June 25, 1968 T. J. ARCURI 3,389,893

PORTABLE, DISPOSABLE MIXING CONTAINER SYSTEM

Filed March 31, 1967 2 Sheets-Sheet 1

FIG. 1.

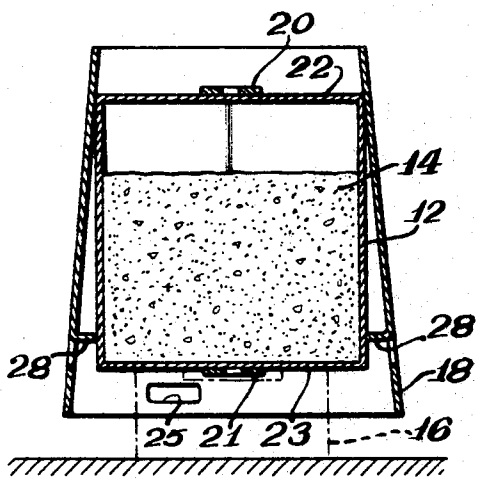


FIG. 2.

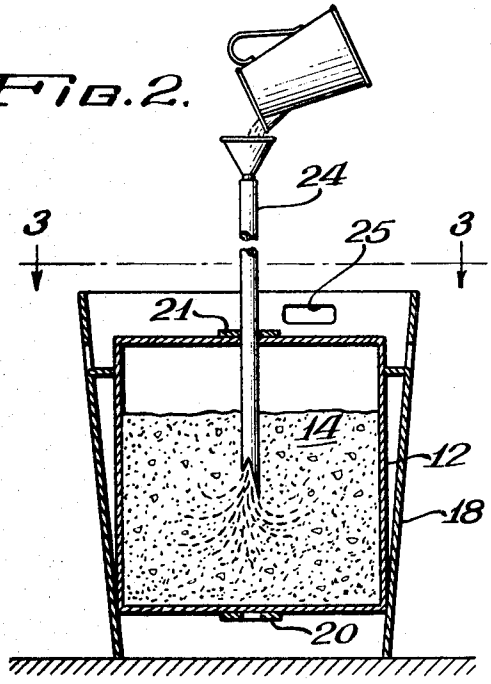


FIG. 4.

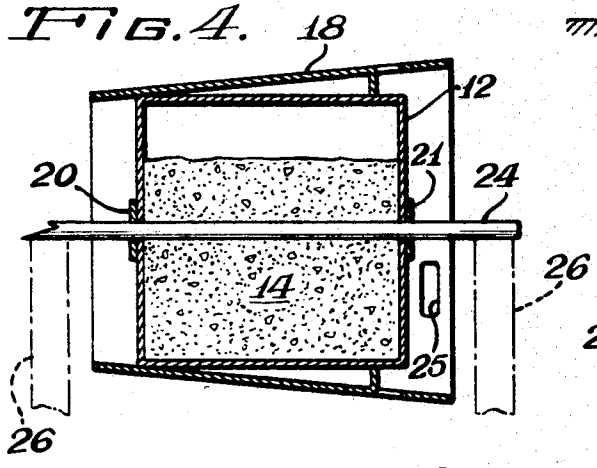


FIG. 3.

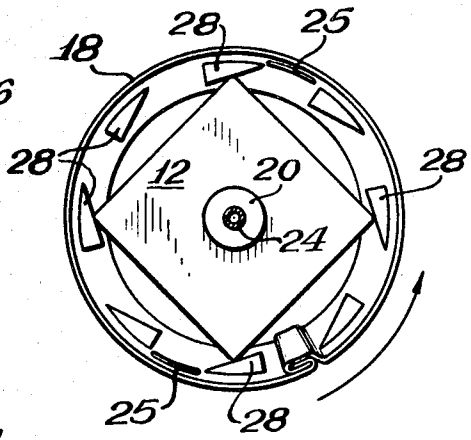
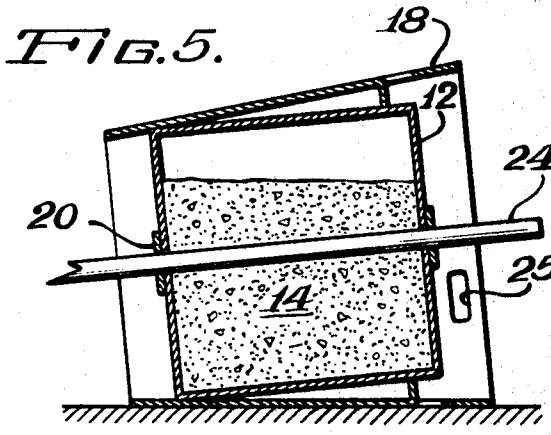


FIG. 5.



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FIG. 6.

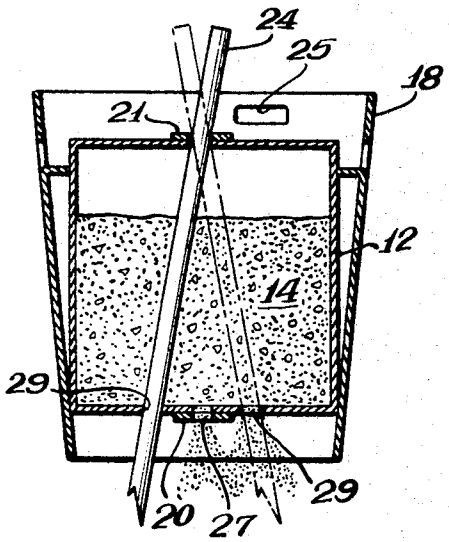


FIG. 7.

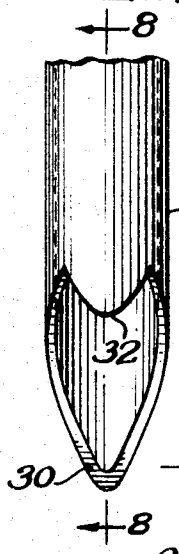


FIG. 8.

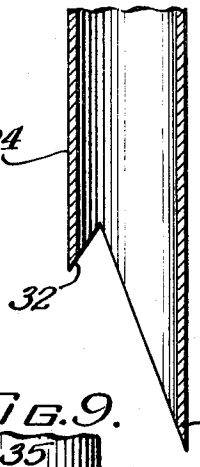


FIG. 9.

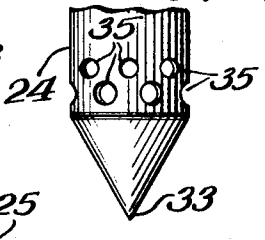


FIG. 10.

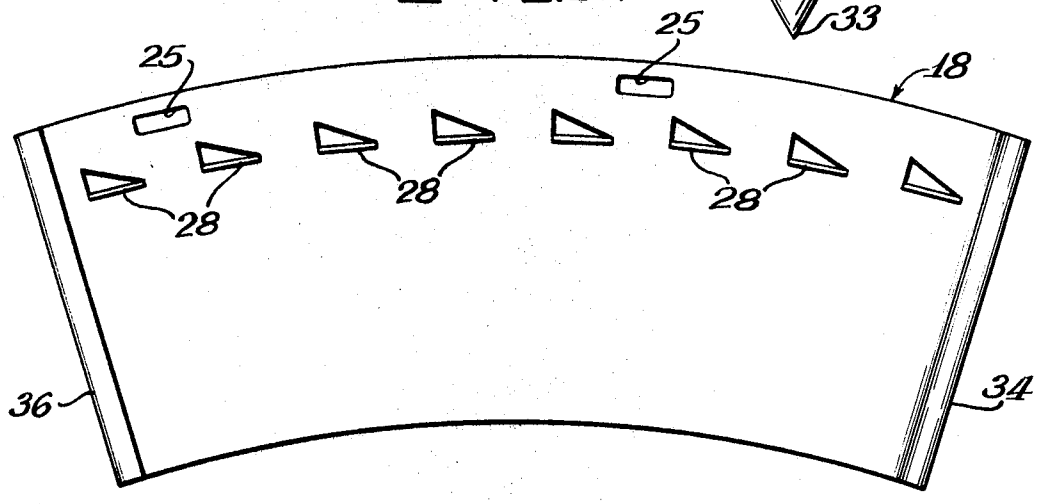
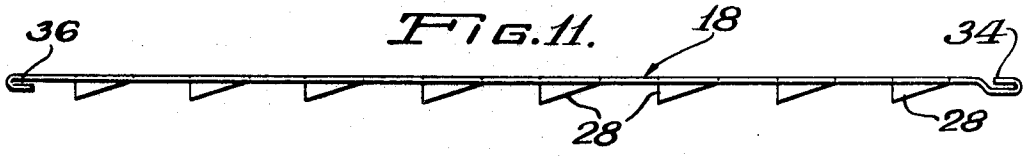


FIG. 11.



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PORTABLE, DISPOSABLE MIXING CONTAINER SYSTEM

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10 Claims. (Cl. 259—146)

ABSTRACT OF THE DISCLOSURE

A method and apparatus for mixing liquid and a dry particulate material, such as concrete mix, especially adapted for smaller projects of the type often performed by a homeowner. A hollow pipe is partially inserted into a box containing a measured amount of the dry material. Water is then added to the dry material in a measured amount through the hollow pipe. The pipe is then pushed through the opposite side of the material container, and the contents are mixed by rotating the container about the hollow pipe axle. Alternatively, the mix container with the inserted pipe may be placed into a frustoconical container and the frustoconical container may be rolled on its side to mix the ingredients. Finally, the hollow pipe is removed and the mixed ingredients allowed to flow through the opening left by the withdrawn pipe.

Background of the invention

This invention relates generally to portable, disposable containers for mixing materials such as concrete and the like, and more particularly to a new and improved disposable container and method for mixing materials such as concrete, plaster and mortar.

Frequently, there arises a need for building or construction materials on a relatively small scale, for example, in the home for purposes of repair or do-it-yourself projects. Although such materials are available in small amounts for homeowner's projects and the like, the task of any homeowner is complicated by the need for various mixing tools, containers and the like. Moreover, many householders are completely deterred from home projects by the foreboding and wearisome tasks of mixing the materials, cleaning the tools, and cleaning the mixing container or wheelbarrow of hardened materials after the job is completed. Manifestly, these factors have impeded the development of the potential market for concrete, plaster, mortar and the like in small amounts for home repair projects.

Summary of the invention

In a principal aspect, the present invention comprises a portable, disposable mixing container system wherein first, a measured amount of water is introduced through a hollow pipe inserted partially into a dry material container which contains a measured amount of the dry material such as concrete mix or the like. Next the hollow pipe is inserted through both sides of the container to form an axle about which the material container is then rotated to mix the contents. Alternatively, the material container with its hollow pipe axle may be wedged into a frustoconical container with the hollow pipe axle substantially coincident with the axis of the frustoconical container such that when the frustoconical container is rolled on its side the contents of the material container are fully mixed. Withdrawing the hollow pipe from the material or mix container allows the mixed contents to flow out of the mix container as desired. Optionally, the hollow pipe may be withdrawn and reinserted through the mix container wall to create a larger opening through which the mixed contents may flow.

Accordingly, it is a general object of this invention to provide new and improved container means for mixing dry materials with fluids in a relatively effortless and clean fashion.

It is another object of this invention to provide a new and improved disposable container of cubical form for storing desired amounts of dry material therein and adapted to be rotated after fluid is added to the dry material for efficiently mixing the dry material and fluid to place them in usable condition.

It is still another object of this invention to provide a novel, portable, disposable mixing container system which serves the function of storing a premixed product in dry form, of mixing the product with fluid by rotation and disposing the unwanted remainder of the mix after the job is completed, all in a clean fashion and without the need for any additional mixing tools or mixing containers.

It is a further object of this invention to provide a novel mixing container which may be utilized to store a predetermined amount of dry material prior to mixing and which may be rolled, after fluid is added, to efficiently prepuare the mix for use.

It is still a further object of this invention to provide a mixing container which is formed of a relatively inexpensive material, such as moisture-resistant cardboard, to enable said container to serve as a disposable mixing container which economically may be thrown away after the mix is used, thereby eliminating the prior art problem of cleaning the mixing tools and mixing container.

It is another object of this invention to provide a rotatable, mixing container adapted to rotate about a hollow pipe axis inserted therethrough, or adapted to rotate within a frustoconical container into which the mixing container is inserted.

The above and other novel objects and features which are characteristic of the invention are set forth with particularity in the appended claims.

Brief description of the drawings

The invention itself, both as to its organization and operation, together with further objects and advantages thereof, will best be understood by reference to the following description taken in conjunction with the accompanying drawings in which:

FIGURE 1 is a cross-sectional view illustrating the initial steps of the method of the invention;

FIGURE 2 is a cross-sectional view illustrating the next steps of the method;

FIGURE 3 is a plan view of FIGURE 2 substantially along the line **3—3**;

FIGURE 4 is a cross-sectional view illustrating a method of mixing the liquid and dry particulate material;

FIGURE 5 is a cross-sectional view illustrating an alternative method of mixing;

FIGURE 6 is a cross-sectional view illustrating distribution of the mixed ingredients after mixing;

FIGURE 7 is a plan view of the piercing end of an embodiment of the hollow tube;

FIGURE 8 is a cross-sectional view of FIGURE 7 substantially along the line **8—8**;

FIGURE 9 is a plan view of an alternative construction of the piercing end of the hollow tube;

FIGURE 10 is a plan view of the frustoconical container before assembly; and

FIGURE 11 is an end view of the container in FIGURE 10.

Description of the preferred embodiment

As illustrated in FIGURE 1, the rectangularly sided box container **12** is filled with a measured amount of dry mix or material **14**. Preferably, the dry mix **14** which is

comprised, for example, of appropriate amounts of sand, gravel and cement is measured into the box **12**, and the box **12** with its dry contents is then sealed to prevent moisture from penetrating the box and damaging or ruining the utility of the contents. The box **12** is constructed of paper, fiberboard, sheet metal or the like; however, a water-proof fiberboard or cardboard construction is preferred since the box **12** is disposable as well as moisture-proof.

The volume of the box **12** is greater than the combined volume of the dry materials **14** plus the required mixing water since the ingredients slosh against the box walls during mixing thereby implementing thorough and quick mixing. Therefore, the dry mix **14** only partially fills the box **12**. The total weight of dry mix **14** in a box **12** is preferably limited since excessive amounts of material are difficult to handle and carry by a single person. Uniform dry material package sizes, for example, 25, 50 and 100 pound sizes, are considered the most commercially practical. Preferably the dry mix is packaged at a central or factory site, and the containers of mix are shipped for sale or for use at construction sites.

The box **12** has a hub plate **20** positioned substantially at the center of the top side **22** of the box **12** and a second hub **21** positioned substantially at the center of the bottom side **23** of the box **12**. The hub plates are preferably of a pierceable, strong plastic material such as polyethylene. The hub plates **20** and **21** act as a guide for the hollow pipe **24** as will be more fully described later, and as re-enforcement for the walls intersected by the pipe **24**.

After the box **12** is filled with the dry mix **14** and taken to a construction site, it is temporarily placed on a support box **16** and a frustoconical container **18** is wedged against the sides of the frustoconical container **18** and the bottom side or part **23** of the box **12** is wedged or held into position by wedges or flaps **28** extending inwardly from the side of the frustoconical container. The flaps **28** are pressed or punched out of the sidewall of the container **18** as are the handholes **25**, and their wedge shape permits the flaps **28** to securely hold in position various sizes of mix containing boxes **12**. The frustoconical container is preferably formed of a heavy gauge sheet metal such that the frustoconical container may be reused many times for mixing many boxes **12** of dry materials **14**.

After the frustoconical container **18** is wedged on the box **12**, the combined containers are turned over to the position shown in FIGURE 2. Alternatively the box **12** may be left in the same position as shown in FIGURE 1 and the following steps completed. Handholes **25** cut in opposite sides of the frustoconical container facilitate the ease of turning over the combined box **12** and the container **18** and also facilitate the handling of the system in general, especially when discharging the box **12** contents as described later.

A hollow pipe conduit **24** is then inserted through one of the hubs **21** piercing the box **12**, and the mixing fluid is poured into the box **12** through the hollow pipe **24**. The fluid is added in an amount appropriate for preparing the measured amount of dry ingredients **14** in the box **12**.

The hollow pipe **24** is then pushed through hub **20** as shown in FIGURE 4. The ingredients are then mixed by rotating the combined containers **12** and **18** about the hollow pipe axle **24** which is supported at both ends by support means such as the pair of blocks **26**. Alternatively, the frustoconical container **18** may be positioned on its side and rolled along the ground until the ingredients are fully mixed as illustrated in FIGURE 5.

The shape of the frustoconical container allows mixing of the ingredients without requiring a large area for the rolling of the container **18**. This results from the shape or design of the container **18** which inherently permits the container **18** to be rolled in a circular path. The container **18** is preferably rolled in the counter-clockwise sense, as denoted by the arrow in FIGURE 3, to promote the wedging action of the box **12** against the wedges **28**.

After the ingredients are fully mixed the hollow tube **24** may be partially withdrawn to expose the opening **27** through the hub **20** as illustrated in FIGURE 6. The mixed contents flow out through the opening **27**. To shut the flow off the pipe **24** is reinserted in the opening **27**. To increase the flow of the mixed ingredients from the box **12**, additional holes **29** are punctured in the bottom of the box **12** by the hollow tube **24** as further illustrated in FIGURE 6.

The FIGURES 7 and 8 illustrate the piercing or leading edge of the hollow tube **24**. As shown in the cross-sectional view, FIGURE 8, the leading edge of the hollow tube **24** is cut partially at a first angle with the remainder of the tube **24** being cut at a second angle. This produces a leading edge **30** which pierces or cuts the material in the hubs **20** and **21** and the box **12** and a trailing edge **32** which acts to cut out and remove from the hubs **20** and **21** and the box **12** a circular section of the box **12** which is equal to the inner diameter of the hollow tube **24**. By twisting the tube **24** as it is inserted, the cutting action of the leading and trailing edges **30** and **32** respectively is accentuated. Alternatively, as illustrated in FIGURE 9, the hollow pipe **24** may have a pointed, sealed, piercing end **33** with openings **35** in the side of the pipe **24** to allow the water to seep into the mix.

FIGURE 10 is an unassembled frustoconical container **18** showing the wedges **28** which are die pressed or cut in the container **18**. The container **18** can be cut from a flat piece of material with the handholes **25** and the wedges simultaneously cut in the same piece of material. The unassembled container **18** has interlocking folds **34** and **36** which are made to engage one another and hold the container in its useful shape. FIGURE 11 more clearly illustrates the construction of the locking folds **34** and **36**. Likewise the manner in which the wedges **28** are folded out away from the walls of the container **18** is more clearly illustrated in FIGURE 11.

The mix-filled boxes **12** are disposable; however, the hollow pipe **24** and container **18** are used again and again. For this reason the container **18** and pipe **24** are constructed of a rugged material such as metal sheet. The container **18** may thus be more easily stored in its flat configuration and assembled when use is desirous.

While in the foregoing there has been disclosed a preferred embodiment of the present invention, it is to be understood that equivalents obvious to those skilled in the art are within the scope of the claimed invention.

What is claimed is:

1. A method especially suitable for mixing relatively small amounts of liquid with a dry particulate material comprising, in combination, the steps of:

(a) sealing a measured amount of said dry material in a container having first and second opposing walls,

(b) inserting a hollow pipe through said first wall into said material container,

(c) pouring a measured amount of liquid into said dry material in said material container through said hollow pipe,

(d) pushing said pipe through said second wall of said material container such that said pipe forms an axle through said material container, and

(e) rotating said material container about said pipe axle such that said dry material and said liquid are fully mixed.

2. The method as set forth in claim **1** including the step of withdrawing said pipe from said second wall of said material container upon completion of mixing such that said mix is discharged from said material container through the opening in said second wall of said container created by said hollow pipe.

3. The method as set forth in claim **1** including the steps of withdrawing said pipe from said second wall of

said container and reinserting and rewithdrawing said pipe from said second wall of said container adjacent said original pipe insertion until an aperture is defined in said second wall of said container which permits said material to be discharged therethrough.

4. The method as set forth in claim **1** wherein rotating said container about said pipe axle comprises the steps of:

(a) inserting said material container into a frustoconical container with the axis of said frustoconical container substantially parallel with said pipe axle, said frustoconical container having a continuous side surface, a top and a bottom,

(b) placing said frustoconical container on its side surface, and

(c) rolling the combination of said container, said frustoconical container and said hollow pipe axle such that the contents of said container are thoroughly mixed.

5. A portable, disposable mixing container system especially suitable for mixing smaller amounts of dry particulate material comprising, in combination,

(a) a hollow pipe having a piercing end,

(b) a material container with means adapted to receive said hollow pipe such that said pipe forms an axle through said container when said piercing end of said pipe is inserted through said means adapted to receive said pipe, and

(c) support means for rotating said container substantially about said axle.

6. The combination of claim **5** wherein said support means comprise a frustoconical container having a continuous side surface, a narrow, open top end and a wide, open bottom end with means adapted to receive said material container such that said hollow pipe when inserted through said material container forms an axle which lies substantially parallel the axis of said frustoconical container when said material container is inserted into said frustoconical container.

7. The combination of claim **5** wherein said hollow pipe is a substantially straight, hollow, thin wall tube with one end cut partially therethrough at a first angle, the remainder of said end being cut at a second angle unequal to said first angle such that said pipe upon insertion into said material container removes a slug from said material container, said slug being substantially equal to the inside area of said hollow pipe.

8. A device as set forth in claim **5** wherein said material container has rectangularly shaped parallel pairs of side walls, and said means adapted to receive said hollow pipe comprise flexible pierceable inserts positioned substantially in the center of one pair of parallel, rectangularly shaped walls of said material container.

9. The device as set forth in claim **6** wherein said means adapted to receive said material container include wedges positioned circumferentially about the bottom end of said frustoconical container such that said material container is held in a substantially non-rotatable, immovable position within said frustoconical container upon insertion of said material container into said frustoconical container.

10. The device as set forth in claim **6** including first and second handholes positioned substantially opposite one another in the side of said frustoconical container adjacent the bottom end such that said container can easily by carried.

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