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(11)

EP 0 829 843 A2

(12)

EUROPEAN PATENT APPLICATION

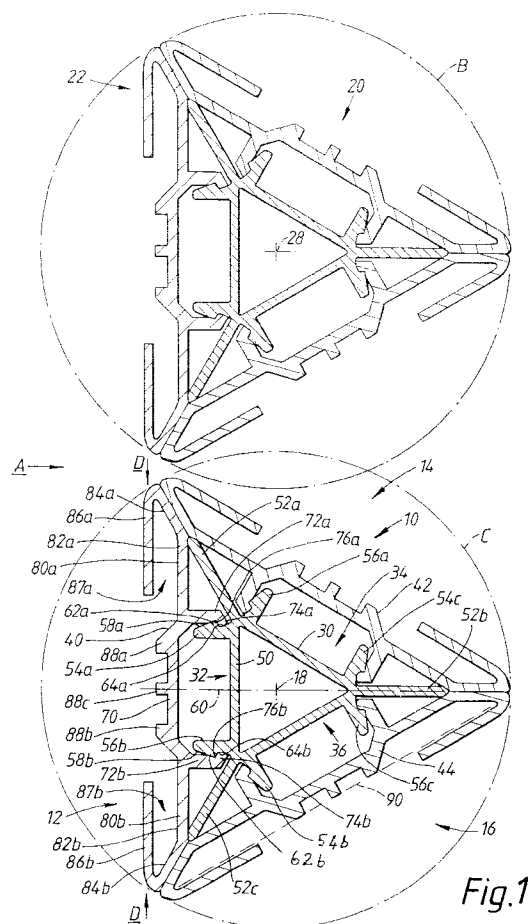
(43) Date of publication:

18.03.1998 Bulletin 1998/12(51) Int Cl.⁶: **G09F 11/02**(21) Application number: **97307217.6**(22) Date of filing: **17.09.1997**

(84) Designated Contracting States:

**AT BE CH DE DK ES FI FR GB GR IE IT LI LU MC
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Lloyd Wise, Tregear & Co.,
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London WC1A 1LW (GB)**(54) Rotary display apparatus and vane therefor**

(57) A vane (10, 20) for a rotary display apparatus comprises an elongate core member (30) defining a triangular cross-section. The core (30) is mountable for rotation about its long axis (28) when mounted in a rotary display apparatus in parallel with a set of similar vanes such that three display surfaces (12, 14, 16) can be presented. The core of aluminium say has a pair of parallel elongate lugs (54a, 56b) associated with each triangular side which are shaped to receive cooperating legs (72a, 72b) of a facet member (40, 42, 44) of resilient material. A clear acrylic is preferred. A respective facet member (40, 42, 44) is detachably mounted to each side (32, 34, 36) of the core and has a pair of opposed elongate slots (87a, 87b) for receiving the edges of a strip of display material. The slots (87a, 87b) are provided by reflexed lips (86a, 86b) and the outer edges (80a, 80b) of the facet members meet to define a triangular shape in cross-section. The core has three radially projecting parts (52a, 52b, 52c) that provide location and support for the facet members (40, 42, 44) at the corners of the triangle. The disclosed structure is particularly useful in making up cassettes (120) of vanes pre-loaded with strips of display material.

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Description

This invention relates to a rotary display apparatus of the kind employing a plurality of parallelly-mounted, elongate members, each having a plurality of display facets and being rotatable along a lengthwise axis whereby by organized rotation of the elongate members it is possible to provide a plurality of display surfaces for the apparatus. The elongate members are commonly referred to as vanes or louvres and the apparatus may also be referred to as a rotary vane unit.

The invention also relates to a vane for a rotary display apparatus.

The conventional apparatus of this kind employs like elongate members of triangular cross-section, specifically equilateral triangular section, having three display facets. These members are synchronously rotatable to provide three successively-presented, display surfaces for the overall display apparatus. The synchronous rotation of the vanes, each being rotated through 120°, may be simultaneous or in a succession to achieve a ripple effect. The vanes have a common dwell period for presenting each display surface. Although cross-sections other than an equilateral triangle can be used, the great majority of rotary vane units use this shape of vane as it provides the nearest approach to continuous display surfaces. The invention will be described in the context of equilateral-triangular cross-section vanes.

Rotary vane units are used for various information displays. The most usual form of display is poster material for advertising. For this purpose a poster sheet is sliced into strips, each of which is affixed to a facet of a respective vane. A long-standing problem has been the changing of poster display material which may need to be done quite frequently. Despite significant disadvantages, the usual practice for affixing the poster strips to the vane facets has been by means of an adhesive, particularly for large display units, e.g. a 4m x 3m display area.

Changing poster display material in situ is difficult. Rather than disassemble complete vanes, proposals were made to construct each vane as an elongate core structure to which three removable parts are affixed. Each part provides one of the three display facets for the vane and the parts affixed to the core provide the familiar equilateral triangle cross-section. By such measures the parts carrying the display material to be changed can be removed and replaced by parts carrying fresh display material.

A vane structure of this kind is described in British patent specification GB-A-2 134 301 (Prismavision). In this specification, the parts (called screen sides) are mechanically secured to the core structure of a vane by a snap action. An alternative to the mechanical securement of the parts is a magnetic securement. U.S. patent 3,367,049 (Noreen) discloses the parts carrying the display material as being of magnetizable material, e.g.

sheet steel, and the core structure includes magnets to which the sheet steel parts are attracted.

In U.S. patent 3,637,049, the display material is held on the removable parts, which comprise elongate strips of steel, by transparent covers which clip on the long edges of these strips to define a pocket in which the display strip is located. Although this method of holding the display material does not involve adhering the display material to the steel strip, it does not provide for easy changing of displays. The covers are removed from the steel strips by a sliding action, though it is not necessary to slide the cover completely off the steel strip to change the display material. However, either the changing of material is to be done in situ at the rotary display unit which may be difficult and inconvenient; or the steel strips with the covers are taken away, a bulky and heavy assemblage to manipulate. Despite its disadvantages the adhesive affixing of the display strips to the vanes, or the detachable vane parts as found in GB-A-2 134 301, has remained the preferred industry practice over a long period.

Although the detachable parts having the display material adhered thereto may be taken away from the site of the display unit for treatment in a more convenient workshop, the changing of the display material is still laborious and time-consuming and thus expensive. The parts have to be soaked to soften the adhesive and the relevant surfaces scrubbed to remove the poster material and prepare the surface for the adhesion thereto of fresh material. The parts can then be taken to a fresh site to display the new poster material.

The present invention enables us to provide a vane structure for a rotary display apparatus and rotary display apparatus incorporating such vanes which allows of easy changing of display material, and avoids the use of adhesive. The vane structure to be described is economical in construction and the changing of display material in rotary vane units in which such vanes are employed can be done economically.

In one aspect the present invention provides a vane for a rotary display apparatus as set forth in Claim 1. In another aspect the invention provides a rotary display apparatus as set forth in Claim 13.

The invention also relates to a system and a method for changing display material.

Reverting to the earlier discussion of changing display material, it is clearly advantageous if the amount of work to be done in situ at a rotary display unit be minimized to detaching the relevant vane parts carrying display material to be changed and replacing them with parts already pre-loaded with the new display material.

There will be described hereinafter a system and method for preloading a set of parts with display material, the operation extending from the initial roll of uncut poster material to a cassette of parts containing respective strips of poster material. More particularly, the system can be fitted in a vehicle which can be moved from site to site with the new posters and the pre-loading op-

eration be done at a point conveniently near each of the display units to be changed.

According to yet other aspects of the invention there is provided a system according to Claim 14 and a method according to Claim 18.

The invention and its practice will be further described with reference to the accompanying drawings in which:

Fig. 1 shows a cross-section pair of adjacent vanes as they would be mounted in a rotary display unit; Fig. 1A shows a cross-section of a facet portion having the lips of the wing tips reflexed inwardly; and Fig. 2 shows in diagrammatic form a system for pre-loading vane facet portions with display strips.

Referring to Fig. 1, two identical vanes 10 and 20 are shown in cross-section. In a rotary vane display unit, vanes 10 and 20 are within a plurality of like vanes mounted in parallel for rotation about their long axes. The general arrangement of such vanes, housing or other support structures, and drive arrangements to intermittently rotate the vanes through 120° are well known in the art and do not form part of this invention.

If the vanes 10 and 20 are taken to be in a dwell position, then their facets 12 and 22 form part of a display surface viewable from the direction of arrow A and provided by the like oriented and aligned facets of all the vanes in the display unit. The vanes 10 and 20 are mounted for rotation about respective central long axes 18 and 28 respectively. The circular paths traced out by the tip extremities of the vanes are indicated as B and C. As the vanes 10 and 20 are identical, it suffices to describe vane 10 in detail.

Vane 10 provides three display facets 12, 14 and 16 which lie in an equilateral triangle centred on axis 18. The vane 10 comprises a core portion 30, which is conveniently an extruded aluminium section, and three detachable identical facet portions 40, 42, 44. The core portion 30 itself presents three identical sides 32, 34, 36 to each of which a respective facet portion 40, 42, 44 is attached by a releasable snap action fitting. The facet portions 40, 42, 44 may be made of an acrylic material that is impervious to UV. The acrylic material provides the appropriate combination of stiffness with sufficient resilience to provide a snap-on function and a retaining function for display material, as will be described further below.

The core portion 30 includes a hollow inner core 50 of equilateral-triangular section centred on axis 18. From each corner of inner core 50 a respective planar portion 52a, 52b, 52c extends radially with respect to axis 18. Also from each corner extends a pair of opposed and symmetrical wing portions 54 and 56, designated 54a, 56a; 54b, 56b; and 54c, 56c at the respective corners. It will be seen each side 32, 34 and 36 of the core portion includes a pair of these wing portions 54a, 56b; 54b, 56c; and 54c, 56a. The wing portions are of

like shape to provide projections or lugs having lock-in recesses for receiving the facet portions. To explain how the facet portions snap-fit onto the wing portions only one side 32 need be considered. The others are identical.

The wing portions or fastening lugs 54a and 56b are transversely spaced across the side 32 and have active surfaces facing away from one another and symmetrical with respect to a central radial plane 60 through the side 32. Each active surface, starting from the free end, outermost with respect to the general plane of the side, comprises a camming surface 58a, 58b sloping away from the central radial plane 60, leading to a projection 62a, 62b and thence into recess 64a, 64b inwardly directed toward the central plane.

The cooperating facet portion 40 comprises a central support section 70 of generally arched shape, the arch rising outwardly with respect to the general plane of side 32. From the sides of the arch a pair of legs 72a, 72b depend inward and provide a resilient engagement with the active surfaces of the wing portions 52a, 56b respectively. To this end each leg has an inwardly projecting lug 74a, 74b seating in a respective recess 64a, 64b and a respective projection 62a, 62b. The transverse spacing between the lugs 74a and 74b is made a little greater than that between the camming surfaces 58a, 58b at the free end of projections 54a, 54b so that the lugs fit onto the camming surfaces and are guided by them.

The facet portion 40 has a pair of symmetrical wings 80a, 80b which have portions 82a, 82b extending in the plane of the side 32 to seat against the end of the respective radial planar portions 52a, 52c. The portions 82a, 82b lead to outer tip portions 84a, 84b at 120° to the portions 82a, 82b respectively so each tip portion engages the neighbouring tip portion of an adjacent facet portion along the radial plane of the associated planar portion of the inner core, e.g. 52a. The outer end of each planar portion may be V-chamfered to better seat the wing portions. In this way the radial planar portions of the core locate and support the adjacent portions of the facet members.

Finally the tips 84a, 84b terminate in reflex lips 86a, 86b that are directed inwardly toward the central plane 60 so that the outer edge portions of the facet portion 40 provide opposed elongate slots 87a, 87b for receiving the edges of a strip of display material.

The reflex lips 86a, 86b may be turned in to be directed toward the plane of the strip to be seated on projections 88a, 88b in order to assist in firmly holding the strip in place. This additional reflexing is seen in the facet portion illustrated in Figure 1A.

The top of the arch section 70 has a pair of transversely spaced, parallel, guide projections 88a, 88b which provide a rear support for holding a strip of display material flat within the facet portion. A further support projection 88c may be provided if desired. The projections 88a, b, c may project further forwardly with respect

to the reflex lips 86a, 86b than is shown so that the strip of display material is held in a slightly sinuous configuration with the portion of it supported by these projections bowed outwardly. This aids in releasing the strip particularly if it has become wet due to ingress of rain or moisture.

It is preferred that the acrylic material be both transparent and colourless to allow the top and bottom edges of the display strip to show through the lips 86a, 86b. It is to be understood that the features of the cross-section of the vane structure thus far described all extend along the elongate vane parallel to the axis 18. It is not essential that the various features should necessarily extend in an unbroken line along the length of the vane. For example the legs 72a, 72b and/or the wing portions 54a, 54b etc. could be interrupted in the axial direction while maintaining their retaining function.

The dashed line 90 in facet portion 44 providing facet 16 indicates the plane in which a strip of display material is received. As already mentioned above, the extent of the forward projection of the guide projections 88a, b, c relative to the lips may be such as to slightly bow out the centre portion of the strip from the plane 90. Reverting to facet portion 40, in order to protect the display strip against the weather a flat protective strip of clear material, e.g. acrylic, may also be inserted along the plane 90 to be trapped by the lips 86a, 86b. The clearance allowed between the free ends of the lips and the projections 88a,b,c is chosen accordingly. The unstressed lips may be formed to depend slightly inwardly (Fig. 1A) so that when the display material and the protective strip are in place the lips are in flat engagement with the outer surface of the protective strip.

In attaching the facet portion 40 to the core portion 30, the legs of the facet portion can be pressed onto the wings 54a, 56b so that the legs 72a, 72b are cammed along the surfaces 58a, 56b and over the projections 62a, 62b to have the inwardly directed lugs 74a, 74b seat in recesses 64a, 64b. The facet portion 40 can be detached by pressing the wing tips together at D and D. The outwardly concave shape of the facet portion causes it to bow more concavely, releasing the lugs from the recesses.

The hollow triangular shape of the inner core 30 is particularly suitable for receiving at each end a bearing/camming insert of the kind disclosed in EP-A-024 396.

It will be understood that other means of detachably mounting the facet portions to the vane core portions may be devised. These may be mechanical but magnetic attachment is also possible.

The preferred way of inserting a strip of display material into a facet portion is to slide it in from one end. A particular system and method for doing this for a number of facet portions relating to one poster is described below with reference to Fig. 2.

Fig. 2 is a diagrammatic representation of a vehicle body 100 into which is fitted a system for pre-loading facet portions such as 40 described above. Furthermore

the facet portions are stacked into a cassette for ease of delivery to the rotary display unit in which they are to be mounted. The vehicle thus provides a mobile workshop.

The vehicle body provides an enclosed interior working space accessible through the rear 102 of the body in the usual manner.

Along one side wall 104 of the body is mounted a roller assembly 106 located toward the top of the side wall. The roller assembly carries poster material as complete sheets. The poster material is pulled off the roller assembly over a downwardly and inwardly sloping surface 108 to a roller guillotine 110. Such machines are known. For present purposes the guillotine 110 is an extended version having a length of 3m. The roller guillotine is set to cut pre-set increments of the poster sheet to provide display strips of a pre-set width. This width is set to match the transverse width of the strip to be accommodated by the facet portions, e.g. 40, in which the poster is to be supported.

From the roller guillotine 110, the strip 112 just cut is taken around guides 114 mounted adjacent the front wall 116 of the vehicle body. The guides 114 lead the strip around 180° so that it moves in the reverse direction on reaching the other side wall 118. Mounted along this side wall spaced inwardly from it is a stack 120 of facet portions, such as 40, with their open (front exterior) sides facing upwards. The top facet portion 122 of the stack is held inclined at an angle, being tilted upwardly in the direction toward the interior, that is toward the plane of the strip 112 as it emerges from guides 114. This assists in the lengthwise movement of the emerging strip into the facet portion 122.

When the strip 112 is loaded into the top facet portion 122 the loaded portion 122 is moved outwardly towards the wall 118 of the vehicle to the top of a stack 124 of pre-loaded facet portions. In this manner the pre-loaded facet portions are stacked in the sequence that they are to be mounted in the rotary display apparatus. The stacking in this fashion is arranged to provide a "cassette" of pre-loaded facet portions that is movable as a unit to the rotary display apparatus.

The system of Figure 2 can be set up and mounted in places other than a vehicle. The preparation of display strips by guillotining as described need not necessarily be followed by loading of the strips in the cassette fashion discussed. They can be transported and used in any way desired once the strips are mounted to the vanes.

Claims

1. A vane for a rotary vane display apparatus comprising an elongate core member intended for rotation about a lengthwise-extending axis, and a plurality of elongate facet portions mountable to said core member to extend lengthwise of said axis and to provide a plurality of display surfaces for receiving

respective strips of display material, and respective, cooperating, attachment means on each of said facet portions and said core member to detachably mount said facet portions to said core, characterized in that:

each facet portion comprises an elongate body portion having long edge portions providing a pair of spaced facing slots into which respective long edges of a display strip are locatable to support the strip at a front surface of the body portion, and the attachment means of the facet portion is located at the rear of said body portion and is detachable from the cooperating means on said core member by manual manipulation of the facet portion.

2. A vane as claimed in Claim 1, in which the attachment means on the core member comprises a pair of spaced upstanding projections and the attachment means on the facet portion cooperable therewith comprises a pair of spaced legs, the spacing of the legs and the shaping thereof and of said projections being such that the legs are a push or snap-on fit on said projections with the legs embracing said projections, and said facet portion is flexible transversely of its lengthwise direction to enable the facet portion to be flexed to cause said legs to open and disengage from said projections.
3. A vane as claimed in Claim 2 in which said edge portions of each facet portion comprise respective wings that provide a forward facing concave or dish shape to the body portion and which are manipulatable to a more concave or dish shape to flex apart said leg portions.
4. A vane as claimed in Claim 1 in which said edge portions of each facet portion comprise respective wings that provide a forward facing concave or dish shape, as seen in a transverse cross-section, to the body portion.
5. A vane as claimed in Claim 3 or 4 in which said wings are in an essentially radial plane with respect to the intended axis of rotation as mounted on said core member, pairs of adjacent wings of neighbouring facet portions abutting along a radial plane.
6. A vane as claimed in Claim 3, 4 or 5 in which in transverse cross-section the body portion of each facet portion comprises an arched centre portion arching forwardly, a respective portion extending from each side of the arch in a display plane normal to a radial plane through the centre of the arch and leading to said wings at an angle thereto.

7. A vane as claimed in Claim 6 in which for each facet portion said legs depend from the sides of said arch portion.

- 5 8. A vane as claimed in Claim 3, 4, 5 or 6 in which for each facet portion said slots are provided by said wings and a respective lip inwardly depending from the tip of each wing.

- 10 9. A vane as claimed in any preceding claim in which each body portion comprises forwardly projecting guides to locate the rear of said display strip.

- 15 10. A vane as claimed in any preceding claim in which said facet portion is a unitary structure of a transparent resilient material such as an acrylic plastic.

- 20 11. A vane as claimed in any preceding claim in which each facet portion comprises an elongate transparent strip having its long edges located in said slots to provide protection for the display surface of a display strip mounted in the facet portion.

- 25 12. A vane as claimed in any preceding claim which has three facet portions mounted as the sides of an equilateral triangle as seen in cross-section, and in which said core member comprises an inner core of equilateral triangular cross-section centred on said axis of rotation a respective radial portion extending from each corner of the triangle to abut and support adjacent body portions, and a respective pair of wing portions extending from each corner of the triangle each being substantially at a right angle to the side of the triangle from which it projects, said wing portions providing the attachment means of the core member.

- 30 13. A rotary vane display apparatus comprising a plurality of parallelly-mounted vanes, each as defined in Claim 1, each vane being rotatable along its lengthwise axis, and means for driving the vanes in intermittent organized rotation for the facet portions to provide a plurality of display surfaces.

- 35 45 14. A system for loading facet portions, each characterized as in Claim 1, with respective strips of display material, comprising:

means for supporting a sheet of display material, preferably in a roll, for cutting into strips;
a guillotine for cutting strips from said sheet in predetermined increments corresponding to the required transverse width of the strips;
guide means for guiding said sheet to said guillotine;
loading means at a location spaced from said guillotine for presenting successive facet portions to receive respective cut strips of display

material;
 guide means for moving each cut strip lengthwise from said guillotine to said loading means so as to enter a facet portion from one end thereof, 5
 and means for moving a facet portion loaded with a display strip into a location at which a set of facet portions are assembled in a sequence corresponding to the sequence in which display strips are cut from said sheet. 10

15. A system as claimed in Claim 14 in which said guillotine and loading means are mounted on opposite sides of a working space such that a cut strip emerges in one direction from the guillotine and enters said loading means in the opposite direction. 15
16. A system as claimed in Claim 15 in which said working space is in a vehicle body said guillotine being mounted adjacent one side wall and said loading means being mounted adjacent the other side wall and said guide means defining a path extending adjacent a front wall of the vehicle body. 20
17. A system as claimed in Claim 15 or 16 in which said loading means is arranged to support the facet portion for receiving the next display strip inclined at an angle about its long axis. 25
18. A method for loading facet portions, each characterized as in Claim 1, with respective strips of display material, comprising: 30
 supporting a sheet of display material, preferably in a roll, for cutting into strips, 35
 leading said sheet to a guillotine for cutting strips therefrom in predetermined increments corresponding to the required transverse width of the strips,
 guiding each cut strip to move lengthwise from the guillotine to a facet portion and to enter the facet portion from one end thereof, and moving the facet portion loaded with the display strip to a location at which is assembled a set of successive facet portions loaded with a sequence of successive display strips cut from said sheet. 40 45
19. A method as claimed in Claim 18 in which each cut strip emerges from said guillotine in one direction and is guided to enter a facet portion moving in the opposite direction at a location spaced from said guillotine. 50
20. A method as claimed in Claim 19 in which the facet portion for receiving the next strip is inclined at an angle about its long axis. 55

