 75. This tank provides the necessary cleaning fluid such as a solution of oxalic acid which is pumped to the brushes. A flexible pipe 76 connects this tank with a horizontally extending pipe 77 suitably carried by the bar 52. From the pipe 77 a series of flexible tubes or hose 78 carry the fluid to the brushes 48. When desired and depending upon the nature of work to be done, a hose or tube may connect the pipe 77 with each brush, or only certain of the brushes at the forward end of the vehicle may be so connected so as to be provided with cleaning fluid.

It is important in order to obtain the most efficient results to have the cleaning liquid heated to the proper temperature, and in order to accomplish this, I provide a flexi-

ble pipe 79 connected to the exhaust of the engine, and this pipe extends through the tank 75 and has an outlet 81, see Fig. 1. The pipe 79 is heated by the exhaust of the engine and thereby heats the cleaning fluid within the tank 75, and the temperature thereof may be regulated by means of a two-way valve 80 in the pipe line 79 which enables the exhaust to be diverted before reaching the tank 75.

An air pump cylinder 82 is mounted beneath the platform 15^a alongside of the fluid tank 75. The cylinder 82 is connected to the tank 75 by means of a pipe line 83, see Fig. 3, and a suitable valve mechanism 84 is provided within the pipe line. This valve mechanism may be manipulated to divert the air forced under pressure from the cylinder 82 away from the tank 75 and also comprises a suitable check valve. A piston 82^a is located within the cylinder 82 and is connected to a piston rod 83. This rod at its rear end is pivoted to a lever 84 which is fulcrumed or pivoted to a bracket 85 secured to the bottom of the platform 15^a. A link 86 is connected to the lever 84 and also connected to an eccentric 87 secured to the lower end of a hollow shaft 89 supported in a bearing bracket 88 secured to the bottom of the platform 15^a. A square shaft 91 extends into a squared bore in the shaft 89, the shaft 91 extending through the platform 22 and at its upper end having a bushing 90 supported on the top of the platform 22, see Fig. 8. Carried by the bushing 90 is a bevel gear 90^a which meshes with a bevel gear 92 secured to the shaft 35. It is to be noted that the shafts 89 and 91 are telescoped, so that on raising or lowering the platform 22, the shaft 91 may slide lengthwise relatively to shaft 89 but will be connected thereto at all times for rotation.

From the foregoing train of mechanism it will be noted that the eccentric 87 will rotate thereby causing through the crank connection 86 an oscillation of the lever 84, which will reciprocate the piston rod 83 and piston 82^a. This operation results in forcing air from the cylinder 82 into the tank 75 thereby forcing the fluid through the pipes 76 and 77 to the brushes.

On the upper end of the shaft 89 is pinned a pulley wheel 93 which rotates on a suitable bearing on the upper face of the platform 15^a. This pulley is connected by means of a belt 94 (see Fig. 3) to a pulley wheel 95 loosely mounted on an enlarged portion 96 of a vertical shaft 97 (see Figs. 1 and 9). The shaft 97 at its lower end is provided with a bevel gear 98 meshing with a bevel gear 99 on a cross shaft 100 journaled in suitable bearing brackets extending from the side bars 14 of the truck. The shaft 100 at opposite ends carries sprocket gears 101, and a sprocket chain 102 connects each

gear with a sprocket gear 103 connected to a driving wheel 11. The shaft extension 96 above the pulley wheel 95 is provided with a vertical keyway 104 within which slides a key 105 which projects outwardly from the shaft portion 96 and is carried by an arm 106 rotatably connected to a lever 107. This lever is fulcrumed at 108 on a post 109 carried by the platform 15^a. The pulley wheel 95 which is loose on the shaft extension 96 is provided with a lug 111 in position to engage the key 105 when the latter is located in its lowest position in the keyway 104. By means of a spring 110, the lever 107 is normally held in position so that the key 105 will lie in the path of the lug 111. The pulley wheels 93 and 95 are constantly driven from the shaft 89, and when the key 105 is in its lowest position, the lug 111 will engage the key and thereby rotate the shaft extension 96. This operation will drive the gears 98 and 99, the sprockets 101 and thereby drive the wheels 11 of the vehicle. By forcing down the outer end of the lever 107, the key 105 will be raised in the keyway 104 so as to disengage the key from the lug 111, and at this time the shaft 96 will be disconnected from the shaft 89 thereby stopping the movement of the truck.

Meshing with the bevel gear 92 on shaft 35 and above the bevel gear 90^a is a bevel gear 112 which is secured to a cross shaft 113 (see Fig. 8). This shaft is supported in suitable bearings carried by a bracket 114 mounted on the platform 22, and the shaft 113 is reduced in diameter and squared to telescope with a shaft 115 which has a square bore to receive the shaft 113. At its outer end the shaft 115 is provided with a bevel gear 116, meshing with a bevel gear 117, which are connected together by means of an angle bracket 119. The bevel gear 117 is secured to a vertical rotary shaft 118. This shaft at its lower end is connected by means of a universal joint with a slide block 121 which is housed for sliding movement within a transverse slideway 120 secured to the platform 22. A vertical supporting bar 122 is secured at its lower end to the bracket 119 and extends in parallelism with the shaft 118. This supporting bar 122 is connected to the shaft 118 at a plurality of points by means of spring controlled plungers 123 which are bored at their outer ends to receive the shaft 118 and permit rotation thereof.

Connected at 124^a to the supporting bar 122 is a shaft or spindle 124 which is provided with threads 123^b cooperating with threads in a bore tapped in the bar 52. The spindle 124 at its rear end is provided with a handle 125, so that by turning this handle the screw or spindle 124 will be rotated thereby shifting the supporting bar 122 laterally in either direction. This oper-

ation will shift the shaft 118 laterally in the slideway 120 and the shaft 115 will also slide in conformance with this movement by virtue of its telescopic connection with the shaft 113. Adjustably mounted on the shaft 118 are a plurality of rotary brushes 126. These brushes are constructed so that they can be adjusted at different points on the shaft 118 so that they may act in conjunction with the brushes 48 to scrub or wash any surfaces which are not reached by the reciprocating brushes 48.

By means of the screw 124, the brushes 126 may be adjusted toward and from the side of the car, and the spring plungers 123 permit slight yielding movement of the shaft 118 during the operation of the brushes or when they are adjusted against the side of the car.

From the foregoing construction the operation of the present machine will be readily understood. All of the operating mechanisms are controlled from the engine 32. The rotary shaft 35 driven from the drive shaft 33 of the engine by means of gears 34 and 36 operates through the belt 38 and pulleys 37 and 39, the shaft 40. This shaft through the eccentric connections with the shaft 41 reciprocates the latter vertically thereby reciprocating the brush rods 47. The shaft 35 in addition operates the air pump 82 through the medium of bevel gears 92 and 90^a, telescopic shafts 89 and 91, eccentric 87, which latter is connected by a crank 86 to a swinging lever 84. The piston rod 83 is reciprocated from the lever 84 thereby forcing air from the cylinder 82 into the fluid tank 75. The air forced under pressure from the cylinder 82 may be diverted away from the tank 75 by means of the valve 84. The fluid is forced through the pipe connections to the brushes thereby supplying them with cleaning fluid. The fluid in the tank 75 is heated by means of the exhaust of the engine conducted by means of pipe 79 through the tank. The driving wheels 11 of the vehicle are also driven from the shaft 89 by means of the belt 94 and pulley wheels 93 and 95, which drive the sprocket wheels 101. The cross shaft 100 connected to the sprockets 101 may be disconnected from the shaft 89 by operating the lever 107, so that the truck may be moved at a definite speed during the operation of the brushes, or may be stopped independently of the operation of the brushes.

An idler pulley 130 is carried by the shaft 35 adjacent the pulley wheel 37, and by shifting the belt 38 from the pulley 37 to the pulley 130, the shaft 40 may be stopped independent of the operation of the shaft 35 thereby stopping the reciprocation of the brushes 48 independently of the rotary brushes 126.

It will be further noted that all of the

brushes may be simultaneously adjusted vertically by raising or lowering the platform 22 which is accomplished by turning the crank 26. Furthermore, the brush rods 47 and brush shaft 118 may all be swung laterally toward or from the car by adjusting the bar 52 in the slideway 51, this being accomplished by turning the handle 74. Furthermore, each brush rod 47 may be independently adjusted laterally by means of the lever 60. This is an important feature where a series of cars are being washed, since when the truck reaches the open space between the adjacent ends of two cars, it is desirable to successively shift the brush rods rearwardly when each brush reaches the space between the ends of the cars.

The brush rods 47 are inclined upwardly from the truck, so that in operation the platform 22 will run underneath the side of the car in the space adjacent to the car wheels, and since the brushes overhang the platform 22 they may be operated vertically against the side of the car. It is to be understood that the brush rods 47 may be slanted outwardly at different angles in accordance with the necessary conditions of use. The outward slope or incline of the brush rods 47 shown in the drawings are merely illustrative, and it will of course be understood that where sufficient clearance between the truck and the car to be washed is required the normal slant of the brush rods which is determined by the length of the plungers 55 may be increased as desired. One of the important features however, resides in the outward sloping of the brush rods 47 which are mounted to permit vertical reciprocation and at the same time enable the truck to run along the side of the car. It is also to be noted that the brushes 48 are reciprocated and the brushes 120 rotated through driving connections with the shaft 35, and at the same time the vehicle is moved at a uniform speed through drive connections with the same shaft, so that these driving connections are so proportioned that the speed of the vehicle will be at a given ratio to the speed of operation of the brushes thereby enabling the side of the car to be thoroughly cleaned from one end to the other.

In the present instance, the cross shaft 113 for driving the vertical brush shaft 118 extends above the shaft 41, and the latter shaft may be provided with an offset 150 (see Figures 6 and 8) to obtain sufficient clearance during the vertical reciprocation of shaft 41.

It is to be understood that by describing in detail herein any particular form, structure or arrangement, it is not intended to limit the invention beyond the terms of the several claims or the requirements of the prior art.

Having thus explained the nature of my

said invention and described a way of constructing and using the same, although without attempting to set forth all of the forms in which it may be made, or all of the modes of its use, I claim:

1. In a railway car washing machine, the combination of a support, a horizontal shaft mounted on said support for vertical bodily reciprocation, a plurality of vertically disposed brush carrying rods carried by said shaft and means connected to said shaft for vertically reciprocating the shaft bodily and thereby the rods.

2. In a railway car washing machine, the combination of a support, a plurality of brush carrying rods slidably and pivotally connected to said support, means for reciprocating said rods, means for adjusting the rods about their pivots laterally relatively to said support and means for adjusting said support vertically.

3. In a railway car washing machine, the combination of a support, a vertical array of shafts rotatably mounted thereon, brushes carried by said shafts, a horizontal stub shaft operatively connected to the vertical shaft, a horizontal rotary shaft telescopically connected to said stub shaft for rotating the same and means for laterally adjusting said brush carrying shafts relatively to said horizontal shaft.

4. In a railway car washing machine, the combination of a supporting truck, a support thereon, a plurality of vertically disposed inclined rods slidably and pivotally connected to said support, brushes carried thereby, spring acting means between said rods and a fixed element for yieldingly maintaining the rods in inclined working position, and means for reciprocating said rods relatively to said spring acting means.

5. In a machine of the class described, the combination of a supporting truck, a plurality of inclined vertical brush carrying rods mounted on said truck, yielding means engaging a fixed element of said truck and said rods for retaining said rods in working position, means connected to said rods for reciprocating the same relatively to said yielding means, and means for shifting said rods laterally to vary the inclined position of said rods.

6. The combination of a support, a plurality of brush carrying rods pivoted thereto in inclined position and arranged for vertical reciprocation with the brushes in substantially a common plane, means for simultaneously shifting said rods vertically into various adjusted positions, means for simultaneously shifting said rods horizontally relatively to said support to vary the inclined position of the rods, and means for reciprocating said rods relatively to said last means.

7. The combination of a support, a plurality of upright brush carrying rods pivoted

to said support and arranged for vertical reciprocation with the brushes in substantially a common plane, means for simultaneously swinging said rods into various adjusted positions relatively to said support, means for independently swinging each rod relatively to another, and means for reciprocating said rods relatively to both of said means.

8. The combination of a support, a plurality of vertically disposed inclined rods pivotally and slidably connected to said support, brushes carried by said rods, means for reciprocating said rods, a plurality of vertically disposed rotary shafts, brushes carried by said shafts and adapted to operate on a common surface with the first named brushes, means for rotating said shafts, and a common means for simultaneously adjusting said rods and shafts to vary the operating positions thereof.

9. The combination of a support, a plurality of vertically disposed shafts, brushes carried thereby, means for rotating said shafts, a series of vertically disposed inclined rods pivotally and slidably connected to said support, brushes carried thereby and adapted to operate upon a common surface with the first named brushes, means for adjusting the rods laterally, means for vertically reciprocating the rods, and a common means for adjusting said shafts and rods vertically.

10. In a machine of the class described, the combination of a wheeled supporting truck, a series of vertically disposed brush carrying members reciprocally mounted thereon and having brushes normally located in different horizontal planes, a vertically arranged rotary shaft, a brush carried thereby and adapted to operate on a common surface with the first named brushes, a power driven shaft carried by the truck, and mechanism connected to said last shaft for reciprocating said members and for simultaneously rotating said rotary brush.

11. In a machine of the class described, the combination of a wheeled supporting truck, a series of vertically disposed brush carrying members reciprocally mounted thereon and having brushes normally located in different horizontal planes, a plurality of vertically arranged rotary shafts, brushes carried thereby and adapted to operate on a common surface with the first named brushes, a power driven shaft carried by the said truck, and mechanism connected with said last shaft for reciprocating said members and rotating said brush shafts and for simultaneously moving said truck.

12. In a machine of the class described, the combination of a wheeled supporting truck, a series of vertically disposed brush carrying members reciprocally mounted thereon and having brushes normally lo-

cated in different horizontal planes, a power driven shaft carried by the truck, mechanism connected to said shaft for reciprocating said members, a fluid carrying tank having pipe connections with certain of said brushes, and mechanism operated from said shaft for supplying fluid to said brushes.

13. In a machine of the class described, the combination of a wheeled supporting truck, a plurality of rods reciprocally mounted thereon and having scrubbing members connected thereto, a motor carried by said truck, motion translating means between said motor and rods for simultaneously reciprocating said rods, means for simultaneously adjusting said rods to vary the horizontal and vertical positions thereof, and means for independently adjusting each rod.

14. The combination of a wheeled supporting truck, a platform carried thereby, a horizontally extending shaft carried by said platform and mounted for vertical bodily reciprocation, a plurality of brush carrying rods connected to said shaft, means for vertically reciprocating said shaft, and means for vertically adjusting said platform.

15. The combination of a support, a plurality of brush carrying rods, means connected to the ends thereof for reciprocating the rods, and spring acting means connected to the rods intermediate the ends thereof for retaining the rods in predetermined working position, said means permitting the reciprocation of the rods relatively thereto.

16. The combination of a support, a platform carried thereby, a horizontally extending shaft carried by said platform, means for guiding said shaft for vertical reciprocation, means for vertically reciprocating said shaft, and a plurality of brush carrying members tiltably connected to said shaft.

17. The combination of a support, a platform carried thereby, a plurality of swingingly and reciprocally mounted brush carrying members supported on said platform, means for reciprocating said members, means for vertically adjusting said platform, means for simultaneously swinging said members laterally relatively to the platform, and means for independently swinging each member to adjust the same.

18. The combination of a wheeled supporting truck, a power driving means carried thereby, a vertical brush carrying shaft, means connected with said power driving means for rotating said brush shaft, means also connected with said power driving means for moving the truck during the rotation of said brush and means for bodily shifting said shaft relatively to said power driving means thereby to adjust the position of the brush.

19. The combination of a support, a horizontal shaft carried thereby and arranged for bodily reciprocation, a series of tiltable brush carrying rods mounted on said shaft and swingable about the axis thereof, spring acting means for urging said rods into working position, means for adjusting said rods laterally against the action of said springs, and means for reciprocating said rods relatively to said spring acting means.

20. The combination of a support, a plurality of pivotally mounted rods, brushes carried at the outer ends of said rods, means connected to the inner ends of the rods for reciprocating the same, and means connected to said rods intermediate the ends thereof and to a fixed element for yieldingly maintaining the rods in their working position and effective to permit the reciprocation of the rods relatively thereto.

21. The combination of a support, a plurality of pivoted brush carrying rods, a spring controlled device for independently swinging each of said rods, a slide carrying said spring controlled devices, means for adjusting said slide to simultaneously swing said rods, and means for reciprocating the rods relatively to said devices.

22. The combination of a support, a plurality of rods carried thereby, brushes carried by said rods, means for reciprocating said rods, a fluid carrying tank having pipe connections with said brushes, means connected to said tank for forcing air into the tank to supply fluid to said brushes, and means controlled by said reciprocating means for operating said second means.

23. In a railway car washing machine, the combination of a supporting truck, a plurality of upright reciprocating rods tiltably connected to said truck, scrubbing means carried by said rods, and common means for simultaneously shifting the truck at a uniform speed and reciprocating said scrubbing rods.

24. In a railway car washing machine, the combination of a truck, power driving means carried thereby, a shiftable platform carried by the truck, means for raising and lowering the platform, a series of inclined and yieldingly supported brush carrying rods reciprocally mounted on the platform, means actuated by the power driving means for reciprocating said rods, and means for laterally adjusting said rods.

25. In a railway car washing machine, the combination of a truck, power driving means carried thereby, a shiftable platform carried by the truck, means for raising and lowering the platform, a series of inclined and yieldingly supported brush carrying rods reciprocally mounted on the platform, means actuated by the power driving means for reciprocating said rods, means for later-

ally adjusting said rods, and means for independently moving said rods laterally.

26. In a railway car washing machine, the combination of a truck, power driving means carried thereby, a shiftable platform carried by the truck, means for raising and lowering the platform, a series of inclined and yieldingly supported brush carrying rods reciprocally mounted on the platform, means actuated by the power driving means for reciprocating said rods, means for laterally adjusting said rods, means for independently moving said rods laterally, and means for holding the rods in their retracted position.

27. In a railway car washing machine, the combination of a truck, power driving means carried thereby, a shiftable platform carried by the truck, means for raising and lowering the platform, a series of inclined and yieldingly supported brush carrying rods reciprocally mounted on the platform, means actuated by the power driving means for reciprocating said rods, means for laterally adjusting said rods, means connected with the power driving means for driving the truck at a uniform speed, means for stopping the truck without stopping the reciprocating brush rods, and means for stopping the reciprocating brush rods without stopping the truck.

28. In a railway car washing machine, the combination of a truck, power driving means carried thereby, a shiftable platform carried by the truck, means for raising and lowering the platform, a series of inclined and yieldingly supported brush carrying rods reciprocally mounted on the platform, means actuated by the power driving means for reciprocating said rods, means for laterally adjusting said rods, a rotary shaft also carried by the platform, a brush carried thereby and adapted to work in the common plane of the first named brushes, means also operative by the power driving means for rotating the brush shaft and means for adjusting said rotary brush shaft laterally.

29. In a railway car washing machine, the combination of a truck, power driving means carried thereby, a shiftable platform carried by the truck, means for raising and lowering the platform, a series of inclined and yieldingly supported brush carrying rods reciprocally mounted on the platform, means actuated by the power driving means for reciprocating said rods, means for laterally adjusting said rods, means connected with the power driving means for driving the truck at a uniform speed, means for stopping the truck without stopping the reciprocating brush rods, means for stopping the reciprocating brush rods without stopping the truck, a rotary shaft also carried by the platform, a brush carried thereby and

adapted to work in the common plane of the first named brushes, means also operative by the power driving means for rotating said brush shaft, and means for adjusting said rotary shaft laterally.

30. In a railway car washing machine, the combination of a truck, power driving means carried thereby, a shiftable platform carried by the truck, means for raising and lowering the platform, a series of inclined and yieldingly supported brush carrying rods reciprocally mounted on the platform, means actuated by the power driving means for reciprocating said rods, means for laterally adjusting said rods, means connected with the power driving means for driving the truck at a uniform speed, means for stopping the truck without stopping the reciprocating brush rods, means for stopping the reciprocating brush rods without stopping the truck, a rotary shaft also carried by the platform, a brush carried thereby and adapted to work in the common plane of the first named brushes, means also operative by the power driving means for rotating said brush shaft, means for adjusting said rotary shaft laterally, and means also connected with the power driving means for supplying a heated cleaning fluid to certain of the brushes.

31. In a railway car washing machine, the combination of a truck, power driving means carried thereby, means connected therewith for driving the truck at a uniform speed, a shiftable platform carried by the truck, means for raising and lowering the platform, a series of inclined and yieldingly supported brush carrying rods reciprocally mounted on the platform, means also actuated by the power driving means for reciprocating said rods, means for laterally adjusting said rods, means for independently moving said rods laterally, means for hold-

ing the rods in their retracted position, means for stopping the truck without stopping the reciprocating brushes, means for stopping the reciprocating brushes without stopping the truck, a yieldingly supported rotary shaft also carried by the platform, a brush carried thereby and adapted to work in the common plane of the first named brushes, means also operative by the power driving means for rotating said brush shaft, means for adjusting said rotary brush shaft laterally, and means also connected with the power driving means for supplying a heated cleaning fluid to certain of said brushes.

32. In a railway car washing machine, the combination of a support, a horizontal shaft mounted on said support for vertical bodily reciprocation, a plurality of vertically disposed brush carrying rods pivotally connected to said shaft, actuating means for raising and lowering the shaft bodily thereby to reciprocate the rods, means for vertically adjusting the shaft and actuating means and thereby the rods and means for laterally adjusting the rods.

33. The combination of a support, a plurality of vertically disposed shafts carried thereby, brushes carried by said shafts, means for rotating said shafts, a series of vertically disposed rods tiltably connected with said support, brushes carried thereby and adapted to operate on a common surface with the first named brushes, means for adjusting the rods laterally, means for vertically reciprocating the rods, common means for adjusting said shafts and rods vertically, and means for adjusting said shafts laterally.

Signed at 1822 Park Row Bldg., New York, New York this 24th day of February, 1925.

CHARLES KEVLIS.