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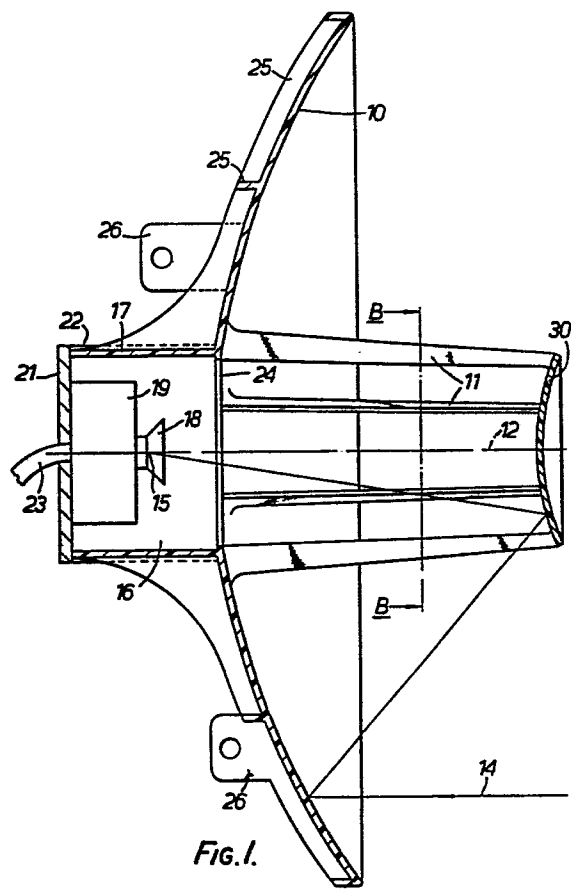
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(54) **Dish aerial.**

(57) A dish aerial, for example for receiving satellite broadcast signals, includes a primary dish (10) and a ring of forwardly extending legs (11) and a cylindrical housing (17) which are integrally moulded from a thermoplastics structural foam material. A member (30) defining a secondary reflecting surface and also moulded from such material or formed from metal is located with the forward ends of the struts (11) to be in the correct relationship to the surface of the dish (10) to produce a focus for incoming parallel radiation at (15) on the principal axis of the aerial. That point (15) is within a space (16) within the tube (17) and sealed from the weather.

EP 0 108 515 A1

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DISH AERIAL

This invention relates to dish aerals, for example, for the reception of satellite broadcast signals, or other electro-magnetic radiation, although it may also be useful for transmitting signals.

5. One object of the present invention is to provide a design of a dish aerial including primary and secondary reflecting components enabling it - or a substantial part of it - to be moulded from a structural plastics material, and without there
10. being the need for fine adjustment of the reflecting components of the aerial in relation to each other. Another object of the invention is to provide an aerial design enabling the signal receiving electronic components to be positioned in a region
15. which can be protected from the weather.

- According to the present invention, a dish aerial includes a dish having a primary reflecting surface, a component having a secondary reflecting surface held located to receive signals reflected
20. from the primary reflecting surface, and a housing disposed around the principal axis of the dish for accommodating electronic equipment to receive signals reflected from the secondary reflecting surface. As much as possible of the aerial is
25. moulded of plastics material, and that will include the dish and probably also at least the housing and/or the means for holding the secondary reflecting component located.

- The secondary component may be moulded from
30. plastics material, but there are applications in which it is desirable to have alternative secondary components with different radii of curvature and

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then it may be easiest to form them from sheet metal.

5. The component having the secondary reflecting surface may be held located in relation to the dish for example by circumferentially spaced struts or legs, and they are likely to be moulded integrally with the dish - and with the secondary component if it is not an interchangeable component.

10. The housing disposed around the principal axis of the disc enables the first stage of the receiving chain to be at or near the focus for received radiation, while yet being protected in the housing from the weather.

15. The housing is conveniently defined by a moulded cylindrical wall, preferably integral with the moulded dish and the space within it can be closed off at one end by a mounting plate for the electronic equipment, and at the other end by a thin sheet of signal-transparent insulating material.

20. The housing wall or tube is preferably positioned at least partly behind the dish.

The invention may be considered to reside in any of the features listed above, together with any one or more of any of the features set out
25. in the accompanying claims, in any combination.

The invention may be carried into practice in various ways, and one embodiment will now be described by way of example, with reference to the accompanying drawings, in which:-

30. FIGURE 1 is a sectional elevation of a dish

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aerial taken on the line A-A in FIGURE 2;

FIGURE 2 is a partial rear view of the aerial of FIGURE 1; and

FIGURE 3 is a section to an increased scale on the line B-B in FIGURE 1.

The aerial includes a primary dish element 10 moulded from a thermoplastics structural foam comprising a low density cellular core enclosed within a solid integral skin. Thermoplastics structural foams are described in two papers in Materials in Engineering, Volume 3, at page 354, and 443 by P.R. Hornsby and many of the materials described in those papers can be used in dependence upon the application. In a preferred embodiment the plastics material is polypropylene with glass fibre reinforcing filler.

The dish element 10 has a parabolic cross section with a central opening leading to a space for electronic equipment to be described later. A secondary reflecting surface is defined by another element 30 pressed from sheet metal with a hyperbolic reflecting surface and that is held located in relation to the primary dish element by a circumferential ring of legs 11 disposed around the periphery of the secondary element 30 and the opening in the primary element 10.

In the preferred embodiment, the legs 11 are moulded integrally with the primary dish element 12 and engage in and are fixed in slots 13 in the edge of the secondary element 30, although it would be possible to mould the primary element and the legs separately and fix them together.

- After assembly, the primary and secondary reflecting elements are held in fixed relative positional relationship by the legs so that parallel radiation indicated generally at 14 in FIGURE 1,
5. is reflected first to the secondary element 30, and then to a secondary focus 15 on the axis 12 within a space 16 defined at the rear of the primary dish element 10 by an integrally moulded rearwardly extending cylindrical housing 17.
10. The reflecting surfaces of the primary and secondary elements 10 and 30, if the latter is moulded integrally, are metallised or bear metal foil, and this may be on the front surface or the rear surface of the wall defining the element. The
15. advantage of having the metallised layer on the first surface encountered by the radiation is that the radiation is not refracted and does not have any loss due to having to traverse the thickness of the element twice at each reflecting surface.
20. The advantage of having the metallised surface at the rear is that the metallised surface is not exposed to the atmosphere but is protected by the material of the element. The particular application will probably determine which system is used. Of
25. course, if the secondary element is a metal pressing the convex face can be polished to define the reflecting surface.

It will be appreciated that some of the incoming signal will be lost from the secondary element 30 because

30. of the presence of the legs 11, but this loss is likely to be quite small and not enough to outweigh the great advantage of being able to mount the two elements in a symmetrical arrangement about the principal axis 12 without having a separate_____

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supporting mechanism which has to be subsequently assembled with the dish.

5, The space 16 houses a wave guide horn 18 and an amplifier and down converter 19, mounted on a plate 21 held in position by bolts (not shown) in rod-like protruberances 22 surrounding the sleeve 17. An external coaxial cable 23 takes the signal from the converter 19 to remote signal processing equipment, and may be used to bring power to the 10. amplifier and down converter. The wave guide horn 18 is mounted at the focus 15 of radiation from the secondary element 30.

15. Once the converter 19 and wave guide horn 18 have been positioned in the space 16, the rear of the space is closed off by the plate 21, and the front can also be closed off by a plate at 24, or even a sheet of plastics material so that the space 16 is protected from dirt and moisture from the atmosphere.

20. At the rear the primary dish element 10 is provided with reinforcing ribs indicated generally at 25, and also three mounting lugs 26. Only two lugs are shown in FIGURE 2, which is an incomplete view although it is symmetrical about an axis parallel 25. with and slightly to the left of the line AA.

30. It will be appreciated that different types of electronic equipment may be mounted in the housing at the start of the receiver chain. The position in the housing of the wave guide horn for receiving the reflected signal and feeding the chain will depend on the type of the equipment used and may require an appropriate secondary reflecting element to produce a focus at the wave guide horn,

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and to produce a cone of energy conforming to the waveguide horn acceptance angle.

5. In one preferred embodiment, the diameter of the primary dish 10 is about one metre, and the average wall thickness of the moulded components is about 6mm.

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CLAIMS

1. A dish aerial including a dish having a primary reflecting surface, a component having a secondary reflecting surface held located to receive signals reflected from the primary reflecting surface by
5. holding means and a housing disposed around the principal axis of the dish for accommodating electronic equipment to receive signals reflected from the secondary reflecting surface, the dish and at least the housing and/or means for holding the secondary
10. component located in relation to the dish being moulded of plastics material in a single moulding.
2. An aerial as claimed in Claim 1 in which the holding means comprise a number of circumferentially
15. spaced struts.
3. An aerial as claimed in either of the preceding claims including means for closing the housing to protect the interior from the environment.
20. 4. An aerial as claimed in Claim 3 in which the closing means is between the secondary reflecting surface and the interior of the housing, and is transparent to radio signals from the secondary
25. reflecting surface to the interior of the housing.
5. An aerial as claimed in any of the preceding claims in which the housing comprises a tube positioned behind, or at least partly behind, the dish.

6. An aerial as claimed in any of the preceding claims including mounting means for the dish integrally moulded at the rear of the dish.
5. 7. An aerial as claimed in any of the preceding claims in which the secondary reflecting surface is on a component which is removably attached to the holding means.
10. 8. An aerial as claimed in any of the preceding claims in which the plastics material is in the form of a thermo-plastics structural foam comprising a low density cellular core enclosed within a solid integral skin, and possibly containing a reinforcing
15. filler.
9. An aerial as claimed in any of the preceding claims in which either or each reflecting surface is defined by a metallic layer on a moulded plastics
20. surface.
10. An aerial as claimed in any of the preceding claims including a radio frequency signal amplifier and down converter positioned within the housing
25. with a wave guide horn or the equivalent for feeding it positioned at the secondary focus.

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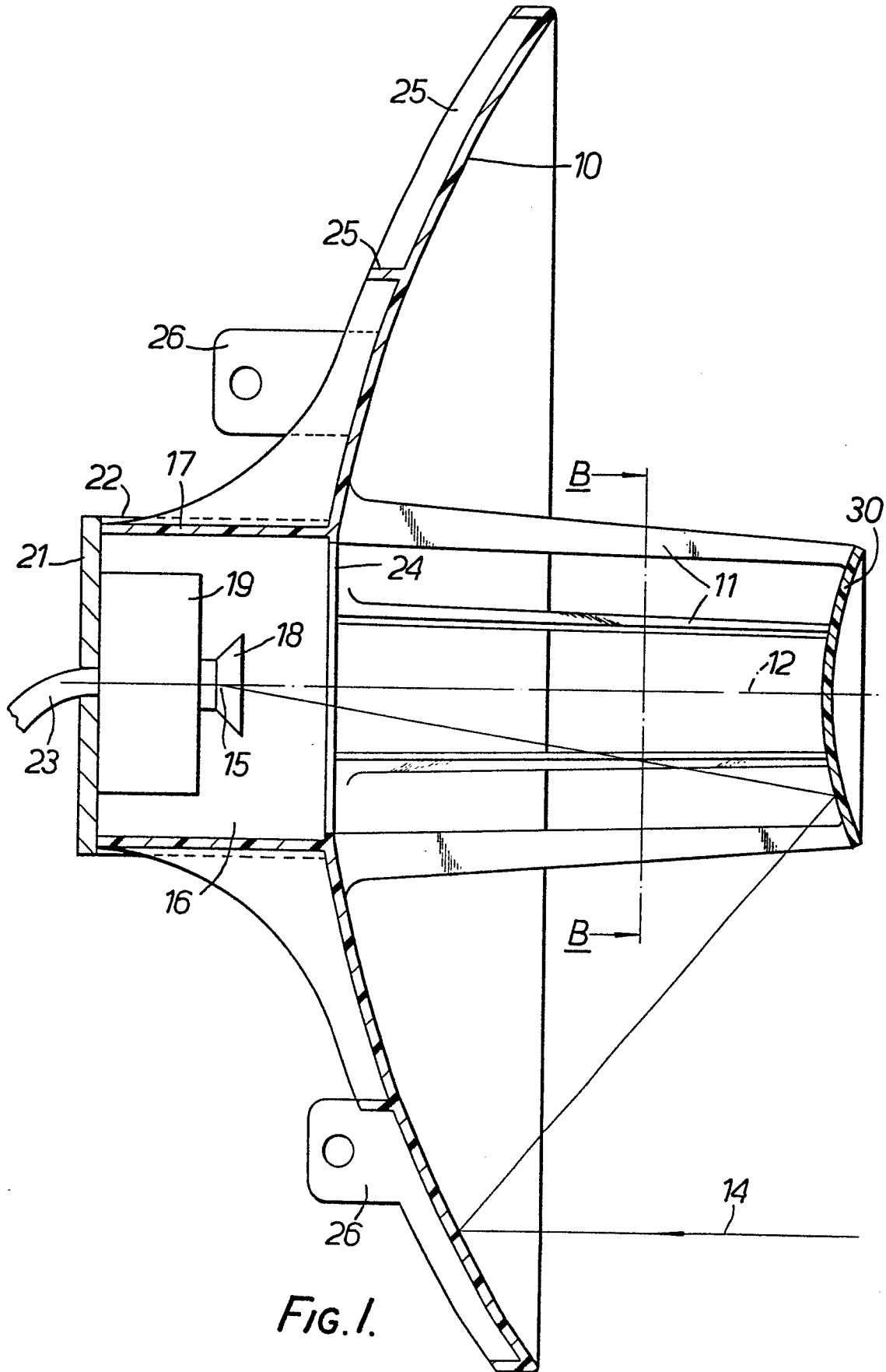
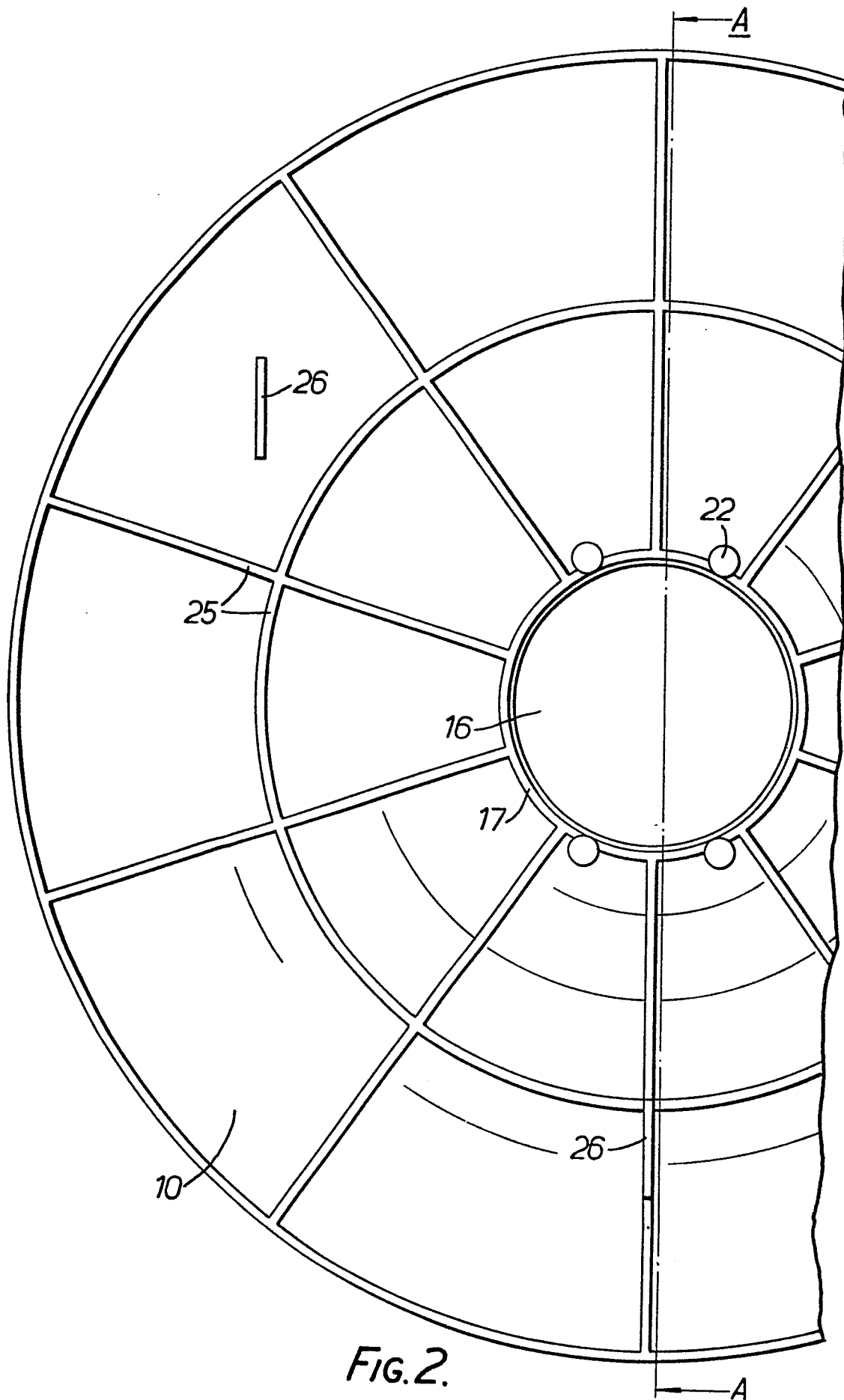


FIG. 1.

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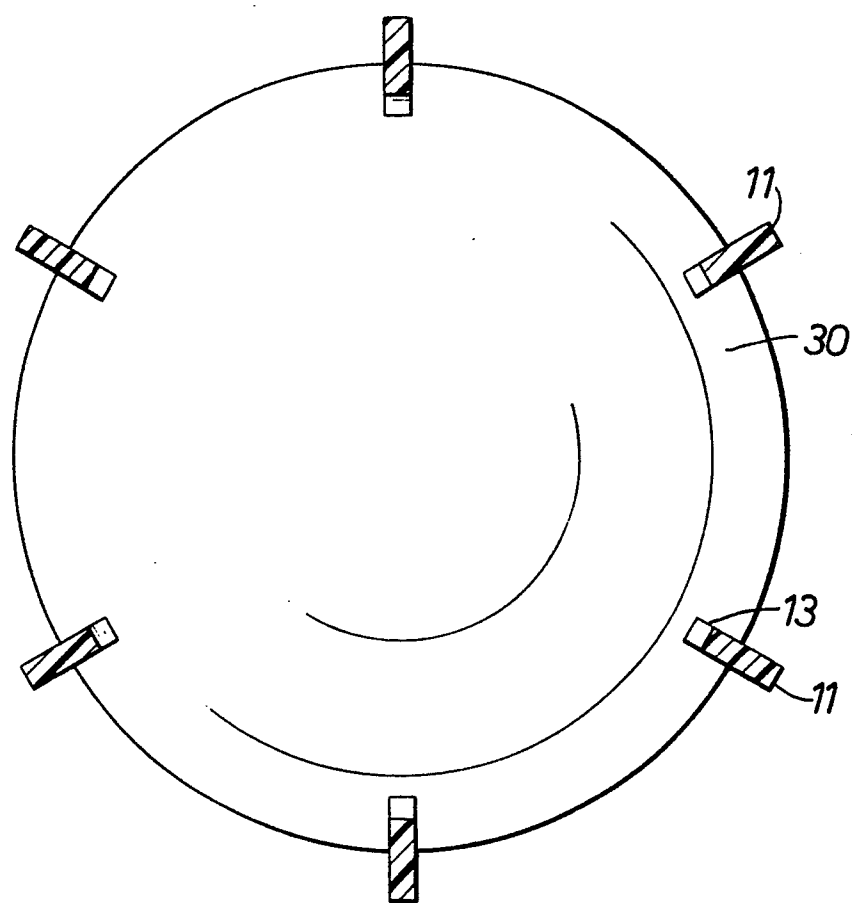


FIG. 3.



European Patent
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EUROPEAN SEARCH REPORT

0108515

Application number

EP 83 30 6128

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl. 3)
X	DE-A-2 240 893 (GRÜNZWEIG & HARTMANN) * Figures 1, 2 *	1,3-7 9,10	H 01 Q 19/19
A,P	EP-A-0 084 420 (PA MANAGEMENT CONSULTANTS) * Claim 3 *	8	
A	DE-B-1 918 084 (A. KATHREIN) * Figure 2 *		
A	FUNKSCHAU, vol. 52, no. 14, July 1980, München, "Anlagen zum Direktempfang der TV-Satelliten" * Pages 45-48 *		
			TECHNICAL FIELDS SEARCHED (Int. Cl. 3)
			H 01 Q 19/18 H 01 Q 19/19
The present search report has been drawn up for all claims			
Place of search BERLIN		Date of completion of the search 28-12-1983	Examiner BREUSING J
CATEGORY OF CITED DOCUMENTS			
X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	