Title: SUPPORTING STRUCTURE FOR AN IMAGE-CAPTURE PORTABLE DEVICE AND VIDEO-RECORDING SYSTEM

Abstract: A video-recording system (100) provided with an image-capture portable device (200) having a headphone inlet (210), and comprising: – a portable supporting structure (400) associated to said portable device (200), the portable supporting structure (400) comprising a professional audio inlet (410) and a connector outlet (420); – a RF receiver (300) comprising a professional audio outlet (310) and associated to said portable supporting structure (400); – a first connector cable (305) interconnecting said professional audio outlet (310) to said professional audio inlet (410) of said supporting structure (400); – a second connector cable (250) interconnecting said connector outlet (420) to said headphone inlet (210).
"SUPPORTING STRUCTURE FOR AN IMAGE-CAPTURE PORTABLE DEVICE AND VIDEO-RECORDING SYSTEM"

TECHNICAL FIELD

The present invention refers to a supporting structure for a portable image-capture device.

Specifically, the present invention refers to a portable supporting structure for a portable electronic device that is configured to capture images.

Moreover, the present invention refers to a portable video-recording system provided with an image-capture portable device.

PRIOR ART

As it is known, portable electronic devices such as: cell phones, tablets or laptops, are more and more used for recording films and for professional or semi-professional video-recordings.

Generally, the films comprise a combination of images and sounds, in other words video-recordings and audio-recordings.

The technology has obtained performances enabling a good quality with reference to video-recordings, while with reference to audio-recordings, the quality is not completely satisfying.

Actually, the portable electronic devices exhibit an audio-recording which hardly adapts to record films by communication means such as television, Internet, and other similar means.

For example, when the electronic device is a cell phone,
the audio is captured by a small microphone incorporated in the cell phone itself which supplies satisfying results only in case the recording is taken in close proximity with the device itself. The audio-recordings, by cell phone, therefore are generally accepted for producing the so-called amateur films.

A known solution for improving the audio-recording, provides to connect so-called cable microphones to the cell phone.

Even though such solution is satisfying under different aspects, is scarcely practical. Actually, the use of a cable microphone makes difficult and awkward video-recording images containing moving scene.

The technical problem underlying the present application is to provide a handy supporting structure enabling to make simple and easy the use of a portable electronic device for producing smooth films of the professional type, and having structural and functional features such to satisfy the required needs, by overcoming the drawbacks cited with reference to the prior art.

A further technical problem consists to provide a video-recording system enabling to perform top-grade motion video-recordings and audio-recordings despite a remote microphone source, and having structural and functional features for satisfying the required needs, by overcoming the drawbacks cited with reference to the prior art.

**SUMMARY OF THE INVENTION**

The Applicant has observed that the portable devices for
making films containing video-recordings and audio-recordings can be made more efficient and handier by adopting a structure transforming such devices in professional video cameras.

Therefore, the object of the present invention consists in a portable supporting structure for an image-capture device as defined in claim 1 and in the preferred embodiments thereof described in the dependent claims.

It is also an object of the invention a video-recording system as defined in claim 11.

DESCRIPTION OF THE DRAWINGS

Further characteristics and advantages of the invention will appear in the following description of a preferred embodiment given in an exemplifying non-limiting way with reference to the attached drawings, wherein:

Figure 1 shows a video-recording system according to the present invention;

Figure 2 shows a portable supporting structure according to the present invention by a three-quarter view with exploded illustrated parts;

Figure 3 shows a partial top view of the system in Figure 2;

Figure 4 shows a flow-chart of the adjusting means comprised in the supporting structure, according to the present invention;

Figures 5-10 show some details of the portable supporting structure in Figure 2;

Figure 11 shows a three-quarter view of a further
embodiment of a supporting structure according to the present invention;

Figure 12 is a three-quarter view with exploded parts of the supporting structure in Figure 11;

Figures 13 and 14 show further embodiments of the supporting structure according to the present invention by corresponding three-quarter views.

**DETAILED DESCRIPTION**

Figure 1 schematically shows a video-recording system 100 according to an embodiment of the invention. The recording system 100 is portable and it is provided with an image-capture portable device 200 and a RF (radiofrequency) receiver 300. The RF receiver 300 is coupled to a microphone source such as a wireless communications microphone 350.

The recording system 100 further comprises a portable supporting structure 400 adapted to support and lock the image-capture portable device 200 and the RF receiver 300.

The RF receiver 300 is configured for receiving, at radio frequencies, an inlet audio signal IN, transmitted by the microphone 350. Further, the RF receiver 300 is provided with an audio outlet 310.

In the illustrated embodiment, which will be described in the following, the image-capture portable device 200 is a cell phone provided with at least one headphone inlet 210. In an embodiment, the headphone inlet 210 is of a jack or micro-jack quadripole 3.5 mm type.

The portable supporting structure 400 comprises a professional audio inlet 410. The professional audio inlet
410 is configured to be connected, by a first connector cable 305, to the professional audio outlet 310 of the RF receiver 300.

Preferably, the audio outlet 310 and audio inlet 410 consist of male-female XLR connectors adapted to be coupled by the first connector cable 305 for transmitting the inlet audio signal IN, from the receiver 300 to the image-capture portable device 200 through the supporting structure 400.

The supporting structure 400 comprises a connector outlet 420 adapted to enable a connection, by a second connector cable 250, to the headphone inlet 210 for transmitting at least one outlet audio signal Out1 to the cell phone 200. The outlet audio signal Out1 is proportional to the inlet audio signal IN.

Moreover, the supporting structure 400 comprises adjusting means 500 associated to and interposed between the professional audio inlet 410 and the connector outlet 420, as schematically illustrated in Figure 4. The adjusting means 500 are adapted to process the inlet audio signal IN, for generating the outlet audio signal Out1.

Referring again to the description of the supporting structure 400, it comprises a supporting base 430 configured to be associated to the cell phone 200, by interposing a hooking element 440. The supporting base 430 is substantially a plate extending along a prevalent direction Y-Y. The base 430 comprises an abutment surface lying in a first plane Q. When the cell phone 200 is associated to the base 430, the first plane Q is perpendicular to a second image-capture
plane P substantially perpendicular to the focal axis F of the cell phone 200 during the phase of images capturing.

In a first embodiment, the hooking element 440 substantially comprises a stationary element 441 interconnected to and coupled to a movable element 442, both elements being "U" shaped.

The stationary element 441 comprises two lateral wings 444 connected by a joining element 443 developing along the prevalent direction Y-Y and fixed to the base 430 by fixing elements, for example of the screw-bolt type or quick-connect hooks of the male-female type, or bayonet connections.

The movable element 442 has two rods connected by a plate 445. The two rods are inserted in said lateral wings 444 and fixed adjacent to the joining element 443 by suitable extension springs, not shown in the figures. Therefore, the plate 445 is movable with respect to the joining element 443 in a direction X-X perpendicular to the first plane Q. The plate 445 is adapted to lock the cell phone 200 to the base 430 when inserted between the joining element 443 and plate 445 itself. In such position, the cell phone 220 has the focal axis F substantially perpendicular to the second plane P, as illustrated in Figure 1.

Further, the supporting structure 400 comprises a gripping element 450 adapted to be removably coupled to the base 430. A housing 460, that is associated to the manual gripping element 450, is configured to receive the RF receiver 300.

The gripping element 450 is provided with a
substantially hollow cylindrical body mainly developing along an axis in the direction X-X.

The body is downwardly associated to the base 430 by corresponding hooking elements 451 and 341 of the quick-connect type or of the bayonet-type. The hollow body can be provided with different shapes.

As illustrated in Figure 5, the cylindrical body is preferably made of two half-shells 452, 453, coupled to each other in the direction of the axis X-X. The two half-shells 452 and 453 are inwardly provided with suitable seats 447 and 448 adapted to receive the adjusting means 500 and at least one supply portable unit 505 preferably of a rechargeable type. The gripping element 450 is configured to be coupled to the housing 460 of the RF receiver 300 by a handle 455, that in an embodiment, is laterally projecting opposite to the cell phone 200. The RF receiver 300 is configured to be inserted in the housing 460 and locked to it by strap-like locking elements or similar.

The gripping element 450 has an ergonomically shaped lateral surface configured to be easily gripped by an user hand.

A first activator 456, for example a push-button of the wheel- or lever-type, configured to generate a first command signal c1 and a second activator 457, also a push-button of the wheel- or lever-type, configured to generate a second command signal c2, are suitably housed on the lateral surface.

Further, a connector outlet 420 is provided on the
lateral surface.

According to a second embodiment illustrated in Figure
4, the adjusting means 500 comprise a control unit 510
provided with a first adjusting block 512 adapted to receive
the inlet audio signal IN through the audio inlet 410 and
receive the first command signal cl for generating the outlet
audio signal Out1. Specifically, the first adjusting block
512 is substantially an amplifier block commanded by the
first command signal cl and enables to generate the outlet
audio signal Out1 proportional to the inlet audio signal IN,
as a function of the transfer function and gain G. Moreover,
the first adjusting block 512 can comprise further
processings of the inlet audio signal IN.

Moreover, the control unit 510 is provided with a second
adjusting block 513 adapted to receive the second command
signal c2 for generating the adjusting signal Out2.
Specifically, the second adjusting block 513 is a selector
adapted to generate an impedance value varying, according to
an embodiment, in a range of [0-660] Ohm.

The connector outlet 420 receives the outlet audio
signal Out1 and the adjusting signal Out2 and through the
second connector cable 250, transmits such signals to the
headphone inlet 210 of said cell phone 200. The second
connector cable 250 can transmit the outlet audio signal Out1
by a mono-speaker box mode or by a dual-speaker box that is a
stereophonic mode. The second connector cable 250 comprises a
micro-jack bipolar, tripolar or quadripolar type connector.

The adjusting means 500 are coupled to the supply

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portable unit 505 for enabling a suitable electric supply.

According to an embodiment, the supply unit 505 comprises a battery 503 associated to a voltage regulator 504. The battery exhibits a voltage for example of 3.7 V and is rechargeable by a port, for example an USB-type port, suitably provided on the lateral surface of the gripping element 450, for a connection to the supply grid or to further portable power units.

According to a further embodiment, the lateral surface of the gripping element 450 comprises a further connector outlet 421 provided to be connected to a further connector cable, equipped with a micro-jack connector, coupled to suitable headphones for enabling an user to hear in real time the inlet audio signal IN.

In addition, the base 430 can be provided for inwardly housing, in a suitable seat, a second supply rechargeable unit 438 of the stationary or movable-type configured to supply the cell phone 200.

With reference to the operation, after assembling the portable supporting structure 400 coupling the base 430 to the manual gripping element 450 and inserting the RF receiver 300 into the housing 460, and after connecting the cell phone 200 by the height-adjusted hooking element 440, the electronic connection is established by coupling the first connector cable 305 and the second connector cable 250 for starting recording images and sounds contemporaneously by the cell phone 200.

Particularly, the inlet audio signal IN received by the
first connector cable 305, is processed by the first adjusting block 512 activated by the user which, in real time, generates the first command signal c1. The outlet audio signal Out1, as generated, is transmitted, by the second cable 250, to the cell phone 200 and is therefore recorded and associated to video recordings by suitable applications and/or circuits and/or further devices comprised in the cell phone 200.

According to an embodiment, by a suitable software application stored in the cell phone 200, the adjusting signal Out2 can be used for adjusting some image-recording parameters which are directly stored in a camera associated to the cell phone 200. An adjustable image-recording parameter could be the zoom, for example.

The present invention has several variants. For example, the image-capture portable device can be also a tablet, a consumer camera, an action cam provided with a microphone inlet port of the micro-jack type.

In this case, as illustrated in Figures 11 and 12, the portable supporting structure 400 has a first supporting base 430 coupled to a second supporting base 430 by a joint 470 provided with coupling ends, of a bayonet-type according to an embodiment. Each first and second supporting base 430 exhibits a respective gripping element 450 associated to a housing 460.

Further, the portable supporting structure 400 can comprise a second vertically-adjustable hooking element 480 and operatively and structurally substantially analogous to
the above described hooking element 440 suitable adapted to the size of the portable device 200 to be associated. The second hooking element 480, connected to the first and/or second bases 430, enables to connect and lock the image-capture portable device 200.

In this way, the obtained portable supporting structure is extremely versatile.

Obviously, in case of video-recordings requiring a heavy portable device or under severe video-recording conditions, the supporting structure 400 can be in turn connected to a stand or tripod as schematically illustrated in Figure 14.

The video-recording system according to the present invention enables to satisfy the required needs by enabling to produce smooth films of the professional-type also in case of video-recordings using a remote microphone.

Further, the system enables to improve an audio-recording by using portable devices consequently producing both static and dynamic top-quality video-recordings.

Moreover, the portable supporting structure, according to the present invention, enables, to make easy and simple a video-recording by means of portable devices, even though contains moving scenes.

Further, the substantially modular supporting structure is widely adaptable enabling to associate a variety of portable devices without requiring particular changes.

The portable supporting structure, according to the present invention, is particularly efficient in terms of handiness, practicality, and maneuverability.
CLAIMS

1. Portable supporting structure (400) for an image-capture portable device (200), characterized in that it comprises:

- a supporting base (430) extending according to a prevalent direction (Y-Y) having an abutment surface lying in a first plane (Q), said supporting base (430) comprising a hooking element (440) configured to associate the portable device (200) in order to the focal axis (F) of said portable device (200) is perpendicular to a second image-capture plane (P), said second plane (P) being perpendicular to said first plane (Q);

- a gripping element (450) having a substantially hollow body mainly developing along an axis (X-X), said body being associated to said base (430) and disposed with the axis (X-X) substantially perpendicular to said first plane (Q);

- a housing (460) that is configured to receive a RF receiver (300), said housing (460) being coupled to said gripping element (450);

said gripping element (450) comprising an audio professional inlet (410) configured to receive an inlet audio signal (IN) and adjusting means (500) adapted to process said inlet audio signal (IN) for generating at least one outlet audio signal (Out1), said gripping element (450) further comprising a connector outlet (420) configured for delivering at least said outlet audio signal (Out1) to said portable device (200).
2. Structure according to claim 1, characterized by comprising a RF receiver (300) having an professional audio outlet (310) that is implemented by a XLR connector, said professional audio outlet (310) being configured to be coupled to said professional audio inlet (410).

3. Structure according to claim 1, characterized in that said professional audio inlet (410) is implemented by a XLR connectors.

4. Structure according to claim 1, characterized in that said adjusting means (500) comprise a control unit (510) which is provided with a first adjusting block (512) configured to receive the inlet audio signal (IN) and a first command signal (c1) for generating said outlet audio signal (Out1).

5. Structure according to claim 1, characterized in that said gripping element (450) is provided with a substantially hollow cylindrical body comprising a lateral surface, the lateral surface being ergonomically shaped in order to be easily gripped by an user hand.

6. Structure according to claim 4, characterized in that said control unit (510) is provided with a second adjusting block (513) configured to receive a second command signal (c2) and to generate an adjusting signal (Out2), said connector outlet (420) being configured to deliver said adjusting signal (Out2) to said portable device (200).

7. Structure according to claim 4 or 6, characterized in that the body of said gripping element (450) comprises a
first activator (456) and/or a second activator (457) configured to be activated in order to generate said first command signal (c1) and said second command signal (c2) respectively.

8. Structure according to claim 1, characterized by comprising a first connector cable (305) configured to connect said professional audio inlet (410) of said gripping element (450) to a professional audio outlet (310) of a RF receiver (300) that is housed in said housing (460) and further comprising a second connector cable (250) that is configured to connect the connector outlet (420) to said portable device (200) by means of a headphone inlet (210) that is configured to receive at least said outlet audio signal (Out1) from said connector outlet (420).

9. Structure according to claim 1, characterized by comprising at least one electric supply unit (438, 505) configured to be electrically coupled to at least said adjusting means (500) and/or said portable device (200).

10. Structure according to claim 1, characterized by comprising a stand or a tripod connected to said supporting base (430).

11. Video-capture system (100) provided with an image-capture portable device (200) having a headphone inlet (210), characterized in that it comprises:

- a portable supporting structure (400) implemented according to one or more of claims from 1 to 10;

- said image-capture portable device (200) being
associated to said portable supporting structure (400);

- a RF receiver (300) comprising a professional audio outlet (310), said RF receiver (300) being housing in said housing (460) of said portable supporting structure (400);

- a first connector cable (305) interconnected between said professional audio outlet (310) of said RF receiver (300) and said audio inlet (410) of said portable supporting structure (400);

- a second connector cable (250) interconnected between said connector outlet (420) and said headphone inlet (210).

12. System according to claim 11, characterized in that said portable supporting structure (400) comprises at least a further connector outlet (421) for a connection to dedicated headphones.

13. System according to claim 11, characterized in that said RF receiver (300) is coupled to a remote microphone (350), said RF receiver (300) being configured to receive an inlet audio signal (IN) transmitted by the microphone (350).
## INTERNATIONAL SEARCH REPORT

### A. CLASSIFICATION OF SUBJECT MATTER

<table>
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<th>INV.</th>
<th>FIGM11/04</th>
<th>FIGM13/04</th>
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According to International Patent Classification (IPC) or to both national classification and IPC.

### B. FIELDS SEARCHED

Minimum documentation searched: (classification system followed by classification symbols)

- FIGM

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched.

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used):

- EPO-Internal, WPI Data

### C. DOCUMENTS CONSIDERED TO BE RELEVANT

<table>
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<th>Category</th>
<th>Citation of document, with indication, where appropriate, of the relevant passages</th>
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<td>A</td>
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Further documents are listed in the continuation of Box C. See patent family annex.

**A** document defining the general state of the art which is not considered to be of particular relevance.

**E** earlier application or patent but published on or after the international filing date.

**L** document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified).

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**X** document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone.

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**Z** document member of the same patent family.

Date of the actual completion of the international search: 26 April 2016

Date of mailing of the international search report: 04/05/2016

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Authorized officer: Afanasiev, Andrey
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