

[54] **WRAPAROUND BRUSHING DEVICES**
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Related U.S. Application Data

[63] Continuation of Ser. No. 81,133, Oct. 15, 1970, abandoned.
[52] U.S. Cl. 15/21 D, 15/DIG. 2
[51] Int. Cl. B60s 3/06
[58] Field of Search.....15/DIG. 2, 21 D, 21 E, 53.97

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[57] ABSTRACT

A wraparound brushing device 20 (FIGS. 1-4) has a linkage carrying a brush and urged toward a normal position by a spring and a counterweight. A top brushing device 120 (FIGS. 5 and 6) includes a pair of linkages at each side which fold as the brush rolls over the top of a car and then unfold to cause the brush to follow the rear surfaces of the car. Wraparound brushing devices 220 (FIG. 7), 320 (FIG. 8), 420 (FIG. 9) and 520 (FIG. 10) are moved around moving cars solely by the action of rotating brushes and constantly operative biasing means.

11 Claims, 10 Drawing Figures

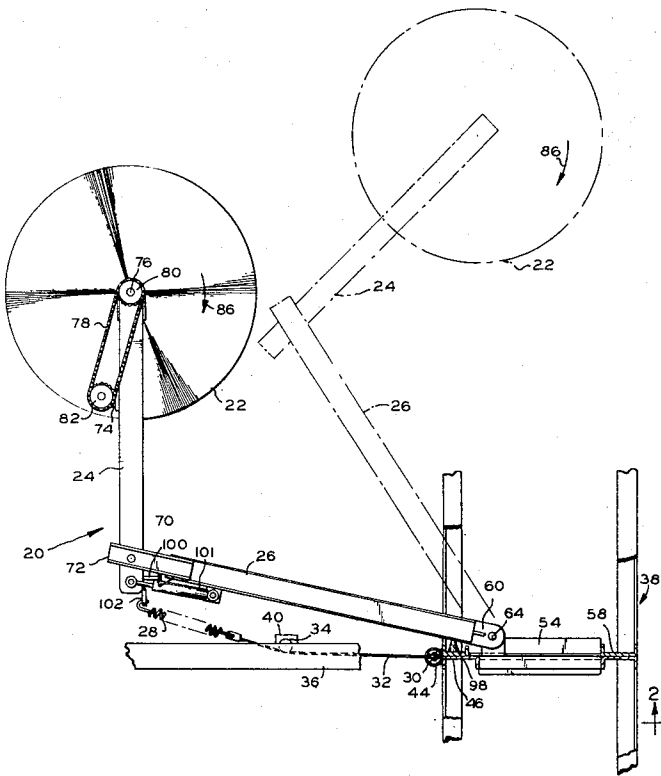


FIG. 2

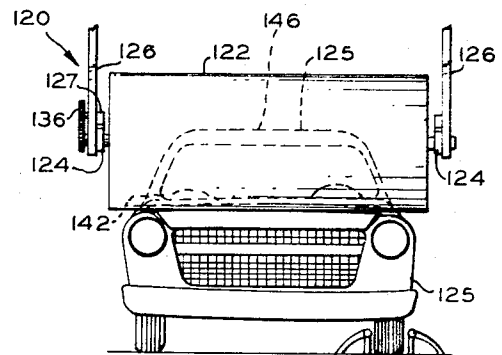
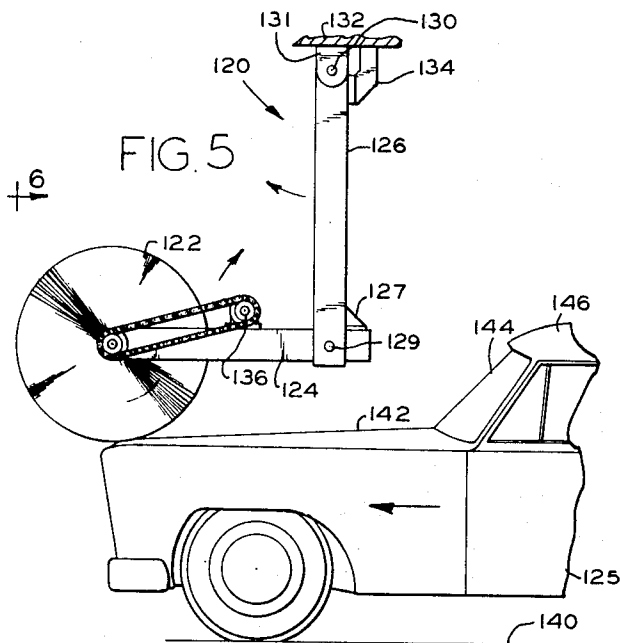
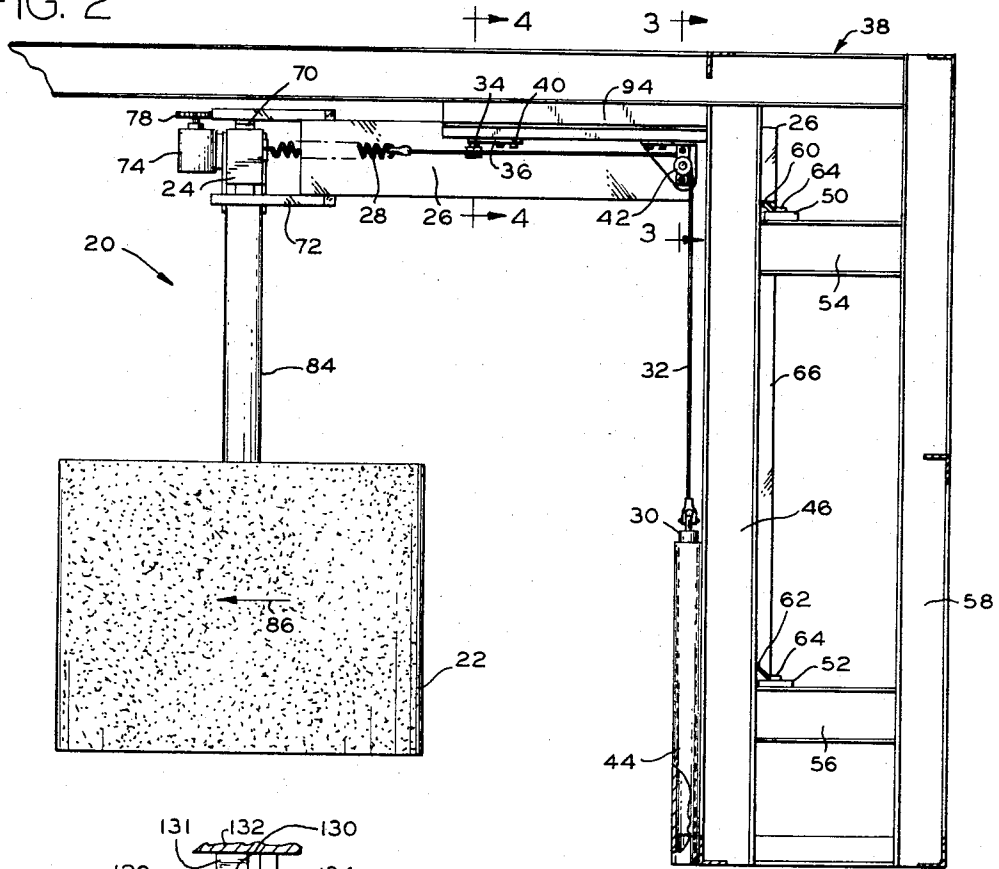


FIG. 6

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FIG. 7

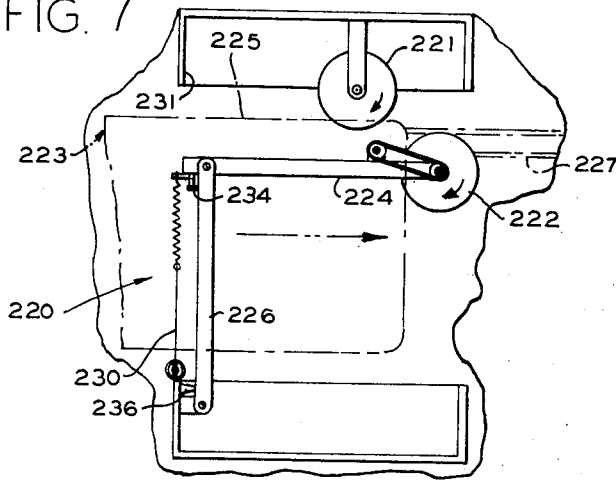


FIG. 8

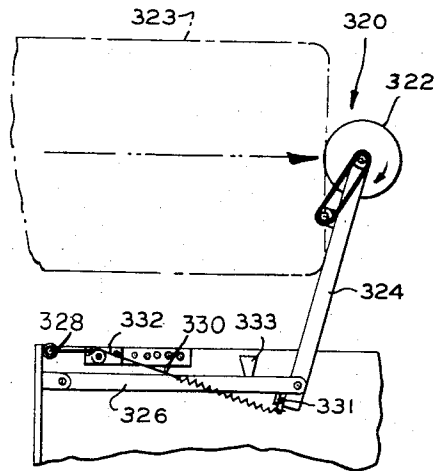


FIG. 9

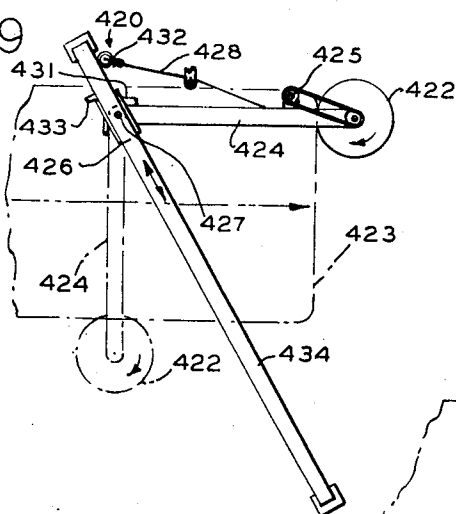
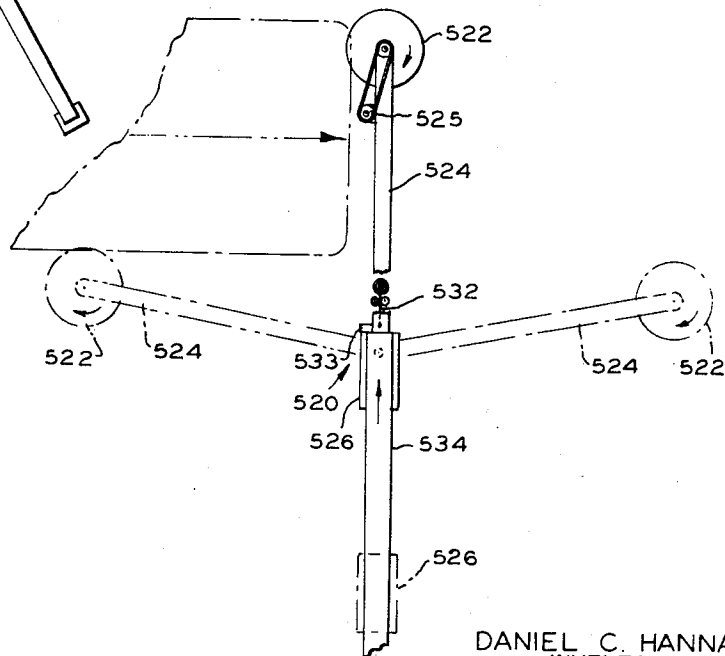


FIG. 10



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WRAPAROUND BRUSHING DEVICES

This is a continuation, of application Ser. No. 81,133, filed Oct. 15, 1970.

This invention relates to improved wraparound brushing devices, and more particularly to improved automatic wraparound brushing devices.

An object of the invention is to provide improved wraparound brushing devices.

Another object of the invention is to provide improved automatic wraparound brushing devices.

A further object of the invention is to provide improved wraparound brush actuators.

Another object of the invention is to provide a wraparound brush device including a rotary brush which is held against a car and is driven at least half way around a car solely by reaction of the car on the brush and by a biasing mechanism including a counterweight and adjustable guide means to control the force of the counterweight exerted on the brush.

Another object of the invention is to provide an improved wraparound brushing device in which a fixed rotary brush mechanism cleans one side of a car and a movable rotary brush mechanism cleans the entire front end, the other side and the entire back end of the car.

A further object of the invention is to provide a wraparound brush device wherein a first, supporting arm normally is biased toward a position extending forwardly along the side of a path of a car and carries pivotally a second, brush carrying arm in a normal position extending across the path of the car with biasing means biasing the arms toward the normal positions thereof, with the rotation of the brush, constituting the sole driving force of the device.

Another object of the invention is to provide an improved wraparound brush device including an overhead monorail inclined across a path of a car and carrying a carriage which pivotally mounts an overhead arm carrying a rotary brush, with the arm normally biased toward a position extending forwardly along the path.

Another object of the invention is to provide an improved wraparound brush device including an overhead arm carrying a rotary brush and mounted pivotally by a carriage movable on a monorail extending transversely of the path with the arm biased toward a normal position extending transversely of the path and swingable forwardly to move off the front end of the car, the arm also being swingable rearwardly as the brush moves along the side of the car and then swingable forwardly to keep the brush against the rear end of the car.

Another object of the invention is to provide a wraparound brush device in which a rotary top brush is carried by a first pair of normally forwardly extending arms bracketing a path of a car and a second pair of normally downwardly extending arms bracketing the path of the car to pivotally mount the first pair of arms.

The invention provides improved wraparound brush devices in which counterweighted biasing mechanisms bias arms to normal positions holding rotary brushes in the paths of cars and holding the brushes against the car with the brushes being rotated in directions such that reaction forces of the cars thereon move the brushes around the front end side and rear end of the car. In a device forming a specific embodiment of the invention, a first overhead arm pivotally mounted on an

arch carries a brush carrying arm and a cable and a spring connect a counterweight to the second arm to bias the arms toward normal positions in which one of the arms extends transversely of the path of the car and the other arm extends along the path of the car, the cable traveling around a pulley which is adjustable to vary the force exerted on the arms. In a wraparound brush device forming an alternate embodiment of the invention, a rotary top brush is carried by a first pair of forwardly extending arms pivotally mounted on a second pair of downwardly extending arms mounted pivotally on an arch with both pairs of arms bracketing the path of a car to be cleaned. Another improved wraparound brush device forming an alternate embodiment of the invention includes a first rotary brush positioned for rotation on a fixed axis at one side of a path of a car guided by a track to brush the adjacent side of the car, and a second rotary brush is carried by a pivoted arm construction for travel sequentially across the front end of the car along the side of the car remote from the first brush and across the rear end of the car. Another wraparound brush device forming an alternate embodiment of the invention includes a first pivotal arm extending forwardly along the side of the path of a car and a brush carrying second arm pivotal on the first arm between a normal position extending transversely of the path and a second position folded back on the first arm with a single biasing mechanism crossing the first arm and urging the first arm toward the car and the second arm forwardly. In another wraparound brush device forming an alternate embodiment of the invention, an overhead carriage is slidable along a monorail forwardly and across the path of a car and pivotally mounts an overhead brush carrying arm. In another wraparound brush device forming an alternate embodiment of the invention, an overhead brush carrying arm pivoted on a carriage movable along a monorail transversely away from the path of a car is biased toward a normal position extending transversely of the path and may be swung forwardly and rearwardly.

A complete understanding of the invention may be obtained from the following detailed description of improved wraparound brush devices forming specific embodiments thereof, when read in conjunction with the appended drawings, in which:

FIG. 1 is a top plan view of an improved wraparound brush device forming one embodiment of the invention;

FIG. 2 is a front elevation view of the brush device of FIG. 1;

FIG. 3 is an enlarged vertical section taken along line 3—3 of FIG. 2;

FIG. 4 is an enlarged vertical section taken along line 4—4 of FIG. 2;

FIG. 5 is a side elevation view of an improved wraparound brush device forming an alternate embodiment of the invention;

FIG. 6 is a front elevation view taken along line 6—6 of FIG. 5; and

FIGS. 7, 8, 9 and 10 are top plan views of improved wraparound brush devices forming alternate embodiments of the invention.

Referring now in detail to the drawings, a wraparound brush device 20 includes a rotary brush 22 carried by an overhead brush carrying arm 24 pivotally

mounted on an arm 26. A biasing mechanism includes a spring 28 connected to the arm 24, a counterweight 30 and a cable 32 connecting the counterweight 30 and traveling around a pulley 34 carried adjustably on an elongated channel member 36 of an arch or fixed frame 38 by a bracket 40. The bracket 40 is bolted to the frame member 36 and is adjustable along the frame member 36 to vary the angle from the pulley 34 to the point of attachment of the spring 28 to the arm 24. A second pulley 42 is mounted on the arch for rotation on a fixed axis and the cable extends vertically therefrom to the counterweight 30 which is slidable in a vertical tubular container 44 fixed rigidly to a post portion 46 of the arch in a position directly below the pulley 42. Vertically aligned bearings 50 and 52 are mounted on cross members 54 and 56 welded to the post portion 46 and a post portion 58 of the arch. Brackets 60 and 62 fixed to a vertical leg 66 of the arm 26 are mounted pivotally on pins 64 of the bearings to mount the arm 26 pivotally.

The arm 24 (FIGS. 1 and 2) is mounted pivotally on a vertical axis and on the free end of the arm 26 by a pin and bearing construction 70 and a clevis-like member 72. An electric or hydraulic motor 74 mounted on the arm 24 drives a vertical shaft 76 through a chain 78 and sprockets 80 and 82. The shaft is journaled in radial and thrust bearings in tubular member 84, and the brush 22 is mounted on and keyed to the lower end of the shaft. The motor rotates the brush in the direction of an arrow 86.

The pulley 34 (FIGS. 1 to 4) is carried by the bracket 40 which is clamped by plate 90 and bolts 92 to the channel-like member 36 in the desired position of adjustment. The member 36 is fixed to spacer member 94 fixed to overhead cross member 96 of the arch 38. The bolts 92 are secured to the bracket 40, and the nuts on the bolts may be loosened, the bracket 40, the spacer member 94 and the bolts be slid along the member 40 and the nuts retightened to adjust the position of the pulley 34 longitudinally relative to the arm 26. This adjustment changes the angle of the tension means 28, 32 relative to the arms 24 and 26, thus enabling optimum angular positioning of the tension means.

In the operation of the wraparound brush device 10, a car is driven upwardly as viewed in FIG. 1, and engages the rotating brush 22 and swings, against the action of the counterweight 30, the brush, the arm 24 and the arm 26 clockwise until the brush clears the right front corner of the car. The brush 22 then engages the right side of the car and drives itself rearwardly to fold or cock the arm 24 back along the arm 26 and the arm 26 is moved back to its normal position engaging a cushioned stop 98. Then when the right rear corner of the car clears the brush the arm 24 is swung forwardly and across the rear end of the car to its normal position engaging a cushioned stop 100 on the arm 26, the counterweight 30 continuously urging the arms 24 and 26 toward their normal positions and serving to hold the brush against the car throughout the passage of the car past the brush. The spring 28 takes away sudden shocks and is fastened to bracket 102 fixed to the arm 24. A shock absorber 101 exerts a slowing or damping effect on the folding movement of the arm 24.

EMBODIMENT OF FIGS. 5 AND 6

A brush device 120 forming an alternate embodiment of the invention includes a rotary brush 122 carried for rotation on a horizontal axis by arms 124 spaced farther apart than the width of a car 125 to be brushed and extending along the path of the car on opposite sides of the path of the car. The arms are normally in horizontal, forwardly extending positions engaging stops 127 of arms 126 to which the arms 124 are pivoted by pins 129. The arms 126 also bracket, with clearance, the path of the car 125 and are pivotally mounted on aligned horizontal pins 130 carried by brackets 131 fixed to an overhead cross member 132 of an arch or frame. Gravity urges the arms 124 and 126 toward their normal positions in which the arms 126 are vertical and engage stops 134 carried by the member 132 and the arms 124 are horizontal and engage the stops 127. An electric or hydraulic motor 136 rotates shaft 138 supporting and keyed to the brush 122 to rotate the brush 122 clockwise, as viewed in FIG. 5.

As the car 125 is advanced continuously to the left, as viewed in FIG. 5, along its path 140 between the arms 124 and 126, a hood 142 of the car engages and is brushed by the brush 122. Then the windshield 144 of the car engages, is brushed by, and pushes the brush forwardly with the car, the brush and the arms 124 and 126 swinging clockwise as a unit until top 146 of the car is engaged by the brush. Then the reaction of the car from the brush rotation folds the arms 124 upwardly and back on the arms 126 and moves the arms 126 back to their normal positions. Then, as the rear window comes to the brush, the arms 124 swing the brush forwardly and downwardly to keep the brush in engagement with the rear window. The brush then engages the top of the trunk and brushes it.

EMBODIMENT OF FIG. 7

A wraparound brush device 220 forming an alternate embodiment of the invention is used with a rotary brush 221 rotated on a fixed vertical axis in an arch 231 and serving to brush lefthand side 225 of a car 223 as the car 223 moves continuously from left to right along a wheel guiding track 227. The device 220 is identical with the brush device 20 except that overhead arms 224 and 226 carrying rotated brush 222 are sufficiently longer than the arms 24 and 26 that the brush 222 normally is positioned in the path of the left hand corner portion of the car 223 and brushes the entire front end and the entire rear end of the car as well as the righthand side of the car. A counterweighted biasing mechanism 230 normally holds the arm 224 against stops 234 and arm 226 against stop 236 in which positions the arm 224 extends forwardly along and over the lefthand portion of the car and the arm 228 extends directly across and over the path of the car.

In the operation of the device 220 and the brush 221, the car is driven along the path with its lefthand wheels in the track 227. The brush 221 brushes the lefthand side of the car. The left front corner of the car engages the brush 222 and swings the brush and the arms 224 and 226 as a unit clockwise until the brush clears the right front corner. The brush then engages the righthand side of the car and folds the arm 224 back on

the arm 226 and returns the latter to its normal position. Then, as the right rear corner of the car clears the brush, the brush is swung forwardly with the car and entirely across the rear end of the car to brush the entire rear end of the car.

EMBODIMENT OF FIG. 8

A wraparound brush device 320 forming an alternate embodiment of the invention is like the device 20 except that an overhead arm 324 carrying a rotary brush 322 is normally in a position extending transversely across the path of a car 323 and an arm 326 pivotally mounting the arm 324 normally is in a position extending forwardly along the side of the path of the car. A counterweighted biasing mechanism 328 crossing the arm 326 and secured to the arm 324 urges the arm 324 clockwise toward its normal position engaging a stop 331 and urges the arm 326 counterclockwise toward its normal position engaging a stop 333. The biasing mechanism includes a cable 330 guided by an adjustable pulley mechanism 332. A motor 338 continuously drives the brush 322 in a clockwise direction, as viewed in FIG. 8.

In the operation of the wraparound brush device of FIG. 8, the front end of the car 323 first engages the brush 322 and swings the brush 322 and the arms 324 and 326 as a unit clockwise until the brush clears the right front corner of the car. Then the brush, in effect, rolls itself rearwardly along the car to move the arm 324 to a rearwardly extending position folded on the arm 326 which is moved back to its normal position engaging the stop 333. Then when the right rear corner of the car clears the brush, the arm 324 swings the brush forwardly with and across the rear end of the car.

EMBODIMENT OF FIG. 9

A wraparound brush device 420 includes a brush 422 driven in a clockwise direction by motor 425. The brush and motor are carried by an overhead arm 424 pivotally mounted on an overhead carriage 426 and biased counterclockwise by a counterweighted biasing mechanism 432 toward a normal position engaging a stop 431 on the carriage. The biasing mechanism also urges the carriage along an overhead monorail 434 extending obliquely across the path of the car 423 to a normal position engaging stop 433 on the monorail. The carriage is somewhat elongated and has no tendency to turn on the monorail but slides easily therealong. The arm 424 is mounted pivotally on the carriage by a vertical pin and bearing structure 427.

In the operation of the wraparound brush device 420, with the car 423 being advanced along its path toward the right, as viewed in FIG. 9, and the arm 424 and the carriage 426 in their normal positions, the car engages and pushes the brush 422 forwardly. This pulls the carriage along the monorail forwardly and across the path to move the brush across the path until the brush clears the right front corner of the car, the brush brushing the front end of the car and driving itself to the right from reaction to the brushing movement. Then the brush brushes the side of the car and drives itself rearwardly along the side of the car to swing the arm 424 clockwise to the broken line position thereof and return the carriage 426 to its normal position. The arm 424 then extends primarily across the path of the

car. Then, after the right rear corner clears the brush, the biasing mechanism 432 swings the arm 424 counterclockwise to move the brush forwardly with and across the rear end of the car to keep the brush in contact with the rear end of the car until the arm 424 reaches its normal position.

EMBODIMENT OF FIG. 10

An improved wraparound brush device 520 forming an alternate embodiment of the invention includes a brush 522 rotated clockwise by a motor 525 to brush the front end, the right side and the rear end of a car 423 advanced to the right, as viewed in FIG. 10. The brush 522 is carried by an overhead arm 524 pulled toward a normal position extending transversely over the path of the car by a counterweighted biasing mechanism 532, which pulls, through the arm 524, a carriage 526 toward a normal position engaging a stop 533 on a monorail supporting the carriage and extending transversely outwardly from the path of the car.

In its operation, with the wraparound brush device 520 in its normal position, the car 423 engages the brush 522 and pushes it to swing the arm 524 clockwise to its front clearing position shown in broken lines, the brush brushing the front end of the car. Then the brush drives itself rearwardly along the right side of the car and pushes the carriage outwardly along the monorail 534 and goes over center and moves the arm to a rearwardly extending position shown in dotted lines with the carriage 526 returning to its starting position. Then, as the right rear corner of the car moves past the brush, the arm 524 is swung clockwise to keep the brush in engagement with the rear end of the car and move the brush across the rear end of the car.

It is to be understood that the above-described arrangements are simply illustrative of the application of the principles of the invention. Numerous other arrangements may be readily devised by those skilled in the art which will embody the principles of the invention and fall within the spirit and scope thereof.

What is claimed is:

1. In a wraparound brush device:
 - a rotary brush,
 - a frame adjacent a path of a car,
 - a first arm pivotally mounted at a first end on the frame for movement between a normal position and a second position away from said path,
 - second arm means carrying the brush at a first end thereof and mounted intermediate its ends to the second end of said first arm for movement between a normal position in which said brush is positioned in said path and a second position folded back along said first arm,
 - holding means mounted adjustably on said frame,
 - releasable means securing said holding means to said frame,
 - elongated tension means held by and extending from the holding means adjacent the first end of said first arm to the second end of said second arm,
 - adjustment of said holding means on said frame serving to change the angle of the tension means relative to said second arm.
2. The wraparound brush device of claim 1 wherein the tension means comprises a tension spring.

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3. The wraparound brush of claim 1 wherein the tension means comprises a counterweight and a cable, the holding means comprising a cable guide.

4. The wraparound brush device of claim 1 wherein the first arm normally extends primarily transverse to said path, and the second arm extends primarily along said path.

5. The wraparound brush of claim 1 wherein the frame includes an overhead portion extending transversely of said path and the holding means is adjustably mounted on the overhead portion.

6. The wraparound brush of claim 1 wherein the first arm extends primarily along the path and the second arm extends primarily across the track.

7. The wraparound brush of claim 6 wherein the tension means extends across the first arm.

8. In a wraparound brush device,

a rotary brush,

a frame adjacent a path of a car,

a first arm pivotally mounted on the frame for movement between a normal position extending primarily along one side of the path and a second position swung away from the path,

a second arm carrying the brush on a free end thereof and pivotally mounted on the first arm at a point on the second arm intermediate the ends of the second arm for movement between a normal position extending primarily transversely of the first arm and a second position folded back along the first arm,

and biasing means connected to the frame at a point between the first arm and said path and continuously urging the arms toward the normal positions

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thereof,

the biasing means extending from the frame across the first arm and being secured to the end of the second arm remote from said free arm.

9. The wraparound brush device of claim 8 wherein the biasing means comprises a tension spring.

10. The wraparound brush of claim 8 wherein the first arm extends forwardly along said path from its pivot.

11. In a wraparound brush device,

a rotary brush,

a frame adjacent a path of a car,

a first arm pivotally mounted on the frame for movement between a normal position extending primarily across said path and a second position swung away from said path,

a second arm carrying the brush at one end thereof and pivotally mounted at a point intermediate the ends thereof on the first arm for movement between a normal position extending primarily transversely of the first arm and a second position folded back along the first arm,

holding means mounted adjustably along the frame, elongated tension means extending from the holding means to the other end of the second arm and continuously urging the arms toward the normal positions thereof,

and releasable means securing the holding means to the frame in adjusted position,

adjustment of the holding means along the overhead portion serving to change the angle of the tension means relative to the second arm.

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