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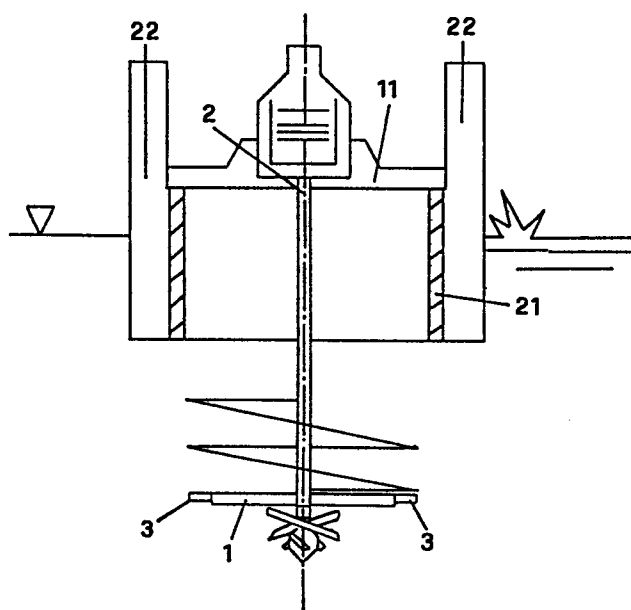
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54 A device that may be applied to perforating drills for the drilling of foundation holes, and the insertion and stabilization of

57 A device that may be applied to perforating drills comprising an expansion headpiece (1) with a determined rotation sense and retraction by motion inversion, that will perform holes of a diameter adapted to the reinforcement tube (of steel, cement or other), a pusher (11) having the function of causing the penetration of the reinforcement tube or the hooking simultaneously to the drilling of the hole, which will therefore be reinforced in one single stage, and a reinforcement tube (21), provided with a series of tongues (22), outwardly fixed, for stabilizing the foundation relating to flexion and torsion and assure the structural connection between the different stages of said tube. Each single component element of the device may be applied to perforating drills or in connection with one or two of the other elements, according to the requests.



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"A device that may be applied to perforating drills for the drilling of foundation holes, and the insertion and stabilization of reinforcement tubes".

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10 The present invention concerns a device that may be applied to perforating drills for the drilling of foundation holes and the insertion and stabilization of reinforcement tubes of steel, cement and other materials.

15 It is already well known that the drilling of holes in the earth oftenly shows the problem of the sinking thereof, that oftenly may take place due to incoherence of the ground or to loads situated nearby. In these cases it is not possible to use traditional drills and it is necessary to use
20 shovel excavators with the performing of greater holes, so that the walls thereof may be reinforced for obtaining the desired dimensions.

The main inconveniences of this system are:

- 25
- an excavation greater than really necessary;
 - the need of greater space all around;
 - the difficulty of performing the excavation in proximity of already existing buildings;
 - the need of using molds or similar in case of sinking grounds;

- the use of more material;
 - the use of more machines;
 - the difficulty of recovering the interred reinforcement;
 - due to all above mentioned, the need of different working
- 5 stages and therefore more time and higher costs.

It is the aim of the present invention to rationalize in the best way possible the performance of reinforced holes in the ground, so that the same may be quickly performed in one single stage, thus eliminating all above mentioned inconveniences.

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The aim is reached by means of the device according to the present invention that may be applied to the perforating drills, comprising an expansion headpiece with a determined rotation sense and retraction by motion inversion, that will perform holes of a diameter adapted to the reinforcement tube, a pusher superiorly applied to said drill and a reinforcement tube provided with a series of vertical tongues projecting from said tube.

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The advantages obtained according to the aim set forth by the present invention, are the following:

- small drilling spaces;
 - the possibility of performing the hole also nearby a building without causing damages;
 - the elimination of the use of molds and similar;
 - the use of one single machine;
 - the shortening of working times and saving of materials
- 25

with an expense reduction;

- the possibility of recovering the interred reinforcement;
- an extremely simple process, quick and little expensive,
with the consequence of the possible amplance of the uti-
5 lization field thereof to any kind of ground and applica-
tion.

The present invention will be described in detail hereinbe-
low relating to the enclosed drawings showing some preferred
10 embodiments thereof.

Figure 1 shows a lateral view of a device for perforating
drills comprising an expansion headpiece, a pusher and a
finned tube.

15 Figures 2 and 3 show the variants of the device comprising,
respectively, the sole expansion headpiece and the sole push-
er apparatus in the following stages:

A - lateral view and plant in drilling position;

20 B - perforation: start;

C - perforation: introduction of first tube;

D - extraction of the drill;

E - mounting of the second and following tubes;

F - perforation: introduction of the second and following tubes.

25 Figure 4 shows the device comprising the sole reinforcement
tube provided with vertical tongues projecting from said tu-
be, in the following stages:

A - lateral view of the tube with the tongues in penetration

position;

B - introduction of the first tube;

C - superimposition of the second and following tubes;

D - introduction of a pile.

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The present invention concerns a device that may be applied to perforating drills for the execution of foundation holes and the insertion and stabilization of reinforcement tubes, comprising:

- 10 - an expansion headpiece 1 provided with one or more expansion blade 3 which, with the rotation in the sense of drills 2 for perforation 4 and in contact with the ground, spread apart in a position 5 and therefore enlarge the hole adapting the same to the outer diameter of the reinforcement
- 15 tube that is to be introduced. The extraction of the drill then takes place following to the rotation in a sense 6 contrary to the one of perforation, whereby the expansion blades are situated in a position 7 thus allowing the passing of the drill through the inner diameter of the tube;
- 20 - a pusher apparatus 11, placed upwardly to said drill 2, fixed to the non-rotating part thereof so that, when the drill is lowered and the pusher resting on the tube, the same will be downwardly pushed, introducing or forcing it into the provided hole according to the diameter of the same
- 25 being greater, equal or smaller than the one of the outer diameter of the tube;

- a reinforcement tube 21, provided with a series of vertical tongues 22, extending from said tube so as to guide the following tube 21' and to realize a connection between said tubes.

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The functioning and working of the device according to the present invention may be described according to the single stages exemplified in the enclosed drawings:

- 10 Figure 2 B - perforation: start: Tube 21 is placed on the ground and drill 2 with blades 3 retracted in position 7 is introduced therein until touching the ground;
- 15 C - perforation: introduction of the first tube. At the contact with the ground and rotating the drill as shown with 4, blades 3 are brought in position 5 enlarging the hole to the desired diameter, so that tube 21, pushed by the own mass or by the pusher apparatus 11, penetrates the ground delimiting the hole and, if necessary, contains the sinkings in any case caused;
- 20 D - extraction of the drill: once the first tube 21 has been completely interred, the rotation sense of the drill is inverted as in position 6, whereby the blades are brought in position 7 and it is therefore possible to extract the drill without causing any damage to the tube;
- 25

- 6 -

5 E - mounting of the second and following tubes: once the second (and in the same way all the following) tube 21' has been positioned on the first one, the above described sequence will be repeated and if necessary the drill will be extended.

Figure 3 A - the pusher 11 is placed upwardly to drill 2;
B - perforation: start. The first tube 21 will be placed on the ground and the drill 2 will be introduced therein;
10 C - perforation: introduction of the first tube: the drill starts perforating and while lowering brings the pusher 11 at contact with the tube, causing the forced penetration thereof in the ground;
15 D - extraction of the drill: once the first tube 21 is completely interred, drill 2 will be extracted;
E - mounting of the second and the following tubes:
20 once the second (and in the same way all the following) tube 21' has been placed on the first one, above described sequence will be repeated, providing, if necessary, to the extension of the drill.

25 Figure 4 A - the tube 21 is ready to be placed on the ground, the projection of tongues 22 being upwardly positioned;

B - introduction of the first tube: the tube 21 will be introduced contemporarily to the execution of the hole;

5 C - superimposition of the second and following tubes: the second tube 21' (and in the same way all the following) will be placed on the first one with the tongues 22' offset and will be embraced by tongues 22 of the preceding tube 21, so as to obtain a good connection between the two tubes. The last tube will be inserted with the tongues placed
10 ed downwardly, eliminating all superficial projection and further improving the connection between the last foundation stages;

15 D - introduction of the piles: once the necessary stages have been performed, pile P may be inserted and fixed by upfilling with sand or other material from the foundation.

20 It is evident that the elements making up the device according to the present invention may be simultaneously applied so as to perfection the functioning of the perforating drills, but they will be equally effective if working single, one by one, or variously coupled.

CLAIMS

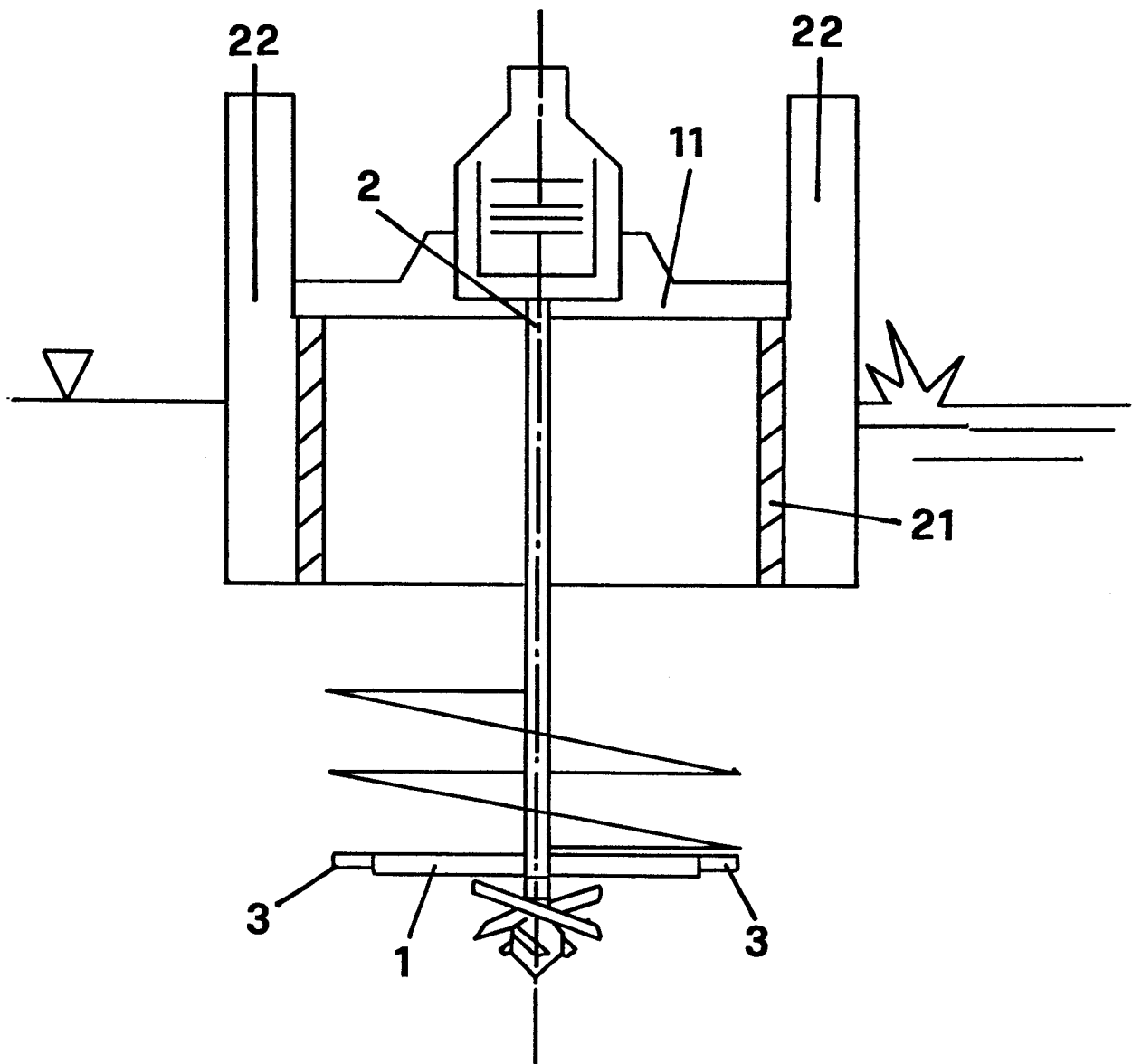
1. A device that may be applied to perforating drills for the drilling of foundation holes and the insertion and stabilization of reinforcement tubes, characterized in the making
5 up elements:
- an expansion headpiece (1) provided with one or more expansion blades (3) which, with the rotation of drill (2) in the perforation sense (4) and at the contact with the
10 ground, spread apart in a position (5) and therefore enlarge the hole adapting the same to the outer diameter of the reinforcement tube to be inserted; the extraction of the drill takes place due to the rotation in a sense (6) contrary to the one of perforation, whereby the expansion blades are brought in a position (7) thus allowing the passage of the drill through the inner diameter
15 of the tube;
 - a pusher apparatus (11), placed upwardly to said drill (2), fixed to the non-rotating part thereof so that, when the
20 drill is lowered and the pusher resting on the tube, the same will be downwardly pushed, introducing or forcing it into the provided hole according to the diameter of the same being greater, equal or smaller than the one of the outer diameter of the tube;
 - 25 - a reinforcement tube (21), provided with a series of vertical tongues (22), extending from said tube so as to gui-

de the following tube (21') and to realize a connection between said tubes.

2. A device according to claim 1, characterized in that the expansion headpiece (1) is provided with blades (3) hinged thereto in such a way that when the drill rotates in the contrary sense the same will retract so as to allow the extraction of the drill through the reinforcement.
3. A device according to claim 1, characterized in that tube (21), pushed by pusher apparatus (11), penetrates the ground delimiting the hole and/or limiting the sinking thereof.
4. A device according to claim 1, characterized in that the second tube (21') (and in the same way all the following) will be superimposed to the first one with the tongues (22') thereof offset, and will be embraced by tongues (22) of preceding tube (21), so that a good connection between the two tubes may be obtained.
5. A device according to claims 1 and 4, characterized in that the last tube (21') will be inserted with the tongues thereof placed downwardly, thus eliminating any surface projection and further improving the connection between the last stages of the foundation.
6. A device according to any of the precedent claims, characterized in that elements (1, 11 and 21) may be variously coupled according to the requests.

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FIG.1



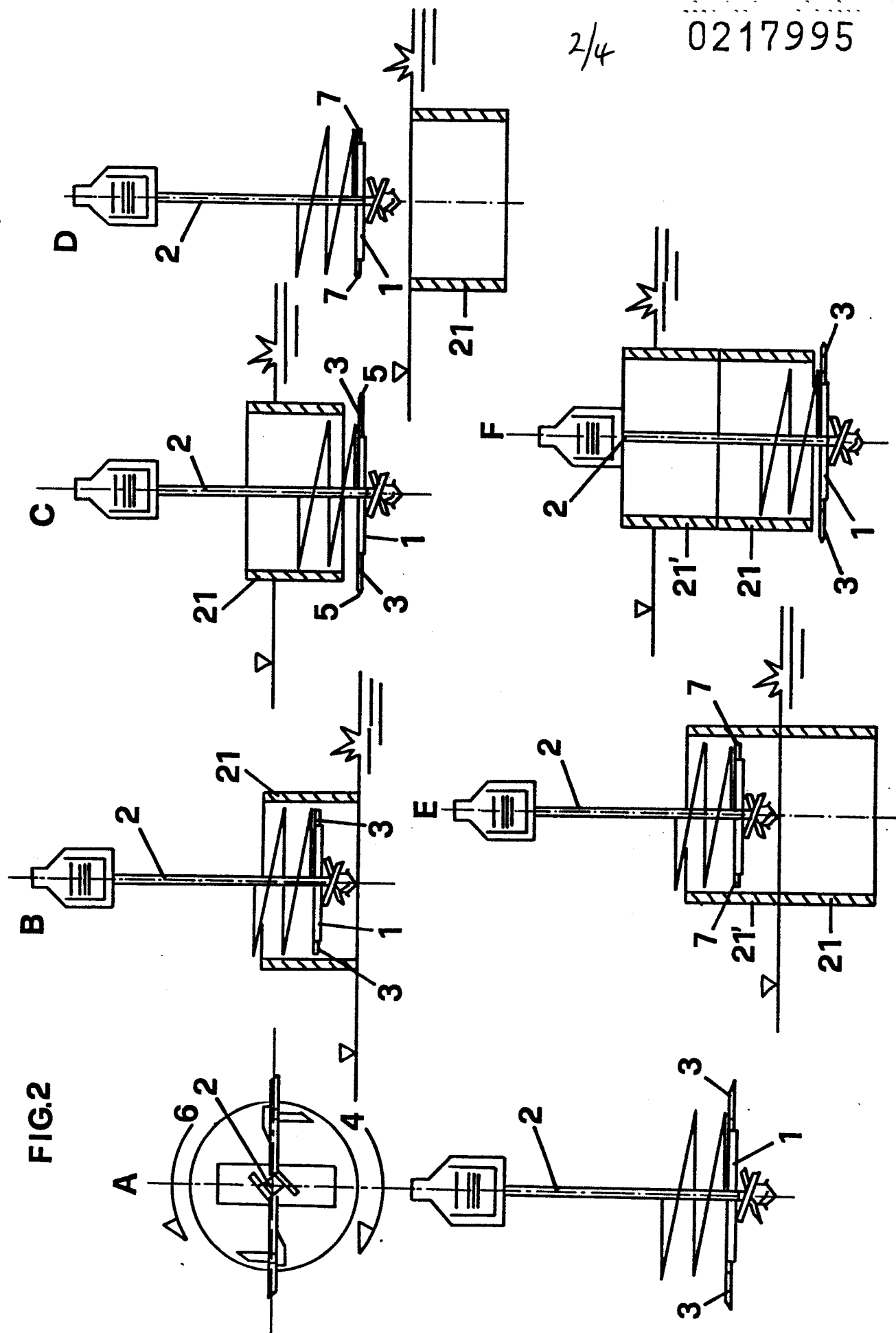
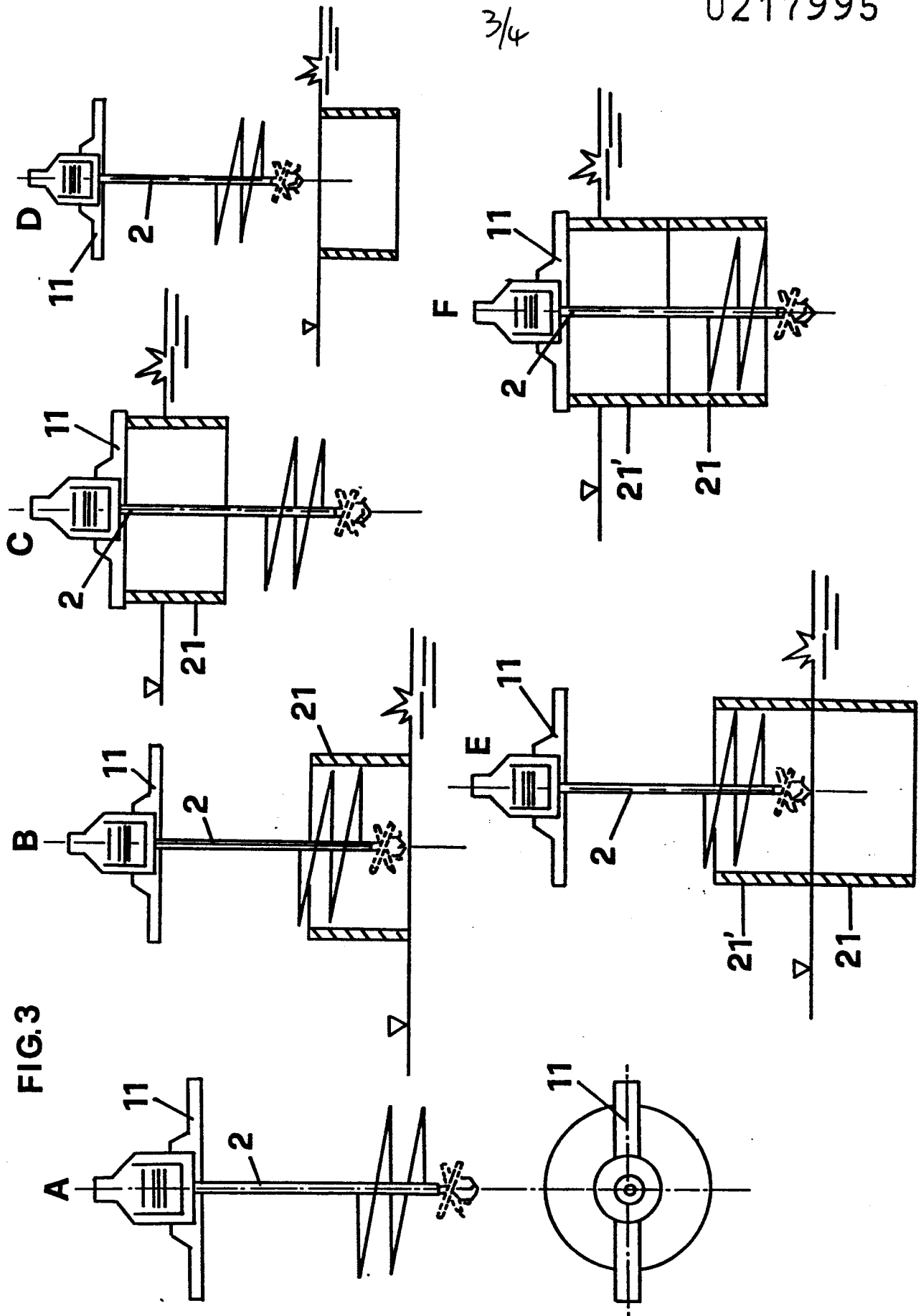


FIG.3



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