



(43) International Publication Date
25 September 2014 (25.09.2014)

- (51) International Patent Classification:
A01C 7/00 (2006.01) *A01C 15/00* (2006.01)
- (21) International Application Number:
PCT/US2014/018493
- (22) International Filing Date:
26 February 2014 (26.02.2014)
- (25) Filing Language: English
- (26) Publication Language: English
- (30) Priority Data:
13/833,560 15 March 2013 (15.03.2013) US
- (72) Inventor; and
- (71) Applicant : MARCONI, Fred [US/US]; 3222 Tuscarora Road, Erieville, NY 13061 (US).
- (74) Agents: NOCILLY, David, L et al.; Bond, Schoeneck & King, PLLC, One Lincoln Center, Syracuse, NY 13202 (US).
- (81) Designated States (*unless otherwise indicated, for every kind of national protection available*): AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BN, BR, BW, BY,

BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IR, IS, JP, KE, KG, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PA, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SA, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

- (84) Designated States (*unless otherwise indicated, for every kind of regional protection available*): ARIPO (BW, GH, GM, KE, LR, LS, MW, MZ, NA, RW, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, RU, TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, KM, ML, MR, NE, SN, TD, TG).

Published:

— with international search report (Art. 21(3))

(54) Title: ELECTRICALLY POWERED HAND SPREADER

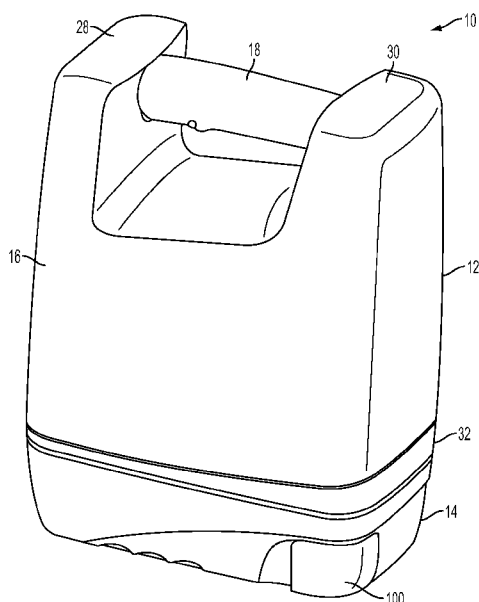


FIG. 1

(57) Abstract: A handheld spreader having a tillable container for dispensing particulate from an electrically powered blower assembly in a detachable base. The spreader includes a feed slide leading from the container to the air stream channel of the base that has a vibrating eccentric plate for guiding and improving the flow of particulate from container into the air stream. The container and base are frictionally engaged together, thereby allowing for easy assembly of spreader, including assembly after container has been filled with particulate, as well as easy reassembly if container is removed and re-filled. The spreader includes a rotating slide that may be operated by a user to open and partially close the feed slide of the container to control the feed rate.

TITLE

ELECTRICALLY POWERED HAND SPREADER

Cross-reference to Related Applications

[0001] The present application claims priority to U.S. Application No. 13/833,560, filed on March 15, 2013.

BACKGROUND OF THE INVENTION

1. FIELD OF THE INVENTION

[0002] The present invention relates to particulate spreading devices and, more particularly, to an electrically powered hand spreader.

2. DESCRIPTION OF THE RELATED ART

[0003] Home owners frequently need to dispense particulate matter, such as lawn fertilizer, weeding chemicals, grass seed, and even salt, over a given area, such as lawn, sidewalk or driveway. Conventional methods for spreading or dispensing particulate have a hopper that is manually filled particulate and allows the particulate to gravity feed onto a spinning spreader plate that cases the particulate outwardly. The spreader is usually powered by mechanical interconnection to wheels or a hand crank associated with the spreader plate so that the plate is causes to spin and the user pushes the hopper along the ground or turns the hand crank. These systems typically have poor distribution and control over dispensing, and require that the user physically drive spreading operations by moving along the ground or turning a crank. These systems also require a lot of contact between the user of the system and the particulate to be spread, which is a significant disadvantage due to the hazardous nature of many particulates.

[0004] While automatically powered spreaders avoid the need for the user to provide the distributing force, they suffer from many of the same drawbacks. For example, electrically powered spreader plates still have poor distribution and control, due in part to the lack of means for ensuring flow of particular from the container to the distributor, and also require that the user manually handle particulate. Other systems, such as those the attached to conventional leaf blowers are mechanically complicated and expensive. While these systems may be attractive to commercial customers, they are not too expensive and complicated for the average homeowner and require the use of additional equipment that is expensive and difficult to use.

BRIEF SUMMARY OF THE INVENTION

[0005] It is therefore a principal object and advantage of the present invention to provide a powered handheld spreader that has improved particulate distribution.

[0006] It is an additional object and advantage of the present invention to provide a powered handheld spreader that minimizes contact with particulate.

[0007] It is a further object and advantage of the present invention to provide a powered handheld spreader that is less expensive and may be easily replenished or reused.

[0008] It is also an object and advantage of the present invention to provide a powered handheld spreader that is easy to manufacture and can be filled with particulate during the assembly process.

[0009] In accordance with the foregoing objects and advantages, the present invention provides a handheld spreader having a fillable container that is interconnected to a base assembly having a blower and air flow channel via a slide having a vibrating eccentric plate for guiding particular matter and improving flow of particulate into channel. Particulate dispensed from the container is collected in the air flow channel and distributed out of the spreader. The container and base are further interconnected by a coupling member that frictionally engages and seals the container to the base, thereby allowing for easy assembly of spreader, including assembly after container has been filled with particulate as well as easy reassembly if container is removed and refilled at a later date. The spreader further comprises a sliding gate that may be operated by a user to open and close the opening of the container while simultaneously activating and deactivating the blower motor.

BRIEF DESCRIPTION OF THE SEVERAL VIEWS OF THE DRAWING(S)

[0010] The present invention will be more fully understood and appreciated by reading the following Detailed Description in conjunction with the accompanying drawings, in which:

[0011] Fig. 1 is a perspective view of a powered hand spreader according to the present invention;

[0012] Fig. 2 is a perspective, exploded view of a powered hand spreader according to the present invention;

[0013] Fig. 3 is a longitudinal cross-section of an assembled powered hand spreader according to the present invention;

[0014] Fig. 4 is a perspective view of a container for a powered hand spreader according to the present invention;

[0015] Fig. 5 is a perspective view of a hook plate for a powered hand spreader according to the present invention;

[0016] Fig. 6 is a perspective view of a slide plate for a powered hand spreader according to the present invention;

[0017] Fig. 7 is a top plan of a slide plate for a powered hand spreader according to the present invention;

[0018] Fig. 8 is a perspective view of a base for a powered hand spreader according to the present invention;

[0019] Fig. 9 is a second perspective view of a base for a powered hand spreader according to the present invention;

[0020] Fig. 10 is a perspective view of a cover for a powered hand spreader according to the present invention;

[0021] Fig. 11 is a perspective view of a base and pull assembly for a powered hand spreader according to the present invention.

DETAILED DESCRIPTION OF THE INVENTION

[0022] Referring now to the drawings, wherein like reference numerals refer to like parts throughout, there is seen in Figure 1 a powered hand spreader 10 according to the present invention. Spreader 10 comprises an upper assembly having a container 12 that may be selectively attached to or detached from a bottom assembly comprising a base 14.

[0023] Container 12 comprises an upper housing 16 having a user handle 18 and defining a cavity 20 therein for holding particulate matter therein. As seen in Fig. 4, container 12 further includes a tubular chute 22 extending outwardly therefrom and having a series of circumferentially extending external ridge 24. Tubular chute 22 defines an opening 26 in the bottom of container 12 that allows any particulate in cavity 20 to be a gravity fed out of container 12 through opening 26. It should be recognized by those of skill in the art that opening 26 may be temporarily covered by a foil or other closure to ensure that any potentially harmful particulate stored in container 12 are maintained in place prior to spreading operations. Container 12 is preferably blow molded and further includes a pair of planar surfaces 28 and 30

to allow container 12 to be stably positioned on a horizontal surface with opening 26 facing upwardly.

[0024] As seen in Fig. 4, container 12 is interconnected to base 14 via a hook plate 32 that engages and is retained to the lower edge of container 12 via a hole 34 formed therethrough which tubular chute 22 may extend so that hole 34 engages ridge 24. Hook plate also include a peripheral edge 36 dimensioned to encompass and retain the lower edge 38 of container 12. Due to the inherent inaccuracies in blow molding processes, hook plate 32 can be injection molded and used to compensate for manufacturing irregularities in container 12 so that container 12 and hook plate 32 have consistent dimensions for further coupling to the bottom assembly of spreader 10. As explained in detail below, this provides a modular design and allows for dependable coupling of container 12 to base 14. To connect to base 14, hook plate 32 further includes two opposing tabs 40 and 42 extending from hole 34 for releasable attachment to the rest of spreader 10.

[0025] Referring to Figs. 5 and 6, spreader 10 further comprises a slide plate 44 having slots 46 and 48 corresponding to tabs 40 and 42, respectively, to allow container 12 and hook plate 32 to be releasably attached to slide plate 44. For example, slots 46 and 48 may each have a first, wide receiving portion 50 that extends to a second, narrow locking portion 52 so that container 12 and hook plate 32 may be mated with slide plate 44 by positioning container 12 and hook plate 32 at a rotationally offset angle from slide plate 44, inserting tabs 40 and 42 into each wide receiving portion 50 of each of slots 46 and 48, then rotating container 12 and hook plate 32 relative to slide plate 44 so that tabs 40 and 42 are moved into frictional locking engagement with narrow locking portion 52 of each of slots 46 and 48 to firmly engage container 12 and hook plate 32 with slide plate 44. Reverse rotation of container 12 and hook plate 32 relative to slide plate 44 thus allows for container 12 and hook plate 32 to be disengaged from slide plate 44.

[0026] Slide plate 44 further includes a tubular channel 56 that has a first end 58 that is aligned and dimensioned to mate with tubular chute 22 of container 12. The opposing end 60 of tubular channel 60 includes a first, closed portion 62 that covers a portion of opening 26 of container 12 as well as a second, open portion 64 having a control aperture 66 that is in fluid communication with opening 26 of container 12, thereby reducing the amount of particulate that can be gravity fed out of opening 26 of container 12. A rotatable slide 70 comprising a partial

disk is positioned in tubular channel 60, such as by a pivot boss 72, to be moveable in response to manual input, such as by grasping one of more protrusions 74 extending from slide 70. Slide 70 can thus be selectively positioned to cover none or various amounts of control aperture 66, thereby allowing adjustment of the amount of particulate that can flow from container 12 through chute 22 and out of control aperture 66.

[0027] In addition to controlling size of control aperture 66, slide 70 assists in the dispensing of particulate by ensuring a relatively even flow of particulate into base 14. More particularly, slide 70 may be aligned so that it does not extend perpendicularly to the direction of flow of particulate and thus encourages particulate to flow toward control aperture 66. In addition, by virtue of the agitation produced by the rotation of a blower 80, described in detail below, slide 70 will vibrate at a high frequency corresponding to the rotational speed of blower 80. This vibration of slide 70 assists with the flow of particulate to and through aperture 66 by preventing bridging of the particulate or stoppage of flow. To improve vibration of slide 70, blower 80 may comprise an unbalanced fan, such as one having a single fan blade that is thicker than the other blades.

[0028] Referring to Fig. 7, spreader 10 further comprises a base 14 having a passageway 82 positioned in operative relation to control aperture 66 to accept any particulate matter and eject it from spreader 10. More particularly, passageway 82 extends from a point adjacent to blower 80 circumferentially around blower 80, thereby forming a shroud 86 for blower 80, while gradually widening until a point 88 just proximate to and upstream of control aperture 66. At a point 88 just prior to control aperture 66, passageway 82 narrows slightly and then widens again as reaches and passes under aperture 66 and continues widening until reaching an exit opening 90 formed in base 14. Thus, any particulate fed through control aperture 66 will be entrapped in the airstream created by blower 80, forced along passageway 82 and driven out of exit opening 90. As seen in Fig. 8, base 14 further includes an air intake 92 in fluid communication with blower 80 so that blower can create an air stream in passageway 82 that leads out of exit opening 90. The width of passageway 82 is defined and controlled as explained above to reduce air pressure at blower 80, thereby improving efficiency, and also to create a slight negative pressure in passageway 82 underneath control aperture 66. As a result, particulate being fed from container 12 is less likely to be forced back into container 12 and will instead be drawn into passageway 82 by gravity and a slight venturi effect.

[0029] Referring to Fig. 9, base 14 further comprises a cover 92 positioned over passageway 82 that includes an opening 93 aligned with control aperture 66 and passageway 82 to permit fluid communication therebetween. Cover 92 further includes a battery compartment 94 and a detent 96 for supporting a motor 98 that is interconnected to and drives blower 80. Battery compartment 94 may include a door 97 enclosing compartment 94 that is aligned with and positioned in slide plate 44. Thus, in a preferred embodiment, slide plate 44, cover 92, and base 14 for a bottom assembly for spreader 10 and may be manufactured and assembled separately from container 12 and then coupled or decoupled from the upper assembly of container 12 and hook plate 32 during manufacturing or by a user.

[0030] Referring to Fig. 10, base 14 additionally includes a pull 100 that is moveable between a first, closed/off position and a second, open/on position. Pull 100 is operatively interconnected to motor 98, such as by having movable electrical contact points as part of a switch, to allow manual activation and deactivation of blower 80 as desired. Pull 100 further includes an extending portion 102 that is capable of selectively covering the opposite side of control aperture 66 from slide 70. Thus, at the same time that pull 100 electrically activates or deactivates blower 80, pull 100 also selectively uncovers and covers control aperture 66. Preferably, the distance that pull 100 moves before turning on blower 80 is less than the distance required to uncover aperture 66, thus allowing an air stream to be formed in passageway 82 by blower 80 before any particulate is allowed to fall into passageway 82 through control aperture 66.

[0031] Spreader 10 thus includes two assemblies that may be readily detached from each other. First, is an upper assembly comprising container 10 and hook plate 32 that are frictionally engaged to each other (such as at the time of manufacture) and, second is the bottom assembly comprising slide plate 44, cover 92, and base 14, which can be permanently attached to each other at manufacture. This modularity allows either bottom assembly or top assembly to be re-used or reconfigured for attachment to a replacement for the other assembly, as desired or needed.

[0032] A user can thus obtain a spreader 10 that has been pre-filled with particulate, take spreader 10 to the location where the particulate is to be spread, extend pull 100 to activate blower 80 and, nearly simultaneously, allowing particulate to fall into passageway 82, thereby blowing particulate out of spreader 10 onto the desired location. When spreading operations

have concluded, the user can close pull 100, thereby preventing any more particulate from being dispensed into base 14 and also turning off blower 18. If all particulate has been exhausted, the user can separate base 14 from container 12 by twisting container 12 relative to slide plate 32, and then attach a filled container 12 or a refilled container 12 back to base 14 for further use.

CLAIMS

What is claimed is:

1. A powered hand spreader, comprising:
 - a base having a passageway having a blower positioned at one end and that extends to a second end in communication with an opening formed in said base;
 - a cover positioned over said base and enclosing at least a portion of said passageway;
 - a slide plate positioned over said cover and including a channel that extends along an axis from a first open end to a second partially closed end having a control aperture formed therein, wherein said control aperture is in fluid communication with an intermediate portion of said passageway;
 - a slide positioned in said channel for rotation between a first position wherein said control aperture is not covered by said slide and a second position where said slide at least partially covers said control aperture;
 - a hook plate having a hole formed therethrough; and
 - a container defining a cavity therein and including a chute that engages with said hole of said hook plate and that is in fluid communication with said cavity and said channel of said slide plate.
2. The spreader of claim 1, wherein said slide plate includes a pair of opposing slots formed therein, wherein each of said slots includes a first wide portion and a second narrow portion.
3. The spreader of claim 2, wherein said hook plate includes a pair of opposing tabs extending from said hole to engage with said pair of opposing slots.
4. The spreader of claim 3, wherein said hook plate may be selectively engaged and disengaged from said slide plate by rotation of said hook plate relative to said slide plate such that said opposing pair of tabs may be moved between an engaged position where said each of said tabs is tightly engaged with the narrow portion of each of said slots and a disengaged position wherein said each of said tabs are positioned in a respective wide portion of each of said slots such that said tabs may be separate from said slots.

5. The spreader of claim 1, further comprising a pull operatively interconnected to said blower and movable between a retracted position where said blower is deactivated and an extended position where said blower is activated to produce an air stream in said passageway.

6. The spreader of claim 5, wherein said pull includes a portion that is operatively interconnected to said opening of said cover such that said opening is covered by said portion of said pull when said pull is in said retracted position and is uncovered when said pull is in said extended position.

7. The spreader of claim 6, wherein movement of said pull from said retracted position to said extended position activated said blower before said opening is first uncovered.

8. The spreader of claim 1, wherein said passageway gradually widens from a point proximate to said blower to a second point prior to any communication between said passageway and said opening.

9. The spreader of claim 8, wherein said passageway narrows at said second point and then widens again at said opening.

10. The spreader of claim 1, wherein said slide extends along a plane that is non-perpendicular to said axis of said channel.

11. The spreader of claim 2, wherein said slide includes a protrusion for manual rotation of said slide.

12. The spreader of claim 1, wherein said hook plate includes a peripheral edge that frictionally engages said container.

13. The spreader of claim 1, further comprising a battery compartment positioned in said base.

14. The spreader of claim 14, further comprising a motor electrically interconnected to said battery compartment and operatively interconnected to said blower.

15. The spreader of claim 15, wherein said pull electrically disconnects said battery compartment from said motor when said pull is in said retracted position and electrically connects said battery compartment to said motor when said pull is in said extended position.

1/10

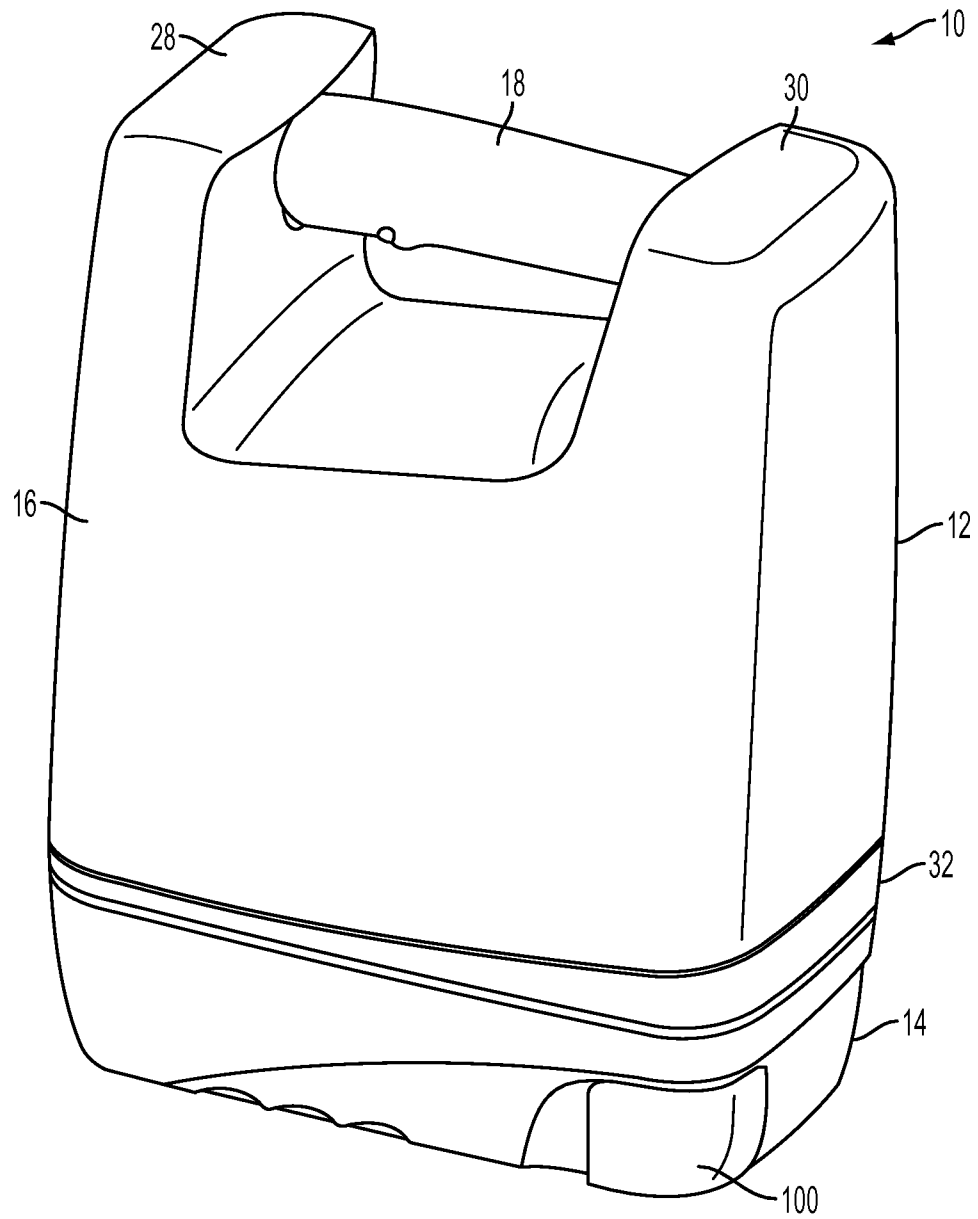


FIG. 1

2/10

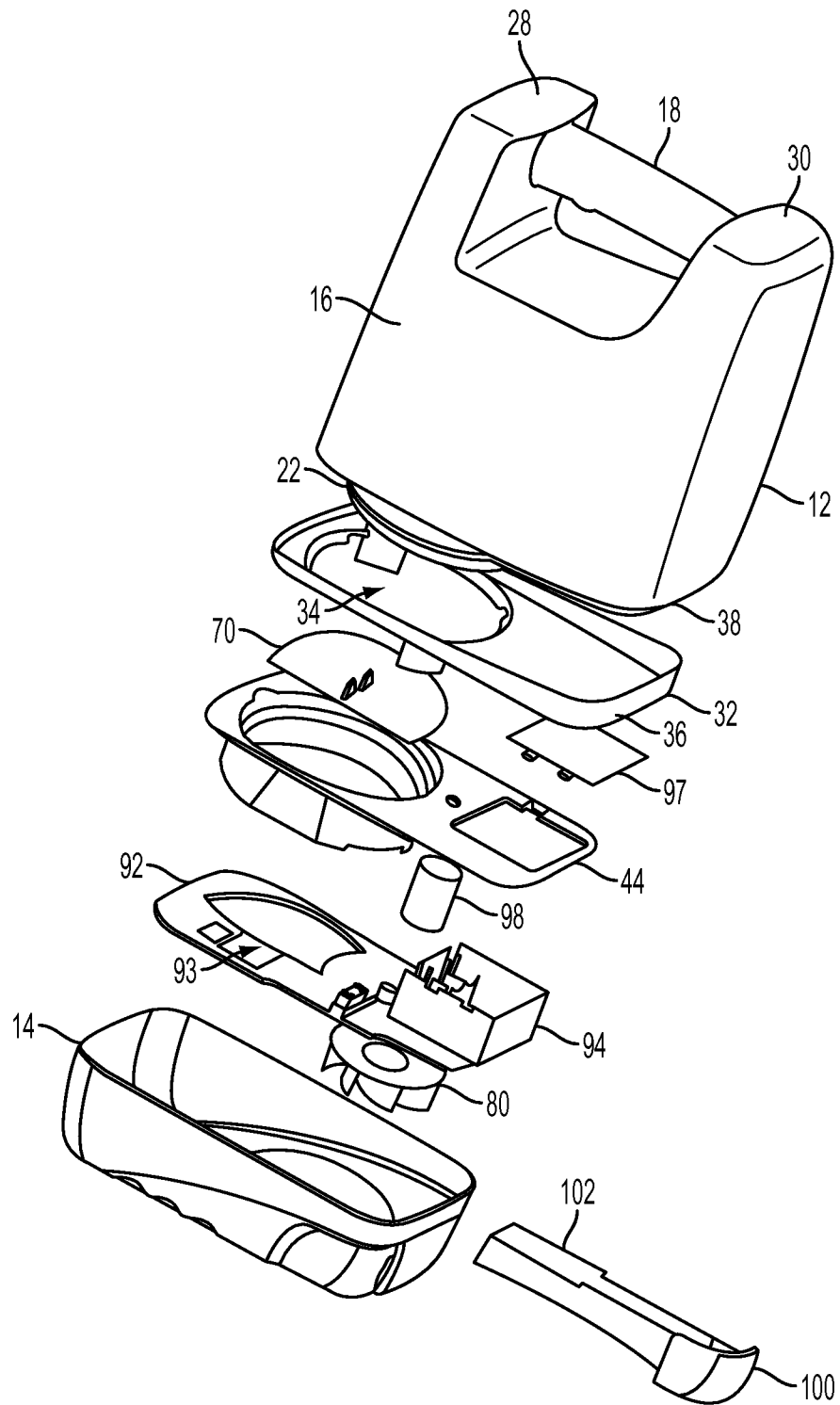


FIG. 2

3/10

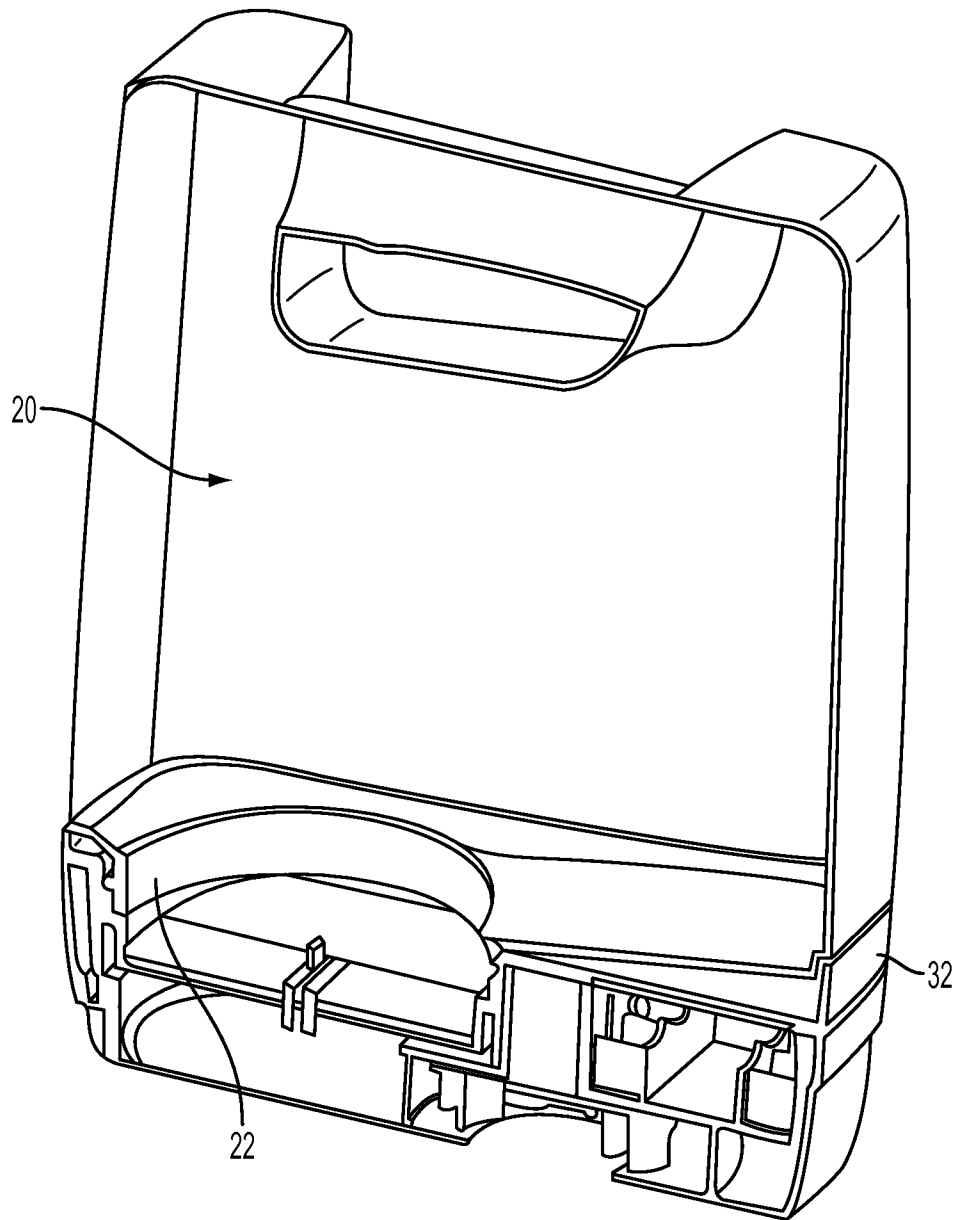


FIG. 3

4/10

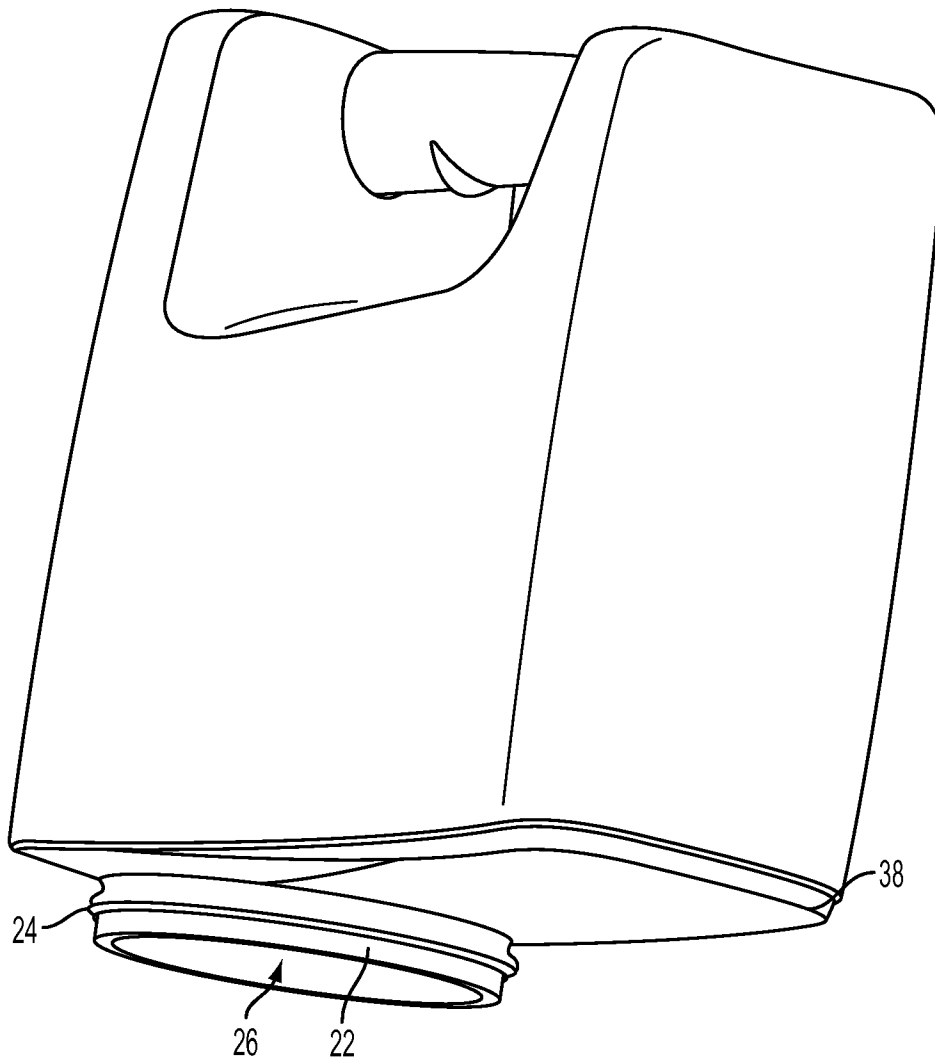


FIG. 4

5/10

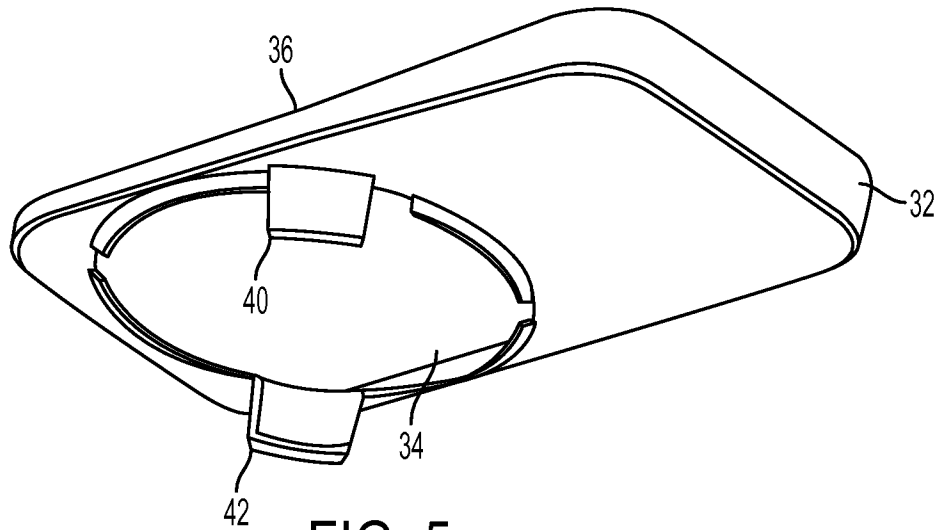


FIG. 5

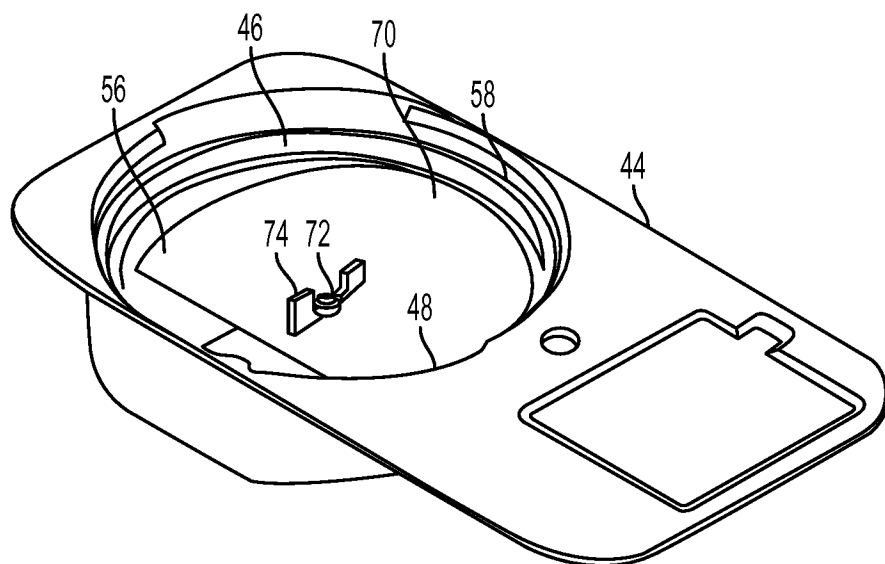


FIG. 6

6/10

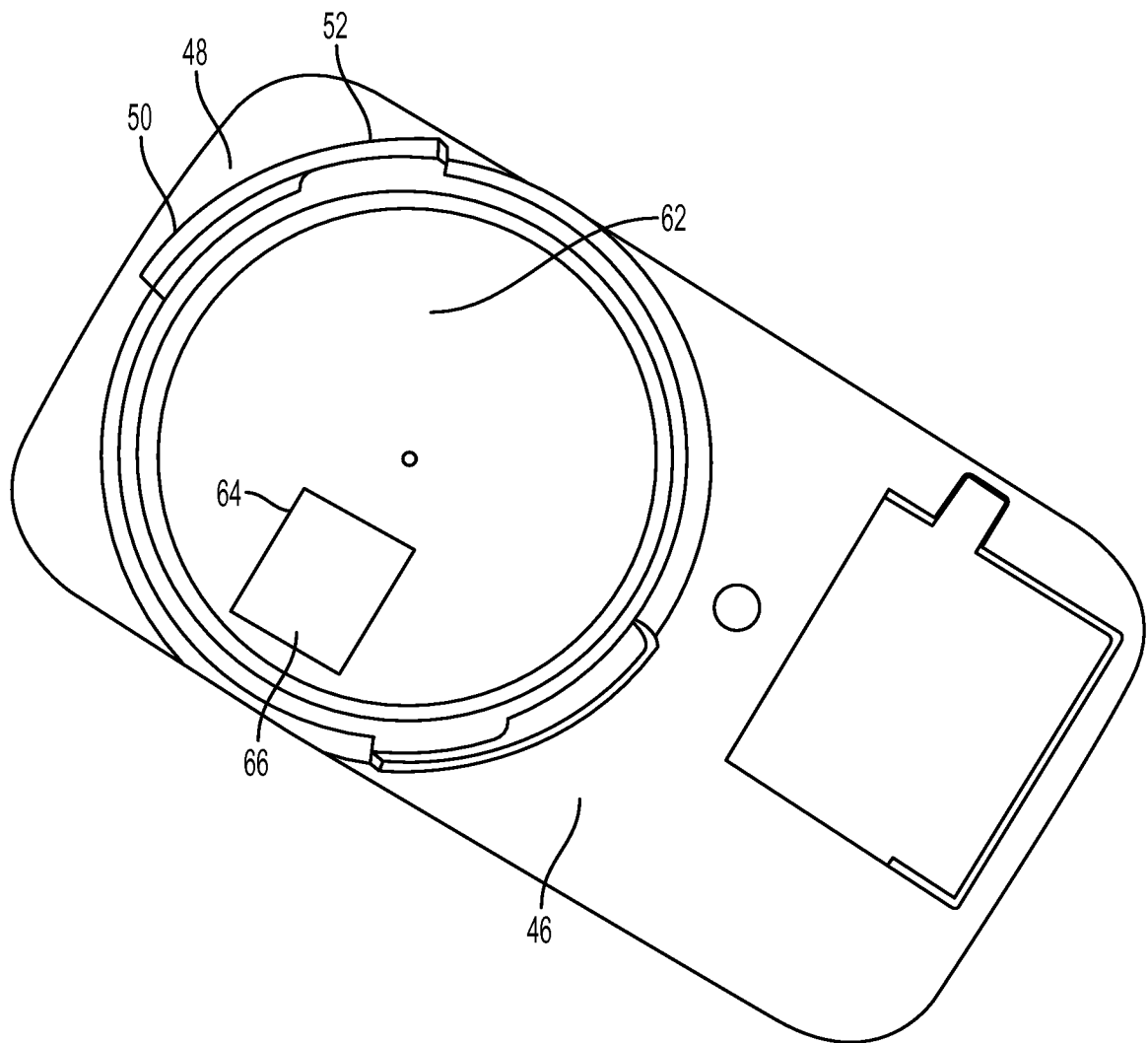


FIG. 7

7/10

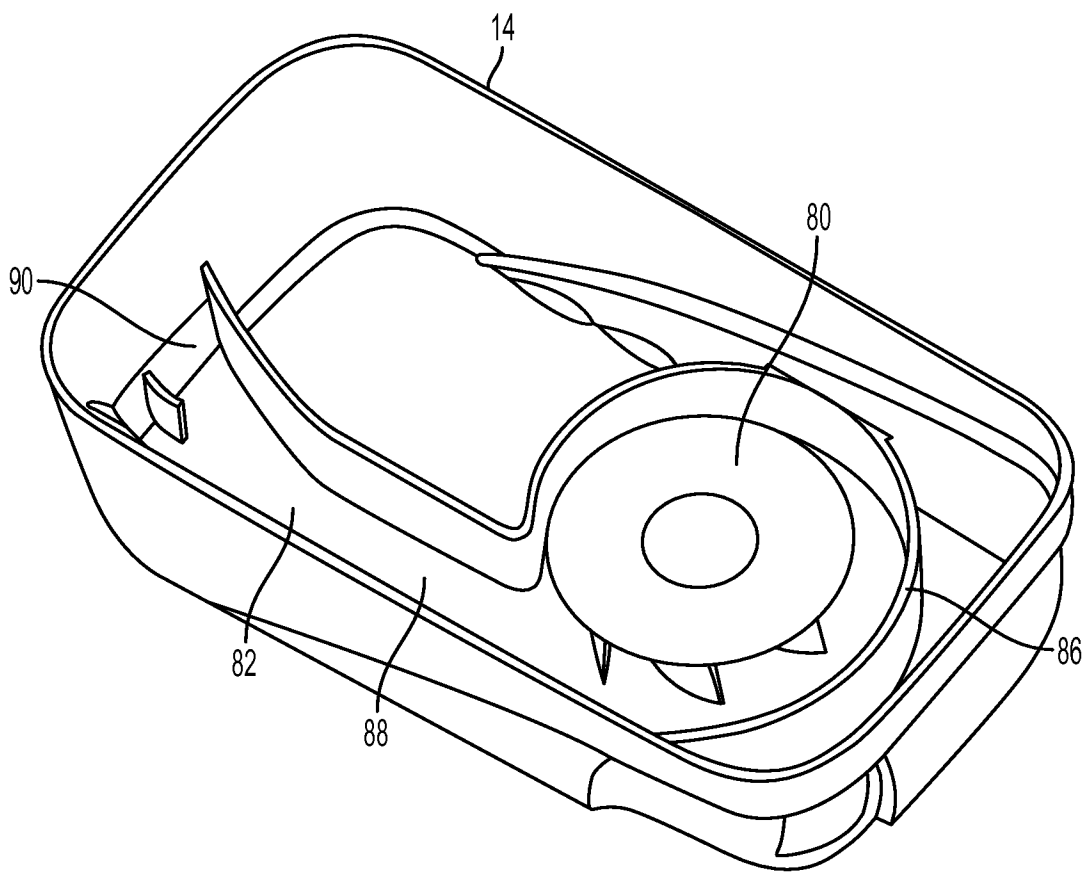


FIG. 8

8/10

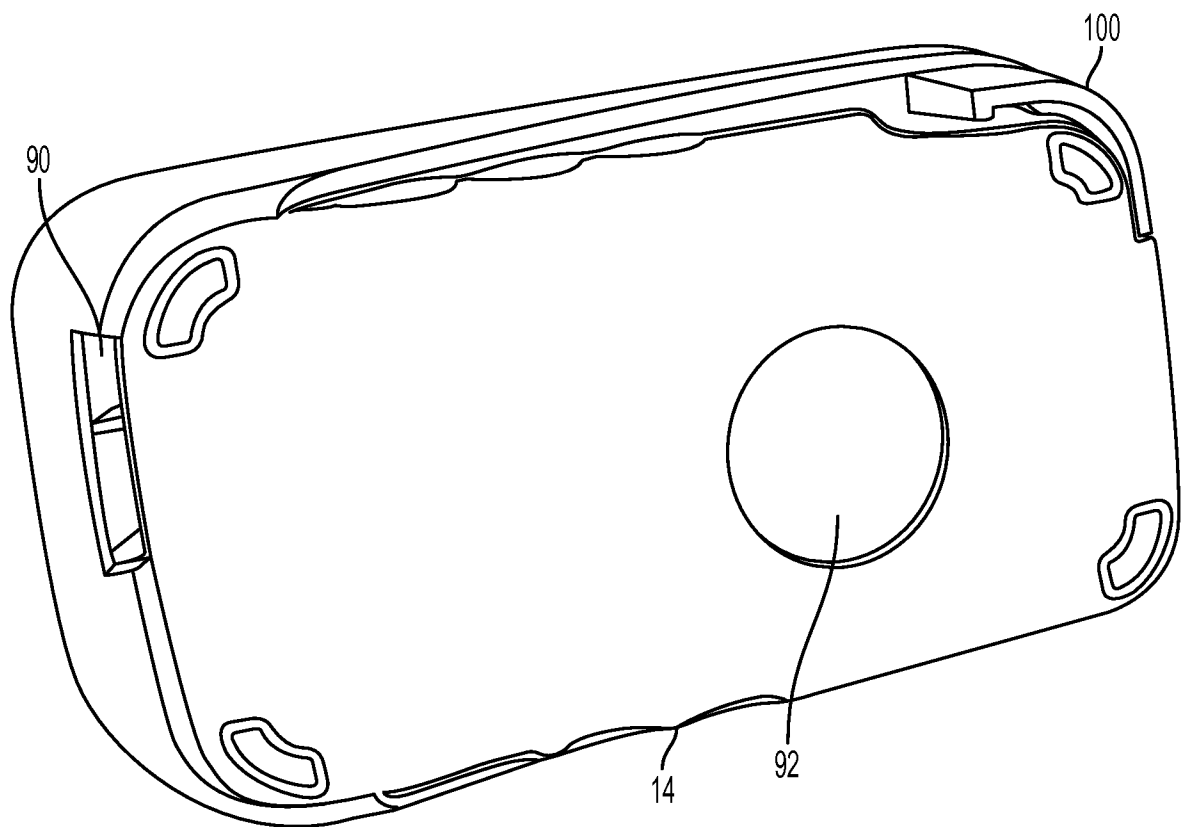


FIG. 9

9/10

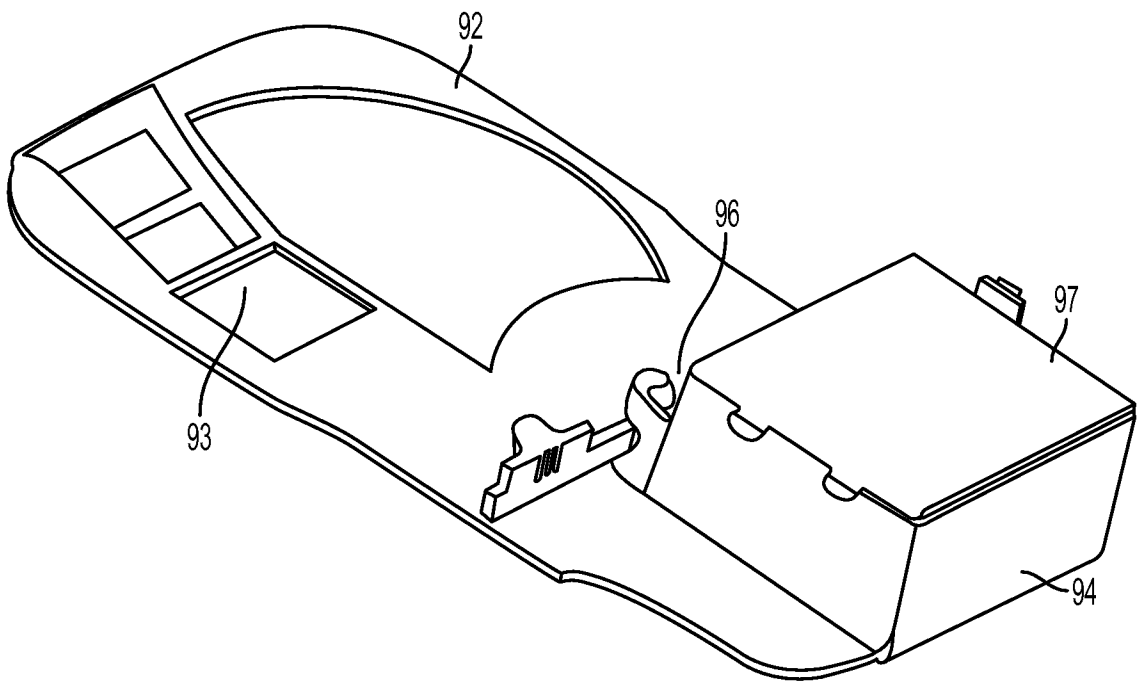


FIG. 10

10/10

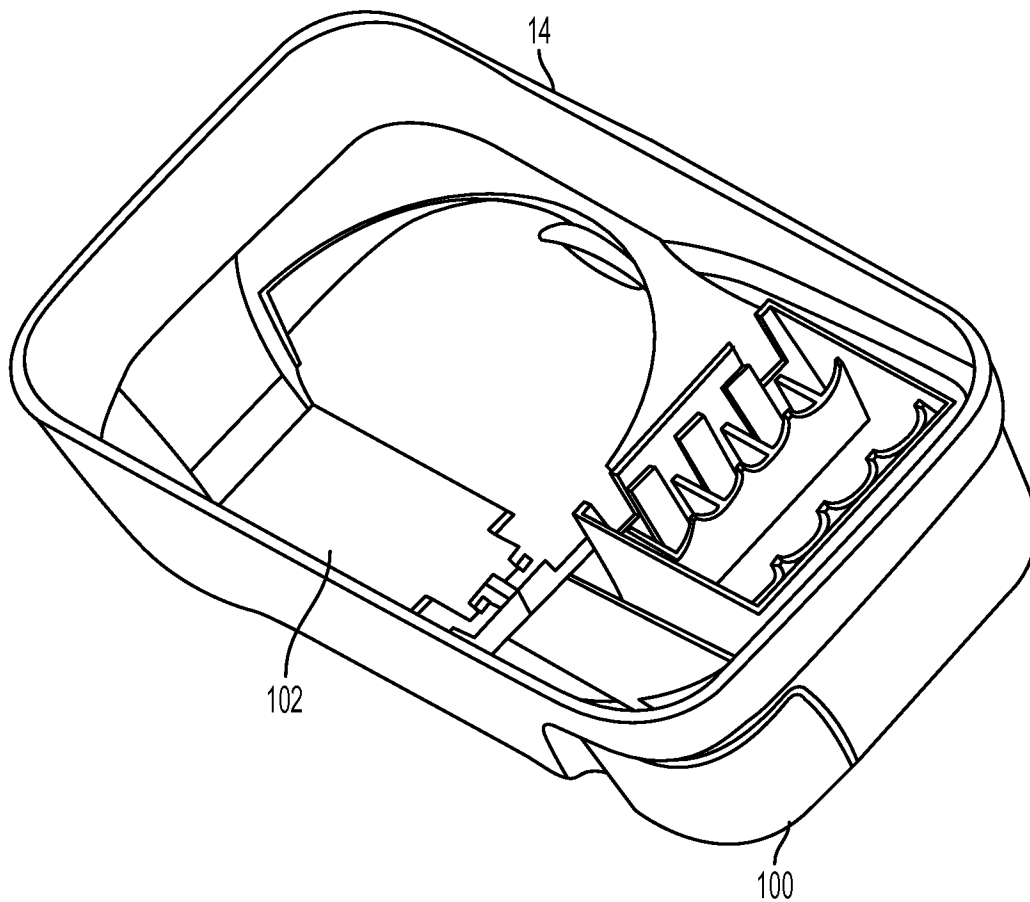


FIG. 11

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2014/018493**A. CLASSIFICATION OF SUBJECT MATTER****A01C 7/00(2006.01)i, A01C 15/00(2006.01)i**

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)

A01C 7/00; A01C 15/04; B05B 9/03; B65G 31/04; A01C 17/00; B05B 7/30; A01G 25/09; A01C 15/00

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

Korean utility models and applications for utility models

Japanese utility models and applications for utility models

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

eKOMPASS(KIPO internal) & keywords: hand spreader, slide plate, slide, hook plate, control aperture, chute, blower, channel

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 2007-0034710 A1 (ELROD, M. et al.) 15 February 2007 See abstract; claims 1-3 and 7-14; figures 1-5.	1-14
A	US 2013-0001332 A1 (MARCONI, JR., F. A.) 3 January 2013 See abstract; claims 15 and 26; figures 1-6.	1-14
A	US 5409166 A (GUNZEL, JR., R. M. et al.) 25 April 1995 See abstract; claims 1-3; figures 1-4.	1-14
A	US 5119993 A (GUNZEL, JR., R. M. et al.) 9 June 1992 See abstract; claim 1; figures 1-3.	1-14
A	US 5190225 A (WILLIAMS, B. M.) 2 March 1993 See abstract; claim 1; figures 1-3.	1-14



Further documents are listed in the continuation of Box C.



See patent family annex.

* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search

24 June 2014 (24.06.2014)

Date of mailing of the international search report

25 June 2014 (25.06.2014)

Name and mailing address of the ISA/KR

International Application Division
Korean Intellectual Property Office
189 Cheongsu-ro, Seo-gu, Daejeon Metropolitan City, 302-701,
Republic of Korea

Facsimile No. +82-42-472-7140

Authorized officer

HEO, Joo Hyung

Telephone No. +82-42-481-8150



INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2014/018493

Box No. II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:

2. ☒ Claims Nos.: 15
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:
Claim 15 is worded in reference to 'said pull' and 'said battery compartment' of claim 15 itself. Said features are vague and unclear and leaves the reader in doubt as to the meaning of the technical features to which they refer, thereby rendering the definition of the subject matter of the said claim unclear (PCT Article 6).

3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box No. III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

1. ☐ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.

2. ☐ As all searchable claims could be searched without effort justifying an additional fees, this Authority did not invite payment of any additional fees.

3. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:

4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest and, where applicable, the payment of a protest fee.
- ☐ The additional search fees were accompanied by the applicant's protest but the applicable protest fee was not paid within the time limit specified in the invitation.
- ☐ No protest accompanied the payment of additional search fees.

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.

PCT/US2014/018493

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2007-0034710 A1	15/02/2007	US 7281675 B2	16/10/2007
US 2013-0001332 A1	03/01/2013	None	
US 05409166 A	25/04/1995	None	
US 05119993 A	09/06/1992	WO 92-07458 A1	14/05/1992
US 05190225 A	02/03/1993	None	