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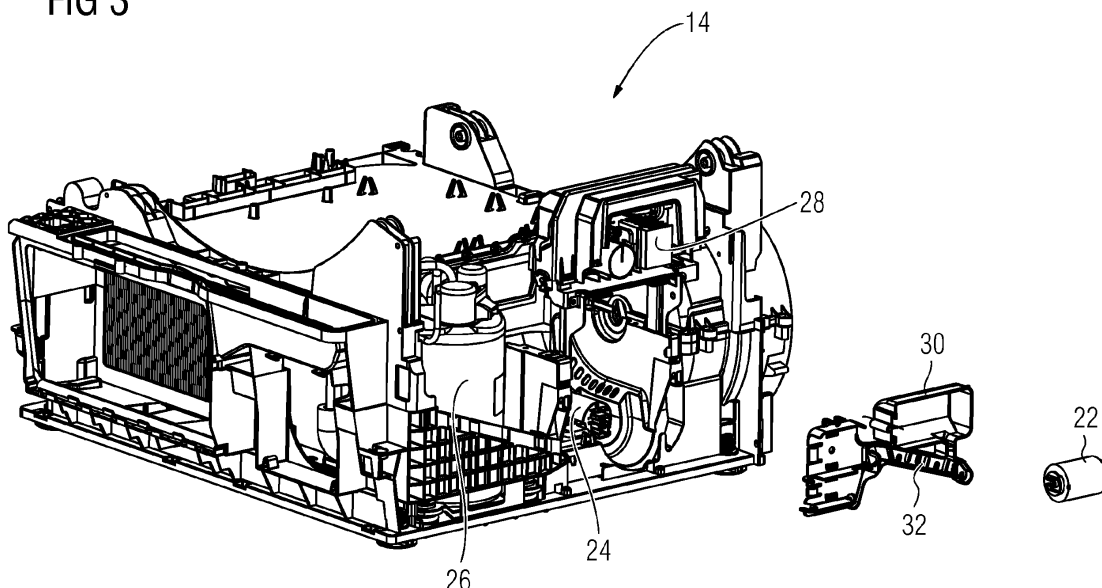
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(54) **A laundry treating machine including a supporting housing**

(57) The present invention relates to a laundry treating machine (10) comprising a casing (12) including a basement portion (14). The basement portion (14) comprises at least one seat (16) for receiving an electric motor (36). An electric and/or electronic control circuit (28) for controlling the electric motor (36) is arranged in a first position inside the casing (12). A supporting housing (30)

is provided for receiving an electrical component (22; 34) of the control circuit (28). The electrical component (22; 34) is electrically connected to the control circuit (28). The electrical component (22; 34) is arranged in a second position and inside the casing (12). The second position is spaced apart from the first position. The second position is arranged close to the electric motor (36).

FIG 3**EP 2 728 063 A1**

Description

[0001] The present invention relates to a laundry treating machine. In particular, the present invention relates to a laundry dryer or a laundry treating machine having a laundry drying function.

[0002] The development of laundry treating machines, in particular laundry dryers, has led to the use electric motors controlled by inverter circuits in order to obtain a better performance in term of reduction of energy consumption. Said inverter circuits allow that the rotational speed of the controlled electric motors may be changed and adapted to the laundry treatment requirements. In particular, the electric motor is provided to rotate a laundry drum at different rotation speed. Further, the electric motor may be provided to drive a compressor of a heat pump system installed inside the laundry treatment machine, wherein the rotational speed of the compressor is variable.

[0003] The inverter circuit for controlling the electric motor is arranged inside the laundry treatment machine and generates electromagnetic emissions. Said electromagnetic emissions may disturb other control circuit and wirings of the laundry treatment machine.

[0004] In order to limit the electromagnetic emissions the use of an anti-interference filter is known. The anti-interference filter has to be arranged very close to the source of the electromagnetic emissions, i.e. the inverter circuit, in order to work efficiently. However, it is not possible to provide the anti-interference filter as an integrated part of the inverter circuit, since the size of said anti-interference filter is too wide. Thus, the inverter circuit with the integrated anti-interference filter would cause space problems inside the laundry treating machine.

[0005] EP 1 666 660 A1 discloses a laundry drying machine with a laundry drum. The laundry drum is driven by an asynchronous motor able to drive said laundry in both rotation senses. The asynchronous motor includes a main coil and an auxiliary coil permanently interconnected via a capacitor and switchably interconnected via a further capacitor. Said capacitors are provided for regulating the torque supplied by the asynchronous motor. However, the capacitors have often a wide size. Thus, the capacitors cannot be integrated on a circuit board with a usual size. Otherwise, an appropriate circuit board would require a very large space inside the laundry treating machine.

[0006] When the anti-interference filter is installed separately from the inverter circuit or the capacitors are installed separately from the torque control circuit, an appropriate placement of the anti-interference filter or capacitors, respectively, may be problematic in the laundry treating machine. The most appropriate location of the anti-interference filter in order to ensure an efficient decoupling of disturbance may not coincide with a sufficiently free place inside the laundry treating machine. In a similar way, an appropriate location of the capacitors may not coincide with a sufficiently free place inside the laundry

treating machine. Further, the location chosen for the anti-interference filter or capacitors has to ensure safe operation and safe conditions in case of an incident, for example a fire of the anti-interference filter or capacitors, respectively. Moreover, a location of the capacitors is preferred, which allows short wires between the torque control circuit and the capacitors.

[0007] It is an object of the present invention to provide a laundry treating machine, which overcomes the problem of the position of the anti-interference filter or capacitors, respectively, inside said laundry treating machine.

[0008] The object of the present invention is achieved by the laundry treating machine according to claim 1.

[0009] According to the present invention the laundry treating machine comprises a casing including a basement portion, wherein:

- the basement portion comprises at least one seat for receiving an electric motor,
- an electric and/or electronic control circuit for controlling the electric motor is arranged in a first position inside the casing,
- a supporting housing is provided for receiving an electrical component of the control circuit,
- the electrical component is electrically connected to the control circuit,
- the electrical component is arranged in a second position and inside the casing,
- the second position is spaced apart from the first position, and
- the second position is arranged close to the electric motor.

[0010] The main idea of the present invention is the supporting housing for receiving the electrical component of the control circuit on the one hand and the relative positions of the components to each other on the other hand. The supporting housing allows an appropriate position of the electrical component inside the laundry treating machine.

[0011] Preferably, the supporting housing comprises a wiring support. This contributes to a reduced complexity.

[0012] Further, the supporting housing may comprise at least one fire resistant material. Thus, the supporting housing creates a shield against fire.

[0013] Moreover, the supporting housing may comprise a box-like shape with an open side. The open side allows a fast assembling of the electrical component in supporting housing.

[0014] In particular, the open side of the supporting housing is directed at a side wall of the casing.

[0015] According to a preferred embodiment, the supporting housing is removably fastened at the basement portion.

[0016] For example, the laundry treating machine is a laundry dryer or comprises a laundry drying function.

[0017] In particular, the laundry treating machine com-

prises at least one electric motor with a variable rotation speed for driving a laundry drum and/or at least one air stream fan.

[0018] According to one embodiment of the present invention, the electrical component is an anti-interference filter.

[0019] Further, the control circuit may comprise an inverter circuit for controlling the speed of the electric motor.

[0020] Preferably, the anti-interference filter is arranged inside the supporting housing.

[0021] For example, the inverter circuit is arranged above the electric motor.

[0022] According to another embodiment of the present invention, the electrical component is a capacitor.

[0023] In this case, the control circuit may comprise at least one further capacitor placed in a seat formed in the basement portion.

[0024] At last, the control circuit may be provided for controlling the torque of the electric motor.

[0025] The novel and inventive features believed to be the characteristic of the present invention are set forth in the appended claims.

[0026] The invention will be described in further detail with reference to the drawings, in which

FIG 1 illustrates a perspective view of a basement portion of a laundry treatment machine according to a first embodiment of the present invention,

FIG 2 illustrates a perspective view of the laundry treatment machine with an opened side part according to a second embodiment of the present invention,

FIG 3 illustrates a partially exploded perspective view of the basement portion of the laundry treatment machine according to the first embodiment of the present invention,

FIG 4 illustrates a side view of the laundry treatment machine with the opened side part according to the second embodiment of the present invention,

FIG 5 illustrates a perspective view of the basement portion of the laundry treatment machine according to the second embodiment of the present invention,

FIG 6 illustrates a partially exploded perspective view of the basement portion of the laundry treatment machine according to the second embodiment of the present invention,

FIG 7 illustrates a perspective view of a supporting

housing including an electric component and a wiring support for the laundry treatment machine according to the first and second embodiment of the present invention,

FIG 8 illustrates an exploded perspective view of the supporting housing, the wiring support and the electric component for the laundry treatment machine according to the first and second embodiment of the present invention, and

FIG 9 illustrates a perspective view of the laundry treatment machine according to the first and second embodiment of the present invention.

[0027] FIG 1 illustrates a perspective view of a basement portion 14 of a laundry treatment machine 10 according to a first embodiment of the present invention. In this example, the laundry treatment machine 10 is a laundry dryer including a heat pump system. The basement portion 14 is the lower part of a casing 12 of the laundry treatment machine 10. The basement portion 14 is arranged below a laundry drum 18 of the laundry treatment machine 10.

[0028] The basement portion 14 includes a first capacitor 22, a second capacitor 24, a heat pump compressor 26 and a control circuit 28. The first capacitor 22 and the second capacitor 24 are components of and electrically connected to the control circuit 28. The heat pump compressor 26 is a part of the heat pump system. Further, the basement portion 14 includes a supporting housing 30 and a wiring support 32. In this example, the supporting housing 30 and the wiring support 32 form a single-piece part. The supporting housing 30 is formed like a box with one open side. The open side of the supporting housing 30 is directed at a side wall of the casing 12.

[0029] The first capacitor 22 is arranged in the supporting housing 30. The second capacitor 24 is arranged in a seat formed in the basement portion 14. The control circuit 28 is provided for controlling the torque of an electric motor. Said electric motor may drive the laundry drum 16 and/or an air stream fan. Alternatively, the electric motor may drive the heat pump compressor 26.

[0030] The control circuit 28 with the first capacitor 22 and the second capacitor 24 may control the torque of the electric motor.

[0031] FIG 2 illustrates a perspective view of the laundry treatment machine 10 with an opened side part according to a second embodiment of the present invention. In this example, the laundry treatment machine 10 is also a laundry dryer including the heat pump system. FIG 2 clarifies the position of the basement portion 14 within the laundry treatment machine 10. The basement portion 14 is arranged below the laundry drum 18.

[0032] The basement portion 14 includes the heat pump compressor 26, an inverter circuit 28, the supporting housing 30 and the wiring support 32. Also in this example, the supporting housing 30 and the wiring sup-

port 32 form a single-piece part. Instead of the first capacitor 22 and the second capacitor 24, the laundry treatment machine 10 of second embodiment includes an anti-interference filter 34. The anti-interference filter 34 reduces the electromagnetic emissions generated by the inverter circuit 28.

[0033] The anti-interference filter 34 is arranged in the supporting housing 30. The inverter circuit 28 is provided for controlling the speed of the electric motor. The electric motor may drive the heat pump compressor 26. Further, the electric motor may drive the laundry drum 16 and/or the air stream fan. The inverter circuit 28 may control the rotation speed of the electric motor.

[0034] FIG 3 illustrates a partially exploded perspective view of the basement portion 14 of the laundry treatment machine 10 according to the first embodiment of the present invention. In FIG 3 the first capacitor 22, the supporting housing 30 and the wiring support 32 are shown in an unmounted state from the basement portion 14, while the second capacitor 24 is shown in a mounted state, i.e. the second capacitor 24 is arranged in a seat formed in the basement portion 14.

[0035] In particular, FIG 3 clarifies the structure of the supporting housing 30 and the wiring support 32 forming the single-piece part.

[0036] FIG 4 illustrates a side view of the laundry treatment machine 10 with the opened side part according to the second embodiment of the present invention. FIG 4 clarifies the position of the supporting housing 30 with the anti-interference filter 34, which are arranged below the inverter circuit 28.

[0037] The basement portion 14 includes the heat pump compressor 26, the inverter circuit 28, the supporting housing 30 and the wiring support 32. The supporting housing 30 and the wiring support 32 form the single-piece part. The anti-interference filter 34 is arranged inside the supporting housing 30.

[0038] An electric motor 36 is arranged below the inverter circuit 28. The electric motor 36 is provided for driving the laundry drum 18. Additionally, the electric motor 36 may be provided for driving the air stream fan.

[0039] FIG 5 illustrates a perspective view of the basement portion 14 of the laundry treatment machine 10 according to the second embodiment of the present invention. FIG 5 clarifies the position of the supporting housing 30 including the anti-interference filter 34 below the inverter circuit 28.

[0040] FIG 6 illustrates a partially exploded perspective view of the basement portion 14 of the laundry treatment machine 10 according to the second embodiment of the present invention. In FIG 6, the anti-interference filter 34, the supporting housing 30 and the wiring support 32 are shown in an unmounted state from the basement portion 14. The supporting housing 30 and the wiring support 32 of the second embodiment have the same structure as the supporting housing 30 and the wiring support 32 of the second embodiment.

[0041] FIG 7 illustrates a perspective view of the sup-

porting housing 30 including an electric component 22 or 34 for the laundry treatment machine 10 according to the first and second embodiment of the present invention.

[0042] In the case of the first embodiment, the electric component is the first capacitor 22 of the control circuit 28. In the case of the second embodiment, the electric component is the anti-interference filter 34 of the inverter circuit 28. FIG 7 clarifies that the size of the supporting housing 30 is marginally bigger than the size of the first capacitor 22 or the anti-interference filter 34, respectively. Further, the supporting housing 30 with the wiring support 32 and the first capacitor 22 or the anti-interference filter 34, respectively, requires less space, so that these components can be easily integrated inside the casing 12 of the laundry treatment machine 10.

[0043] FIG 8 illustrates an exploded perspective view of the supporting housing 30, the wiring support 32 and the electric component 22 or 34 for the laundry treatment machine 10 according to the first and second embodiment of the present invention. The first capacitor 22 or the anti-interference filter 34, respectively, is fastened or fixable by only one screw in the supporting housing 30.

[0044] FIG 9 illustrates a perspective view of the laundry treatment machine 10 according to the first and second embodiment of the present invention.

[0045] The laundry treatment machine 10 includes a front door 38 in the centre of its front wall. The laundry drum 18 is arranged behind said front door 38. The basement portion 14 is arranged below the laundry drum 18. FIG 9 clarifies that the supporting housing 30 allows the integration of the first capacitor 22 or the anti-interference filter 34, respectively, inside the casing 12 of the laundry treatment machine 10, when the laundry treatment machine 10 has a conventional size.

[0046] Although illustrative embodiments of the present invention have been described herein with reference to the accompanying drawings, it is to be understood that the present invention is not limited to those precise embodiments, and that various other changes and modifications may be affected therein by one skilled in the art without departing from the scope of the invention as claimed. All such changes and modifications are intended to be included within the scope of the invention as defined by the appended claims.

List of reference numerals

[0047]

10	laundry treating machine
12	casing
14	basement portion
18	laundry drum
20	supporting housing
22	first capacitor
24	second capacitor
26	heat pump compressor
28	control circuit, inverter circuit

- 30 supporting housing
- 32 wiring support
- 34 anti-interference filter
- 36 electric motor
- 38 front door

Claims

1. A laundry treating machine (10) comprising a casing (12) including a basement portion (14), wherein:

- the basement portion (14) comprises at least one seat (16) for receiving an electric motor (36),
- an electric and/or electronic control circuit (28) for controlling the electric motor (36) is arranged in a first position inside the casing (12),
- a supporting housing (30) is provided for receiving an electrical component (22; 34) of the control circuit (28),
- the electrical component (22; 34) is electrically connected to the control circuit (28),
- the electrical component (22; 34) is arranged in a second position and inside the casing (12),
- the second position is spaced apart from the first position, and
- the second position is arranged close to the electric motor (36).

2. The laundry treating machine according to claim 1, **characterized in that** the supporting housing (30) comprises a wiring support (32).

3. The laundry treating machine according to claim 1 or 2, **characterized in that** the supporting housing (30) comprises at least one fire resistant material.

4. The laundry treating machine according to any one of the preceding claims, **characterized in that** the supporting housing (30) comprises a box-like shape with an open side.

5. The laundry treating machine according to claim 4, **characterized in that** the open side of the supporting housing (30) is directed at a side wall of the casing (12).

6. The laundry treating machine according to any one of the preceding claims, **characterized in that** the supporting housing (30) is removably fastened at the basement portion (14).

7. The laundry treating machine according to any one of the preceding claims,

characterized in that

the laundry treating machine (10) is a laundry dryer or comprises a laundry drying function.

8. The laundry treating machine according to any one of the preceding claims,

characterized in that

the laundry treating machine (10) comprises at least one electric motor (36) with a variable rotation speed for driving a laundry drum (18) and/or at least one air stream fan.

9. The laundry treating machine according to any one of the preceding claims,

characterized in that

the electrical component is an anti-interference filter (34).

10. The laundry treating machine according to claim 9, **characterized in that**

the control circuit (28) comprises an inverter circuit for controlling the speed of the electric motor (36).

11. The laundry treating machine according to claim 9 or 10,

characterized in that

the anti-interference filter (34) is arranged inside the supporting housing (30).

12. The laundry treating machine according to any one of the claims 9 to 11,

characterized in that

the inverter circuit (28) is arranged above the electric motor (36).

13. The laundry treating machine according to any one of the claims 1 to 8,

characterized in that

the electrical component is a capacitor (22).

14. The laundry treating machine according to claim 13, **characterized in that**

the control circuit (28) comprises at least one further capacitor (24) placed in a seat formed in the basement portion (14).

15. The laundry treating machine according to claim 13 or 14,

characterized in that

the control circuit (28) is provided for controlling the torque of the electric motor (36).

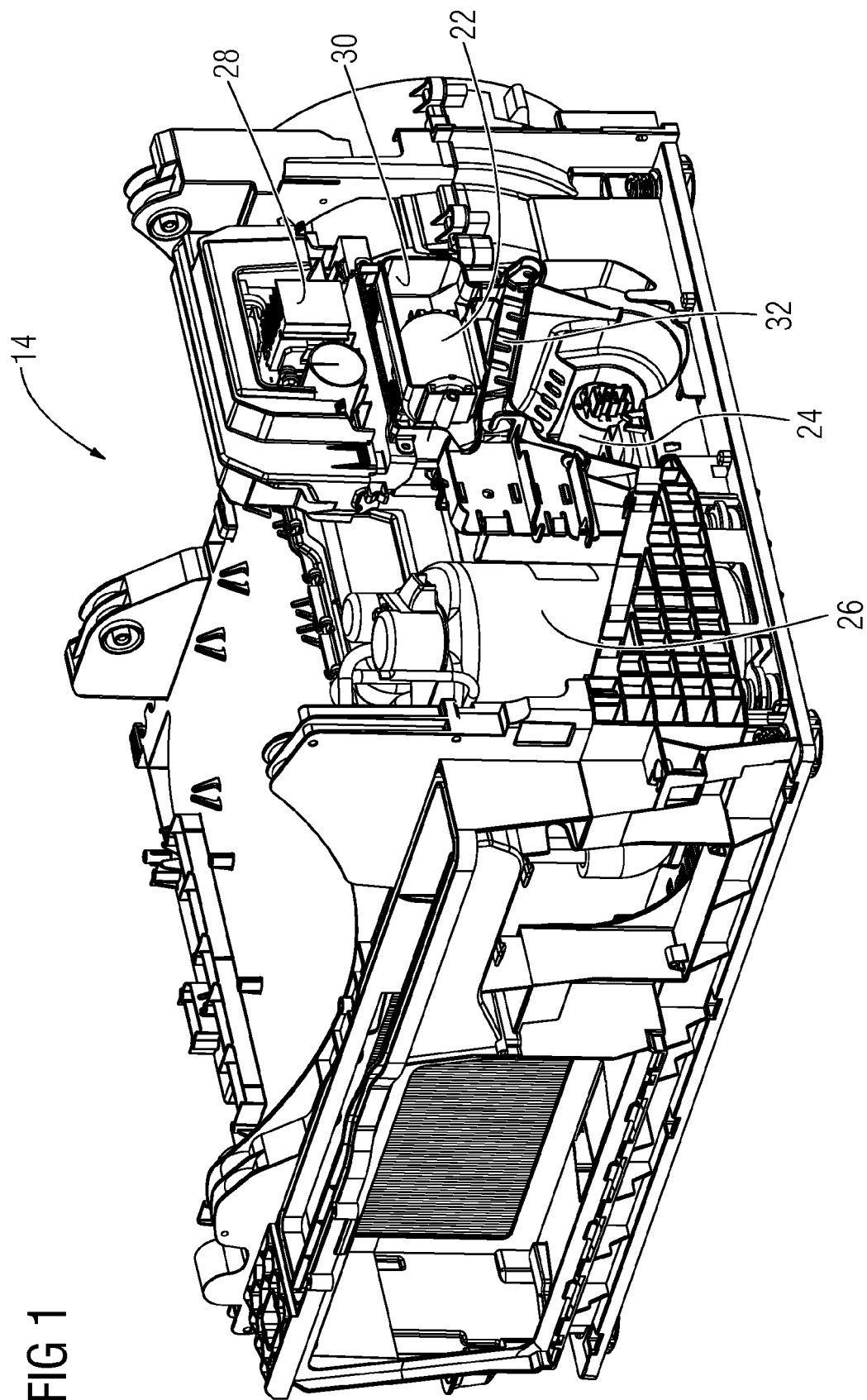


FIG 2

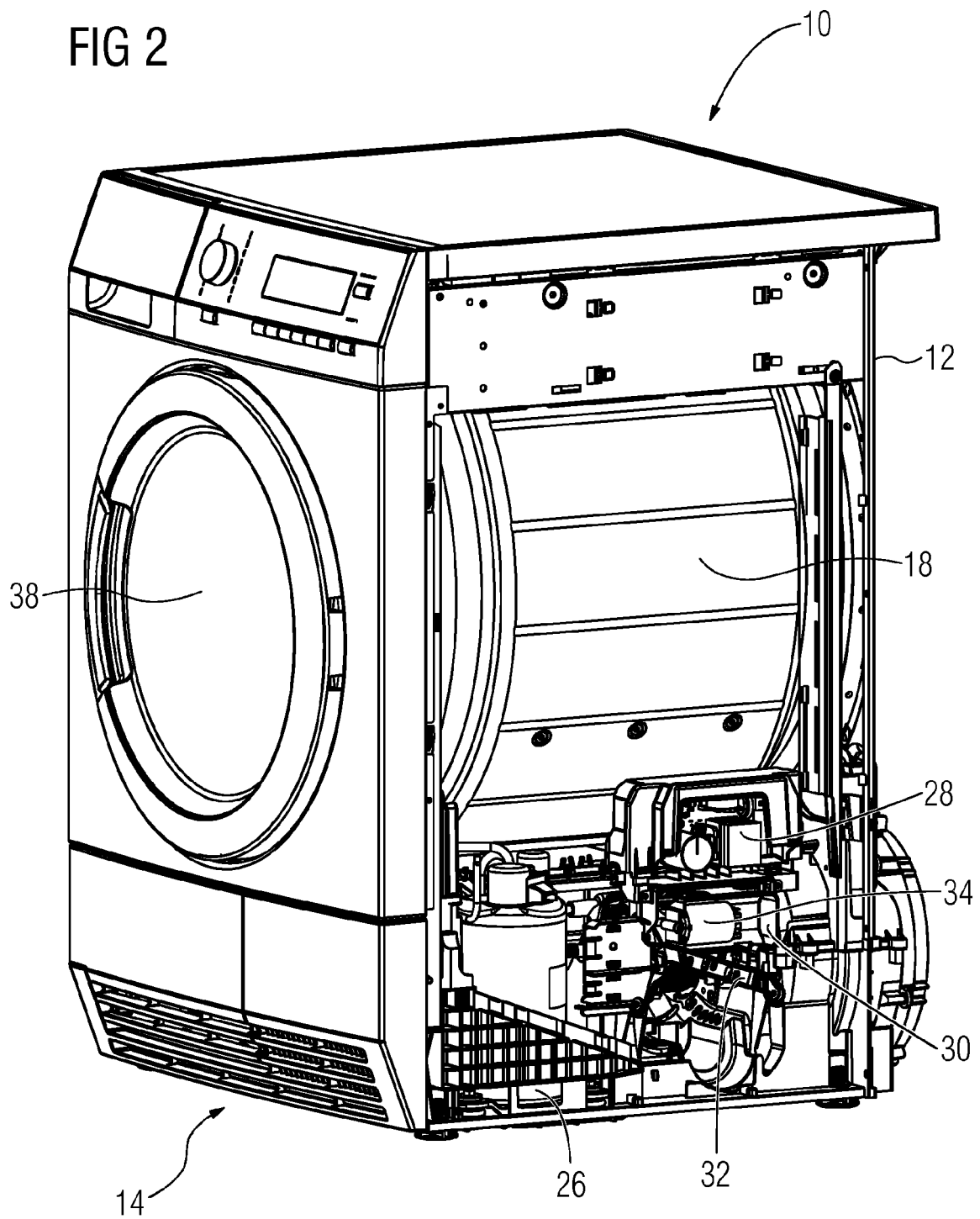


FIG 3

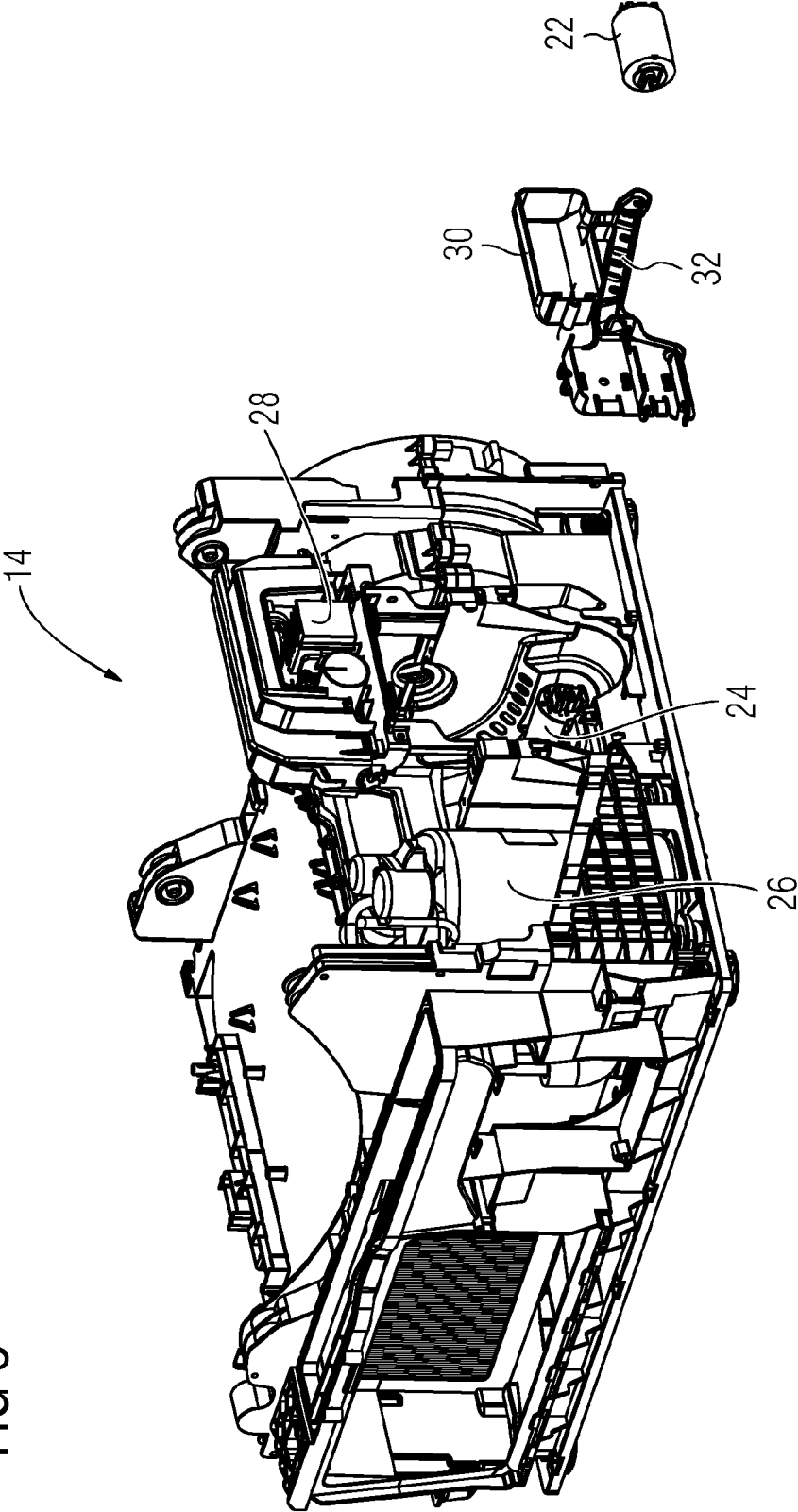
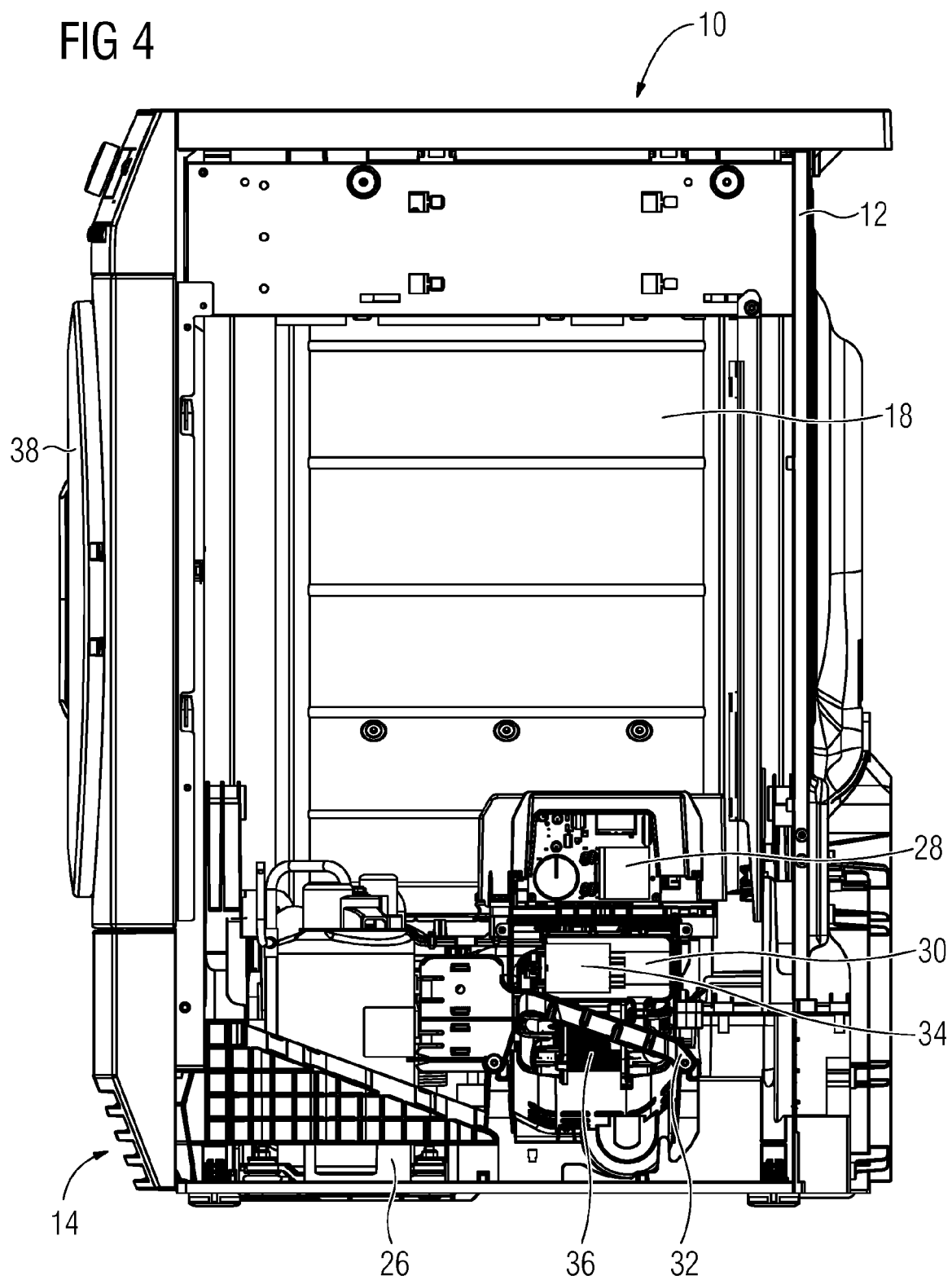


FIG 4



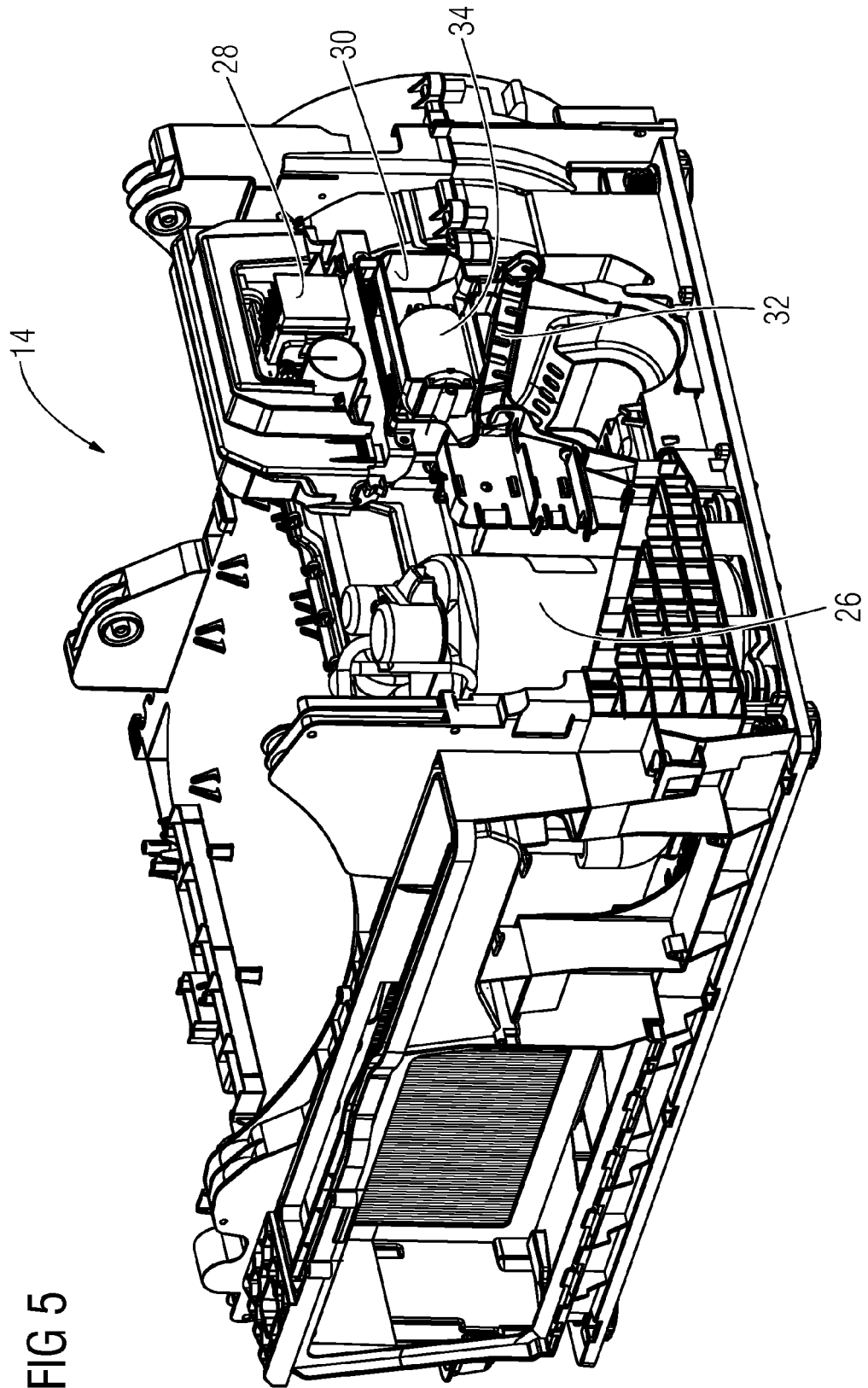


FIG 5

FIG 6

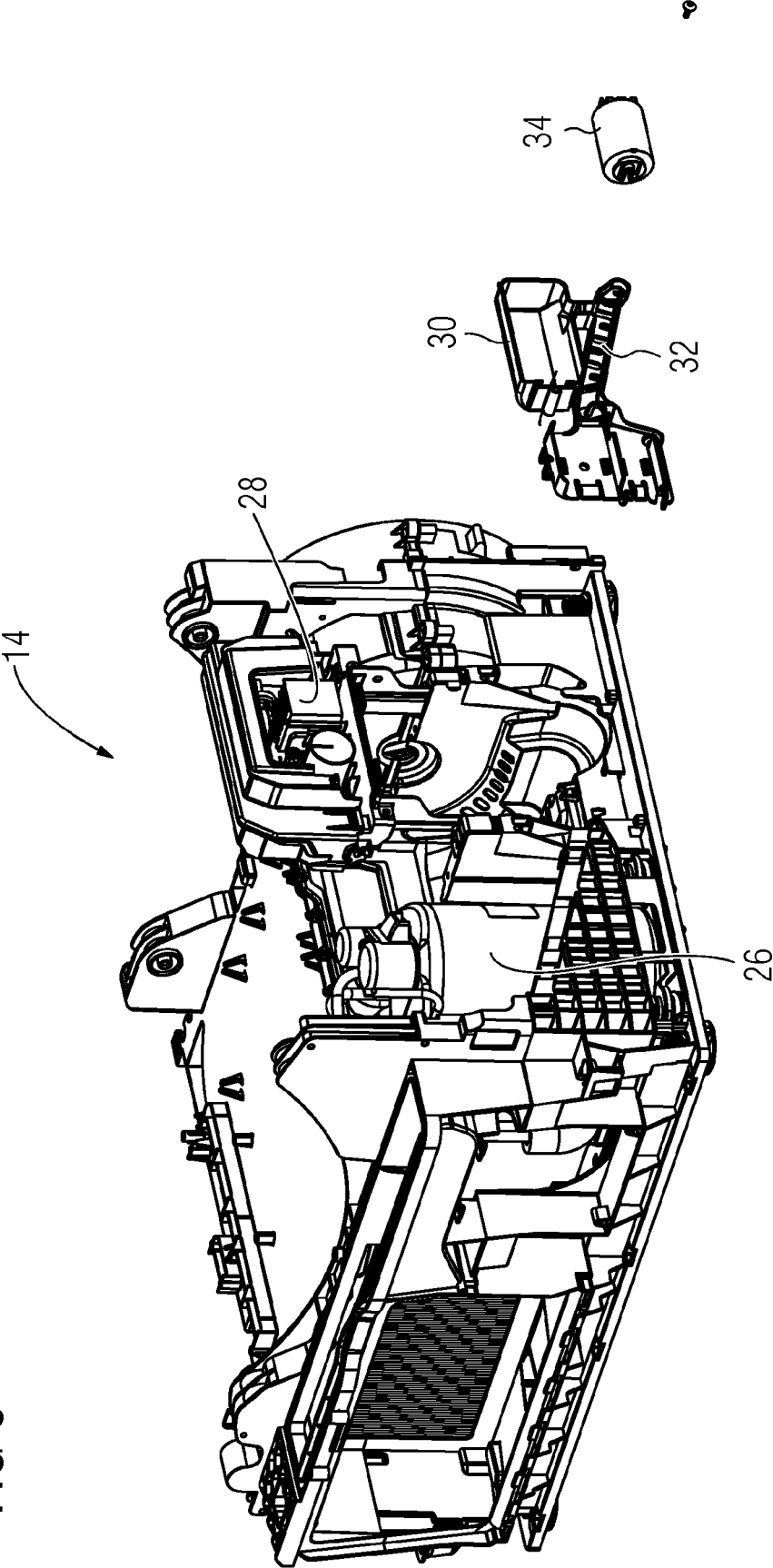


FIG 7

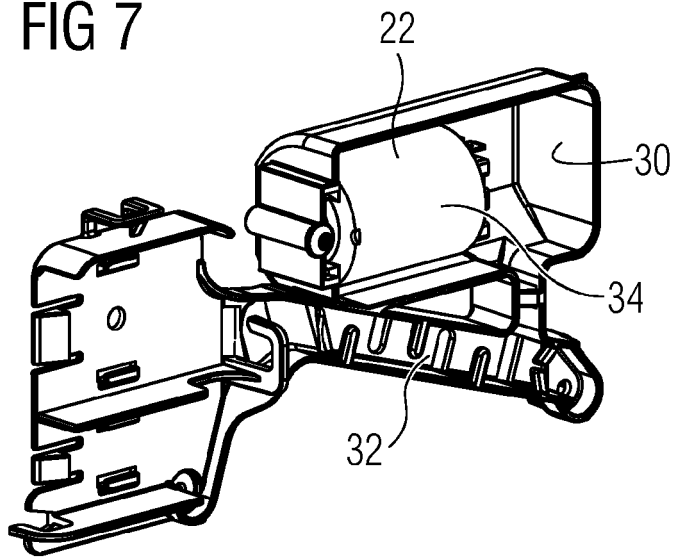


FIG 8

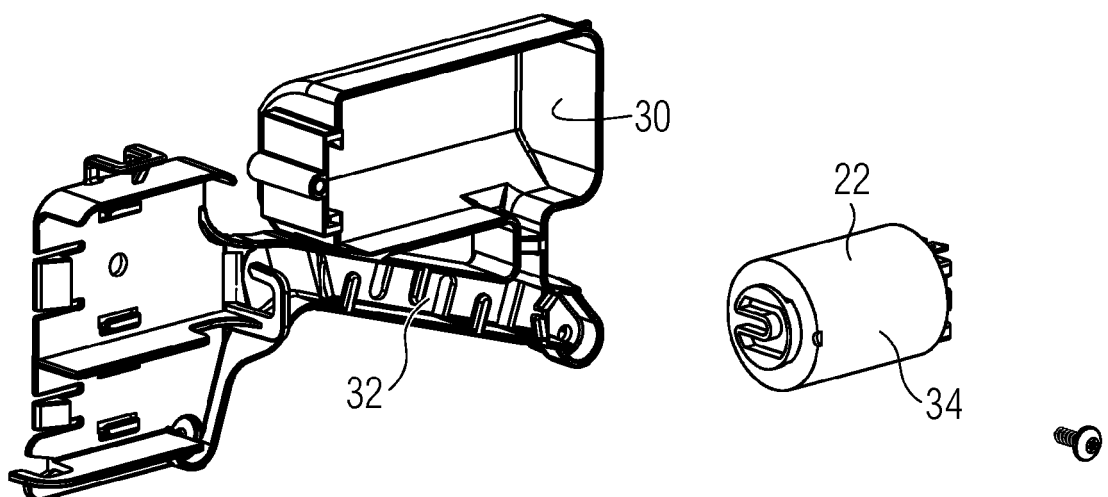
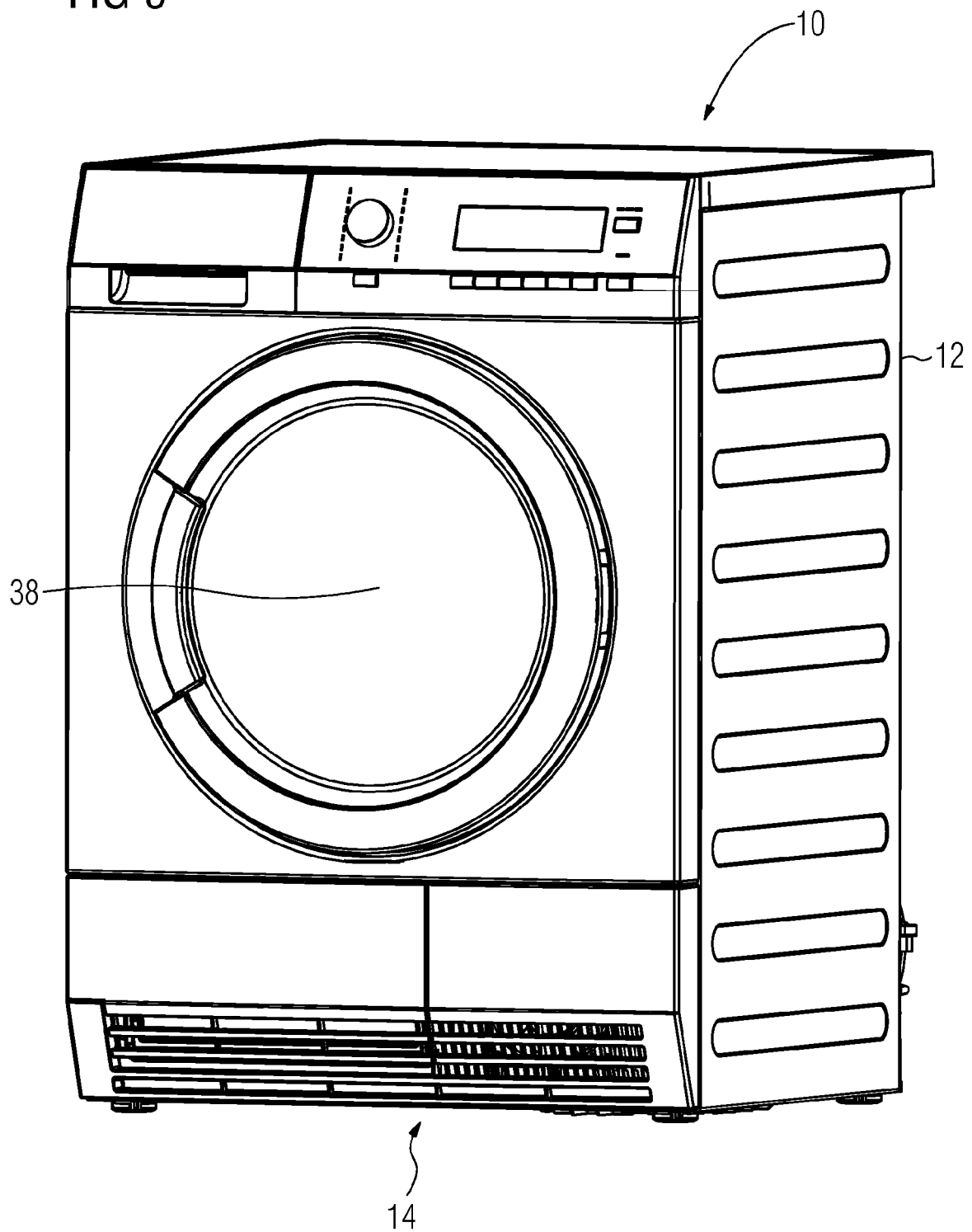


FIG 9





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Application Number
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Place of search Munich		Date of completion of the search 5 April 2013	Examiner Weinberg, Ekkehard
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