SYSTEMS AND METHODS FOR CONSTRaining A CAN IN AN UPRIGHT POSITION

Inventor: Craig Howard, Seattle, WA (US)

Correspondence Address:
Janeway Patent Law PLLC
SUITE 508, 2208 NW MARKET STREET
Seattle, WA 98107 (US)

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ABSTRACT

A system and method for constraining a can in an upright position includes a base and a plurality of legs. The base defines a support area and enlarges the footprint of a can when the can is constrained by the device. Each of the plurality of legs extends in the same direction from the base, over the support area defined by the base, and toward at least one of the other legs at an acute angle relative to the support area. Together, the legs constrain a can in an upright position when a can is inserted into the device.
SYSTEMS AND METHODS FOR CONSTRaining A CAN IN AN UPRIGHT POSITION

CROSS REFERENCE TO RELATED APPLICATION AND CLAIM OF PRIORITY


BACKGROUND

[0002] Many pests, such as cats, dogs, raccoons, deer and varmints, often forage for food in the trash cans that people use to hold their trash until the trash can be collected or dumped. When such pests forage in trash cans they often tip the garbage can over to gain easy access to the food inside. In addition to pests, wind can often tip a garbage can over. This unfortunately causes much of the trash to be strewn about, and forces the owner of the trash can to pick up and place the trash back into the garbage can. If the person fails to do this before a garbage collector arrives to take the garbage away, then the trash sits in the can until the collector comes again—typically a week.

[0003] This problem becomes more acute when the garbage can’s structure is wider at the can’s entrance than at the can’s base. Most garbage cans have this type of structure because this structure provides quick and easy movement of the trash into and out of the can. The problem with this type of structure is that as the can fills with trash the can becomes top-heavy and this easy for a pest to tip over.

[0004] Devices exist for holding a garbage can upright to prevent a pest from tipping the can over. Many of these devices are anchored to the ground or to a very heavy base, and include a means for fastening the can to the device to secure the can in an upright position. Unfortunately, fastening the can to a device anchored to the ground or a very heavy base often makes it difficult and time-consuming for a garbage collector to empty the can because the collector must release the can from the device before emptying it. To avoid this trouble other devices do not include a means for fastening the can to the device, but rather simply hold the can in an upright position. Unfortunately, anchoring the device to the ground and a very heavy base also makes it difficult and time-consuming for a garbage collector to empty the can because the collector must retrieve the can from where the device is located—typically right next to a house or garage. The device is not easily moved to a location, such as a curb, that is close to where a collector arrives to collect the trash.

[0005] Other devices exist that prevent garbage from spilling from the can when the can is tipped over. Such devices typically include a fastening means, such as a rope, or a bungee cord, for fastening the lid of the garbage can to the can. Unfortunately, fastening the lid to the can often also makes it difficult and time-consuming for a garbage collector to empty the can because the collector must release the lid from the can before emptying it. To avoid this trouble, the fastening means may be designed for easy and quick release. Unfortunately, such fastening means may also be easily released when the can is tipped over.

SUMMARY

[0006] In one aspect of the invention, a device for constraining a can in an upright position includes a base and a plurality of legs. The base defines a support area and enlarges the footprint of a can when the can is constrained by the device. Each of the plurality of legs extends in the same direction from the base, over the support area defined by the base, and toward at least one of the other legs at an acute angle relative to the support area. Together, the legs constrain a can in an upright position when a can, which may be a can for holding garbage or any other material, is inserted into the device.

[0007] Because each leg extends from the base over the support area, and toward at least one of the other legs at an acute angle relative to the support area, the base enlarges the footprint of the can, thus making the can more stable in an upright position. Furthermore, when a pest exerts pressure on a can that is constrained by the device in an attempt to tip the can over, the can contacts one or more of the legs. The one or more legs resist this pressure by directing some or all of the pressure downward toward a region of the base located outside the can’s footprint, which enlarges the can’s footprint and thus makes tipping the can more difficult when the pressure is applied to the can. In addition, when a pest exerts pressure on a can that is constrained by the device, the can tip slightly inside, and relative to, the device to cause the leg to contact the can in a region closer to the can’s entrance, thus stabilizing the can in an upright position. Also in addition, when a pest exerts pressure on a can that is constrained by the device, the base can slide relative to the ground to release some or all of the exerted pressure.

[0008] In another aspect of the invention, a device for constraining a can in an upright position includes a base and a wall. The base defines a support area having a center, and expands the footprint of a can when the can is constrained by the device. The wall extends from the base, over the support area, and toward the center at an acute angle relative to the area, and constrains a can in an upright position.

BRIEF DESCRIPTION OF THE DRAWINGS

[0009] FIG. 1 is a perspective view of a device for constraining a can in an upright position, according to an embodiment of the invention.

[0010] FIG. 2 is a partial cross-sectional view of the device shown in FIG. 1, according to an embodiment of the invention.

[0011] FIG. 3A is a side view of the device shown in FIG. 1 constraining a can, wherein the can is slightly tilted relative to the device, according to an embodiment of the invention.

[0012] FIG. 3B is a side view of the device shown in FIG. 1 constraining a can, wherein the can and device are slightly tilted relative to the ground, according to an embodiment of the invention.

[0013] FIG. 3C is a side view of the device shown in FIG. 1 constraining a can, wherein the can and device slide relative to the ground, according to an embodiment of the invention.

[0014] FIG. 4 is a perspective view of a device for constraining a can in an upright position, according to another embodiment of the invention.

[0015] FIG. 5 is a perspective view of a device for constraining a can in an upright position, according to yet another embodiment of the invention.

DETAILED DESCRIPTION

[0016] The invention includes a device and a method for constraining a can in an upright position while allowing a
person to quickly and easily lift the can out of the device. The can may be a can for holding garbage or the can may be a can for holding any other material. The device and method constrain a can in an upright position by resisting any substantial tipping movement of the can when pressure is exerted against a side or a top of the can. In some embodiments of the invention, the device and method may permit the can to tip slightly before resisting the tipping movement, while in other embodiments of the invention, the device and method may resist any tipping movement. The device and method allow a person to easily lift the can by not resisting movement of the can when the can is pulled up, away from the ground. In addition, the device and method allow a person to easily re-locate the device, and thus a can constrained by the device, because the device does not need to be anchored to the ground to constrain a can in an upright position. Thus, the device may be slid and/or carried to relocate it.

[0017] FIG. 1 is a perspective view of a device 10 for constraining a can 12 (here a garbage can shown in phantom lines) in an upright position, according to an embodiment of the invention. The device 10 includes a base 14 and a plurality of legs 16 (here five legs). The base 14 defines a support area 18 that is larger than the area of the garbage can's bottom 20. Each of the plurality of legs 16 extend over the support area 18 at an acute angle relative to the support area (discussed in greater detail in conjunction with FIG. 2), and together constrain the garbage can 12 in an upright position.

[0018] Because the support area 18 is larger than the area of the garbage can's bottom 20, the base 14 enlarges the garbage can's footprint. With the garbage can's footprint enlarged, the tipping angle of the can—the angle of the can relative to the ground at which the weight of the can and trash inside will cause the can to tip over—is larger than the tipping angle of the can without the enlarged footprint. Thus, for a pest or the wind to tip over a garbage can constrained by the device 10, the pest or wind must exert more pressure on the side's and/or top of the can. This additional pressure is typically more than small pests, such as cats, small dogs and small varmints, can provide. To make it more difficult for larger pests, such as raccoons, deer, and large dogs to tip over the can, the device and can may slide across the ground (shown in FIG. 3C) to relieve pressure exerted by the larger pests. Thus, the pressure exerted by a larger pest may cause the can and device to slide along the ground; not tip over. In some embodiments and as discussed in greater detail in conjunction with FIG. 2, the device can be weighted down with water or sand to further increase the amount of pressure that a pest must exert on the side or top of the can to tip the can and device over. In still other embodiments, the device 10 can include one or more wheels to facilitate the device 10 and can 12 sliding along the ground.

[0019] Still referring to FIG. 1, the base 14 may define a support region having any desired shape. For example, in this and other embodiments, the base 14 includes a peripheral component 22 that is circular and defines the circular support area 18. The diameter of the peripheral component 22—and thus the diameter of the support area 18—may be any desired length that is longer than the longest dimension of the garbage can's bottom 20 (here the longest dimension is the diameter of the can's bottom) and preferably longer than the longest dimension of the can's top 22. Because the stability of a garbage can 20 constrained by the device increases as the area of the support area 18 increases, increasing the length of the support area's diameter will increase the stability of the can. And, because the support area 18 is circular, the resistance to tipping that the device 10 provides does not depend on the direction from which pressure is exerted on the can.

[0020] Other embodiments are possible. For example, the base 14 may include a plate (not shown) attached to the peripheral component 22 and upon which the bottom 20 of the garbage can 12 rests. In other embodiments, the base 14 may include a peripheral component 22 that is square or oval and in which the resistance to tipping that the device 10 provides may depend on the direction from which pressure is exerted on the can 12.

[0021] The device 10 may also include any desired number of legs 16, and each leg may be located relative to one or more other legs 16 as desired. For example, in this and other embodiments, the device 10 includes five legs 16 equally spaced around the garbage can 12 constrained by the device 10. In other embodiments, the device 10 may include more or less than five legs 16, and some or all of the legs 16 may be unequally spaced relative to their adjacent legs 16.

[0022] Still referring to FIG. 1, each leg 16 may extend from any desired location on the base 14, and have any desired length. For example, in this and other embodiments, each of the five legs 16 extends from the peripheral component 22 of the base 14, and has a length of 18 inches and a distal end 24. By extending from the peripheral component 22, the angle between each leg 16 and the support area 18 can be minimized to provide greater stability for the can 12 (discussed in greater detail in conjunction with FIG. 2). In this and other embodiments, the distal ends 24, together, define an entrance 25 that is larger than the cross-section of the can 12 that lies in the entrance 25 when the can is positioned in the device 10. Thus, when pressure is not exerted against the side and/or top of the can 12, each distal end 24 may not contact the can 12. But, when pressure is exerted against the side and/or top of the can 12 and the can 12 tips relative to the device 10, one or more of the distal ends 24 may contact the side of the can above its middle. By contacting the can 12 after it has tipped relative to the device 10, the pressure that the one or more distal ends 24 exert to resist further tipping of the can can be applied above the location of the can's cross-section that normally lies in the entrance 25. Because of this, the device 10 may provide the can 12 greater stability than another device that does not permit the can 12 to tip relative to the other device before resisting further tipping of the can. Furthermore, the length of each leg 16 can be reduced to facilitate the lifting of the can out of the device by a person.

[0023] Other embodiments are possible. For example, one or more of the legs 16 may extend from a location on the base 14 that does not include the peripheral component 22, such as the plate of a base that the bottom of the can rests on. In other embodiments, one or more legs 16 may have a length that causes their respective distal end 24 to contact the side of the can 12 below its middle. In still other embodiments, one or more of the legs 16 may extend crooked, not straight. In still other embodiments, one or more of the legs 16 may have a length that is adjustable to accommodate different sized garbage cans, and to increase or decrease the stability of the device 10 and can 12 by constraining the can 12 at different heights along the can's side.

[0024] Still referring to FIG. 1, the device 10 may be made from any desired material using any desired manufacturing technique. For example, in this and other embodiments, the base 14 and legs 16 are made from a UV stabilized plastic.
such as PVC, and each leg 16 is fastened to the peripheral component with conventional glue.  

[0025] FIG. 2 is a partial cross-sectional view of the device 10 shown in FIG. 1, according to an embodiment of the invention. As mentioned elsewhere herein, each of the legs 16 extend over the support area 18 (FIG. 1) at an acute angle relative to the support area. Thus, the view shown in FIG. 2 is typical for each leg 16.  

[0026] When pressure is exerted on a side and/or top of the can 12 (FIG. 1), the can moves until it contacts one or more of the legs 16. When contact is made, the one or more legs 16 transfer some or all of the pressure down toward the peripheral component 14 at the angle Θ 26. The peripheral component 14 then transfers some or all of the pressure from the legs 16 to the ground at the same angle Θ 26. Because the angle Θ 26 is less than 90 degrees (acute), a portion of the pressure transferred to the ground is transferred in a horizontal direction, which may cause the device 10 and can 12 to slide relative to the ground. The portion of the pressure that is horizontally transferred depends on the angle Θ 26. As the angle Θ 26 decreases, the portion of the pressure that is horizontally transferred to the ground increases. Thus, the smaller the angle Θ 26 is, the greater the portion of the pressure exerted on the side and/or top of the can 12 is that is horizontally transferred to the ground. Therefore, decreasing the angle Θ 26 improves the ability of the device 10 to constrain the can 12 in an upright position, by encouraging the device 10 and can 12 to slide, not tip over, relative to the ground when pressure is exerted on the can 12.  

[0027] The angle Θ 26 can be any desired angle that is less than 90 degrees. For example, in this and other embodiments, the angle Θ 26 is 75 degrees. At 75 degrees, each leg 16 can extend to a length that allows the can 12 to contact the distal end 24 of a leg 16 between the can’s middle and top quarter, while keeping the size of the support area manageable. In other embodiments, the angle Θ 26 may be greater than or less than 75 degrees.  

[0028] Still referring to FIG. 2, one or more of the legs 16 and/or base 14 may include a cavity 28 to hold any desired material for adding weight to the device 10 to improve the device’s ability to constrain the can 12 in an upright position. For example, in this and other embodiments, the cavity 28 is located in the peripheral component 22 and a leg 16, and capable of holding water and/or sand. By increasing the weight of the device 10, it becomes more difficult to tip over the device 10 and thus the can 12 (FIG. 1) constrained by the device 10.  

[0029] FIGS. 3A-3C each show, according to an embodiment of the invention, how the device 10 constrains a can 12 that has pressure exerted on its side.  

[0030] FIG. 3A shows a can 12 slightly tipped relative to the ground, and the device 10 not tipped relative to the ground. In FIG. 3A, the can 12 is tipped to a position where it would fall onto its side, but because the device 10 constrains the can and enlarges the can’s footprint, the device maintains the can’s upright position. The situation shown here is typical of a small pest attempting to tip the can 12 over onto its side. The pest may be able to exert enough pressure on the can 12 to tip the can, but when the can 12 contacts one or more legs 16, the pressure required to continue tipping the can increases to an amount that the pest can not exert. Thus, the device 10 constrains the can 12 in an upright position, preventing the pest from tipping the can onto its side and gaining access to the trash inside.  

[0031] FIG. 3B shows a can 12 tipped more than the can in FIG. 3A relative to the ground, and the device 10 slightly tipped relative to the ground. In FIG. 3B, the can 12 is tipped to a position beyond the position shown in FIG. 3A, but because the device 10 constrains the can and enlarges the can’s footprint, the device 10 maintains the can’s upright position. The situation shown here can occur if a pest exerts more pressure on the can 12 than the pressure exerted in FIG. 3A. When this happens, the device 10 can either tip as shown here in FIG. 3B or slide as shown in FIG. 3C. If the device 10 and can 12 tip as shown here in FIG. 3B, the pest must exert enough pressure to tip over both the can 12 and device 10. If the device 10 includes water or sand in a cavity 28 (FIG. 2), the pest must exert even more pressure on the can 12 to tip the can and device 10 over.  

[0032] FIG. 3C shows a can 12 and device 10 sliding relative to the ground in response to a dog 30 exerting pressure against a side of the can 12. By sliding relative to the ground, the can 12 and device 10 relieve the pressure exerted by the dog 30 without tipping over.  

[0033] FIG. 4 is a perspective view of a device 40 for constraining a can 12 in an upright position, according to another embodiment of the invention. The device 12 is similar to the device 10 shown in FIGS. 1-3C and discussed in conjunction with these FIGS., and includes a base 42, a wall 44, and a coupler 46 (here two). The can 12 may be a can for holding garbage or the can may be a can for holding any other material. The base 42 defines a support area 48 having a center 50, and expands the footprint of the can 12 (here a garbage can) when the can 12 is constrained by the device 40. The wall 44 extends from the base 42 and over the support area 48 toward the center 50 at an acute angle relative to the area, and wherein the wall 44 constrains the can 12 in an upright position. The coupler 46 fastens a right side 52 of the wall 44 to a left side 54 of the wall to complete the formation of the device 40.  

[0034] The wall 44 may include any desired shape and material, and the coupler 46 may be any desired fastener. For example, in this and other embodiments, the wall 44 may include a flat flexible sheet of plastic whose lower edge 56 is longer than the upper edge 58. The coupler 46 may be a conventional fastener, such as Velcro and/or a nut and bolt, that can be released and re-engaged as desired. To form the device 40, one bends the sheet so that the right side 52 of the wall 44 is adjacent to the left side 54 of the wall, and then engages the couplers 46 to fasten the right side 52 to the left side 54. In addition, in this and other embodiments, the base 42 of the device includes the lower edge 56 of the wall 44.  

[0035] Because the device 40 includes a wall 44 having a flexible sheet, the device 40 may be easily assembled by a person who purchases the device 40. Therefore, the device 40 may be shipped, and sold disassembled to facilitate shipping, storing and selling the device 40.  

[0036] FIG. 5 is a perspective view of a device 60 for constraining a can 12 (here a garbage can) in an upright position, according to yet another embodiment of the invention. The device 60 is similar to the device 10 shown in FIGS. 1-3C and discussed in conjunction with these FIGS. Unlike the device 10, however, the device 60 includes a collar 62 to position each leg 64 relative to the other legs 64, and the support area 66 is defined by the respective ends 68 of each leg 64. The device 60 may be more desirable than the device 10 when the ground upon which the device 60 and can 12 rest is not very flat or smooth.
The preceding discussion is presented to enable a person skilled in the art to make and use the invention. Various modifications to the embodiments will be readily apparent to those skilled in the art, and the generic principles herein may be applied to other embodiments and applications without departing from the spirit and scope of the present invention. Thus, the present invention is not intended to be limited to the embodiments shown, but is to be accorded the widest scope consistent with the principles and features disclosed herein.

What is claimed is:

1. A device for constraining a can in an upright position, the device comprising:
   a base defining a support area and operable to enlarge the footprint of a can when the can is constrained by the device; and
   a plurality of legs, each extending in the same direction from the base and each extending over the support area toward at least one of the other legs at an acute angle relative to the support area, and wherein, together, the plurality of legs are operable to constrain a can in an upright position.

2. The device of claim 1 wherein one or more of the plurality of legs is located at a portion of the support area’s perimeter.

3. The device of claim 1 wherein the base includes a peripheral component located along the support area’s perimeter, and from which one or more of the plurality of legs extends.

4. The device of claim 1 wherein:
   - the support area is circular, and
   - the base includes a peripheral component that is circular and located along the support area’s perimeter, and from which one or more of the plurality of legs extends.

5. The device of claim 1 wherein the base includes a cavity operable to hold sand for improving the device’s stability when the device constrains a can in an upright position.

6. The device of claim 1 wherein the plurality of legs includes five legs.

7. The device of claim 1 wherein each of the plurality of legs is located at a respective portion of the support area’s perimeter, and the respective portions are equally spaced along the perimeter’s length.

8. The device of claim 1 wherein one or more of the plurality of legs extends at an angle less than 75 degrees.

9. The device of claim 1 wherein one or more of the plurality of legs extends from the base at least 18 inches.

10. The device of claim 1 wherein one or more of the plurality of legs extends straight or substantially straight from the base.

11. The device of claim 1 wherein each of the plurality of legs extends at the same angle and has the same length.

12. The device of claim 1 wherein, when the device constrains a can in an upright position, the device and can can slide relative to the ground.

13. The device of claim 1 further comprising an entrance having a size that is larger than a can’s cross-section located in the entrance when the device constrains the can.

14. The device of claim 1 wherein, when the device constrains a can in an upright position, the can can tip relative to the device.

15. A device for constraining a can in an upright position, the device comprising:
   - a base defining a support area having a center, and operable to expand the footprint of a can when the can is constrained by the device; and
   - a wall extending from the base and over the support area toward the center at an acute angle relative to the area, and wherein the wall is operable to constrain a can in an upright position.

16. The device of claim 15 wherein the base includes a peripheral component located along the support area’s perimeter, and from which the wall extends.

17. The device of claim 15 wherein the base includes a cavity operable to hold sand for improving the device’s stability when the device constrains a can in an upright position.

18. The device of claim 15 wherein the wall includes an end distal from the base that surrounds a portion of the can when the can is constrained in an upright position by the device.

19. The device of claim 15 wherein the wall extends at an angle less than 75 degrees.

20. The device of claim 15 wherein the wall extends at least 18 inches from the base.

21. The device of claim 15 wherein the wall extends straight or substantially straight from the base.

22. The device of claim 15 wherein the whole wall extends at the same angle and the same distance from the base.

23. The device of claim 15 wherein, when the device constrains a can in an upright position, the device and can can slide relative to the ground.

24. The device of claim 15 further comprising an entrance having a size that is larger than a can’s cross-section located in the entrance when the device constrains the can.

25. The device of claim 15 wherein, when the device constrains a can in an upright position, the can can tip relative to the device.

26. A method for constraining a can in an upright position, the method comprising:
   - enlarging, with a base of a device, the footprint of the can, wherein the base defines a support area; and
   - constraining, with a plurality of legs of the device, the can in an upright position, wherein each of the plurality of legs extends from the base in the same direction, over the support area toward at least one of the other legs, and at an acute angle relative to the support area.

27. The method of claim 26 wherein:
   - the support area defined by the base is circular,
   - the footprint includes locating a circular peripheral component of the base on the support area’s perimeter, and
   - constraining the can in an upright position includes each of the plurality of legs extending from the peripheral component.

28. The method of claim 26 wherein constraining the can in an upright position includes each of the plurality of legs extending at an angle of at least 75 degrees relative to the support area.

29. The method of claim 26 wherein constraining the can in an upright position includes each of the plurality of legs extending a distance of 18 inches from the base.

30. The method of claim 26 wherein constraining the can in an upright position includes allowing the can and the device to slide relative to the ground.

31. The method of claim 26 wherein constraining the can in an upright position includes allowing the can to tip relative to the device.

32. A method for constraining a can in an upright position, the method comprising:
enlarging, with a base of a device, the footprint of the can, wherein the base defines a support area having a center; and
constraining, with a wall of the device, the can in an upright position, wherein the wall extends from the base and over the support area toward the center at an acute angle relative to the area.

33. The method of claim 32 wherein:
the support area defined by the base is circular,
enlarging the footprint includes locating a circular peripheral component of the base on the support area's perimeter, and
constraining the can in an upright position includes the wall extending from the peripheral component.

34. The method of claim 32 wherein constraining the can in an upright position includes the wall extending at an angle of at least 75 degrees relative to the support area.

35. The method of claim 32 wherein constraining the can in an upright position includes the wall extending a distance of 18 inches from the base.

36. The method of claim 32 wherein constraining the can in an upright position includes allowing the can and the device to slide relative to the ground.

37. The method of claim 32 wherein constraining the can in an upright position includes allowing the can to tip relative to the device.

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