(12) STANDARD PATENT (11) Application No. **AU 2012201451 B2**
(19) AUSTRALIAN PATENT OFFICE

(54) Title
Torque limiting disposable agitator for a food mixer

(51) International Patent Classification(s)
B01F 7/00 (2006.01) ***A47J 43/07*** (2006.01)

(21) Application No: **2012201451** (22) Date of Filing: **2012.03.09**

(30) Priority Data

(31) Number	(32) Date	(33) Country
13/065,905	**2011.04.01**	**US**

(43) Publication Date: **2012.10.18**
(43) Publication Journal Date: **2012.10.18**
(44) Accepted Journal Date: **2015.12.10**

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(56) Related Art
US 2010/0251861

ABSTRACT OF THE DISCLOSURE

An agitator (10) includes a stem (11) having a shaft coupler (12) at one end adapted to be attached to the rotatable shaft (25) of a food mixing machine. The other end of the stem (11) has a mixing blade (13) which can be in the shape of the bowl of a spoon. The stem (11) is shaped like an I-beam having side walls (20) spaced by a central wall (21). The side walls (20) have opposed notches (22) leaving a web (23) therebetween, and the central wall (21) is provided with an aperture (24) which is aligned with the web (23). Together the web (23) and the aperture (24) define a weakened area where the stem (11) will break upon a predetermined torque which is established based on the hardness of the food product (26) being mixed.

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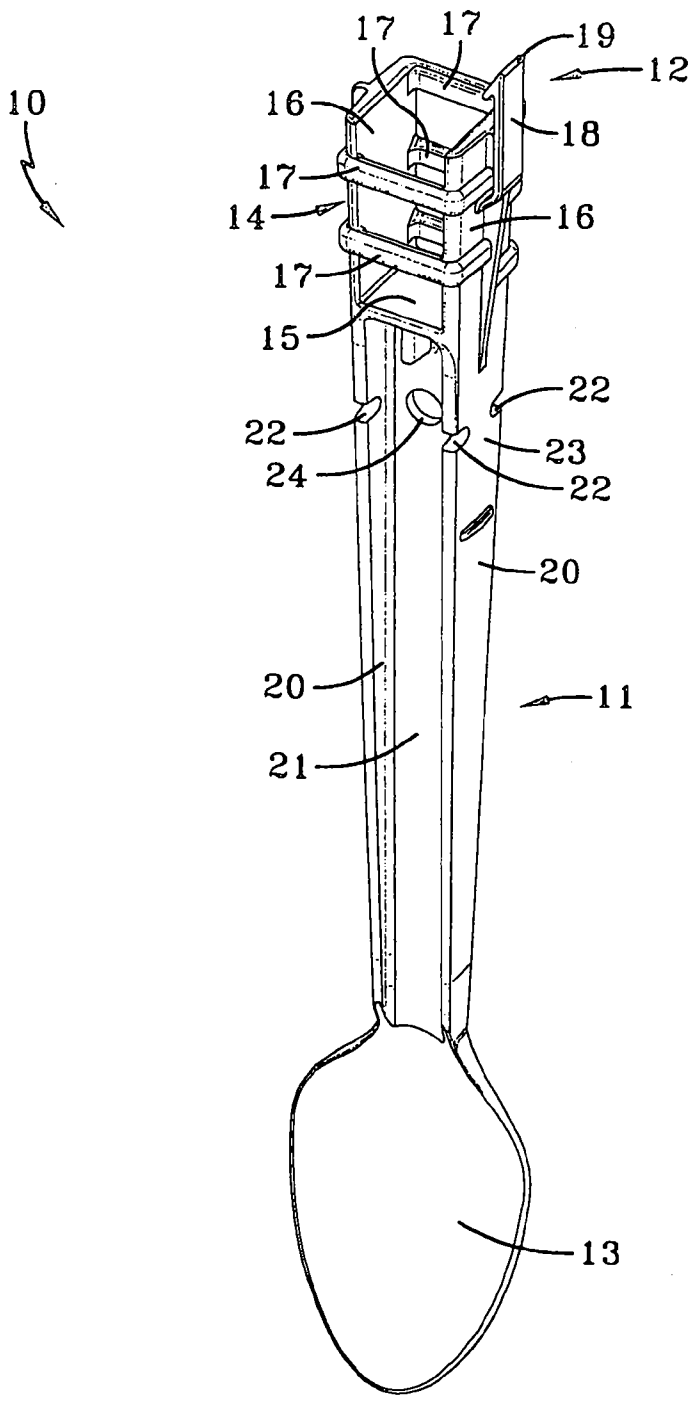

FIG—1

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Australian Patents Act 1990 – Regulation 3.2

ORIGINAL COMPLETE SPECIFICATION
STANDARD PATENT

Invention Title

Torque limiting disposable agitator for a food mixer

The following statement is a full description of this invention, including the best method of performing it known to me/us:-

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This invention relates to a disposable agitator for mixing food products, such as ice cream or the like, which is formed in the shape of a spoon so that the user may utilize it to consume the food after the mixing is complete. More specifically, this invention relates to such an agitator, and its method of construction, which will break cleanly at a predetermined location discernible to the user if the food product is too hard.

Food mixing machines are commonly utilized by convenience stores, fast food establishments or the like, particularly those that blend condiments or other foods into ice cream in a container for consumption by the customer with a spoon. The blending is typically performed by an agitator carried at the bottom of a rotating shaft. The ice cream and other foods to be blended are provided to the user in a container, and the agitator is positioned in the ice cream to blend the product. After use, the agitator must be cleaned to avoid contamination of the next product to be blended.

In order to avoid the step of cleaning the agitator, disposable plastic agitators have been developed which are placed on the rotating shaft prior to use, and removed from the rotating shaft after use. As a result, the shaft does not need to be cleaned between each usage.

Some of those disposable agitators have been formed in the shape of a spoon. In those devices, the bowl of the spoon mixes the product and the stem of the spoon is hollow and is positioned by the user over at least a portion of the rotatable shaft of the food mixer. The spoon shaft is provided with a clip which is snapped over a rib provided on the rotatable shaft to attach the spoon to the shaft. The product is then blended by the user and the spoon removed from the shaft. This system is advantageous not only because of the saving of time by not having to clean the agitator after each use, but also the spoon can be used by the customer to consume the food thereby saving the establishment the cost of providing a conventional spoon to the customer.

However, if these plastic agitators are attempted to be utilized to mix ice cream or other products which are too hard, as by being too cold, it is possible that when the bowl of the spoon is placed in the ice cream and the agitator rotated, the agitator could break as it is twisted. Such breakage, if left uncontrolled, would occur at a random location along the stem of the spoon which could create sharp or jagged edges along the stem of the spoon. The random breakage could also occur at the bowl of the spoon and could result in small

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fragments of the bowl of the spoon being disposed in the blended product, or could result with the bowl of the spoon having sharp edges. In either instance, such breakage of the spoon could constitute a potential safety risk to an individual failing to inspect the spoon prior to using it to consume the blended product.

Thus, the need exists to provide a disposable plastic spoon-shaped agitator which, if breakage does occur, will not break randomly but rather will break cleanly at a location easily discerned by the customer.

Embodiments of the present invention seek to provide a rotatable agitator for a food mixer which will break at a predetermined location when encountering a torque force of a predetermined size resisting the rotation.

Embodiments of the present invention seek to provide an agitator, as above, which when used to mix ice cream will break at a predetermined temperature of the ice cream.

Embodiments of the present invention seek to provide a method of constructing the agitator with the above-described features.

In general, an agitator adapted to be attached to a rotatable shaft to mix food includes a stem, a shaft coupler at one end of the stem adapted to be attached to the shaft, and a blade for mixing the food at the other end of the stem. The stem has a weakened area where the stem will break if a predetermined amount of torque is encountered by the agitator.

The invention provides a food mixing agitator adapted to be attached to a rotatable shaft of a food mixing machine comprising: a stem having a first end portion and a second end portion; a coupler portion positioned at the first end portion of the stem wherein the coupler portion includes a socket configured to engage the shaft of the food mixing machine; and a mixing portion positioned at the second end portion of the stem, wherein the stem includes a weakened area positioned adjacent to said socket near the first end portion of the stem, the weakened area being configured to break when a torque generated on the stem during a mixing operation exceeds a predetermined amount.

The invention provides a food mixing agitator comprising: a longitudinally extending stem having opposed lateral edges defining a lateral width and having a first end portion and a second end portion; a coupler portion positioned at the first end portion of the stem; and a mixing portion positioned at the second end portion of the stem; wherein the stem includes a

weakened area near the first end portion of the stem, the weakened area including two spaced notches on one lateral edge and two spaced notches on the opposed lateral edge, said notches not extending through said lateral width and being sized so as to break when a torque generated on the stem during a mixing operation exceeds a predetermined amount.

The invention provides an agitator adapted to be attached to a rotatable shaft to mix food comprising a stem having a first wall spaced from a second wall and a third wall extending generally centrally between said first and second walls, a shaft coupler at one end of said stem adapted to be attached to the shaft, and a blade for mixing the food at the other end of said stem, said stem having a weakened area where said stem will break if a predetermined amount of torque is encountered by the agitator, said weakened area including notches formed in said first and second walls leaving a web between said notches in each said first and second wall.

The invention provides a method of constructing an agitator for mixing food and having a stem which will break when a predetermined torque is encountered by the stem comprising the steps of providing the stem with a first wall spaced from a second wall and a third wall extending generally centrally between said first and second walls, and providing a weakened area in the stem at a desired discernible location along the stem.

The invention provides a method of constructing an agitator for mixing food and having a stem which will break when a predetermined torque is encountered comprising the steps of providing a coupler portion positioned at a first end portion of the stem, providing a weakened area in the stem adjacent to the coupler portion near the first end portion of the stem, and determining the size of the weakened area depending on the size of the predetermined torque.

A method of constructing an agitator for mixing foods and having a stem which will break when a predetermined torque is encountered by the stem includes the step of providing a weakened area in the stem at a desired discernible location along the stem.

Another method for constructing an agitator for mixing food and having a stem which will break when a predetermined torque is encountered includes the steps of providing a weakened area in the stem, and determining the size of the weakened area depending on the size of the predetermined torque.

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A preferred exemplary rotatable agitator is shown by way of example in the accompanying drawings without attempting to show all the various forms and modifications in which the invention might be embodied.

The present invention will now be described, by way of non-limiting example only, with reference to the accompanying drawings as briefly described below.

Fig. 1 is a perspective view of an agitator.

Fig. 2 is a front elevational view of the agitator of Fig. 1.

Fig. 3 is a side elevational view of the agitator of Fig. 1.

Fig. 4 is a somewhat schematic view showing the agitator attached to a rotatable shaft and mixing ice cream in a cup.

A food mixing agitator is generally indicated by the numeral 10. Agitator 10 is preferably made of a copolyester or polycarbonate plastic material and can take on any conventional shape, but is advantageously shown as being in the shape of a spoon. As such, agitator 10 includes a stem portion, generally indicated by the numeral 11, a shaft coupler portion, generally indicated by the numeral 12 and formed at one end of stem portion 11, and a blade portion 13 which is in the

shape of the bowl of a spoon and which is formed at the other end of stem portion 11.

Coupler portion 12 of agitator 10 includes a generally rectangular hollow socket generally indicated by the numeral 14 and having an open top. Socket 14 is defined by a bottom surface 15, opposed side walls 16 extending upwardly from bottom surface 15, and opposed offset slats 17 extending between side walls 16. A flexible clip 18 is carried by one of the side walls 16 and extends upwardly over the top of socket 14. A lock barb 19 is positioned on clip 18 above the top of socket 14.

The stem portion 11 of agitator 10 is in the shape of an I-beam and includes opposed side walls 20 spanned by a central wall 21. Walls 20 and 21 extend downwardly from bottom surface 15 of socket 14 to blade portion 13. This I-beam shape provides strength to spoon agitator 10 to resist potential torque and breakage when in operation.

However, if agitator 10 is used to mix extremely frozen or hard material, breakage of the blade portion 13 or even the I-beam stem portion 11 could occur on a random basis which, particularly if unnoticed, could injure the user as previously described. To assure that if any breakage occurs, that it will always occur at one discernible location, I-beam side walls 20 are provided with opposed slots or notches 22 which extend inwardly toward each other leaving a web 23 therebetween. An aperture 24 is provided through central wall 21 and is preferably generally aligned with notches 22 and web 23. As such, notches 22, web 23, and aperture 24 define a weakened area of the stem portion 11 of agitator 10. As will hereinafter be more fully described, if agitator 10 is to fracture, side walls 20 will do so at the weakened area of web 23, and central wall 21 will fracture at the area of aperture 24.

Agitator 10 is intended to be used primarily in conjunction with a machine that mixes food products. For a full understanding of understanding of a typical machine and its operation, reference is made to pending U.S. Patent Application Serial No. 12/460,273 filed on July 17, 2009, which is incorporated herein by reference.

In such a machine, agitator 10 is attached to a shaft 25, as shown in Fig. 4, for rotation therewith. Such is accomplished by positioning the driver end of shaft 25 into the socket 14. As the agitator 10 is being moved upwardly to accomplish such connection, clip 18 flexes until lock barb 19 engages a

flange 26 on the driver end of shaft 25. Agitator 10 may be manually removed from shaft 25 by merely pulling down an agitator 10, or the mixing machine may be provided with an automatic agitator ejection system.

As shown, in Fig. 4, when agitator 10 is positioned in a food product 27, such as ice cream provided in a cup 28, shaft 25 begins to rotate and the blade portion 13 begins to mix the food 27. But if the food is too hard and thereby resists rotation of blade portion 13, and if the torque generated on stem 11 exceeds a predetermined amount, before any other breakage can occur, stem 11 will sever at the weakened area defined by notches 22 and 23 and aperture 24. Such will essentially tear the copolyester material of agitator 10 at the weakened area rather than allowing it to randomly break at other areas.

The size of the notches 22 and 23 and therefore the size of the web 23, and the size of the aperture 24, as well as the material of agitator 10, dictate at what torque amount the stem 11 will break. For example, by making web 23 smaller, stem 11 would break with less torque. Similarly, by making aperture 24 bigger, stem 11 would break with less torque. Thus, the amount of torque force needed to break stem 11 can be controlled by adjusting the size of web 23, aperture 24 or both.

When mixing ice cream, the torque placed on stem 11 is a function primarily of the temperature of the ice cream. Typically, cups of ice cream when delivered to a convenience store or the like may be as cold as -15°F. As they are stored at the establishment, they may warm up to 6°F for use by the consumer. At such temperatures, stem breakage is typically not a problem. However, if the cup is served when too cold, for example, at -6°F, stem breakage could begin to be a problem. As a result, at least as a starting point, the size of web 23 and aperture 24 may be set to allow stem 11 to sever at the weakened area if the ice cream is of a hardness exemplified at -6°F. It has been found that a web 23 of about 0.2 inch and an aperture 24 of about that same dimension will permit breakage of the stem at -6°F.

In light of the foregoing, it should thus be evident that a an agitator for a food mixer constructed as described herein substantially improves the art and otherwise accomplishes the objects of the present invention.

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The reference in this specification to any prior publication (or information derived from it), or to any matter which is known, is not, and should not be taken as an acknowledgment or admission or any form of suggestion that that prior publication (or information derived from it) or known matter forms part of the common general knowledge in the field of endeavour to which this specification relates.

Throughout this specification and the claims which follow, unless the context requires otherwise, the word "comprise", and variations such as "comprises" and "comprising", will be understood to imply the inclusion of a stated integer or step or group of integers or steps but not the exclusion of any other integer or step or group of integers or steps.

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THE CLAIMS DEFINING THE INVENTION ARE AS FOLLOWS:

1. A food mixing agitator adapted to be attached to a rotatable shaft of a food mixing machine comprising: a stem having a first end portion and a second end portion; a coupler portion positioned at the first end portion of the stem wherein the coupler portion includes a socket configured to engage the shaft of the food mixing machine; and a mixing portion positioned at the second end portion of the stem, wherein the stem includes a weakened area positioned adjacent to said socket near the first end portion of the stem, the weakened area being configured to break when a torque generated on the stem during a mixing operation exceeds a predetermined amount.

2. The food mixing agitator of claim 1, wherein the weakened area is positioned closer to the coupler portion than the mixing portion of the stem.

3. The food mixing agitator of claim 1 or 2, wherein the weakened area includes at least one notch provided in the stem.

4. The food mixing agitator of any one of the preceding claims, wherein the mixing portion is a spoon-shaped blade.

5. The food mixing agitator of any one of the preceding claims, wherein the predetermined torque is based on a hardness of a food to be mixed by the agitator.

6. A food mixing agitator comprising: a longitudinally extending stem having opposed lateral edges defining a lateral width and having a first end portion and a second end portion; a coupler portion positioned at the first end portion of the stem; and a mixing portion positioned at the second end portion of the stem; wherein the stem includes a weakened area near the first end portion of the stem, the weakened area including two spaced notches on one lateral edge and two spaced notches on the opposed lateral edge, said notches not extending through said lateral width and being sized so as to break when a torque generated on the stem during a mixing operation exceeds a predetermined amount.

7. An agitator adapted to be attached to a rotatable shaft to mix food comprising a stem having a first wall spaced from a second wall and a third wall extending generally centrally between said first and second walls, a shaft coupler at one end of said stem adapted to be attached to the shaft, and a blade for mixing the food at the other end of said stem, said stem

having a weakened area where said stem will break if a predetermined amount of torque is encountered by the agitator, said weakened area including notches formed in said first and second walls leaving a web between said notches in each said first and second wall.

8. The agitator of claim 7 wherein said weakened area further includes an aperture through said third wall aligned with said webs.

9. The agitator of claim 8 wherein the size of said webs and the size of said aperture are dependent upon the predetermined amount of torque.

10. The agitator of any one of claims 7 to 9 wherein the predetermined amount of torque is based on the hardness of the food being mixed.

11. The agitator of any one of claims 7 to 10 wherein said blade is in the shape of the bowl of a spoon.

12. The agitator of claim 7 wherein the amount of torque encountered by said blade when mixing the food is dependent on the hardness of the food, said predetermined amount of torque being determined based on the hardness of the food.

13. A method of constructing an agitator for mixing food and having a stem which will break when a predetermined torque is encountered by the stem comprising the steps of providing the stem with a first wall spaced from a second wall and a third wall extending generally centrally between said first and second walls, and providing a weakened area in the stem at a desired discernible location along the stem.

14. The method of claim 13 further comprising the step of determining the size of the weakened area dependent on the size of the predetermined torque.

15. The method of claim 13 or 14 wherein the step of providing a weakened area includes the step of providing a web in the stem.

16. The method of any one of claims 13 to 15 wherein the step of providing a weakened area includes the step of providing an aperture in the stem.

17. The method of claim 16 wherein the step of providing a weakened area includes the step of aligning the web with the aperture.

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18. A method of constructing an agitator for mixing food and having a stem which will break when a predetermined torque is encountered comprising the steps of providing a coupler portion positioned at a first end portion of the stem, providing a weakened area in the stem adjacent to the coupler portion near the first end portion of the stem, and determining the size of the weakened area depending on the size of the predetermined torque.

19. The method of claim 18 including the step of determining the predetermined torque based on the hardness of the food to be mixed by the agitator.

20. The method of claim 18 or 19 wherein the step of providing a weakened area includes the step of providing a web and an aligned aperture in the stem.

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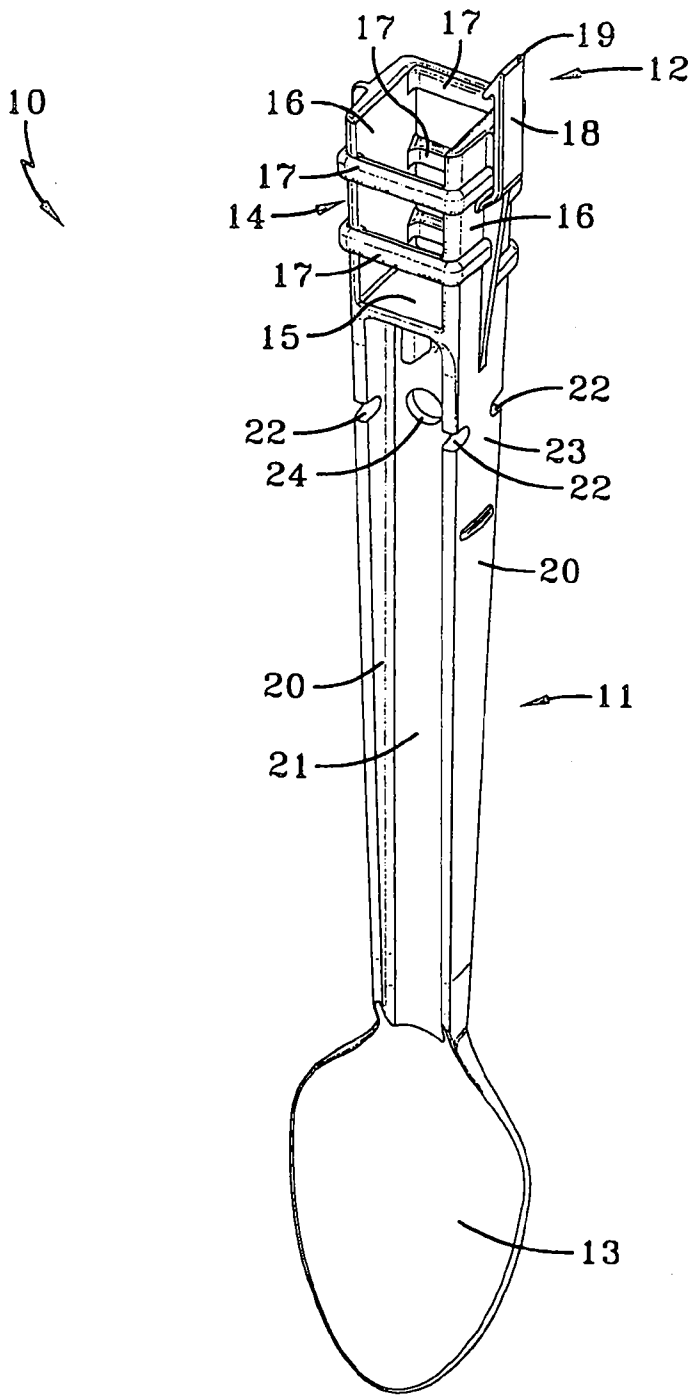

FIG—1

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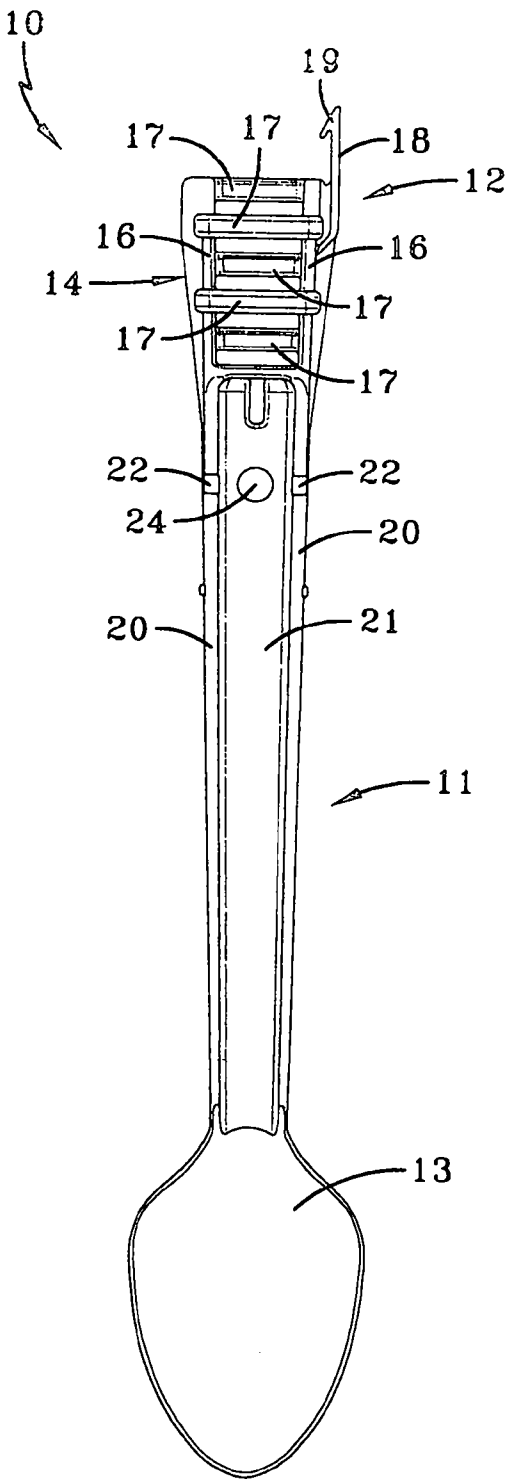

FIG-2

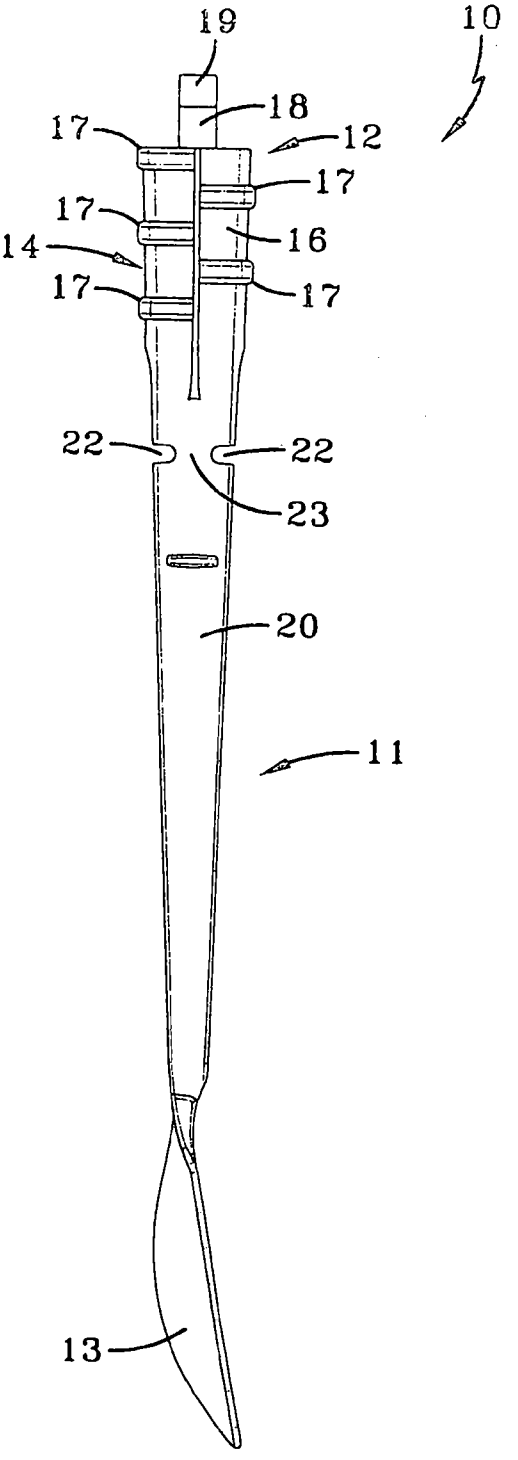

FIG-3

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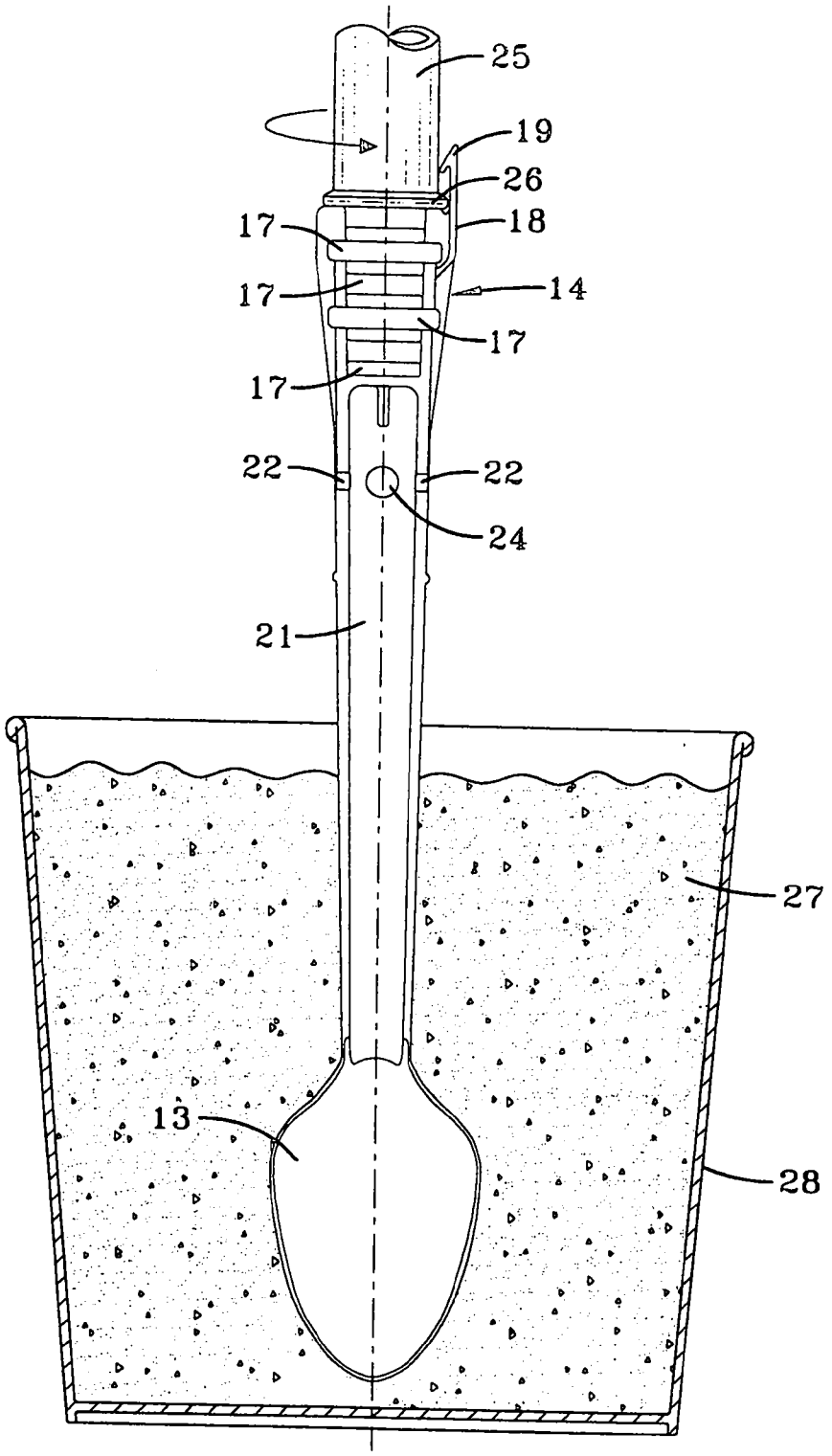

FIG-4