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US-A- 4 613 079
US-A- 4 988 043
US-A- 5 149 546
US-A- 5 873 528
US-A1- 2004 134 670
US-A1- 2006 175 428
US-B1- 6 394 366
US-B1- 6 460 344

DESCRIPTION

Area of the Invention

[0001] This invention relates in general to spray nozzle assemblies and in particular to the type of spray nozzle having a check valve which is specifically adapted to be used with spray drying nozzles, but could also be used in association with other nozzles.

Background to the Invention

[0002] For ease of description, we shall refer to such a spray nozzle assembly in terms of one associated with spray drying of milk.

[0003] In general spray nozzles which are provided with swirl chambers and orifice discs have these components manufactured from tungsten carbide or the like which is very hard but also brittle and prone to damage when dropped or other wise roughly treated during assembly and disassembly.

[0004] When ordinary spray nozzles are used for spray drying milk a certain percentage of the liquid simply fell as drops from the nozzles, without being atomized, and this material could well lead to pollution of the product.

[0005] To avoid this problem a unitary check valve was developed for spray drying nozzles, and other nozzles, which caused little restriction in the flow through the nozzle and which, at the same time, did not have any parts likely to be passed into the fluid stream.

[0006] Conventional check valves however have sealing problems when operated at high pressures and are not necessarily as compact as would be desirable.

[0007] US6394366 and US4613079 each disclose a spray nozzle assembly having components housed within a body formed from an engagable lance adaptor and spray nozzle retainer cap and having a housing for protecting an internal wear component from damage.

Outline of the Invention

[0008] It is an object of the invention to ameliorate the above problems associated with spray nozzles, and particularly those used in association with check valves, and to provide general improvements in the assembly and construction of spray nozzle components.

[0009] In accordance with the present invention, as defined by claim 1, there is provided a

spray nozzle assembly of the kind disclosed in US6394366 and US4613079, which is characterised in that the assembly comprises a further housing for protecting a further internal wear component from damage and a clasp device for locating and securing the wear components in the cap, wherein the wear components and housings clip in to the clasp device in which they are retained by means of arm members, wherein the wear component comprises a swirl chamber and the further wear component comprises an orifice disc.

[0010] It is preferred that these housings be manufactured from a durable material such as stainless steel however any appropriate material is included within the scope of the invention.

[0011] It is further preferred that the orifice disc and the swirl chamber be retained in their respective housings by means of a peened over retaining edge about their peripheries thus making these parts and respective housings unitary objects.

[0012] The precise means whereby the wear parts and housings clip in to the clasp device is effected is not restricted in the invention. A preferred means however is the engagement of the terminal ends of the arms with corresponding lugs on engaging flats of the wear parts.

[0013] A preferred feature of the invention is the provision within a spray nozzle assembly of a first O ring which seats within a lance adapter and is held compressively by the retainer cap when assembled and a second O ring within the retainer cap which compressively seals under the load applied by a clasp used to locate the swirl chamber and orifice disc components.

[0014] The arrangement is such that each O ring is compressed independently of the other.

[0015] Previously such sealing had been effected by means of flat washers or axial gland seals, both of these being less effective at high pressures. This could be partially addressed with support backup rings however are difficult to install on a regular basis and expensive to replace and have limitations at elevated pressures. The use of the O rings as described here addresses these problems and are highly effective in such a static arrangement at much higher pressure levels than previously possible.

[0016] The wear components in the spray nozzle are preferably provided with durable housings into which they are located.

[0017] In a further embodiment of the invention a swirl chamber or orifice plate can be provided which is smaller in diameter than that which would be conventionally used such that, when a housing is applied about their peripheries, the resulting diameter of each is then that of conventional such devices.

[0018] It is therefore preferred that these be able to be retro fitted to existing spray nozzle assemblies.

[0019] In an embodiment of the invention in which a check valve is included the perforated

sleeve covering the valve is provided with locating pins positioned at the end of the sleeve furthest from the nozzle in order to minimise the length of the spray nozzle assembly.

[0020] A threaded end on the retainer cap preferably engages with an internal thread in the lance adapter such that no exterior threads are provided on the assembled spray nozzle assembly and as such damage to external threads cannot occur.

[0021] In order that the invention may be more readily understood we shall describe by way of non limiting example one particular embodiment of the invention with reference to the accompanying drawings.

Brief Description of the Drawing Figures

[0022]

Fig.1 Shows an exploded diagram of the components of the invention; and

Fig. 2 Shows an assembled section view of the nozzle assembly of the invention.

Description of Embodiments of the Invention

[0023] In a first embodiment of the invention 10 a spray nozzle is provided, within its lance adapter 20 and retainer cap 30 components, with a clasp device 40 which at a first end 41 seats compressively against an O ring 60 located in sealing arrangement within the lance adapter.

[0024] An opposing end of the clasp 42 is provided with a seat 43 for a swirl chamber 50 and orifice disc 70 assembly, the clasp also being provided with arm members 44 which pass over the wear parts and compressively abut an O ring 80 within the retainer cap which provides a seal.

[0025] During use of such a spray nozzle it is common for the material being sprayed to adhere to the contacting components however with the device of the invention the provision of this clasp permits the wear parts to be simply removed upon rotation of the clasp thereby avoiding the damage to the wear parts caused by the conventional pressing out of the wear parts by an arbor press or other such means.

[0026] The swirl chamber 50 is located within a housing 55 of stainless steel to provided a strong swirl chamber assembly. Similarly the orifice disc 70 is surrounded by a stainless steel housing 75 which protects it from any damage that might otherwise result from dropping or

handling during assembly and disassembly.

[0027] The swirl chamber and the orifice disc are retained in their housings as unitary devices by the peening of a peripheral edge of each housing over these devices.

[0028] These wear items are manufactured typically from tungsten carbide which is relatively expensive and brittle. By providing smaller diameter orifice discs and swirl chambers expense is spared as well as the devices being protected from damage by their housings.

[0029] It is also envisaged that these wear items be provided in situ in their housings at the same size as conventional such items which also permits them to be retro fitted to existing spray nozzle assemblies.

[0030] Although the materials described are preferred they are not restricted in the invention.

[0031] In a second embodiment of the invention a check valve is provided within the spray nozzle assembly. In this embodiment the first end 41 of the clasp passes generally over the perforated sleeve 90 covering the valve spring 100. This first end of the clasp in turn seats compressively against an O ring 60 located against a shoulder 25 within the lance adapter 20 to form a seal.

[0032] The lance adapter 20 and end cap 30 engage by means of a screw thread 31 located within one end of the lance adapter and the exterior of one end of the end cap the arrangement being such that when screw connection of these components has been effected no external thread is present which could be damaged by contact.

[0033] Whilst we have, in this specification, described one general form of a spray nozzle and one particular arrangement of the nozzle with a check valve, it will be understood that other spray nozzle forms, which operate in the same manner as that described, can readily be utilised in the invention, which is defined by the appended claims.

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- US6394366B [0007] [0009]
- US4613079A [0007] [0009]

Patentkrav

- 1.** Sprøjtedyseanordning (10) med komponenter indeholdt i et legeme dannet fra en indgribelig lanseadaptor (20) og sprøjtedyse-fastholdehætte (30) og som har et hus (55) til at beskytte en indre slidkomponent (50) mod skade, **kendetegnet**
- 5 **ved, at** anordningen omfatter et yderligere hus (75) til at beskytte en yderligere indre slidkomponent (70) mod skade og en spændeindretning (40) til at lokalisere og fastgøre slidkomponenterne (50, 70) i hættens (30), hvor slidkomponenterne (50, 70) og husene (55, 75) spænder ind i spændeindretningen (40) i hvilken de fastholdes ved hjælp af armelementer (44), hvor slidkomponenten omfatter et
- 10 hvirvelkammer (50) og den yderligere slidkomponent omfatter en åbningsskive (70).
- 2.** Sprøjtedyseanordning (10) ifølge krav 1, hvor husene (55, 75) er fremstillet fra et slidbestandigt materiale såsom rustfrit stål.
- 15
- 3.** Sprøjtedyseanordning (10) ifølge krav 2, hvor hvirvelkammeret (50) og åbningsskiven (70) fastholdes i deres respektive huse (55, 75) ved hjælp af en tilhamret fastholdelseskant omkring deres periferier.
- 20 **4.** Sprøjtedyseanordning (10) ifølge et hvilket som helst af kravene 1 til 3, med tilvejebringelsen i sit legeme af en første O-ring (60), som sidder inden i lanseadaptoren (20) og holdes komprimeret af fastholdehætten (30), når samlet, og en anden O-ring (80) i fastholdehætten (30), som komprimeret tætnes under en belastning påført af spændet (40).
- 25
- 5.** Sprøjtedyseanordning (10) ifølge krav 4, hvor hver O-ring (60, 80) er komprimeret uafhængigt af hinanden.
- 6.** Sprøjtedyseanordning (10) ifølge et hvilket som helst af kravene 1 til 5, som
- 30 inkluderer en kontraventil, hvor et perforeret hylster (90) dækker ventilen er forsynet med positionsstifte positioneret ved en ende af hylsteret længst fra dysen for at minimere længden af sprøjtedyseanordningen (10).

7. Sprøjtedyseanordning (10) ifølge et hvilket som helst af kravene 1 til 6, hvor en gevindende (31) på fastholdehætten (30) indgriber med et indre gevind (25) i lanseadaptoren (20), således at ingen udvendige gevind er tilvejebragt på den samlede sprøjtedyseanordning (10) og hvorved skade på udvendige gevind ikke
5 kan forekomme.

8. Sprøjtedyseanordning (10) ifølge krav 1, hvor terminale ender af armelementerne (44) indgriber med tilsvarende ører på indgrebsflader af de indre slidkomponenter (50, 70).

DRAWINGS

