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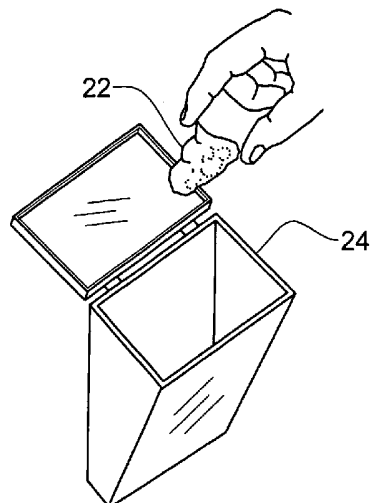
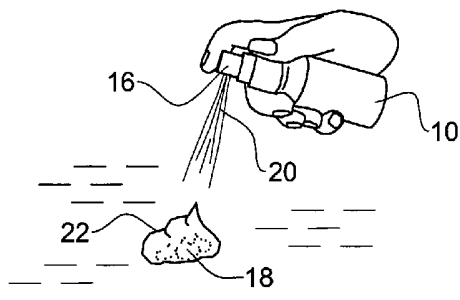
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[Continued on next page]

(54) Title: PET EXCREMENT DISPOSAL



(57) Abstract: A spray container (10) for disposal of solid waste (18), containing pressurized gaseous-liquid mixture (20) capable of forming solid foam in open air. The mixture comprises a polymer, a highly volatile non-poisonous organic solvent, and a pressurized gas, such that the solid foam (22) has good adhesion to the waste and weak adhesion to hard solid surfaces and skin, and solidifies in open air in about one minute or less. The spray container, built in pocket-size, with the foam solidifying in about half a minute or less, is suitable for disposal of pet's excrements.

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PET EXCREMENT DISPOSAL

FIELD OF THE INVENTION

This invention relates to a device and method of disposal of solid waste, in particular pet excrements.

BACKGROUND OF THE INVENTION

5 Dogs are so important for human society. There is no doubt that dogs are the most important pets grown by people. Having dogs in private homes in modern, westernized society raises a serious problem: dogs have to be taken outside the homes several times a day for trips in the streets, in order to allow them to excrete and breath fresh air. Hygiene regulations in most of modern cities do not allow the
10 owners of dogs to leave dogs excrements on the streets and even on park alleys and lawns. People who walk their dogs have to carry with them tools for collecting the dog excrements and put them in the garbage cans (e.g. the so called 'pooper scooper' in the US). Carrying such tools whenever taking a dog to a trip outside, makes such trip unpleasant and uncomfortable.

15 One would suggest dogs owners to carry with them plastic bags in which they should put their dog litter when it lays on the street. However the touch of the hand to the warm, humid dogs excrements even through a plastic bag is also very unpleasant and disgusting. US 4,900,077 and US 5,540,470 suggest portable mechanical devices which facilitate the scooping of litter, without touching it, into a
20 disposable plastic bag. US 4,718,707 discloses an entirely disposable waste scooper comprising a U-shaped wire frame, a plastic bag and a cardboard lid. These devices facilitate the scooping and disposal procedure but do not remove the unpleasant sensation.

DE4421511 suggests an arrangement for disposing of dog faeces on the ground in open places. The human minder of the pet first places a luminescent-colored cardboard ring wall around the faeces and then sprays the faeces with a gas or liquid chemical covering the faeces with a foam which has biocidal effect. The
5 cardboard ring degrades under UV exposure to sunlight.

DE19937983 describes foam for excrement disposal which creates stable isolation layer after the application and makes the faeces unrecognizable. The foam is applied from a spray container and becomes hard in less than 3 hours, preferably in 5 minutes. It is suggested that the excrement can be simply allowed to remain on
10 the street, since the isolating layer remains stable even if a person steps in the excrement. The foam-forming fluid contains gelatin dissolved in alcohol and the propellant gas is CO₂ or air.

Hence, it is clear that so many dog owners are waiting and seeking an elegant solution to the problem described above, namely, how to get rid of dog
15 excrements in an easy way, without carrying collection tools, plastic bags etc, and yet leaving the streets clean as demanded by the authorities.

Similar and even more basic problems arise with other kinds of solid waste, which may be not only unpleasant but mechanically, biologically or chemically hazardous, when such waste is spilled in unprepared place or in unexpected way.

20 SUMMARY OF THE INVENTION

In accordance with the present invention, there is provided a spray container for disposal of solid waste, filled with pressurized gaseous-liquid mixture capable of forming solid foam in open air. The mixture comprises a polymer, a highly-volatile non-poisonous organic solvent, and pressurized gas. The solid foam has
25 good adhesion to the waste and weak adhesion to hard solid surfaces and skin. The foam solidifies in the open air in about one minute or less. Preferably, the foam is formed with closed bubbles.

In one embodiment of the present invention, the spray container is of pocket-size and is adapted to deliver multiple portions of foam. The foam solidifies
30 in open air in about half a minute or less, whereby it is suitable for disposal of such

solid waste as pet's excrements. Preferably, the container is adapted for being carried attached to a person's body or clothing, or to pet's walking accessories. For this purpose, the spray container may comprise means for attaching to belts, textile fabric (clothes), pet leash, pet collar, or pet leash reel.

5 The spray container is preferably adapted to meter out portions of foam of limited predetermined quantity, and preferably this predetermined quantity is adjustable within a predetermined range.

 In accordance with another aspect of the present invention, there is provided gaseous-liquid mixture for use with the above spray container, for disposal of solid
10 waste. The polymer in the mixture may be one or more of the group: polystyrene, PVC, rubber, polyethylene glycol nylons, polyesters, polycarbonate, and polyacrylate. The organic solvent may be one or more of the group: diethyl ether, ethyl acetate, ethanol, methylene chloride, acetone, freon, and three chloro ethane. The pressurized gas may be one or more of the group: carbon dioxide, butane, and
15 propane.

 The gaseous-liquid mixture may be made up of PVC, methylene chloride and propane or carbon dioxide, for example in proportion 80 g of PVC, approximately 300 g of methylene chloride and 2 g of the pressurized gas.

 The gaseous-liquid mixture may be also prepared on the basis of
20 polystyrene, acetone and carbon dioxide.

 Preferably, the gaseous-liquid mixture contains two polymers from the group: polystyrene, PVC, rubber, polyethylene glycol nylons, polyesters, polycarbonate, and polyacrylate, while the organic solvent is a mixture of at least two solvents, one polar solvent such as ethyl acetate, ethanol, or three chloro
25 ethane, and one less polar solvent such as diethyl ether, or methylene chloride.

 The solidifying foam may contain antiseptic or germicide or deodorant additives; and/or it may contain surfactant additives to enhance forming of closed bubbles.

 In the specific embodiment for disposal of pet's excrements, the solidifying
30 foam may further contain a substance-indicator of a predetermined chemical

property or component of the pet's excrements, thereby allowing diagnostics of a medical condition.

In accordance with yet another aspect of the present invention there is provided a method for disposal of hazardous and/or unpleasant solid waste in a waste-disposal container, the method comprising:

- providing a spray container loaded with pressurized gaseous-liquid mixture capable of forming solid foam in open air, the solid foam having good adhesion to the solid waste and weak adhesion to hard solid surfaces and skin;
- spraying a portion of the foam over the solid waste so that the solid waste is covered from all sides and forms an integral body with the foam;
- waiting a period of time necessary for the foam to solidify; and
- taking the integral body by fingers, touching only the foam portion, and placing it in said waste-disposal container.

The present invention is an elegant solution to the problem of disposal of specific kinds of solid waste. In particular, using appropriate combinations of organic solvents, gases and polymeric or polymerizable species, it is possible to form mixtures that can be stored in small aerosol containers, thereby solving the problem of dog's excrements. When such mixture is sprayed out of the container on a dirty object, it forms a solid crust in a very short time. Then, the dirt can be immediately removed and be thrown to the closest garbage can, so that the user has no direct touch with it and has no need to watch over the excrement for an inconveniently long period of time. The foam with

The solidifying foam may contain surfactant additives to enhance forming of closed bubbles. Such foam is a better insulator than material with communicating pores, does not absorb humidity and provides for more economical usage of the materials.

It is possible to select materials that are cheap and environmentally friendly (e.g. most of commonly used thermoplastic polymers, alcohols and carbon dioxide). Hence, such a product can be distributed by any supermarket, shops for food, general supplies, pharmacies etc.

The above method of waste disposal may be implemented in such facilities as operation rooms, biological and chemical laboratories where the solid waste may be not only unpleasant but mechanically, biologically or chemically hazardous, and may be spilled in unprepared place or in unexpected way as a result of breaking
5 flasks, tubes, etc.

BRIEF DESCRIPTION OF THE DRAWINGS

In order to understand the invention and to see how it may be carried out in practice, a preferred embodiment will now be described, by way of non-limiting example only, with reference to the accompanying drawings, in which:

10 **Fig. 1** shows a dog on a leash, equipped with a spray container of the present invention;

Fig. 2 shows the usage of the spray container for forming a solid foam body over dog's excrements.

Fig. 3 shows the disposal of the solid foam body by hand.

15 **DETAILED DESCRIPTION OF THE INVENTION**

With reference to Figs. 1 and 2, there is shown an example of spray container 10 for disposal of pet's excrements, loaded with pressurized gaseous-liquid mixture that forms solid foam in open air. The spray container 10 is of pocket size and is attachable to a leash 12 of a pet dog 14. The spray container can deliver
20 multiple portions of foam. The container has a spray valve 16 which may be adapted to dispense portions of foam of predetermined quantity and this quantity may be manually adjustable.

The process of disposal by means of the foam in the spray container 10 is shown in Figs. 1, 2 and 3. After the dog 14 delivers excrements 18, the dog owner
25 takes the spray container 10 from the leash 12 and sprays pulverized foam 20 over the excrements 18 covering them from all sides. The foam then sets to form a solid body 22 with the excrements 18 embedded therein. The solid body 22 however has clean upper surface, so that the dog owner easily takes it by his fingers and throws it into a nearby litter bin 24.

It would be appreciated that the foam must have some specific properties in order to serve its purpose. The solid foam should have good adhesion to the solid waste (excrements) but should not stick tight to hard solid surfaces such as asphalt, concrete, bricks, ceramic tiles, etc. Actually, what is needed is solidifying foam
5 detachable from the solid surface by a slight side pressure which would not crush the foam itself. The foam should not stick also to the fingers (skin). The time of foam setting (solidifying) should be short enough, not to extend significantly the waiting period for the dog owner and to cause perhaps embarrassment. A suitable setting time would be about half a minute, preferably about 10-15 sec.

10 Antiseptic or germicide or deodorant additives may be used. The solidifying foam may further contain a substance-indicator of a predetermined chemical property or component of the pet's excrements, thereby allowing diagnostics of a medical condition. Additionally, surface active substances may be added in order to enhance formation of closed bubbles in the foam.

15 The mixture for the solidifying foam meeting the above requirements is prepared on the basis of materials that are cheap and environmentally friendly (e.g. most of commonly used thermoplastic polymers, dissolved in non-toxic solvent with added non-toxic aerosol-forming gas). For example, polymers may be polystyrene, PVC, polyacrylate, rubber, polyethylene glycol nylons, polyesters, or
20 polycarbonate. The non-toxic solvent may be freon, ethers, methylene chloride, acetone, three-chloro-ethane, or a low paraffin. The aerosol-forming gas may be carbon dioxide, butane, and propane. Combinations of the above materials may be used, for example a mixture of polystyrene, acetone and carbon dioxide.

Good results, for example, were obtained by using a mixture of 80 g PVC
25 (the polymer), 300 g methylene chloride (the solvent), and 2 g CO₂ or propane (the gas). The preparation consisted in dissolving PVC powder in methylene chloride by simple mixing. The container was filled with the solution and then filled with gas under 2 to 6 ata pressure. When sprayed in the open air, the mixture formed very quickly a flexible PVC matrix, as the solvent is very volatile. In less than a minute,
30 dry layer of polymer foam with closed bubbles was formed.

The mixture can be further optimized, for example, for obtaining faster setting time, by using multi-component mixtures. We have found that it may be advantageous to use two or more polymers from the above list. Also, it will be advantageous to use a mixture of solvents including at least one polar solvent (such as ethanol, ethyl acetate, or three-chloro-ethane) and one less polar solvent (such as diethyl ether or methylene chloride).

It would be appreciated, that other suitable properties of the foam may be obtained, for example the solid foam may be degradable in the long term by such factors as oxygen, humidity, solar radiation, temperature, biological factors, etc.

The above-described approach may be applied to other kinds of solid waste. A method for disposal of hazardous and/or unpleasant solid waste in a waste-disposal container, would then comprise:

- providing a spray container loaded with pressurized gaseous-liquid mixture capable of forming solid foam in open air, the solid foam having good adhesion to the solid waste and weak adhesion to hard solid surfaces and skin;
- spraying a portion of the foam over the solid waste so that the solid waste is covered from all sides and forms an integral body with the foam;
- waiting a period of time necessary for the foam to solidify; and
- taking the integral body by fingers/hands, touching only the foam portion, and placing it in said waste-disposal container.

Understandably, in some of the applications, the foam setting time may be longer than indicated above, or the spray containers may be larger than pocket-size.

The present invention is an effective solution to the problem of disposal of specific kinds of solid waste, which may be not only unpleasant but also mechanically, biologically or chemically hazardous. It is especially useful when such waste is spilled in an unprepared place or in unexpected way, i.e. breaking a container in a laboratory or operation room.

CLAIMS:

1. A spray container for disposal of solid waste, containing pressurized gaseous-liquid mixture capable of forming solid foam in open air, wherein said mixture comprises a polymer, a highly volatile non-poisonous organic solvent, and
5 a pressurized gas, such that said solid foam has good adhesion to said waste and weak adhesion to hard solid surfaces and skin, and solidifies in open air in about one minute or less.
2. The spray container of Claim 1, wherein said container is pocket-size, said solid waste is pet's excrements, and said foam solidifies in open air in about half a
10 minute or less.
3. The spray container of Claim 2, wherein said mixture is pressurized at 2 to 6 ata.
4. The spray container of Claim 2, wherein said foam is formed with closed bubbles.
- 15 5. The spray container of Claim 2, wherein said container is adapted for carrying attached to a person's clothing and/or pet's walking accessories.
6. The spray container of Claim 5, further comprising means for attaching to one or more of the following: belt, textile fabric, pet leash, pet collar, and pet leash reel.
- 20 7. The spray container of Claim 1, wherein said container is adapted to meter out portions of foam limited to a predetermined quantity.
8. The spray container of Claim 7, wherein said predetermined quantity is adjustable within a predetermined range.
9. A gaseous-liquid mixture for use with the spray container of Claim 1.
- 25 10. The gaseous-liquid mixture of Claim 9, wherein that said polymer is one or more of the group: polystyrene, PVC, rubber, polyethylene glycol nylons, polyesters, polycarbonate, and polyacrylate.
11. The gaseous-liquid mixture of Claim 9, wherein said organic solvent is one or more of the group: diethyl ether, ethyl acetate, ethanol, methylene chloride,
30 acetone, freon, and three chloro ethane.

12. The gaseous-liquid mixture of Claim 9, wherein said pressurized gas is one or more of the group: carbon dioxide, butane, and propane.
13. The gaseous-liquid mixture of Claim 9, wherein said polymer is a mixture of two polymers from the group: polystyrene, PVC, rubber, polyethylene glycol
5 nylons, polyesters, polycarbonate, and polyacrylate, while said organic solvent is a mixture of at least two solvents, one from the group of diethyl ether, methylene chloride, and one from the group of ethyl acetate, ethanol, or three chloro ethane.
14. The gaseous-liquid mixture of Claim 13, wherein said polymer is PVC, said organic solvent is methylene chloride and the pressurized gas is propane or
10 carbon dioxide.
15. The gaseous-liquid mixture of Claim 14, wherein for each 80 g. of said PVC, approximately 300 g. of said methylene chloride and 2 g. of said pressurized gas are used.
16. The gaseous-liquid mixture of Claim 9, prepared on the basis of
15 polystyrene, acetone and carbon dioxide.
17. The gaseous-liquid mixture of Claim 9, further containing a substance-indicator of a predetermined property or component of pet's excrements, thereby allowing diagnostics of a medical condition of said pet.
18. The gaseous-liquid mixture of Claim 9, further containing an antiseptic or
20 germicide or deodorant substance.
19. The gaseous-liquid mixture of Claim 9, further containing a surfactant additive.
20. The gaseous-liquid mixture of Claim 9, wherein said solid foam is degradable.
- 25 21. A method for disposal of solid waste in a waste-disposal container, the method comprising
- providing a spray container loaded with pressurized gaseous-liquid mixture capable of forming solid foam in open air, said solid foam having good adhesion to said waste and weak adhesion to hard solid surfaces and skin;
 - 30 - spraying a portion of said foam over said solid waste so that said waste is covered from all sides thereof and forms an integral body with the portion of foam;

- waiting a period of time necessary for the foam to solidify; and
- taking said integral body and placing it in said waste-disposal container.

22. The method of Claim 21, wherein said period of time for the foam to solidify is about half a minute or less.

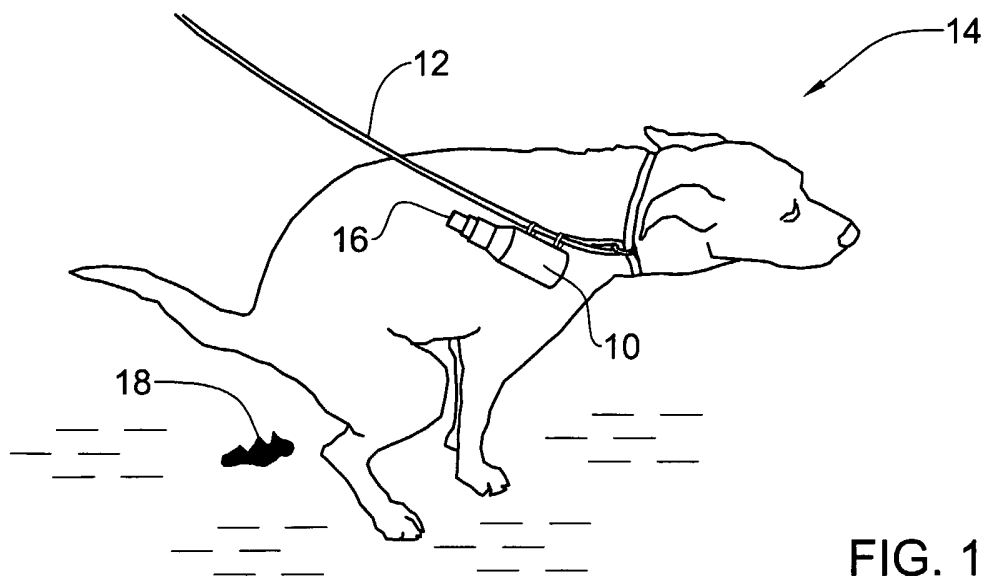


FIG. 1

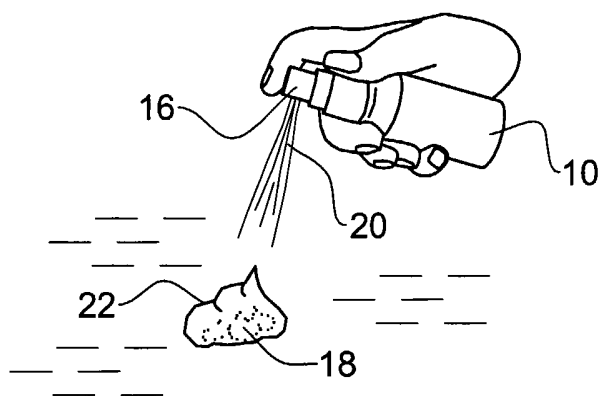


FIG. 2

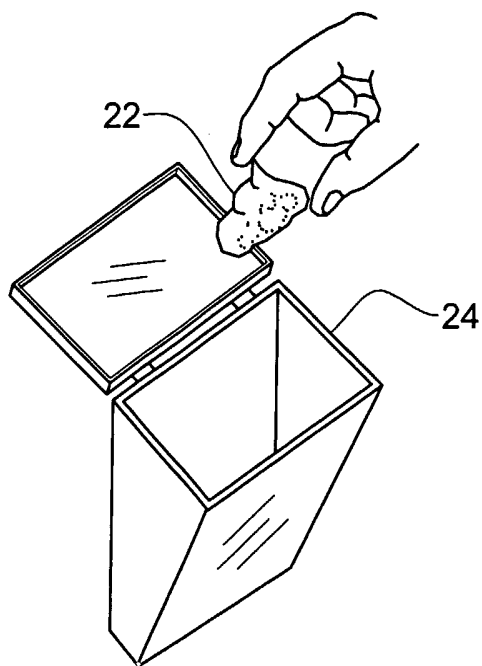


FIG. 3

INTERNATIONAL SEARCH REPORT

International Application No

CT/IL2004/000376

A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 E01H/12 C08J9/00 C08J9/14

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 E01H C08J

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
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X	US 4 329 376 A (SZIGETI ELEMER) 11 May 1982 (1982-05-11) the whole document -----	1-10, 21, 22
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Further documents are listed in the continuation of box C.



Patent family members are listed in annex.

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INTERNATIONAL SEARCH REPORT

International Application No

CT/IL2004/000376

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
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