Device for driving a flexible lance

The present invention relates to a device for driving a flexible lance. A flexible lance is used to clean the ducts in a heat exchanger. In the course of time these ducts become fouled such that the through-flow is blocked to a greater or lesser degree. In order to enable the heat exchanger to function optimally again the ducts, particularly the pipes thereof, are cleaned by injecting liquid under high pressure through these ducts using a high-pressure lance.

For instance from WO01/11303A1, a device for driving a flexible lance for cleaning a heat exchanger duct or the like is known, which device is provided with a frame in which a means driving a flexible lance is arranged for moving this flexible lance in the direction of an outlet opening. According to thus publication, the driving means is provided with a member which can be clamped around the flexible lance and which is movable in the frame towards and away from this outlet opening, said clamping member being formed by two parts which can be pressed against each other, each of which is mounted on an endless drive element, wherein the active parts of the two endless drive elements run parallel to each other.

It is an object, amongst other objects, of the present invention to provide an improved, compact and/or efficient device for driving a flexible lance.

According to an aspect of the present invention, there is provided a device for driving a flexible lance for cleaning a heat exchanger duct or the like, provided with a frame in which a driving mechanism is arranged for moving this flexible lance in a driving direction in the direction of an outlet opening, wherein the driving mechanism is provided with a plurality of separate clamp members which can be clamped on the flexible lance and which are movable in the frame towards and away from this outlet opening, wherein said clamp members are mounted on an endless drive element and arranged along the length thereof, wherein the active part of the endless drive runs parallel to the driving direction, wherein the drive mechanism further comprises a second drive arranged opposite said clamp members, wherein the lance is clamped between the clamp members and a second drive mechanism, wherein the clamp members are arranged to pivotally connect to the endless drive element.

By providing a clamp member provided on an endless drive element, such as a driving belt or driving chain, on one side of the lance to be driven and a non-driven counter roller at the other side, such that the lance is firmly clamped there between, a compact and efficient device is obtained. Although the driving of a lance requires substantial force, in particular in the case of a clogged duct due to fouling, it was found that by providing a driven clamp member at one side and

Claims

1. Device for driving a flexible lance for cleaning a heat exchanger duct or the like, provided with a frame in which a driving mechanism is arranged for moving this flexible lance in a driving direction in the direction of an outlet opening, wherein the driving mechanism is provided with a plurality of separate clamp members which can be clamped on the flexible lance and which are movable in the frame towards and away from this outlet opening, wherein said clamp members are mounted on an endless drive element and arranged along the length thereof, wherein the active part of the endless drive runs parallel to the driving direction, wherein the drive mechanism further comprises a second drive mechanism arranged opposite said clamp members, wherein the lance is clamped between the clamp members and a second drive mechanism, wherein the clamp members are arranged to pivotally connect to the endless drive element.

2. Device for driving a flexible lance according to claim 1, wherein the clamp members are arranged at mutual distances on the endless drive element along the length thereof.

3. Device for driving a flexible lance according to claim 1 or 2, wherein the distance between the clamp members is sufficient to allow a pivoting movement of the clamp members of ate least 5°, more preferably at least 10°, preferably the distance between two clamp members is at least half the height of a clamp member.

4. Device for driving a flexible lance according to claim 1, 2 or 3, wherein the clamp members comprise a driven end arranged to the endless drive element and a contact end for contacting the lance.

5. Device for driving a flexible lance according to claim 4, wherein the clamp members are arranged such that the clamp members are urged to pivot backwards with respect to the driving direction due to the driving force provided by the endless drive element at the driven end of the clamp members and the reaction force of the lance at the contact end of the clamp members.

6. Device for driving a flexible lance according to any of the preceding claims, wherein the driving mechanism is provided with a plurality of counter rollers, wherein rotation axes of said counter rollers substantially extend in a plane parallel to said driving direction.

7. Device for driving a flexible lance according to claim 6, wherein the second drive mechanism comprises at least one non-driven counter roller, preferably wherein the non-driven counter roller is biased in a direction towards the clamping element for clamping the lance there between

8. Device according to claim 6, wherein the plurality of counter rollers is arranged on a separate counter roller frame mounted in the frame, wherein the counter roller frame is movable with respect to said frame, wherein the counter roller frame is biased in the frame.

9. Device for driving a flexible lance according to claim 6, wherein at least two of the counter rollers are movable with respect to each other in a direction towards and away from the lance to be driven; and
preferably wherein at least two counter rollers are arranged on a subframe, wherein the subframe is arranged pivotally allowing relative movement of the counter rollers.

10. Device for driving a flexible lance according to claim 9, wherein the subframe is pivotally arranged in the counter roller frame.

11. Device for driving a flexible lance according to any of the preceding claims 6-10, wherein a counter roller is at least located near an end of the active part of the endless drive element; and preferably wherein counter rollers are located at least at both ends of the active parts of the endless drive element.

12. Device for driving a flexible lance according to any of the preceding claims, wherein a clamp member comprises a base member arranged to connect to the endless drive element, wherein the base member holds a plastic engaging member, and preferably wherein the base member is substantially U-shaped, wherein the engaging member is received between the legs of the U-shape.

13. Device for driving a flexible lance according to any of the preceding claims, wherein the clamp member is provided with an engaging surface at least partially formed complementary to the lance to be engaged; and preferably wherein the clamp member is provided with a V-shaped slot.

14. Device for driving a flexible lance according to claim 13 wherein the counter roller is arranged to substantially engage the engaging surface of the clamp member if no lance is supplied to the drive system, such that the distance between the axis of the counter roller and upper end of the clamp member on the active part, which is in contact with the counter roller, is equal or less then the radius of the counter roller.