

(19)



Europäisches Patentamt
European Patent Office
Office européen des brevets



(11) Publication number:

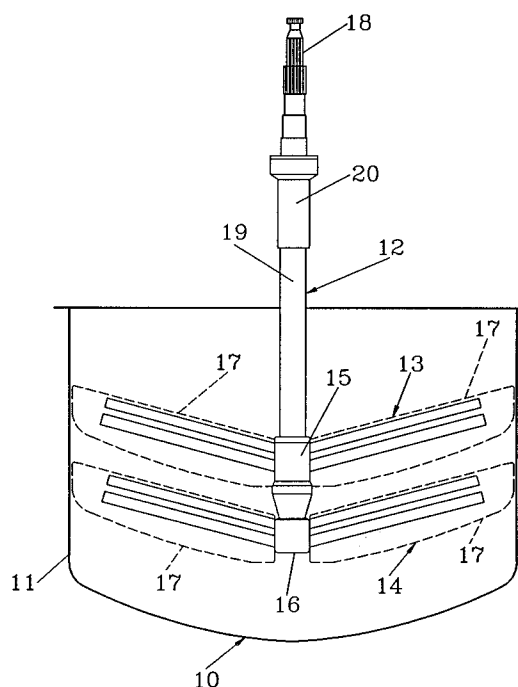
0 629 435 A1

(12)

EUROPEAN PATENT APPLICATION(21) Application number: **94850097.0**(51) Int. Cl.⁵: **B01F 15/00**(22) Date of filing: **07.06.94**(30) Priority: **14.06.93 SE 9302061**(43) Date of publication of application:
21.12.94 Bulletin 94/51(84) Designated Contracting States:
AT BE CH DE DK FR GB IE LI NL PT SE(71) Applicant: **Persson, Göran**
Norra Liden 33
S-411 18 Göteborg (SE)(72) Inventor: **Persson, Göran**
Norra Liden 33
S-411 18 Göteborg (SE)
Inventor: **Johansson, Lars-Erik**
Länsmansvägen 1
S-442 50 Kungälv (SE)(74) Representative: **Roth, Ernst Adolf Michael et al**
GÖTEBORGS PATENTBYRA AB
Box 5005
S-402 21 Göteborg (SE)(54) **Mixing apparatus for cooking vessels.**

(57) A mixing apparatus for mixing and stirring of liquid or paste-like masses in a cylindric cooking vessel (12), for example for preparation of food in large kitchens. The apparatus comprises at least one vertical drive-shaft (18, 19) which is connected to drive means. The drive-shaft is located primarily coaxial with or in line with the longitudinal axis of the vessel and it is provided with attachments (15, 16) for at least three agitator wings (17). The agitator wings (17) are radially displaceable connected to each respective attachment (15, 16), in such a manner that radially outer ends of the agitator wings (17) during rotation are elastically supported via support surfaces against the inner surface of the cooking vessel (10). The support force contributing to the centring of the drive-shaft (18, 19) in relation to the inner surface of the vessel (10).

FIG. 1

**EP 0 629 435 A1**

TECHNICAL FIELD

The present invention refers to a mixing apparatus for mixing and stirring liquid or paste-like masses in a cylindric cooking vessel, for example for preparation of food in large kitchens, comprising at least one vertical drive-shaft which is connected to drive means, said drive-shaft being located primarily coaxial with or in line with the longitudinal axis of the vessel, and which is provided with attachments for at least three agitator wings.

BACKGROUND OF THE INVENTION

Cooking vessels with mixing apparatus according to above are used in large kitchens and are for example known from SE-A-425210 which discloses a drive unit that can be raised and lowered. Often, the drive unit is arranged so that it can move or swing over from one pot to another. Because the development has gone in the direction towards mixing apparatuses with scrapers of plastic- or rubber material which keeps the sides and the bottom of the vessels clean, the increased friction has created more stresses upon the drive unit and its stand. The drive unit and its stand can of course be made stronger, to compensate for the increased loads. This is however comparatively expensive, due to the ability of the drive unit to be raised and lowered.

SE-A-455264 describes a cooking vessel with a dismountable horizontal stay that holds the mixing apparatus, even if the drive unit is disconnected. A drawback with this arrangement is, that the cleaning of the pot is more complicated. The purpose with the use of scrapes or brushes is consequently partly counteracted by this known device.

THE TECHNICAL PROBLEM

The object of the present invention is to provide a mixing apparatus for cooking vessels, which makes it possible to keep the vessels clean in an efficient way while at the same time reducing the stresses upon the drive unit.

THE SOLUTION

For this purpose, the agitator wings on the mixing apparatus according to the invention are radially displaceable connected to each respective attachment, in such a manner that the radially outer ends of the agitator wings during rotation are elastically supported via support surfaces against the inner surface of the cooking vessel, said support force contributing to the centring of the drive-shaft in relation to the inner surface of the vessel. A self centring is achieved in a simple and efficient way

by this design, contributing to create bearing support for the shaft of the mixing apparatus.

According to an advantageous embodiment of the invention, the attachments comprise substantially radially pointing rods, which are arranged in parallel pairs, and that the wings are provided with longitudinally running channels for receiving said rods. This design of the attachments with rods which are received in channels in the wings, simplifies mounting and dismounting of the wings without causing surfaces which are difficult to clean.

According to another advantageous embodiment of the invention, the channels of the wings are designed in the manner of open slots, wherein the longitudinal opening of one of the slots is angled least 90° from the other opening. By this design of the channels of the wings, the wings can be formed by extrudable profiles.

DESCRIPTION OF THE DRAWINGS

The invention will now be described hereinafter with reference to an embodiment shown on the enclosed drawings, in which

- Fig. 1 shows a mixing apparatus according to the invention at a cooking vessel in view from the side,
- Fig. 2 shows on an enlarged scale, in a broken lateral view, the attachment of a wing which is a part of the mixing apparatus in Fig. 1,
- Fig. 3 shows correspondingly as in Fig. 2, the attachment of the wing, but from another optic angle,
- Fig. 4 shows the attachment in Fig. 2 and 3 in view from above, and
- Fig. 5 is an end view of an agitator wing.

DESCRIPTION OF EMBODIMENT

Fig 1 schematically shows a cooking vessel 10 with its cylindric inner wall 11. A mixing apparatus 12 is according to practice connectable to a drive unit which can be raised and lowered in the same manner as described in SE-A-425210.

The mixing apparatus 12 includes an upper and a lower agitator rotor 13 and 14 respectively, each of which is provided with an attachment 15 and 16 respectively, for three agitator wings 17. Because of simplicity, Fig. 1 only shows two wings 17 on each rotor.

The attachment 16 of the lower agitator rotor 14 is mounted upon an inner shaft 18 which is driven in one direction by the drive unit. The attachment 15 of the upper agitator rotor 13 is mounted on an outer tubular shaft 19 which surrounds the shaft 18 and is driven in the opposite direction by the drive unit. A locking means 20 is used for

locking the inner shaft 18 axially with respect to the outer shaft 19.

Fig. 2 shows the lower attachment 16 which is provided with three pairs of substantially radially pointing rods 21, 22 having a cylindrical cross section. These are arranged in parallel with a certain dislocation to each side of the rotational axis centre of the shaft 18 (see Fig. 3 and 4). One of the rods 22 has a slightly larger cross section than the other rod 21.

The wings 17 have been produced with a profile which appears from Fig. 5, and which makes it possible to manufacture them in a cost efficient way, for example by extrusion. The wings are provided with channels 23, 24 running in the longitudinal direction, and which are dimensioned to receive the rods, which means that the channel 24 is slightly wider than the channel 23. Since each pair of rods that carry one respective wing has different diameter with one another, and the channels 23, 24 have different width, this prevents incorrect mounting of the wings 17 upon the attachments 15, 16. The channel 23 runs from the rear edge of the wing to a distance in parallel with the plane of the wing. The other channel 24 runs in parallel with the channel 23, but from the rear side of the wing and a distance in towards the front of the wing. The angle between the walls on the two channels is slightly larger than 90 degrees, which locks the wing firmly from being twisted loose from the pair of rods 21, 22.

The upper rotor 13 is designed in principally the same way as the lower rotor 14. However, the rods 21, 22 are displaced to the opposite side of the rotational centre axis of the shaft 18 as a consequence of that the rotor 13 rotates in the opposite direction.

Mounting and dismounting of the wings onto respectively from the attachments 15, 16 is remarkably simple. When the mixing apparatus 12 has been lifted from the vessel 10, the wings 17 can be pulled off the rods, in their longitudinal direction. The cleaning of the wings 17 is simple, since the channels 23, 24 are broad, shallow and therefore easily accessible. Besides, the attachments 15, 16 with the rods 21, 22 are designed with surfaces that are simple to clean.

The wings 17 are shaped with a frontal scraper edge 25 which in the lower position of the mixing apparatus makes it possible for the rotor 14 to scrape against the inside 11 of the vessel bottom. Because the wings are held mobile in the radial direction, they are supported elastically compliant against cylindric wall portion of the vessel during the rotation of the apparatus. This means that the wings also can scrape and hold these surfaces clean when raising and lowering the mixing apparatus within the vessel. Besides, an automatic cen-

tring of the wings in relation to the centre axis of the vessel is accomplished, which contributes to the centring of the drive-shaft in relation to the inner surface of the vessel and in this manner reduces the stresses upon the drive unit and its stand.

The invention is not limited to the above described embodiment, but more variants are conceivable within the scope of the following claims. As an example, the wings 17 and attachments 15, 16 can be shaped differently than what is shown. The mixing apparatus need not be provided with double rotors 13, 14.

Claims

1. Mixing apparatus for mixing and stirring liquid or paste-like masses in a cylindric cooking vessel (12), for example for preparation of food in large kitchens, comprising at least one vertical drive-shaft (18, 19) which is connected to drive means, said drive-shaft being located primarily coaxial with or in line with the longitudinal axis of the vessel, and which is provided with attachments (15, 16) for at least three agitator wings (17),
characterized in that the agitator wings (17) are radially displaceable connected to each respective attachment (15, 16), in such a manner that the radially outer ends of the agitator wings (17) during rotation are elastically supported via support surfaces against the inner surface of the cooking vessel (10), said support force contributing to the centring of the drive-shaft (18, 19) in relation to the inner surface of the vessel (10).
2. Mixing apparatus according to claim 1,
characterized in that the attachments (15, 16) comprise substantially radially pointing rods (21, 22), which are arranged in parallel pairs, and that the wings (17) are provided with longitudinally running channels (23, 24) for receiving said rods.
3. Mixing apparatus according to claim 2,
characterized in that the channels (21, 22) of the wings are designed in the manner of open slots, wherein the longitudinal opening of one of the slots is angled at least 90° from the other opening.
4. Mixing apparatus according to claim 3,
characterized in that the wings (17) are formed by extrudable profiles.

FIG. 1

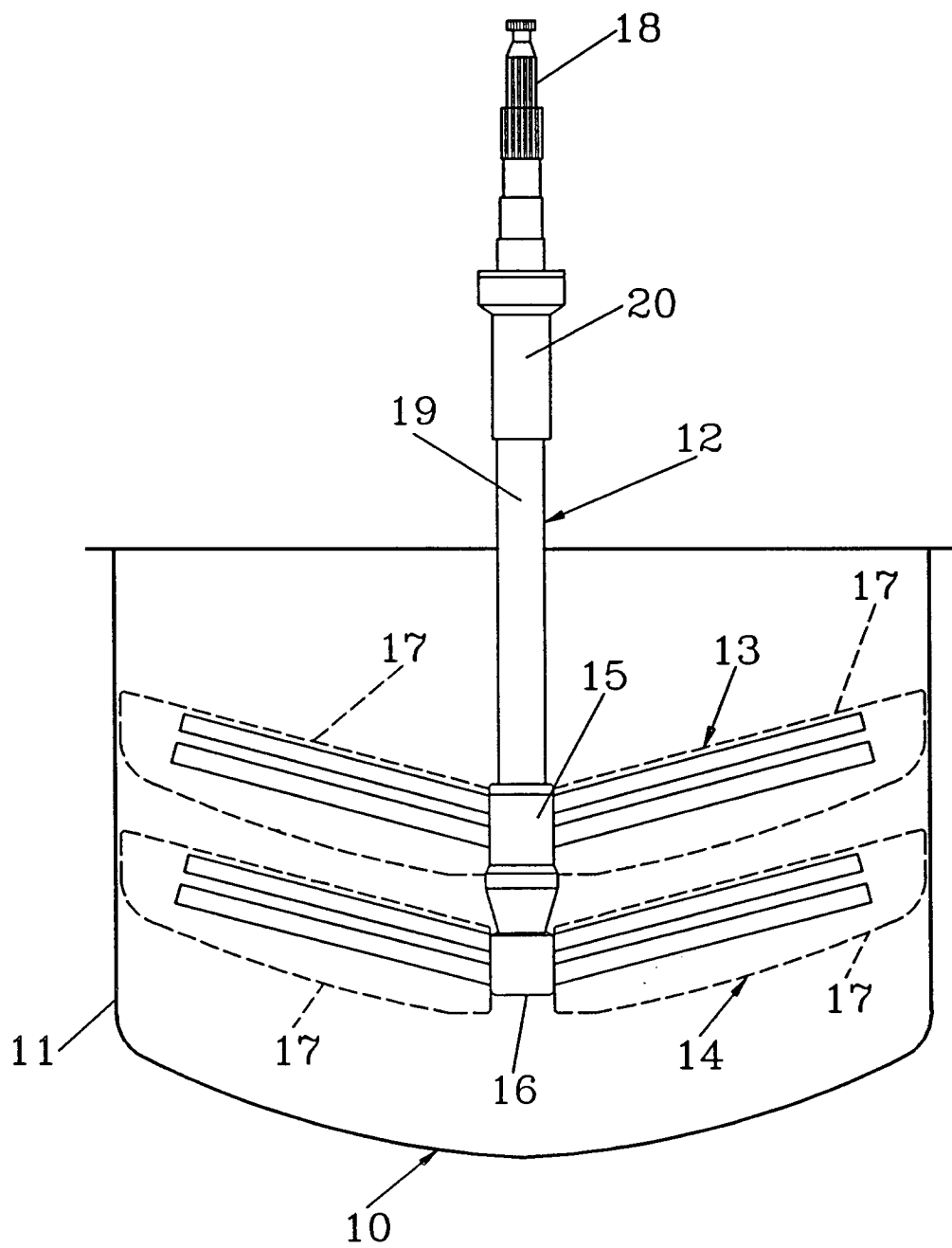


FIG.2

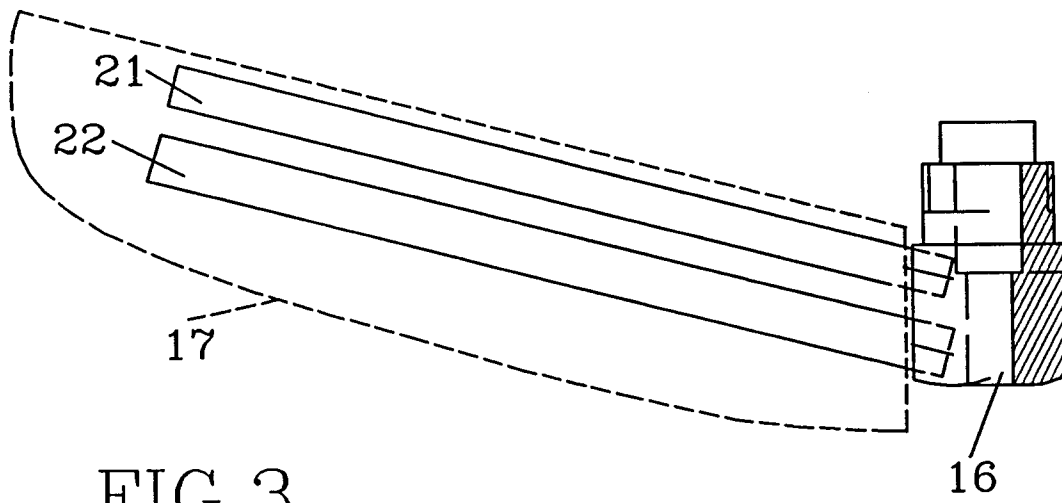


FIG.3

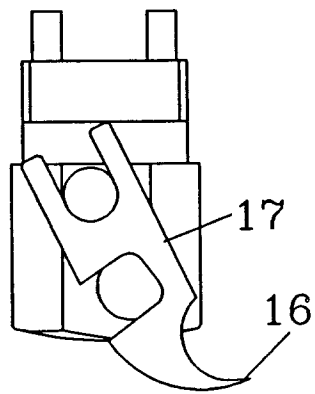


FIG.4

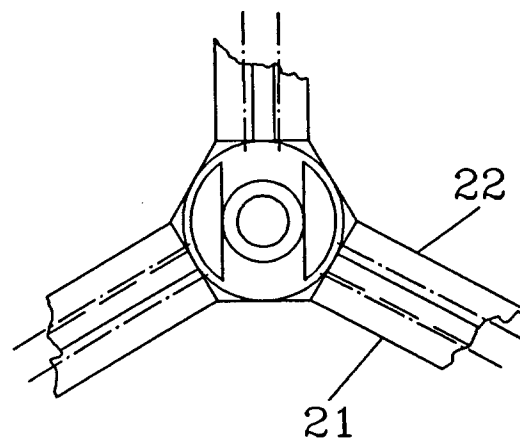
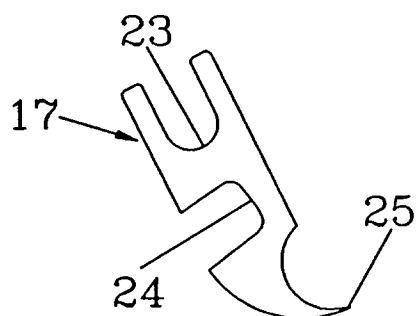


FIG.5





European Patent
Office

EUROPEAN SEARCH REPORT

Application Number
EP 94 85 0097

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.5)
X	DE-A-35 31 841 (GERESZ) ---	1	B01F15/00
A	US-A-5 197 803 (WALL) ---		
A	US-A-2 178 269 (SEYBERT) ---		
A	US-A-3 381 941 (GIBSON) ---		
A	GB-A-2 194 460 (GUISTI) -----		
			TECHNICAL FIELDS SEARCHED (Int.Cl.5)
			B01F
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 6 September 1994	Examiner Peeters, S
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			