

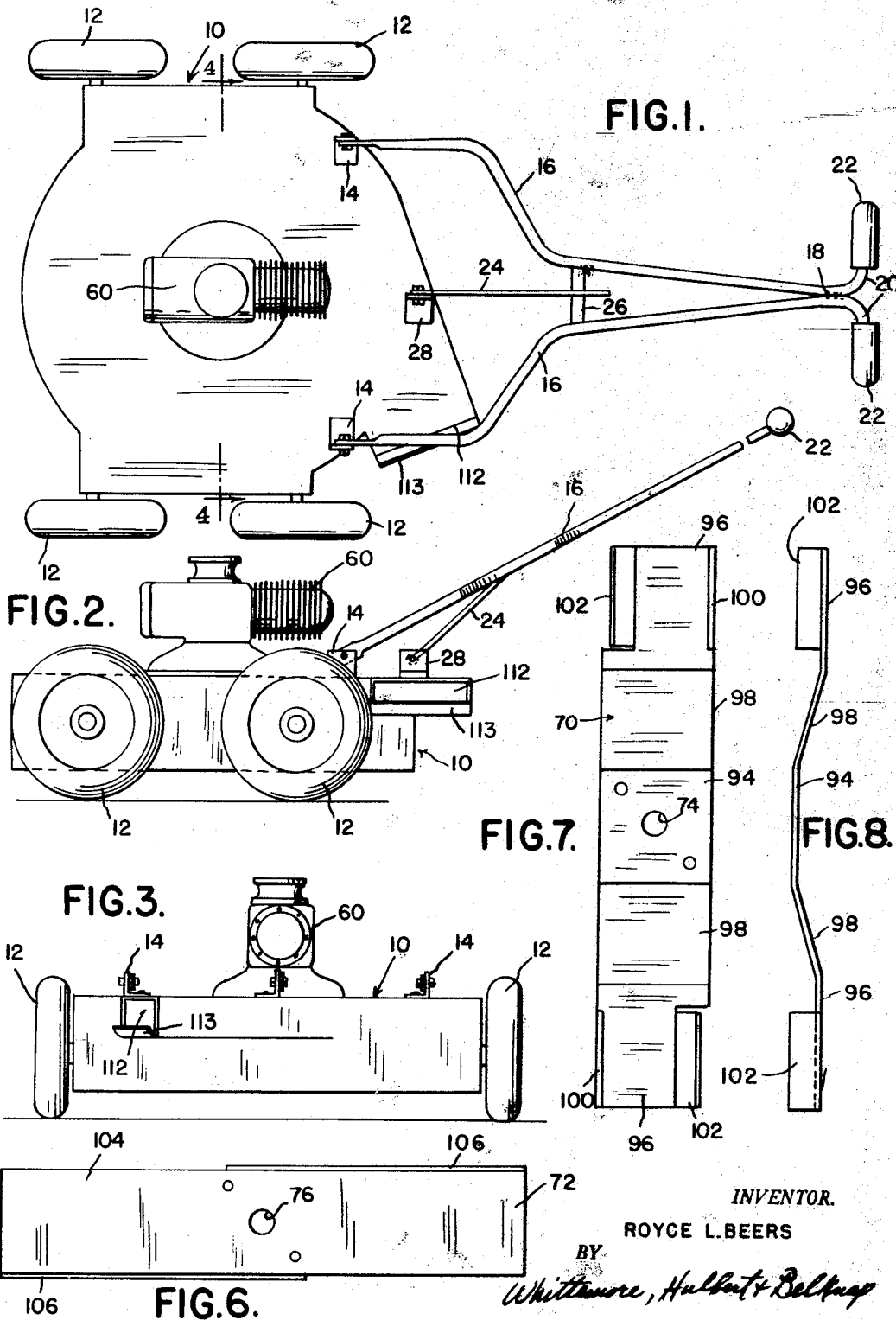
March 6, 1956

R. L. BEERS
LEAF MULCHER HAVING A SUCTION FEED
AND A CENTRIFUGAL PULVERIZER

2,737,003

Filed April 20, 1953

2 Sheets-Sheet 1



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FIG. 4.

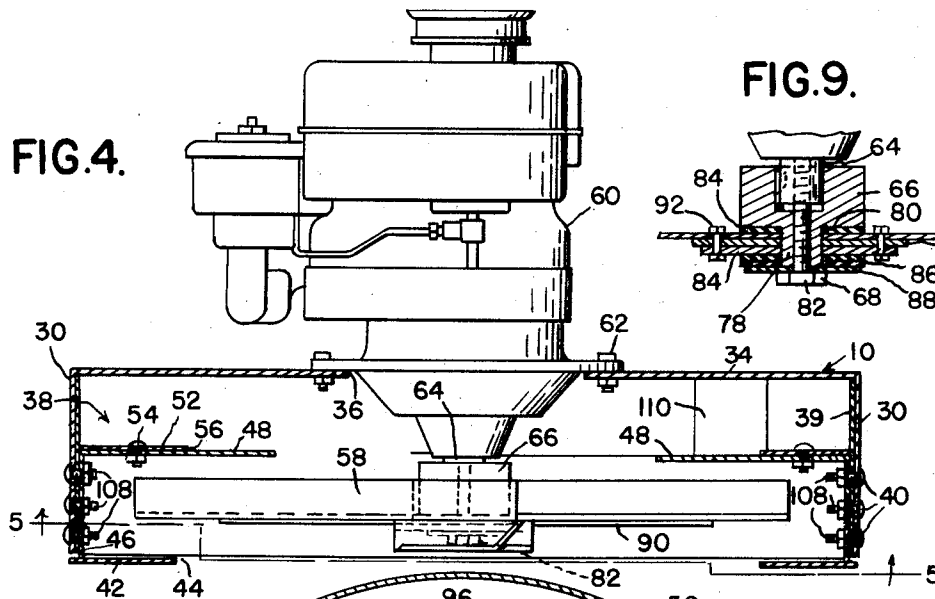


FIG. 9.

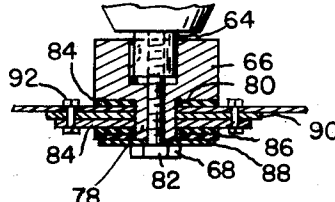
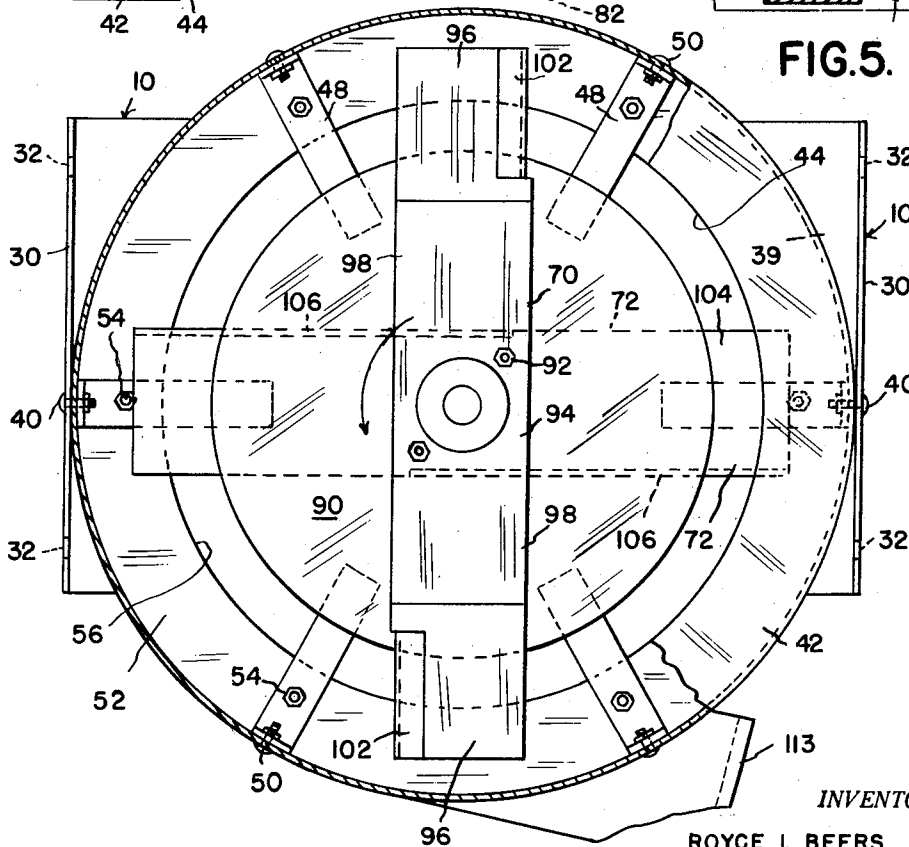


FIG. 5.



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LEAF MULCHER HAVING A SUCTION FEED AND A CENTRIFUGAL PULVERIZER

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4 Claims. (Cl. 55—62)

This invention relates to apparatus for pulverizing and for transferring relatively light solid particles, and more particularly to a mulcher for leaves and the like.

One object of the invention is to provide apparatus for transferring materials, such as leaves and the like, from one location to another, having means for breaking up and pulverizing the material to afford a more efficient transfer thereof and also, in the case of certain materials which have valuable fertilizing properties, to reduce the same to a form more convenient for spreading.

The leaf mulcher may be mounted on a carriage so as to be conveniently movable over the ground, and may comprise a housing having an opening in the bottom through which the leaves are drawn by a suitable impeller. It is a further object of the invention to provide means for breaking up and pulverizing material drawn through the housing.

Another object of the invention is to provide the impeller with portions shaped to have a beating action upon the material which is drawn through the housing by the action of the impeller.

Still another object of the invention is to provide baffle means or deflectors for improving the efficiency of the impeller and for directing the flow or circulation through the housing and past the means for pulverizing the material.

Other objects of the invention will become apparent as the following description proceeds, especially when taken in connection with the accompanying drawings wherein:

Figure 1 is a top plan view of the apparatus embodying the present invention;

Figure 2 is a side elevational view of the apparatus shown in Figure 1;

Figure 3 is a rear view of the apparatus with parts removed;

Figure 4 is an elevational view of the apparatus with the housing in section to show the interior construction to advantage, the section being taken along the line 4—4 on Figure 1;

Figure 5 is a view partly in section taken along the line 5—5 on Figure 4;

Figure 6 is a top plan view of one of the impeller blades;

Figures 7 and 8 are respectively top plan and side elevational views of another impeller blade; and

Figure 9 is a detail sectional view showing the connection between the drive means and impeller.

Referring now more particularly to the drawings and especially Figures 1 and 2 thereof, the device will be seen to comprise a carriage generally indicated at 10, having a plurality of ground engaging wheels 12. Brackets 14 are secured to the upper side of the carriage near the rear end thereof and respectively pivotally support the rearwardly extending arms 16, the latter converging in a rearward direction and being secured together near their rear extremities by welding or other suitable means, as indicated at 18. The rear extremities of arms 16 are turned outwardly to provide handle portions 20 respec-

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tively capped by suitable hand grips 22. The arms 16 may be maintained at a suitable inclination for hand operation of the carriage by a rod 24 engageable with a transverse member 26 interconnecting the arms 16 at an intermediate point. The front end of rod 24 is pivotally mounted on the top side of the carriage 10 by a bracket 28.

The carriage 10 is in the form of a metal shell having parallel opposite side walls 30 formed with apertures 32 for receiving the wheel supporting axles. The top wall 34 of the shell has a central opening 36 for accommodating parts of the drive mechanism for an impeller described more fully hereinafter.

Within the shell-like carriage is supported a housing 38 through which the leaves or like material are caused to flow by the action of the impeller and in which the breaking up or pulverizing of the material is effected. The housing 38 comprises a circular side wall 39 which is secured to the side walls 30 of the carriage by nut and bolt assemblies 40. The bottom wall of the housing is in the form of an annular ring 42 defining a central circular inlet opening 44. An upstanding flange 46 extends around the outer periphery of the ring 42 and is secured to the side walls 30 and 39 of the carriage and housing by the nut and bolt assemblies 40. The top wall 34 of the carriage within the confines of the housing side wall 39 defines the upper limit of the housing 38.

Breaker lugs 48 project radially inwardly from the circular side wall 39 of the housing in circumferentially-spaced relation and have depending flanges secured to side wall 39 by nut and bolt assemblies 40 and 50. These breaker lugs 48 are positioned between the bottom wall or ring 42 of the housing and the top wall 34 and support an annular ring 52 by means of nut and bolt assemblies 54. The rings 42 and 52 will be seen to be arranged in vertically-spaced concentric relation and the central circular opening 56 defined by ring 52 is of approximately the same diameter as that of opening 44 in the bottom wall.

An impeller generally indicated at 58 is supported within housing 38 between the rings 42 and 52 and is driven by a suitable motor, such as that indicated at 60. The motor 60 is supported on the top wall 34 of the carriage above the opening 36 therein by a plurality of nut and bolt assemblies 62. The output shaft 64 of the motor projects into housing 38 centrally of the openings 44 and 56 and normal thereto.

A sleeve 66 (Figure 9) has a circular recess therein for receiving the lower end of the output shaft 64. The sleeve is secured thereto against relative axial movement by a bolt 68, and is also keyed against relative rotation.

The impeller blades 70 and 72 are formed with central apertures 74 and 76 which receive the lower reduced end portion 78 of sleeve 66 and are clamped against the circular shoulder 80 on said sleeve by the head 82 of bolt 68. Friction fiber discs 84 are sleeved over the reduced end portion 78 of the sleeve on opposite sides of the blades 70 and 72 and interposed between the head 82 of the bolt and the lower fiber disc are a rubber washer 86 and a steel washer 88. The blades are thus operatively connected to the output shaft 64 of the motor for rotation as a unit therewith. A circular disc 90 is also sleeved over the reduced end portion 78 of the sleeve between the blades and the blades and disc 90 are rigidly interconnected by nut and bolt assemblies 92.

Referring now to Figures 4, 5, 7 and 8, the blade 70 will be seen to comprise a central horizontal portion 94 having the horizontal extremities 96 disposed somewhat below the central portion 94 and connected to the latter by the inclined intermediate portions 98. The leading edges of the extremities 96 are bevelled as shown at 100 and these bevelled edges provide cutting surfaces for

cutting grass. The trailing edges of the extremities 96 are inclined upwardly as shown at 102 to provide a lifting action which tends to draw air and grass or leaves and the like upwardly into the housing upon rotation of blade 70 in the direction indicated by the arrow in Figure 5.

Referring to Figures 4, 5 and 6, the blade 72 comprises a main body portion 104 which extends in a common plane throughout its horizontal extent, and the opposite trailing edges of the blade 72 are formed with vertically upturned flanges 106. These flanges 106 cooperate with the edges 96 of blade 70 in directing the circulation of air and entrained solid particles upwardly, and also have a beating action upon the leaves tending to break them up by direct impingement and also by creating a turbulence of air.

The rotation of the blades 70 and 72 creates a circular flow about the axis of rotation causing the air and solid particles to move outwardly by centrifugal force against the circular side wall 39 of the housing. In this connection it will be noted that a plurality of breaker pins 108 project radially inwardly from the side wall 39 at circumferentially-spaced intervals and these pins are effective to break up and pulverize the leaves or like material impinging thereagainst. In the present instance, these pins are actually formed by the shanks of the securing means 40 and 50.

The disc 90 will be seen to extend across the openings 44 and 56 and to be of approximately the same diameter as these openings. This disc provides a partial shield between the openings 44 and 56 and serves to direct the incoming air to the radially outward portions of the housing, preventing the air and entrained particles from bypassing the breaker pins 108 and breaker lugs 43.

In the upper portion of housing 33 above ring 52, the circular side wall 39 is formed with an opening 110 which opens into an outlet passage for discharge through the outlet opening 112 in the housing. A lip 113 projects beyond the lower edge of opening 112 and is slightly upturned to spread the material discharge over a wide area.

The operation of the leaf mulcher will now be readily apparent. When the motor 60 is in operation, the blades 70 and 72 are rotated producing an updraft by the action of the upturned portions 102 and 106 on the trailing edges of the blades. Leaves and other relatively light material may thereby be drawn into the housing in a current of air directed to the radially outward portions of the housing by the central disc 90. The air and entrained particles are urged radially outwardly by centrifugal force caused by the rotary motion of the impeller, and the solid particles are broken up and pulverized by striking against the breaker pins 108 which extend into the path of circulation through the housing. The flow continues upwardly through opening 56 and the radially inwardly projecting lugs 43 provide obstructions for further pulverizing action. The pulverized particles are then discharged in a current of air through the discharge opening 112 of the housing. It is to be noted that the upturned flanges 106 on blade 72 also have a pulverizing action on the leaves.

The bottom wall or ring 42 is of importance in resisting the tendency of air being blown out around the lower part of the housing and is of definite advantage in increasing the suction action of the impeller in drawing up the leaves, etc.

The rings 42 and 52 define a circular channel-shaped chamber in which the leaves, etc., are acted upon by the breaker pins. The leaves, etc., while relatively light, nevertheless are much more easily and efficiently drawn

into and through the housing and discharged therefrom when broken up into minute particles.

The drawings and the foregoing specification constitute a description of the improved leaf mulcher in such full, clear, concise and exact terms as to enable any person skilled in the art to practice the invention, the scope of which is indicated by the appended claims.

What I claim as my invention is:

1. A leaf mulcher comprising a carriage movable along the ground, a housing supported on said carriage, said housing having a generally vertically extending annular side wall and a generally horizontal bottom wall disposed closely adjacent the ground when said carriage is supported thereon, said bottom wall extending radially inwardly from said side wall adjacent the lower margin of the latter and having a central inlet opening therein spaced from said side wall, another generally horizontal wall spaced above said bottom wall, said other horizontal wall extending radially inwardly from said side wall and having a central discharge opening spaced from said side wall and concentric with said inlet opening, said vertical and horizontal walls defining an annular pulverizing chamber of channel cross-section, blades mounted in said housing between said horizontal walls and supported for rotation about an axis concentric with said openings, said blades having a radius approximating the radius of the inlet opening, means for rotating said blades in one direction, certain of said blades having an inclined portion effective to draw air and leaves and the like into said housing through the inlet opening and to discharge the same through the discharge opening when said blades are thus rotated, the rotation of said blades also inducing a circular flow about said axis causing the air and leaves and the like to move radially outwardly into said annular pulverizing chamber by centrifugal force, and breaker elements fixed within said annular pulverizing chamber for pulverizing the leaves and the like circulating in said chamber by direct impingement thereagainst, said pulverizing chamber providing a confining space in which the leaves and the like are held by centrifugal force until pulverized sufficiently to be carried by the air stream through the discharge opening.

2. The structure as defined in claim 1, including a baffle plate in said housing spaced between said horizontal walls and extending across said openings, the peripheral edge of said baffle plate terminating in spaced relation to said side wall, said baffle plate assisting in directing the air and leaves and the like toward said side wall and preventing the same from by-passing said breaker elements.

3. The structure as defined in claim 2, including additional breaker elements mounted on said other horizontal wall and extending radially inwardly of the discharge opening.

4. The structure as defined in claim 1, in which certain of said blades have vertical portions to create turbulence and to beat and thereby pulverize leaves and the like circulated through said housing.

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