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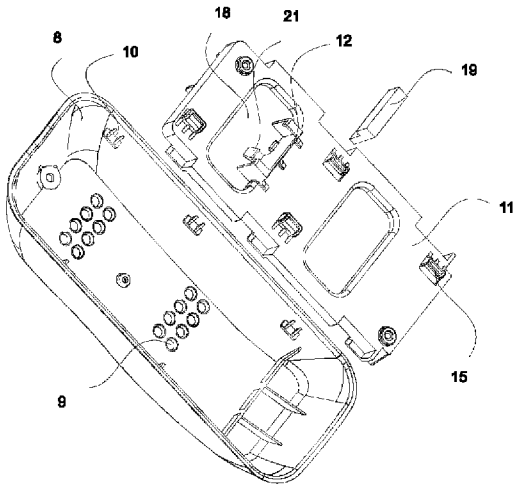
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(54) Title: A WASHING MACHINE COMPRISING A LIFTER

Figure 4



(57) Abstract: The present invention relates to a washing machine (1) comprising a body (2); a loading port (3) which is provided on the body (2); a drum (4) which is disposed in the body (2) and wherein the laundry is loaded via the loading port (3); a tub (5) wherein the drum (4) is disposed; a pipe (6) which provides the delivery of the water to the tub (5) during the washing cycle; a lifter (7) which is disposed in the drum (4), which tumbles the laundry and which has at least one nozzle (9) for delivering the water into the drum (4); a magnet (19) which creates a magnetic field during the rotation of the drum (4); a sensor (20) which is disposed on the tub (5) and which detects the position of the lifter (7) with respect to the tub (5) with the magnetic effect of the magnet (19); and a control unit (23) which stops the drum (4) when the lifter (7) is at the topmost position of the tub (5) according to the data received from the sensor (20).

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Description

A WASHING MACHINE COMPRISING A LIFTER

[0001] The present invention relates to a washing machine comprising a lifter having a magnet for detecting the position of the drum.

[0002] The lifters provided as protrusions on the inner surface of the drum in the washing machine are components which tumble the textile in the drum, thus enabling the detergent-water mixture to contact every point of the laundry and removing the stains by rubbing. However, the rubbing caused by the contact between the lifters and the textile results in a wearing effect on the laundry. Therefore, it is required to benefit from the hydrodynamic effect of the water in order to increase the washing efficient by optimizing the amount of water, the temperature of the water and the textile damage during the washing cycle. In order to maximize the effect of the hydrodynamic effect of the water, the water must be sent onto the textile in a regulated flow during the washing step. Said flow is provided by detecting the position of the drum during the washing process and sending the water into the drum from the topmost point in the tub via the lifters. A magnet and sensors are used in order to stop the lifter in the drum stop at the topmost point of the drum during the water intake. As the sensors detect the magnetic field, the lifter is stopped at the topmost point of the drum, and the water is sent into the lifter at the topmost point by means of a distribution pipe so as to be delivered onto the textile in the drum.

[0003] In the state of the art embodiments, the magnet is positioned in a region on the inner surface of the drum or on the tub. In these embodiments, the magnet may dislodge with the effect of the water during the washing process and it becomes impossible for the sensor to detect the magnet. Moreover, in case of any problem with the magnet, the drum must be completely removed in order to provide maintenance service, which makes it difficult to provide service during any malfunction.

[0004] In the state of the art Japanese Patent Document No. JPH04193292, a washing machine is disclosed, wherein the position of the drum is detected by means of the magnet positioned on the drum in a region close to the lifter.

[0005] The aim of the present invention is the realization of a washing machine comprising a lifter which can be detachably attached in order to facilitate the maintenance service in case of malfunction.

[0006] The washing machine of the present invention comprises a two-piece lifter which can be easily attached to/detached from the drum. The lifter comprises a first piece and a second piece. The first piece is positioned at the inner volume of the drum and has at least one nozzle thereof, thus providing the delivery of the water received through the tub holes from the pipe onto the laundry. The second piece is a plate which can be detachably attached to the drum and which becomes coplanar with the outer surface of the drum when attached. The second piece comprises at least one opening which enables the water delivered to the tub by means of the pipe during the washing cycle to pass into the drum through the tub holes.

[0007] The lifter comprises at least one magnet which creates the magnetic field for detecting the position of the lifter with respect to the tub by means of the sensors. In the preferred embodiment of the present invention, said magnet is disposed in a housing on the second piece.

[0008] The second piece is mounted onto the drum from the inner surface by fitting claws into the gaps on the drum. Thus, the second piece is mounted so as to be coplanar with the outer surface of the drum. Only the side of the claws on the second piece which allows mounting is hollow. Thus, the second piece is mounted by means of the claws and the holes on the drum, and the lifter is fixed to the drum from only one direction such that the nozzles on the first piece which is the other piece of the lifter become coaxial with the water passage gaps on the tub. Consequently, a regulated flow is provided during the washing process.

[0009] Slides provided on the second piece are slid over guide rods on the first piece such that the second piece is mounted to the first piece, forming a two-piece lifter structure.

[0010] By means of the present invention, a washing machine is realized, wherein the position of the lifter with respect to the tub can be detected and the water is delivered onto the laundry while the lifter is at the topmost position

of the tub, thus performing a more efficient washing process.

[0011] The model embodiments relating to the washing machine realized in order to attain the aim of the present invention are illustrated in the attached figures, where:

[0012] **Figure 1** - is the front view of the washing machine of the present invention.

[0013] **Figure 2** - is the perspective view of the washing machine of the present invention after the front panel is removed.

[0014] **Figure 3** - is the top and sideways perspective view of the second piece of the lifter in the washing machine of the present invention.

[0015] **Figure 4** - is the perspective view of the first and second pieces of the lifter in an embodiment of the washing machine of the present invention.

[0016] **Figure 5** - the view of the mounting of the second piece onto the inner surface of the drum in the washing machine of the present invention.

[0017] **Figure 6** - the view of the outer surface of the drum facing the tub after the second piece is mounted to the drum in the washing machine of the present invention.

[0018] **Figure 7** - is the view of the drum and the lifter in an embodiment of the washing machine of the present invention.

[0019] The elements illustrated in the figures are numbered as follows:

1. Washing machine
2. Body
3. Loading port
4. Drum
5. Tub
6. Pipe
7. Lifter
8. First piece
9. Nozzle
10. Guide rod
11. Second piece
12. Housing
13. Side wall

14. Rear wall
15. Claw
16. Slide
17. Slide gap
18. Opening
19. Magnet
20. Sensor
21. Holder
22. Hole
23. Control unit

[0020] The washing machine (1) comprises a body (2); a loading port (3) which is provided on the body (2); a drum (4) which is disposed in the body (2) and wherein the laundry is loaded via the loading port (3); a tub (5) wherein the drum (4) is disposed; a pipe (6) which provides the delivery of the water to the tub (5) during the washing cycle; a lifter (7) which is disposed in the drum (4), which tumbles the laundry and which has at least one nozzle (9) for delivering the water into the drum (4); a magnet (19) which creates a magnetic field during the rotation of the drum (4); a sensor (20) which is disposed on the tub (5) and which detects the position of the lifter (7) with respect to the tub (5) with the magnetic effect of the magnet (19); and a control unit (23) which stops the drum (4) when the lifter (7) is at the topmost position of the tub (5) according to the data received from the sensor (20).

[0021] The washing machine (1) of the present invention comprises the lifter (7) having a second piece (11) which can be detachably attached to the drum (4) and which has at least one opening (18) for allowing the passage of water into the drum (4), a first piece (8) which can be detachably attached to the second piece (11) and a magnet (19) which is disposed in the first piece (8) and/or the second piece (11).

[0022] In the washing machine (1), the delivery of water into the drum (4) from the lifter (7) while the lifter (7) together with the drum (4) is at the topmost position of the tub (5) is important for efficiently washing the laundry and benefiting from the hydrodynamic effect of the water during the washing

process. The magnet (19) and the sensor (20) are used for detecting if the lifter (7) is at the topmost position of the tub (5). In the washing machine (1), the magnet (19) in the lifter (7) creates a magnetic field during the rotation of the drum (4), and said magnetic field is detected by the sensor (20), thus detecting the position of the lifter (7), and the control unit (23) stops the drum (4) when the lifter (7) is at the topmost position of the tub (5) and delivers the water into the drum (4). In the washing machine (1) of the present invention, the lifter (7) comprises two interlocking pieces, namely the first piece (8) and the second piece (11). The magnet (19) can be disposed on the first piece (8) or the second piece (11) in said two-piece lifter (7). The second piece (11) comprises the opening (18) for allowing the passage of the water during the washing process and for enabling the magnetic field created by the magnet (19) to be more efficiently detected by the sensor (20). The second piece (11) and the first piece (8) are mounted to each other to form the lifter (7), and the lifter (7) is mounted to the drum (4) by means of the second piece (11). Thus, in case of the dislodging of the magnet (19) due to the movement of the drum (4) or in case of any malfunction, the lifter (7) can be easily detached from the drum (4) and serviced.

[0023] In an embodiment of the present invention, the magnet (19) is disposed in a housing (12) on the second piece (11). Thus, the magnet (19) can be firmly disposed into the lifter (7).

[0024] In an embodiment of the present invention, the washing machine (1) comprises the housing (12) at one side of the opening (18), having a rear wall (14) and two side walls (13) as an elevation from the surface whereon one claw (15) for connecting the second piece (11) to the drum (4) is provided. Thus, the magnet (19) is positioned higher than the surface whereon the claws (15) for connecting the second piece (11) to the drum (4) are provided, and the dissipation effect of the magnetic field is improved.

[0025] In an embodiment of the present invention, the second piece (11) comprises a holder (21) which enables the magnet (19) to be fixed in the housing (12). Thus, the magnet (19) placed into the housing (12) is

prevented from dislodging from the housing (12) due to the impacts of the water.

[0026] In an embodiment of the present invention, the washing machine (1) comprises the second piece (11) having at least one slide (16) and at least one slide gap (17) for slidably mounting to the first piece (8), and the first piece (8) having at least one slide rod (10) wherein the slide (16) is guided. Thus, the second piece (11) and the first piece (8) can be easily attached to/detached from each other without the need for any screws.

[0027] In an embodiment of the present invention, the washing machine (1) comprises the second piece (11) having at least one claw (15) for mounting the second piece (11) coplanarly onto the outer surface of the drum (4) facing the tub (5), and the drum (4) having at least one hole (22) for engaging with the claw (15). Thus, the claw (15) engages with the hole (22) on the surface of the drum (4) such that the lifter (7) is coplanarly mounted onto the outer surface of the drum (4) facing the tub (5).

[0028] By means of the present invention, a washing machine (1) is realized, comprising a two-piece lifter (7) which can be easily dismounted from the drum (4) and can be easily serviced in case of any problem with the magnet (19) which is used for detecting the position of the drum (4) and of the lifter (7).

Claims

1. A washing machine (1) **comprising** a body (2); a loading port (3) which is provided on the body (2); a drum (4) which is disposed in the body (2) and wherein the laundry is loaded via the loading port (3); a tub (5) wherein the drum (4) is disposed; a pipe (6) which provides the delivery of the water to the tub (5) during the washing cycle; a lifter (7) which is disposed in the drum (4), which tumbles the laundry and which has at least one nozzle (9) for delivering the water into the drum (4); a magnet (19) which creates a magnetic field during the rotation of the drum (4); a sensor (20) which is disposed on the tub (5) and which detects the position of the lifter (7) with respect to the tub (5) with the magnetic effect of the magnet (19); and a control unit (23) which stops the drum (4) when the lifter (7) is at the topmost position of the tub (5) according to the data received from the sensor (20), **characterized by** the lifter (7) having a second piece (11) which can be detachably attached to the drum (4) and which has at least one opening (18) for allowing the passage of water into the drum (4), a first piece (8) which can be detachably attached to the second piece (11) and a magnet (19) which is disposed in the first piece (8) and/or the second piece (11).
2. A washing machine (1) as in Claim 1, **characterized by** the lifter (7) having a housing (12) on the second piece (11) for positioning the magnet (19).
3. A washing machine (1) as in Claim 2, **characterized by** the housing (12) at one side of the opening (18), having a rear wall (14) and two side walls (13) as an elevation from the surface whereon one claw (15) for connecting the second piece (11) to the drum (4) is provided.
4. A washing machine (1) as in any one of the above claims, **characterized by** the second piece (11) comprising a holder (21) for fixing the magnet (19) in the housing (12).
5. A washing machine (1) as in any one of the above claims, **characterized by** the second piece (11) having at least one slide (16) and at least one slide gap (17) for slidably mounting to the first piece (8), and the first piece (8) having at least one slide rod (10) wherein the slide (16) is guided.
6. A washing machine (1) as in any one of the above claims, **characterized by** the second piece (11) having at least one claw (15) for mounting the second piece

(11) coplanarly onto the outer surface of the drum (4) facing the tub (5), and the drum (4) having at least one hole (22) for engaging with the claw (15).

Figure 1

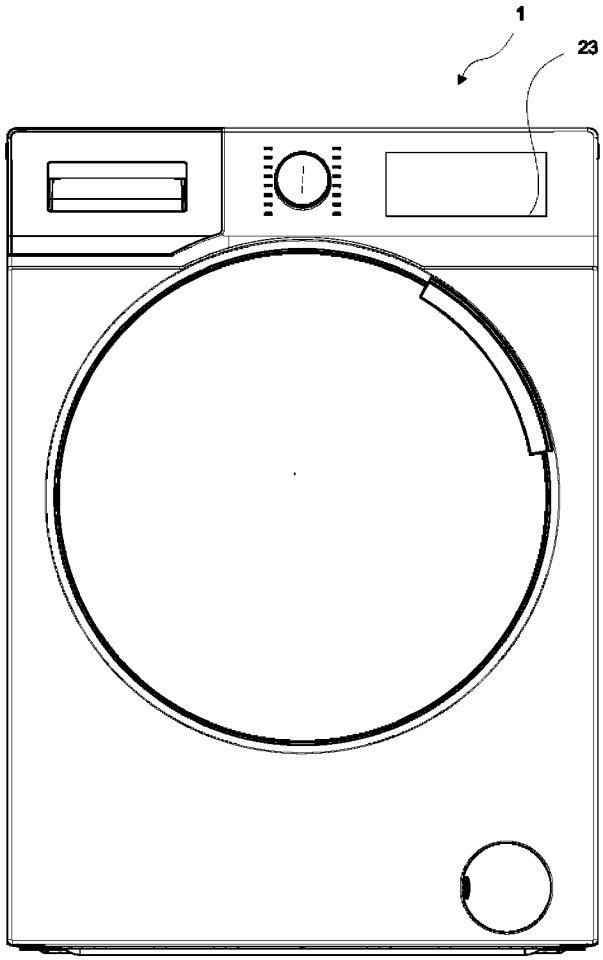


Figure 2

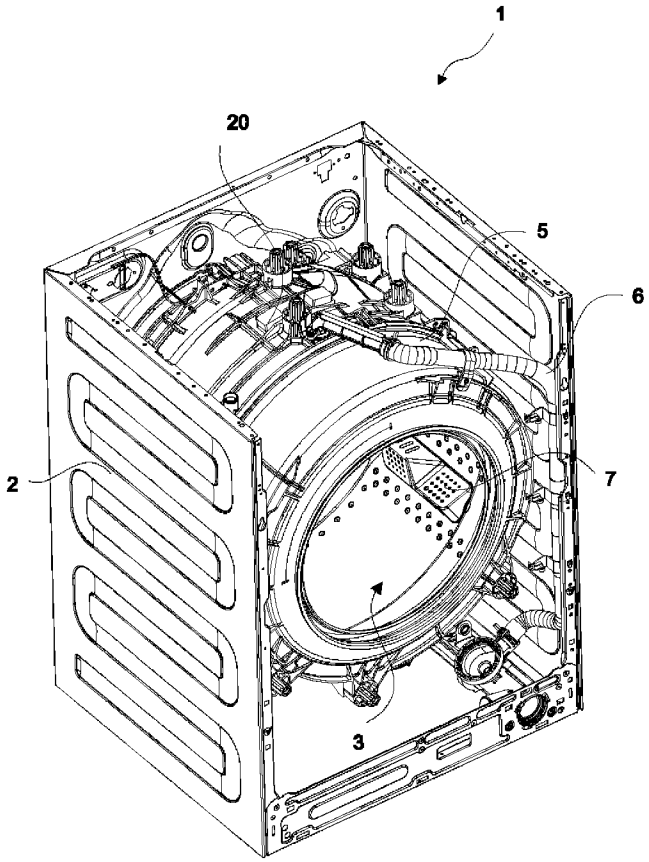


Figure 3

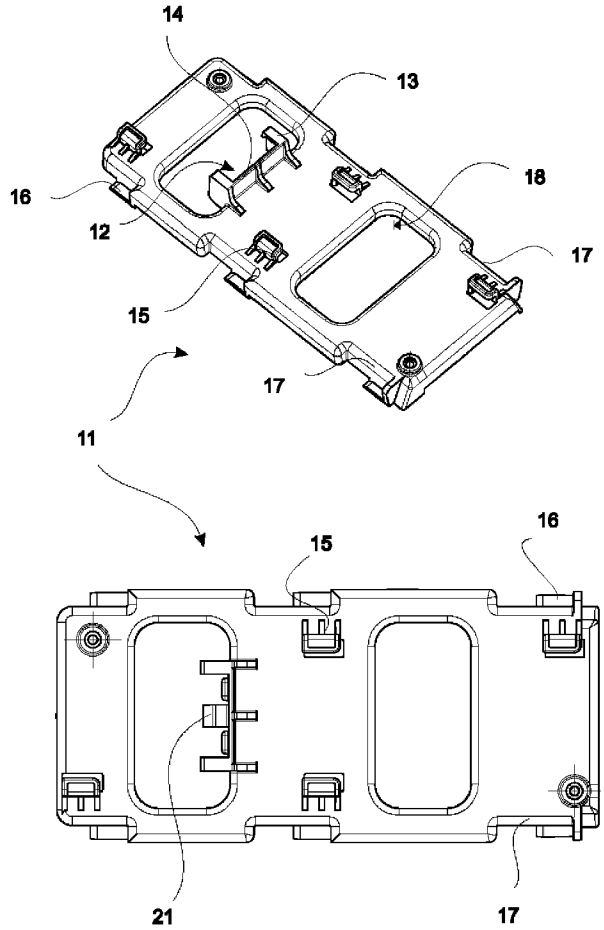


Figure 4

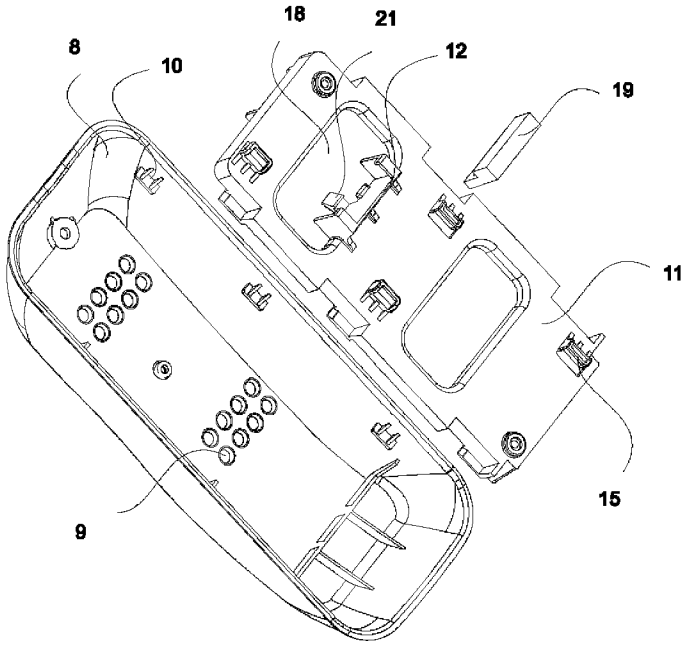


Figure 5

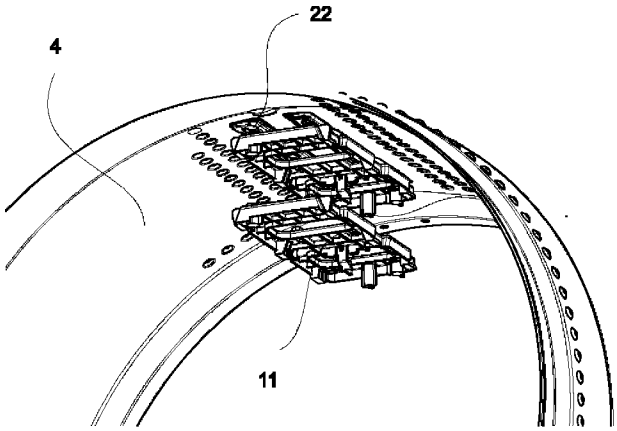


Figure 6

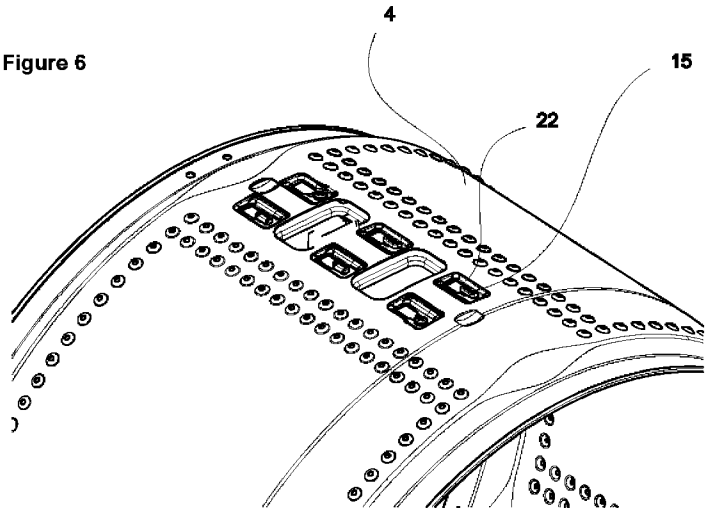
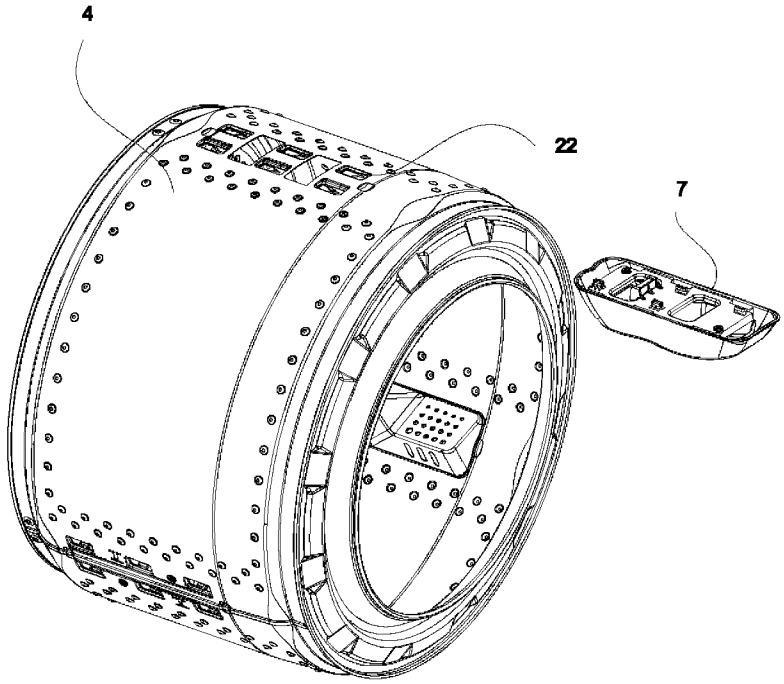


Figure 7



INTERNATIONAL SEARCH REPORT

International application No
PCT/EP2020/054764

A. CLASSIFICATION OF SUBJECT MATTER
INV. D06F37/06 D06F37/30
ADD. D06F23/02 D06F37/14 D06F39/08

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)
D06F

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

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[X] Further documents are listed in the continuation of Box C.

[X] See patent family annex.

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Date of the actual completion of the international search	Date of mailing of the international search report
6 April 2020	17/04/2020

Name and mailing address of the ISA/	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016	Werner, Christopher

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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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INTERNATIONAL SEARCH REPORT

Information on patent family members

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