

Trapping System for Flying Insects

The apparatus provides a trapping system for collecting flying insects, especially flying beneficial insects, where they have become a nuisance. The insects can be collected alive for later release, or a killing agent can be included in the trap. The trap is small, inexpensive, collapsible, and easily assembled or disassembled in as little as 2 minutes. It captures almost 100% of all attracted insects.

Trap 10 (figs. 1 and 2) consists of five major components; light assembly 20, ballast and starter assembly 30, baffle assembly 40, support assembly 50, and collection assembly 60. Light assembly 20 is made up of lamp 22, endholder spacer rods 24, endholders 26, fasteners 28, and connecting wires 12. Lamp 22 is any lamp, preferably a blacklight lamp, capable of attracting flying insects. A blacklight lamp is preferred especially when the trap is to be used indoors. A most preferred lamp is a 12-20 watt fluorescent blacklight lamp (Sylvania, F12T8/350BL/PH, GTE Sylvania, Inc., Lighting Products; Danvers, MA 09123). At least one lamp is used in trap 10. Each end of lamp 22 is inserted into endholders 26 that are standard slot mount with a two-pin socket. Endholders 26 include wires 12 that connect lamp 22 to starter 32 and ballast 34 (fig. 3). Endholder spacer rods 24 attach into both endholders 26 and provide support to light assembly 20. Any ballast 34 and lamp 22 can be used as long as they are compatible with each other.

Light Assembly and Support Assembly

Light assembly 20 attaches to support assembly 50 at the underside of triangular mounting frame 52. Support assembly 50 is made up of triangular mounting frame 52, pop rivets 14, suspension lines 56, and fasteners 58. Triangular mounting frame 52 can be any material capable of providing rigid support to trap 10. Materials include, for example, masonite, plywood, and plastic. Fasteners 58 are located on the underside of frame 52. Fasteners 58 hold baffles 42 to frame 52 of support assembly 50. One set is located on center line of the frame 52 between the apex and the center of frame 52. Pop rivets 14 are fastened at each angle of triangular frame 52. Suspension lines 56 are attached to frame 52 by each rivet and extend down to the collection system where they tie to rivets 14 located along the top edge of cone-shaped funnel 62. Suspension lines 56 can be any type of string, rope, etc., that can support the weight of the collection system fully loaded with captured flying insects. Preferred material is nylon line that is 50-lb test line.

Ballast and Starter Assembly

Ballast and starter assembly 30 is attached to the top of frame 52. Starter assembly is made up of a 14W-15W-20W starter 32 for the fluorescent lamp (12-20 watt) 22, starter socket 36, 12-20 watt ballast 34, electrical utility box 38, and cover plate 39. A 4-inch electrical utility box 38 is fastened to about the middle, upper surface of frame 52 using pop rivets 14 or any fastening means, such as screws 16 and spacers 18. Spacers 18 can be, for example, flat washers of suitable size for pop rivets 14 (fig. 2). Starter socket 36 is attached to the inside vertical wall of utility box 38 with screws 16 that places the socket over a knock-hole in which starter 32 is inserted from outside of utility box 38. A 12-20 watt ballast 34 is attached inside the base of box 38 and held in place with $\frac{1}{8}$ -inch x $\frac{3}{16}$ -inch pop rivets 14. Pop rivets 14 also attach the ballast and starter assembly to the triangular frame 52. Ballast 34 has wires 12 that attach to wires 12 of light assembly 20 and wires 12 of light cord 31 with wires 12 and plug 13. Light cord 31 enters box 38 through an opening in one of the side walls of box 38 and attaches to wire 12 of ballast 34 and wire 12 of light assembly 20. Cord 31 is an 18-gauge two-wire light cord, about 6 feet long. It has a standard two-prong plug 13 with a grounded blade. The starter assembly can be connected to any source capable of providing 110-120 V AC for operating trap 10 such as an electrical wall socket or an AC generator. Box 38 has cover plate 39 attached with screws 16. An eye bolt 8 is inserted in the center of plate 39 and anchored with a $\frac{3}{16}$ -inch nut 6 for hanging trap 10.

Baffling System

Baffling system 40 consists of three baffles 42 that are most preferably made of white 4-mil polyethylene and are about 9 inches x 4½ inches. The baffle can be of any size and shape and made of any smooth surface material suitable for insects to attempt to land on. It is preferred that the material be a lightweight plastic so that trap 10 is lightweight and collapsible for ease of handling. It is also preferred that baffles 42 are rectangular. Each smaller end of baffle 42 is inserted into a supporting means 44, such as plastic paper binders and fastened, for example, with staples. Fasteners 58 are attached to the top binder at each end. Fasteners 58 can be anything that will hold the baffles onto triangular frame 52, such as ¼-inch x ¾-inch strips of Velcro (Velcro USA, Inc., 406 Brown Ave., Manchester, NH.). Baffles 42 hang perpendicular to lamp 22. Three baffles 42 are attached to trap 10 at 120° angles between each one, which gives optimum illumination and landing surfaces for attracted insects and optimum insect capture. The surface of baffles 42 is nonstick. A nonsticking agent can be applied to baffles 42, or baffles 42 can be made of a material that has a nonstick surface incorporated into or onto the surface. Examples of material that can be applied to the baffle as needed and give a nonstick surface are talcum powder or spray Teflon.

Collection Assembly

Collection assembly 60 is located below light assembly 20 and baffle assembly 40. Assembly 60 is made up of cone-shaped funnel 62, a collector holder 64, and a collector 66. Cone-shaped funnel 62 is made up of a flexible lightweight material, such as 4-mil polyethylene. It has a 12-inch ID diameter top and a 1⅞-inch diameter outlet end. The top edge of funnel 62 is folded over a circular rim support means (not shown) made up of a flexible, but rigid material such as flexible plastic, wood, or sheet metal. Funnel 62 can be fastened to the rim using any suitable fastening means such as double-faced tape, adhesive, etc. For example, double-faced tape is secured around the outer edge of the circular rim (not shown) and the upper edge of the funnel 62 is folded over the upper edge of the rim and affixed to the outer surface of the double-faced tape. Three evenly spaced holes are inserted into the upper portion of funnel 62, below the rim support means, in order to suspend the collection assembly from suspension lines 56 attached to frame 52. The holes are spaced so that collection assembly 60 is plumb with the other assemblies of trap 10. The outlet end of funnel 62 is fastened, using glue for example, into an approximately 1¼-inch length x 1⅞-inch piece of flexible plastic tubing 61 with a flared upper rim. A collector holder 64, constructed of any lightweight material such as an inverted 8-oz food container, is frictionally attached through a 1-inch hole in the bottom of holder 64 to the outlet end of funnel 62 over tubing 61 and held in place with an O-ring 63 that has a diameter of about 1 inch to about 1⅞ inch. Collector holder 64 can be anything that allows collector 66 to be operatively attached to funnel 62 so that the captured insects cannot escape as they drop into collector 66 from funnel 62. A lightweight, bag-shaped collector 66 is attached to holder 64 using as type of fastener 68, for example a rubber band. Collector 66 can be of any size or shape depending on the insect and level of infestation. For lady beetles, a 15-inch x 8-inch plastic bag is preferred.

The interior surfaces of collection assembly 60 are nonstick. A nonsticking agent can be applied to the interior surfaces of assembly 60, or the interior surfaces of all the components of assembly 60 can be made of a material that has a nonstick surface incorporated into or onto the interior surfaces. Examples of material that can be applied to assembly 60 as needed and give a nonstick surface are talcum powder or spray Teflon, such as Fluon.

Using the Trap

Trap 10 is used to attract flying insects and to cause them to fall into the collection assembly 60 of trap 10 where a nonstick surface prohibits their escape. If killing the insects is desirable, an effective amount of a control agent in an amount that is lethal for an insect or at least sublethal but sufficient to incapacitate the insect in regard to future mating or oviposition activity is included in collecting means 60. Illustrative of the wide variety of useful agents are organophosphates such as diazinon, malathion, chlorpyrifos, fenitrothion, promiphos, fenthion, phoxim, acephate, and methacrifos; carbamates such as baygon, propoxur, bendiocarb, dioxacarb, and carbaryl; natural pyrethroid such as

pyrethrin; and synthetic pyrethroids such as sumithrin, tetramethrin, d-trans allethrin, and s-bio allethrin; and metabolic inhibitors such as hydramethylnon. The control agent, in most cases, can be incorporated into a pest strip that is placed inside or suspended inside collector 66.

The trapping system was developed by research entomologist Louis Tedders (retired) and colleagues at the Southeastern Fruit and Tree Nut Research Laboratory, Agricultural Research Service, U.S. Department of Agriculture. The lab is located at 21 Dunbar Rd., Byron, GA 31008, phone (912) 956-6421, fax (912) 956-2929. The laboratory's World Wide Web site can be found at <http://www.ars-grin.gov/ars/SoAtlantic/Byron/seftnr/>.

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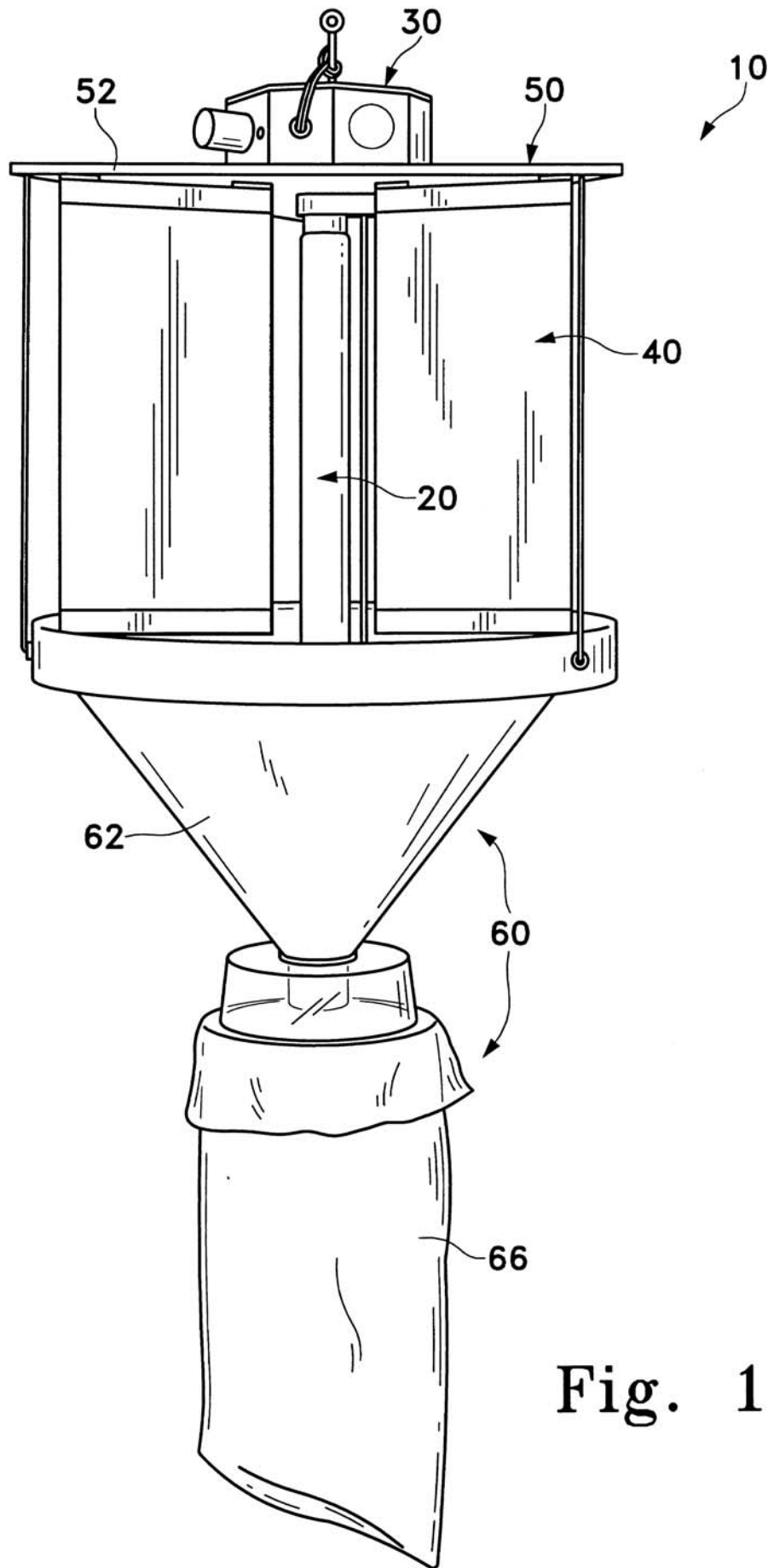


Fig. 1

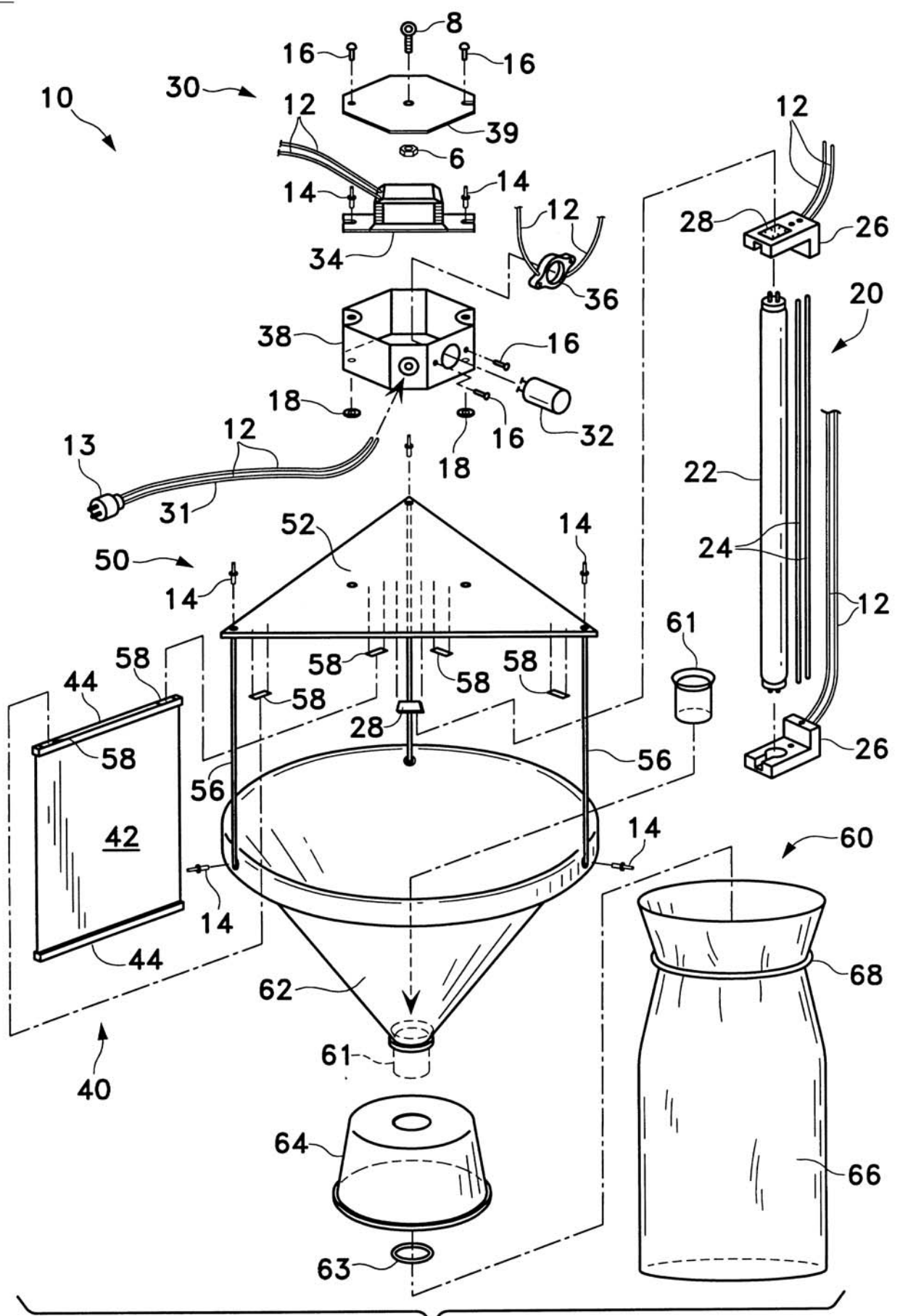


Fig. 2

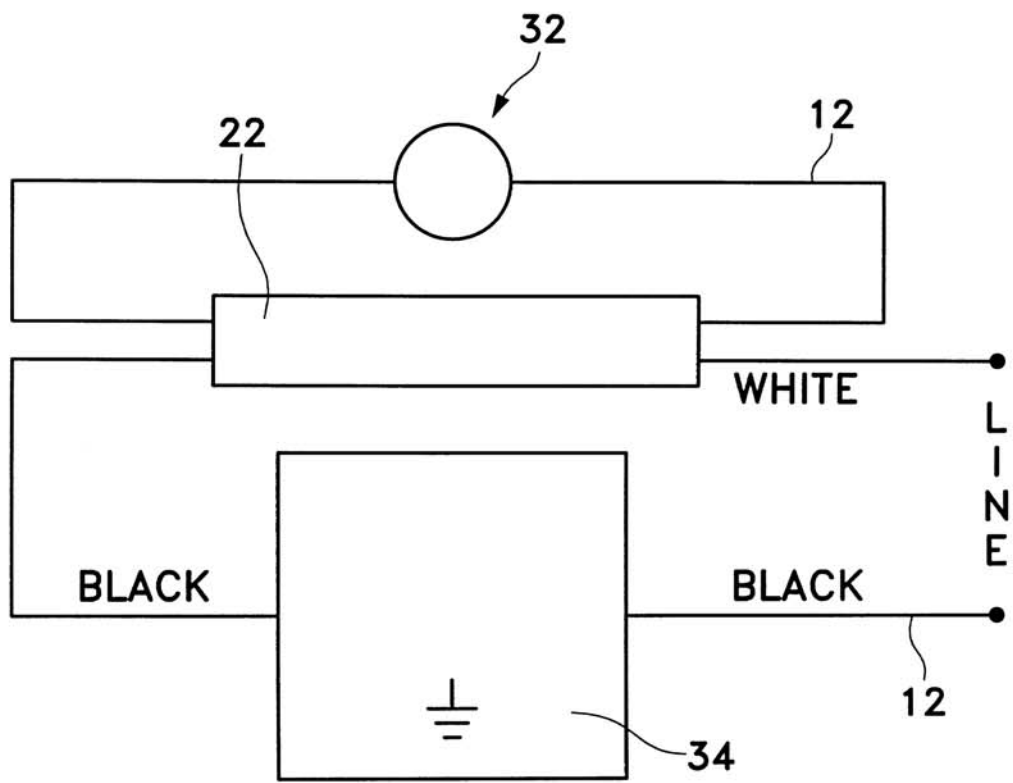


Fig. 3