Our Docket No.: 122354-7795

IN THE INTERNATIONAL BUREAU

OF THE WORLD INTELLECTUAL PROPERTY ORGANIZATION

Applicant:	CareFusion 303, Inc.
International Application No.:	PCT/US2019/059238
International Filing Date:	31 October 2019
Title:	CHECK VALVE WITH INTEGRATED FILTER

RESPONSE TO FORM PCT/IB/345

The International Bureau of WIPO
34, chemin des Colombettes
CH-1211 Geneva 20
Switzerland

ATTENTION: Rochaix Thomas

Dear Sir:

In response to your Form PCT/IB/345 dated March 3, 2020, the applicant submits a corrected Response to International Search Report and Amendment in Accordance with PCT Article 19.

As requested, the Response letter is corrected to indicate the basis of the amendments in the application as filed, as required by Rule 46.5(b)(iii).

Please process the corrected Response letter and accompanying amendments under Article 19 as soon as possible for publication with the subject application.

Respectfully submitted,

MORGAN, LEWIS & BOCKIUS LLP

Date: 14 Apr 2020

M. Todd Hales
Registration No. 60,472

IN THE INTERNATIONAL BUREAU OF WIPO

Applicant:	CareFusion 303, Inc.
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Title:	CHECK VALVE WITH INTEGRATED FILTER

RESPONSE TO INTERNATIONAL SEARCH REPORT AND AMENDMENT IN ACCORDANCE WITH PCT ARTICLE 19

The International Bureau of WIPO
34, chemin des Colombettes
CH-1211 Geneva 20
Switzerland

Dear Commissioner:

In response to the International Search Report dated January 24, 2020, the applicant submits amended claims pursuant to PCT Article 19.

After entry of the amendments submitted herein, Claims 1–20 are in the present application, with Claims 1 and 15 being the independent claims. Claims 1, 9, 13–15, and 19 are amended herein. No new matter is believed to have been added by way of the amendments herein.

Basis for the amendments:

Claims 1 and 15 are each amended at line 1, respectively, to refer to "use in an IV set," as suggested in the Written Opinion of the International Searching Authority and disclosed in, at least, paras. [0002] and [0003] of the present Application.

Claim 9 is amended at line 1 to indicate that the claim depends upon Claim 8.

Claims 13, 14, and 19 are each amended at lines 1 and 2, respectively, to provide antecedent basis for the "inlet" and "outlet;" consistent with the base claim from which each of Claims 12, 14, and 19 depend.

The following listing of claims shows the differences between the claims as originally filed and the amended claims. In particular, new text added to the claim is underlined, while text removed from the claim is indicated by a strikethrough or by being enclosed in double brackets ([[ ]]).

A clean version of the amended claims is attached. The amended claims will replace the previous set of claims for the purpose of the International Publication.

Respectfully submitted,

MORGAN, LEWIS & BOCKIUS LLP

Date: 14 Apr 2020

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AMENDED CLAIMS (Marked Up Version)

1. (Currently Amended) A check valve for use in an IV set, comprising:

an upper housing defining an inlet of the check valve;

a lower housing defining an outlet of the check valve;

a cavity interposed between and defined by the upper and lower housings for fluidly connecting the inlet and the outlet;

a flexible valve member mounted in the cavity to selectively permit fluid flow in a first direction, and prevent fluid backflow in a second direction opposite to the first direction; and

a filter member mounted in the upper housing upstream of the flexible valve member, the filter member having an elongated portion configured to maximize surface area thereof exposed to the fluid flow and restrict passage of undesirable matter in fluid flowing through the check valve.

2. (Original) The check valve of Claim 1, wherein:

the upper housing comprises a cylindrical body having an internal surface; and

the filter member comprises a T- shaped filter including a cylindrical elongated stem portion and a head portion, the cylindrical elongated stem portion being spaced apart from the internal surface.

3. (Original) The check valve of Claim 2, wherein the stem portion is mounted in the upper housing with an interference fit.

4. (Original) The check valve of Claim 2, wherein the stem portion comprises a first diameter and the head portion comprises a second diameter, the second diameter being larger than the first diameter.

5. (Original) The check valve of Claim 1, wherein the filter member comprises a porous material selected from the group consisting of plastic materials, cork materials, woven and nonwoven materials.

6. (Original) The check valve of Claim 1, wherein:

the lower housing comprises a support portion disposed in the cavity at a central portion thereof, a central axis of the support portion being aligned with a central longitudinal axis of the check valve; and

the valve member is configured to be mounted and supported on the support portion.

7. (Original) The check valve of claim 1, wherein:

the upper housing comprises an internal surface and an external surface, the internal surface including an upstream internal surface and a downstream internal surface; and

the downstream internal surface of the upper housing includes a projection extending into the cavity, the projection being circularly disposed about a central axis of the filter member.

8. (Original) The check valve of claim 7, wherein:

a sealing surface is defined at a distal end of the projection; and

in a closed state, the valve member is configured to contact the sealing surface to limit fluid flow past the sealing surface.

9. (Original) The check valve of claim ~~7~~8, wherein:

when an upstream pressure is applied to the valve member, the valve member is configured to deflect away from the sealing surface to fluidly communicate the inlet and the cavity; and

when a downstream pressure is applied to the valve member, the valve member is configured to deflect towards the sealing surface to block the fluid communication

between the inlet and the cavity, and restrict backflow of the fluid from the outlet to the inlet.

10. (Original) The check valve of claim 1, wherein:

the upper housing comprises an internal surface and an external surface, the internal surface including an upstream internal surface and a downstream internal surface; and

the upstream internal surface comprises at least one stop protruding radially inward from the upstream internal surface to restrict axial displacement of the filter member by the valve member in the upstream direction.

11. (Original) The check valve of Claim 1, wherein:

the upper housing comprises an internal surface and an external surface, the internal surface including an upstream internal surface and a downstream internal surface; and

the downstream internal surface includes a plurality of ribs formed thereon, the plurality of ribs disposed in the cavity and protruding radially inward from the downstream internal surface to center the valve member within the cavity.

12. (Original) The check valve of Claim 1, wherein the filter member comprises a hollow central channel extending longitudinally through an axial center thereof.

13. (Original) The check valve of Claim 12, wherein the inlet ~~port~~, the hollow central channel, and the outlet ~~port~~ are aligned along a central longitudinal axis of the check valve.

14. (Original) The check valve of Claim 13, wherein the inlet ~~port~~, the hollow central channel, and the outlet ~~port~~ are fluidly communicated to define a flow channel through which the fluid flows through the check valve.

15. (Currently Amended) A check valve for use in an IV set, comprising:

an upper housing comprising an inlet of the check valve;

a lower housing axially coupled to the upper housing and comprising an outlet of the check valve;

a cavity cooperatively formed by the upper and lower housings for fluidly connecting the inlet and the outlet;

a flow passage extending between the inlet and outlet and fluidly communicated with the cavity;

a flexible valve member mounted in the cavity to selectively permit fluid flow in a first direction, and prevent fluid backflow in a second direction opposite to the first direction; and

an elongate filter member mounted in the flow passage upstream of the flexible valve member to maximize surface area thereof exposed to the fluid flow, and restrict passage of undesirable matter in fluid flowing towards the flexible valve member.

16. (Original) The check valve of claim 15, wherein the filter member is mounted in the upper housing by press-fitting into the flow passage in the upper housing.

17. (Original) The check valve of Claim 15, wherein:

the upper housing comprises a cylindrical body having an internal surface; and

the filter member comprises a T- shaped filter including a cylindrical elongated stem portion and a head portion, the cylindrical elongated stem portion being spaced apart from the internal surface.

18. (Original) The check valve of Claim 17, wherein the filter member comprises a hollow central channel extending longitudinally through at least a portion of the head portion and the stem portion.

19. (Original) The check valve of Claim 18, wherein the inlet ~~port~~, the hollow central channel, and the outlet ~~port~~ are co-axially aligned with each other.

20. (Original) The check valve of claim 15, wherein:

an internal surface of the upper housing in the cavity includes an axially extending projection disposed circularly about the flow passage in the cavity; and

a sealing surface is defined at a distal end of the circular projection, wherein the valve member is configured to contact the sealing surface to limit fluid flow across the sealing surface.

WHAT IS CLAIMED IS:

1. A check valve for use in an IV set, comprising:

an upper housing defining an inlet of the check valve;

a lower housing defining an outlet of the check valve;

a cavity interposed between and defined by the upper and lower housings for fluidly connecting the inlet and the outlet;

a flexible valve member mounted in the cavity to selectively permit fluid flow in a first direction, and prevent fluid backflow in a second direction opposite to the first direction; and

a filter member mounted in the upper housing upstream of the flexible valve member, the filter member having an elongated portion configured to maximize surface area thereof exposed to the fluid flow and restrict passage of undesirable matter in fluid flowing through the check valve.

2. The check valve of Claim 1, wherein:

the upper housing comprises a cylindrical body having an internal surface; and

the filter member comprises a T-shaped filter including a cylindrical elongated stem portion and a head portion, the cylindrical elongated stem portion being spaced apart from the internal surface.

3. The check valve of Claim 2, wherein the stem portion is mounted in the upper housing with an interference fit.

4. The check valve of Claim 2, wherein the stem portion comprises a first diameter and the head portion comprises a second diameter, the second diameter being larger than the first diameter.

5. The check valve of Claim 1, wherein the filter member comprises a porous material selected from the group consisting of plastic materials, cork materials, woven and nonwoven materials.

6. The check valve of Claim 1, wherein:

the lower housing comprises a support portion disposed in the cavity at a central portion thereof, a central axis of the support portion being aligned with a central longitudinal axis of the check valve; and

the valve member is configured to be mounted and supported on the support portion.

7. The check valve of claim 1, wherein:

the upper housing comprises an internal surface and an external surface, the internal surface including an upstream internal surface and a downstream internal surface; and

the downstream internal surface of the upper housing includes a projection extending into the cavity, the projection being circularly disposed about a central axis of the filter member.

8. The check valve of claim 7, wherein:

a sealing surface is defined at a distal end of the projection; and

in a closed state, the valve member is configured to contact the sealing surface to limit fluid flow past the sealing surface.

9. The check valve of claim 8, wherein:

when an upstream pressure is applied to the valve member, the valve member is configured to deflect away from the sealing surface to fluidly communicate the inlet and the cavity; and

when a downstream pressure is applied to the valve member, the valve member is configured to deflect towards the sealing surface to block the fluid communication between the inlet and the cavity, and restrict backflow of the fluid from the outlet to the inlet.

10. The check valve of claim 1, wherein:

the upper housing comprises an internal surface and an external surface, the internal surface including an upstream internal surface and a downstream internal surface; and

the upstream internal surface comprises at least one stop protruding radially inward from the upstream internal surface to restrict axial displacement of the filter member by the valve member in the upstream direction.

11. The check valve of Claim 1, wherein:

the upper housing comprises an internal surface and an external surface, the internal surface including an upstream internal surface and a downstream internal surface; and

the downstream internal surface includes a plurality of ribs formed thereon, the plurality of ribs disposed in the cavity and protruding radially inward from the downstream internal surface to center the valve member within the cavity.

12. The check valve of Claim 1, wherein the filter member comprises a hollow central channel extending longitudinally through an axial center thereof.

13. The check valve of Claim 12, wherein the inlet, the hollow central channel, and the outlet are aligned along a central longitudinal axis of the check valve.

14. The check valve of Claim 13, wherein the inlet, the hollow central channel, and the outlet are fluidly communicated to define a flow channel through which the fluid flows through the check valve.

15. A check valve for use in an IV set, comprising:

an upper housing comprising an inlet of the check valve;

a lower housing axially coupled to the upper housing and comprising an outlet of the check valve;

a cavity cooperatively formed by the upper and lower housings for fluidly connecting the inlet and the outlet;

a flow passage extending between the inlet and outlet and fluidly communicated with the cavity;

a flexible valve member mounted in the cavity to selectively permit fluid flow in a first direction, and prevent fluid backflow in a second direction opposite to the first direction; and

an elongate filter member mounted in the flow passage upstream of the flexible valve member to maximize surface area thereof exposed to the fluid flow, and restrict passage of undesirable matter in fluid flowing towards the flexible valve member.

16. The check valve of claim 15, wherein the filter member is mounted in the upper housing by press-fitting into the flow passage in the upper housing.

17. The check valve of Claim 15, wherein:

the upper housing comprises a cylindrical body having an internal surface; and

the filter member comprises a T- shaped filter including a cylindrical elongated stem portion and a head portion, the cylindrical elongated stem portion being spaced apart from the internal surface.

18. The check valve of Claim 17, wherein the filter member comprises a hollow central channel extending longitudinally through at least a portion of the head portion and the stem portion.

19. The check valve of Claim 18, wherein the inlet, the hollow central channel, and the outlet are co-axially aligned with each other.

20. The check valve of claim 15, wherein:

an internal surface of the upper housing in the cavity includes an axially extending projection disposed circularly about the flow passage in the cavity; and

a sealing surface is defined at a distal end of the circular projection, wherein the valve member is configured to contact the sealing surface to limit fluid flow across the sealing surface.