United States Patent

Bonnis

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[54] **LEAF SWEEPER AND LOADER**

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[21] Appl. No.: **130,220**

[52] **U.S. Cl.** **15/79**

[51] **Int. Cl.** **E01h 1/04**

[58] **Field of Search** 15/79, 83, 84, 348, 349, 352; 56/400.02

[56] **References Cited**

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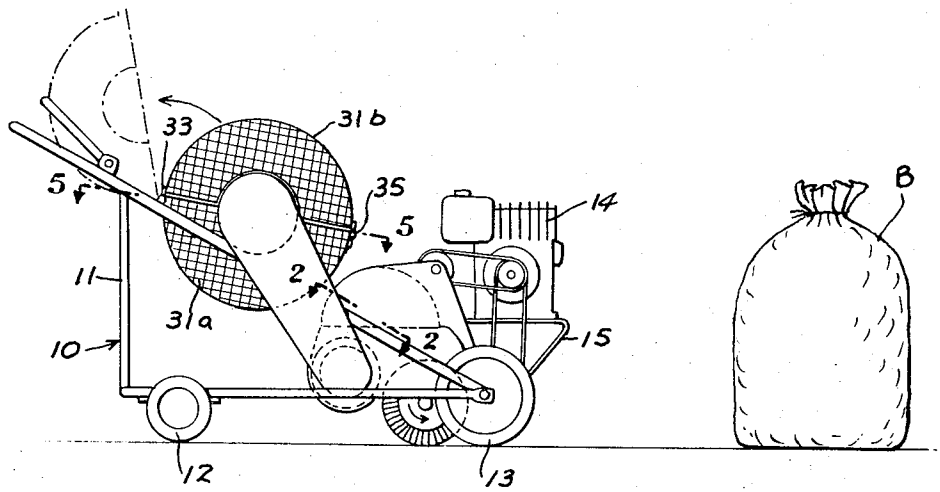
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[57] **ABSTRACT**

A leaf sweeper and loader comprising a wheeled hand-guided vehicle having a rotary sweeper element rotatably mounted thereon about a transverse axis and a screw mounted for rotation about another transverse axis adjacent the sweeper element. A casing surrounds the screw and having a longitudinal opening through which the leaves and cuttings are directed by a shroud extending from the sweeper element to the casing. A passage extends from one end of the casing to a foraminous housing in which a collapsible bag is positioned to receive the compacted leaves and cuttings.

17 Claims, 7 Drawing Figures



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SHEET 1 OF 2

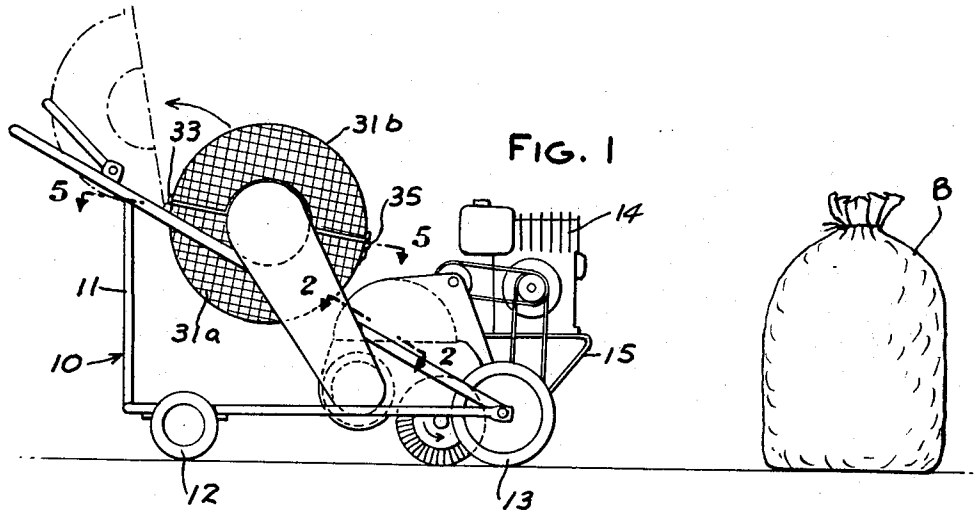


FIG. 1

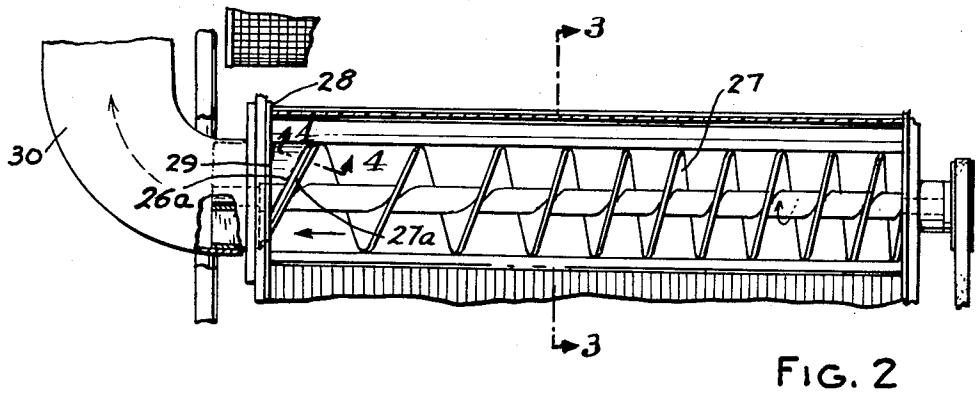


FIG. 2

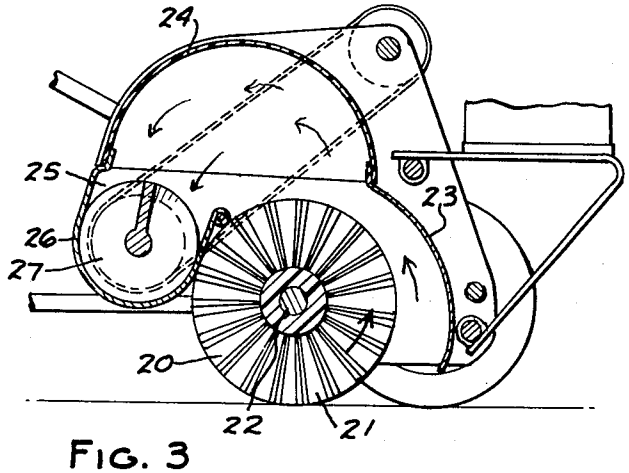


FIG. 3

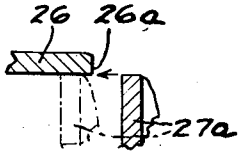


FIG. 4

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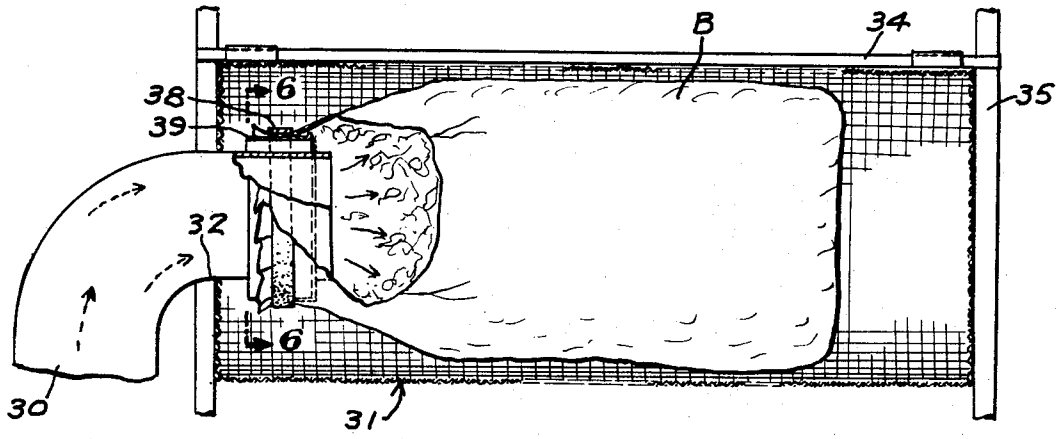


FIG. 5

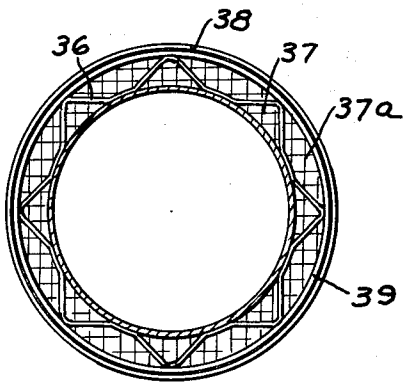


FIG. 6

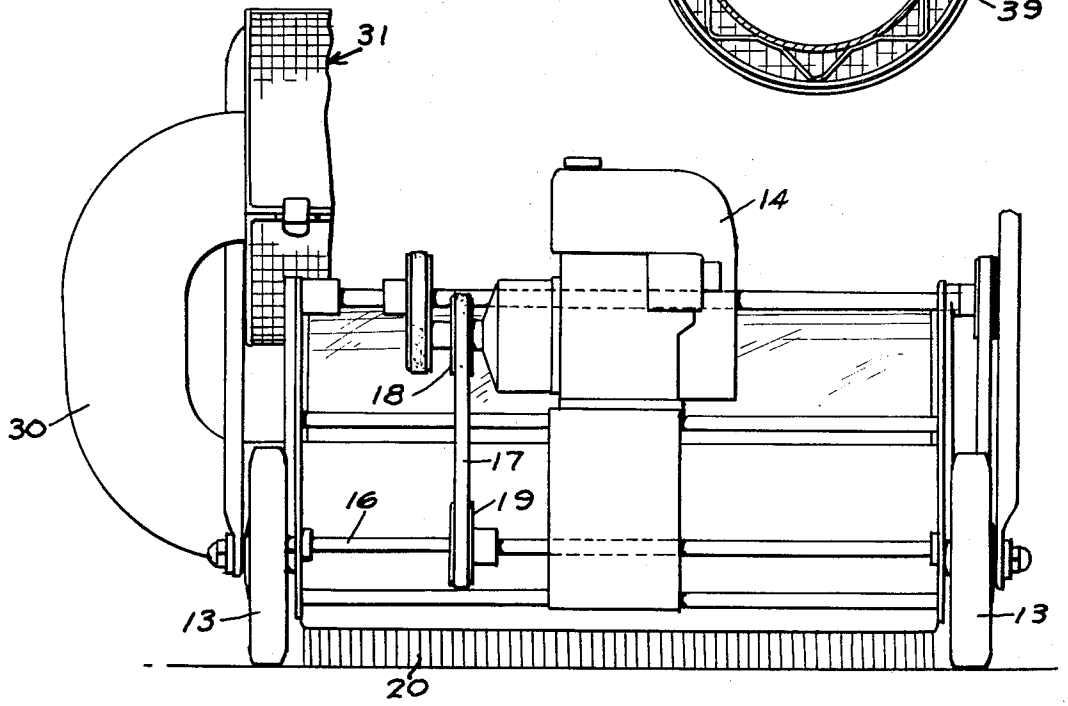


FIG. 7

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LEAF SWEEPER AND LOADER

This invention relates to collecting leaves and cuttings and particularly to an apparatus or vehicle for collecting leaves and cuttings.

BACKGROUND OF THE INVENTION

It is common in the field of landscaping to collect the leaves and cuttings by the use of either hand-propelled or power-propelled vehicles which have rotating sweeper elements thereon. Such devices or vehicles usually utilize a bag or container in which the leaves and cuttings are directed.

One of the problems with such devices is that the leaves and cuttings are bulky and frequent emptying of the container is required.

It has heretofore been suggested that screw elements or the like be utilized in connection with the sweeper element to force the leaves or cuttings into the container. However, as far as the present applicant is aware, none of these devices has satisfactorily performed and achieved the desired results.

One of the objects of the invention are to provide a leaf sweeper and loader in which the leaves and cuttings are collected and compacted without jamming into collapsible bags or containers that can be readily attached and removed; wherein the construction is such that jamming or obstruction of the flow of the leaves and cuttings is minimized; which can be readily adapted to presently available leaf sweepers with a minimum of change.

SUMMARY OF THE INVENTION

The leaf sweeper and loader embodying the invention comprises a wheeled hand-guided vehicle having a rotary sweeper element rotatably mounted thereon about a transverse axis and a screw mounted for rotation about another transverse axis adjacent the sweeper element. A casing surrounds the screw and has a longitudinal opening through which the leaves and cuttings are directed by a shroud extending from the sweeper element to the casing. A passage extends from one end of the casing to a foraminous housing in which a collapsible bag is positioned to receive the compacted leaves and cuttings.

DESCRIPTION OF THE DRAWINGS

FIG. **1** is a side elevational view of a leaf sweeper and loader embodying the invention showing the collapsible container removed from the leaf sweeper and loader.

FIG. **2** is a fragmentary sectional view on an enlarged scale taken along the line **2—2** in FIG. **1**.

FIG. **3** is a fragmentary sectional view on an enlarged scale taken along the line **3—3** in FIG. **1**.

FIG. **4** is a fragmentary view of a portion of the leaf sweeper and loader taken along the line **4—4** in FIG. **3**.

FIG. **5** is a fragmentary sectional view on an enlarged scale taken along the line **5—5** in FIG. **1**.

FIG. **6** is a fragmentary sectional view taken along the line **6—6** in FIG. **5**.

FIG. **7** is a fragmentary front elevational view of the leaf sweeper and loader, parts being broken away.

DESCRIPTION

Referring to FIG. **1**, the leaf sweeper and loader embodying the invention is adapted to be attached to a conventional leaf sweeper **10** that comprises a frame **11** including rear wheels **12** and powered front wheels **13**. An internal combustion engine **14** is mounted on a bracket **15** supported by the frame **11** and drives a transverse shaft **16** through a belt **17** and pulleys **18, 19** (FIG. **7**) and, in turn, the wheels **13** trough gearing (not shown) in accordance with conventional construction. A rotary sweeper element **20** having bristles **21** is fixed to a shaft **22** that extends transversely of the vehicle and is rotated through gearing in a direction opposite the direction of rotation of the drive wheels **13**.

The vehicle includes a first shroud **23** that directs the leaves and grass cuttings upwardly and a second shroud **24** which further guides the leaves and cuttings into the open upwardly facing end of opening **25** of a semi-cylindrical casing **26**. A screw element **27** is rotatably mounted about a transverse axis within the casing **26** and has a periphery in close engagement with the inner surface of the casing (FIG. **4**).

As shown in FIG. **2**, the screw element **27** has a progressively increasing pitch toward one end **28** of the casing in which an outlet **29** is provided. A pipe **30** is connected to the outlet **29** and extends substantially **180** degrees (FIG. **7**) to the inlet of a foraminous housing **31**. The cross sectional area of the pipe **30** is generally circular and increases progressively from the outlet **29** into the inlet **32** of the housing **31**. The housing **31** comprises two semi-cylindrical screen elements **31*a***, **31*b*** that are hinged as at **33**. The housing element **31*a*** is fastened by a cross bar **34** to the handles **35** of the vehicle **10**. The housing element **31*b*** is adapted to be removably connected to the element **31*a*** by closure **35**.

A collapsible bag B is removably mounted on the end of the tube **30** within the container **31** by a structure which includes an undulating member **36** that surrounds the tube providing air passages **37** covered by a screen **37*a*** and a rubber band **38** which engages a ring **39** and holds the end of the bag on the end of the tube **30**.

In operation, as the vehicle is moved along the ground, it is guided by grasping the handles and the sweeper element **20** picks up the leaves and grass cuttings and directs them upwardly where they are guided by the shrouds **23, 24** into the opening **25** of the casing **26**. The screw **27** progressively compacts the leaves and cuttings and moves them axially through the outlet **29** through the tube **30** and into the collapsible bag B.

Since the tube **30** progressively increases in cross sectional area, minimum tendency of jamming or clogging is created. The provision of means for air within the bag B to be forced outwardly through spaces **37** and screen **37*a*** as the leaves and cuttings displace the air in the bag provides for full use of the volumetric capacity of the bag. When the bag is filled, the cover or housing element **31*b*** is opened, the band **38** removed permitting the bag B to be lifted out of the housing and a new bag to be inserted in its place.

The casing **26** includes an inclined edge **26*a*** at one end of opening **25** which has the same inclination as the endmost convolution **27*a*** of screw **27** along which the

end of screw 27 translates to shear any leaves and cuttings and thereby minimize any tendency to clogging.

I claim:

1. The combination comprising

a wheeled hand-guided vehicle,

a rotary sweeper element rotatably mounted on the vehicle for rotation about an axis extending generally transversely of the vehicle such that the element engages leaves and cuttings and the like as the vehicle is moved along the ground,

a feed screw mounted for rotation about a transverse axis on the vehicle adjacent the sweeper element,

a casing having a longitudinal opening therein surrounding said screw,

shroud means extending from the sweeper element to said screw for guiding leaves and the like from said sweeper element through the longitudinal opening to said screw,

a foraminous housing mounted on said vehicle and having inlet opening adjacent one end thereof,

said casing having an outlet adjacent one end thereof through which the screw feeds the leaves and cuttings,

passage means interconnecting the outlet of said casing and the inlet of said housing,

means releasably connecting a collapsible container to the inlet of said housing within said housing whereby upon operation of said sweeper element and said screw, the leaves and cuttings are compacted and delivered to the flexible container within said housing.

2. The combination set forth in claim 1 including means drivingly interconnecting the sweeper element and the screw.

3. The combination set forth in claim 1 including means on the vehicle for rotating said sweeper element.

4. The combination set forth in claim 1 including means on said vehicle for rotating said sweeper element in a direction opposite to the direction of rotation of the wheels of the vehicle as the vehicle is moved along the ground.

5. The combination set forth in claim 1 wherein said screw has a progressively increasing pitch toward the outlet of the casing.

6. The combination set forth in claim 1 wherein said passage has progressively increasing cross sectional area from the outlet of said casing to the inlet of said housing.

7. The combination set forth in claim 1 wherein said housing has readily removable and replaceable wall portions for gaining access to said collapsible container.

8. The combination set forth in claim 7 wherein said last-mentioned means comprises a removable wall of said container.

9. The combination comprising

a wheeled hand-guided vehicle,

a rotary sweeper element rotatably mounted on the vehicle for rotation about an axis extending generally transversely of the vehicle such that the element engages leaves and cuttings and the like as the vehicle is moved along the ground,

a feed screw mounted for rotation about a transverse axis on the vehicle adjacent the sweeper element,

a casing having a longitudinal opening therein surrounding said screw,

shroud means extending from the sweeper element to said screw for guiding leaves and the like from said sweeper element through the longitudinal opening to said screw,

a foraminous housing mounted on said vehicle and having inlet opening adjacent one end thereof,

said casing having an outlet adjacent one end thereof through which the screw feeds the leaves and cuttings,

passage means interconnecting the outlet of said casing and the inlet of said housing,

means releasably connecting a collapsible container to the inlet of said housing within said housing whereby upon operation of said sweeper element and said screw, the leaves and cuttings are compacted and delivered to the flexible container within said housing,

said screw having a progressively increasing pitch toward the outlet of the casing,

said passage having progressively increasing cross sectional area from the outlet of said casing to the inlet of said housing,

said housing having readily removable and replaceable wall portions for gaining access to said collapsible container.

10. For use with a wheeled hand-guided vehicle having a rotary sweeper element rotatably mounted on the vehicle for rotation about an axis extending generally transversely of the vehicle such that the element engages leaves and cuttings and the like as the vehicle is moved along the ground, the improvement comprising

a feed screw mounted for rotation about a transverse axis on the vehicle adjacent the sweeper element,

a casing adapted to be mounted on said vehicle having a longitudinal opening therein surrounding said screw,

shroud means adapted to be mounted on said vehicle and extend from the sweeper element to said screw for guiding leaves and the like from said sweeper element through the longitudinal opening to said screw,

a foraminous housing adapted to be mounted on said vehicle and having inlet opening adjacent one end thereof,

said casing having an outlet adjacent one end thereof through which the screw feeds the leaves and cuttings,

passage means interconnecting the outlet of said casing and the inlet of said housing,

means releasably connecting a collapsible container to the inlet of said housing within said housing whereby upon operation of said sweeper element and said screw, the leaves and cuttings are compacted and delivered to the flexible container within said housing.

11. The combination set forth in claim 10 wherein said screw has a progressively increasing pitch toward the outlet of the casing.

12. The combination set forth in claim 10 wherein said passage has progressively increasing cross sectional area from the outlet of said casing to the inlet of said housing.

13. The combination set forth in claim 10 wherein said housing has readily removable and replaceable wall portions for gaining access to said collapsible container.

14. The combination set forth in claim 13 wherein said last-mentioned means comprises a removable wall of said container.

15. The combination set forth in claim 10 wherein said casing includes an inclined edge at one end of said opening which has the same inclination as the endmost convolution of said screw cooperates with said convolution of said screw to provide a shearing action in the leaves and cuttings.

16. The combination set forth in claim 1 wherein said casing includes an inclined edge at one end of said opening which has the same inclination as the endmost convolution of said screw cooperates with said convolution of said screw to provide a shearing action on the leaves and cuttings.

17. The combination set forth in claim 9 wherein said casing includes an inclined edge at one end of said opening which has the same inclination as the endmost convolution of said screw cooperates with said convolution of said screw to provide a shearing action on the leaves and cuttings.

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