PROTECTIVE STRUCTURE FOR A CLAMPING UNIT FOR CLAMPING A CONTAINER IN A MIXER FOR FLUID PRODUCTS

A protective structure for protecting a clamping unit for clamping a container in a mixer for fluid products, wherein the clamping unit includes at least one control screw (18) connected by a screw thread to at least one clamping plate (16,17) comprises an elongate structure (26) inserted between the threaded connection (18, 23) between the clamping plate and the screw (18) on the one hand, and the portion of the plate intended, in use, for clamping the container of fluid products on the other hand. The elongate structure (26), preferably a U-shaped plate, passes through an opening (25) provided on an appendage (22) of the clamping plate (17), in proximity to the control screw (18).
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PROTECTIVE STRUCTURE FOR A CLAMPING UNIT FOR CLAMPING A CONTAINER IN A MIXER FOR FLUID PRODUCTS

The present invention relates to the field of mixers for fluid products, and in particular to mixers provided with clamping devices for clamping the containers containing fluid products.

The fluid products comprise in particular, although not by way of limitation, paints, varnishes, lacquers, inks, enamels and the like.

Mixers for fluid products of known type are described in documents EP 0617998, EP 0680778 and EP 0706820 of the same Applicant. The mixers of known type indicated above are arranged for mixing the fluid content of one or more containers placed inside the mixer itself and clamped by way of a device which normally comprises a pair of plates. The plates are moved away from and towards each other by means of various devices, the most common of which comprise one or more control screws coupled to one or both plates to allow their displacement as a result of rotation of the screws in one or the other direction.

Since the mixing of the fluid product is effected by means of the movement, by way of the motion, for example a shaking or gyroscopic motion, or of any other kind, of the container clamping unit, it is clear that the function of the control screws is particularly important because the latter contribute to applying and maintaining an adequate clamping force for clamping the plates on the container during the whole of the mixing operation. To perform this function, the screws must of course be in a good state of preservation and cleanliness. This state is particularly difficult to achieve and, above all, to maintain in the mixers of the prior art, since the internal ambience of the mixer is
inclined to become dirty, for example because of residues of fluid product or dust.

The aforesaid drawback is particularly serious in the case where the clamping force clamping the plates on the container is adjusted by way of measurement of the consumption of the electric motor which operates the control screws. When the plates meet the container, the power required for operating the screws increases more rapidly, the greater the clamping force exerted. On reaching a specific consumption, it is assumed that a predetermined clamping force has been reached. In the case where the control screws are not in an optimum state of cleanliness, the screw/nut coupling between the clamping plate and the control screw may be harder than foreseen, with the consequence that a greater effort than that envisaged is required from the motor in order to effect the displacement of the plate, so much so that an incorrect indication of the clamping of the container having been achieved is arrived at. In these cases, the effective clamping force clamping the container would be below that desired, with the serious consequences that this would involve in terms of safety of operation of the mixer itself.

An aim of the present invention is to remedy the drawbacks described above, by providing a protective structure for a clamping unit for clamping a container in a mixer for fluid products, with particular reference to the protection of one or more control screws provided on the mixer itself.

Another aim of the invention is that of providing a protective structure which is simple and economic to produce, easy to assemble, and which does not introduce further maintenance tasks with respect to what is provided for in mixers of conventional type, but instead reduces the need for and frequency of maintenance and cleaning of the mixer itself.
In order to fulfil the aims indicated above, the subject of the invention is a protective structure of the type indicated in the claims which follow.

By adopting a protective structure according to the present invention, the control screws maintain their optimum state of cleanliness for a significantly longer period of time with respect to what can be achieved with the mixers of known type.

Further characteristics and advantages will become clear from the following detailed description of a preferred embodiment with reference to the appended drawings, provided purely by way of non-limiting example, in which:
- Figure 1 is a front view, partly in section, of a mixer provided with a protective structure according to the present invention, and
- Figure 2 is a perspective view, on an enlarged scale, of a detail of the protective structure for protecting a control screw of the mixer in Figure 1.

With reference now to Figure 1, a mixer 10, of generally known type, comprises a framework 11 which bears on the ground by means of adjustable feet 12 and is covered by a casing 13. Although the mixer illustrated in Figure 1 is of the type with shaking motion, the application of the present invention to the field of mixers should not be regarded as being limited to such a type of mixer, but may also extend to mixers having different modes of operation, for example with rotatory, or centrifugal, or gyroscopic motion and the like.

Inside the mixer 10 is placed a movement unit, indicated generally by the reference number 14, which moves along a predetermined path, depending on the type of mixer, with respect to the support structure 11 by means of a main drive unit 15.
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The details of the movement unit 14 of the mixer form part of the prior art and will not be discussed further in the continuation of the present description. The movement unit 14 comprises a clamping unit with a lower clamping plate 16 and an upper clamping plate 17 which are opposed and movable towards and away from each other. The upper clamping plate 17 is moved by means of control screws 18, the upper ends 19 of which are coupled to an electric control motor 21 with reducing devices 20 interposed. In the example in the drawings, the mixer is provided with two control screws, but the invention may of course also apply to mixers provided with a different number of control screws which is smaller or greater than that illustrated.

Still with reference to the drawings, the upper plate 17 comprises two lateral appendages 22, each of which is provided with a hole for receiving an internally threaded bush 23, preferably fixed to the appendage 22 by way of a screw 24, or other functionally similar means, known to experts in the field. The internal thread of the bush 24 is coupled to the thread of the respective control screw 18 to allow the raising or lowering of the clamping plate 17 as a result of the rotation of the control screw 18 in one or the other direction.

As can be seen more easily in Figure 2, on the appendage 22 a wide opening 25 is provided through which passes an elongate protective structure for protecting the control screw 18 and substantially constituted by a plate 26 bent in a U-shape, with the concavity facing towards the control screw 18. Preferably, as illustrated in Figure 1, the protective structure 26 extends longitudinally, substantially parallel to the control screw 18, at least for a major part of the length of the latter and in particular of its threaded portion. The lower end 26a of the protective structure 26 is fixed to the lower clamping plate 16, while its upper end 26b
is preferably fixed to a plate or transverse member 27 which supports the motor 21 and the reduction devices 20. The details of fixing and mounting of the protective structure 26 may of course vary according to the specific type of mixer and to its particular configuration, always for the purpose of shielding and protecting the threaded portion of the at least one control screw 18.

From the detailed description above, it is clear that at all times, for any position whatsoever of the upper clamping plate 17, the threaded part of each of the control screws 18 is shielded with respect to the central span 28 of the mixer 10, within which, in the operating state, at least one container of fluid products is placed. In this way, even accidental broaching of fluid product from the container, which may occur for example during the introduction of the container into, or its removal from, the clamping unit, is not likely to dirty the control screws 18 and thus adversely affect correct operation.

The configuration of the protective structure 26, illustrated as a U-shape in the appended drawings, may of course vary, adopting for example a simple flat form, or an L-shaped or concave form of various types.

With the principle of the invention remaining unchanged, the details of production and the embodiments may of course vary widely with respect to what has been described and illustrated, without thereby departing from the scope of the present invention.
1. A protective structure for protecting a clamping unit for clamping a container in a mixer for fluid products, the clamping unit comprising at least one control screw (18) connected by a screw thread to at least one clamping plate (16, 17), characterised in that it comprises an elongate structure (26) inserted between the threaded connection (18, 23) between the clamping plate and the screw (18) on the one hand, and the portion of the plate intended, in use, for clamping the container of fluid products on the other hand.

2. A protective structure according to claim 1, characterised in that the elongate structure (26) extends substantially parallel to the control screw (18), at least for a major part of its threaded portion.

3. A protective structure according to claim 2, characterised in that the elongate structure (26) is a plate.

4. A protective structure according to claim 3, characterised in that the cross-section of the elongate plate (26) is concave, preferably U-shaped, with the concavity facing towards the control screw (18).

5. A protective structure according to any one of the preceding claims, characterised in that the elongate structure (26) passes through an opening (25) provided on an appendage (22) of the clamping plate (17), in proximity to the control screw (18).

6. A protective structure for protecting a clamping unit for clamping a container in a mixer for fluid products, as described and illustrated, and for the aims specified.
7. A mixer for fluid products, comprising a protective structure according to any one of the preceding claims.
A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 B01F15/00

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 7 B01F B23Q B25B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)
WPI Data, EPO-Internal, PAJ

C. DOCUMENTS CONSIDERED TO BE RELEVANT

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column 6, line 66 -column 7, line 1; figures 1,4 | 1-7                    |

X Further documents are listed in the continuation of box C.  
X Patent family members are listed in annex.

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