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Mortar-dispensing device

Abstract

The mortar-dispensing device includes a hopper, a trowel, an extruder, a battery, and an operator control. The mortar-dispensing device may be a tool for applying mortar to a substrate in preparation for laying tile. The hopper may be configured to hold the mortar prior to application of the mortar to the substrate. The trowel may rake the mortar to create a bed of mortar comprising mortar ridges. The extruder may force the mortar out of the hopper through the bottom of the hopper. The extruder may be energized by the battery under control of the operator control.

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Field of Classification Search

References Cited

U.S. PATENT DOCUMENTS

Patent No.	Issued Date	Patentee Name	U.S. Cl.	CPC
1142022	12/1914	Chappell	401/265	E04F 21/1652
1641703	12/1926	Stanton	404/110	E04G 21/04
2104086	12/1937	Lines	401/265	E04F 21/1652
2610768	12/1951	Le Clair	222/262	F16N 5/02
2692641	12/1953	Woods	126/401	E01C 19/44
2694509	12/1953	Vita	222/413	E04F 21/08
2847689	12/1957	Miller	15/147.1	E04D 15/07
3363524	12/1967	Catenacci	404/84.2	E01C 19/4893
3389838	12/1967	Morra	222/326	B05C 17/01
3396218	12/1967	Despota	48/197R	E04F 21/08
3768939	12/1972	Gramling	401/265	E04F 21/165
3804696	12/1973	Lobmeier	156/499	E01C 19/16
3826410	12/1973	Meyer	N/A	N/A
3868046	12/1974	Maddalena	222/146.5	B29C 48/02
3877830	12/1974	James, III	404/110	E01C 19/4873
3985273	12/1975	Davis, Jr.	222/326	B05C 17/0103
4231668	12/1979	Groth	401/206	B05C 17/0333
4322022	12/1981	Bergman	74/424.78	B05C 17/0103
4352445	12/1981	Cusumano	52/749.13	E04G 21/204
5054658	12/1990	Aronie	N/A	N/A
5226575	12/1992	Faust	N/A	N/A
5244123	12/1992	Benedict	401/265	E04F 21/08
5254167	12/1992	Janoski	118/305	B05C 5/0275
5385274	12/1994	Twyman	106/713	B05C 17/01
5387051	12/1994	Valente	N/A	N/A
5603435	12/1996	Fenwick	198/662	B05C 17/00569
5695788	12/1996	Woods	15/245.1	E04F 21/08
5878921	12/1998	Chase	222/626	E04F 21/08
5947346	12/1998	London	401/48	E04D 15/07
6012614	12/1999	Stanford	222/391	B28C 5/123
6050744	12/1999	Binning	404/110	E01C 19/185
6450723	12/2001	Lithgow	401/266	E04F 21/08
6645329	12/2002	Rafoss	N/A	N/A
7138015	12/2005	Rytter	N/A	N/A
D820886	12/2017	Ewringmann	N/A	N/A
10597831	12/2019	Menard	N/A	N/A
2009/0293414	12/2008	Keohan	52/742.16	E04F 21/1652
2009/0294489	12/2008	Keohan	401/137	E04F 21/1652
2010/0050567	12/2009	Vandewinckel	52/749.13	E04G 21/025
2010/0236007	12/2009	Lawes	15/235.3	E04G 21/20
2012/0114850	12/2011	Ferguson	118/100	E04B 2/54

2012/0257927	12/2011	Schmidt	404/110	E01C 23/0973
2012/0328792	12/2011	Campbell	401/5	E04G 21/204
2014/0050513	12/2013	Wilcox	401/137	E04G 21/20
2017/0101792	12/2016	Campbell	N/A	E04G 21/0418
2020/0030491	12/2019	Weisman	N/A	B33Y 80/00
2022/0316931	12/2021	Joseph	N/A	E04G 21/04
2023/0256649	12/2022	McGee	425/149	B33Y 30/00

FOREIGN PATENT DOCUMENTS

Patent No.	Application Date	Country	CPC
10057865	12/1997	JP	N/A

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Background/Summary

CROSS REFERENCES TO RELATED APPLICATIONS

(1) Not Applicable

STATEMENT REGARDING FEDERALLY SPONSORED RESEARCH

(2) Not Applicable REFERENCE TO APPENDIX

(3) Not Applicable

BACKGROUND OF THE INVENTION

Field of the Invention

(4) The present invention relates to the field of masonry tools, more specifically, a mortar-dispensing device.

SUMMARY OF INVENTION

(5) The mortar-dispensing device comprises a hopper, a trowel, an extruder, a battery, and an operator control. The mortar-dispensing device may be a tool for applying mortar to a substrate in preparation for laying tile. The hopper may be configured to hold the mortar prior to application of the mortar to the substrate. The trowel may rake the mortar to create a bed of mortar comprising mortar ridges. The extruder may force the mortar out of the hopper through the bottom of the hopper. The extruder may be energized by the battery under control of the operator control.

(6) An object of the invention is to extrude mortar from a hopper onto a substrate.

(7) Another object of the invention is to provide an actuator and a pusher plate to extrude the mortar.

(8) A further object of the invention is to provide a trowel to rake the mortar as the invention is moved over the mortar.

(9) Yet another object of the invention is to provide a battery and an operator control to energize and de-energize the actuator.

(10) These together with additional objects, features and advantages of the mortar-dispensing device will be readily apparent to those of ordinary skill in the art upon reading the following detailed description of the presently preferred, but nonetheless illustrative, embodiments when taken in conjunction with the accompanying drawings.

(11) In this respect, before explaining the current embodiments of the mortar-dispensing device in detail, it is to be understood that the mortar-dispensing device is not limited in its applications to the details of construction and arrangements of the components set forth in the following description or illustration. Those skilled in the art will appreciate that the concept of this disclosure may be readily utilized as a basis for the design of other structures, methods, and systems for

carrying out the several purposes of the mortar-dispensing device.

(12) It is therefore important that the claims be regarded as including such equivalent construction insofar as they do not depart from the spirit and scope of the mortar-dispensing device. It is also to be understood that the phraseology and terminology employed herein are for purposes of description and should not be regarded as limiting.

Description

BRIEF DESCRIPTION OF DRAWINGS

(1) The accompanying drawings, which are included to provide a further understanding of the invention are incorporated in and constitute a part of this specification, illustrate an embodiment of the invention and together with the description serve to explain the principles of the invention. They are meant to be exemplary illustrations provided to enable persons skilled in the art to practice the disclosure and are not intended to limit the scope of the appended claims.

(2) FIG. 1 is a side view of an embodiment of the disclosure.

(3) FIG. 2 is a front view of an embodiment of the Disclosure.

(4) FIG. 3 is a rear view of an embodiment of the disclosure.

(5) FIG. 4 is a bottom view of an embodiment of the disclosure.

(6) FIG. 5 is an exploded view of an embodiment of the disclosure.

DETAILED DESCRIPTION OF THE EMBODIMENT

(7) The following detailed description is merely exemplary in nature and is not intended to limit the described embodiments of the application and uses of the described embodiments. As used herein, the word “exemplary” or “illustrative” means “serving as an example, instance, or illustration.”

Any implementation described herein as “exemplary” or “illustrative” is not necessarily to be construed as preferred or advantageous over other implementations. All of the implementations described below are exemplary implementations provided to enable persons skilled in the art to practice the disclosure and are not intended to limit the scope of the appended claims. Furthermore, there is no intention to be bound by any expressed or implied theory presented in the preceding technical field, background, brief summary or the following detailed description. As used herein, the word “or” is intended to be inclusive.

(8) Detailed reference will now be made to a first potential embodiment of the disclosure, which is illustrated in FIGS. 1 through 5.

(9) The mortar-dispensing device **100** (hereinafter invention) comprises a hopper **200**, a trowel **230**, an extruder **240**, a battery **270**, and an operator control **272**. The invention **100** may be a tool for applying mortar **900** to a substrate **910** in preparation for laying tile. The hopper **200** may be configured to hold the mortar **900** prior to application of the mortar **900** to the substrate **910**. The trowel **230** may rake the mortar **900** to create a bed of mortar **902** comprising mortar ridges **904**. The extruder **240** may force the mortar **900** out of the hopper **200** through the bottom of the hopper **200**. The extruder **240** may be energized by the battery **270** under control of the operator control **272**.

(10) The hopper **200** may be an open-top container for holding the mortar **900** prior to extruding onto the substrate **910**. The hopper may comprise a front wall **202**, a left wall **204**, a right wall **206**, a rear wall **208**, and a bottom wall **220**. In some embodiments, the profile of the hopper **200** as seen from a side may be a rhomboid such that the hopper **200** may guide the movement of a pusher plate **260**.

(11) The rear wall **208** may be coupled to a back board **210** which may extend upward and rearward from the rear of the hopper **200**. The back board **210** may comprise a mounting aperture **212** for mounting the extruder **240**. The top of the back board **210** may comprise a pair of handles **214** adapted for a user to grip while operating the invention **100**. The hopper **200** may comprise a

pair of wheels **216** to support the rear of the hopper **200** and to aid in maneuvering the invention **100**. The hopper **200** may be elevated above the substrate **910** by the pair of wheels **216** in the rear and the trowel **230** in the front.

(12) The mortar **900** may be extruded onto the substrate **910** through the bottom of the hopper **200**. The bottom wall **220** of the hopper **200** may spread the mortar **900** evenly as the invention **100** is pulled backwards-towards the user. The trowel **230** may be coupled to the bottom of the front wall **202** of the hopper **200** and may extend downward below the level of the bottom wall **220** of the hopper **200**. The trowel **230** may comprise a plurality of teeth **232** separated by a plurality of gaps. The mortar **900** May squeeze through the plurality of gaps to create the mortar ridges **904** as the mortar **900** emerges from under the front of the hopper **200**. In some embodiments, the trowel **230** may be detachable and replaceable such that a different trowel May create ridges of a different shape, size, spacing, or any combination thereof.

(13) It shall be noted that the trowel **230** has a bend in the design such that a first portion **230A** of the trowel **230** interfaces with the substrate **910** directly. A second portion **230B** of the trowel **230** includes holes **277** to enable fasteners **278** to secure the trowel **230** to the front wall **202**.

(14) The extruder **240** may comprise an actuator **250** and the pusher plate **260**. The actuator **250** may be coupled to the back board **210**. Energizing the actuator **250** may move the pusher plate **260** up or down. The pusher plate **260** may be positioned in the hopper **200** such that moving the pusher plate **260** down may press the top of the mortar **900** and force the mortar **900** through the trowel **230**.

(15) The actuator **250** may be an electric linear actuator. The actuator **250** may comprise a telescoping armature **252** that may be extended and retracted by energizing the actuator **250** with an electric potential. As non-limiting examples, the electric potential may have a first polarity to extend the telescoping armature **252** and the electric potential may have a second polarity that is opposite the first polarity to retract the telescoping armature **252**. Removing the electric potential stop the telescoping armature **252** from moving. The actuator **250** may be oriented such that the telescoping armature **252** is located below the actuator **250**.

(16) The bottom of the telescoping armature **252** may comprise an actuator coupler **254** for coupling the telescoping armature **252** to a plate coupler **262** on the pusher plate **260**. A pusher pin **264** may detachably couple the plate coupler **262** to the actuator coupler **254**.

(17) The actuator **250** may be coupled to a mounting frame **242**. The mounting frame **242** may detachably couple to the back board by passing through the mounting aperture **212** in the back board **210**. The mounting frame **242** may be secured to mounting brackets **244** located on the rear of the back board **210** by a mounting pin **246**. The mounting brackets **244** may be coupled to the back board **210** in a lateral orientation and the mounting pin **246** may pass longitudinally through the mounting brackets **244** and the mounting frame **242**.

(18) The pusher plate **260** may be a rigid plate that may be detachably coupled to the lower end of the telescoping armature **252**. The pusher plate **260** may press down against the mortar **900** as the telescoping armature **252** extends. The pusher plate **260** may be lifted from the hopper **200** as the telescoping armature retracts.

(19) The battery **270** may comprise one or more energy-storage devices. The battery **270** may be a source of electrical energy to operate the actuator **250**. The battery **270** may be rechargeable and replaceable. In some embodiments, the battery **270** may be accessible for replacement at the top of the back board **210**.

(20) The operator control **272** may control the energization of the actuator **250**. The operator control **272** may apply the electric potential having the first polarity to extend the telescoping armature **252**, may apply the electric potential having the second polarity to retract the telescoping armature **252**, and may remove the electric potential to hold the telescoping armature **252** motionless. As non-limiting examples, the operator control **272** may be one or more rocker switches, toggle switches, rotary switches, pushbutton switches, key switches, or drum switches. In

some embodiments, the operator control 272 may be a variable control such that the speed of extending and/or retracting may be adjustable.

(21) In use, the pusher plate 260 may be withdrawn from the hopper 200 by using the operator control 272 to apply the electric potential having the second polarity to the actuator 250 and mortar 900 may be placed into the hopper 200. The pusher plate 260 may be lowered into the hopper 200 by using the operator control 272 to apply the electric potential having the first polarity to the actuator 250 until the pusher plate 260 reaches the top of the mortar 900 and the actuator 250 may be de-energized. The invention 100 may be positioned on one side of the substrate 910 and the actuator 250 may be energized again. The invention 100 may be pulled rearwards as the extruder 240 forces the mortar 900 out through the trowel 230. The bottom wall 220 of the hopper 200 may spread the mortar 900 into a thin, even coat under the hopper 200. As the front of the hopper 200 passes over the mortar 900, the plurality of teeth 232 on the trowel 230 may rake the mortar 900 to produce mortar ridges 904.

Definitions

(22) Unless otherwise stated, the words “up”, “down”, “top”, “bottom”, “upper”, and “lower” should be interpreted within a gravitational framework. “Down” is the direction that gravity would pull an object. “Up” is the opposite of “down”. “Bottom” is the part of an object that is down farther than any other part of the object. “Top” is the part of an object that is up farther than any other part of the object. “Upper” may refer to top and “lower” may refer to the bottom. As a non-limiting example, the upper end of a vertical shaft is the top end of the vertical shaft.

(23) As used in this disclosure, an “aperture” may be an opening in a surface or object. Aperture may be synonymous with hole, slit, crack, gap, slot, or opening.

(24) Throughout this document the terms “battery”, “battery pack”, and “batteries” may be used interchangeably to refer to one or more wet or dry cells or batteries of cells in which chemical energy is converted into electricity and used as a source of DC power. References to recharging or replacing batteries may refer to recharging or replacing individual cells, individual batteries of cells, or a package of multiple battery cells as is appropriate for any given battery technology that may be used. The battery may require electrical contacts which may not be illustrated in the figures.

(25) As used herein, the words “control” or “controls” are intended to include any device which can cause the completion or interruption of an electrical circuit; non-limiting examples of controls include toggle switches, rocker switches, push button switches, rotary switches, electromechanical relays, solid state relays, touch sensitive interfaces and combinations thereof whether they are normally open, normally closed, momentary contact, latching contact, single pole, multi-pole, single throw, or multi-throw. In some embodiments, a control may alter an electrical property of a circuit such as resistance, inductance, or capacitance.

(26) As used herein, the words “couple”, “couples”, “coupled” or “coupling”, may refer to connecting, either directly or indirectly, and does not necessarily imply a mechanical connection.

(27) As used herein, “energize” and/or “energization” may refer to the application of an electrical potential to a system or subsystem. “De-energize” and/or “de-energization” may refer to the removal of the electrical potential.

(28) As used in this disclosure, the word “lateral” may refer to the sides of an object or movement towards a side. Lateral directions are generally perpendicular to longitudinal directions. “Laterally” may refer to movement in a lateral direction.

(29) As used herein, a “linear actuator” may be a device that produces linear motion. The device may be electromechanical, hydraulic, or pneumatic in nature. Upon activation by an electrical potential or by a change in fluid or air pressure, the overall length of the device may change-either by lengthening or shortening. In use, a first component of the linear actuator, which may be referred to as a motor or body, is fixed mounted to a first object and a second component of the linear actuator, which may be referred to as an actuator arm or lead screw, is fixed mounted to a

second object. Activation of the device may cause the second component to linearly move relative to the first component thus changing the distance between the first object and the second object.

(30) As used herein, the word “longitudinal” or “longitudinally” may refer to a lengthwise or longest direction or to a direction that is perpendicular to the lateral direction.

(31) As used in this disclosure, “orientation” may refer to the positioning and/or angular alignment of a first object relative to a second object or relative to a reference position or reference direction.

(32) As used herein, “rhomboid” may refer to the geometric shape which is a parallelogram with adjacent sides of unequal length and no right angles.

(33) As used herein, “rigid” may refer to an object or material which is inflexible.

(34) As used in this disclosure, “telescopic”, “telescoping”, and “telescopically” may refer to an object made of two or more sections that fit or slide into each other such that the object can be made longer or shorter by adjusting the relative positions of the sections.

(35) As used herein, “trowel” may refer to a tool for applying and/or spreading mortar or plaster.

(36) With respect to the above description, it is to be realized that the optimum dimensional relationship for the various components of the invention described above and in FIGS. 1 through 5, include variations in size, materials, shape, form, function, and manner of operation, assembly and use, are deemed readily apparent and obvious to one skilled in the art, and all equivalent relationships to those illustrated in the drawings and described in the specification are intended to be encompassed by the invention.

(37) It shall be noted that those skilled in the art will readily recognize numerous adaptations and modifications which can be made to the various embodiments of the present invention which will result in an improved invention, yet all of which will fall within the spirit and scope of the present invention as defined in the following claims. Accordingly, the invention is to be limited only by the scope of the following claims and their equivalents.

Claims

1. A mortar-dispensing device comprising: a hopper, a trowel, an extruder, a battery, and an operator control; wherein the mortar-dispensing device is a tool for applying mortar to a substrate in preparation for laying tile; wherein the hopper is configured to hold the mortar prior to application of the mortar to the substrate; wherein the trowel rakes the mortar to create a bed of mortar comprising mortar ridges; wherein the extruder forces the mortar out of the hopper through the bottom of the hopper; wherein the extruder is energized via an electrical potential of by the battery under control of the operator control; wherein the hopper is a container for holding the mortar prior to extruding onto the substrate; wherein the hopper comprises a front wall, a left wall, a right wall, a rear wall, and a bottom wall; wherein the mortar is placed into the hopper through an open top and is pushed out of the hopper via the trowel located in the bottom wall; wherein the rear wall is coupled to a back board which extends upward and rearward from the rear of the hopper; wherein the back board comprises a mounting aperture for mounting the extruder; wherein the top of the back board comprises a pair of handles adapted for a user to grip while operating the mortar-dispensing device; wherein the hopper comprises a pair of wheels to support the rear of the hopper and to aid in maneuvering the mortar-dispensing device; wherein the hopper is elevated above the substrate by the pair of wheels in the rear and the trowel in the front.
2. The mortar-dispensing device according to claim 1 wherein the profile of the hopper as seen from a side is a rhomboid such that the hopper guides the movement of a pusher plate.
3. The mortar-dispensing device according to claim 2 wherein the mortar is extruded onto the substrate through the trowel on the bottom of the hopper; wherein the bottom wall of the hopper spreads the mortar evenly as the mortar-dispensing device is pulled backwards.
4. The mortar-dispensing device according to claim 3 wherein the trowel is coupled to the bottom of the front wall of the hopper and extends downward below the level of the bottom wall of the

hopper; wherein the trowel comprises a plurality of teeth separated by a plurality of gaps; wherein the mortar squeezes through the plurality of gaps to create the mortar ridges as the mortar emerges from under the front of the hopper.

5. The mortar-dispensing device according to claim 4 wherein the trowel has a bend in the design such that a first portion of the trowel interfaces with the substrate directly; wherein a second portion of the trowel includes holes to enable fasteners to secure the trowel to the front wall.

6. The mortar-dispensing device according to claim 4 wherein the extruder comprises an actuator and the pusher plate; wherein the actuator is coupled to the back board; wherein energizing the actuator moves the pusher plate up or down; wherein the pusher plate is positioned in the hopper such that moving the pusher plate down presses the top of the mortar and forces the mortar through the trowel.

7. The mortar-dispensing device according to claim 6 wherein the actuator is an electric linear actuator; wherein the actuator comprises a telescoping armature that is extended and retracted by energizing the actuator with the electric potential of the battery.

8. The mortar-dispensing device according to claim 7 wherein the electric potential has a first polarity to extend the telescoping armature and the electric potential has a second polarity that is opposite the first polarity to retract the telescoping armature; wherein removing the electric potential stops the telescoping armature from moving.

9. The mortar-dispensing device according to claim 8 wherein the actuator is oriented such that the telescoping armature is located below the actuator.

10. The mortar-dispensing device according to claim 9 wherein the bottom of the telescoping armature comprises an actuator coupler for coupling the telescoping armature to a plate coupler on the pusher plate; wherein a pusher pin detachably couples the plate coupler to the actuator coupler.

11. The mortar-dispensing device according to claim 10 wherein the actuator is coupled to a mounting frame; wherein the mounting frame detachably couples to the back board by passing through the mounting aperture in the back board; wherein the mounting frame is secured to mounting brackets located on the rear of the back board by a mounting pin; wherein the mounting brackets are coupled to the back board in a lateral orientation and the mounting pin passes longitudinally through the mounting brackets and the mounting frame.

12. The mortar-dispensing device according to claim 11 wherein the pusher plate is a rigid plate that is detachably coupled to the lower end of the telescoping armature; wherein the pusher plate presses down against the mortar as the telescoping armature extends; wherein the pusher plate is lifted from the hopper as the telescoping armature retracts.

13. The mortar-dispensing device according to claim 12 wherein the battery comprises one or more energy-storage devices; wherein the battery is a source of electrical energy to operate the actuator; wherein the battery is rechargeable and replaceable.

14. The mortar-dispensing device according to claim 13 wherein the battery is accessible for replacement at the top of the back board.

15. The mortar-dispensing device according to claim 13 wherein the operator control controls the energization of the actuator; wherein the operator control applies the electric potential having the first polarity to extend the telescoping armature, applies the electric potential having the second polarity to retract the telescoping armature, and removes the electric potential to hold the telescoping armature motionless.

16. The mortar-dispensing device according to claim 15 wherein the operator control is one or more of rocker switches, toggle switches, rotary switches, pushbutton switches, key switches, or drum switches.

17. The mortar-dispensing device according to claim 15 wherein the operator control is a variable control such that the speed of extending and/or retracting is adjustable.
