United States Patent [19]

Dankel

[11] **3,907,214**

[45] **Sept. 23, 1975**

[54] **BAGGING ATTACHMENT FOR SHREDDER-BAGGER**

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[73] Assignee: **Roper Corporation,** Kankakee, Ill.

[22] Filed: **Jan. 16, 1973**

[21] Appl. No.: **324,209**

[52] **U.S. Cl.** **241/79;** 55/385; 55/429; 55/509; 55/511; 55/529; 55/DIG. 26; 241/100

[51] **Int. Cl.** **B02b 7/02**

[58] **Field of Search** ..... 55/356, 359, 361, 362, 55/366, 372, 378, 429, 432, 433, 515, 516, 519, 380, 529, 342, 343, 350, DIG. 4, 357, DIG. 26, 341, 509, 511, 315, 437, 473, 385; 241/24, 79, 79 A, 100

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Assistant Examiner—David L. Lacey
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[57] **ABSTRACT**

A bagging attachment intended for use with a shredding machine of the type which shreds garden waste and discharges it in an airborne stream spaced above but generally parallel to the ground. The attachment is in the form of an enclosure having spaced-apart front and back walls, side walls, and top and bottom walls. The front and back walls are self-supporting or hinged on the bottom wall. The front wall is of "picture frame" shape to register with the mouth of a refuse bag. The rear wall has an inlet opening which registers with the stream when the enclosure is supported upon the ground for direct discharge of the stream into the mouth of the bag. The side and top walls are formed by a single piece of porous fabric which serves to filter the escaping air, the edges being lapped over the supporting structure and held in place by a suitable fastening means, preferably of the hook-and-loop type. A slip joint is provided with the discharge chute so that the enclosure, with bag attached, may be readily slipped clear of the discharge chute, swung up to a bag-vertical position and shaken so that any collected dust or shredded material adhering to the porous fabric walls id dislodged into the mouth of the bag. In an alternate form of the invention, the structure includes a bottom wall panel having side flanges, a back wall panel having forwardly turned flanges and a front frame having rearwardly turned flanges, the adjacent portions of the flanges being secured by bolts or the like to form a rigid box structure, with flanges forming a continuous edge or supporting surface. The lateral edges of fabric forming a porous filter are secured along the supporting surface to complete the enclosure.

4 Claims, 13 Drawing Figures

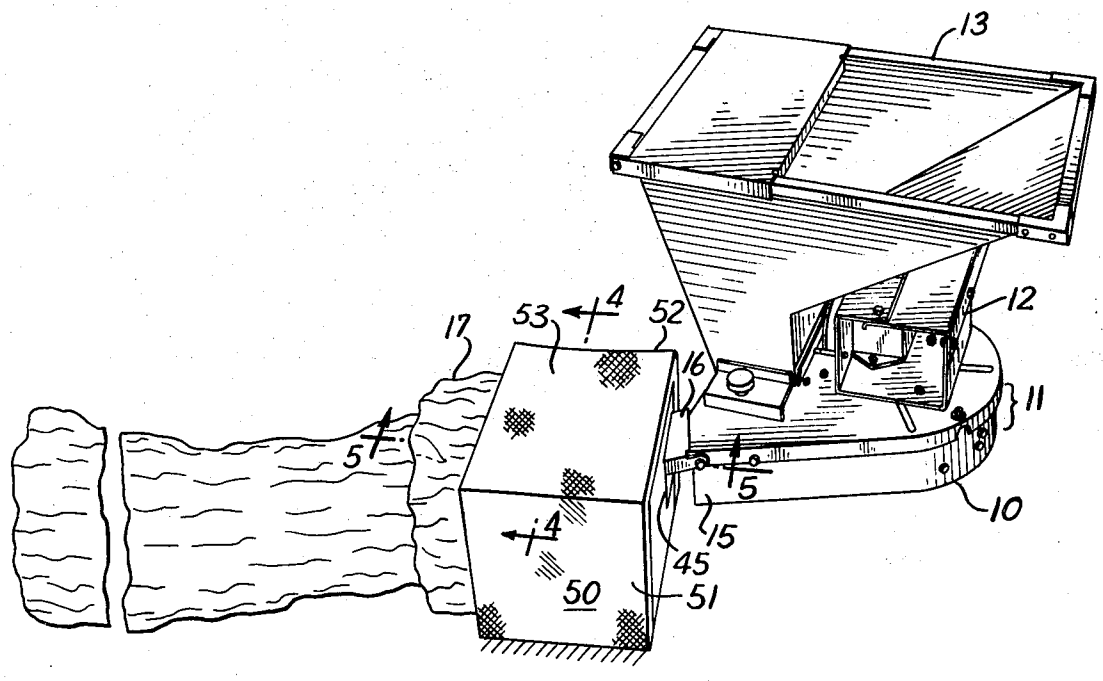


FIG. 7

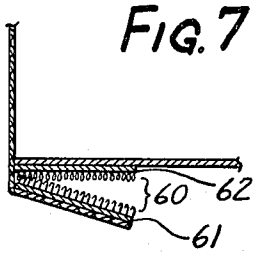


FIG. 1

FIG. 2

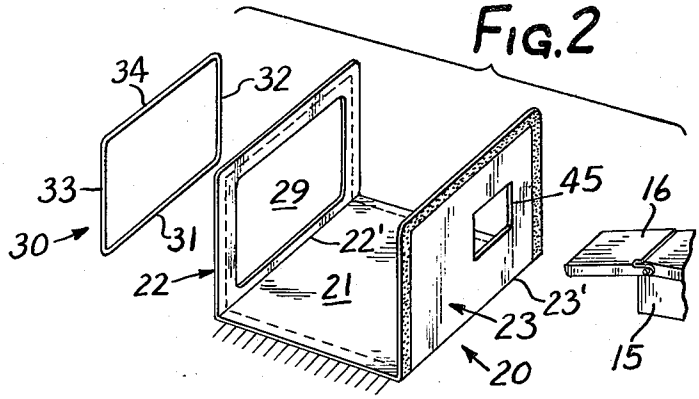


FIG. 4

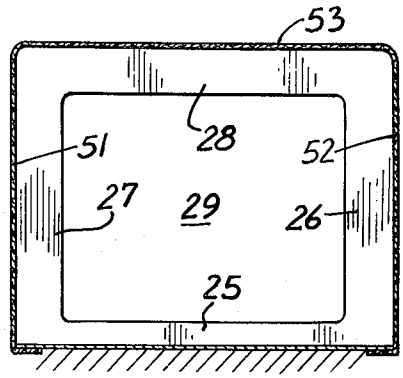


FIG. 3

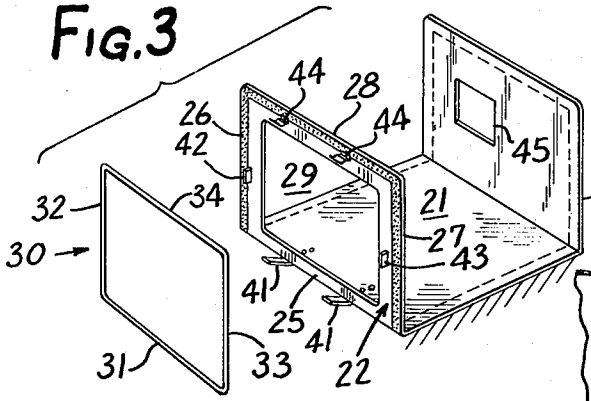


FIG. 5

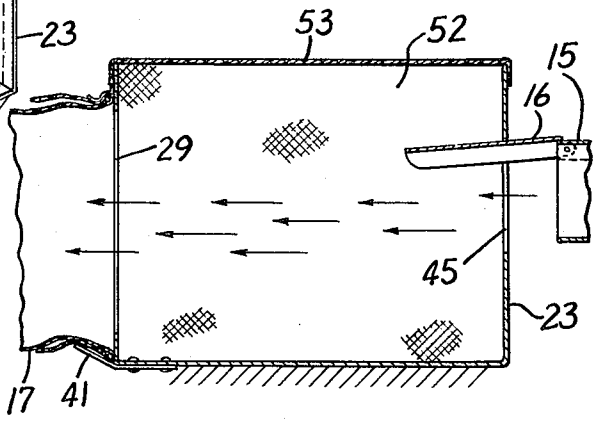
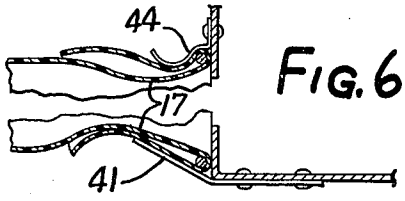


FIG. 6



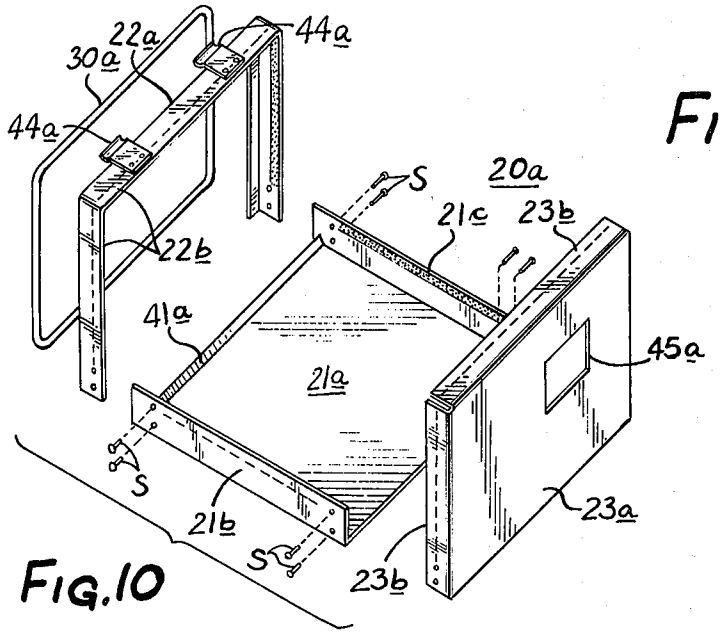


FIG. 10

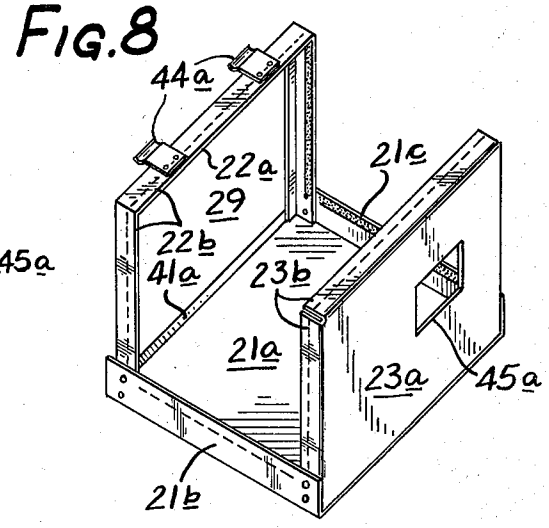


FIG. 8

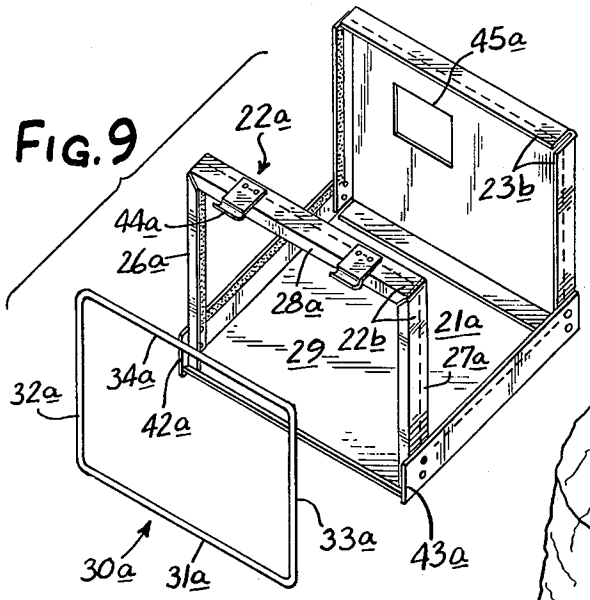


FIG. 9

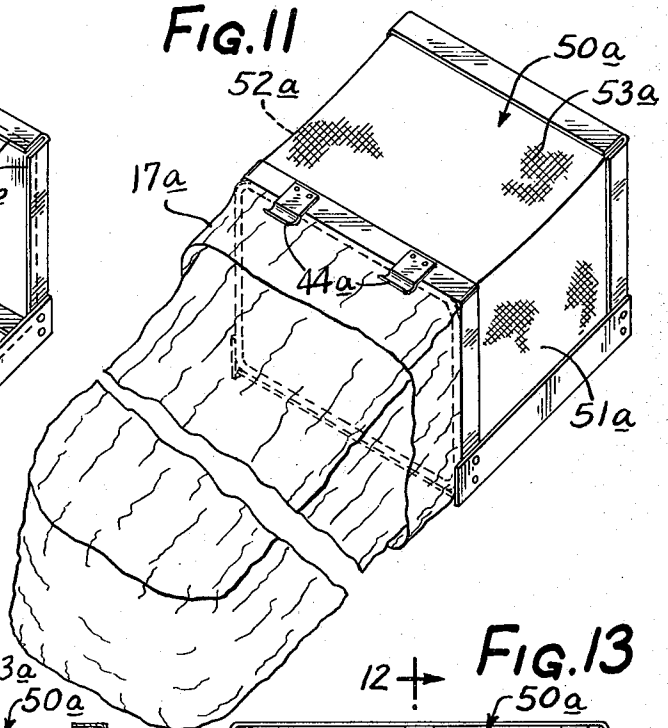


FIG. 11

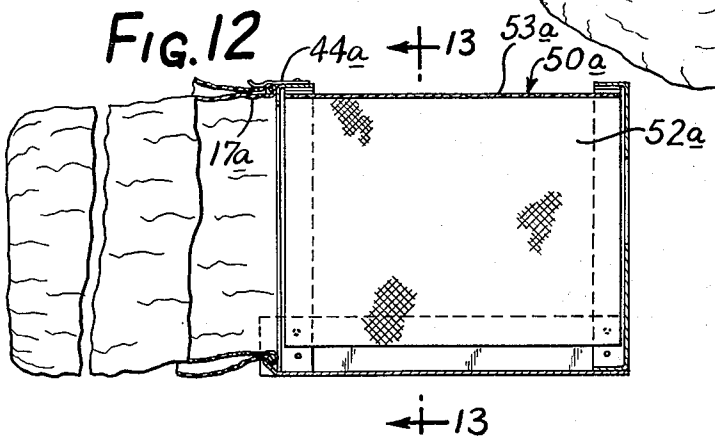


FIG. 12

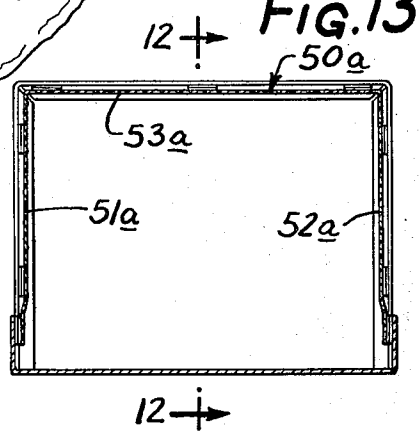


FIG. 13

BAGGING ATTACHMENT FOR SHREDDER-BAGGER

It is an object of the present invention to provide a bagging attachment for a shredding machine, interposed between the discharge chute and mouth of the bag, which filters the air which is turned back from the mouth of the bag and which thus catches any dust or fly material which would otherwise escape to pollute the atmosphere and surroundings. It is a more specific object to provide a bagging attachment which is tightly secured to the bag during the filling operation and which is self-supporting, having a slip joint with the discharge chute of the shredder, so that the enclosure, with bag attached, may be lifted from the ground into shaking position. The dust and extraneous material collected by reason of the filtering action may be easily and quickly shaken down into the mouth of the bag thereby to renew the filter surfaces between the filling of a series of bags. If desired, the bag may be shaken in this manner at intervals to load each bag as compactly as possible.

It is another object of the present invention to provide a bag-filling attachment which, notwithstanding the fact that three walls thereof are formed with porous fabric, is nevertheless strong and self-supporting, the porous fabric being in the shape of a rectangle having means around the periphery for engagement with the structural portions of the enclosure to provide a filter which is readily removable but which is effective to filter practically all of the escaping air.

It is another object of the present invention to provide a bagging attachment in which the bottom, front and back walls are self-supporting and which may be readily fabricated, at low cost, of either metal or plastic.

In one of the aspects of the invention it is an object to provide a bagging attachment which can be readily collapsed or folded together for compact storage.

Other objects and advantages of the invention will be apparent upon reading the attached detailed description and upon reference to the drawings, in which:

FIG. **1** shows a typical bagging set-up with the bagging attachment ground-supported and interposed between the shredding machine and the mouth of the bag;

FIG. **2** shows the supporting structure consisting of integral bottom, front and back walls and with the associated hoop separated from the front wall;

FIG. **3** is a view similar to FIG. **2** but showing the structure from a different angle;

FIG. **4** is a transverse section looking along line **4—4** in FIG. **1**;

FIG. **5** is a longitudinal section looking along line **5—5** in FIG. **1**;

FIG. **6** is a fragmentary view showing the mode of securing the bottom and top rungs of the rectangular hoop in place of the front wall;

FIG. **7** is a fragmentary view showing the means for anchoring the edge of the porous fabric layer upon the lateral edge of the bottom wall.

FIGS. **8** and **9** are perspective views showing a modified form of the present invention as viewed from two different angles;

FIG. **10** is an exploded perspective;

FIG. **11** shows the structure of FIG. **9** with the filter attached;

FIG. **12** is a longitudinal section taken along line **12—12** of FIG. **13**; and

FIG. **13** is a transverse section taken along the line **13—13** of FIG. **12**.

While the invention has been described in connection with a preferred embodiment, it will be understood that I do not intend to be limited to the embodiment shown but intend, on the contrary, to cover the various alternatives and equivalent constructions which may be included within the spirit and scope of the appended claims.

Turning now to the drawings, there is shown a shredding machine **10** having a housing **11** mounting a motor **12** and hopper **13**. The motor drives one or more blades (not shown) within the enclosure which are mounted for rotation about a vertical axis. The blades cooperate with breakers (also not shown) which are spaced about the interior of the housing. The result is that the garden wastes in the form of dried leaves, twigs and the like deposited in the hopper are acted upon by the whirling blades and ejected, in shredded form, in an airborne stream from a discharge chute **15**. The chute **15** is conventionally provided with a pivoted extension **16** as shown in FIGS. **1** and **2**. The shredding machine may be mounted upon groundsupporting wheels as shown in application Ser. No. 186,076 so that the stream of shredded material is discharged above, but parallel to, the surface of the ground. Alternatively, the machine may be supported by a linkage connected to the power lift mechanism either at the front or rear of a garden tractor.

Generally aligned with the discharge chute **15** is a refuse bag having a mouth portion **17**, the bag being formed of thin-gauge flexible plastic material such as polyethylene. It is found that when the bag is aligned with the discharge chute, the shredded material, because of its momentum, tends to be carried to the bottom of the bag for progressive accumulation, whereas the air in the discharge stream is turned back from the bag or mouth portion thereof for discharge into the atmosphere.

In accordance with the present invention, a box-like enclosure is provided having a bottom wall intended for supporting at or on the ground with integral, upstanding back and front walls which are spaced apart and arranged generally parallel to one another. The front wall is of picture-frame shape defining a large central opening and having means for securing the mouth of a refuse bag in register with the opening, while the back wall has an inlet opening registering with the chute of the shredding machine, in a position aligned with the large central opening in the front wall, for direct discharge of the airborne stream into the mouth of the bag. The side and top walls are formed by a layer of porous fabric so that the air in the stream which is returned from the mouth of the bag is filtered incident to escape from the enclosure. Thus, I provide an enclosure **20** having a bottom wall **21**, a front wall **22** and a back wall **23**, the front and back walls being separated by an appreciable distance and arranged generally parallel to one another. The front wall **22** is of rectangular, picture-frame shape having a bottom portion **25**, side portions **26**, **27**, and a top portion **28** which together define a central opening **29**. For securing a refuse bag in register with the front wall, a rectangular hoop **30** is provided having corresponding rungs **31–34** about which the neck of the bag is registeringly folded. To at-

tach the hoop to the front wall, a pair of bottom lugs **41** form a receiving ledge into which the bottom rung **31** of the hoop is nested. For holding the top rung **34** captive, it is received in manually releasable spring clips **44** (see also FIG. **6**). Finally, for preventing the hoop and bag from moving sideways, lugs **42, 43** are provided which register with the side rungs **32, 33** of the hoop.

Turning attention to the rear wall **23,** it is formed with an inlet opening **45** which is in general alignment with the large central opening **29** of the front wall, in the sense that the airborne shredded material which enters through the opening **45** follows a straight line path of discharge through the mouth of the bag.

It is one of the features of the present invention that the top and sides of the enclosure, indicated at **51, 52,** 53 are in the form of a filtering element **50** consisting of a continuous length of porous fabric. The fabric is sufficiently dense as to prevent escape of airborne dust, yet sufficiently porous as to allow free flow of air which is pumped in from the discharge chute of the machine. It is found that the filtering function is adequately performed by lightweight cotton fabric although synthetic fabrics having somewhat greater wear resistance may be used if desired.

In order to secure the filtering element **50** about its edges to the structural portions of the enclosure, an adherent type fastener is provided in the form of cooperating tapes having mutually adherent surfaces. Preferably, I employ a hook-and-loop type fastener, indicated at **60** in FIG. **7,** commonly referred to as Velcro. The fastener consists of a first length of tape **61** secure to the fabric having miniature plastic hooks formed thereon and a second length of tape **62** which is secured to the supporting structure and which has a surface formed of closely spaced loops. The hooks serve to temporarily engage the loops when the two tapes are pressed together but the hooks, being resilient, are capable of yielding to bring about release when the tapes are forcibly pulled apart. It will be understood that in the preferred embodiment the filter **50,** consisting of portions **51-53,** is formed of a single rectangular piece of cloth bounded about its edge either continuously or at intervals, by a length of "hook" tape **61.** The "loop" tape is cemented or otherwise anchored about three sides of the periphery of the front and back walls and along the underside of the lateral edges of the bottom wall in the areas indicated by the stippling. This forms a continuous and relatively tight joint through which the dust and debris cannot escape, while permitting easy application or removal. The fabric anchored by the engaged tapes adds structural strength to the subassembly formed by the integral front, back and bottom walls.

The front, back and bottom walls may be formed of a single piece of metal or suitable plastic bent into U-shape as shown. Alternatively, the front, back and bottom walls may be flexibly hinged together along lines **22', 23'.** Where the structure is made of plastic, hinging may occur at corresponding grooves or score lines. The hinges in turn may include springs (not shown) to keep the front and back walls sprung relatively away from one another. In such event, the filter element, when in place, serves to rigidify the structure and to keep the front and back walls in upright position, while permitting the enclosure to be folded together for compact storage. Or, if desired, the enclosure may be provided with an internal brace (not shown) to keep the front and back walls extended at the desired spacing.

The resulting enclosure, as will be apparent, is of inherently light construction. While the structure will maintain its position relative to the shredding machine while it is ground-supported, the opening **45** in the back wall provides a loose "slip joint" connection with the chute **15,** the term referring to any registering connection which allows the structure to be completely separated from the shredding machine by picking it up from the ground and drawing it clear of the chute extension **16.** After the attachment has been drawn away from the shredding machine, it may be lifted into a bag-vertical position so that any of the collected dust and waste which may be coating the inner wall of the filter element may be dislodged into the neck of the bag by simple shaking or tapping.

In use, the enclosure is mated with the chute **15** as shown in FIG. **1,** either with the chute being close-coupled to the opening **45** or separated therefrom by a short distance as shown. The shredded waste, by reason of its momentum in the air stream, follows a straight line of path of movement into the "bottom" of the bag, while the air in the stream, having less momentum, makes a "U" turn, passing outwardly of the bag adjacent the incoming stream and back into the plenum formed by the enclosure from which it escapes through the walls of the filter element. The turned-back air carries with it a small percentage of the shredded material, particularly the light chaff or fly elements along with the dust which covers a range of particle size. The chaff, fly and dust collect more or less uniformly on the inner walls of the filter element.

The act of shaking the enclosure, in removing the residual chaff and dust, tends to restore the free porosity of the fabric so that the filter is in effect restored to fresh condition offering minimum obstruction to the escape of air. If the enclosure is raised and shaken as described, when the filling of each bag is complete (or if desired more frequently than this) the filtering efficiency is maintained regardless of the number of cycles of use.

The bagging attachment avoids pollution of the atmosphere by clouds of dust which usually accompany use of a shredder under normal or dry conditions. Moreover, the attachment avoids a possible health hazard, especially risk to eyes and lungs. The substantial spacing between the front and back walls insures a large total area of active filter.

When it is desired to remove the bag, the hoop is simply rocked outwardly of the clips **44** about the ledge **41.** A new bag is strung upon the hoop and the process is reversed.

Where the front and back walls are hinged to the bottom wall they may simply be folded inwardly, with the filtering element remaining attached, for storage.

While support of the bottom wall directly upon the ground is intended, it will be apparent that the enclosure may be supported at the surface of the ground but in a slightly elevated position without departing from the invention. Indeed the bottom surface, if spaced above the ground could, if desired, be of open construction, i.e., with a large central opening, and covered with a porous layer of fabric for filtering purposes. Where this is done the fabric layer may be in the form of a continuous loop with elastic bands or draw strings

about the respective presented edges to facilitate slipping into place upon the supporting structure.

If desired, the enclosure may be supported on the shredder itself, for example, by a slip-type supporting bracket so that the inlet opening **45** registers with the discharge chute **15**, or, if desired, a fitting may be provided at the edge of the discharge chute **15** for engagement with a cooperating fitting at the periphery of the inlet opening **45** in the same manner that a grass catcher is secured to the discharge chute of a rotary-type mower. Thus the term "slip joint" as used herein is not limited to any particular direction of slip but refers to a joint which is readily disengageable by relative movement.

It will be understood that the structure shown in FIGS. **1–7** inclusive, described above, and which is distinguished by the bottom front and back walls being formed of flat panels of metal or plastic, constitutes only one form of the present invention and a second construction is set forth in FIGS. **8–13.**

In these figures, corresponding reference numerals, with addition of subscript *a*, denote corresponding parts. The structure differs from that shown in the earlier figures in that the bottom front and back members are formed of separate flanged pieces, preferably of metal, with adjacent portions of the flanges being secured together to form a box-like structure by means of machine screws of the like.

The bottom panel as shown in FIGS. **8–10** thus has side flanges **21***b*, 21*c*. The front panel, or frame member, has rearwardly turned flanges **22***b* while the back panel has forwardly extending flanges **23***b*. The latter flanges are dimensioned to lie adjacent and inside of the lateral flanges **21***b*, 21*c*, the flanges being secured together by screws S. The parts **21***a*–**23***a*, being separable, may be compactly shipped in knocked-down condition and set up using a total of only eight screws in a simple assembling procedure.

For mounting the hoop **30***a* a lip **41***a* integrally formed at the front edge of the bottom panel **21***a* forms a receiving ledge. The upper edge of the hoop is retained by clips **44***a* (see FIG. **12**). Side-to-side registration is insured by extending the front edges of the flanges **21***b*, 21*c* forwardly as indicated at **42***a*, 43*a* (FIG. **9**) thereby keeping the hoop captive.

It is one of the main features of the alternate construction shown in FIGS. **8–13** that the peripheral flanges form a continuous mounting edge, or surface and also that the filter, indicated at **50***a*, is secured inside of the flanges rather than being wrapped around the edges and secured on the outside. The same hook-and-loop tape combination is used for fastening purposes, one layer of tape being mounted along the stippled surfaces on the flanges, the other being secured to the edges of the fabric filter. It is a simple matter to reach into the front opening **29** and to press the edges of the filter in place to provide a good chaff-proof joint. The fact that a slight pressure is developed within the enclosure only tends to seat the edges of the filter more securely. The hook-and-loop tape may be provided in continuous length or in the form of spaced patches, just as in the case of the earlier embodiment.

The term "fabric" as used herein is intended to denote a flexible porous layer and is not limited to woven materials. The term "portion" as used herein, as applied to the sides, refers either to individual ones of the side or to portions of an individual side. The term "spaced at a substantial distance" in reference to the front and back walls has to do with the fact that sufficient filter area is available to pass the exhausted air without building up any substantial back pressure within the enclosure. While the term "picture-frame" has been used to characterize the front wall or panel member, it will be understood that this has to do with the large central opening provided by this panel and not necessarily to the geometric shape.

The complete enclosure of the airstream down the mouth of the chute and a straight line discharge into the bag precludes any possibility of errant missiles and enhances the safety of the user of this type of equipment.

I claim as my invention:

1. In a bagging attachment for use with a shredding machine having a discharge chute for discharging shredded garden waste in an airborne stream spaced parallel to the ground and for use with a plastic film refuse bag, the combination comprising an enclosure having front, back, top, bottom and side walls connected together about their edges, the front wall being of narrow picture-frame configuration defining a large central opening and having means for securing thereto in intimate registering relation the mouth of the plastic refuse bag, the back wall having a relatively much smaller inlet opening registering with the chute and in a position so that the flow from the chute is discharged in a concentrated straight stream through the large central opening directly into the mouth of the bag, at least a portion of the walls being formed of porous fabric, all of the air in the incoming stream entering the bag being turned back through the space surrounding the incoming stream for venting through the porous fabric so that dust and chaff entrained in the turned-back air is captured on the walls of the fabric, the inlet opening providing a loose slip joint connection with respect to the chute and the front and back walls of the enclosure being rigidly supported with respect to the bottom wall to permit the enclosure with the connected bag to be disconnected from the chute and swung into a bag-vertical position for bodily shaking and for dislodgement from the fabric and into the mouth of the bag the captured dust and chaff.

2. The combination as claimed in claim **1** in which the means for securing the bag includes a hoop member conforming to the picture frame configuration of the front wall and over which the mouth of the bag is registeringly folded, and means on the front wall for captively engaging the hoop with the bag in place to form a tight joint between the enclosure and mouth of the bag.

3. The combination as claimed in claim **1** in which the top and side walls are formed of a single rectangular length of fabric having securing means distributed along the edge thereof for substantially continuous edge-to-edge attachment to the cooperating portion of the enclosure, the securing means being readily disengageable to permit removal of the length of fabric.

4. The combination of a shredding machine having a discharge chute, a bagging attachment, and a refuse bag, the opening in the bag being spaced apart from the discharge chute, the bagging attachment being interposed directly between the discharge chute and the opening in the bag, the attachment being an enclosure having an inlet opening, an outlet opening, and a filtering element, the inlet opening being in direct generally

alined communication with the outlet opening, the inlet opening being alined with the discharge chute, and the outlet opening being alined with the opening in the bag, so that the flow from the discharge chute is discharged in a concentrated undiverted stream into the inlet opening of the attachment, through the attachment, and into the mouth of the bag, bag securement means cooperatively associated with the enclosure for holding the mouth of the refuse bag in an open configuration and securing the mouth around the outlet opening and to the enclosure, the filtering element being a porous portion of the walls of the enclosure, the bag being formed of non-porous material so that the porous portion of the enclosure provides the sole communication between the interior of the bag and the atmosphere surrounding the bagging attachment, the outlet opening being substantially larger in cross section than the inlet opening and the incoming stream whereby all of the air in the incoming stream entering the bag is turned back and passes through the space surrounding the incoming stream and is vented through the filtering element of the bagging attachment.

* * * * *