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Schiefer(10) **Pub. No.: US 2013/0168044 A1**(43) **Pub. Date: Jul. 4, 2013**(54) **DEVICE FOR CLEANING A HEAT EXCHANGER****Publication Classification**(76) Inventor: **Erwin Schiefer, Gnas (AT)**(21) Appl. No.: **13/813,389**(22) PCT Filed: **Jul. 19, 2010**(86) PCT No.: **PCT/EP10/60430**

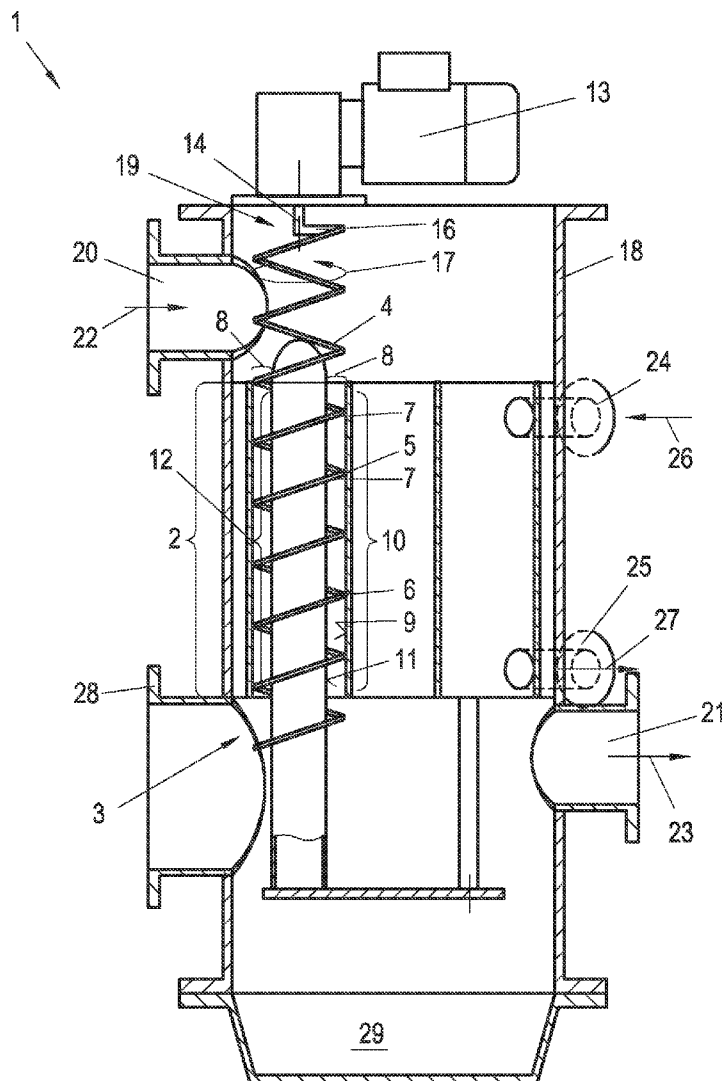
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CPC **F28G 3/10** (2013.01)
USPC **165/95**(57) **ABSTRACT**

A heat transmitter, in particular a tube heat transmitter, for contaminated media such as, e.g., waste gas, having a gas entry opening and a gas exit opening with an entry opening for the tempering medium and an exit opening for the tempering medium as well as a cleaning device, wherein there is arranged in a circular gap of the heat transmitter, through which the contaminated waste gas passes, a rotatable cleaning spiral of the cleaning device, the external edge of which contacts at least in one section the external transmitter surface.



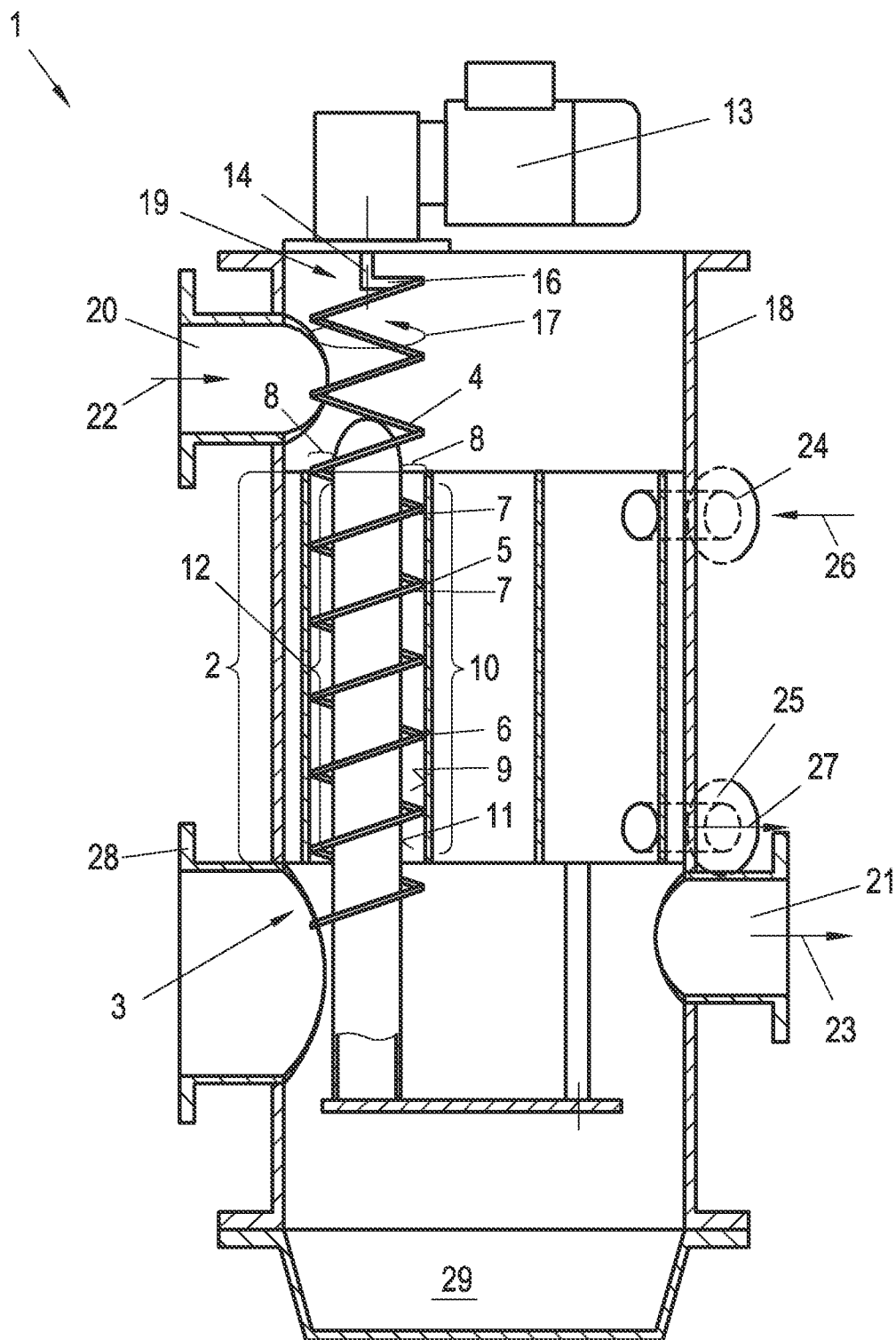
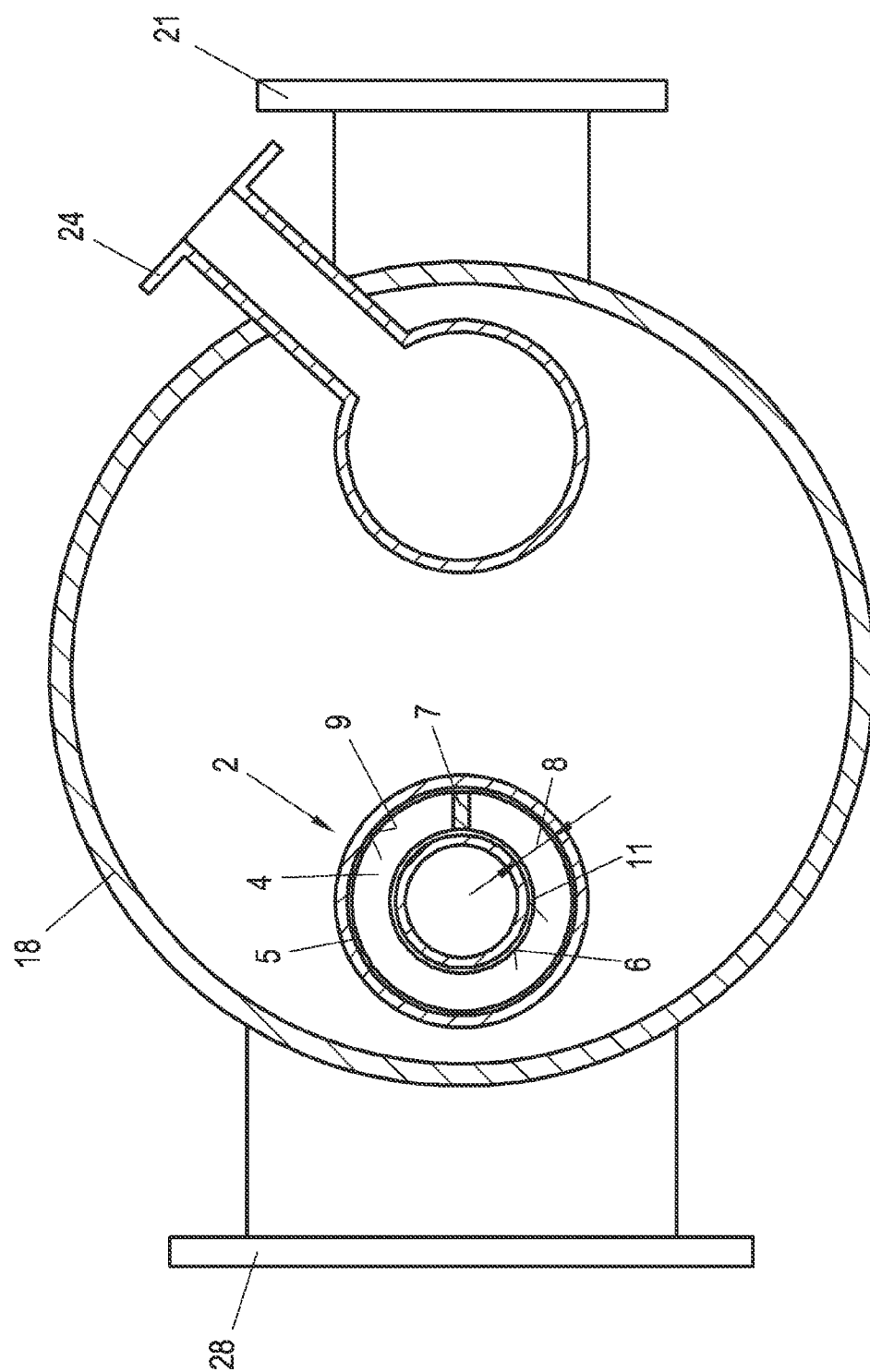


Fig. 1a









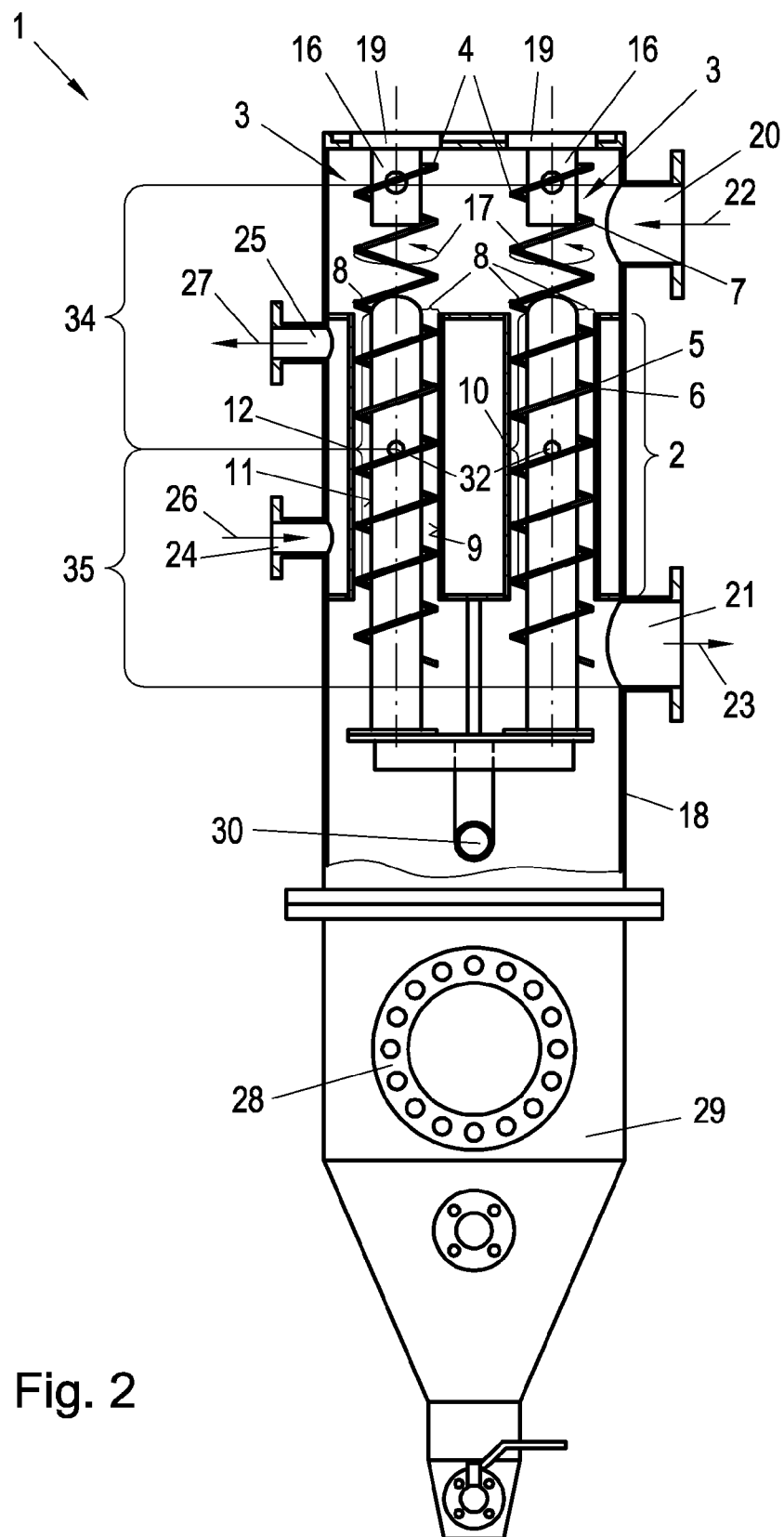
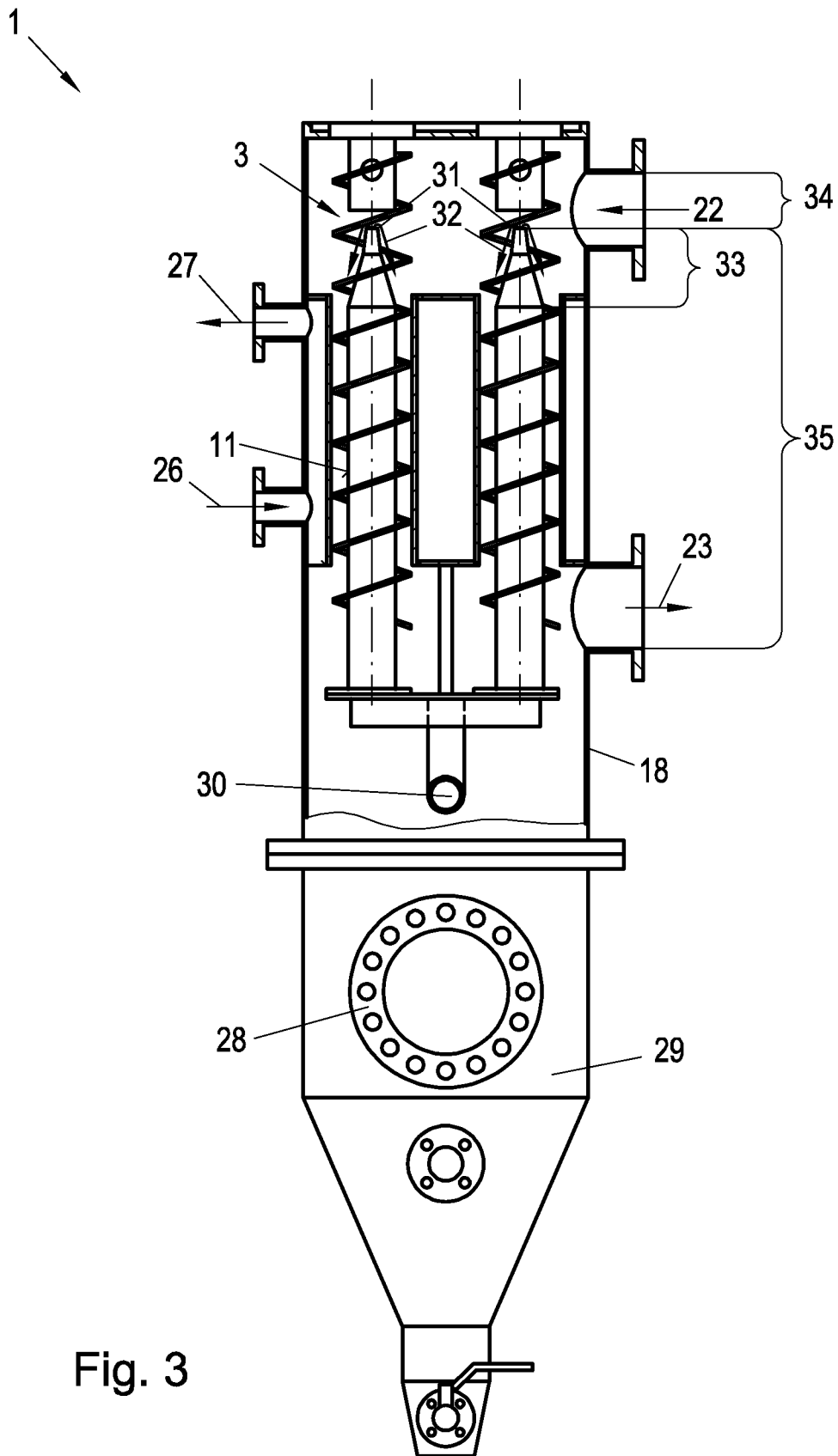


Fig. 2



DEVICE FOR CLEANING A HEAT EXCHANGER

[0001] The invention relates to a heat transmitter, in particular a tube heat transmitter, for contaminated media such as, e.g., waste gas, having a gas entry opening and a gas exit opening with an entry opening for the tempering medium and an exit opening for the tempering medium as well as a cleaning device.

[0002] Modern solid fuel boilers in general have devices for the regular cleaning of the heat exchanger surfaces. The appropriate cleaning spirals are activated by the control of the plants in regular intervals and remove carbon black and dust deposits from the surfaces of the heat exchanger in order to keep the efficiency of the plants over the period of utilization as constant as possible. In the case of tubular heat exchangers and with a standing arrangement, there are used cleaning spirals, which are provided with the appropriate cleaning knives, which remove carbon black and dust that is deposited there during the operation of the plant from the surfaces of the heat exchanger. The systems based on this principle show the disadvantage that the cleaning knives are attached rigidly at the cleaning spiral. This has the result that due to the reasons of heat expansion and tolerances conditioned by production, the radius of the cleaning knives has to be always smaller than the internal radius of the heat exchanger tube in order to prevent blocking of the cleaning spirals. This necessary tolerance, however, has the consequence that during the utilization of the plants there is deposited, according to the tolerance between internal radius of the heat exchanger tubes and the radius of the cleaning knives, a layer at the heat exchanger surface, which cannot be removed by the cleaning spiral. As this layer consisting of carbon black and dust has very poor heat conductivity, the efficiency of the solid fuel boiler is measurably reduced, leading disadvantageously to a higher consumption of fuel for the same performance output. By coking of the deposited contaminations, these, furthermore, are very difficult to be removed from the surfaces of the heat exchanger. Cleaning efforts, hence, are significantly increased during revision, this constituting another disadvantage of these embodiments.

[0003] In order to overcome the disadvantages mentioned above, there is proposed in DE 10 2004 031 220 A1 a cleaning spiral for solid fuel boilers, which bears at least one cleaning knife that extends across the length of the heat exchanger surface to be cleaned and that is inserted at least in the centre and at the lower end thereof loosely in the respective guides at discs of the cleaning spindle. The discs, which are attached at the cleaning spindle and are arranged transversely to the flow direction of the waste gas, not only offer a guide for the cleaning knives that are loosely inserted therein in guiding grooves but rather swirl the hot air within the heat exchanger. The cleaning knives thereby project beyond the guiding grooves in parallel to the surface of the heat exchanger. Centrally of their length, the cleaning knives are each supported by respective wedge-like support bearings, which are situated in the bottom of the guiding groove of the central disc, against the surface of the heat exchanger.

[0004] This embodiment is disadvantageous insofar, however, as the cleaning knives are arranged at their two free ends slightly movably in regard to the circulating cleaning spindle and as such are able to compensate for unevenness at the surface of the heat exchanger, which is situated respectively on the level of its both end sections. By the wedge-like support bearings, however, by means of which the cleaning

knives are supported in the centre of the longitudinal sides thereof against the central disc of the cleaning spindle, unevenness of the heat exchanger surface cannot be compensated for along the central section of the cleaning knives, which at least in this central section continues to lead to the formation of undesired depositions at the heat exchanger surface. A further disadvantage is that the cleaning knives are configured rigid over their overall length. Once a cleaning knife at one of the free end sections thereof follows the contour of unevenness of the heat exchanger surface, the opposite free end thereof will be moved correspondingly in the opposite direction to the heat exchanger surface. Thus, the cleaning knives according to this embodiment will not achieve a desired uniform as well as thorough cleaning effect across the entire heat exchanger surface passed in order to remove depositions.

[0005] The discs shown in DE 10 2004 031 220 A1 further act at the cleaning spindle due to their transversal arrangement to the longitudinal axis direction of the cleaning spindle or to the flow direction of the gas flow, respectively, like baffles. In the passing flows of the discs that are arranged transversely to the flow direction, the rather desired effects of an improved swirling of the gas flow, which result in improved heat transition, are accompanied, however, disadvantageously by a high flow loss due to a significantly reduced free cross-sectional area of the tubular heat exchanger caused by the discs. The high flow or pressure loss, respectively, thus has to be compensated for by appropriately efficient gas feed pumps, leading at least to increased operational costs if such a cleaning spindle having transversely arranged discs is used.

[0006] Hence, it is the task of the present invention to provide a heat transmitter having a cleaning device, which overcomes the drawbacks of the state of the art described above. The cleaning device is to be suitable especially for the use in a tubular heat transmitter, in which significantly contaminated media such as, e.g., waste gas originating in the gasification of wood, is passed through.

[0007] According to the invention, this task is solved by a heat transmitter according to this type by way of the features designated in the characterizing part of patent claim 1. Especially preferred embodiments and developments of the invention are subject of the sub-claims.

[0008] A heat transmitter according to the invention, in particular a tube heat transmitter, for contaminated media such as, e.g., waste gas, advantageously comprises a gas entry opening and a gas exit opening, an entry opening for the tempering medium and an exit opening for the tempering medium as well as a cleaning device, wherein in a circular gap of the heat transmitter, in which the contaminated waste gas passes through, there is arranged a rotatable cleaning spiral of the cleaning device, the external edge of which cleaning spiral contacts at least in one section the external transmitter surface thereof.

[0009] The rotatable cleaning spiral is thereby put or maintained, respectively, in rotation during the operation of the heat transmitter. The external edge of the cleaning spiral thus contacts the external transmitter surface. Undesired depositions such as sticky combustion residues, carbon black, dust etc., which would deteriorate, because of their poor heat conductivity, the heat passage through the transmitter surface and, hence, the entire efficiency of the heat transmitter, are continuously collected at the external edge by the cleaning spiral, they are loosened up and then removed from the exter-

nal transmitter surface. The loosened deposition particles are dragged along with the gas flow and, for example, separated from the gas flow in proper separation devices. Conditioned by the rotatable cleaning spiral, the contaminated medium, for example a waste gas flow charged with dirt particles, is given a twist when it passes through the heat exchanger according to the invention. The dirt particles are thereby fed in the direction of the external transmitter surface due to the centrifugal forces present. In this way, the gas flow is put into a spiral-like rotational movement, comparable to passing a cyclone, and is in this way at least partly cleaned from dirt particles, leaving the heat exchanger advantageously having an at least lower load of contamination. The free flow cross-section of the circular gap is not or only slightly, at the most, reduced by the rotatable cleaning spiral. The flow resistance of the contaminated medium in the circular gap of the heat transmitter according to the invention is advantageously only rather slightly enlarged in this way.

[0010] If, in the further course, there is mentioned as contaminated medium, e.g., waste gas, then the heat transmitter according to the invention may also be used for tempering contaminated liquid media, this is cooling as well as heating thereof, or for tempering gas-liquid mixtures contaminated by solids.

[0011] Especially usefully, in a heat transmitter according to the invention, the internal edge of the cleaning spiral contacts at least in a section the internal transmitter surface.

[0012] By the internal edge of the rotating cleaning spiral, which in operation contacts the internal transmitter surface, the depositions adhering thereto are collected and loosened and further on dragged along by the gas flow. The undesired formation of deposition layers at the internal transmitter surface, which would deteriorate the heat passage, is reliably prevented. The efficiency of the heat transmitter still remains high even if strongly contaminated media passes through.

[0013] Heat transmitters, to which a tempering medium is applied only at the internal transmitter surface or at the external transmitter surface of the circular gap, this is, in which not the entire available transmitter surface is used for the transmission of heat, are also comprised by the invention.

[0014] In a variant of the invention in a heat transmitter the cleaning spiral is motion-coupled with a drive, which is arranged at the external surface of the heat transmitter.

[0015] In an advantageous configuration the cleaning spiral in a heat transmitter according to the invention is connected via a drive shaft with the drive.

[0016] A preferred exemplary embodiment of a heat transmitter is characterized by a hermetically sealing through-passage of the drive shaft through the housing of the heat transmitter.

[0017] In a heat transmitter according to the invention, the cleaning spiral is usefully made of a spiral-like coiled strip-like material.

[0018] Due to the spiral-like coiled strip-like configuration, the cleaning spiral obtains high flexibility for adapting to the contours of the external or internal, respectively, transmitter surfaces. Smooth adjustment of the two edges of the cleaning spiral to the contours of the external or internal, respectively, transmitter surfaces is not given. Blocking of the cleaning device due to contact with the transmitter surfaces, as may be the case in cleaning knives known from prior art due to the heat expansion of the heat transmitter, is not given in the embodiment according to the invention. The selected configuration of the stripe-like or spiral-like, respectively, coiled

cleaning spiral is further advantageous in regard to the configuration of other common feed screws, in which the spiral is fixed to a core tube or welded thereto, respectively. The coating surface of the core tube in a common feed screw has a large surface that is motionless in regard to the spiral, at which contaminations may deposit and, hence, the free cross-sectional area in the circular gap is reduced. Also a cleaning spiral, which is coiled like a spiral spring, may be used as a cleaning device according to the invention.

[0019] In a variant of a heat transmitter according to the invention, the cleaning spiral is made of a material having high mechanical strength, preferably metal.

[0020] Apart from the flexibility of the cleaning spiral to adapt to the contours of the transmitter surfaces, also high mechanical strength is necessary. In particular in the case of sticky depositions, for example with tar containing depositions, rather high shear forces are applied onto the rotating cleaning spiral in operation.

[0021] In a heat transmitter according to the invention the cleaning spiral is especially advantageously provided at its internal edge and/or at its external edge with a cleaning edge.

[0022] By means of a cleaning edge, which is arranged at least at one edge of the cleaning spiral, the heat transmitter may especially advantageously be adjusted to the most diverse states of operation. For this purpose, the cleaning edge may then be configured to be exchangeable, and it may be replaced as a piece of wear following a certain time of operation. There may also be used selectively various cleaning edges having different mechanical strengths. The cleaning spiral, hence, may especially economically be made of a material having less mechanical strength.

[0023] In a preferred embodiment of the invention, in a heat transmitter there is arranged a sump container for receiving contaminations below the level of the cleaning spiral.

[0024] The depositions, which are taken off the external or internal, respectively, transmitter surface by the cleaning spiral in operation and which are dragged along with the gas flow, reach the sump container, which is arranged underneath the cleaning spiral. Also other contaminations, which are introduced by the gas flow entering the heat transmitter, at least in part reach the sump container and are thus advantageously separated from the gas flow.

[0025] In a heat transmitter according to the invention there is usefully provided a revision opening in the housing underneath the level of the cleaning spiral.

[0026] The revision opening, which is usefully arranged in the proximity of the sump container, enables for simple and fast maintenance of the heat transmitter according to the invention in the case of a failure or defect.

[0027] Another advantageous feature of a heat transmitter according to the invention is characterized in that there is provided within the circular gap at least one distributor device for filling in the cleaning medium.

[0028] Using a cleaning medium, which is filled via the at least one distributor device within the circular gap into the gas flow, causes an additional gas washing, and thus the cleaning effect of the heat exchanger according to the invention for the contaminated medium or waste gas, respectively, is further improved. The distributor device may comprise, for example, several nozzles for filling in the cleaning medium, which are arranged at the same or at different levels of the internal and/or external transmitter surface. The desired and advantageous washing effect of the waste gas is obtained in a section of the circular gap, which is situated downstream of the dis-

tributor device, observed in the flow direction of the waste gas. There are conceivable also other embodiment variants of a distributor device according to the invention for filling in the cleaning medium. The cleaning medium may, for example, also be conveyed upwards within the standing coating of the internal transmitter surface. The top section of the internal transmitter surface may thus be configured as a distributor section conically tapering towards the top and having a horizontally circumferential tear-off edge, so that the cleaning medium conveyed across the tear-off edge flows down uniformly at the side of the internal transmitter surface that faces the gas flow in the conical distributor section as a uniform thin film distributed across the entire perimeter of the internal transmitter surface at this covering surface. Due to the large surface between the thin film of the cleaning medium and the gas flow, there is obtained an especially good washing effect, and the contaminated waste gas is appropriately freed of contaminations.

[0029] The contaminations, which are bound by the film of the cleaning medium flowing down, reach the sump container at the lower end of the heat transmitter, are transported from there to the outside and are, hence, separated from the gas flow.

[0030] In a heat transmitter according to the invention the distributor device is usefully arranged between the gas entry opening and the gas exit opening. The distributor device is, e.g., arranged approximately centrally between the gas entry opening and the gas exit opening.

[0031] In this embodiment variant, the gas flow is dry-cleaned by the centrifugal force in the section between the gas entry opening and the distributor device, comparable to cleaning in a cyclone, and in the section between the distributor device and the gas exit opening, the gas flow is, in addition to the mechanical cleaning, also washed.

[0032] Cleaning media to be used in the heat transmitter according to the invention may be, depending on the composition of the waste gas to be cleaned/purified, water or the cleaning media commonly used in the purification of flue gas.

[0033] In no way the invention is limited to embodiments of standing heat transmitters having a vertically arranged circular gap but rather also comprises analogously all variants of positioning. For example, the invention also comprises heat transmitters that are horizontally positioned having a circular gap that is horizontally passed through, or also heat transmitters positioned obliquely.

[0034] Further features of the invention become apparent from the following description of exemplary embodiments and in reference to the drawing, wherein

[0035] FIG. 1 shows in a schematic lateral section from the side a first embodiment variant of a heat transmitter according to the invention having a cleaning device;

[0036] FIG. 1a shows in a schematic sectional view from the top details of the first embodiment variant of a heat transmitter according to the invention shown in FIG. 1;

[0037] FIG. 2 shows in a schematic lateral section details of a second embodiment variant of a heat transmitter according to the invention having two tubular sections with cleaning devices;

[0038] FIG. 3 shows in a schematic sectional view details of a third embodiment variant of a heat transmitter according to the invention having two tubular sections with cleaning devices.

[0039] In FIG. 1 there is illustrated in a sectional view a heat transmitter 1 according to the invention having a tubular heat

transmitter section 2. A cleaning device 3 comprises a cleaning spiral 4, which is made of a spiral-like coiled metal strip that is similar to a spiral spring and which is provided at the external edge 5 and at the internal edge 6 thereof respectively with a cleaning edge 7 having high mechanical strength. The cleaning spiral 4 is situated within the circular gap 8, which is positioned between an external transmitter surface 9 that is formed by an external tube coating and an internal transmitter surface 11 that is formed by an internal tube coating concentric to the external tube coating. The rotatable cleaning spiral 4 aims at cleaning, during the operation of the heat transmitter 1, a section 10 of the external transmitter surface 9 or a section 12 of internal transmitter surface 12, respectively, which is as large as possible. Thereby, the cleaning edges 7 of the turning or rotating, respectively, cleaning spirals 4 contact the surfaces 9 or 11, respectively, along the corresponding sections 10 or 12, respectively.

[0040] The fixed internal tube coating of the internal transmitter surface 11 is closed at the upper end thereof by way of an appropriate cover. During operation, hence, there is guaranteed that the biomass to be gasified reaches the circular gap 8 exclusively from the top and is then heated therein.

[0041] The cleaning shaft 4 is motion-coupled by a drive shaft 14 with its own drive 13 including the associated gearbox, and it is driven by the drive shaft 14 in the direction of rotation 17. The rotatable drive shaft 14 is provided at the upper end thereof with an adapter 16 for attachment of the cleaning spiral 4. The housing 18 of the heat transmitter 1 has a hermetically sealing through-passage 19 for the drive shaft 14 at its top side.

[0042] In order to cool or temper, respectively, the waste gas, the housing 18 is laterally provided with a gas entry opening 20 as well as with a gas exit opening 21 situated further underneath the level of the gas entry opening 20. The waste gas 22 flowing through the gas entry opening reaches the tubular heat transmitter section 2 and is then guided through the circular gap 8, in which the rotating cleaning spiral 4 causes a swirl to the gas flow, to the gas exit opening 21, where it leaves the heat transmitter 1 as waste gas 23 flowing out.

[0043] In the secondary circuit, there is transported a tempering medium through the heat transmitter 1, wherein the peripheral pipelines, fittings and aggregates that are required and situated outside the heat transmitter 1 are not depicted in the figures. The housing 18 is provided with an entry opening 24 for the tempering medium as well as an exit opening 25 for the tempering medium, wherein the tempering medium moves in the direction of the arrow 26 into the heat transmitter, flows along the respective back side of the external transmitter surface 9 that is oriented opposite to the gas flow and/or of the internal transmitter surface 11 and then leaves the heat transmitter 1 in the direction of the arrow 27 through the exit opening 25 for the tempering medium.

[0044] As tempering medium there is used, e.g., cooling water in order to cool the hot waste gas in the assembly shown in FIG. 1 in an operation in the same direction.

[0045] In the lower section of the housing 18 of the heat transmitter 1 according to the invention, there is situated a revision flange 28, which is arranged underneath the level of the cleaning spiral 4. In the case of revision/inspection works, the heat transmitter 1 may be simply cleaned upon opening of the revision flange 28. The sump container 29, in which the deposited contaminations are collected, is further well accessible via the opening of the revision flange 28.

[0046] The sump container 29 also has an appropriate release valve for the slurry for the continuous disposal of the contaminations, which is known from prior art and, hence, not depicted in greater detail in FIG. 1.

[0047] FIG. 1a shows in a top view details of the heat transmitter 1 illustrated in FIG. 1. For the depiction thereof, there was chosen a horizontal sectional plane, approximately centrally of the height of the entry opening 24 for the tempering medium shown in FIG. 1. In the top view of the tubular heat transmitter section 2 there is visible a section of the cleaning spiral 4 arranged within the circular gap 8. The cleaning spiral 4 is provided at the external edge 5 thereof as well as the internal edge 6 thereof respectively with a cleaning edge 7. By way of its cleaning edges 7, the cleaning spiral 4 contacts during the operation of the cleaning device 3, this is if the cleaning spiral 4 is then set in rotation, the external transmitter surface 9 as well as the internal transmitter surface 11 and thereby also cleans the transmitter surfaces. Heat transition in the circular gap 8 thus is not impaired by the significantly contaminated waste gas; and depositions at the transmitter surfaces are continuously removed by the rotating cleaning spiral 4.

[0048] In FIG. 2 there are illustrated details of a second embodiment variant of a heat transmitter 1 according to the invention in a schematic sectional view. The heat transmitter 1 is provided with two tubular heat transmitter sections 2 that are arranged adjacently and in parallel to each other with cleaning devices 3, which each comprise a cleaning spiral 4.

[0049] The heat transmitter 1 shown in FIG. 2 is used in an operation in the same direction. The hot waste gas 22 passes through the gas entry opening 20 arranged at the top of the housing 18 into the circular gap 8 and is then put into swirl movement by the spiral-like rotating cleaning spiral 4. The rotational movement of this swirl movement corresponds to the axial direction of the drive shaft 14. By way of the swirl, contamination particles are transported from the waste gas flow in the direction of the external transmitter surface 9, which then possibly will adhere thereto. These depositions are immediately collected by the rotating cleaning edge 7, which is fixed at the external edge 5 of the cleaning spiral 4, and loosened up; subsequently they will enter, together with the gas flow in the flow direction, the lower section of the heat transmitter 1, where they are separated in the sump container 29.

[0050] The cooled waste gas leaves the heat transmitter 1 at the lower section thereof in the direction of the arrow 23 through the gas exit opening 21. As for the tempering medium circulation, also for the primary circulation of the contaminated waste gas applies that the required connection pipe lines as well as the aggregates and fittings that are commonly used therefore, which are situated outside of the heat transmitter 1, are not illustrated in the FIGS. 1 to 3.

[0051] In the counter-flow, the tempering medium—herein, e.g., cooling water—is transported through the entry opening 24 for the tempering medium in the direction of the arrow 26 into the heat transmitter 1 and leaves the heat transmitter 1 in the direction of the arrow 27 through the exit opening for the tempering medium, which is situated above.

[0052] In the heat transmitter shown in FIG. 2 the external transmitter surface 9 as well as the internal transmitter surface 11 are used as transmittance surfaces and the tempering medium is applied respectively at the back sides thereof that are in the opposite direction of the gas flow.

[0053] Approximately centrally of the distance between the upper gas entry opening 20 and the lower gas exit opening 21, there is situated within the circular gap 8 in the gas-side primary circulation a distributor device 31 for filling a cleaning medium 32. The cleaning medium 32 is transported from the outside through a feed line 30 into the heat transmitter 1 and is then further transported within the fixed coating of the internal transmitter surface 11 further up to the level of the distributor device 31. The cylindrical coating of the internal transmitter surface 11 is closed at the top side thereof. The distributor device 31 comprises, for example, several nozzle-like openings, through which the cleaning medium, e.g., water, is introduced in the hot waste gas flow. As a consequence, in the embodiment shown in FIG. 2 there are realized for the contaminated waste gas two different cleaning sections within the heat transmitter 1: in the section 34 there is realized, due to the centrifugal forces caused by the cleaning spiral 4, a dry waste gas cleaning process, and, similar to a cyclone, solid contamination particles are transported from the hot waste gas flow towards the outside to the external transmitter surface 9 and are thus removed from the waste gas flow.

[0054] In addition to mechanical cleaning due to the applied centrifugal forces, also in the subsequent section 35 of the circular gap 8 the contaminated waste gas is washed. By way of the cleaning medium 32 that is introduced or sprayed in, respectively, contamination particles are washed out of the waste gas flow and reach, bound as slurry, the sump container 29 situated underneath.

[0055] Comparable to FIG. 2, there are shown in FIG. 3, in a schematic sectional view, details of a third embodiment variant of a heat transmitter 1 according to the invention having two tubular heat transmitter sections 2 that are arranged adjacently and in parallel to each other, each having cleaning devices 3.

[0056] The heat transmitter 1 illustrated herein is also provided with a feed line 30 for a cleaning medium 32. The distributor device 31 for the supply of the cleaning medium 32 into the circular gap 8 passed through by the waste gas, however, is configured in another way than the variant shown herein in FIG. 2. The fixed cylindrical coating of the internal transmitter surface 11 is configured along the top section thereof as a conically tapering distributor section 33, which has an overflow opening at its top point as an outlet for the cleaning medium 32. By the conical distributor section 33, the cleaning medium 32 is distributed as a thin film uniformly across the entire periphery of the internal transmitter surface 11 and flows further downward in the circular gap 8 as a film alongside the cylindrical coating of the internal transmitter surface 11 until the excessive cleaning medium finally reaches the sump container 29 and is collected therein. The huge surface of the internal transmitter surface 11, which is wetted by the film of the cleaning medium 32, achieves a very efficient and effective gas washing. The contaminations of the waste gas flow that are collected by the film of the cleaning medium 32 flowing downwards are separated as slurry in the sump container 29 and from there, they are removed from the heat transmitter 1 according to the invention.

[0057] Due to the position of the distributor device 31 selected in FIG. 3, wherein the conical distributor section 33 is situated at the head of the internal transmitter surface 11, the length of the section 35 for washing the waste gas is expanded in regard to the variant shown in FIG. 2. The section

34, in which there is performed a dry cleaning of the waste gas, is correspondingly reduced in the variant shown in FIG. 3.

[0058] It may further be conceived to provide the embodiment shown in FIG. 3 of a heat transmitter **1** having a distributor device **31** at the internal transmitter surface **11** with an additional and not depicted distributor device for filling in a cleaning medium film also at the external transmitter surface **9** and as such to further increase the cleaning effect within the section **35** for the washing of the waste gas by way of a falling film, which will wet the entire transmitter surfaces within the circular gap **8** along the tubular section **2**.

LIST OF POSITION NUMBERS

[0059]	1 heat transmitter
[0060]	2 tubular heat transmitter section
[0061]	3 cleaning device
[0062]	4 cleaning spiral
[0063]	5 external edge of the cleaning spiral
[0064]	6 internal edge of the cleaning spiral
[0065]	7 cleaning edge
[0066]	8 circular gap
[0067]	9 external transmitter surface
[0068]	10 section of the external transmitter surface
[0069]	11 internal transmitter surface
[0070]	12 section of the internal transmitter surface
[0071]	13 drive
[0072]	14 drive shaft
[0073]	15 shaft bearing
[0074]	16 shaft adapter
[0075]	17 direction of rotation
[0076]	18 housing of the heat transmitter
[0077]	19 through-passage for drive shaft
[0078]	20 gas entry opening
[0079]	21 gas exit opening
[0080]	22 waste gas flowing in
[0081]	23 waste gas flowing out
[0082]	24 entry opening for tempering medium
[0083]	25 exit opening for tempering medium
[0084]	26 entry tempering medium
[0085]	27 exit tempering medium
[0086]	28 revision flange
[0087]	29 sump container
[0088]	30 feed line for cleaning medium
[0089]	31 distributor device for cleaning medium
[0090]	32 cleaning medium exiting
[0091]	33 conical distributor section

[0092] **34** section for dry waste gas cleaning

[0093] **35** section for washing of waste gas

1. A heat transmitter for contaminated media having:

a gas entry opening and a gas exit opening with an entry opening for the tempering medium and an exit opening for a tempering medium and a cleaning device,

wherein the heat transmitter comprises:

a rotatable cleaning spiral of the cleaning device, wherein:

the rotatable cleaning spiral is arranged in a circular gap of the heat transmitter, the circular gap being configured for contaminated waste gas to pass therethrough; and

the external edge of the cleaning spiral contacts at least in one section an external transmitter surface.

2. A heat transmitter according to claim 1, wherein an internal edge of the cleaning spiral contacts at least in one section an internal transmitter surface.

3. A heat transmitter according to claim 1, wherein the cleaning spiral is motion-coupled with a drive, which is arranged at an external surface of the heat transmitter.

4. A heat transmitter according to claim 3, wherein the cleaning spiral is connected via a drive shaft with the drive.

5. A heat transmitter according to claim 4, wherein a through-passage of the drive shaft through a housing of the heat transmitter is hermetically sealing.

6. A heat transmitter according to claim 1, wherein the cleaning spiral is made of a spiral-like coiled strip-like material.

7. A heat transmitter according to claim 6, wherein the cleaning spiral is made of a material having high mechanical strength.

8. A heat transmitter according to claim 1, wherein the cleaning spiral is provided at an internal edge and/or at an external edge thereof with a cleaning edge.

9. A heat transmitter according to claim 1, wherein underneath the level of the cleaning spiral there is arranged a sump container for receiving contaminations.

10. A heat transmitter according to claim 1, wherein underneath the level of the cleaning spiral there is provided a revision opening in a housing of the heat transmitter.

11. A heat transmitter according to claim 1, wherein within the circular gap there is provided at least one distributor device for filling in a cleaning medium.

12. A heat transmitter according to claim 11, wherein the distributor device is arranged between the gas entry opening and the gas exit opening.

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