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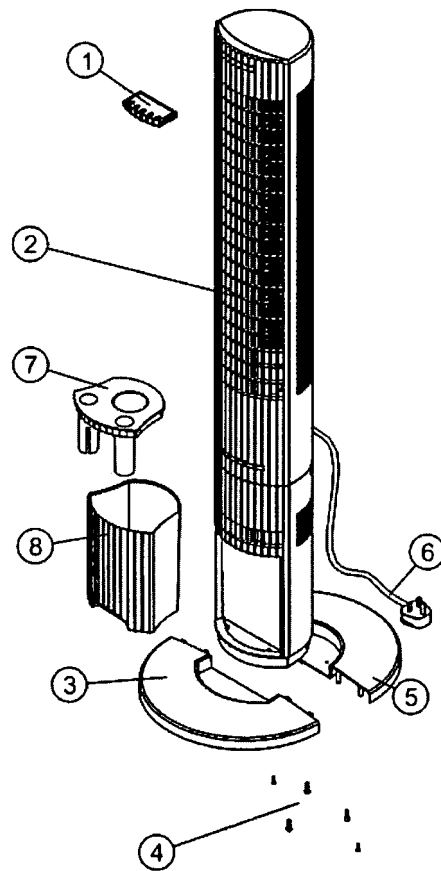
(72) Inventor: **Ngan, Hon Hing**  
**No 95 How Ming St**  
**Kwun Tong**  
**Kowloon (HK)**

(71) Applicant: **Firmstar Household Appliances, Ltd**  
**Kowloon (HK)**

(74) Representative: **Thinat, Michel**  
**Cabinet Weinstein**  
**56 A, rue du Faubourg Saint-Honoré**  
**75008 Paris (FR)**

(54) **Air fan**

(57) The present invention provides an air fan, comprising:  
a main propeller (19); a main motor (24) operably connected to the main propeller (19), driving the main propeller (19) to rotate to generate air stream; characterized in that the air fan further comprises a wind guide device composed of a wind guard plate (35) and a wind reject plate (21) and surrounding the main propeller (19), a gap is provided between the wind guard plate (35) and the wind reject plate (21) for facilitating flowing out of air; an auxiliary motor (53) operably connected to the wind guide device via a rotation-oscillation shifting device, for driving the wind guide device to oscillate to change the wind direction.



**FIG 1**

**EP 1 764 510 A1**

## Description

### Technical Field

[0001] The present invention relates to an air fan, comprising a main propeller and a main motor operably connected to the main propeller, the main motor driving the main propeller to rotate to generate air stream.

### Background Art

[0002] The prior art discloses various fans such as ground fans, table fans, ceiling fans, vane rotating fans, and transverse flow type fans, some examples of which can be seen in the patent documents US6,344,065B1, CN1063530C, CN1034043A and CN1147603A or in FS29-SW tower fan as shown in Fig. 4. These conventional air fans have the following drawbacks:

1) As for conventional ground fans, table fans, ceiling fans and transverse flow type fans, wind direction is changed by allowing the whole fan head and the whole substantially cylindrical housing to oscillate. In this circumstance, the whole fan head and the whole substantially cylindrical housing are large in mass so the rotation inertia is relatively great, so more energy is consumed to change wind direction. With respect to the conventional vane rotating fans, the guide vanes in the front face are rotated to change wind direction. Under this circumstance, the radius of the guide vanes are relatively large so that the rotation inertia is relatively great, so more energy is consumed to change wind direction. In addition, the conventional fans with oscillating heads require a predetermined indoor space for oscillation of the fan head, which is particularly disadvantageous in a narrow environment. To sum up, one defect of the fans in the prior art is a greater consumption of energy and a larger occupation of space.

2) As the oscillating part (the whole fan head and the whole substantially cylindrical housing) or rotating part (guide vanes) for changing wind direction are exposed to the outside in the prior art, oscillation or rotation might injure by accident the ambient objects or human beings such as an operator, for example, when the juveniles operate the air fan, the oscillating head, housing or rotating vanes might injure his fingers by accident. In summary, another defect of fans in the prior art is a certain danger in operation.

3) In addition, the conventional fan with oscillating head, in operation, may shift its center of gravity due to oscillation of the head. Therefore, another defect of fans in the prior art is that the fan in operation is not stable and steady enough and is liable to overturn.

### Summary of the invention

[0003] In order to overcome the defects in the prior art, the present invention provides an air fan adopting an internal oscillation technology, comprising: a main propeller and a main motor operably connected to the main propeller, the main motor driving the main propeller to rotate to generate air stream, characterized in that the air fan further comprises a wind guide device composed of a wind guard plate and a wind reject plate and surrounding the main propeller, a gap is provided between the wind guard plate and the wind reject plate for facilitating flowing out of air; an auxiliary motor operably connected to the wind guide device via a rotation-oscillation shifting device, for driving the wind guide device to oscillate to change the wind direction.

[0004] In a preferred technical solution, the air fan further comprises an ion generator.

[0005] In another preferred technical solution, the air fan further comprises a water filter.

[0006] In a further preferred technical solution, the air fan further comprises an enclosure in which the main propeller and the wind guide device are both disposed.

[0007] In a further preferred technical solution, the rotation-oscillation shifting device is a crank and rocker mechanism.

[0008] As compared with the prior art, the present invention is advantageous in the following points: 1) the rotation inertia of the oscillating member (i.e., the wind guard plate and the wind reject plate) is smaller, so the air fan according to the present invention is energy saving; besides, no space needs to be reserved to facilitate oscillation of head of the air fan, which is particularly advantageous in a narrow environment; 2) the enclosure is stationary and encloses the oscillating wind guide device so that the air fan is pretty much safer; 3) the internal oscillation technology allows the center of gravity of the whole air fan to be stable and steady so that the center of gravity is not shifted any more as in the conventional fans due to oscillation of head. As a result, the air fan according to the present invention is extremely stable and is not liable to overturn.

### Brief Introduction of Drawings

[0009] The present invention will be specified by describing the preferred embodiments with reference to the following drawings:

Fig. 1 is a perspective view of an air fan of the preferred embodiment according to the present invention;

Fig. 2 is an exploded perspective view of component parts of the air fan of the preferred embodiment according to the present invention;

Fig. 3 is another perspective view of the air fan of the preferred embodiment according to the present invention, roughly showing the mounting positions

of and connection relation between a wind guide device and an auxiliary motor; and

Fig. 4 is a view of a FS29-SW tower fan in the prior art.

### Preferred Embodiments

**[0010]** As shown in Figs. 1 and 2, the air fan of the preferred embodiment (the applicant's product model JH-AFN) according to the present invention comprises a substantially cylindrical main propeller 19 which may be a conventional propeller used in a transverse flow fan or of other similar configurations, so the specific structure of the main propeller is not described in detail herein. In the description hereunder, "axial direction" refers to the direction of the vertical axis of the main propeller 19 when the air fan is placed normally, and "radial direction" refers to the direction perpendicular to the axis. A main motor 24 is operatively connected to the main propeller 19 in a conventional manner along the axial direction of the main propeller 19, and is used to drive the main propeller 19 to rotate to generate air stream. The main motor 24 is detachably held in a main motor holder 26 via screws.

**[0011]** The air fan according to the present invention further comprises a wind guide device composed of a wind guard plate 35 and a wind reject plate 21 and surrounding the main propeller 19. The wind guard plate 35 and the wind reject plate 21 are disposed along the axial direction of the main propeller 19 and are detachably connected to each other. The wind guard plate 35 has a top wall and a bottom wall extending along the radial direction of the main propeller 19. The top end of the main propeller 19 is supported on the top wall and the lower end of the main propeller 19 is operably connected to the main motor 24. The holder 26 of the main motor 24 is connected to the bottom wall of the wind guard plate 35. Besides, there remains a gap between the wind guard plate 35 and the wind reject plate 21 for facilitating flowing out of air.

**[0012]** The air fan according to the present invention further comprises an enclosure which is of a combined type, comprising an upper front enclosure 5, a lower front enclosure 80, an upper rear enclosure 65 and a lower rear enclosure 75. The said enclosures are assembled together to form a substantially cylindrical unitary enclosure in which the main propeller 19 and the wind guide device are received. Specifically, the upper portion of the upper front enclosure 5 can be provided with an opening for receiving a remote controller and some accessories thereof. The upper rear enclosure 65 comprises a top plate, a bottom plate and a middle partition. The wind guard plate 35 at the top end thereof is supported on the top plate of the upper rear enclosure 65 via an upper shaft 33 and accessories such as a shaft clamp 29, a shaft ring 31 and a shaft bushing 32, and at the bottom end thereof is supported on the middle partition of the upper rear enclosure 65 via a lower shaft 37 and accessories such as a shaft clamp 43, a shaft ring 41, a shaft bushing 40, a shaft support 39 and a washer 38. The

middle partition is provided thereon with a rotation-oscillation shifting device. Specifically, in the preferred embodiment according to the present invention, the rotation-oscillation shifting device is a crank and rocker mechanism as shown in Figs. 2 and 3, comprising a cam 51 and a cam lever 46 which both ends are respectively provided with a hole. One end of the cam 51 is provided with a hole cooperating with the output shaft of a synchronous motor 53. The cam 51 is connected to the output shaft via a cam pin 52 so that the cam 51 can be driven by the synchronous motor 53 to rotate. The other end of the cam 51 is provided with a protruding portion for insertion into the hole at one end of the cam lever 46, thereby hinged with said end of the cam lever 46. In addition, the bottom wall of the wind guard plate 35 is also provided with a protruding portion for insertion into the hole at the other end of the cam lever 46, thereby hinged with said the other end of the cam lever 46. In principle, the middle partition portion of the oscillation center of the wind guard plate 35 to the rotation center of the cam 51 is equivalent to the fixing lever of the crank and rocker mechanism, the cam 51 is equivalent to the crank, the cam lever 46 is equivalent to a connection lever, and the wind guard plate 35 is equivalent to a rocker. In operation, the synchronous motor 53 drives the cam 51 (crank) to rotate, the rotation is shifted into oscillation of the wind guard plate 35 (rocker) via the crank and rocker mechanism, thereby realizing the object of changing wind direction. Although the rotation-oscillation shifting device is described in combination with a crank and rocker mechanism herein, those having ordinary skill in the art should understand that any other devices which can realize the shifting from rotation to oscillation all fall into the scope of the present invention, for example, parallel double crank mechanism, oscillation guide lever mechanism, oscillation driven member disk-shaped cam mechanism.

**[0013]** In addition, a space is defined between the bottom plate and the middle partition of the upper rear enclosure 65, for receiving a main controller 57 and some accessories.

**[0014]** After being assembled and formed, the unitary enclosure is seated into a base consisting of a front base 63 and a rear base 77.

**[0015]** It is easy to understand from the above that so-called internal oscillation technology means that rotation of the main propeller 19 and oscillation of the wind guide device both take place in the interior of the enclosure.

**[0016]** In another preferred embodiment (applicant's product model JH-AFI) according to the present invention, the air fan comprises an ion generator 85. The wind reject plate 21 is made of for example metal and the ion generator 85 is secured to the wind reject plate 21 via an ion generator holder 81 and screws. It is understood herein that the mounting position of the ion generator 85 can be freely selected as needed. The functions, principle and structure of the ion generator 85 are well known and therefore are not described in detail herein. The ion generator is advantageous in that it can generate anion in

the course of operation of the air fan, in that it is conducive to improvement of ambient air environment and promotes a user's physical and mental health.

[0017] In further another preferred embodiment (applicant's product model JH-AFW) according to the present invention, the air fan comprises a water filter. In this embodiment, as shown in the left lower part of Fig. 2, the lower portion of the lower front enclosure 86 is provided with an opening through which a water tank 100 and its accessories are received in a space encompassed by lower front enclosure 86 and the lower rear enclosure 75. Said accessories include for example a shaded-pole motor 91, a shaded-pole motor holder 92, a propeller upper enclosure 94, a propeller 95, a propeller lower enclosure 97 and a water tank cover 99. The functions, principle and structure of the water filter are well known and therefore are not described in detail herein. The water filter is advantageous in that it can filter dust and impurities in the air during the operation of the air fan and is conducive to improvement of ambient air environment. Besides, the water filter has the advantage of increasing air humidity when used in dry regions.

[0018] Although the preceding text describes the preferred embodiments of the present invention with reference to the drawings, those having ordinary skill in the art understand that the present invention is not limited to the above specific content of the above preferred embodiments. For example, the connection modes between component parts can be freely selected as needed for example threaded connection, riveting, adhesive connection or welding. The adopted drive source can be any one motor selected by those having ordinary skill in the art and other drive sources besides motors, not limited to the synchronous motor and the shaded-pole motor as described herein. In addition, the function of one part can be realized by two or more parts, vice versa. In one word, those having ordinary skill in the art can make various variations and improvements to the extent they do not go beyond the scope of the present invention as defined in the appended claims.

## Claims

1. An air fan, comprising:
  - a main propeller (19);
  - a main motor (24) operably connected to the main propeller (19), driving the main propeller (19) to rotate to generate air stream;
  - characterized in that** the air fan further comprises a wind guide device composed of a wind guard plate (35) and a wind reject plate (21) and surrounding the main propeller (19), a gap is provided between the wind guard plate (35) and the wind reject plate (21) for facilitating flowing out of air; an auxiliary motor (53) operably connected to the wind guide device via a rotation-oscil-

lation shifting device, for driving the wind guide device to oscillate to change the wind direction.

2. The air fan as claimed in claim 1, **characterized in that** it further comprises an ion generator (85).
3. The air fan as claimed in claim 1, **characterized in that** it further comprises a water filter.
4. The air fan as claimed in claim 2, **characterized in that** it further comprises a water filter.
5. The air fan as claimed in anyone of claims 1-4, **characterized in that** it further comprises an enclosure in which the main propeller (19) and the wind guide device are both disposed.
6. The air fan as claimed in anyone of claims 1-4, **characterized in that** the rotation-oscillation shifting device is a crank and rocker mechanism.
7. The air fan as claimed in claim 5, **characterized in that** the rotation-oscillation shifting device is a crank and rocker mechanism.

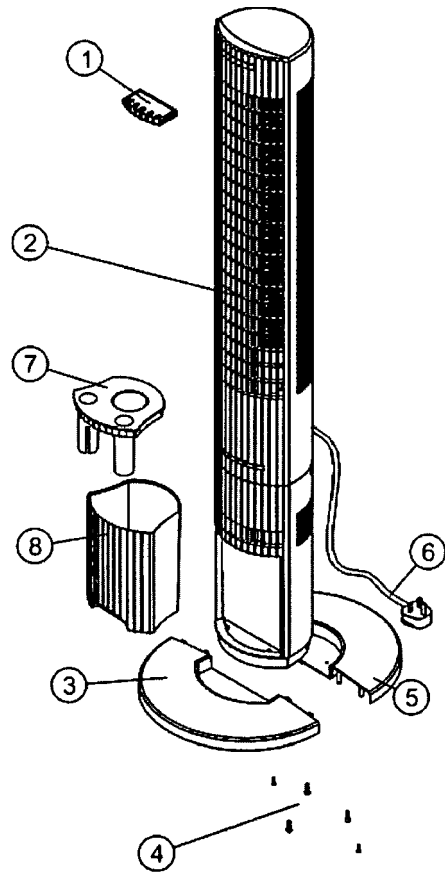


FIG 1

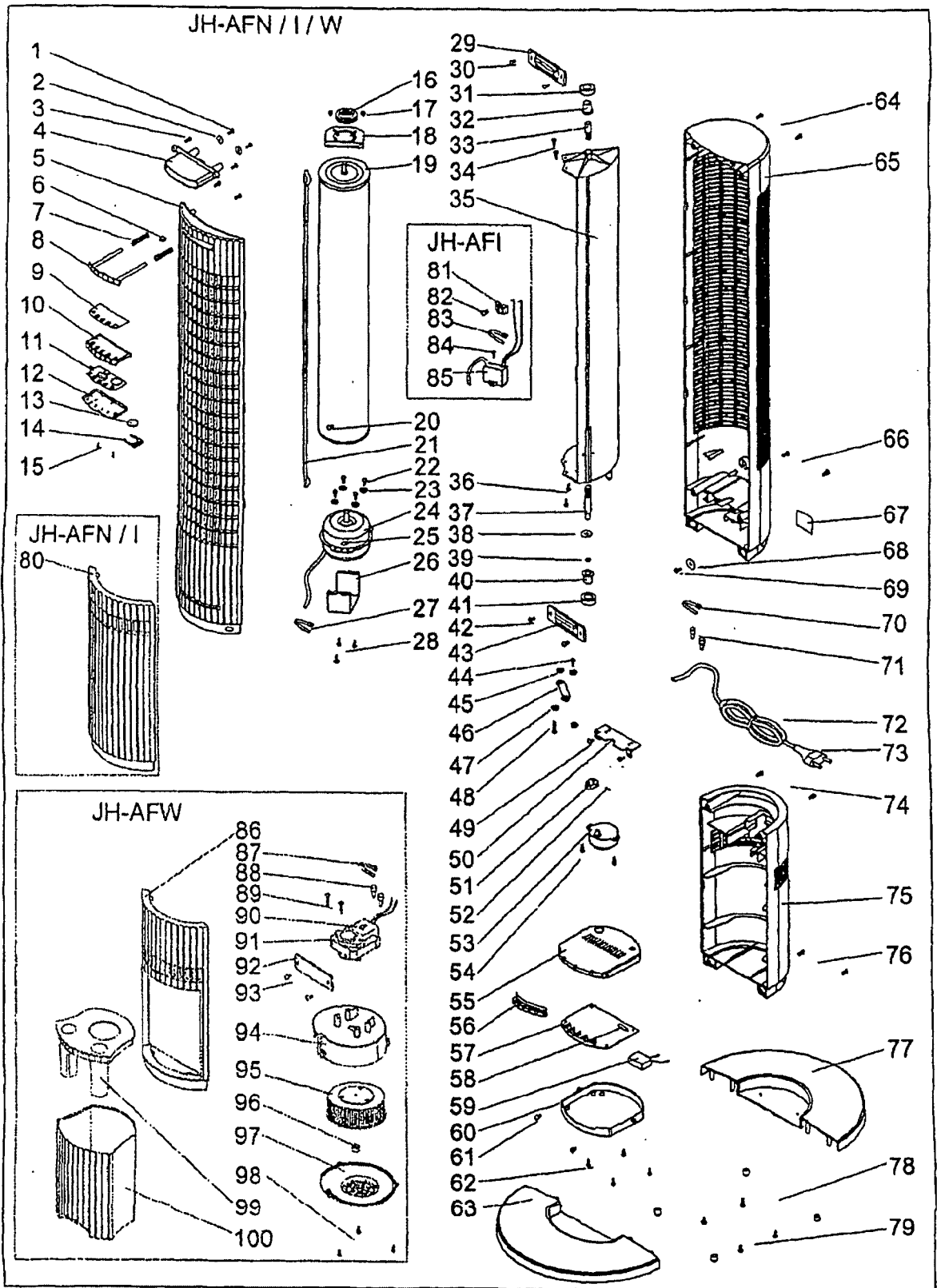


FIG 2

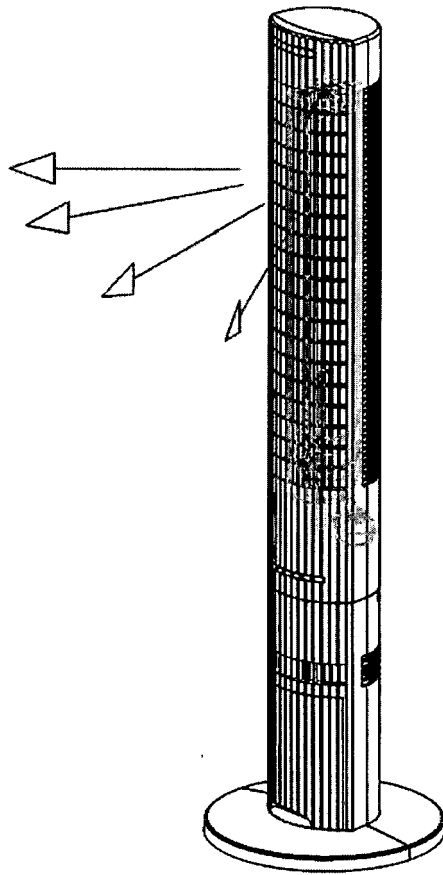


FIG 3

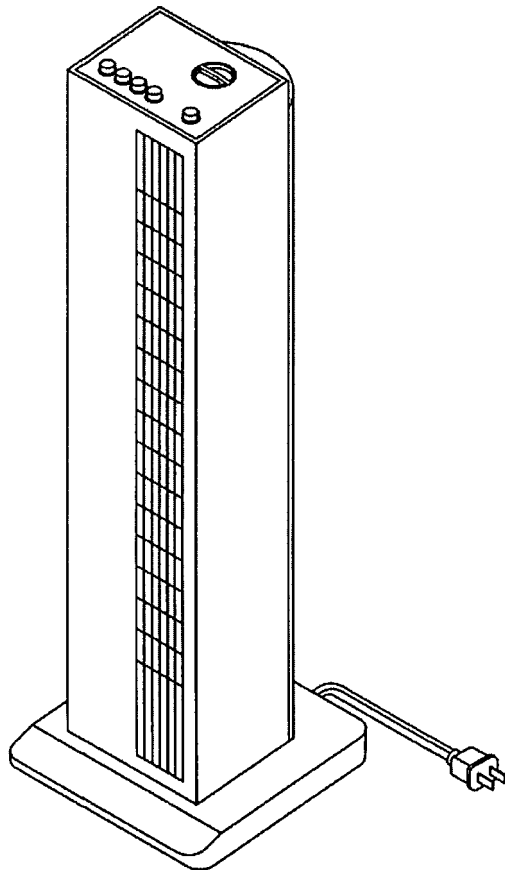


FIG 4



DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	PATENT ABSTRACTS OF JAPAN vol. 017, no. 604 (M-1506), 8 November 1993 (1993-11-08) -& JP 05 180473 A (HITACHI LTD; others: 01), 23 July 1993 (1993-07-23) * abstract *	1-7	F04D17/04 F04D29/42 F24F7/007
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The present search report has been drawn up for all claims			
Place of search		Date of completion of the search	Examiner
The Hague		16 January 2006	Gonzalez-Granda, C
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**ANNEX TO THE EUROPEAN SEARCH REPORT  
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