



(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
04.04.2018 Bulletin 2018/14

(51) Int Cl.:
E01D 1/00 (2006.01) E01D 18/00 (2006.01)

(21) Application number: **17193630.5**

(22) Date of filing: **28.09.2017**

(84) Designated Contracting States:
AL 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 RS SE SI SK SM TR
Designated Extension States:
BA ME
Designated Validation States:
MA MD

(71) Applicant: **Big Stream Bridge Development IVS**
4760 Vordingborg (DK)

(72) Inventor: **Henriksen, Jonna Colding**
4760 Vordingborg (DK)

(74) Representative: **Sun, Yiming**
HUASUN Patent- und Rechtsanwälte
Friedrichstraße 33
80801 München (DE)

(30) Priority: **29.09.2016 DK 201600571**

(54) **A BRIDGE CONSTRUCTION**

(57) A bridge construction 100 to be placed in a water surface comprises a first deck 102 having a rail track 108 and a pathway 112. The bridge construction 100 further comprises a second deck 104 and a plurality of pillars 130 supporting the decks (102 & 104). The first deck 102 comprises a central arch structure 110. The second deck 104 comprises a plurality of containers 114 configured to provide an access for utilities. The bridge construction

100 further comprises an integrated power system 118 in the water surface 116, provide power to the utilities of the decks (102 & 104), at least one incineration system 122 configured to treat waste materials and a floating platform 124 on the water surface 116 configured to have a rescue area accessed via a maritime staircase 126 operably attached to the first deck 102.

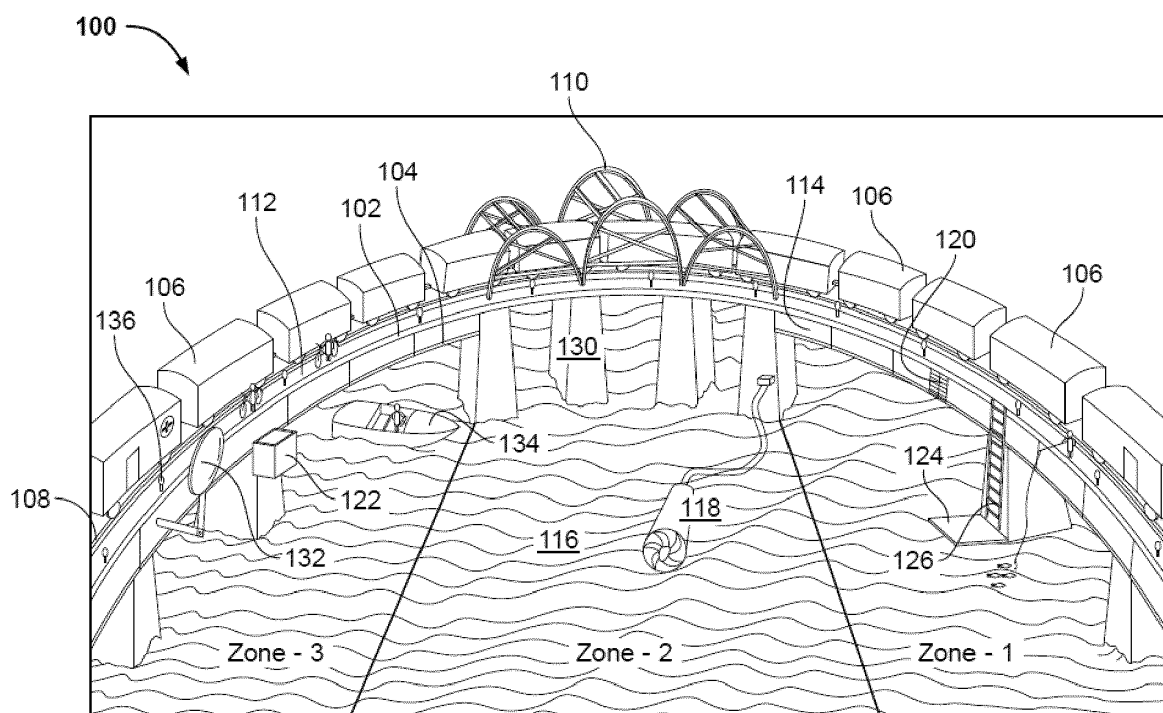


FIG. 1

Description

BACKGROUND

[0001] Currently, an urban development and planning process plays a major role in the economic significance of a location in a state. The urban development factor depends on commercial and marketing activities. Therefore, a strategic planning is required to build a system that concentrates on a land-use planning, road and rail transportation planning, and an economic development. Nowadays most of the government and state authorities devise strategies to improve the infrastructure inside the city limits to boost the economic significance of the place. However, this led to the development of skyscrapers, and new streets to get access to various utilities, which in turn increases the road traffic and congestion as well as the land value.

[0002] There have been many attempts to provide solutions to improve the environment, business status and transportation away from the city limits and at the same time giving an experience of using all the utilities at the same place. However, most of the attempts have their own limitations like lack of coordination among the utilities, cumbersome set up, expensive funding and so on. A prior art reference US 5655244 A discusses about a super long bridge with an automatic transporting system wherein individually controllable trucks and transportation lane configured to provide access to the public. However, this disclosure does not provide additional utilities such as a hotel, a hospital, a museum and so on. Furthermore, it includes more limitations like lack of power supply for the transportation unit and other purposes.

[0003] Additionally, although existing double deck bridges, for example, the Galata Bridge located in Turkey houses pathways for pedestrians and cyclists and has restaurants, the bridge in itself is not self-sufficient in terms of energy requirements and waste management. The lower deck of the bridge houses restaurants and beer parlors that require energy, which must be supplied from a power plant located away from the bridge. Moreover, a township comprising utilities, for example, hospitals, museums, etc., cannot be sustained on such a bridge. An energy sufficient bridge, which allows development of a township on a bridge, is required. Further, the lower deck of the Galata bridge is positioned very close to the water surface, which prevents large ships from passing underneath. A bridge, which is positioned at a suitable height to allow passage of ships underneath the bridge, is required.

[0004] Hence, there is a long felt but unresolved need for an infrastructure system at one place such as a historic bridge located on a waterway to provide a plurality of utilities such as transportation, business zone, entertainment zone, market zone and so on to give the public an enthralling experience of an integrated mini-society at one place. Moreover, an energy sufficient bridge, which allows development of a township on a bridge, is

required. Furthermore, a bridge, which is positioned at a suitable height to allow passage of ships underneath the bridge, is required.

SUMMARY OF THE INVENTION

[0005] According to the present invention, the present invention relates to a bridge construction to be placed in a water surface. In an embodiment, the bridge construction comprises a first deck having a rail track and a pathway. The pathway is configured to provide access to a pedestrian and a cyclist. The bridge construction comprises a second deck and a plurality of pillars supporting the decks, where the rail track of the first deck is configured to provide access to a plurality of interconnected wagons and where the pathway is formed along either side of the rail track, characterized in, that the first deck further comprises a central arch structure. In one embodiment, the second deck comprises a plurality of containers configured to provide an access for utilities selected from at least one of a hotel, a residence, a hospital, a police station, a prison, a museum, an educational zone, a business zone, an exhibition zone, a conference hall and a market zone. In one embodiment, the bridge construction further comprises an integrated power system configured to be placed in the water surface and provide power to the utilities of the first deck and second deck, at least one incineration system configured to treat waste materials and a floating platform to be floating on the water surface and configured to have a rescue area accessed via a maritime staircase operably attached to the first deck.

[0006] In one embodiment, the central arch structure comprises a plurality of arches made from a transparent material. The arches are configured to have a plurality of steel frames and spans to provide the structural stability of the central arch structure with the bridge. In different embodiments, a lighting system is implemented in the bridge construction, which enhances the aesthetic appearance of the bridge.

BRIEF DESCRIPTION OF THE DRAWINGS

[0007]

FIG. 1 exemplarily illustrates a schematic diagram of a bridge construction on a waterway supported by pillars, incorporating the aspects of the present invention.

FIG. 2 exemplarily illustrates an exploded view of a container configured to be attached to a second deck of the bridge, incorporating the aspects of the present invention.

DETAILED DESCRIPTION OF THE INVENTION

[0008] FIG. 1 exemplarily illustrates a schematic dia-

gram of a bridge construction 100. The present invention relates to a bridge construction 100 to be placed in a water surface 116. In an embodiment, the bridge construction 100 comprises a first deck 102 having a rail track 108 and a pathway 112. The pathway is configured to provide access to a pedestrian and a cyclist. The bridge construction 100 comprises a second deck 104 and a plurality of pillars 130 supporting the decks (102 & 104), where the rail track 108 of the first deck 102 is configured to provide access to a plurality of interconnected wagons 106 and where the pathway 112 is formed along either side of the rail track 108, characterized in, that the first deck 102 further comprises a central arch structure 110. In one embodiment, the second deck 104 comprises a plurality of containers 114 configured to provide an access for utilities selected from at least one of a hotel, a residence, a hospital, a police station, a prison, a museum, an educational zone, a business zone, an exhibition zone, a conference hall and a market zone. In one embodiment, the bridge construction 100 further comprises an integrated power system 118 configured to be placed in the water surface 116 and provide power to the utilities of the first deck 102 and second deck 104, at least one incineration system 122 configured to treat waste materials and a floating platform 124 to be floating on the water surface 116 and configured to have a rescue area accessed via a maritime staircase 126 operably attached to the first deck 102.

[0009] In an embodiment as shown in FIG. 1, the central arch structure 110 of the bridge construction 100 comprises a plurality of arches made from a transparent material. Preferably, the arches are covered with a glass material to enhance the artistic appearance of the central arch structure 110 in the bridge as well as to withstand the wind and impact of storm birds. Further, the floor of the arches is also configured to have a transparent material so that a person could view the structure below with ease. The central arch structure 110 further comprises a plurality of steel frames and spans configured to provide the structural stability of the central arch structure 110 with the bridge. In an exemplary embodiment, the central arch structure 110 comprises three arches with steel frames and spans covered by the glass material.

[0010] In an embodiment as shown in FIG. 1, the floating platform 124 is deployed during the bridge construction. The floating platform 124 could be used as rescue area, and deployed juxtaposed to the first deck 102 of the bridge via the maritime staircase 126 operably attached therein. In an exemplary embodiment, the maritime staircase 126 could be deployed and connected to the floating platform 124 during a critical situations encountered by the user or swimmers. For example, if the person dives into the water from one of the decks, in case if he is unable to swim or save himself, the maritime staircase 126 person could be deployed to rescue the person in time. In other embodiments, the floating platform 124 is configured to implement as the bathing island with eye-lashes, and enclosed swimming area with much comfort,

which could also be accessed from the bridge via maritime stairs 126.

[0011] In another embodiment according to FIG. 1, the bridge construction 100 comprises a lighting system, which enhances the aesthetic appearance of the bridge. The lighting system 136 comprises a tone lighting arrangement with desired colors covering the decks (102 & 104), central arch structure 110, pillars 130, and other sections of the bridge to highlight the bridge construction 100 especially during night. The lighting system 136 for the second deck allows the user to access various utilities by enhancing the visibility and appearance of all the utilities during both day and night time. The plurality of pillars 130 and pliers supports the bridge construction 100 on the waterway is configured to allow a ship 134 to pass through the structure. Optionally, one or two platforms can be provided under the bridge for safety and maintenance purpose. Further, a magnifying glass 132 is configured to be attached to one of the containers 114 to give the user an enhanced view of the city infrastructure from the bridge itself.

[0012] Referring to FIG. 1, the first deck 102 and second deck 104 of the bridge construction 100 on the waterway supported by a plurality of pillars 130 is illustrated. The first deck 102 of the bridge is deployed with a rail track 108 to enable the rail transportation through the central arch structure 110 of the bridge. One or two wagons 106 are deployed on the rail track 108, which is configured to move, and connect to any other existing rail network in the state. Optionally, the wagons 106 are configured to stay intact on the rail track so that it provides access to a hospital, a security station and an emergency vehicle. The middle arch of the central arch structure 100 comprises ropes on the floor, which may be loosened when the wagons moves along the rail track 108. Further, the bridge construction 100 according to the present invention provides a set of wagons 106 to act as a backdrop house, a dining car, a sleeping car, an exhibition vehicle, etc. on the bridge. However, the configuration of wagons 106 on the first deck 102 of the bridge gives an appearance of trains running on the bridge that stands on the waterway. A roadway path 112 is also constructed along the sides of the rail track 108 on the first deck 102 to give access to the pedestrians and cyclists for commuting purpose. In some embodiments, wagons 106 are configured to assist disabled people for extended usage. The integrated power system 118 provides power to the wagons 106 of the rail system.

[0013] As shown in FIG. 2, the containers 114 are configured to provide an access for utilities in the bridge construction 100 on the waterway. The containers 114 are arranged in the second deck 104 of the bridge to provide access for multiple utilities such as the hotel, the residence, the hospital, the police station, the prison, the museum, the educational zone, the business zone, the exhibition zone, the conference hall and the market zone. The utilities are divided into three zones: a zone-1 providing access for education and delighting zone, a zone-

2 providing access for conference halls and market square and a zone-3 providing access for hotels, profession and promotional activities. Therefore, the bridge acts as a point of source for several facilities to give the user an experience of mini society. In addition to the wagons 106 on the first deck 102, the containers 114 in the second deck 104 also provides emergency and police unit for user safety and convenience. In different embodiments, a plurality of operational departments and modern minimalist residential are configured to be arranged on the second deck 104 to serve multiple purposes. The bridge is located in the banks and the hotels are fitted to give east and west views, and if the iron plates are replaced by the transparent materials, the user in the bridge can see through at a distance in sunlight and also providing light and views of people inside the room shaped container. The containers 114 are mounted and arranged under the roadway 112 of the first deck 102 providing additional stability to the structure.

[0014] In preferred embodiments, as shown in FIG. 1, the bridge further comprises integrated power system 118 configured to provide power to the utilities of the first deck 102 and the second deck 104 of the bridge. The integrated power system 118 comprises a power source selected from at least one of a water turbine and a solar panel 120. The water turbines are installed in nearby places of the bridge so that the power generated can be easily transferred to the utility system for usage. Further, the solar panels 120 are implemented to arrange on a plurality of predetermined positions of the second deck 104. The water turbines and solar panels 120 acts as the integrated power system 118 to supply power to all the utilities of the bridge. The bridge also comprises the incineration system 122 to treat the waste materials for additional power generation, which could be used to supply power to many applications such as heating the water and so on. Optionally, a water purification system is configured to provide drinking water requirements to the utilities of the bridge.

[0015] The bridge construction 100 enables promoting 'Blue and green' environmental policies of the state and as it comprises power, heating, lighting and waste incineration, it can be modeled as a mini-society. The operation of the bridge allows for minimum transport of things and helps to promote recycling of energy from consumption locally. The architectural expression of the bridge gives an appealing vision when viewed from far away in the sunlight from the West. Being away from the land, the bridge still accommodates residential, overnight guests, liberal business, exhibitions, experience oriented activities, and museums. The lighting arrangement 136 for the bridge gives a historically unique impression for the place when viewed during the night. The bridge provides access to pure drinking water, where needs and consumption of water is achieved on the bridge itself without having access to the land. The combustion of waste by the incineration system 122 provides additional power capability for the utilities in the bridge. Overall, the bridge

developments act as a historic achievement enabling industrialism development in the state, and acts as a ship with several facilities on the sea.

[0016] The foregoing examples have been provided merely for the purpose of explanation and are in no way to be construed as limiting of the present concept disclosed herein. While the concept has been described with reference to various embodiments, it is understood that the words, which have been used herein, are words of description and illustration, rather than words of limitation. Further, although the concept has been described herein with reference to particular means, materials, and embodiments, the concept is not intended to be limited to the particulars disclosed herein; rather, the concept extends to all functionally equivalent structures, methods and uses, such as are within the scope of the appended claims. Those skilled in the art, having the benefit of the teachings of this specification, may affect numerous modifications thereto and changes may be made without departing from the scope and spirit of the concept in its aspects.

Claims

1. A bridge construction (100) to be placed in a water surface (116), the bridge construction (100) comprising a first deck (102) having a rail track (108) and a pathway (112) configured to provide access to a pedestrian and a cyclist, a second deck (104) and a plurality of pillars (130) supporting the decks (102 & 104), where the rail track (108) of the first deck (102) is configured to provide access to a plurality of interconnected wagons (106) and where the pathway (112) is formed along either side of the rail track (108), **characterized in, that** the first deck (102) further comprises a central arch structure (110), the second deck (104) comprises a plurality of containers (114) configured to provide an access for utilities selected from at least one of a hotel, a residence, a hospital, a police station, a prison, a museum, an educational zone, a business zone, an exhibition zone, a conference hall and a market zone, and the bridge construction (100) further comprises an integrated power system (118) configured to be placed in the water surface (116) and provide power to the utilities of the first deck (102) and second deck (104), at least one incineration system (122) configured to treat waste materials and a floating platform (124) to be floating on the water surface (116) and configured to have a rescue area accessed via a maritime staircase (126) operably attached to the first deck (102).
2. The bridge construction (100) of claim 1, wherein the floating platform (124) is configured to use selectively as a bathing island and a swimming pool.

3. The bridge construction (100) of claim 1, wherein the central arch structure (110) comprises a plurality of arches made from a transparent material.
4. The bridge construction (100) of claim 1, wherein the central arch structure (110) comprises a plurality of steel frames and spans configured to provide structural stability of the central arch structure (110). 5
5. The bridge construction (100) of claim 1, further comprising a lighting system (108) configured to enhance the aesthetic appearance of the bridge. 10
6. The bridge construction (100) of claim 1, wherein the plurality of pillars (130) supporting the bridge is configured to allow one or more ships (134) to pass through the bridge. 15
7. The bridge construction (100) of claim 1, further comprises a water purification system configured to provide drinking water to the utilities of the bridge. 20
8. The bridge construction (100) of claim 1, wherein the integrated power system (118) comprises a power source selected from at least one of a water turbine and a solar panel. 25
9. The bridge construction (100) of claim 1, wherein the solar panels (120) are configured to arranged on a plurality of predetermined positions of the second deck (104). 30
10. The bridge construction (100) of claim 1, wherein the wagon (106) is configured to provide access for at least one of a hospital, a security station and an emergency vehicle. 35

40

45

50

55

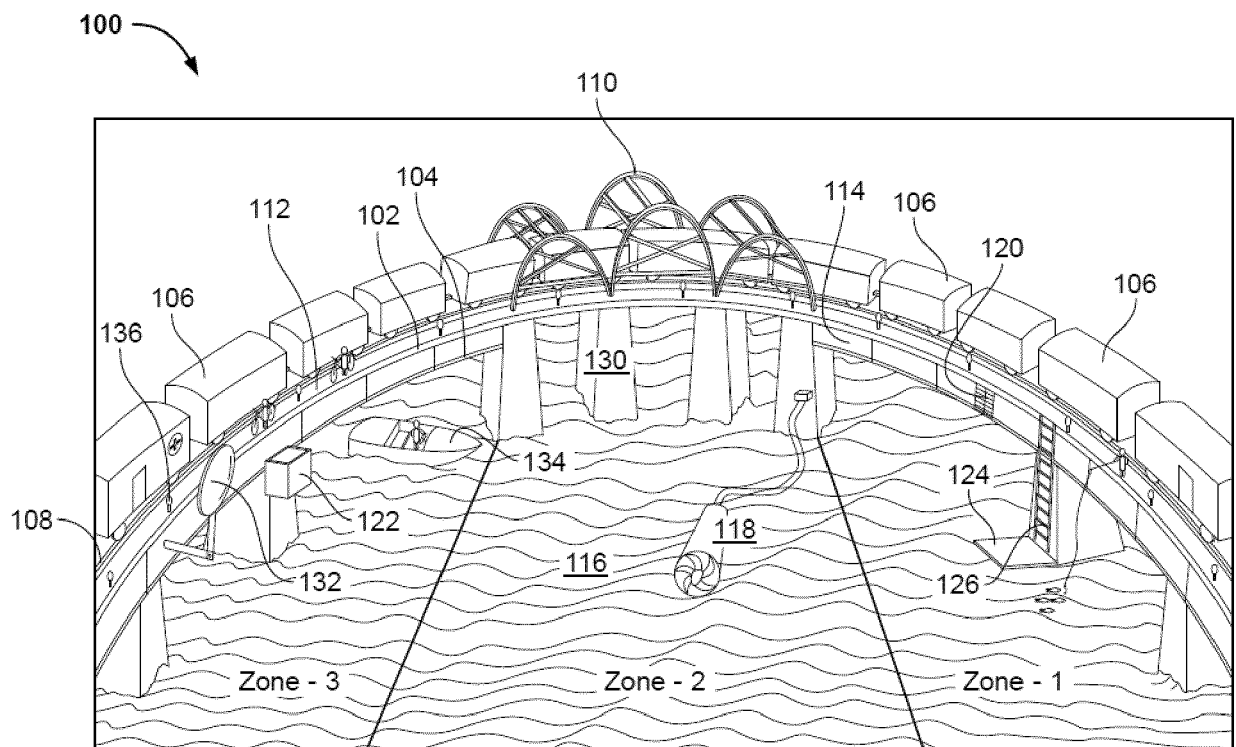


FIG. 1

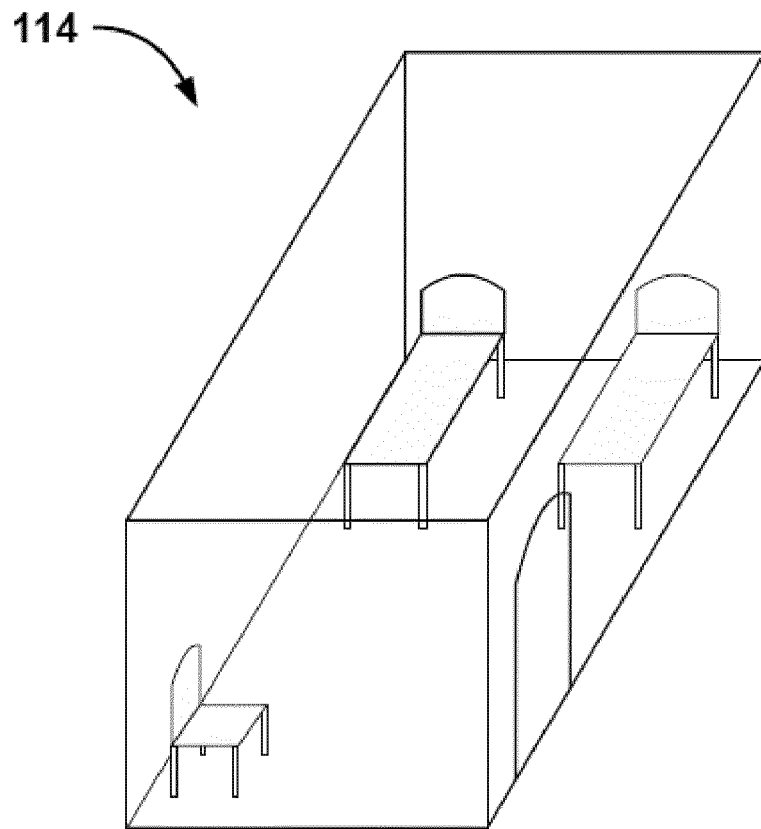


FIG. 2



EUROPEAN SEARCH REPORT

Application Number
EP 17 19 3630

5

10

15

20

25

30

35

40

45

50

55

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
A	KR 2013 0000636 A (OH SEUNG YOUNG [KR]) 3 January 2013 (2013-01-03) * the whole document *	1-10	INV. E01D1/00 E01D18/00
A	Powell ET AL: "The Galata Bridge - Istanbul For 91 Days", 27 May 2013 (2013-05-27), pages 1-20, XP055432109, Retrieved from the Internet: URL:http://istanbul.for91days.com/2013/05/27/the-galata-bridge/ [retrieved on 2017-12-05] * the whole document *	1-10	
A	Mike Chino: "Bay Line: A High Line Park for San Francisco's Bay Bridge", 10 August 2009 (2009-08-10), pages 1-2, XP055432112, Retrieved from the Internet: URL:https://inhabitat.com/bay-line-a-high-line-park-for-san-franciscos-bay-bridge/ [retrieved on 2017-12-05] * the whole document *	1-10	TECHNICAL FIELDS SEARCHED (IPC) E01D E04H
A	DE 20 2015 002676 U1 (PFANNER SCHUTZBEKLEIDUNG GMBH [AT]) 13 May 2015 (2015-05-13) * the whole document *	1-10	
The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 14 February 2018	Examiner Beucher, Stefan
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			

EPO FORM 1503 03.82 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 17 19 3630

5

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
The members are as contained in the European Patent Office EDP file on
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

14-02-2018

10

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
KR 20130000636 A	03-01-2013	NONE	
DE 202015002676 U1	13-05-2015	NONE	

15

20

25

30

35

40

45

50

55

EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

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

- US 5655244 A [0002]