

Description

Technical field

[0001] The present invention falls within the sector of mixing apparatuses with rotating stirring devices in fixed receptacles, i.e., apparatuses in which the movement of the receptacle is not intended to perform mixing. In particular, this mixer also falls within those mixers that have stirrers with planetary movement, i.e., that rotate around their own axis and around a vertical axis.

[0002] The object of the invention is a mixer of the type that has a conical container in which an endless screw moves arranged close to and parallel to the inner wall of the container and rotates on its own axis and around the vertical axis of the mixing container.

State of the art

[0003] Based on 1939 EWARDUS NAUTA JOHANES (for example US2345063 (A) and GB599900 (A)), various mixing apparatuses were patented, particularly adapted for mixing pulverised materials, such as flour, comprising a conical mixing container, with a lower outlet mouth for the mixed product, which is internally provided with a mixing endless screw, which is actuated such that the content of the troughs is transported from the lower end to the upper end thereof and then falls back into the mixing bowl. From its early developments, the endless screw began to be placed with the lower end thereof at the centre and with the upper end thereof eccentrically in the mixing receptacle, so that said screw is located at all times near the side wall of the conical container, while being provided with drag means so that said screw rotates on its own axis and around the vertical axis of the mixing container.

[0004] Based on this invention, many improvements have arisen in mixers of this type, ranging from placing two diametrically opposed endless screws, or one second endless screw placed hanging on the vertical axis of the container, to placing a second motor close to the lower outlet mouth to facilitate the removal of the product from the conical container wherein it is mixed.

[0005] In some solutions, this endless screw is actuated by means of one or more motors located above the container, which move a central vertical axis coinciding with the vertical axis of the container, in which it couples a transmission that in turn is coupled at the upper end of said endless screw, enabling both movement around the container and rotation around its axis, which generates the vertical flow of the product in order to make the mixture homogeneous.

[0006] The problem with mixers of this type, particularly when they have a very large rotation radius, is that the rotating arm is not very stable in its perimeter rotation due to the displaced loads, which causes oscillations during the rotation thereof and friction of the endless screw with the wall of the container, particularly when the end-

less screw works without support on the lower portion of the container.

Description of the invention

[0007] Based on the prior art, an aim of the present invention is to prevent the aforementioned drawbacks of the known mixers and achieve a mixing device that is very simple to construct, efficient to use and enables complete mixing to obtain a finished product of great homogeneity and practically without losses.

[0008] Another aim of the invention is to prevent the endless screw from oscillating in the lower portion thereof, which will contribute to increasing the useful life of the mixer and reducing noise and friction on the wall of the container.

[0009] In order to achieve the proposed aims, mentioned in the previous section, the invention proposes a conical mixer, having the features of claim 1.

[0010] The conical mixer of the invention includes a horizontal ring, which is located along the perimeter inside the conical container, above the lid thereof. This perimeter ring constitutes a support means for supporting at least one bearing that is fixed at the end of a horizontal arm that rotates on an axis coinciding with that of the container and that also includes at the end a transmission for actuating the endless screw during rotation.

[0011] Another feature of this mixer is the fixing of the perimeter ring, which is fixed above the lid of the mixer, attached by means of adjustable bolts thereto.

[0012] Moreover, the bearing(s) on which the end of the rotating horizontal arm rests on the perimeter ring are mounted angularly, so that they are located in a substantially horizontal plane on said perimeter ring, despite the fact that the transmission from the horizontal axis to the inclined endless screw to be located close to the inner periphery of the conical container is located inclined at an angle equivalent to the conicity of said container. These bearings are also mounted with the interposition of one or more pretensioning washers that enable the position of the bearings on the perimeter ring to be adjusted in order to fully support it.

[0013] As a result, the oscillating movement in the lower portion of the mixer axis is prevented, improving the functionality of the mechanism and increasing the life of the interior components, while reducing the noise and friction generated in the translation from the gear head to the endless screw.

Description of the drawings

[0014] As a complement to the description provided herein, and for the purpose of helping to make the features of the invention more readily understandable, the present specification is accompanied by a set of drawings which, by way of illustration and not limitation, represent the following:

Figure 1 shows a general perspective view from an upper point of view of a mixer made according to the invention.

Figures 2 and 3 represent respective enlarged details of the support system for supporting the transmission of the end of the arm (6) in a perimeter ring (8) so that the endless screw (2) rotates in a position close to the wall of the container (1) without causing friction thereon, or oscillations in the same.

Figures 4 and 5 show respectively a horizontal cross section view and an elevation view of the mounting of the bearings (7) on the upper end of the horizontal arm (6). Figure 6 is a lower plan view perpendicular to the base (10) on which the bearings (7) are mounted.

Embodiment of the invention

[0015] As can be seen in the referenced figures, the invention relates to a conical mixer of the type that is made up of a conical mixing container (1), which has a lower outlet mouth for the mixed product and is internally provided with an endless screw (2), arranged with the lower end thereof at the centre of the container (1) and with the upper end thereof eccentrically in said container, so that said endless screw (2) is located at all times near the side wall of the conical container (1).

[0016] This endless screw (2) is actuated by a motor-reducer (3), located on the lid (9) of the container, which moves a vertical axis (4) located in correspondence with the axis of the conical container (1). Said axis (4) provides a rotational movement to a horizontal arm (6) that includes at the free end thereof, close to the inner wall of the container (1), a transmission (5) to also actuate the endless screw (2) during rotation, while said arm (6) rotates around the axis (4); in this way a vertical flow is generated in the product to mix it homogeneously.

[0017] Inside the container (1) and fixed to the lid (9) of the mixer by means of adjustable bolts, a horizontal ring (8) is located along the perimeter inside the container (1). On this horizontal ring (8) the end of the horizontal arm (6) is supported on bearings (7), which have been represented in greater detail in Figs. 4-6.

[0018] The bearings (7) are mounted on a plate (10) that is screwed on top of the transmission (5) located at the end of the horizontal arm (6). Since the transmission (5) that promotes the movement of the endless screw (2) must form an acute angle with the horizontal arm (6) so that the endless screw is inclined and parallel to the inner edge of the container (1), it has been provided that said bearings (7) are placed angularly with respect to the plate (10) so that they are located in a substantially horizontal plane on the perimeter ring (8) (see Fig. 5).

[0019] As shown in detail in Fig. 4, the bearings (7) on which the end of the arm (6) rests on the perimeter ring (8) are mounted with at least one pretensioning washer

(11) in order to slightly lengthen or shorten the position of said bearings (7) with respect to the base plate (10), in order to adjust the support of the bearing so that it is completely on the perimeter ring (8).

[0020] Once the nature of the invention has been described, in addition to a preferred exemplary embodiment, it is evident that the invention is subject to industrial application in the indicated sector.

[0021] Likewise, it is hereby stated for the relevant purposes that the materials, shape, size and layout of the described elements may be modified, provided that it does not imply altering the essential features of the invention claimed below:

Claims

1. A conical mixer comprising:

- a conical mixing container (1), with a lower outlet mouth for the mixed product, which is internally provided with an endless screw (2), arranged with the lower end thereof at the centre of the container (1) and with the upper end thereof eccentrically in said container, so that said endless screw (2) is located at all times near the side wall of the conical container (1),
- a lid (9) on which a motor-reducer (3) is fixed that moves a vertical axis (4) located on the axis of the container (1), the axis (4) of which provides a rotational movement to a horizontal arm (6) at the free end of which, close to the inner wall of the container (1), a transmission (5) is mounted for actuating the endless screw (2) during rotation, while said arm (6) rotates around the axis (4) generating a vertical flow in the product to achieve a homogeneous mixture;

characterised in that it further comprises a horizontal ring (8), located along the perimeter inside the container (1) above the lid (9), on which the end of the horizontal arm (6) rests on at least one bearing (7).

2. The mixer according to claim 1, **characterised in that** the perimeter ring (8) is fixed to the lid (9) of the mixer by means of adjustable bolts.

3. The mixer according to the preceding claims, **characterised in that** the bearing(s) (7) on which the end of the arm (6) rests on the perimeter ring (8) are mounted angularly on a plate (10), which is fixed on the head of the transmission (5) at the end of the horizontal arm (6), so that said bearings (7) are located in a substantially horizontal plane on the perimeter ring (8).

4. The mixer according to the preceding claims, **char-**

acterised in that the bearing(s) (7) on which the end of the arm (6) rests on the perimeter ring (8) are mounted on the plate (10) interposing at least one pretensioning washer (11) in order to adjust the support of the bearing on the perimeter ring (8).

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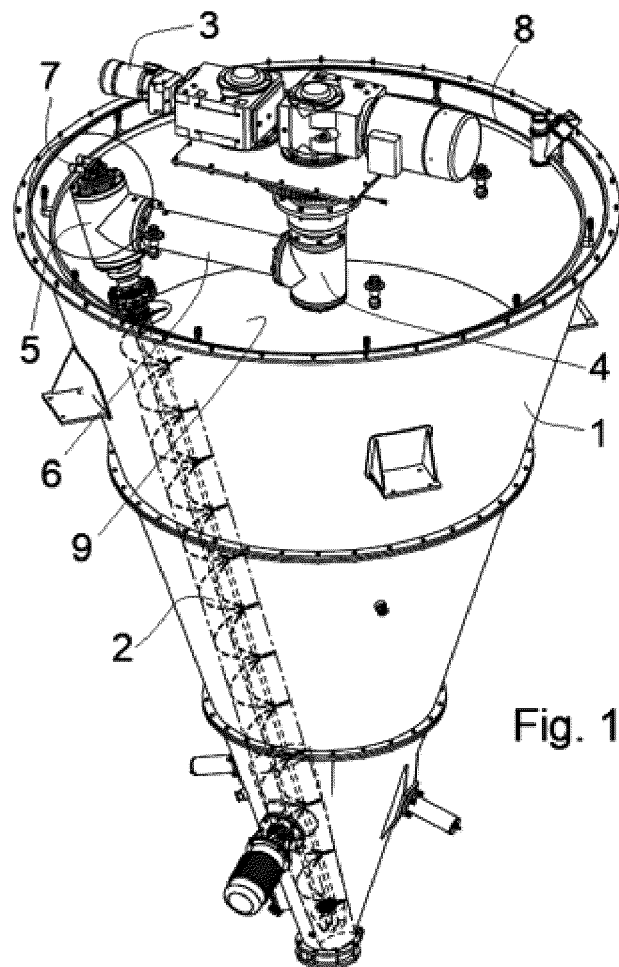
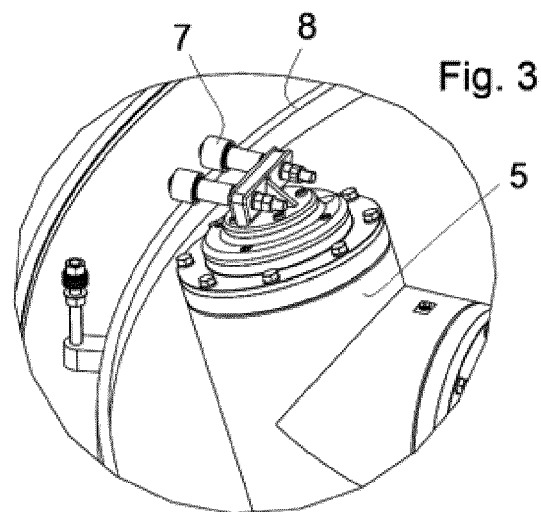
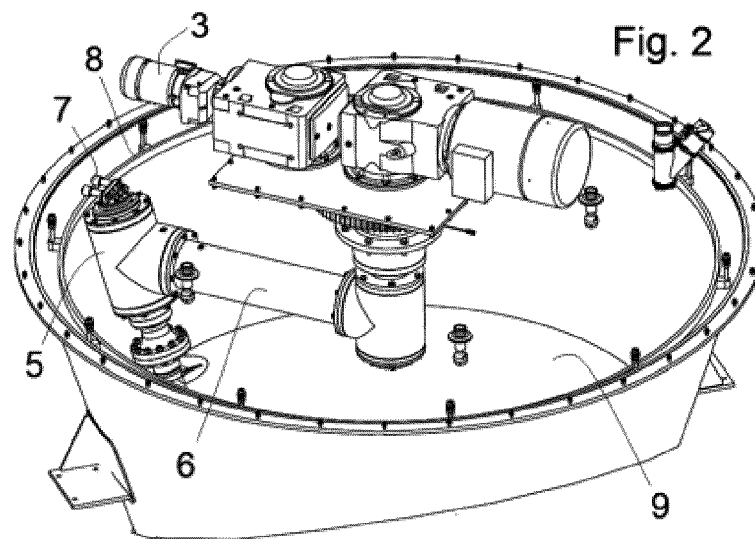
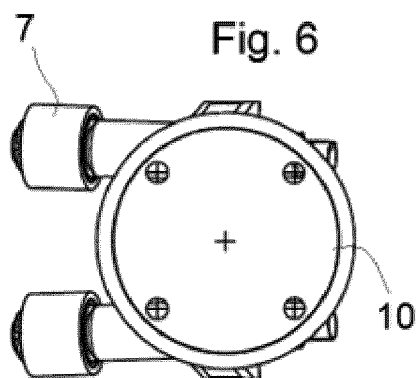
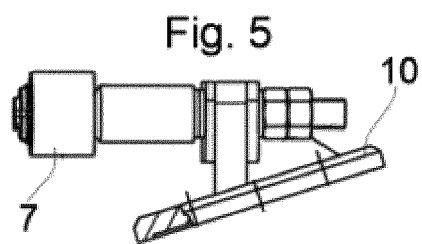
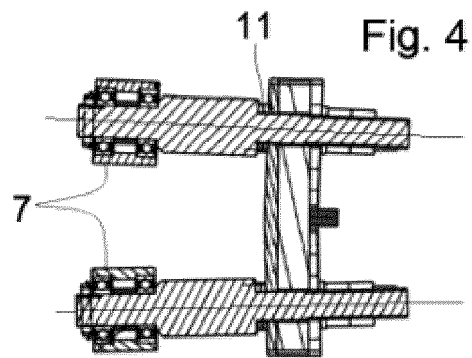


Fig. 1







EUROPEAN SEARCH REPORT

Application Number

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EPO FORM 1503 03.82 (P04C01)

DOCUMENTS CONSIDERED TO BE RELEVANT			
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X	US 4 217 996 A (GOOD LEWIS D [US]) 19 August 1980 (1980-08-19)	1, 3, 4	INV. B01F27/95 B01F27/1143 B01F27/232
A	* abstract * * figures 1-6 * * column 3, line 28 - column 7, line 46 * -----	2	
X	CN 108 636 232 A (ZHOU MEIFENG) 12 October 2018 (2018-10-12)	1, 3, 4	
A	* abstract * * figures 1-4 * -----	2	
X	GB 784 469 A (JOHANNES EWARDUS NAUTA) 9 October 1957 (1957-10-09)	1, 3, 4	TECHNICAL FIELDS SEARCHED (IPC) B01F
A	* figures 1-6 * * page 1, line 50 - page 2, line 114 * -----	2	
A	US 2 831 663 A (EWARDUS NAUTA JOHANNES) 22 April 1958 (1958-04-22)	1-4	
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The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 21 April 2022	Examiner Krasenbrink, B
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

REFERENCES CITED IN THE DESCRIPTION

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- GB 599900 A [0003]