A device for the aspiration of waste, in particular for machinery used in the production of textiles.

The invention concerns a device for the aspiration of waste, in particular for machinery used in the production of textiles.

The device comprises an ejector (1) which, by means of the action of the flow M of primary fluid, aspirates waste from a secondary fluid conduit (2) which has one of its extremities positioned in the immediate vicinity of the part of the machine which produces the waste; the mixture of primary and secondary fluid containing the waste leaves the ejector (1), thus being distanced from the machinery, by passing through the successive cylindrical and conical sections (3a, 3b, 3c, 3d, 3e, 3f) of the primary fluid conduit (3) of the device.
A DEVICE FOR THE ASPIRATION OF WASTE, IN PARTICULAR FOR MACHINERY USED IN THE PRODUCTION OF TEXTILES.

The invention relates to a device for the aspiration of waste, in particular for machinery used in the production of textiles.

During operation, many continuous textile machines produce waste constituted of long, thin strands of material which have been trimmed from the lengths of material under production. These strands, often considerable in volume, cause problems to the machine and therefore must be removed.

If the waste is constituted of continuous strands, it can be eliminated by being rolled around spools which, turning around their own axis, collect the waste in bobbins which can then be removed. This kind of device, apart from creating some discontinuity problems when full and the spools must be substituted, are in any case unable to eliminate short-length waste, or waste which breaks under the slightest pressure.

To eliminate such waste the present art embraces aspirators constituted of a closed container inside which, by means of a pump, a vacuum is created which aspirates the waste produced by the machine. This type of device is able to aspirate both continuous strands and discontinuous waste, but has the notable disadvantage of causing interruption of work whenever the container is full and must be substituted. With these devices there is the further disadvantage that the containers required must be quite large and must be positioned in close proximity to the textile machine in order not to suffer from excessive lowering of vacuum levels with consequent difficulty of aspiration of waste due to the excessive length of the aspiration tube that aspirates the waste and collects it in the container.

Aim of the present invention is to eliminate the above-described disadvantages by providing a device which permits of aspiration of waste of both good length and short length, which does not necessitate interruption in aspiration of the waste and therefore the consequent interruption of machine function, and which permits of the accumulation of waste at a notable distance from the actual machine.

An advantage of the device in question is represented by the fact that it may be installed to existing machines without difficulty.

These advantages and others are all reached by the present device, as described in the claims which follow, which comprises an ejector provided with a secondary fluid conduit which is positioned in the immediate vicinity of the part of the machine producing the waste; the secondary fluid conduit connects into a primary fluid conduit which causes depression in said secondary fluid conduit and which collects a fluid mixture comprising the primary and secondary fluids, the secondary containing the aspirated waste, and carries the mixture away from the machine which produces the said waste.

Further characteristics and advantages of the present invention will better appear in the claims which follow of a preferred but not unique embodiment of the device in question, illustrated here in the form of a non-limiting example, with reference to the accompanying illustration which shows a vertical elevation section.

The device comprises an ejector (1) provided with a secondary fluid conduit (2) and a primary fluid conduit (3). The primary fluid conduit (3) is provided with several conduit sections, all arranged coaxially; precisely these are: the first section (3a); the second section (3b); the third section (3c); the fourth section (3d); the fifth section (3e); and the sixth section (3f). The conduit is further provided with an inlet (4) arranged with its axis perpendicular to the primary fluid conduit (3), through which the pressurised primary fluid flow (M), usually air, coming from a blower not illustrated in the diagram, is directed into the primary fluid conduit (3).

The first section (3a) on the primary fluid conduit (3) is conical and is convergent in the direction of the flow of the fluid; the second section (3b) is cylindrical; the third section (3c) is conical and is convergent in the direction of the flow of the fluid; the fourth section (3d) is cylindrical; the fifth section (3e) is conical and divergent with respect to the direction of the flow of the fluid; the sixth section (3f) is cylindrical and has a larger diameter than the second section (3b).

The secondary fluid conduit (2) is cylinder-shaped and is arranged coaxially to the primary fluid conduit (3). Its first extremity (2a) is positioned in the immediate vicinity of the part of the machine which produces the waste; the second extremity (2b) of the secondary fluid conduit (2) is inserted coaxially in to the primary fluid conduit (3), in correspondence with the first section (3a) of the primary fluid conduit (3). The external diameter of the secondary fluid conduit (2) and in particular of its extremity (2b) is inferior to the internal diameters of the conical section (3a) except for the diameters nearest to the lower base of said conical section (3a), which, for reasons that will be more fully explained below, has diameters which are slightly inferior to the external diameter of the extremity of section (2b).
The secondary fluid conduit (2) is mobile in an axial direction with respect to the primary fluid conduit (3), and in particular its extremity (2b) is mobile in an axial direction with respect to and inside the conical section (3a). Means of fixing the secondary fluid conduit (2) in a plurality of positions with respect to the primary fluid conduit (3) are envisaged; such fixing means comprise a screw (6) which, to prevent sliding of the secondary fluid conduit (2), is screwed against said conduit (2) and which, when unscrewed so that it no longer has contact with said conduit (2), permits of sliding the conduit (2) inside a collar (5) whose lower part is fixed coaxially to the primary fluid conduit (3).

An annular gap is created between the extremity (2b) of the secondary fluid conduit (2) and the internal wall of section (3a) whose radial breadth can be varied simply by varying the position of the secondary fluid conduit (2) with respect to the primary fluid conduit (3). The diameters of extremity (2b) and section (3a) are such that the breadth of the gap can be reduced to nothing, even if this never actually happens during functioning of the device.

The fluid that enters through the inlet (4) crosses the above-described annular gap, raising considerably its kinetic energy and thus causing aspiration inside the secondary fluid conduit (2) by means of the Venturi effect.

It should be noted that the secondary fluid conduit (2) is slotted airtight into the collar (5) in such a way as to avoid primary fluid escape from the lower part of the ejector.

The functioning of the device is described below.

The flow of primary fluid enters from the inlet of the ejector and, crossing the annular gap arranged between the extremity (2b) of the secondary fluid conduit (2) and section (3a) of the primary fluid conduit (3), creates a depression inside the secondary fluid conduit (2) which causes thus the aspiration of secondary fluid in the direction indicated by arrow A; since extremity (2a) of the secondary fluid conduit is positioned in close proximity to the place where the waste is produced, said waste is aspirated together with the secondary fluid.

The mixture of primary and secondary fluid containing the waste which is thus formed in section (3b) of the primary fluid conduit (3) proceeds along said conduit (3), borne by the kinetic energy of the primary fluid and leaves the ejector at the point indicated by arrow S. At section (3f) of the ejector a further conduit can be applied, of considerable length if necessary, which can carry the mixture of fluids containing the waste, to a location at a great distance, if required, from the machine itself.

The possibility of sliding the secondary fluid conduit (2) with respect to the primary fluid conduit (3), and thus the possibility of varying the dimensions of the annular gap created between said conduits (2) and (3), permits of regulating finely the functioning of the device with respect to the volume and weight of the waste to be aspirated.

The particular conformation of the primary fluid conduit (3), and in particular the sequence of sections (3b, 3c, 3d, 3e, and 3f) which cause successive transformations of the relationship between the velocity and the pressure of the fluid mixture, permit of obtaining an optimisation of the volume of secondary fluid aspirated in relation to the volume of and energy possessed by the primary fluid.

The device, which has been described in particular for the aspiration of waste material from machinery used in the production of textiles, can be used also for the aspiration of other kinds of waste, as long as it has analogous characteristics with regard to size and weight to the waste produced in the production of textiles.

Claims

1) Device for the aspiration of waste, in particular for machinery used in the production of textiles, comprising an ejector (1) provided with a secondary fluid conduit (2), one of whose extremities (2a) is positioned in the immediate vicinity of the part of the machine which produces the waste, and whose second extremity (2b) is inserted coaxially into the first section (3a) of a primary fluid conduit (3) having an internal diameter which is superior to that of the external diameter of the second extremity (2b).

2) Device as in claim 1, wherein said first section (3a) of the primary fluid conduit (3) is conical and is convergent in the direction of the flow of the fluid; the second extremity of the secondary fluid conduit (2) is mobile in an axial direction with respect to the first section (3a) of the primary fluid conduit (3); wherein a means of fixing said second extremity (2b) of the secondary fluid conduit (2) in a plurality of positions with respect to the primary fluid conduit (3) is comprised.

3) Device as in claim 1, wherein said primary fluid conduit (3) comprises, below said first section (3a); a second, cylindrical section (3b) having a diameter about the same as that of the secondary fluid conduit (2); a third section (3c), conical and convergent in the direction of the flow of the fluid; a fourth section, cylindrical (3d); a fifth section (3e) conical and divergent with respect to the direction of the flow of the fluid; a sixth section (3f) having a diameter superior to that of the secondary fluid conduit (2).
4) Device as in claim 1, comprising a collar (5) fixed to the posterior extremity of the primary fluid conduit (3), by which the secondary fluid conduit (2) is fixed airtight into the primary fluid conduit (3).
**DOCUMENTS CONSIDERED TO BE RELEVANT**

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<thead>
<tr>
<th>Category</th>
<th>Citation of document with indication, where appropriate, of relevant passages</th>
<th>Relevant to claim</th>
<th>CLASSIFICATION OF THE APPLICATION (Int. Cl.)</th>
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</thead>
<tbody>
<tr>
<td>A</td>
<td></td>
<td>3</td>
<td></td>
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<tr>
<td>X</td>
<td>US-A-3564958 (RICHTER) * column 3, lines 64 - 72; figure 2 *</td>
<td>1, 2, 4</td>
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<td>3</td>
<td></td>
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<td>A</td>
<td>EP-A-0146898 (TORAY) * figures 1, 11, 15, 23, 24 *</td>
<td>1, 3</td>
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**TECHNICAL FIELDS SEARCHED (Int. Cl.)**

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