

Support device for portable digitizers

Scope of the invention

The present invention finds application in the field of the art concerning the digitization of documents and two-dimensional objects, such as photographs and drawings. For ease of description, in the present description the term "image" refers to any document or object of the above type.

The digitization of an image is carried out by capturing the latter by means of an optical instrument (such as a scanner or camera) which stores the digitized image, in digital format, on a storage medium. For ease of description, in the present description the term "digitizer" refers to any optical instrument of the above type. A digitizer thus associates an actual image to one or more files from which the captured image can be reproduced by using a suitable viewer (such as a computer provided with a screen).

The present invention relates, in particular, to an accessory for facilitating the digitization of an image using a digitizer of "portable" type, i.e. a digitizer imposing no restrictions on the freedom of movement of a user thereof. At present, the most common portable digitizers are the so-called "smartphones", i.e. mobile phones usually integrating a camera and so technologically advanced as to be able to perform some functions typically performed by a computer.

Prior art overview

Portable digitizers typically have an almost rectangular parallelepiped structure and include a camera the lens (or "optics") of which is arranged at one of the

walls of the structure (i.e., at one of the flat sides of the digitizer).

To better digitize an image, since the latter is two-dimensional, it is appropriate to orient the digitizer so that the focal plane of the lens is arranged parallel to the image to be captured. Since the focal plane is usually parallel to the wall of the digitizer on which the lens is placed, in order to better digitize an image, the latter is usually placed on a flat horizontal surface (such as the work surface of a table) and the digitizer is grabbed with one or both hands by a user thereof and oriented so that the wall where the camera lens is placed is arranged parallel to the image to be digitized. However, a person is hardly able to hold an object so that it is perfectly parallel to a work surface. Therefore, an image can rarely be captured in an optimal manner by means of a portable digitizer.

Objects of the invention

It is the object of the present invention to overcome the above drawbacks by providing a device which can assist a user of a portable digitizer so that the digitization of an image in an optimal manner (i.e., for the digitizer to be arranged so that the focal plane of the camera lens and the image to be digitized are mutually parallel).

Summary of the invention

The present invention relates to a device adapted to support a portable digitizer in which, according to the invention, the device comprises:

- a platform on which the device of the invention can be placed, by way of example on a work surface, said platform including a first seat adapted to accommodate, at least partially, an image which can be digitized by means of said digitizer;
- a top structure comprising a second seat adapted to accommodate, at least partially, the digitizer;
- means for reciprocally connecting the platform and said top, so that:
 - said first and second seats are mutually opposed
 - and
 - when the digitizer is accommodated in the first seat and the image to be digitized is accommodated in the second seat, the focal plane of a digitizer lens is arranged parallel to the image to be digitized.

Advantageously, when someone wants to digitize an image using a portable digitizer, by using the device of the invention said person does not need to hold the digitizer while digitizing the image. Moreover, the image is digitized in an optimal manner, since the focal plane of the digitizer lens is arranged parallel to the image to be digitized.

In addition to the above, if the device of the invention is used with a portable digitizer which can be connected to a printer by means of a cable or wirelessly (e.g. via Wi-Fi or Bluetooth™ technology), the present device allows to use said digitizer and said printer as a multi-function copier (since the digitizer acts as a scanner).

Further innovative features of the present invention are described in the dependent claims.

Brief description of the drawings

Further objects and advantages of the present invention will become apparent from the following detailed description of an exemplary embodiment thereof and from the accompanying drawings, which are merely illustrative and non-limiting, in which:

- **figure 1** shows a perspective view of a device for supporting a portable digitizer according to the present invention;
- **figure 2** shows a perspective view of the device in figure 1 with a portable digitizer supported at a top part of said device;
- **figure 3** shows a perspective view of the device in figure 2 when digitizing a sheet supported at a platform of said device;
- **figure 4** shows a perspective view of a variant of the device in figure 1.

Detailed description of some preferred embodiments of the invention

Hereinafter in the present description, a figure may also be shown with reference to elements not expressly indicated in that figure but in other figures. The scale and proportions of the various elements depicted do not necessarily correspond to the actual ones.

Figure 1 shows a device 1, object of the invention, for supporting a portable digitizer so that a user thereof can digitize an image in an optimal manner.

Device 1 comprises a preferably rectangular parallelepiped-shaped platform 2

including a lower base 3, an upper base 4 opposite to base 3, and four side walls 5 orthogonally interposed between the bases 3 and 4. By way of example, platform 2 can rest on a work surface at base 3, and comprises a depression 6 at base 4. Depression 6 preferably has a rectangular parallelepiped shape and is preferably arranged so that its edges are parallel to the edges of platform 2, respectively. Even more preferably, depression 6 is obtained centrally in base 4. Depression 6 comprises a substantially flat bottom 7 where an image to be digitized can be placed. Therefore, depression 6 acts as a seat for accommodating said image. Incidentally, bottom 7 is arranged parallel to bases 3 and 4 (i.e. horizontally in figure 1).

In an alternative embodiment of device 1, platform 2 is devoid of depression 6 and the seat for accommodating the image to be digitized simply corresponds to a preferably rectangular portion of base 4.

Platform 2 is provided with a preferably flat and, more preferably, substantially rectangular cover 8. Cover 8 preferably has almost the same length and the same width as base 4, so as to overlap the latter. Cover 8 is preferably connected to base 4 so as to be movable between at least a first position (seen in figure 3) in which cover 8 overlaps base 4, so as to close depression 6 at the top, and a second position (seen in figures 1 and 2) in which cover 8 does not overlap base 4, so as to enable a user of device 1 to place an image on bottom 7. When cover 8 is in the second position, it is preferably arranged almost perpendicularly to bottom 7 (i.e. almost vertically in the figures). On the other hand, when cover 8 is in the first position, overlapping base 4, it is preferably arranged almost parallel to bottom 7 (i.e. almost horizontally in the figures). The connection between cover 8 and base 4 is preferably achieved by a plurality of hinges 9, so that cover 8 is rotatable between said first and second positions.

Cover 8 comprises a central portion 10 which is substantially permeable to light. Portion 10 has an extension which is not shorter than that of bottom 7. In addition, when cover 8 is in the first position, portion 10 is preferably opposite to depression 6, so that bottom 7 is fully visible through cover 8.

Device 1 comprises a top structure 11 opposite to platform 2 and preferably vertically aligned to depression 6. Structure 11 is preferably connected to platform

2 by means of a plurality of bars 12. Structure 11 comprises a substantially flat frame 13 on which a portable digitizer can be supported. Frame 13 is preferably rectangular in shape and acts as a seat for accommodating said digitizer. Structure 11 is connected to platform 2 so that frame 13 is opposed to depression 6
5 and is arranged parallel to bottom 7.

Device 1 is preferably made of metal material with the exception of portion 10 which is made of glass or a polymeric material being substantially permeable to light, such as polymethylmethacrylate. Platform 2 has: a length preferably from
10 250 mm to 290 mm, and more preferably of 270 mm; a width preferably from 20 mm to 40 mm, and more preferably of 30 mm. Frame 13 has: a length preferably from 80 mm to 100 mm, and more preferably of 90 mm; a width preferably from 140 mm to 180 mm, and more preferably of 160 mm. Frame 13, with respect to base 4, is placed at a height preferably in the range between 250 mm
15 and 290 mm, and more preferably of 270 mm.

Figure 2 shows device 1 with a portable digitizer 15 (not part of the invention) resting on frame 13 (i.e. accommodated in the seat within structure 11). By way of example, digitizer 15 is a smartphone and rests on frame 13 so that the camera lens it is provided with faces towards platform 2. More precisely, digitizer 15
20 rests on frame 13 so that said lens lies at the empty portion delimited by frame 13. The camera of digitizer 15 is thus capable of framing the bottom 7 of depression 6. As shown in figure 2, when cover 8 is arranged almost orthogonally to base 4, it is definitely not interposed between depression 7 and frame 13.

As mentioned above, the focal plane of a lens of a portable digitizer camera is usually parallel to the wall of the digitizer on which said lens is placed. Since
25 frame 13 is arranged parallel to the bottom of frame 7, digitizer 15 rests on frame 13 so that the focal plane of its lens is arranged parallel to bottom 7.

Figure 3 shows device 1 in figure 2 with an image 20 (not part of the invention) resting on the bottom 7 of depression 6 (that is, accommodated in the seat within platform 2). Compared to figures 1 and 2, cover 8 is opposite to base 4, so as
30 to be interposed between depression 6 and frame 13. More precisely, the substantially light-permeable portion 10 is interposed between depression 6 and

frame 13, so that image 20 can be framed by the camera of digitizer 15 (and thus digitized by the latter).

Since digitizer 15 rests on frame 13 so that the focal plane of its lens is arranged parallel to bottom 7 and since image 20 is arranged parallel to bottom 7, said focal plane is arranged parallel to image 20. Therefore, the capture of the latter by means of digitizer 15 takes place in an optimal manner.

Advantageously, if image 20 is crumpled or tends to curl, cover 8 keeps it flat.

The portion 10 of cover 8 was preferably subjected to an antireflection treatment at the face facing frame 13 (i.e. at the upper face in figure 3).

In an alternative embodiment of device 1, structure 11 comprises an artificial light emitter 11 (such as an LED) preferably connected to frame 13. Said emitter is oriented so that the light beam is emitted in the direction of depression 6 (i.e., so as to illuminate it). The presence of the emitter advantageously allows to digitize images even in low natural light.

Figure 4 shows a device 25 which differs from device 1 in that cover 8 is movable in an approaching or removing direction to/from bottom 7. This is preferably achievable by connecting the hinges 9 to respective sliders (not shown in the figure) sliding on respective guides 26. Alternatively, cover 8 is connected to a frame (not shown in the figure) opposite to base 4 by means of hinges 9, instead of being connected to base 4, delimiting depression 6 and movable by means of the guides 26.

Advantageously, cover 8 being vertically movable with respect to bottom 7 allows to digitize images having a thickness which is greater than the depth of depression 6. When resting on bottom 7, in fact, these images project from base 4, and cover 8 can be horizontally arranged only once it has been moved towards frame 13, as needed.

Device 25 also differs from device 1 in that structure 11 (and thus frame 13) is movable in an approaching or removing direction to/from bottom 7. This is preferably achievable by connecting structure 11 to a slider 27 which is movable on a guide 28 vertically connected to bar 12.

Advantageously, frame 13 being vertically movable with respect to bottom 7 allows to adjust the focal length of the camera lens of digitizer 15.

Device 25 also differs from device 1 in that frame 13 is movable parallel to bottom 7. This is preferably achievable by connecting frame 13 to a slider 29 which is movable on a guide 30 connected to slider 27.

Advantageously, frame 13 being movable parallel to bottom 7 allows to center
5 the camera lens of digitizer 15 with respect to the image 20 to be digitized.

In an alternative embodiment of device 1 or 25, the device of the invention provides for the possibility of accommodating a printer, preferably at platform 2 and connectable to digitizer 15 (by means of a cable or wirelessly, for example) at least when the latter rests on frame 13.

10 In another alternative embodiment of device 1 or 25, the device of the invention comprises a storage adapted to store the images digitized by digitizer 15. Said storage can preferably be accommodated at platform 2 and can be connected to digitizer 15 (by means of a cable or wirelessly, for example) at least when the latter rests on frame 13.

15 According to the description given for a preferred exemplary embodiment, it is apparent that some changes may be made by those skilled in the art without departing from the scope of the invention as defined by the following claims.

CLAIMS

1. A device (1, 25) for supporting a portable digitizer (15) characterized in that it comprises:
- a platform (2) including a first seat (6) for accommodating an image (20) which can be digitized by means of said digitizer (15);
 - a top structure (11) including a second seat (13) for accommodating, at least partially, said digitizer (15);
 - means (12) for reciprocally connecting said platform (2) and said top structure (11) so as to arrange:
 - said first and second seats (6, 13) in mutually opposite positions and
 - the focal plane of a lens of said digitizer (15) parallel to said first seat (6).
2. A device (1) according to claim 1, characterized in that said platform (2) comprises:
- a substantially flat cover (8) comprising at least one central portion (10) which is substantially permeable to light;
 - first means (9) for moving said cover (8) between at least a first position in which said cover (8) is interposed between said first and second seats (6, 13) so as to close said first seat (6) at the top, and a second position in which said cover (8) is not interposed between said first and second seats (6, 13).
3. A device (1) according to claim 2, characterized in that said platform (2) comprises, at said first seat (6):
- a substantially flat bottom (7) where said image (20) to be digitized can be placed, said cover (8) being arranged parallel to said bottom (7) when it is in said first position.
4. A device (25) according to claim 3, characterized in that it comprises:
- second means (26) for moving said cover (8) in an approaching or re-moving direction to/from said bottom (7).
5. A device (25) according to claim 3, characterized in that it comprises:
- third means (27, 28) for moving said top structure (11) in an approaching

or removing direction to/from said bottom (7).

6. A device (25) according to claim 3, characterized in that it comprises:

- fourth means (29, 30) for moving said second seat (13) parallel to said bottom (7).

5 7. A device according to claim 3, characterized in that said top structure (11) comprises, at said second seat:

- a substantially flat frame (13) where said digitizer (15) can be placed, said frame (13) being arranged parallel to said bottom (7).

10 8. A device according to claim 1, characterized in that said top structure (11) comprises:

- means for emitting artificial light at least in the direction of said first seat (6).

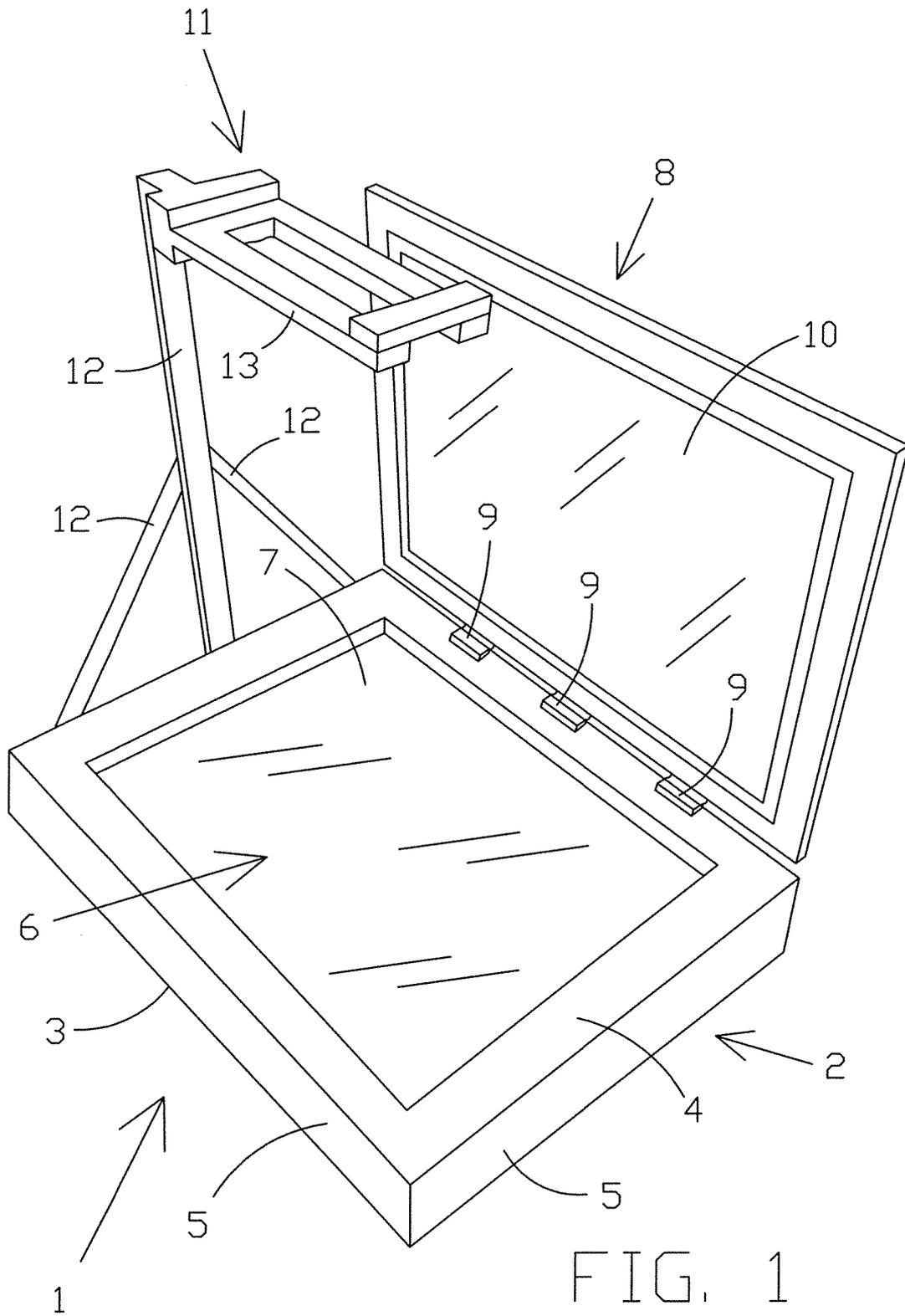
9. A device according to claim 1, characterized in that it comprises:

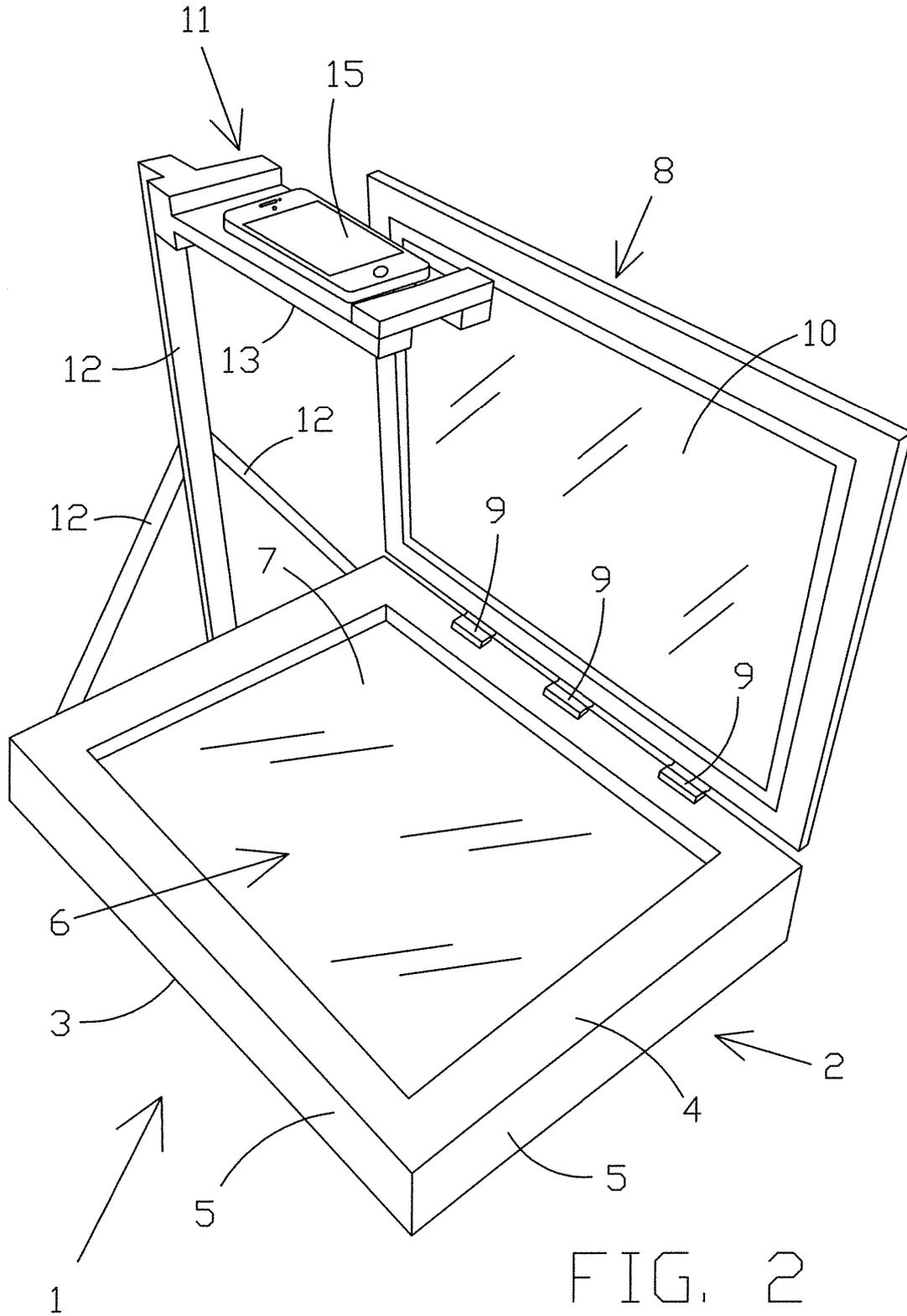
- a printer which can be connected to said digitizer (15) at least when the latter is accommodated in said second seat (13).

10. A device according to claim 1, characterized in that it comprises:

- a storage which can be connected to said digitizer (15) and adapted to store the images captured by said digitizer (15).

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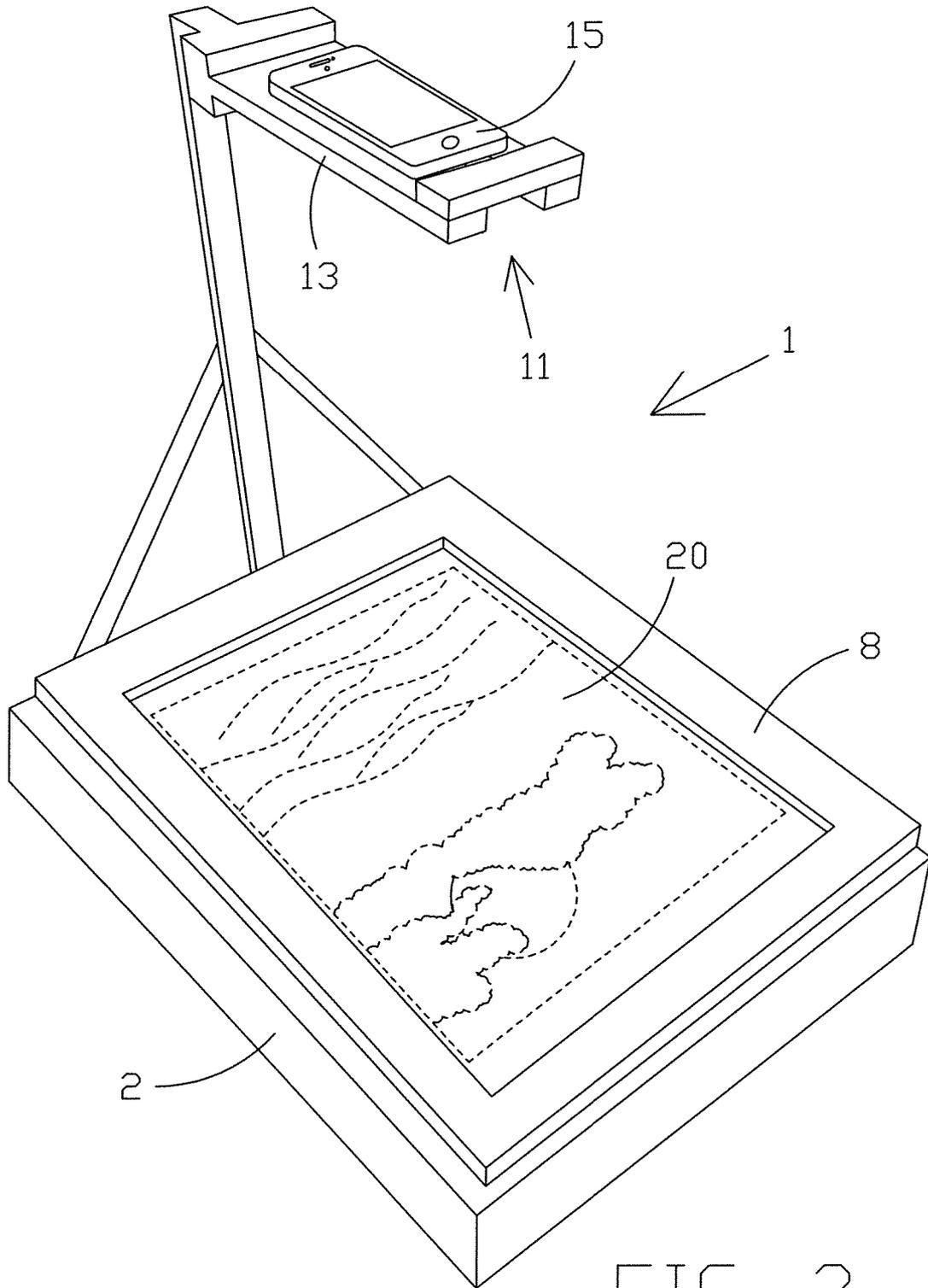
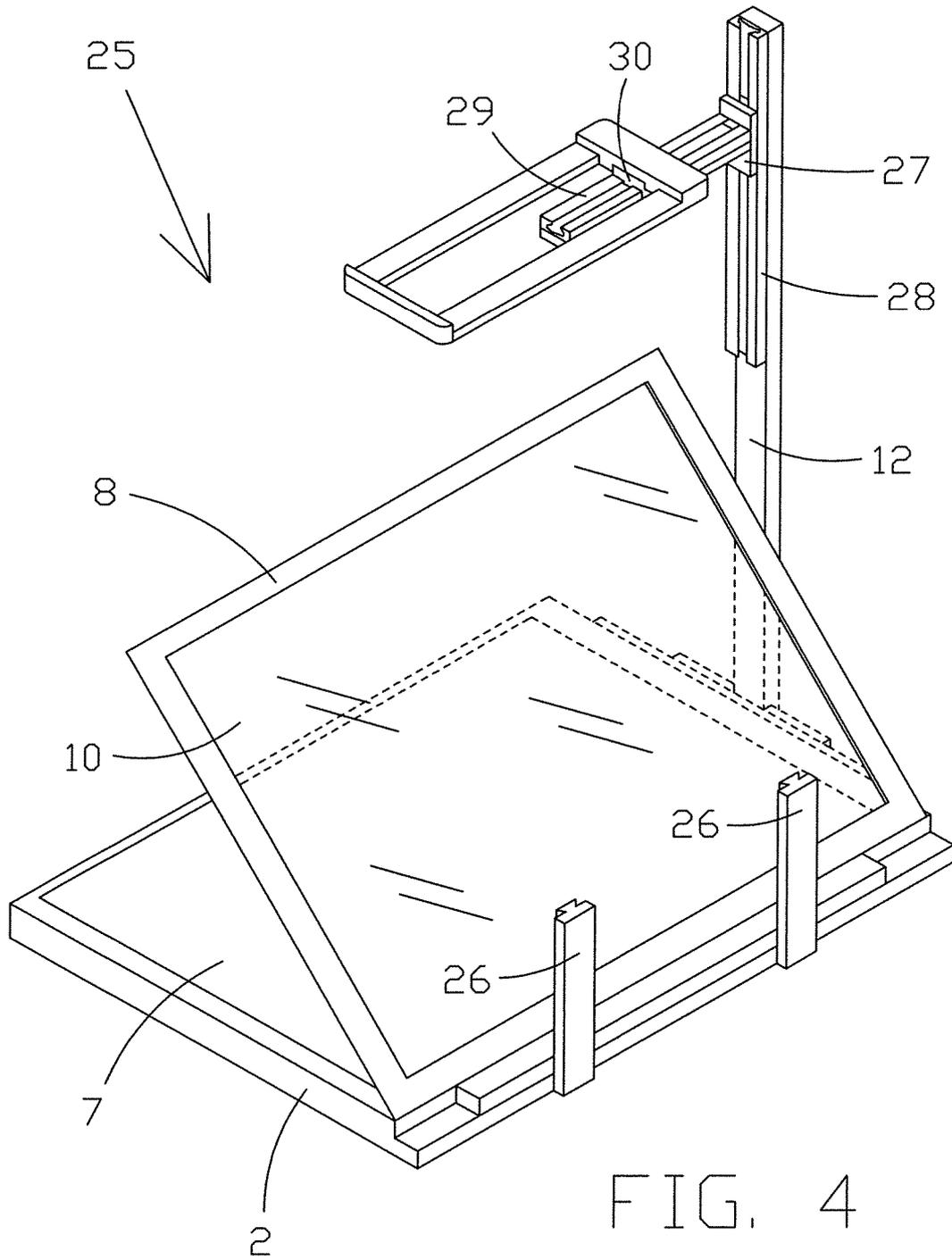


FIG. 3



INTERNATIONAL SEARCH REPORT

International application No
PCT/IT2016/000251

A. CLASSIFICATION OF SUBJECT MATTER
INV. H04N1/00
ADD.
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)
H04N

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

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2014/118764 AI (MAGHAKIAN EMI L [US] ET AL) 1 May 2014 (2014-05-01)	1-3,5-10
Y	abstract paragraph [0001] - paragraph [0003] ; figures 6-12 paragraph [0037] - paragraph [0040]	4
X	US 2016/050348 AI (GIBBONS JASPER S [US]) 18 February 2016 (2016-02-18)	1-3,5-10
Y	abstract figures 1-24 paragraph [0044] - paragraph [0055] paragraph [0087]	4
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Further documents are listed in the continuation of Box C.

See patent family annex.

* Special categories of cited documents :

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"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"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

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

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Date of the actual completion of the international search 17 May 2017	Date of mailing of the international search report 24/05/2017
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INTERNATIONAL SEARCH REPORT

International application No
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C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
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Y	abstract figures 1-11 paragraph [0005] - paragraph [0036] paragraph [0060] -----	4
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Y	abstract figures 1-26 paragraph [0011] - paragraph [0064] -----	4
X	US 2015/138609 AI (GOLDING MICHAEL PETER [GB] ET AL) 21 May 2015 (2015-05-21)	1-3 ,5-10
Y	abstract figures 1-8 paragraph [0029] - paragraph [0038] -----	4
Y	US 2005/196208 AI (LIN TSUNG-TE [TW]) 8 September 2005 (2005-09-08) abstract figures 2-6b paragraph [0021] - paragraph [0029] -----	4

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No PCT/IT2016/000251
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