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(54) **Mixer-transport apparatus for floor mortar and the like.**

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Description

The invention relates to a mixer-transport apparatus for floor mortar and the like, comprising a mixing tank having a filling hole that can be sealed, a transport hose being connected to the mixing tank for pneumatic transportation of an earth-humid sand-cement mixture to a site where it is used.

Such mixer-transport apparatuses are known from practice and are described in a brochure of Bredel Machine- en Constructiebedrijf B.V. These known mixer-transport apparatuses are designed as trailers, which can be connected to the rear of vehicles for transportation. The mixing tank that is part of the apparatus typically has a volume of 220 l. In some manner or other the mixing tank is filled with sand and mortar in the proper proportions, after which these components are mixed and, using a compressor forming part of the apparatus, pneumatically transported via a hose connected to the mixing tank to, for instance, a construction site where cement floors are to be constructed. Pneumatic transport requires high pressure, typically amounting to 7-8 atmospheres gauge pressure, and such pressure requires that the sealing of the filling hole in the mixing tank meets high standards. To that effect the mixing tank is provided with one connecting stub, elliptic in cross-section, with an edge pointing inward, in which a cover, also of elliptic configuration, is disposed in such a way that the cover is pressed against the inwardly pointing edge of the connecting stub owing to the pressure obtaining in the mixing tank. On account of its elliptic form, placing the cover and removing it require a complex, composite movement to be made manually by an operator. The floor mortar is mixed and transported by charges. After a charge has been transported from the mixing tank to the site where it is used, the elliptic cover must be removed manually, the mixing tank must be refilled, the elliptic cover must be replaced and after sufficient mixing the sand-cement mixture is transported. So far, the complex movement involved in removing and replacing the cover has been an obstacle to the automatic operation of the mixer-transport apparatus.

A solution to this problem is proposed in the prior-filed but not prior-published NL-A-88.02924, to the effect that a remote-controlled cone valve is mounted in the filling hole of the mixing tank. Although this solution is eminently suitable in a great number of cases, there are still a few drawbacks involved, viz.:

- the coned valve moves vertically and is therefore always located in the path of the sand-cement mixture that is being fed into the mixing tank. If the valve is wet, grains of sand-cement will stick to its surface yielding a sticky mortar mixture which prevents the valve from properly sealing the filling hole. The compressed air required for pneumatic transport will thus escape via the valve and the proper operation of the apparatus will be disturbed.
- The coned valve with the apputenant control apparatus is of relatively large vertical size, thus increasing the height of the part of the installation extending upward from the mixing tank and making it impossible in some cases for the mixer-transport apparatus to fit under the dosaging screw of existing sand-cement silos.

The present invention aims to overcome these disadavantages and to that effect is characterized by the features defined in claim 1.

Because the valve can be displaced in a horizontal plane, it can be moved fully out of the path of the material charged to the mixing tank when it is being filled, so that no sticky mortar mixture will form on the surface of the valve, which would prevent a proper sealing during the pneumatic transport of the material from the mixing tank. Because the valve is flat and its control mechanism is also disposed in a horizontal plane, the construction height of the mixing tank can be reduced by about 25 cm, so that placing the mixer-transport apparatus under existing sand-cement silos no longer presents any problems whatsoever.

The vertical movement of the vertical valve shaft over an adjustable distance permits the valve to be pressed in sealing engagement against the 0-ring under the influence of pressurized air introduced into the mixing tank for the pneumatic transportation of its content. After the air pressure is released the valve is pushed in its lowermost position and can be displaced horizontally without pressing against the sealing 0-ring, thus increasing the life span thereof.

It is observed that from DE-A-36,41,328 it is known to arrange a level controlled shut-off valve at the filling hole of a mixing tank for pivotal movement about a vertical shaft, which enables the valve to be displaced in a horizontal plane, fully out of the path of the material charged to the mixing tank, when it is being filled. In the closed position, however, the shut-off valve does not properly seal the filling hole so that the compressed air required for the pneumatic transport of the mixture from the mixing tank would escape via the closed shut-off valve.

From US-A-3,152,624 a mixing tank is known, which is suitable for removing therefrom, by means of pneumatic transportation, material which flows in through a filling opening from a loading hopper.

Disposed around the filling opening is a sealing ring. The opening may be closed by a convex

shaped valve which is pivotable about an inclined axle. When swivelling the valve it is wiped clean by the sealing ring, which is pressed against the convex valve surface. The valve is not vertically movable over an adjustable distance between a pivoting and a sealing position.

Further features of the apparatus according to the invention are defined in the subclaims.

One embodiment of the apparatus according to the invention will hereinbelow be further explained and illustrated, by way of example, with reference to the accompanying drawings, in which:

Fig. 1 shows an arrangement of a mixer-transport apparatus placed in the operative position under a sand-cement silo;

Fig. 2 is a cross-section of the valve taken on the line II-II of Fig. 3; and

Fig. 3 shows a top plan view of the mixing tank comprising a valve according to Fig. 2.

Fig. 1 shows a known per se silo 1 comprising separate compartments for sand and cement and provided with a cement dosaging screw 2 and a sand dosaging screw 3. The mixing and transport apparatus 4 comprises a mixing tank 5, at the top of which a filling hole with a valve 6 is provided. In Fig. 1 the valve is a coned valve, as described in NL-A-88.02924. The mixing and transport apparatus 4 has its valve 6 placed under the outlet opening of the sand dosaging screw 3 of the silo 1.

Figs 2 and 3 show in detail the upper part of the mixing tank 5 with the valve 6. On the edge 10 of an opening provided in the mixing tank 5, a connecting stub 11 is arranged, which is covered at the top by an upper plate 12. In the upper plate 12 of elliptic configuration, a circular opening 13 is provided in which a ring 14, L-shaped in cross-section, is mounted, the ring being secured to the upper plate 12 by means of bolts. The ring 14 comprises an inlet funnel 15 (shown in part). The ring 14 bounds a circular filling hole 18. In the bottom surface of the ring 14 a groove 16 is provided for accommodating an O-ring 17, which projects some distance downwards from the bottom surface of the ring 14 and engages the upper surface of a valve plate 23. In addition to the ring 14 a vertical bearing bush 19 is mounted on the upper plate 12 and welded to it. The bearing bush 19 accommodates the thickened guiding part 31 of a vertical valve shaft 20 whose lower end projects into stub 11. Mounted onto this free end of the valve shaft 20 is a bush 22 comprising an arm 21 extending radially, onto which the horizontal valve plate 23 is mounted. In the position shown in Fig. 2 the valve plate 23, under the influence of the pressure obtaining within the mixing tank, is pressed into sealing engagement with O-ring 17.

Provided at the top of the valve shaft 20 is a threaded part 24, onto which an adjusting nut 25 and a locking nut 26 are mounted. In the position as shown in Fig. 2, where the valve plate 23 is pressed against the O-ring 17, the bottom surface of the adjusting nut 25 is at a distance X from the upper edge of bearing bush 19. The distance or clearance X determines the distance over which the valve shaft 20, and hence also the valve plate 23, can lower in vertical direction when the pressure in the mixing tank 5 is released. The valve shaft 20 is then pressed down vertically by means of Belleville washers 27, arranged between the bottom edge of the bearing bush 19 and the upper edge of the bush 22 mounted on the valve shaft 20. Because the adjusting nut 25 engages the upper edge of the bearing bush 19 when the valve shaft 20 is pivoted, a plain bearing 28 is mounted, for instance glued, on the upper edge of the bearing bush. In the adjusting nut 25 a recess 29 is provided for applying a spanner for adjusting the clearance X such that when the pressure in the mixing tank is removed, the valve plate will be just clear of the O-ring 17, so that when the valve plate 23 is displaced horizontally no friction, which causes wear, will be exerted on the O-ring 17.

Mounted on the free upper end of the valve shaft 20 is a control arm 30, which, using an automatically operable air cylinder, can be pivoted into a position in which the filling hole 18 is completely sealed, or a position in which the filling hole 18 is cleared entirely, as shown in top plan view in Fig. 3.

For the proper lubrication of the valve shaft 20 in the bearing bush 19, a grease nipple 34 is provided in the wall of the bush bearing 19, and the guiding part 31 of the valve shaft 20 at its bottom surface is sealed in axial direction by means of an O-ring 33.

Claims

1. A mixer-transport apparatus (4) for floor mortar and the like, comprising a mixing tank (5) having a filling hole (18) that can be sealed, a transport hose being connected to the mixing tank (5) for pneumatic transportation of an earth-humid sand-cement mixture to a site where it is used, characterized in that at the filling hole (18) of the mixing tank (5) a remote-controlled shut-off valve (23) is arranged for pivotal movement about a vertical shaft (20), which is vertically movable over an adjustable distance (X) between a pivoting position, in which the valve (23) is just clear of an O-ring (17) mounted in an annular groove (16) provided in the bottom surface of a ring (14) surrounding the filling hole (18), and a sealing position, in which the valve (23), owing to the pressure in the mixing tank (5), is pressed into

sealing engagement with the O-ring (17).

2. A mixer-transport apparatus acording to claim 1 characterized in that the valve shaft (20) comprises a thickened guiding part (31) accommodated in a bearing bush (19) mounted on a connecting stub (11) of the mixing tank (5), a set of Belleville washers (27) being arranged between the bottom edge of the bearing bush (19) and a carrier arm (21, 22) mounted on the lower end of the valve shaft (20), said Belleville washers imparting a spring-bias in downward direction to the valve shaft (20).

3. A mixer-transport apparatus according to claims 1-2, characterized in that the valve shaft (20) has at its upper end a threaded part (24) on which an adjusting nut (25) and a locking nut (26) are mounted for adjusting the axial clearance (X) of the valve shaft (20).

4. A mixer-transport apparatus according to claims 1-3, characterized in that when the valve plate (23) is in the pivoting position, the bottom surface of the adjusting nut (25) engages a plain bearing (28) mounted on the upper edge of the bearing bush (19).

5. A mixer-transport apparatus according to claims 1-4, characterized by a control arm (30) engaging the upper end of the valve shaft (20), the end of said control arm (30) being connected to an air cylinder (32) horizontally mounted on the mixing tank (5).

Patentansprüche

1. Mischtransportapparat (4) für Bodenmörtel und dergleichen, mit einem Mischtank (5) mit einer Befüllöffnung (18), die abgedichtet werden kann, mit einem Transportschlauch, der an den Mischtank (5) angeschlossen ist, um eine erdfeuchte Sand-Zement-Mischung zu einem Einsatzort zu transportieren, **dadurch gekennzeichnet,** daß an der Befüllöffnung (18) des Mischtankes (5) eine fernsteuerbare Abschlußklappe (23) für eine Verschwenkbewegung um eine vertikale Achse (20) angeordnet ist, die über einen einstellbaren Abstand (X) hinweg vertikal zwischen einer verschwenkten Position, in der die Klappe (23) gerade einen O-Ring (17) freigibt, der in einer ringförmigen Nut (16) in der Bodenfläche eines die Befüllöffnung (18) umgebenden Ringes (14) vorgesehen ist, und einer abdichtenden Position bewegbar ist, in der die Klappe (23) auf Grund des Druckes in dein Mischtank (5) in einen dichtenden Eingriff mit dem O-Ring (17) gedrückt wird.

2. Mischtransportapparat nach Anspruch 1, dadurch gekennzeichnet, daß die Welle (20) der Klappe über einen verdickten Führungsabschnitt (31), der in einer Lagerbuchse (19) angeordnet ist, die auf einem Verbindungsstummel (11) des Mischtankes (5) montiert ist, und über einen Satz von Belleville-Tellerfedern (27) verfügt, die zwischen der Bodenkante der Lagerbuchse (19) und einem Trägerarm (21, 22) auf dem unteren Ende der Welle (20) der Klappe angeordnet sind, wobei diese Belleville-Tellerfedern (27) in nach unten gerichteter Weise auf die Welle (20) der Klappe zu eine Vorspannung ausüben.

3. Mischtransportapparat nach den Ansprüchen 1 - 2, dadurch gekennzeichnet, daß die Welle (20) der Klappe an ihrem oberen Ende über einen gewindeten Abschnitt (24) verfügt, auf dem eine Einstellmutter (25) und eine Verschlußmutter (26) angeordnet sind, um die lichte Weite (X) der Welle (20) der Klappe einzustellen.

4. Mischtransportapparat nach den Ansprüchen 1 - 3, dadurch gekennzeichnet, daß, wenn sich die Platte (23) der Klappe in der verschwenkten Position befindet, die Bodenfläche der Einstellmutter (25) in ein Quergleitlager (28) eingreift, das an der oberen Kante der Lagerbuchse (19) angeordnet ist.

5. Mischtransportapparat nach den Ansprüchen 1 - 4, dadurch gekennzeichnet, daß ein Steuerarm (30) vorgesehen, der in das obere Ende der Welle (20) der Klappe eingreift, wobei das Ende des Steuerarms (30) mit einem Luftzylinder (32) verbunden ist, der horizontal auf dem Mischtank (5) angeordnet ist.

Revendications

1. Appareil (4) pour mélanger et transporter du mortier de sol et similaire, comprenant une cuve de mélange (5) dotée d'un orifice de remplissage (18) susceptible d'être fermé, un tuyau de transport étant relié à la cuve de mélange (5) pour le transport pneumatique d'un mélange ciment/sable humide/terre vers un site d'utilisation, caractérisé en ce qu'une vanne d'arrêt (23) télécommandée est montée au niveau de l'orifice de remplissage (18) de la cuve de mélange (5) de manière à pouvoir pivoter autour d'un axe vertical (20) mobile verticalement sur une distance réglage (X) entre une position de pivotement, dans laquelle la vanne (23) est juste dégagée d'un joint torique (17) inséré dans une rainure annulaire

(16) ménagée dans la surface inférieure d'une bague (14) entourant l'orifice de remplissage (18), et une position d'étanchement, dans laquelle la vanne (23) est plaquée de manière étanche contre le joint torique (17) sous l'effet de la pression régnant dans la cuve de mélange (5).

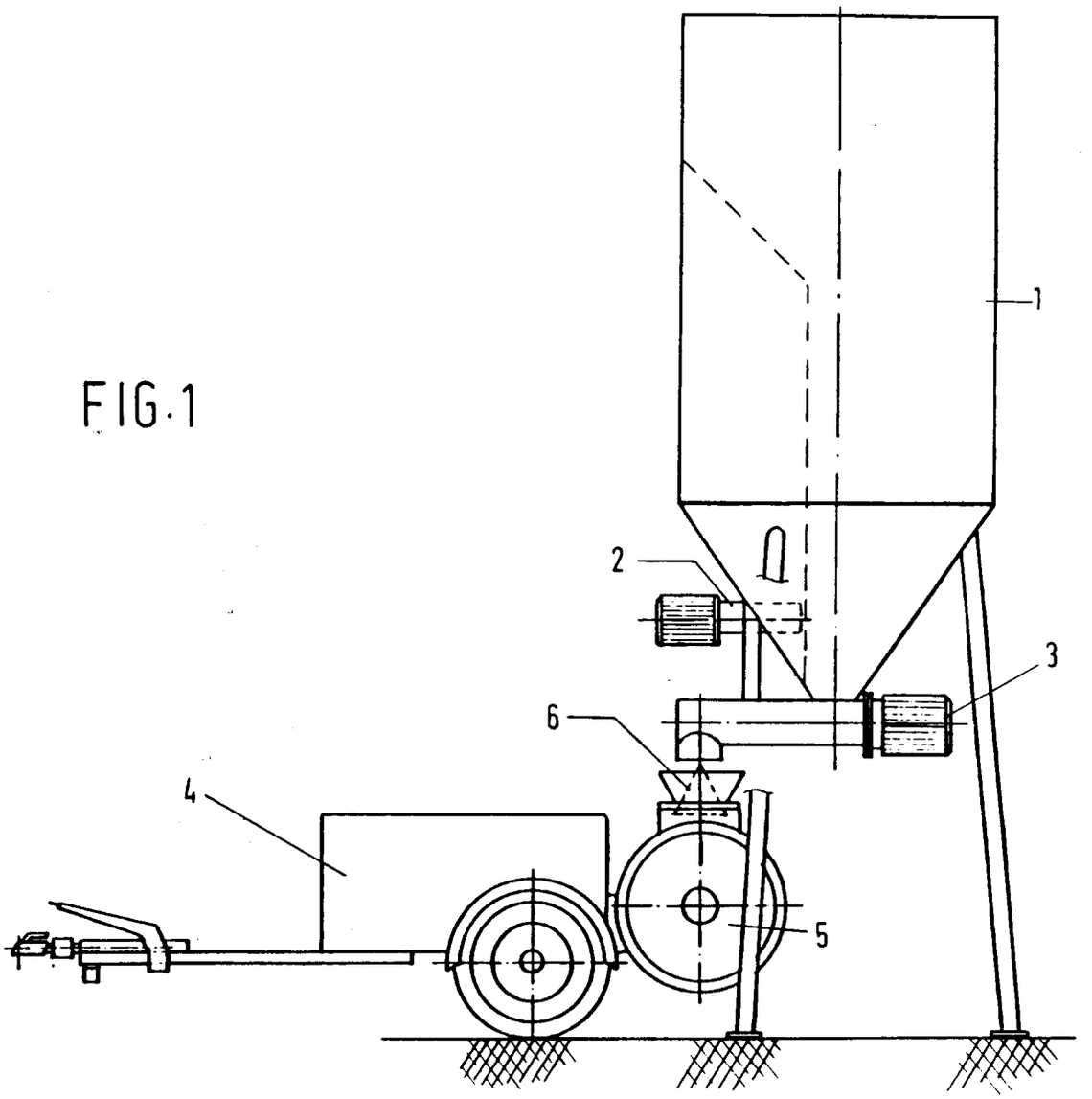
2. Appareil de mélange et de transport selon la revendication 1, caractérisé en ce que l'axe de vanne (20) comprend une partie de guidage (31) de plus grande épaisseur, logée dans un coussinet (19) monté sur un manchon de raccordement (11) de la cuve de mélange (5), un jeu de rondelles Belleville (27) étant disposé entre le bord inférieur du coussinet (19) et un bras de support (21, 22) monté à l'extrémité inférieure de l'axe de vanne (20), lesdites rondelles Belleville exerçant sur l'axe de vanne (20) une force élastique orientée vers le bas.

3. Appareil de mélange et de transport selon les revendications 1 et 2, caractérisé en ce que l'extrémité supérieure de l'axe de vanne (20) comporte une partie filetée (24) sur laquelle un écrou de serrage (25) et un contre-écrou (26) sont montés pour le réglage du jeu axial (X) de l'axe de vanne (20).

4. Appareil de mélange et de transport selon les revendications 1 à 3, caractérisé en ce que lorsque la plaque de vanne (23) est en position de pivotement, la surface inférieure de l'écrou de serrage (25) s'engage dans un palier lisse (28) monté sur le bord supérieur du coussinet (19).

5. Appareil de mélange et de transport selon les revendications 1 à 4, caractérisé par un bras de commande (30) engageant le bord supérieur de l'axe de vanne (20), l'extrémité dudit bras de commande (30) étant reliée à un vérin pneumatique (32) monté horizontalement sur la cuve de mélange (5).

FIG.1



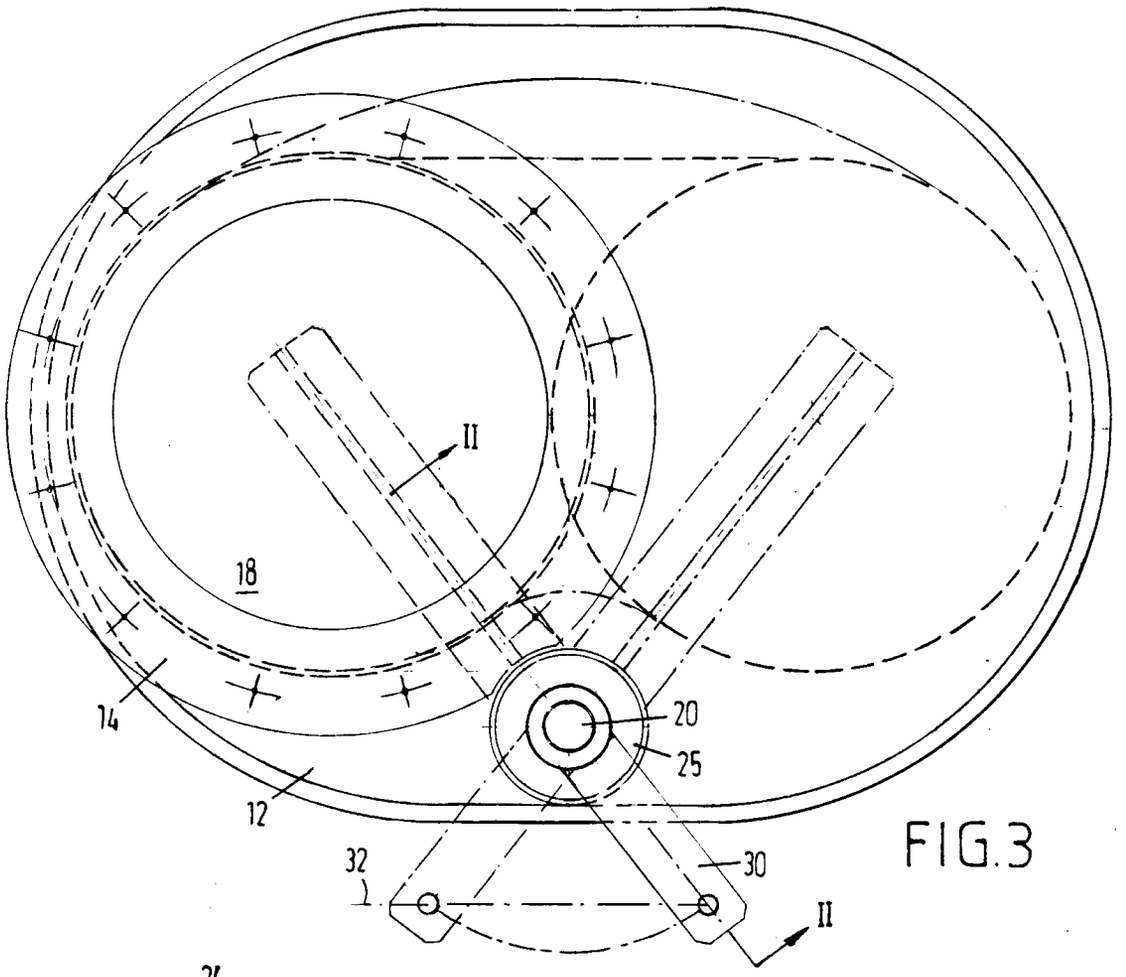

II
18
14
12
20
25
32
30
II

FIG.3

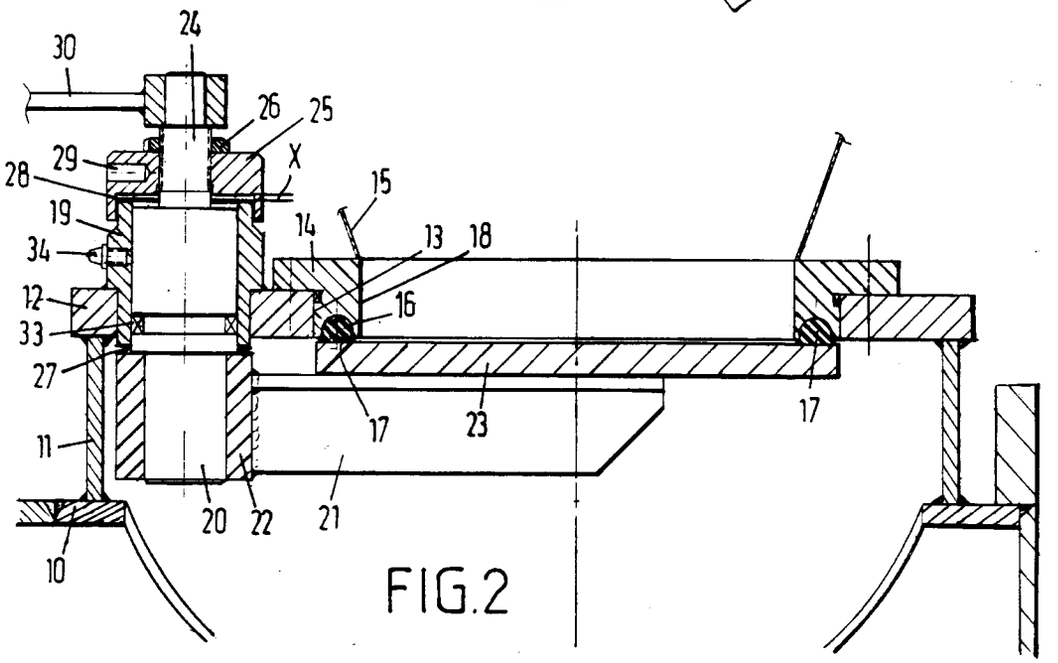

30
24
26
25
X
29
28
19
34
12
33
27
11
10
20
22
21
15
14
13
18
16
17
23
17

FIG.2