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VACUUM STREET CLEANER

Filed May 31, 1950 2 Sheets-Sheet 1

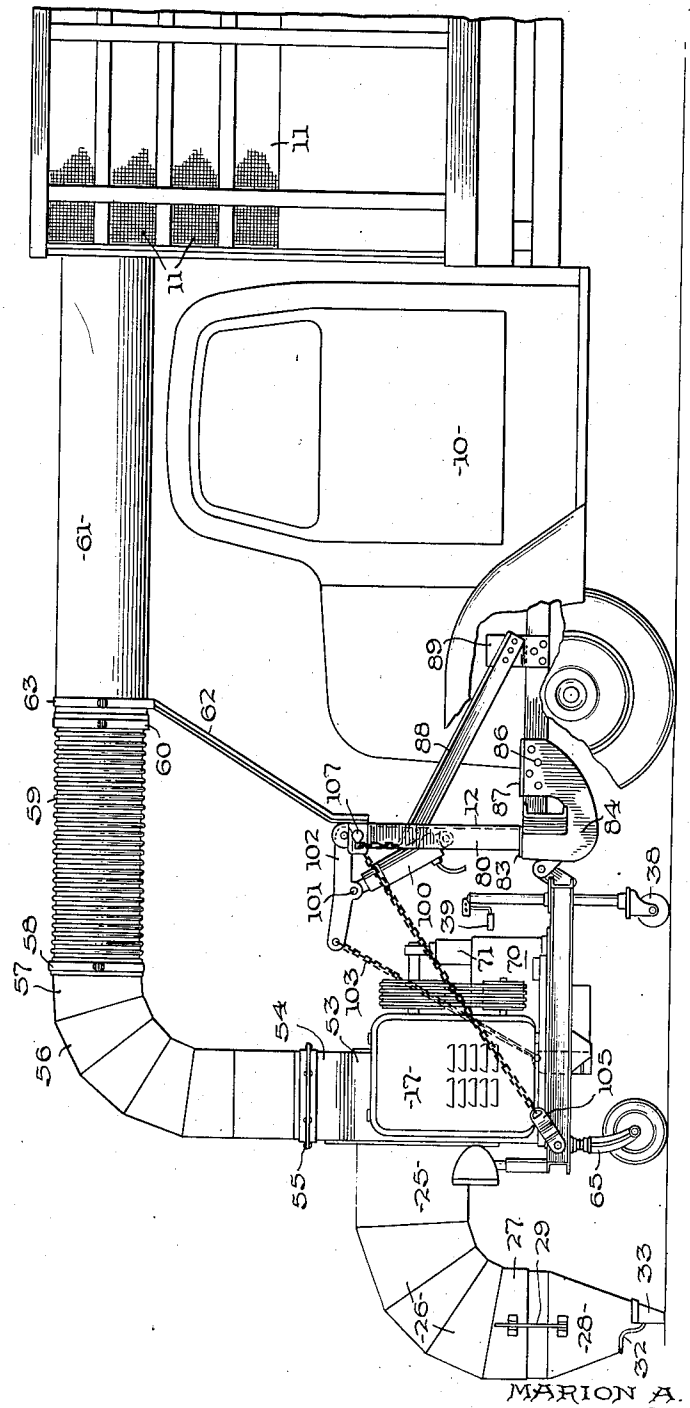



Fig. 1.

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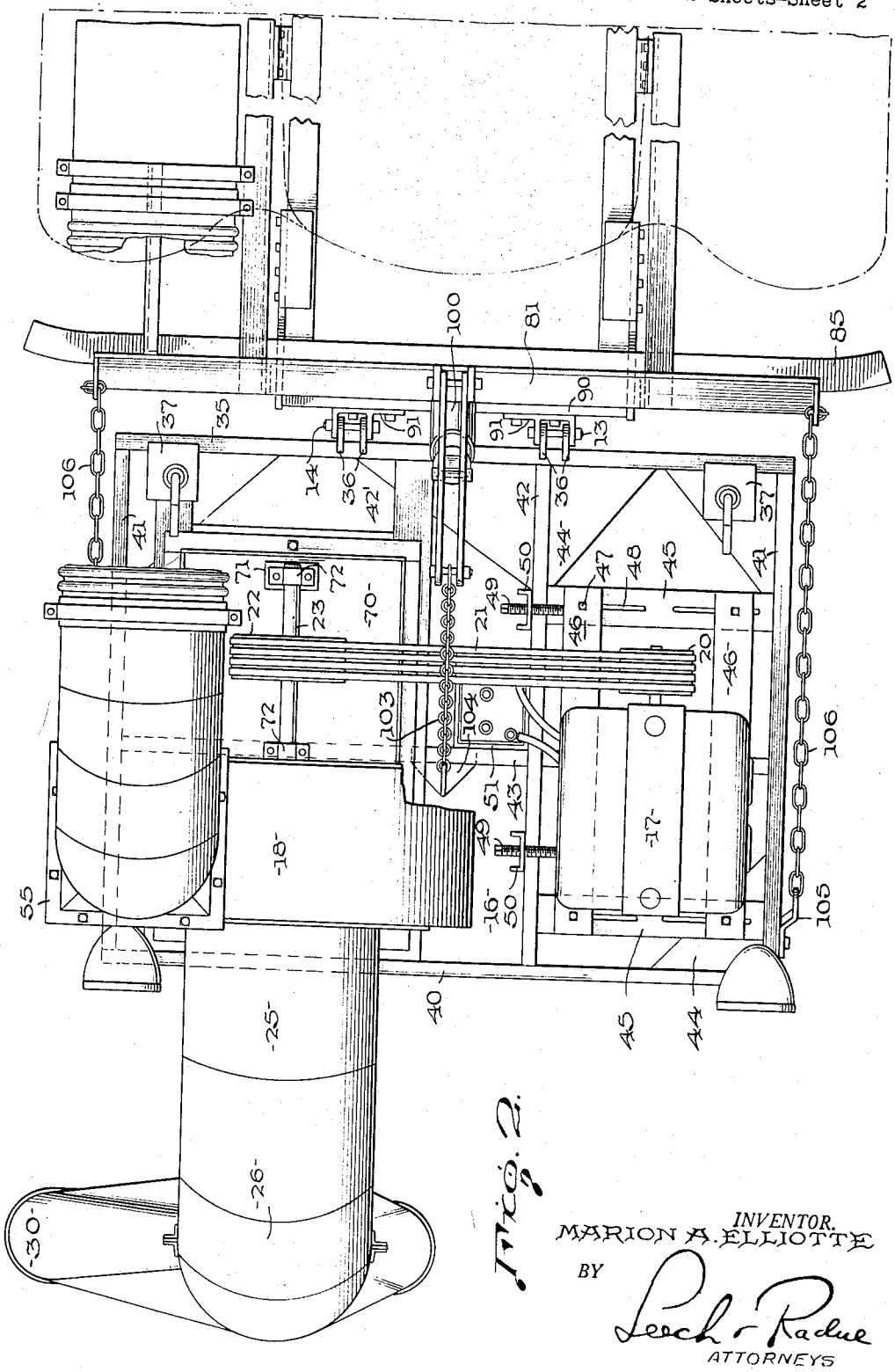



Fig. 2.

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## VACUUM STREET CLEANER

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5 Claims. (Cl. 15—340)

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This invention relates to vacuum street cleaning and leaf collecting apparatus and more particularly to such apparatus mounted on an independent chassis frame and adapted to be pushed ahead of a motor driven vehicle containing a screened receptacle for the collected litter.

It is a general object of the present invention to provide a novel and improved vacuum street cleaner and leaf loader.

More particularly it is an object of the invention to provide in such apparatus an independent chassis frame adapted for hinged mounting at the front end of a self-propelled vehicle and provided with a self-contained power unit and a centrifugal fan, the parts being arranged to provide maximum vision for the operator of the vehicle.

An important object of the invention consists in the arrangement on a platform frame of a self-contained power unit and a centrifugal fan having a pickup nozzle adjacent the ground at a position forward of the frame, which latter is arranged to be hinged to the forward end of a self-propelled vehicle which mounts a screened body for collecting litter and wherein the frame is fitted with forward mounted caster wheels for supporting the major portion of the load thereon and is equipped to be hoisted about its hinged connections to the vehicle for transit at high speeds under non-operative conditions.

Another important object of the invention consists in the arrangement of the cleaner frame and mounted parts whereby the axis of the centrifugal blower extends fore and aft and is offset toward the right side of the frame whereby its suction inlet may be directly connected to a pick-up nozzle adapted to extend into the gutter and adjacent the curb of a conventional street for collecting leaves and trash accumulated in the gutters and transferring the same to a suitable container.

An important feature of the invention resides in the specific arrangement of the supporting frame attached to the front end of the vehicle and its cooperation with the chassis frame of the vacuum cleaner.

Another feature of the invention resides in the arrangement for mounting and supporting the discharge pipe or conduit delivering litter from the suction fan to the screened body of the propelling vehicle.

Other and further objects and features of the invention will be more apparent to those skilled in the art upon a consideration of the accompanying drawing and following specification, wherein is disclosed a single exemplary embodiment of

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the invention, with the understanding that such changes and modifications may be made therein as fall within the scope of the appended claims without departing from the spirit of the invention.

In said drawings:

Fig. 1 is a side elevation of a vacuum street cleaner constructed in accordance with the present invention and shown as attached to a truck equipped with a screened body; and

Fig. 2 is a top plan view of the cleaner and attaching parts shown on a larger scale than Fig. 1, parts of the truck being shown in dotted lines.

The heavy accumulation of leaves in certain sections of the country in the fall season imposes a severe extra load on the street and road cleaning departments of many cities and towns. The old practice of sweeping the leaves into piles and then lifting them manually by means of rakes and pitchforks into trucks is too prodigal of manpower to be economical at the present wage scales. In accordance with the present invention pneumatic means are provided for collecting leaves from gutters or where they are arranged in windrows either naturally or manually. The apparatus is intended for use and operation by a single operator, who drives the vehicle, and except in unusual conditions requires no other help. The apparatus is essentially combined on a platform frame adapted to be hinged to and pushed in front of a motor truck which carries a screened body for accumulating and holding the collected leaves and other litter. The apparatus is substantially independent of the truck type or style and can be handled by any vehicle of adequate size and power.

As shown in the drawings, a conventional motor truck 10, preferably of at least one and one-half ton capacity is shown fitted with a screened body 11 of adequate capacity for handling a large volume of leaves. The large platform type slat body is preferably screened at all openings with suitable hardware cloth, metal mesh or wire screening to reinforce an inner filtering fabric such as heavy burlap or the like for collecting dust and similar particles and preventing them from being blown about. The body 11 is preferably of the dump type with openable tail gates so that the load can readily be discharged. The forward end of the vehicle is fitted with a substantially vertical frame 12, which will be described in more detail later, so that there may be hinged thereto at points 13 and 14 the rear edge of a chassis or platform frame 16 mounting a self-contained power unit 17 and a centrifugal

blower 18 in the relative positions shown. The power shaft of the motor extends fore and aft and mounts a multiple V pulley 20, which drives V belts 21 connected to the pulleys 22 on the fore and aft shaft 23 of the centrifugal blower. The blower is of the type having a central or axial inlet, which is arranged at the forward face thereof and has attached thereto the horizontal duct section 25 supporting the bent portions 26 and the vertical section 27 to which is detachably secured the tapered nozzle unit 28, held in position by means of suitable clamps 29 on opposite sides for quick removal. In side elevation the nozzle tapers to a considerably reduced fore and aft dimension, but laterally it spreads, as shown in Fig. 2, the maximum spread being on the right side, as shown at 30 to extend outwardly beyond the vehicle wheels toward the right for operation adjacent the curb. The transverse width is about twice that of the diameter of the conduit 25.

Nozzle portion 28 is all metal and is provided with an opening at the bottom of the configuration shown at 32 in Fig. 1. It terminates well above the normal ground level and is protected and reinforced by a rubber apron 33 depending from the rear edge thereof for its full width and extending susbtantially to the ground to act as a shroud and collector. The direction of suction intake from this type of nozzle is generally parallel to the ground with a curve to the vertical directly beneath the inlet.

As viewed in Fig. 2 the chassis frame or mounting platform includes the rear transverse channel member 35 mounting the hinge parts 36 as well as the brackets 37 for the jack wheels 38, seen in Fig. 1. These are normally spaced above the ground level but can be lowered by cranks 39 to support the rear of the vacuum street cleaner assembly when it is disconnected from its propelling vehicle. The jack wheel assemblies are commercially available units. The front channel frame member 40 is connected to the rear member 35 by the side channel elements 41 and intermediate channel elements 42 and 42', the latter being of substantial width to provide reinforcement beneath the heavy parts of the mechanism. Intermediate transverse channel member 43 joins the side and intermediate elements 41, 42 and 42'. Suitable gussets 44 reinforce the corners of the chassis frame and the intersections of certain of the outer and intermediate members in order to provide a strong and rigid arrangement.

Between the intermediate longitudinal frame member 42 and the left side frame member 41 are arranged the broad transverse rails 45 on which are slidably mounted the motor bed elements 46 fitted with adjusting bolts 47 received in slots 48 in elements 45. The motor bed members 46 are attached to the self-contained motor unit 17, of conventional industrial type, including an internal combustion engine, power take-off, fuel tank, generator, radiator, muffler and the like. By permitting the motor beds 46 to be slidably adjusted in the cross rails 45 the belt tensions can be adjusted to suit by means of screws 49 threaded through vertical channel bar sections 50 welded to the intermediate frame member 42. A suitable box 51 is attached to frame members 42 and 43 to house the storage battery below the level of the top surface of the chassis frame.

The centrifugal suction fan rotates counterclockwise as viewed from the truck driver's seat and has a volute housing 53 with a vertical discharge 54 tangent thereto at the outer side of the chassis frame. This is fitted with a flange collar 55 for attachment of the discharge elbow assembly 56 thereto. This elbow terminates in a rearwardly directed horizontal section 57 having a clamp 58 for attaching the flexible pipe or hose section 59 thereto, which connects by means of a similar clamp 60 to the horizontal section of the discharge duct 61 which is rigidly attached to and discharges through the forward face of the screened truck body and is carried thereby. The forward end of this rigid section 61 is supported by a bracket 62 attached to the upper portion of the frame 12 secured to the front end of the vehicle chassis. This bracket is fitted with a quick detachable clamp 63 so that conduit 61 can be released at its front end when the screened body is dumped. The flexible hose section 59 absorbs any inequalities in the distance between 57 and 61 resulting from irregularities in the road surface acting on the castered wheels 65 arranged at the forward corners of the chassis frame of the cleaner. These are desirably equipped with pneumatic tires to carry a substantial part of the load during operation and to assist in maintaining the proper clearance of the nozzle mouth from the roadway.

The centrifugal blower housing is attached to the forward face of a box-like base 70, suitably secured to principal members of the chassis frame for rigid mounting. This base also supports spaced columns 71 carrying the bearing elements 72 for the shaft 23 of the blower. This eliminates need for a forward bearing and permits full clearance for the entering leaves and trash at the suction inlet.

The substantially vertical frame 12 attached to the forward end of the motor vehicle may take any form but preferably includes the vertical channel members 80 and top horizontal channel member 81 welded thereto, a bottom plate 83 and supporting brackets 84 secured to the bottom plate and curved around beneath the vehicle bumper 85 and riveted to the longitudinal frame members of the vehicle at 86. Overhanging flanges 87 assist in this attachment. A brace member 88 on each side extends from each vertical post 80 back to a bracket 89 riveted to the vehicle chassis frame behind the attaching point 86. The whole frame is very strongly reinforced and diagonally braced in order that the heavy transverse lower plate 90 thereon may appropriately carry the hinge members 91 receiving the pivot bolts 13 and 14 for attaching the hinge members 36 of the vacuum street cleaning frame.

These hinge members carry a substantial load and at times are called on to carry most of the load of the apparatus, such as when it is hoisted to lift its front wheels from the ground for travelling in non-operative condition. Such hoisting may be effected by a hydraulic power cylinder 100 pivoted to the frame 12, as shown, and having its plunger pivoted at 101 intermediate the ends of lever 102 fulcrumed at its rear end to frame 12 and having its forward end attached by chain 103 to the attaching eye 104 on the cross member 43 of the chassis frame.

In order to relieve this apparatus of the load for long distance trips, clips 105 are provided on the side frame members at their forward ends, to which chains 106 are attached which pass through keyhole slots 107 at the top of the frame 12 to permit any desired adjustment. These are normally operated in the position shown in Fig. 1 to prevent the cleaner frame from dropping

too low in the event wheels 65 pass over deep ruts or the like.

As will be seen from Fig. 2 all of the high portions of the apparatus which would obstruct the vision of the driver are arranged well to the right of the axis of the motor vehicle so that the operator is afforded a clear forward vision and clear vision to the left. He has only minor visual obstruction by the vertical discharge pipe at about 30° to the right of the fore and aft axis but this does not seriously interfere with the operation of the vehicle since the movement is slow in the collection of leaves and other gutter trash, which is achieved by driving the vehicle close along the gutter with the nozzle portion substantially touching the curb and extending sufficiently far into the street to pick up the usual accumulation of leaves and gutter trash.

The truck body will hold a large accumulation of leaves and similar material, and when completely filled may be driven away for dumping either with the vacuum street cleaner attached and hoisted or separated therefrom. This separation can be effected quickly and the apparatus is left for subsequent use when the truck returns or is attached to a similar but empty vehicle for continued use if desired. With apparatus of this character leaves and gutter trash can be handled at only a small fraction of the cost of handling them in accordance with previous methods. Where it is desired to collect leaves over a wide area a flexible hose and manually moved nozzle can be substituted for the portion secured to the inlet of the centrifugal fan.

I claim:

1. A vacuum type street cleaner adapted to be mounted for propulsion at the front end of a truck having a screened body for receiving collected litter, comprising in combination, a chassis frame, castered front wheels for said frame, means to hinge the rear end of the frame to the front of a truck, a self-contained internal combustion power-unit arranged along the left side of the chassis and below the line of the truck-driver's vision in driving, a suction fan mounted near the other side of the chassis, the shafts of said unit and fan extending longitudinally of the frame and having a driving connection therebetween, said fan having a casing with a central inlet facing forward and a tangential discharge to the right and facing up, a bent suction pipe extending from said inlet and having a suction nozzle adjacent the roadway in front of said frame and a discharge pipe connected to said fan discharge extending vertically above the fan casing and then being turned rearwardly for delivery in a substantially leak-proof manner into the screened body.

2. A push type street cleaner comprising in combination a truck-mounted screened receptacle arranged to receive upwardly and rearwardly directed litter and leaves in a wind-proof and scatter-proof manner, a substantially vertical frame adapted to be secured to the front of the truck-chassis and a normally horizontal chassis frame having its rear edge removably hinged to said vertical frame, a castered wheel for supporting the front of said chassis frame, means on the vertical frame to hoist the front of the chassis frame to lift the wheel from the ground, a self-contained power unit on the chassis frame in front of the truck driver's seat and below his line of vision in driving, a combined suction-blower fan at the other side of the chassis frame and having a fore-and-aft shaft, drive means connecting the unit and shaft, an inlet at the front of said fan, a suction pipe extending downwardly from said inlet and having a suction-head substantially at ground level when the wheel is in ground contact, a discharge pipe extending vertically upward from said fan at the extreme right edge of the chassis frame and a duct connecting said discharge pipe and screened receptacle at a level above the said driver's line of vision.



3. The street cleaner of claim 2 in which the said duct is flexible adjacent the discharge pipe with the remainder rigid, and a bracket extending from said vertical frame and supporting the forward end of the rigid section of the duct.

4. A vacuum-type street-cleaner and leaf-loader adapted to be mounted for propulsion at the front end of a truck having a screened body for receiving collected litter, comprising in combination, a platform frame, a castered front wheel for the frame, rear mounted hinges on the frame for attachment to the truck substantially forward of its front wheels, a centrifugal suction-blower mounted at the forward right corner of the frame with its shaft fore and aft and its suction inlet forward, a self-contained internal combustion power unit mounted on the frame, means connecting said unit to drive said suction blower, a suction elbow extending forwardly and downwardly from said inlet, a suction nozzle attached to said elbow and positioned with its mouth adjacent to the road surface, said nozzle being widened laterally and having its right side extending substantially beyond the frame for operation adjacent a curb.

5. The apparatus as defined in claim 4 in which said suction blower is fitted with a vertically directed discharge at the right edge of the frame, a vertical duct extending from said discharge to a position above the truck driver's normal line of vision, a rearwardly directed elbow on said duct and a flexible connection leading from the elbow for connection to the screened body.

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