United States Patent

Kohls

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[54] **LITTER COLLECTOR AND RECEPTACLE**

[72] Inventor: **James L. Kohls,** 420 Arawe Circle E., Irving, Tex. 75060

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[52] **U.S. Cl.** **141/391,** 232/44, 248/94, 273/105

[51] **Int. Cl.**.....**B65b 1/04,** B65b 3/04

[58] **Field of Search** 232/43.1, 43.2, 44; 248/94, 248/95, 97, 99, 100; 43/11, 7, 12; 273/105; 141/313–322, 331–345, 365, 366, 391, 392

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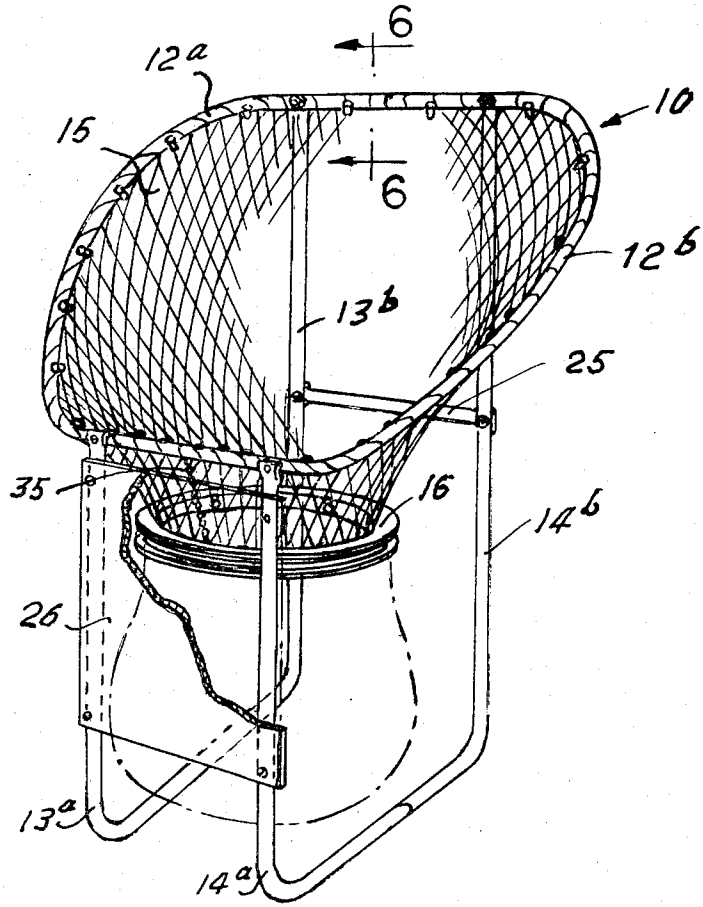
Primary Examiner—Houston S. Bell, Jr.

Attorney—Cecil L. Wood and Peter J. Murphy

[57] **ABSTRACT**

A collector for litter includes a tubular frame presenting a large, generally oval ring supported at an inclined plane on supporting legs. The ring defines a large target area and has suspended therefrom a net defining a collector funnel with a discharge opening at the bottom of the funnel defined by a discharge ring. The net funnel may discharge into a barrel or other container placed beneath the discharge ring; or the discharge ring may include means for attaching a receptacle, in the form of a plastic bag for example, which may be readily removed for transporting the litter from the site. The net is readily assembled to the frame ring and to the discharge ring by means of suitable fasteners which are readily assembled but difficult to remove. For convenience a subassembly of a plastic bag and bag ring may be preassembled and readily dropped into and supported by the receptacle discharge ring.

13 Claims, 12 Drawing Figures



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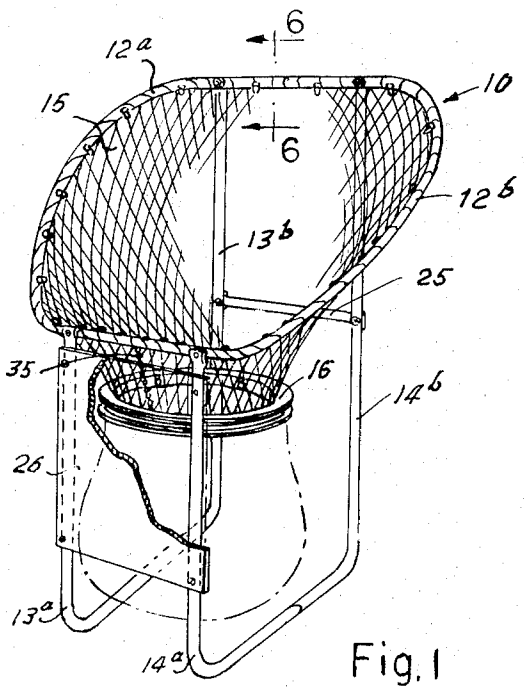


Fig. 1

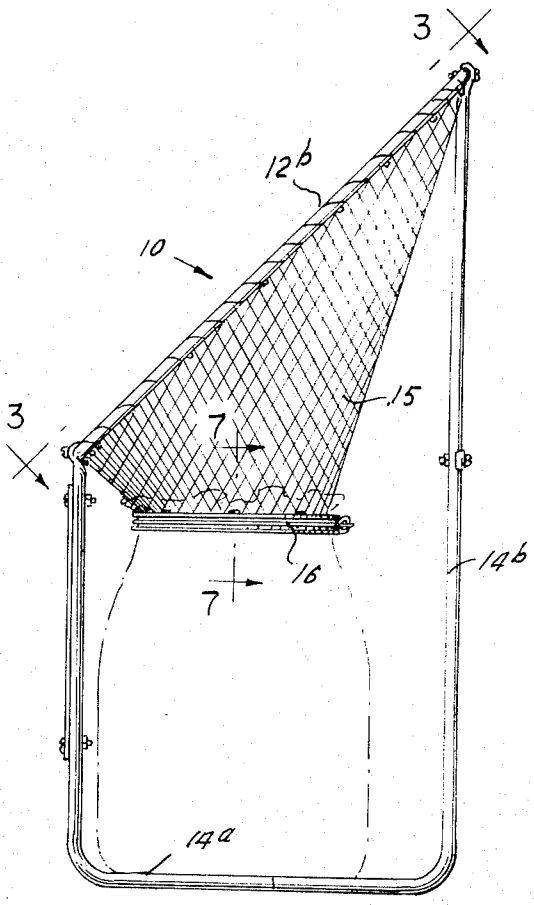


Fig. 2

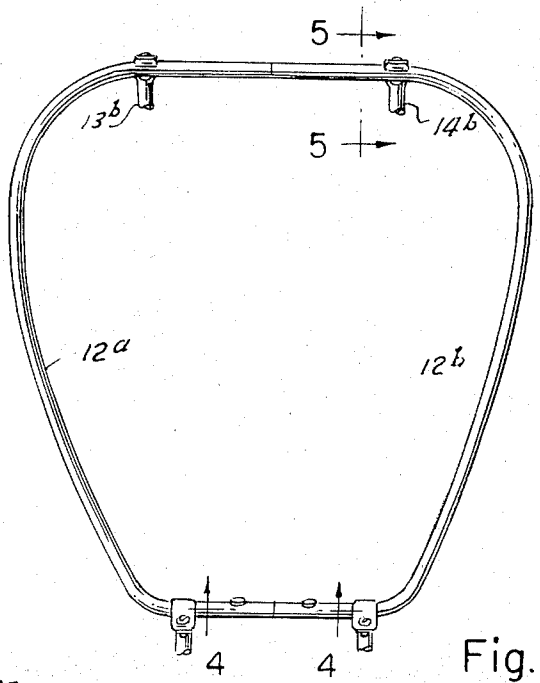


Fig. 3

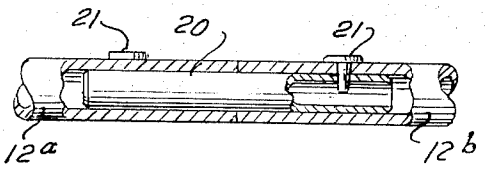


Fig. 4

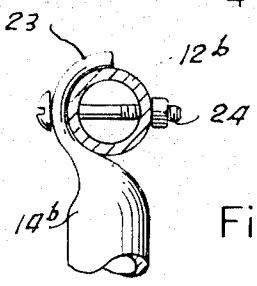


Fig. 5

INVENTOR
James L. Kohls

BY

Paul L. Wood
Peter J. Murphy
ATTORNEYS

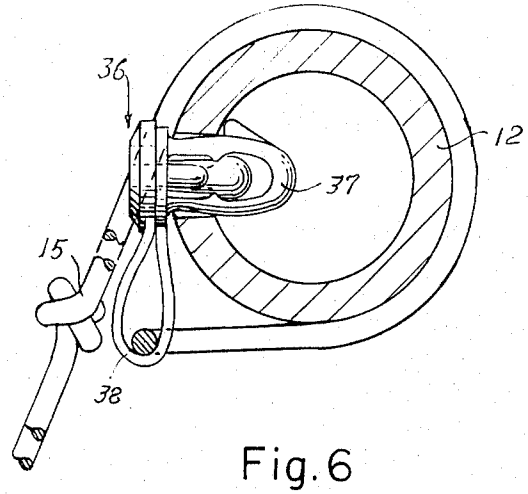


Fig. 6

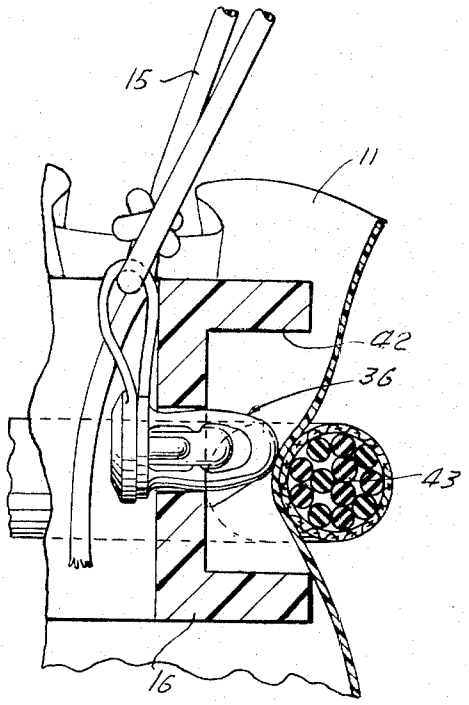


Fig. 7

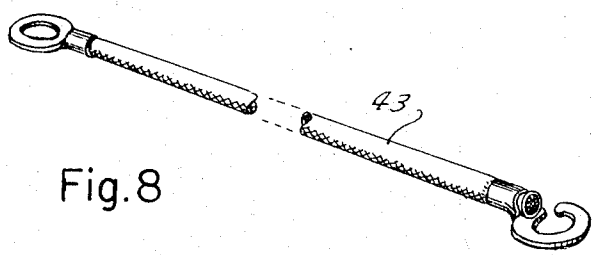


Fig. 8

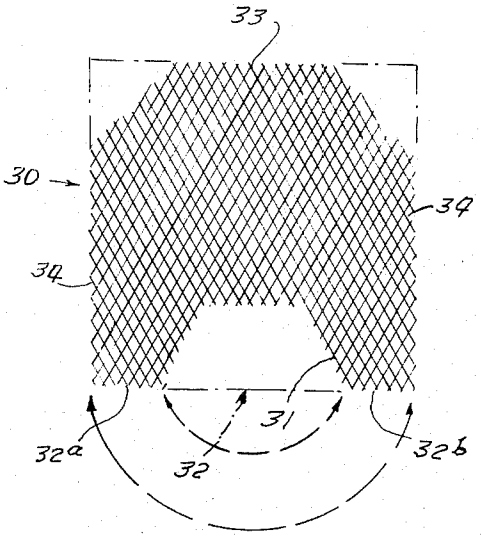


Fig. 9

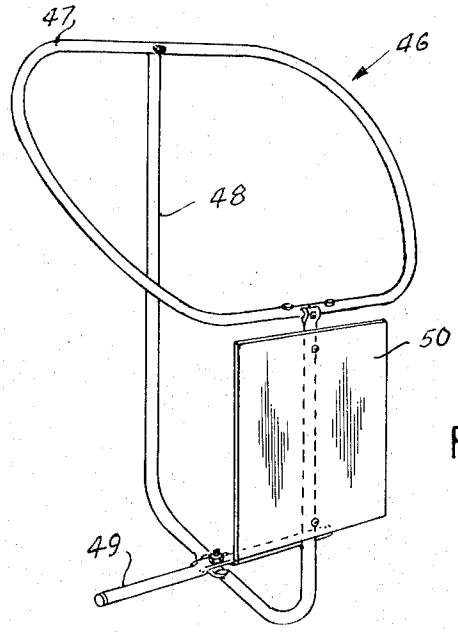


Fig. 10

INVENTOR
James L. Kohls

BY Cecil L. Wood
Peter J. Murphy
ATTORNEYS

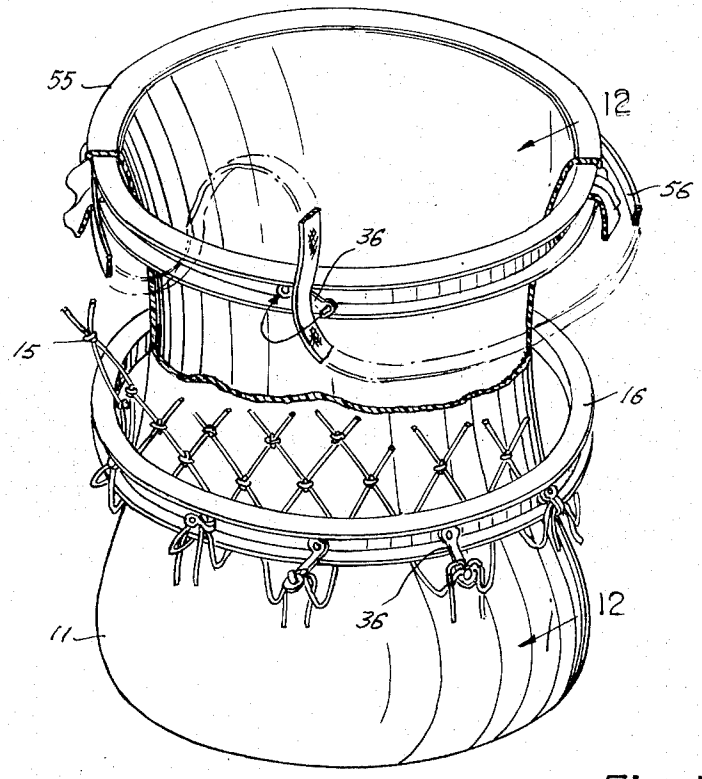


Fig. 11

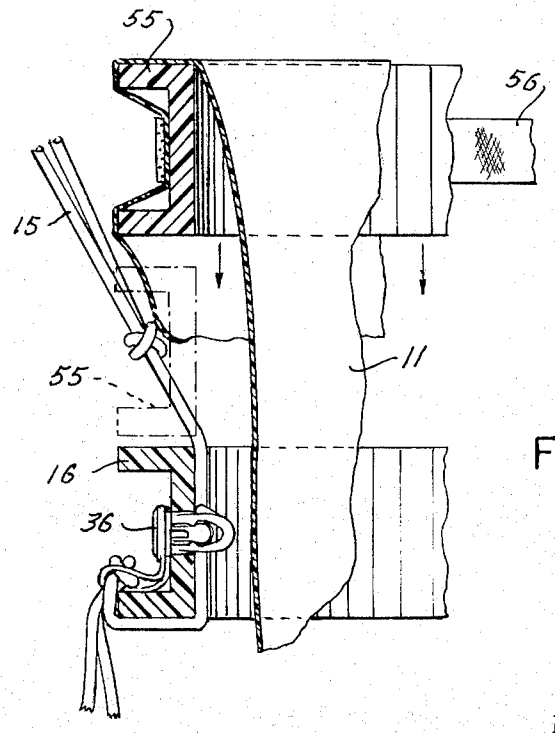


Fig. 12

INVENTOR
James L. Kohls

BY

ATTORNEYS

LITTER COLLECTOR AND RECEPTACLE

BACKGROUND AND SUMMARY OF THE INVENTION

This invention relates to a device facilitating the collection and removal of litter, and more particularly to such a device especially adapted for use along highways or roadways for the convenience of travelers.

The cost of collecting litter, particularly litter of a type which is strewn from automobiles and other vehicles along highways, roadways and streets, is an ever increasing problem due to the continuing increase in the number of vehicles traveling the roadways and due to the ever increasing costs for personel and equipment While the problem is not limited to highways and roadways, the problem is aggravated in those situations because of the large area which must be policed coupled with a low concentration of litter. The problem also exists, of course, in parks, picnic areas and public sports areas to a lesser degree perhaps because the the litter is more concentrated in those areas.

The highway traveler in a hurry seems to have no time to stop and dispose of litter which he has accumulated in his automobile or other vehicle, and pitches the litter at any convenient time. While efforts have been made to place litter receptacles, such as metal drums, at selected places along the highways and streets, these present a small target area which is difficult to hit from even a vehicle which is completely stopped, and are really effective perhaps only if the traveler emerges from his vehicle to place the litter in the receptacle. Of course litter, other than relatively heavy cans and bottles, which does not find the container is quickly distributed over a substantial area by the wind.

While conventional litter receptacles for outdoor use are metal barrels, these have the disadvantages of being heavy and cumbersome to handle, and requiring the use of closed trucks or other vehicles into which the barrels are emptied for transporting the litter to a suitable dumping or disposal point.

An object of this invention is to provide an improved litter collector which is particularly adapted for use with flexible bag receptacles, which is also adapted for use with conventional receptacles such as metal drums.

Another object of this invention is to provide a litter collector for use with a receptacle, the collector presenting a relatively large target area for receiving litter which may be thrown from a moving vehicle and serves to direct the litter into the receptacle while preventing the dispersal of the litter by the wind.

A further object of this invention is to provide a litter collector for use with a receptacle, which collector serves to retain overflow litter of the receptacle and prevents its dispersal by the wind.

Still another object of this invention is to provide a rugged and durable litter collector for use with flexible bag litter receptacles providing convenient means for securing the litter bags to and removing the litter bags from the collector.

For accomplishing these objects, a litter collector, according to the invention, includes a rigid frame presenting a large oval shaped ring supported in an inclined plane relative to a horizontal supporting surface by supporting legs having a portion suitable for anchoring to the supporting surface. A collector funnel formed of a flexible fabric is secured to the periphery of the frame ring with suitably spaced fasteners, and includes a smaller discharge opening at the lower extremity formed by a discharge ring to which the funnel material is anchored again by peripherly spaced fasteners. The discharge ring is supported at a suitable level to direct the litter into a suitable auxiliary receptacle; or the discharge ring may include means for readily and detachably securing thereto a flexible bag receptacle.

The novel feature and advantages of the invention, as well as additional objects thereof, will be understood more fully from the following discription when read in connection with the accompanying drawings.

DRAWINGS

FIG. **1** is perspective view of one form of litter collector according to the invention;

FIG. **2** is a side elevation view of the collector of FIG. **1**;

FIG. **3** is a view of the frame ring as viewed from the plane **3—3** of FIG. **2** parallel to the plane of the ring;

FIG. **4** is a fragmentary view of the frame ring, partially broken away, as viewed from the plane **4—4** of FIG. **3**, illustrating a joint in the frame ring;

FIG. **5** is a fragmentary view taken in the plane **5—5** of FIG. **3**, illustrating the attachment of a frame leg to the frame ring;

FIG. **6** is a transverse sectional view through the frame ring, taken in the plane **6—6** of FIG. **1**, illustrating the attachment of the collector net to the frame ring;

FIG. **7** is a transverse sectional view through the discharge ring, taken in the plane **7—7** of FIG. **2**, illustrating the connection of the discharge ring to the collector net and the connection of a receptacle bag to the discharge ring;

FIG. **8** is a perspective view of an elastic member for securing a flexible receptacle bag to the discharge ring as seen in FIG. **7**;

FIG. **9** is a view of a flat sheet of net fabric from which collector a collector funnel is fabricated;

FIG. **10** is a perspective view of the frame of another form of a collector according to the invention;

FIG. **11** is a perspective view of a flexible bag and bag ring assembly, with a fragmentary showing of a collector net and discharge ring; and

FIG. **12** is a fragmentary transverse sectional view, taken in the plane **12—12** of FIG. **11**, showing the assembled relation of the collector funnel and discharge ring, and the subassembly of a flexible bag and bag ring.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

FIGS. **1–9** of the drawings illustrate one form of litter collector **10** according to the invention which is particularly adapted for use with flexible bag receptacle **11**, as illustrated in broken lines in FIGS. **1** and **2**, and which is also adapted for use with more conventional containers, such as metal drums, which may be placed within the frame under the discharge opening of the collector. References to the flexible fabric bags **11** herein will be understood to include bags fabricated of polyethyline film which are commonly used for disposal of leaves and other trash, and will also be understood to include bags fabricated of other material

such as woven fabric or netting formed from natural, synthetic or metal fibers for example.

The principle components of the collector **10** are a frame consisting principly of a ring **12** supported in an inclined plane above the supporting surface by legs **13** and **14**, a collector funnel **15** formed of a flexible fabric, and a discharge ring **16** supported at the lower extremity of the collector funnel to define the discharge opening for the collector. While the collector funnel **15** is illustrated in the drawings as a net, it will be understood that the terms collector funnel and fabric material are intended to include such materials as woven fabric of natural, synthetic or metal fibers, any type of netting made up of natural, synthetic or metal fibers or strands, and other materials such as plastic film.

Referring in more detail to the collector particularly illustrated in FIGS. **1** through **9**, the frame ring **12** is viewed in FIG. **3** from a plane parallel to the plane of the ring, and it will be seen that the ring has a generally oval configuration being somewhat wider at the top than at the bottom. The ring **12**, as well as the frame legs **13** and **14**, are preferably fabricated from tubular steel, such as 1-inch tubular steel for example, so that the frame is of rigid and of durable construction. As best seen in FIG. **3**, the ring is formed into halves **12***a* and **12***b*; and this is primarily for convenience in packaging the device for shipping. The collector of course may be an desired size; and where the ring has a depth and width of approximately 5 feet, for example, it is desirable to form the ring in two parts for shipping purposes. For a smaller ring, only a single joint may be provided.

A means for joining the ring halves together is illustrated in FIG. **4**, and includes a tubular sleeve **20** which is received within the abutting tubular ends of the ring halves, with the ring halves being secured to the insert by means of drive pins **21** driven into suitably aligned holes in the ring members and sleeve.

As best seen in FIGS. **1** and **2**, the legs **13** and **14** are U-shaped members each having a forward upright portion which is secured at the upper end to the front portion of the ring **12**, having a upright rearward portion which is longer than the forward portion and is secured at the upper end to the rearward portion of the ring **12**, and having an interconnecting horizontal portion which defines the base of the leg. In a relatively large collector, as illustrated in FIG. **1** and **2**, the legs may be fabricated in two parts, again for convenience in packaging, these parts being illustrated as forward parts **13***a* and **14***a* and rearward parts **13***b* and **14***b* respectively. The joint between these leg parts may be formed in the same manner as the ring joint illustrated in FIG. **4**. The upper extremities of the support legs are formed into arcuate pads **23** to closely fit the ring **12**; and the legs are rigidly connected to the ring by means of suitable bolt and nut assemblies **24**. For rigidity, a horizontal brace **25** is connected between the rearward leg portions **13** *b* and **14***b*, and a sign brace **26** in the form of a rectangular plate of metal or other suitable material is connected between the forward leg portions **13***a* and **14***a*. The sign brace is appropriate either for advertising or for suitable slogens.

The horizontal base portions of the legs provided a stable base for the collector, and may be provided with suitable vertically aligned holes for anchoring the collector to the ground or to a suitable concrete or asphalt supporting pad.

The collector funnel **15** is illustrated in the drawings as an open mesh net which may be fabricated of nylon or polypropylene strands for example; and such net provides loops at the edges for convenience in attaching the net to the frame ring and for attaching the discharge ring to the lower extremity.

It has been found that the collector net may be conveniently formed from a rectangular piece of netting material **30**, as illustrated in FIG. **9**. with a cut out **31** being removed from one edge **32** thereof, leaving spaced portions **32***a* and **32***b* of the one edge. Triangle segments of material are removed from the two corners opposite the one edge **32** between the opposite or rear edge **33** and the side edges **34**. To form the collector funnel, the spaced edge portions **32***a* and **32***b* are joined together to form a seam **35**, indicated in FIG. **1**. The edges **33** and **34** of the net segment then form the upper periphery of the net which is attached to the frame ring **12**, with the edge **33** being attached to the upper and rearward most portion of the ring **12**. The seam **35** is at the front of the collector funnel, and the cutout **31** defines the discharge opening described. It will be seen then that collector funnels may be formed with little waste of material; and the pieces so removed may be provided as patch pieces for repair kits.

A preferred device for securing the collector funnel net **15** to the frame ring **12** is particularly illustrated in FIG. **6**. A number of peripheraly spaced holes are provided in the inner wall of the ring **12** , and these may be spaced at suitable intervals of 6 inches, for example. These holes are properly sized to accommodate a fastener device which may be described as a self anchoring loop fastener **36**, for example. As best seen in FIG. **6**, this fastener, which is fabricated of a resilient plastic material, includes an open body which is compressable and has external bosses for anchoring in the wall aperture, the body being integrally connected to one end of an elongated band **38**, and a locking pin **39** being intregally connected to the opposite end of the band. The band is formed into a loop as shown, and the locking pin inserted into the body to prevent removal of the fastener body from the ring wall. As indicated in FIG. **6**, the upper loops of the collector funnel net are passed around the ring **12** and are engaged by the band **38** of the fastener which forms a loop to secure the net to the ring with fasteners **36** of the type described, the collector funnel net **15** is very readily secured to the frame ring for initial assembly of the collector, and is secured in a manner that is not easily removable without either cutting the net material or cutting the several fasteners. This type of fastening may be beneficial from the standpoint of deterring mischievous removal of the net from the frame.

The discharge ring **16** is a continous ring, which may be fabricated of metal or a plastic for example, and is channel shaped in cross section as best seen in FIG. **7**. The discharge ring **16** may be connected to the collector funnel net with the above described self anchoring loop fasteners **36**; and ring is provided with suitable peripheral spaced holes as illustrated in FIG. **7**. The net extends through the discharge ring, and the loop fasteners may be connected to appropriate loops of the

net to secure the ring at the desired height relative to the frame. For example, the height of the ring may be 26 inches from the collector base to accommodate a 25 gallon drum.

The channel shaped ring **16** defines an external peripheral groove **42** suitable for confining an elastic band **43** and, in combination with a discharge ring band, provides means for conveniently securing to the discharge ring a flexible bag receptacle **11** as best seen in FIG. 7. One form of elastic band **43** is particularly illustrated in FIG. **8** having the form of an elastic shock cord with an eyelet secured to one end and a hook secured to the other end. When desired, this elastic band **43** may be secured to the discharge ring in any desired manner to prevent loss.

FIG. **10** of the drawing is an alternative form of collector frame **46** made up of a single piece of frame ring **47** having a joint at the front portion thereof, a single piece U-shaped leg **48**, connected to the front and rear portions of the ring at the centers thereof, and a transverse base member **49** connected to the horizontal base portion of the leg **48** to define a pedestal for the receptacle. The base member or base portion of the leg may include suitable holes for anchoring the collector to the ground or a supporting pad. The U-shaped leg **48** is connected to the ring **47** in the manner previously described; and a sign **50** may be secured to the forward portion of the leg **48** if desired.

The configuration of the frame **46** is adapted for relatively small units wherein the ring **46** may have an approximate diameter of 2 feet or less, for example, with the ring **47** supporting a collector funnel as described with a discharge ring **16** for securing a bag receptacle **11**. This size collector and receptacle is adapted for interior use such as use in office areas to replace the usual waste baskets and other waster receptacles.

FIGS. **11** and **12** of the drawing illustrate a subassembly of a flexible bag receptacle **11** and a bag ring **55** for use with the above described collectors. In these figures, the discharge ring **16** has the same configuration as the above described; however the ring is secured to the collector funnel net in a slightly different manner with the net passing through and under the ring and being secured through self anchoring loop fasteners **36** which are inserted into the ring from the exterior rather than from the interior. In other respects the collector is assembled in the manner previously described.

The bag ring **55** may be identical in size and configuration to the discharge ring **16**, these rings being preferably fabricated of a plastic material. The bag ring is channel shaped in cross section providing an external peripheral groove; and a continuous elastic band **56** is preferably attached to the bag ring at one point along its periphery to prevent loss. This attachment may be made by one of the loop fasteners **36** as illustrated in FIG. **11**. The purpose of the subassembly of bag **11** and bag ring **55** is to provide for convenience of servicing the litter collector and receptacle. This is accomplished by preassembling the bag receptacle **11** and bag rings **55**, in a service building for example, and loading these subassemblies on a service truck for servicing a group of litter collectors. A subassembly is loaded in the collector merely by dropping the bag **11** through the discharge ring **16**, as illustrated in FIG. **11**, and the subassembly is then supported by the discharge ring and attached net in the manner suggested in FIG. **12**; that is, the bag ring will be supported by the strands of the net adjacent to the discharge ring, and as the receptacle **11** is loaded the bag ring may move down to assume the broken line position of FIG. **12**.

For unloading a litter collector and receptle a bag ring **55** is removed from the bag **11** by grasping the elastic band **56** and releasing it from the bag ring. For this purpose, the elastic band may be provided with an appropriate finger loop. The bag ring **55** is then removed from the top of the collector funnel while the top of the bag **11** is grasped and removed from beneath the discharge ring. The full bag **11** may then be secured and carried to the service vehicle along with the bag ring which is assembled to a new bag **11** either at the service vehicle or at the service base. The convenience of this is that the service personal may carry the replacement subassembly of bag and bag ring from the service vehicle, remove the full litter bag from the collector as described, and quickly drop the new subassembly into the collector for immediate use.

What has been described is a novel and effective litter collector and receptacle to encourage the disposal of litter at selected points and to thereby reduce the cost of litter collection and cleanup in areas such as highways, roadways, park and recreation areas.

A feature of the device is its rugged construction providing for an extended life of the device and minimizing maintance and mischievous vandalism. The collector is permanently anchored and only the receptacle requires normal servicing.

Another feature of the device is that it presents a relatively large target area to receive the litter, thereby minimizing the amount of litter that misses the receptacle. Despite a large size receptacle, with a net funnel there is no hazardous obstruction to visibility along roadways.

Still another feature of the device is the its fabric collector funnel is adapted for use either with an attached flexible bag receptacle or with rigid receptacles such as open drums or boxes. In either case the collector funnel serves to retain overflow litter, after the receptacle is full, and prevents such litter from being dispersed over a wide area. Still another feature of the invention is that the flexible collector funnel is resilient and tends to deflect any material thrown into the funnel toward the receptacle rather than out of the collector units.

It has been observed that loose paper, once received within the perimeter of the collector ring will settle into the receptacle. It has been observed further that wind currents around a net funnel and associated plastic bag receptacle tend to cause alternate collapsing and opening of the unfilled portion of the bag, and during such opening of the bag light litter in the discharge area of the net is drawn into the bag. This arrangement, then, is particularly advantagous for the collection of light litter on a breezy day.

Features of the construction of the device are that it may be readily shipped to users in a disassembled condition and readily assembled by the user, that the collector funnel net is readily secured to the frame and the discharge ring in a permanent manner to resist mischeavous vandalism, and that the discharge funnel net is formed from rectangular pieces of material with little waste of the net material.

A particular feature and advantage of the collector and receptacle from a standpoint of the user is the subassembly arrangement of bag and bag ring collecting with the discharge ring for ease of servicing of the units.

The device is particularly useful along highways, due to the construction of the resilient collector funnel in conjunction with the large target area, where operators of vehicles need not slow down or stop for the purpose of pitching litter into the litter receptacle. The collector funnel readily accommodates and reflects the relatively heavy litter such as cans and bottles.

In general, the litter collector and the receptacle presents a generally pleasing appearance for use in any of the locations discussed and is much more effective in encouraging centralized litter disposal than the commonly used drums or barrels. While the device has been discussed principly for use in connection with the collection of highway or park litter, it will be apparent that the device is useful in many other locations and for other purposes such as factory areas, fast food operations, sports arean , mobile home and trailer parks, apartment complexes and many others.

While preferred embodiments of the invention have been illustrated and described, it will be understood by those skilled in the art that changes and modifications may be resorted to without departing from the spirit and scope of the invention.

What is claimed is:

1. A device for collecting litter comprising

a rigid metallic frame including a ring of generally oval configuration supported above a supporting surface in a plane inclined relative to the supporting surface by leg members including horizontal portions adapted to be anchored to the supporting surface;

a collector funnel formed of a flexible fabric having its upper end secured to and suspended from the frame ring with the lower extremity defining the smaller opening of the collector funnel and being supported in spaced relation to the supporting surface;

and a discharge ring secured to the lower extremity of the collector funnel to define a discharge opening for directing litter from the funnel into a receptacle.

2. A device as set forth in claim 1

wherein the collector funnel is secured to said frame ring by means of a plurality of relatively closely spaced fasteners permanently anchored to said ring.

3. A device as set forth in claim 2

wherein said collector funnel is fabricated of a net fabric; and wherein said fasteners are plastic fasteners forming loops for engaging strands of the net fabric and anchoring same to said frame ring.

4. A device as set forth in claim 1

wherein said frame ring is provided with a plurality of peripherally spaced holes; and wherein said collector funnel is secured to said ring by means of a plurality of self anchoring loop fasteners engaging the funnel fabric and received in said frame holes.

5. A device as set forth in claim 3

wherein said discharge ring is provided with a plurality of peripherally spaced holes; and wherein said discharge ring is secured to said collector funnel by means of a plurality of self anchoring loop fasteners engaging strands of said funnel fabric and anchored in said discharge ring; said discharge ring being secured at a desired height with the lower extremity of said funnel extending through said discharge ring,

6. A device as set forth in claim 5,

wherein said discharge ring is formed to define an exterior peripheral groove; a separable elastic member engagable with said groove for securing to said discharge ring a bag receptable formed from a flexible fabric.

7. A device as set forth in claim 1

wherein said frame is fabricated of relatively heavy tubular steel; and wherein the leg members are bolted to the frame ring through arcaute pads integrally formed at the extremities of the leg members.

8. A device as set forth in claim 1

including two generally U-shaped leg members disposed in generally parallel planes, with the bases of said U-shaped leg members in engagement with the supporting surface and adapted to be anchored thereto; and transverse braces connected between said leg members.

9. A device as set forth in claim 1

wherein said collector funnel is formed from a rectangular sheet of fabric having a central cutout removed from one edge thereof leaving spaced edge portions of said one edge, and having the corners opposite said one edge removed by angle cuts; and said collector funnel being formed by joining said spaced edge portions of said one edge in a fabricated seam.

10. A device as set forth in claim 9.

wherein said collector funnel is fabricated from a net fabric.

11. A device as set forth in claim 1

including a bag ring having a diameter substantially the same as that of said discharge ring, and having an external peripheral groove; and an elastic band engagable in said bag ring groove for securing to said ring a bag formed of a flexible fabric; and said assembled bag and bag ring being adapted to be dropped through said collector funnel and supported therein by said discharge ring.

12. A device as set forth in claim 11.

wherein said discharge ring and said bag ring are of identical configuration and are formed of a plastic material.

13. A device as set forth in claim 11

wherein said elastic band for said bag ring is a continuous band; means securing said band at one point to the periphery of said bag ring; and a finger loop secured to said band for removing said band from the ring groove.

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