



(19)

Europäisches Patentamt

European Patent Office

Office européen des brevets



(11)

EP 0 783 920 A1

(12)

EUROPEAN PATENT APPLICATION

published in accordance with Art. 158(3) EPC

(43) Date of publication:

16.07.1997 Bulletin 1997/29

(51) Int. Cl.⁶: **B01F 9/04**, B01F 9/06,
B01F 9/08

(21) Application number: **96920843.8**

(86) International application number:
PCT/ES96/00144

(22) Date of filing: **04.07.1996**

(87) International publication number:
WO 97/02089 (23.01.1997 Gazette 1997/05)

(84) Designated Contracting States:

**AT BE CH DE DK FI FR GB GR IE IT LI LU MC NL
PT SE**

(30) Priority: **05.07.1995 ES 9501352**

02.07.1996 ES 9601475

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(54) **UNIVERSAL MIXER**

(57) The universal mixer is comprised of a revolution container body (1), preferably cylindrical and capable of rotating during the mixing phase, and characterized in that its revolution shaft (7) integral with the container body (1) adopts a substantially skewed position with respect to the geometrical axis of said body, specifically traversing its bases at marginal and diametrically opposite points. There is provided at one of said bases (3), and opposite to the shaft (7), a filling-emptying mouth (4) closeable by means of a sealed closure lid (5), so that said mouth or opening is susceptible of adopting an upper extreme position for filling the mixer and a lower extreme position for emptying the mixer after homogenization of the mixture. Inside the container (1) are provided blades (11) which may rotate in conjunction with said container or which may be displaced independently in order to improve the removal of the mixture, the blades being optionally provided with cutting edges so as to have a complementary cutting effect.

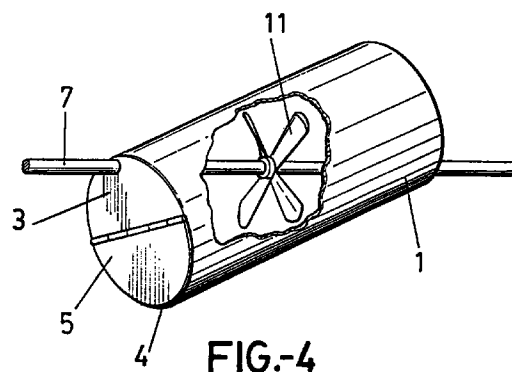


FIG.-4

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Description

OBJECT OF THE INVENTION

The present invention refers to a mixer device, specially designed for the removal of different granular, powdery and/or liquid products, with the purpose of obtaining an homogeneous mixture thereof.

The object of the invention is to obtain the mentioned condition of homogeneous mixture, with a minimum consumption of energy and in a considerably short removal time, that is a high yield.

The mixer which is proposed is usable both at industrial level as well as private one, in any field in which it is required a mixture of two or more substances.

BACKGROUND OF THE INVENTION

The mixers known up to the present have as common denominator the incorporation of a revolution body, capable of rotating on its own geometrical axis, in such a way that the removal of the materials to be mixed is produced by means of a combination of the movement itself of the rotating body, of the centrifugal force generated in such rotating movement, and of the force of gravity, being generally located the mentioned rotation axle in an inclined position in reference to the earth vertical axis. A series of additional paddles facilitate the rising pulling of the material.

This supposes that such materials basically receive two movements, a transversal or rotating one, and another vertical one, that is, the mass is practically moved according to two axis of Cartesian coordinates system.

The mixture would obviously be more quickly made and more homogenous if the removal would be produced in correspondence with the three axis of a Cartesian coordinates system, which until today has not been achieved by any type of mixer.

DESCRIPTION OF THE INVENTION

The universal mixer that the invention proposes has been designed precisely to have access to this third dimension, that is in order to achieve a complete removal, in correspondence with the three axis of a Cartesian coordinates system, which and as it is mentioned above, determines that the homogenization of the mixture is achieved in a considerable shorter time and, consequently, with a better energy consumption, which supposes a considerable increase of productivity and also a considerable costs reduction, compared with the conventional mixers.

For this reason to be more precise, the mixer which is recommended has, as main characteristic, the fact that its containing body is provided with a rotation axle in such a way that forms an acute angle with its geometrical axis, so that in the classic rotating movement of the containing body, it is also achieved the longitudinal vas-

culating movement which determines an alternative axial displacement for the mass, obviously complementary of the classic vertical and transversal displacements.

As complement of the described structure the mentioned containing body, either in one of its external walls, or in its lateral wall area near to the one of such external walls, will incorporate the corresponding opening for filling/emptying, that in this case and due to the special mobility of the containing body should be supported by a hermetic locking cover.

Starting from this basic structure, the containing body will be equipped with internal removing paddles associated to its own internal wall, associated to its axle, or it will even lack of such paddles.

The axle of the mixer will be driven by any type of conventional motor or actually it will be manually driven, when its capacity and practical application make it advisable.

According to another embodiment of the invention, the mentioned removing inner paddles can be equipped with their own movement, that is instead of being installed either on the internal wall of the container or on the rotation axle itself, they will be installed on an independent axle, preferably coaxial with the container axle and equipped with own driving means which allow to promote the efficiency thereof.

Another one of the improvements which are recommended, lies in the fact that the mentioned paddles take the shape of a propeller, but with the special particular characteristic that pairs of paddles participate with opposite pitch thereof, with the purpose that its operativity results alternative, in parallel to the alternating displacement of the mass foreseen in the cavity of the container body.

This turns out to be specially interesting insofar when overpassing the 100 r.p.m. the gravity effect disappears and the product mass stops displacing itself in the cavity of the container, since the effect of the centrifugal force cancels the gravity effect, obtaining with the incorporation and mobility of these opposite pitch paddles the foreseen and necessary displacement of the product from the centre of the container to its walls.

Finally and according to another one of the improvements of the invention, it has been foreseen that the mentioned paddles have the shape of blades that, besides acting as removing elements, they act as cutting elements, which give the mixer a new operative dimension, precisely of a grinding-mixing device.

DESCRIPTION OF THE DRAWINGS

In order to complement the description that has been made and with the purpose of helping to a better understanding of the characteristics of the invention, it is accompanied to the present descriptive technical specification, as integral part thereof, a set of drawings in which with illustrative and not limiting character, the following has been represented:

Figure 1.- Shows a schematic representation in perspective of a universal mixer fabricated according to the object of the present invention.

Figure 2.- Also shows a schematic representation in lateral elevation of the same mixer, in which in broken lines the internal elements of the container body, that is in filling position, have been represented.

Figure 3.- Shows a similar representation to the previous figure, but in which the mixer adopts the emptying position.

Figure 4.- Shows a view in perspective similar to figure 1, corresponding to the version of embodiment in which the paddles are equipped with own movement, independent from the container movement, appearing this last one partially sectioned to show its internal structure.

Figure 5.- Shows a schematic representation in lateral elevation of the assembly represented in the previous figure, in which the two driving elements also appear incorporated, both the one of the container and the one of the internal paddles.

Figure 6.- Also finally shows, according to a schematic representation, the set of removing paddles in the case that these ones in parallel form cutting blades.

PREFERRED EMBODIMENT OF THE INVENTION

In view of these figures, and more precisely the figures 1 to 3, it can be seen how the mixer which is proposed is formed from a hollow cylindrical body (1), based on any adequate material, which can be steel, plastic, glass, etc., as a function of the type of materials to be mixed and of the capacity that the mixer should have, showing such cylindrical body (1) one of its bases (2), totally closed, while on the other base it is established a closed sector (3) and an open sector (4), determining a filling-emptying hood inlet, being this mouth (4) supported by a cover (5), that in the example of the practical embodiment represented in the figures is a tiltable cover through a hinge (6), but that can be equipped with any other locking means, provided that it establishes over the mouth (4) a hermetic lock, which obstructs the flowing out of liquid products which may participate in the mixture, in the normal operation of the mixer.

The body (1) constructed in this way is passed through by an axle (7), with the special characteristic that such axle adopts a very inclined disposition, in reference to the geometrical axis of the cylindrical body (1), in such a way that it emerges through one of its bases (3) in a very off-centre position and opposed to the mouth (4), at the same time to its other base (2) being also with the same off-centring level, but in contrast, in such a way that the middle point of the axle (7) sector located in the inside of the mixing chamber, crosses itself with the geometrical axis of the cylindrical body (1) in correspondence with the middle point of the

latter.

The axle (7) rests by its ends, by means of bearings or other appropriate antifriction elements, which are not represented in the figure, on supports (8) schematically represented in figure 1 and that in practice will remain integrated in a sole support chassis.

This axle (7) is strongly linked to the bases (2) and (3) of the container body (1), in such a way that its rotating movement pulls such body, rotating movement that can be indistinctly produced to the right or to the left, such as it is shown by the arrows of figure 1, and which driving movement, previously mentioned, can be carried out by any type of electrical pneumatic, etc., motor, and even by hand.

The described structure is complemented with a series of internal paddles (9), which can be linked to the axle (7), as in the example of practical embodiment represented in the figures, but that equally may be linked to the internal face of the container body (1), with the shape of the figures or with any other one which may be considered appropriate, and that actually may not exist.

In any case, as we have previously said and as it can be deduced from viewing figure 1, the axle (7) is intended to adopt a horizontal disposition, in such a way that in its rotating movement the container body (1) may adopt the position represented in figure 2, in which its mouth (4) adopts an upward extreme position, corresponding to the filling, preferably until the level with the reference (10) in figure 2, where the mixture of materials appears represented by means of dots, starting from this position and after the hermetic locking of the cover (5), supported by means of blocking, not represented, that guarantee a perfect stability thereof in such situation of locking, the axle (7) rotating movement, and consequently of the same container (1), determines a mass mobilization which is transversally displaced, that is raised pulled by the paddles (9), and that besides is longitudinally displaced from one to another end of the container body, as it is derived from the graphic comparison of the figures 2 and 3, or, in another words, the mobilization of such mass is carried out in correspondence with the three axis of a Cartesian coordinates system, that is in optimal conditions so that the mixture achieves a perfect homogeneity in a minimum period of time and also with a minimum energy consumption.

Finally and also as it can be derived from viewing figure 3, the stopping of the mixer must be carried out in a way that its mouth (4) remains in a lower limit position, in which the opening of the cover (5) supposes the total and automatic discharge of its content.

According to the version of the embodiment of the figures 4 and 5 the above mentioned removing paddles are materialized in a propeller (11), preferably formed by four paddles, in a way that two of the paddles of such propeller are of opposite pitch to the other two, as it is specially seen in figure 4. The special shape of these paddles (11) acts as if when the mixture is transported by gravity from one base to the other of the cylinder (1), such paddles tend to displace the mixture in an opposite

direction, improving the conditions of the removal.

Optionally these paddles can form a sole propeller (11), as in the example of practical embodiment represented in figure 4, or also they can form different propellers conveniently distributed along the axle (7).

Furthermore, the propeller (11), or in its case the different propellers established in the cavity of the container body (1), are physically independent from the axle (7), in such a way that, while through such axle (7) the cylindrical container (1) receives the movement from the corresponding motor (12), the propeller or group of propellers (11) receives the independent movement of a second driving group (13), to which effect and as it has been schematically represented in figure 5, the propeller (11) can be installed over a hollow axle (14), coaxial with the axle (7) but independent thereof, closely connected with it, for example, through bearings. In this way, as the movement of the propeller or propellers (11) is not depending on the movement of the container body (1), it is possible an important improvement in the removal conditions of the product placed in such container (1).

Finally another one of the improvements of the invention is centred on the fact that the paddles have been designed to have a cutting effect, in such a way that this is achieved, whether maintaining the shape of a propeller for such described paddles described up to this moment, having only to conveniently sharpen the edges of such paddles, either through the use of real blades (15) as the ones represented in figure 6, based on high resistance steel, that can be linked radially to the axle (7) in the case that they are jointly moved with the container itself (1), or installed on the previously mentioned auxiliary and independent axle (14) when its driving is also independent from the container body (1).

In this way it is achieved, on the one hand to improve the removal conditions of the product placed inside the container (1), that is to improve the services rendered as mixer, due to the special shape of the paddles (11) as propeller and due to the independent movement thereof, at the same time on the other hand it is possible to achieve the possibility of converting such mixer in a mixing-grinding device, converting the removing paddles (11) in cutting blades (15).

Claims

1. Universal mixer, that being of the type which incorporates a container body (1), capable of receiving the materials to be mixed, and also capable of receiving a rotating movement determinant of its internal mixing operation, is essentially characterized in that such container body (1) is strongly linked to an axle (7) which adopts an acute inclined position in relation to the geometrical axis of such body (1), in such a way that the rotating movement of such axle (7), and consequently of the container (1), produces a longitudinal alternative displacement of the mass in the cavity of such container

body (1).

2. Universal mixer, according to claim 1, characterized in that the axle (7) adopts a horizontal position, remaining fixed on end supports (8), by means of bearings or any other appropriate antifriction means.
3. Universal mixer, according to previous claims, characterized in that the container body (1) incorporates, in one of its end bases (3), or in the area near its lateral surface, a mouth (4) for filling-emptying, that as a function of the oblique position of the axle (7) is susceptible of adopting both a maximum elevation situation in the context of the mixer, as well as a lower extreme situation.
4. Universal mixer, according to claim 3, characterized in that the mentioned mouth (4) of filling-emptying, is supported by a cover (5) of hermetic lock.
5. Universal mixer, according to the previous claims, characterized in that the container body (1) is of cylindrical shape and the axle (7), to which it is strongly linked, goes through one of its bases (3) in extreme situation in contrast to the filling-emptying mouth (4) which at the same time its other base (2) also marginally is passed through and in contrast to the first one.
6. Universal mixer, according to the previous claims, characterized in that in the mixer chamber defined in the cavity of the container body removing paddles (9) are established, which can be indistinctly fixed to the axle (7) and/or to the container body (1) itself.
7. Universal mixer, according to previous claims, characterized in that the removing paddles of the product place in the inside of the container body (1), are materialized in at least one propeller (11) conveniently linked to the rotation axle (7) of such container (1), with the special characteristic that in such propellers are defined pairs of paddles (11) of opposite pitch, such pairs of opposite pitch being possibly located in the same propeller or in different propellers.
8. Universal mixer, according to claim 1 to 5, characterized in that in the cavity of the container body removing paddles (11) are established on an axle (14) independent of the rotation axle (7) of the container, in such a way that the mentioned paddles (11) receive the movement from a driving element (13), at the same time independent from the driving element (12) of the container body (1).
9. Universal mixer, according to claim 8, characterized in that the complementary axle (14) belonging to

the paddles (11), is tubular and is axially installed, through the bearings or similar elements, on the main driving axle (7) of the container body (1).

10. Universal mixer, according to claim 1 to 6, characterized in that in the cavity of the container body (1) removing paddles (15) are established provided with sharpen edges that besides confer on the removing function a cutting effect, being materialized such paddles as true cutting blades (15).

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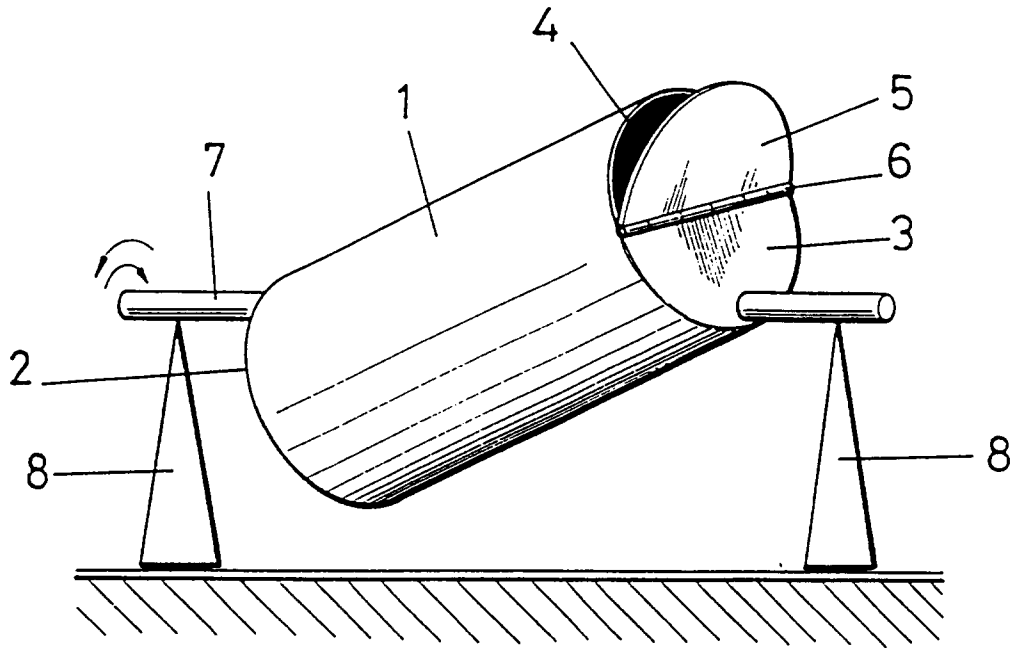


FIG.-1

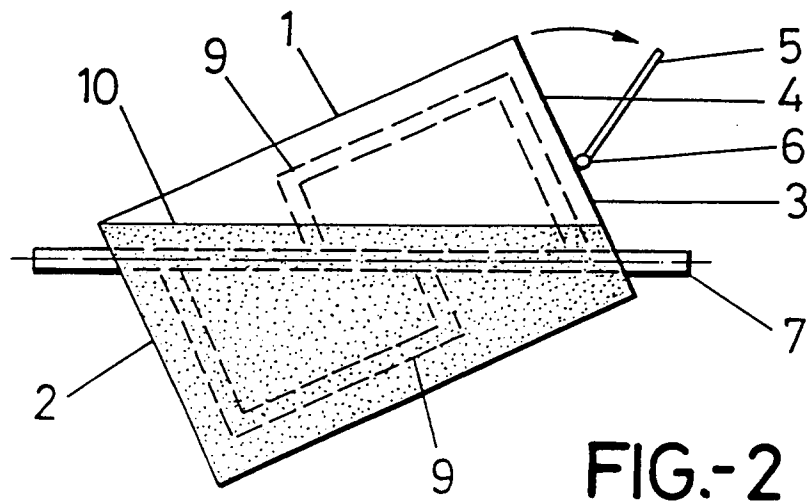


FIG.-2

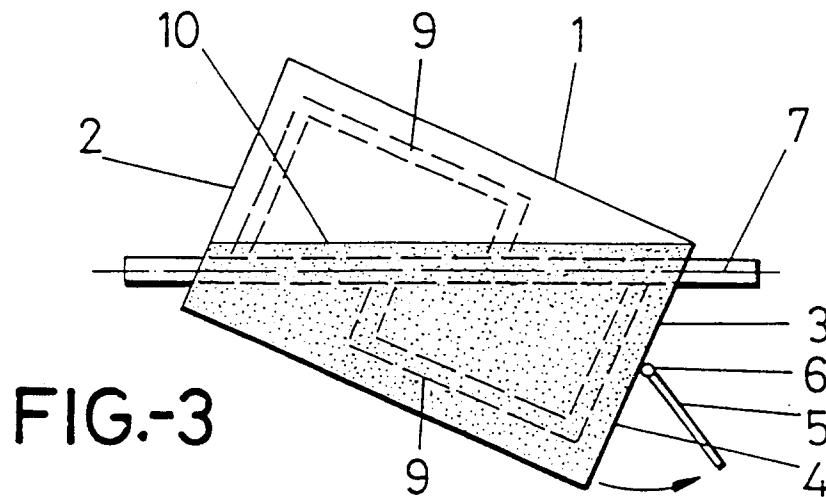
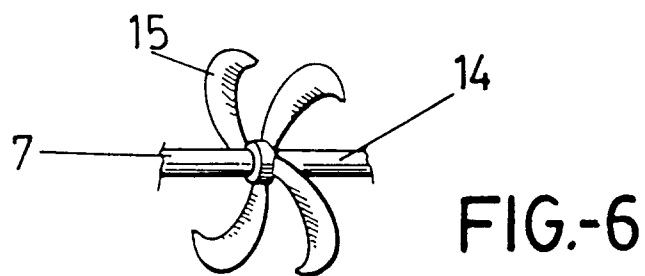
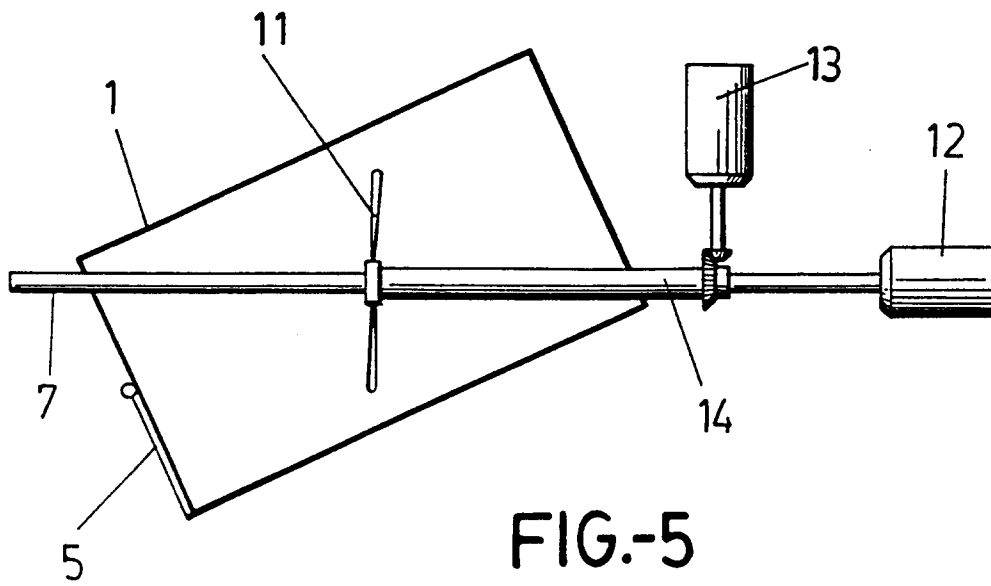
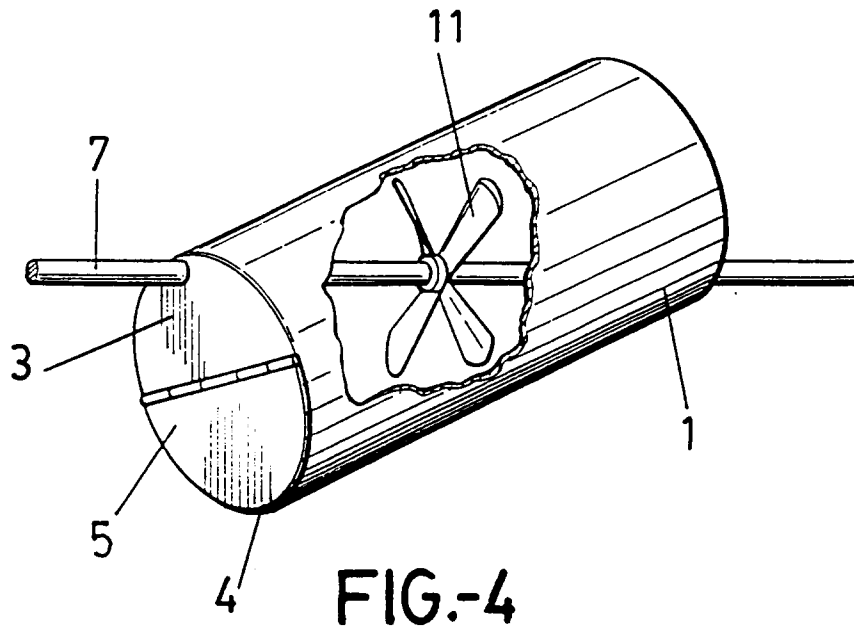


FIG.-3



INTERNATIONAL SEARCH REPORT

International Application No
PCT/ES 96/00144

A. CLASSIFICATION OF SUBJECT MATTER

IPC 6 B01F9/04 B01F9/06 B01F9/08

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 6 B01F

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)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	FR 846 387 A (DUMONT) 15 September 1939	1-4
Y	see the whole document	8,10

X	FR 1 183 650 A (LIENAU) 9 July 1959	1-4,6
	see the whole document	

X	FR 434 526 A (TRIBOUT) 6 February 1912	1,2
	see the whole document	

X	NL 19 204 C (THRÄNHARDT) 15 March 1929	1-3
	see the whole document	

Y	GB 1 131 097 A (FOSTER YATES & THOM LTD)	8,10
	23 October 1968	
	see the whole document	

	-/-	

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

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Date of the actual completion of the international search

31 October 1996

Date of mailing of the international search report

12.11.96

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INTERNATIONAL SEARCH REPORT

International Application No
PCT/ES 96/00144

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT		
Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 4 183 678 A (OHNO IETATSU) 15 January 1980 see the whole document ---	1-10
A	EP 0 077 162 A (GEN SIGNAL CORP) 20 April 1983 see claims; figures ---	1-10
A	DE 10 62 222 B (CRAMER) 30 July 1959 see the whole document -----	1-4,7,8

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