Oct. 4, 1955 C. T. MORRIS ET AL 2,719,396

ROTARY POWER LAWN MOWER WITH LATERAL DISCHARGE

Filed July 28, 1952 3 Sheets-Sheet 1

Fig. 1

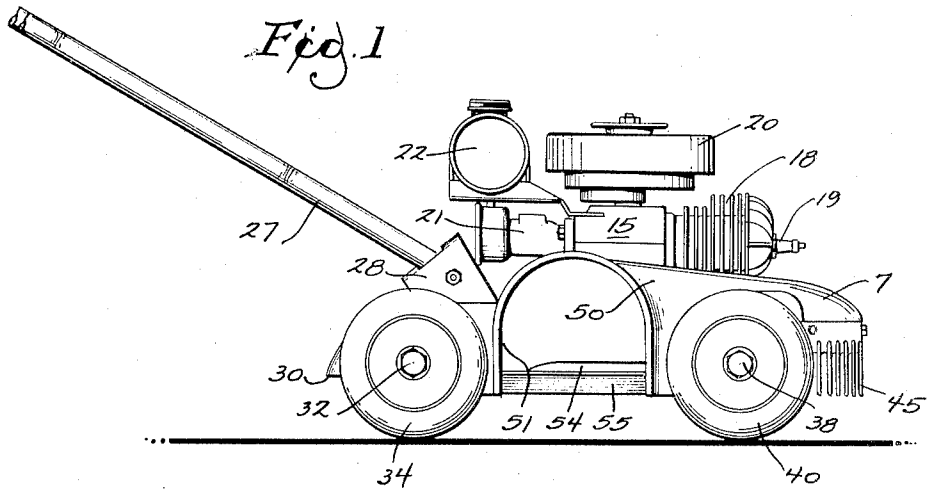
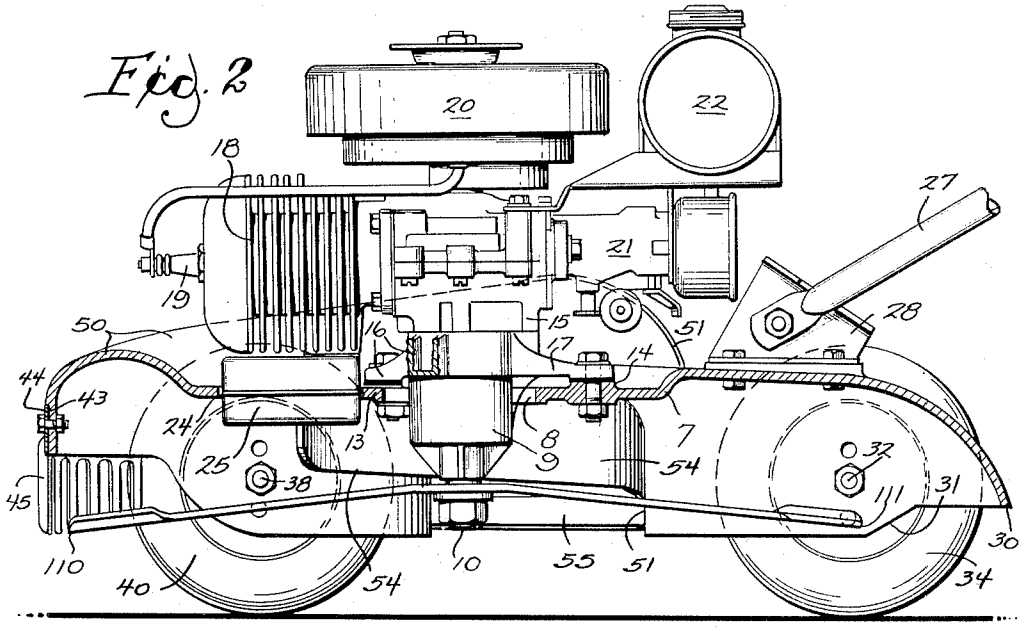


Fig. 2



INVENTORS
CURTIS T. MORRIS
BY THOMAS E. CONERS
Wheeler, Wheeler & Wheeler
ATTORNEYS

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Filed July 28, 1952 3 Sheets-Sheet 2

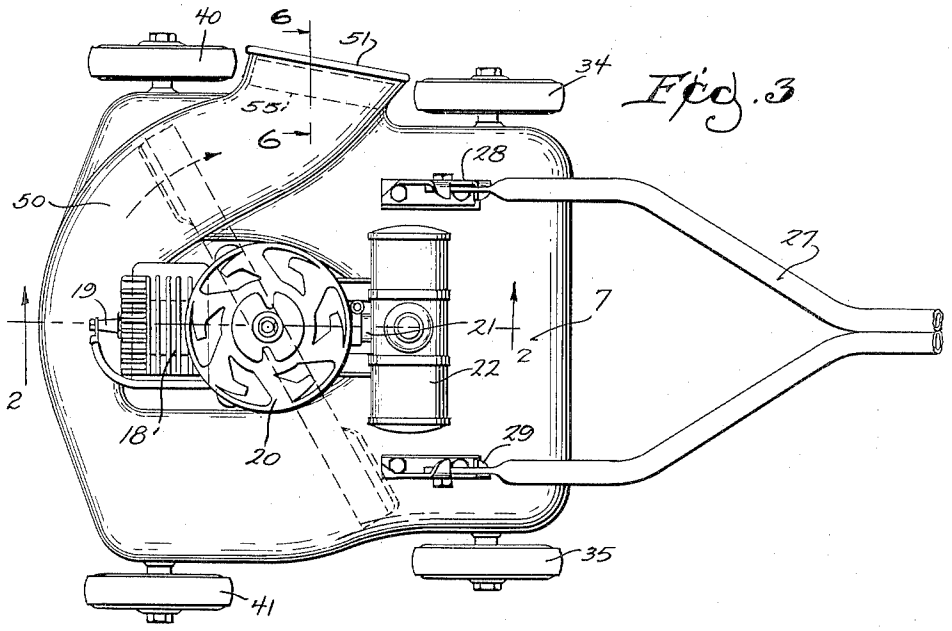


Fig. 3

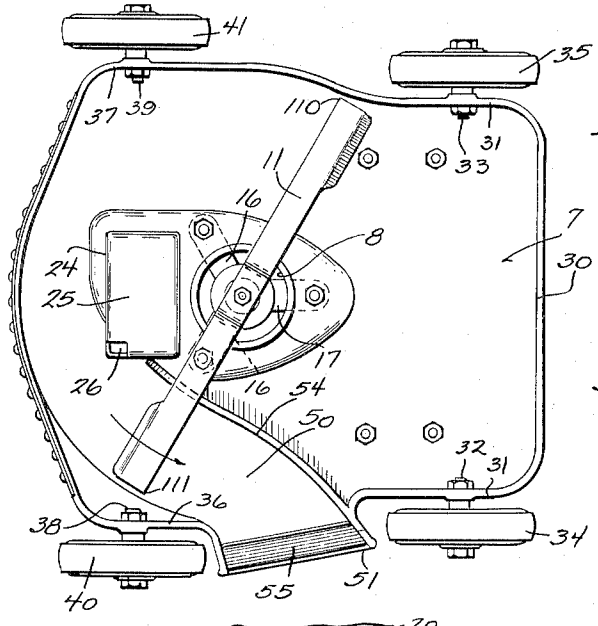


Fig. 4

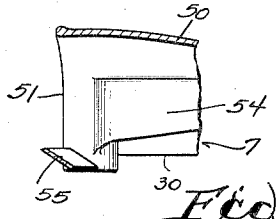


Fig. 6

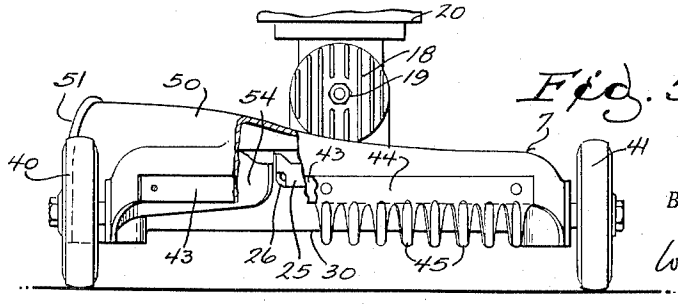


Fig. 5

INVENTORS
CURTIS T. MORRIS
BY THOMAS E. CONERS
Wheeler, Wheeler & Wheeler
ATTORNEYS

Oct. 4, 1955 C. T. MORRIS ET AL 2,719,396

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Filed July 28, 1952 3 Sheets-Sheet 3

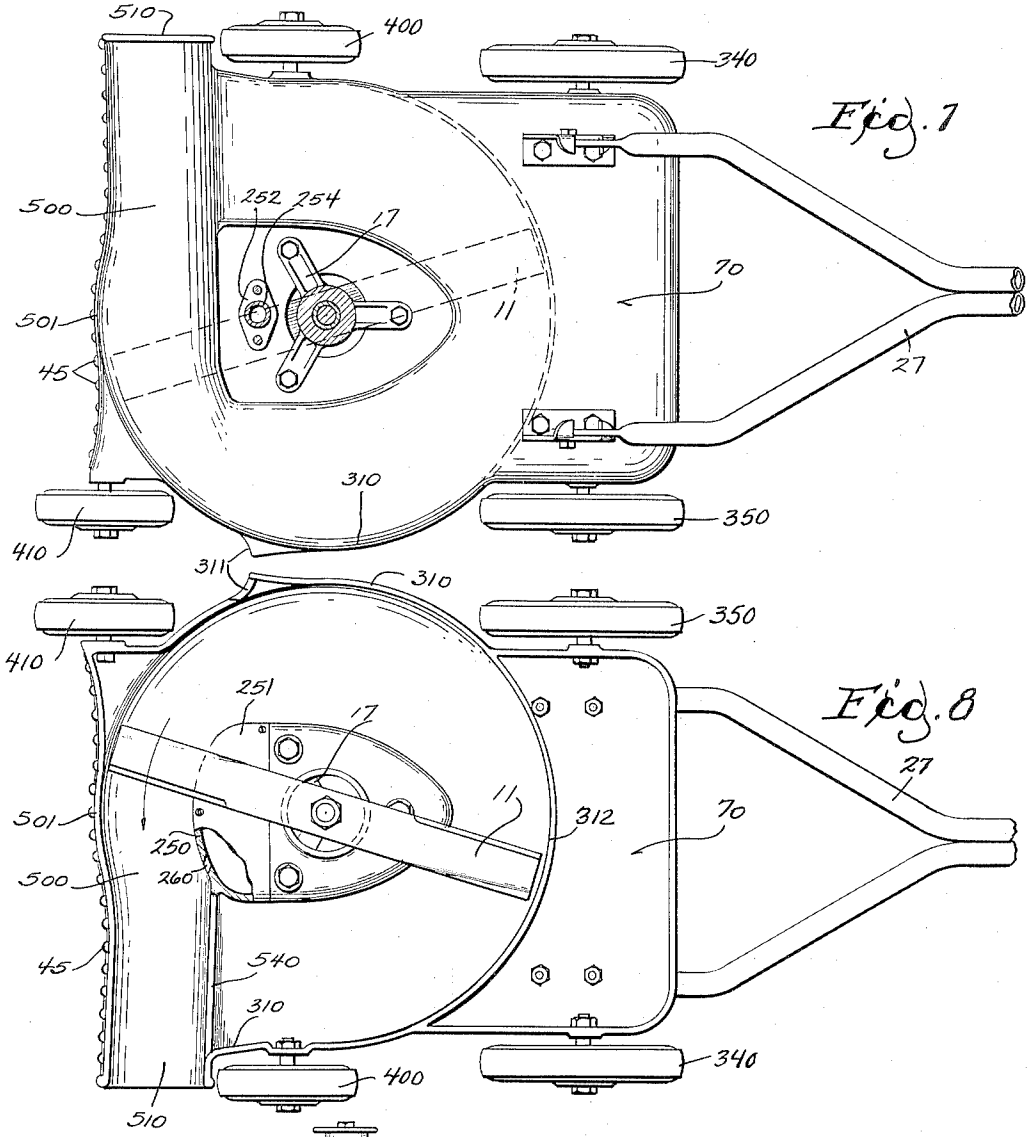


Fig. 7

Fig. 8

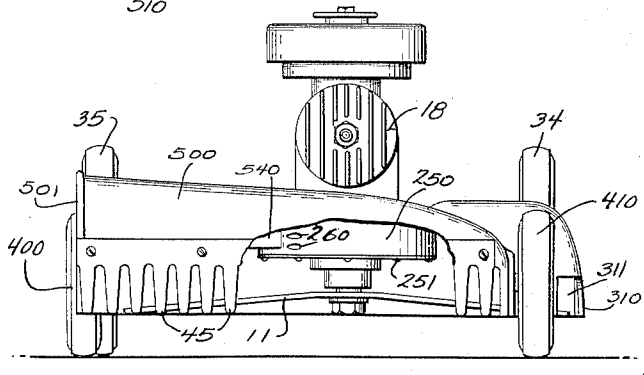


Fig. 9

INVENTORS
CURTIS T. MORRIS
THOMAS E. CONERS
BY
Wheeler, Wheeler & Wheeler
ATTORNEYS.

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ROTARY POWER LAWN MOWER WITH LATERAL DISCHARGE

Curtis T. Morris and Thomas E. Coners, Lamar, Mo., assignors, by mesne assignments, to Outboard, Marine & Manufacturing Company, Waukegan, Ill., a corporation of Delaware

Application July 28, 1952, Serial No. 301,262

9 Claims. (Cl. 56—25.4)

This invention relates to a rotary power lawn mower with lateral discharge.

The teaching of the art has been to keep the grass clippings within the cutter housing of a rotary mower to cause them to be struck again and again by the blades with a view to thorough comminution. The present invention is based upon my discovery of the unexpected fact that the power absorbed by repeated action of the blades upon the clippings is far out of proportion to any result achieved and I am able, by lifting the clippings out of contact with the growing grass and immediately discharging the clippings from the mower housing, to effect power savings of 30 to 50%. For example, actual tests of a .9 H. P. power engine on a mower having an eighteen inch cutting blade and a lateral discharge opening from its forward side show better grass clipping results than were formerly accomplished with the same cutting blade using 1½ H. P.

To achieve these results, the motor base and blade housing are so formed as to provide an upwardly convex channel of progressively increasing height which starts near one side of the housing forwardly of the cutter axis and continues upwardly and laterally to provide a laterally directed opening at the side toward which the forward part of the blade turns in operation. In the device disclosed, in which blade rotation is clockwise, the channel starts at the front left portion of the housing and discharges to the right, as viewed toward the direction of housing advance. The cut grass is raised and ejected in the same semi-circular traverse of the blade in which it is cut.

Substantially all of the grass cutting is done in the 180 degrees of cutter rotation which lies forwardly of the axis of rotation. This is true in any rotary mower, but in the present mower the axis of rotation is desirably slightly tilted so that the path of travel of the blade is slightly lower in this forward sector than in the sector behind the axis, whereby the blade is removed from frictional contact with the growing grass from which the tips have already been cut. The cut tips are thereby swept continuously to the side and out of the housing without repeated contact with the blade and even without the forward tilting of the axis of rotation, the lateral discharge alone is sufficient to affect the power economies above described.

A further feature of the invention consists of the arrangement whereby the housing has a cavity which accommodates the engine muffler, the muffler discharging into the laterally opening channel through which the grass clippings are moving laterally, the arrangement being such that the muffler blast is commingled with, and dissipated by, the clippings and gives up its energy to the clippings, to promote their flow and to reduce its own noise.

In the drawings:

Fig. 1 is a view in right side elevation of a mower embodying the invention.

Fig. 2 is a view of the mower on enlarged scale in longitudinal section, substantially along the line 2—2 in Fig. 3.

Fig. 3 is an enlarged plan view of the mower shown in Fig. 1.

Fig. 4 is an inverted plan view of the mower.

Fig. 5 is a view of the mower in front elevation, portions of the housing being broken away and shown in section to expose the muffler discharge.

Fig. 6 is a detailed view on the line 6—6 of Fig. 3.

Fig. 7 is a plan view of a modified embodiment of the invention, the motor being removed to expose the frame housing in plan.

Fig. 8 is an inverted plan view of the embodiment shown in Fig. 7, portions of the muffler being broken away.

Fig. 9 is a view in front elevation of the embodiment shown in Figs. 7 and 8, portions of the frame housing being broken away.

A casting 7 provides a frame and motor base. It has a central opening at 8 through which projects the lower crank shaft bearing 9 and the shaft 10 upon which the blade assembly 11 is mounted for rotation. At several points about the central opening 8 there are seats 13, 14 for the motor, the motor crank case 15 including arms 16, 17 which rest upon these seats. The seat 14 may optionally comprise a slightly elevated boss in order that the crank shaft axis may be slightly tilted upwardly and forwardly so that the path of travel of the blades is slightly lower forwardly of the axis than rearwardly thereof. This is shown in Fig. 2 by comparison of the blade tip 110 with blade tip 111.

The engine has an air cooled cylinder which projects forwardly at 18, a spark plug 19 provided with current by a fly wheel magneto 20, and a carburetor 21 supplied with fuel from a tank 22. The whole engine is unitary and is assembled on the frame base 7 simply by bolting the arms 16 and 17 to the seats 13, 14.

Forwardly of the seats 13 the frame base has a further aperture at 24 through which projects a box like muffler 25 which is in unitary connection with the engine and supported entirely therefrom. Exhaust gases escape from the muffler through the discharge port 26 which is illustrated in Figs. 4 and 5 and discharges into the inverted grass flow channel hereinafter to be described.

The propelling and guiding handle 27 is pivoted to brackets 28 and 29 mounted on the upper surface of frame base 7 near the rear thereof as shown in Figs. 2 and 3.

The frame base 7 has a downwardly turned margin at 30 which is nearly continuous, as is clearly shown in Fig. 4. To the generally parallel portions 31 of the downwardly turned marginal flange 30 are bolted the axle studs 32, 33 for the rear wheels 34, 35. To the generally parallel and somewhat more widely separated portions 36, 37, of the downwardly turned flange 30, are bolted the axle studs 38, 39 of the forward wheels 40, 41, these being somewhat more widely spaced apart than the rearward wheels. Transversely of the housing and frame base 7, at the forward end of the housing, there is a finished surface at 43 to which is bolted a comb plate 44 having depending teeth 45 through which the grass tips pass into the path of the rotating cutter blade tips 110 and 111.

Commencing between the fore and aft center line of the cutter housing and frame base 7, and the left hand side thereof, as viewed toward the direction of advance, the housing is formed to provide an upwardly convex channel 50 which, as clearly shown in Figs. 2 and 5, is of progressively increasing height, terminating at its maximum elevation in the delivery port 51. The top of this port is materially above the level of the wheels 40 and 34, as is clearly evident in Figs. 1, 2, and 5.

At the rear side of the inverted channel, the casting which forms the housing and base plate 7 includes a flange at 54 which delineates the rear wall of the clipping discharge passage leading to port 51. This wall, which clearly appears in Figs. 2, 4, and 5, assures the move-

ment of the grass clippings laterally and outwardly from the housing, and tends to preclude the possibility that any of such clippings will pass rearwardly to whirl about the housing with the blades. We believe that most of the grass clippings have but a single contact with the blade, that being at the instant of severance from the growing grass, after which the clippings tend to move upwardly and laterally along the wall of the inverted channel to the point of discharge. Their lateral movement is assisted by the outward flow of air set in motion by the blades and centrifugally discharged through the channel. It is also expedited by the intermittent blast of exhaust gasses which opens into the channel from muffler **25**. Incidentally, this arrangement substantially completely relieves the operator of the exhaust fumes by which he has heretofore been annoyed. The noise of the exhaust is also minimized.

Instead of the clippings being discharged in rows upon the lawn, as usually happens when they are deposited from a conventional housing, the clippings discharged through the port **51** are very widely dissipated and do not form any discernible windrow. It will be observed that the wider spacing of the front wheels and the resultant rearward inclination of the discharge port in this embodiment causes the clippings to be hurled somewhat rearwardly, as well as laterally.

As a guard against possible injury to the operator or to bystanders, one or more baffles **55** desirably span the discharge port **51** and are desirably set at a slight upward inclination as shown in Figs. 1 and 6 to assure the upward and outward projection of the clippings, while offering maximum protection against contact with the knives.

In the modified embodiment shown in Figs. 7, 8, and 9, the frame housing **70** is quite similar to that above described but the wheels have a different arrangement in order that the clipping discharge channel **500** may open directly to the side instead rearwardly as in the previously described embodiment. It will be observed in Fig. 9 that the inverted channel **500** commences immediately adjacent the left front wheel **410** and continues nearly rectilinearly to the discharge port **510**, there being but a slight forward convexity at **501** to clear the path of the blade **11**. The teeth **45**, along the front of the channel, serve as guard teeth while admitting the grass to the path of the blade just as previously described in the embodiment of Figs. 1 to 5. The rear wall of the channel comprises a rectilinear flange **540** which may be cast integrally with the base frame **70**. At its inner end flange **540** merges with the muffler **250**, likewise desirably cast integrally with the base frame and covered by a cover plate **251**. The muffler is vented through a vertical row of ports **260** which are desirably bored through the casting to direct the exhaust gases longitudinally of the channel **500**. The front wall of the muffler may be curved in conformity with the front wall portion **501** of the channel.

Fig. 7 shows a manifold fitting **252** having an exhaust pipe **254** opening downwardly from the engine into the muffler **250**. As in the previously described embodiment, the engine **18** is mounted on a spider **17** which is bolted at three points to the frame casting **70**.

Instead of having the channel **500** at right angles to the path of movement of the mower, it may be directed slightly forwardly in order to provide an optimum location for the right front wheel **400**. It has been found that there is an advantage in the staggered wheel arrangement shown in that the mower will pass over a slight rise of ground without scalping the lawn in the manner which occurs when the wheels are normally spaced. The location of wheel **400** intermediate the front wheel **410** and the rear wheels **340** and **350** provides intermediate support on such occasions to prevent scalping.

It will be noted that the frame housing has a forwardly opening slot at **311** in its side flange **310**. This slot is located outside the path of travel of the wheel **410** and it will be observed in Fig. 8 that the radius of the path of travel of the blade **11** is greater than the lateral distance of the slot from the cutter axis. Accordingly, the provision of this slot is a great aid in trimming. It enables the mower to be operated at no greater distance from a tree or building or stake or other obstructions than the thickness of the flange **310**. Grass growing in immediate proximity to such an obstruction enters the slot into the path of the blade and is immediately cut.

As in the previously described device, the clippings are discharged from the base housing in the same sweep of the blade by which they are severed and without any movement circumferentially of the housing. It is important that such clippings are elevated from the uncut grass of the lawn and immediately discharged.

Ejection of the clippings is promoted by a strong blast of air set in motion by the blades and discharged tangentially from the base housing. We have found improved results in establishment of such a blast when the housing is spanned by an integral flange **312** substantially concentric with the axis of the cutter, such flange merging at its ends with the side flange **310** and being approximately equal thereto in vertical height.

We claim:

1. A motor base and blade housing for a rotary mower blade, said housing comprising a top wall integrally provided at its forward end with a traversely extending inverted channel opening laterally at the side of the housing toward which the mower rotates in traversing the front of the housing, said channel being approximately at right angles to the direction of travel, the front wheel at the side to which the channel opens being behind the channel, and the front wheel at the other side projecting ahead of the channel whereby said wheels are offset to the front and rear of a transverse line through the housing.

2. A motor base and blade housing for a rotary mower blade, said housing comprising a top wall integrally provided at its forward end with a transversely extending inverted channel opening laterally at the side of the housing toward which the mower rotates in traversing the front of the housing, said channel opening being provided with baffle means comprises at least one baffle plate extending fore and aft across said opening and having a laterally upward inclination.

3. A rotary mower comprising the combination with a generally upright power shaft and sickle blade means mounted thereon for rotation on a generally horizontal path, of a downwardly open housing provided with front and rear wheels and enclosing the path of sickle blade rotation, said housing comprising a depending skirt with a lateral opening from said housing at the forward end thereof and at the side toward which said sickle blade means rotates in the forward portion of its path, the other side of the housing having a lateral projection with a forwardly opening slot immediately ahead of a portion of the path of said blade means in which said blade means is moving forwardly.

4. The device of claim 3 in which said housing comprises in its top wall an inverted channel having a lateral extension past said skirt at said opening for discharge of blade cuttings from grass entering said housing through said slot.

5. The device of claim 4 in which the housing wall portion comprising said channel is extended downwardly at the rear of said channel for guiding said clippings through said opening.

6. In a rotary mower, the combination with a generally upright power shaft and sickle blades mounted thereon for cutting grass, of a housing comprising a top wall and depending skirt enclosing the path of sickle blade rotation, said housing having in said top wall an inverted channel and said skirt having an opening through which said channel opens in a forward portion of the housing

and at the side thereof toward which said blades rotate, and an engine in operative connection with said shaft and having exhaust means with a discharge port opening into said channel in the general direction of grass clipping discharge therethrough.

7. The mower of claim 6 in which the exhaust means comprises side and top wall portions integral with the housing, together with a bottom closure plate fitting such portions and attached to the housing.

8. The device of claim 6 in further combination with wheels connected with said housing for the support thereof, said engine being mounted on said housing to receive support thereby from said wheels, the housing having an opening through which said engine exhaust means bodily projects, and said housing being provided with a flange depending from its top wall and extending at the rear of said channel from said exhaust means to the lateral opening aforesaid.

9. The device of claim 6 in which said housing comprises a relatively wide portion forwardly of said lateral opening and a relatively narrow portion rearwardly thereof, and forward and rearward wheels having axle studs connected with the housing at the relatively wider and narrower portions aforesaid.

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