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(54) **Spreading and screeding device for finishing a screed floor, and method therefor**

Verteil- und Abziehvorrichtung zur Endbearbeitung eines Estrichbodens und Verfahren dafür

Dispositif d'étalement et d'aplanissement de finition de sol d'une chape et procédé associé

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Description

[0001] The invention relates to a spreading and screeding device. Such a device can be used according to the invention to finish a screed floor, particularly a cement screed floor.

[0002] US 1 731 231 A discloses an apparatus for spreading plastic material.

[0003] DE 19 65 141 A1 discloses a device using screws.

[0004] US 3 515 042 A discloses a concrete vibrating and finishing machine.

[0005] EP 1 865 108 A1 discloses a device for providing a floor surface.

[0006] It is known in practice to realize a cement screed floor by placing cement, or sand cement, or mortar on a ground surface. This can optionally take place from a tanker, silo or concrete mixer. The cement is then usually spread manually as well as possible. After this first rough spreading there follows a more precise spreading using a screed. One of the problems occurring here is that it requires much relatively heavy manual work by skilled workers. It is additionally the case that it is usually difficult to maintain a certain quality, and certainly over large floor surfaces. It is likewise known in practice to use auxiliary means in the form of guides which spread the cement together with the screed. It is however also the case here that this is a labour-intensive process involving relatively heavy work and that, even making use of these auxiliary means, it remains difficult to guarantee a constant quality.

[0007] An object of the present invention is to obviate or reduce the above stated problems and to provide a device suitable for realizing a screed floor.

[0008] This object is achieved by the device according to claim 1.

[0009] The displaceable frame achieves that the device is displaceable over the floor where the screed floor has to be realized. This screed floor preferably relates to a cement screed floor, or sand cement screed floor. The frame is provided here with a roller for levelling the screed floor. This roller particularly provides for levelling of the cement for the purpose of thereby realizing a cement screed floor which is even and as level as possible. The frame is operatively connected to a pressing and spreading roller for spreading the screed floor material for the purpose of a good operation of the roller. During use this pressing and spreading roller is placed functionally in front of the roller. This pressing and spreading roller is therefore provided upstream of the roller in the usual forward direction of the frame. The cement is hereby first spread and pressed, or compacted, using this first roller, after which the roller as second roller subsequently levels the floor as a finish. Using the combination of the roller with the pressing and spreading roller the screed floor material can be spread, pressed, or compacted, as well as levelled in one operation. This significantly reduces the number of operations required. It has for instance been found that about 100 m^2/hour of floor can be realized with the device according to the invention while, under the same conditions and with the same set requirements for the finished floor, four skilled workers would be necessary for this purpose. In addition, the reproducibility of the screed floor is greatly improved, whereby a constant quality can be provided for the floor.

[0010] A uniform finish is realized by making use of the roller. Making use of a separate pressing and spreading roller realizes a uniform spreading of the material over the floor, which is then pressed down by the roller. A much more even and uniform spreading and pressing is hereby realized than is possible using for instance conventional vibrating devices. Within the context of the present invention, pressing is understood to mean compacting of the material.

[0011] In an advantageous preferred embodiment according to the present invention the pressing and spreading roller comprises a worm-like roller.

[0012] By providing a worm-like roller the function of the pressing, or compacting, and the spreading is combined in a single roller. The eccentric worm roller in the device according to the invention provides for a gentle displacement and spreading of the material which is particularly suitable for viscous material such as mortar. This results in a highly effective device. It has been found that a slightly higher positioning of the pressing and spreading roller in vertical direction over a distance of about 0 to 1 cm relative to the roller has advantageous results. The specific setting depends on, among other factors, the precise composition of the material used. If desired, it is also possible to set the two rollers to the same height.

[0013] In an alternative embodiment the pressing and spreading roller comprises a spiral-shaped roller. Such a spiral-shaped roller is for instance suitable for highly viscous materials for processing, wherein there is more emphasis on the spreading and less on the pressing of the material.

[0014] According to the present invention the device further comprises an auger for spreading screed floor material over the width of the device.

[0015] By providing a separate auger possible excess material arranged for the screed floor which is thrown up by the pressing and spreading roller can be discharged laterally for the purpose of thereby achieving a better spreading of the material over the width of the device. For this purpose the auger is provided above and more preferably at an angle behind the pressing and spreading roller on the device. This auger is also preferably provided, as seen in longitudinal direction of the device, just in front of the roller. It has been found that the most optimal effect of the separate auger is hereby achieved.

[0016] The device according to the invention is provided with at least one opening arranged on the side of the displaceable frame for discharging an excess of screed floor material. By discharging the surplus screed floor material laterally using an auger, this material is spread over the width of the device. Should an excess of screed floor material nevertheless still be present, it can then be

discharged from the device with the auger by having this excess material as it were ejected through the opening in lateral direction relative to the device according to the invention.

[0017] An opening is preferably provided on both sides of the device so that, depending on the displacement of the frame relative to a wholly or partially finished screed floor, the material is not ejected onto this wholly or partially finished screed floor, but is conversely set down on the other side where the material still has to be spread and further processed. Preferably provided here are one or more flaps or other sealing means with which the openings can be covered and the material can therefore be prevented from being ejected laterally onto an already finished floor.

[0018] In an advantageous preferred embodiment according to the present invention the device comprises height-adjusting means for adjusting the height of at least the roller and/or the pressing and spreading roller. The setting of the roller and/or the pressing and spreading roller relative to the floor for finishing can be adjusted by providing the height-adjusting means. The two rollers are preferably height-adjustable. In a currently preferred embodiment the two rollers are provided in a separate construction part which is height-adjustable as a unit relative to the other parts of the frame.

[0019] The height-adjusting means preferably comprise a laser. It has been found that making use of a laser results here in a very precise height adjustment, preferably of the roller and the pressing and spreading roller.

[0020] The device according to the invention is preferably further provided with width-adjusting means to enable relative adjustment of the outer ends of the roller and/or the pressing and spreading roller. Being able to adjust the outer ends of one, and preferably both, rollers makes it possible to position them straight, i.e. substantially horizontally. A small angle can also be set if desired.

[0021] In a further advantageous preferred embodiment the displaceable frame comprises a linkage belt.

[0022] Providing a linkage belt achieves that the overall weight of the device is spread over a relatively large surface area of the floor using the links of the linkage belt, whereby the point loads remain limited. The linkage belt is therefore preferably also provided here over a significant part of the width of the device and over a significant part of the length of the device in order to thereby realize a sufficiently large support surface. In a currently preferred embodiment the linkage belt is situated behind the roller, as seen in the usual forward direction of the device. This means that this linkage belt moves over the screed floor which has just been made level.

[0023] Alternatively or in addition to the above stated linkage belt, the displaceable frame comprises at least two belts or tracks for displacing the frame. Turning of the device over the floor is simplified by providing for instance two belts or tracks instead of a single linkage belt over the whole width of the device. It is possible here to drive each track or belt individually so as to further simplify taking a bend or corner. In the above stated variant with one linkage belt over a substantial part of the width, one drive can suffice.

[0024] The device preferably comprises a remote control for controlling the device. By operating in any case the drive of the displaceable frame with the remote control a user does not need to walk over the recently levelled floor. Further point loads over the recently finished floor are hereby prevented. The device can hereby also be shortened to some extent since handles and/or levers are for instance not required. In addition, the weight is hereby also further reduced, whereby point loads are further reduced.

[0025] The invention further relates to a method for manufacturing a floor, comprising of providing a spreading and screeding device as described above.

[0026] Such a method has the same advantages and effects as described above for the device. The method is preferably performed for the purpose of realizing a cement screed floor.

[0027] Further advantages, features and details of the invention are elucidated on the basis of preferred embodiments thereof, wherein reference is made to the accompanying drawing, in which:

Fig. 1 shows a side view of the device according to the invention;
Fig. 2 shows a view of the front side of the device of fig. 1; and
Fig. 3 shows a view with partial cross-section of the device of fig. 1.

[0028] A spreading and screeding device 2 (fig. 1) has a front construction part 4 on which roller 6, pressing and spreading roller 8 and auger 10 are arranged. Construction part 4 is provided movably relative to displacing part 12 of device 2. Displacing part 12 is provided with a number of displacing wheels or rollers 14 which rotate a linkage belt 16 with which device 2 is propelled. A drive 18 is placed for this purpose on frame 20 of device 2. Provided on rear side 22 via arm 24 is a handle 26 with control panel 28 with which a user can control device 2. Control panel 28 is provided with an arm 24, for the purpose, among others, of thereby enabling turning, i.e. taking a bend, with device 2.

[0029] The front part (fig. 2) of device 2 has pressing and spreading roller 8 in the form of a worm-like roll, roller 6 and additionally an auger 10. Provided in the shown embodiment on both sides of front part 4 are openings 30 which can be closed if desired with flap 32. In the shown embodiment worm-like pressing and spreading roller 8 is situated a fraction above roller 6 as seen in vertical direction. The auger roller is in turn situated above these and is positioned between these two rollers as seen in horizontal direction.

[0030] Front part 4 is connected to rear displaceable part 12 using lifting arm 34 (fig. 3). Using two cylinders 36 front part 4 can be adjusted in the height A relative to

this rear part 12 in the shown embodiment by making use of lifting mechanism 38. The whole front part 4 is hereby adjusted in the height relative to rear part 12. A possible lateral adjustment B for positioning the front part substantially wholly horizontally or for placing it at a small angle is possible by means of adjusting mechanism 40. In the shown embodiment use is made of a laser 41 in the adjustment.

[0031] In the shown embodiment device 2 has a width of about 76 cm so that device 2 can be moved into a space through a normal door. The overall length, including arm 24 and handle 26, is about 2.5 metres. Arm 24 can be dispensed with by making use of a remote control (not shown) and a length of about 1.5 metres results. Depending on the embodiment, the total weight of device 2 is about 250-400 kg.

[0032] For the purpose of realizing floor 42, particularly a screed floor and still more particularly a cement screed floor, screed floor material in the form of mortar 44 is first provided according to the invention on site on ground surface 46. Device 2 is then displaced over material 44, whereby material 44 is spread, pressed and levelled in one operation. Use is made for this purpose of a separate pressing and spreading roller 8 and a separate roller 6. Use is made of the auger 10 for discharging or spreading excess material 44. Device 2 is in this way moved over the whole surface of floor 42.

[0033] The invention is by no means limited to the above described preferred embodiments thereof. The rights sought are defined by the following claims, within the scope of which many modifications can be envisaged. It is thus possible for instance to envisage also using device 2 according to the invention for pressing or rolling a sand layer, for instance for the purpose of laying clinker paving or paving stones.

Claims

1. Spreading and screeding device (2) for manufacturing a screed floor (42), comprising:

   - a displaceable frame (4);
   - a roller (6) connected to the frame for levelling the screed floor; and
   - a pressing and spreading roller (8), connected to the frame and placed functionally in front of the roller during use, for spreading and pressing screed floor material (44), and
   - an auger (10),

   characterized in that the auger (10) is connected to the frame (4) and positioned above the pressing and spreading roller (8) for spreading screed floor material over the width of the device, wherein the frame (4) is provided with at least one opening (30) arranged in a side for ejecting an excess of screed floor material laterally through the at least one opening.

2. Spreading and screeding device as claimed in claim 1, wherein the auger is further positioned at an angle behind the pressing and spreading roller.

3. Spreading and screeding device as claimed in claim 1 or 2, wherein the pressing and spreading roller (8) comprises a worm-like roller.

4. Spreading and screeding device as claimed in claim 1 or 2, wherein the pressing and spreading roller (8) comprises a spiral-shaped roller.

5. Spreading and screeding device as claimed in one or more of the foregoing claims, further comprising height-adjusting means (38) for adjusting the height of at least the roller and/or the pressing and spreading roller.

6. Spreading and screeding device as claimed in claim 5, wherein the height-adjusting means comprise a laser.

7. Spreading and screeding device as claimed in one or more of the foregoing claims, further comprising width-adjusting means (40) for relative adjustment in height of the outer ends of the roller and/or the pressing and spreading roller.

8. Spreading and screeding device as claimed in one or more of the foregoing claims, wherein the displaceable frame comprises a linkage belt (16).

9. Spreading and screeding device as claimed in one or more of the foregoing claims, the displaceable frame of which comprises at least two belts or tracks for the purpose of displacement.

10. Spreading and screeding device as claimed in one or more of the foregoing claims, further comprising a remote control for controlling the device.

11. Method for manufacturing a floor (42), comprising of providing a spreading and screeding device (2) as claimed in one or more of the foregoing claims.

12. Method as claimed in claim 11, wherein the floor comprises a cement screed floor.

Patentansprüche

1. Verteil- und Abziehvorrichtung (2) zum Herstellen eines Estrichbodens (42), die aufweist:

   - einen versetzbaren Rahmen (4);
   - eine Rolle (6), die mit dem Rahmen verbunden

ist, um den Estrichboden zu nivellieren; und
- eine Druck- und Verteilerrolle (8), die mit dem Rahmen verbunden ist und funktional vor der Rolle während der Verwendung angeordnet ist, um das Estrichbodenmaterial (44) verteilen und zu pressen, und
- eine Schnecke (10),

dadurch gekennzeichnet, dass die Schnecke (10) mit dem Rahmen (4) verbunden und über der Druck- und Verteilerrolle (8) zum Verteilen des Estrichbodenmaterials über die Breite der Vorrichtung angeordnet ist, wobei der Rahmen (4) mit wenigstens einer Öffnung (30) vorgesehen ist, die in einer Seite zum Auswerfen eines Überschusses an Estrichbodenmaterial seitlich durch die wenigstens eine Öffnung angeordnet ist.

2. Verteil- und Abziehvorrichtung nach Anspruch 1, wobei die Schnecke weiterhin in einem Winkel hinter der Druck- und Verteilerrolle positioniert ist.

3. Verteil- und Abziehvorrichtung nach Anspruch 1 oder 2, wobei die Druck- und Verteilerrolle (8) eine schneckenartige Rolle aufweist.

4. Verteil- und Abziehvorrichtung nach Anspruch 1 oder 2, wobei die Druck- und Verteilerrolle (8) eine spiralförmige Rolle aufweist.

5. Verteil- und Abziehvorrichtung nach einem oder mehreren der vorhergehenden Ansprüche, die weiterhin Höheneinstellungsmittel (38) aufweist, um die Höhe von wenigstens der Rolle und/oder der Druck- und Verteilerrolle anzupassen.

6. Verteil- und Abziehvorrichtung nach Anspruch 5, wobei die Höheneinstellungsmittel einen Laser aufweisen.

7. Verteil- und Abziehvorrichtung nach einem oder mehreren der vorhergehenden Ansprüche, die weiterhin Breiteneinstellungsmittel (40) zur relativen höhenmäßigen Anpassung der äußeren Enden der Rolle und/oder der Druck- und Verteilerrolle aufweist.

8. Verteil- und Abziehvorrichtung nach einem oder mehreren der vorhergehenden Ansprüche, wobei der versetzbare Rahmen einen Verbindungsriemen (16) aufweist.

9. Verteil- und Abziehvorrichtung nach einem oder mehreren der vorhergehenden Ansprüche, wobei der versetzbare Rahmen davon wenigstens zwei Riemen oder Schienen zum Zweck der Versetzung aufweist.

10. Verteil- und Abziehvorrichtung nach einem oder mehreren der vorhergehenden Ansprüche, die weiterhin eine Fernsteuerung zur Steuerung der Vorrichtung aufweist.

11. Verfahren zum Herstellen eines Bodens (42), das das Vorsehen einer Verteil- und Abziehvorrichtung (2) nach einem oder mehreren der vorhergehenden Ansprüche aufweist.

12. Verfahren nach Anspruch 11, wobei der Boden einen Zementestrichboden aufweist.

Revendications

1. Dispositif d'étalement et d'aplanissement (2) destiné à fabriquer une chape de plancher (42), comprenant :

un châssis mobile (4) ;
un rouleau (6) couplé au châssis afin d'assurer la mise à niveau de la chape de plancher ; et
un rouleau de pressage et d'étalement (8), couplé au châssis et placé fonctionnellement face au rouleau au cours de l'utilisation, afin de répartir et de presser le matériau de chape de plancher (44), et
une vis sans fin (10),
caractérisé en ce que la vis sans fin (10) est couplée au châssis(4) et positionnée au-dessus du rouleau de pressage et d'étalement (8) afin d'étaler le matériau de chape de plancher sur la largeur du dispositif,
dans lequel le châssis (4) comporte au moins une ouverture (30) agencée sur un côté afin d'éjecter un excès de matériau de chape de plancher latéralement à travers la au moins une ouverture.

2. Dispositif d'étalement et d'aplanissement selon la revendication 1, dans lequel la vis sans fin est, en outre, positionnée sous un certain angle derrière le rouleau de pressage et d'étalement.

3. Dispositif d'étalement et d'aplanissement selon la revendication 1 ou 2, dans lequel le rouleau de pressage et d'étalement (8) comprend un rouleau en forme de vis sans fin.

4. Dispositif d'étalement et d'aplanissement selon la revendication 1 ou 2, dans lequel le rouleau de pressage et d'étalement (8) comprend un rouleau en forme de spirale

5. Dispositif d'étalement et d'aplanissement selon une ou plusieurs des revendications précédentes, comprenant, en outre, un moyen de réglage de hauteur

(38) afin de régler la hauteur d'au moins le rouleau et/ou le rouleau de pressage et d'étalement.

6. Dispositif d'étalement et d'aplanissement selon la revendication 5, dans lequel le moyen de réglage de hauteur comprend un laser.

7. Dispositif d'étalement et d'aplanissement selon une ou plusieurs des revendications précédentes, comprenant, en outre, un moyen de réglage de largeur (40) afin d'assurer un réglage relatif en hauteur des extrémités supérieures du rouleau et/ou du rouleau de pressage et d'étalement.

8. Dispositif d'étalement et d'aplanissement selon une ou plusieurs des revendications précédentes, dans lequel le châssis mobile comprend une bande de liaison (16).

9. Dispositif d'étalement et d'aplanissement selon une ou plusieurs des revendications précédentes, dont le châssis mobile comprend au moins deux bandes ou chenilles afin d'assurer le déplacement.

10. Dispositif d'étalement et d'aplanissement selon une ou plusieurs des revendications précédentes, comprenant, en outre, un moyen de commande à distance afin de commander le dispositif.

11. Procédé de fabrication d'un plancher (42), comprenant la préparation d'un dispositif d'étalement et d'aplanissement (2) selon une ou plusieurs des revendications précédentes.

12. Procédé selon la revendication 11, dans lequel le plancher comprend une chape de plancher à base de ciment.

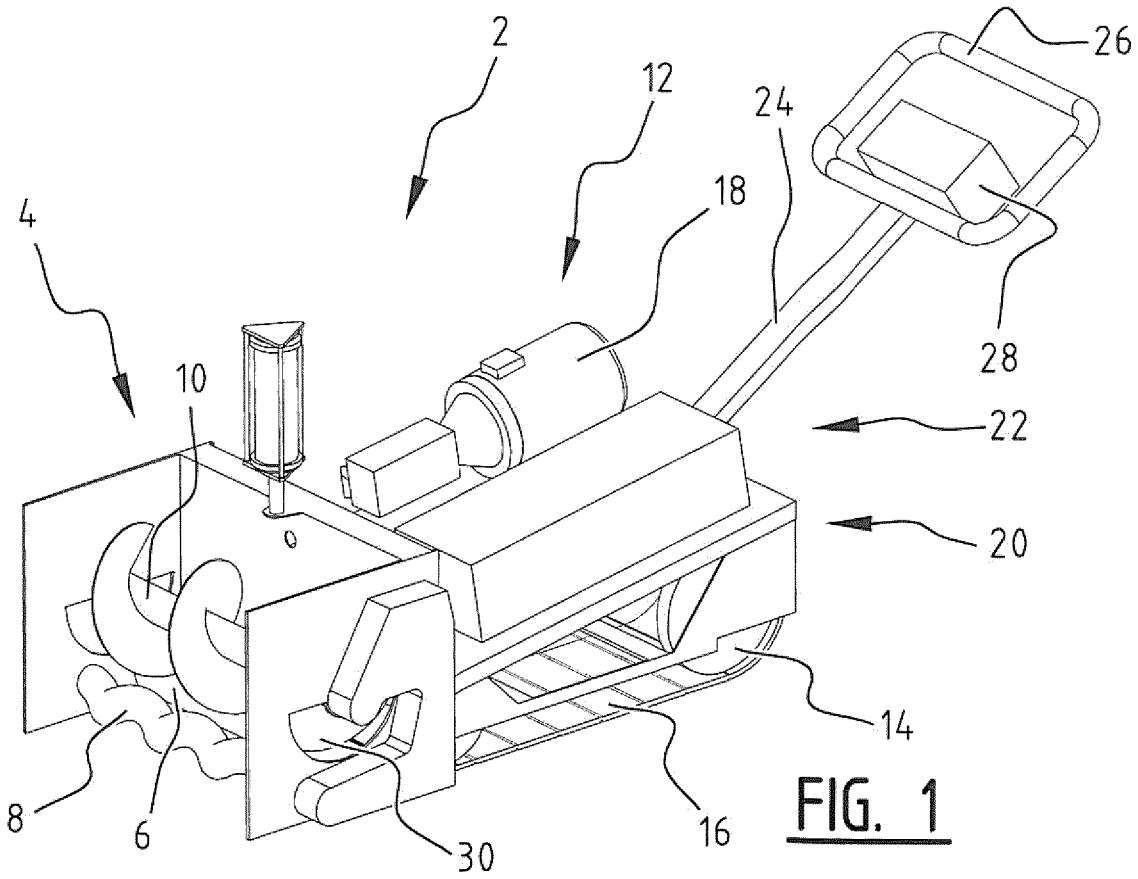

FIG. 1

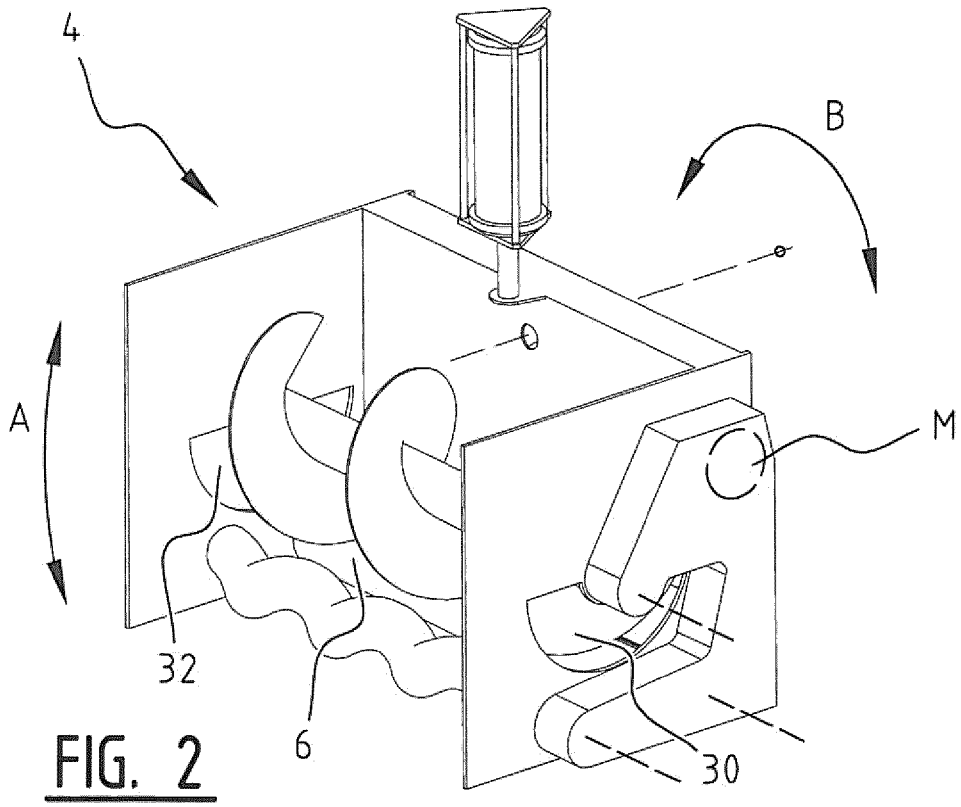

FIG. 2

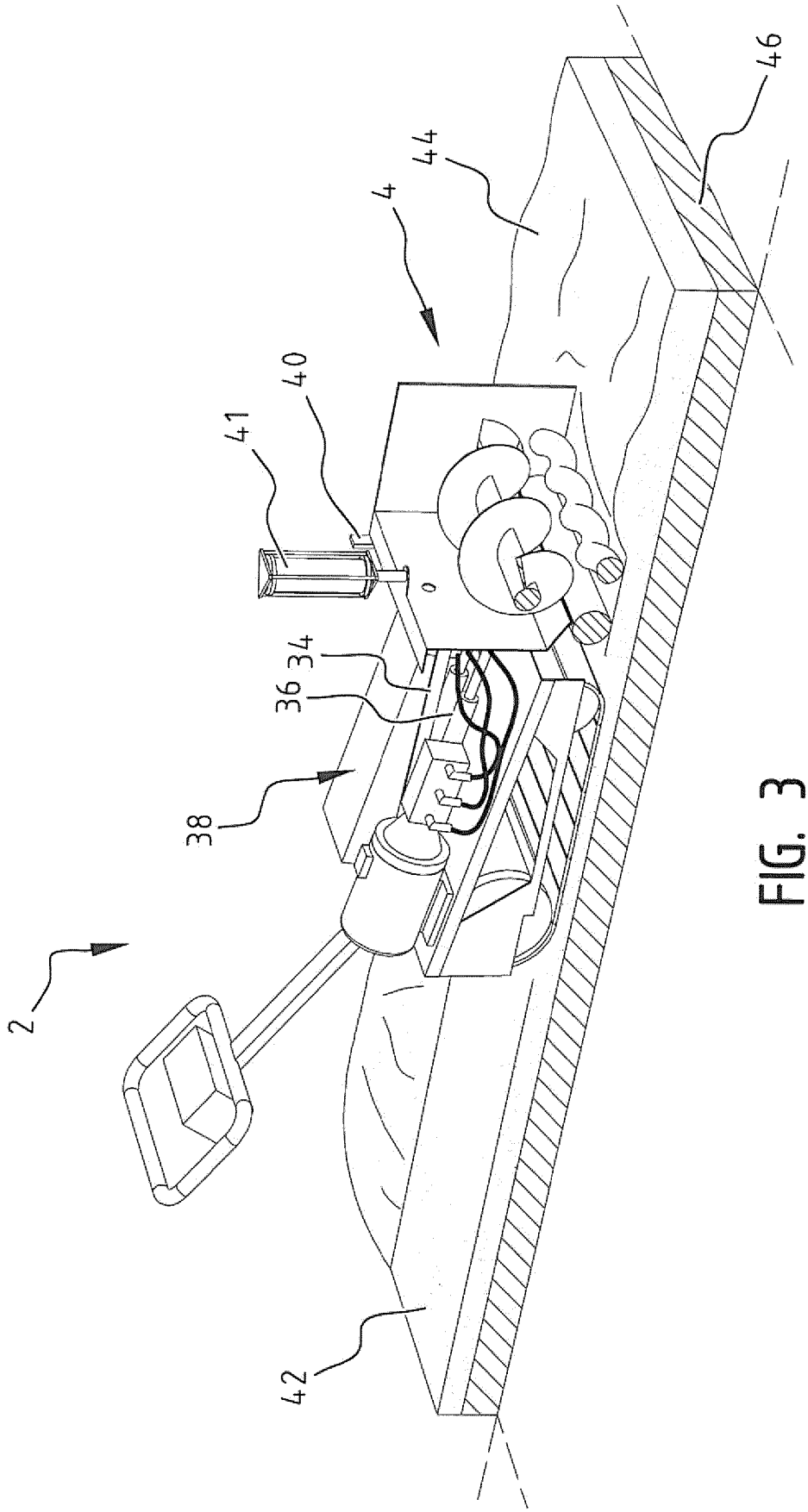

FIG. 3

REFERENCES CITED IN THE DESCRIPTION

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