

(19) **DANMARK**

(10) **DK/EP 3453796 T3**



Patent- og
Varemærkestyrelsen

(12) **Oversættelse af
europæisk patentskrift**

-
- (51) Int.Cl.: **D 06 F 58/12 (2006.01)** **D 06 F 31/00 (2006.01)** *D 06 F 58/38 (2020.01)*
D 06 F 103/00 (2020.01) *D 06 F 103/08 (2020.01)* *D 06 F 103/12 (2020.01)*
D 06 F 103/32 (2020.01) *D 06 F 103/34 (2020.01)* *D 06 F 105/24 (2020.01)*
- (45) Oversættelsen bekendtgjort den: **2022-03-14**
- (80) Dato for Den Europæiske Patentmyndigheds bekendtgørelse om meddelelse af patentet: **2021-12-29**
- (86) Europæisk ansøgning nr.: **18197131.8**
- (86) Europæisk indleveringsdag: **2016-05-11**
- (87) Den europæiske ansøgnings publiceringsdag: **2019-03-13**
- (30) Prioritet: **2015-05-21 DE 102015209370**
- (62) Stamansøgningsnr: **16736372.0**
- (84) Designerede stater: **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**
- (73) Patenthaver: **Lavatec Laundry Technology GmbH, Wannenaeckerstrasse 53, 74078 Heilbronn, Tyskland**
- (72) Opfinder: **GRAESER, Wolf-Peter, Sonnenbergweg 14, 74223 Flein, Tyskland**
KRAUSE, Jochen, Coburger Straße 19, 96472 Rödental, Tyskland
- (74) Fuldmægtig i Danmark: **Patrade A/S, Ceresbyen 75, 8000 Århus C, Danmark**
- (54) Benævnelse: **Modulær lufttørrer**
- (56) Fremdragne publikationer:
EP-A1- 1 449 953
EP-A2- 2 103 731
DE-A1-102008 013 012
DE-U1-202009 017 286

Description

[0001] The present invention relates to a dryer for drying material that is to be dried, comprising a receiving space for the material to be dried, an air guide for guiding
5 air to the receiving space and a heating device for heating the air.

[0002] Dryers of the type mentioned in the introduction are known from practice and exist in various embodiments. A dryer of this type is known from document DE
10 2011 087 874 A1, for example. A receiving space for the material to be dried,
10 to which heated air is supplied via an air guide, is produced in the known dryer. A heating device for heating the air is provided.

[0003] Document DE 10 2008 013012 A1 discloses a dryer for drying material that is to be dried, comprising a receiving space for the material to be dried, an air guide
15 for guiding air to the receiving space and a heating device for heating the air, wherein the receiving space has a plurality of modules that are arranged successively for heating, drying or cooling the material to be dried and that a transport device for further transporting the material to be dried from this module or from one module to the next module is associated with at least one module.

20
[0004] Dryers of this type are used, for example, in industrial drying processes, such as in laundry facilities. Usually, the exhaust air from the dryer can reach temperatures as high as 120° C and higher. A large amount of energy must therefore be expended to operate the dryer, a significant portion of which is released back
25 into the environment in the form of thermal energy. Accordingly, the use of heat exchangers is known, by means of which heat from the exhaust air is employed to heat the stream of supply air. In this way, it is possible to save and reuse a significant portion of the energy.

30 **[0005]** However, due to constantly increasing energy costs, and from an economical viewpoint, it remains desirable to achieve further energy optimizations and cost savings during the operation of a dryer.

[0006] Therefore, the present invention addresses the problem of configuring and developing a dryer of the type mentioned in the introduction in such a way that the efficient use of the energy required for drying in particular is made possible in a simple way.

5

[0007] According to the invention, the above problem is solved by a dryer having the features of Claim 1. Accordingly, the dryer is configured and developed such that the receiving space comprises a plurality of modules for heating, drying or cooling the material to be dried, which are arranged in succession, and such that a transport device is associated with at least one module for further transporting the material to be dried from this module or from any module to the next module.

10

[0008] It has been recognized in an inventive way that a skilful configuration of the receiving space for the material to be dried solved the aforementioned problem in a surprisingly simple way. In a further inventive manner, the receiving space comprises a plurality of modules for this purpose, which are arranged one behind the other and are appropriately configured for heating, drying or cooling the material to be dried. The receiving space can have two or more modules, arranged one behind the other. This offers the possibility of carrying out individual process steps in an especially efficient manner, wherein the supplied heat and/or air as well as a moisture content of the material to be dried can be controlled or regulated individually for each module so as to achieve both the desired drying effect and the most efficient and economic use of energy. For example, a design that comprises one module for heating, one or more modules for drying, one module for monitoring the moisture content of the material to be dried and one module for cooling the material to be dried is especially efficient. Moreover, the dryer according to the invention comprises at least one transport device that is associated with a module for further transporting the material to be dried from said module or any module to the next module. A transport device such as this allows for the secure transport or secure transfer of the material to be dried during the drying process carried out by these modules.

15

20

25

30

[0009] Therefore, the dryer according to the invention provides a dryer that permits

a simple way for an especially efficient use of the energy required for the drying process.

[0010] Generally, the individual modules can be operated in different ways. For
5 example, a module can preferably work completely in air circulation mode. In so
doing, the required heat can be transferred to the material to be dried by means of
heat exchangers, and heat losses can be reduced by means of exhaust air. Other
modules are designed in such a way that supply air is blown into a receiving region
10 for the material to be dried in the module, and exhaust air is discharged from the
receiving region. This type of exhaust air from a module usually has a thermal
content that can be utilized elsewhere in the drying process. It is therefore possible,
in an advantageous exemplary embodiment, for exhaust air from one module or a
plurality of modules to provide at least a portion of the supply air for a module or
15 a plurality of modules arranged upstream, preferably directly upstream, of this
module. By utilizing at least a portion of the exhaust air as the supply air for an
upstream module or multiple upstream modules, the heat contained in the exhaust
air can be used in an upstream module or multiple upstream modules. This involves
a direct supply of the exhaust air from a module to a receiving region for the
20 material to be dried of a different module or multiple other modules. As an
alternative or in addition to the use of exhaust air as the supply air in this way, the
exhaust air can also be utilized as the combustion air of the heating device, provided
the heating device is operated by a combustion process. Apart from this type of
operating mode of the heating device, heating of the air can also be carried out by
25 means of steam or electrical energy, without a combustion process. In this case, the
exhaust air from a module is not used for the heating device.

[0011] As an alternative or in addition to the use of the exhaust air from a module
or multiple modules as described above, the heat from the exhaust air of a module
or multiple modules can be utilized in a further advantageous way to provide at
30 least a portion of the supply air and/or circulating air of a module or multiple
modules arranged upstream, preferably directly upstream, of this module. A
transfer process such as this can be carried out by means of one or more heat
exchangers, preferably air-to-air heat exchangers. By virtue of the transfer medium

that is employed – the heat exchanger – using exhaust heat from exhaust air in this way is different from a direct transfer of heat, which usually occurs, for example, when the exhaust air from a module provides at least a portion of the supply air for a different module or multiple different modules. For example, a heat exchanger
5 can be integrated into a module or directly associated with a module in order to permit an air circulation mode of the module, for example. Alternatively or additionally, one or more heat exchangers can also be provided, which are arranged in an air guide or integrated into an air guide in order to preheat the supply air for a module, if necessary, by means of the exhaust air of a module, for example.

10

[0012] A module for monitoring the moisture content of the material to be dried can be arranged upstream of a module for cooling the material to be dried in order to ensure especially high-quality drying results and an efficient use of the required energy. A monitoring module such as this can form the end of an arrangement of
15 modules for heating and drying in order to monitor the moisture content prior to cooling the material to be dried and, if necessary, to carry out additional subsequent drying in the monitoring module.

[0013] With respect to an especially efficient use of the required energy, the supply
20 air of a module for monitoring the moisture content of the material to be dried can be at least partially air that is heated by means of a heat exchanger, preferably an air-to-air heat exchanger, which draws thermal energy from the exhaust air of a module for heating the material to be dried and/or from the exhaust air of another module or of the module for monitoring the moisture content of the material to be
25 dried itself. In this case, efficient energy use can be achieved by supplying preheated supply air. It is especially advantageous if the supply air for this monitoring module is provided only by air that is preheated in the manner described above.

[0014] A module for cooling the material to be dried, which is commonly provided
30 at the end of the arrangement of various modules, can extract supply air in an advantageous manner from the room in which said module or modules are installed or from ambient air. Such ambient air could be supplied to the cooling module from

outside a building, for example. The cooling effect in this instance is produced by the air in the installation room or by ambient air, which are usually cooler than the air in the modules.

5 [0015] With respect to an efficient use of the thermal energy present in the exhaust air, an exhaust air duct can comprise one or more distribution and/or switching elements, preferably distribution and/or switching flaps. By means of this type of distribution and/or switching elements, it is possible to conduct exhaust air
10 precisely and flexibly to the modules in which the supply of heat is required and/or energy efficient. Distribution and/or switching elements of this kind can be centrally controlled by an appropriate control system. In this way, the individual control of the distribution and/or switching elements can be carried out in an individual and time-dependent manner in consideration of the operation of the dryer as a whole and the overall arrangement of the modules.

15

[0016] If a heating device is provided that is operated by a combustion process, a combustion air duct can have a pressure compensation valve, by which the air pressure or air pressure conditions in the combustion air duct can be influenced and controlled. For example, if too much exhaust air from a cooling module for a
20 desired combustion process is present, for example, then any excessive available or supplied exhaust air can escape through the pressure compensation valve. This excessive exhaust air can be conducted into an air supply duct of a heat exchanger for preheating the supply air for one of the modules, for example. If no exhaust air from a module is available, air for the heating device or heating burner can be
25 drawn via the pressure compensation valve.

[0017] In an especially advantageous embodiment, a transport device can be arranged between each two modules. The transport device can preferably comprise a conveyor belt or a chute or sliding channel. In the case of a chute or sliding
30 channel, it is expedient to create a suitable height offset between the modules so that the material to be dried is transported from one module to the next module by the force of gravity. If necessary, compressed air assistance can be provided, which ensures the secure transport of the material to be dried. As an alternative to the

aforementioned embodiments, the transport device can be configured as internal mechanics of a module or can be integrated into a module. A transport device or mechanics of this type can move the transported material between modules by means of suitable gripping and/or guiding elements. The required amount of material to be dried and transported can be taken into consideration during the selection of a suitable transport device.

[0018] According to the invention and with respect to securely supplying material to be dried to the receiving space, a supply device for the material to be dried is arranged upstream of the receiving space and preferably comprises a weighing device for the material to be dried. It is ensured in this way that the dryer, in particular the receiving space, is loaded with an appropriate amount of material to be dried. This makes it possible to prevent the dryer from being overloaded.

[0019] Each module can be configured in a specific way, depending upon the task – heating, drying, monitoring or cooling. Advantageous components of the modules can include an infrared temperature measuring device and/or a device for detecting a different measuring parameter for determining the moisture content of the material to be dried. A receiving region of a module can be formed by a drum that is rotatably mounted in a suitable manner and powered by a motor. Furthermore, a module can have a fan, which conducts air through the material to be dried. The heating device for heating the air can have a heater that is associated with a module. A heater of this type can be associated with each module. It is particularly advantageous if at least one module, and preferably multiple modules or all of the modules, are configured as cycle dryers. Cycle dryers of this type are known from practice and represent a reliable drying unit, which can be used as a single module in the context of the present invention.

[0020] The dryer can comprise a control or regulating device for a particularly energy-efficient operation of the dryer. This kind of control or regulating device can function as the central element to control or regulate the guiding and/or quantity of the supply air and/or exhaust air to or from the modules and/or the heating of incoming air to the modules and/or the air that is located in one or more modules

in accordance with a predeterminable moisture content of the material to be dried. A control or regulating system such as this can perform the switching, opening and closing of distribution and/or switching elements and/or a pressure compensation valve.

5

[0021] With the arrangement of multiple modules, the dryer according to the invention practically provides a cascaded dryer. Here, the drying air in a first module can be heated to approximately 180° C. For example, a temperature of 120° C can be achieved at the outlet of the dryer.

10

[0022] The air can be supplied in accordance with various operating programs, depending upon the moisture and/or type of material to be dried.

[0023] For instance, the material to be dried can remain in each module for ca. 4 minutes, and so a cycle lasting ca. 4 minutes is established. In three modules, the drying time can amount to a total of ca. 12 minutes. Subsequently, an appropriate amount of additional cooling time can also be provided, such as 2 minutes. However, these periods should be considered to be only examples and can be individually or jointly increased or reduced as appropriate, depending upon the individual situation.

20

[0024] Various options exist here for advantageously configuring and developing the teaching of the present invention. To this end, reference is made both to the subsidiary claims and to the subsequent description of preferred exemplary embodiments of the invention depicted in the drawings. In the context of describing the preferred exemplary embodiments of the invention with reference to the drawings, preferred embodiments and further developments of the teaching are also generally described. In the drawings:

25

30 Fig. 1 shows a schematic illustration of an exemplary embodiment of a dryer according to the invention;

Fig. 2 shows a schematic and more detailed illustration of the exemplary

embodiment according to Fig. 1 with a heating device comprising a plurality of heating burners; and

5 Fig. 3 shows a schematic and more detailed illustration of the exemplary embodiment according to Fig. 1 in a variant with an electrically or steam-heated heating device comprising heating units.

[0025] Fig. 1 shows a schematic illustration of a design of an exemplary embodiment of a dryer according to the invention for drying material to be dried.
10 The dryer comprises a receiving space for the material to be dried, an air guide (not shown here) for guiding air to the receiving space and a heating device (not shown here) for heating the air. With a view to an especially efficient use of the energy that is required for drying, the receiving space comprises a plurality of modules 1, 2, 3 and 4, which are arranged one behind the other, for heating, drying, monitoring
15 the moisture content and cooling the material to be dried. A transport device 5 for further transporting the material to be dried between said modules 1, 2, 3 and 4 is arranged between modules 1 and 2, 2 and 3, and 3 and 4, respectively.

[0026] Upstream of module 1 is a device 6 for supplying the material to be dried,
20 by means of which module 1 is loaded with the material to be dried. The material to be dried is thus introduced into the dryer by means of the supply device 6 for the material to be dried. The removal of the material to be dried occurs downstream of module 4. Fig. 1 represents the flow of material to be dried in this cascaded dryer according to the first exemplary embodiment, which comprises a plurality of
25 modules 1 to 4.

[0027] Figs. 2 and 3 are schematic and detailed representations of the exemplary embodiment generally shown in Fig. 1, wherein Fig. 2 shows a heating device having a plurality of heating units 7 that are based on a combustion process, and
30 Fig. 3 shows a heating device having a plurality of heating units that are heated with steam or electrically. The difference in the configuration of the heating device results in differences among the exemplary embodiments of the supply air flow and/or exhaust air flow to or from the modules 1 to 4.

[0028] For reasons of clarity, the device 6 for supplying the material to be dried, which is shown in Fig. 1, has been omitted from Figs. 2 and 3. The following description generally relates to the two exemplary embodiments shown in Figs. 2 and 3, wherein structural differences due to differently configured heating devices will be explained.

[0029] Module 1 for heating is substantially formed by a known cycle dryer with infrared temperature measurement or the detection of a different measuring parameter for determining the moisture content of the material to be dried. The material to be dried is located in a rotatably mounted and motor-powered drum in module 1. This drum forms a receiving region for the material to be dried. Module 1 comprises a fan, which conducts air in the receiving region through the material to be dried. Module 1 has a heating device to heat the air. In the exemplary embodiment shown in Fig. 2, said heating device is formed by a burner 7 that is based on a combustion process and that brings about the supply of heat to module 1. Moreover, module 1 comprises an air-to-air heat exchanger 8, which is coupled into a circulating air flow that is integrated into module 1. The burner 7 is likewise integrated into module 1. In the same way, module 2 for drying and module 3 for monitoring the moisture content of the material to be dried also have integrated burners 7.

[0030] In the exemplary embodiment shown in Fig. 3, the heating device comprises a plurality of air heaters 9 that are heated with steam or electrically. In this regard, the exemplary embodiment shown in Fig. 3 comprises a heating device having air heaters 9 instead of burners 7. The air heaters 9 are likewise integrated into modules 1, 2 and 3.

[0031] In the exemplary embodiment shown in Fig. 2, an exhaust gas system is provided for the discharge of combustion air from the burners 7, wherein the burner 7, heat exchanger 8 and exhaust gas system in module 1 are configured in such a way that the drying process can be carried out in module 1 with a circulating air portion of 100%. An air circulation mode with a circulating air portion of 100%

such as the one in module 1 is also possible in the exemplary embodiment shown in Fig. 3.

5 [0032] Module 2 for drying likewise substantially corresponds to a cycle dryer with infrared temperature measurement or detection of a different measuring parameter for determining the moisture content of the material to be dried. The material to be dried is dried in one or more of these modules – it is possible to integrate more than one module 2 for drying into the dryer – by providing energy supply and a variable amount of supply air. In the process, the supply air of module 2 is the exhaust air
10 from the respectively subsequent module, which in the present case is module 3 for monitoring the moisture content of the material to be dried.

[0033] Module 3 for monitoring the moisture content of the material to be dried likewise substantially corresponds to a cycle dryer with infrared temperature
15 measurement or detection of a different measuring parameter for determining the moisture content of the material to be dried. The material to be dried that has already been dried is dried again in said module 3 if various parameters, such as the fabric temperature, heating or cooling speed and/or direct exhaust air moisture measurement, indicate too much residual moisture in the material to be dried. The
20 supply air of module 3 is preheated supply air from a heat exchanger 10. This heat exchanger 10 draws thermal energy from the exhaust air of modules 1, 2 and possibly 3. Moreover, the heat exchanger 10 can draw heat from the exhaust air of module 4, since the exhaust air from this module 4 is or can be coupled into a fresh air supply.

25

[0034] Module 4 for cooling is likewise substantially a cycle dryer, but, in contrast to the remaining modules 1, 2 and 3, it has no heating device and no circulation air flaps. The supply air for module 4 is extracted from the installation room or from outside air – from outside of a building envelope. According to Fig. 2, the exhaust
30 air from module 4 serves the burners 7 of the other modules 1, 2 and 3 as combustion air. If no combustion air, or only a small amount of it, is required, the exhaust air escapes from module 4 and/or from the cooling process into the supply air duct upstream of the heat exchanger 10 via a pressure compensation valve 11.

If no exhaust air from this module 4 is available, then air for the burners 7 is drawn via the pressure compensation valve 11. The performance of a fan of module 4 is reduced compared to the fans in the other modules 1, 2 and 3.

5 [0035] The exhaust air from module 3 is conducted to a distribution/switching flap 12, which either supplies the exhaust air directly to module 2 or to the heat exchanger 8 of module 1. It is also possible to guide the exhaust air by means of the distribution/switching flap 12 partially to module 2 and partially to the heat
10 exchanger 8. The distribution/switching flap 12 is controlled in a continuously regulated manner, which results in the appropriate opening or closing of the distribution/switching flap 12 and a distribution of the exhaust air from module 3 so as to avoid over-drying or heat-damaging the material to be dried.

[0036] Furthermore, the exemplary embodiment shown in Fig. 2 has a thermally
15 active compound as an optional regenerator 13 in the exhaust air duct leading out of module 4. In both exemplary embodiments in Figs. 2 and 3, an air filter 14 and/or lint filter are/is also arranged in the exhaust air duct leading out of module 4.

[0037] In the dryer according to the invention, the material to be dried and a drying
20 air stream pass through the process steps substantially in countercurrent. The transported material is unloaded from one module 1, 2 or 3 and loaded into a different module 2, 3 or 4 once adjustable time units or cycles have elapsed. Modules 1, 2, 3 and 4 are loaded on the front side and unloaded on the rear side.

25 [0038] In module 1, the material to be dried is heated in a circulation process to maintain high moisture and high heat transfer capacities. To this end, module 1 comprises an integrated air-to-air heat exchanger 8, to which heat and exhaust air from the downstream modules 2 and 3 is applied on one side. On the other side, the supplied heat is released into the circulating air of module 1.

30

[0039] If the transferred heat is not sufficient to achieve the desired temperature of the material to be dried, additional energy is supplied by a burner 7 or air heater 9. When a burner 7 is used, a required portion of air – exhaust gases from combustion

– is discharged.

5 [0040] The exhaust heat contained in the exhaust air and/or in the exhaust gases from module 1 and cooled exhaust air from modules 2 and 3 are cooled again in a downstream heat exchanger 10 after passing through the heat exchanger 8. The heat transferred in this way is provided to the supply air for the module 3.

10 [0041] The heated material to be dried is reloaded into module 2 by means of an internal or external transport device 5. The exhaust air from the downstream module – either a further module 2 or module 3 – is provided to this module 2. As a result of the largely completed drying process, this hot exhaust air contains only a small amount of moisture and can be further charged with moisture in module 2. In addition, thermal energy is supplied.

15 [0042] If one of the parameters of the temperature of the material to be dried, exhaust air temperature and air supply temperature is exceeded in module 2, or if the temperature difference exceeds a predetermined limit value within a predetermined time unit – the rate of temperature increase – then the heat supply from the burner 7 or the air heater 9 and the incoming supply air are partially or
20 completely interrupted by the distribution/switching flap 12.

[0043] The exhaust air from one or more modules 2 is supplied to the preceding module 1 or to the air-to-air heat exchanger 8 of module 1. A portion of the exhaust heat remaining in the exhaust air downstream of the heat exchanger 8 is provided
25 to the supply air of the module 3 by means of a second air-to-air heat exchanger 10. The cooled exhaust air is discharged as outgoing air through the roof, for example.

[0044] When using air heaters 9, which in all exemplary embodiments can be operated not only electrically but also with steam, the use of exhaust heat can be
30 omitted from module 4 in the burners 7, as can the components pressure compensation valve 11 and optional regenerator 13 in the form of a thermally active mass, for example. The exhaust air from module 4 is then provided to the supply air upstream of the second heat exchanger 10 and, if not required, is discharged via

the supply air duct, as shown in Fig. 3.

5 [0045] Modules 1 to 4, which are regulated substantially independently, are coordinated by an integrated control system, which functions as a control or regulating device 15. Said integrated control system controls the loading and unloading processes of modules 1 to 4, the control of bypass flaps, such as flaps 11 and 12, and coordinates energy consumption.

10 [0046] The unloading of modules 1 to 4 can be carried out, for instance, by tipping the entire system when modules 1 to 4 are stationary, without the support of a fan. Furthermore, a single tipping discharge without the support of a fan is also conceivable. Moreover, the stationary modules 1 to 4 can also be unloaded with fan support.

15 [0047] Fig. 3 includes a graphical simplification: as in modern commercial cycle dryers air, circulating air and supply air are regulated by flaps on the intake side of the fan. Illustrating the supply air separately from the circulating air in modules 2 and 3 merely aids in improving clarity.

20 [0048] In a further advantageous embodiment, multiple variants for supplying heat in a dryer can be implemented. This means that it is possible to implement burners 7 as well as electrical or steam-powered air heaters 9 in a single dryer. One or other type of heater or heating device can be especially advantageous depending upon the requirements and the tasks performed by the individual modules 1 to 3.

25

[0049] In order to avoid repetitions, reference is made, with respect to further advantageous embodiments of the dryer according to the invention, to the general part of the description and to the enclosed claims. Finally, it is expressly noted that the exemplary embodiments described above serve only the purpose of discussing
30 the claimed teaching, but not to restrict this teaching to these exemplary embodiments.

List of Reference Signs**[0050]**

5		
	1	Heating module
	2	Drying module
	3	Module for monitoring the moisture content
	4	Cooling module
10	5	Transport device
	6	Supply device for the material to be dried
	7	Burner
	8	Heat Exchanger
	9	Air heater
15	10	Heat Exchanger
	11	Pressure compensation valve
	12	Distribution/switching flap
	13	Regenerator
	14	Air filter
20	15	Control or regulation device

Patentkrav

1. Tørrer til tørring af tørringsgodset, med en modtager for tørringsgodset, en luftføring til føring af luft til modtageren og en varmeindretning til opvarmning af luften, hvorved modtageren omfatter en flerhed af efter hinanden arrangerede moduler (1, 2, 3, 4) til opvarmning, tørring eller afkøling af tørringsgodset, og hvorved der til mindst et modul (1, 2, 3, 4) er knyttet en transportindretning (5) til videretransport af tørringsgodset fra dette modul (1, 2, 3) eller fra et modul (1, 2, 3) til det næste modul (2, 3, 4), **kendetegnet ved, at** der før modtageren er arrangeret en tørringsgoods-tilførselsindretning (6), som er udformet til at sikre, at modtageren lastes med en passende mængde af tørringsgodset, og en overfyldning er udelukket.
2. Tørrer ifølge krav 1, **kendetegnet ved, at** afgangsluft fra et modul (2, 3, 4) eller en flerhed af moduler (2, 3, 4) mindst delvist udgør indgangsluft for et foran arrangeret, fortrinsvis direkte foran arrangeret modul (1, 2, 3) eller en flerhed af foran arrangerede moduler (1, 2, 3), og/eller kan udnyttes som forbrændingsluft i varmeindretningen.
3. Tørrer ifølge krav 1 eller 2, **kendetegnet ved, at** varme fra afgangsluft fra et modul (2, 3, 4) eller en flerhed af moduler (2, 3, 4) kan overføres, i det mindste delvist, til indkommende luft og/eller cirkulerende luft i et modul (1, 2, 3), som er arrangeret foran, fortrinsvis modulet (1, 2, 3), der er arrangeret direkte foran, eller en flerhed af moduler (1, 2, 3), som er arrangeret foran – direkte eller ved hjælp af en eller flere varmevekslere (8), fortrinsvis luft – luft varmevekslere.
4. Tørrer ifølge et af kravene 1 til 3, **kendetegnet ved, at** et modul (3) til styring af fugtindholdet i godset, som skal tørres, er arrangeret foran et modul (4) til køling af godset, som skal tørres.
5. Tørrer ifølge et af kravene 1 til 4, **kendetegnet ved, at** indkommende luft i et modul (3) til styring af fugtindholdet i godset, som skal tørres, mindst delvist er luft, som er opvarmet ved hjælp af en varmeveksler (10), fortrinsvis en luft/luft-varmeveksler, der trækker termisk energi fra afgangsluften fra et modul (1) med

henblik på opvarmning af godset, som skal tørres, og/eller fra afgangsluften for et andet modul (2, 3) eller modulet (4) til styring af fugtindholdet i selve godset, som skal tørres.

5 6. Tørrer ifølge et af kravene 1 til 5, **kendetegnet ved, at** indkommende luft i et modul (4) til afkøling af godset, som skal tørres, kan tages fra et installationsrum eller fra omgivelsesluft.

10 7. Tørrer ifølge et af kravene 1 til 6, **kendetegnet ved, at** en afgangsluftkanal omfatter et eller en flerhed af fordelings- og/eller koblingselementer, fortrinsvis fordelings- og/eller koblingsklapper (12).

15 8. Tørrer ifølge et af kravene 1 til 7, **kendetegnet ved, at** en forbrændingsluftkanal omfatter en trykudligningsklap (11).

20 9. Tørrer ifølge et af kravene 1 til 8, **kendetegnet ved, at** en transportindretning (5) er arrangeret mellem respektive to moduler (1, 2, 3, 4), hvorved transportindretningen (5) fortrinsvis omfatter et transportbånd eller en sliske eller glidekanal, eller **ved, at** transportindretningen (5) er udformet som en intern mekanisme i et modul (1, 2, 3, 4) eller er integreret i et modul (1, 2, 3, 4).

25 10. Tørrer ifølge et af kravene 1 til 9, **kendetegnet ved, at** tørringsgods-tilførselsindretningen (6) omfatter en vejeindretning for godset, der skal tørres.

30 11. Tørrer ifølge et af kravene 1 til 10, **kendetegnet ved, at** mindst et modul (1, 2, 3, 4) og fortrinsvis en flerhed af eller alle modulerne (1, 2, 3, 4) er udformet som tørretumblere.

35 12. Tørrer ifølge et af kravene 1 til 11, **kendetegnet ved, at** tørreren omfatter en styrings- eller reguleringsindretning (15), der styrer eller regulerer føringen og/eller mængden af den indkommende luft og/eller afgangsluft til eller fra modulerne (1, 2, 3, 4) og/eller opvarmningen af indkommende luft til modulerne (1, 2, 3, 4) og/eller luft, der befinder sig i et eller flere moduler (1, 2, 3, 4) i afhængighed af et forud bestemt fugtindhold i godset, som skal tørres.

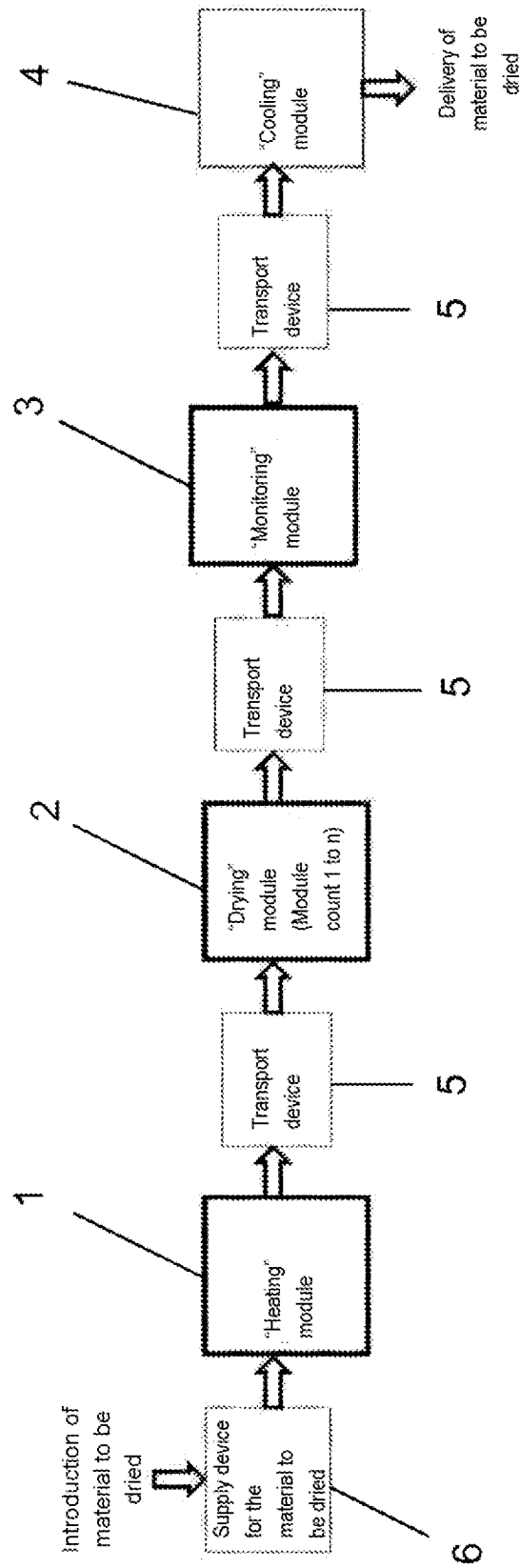


Fig. 1

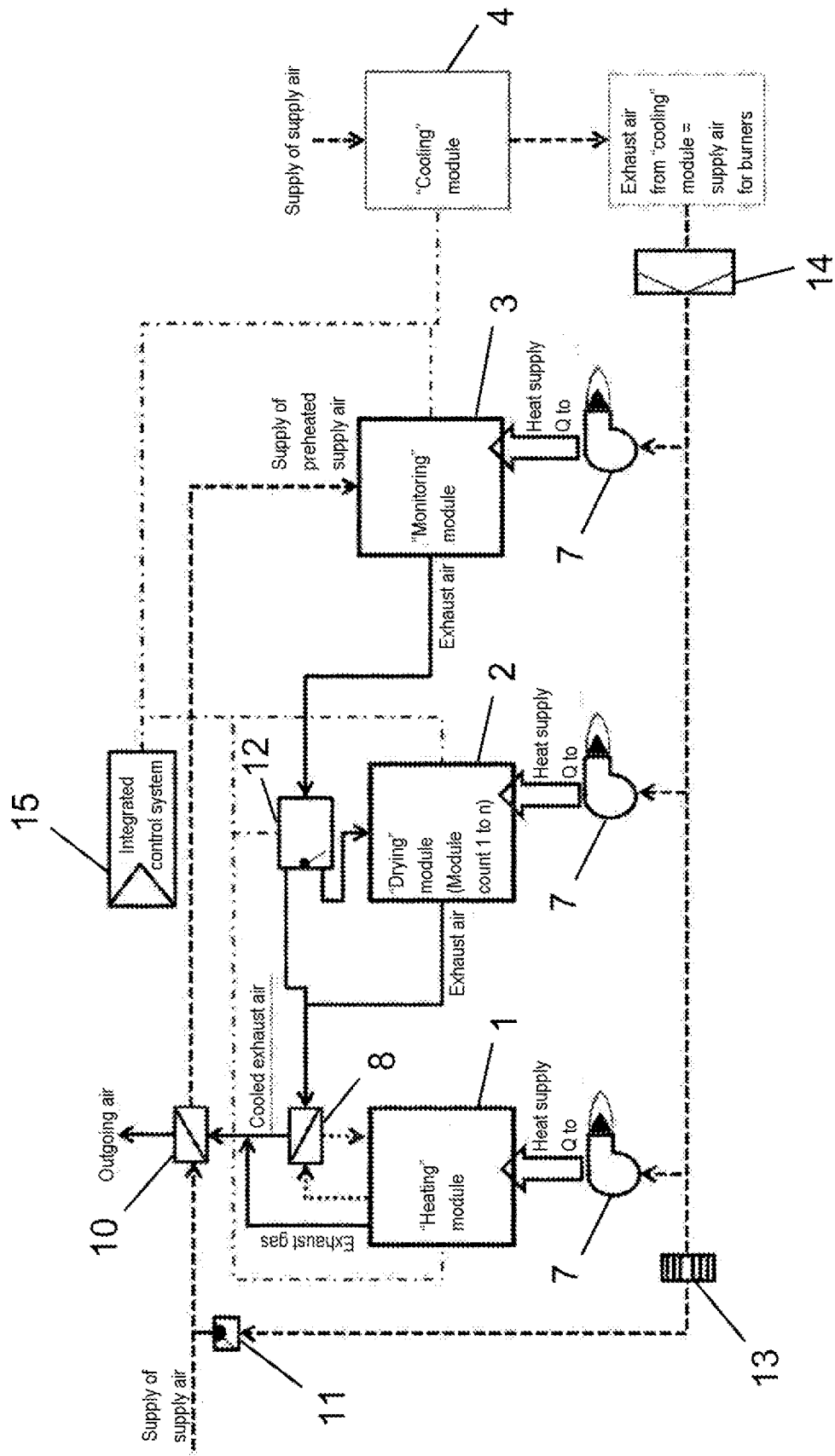


Fig. 2

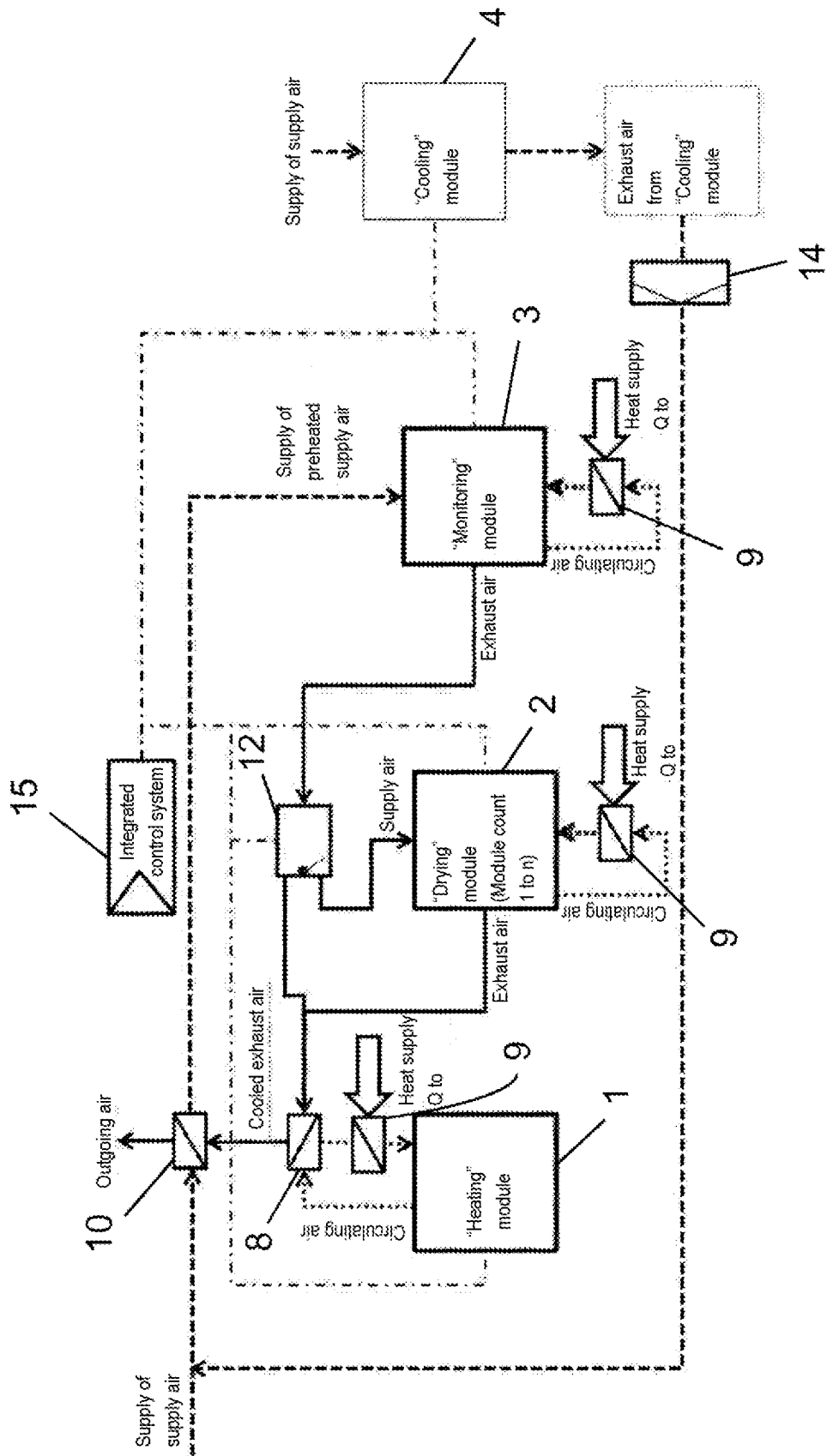


Fig. 3