



EUROPEAN PATENT APPLICATION

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Inventor : **Larsson, Göran**
Gösvägen 20
S-175 47 Järfälla (SE)

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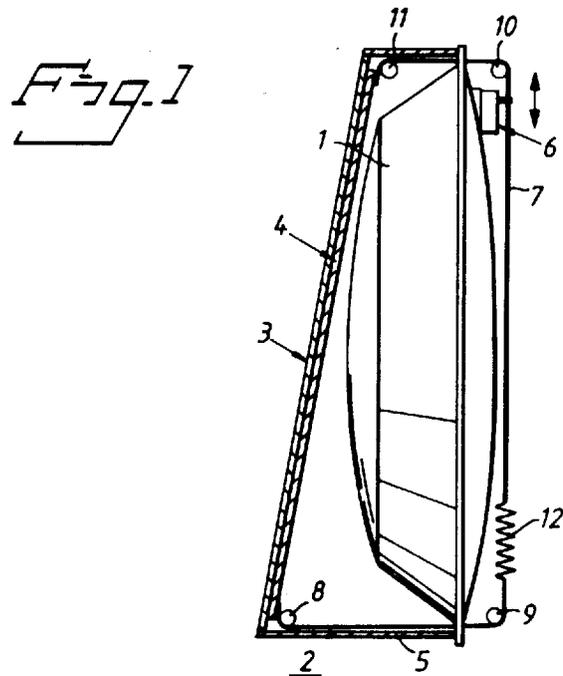
Representative : **Falk, Bengt**
Bofors AB, Patents and Trademarks
S-691 80 Karlskoga (SE)

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Applicant : **NobelTech Electronics AB**
S-175 88 Järfälla (SE)

Screen device.

The invention relates to a screen device. A frequency selective screen means (3) and a plate (4) displaceable relative to the screen device (3) are included in the screen device. In a first position of the plate (4) the screen device allows radiation to pass while in a second position radiation within the transmission range of the screen means is suppressed. The screen device is, for example, suitable to be included in a radome for a radar antenna and enables a reduction of the risk of being detected by, for example, an enemy radar.



The present invention relates to a screen device provided with a frequency selective screen means selectively transmitting or preventing transmission of electromagnetic radiation in dependence on the radiation frequency, the screen device being switchable from a first to a second transmission state. The invention also relates to a radome comprising a screen device according to the invention.

Screen devices according to the above are previously known from US patent specifications nos. 4 684 954 and 4 797 683, respectively. According to US 4 684 954, the transmission range of the screen device is changed by changing the states of the comprised diodes from conducting to non-conducting state and vice versa. However, the change of the states of the diodes may only be used for suppressing within a very limited frequency range. According to US 4 797 683, the transmission range is changed for ever by removing an outer frequency selective layer by means of an explosive charge. The result of this is that the transmission range of the screen device may only be changed once.

It is an object of the present invention to obtain a screen device not suffering from the above mentioned limitations and which due to that in a simple way according to another principle provides for switching between a screened state and a non-screened state and which in the screened state may screen a large frequency range.

The object of the invention is obtained by means of a screen device characterized in that a plate having to electromagnetic radiation transmissible and non-transmissible sections is movable in connection to the frequency selective screen means for cooperation with the screen means so that in a first position of the screen means radiation within the transmission range of the screen means is essentially allowed to pass, while in a second position of the screen means radiation within the transmission range of the screen means is suppressed. A relatively small displacement of the plate is needed between the two positions and due to that a rapid switching may be carried out.

Preferably, the plate is displaced between the first and the second position by means of a linear displacement in a plane parallel to the surface of the screen means facing the plate. In order to switch over between the two positions only a short displacement of the plate is needed and the displacement movement is easy to obtain by means of a mechanical movement transfer from a driving means.

Advantageously, the surface of the screen means facing the plate is constituted by a metal layer provided with slots and is the surface of the plate facing the screen means provided with metal sections. In said first position the metal sections of the plate leave the slots of the screen means open, while in the second position the metal sections of the plate hide the slots. In the second position the metal layer

provided with slots of the screen means together with the metal sections of the plate thereby form a metallic area resulting in an effective screening of the electromagnetic radiation in question.

The invention will now be described in more detail by way of example with reference to the accompanying drawings in which:

Figure 1 shows a screen device according to the invention comprised in a radome for a radar antenna,

Figure 2 schematically shows a screen means and a plate comprised in the screen device according to the invention,

Figure 3a shows a part of the surface of the screen means facing the plate,

Figure 3b shows a section through the screen means according to 3b-3b in figure 3a,

Figure 4a shows a part the surface of the plate facing the screen means, and

Figure 4b shows a section through the plate according to 4b-4b in figure 4a.

According to figure 1 a reflector antenna 1 is protected by a radome 2. In front of the opening of the antenna 1, the radome 2 comprises a screen means in the shape of a frequency selective plate 3, and a displaceable plate 4. The plates are inclined relative to the antenna opening in order not to reflect electromagnetic radiation incident in the lobe direction of the antenna and which is not allowed to pass through the plates back in the direction from which the radiation is incident. Furthermore there is a rim comprised in the radome running around the periphery of the antenna. Together with the plates 3,4 the rim 5 form a closed space.

In order to displace the displaceable plate 4 there is a driving means 6. The driving means is connected with the displaceable plate 4 by means of a transmission belt 7 guided around a number of guide elements 8-11. In order to keep the transmission belt stretched, spring means 12 may be included.

The screen means 3 and the displaceable plate 4 included in the screen device are shown separately in figure 2. The screen means 3 is provided with a metal layer 13 in the surface layer facing the displaceable plate 4. As evident from figure 3 and the corresponding description below, there are slots in the surface layer. The displaceable plate is provided with metal sections 14 in the surface facing the screen means.

As is apparent from figures 3a and 3b there are slots or recesses 15 in the surface layer 13 of the screen means 3. In these slots 15 the metal layer 13 is missing and the embodiment of the slots in essential determines the frequency selectivity of the screen means.

Figures 4a and 4b show examples of how the metal sections 14 of the displaceable plate may be embodied. In the example shown, the metal sections

are constituted by parallel elongated section separated by somewhat wider and elongated sections 16 free from metal.

The invention is not in any way restricted to the embodiment described above, but within the scope of the invention as defined in the claims attached to the application there is room for a plurality of different embodiments. For example, surfaces adjacent to each other of the screen means and the displaceable plate may be given other structures. The displacement mechanism for the displaceable plate is another example of what may be given another embodiment.

Claims

1. A screen device comprising a frequency selective screen means selectively transmitting or preventing transmission of electromagnetic radiation in dependence on the radiation frequency, the screen device being switchable from a first to a second transmission state, characterized in that a plate having to electromagnetic radiation transmissible and non-transmissible sections is movable in connection to the frequency selective screen means for cooperation with the screen means so that in a first position of the screen means radiation within the transmission range of the screen means is essentially allowed to pass, while in a second position of the screen means radiation within the transmission range of the screen means is suppressed.
2. A screen device as claimed in claim 1, characterized in that the surface of the screen means facing the plate is constituted by a metal layer provided with slots and the surface of the plate facing the screen means is provided with metal sections which in said first position leave the slots of the screen means open and in the second position hide the slots.
3. A screen device as claimed in any of the preceding claims, characterized in that the plate is displaceable between the first and the second position by means of a linear displacement in a plane parallel to the surface of the screen means facing the plane.
4. A radome comprising a screen device as claimed in any of the preceding claims.

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Fig. 1

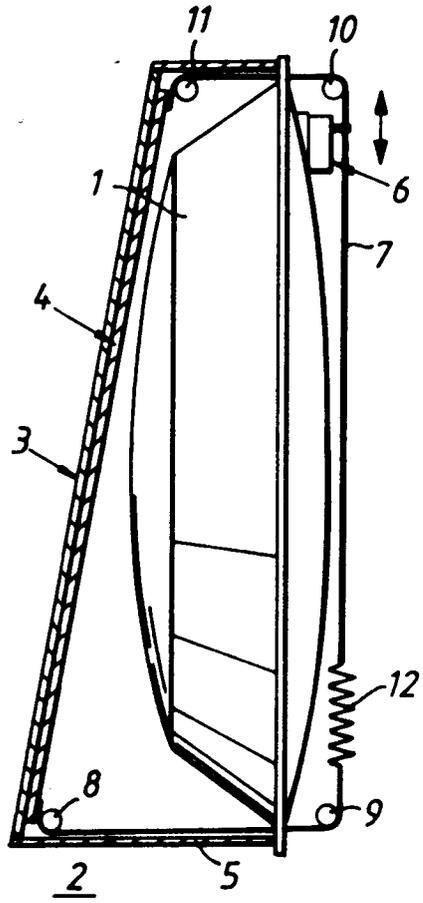


Fig. 2

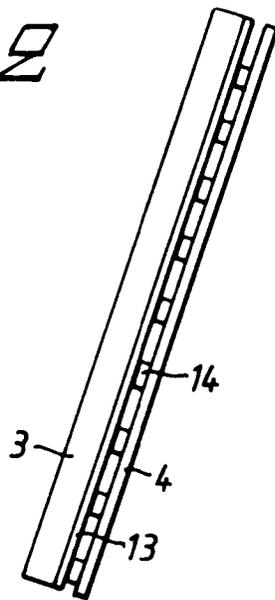


Fig. 3a

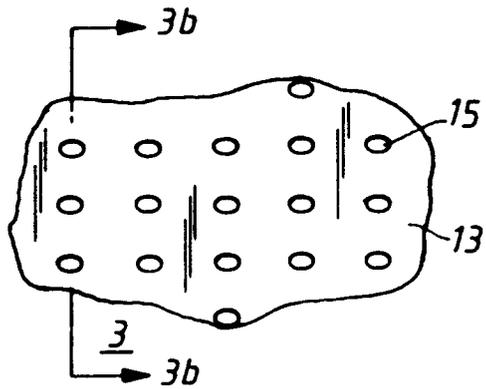


Fig. 3b

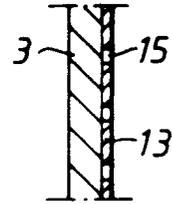


Fig. 4a

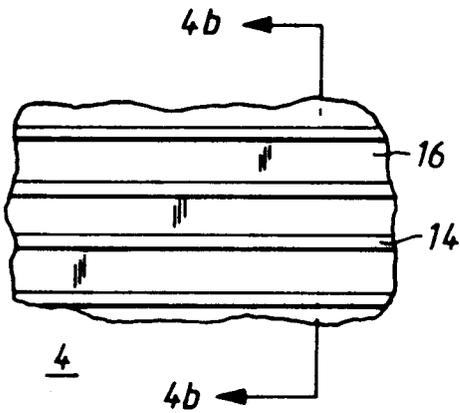
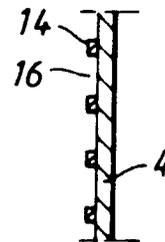


Fig. 4b





European Patent
Office

EUROPEAN SEARCH REPORT

Application Number

EP 93 85 0084

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.5)
X	EP-A-0 468 623 (BRITISH AEROSPACE)	1,3	H01Q15/00
Y	* column 3, line 22 - column 4, line 55; figures 1,2 *	2,4	H01Q1/42

P,X	GB-A-2 253 519 (LOUGHBOROUGH UNIVERSITY OF TECHNOLOGY) * abstract; figures 1-4 *	1,3	

Y	GB-A-1 416 343 (SECRETARY OF STATE FOR DEFENCE) * claims 1-13; figures 1,4,6-8 *	2,4	

A	PATENT ABSTRACTS OF JAPAN vol. 10, no. 58 (E-386)(2115) 7 March 1986 & JP-A-60 210 006 (FUJITSU) * abstract *	1-4	

A	GB-A-600 433 (MINISTRY OF SUPPLY) * claims 1-14; figures 1-6 *	1-4	

			TECHNICAL FIELDS SEARCHED (Int. Cl.5)
			H01Q
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 01 JULY 1993	Examiner ANGRABEIT F.F.K.
CATEGORY OF CITED DOCUMENTS		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	
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			

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