(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) **EP 2 180 719 A2**

(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
28.04.2010 Bulletin 2010/17

(51) Int Cl.:
H04R 1/34 *(2006.01)*

(21) Application number: **09173499.6**

(22) Date of filing: **20.10.2009**

(84) Designated Contracting States:
AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO SE SI SK SM TR

(30) Priority: **22.10.2008 TR 200807969**

(71) Applicant: **Vestel Elektronik Sanayi ve Ticaret A.S.**
45030 Manisa (TR)

(72) Inventors:
- **Karanacak, Özgün**
  45030, MANISA (TR)
- **Elbek, Mehmet Faruk**
  45030, MANISA (TR)

(74) Representative: **Cayli, Hülya**
Paragon Consultancy Inc.
Koza Sokak No: 63/2
GOP
06540 Ankara (TR)

(54) **Speaker grille**

(57) The audiovisual sound system (A) of this invention comprises a screen (1) and a frame (2) surrounding it; a speaker grille (3) on at least one side of the frame (2); and at least one speaker (4) behind the grille (3). In the part of the speaker grille (3) that is left behind the frame (2) is at least one sound diverting system (32) which is constructed in an inward-curving way to direct the audio produced towards the open area; and also, an audio output channel (33) passing through between each sound diverting surface (32) and the grille parts (31) next to it.

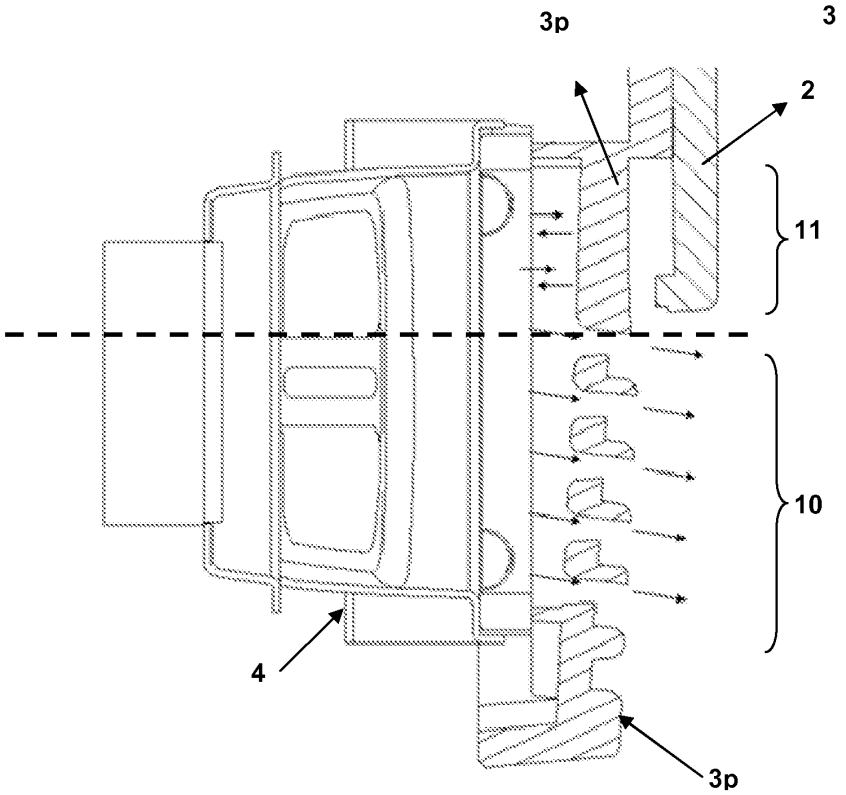

Figure – 2

EP 2 180 719 A2

Description

Technical Field

[0001] This invention is related to the enhancements carried out on the structures of the grilles which are in front of the speakers located on one side of the screen frame used on all kinds of audiovisual sound systems.

Background Art

[0002] In order to lessen the space the audio-visual systems such as televisions occupy, a reduction in the size of the frames surrounding the screens is a subject-matter of work. The speaker grilles are the components which take up the widest space in the screen frames of those devices. Various grille designs are produced in order to protect the speakers from external influences and to provide the clearest sound possible. The published patent applications EP1798967, JP2008005459, JP2007300281, US2007223747, and US7076078 can be listed as examples of those designs. As it can be inferred from those applications, the speakers and their grilles take up a significant space within the entire body of the televisions.

[0003] An embodiment already known in the art, aimed to reduce the space the speaker grilles occupy, is illustrated in the annexed figures (Figure 2) as well. In this embodiment, a part of the speaker faces an area where the sound can pass through the grille directly without facing any barrier and the remaining part of the speaker faces another area where the sound, as it strikes a barrier, is reflected back.

[0004] In this embodiment intended to reduce the space the television occupies, a certain part of each speaker is situated behind the screen frame, thus saving more place; however, the problem that the sound cannot be conveyed to the user in an effective way comes forward. At the same time, the sound waves reflected back from the screen frame affects the performance of the speaker in a negative way. In other words, the part of the screen frame situated in front of the speaker blocks the sound passage and the sound reflected back by the barrier vibrates the speaker diaphragm in the reverse direction, causing a decrease in its performance.

Brief Description of the Invention

[0005] With this invention, enhancements are provided for speaker grilles in the screen frames of audiovisual sound systems. In particular, the sound provided by the speakers located behind the frames is ensured to pass out, facing the least number of barriers possible. To put it in other terms, the reflected part of the sound provided by the speakers is directed towards the outer side of the frame by means of the physical modification applied.

[0006] In order to achieve this, the whole sound provided by the speaker behind the speaker grille is delivered out through the openings between the grille parts. This operation is ensured through an audio output channel provided on the part of the speaker grille that is behind the screen frame (it is explained in more detail in the description and in the claims).

[0007] With the sound diverting surface provided on the part of the speaker grille that is behind the frame, in an inward-curving way to divert the audio output to the outer side (explained in more detail in the description and claims) and with the audio output channel provided through the grille part next to that one, not only the frame is prevented from blocking the audio output but also the speaker and the grille are located behind the frame as much as possible.

Aim of the Invention

[0008] The aim of this invention is to ensure the sound provided by the speakers behind the screen frames of the audiovisual sound systems to be less - affected by the barriers.

[0009] Another aim of this invention is to ensure the speaker grilles to occupy less space on the screen frames.

[0010] Another aim of this invention is to provide a speaker sound that is heard well, by means of modifications implemented on the design of the speaker grilles.

[0011] Yet another aim of this invention is to lessen the space taken up by the screen frames.

Description of the Figures

[0012] An exemplary embodiment of the audiovisual sound system according to this invention and the speaker grilles related to this are illustrated in the annexed figures; wherein,

Figure 1 is a front view of an exemplary audiovisual sound system,
Figure 2 is a sectional side view of a speaker grille and screen frame of the prior art.
Figure 3 is a sectional side view of the speaker grille and the screen frame according to this invention.

[0013] All the components illustrated in these figures are assigned reference numerals, which are listed below as;

Audiovisual sound system (A)
Screen (1)
Frame (2)
Speaker grille (3)
Speaker grille (3p)
Speaker (4)
Active area (10)
Inactive area (11)
Grille opening (30)
Grille part (31)

Sound diverting surface (32)
Audio output channel (33)

Disclosure of the Invention

[0014] A front view of an audiovisual sound system (A) is illustrated in Figure 1. As is shown in this embodiment, the speaker grille (3) is located on the lower side of the frame (2) surrounding the screen (1) of the system (A). With the structure provided by this invention, the speaker grille (3) may also be located on the other sides of the frame.

[0015] In Figure 2, a sectional view of an embodiment relating to a speaker grille (3p) already known in the art and location of it behind a screen frame (2). In this embodiment, a certain part of each speaker (4) faces an area where the sound reaches out through the grille (3p) without being blocked by any barrier (active area (10)) and the remaining part faces another area where the sound is reflected back after striking a barrier (inactive area (11)).

[0016] In this embodiment intended to reduce the space the system (A) occupies, a certain part of each speaker (4) is situated behind the screen frame (2) thus saving more place; however, the problem that the sound provided by the speaker (4) cannot be conveyed to the user in an effective way arises.

[0017] In Figure 3, a sectional view of the speaker grille (3) of this invention and its location behind a screen frame (2) belonging to the system (A) is provided. The speaker grille (3) here is also located in such a way that a certain part of it would be left behind the frame (2) or another barrier, and the other part would face an open area. Almost all or the most of the audio that is coming out of the speaker (4) behind the speaker grille (3) reach out through the openings (30) between the grille parts (31).

[0018] This situation is achieved by means of an audio output channel (33) (explained below) which is provided on the part of the speaker grille (3), left behind the frame (2). With the sound diverting surface (32) provided on the part of the speaker grille (3) that is behind the frame (2), in an inward-curving way to divert the audio output to the open side and with the audio output channel (33) provided through the grille part (31) next to that one, not only the frame (2) is prevented from blocking the audio output but also the speakers (4) and grilles (3) are located behind the frame (2) as much as possible.

[0019] Sound diverting surface (32) can be designed in different geometrical forms such as flat, concave and convex surfaces. Alternatively, the sound diverting surface (32) may have a surface which is constructed with different combinations of at least two of the said flat, concave and convex surfaces.

[0020] With this invention, by means of one or more sound diverting surface(s) (32) used on the parts behind the frame (2) the sound reaches the outer side facing the least number of barriers possible. As it was mentioned earlier by this way, it is possible to use the speaker grilles (3) on the other sides of the frame (2) as well.

[0021] With the grille (3) structure according to the invention, it is also possible to use speakers (4) of larger sizes behind the frame (2) and a better audio output may possibly be achieved.

Claims

1. An audiovisual sound system (A) comprising a screen (1) and a frame (2) surrounding it; a speaker grille (3) on at least one side of the frame (2); and at least one speaker (4) behind the grille (3), **characterized in that**;

   it comprises at least one sound diverting surface (32) on the part of the speaker grille (3) that is behind the frame (2) or a barrier, in an inward-curving way to divert the audio output to the open side
   and an audio output channel (33) reaching out between an sound diverting surface (32) and a part of the grille (31) next to that one.

2. A system (A) according to Claim 1, **characterized in that** the sound diverting surface (32) is in the form of a flat surface.

3. A system (A) according to Claim 1, **characterized in that** the sound diverting surface (32) is in the form of a concave.

4. A system (A) according to Claim 1, **characterized in that** the sound diverting surface (32) is in the form of a convex.

5. A system (A) according to Claim 1, **characterized in that** the sound diverting surface (32) has a surface which is constructed with different combinations of at least two of the said flat, concave and convex surfaces.

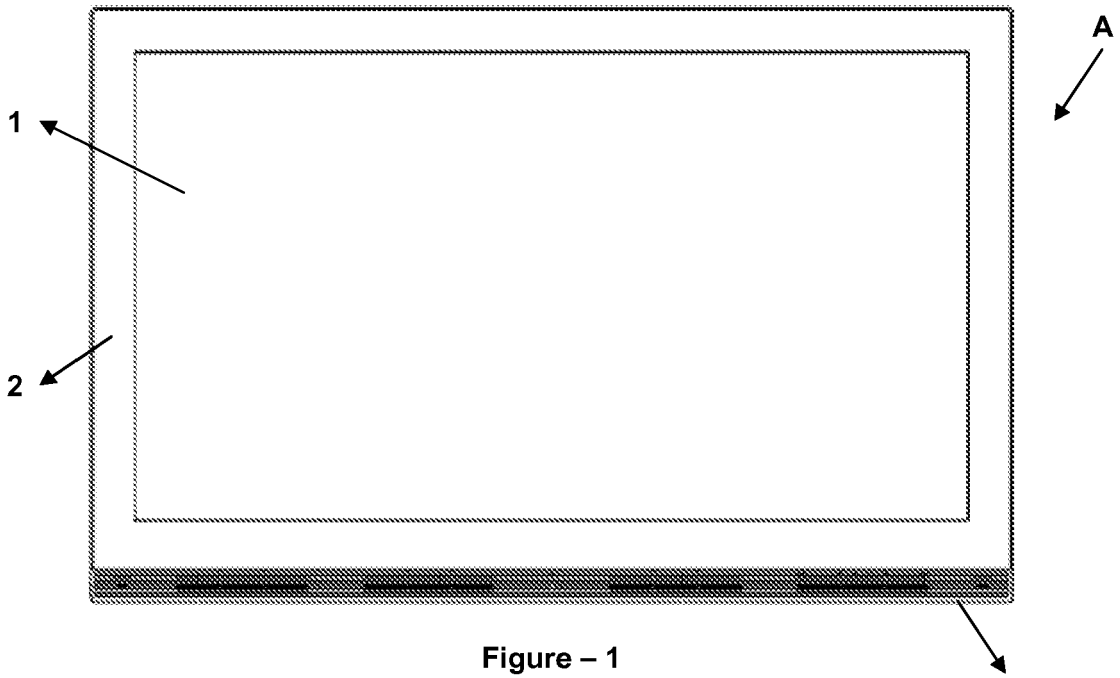

Figure – 1

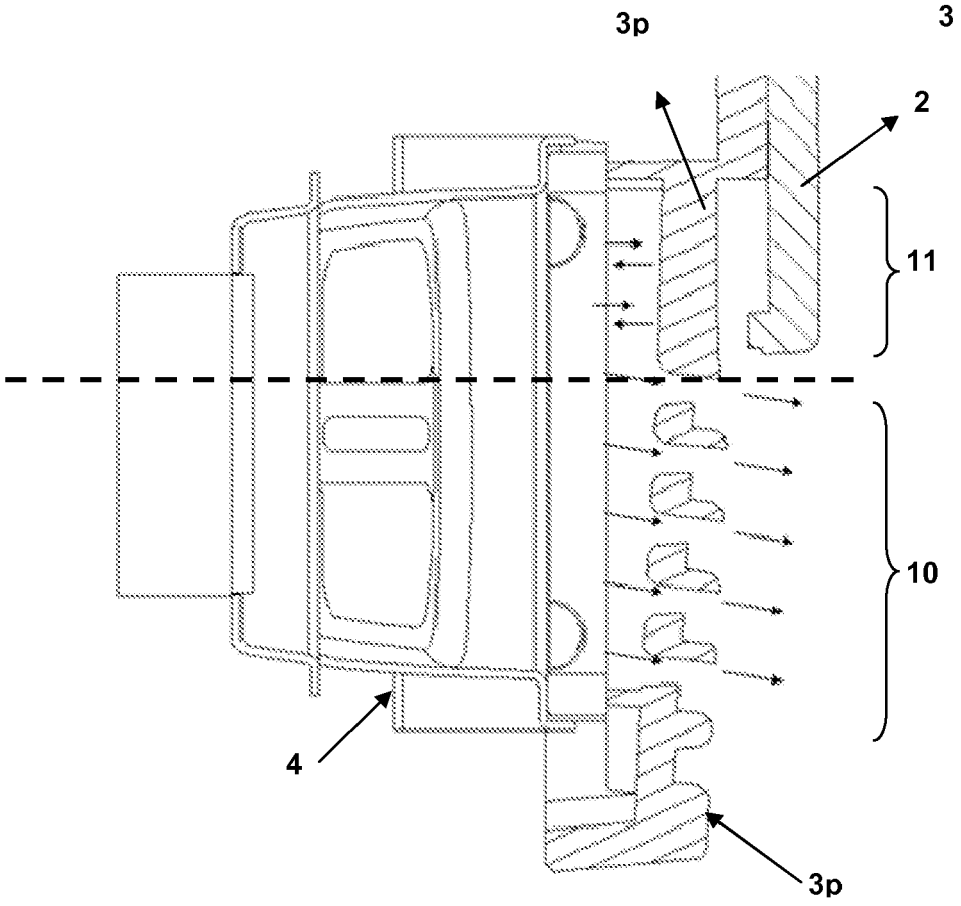

Figure – 2

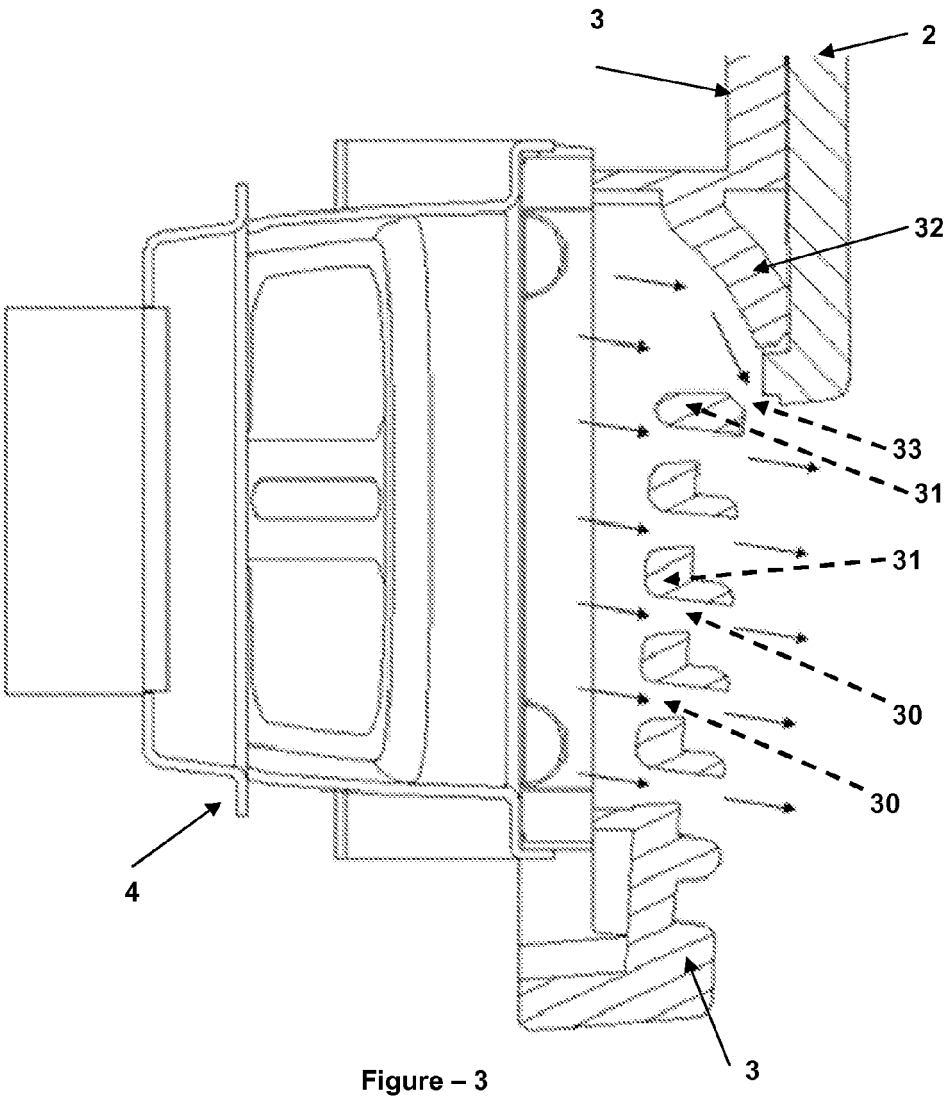

Figure – 3

REFERENCES CITED IN THE DESCRIPTION

This list of references cited by the applicant is for the reader's convenience only. It does not form part of the European patent document. Even though great care has been taken in compiling the references, errors or omissions cannot be excluded and the EPO disclaims all liability in this regard.

Patent documents cited in the description

- EP 1798967 A **[0002]**
- JP 2008005459 B **[0002]**
- JP 2007300281 B **[0002]**
- US 2007223747 A **[0002]**
- US 7076078 B **[0002]**