May 6, 1958 E. J. KIES 2,833,065

SIGN CARRYING WINDMILL CONSTRUCTION

Filed Aug. 30, 1954 4 Sheets-Sheet 1

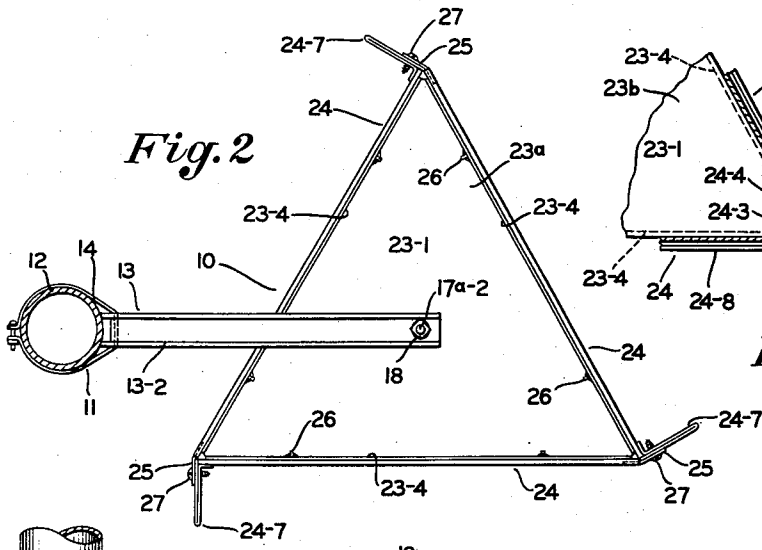


Fig. 2

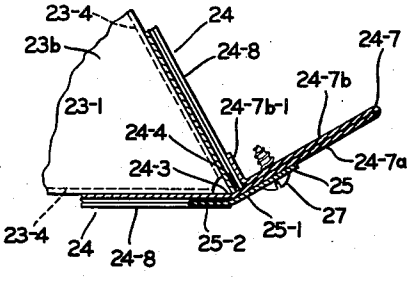


Fig. 3

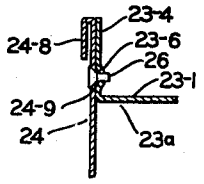


Fig. 4

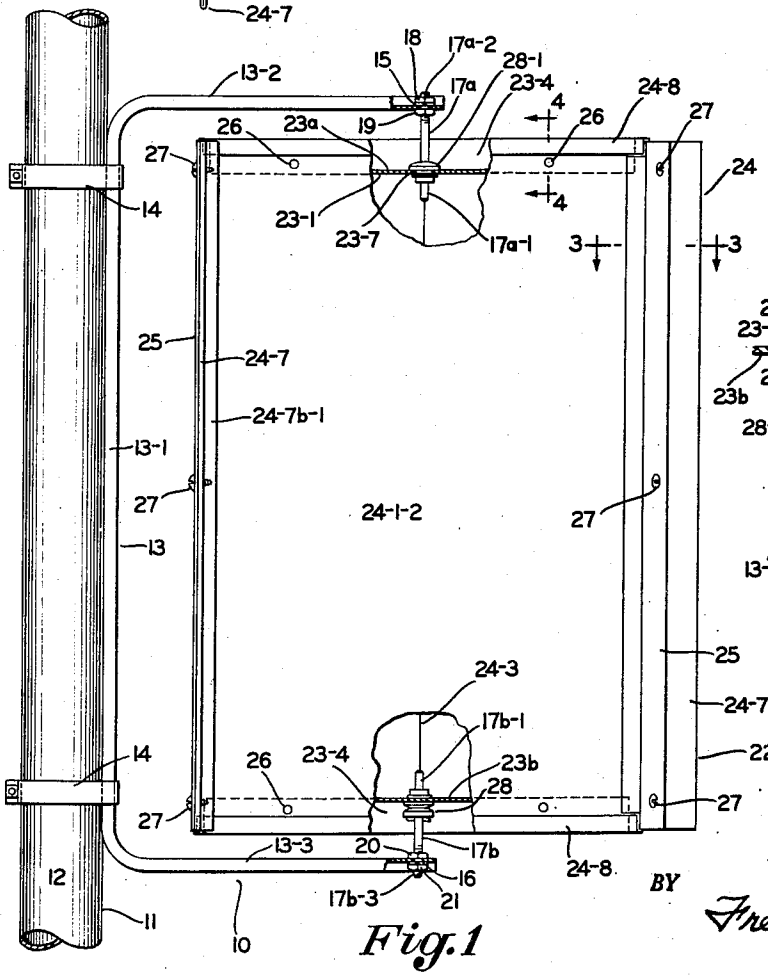


Fig. 1

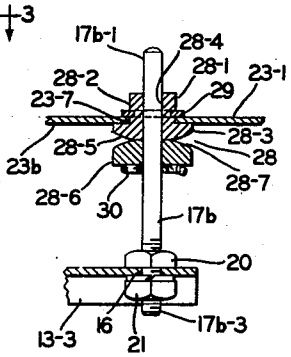


Fig. 5

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SIGN CARRYING WINDMILL CONSTRUCTION

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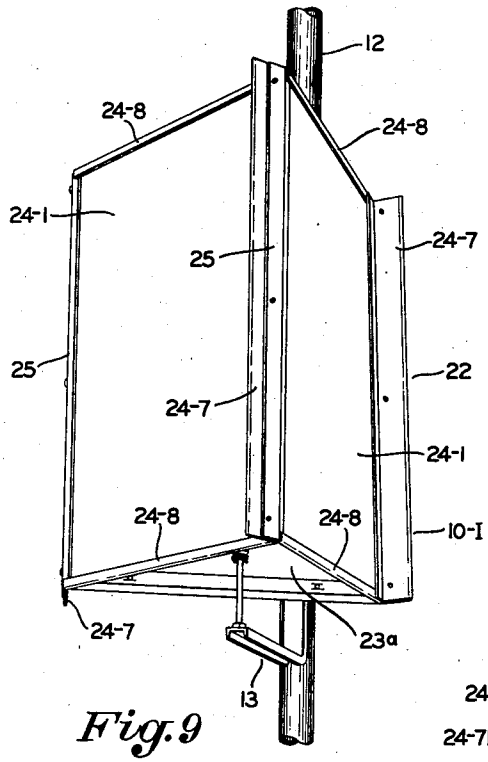
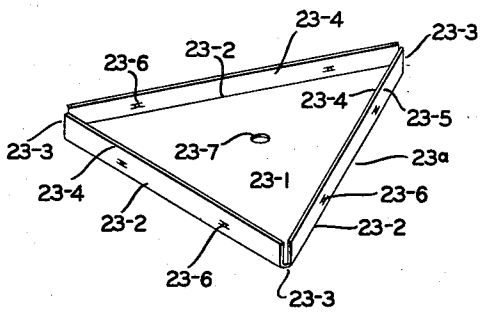


Fig. 9

Fig. 6



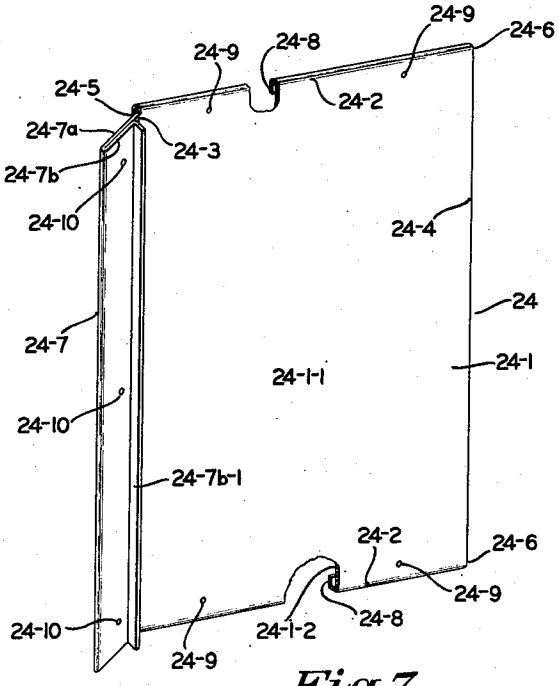


Fig. 7

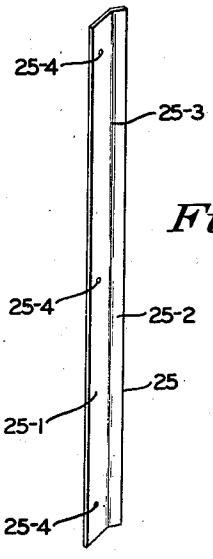


Fig. 8

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SIGN CARRYING WINDMILL CONSTRUCTION

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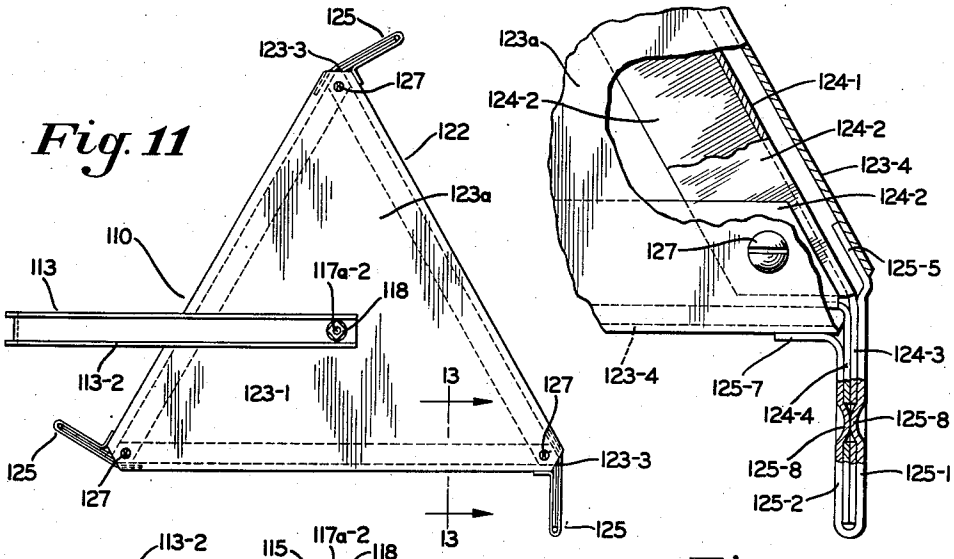


Fig. 11

Fig. 12

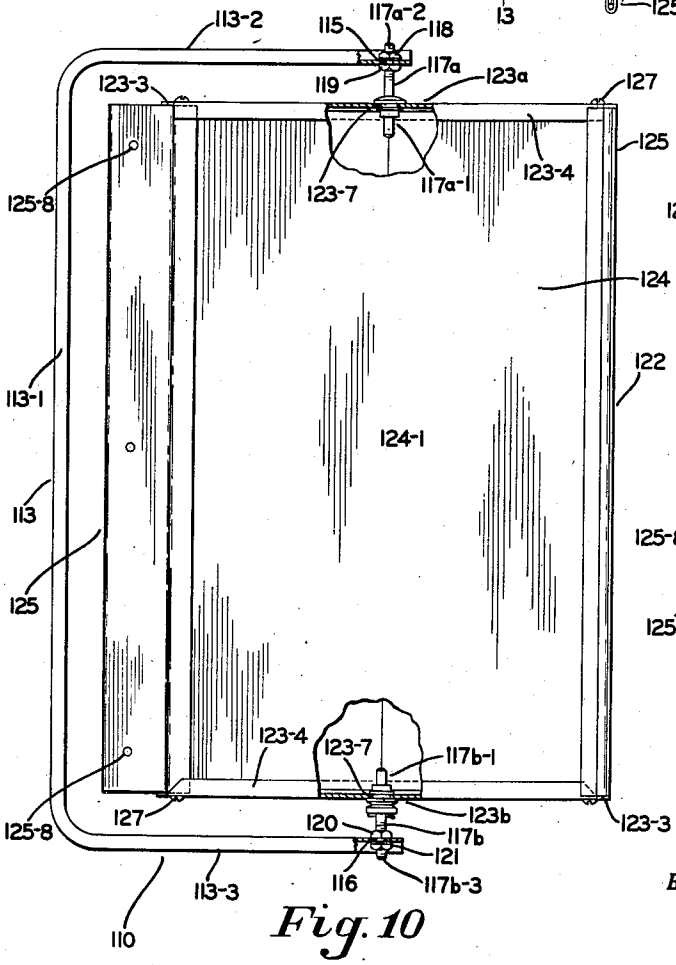


Fig. 10

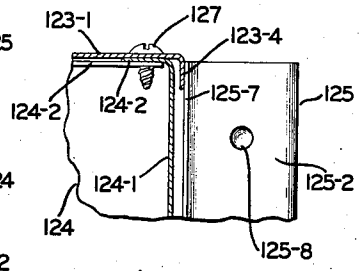


Fig. 13

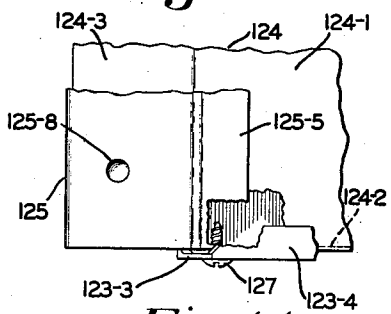


Fig. 14

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SIGN CARRYING WINDMILL CONSTRUCTION

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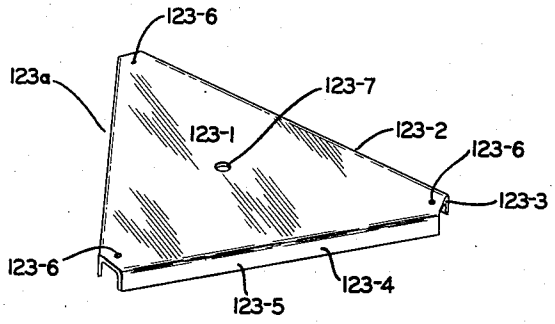


Fig. 15

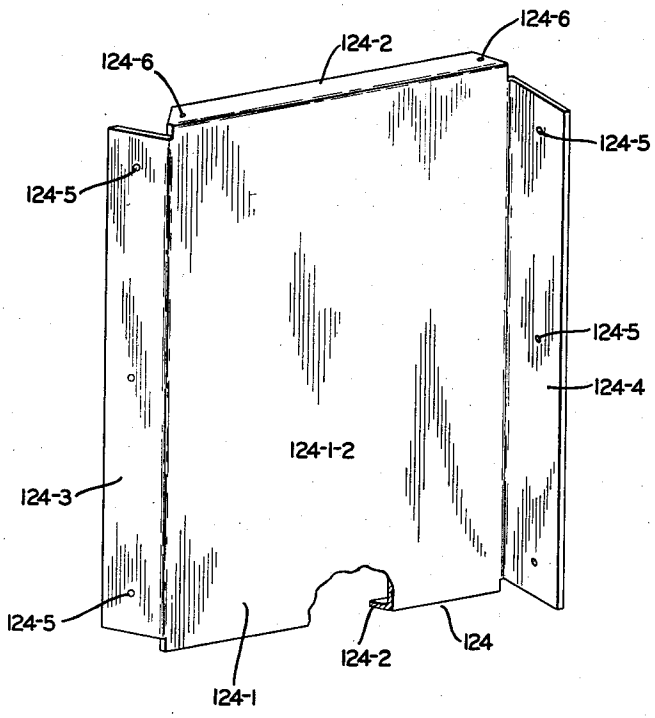


Fig. 16

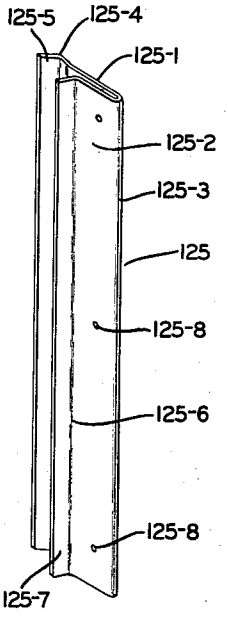


Fig. 17

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SIGN CARRYING WINDMILL CONSTRUCTION

Elliot J. Kies, Massillon, Ohio, assignor to The Massillon-Cleveland-Akron Sign Company, Massillon, Ohio, a corporation of Ohio

Application August 30, 1954, Serial No. 452,795

2 Claims. (Cl. 40—39)

The invention or discovery relates in general to windmill construction, and more particularly to windmill construction which is adapted to carry signs on the rotor of the windmill so as to present a revolving sequence of faces to an observer, when the rotor is actuated by either mechanically created or natural air currents.

Such a sign carrying windmill construction in the field of advertising is frequently termed a motion advertising display device, and such devices are desirable for use outdoors or indoors, and are freqeuntly unattended for prolonged periods. In a motion advertising display device it is also desirable to change displays at frequent intervals, such displays frequently being printed cards.

In prior windmill construction utilized for carrying signs or displays, the constructions have been relatively complicated, and have included a substantially great number of different parts.

Such prior constructions have also frequently been provided with bearings which require lubrication at frequent intervals.

Such prior constructions have also been subject to stoppage arising from the cumulative action of the weather, including the action of variations in temperatures, winds, rain, and snow.

The objects of the present invention or discovery include the provision of an improved sign carrying windmill construction which includes parts which are substantially reduced in number as compared to the number of parts in prior constructions, and which are of simplified construction, and have simplified arrangements and connections with each other, and which include bearings which need little or no lubrication, and in which the bearings are protected from the weather.

The foregoing and other objects are attained by the improved sign carrying windmill construction, apparatus, parts, combinations, and sub-combinations, which comprise the present invention or discovery, and the nature of which is set forth in the following general statement, and preferred embodiments of which, together with their mode of use, are set forth in the following description, and which are particularly and distinctly pointed out and set forth in the appended claims forming part hereof.

The nature of the improvements of the present invention or discovery may be described in general terms as constituting windmill construction including anchorable support means, a bearing frame on the support means, the bearing frame including upper and lower laterally extending arms, and an improved wind rotatable drum rotor operatively mounted for rotation between the arms. The improved drum rotor includes upper and lower drum heads, one or more panels connecting the drum heads, and one or more wind vanes connecting the drum heads. Preferably, the drum heads and panels form a prismatic tube, and the lower drum head may be located within the tube, and mounts a rotary member of a radial and thrust bearing including another member on a shaft carried by the lower arm of the bearing frame. The upper drum head may also be located in the tube and mounts

a rotary member of a radial bearing operating on a shaft carried by the upper arm of the bearing frame.

By way of example, embodiments of the improved sign carrying windmill construction of the present invention or discovery are illustrated in the accompanying drawings forming part hereof, and which

Fig. 1 is an elevational view with portions broken away and shown in section, illustrating a first embodiment of the improved sign carrying windmill construction hereof;

Fig. 2 is a top plan view thereof;

Fig. 3 is an enlarged fragmentary sectional view thereof as on line 3—3, Fig. 1, looking in the directions of the arrows;

Fig. 4 is an enlarged fragmentary vertical sectional view thereof as on line 4—4, Fig. 1, looking in the directions of the arrows;

Fig. 5 is an enlarged view of lower portions of Fig. 1, with additional bearing parts shown in section;

Fig. 6 is a detached perspective view showing the top drum head of the first embodiment of the improved windmill construction;

Fig. 7 is a detached perspective view showing one of the panels of the first embodiment of the improved windmill construction;

Fig. 8 is a detached perspective view showing one of the retaining strips of the first embodiment of the improved windmill construction;

Fig. 9 is a perspective view showing a second embodiment of the improved sign carrying windmill construction hereof, in which the wind vanes are angled for producing rotation reverse to that of the rotation of the rotor of the first embodiment;

Fig. 10 is an elevational view with portions broken away and shown in section, illustrating a third embodiment of the improved sign carrying windmill construction hereof;

Fig. 11 is a top plan view thereof;

Fig. 12 is an enlarged fragmentary view of one of the lower corners of Fig. 11, portions being broken away and shown in section;

Fig. 13 is an enlarged fragmentary vertical sectional view, as on line 13—13, Fig. 11, looking in the direction of the arrows;

Fig. 14 is an enlarged fragmentary view of one of the lower corners of Fig. 10;

Fig. 15 is a detached perspective view showing the top drum head of the third embodiment of the improved windmill construction;

Fig. 16 is a detached perspective view showing one of the panels of the third embodiment of the improved windmill construction; and

Fig. 17 is a detached perspective view showing one of the retaining and flange connecting members of the third embodiment of the improved windmill construction.

Similar numerals refer to similar parts throughout the several views.

The improved sign carrying windmill construction **10** includes anchorable support means **11** constituted, as shown, by a post **12** having a lower end, not shown, adapted for anchorage in the ground or on other suitable foundation or base.

A bearing frame **13** is supported on the post **12**. As shown, the bearing frame constitutes a C-bracket including a back **13–1** from the opposite ends of which there extend lateral shaft mounting arms **13–2** and **13–3**. The back **13–1** extends alongside the post **12**, and is secured thereto, as by a pair of band clamp means **14**. The arm **13–2** is the upper arm as shown, and has formed therein an upper shaft-receiving opening **15**; and the arm **13–3** is the lower arm as shown, and has formed therein a shaft-receiving opening **16**.

An upper stub shaft **17*a*** has an elongated lower bear-

ing section 17*a*–1, and an upper threaded end section 17*a*–2. The upper threaded shaft end section 17*a*–2 extends through opening 15 in the upper shaft mounting arm 13–2, and is connected therewith by opposed top and bottom nuts 18 and 19 screwed on the shaft upper end section 17*a*–2 against opposite top and bottom faces of the upper arm 13–2. Similarly, a lower stub shaft 17*b* has an elongated upper bearing section 17*b*–1, and a lower threaded end section 17*b*–3. The lower threaded shaft end section 17*b*–3 extends through opening 16 in the lower shaft mounting arm 13–3, and is connected therewith by opposed top and bottom nuts 20 and 21 screwed on the shaft lower end section 17*b*–3 against opposite top and bottom faces of the lower arm 13–3.

An improved wind actuatable drum rotor 22 is rotatably supported on the lower stub shaft 17*b*, and is rotatable on the upper stub shaft 17*a*. The drum rotor 22 includes an upper drum head 23*a*, a lower drum head 23*b*, and a plurality of panels 24 extending between and connected with the drum heads.

Each drum head 23*a* and 23*b* is preferably of identical construction, but inverted with respect to each other in the assembled drum rotor 22, as shown on Figs. 1 to 4, inclusive.

In Fig. 6, the drum head 23*a* is shown as a separate part before being incorporated in the drum rotor 22, and includes a flat web 23–1 having a polygonal perimeter which is triangular as shown, and includes three side border edges 23–2 making junction with each other at three apexes or corners 23–3.

At each side border edge 23–2 of the web 23–1, there is located a connector flange 23–4 having an exterior face 23–5 which is perpendicular to the plane determined by the side border edges 23–2. As shown, the drum head 23*a* is a one-piece sheet metal part. Each flange 23–4 extends substantially the entire length of the side border edge 23–2 with which it is connected; and each flange 23–4 preferably has formed therein, a plurality of connector openings 23–6, preferably internally threaded or threadable, or provided with screw thread engaging tangs. The web 23–1 has formed therein a central bearing mounting opening 23–7.

In Fig. 7 one of the panels 24 is shown as a separate part before being incorporated in the drum rotor 22, and includes a flat web 24–1 having a polygonal perimeter which is rectangular as shown, and includes parallel spaced drum head connecting border edges 24–2, and a wind vane connecting border edge 24–3 and a parallel free border edge 24–4 extending between junctions at corners 24–5 and 24–6, respectively, with the drum head connecting border edges 24–2.

A wind vane 24–7 is located at and connected to the border edge 24–3 of the web 24–1. Preferably, the wind vane 24–7 extends the entire length of the border edge 24–3, and is angled with respect to the web 24–1.

As shown, the panel 24 is a one-piece sheet metal part. The wind vane 24–7, as shown is constituted by two plies 24–7*a* and 24–7*b* of sheet metal. The dihedral angle between the web 24–1 and the vane 24–7 is concave on one side, and the ply 24–7*b* is on the concave side. Adjacent the corners 24–3, the ply 24–7*b* has formed thereon a retaining flange 24–7*b*–1, which forms a right dihedral angle with the vane 24–7.

The web 24–1 of the panel 24 has one face 24–1–1, which is a face of said concave dihedral angle, and another face 24–1–2, which is a face of the opposite convex dihedral angle between the web 24–1 and the vane 24–7. At each edge 24–2 of the web 24–1, there is located and connected a retaining flange 24–8 which is spaced from and extends over the border portion of the web face 24–1–2.

The flanges 24–8 extend towards each other, and spaced from their inner edges, each adjacent border portion of the web 24–1 has formed therein a plurality of connector openings 24–9 registerable with the connector openings 23–6 in one of the flanges 23–4 of one of the drum heads 23*a* or 23*b*.

The wind vane 24–7 has formed therein a plurality of connector openings 24–10. In Fig. 8, a retaining strip 25 is shown as a separate part before being incorporated in the drum rotor 22, and is a length of a formed sheet metal strip having an angle cross-section, and including longitudinally extending legs 25–1 and 25–2 making junction with each other at an apex or corner 25–3. The dihedral angle between the legs 25–1 and 25–2 is concave or acute on one side, and has the same magnitude as the concave or acute angle between the wind vane 24–7 and the flat web 24–1 of one of the panels 24. The leg 25–1 has a transverse width greater than the transverse width of the leg 25–2, and the leg 25–1 has formed therein a plurality of connector openings 25–4 registerable with the connector openings 24–10 of one of the wind vanes 24–7, in the assembled drum rotor 22. The length of the retaining strip 25 is substantially equal to the length of the vane 24–7 with which it may be separably associated. The transverse spacing of each opening 25–4 from the corner 25–3 of the strip 25 is slightly greater than the transverse spacing of each opening 24–10 in a wind vane 24–7 from the adjacent corner 24–3 of the panel 24 including the particular wind vane.

In the assembled drum rotor 22, as shown in Figs. 1 to 5, inclusive, the upper drum head 23*a* has its connector flanges 23–4 extending upwardly, and the lower drum head 23*b* has its connector flanges 23–4 extending downwardly. Each connector flange 23–4 at the upper drum head 23*a* has its exterior face 23–5 in the same plane as the exterior face 23–5 of the lower drum head 23*b*. The exterior faces 23–5 of each co-planar set, are abutted by the interior face 24–1–1 of the web 24–1 of one of the panels 24. The top set of connector openings 24–9 of the panel 24 register with the set of connector openings 23–6 in the abutted flange 23–4 of the upper drum head 23*a*, and a screw 26 extends through each opening 24–9 and is screwed in the registered opening 23–6. Each panel 24 and the lower drum head 23*b* are similarly connected.

There is thus formed a triangular tube in which the free border edge 24–4 of each panel 24 is overlapped by the retaining flange 24–7*b*–1 of the adjacent panel 24, the wind vanes 24–7 extending at similar angles with respect to the adjacent panel exterior faces 24–1–2, from the corners of the triangular parallelopiped constituted by the exterior panel faces 24–1–2.

Each retaining strip 25 is separably secured to one of the wind vanes 24–7 by screws 27 each extending through an opening 25–4 in the retaining strip leg 25–1 and being screwed into a registering opening 24–10 in the vane, the inner face of the leg 25–1 abutting the exterior face of the ply 24–7*a* of the vane, and the leg 25–2 being spaced from and extending over a border band of the face 24–1–2 of the panel web 24–1.

In the construction of each panel 24 and connected vane 24–7 and separable retaining strip 25, as above described, the flanges 24–8 form with border top and bottom bands of the panel face 24–1–2, oppositely opening card receiving top and bottom grooves; and the flange 24–7*b*–1 and inner corner band of the vane ply 24–7*a* and the side band of the panel web face 24–1–2 adjacent the free edge 24–4, form a side stop groove for one side edge of a card inserted between the top and bottom grooves and covering the panel web face 24–1–2. The retaining strip 25, when connected with its vane 24–7, as above described, serves to retain a card placed in the grooves and over the panel web 24–1, as above described.

Such a card, not shown, may contain any desired display figures and text. It is noted, however, that display figures and text may be directly painted or trans-

ferred upon the panel web faces 24–1–2. In any case, the display figures and text are easily changed.

The drum rotor 22 is preferably rotatably supported on the bearing section 17*b*–1 of the lower stub shaft 17*b*, by improved radial and thrust bearing means 28, best shown in Fig. 5, and which includes an upper bearing member 28–1 having a shank 28–2 extending through and fitting the bearing mounting opening 23–7 of the web 23–1 of the lower drum head 23*b*. The bearing member 28–1 includes an enlarged thrust head 28–3 on the under-side of the web 23–1 and has associated therewith a separable split retaining ring 29 on the upper side of the web 23–1. The bearing member 28–1 has a bore 28–4 in which is journalled the bearing section 17*b*–1 of the lower stub shaft 17*b*. The under face 28–5 of the head 28–3 constitutes a thrust bearing face, and is preferably convex as shown. The bearing member 28–1 may be made of a desired suitable metal, metallic composition, wood, non-metallic composition, or synthetic material such as nylon.

Below the upper bearing member 28–1, there is located and supported on the lower stub shaft bearing section 17*b*–1, a lower bearing member 28–6 constituting a thrust ring having an upper convex thrust bearing face 28–7 abutting the lower thrust bearing face 28–5 of the upper bearing member 28–1. Means supporting the lower bearing member 28–6 on the shaft 17*b*, as shown, are constituted by a cotter pin 30 located in a cotter pin receiving transverse bore in the shaft 17*b*.

The lower bearing section 17*a*–1 of the upper stub shaft 17*a* extends through the bearing mounting opening 23–7 of the web 23–1 of the upper drum head 23*a*. Preferably, as shown, one of the bearing members 28–1 is journalled on the upper shaft bearing section 17*a*–1 and has its shank 28–2 fitted in the opening 23–7.

In operation, the drum rotor 22 of the improved sign carrying windmill construction 10 is caused to rotate about the vertical axis of the vertically aligned shafts 17*a* and 17*b* by impingement of wind or air currents against the angled faces of each vane 24–7 and adjacent vertical portion of the panel web face 24–1–2, which form a vertical groove or pocket in which the air pressure builds up and applies a torque on the rotor 22.

In Fig. 9, there is shown a second embodiment 10–I of the improved sign carrying windmill construction, which is identical with the construction 10, with the exception that the rotor 22 is inverted, and the drum head 23*a* is at the bottom, thereby reversing the directional angulation of the vanes 24–7 with respect to the panel faces 24–1–2 and causing rotation of the drum rotor 22 in the construction 10–I in a direction opposite to that of the rotation of the rotor 22 in the construction 10.

It is noted that the flanges 23–5 of the heads 23*a* and 23*b*, may be similarly curved if desired, and the panel webs 24–1 likewise similarly curved.

It is also noted that a one-piece shaft may be substituted for the shafts 17*a* and 17*b*.

In the above described improved sign carrying windmill construction 10, it is noted that the number of different sheet metal parts are limited to three: that is the drum heads 23*a* and 23*b*, which are identical; the panels 24; and the retaining strips 25.

It is also noted that the drum rotor structure constitutes a tube having a polygonal cross-section, and that the drum head webs are located within the tube, thereby providing an improved appearance for the construction, and protecting the lower bearing means 28 from the weather.

Thus the stated objects of the invention or discovery are attained by the improved construction 10.

The third embodiment of the improved sign carrying windmill construction 110 shown in Figs. 10 to 17, inclusive, may include an anchorable support means, not shown, similar to the support means 11 which is constituted, as shown, by the post 12 having a lower end, not shown, adapted for anchorage in the ground or on other suitable foundation or base.

The windmill construction 110, furthermore includes a bearing frame 113 adapted to be supported on a post such as the post 12. As shown, the bearing frame constitutes a C-bracket including a back 113–1 from the opposite ends of which there extend lateral shaft mounting arms 113–2 and 113–3. The back 113–1 may extend alongside the post on which it is mounted, and may be secured thereto, as by a pair of band clamp means, not shown, such as the band clamp means 14. The arm 113–2 is the upper arm as shown, and has formed therein an upper shaft-receiving opening 115; and the arm 113–3 is the lower arm as shown, and has formed therein a shaft-receiving opening 116.

An upper stub shaft 117*a* has an elongated lower bearing section 117*a*–1, and an upper threaded end section 117*a*–2. The upper threaded shaft end section 117*a*–2 extends through opening 115 in the upper shaft mounting arm 113–2, and is connected therewith by opposed top and bottom nuts 118 and 119 screwed on the shaft upper end section 117*a*–2 against opposite top and bottom faces of the upper arm 113–2. Similarly, a lower stub shaft 117*b* has an elongated upper bearing section 117*b*–1, and a lower threaded end section 117*b*–3. The lower threaded shaft end section 117*b*–3 extends through opening 116 in the lower shaft mounting arm 113–3, and is connected therewith by opposed top and bottom nuts 120 and 121 screwed on the shaft lower end section 117*b*–3 against opposite top and bottom faces of the lower arm 113–3.

An improved wind actuatable drum rotor 122 is rotatably supported on the lower stud shaft 117*b*, and is rotatable on the upper stub shaft 117*a*. The drum rotor 122 includes an upper drum head 123*a*, a lower drum head 123*b*, and a plurality of panels 124 extending between and connected with the drum heads.

Each drum head 123*a* and 123*b* is preferably of identical construction, but inverted with respect to each other in the assembled drum rotor 122, as shown on Figs. 10 to 14, inclusive.

In Fig. 15, the drum head 123*a* is shown as a separate part before being incorporated in the drum rotor 122, and includes a flat web 123–1 having a polygonal perimeter which is generally triangular as shown, and includes three side border edges 123–2 terminating at opposite ends in three straight corner faces 123–3.

At each side border edge 123–2 of the web 123–1, there is located a connector flange 123–4 having an exterior face 123–5 which is perpendicular to the plane determined by the side border edges 123–2. As shown, the drum head 123*a* is a one-piece sheet metal part. Each flange 123–4 extends substantially the entire length of the side border edge 123–2 with which it is connected.

The web 123–1 preferably has formed therein, a plurality of connector openings 123–6; one adjacent each corner face 123–3; and the web 123–1 has formed therein a central bearing mounting opening 123–7.

In Fig. 16, one of the panels 124 is shown as a separate part before being incorporated in the drum rotor 122, and includes a flat web 124–1 having a polygonal perimeter which is rectangular as shown, and includes parallel spaced drum head connecting end flanges 124–2 at the end edges of the web 124–1, and a wind vane side flange 124–3 and a parallel wind vane side flange 124–4 extending longitudinally at the side edges of the web 124–1.

Each of the wind vane flanges 124–3 and 124–4 is angled with respect to the web 124–1, which has an exterior face 124–1–2. The flange 124–3 extends rearwardly from the web face 124–1–2 at an exterior angle of 210°, and the flange 124–4 extends forwardly from the web face 124–1–2 at an included exterior angle of 90°.

Each of the flanges 124–3 and 124–4 has formed therein a plurality of equally spaced apertures 124–5, and

each of the flanges 124–2 has formed therein corner apertures 124–6.

In Fig. 17, a wind vane cover and card retaining strip 125 is shown as a separate part before being incorporated in the drum rotor 122. The strip 125 is a formed sheet metal strip including an outer wind vane cover leg 125–1 and an inner parallel wind vane cover leg 125–2 extending rearwardly from a forward U-bend edge 125–3.

The outer leg 125–1 makes junction at an outer corner 125–4 with a retaining flange leg 125–5, and the inner leg 125–2 makes junction at an inner corner 125–6 with a retaining flange leg 125–7. The exterior angle between the outer cover leg 125–1 and the retaining flange leg 125–5 is 210°, and the included angle between the inner cover leg 125–2 and the retaining flange leg 125–7 is 90°.

The parallel wind vane cover legs 125–1 and 125–2 are spaced from each other a distance slightly greater than the combined thickness of a panel flange 124–3 and a panel flange 124–4, and as hsown each has the same thickness.

The legs 125–1 and 125–2 have formed therein a plurality of opposite snap heads 125–8 which aline with each other in pairs, and the pairs of heads 125–8 are spaced the same as the spacing of the apertures 124–5 in the panel flanges 124–3 and 124–4.

In the assembled drum rotor 122, as shown in Figs. 10 to 14, inclusive, the flange 124–3 of each panel abuts the flange 124–4 of the adjacent panel, and the cover legs 125–1 and 125–2 of one of the strips 125, overlie respectively the flanges 124–3 and 124–4 of each pair of abutting flanges.

The apertures 124–5 of each pair of abutting flanges 124–3 and 124–4 register with each other and are engaged by the snap heads 125–8 on the cover flanges 125–1 and 125–2.

At the upper end of the drum rotor 122, the drum head 123*a* covers the upper ends of the panels 124. At each corner, one of the ends of one of the panel flanges 124–2 overlaps the adjacent end of the adjacent panel flange 124–2, the apertures 124–6 registering with each other, and with one of the corner drum head connector openings or apertures 123–6, and a screw 127, which as shown is self-threading, is screwed into each set of corner registering apertures 124–6 and 123–6.

In a similar manner, the drum head 123*b* is connected to the lower ends of the panels.

In the assembled drum rotor 122, the drum head flanges 123–4 are spaced from the panel faces 124–1–2, as are the strip flange legs 125–5, and 125–7, thus forming card retaining grooves at the borders of each panel 124.

In other respects, the windmill construction 110, as shown is the same as the windmill construction 10.

In the foregoing description, certain terms have been used for brevity, clearness, and understanding but no unnecessary limitations are to be implied therefrom beyond the requirements of the prior art, because such words are used for descriptive purposes herein and are intended to be broadly construed.

Moreover, the embodiments of the improved constructions illustrated and described herein are by way of example, and the scope of the present invention or discovery is not limited to the exact details of construction set forth.

Having now described the invention or discovery, the construction, the operation, and use of preferred embodiments thereof, and the advantageous new and useful results obtained thereby; the new and useful constructions, and reasonable mechanical equivalents thereof obvious to those skilled in the art, are set forth in the appended claims.

I claim:

1. Construction for a windmill and the like, including anchorable support means, a rotor, bearing and shaft means operatively mounting the rotor on the support means for rotation about an axis, the rotor including heads spaced from each other in the direction of the axis of rotation, each head including a plurality of connector members spaced radially from the axis of rotation, a plurality of vanes extending between the heads, means connecting each vane with a connector member on each head; a panel located adjacent each vane and forming a dihedral angle therewith, each panel and one adjacent vane constituting a one-piece formation, each panel extending between and being connected with the heads, the panels forming a transversely closed tube coaxial with the axis of rotation, each head constituting a drum head closing one end portion of the transversely closed tube, each drum head including a web spaced intermediate the ends of the panels in the direction of the axis of rotation, each panel having a U-shaped flange at opposite ends for separately retaining a display card on the panel, and the bearing and shaft means including a member carried by each drum head web.

2. Rotor construction for a windmill and the like including heads spaced from each other in the direction of an axis of rotation, each head including a plurality of connector members spaced radially from the axis of rotation, a plurality of vanes extending between the heads, means connecting each vane with a connector member on each head; a panel located adjacent each vane and forming a dihedral angle therewith, each panel and one adjacent vane consisting a one-piece formation, each panel extending between and being connected with the heads, the panels forming a transversely closed tube co-axial with the axis of rotation, each head constituting a drum head closing one end portion of the transversely closed tube, each drum head including a web spaced intermediate the ends of the panels in the direction of the axis of rotation, each panel having a U-shaped flange at opposite ends for separately retaining a display card on the panel, and a bearing member carried by each head.

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