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(54) **PET WASTE MANAGEMENT DEVICE, SYSTEM, AND METHODS**

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(57) **ABSTRACT**

A pet waste management system is provided and is designed to provide a hygienic and convenient solution for pet owners. The pet waste management system can include a main housing portion and a non-porous pad having a surface for receiving pet excrement including feces and urine. The system can include a sweeper including a scrapping surface and a movable sweeper arm. The movable sweeper arm is configured to move the sweeper across the surface of the non-porous pad such that the scrapping surface pushes both feces and urine off of the non-porous pad and into a litter box portion.

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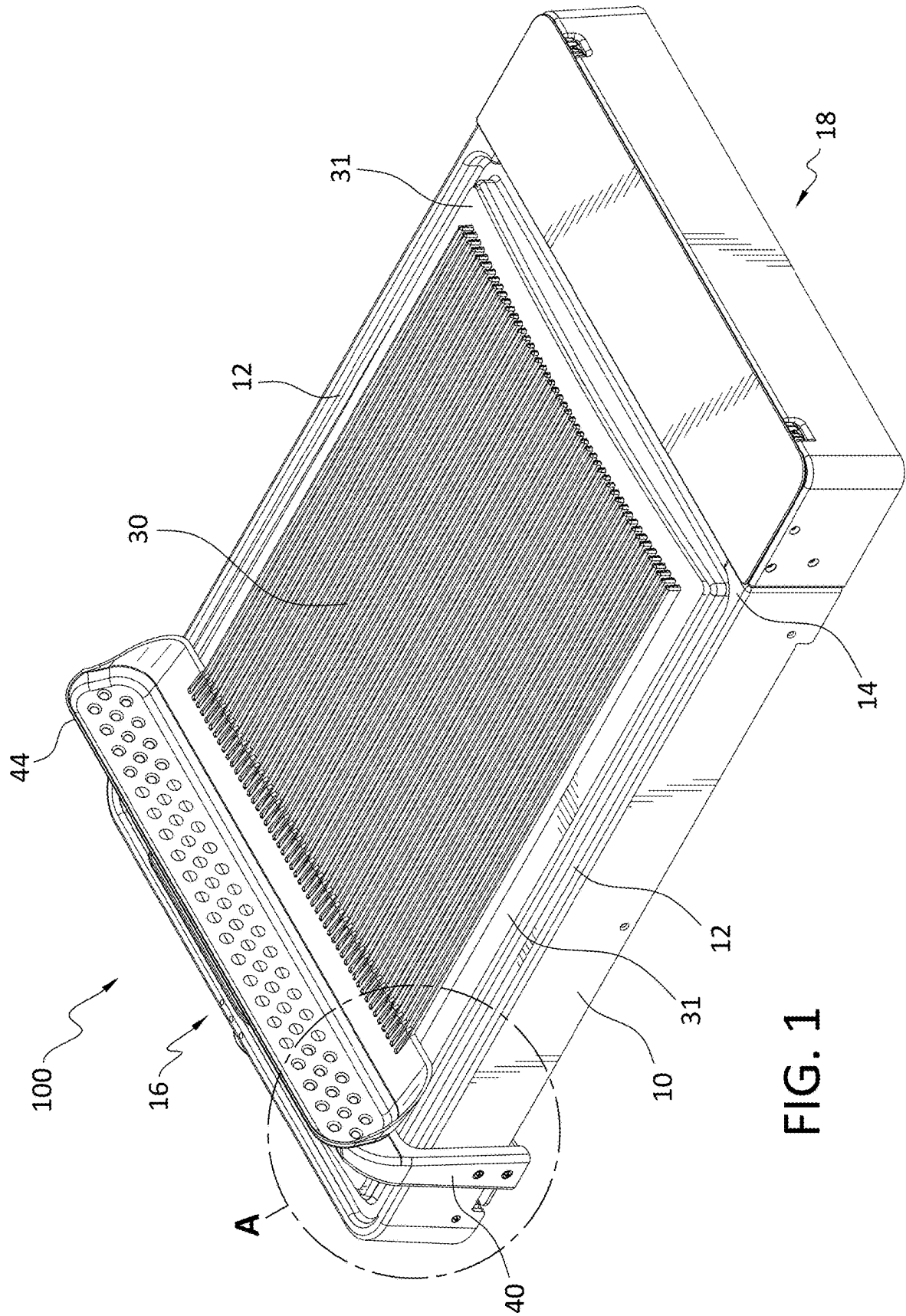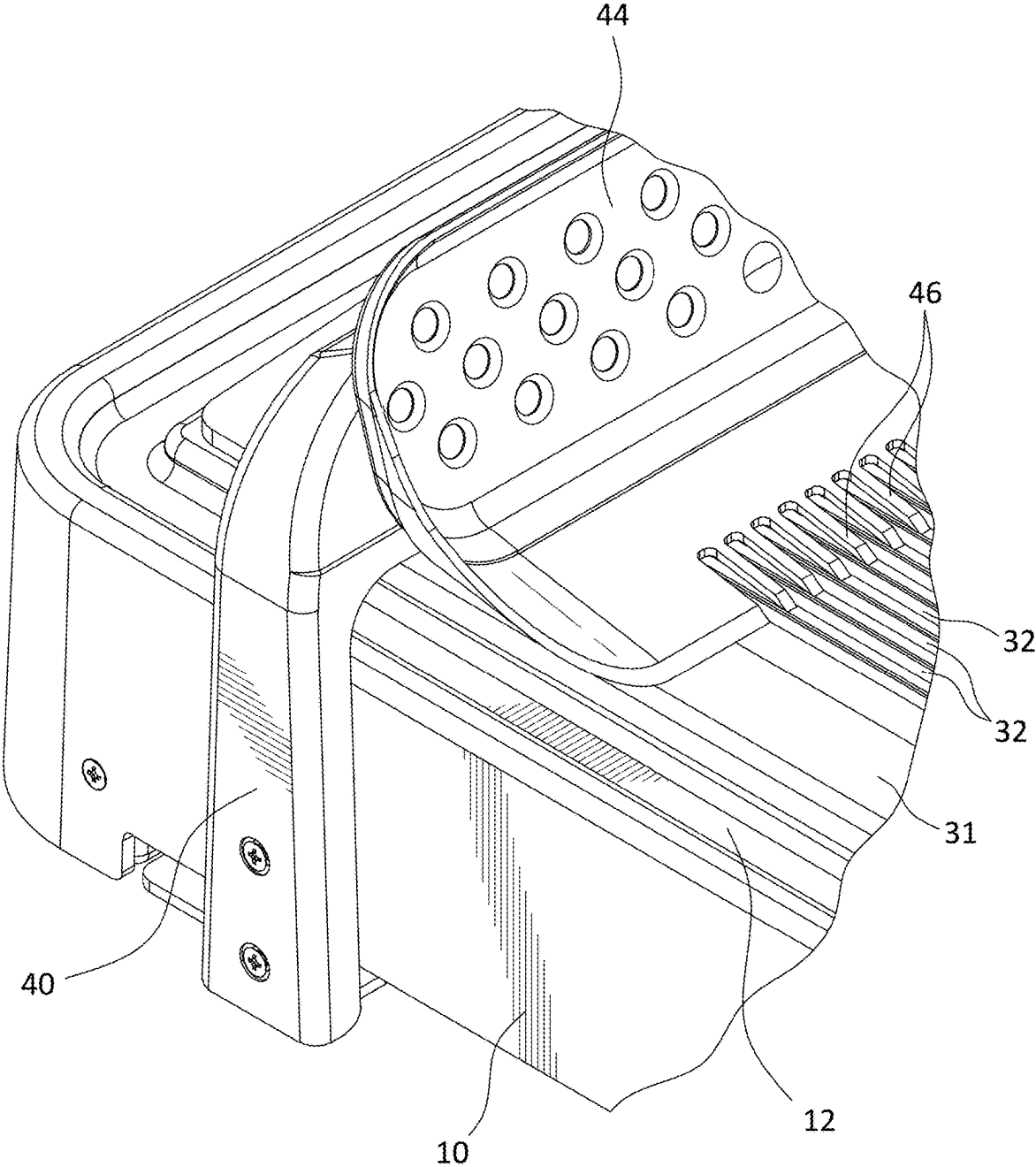12

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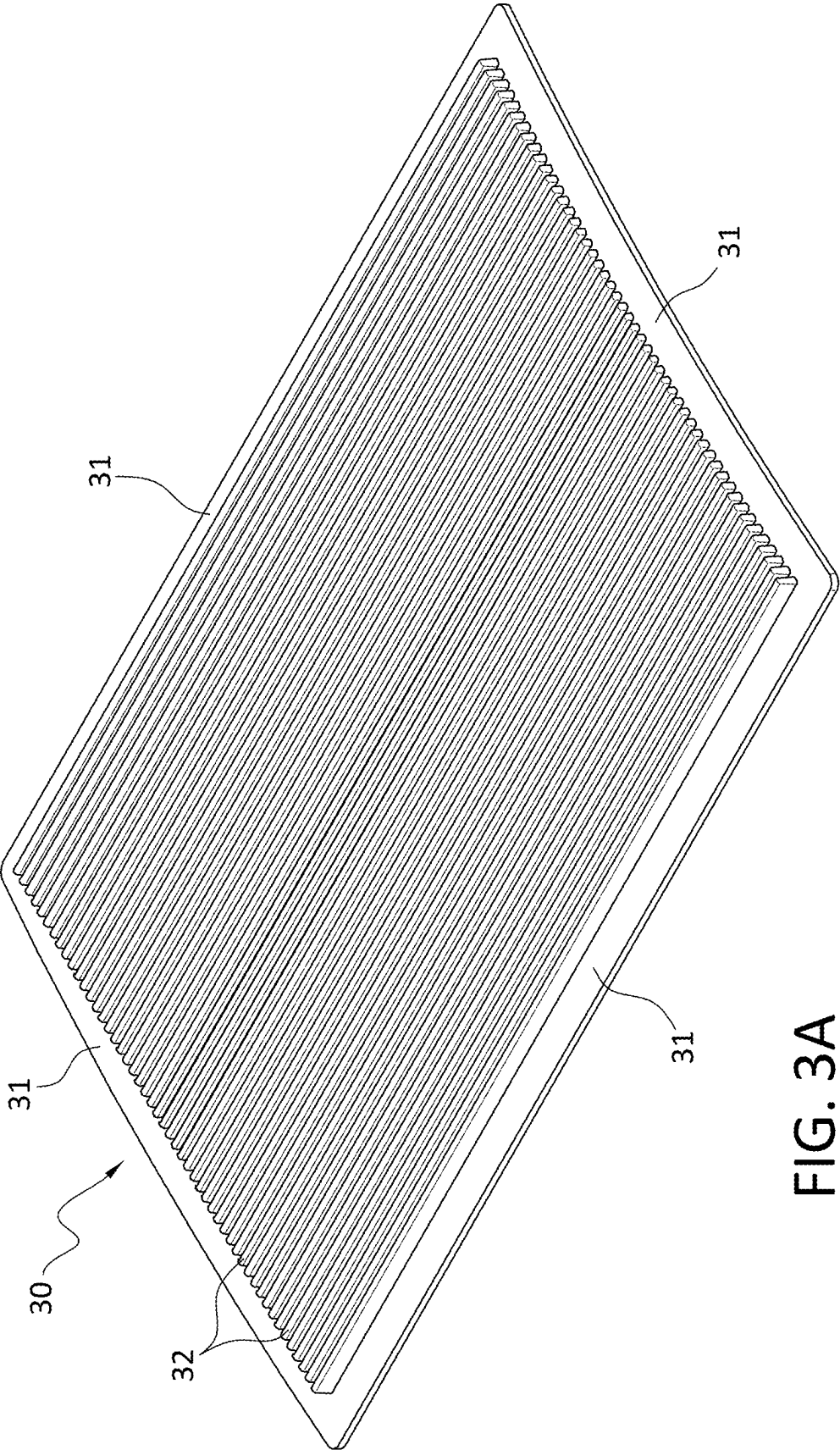44

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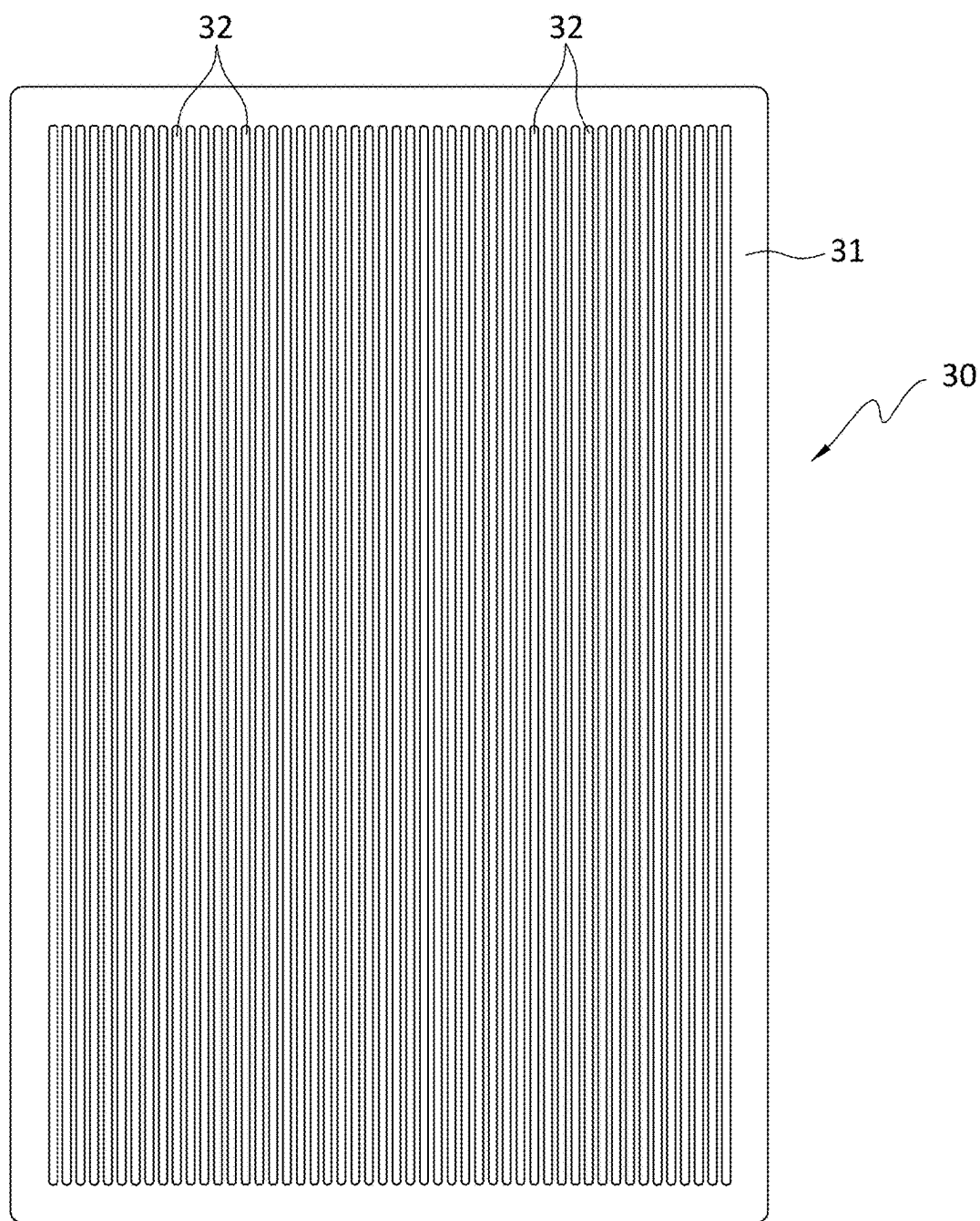
16

A

40

10

31

12

14

18

FIG. 1

FIG. 2

30

31

31

31

32

FIG. 3A

32   32

31

30

FIG. 3B

30

31   32

34

FIG. 3C

44

46

46

FIG. 4A

44

46

46

FIG. 4B

FIG. 5
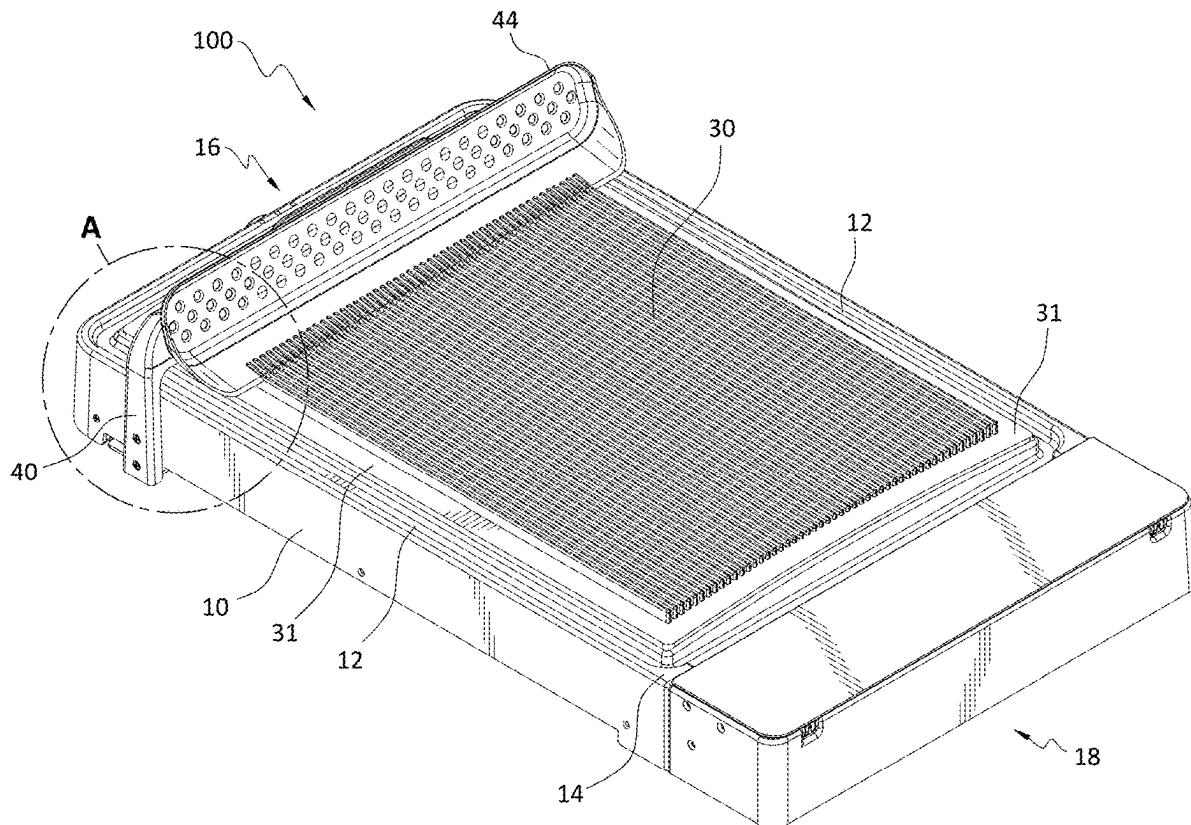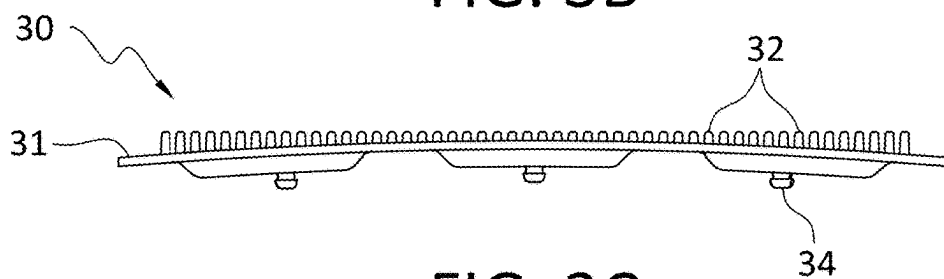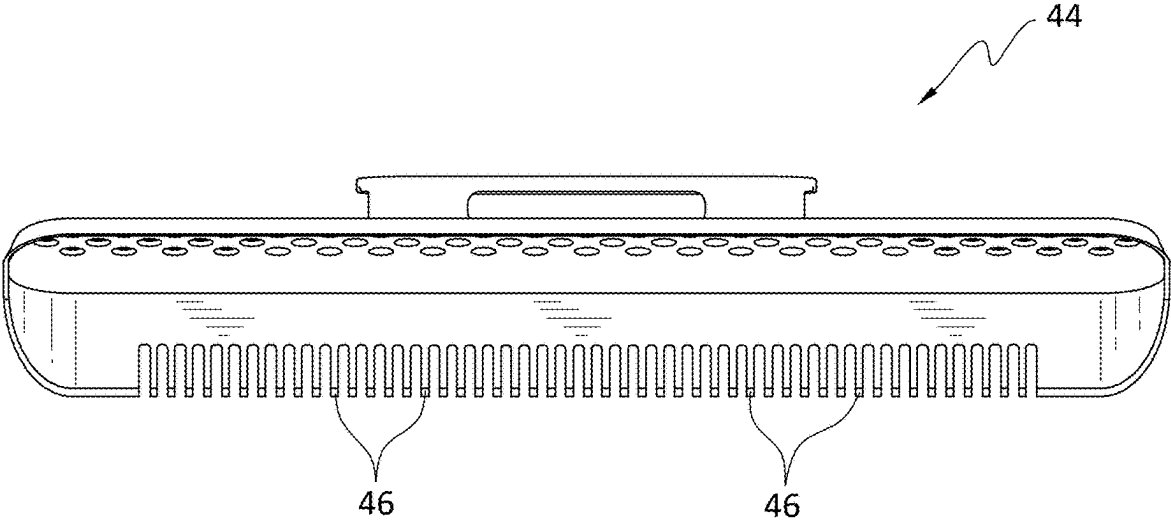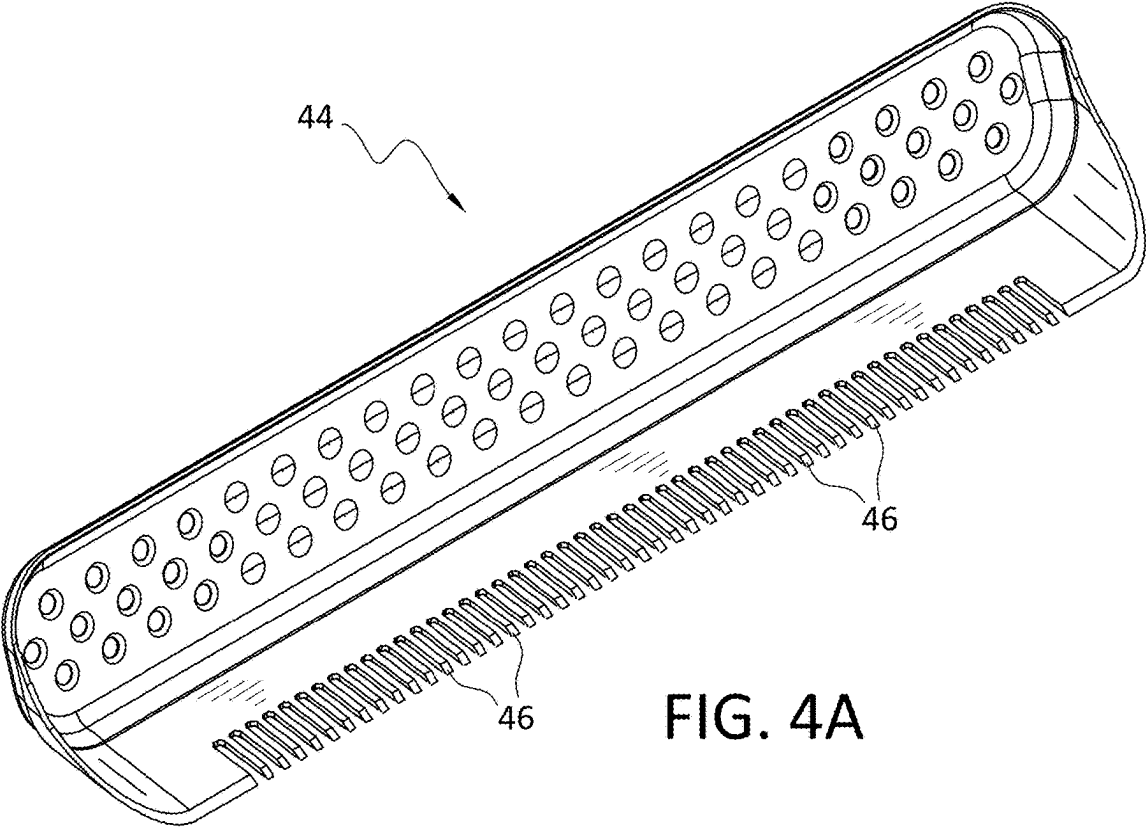
FIG. 6

FIG. 7

FIG. 8

PET WASTE MANAGEMENT DEVICE, SYSTEM, AND METHODS

CROSS REFERENCE TO RELATED APPLICATION

[0001] The present application claims the benefit from earlier filed U.S. Provisional Patent Application No. 63/555,372, filed Feb. 19, 2024, which is incorporated herein in its entirety by reference.

FIELD OF THE INVENTION

[0002] The present teachings generally relate to pet waste disposal. In particular, the present teachings relate to a pet waste management device and system that deposits pet waste including both feces and urine directly into a litter box with minimal human interaction.

BACKGROUND OF THE INVENTION

[0003] In the realm of pet care, particularly concerning the management of waste elimination, existing solutions often lack efficiency and cleanliness. Traditional methods such as disposable pads or manual cleanup can be messy, time-consuming, and fail to adequately address odor and bacteria concerns. Turf pads do not adequately dispose of urine and reek almost instantaneously unless cleaned immediately after use. Known automatic cat litter boxes are designed in such a way that dogs would never use them be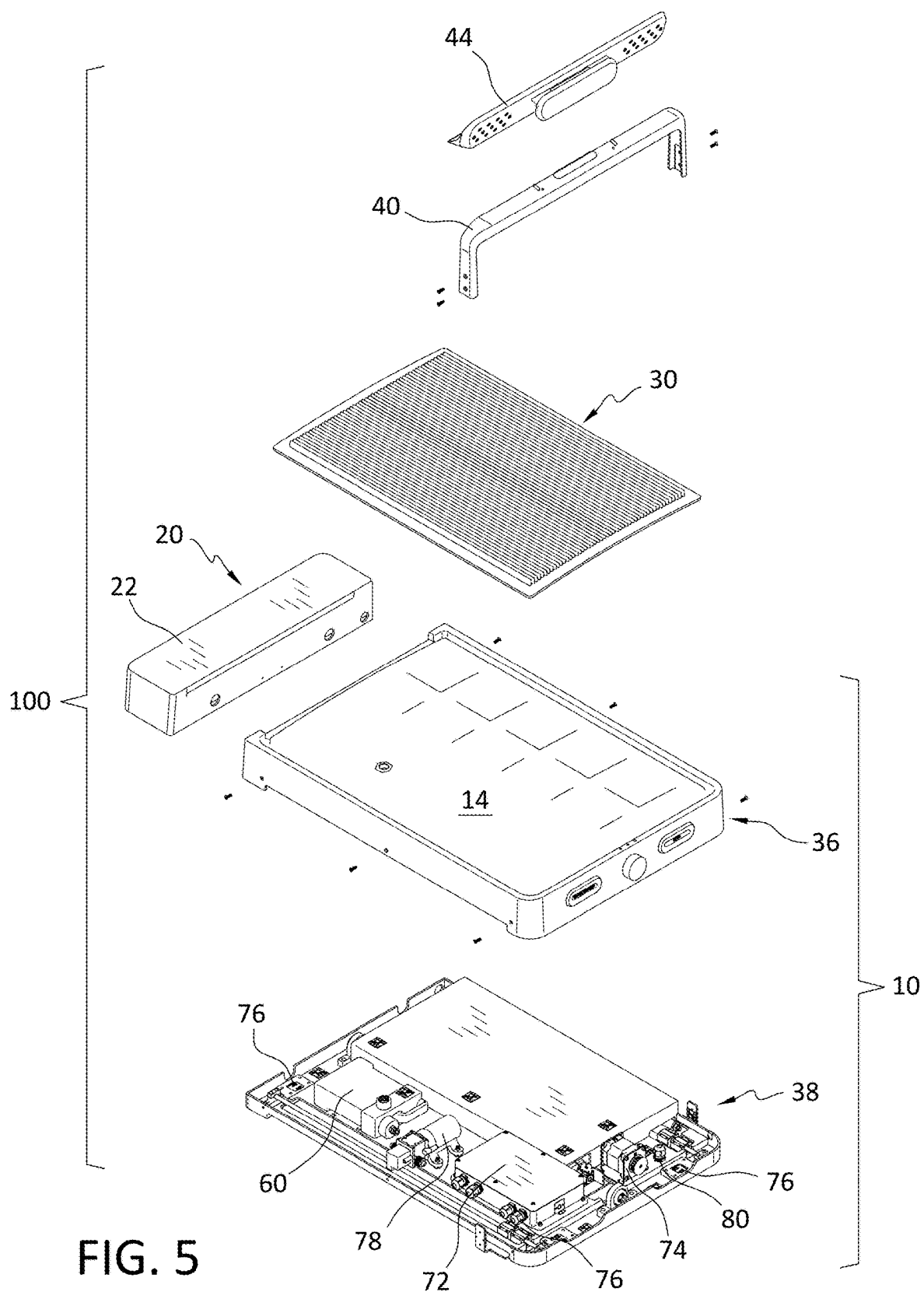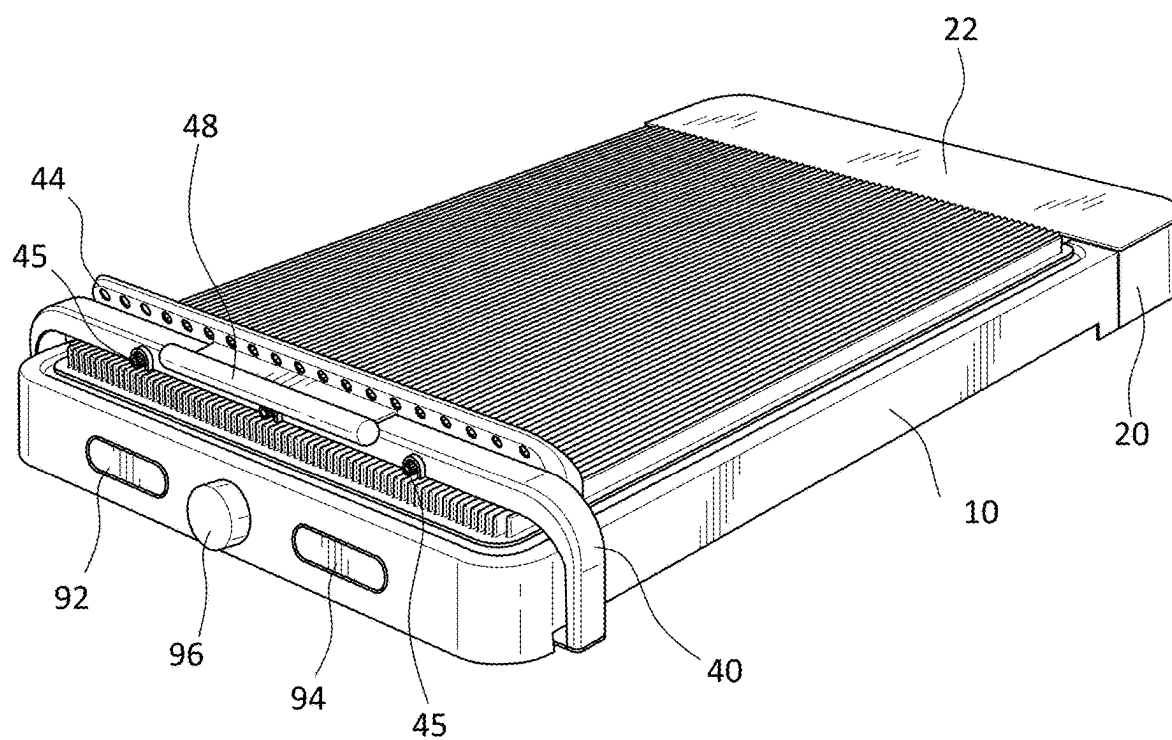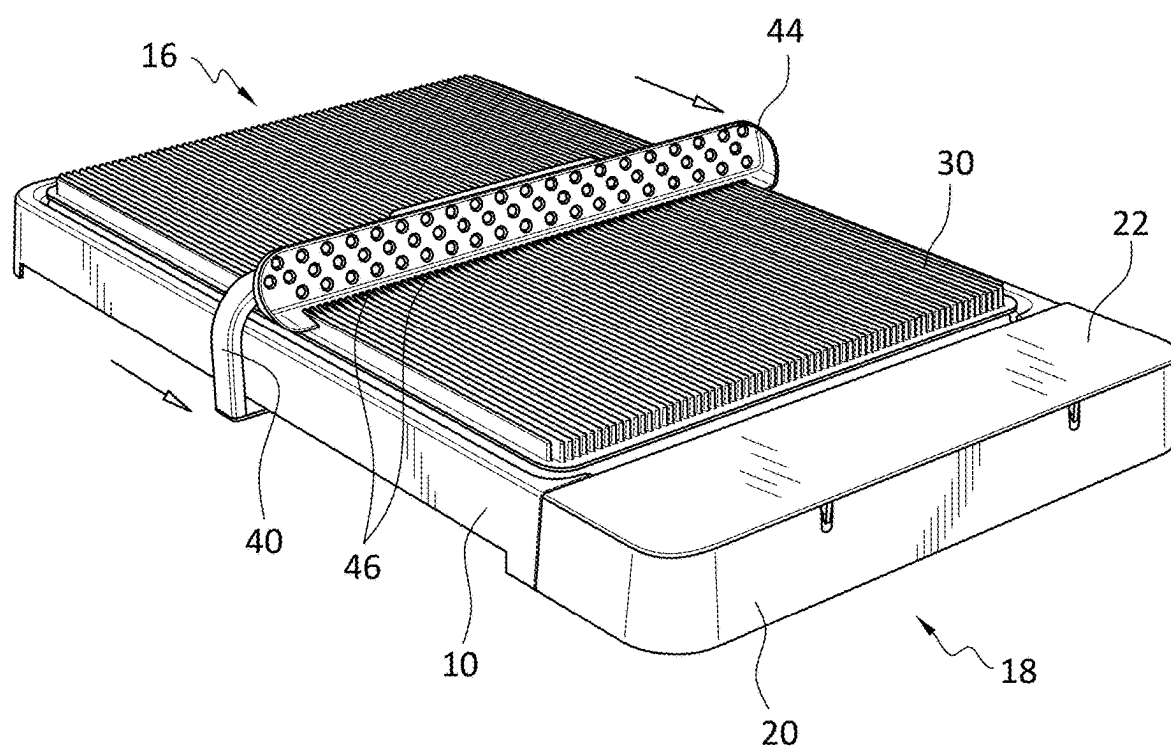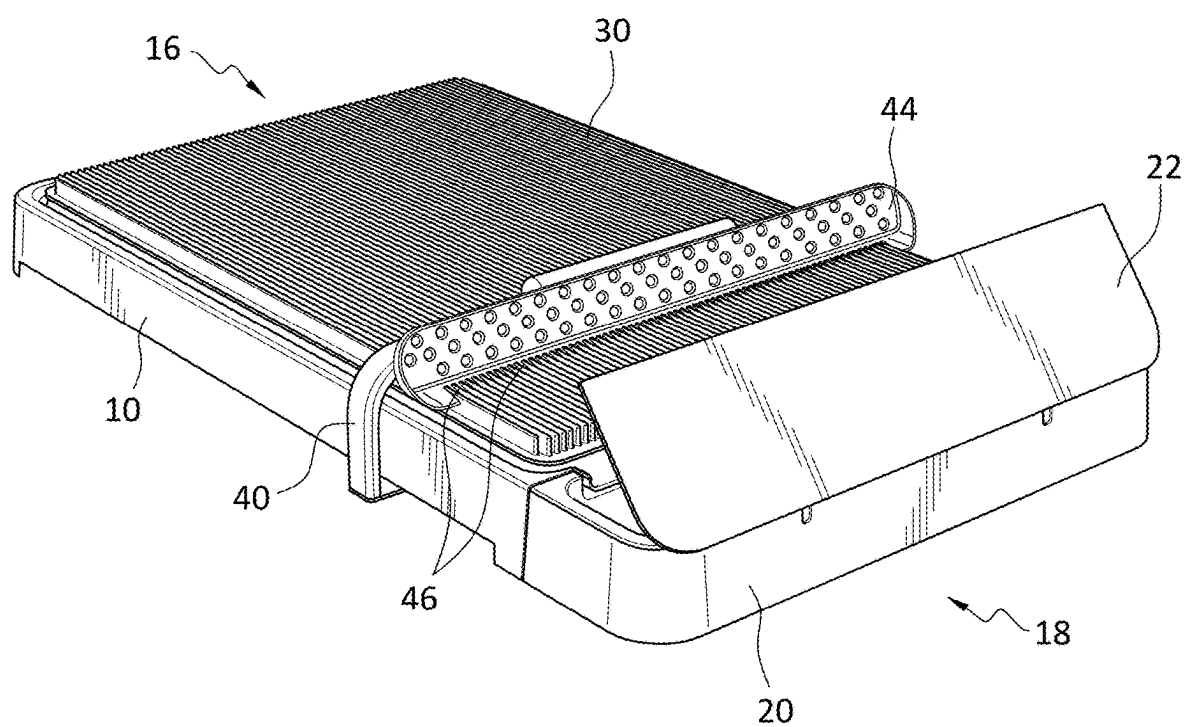cause they are generally enclosed, and the pets that do use them have direct contact with the litter. As a result, the litter particulate is often scattered around the litter box requiring the pet owner to manually clean the surrounding area after use.

[0004] Accordingly, there exists a need for an improved system that streamlines the process of pet waste management including both feces and urine while ensuring a hygienic environment for both pets and their owners.

SUMMARY OF THE INVENTION

[0005] The present teachings provide a pet waste management system including a main housing portion and a non-porous pad arranged on the main housing portion. The non-porous pad including a surface for receiving pet excrement including feces and urine. A sweeper including a scrapping surface and a movable sweeper arm configured to move the scrapping surface of the sweeper across the surface of the non-porous pad such that the scrapping surface is capable of pushing both feces and urine off of the non-porous pad.

[0006] The present teachings also provide a pet waste management system including a main housing portion including a proximal end and a distal end. A non-porous pad can be arranged on the main housing portion and include a series of upstanding ridges each separated by a gap. The ridges can extend from a proximal end to a distal end of the main housing portion. A sweeper defines a plurality of combed teeth, the combed teeth defining a complimentary contour with respect to the series of upstanding ridges and gaps formed in the non-porous pad. A movable sweeper arm can be configured to move the sweeper across the non-porous pad such that the series of combed teeth are capable of sweeping between the ridges of the non-porous pad thereby pushing both feces and urine off of the non-porous pad.

[0007] The present teachings still further provide a pet waste management system including a main housing portion and a non-porous pad arranged on the main housing portion. The non-porous pad includes a surface for receiving pet excrement including feces and urine. A sweeper including a scrapping surface defining a first contour. The surface of the non-porous pad defines a second contour. The first contour and the second contour are shaped in a substantially complimentary manner such that the scrapping surface of the sweeper is capable of pushing both feces and urine off of the non-porous pad.

[0008] Additional features and advantages of various embodiments will be set forth, in part, in the description that follows, and will, in part, be apparent from the description, or may be learned by the practice of various embodiments. The objectives and other advantages of various embodiments will be realized and attained by means of the elements and combinations particularly pointed out in the description herein.

BRIEF DESCRIPTION OF THE DRAWINGS

[0009] FIG. 1 shows a perspective view of the pet waste management system of the present teachings in the home position;

[0010] FIG. 2 shows a blown-up view of portion A of the pet waste management system shown in FIG. 1;

[0011] FIG. 3A shows a perspective view of the non-porous pad of the pet waste management system shown in FIG. 1;

[0012] FIG. 3B shows a top view of the non-porous pad of FIG. 3A;

[0013] FIG. 3C shows an end view of the non-porous pad of FIGS. 3A and 3B;

[0014] FIG. 4A shows a perspective view of the sweeper of the pet waste management system of FIG. 1;

[0015] FIG. 4B shows a top view of the sweeper shown in FIG. 4A;

[0016] FIG. 5 shows an exploded view of the pet waste management system of FIG. 1;

[0017] FIG. 6 shows a perspective view of the back side of the pet waste management system of FIG. 1 shown in the home position; and

[0018] FIGS. 7 and 8 each show a perspective view of the pet waste management system of FIG. 1 with the sweeper arm shown in different positions of a cleaning cycle;

[0019] It is to be understood that both the foregoing general description and the following detailed description are exemplary and explanatory only and are intended to provide an explanation of various embodiments of the present teachings.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0020] Referring to FIGS. 1-6, a comprehensive pet waste management system 100 of the present teachings is shown. Pet waste management system 100 revolutionizes the way pet owners can handle indoor pet waste including both feces and urine. The pet waste management system 100 can be used by any type of trainable pet but is especially suited to handle the waste from dogs.

[0021] The pet waste disposal management system 100 of the present teachings can include a main housing portion 10. The main housing portion 10 can include surface engaging

legs that can resist slippage during use and a top surface **14** that can securely support a removable non-porous pad **30**. The non-porous pad **30** acts as a target area where a pet can relieve itself. During use, the non-porous pad **30** remains stationary and firmly supported on and with the top surface **14** of the main housing portion **10**. As shown in FIG. **3C**, the opposite side of the non-porous pad **30** can include resilient nubs **34** that can lock into apertures formed in the top surface **14** of the main housing portion **10** to securely hold the non-porous pad **30** in place during use.

[0022] As best shown in FIG. **5**, the main housing portion **10** can include an upper assembly **36** and a lower assembly **38**. The top surface **14** is formed in the upper assembly **36** of the main housing portion **10**. As will be discussed in more detail below, the lower assembly **38** can include a cleaner supply tank **60**, a programmable control system **72**, motor **74**, weight sensors **76**, pump, **78**, resistance sensor **80**, as well as other subcomponents of the pet waste disposal management system **100** of the present teachings.

[0023] Referring to FIGS. **3A-3C**, the non-porous pad **30** can be made from a readily cleanable and durable material, such as, for example, silicone. The non-porous pad **30** can include a surface for receiving pet excrement including feces and urine. As will be discussed in more detail below, the surface of the non-porous pad **30** can be defined by a series of ridges **32** that form a contour as best shown in FIG. **3C**.

[0024] For example, the non-porous pad **30** can include a generally planar base **31** with a series of ridges **32** that are spaced apart a set distance along their length. When secured to the upper assembly **36** of the main housing portion **10**, the ridges **32** can run longitudinally between a proximal end **16** and a distal end **18** of the pet waste management system **100** of the present teachings. The ridges **32** can extend upwardly from the planar base **31** from about 5 mm to about 15 mm, and preferably can extend upwardly about 15 mm. The gaps between the ridges **32** can extend from about 5 mm to about 15 mm, and preferably can span about 15 mm. The non-porous pad **30** can roughly mimic grass and can minimize the surface area in contact with feces and urine thereby reducing the risk of contamination and simplifying cleanup.

[0025] As best shown in FIGS. **1** and **5-8**, at the distal end **18** of the main housing portion **10**, a litter box portion **20** can be removably secured and can be arranged for receiving the pet feces and urine that have been deposited on the non-porous pad **30**. The removable litter box **20** can include an articulating cover **22** that can be opened and closed during a cleaning cycle as will be discussed in more detail below.

[0026] The pet waste management system **100** of the present teachings can include a mechanical sweeper arm **40**. The mechanical sweeper arm **40** can support a sweeper **44** that defines a scrapping surface, such as, for example, by way of a series of combed teeth **46**. The scrapping surface defined by the series of combed teeth **46** forms a contour as best shown in FIGS. **4A** and **4B**. The scrapping surface of the sweeper **44** and the surface of the non-porous pad **30** can define complimentary shaped contours which allow both feces and urine to be substantially, if not completely, pushed off of the non-porous pad **30** and into the litter box **20** by the sweeper **44**.

[0027] As best shown in FIGS. **2**, **4A**, and **4B**, the series of combed teeth **46** can be sized and shaped to substantially mate with the longitudinally extending ridges **32** of the non-porous pad **30**. In the operative position of the sweeper **44**, and as best shown in FIG. **2**, the series of combed teeth

46 are shaped and arranged to substantially mate with the gaps between ridges **32** of the non-porous pad **30** so as to comb between the ridges and push all pet excrement (both solids and liquids) off of the non-porous pad **30** and into the removable litter box portion **20** of the pet waste management system **100**.

[0028] More specifically, the motor **74** can be mechanically arranged (via any mechanical linkage or transmission) and programmed to move the mechanical sweeper arm **40** from a home position, generally located at the proximal end **16** of the main housing portion **10** (see FIGS. **1** and **6**), to the distal end **18** substantially adjacent to litter box portion **20**, shown in FIG. **8**. The mechanical sweeper arm **40** can be arranged to ride in or on rails arranged on or below the upper assembly **36**, or any other guiding structure, as would be appreciated by one of ordinary skill in the art. After the sweeper **44** pushes and then deposits all the pet feces and urine into the litter box portion **10**, the sweeper arm **40** moves back to the initial home position. As the sweeper arm **40** moves the sweeper **44** over the non-porous pad **30**, the non-porous pad **30** remains stationary and firmly held on the top surface **14** of the main housing portion **10**. This complete motion can be referred to as a "cleaning cycle" and can be programmed to occur after the pet has relieved itself, stepped off the main housing portion **10**, and a predetermined time has elapsed.

[0029] To let gravity help direct both solid and liquid excrement off of the non-porous pad **30** and into the litter box portion **20**, the top surface **14** of the main housing portion **10** can be pitched downwardly from the proximal end **16** to the distal end **18** of the pet waste management system **100**. The top surface **14** could also be pitched outwardly on both sides of the main housing portion **10**. On either side of the non-porous pad **30**, the main housing portion **10** can include one or more fluid channels **12** that can be arranged to receive run-off from the non-porous pad **30** and direct the run off into the removable litter box portion **20**.

[0030] As best shown in FIG. **8**, the removable litter box **20** can include an articulating cover **22** that can be programmed and/or mechanically configured to selectively open to receive both pet feces and urine as the sweeper arm **40** (and sweeper **44**) reach the distal end **18** of the main housing portion **10**. When the sweeper arm **40** retracts back to the home position, the articulating cover **22** can be configured to close to help contain smells when the pet waste disposal management system **100** is not in use. When getting the pet waste management system **100** ready for use, the pet owner can supply the removable litter box portion **20** with cat litter to help absorb and contain smells.

[0031] Referring to FIG. **6**, the liquid supply tank **60** can be in fluid communication with one or more sprayer nozzles **45** arranged on the sweeper arm **40**. The pump **78** can be programmed to deliver an enzymatic cleaner via the nozzles **45** across the surface of the non-porous pad **30** as the sweeper arm **40** moves across the surface of the non-porous pad **30** during a cleaning cycle. The enzymatic cleaner cleans and disinfects the surface of the non-porous pad **30** and reduces odors. The pump **78** can also be programmed to deliver the enzymatic cleaner via the nozzles **45** at any time.

[0032] As also shown in FIG. **6**, the sweeper arm **40** can include one or more UV light devices **48** that are arranged to disinfect the non-porous pad **30** as the sweeper arm **40** moves across the surface during a cleaning cycle. For

example, the UV light devices **48** can be chosen to emit UVC light in a wavelength range of from about 200 nm to about 280 nm which is the most germicidal part of the UV spectrum.

[0033] The removable litter box **20** can include one or more UV light devices that are arranged to disinfect the interior of the litter box **20** at any time during or after the cleaning cycle.

[0034] A variety of different motors, sensors, pumps, and controllers for coordinating the movement and operation of the sweeper arm **40**, sprayer nozzles **45**, articulating cover **22**, UV light devices **48** and other features of system **100** can be contained in and/or supported by the main housing portion **10**.

[0035] For example, FIG. **5** shows a programmable control system (or CPU) **72** that can be located on the main housing portion **10** and connected to a motor **74** and a pump **78** with the external control system **72** functioning to control and operate the sweeper arm **40**, sprayer nozzles **45**, articulating cover **22**, UV light devices **48**, and any other structure. Any power source can be connected to the motor **74** to provide the necessary power for the operation of the pet waste management system **100** of the present teachings.

[0036] Programmable external control system **72** could include a remote-control unit that could allow a pet owner to operate and program various safety features of the pet waste disposal management system **100**, such as but not limited to, a weight sensor **76** and a resistance sensor **80**.

[0037] Weight sensor **76** could be programmed to run the motor **74** a predetermined time after the pet defecates and then jumps off the main housing portion **10**. Pet owners could choose from pre-programmed intervals to activate the cleaning cycle after use ranging from, for example, **10** seconds to one hour. Such a programmable feature can allow pets to walk away from the non-porous pad **30** before the cleaning cycle is activated, promoting a stress-free experience. The weight sensor **76** could also be arranged to prevent motor **74** and pump **78** from turning on when there is a designated amount of weight on the main housing portion **10**, thereby recognizing that the pet is standing on the device.

[0038] Resistance sensor **80** could be programmed to de-activate the motor **74** and pump **78** upon detection of any electrical resistance thereby automatically stopping the cleaning cycle and preventing any potential accidents and ensuring the safety of pets.

[0039] Similar safety features could include a mechanism for sensing any type of pressure or movement on the sweeper arm **40**, a motion detector, light sensors, weight sensor, or other feedback mechanisms which will turn off the motor **74** and pump **78** and/or disengage the motor **74** under predetermined conditions.

[0040] Programmable control system **72** can operate and can be programmed to control a heating system and any other electronic mechanisms on the pet waste management system **100**. Although not shown, the heating system can include weather and waterproof heating elements located on, or embedded within, various components of the pet waste management system **100**. The heating system functions to prevent freezing when used in cold weather climates. For example, a heating system of the pet waste management system **100** can include heating elements that are mounted in

such a way as to prevent the sweeper arm **40**, sprayer nozzles **45**, motor **74**, pump **78**, and other mechanisms from freezing.

[0041] User-actuatable controls can be arranged anywhere on the main housing portion **10** or on a remote. For example, as shown in FIG. **6**, such buttons could include an ON/OFF button **92**, a reset button **94**, and a control knob **96** for adjusting the timing of the cleaning cycle.

[0042] In the general operation of pet waste management system **100** of the present teachings, a pet will deposit feces and/or urine on the non-porous pad **30** and then jump off the main housing portion **10**. A predetermined period of time after sensing a change in weight, a signal can be sent to motor **74**, such as by way of the programmable control system **72**, to move the sweeper arm **40** (and sweeper **44**) across the stationary surface of the non-porous pad **30** to perform a complete cleaning cycle. The control system **72** can also send a signal to control the angular movement of the articulating cover **22** from a closed position to an opened position in coordination with the location of the sweeper arm **40** to allow the swept pet waste to be received within the litter box portion **20** and then closed.

[0043] Simultaneously, to help move the pet waste into the litter box portion **20**, the pump **78** can be activated during the cleaning cycle to spray enzymatic cleaner from the sprayer nozzles **45** onto the non-porous pad **30**. Spraying a continuous stream of enzymatic cleaner onto the non-porous pad **30** helps to remove any remaining pet waste from the non-porous pad **30** and provides a disinfecting function.

[0044] The non-porous pad **30** and litter box portion **20** can be easily removable and replaceable, simplifying the cleanup process and ensuring ongoing functionality.

[0045] The pet waste disposal system **100** of the present teachings eliminates odors and bacteria by spraying an enzyme solution over the entire surface of the stationary pad **30** during the cleaning cycle. The combination of the movement of the mechanical sweeper arm **40** and the complimentary contoured shapes of the scrapping surface of the sweeper and the surface of the non-porous pad **30** operate to allow the capture of both feces and urine into a single closeable container **20**. This makes the pet waste disposal system **100** an effective and efficient pet waste apparatus that is easy to maintain and clean.

[0046] Those skilled in the art can appreciate from the foregoing description that the present teachings can be implemented in a variety of forms. Therefore, while these teachings have been described in connection with particular embodiments and examples thereof, the true scope of the present teachings should not be so limited. Various changes and modifications may be made without departing from the scope of the teachings herein.

What is claimed is:

1. A pet waste management system comprising:

a main housing portion;

a non-porous pad arranged on the main housing portion and including a surface for receiving pet excrement including feces and urine;

a sweeper including a scrapping surface; and

a movable sweeper arm configured to move the scrapping surface of the sweeper across the surface of the non-porous pad such that the scrapping surface is capable of pushing both feces and urine off of the non-porous pad.

2. The pet waste management system of claim **1**, wherein the surface of the non-porous pad and the scrapping surface of the sweeper define complimentary shaped contours.

3. The pet waste management system of claim **2**, wherein the surface of the non-porous pad is defined by a series of ridges separated by a gap.

4. The pet waste management system of claim **3**, wherein the scrapping surface is defined by a series of combed teeth being shaped to extend into the gaps formed between the ridges of the non-porous pad.

5. The pet waste management system of claim **1**, further including a removable litter box portion arranged to receive both feces and urine pushed off the non-porous pad by the sweeper.

6. The pet waste management system of claim **5**, wherein the removable litter box portion includes an articulating cover configured to open and close based on the location of the sweeper arm.

7. The pet waste management system of claim **1**, further including at least one sprayer arranged on the movable sweeper arm capable of spraying an enzymatic cleaner onto the non-porous pad.

8. The pet waste management system of claim **1**, further including at least one UV light device arranged on the movable sweeper arm capable of disinfecting the non-porous pad.

9. A pet waste management system comprising:
a main housing portion including a proximal end and a distal end;
a non-porous pad arranged on the main housing portion, the non-porous pad including a series of upstanding ridges each separated by a gap, the ridges extending from a proximal end to a distal end of the main housing portion;
a sweeper defining a plurality of combed teeth, the combed teeth defining a complimentary contour with respect to the series of upstanding ridges and gaps formed in the non-porous pad; and
a movable sweeper arm configured to move the sweeper across the non-porous pad such that the series of combed teeth are capable of sweeping between the ridges of the non-porous pad thereby pushing both feces and urine off of the non-porous pad.

10. The pet waste management system of claim **9**, further including a removable litter box portion arranged to receive both feces and urine pushed off the non-porous pad by the sweeper.

11. The pet waste management system of claim **10**, wherein the removable litter box portion includes an articulating cover configured to open and close based on the location of the sweeper arm.

12. The pet waste management system of claim **9**, further including at least one sprayer arranged on the movable sweeper arm capable of spraying an enzymatic cleaner onto the non-porous pad.

13. The pet waste management system of claim **9**, further including at least one UV light device arranged on the movable sweeper arm capable of disinfecting the non-porous pad.

14. A pet waste management system comprising:
a main housing portion;
a non-porous pad arranged on the main housing portion and including a surface for receiving pet excrement including feces and urine; and
a sweeper including a scrapping surface;
wherein the scrapping surface of the sweeper defines a first contour and the surface of the non-porous pad defines a second contour whereby the first contour and the second contour are shaped in a substantially complimentary manner such that the scrapping surface of the sweeper is capable of pushing both feces and urine off of the non-porous pad.

15. The pet waste management system of claim **14**, wherein the second contour defined by the non-porous pad is formed by a series of ridges separated by a gap.

16. The pet waste management system of claim **15**, wherein the first contour defined by the scrapper is formed by a series of combed teeth.

17. The pet waste management system of claim **14**, wherein the first contour defined by the scrapper is formed by a series of combed teeth.

18. The pet waste management system of claim **17**, wherein the series of combed teeth are shaped to extend into gaps formed between ridges defining the second contour of the non-porous pad.

19. The pet waste management system of claim **14**, further including a removable litter box portion arranged to receive both feces and urine pushed off the non-porous pad by the sweeper.

20. The pet waste management system of claim **19**, wherein the removable litter box portion includes an articulating cover configured to open and close based on the location of the sweeper arm.

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