

(19)



Europäisches Patentamt
European Patent Office
Office européen des brevets



(11) Publication number:

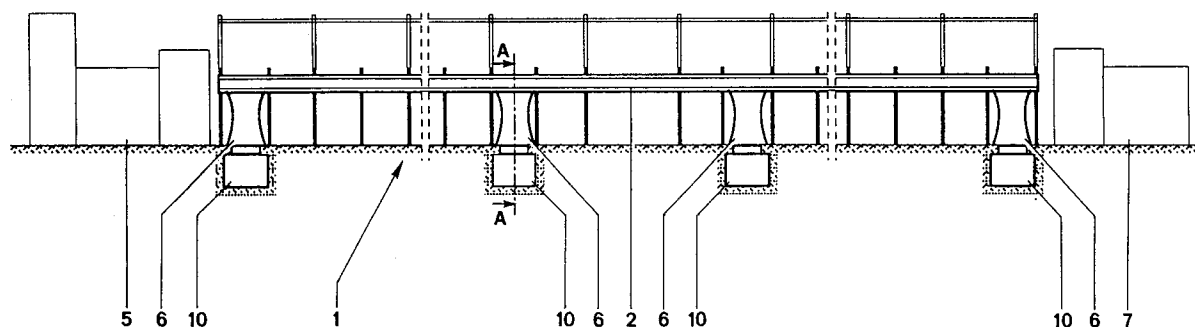
0 487 120 A1

(12)

EUROPEAN PATENT APPLICATION(21) Application number: **91202717.4**(51) Int. Cl.⁵: **D01H 11/00, B65H 54/70**(22) Date of filing: **19.10.91**(30) Priority: **23.10.90 IT 2182990**(43) Date of publication of application:
27.05.92 Bulletin 92/22(84) Designated Contracting States:
AT BE CH DE DK ES FR GB GR LI LU NL SE(71) Applicant: **SAVIO S.p.A.**
Via Udine 105
I-33170 Pordenone(IT)(72) Inventor: **Sartoni, Sandro**
Via Pendini 1/A
I-40026 Imola Bologna(IT)
Inventor: **Mirri, Alessandro**
Via Emilia Ponente 9
I-40026 Imola Bologna(IT)(74) Representative: **Henke, Erwin et al**
Ing.Barzanò & Zanardo Milano S.p.A. Via
Borgonuovo, 10
I-20121 Milano(IT)(54) **Improvements in spinning machines with suction provided by a works central suction system.**

(57) The invention provides improvements in spinning machines producing textile yarns and comprising a pneumatic system for removing dust, fibre web, broken yarn ends and the like, said improvements including a suction system composed of a single manifold duct (2) which extends along the

entire spinning face parallel to the machine axis and is put under vacuum by the works central suction system via vertical conduits (6) which directly connect said manifold duct (2) to the ducting (10) of said works central suction system.

Fig.1**EP 0 487 120 A1**

This invention relates to improvements in the pneumatic system provided for removing dust, fibre web and broken yarns in spinning machines, in particular ring spinning machines, which produce yarn for depositing on rod-shaped tubes in order to form wound yarn packages.

Said ring spinning machines comprise a plurality of working positions, normally on two opposing faces, and are therefore of considerable length.

Textile machines comprise suction ducts used for the most varying purposes, such as to clean determined parts of the machine, to remove fibre dust and to draw in excess yarn ends or cut-off yarn pieces and the like. It is well known that in drafting systems on spinning machines, a fibre sliver consisting of an assembly of fibres of a certain length is subjected to considerable traction with the result that a certain quantity of fibres, particularly the short fibres, separate to form dust. It is therefore necessary to clean the drafting components and to remove the spinning fly and dust from the various machine parts and from the yarn under formation. Any pieces of broken yarn also have to be drawn off. To achieve this, the suction action must be efficient and uniform along the entire spinning face. In addition, the spinning faces of ring spinning machines are known to extend horizontally for a considerable length, namely for several tens of metres, given that the number of spinning spindles can be of the order of one thousand, one following another.

The cross-section of the suction air duct and the power of the pneumatic system must therefore be relatively large, with a consequently high system and operating cost for this service. In addition, given the considerable length of ring spinning machines, the draw-off of dust, fibres, broken yarns etc. in known systems is insufficiently continuous in those regions furthest from the suction fan or other motorized device which provides the suction action. The air throughput in a centralized suction system in which a suction duct extending along the entire spinning face serves all the spinning spindles via suction nozzles or slots is equal to the total air quantity required to provide energetic suction action at all the spinning spindles.

To achieve proper pick-up of broken yarn and filament particles together with their effective conveying into the collection housing at the machine headstock where the suction fan and filters are located, the air velocity in the ducts and through the suction slots must be sufficiently high, and the vacuum produced must take account of the overall and localized pressure drops.

Known constructions suffer from problems such as the retention of a certain number of fibre and yarn pieces in the suction tubes acting on the spinning spindles located in the regions furthest

from the fan in the machine headstock.

Fibres, dust and broken yarns which have not been properly drawn in by the suction tubes often trigger a build-up which obstructs the suction action required for continuous cleaning of the spindles, which then suffer from a progressive deposition of fibre dust on their various parts and on the yarn under formation. The result is that irregularities and defects appear in the yarn to the detriment of quality, such irregularities leading in the limit to yarn breakage either during its formation or during the subsequent yarn working stages. The reasons for all this are the provision of only one suction duct from which all the suction tubes extend, there being more than one for each spinning spindle, and the provision of only one suction fan, located only at the headstock end of the spinning machine. The provision of only one suction duct and suction fan do not sufficiently guarantee a substantially uniform suction along the entire spinning face, with the consequence that the fibrils and dust which deposit on the various spinning machine members are not effectively removed, so compromising proper spinning.

Secondly, the slots in the suction tubes, which are of narrow cross-section, easily and frequently clog due to the fact that the suction action is weak, so that the suction efficiency is considerably reduced after a few hours of operation, making frequent maintenance and cleaning of the suction slots necessary. In addition, the said maintenance and cleaning of the suction slots requires considerable care by the service personnel, who are required to operate without any preprogrammed timing. It is a known fact that such random unprogrammed work results in low labour efficiency.

An object of the present invention is to provide a suction system for removing fibre dust and broken yarn pieces in spinning machines which is free of the aforesaid drawbacks and is able to function with greater effectiveness and for a longer time, without requiring frequent maintenance.

A further object of the present invention is to rationalize the construction of the pneumatic suction system of a ring spinning machine, both in terms of its capacity and in terms of its suction efficiency in effectively removing the fibrils and flying yarn pieces from the spinning spindles. A further object of the present invention is to provide a pneumatic suction system which is of new conception while at the same time being simple, and offering the facility for applying suction to further additional regions which complete the entire suction requirement in terms of any further functions required by the particular application under way.

These and further objects of the invention, which will be apparent from the description, are attained by improvements in a suction system in a

spinning machine of considerable length, in particular a ring spinning machine, wherein said suction system is composed of a single manifold duct which extends along the entire spinning face parallel to the machine axis and is put under vacuum by the works central suction system via vertical conduits which directly connect said manifold duct to the ducting of said works central suction system.

The suction tubes which operate to clean the drafting rollers and those which operate to clean the ring benches of both spinning faces and hence the plurality of spinning spindles of the ring spinning machine are all connected into the said single manifold duct.

The invention is described in greater detail hereinafter with reference to the accompanying drawings, which show one embodiment thereof given by way of non-limiting example only.

Figure 1 is a schematic longitudinal frontal view of the suction system of a ring spinning machine according to the present invention, showing in particular the single manifold duct which extends along the entire spinning face and is put under vacuum by the works central suction system via vertical conduits which directly connect said manifold duct to the ducting of said works central suction system.

Figure 2 is a schematic frontal section of Figure 1 taken on the line A-A, said section showing the suction manifold duct and a vertical conduit; this latter directly connects the single manifold duct to an underlying duct of the works central suction system, the figure also showing schematically a known ring spinning spindle and the overlying drafting unit.

In the figures, corresponding parts or parts with identical functions are indicated for simplicity by the same reference numerals.

The various units and equipment which in combination form the yarn in the ring spinning machine, in which the improved suction system of the present invention is incorporated, are neither illustrated nor operationally described as they are already known, and are not involved in the improvement of the present invention.

In the accompanying figures:

1 schematically indicates the ring spinning machine which comprises two opposing faces with a large plurality of working positions and is hence of considerable length; 2 is the single suction manifold duct which extends along the entire spinning face between the machine ends 5 and 7 parallel to the longitudinal axis of the machine 1. Said suction manifold duct 2 is put under vacuum by the works central suction system via vertical conduits 6, which directly connect it to the ducting 10 of said central suction system of the textile mill; 14 and 16

are suction tubes extending from the manifold duct 2, said tubes 14 and 16 applying suction on both the opposing spinning faces in proximity to the ring bench 9 of the spindle 18. The formation of fibrous dust about the spindle 18 takes place mainly as the spinning ring positioned on the ring bench 9, as is well known to the expert of the art. Said suction tubes 14 and 16 enter the manifold duct 2 in a direction inclined both to a plane perpendicular to and to a plane parallel to the axis of the manifold duct 2.

The angles of inclination to said planes of the direction in which the suction tubes 14 and 16 enter the manifold duct 2 are such that the air in entering the duct 2 does not undergo a sharp direction change, hence considerably reducing localized pressure drops. The suction slots in the tubes 14 and 16 can be of various geometrical forms, for instance a substantially circular or oval geometrical form, or the form of an actual thin rectangular slit, or other forms; 11 and 15 are suction tubes entering the upper part of the manifold duct 2, said tubes 11 and 15 each operating on one spinning face opposite the other. They are arranged with their entry slots in a position corresponding with the region immediately below the exit rollers of the drafting unit 19 to effectively remove those fibres which separate from the fibre web in this region, as is well known to the expert of the art. Said suction tubes 11 and 15 enter the suction manifold duct 2 advantageously inclined thereto in virtually the same manner as described for the suction tubes 14 and 16.

The entry slots in said suction tubes 11 and 15 can take varied geometrical forms, for example a substantially circular geometrical form, or the form of a thin rectangular slit, or other thin forms.

The operation of the improved pneumatic suction system of the present invention shown in the figures of the accompanying drawings is immediately apparent.

The fibre dust and yarn pieces which form about the spinning spindle 18 and drafting unit 19 are drawn through the entry slots of the upper tubes 11 and 15 and through the entry slots of the lower tubes 14 and 16, and are conveyed within the single manifold duct 2 from which they pass into the ducting 10 of the works central suction system via the vertical conduits 6. More than one of these latter are present to provide effective connection between said duct 2 and said ducting 10.

It is apparent that modifications can be made to the improvement in the pneumatic suction system proposed in the present invention, but without leaving the scope of the inventive idea.

Claims

1. Improvements in spinning machines producing textile yarns to be deposited on tubes in order to form wound yarn packages and which comprise a suction system for removing dust, fibre web, broken yarn ends and the like, characterised in that said suction system is composed of a single manifold duct which extends along the entire spinning face parallel to the machine axis and is put under vacuum by the works central suction system via vertical conduits which directly connect said manifold duct to the ducting of said works central suction system. 5
10
2. Improvements in spinning machines producing textile yarns as claimed in claim 1, characterised in that the suction tubes which operate to clean the drafting rollers and those which operate to clean the ring benches are all connected into the single manifold duct. 15
20

25

30

35

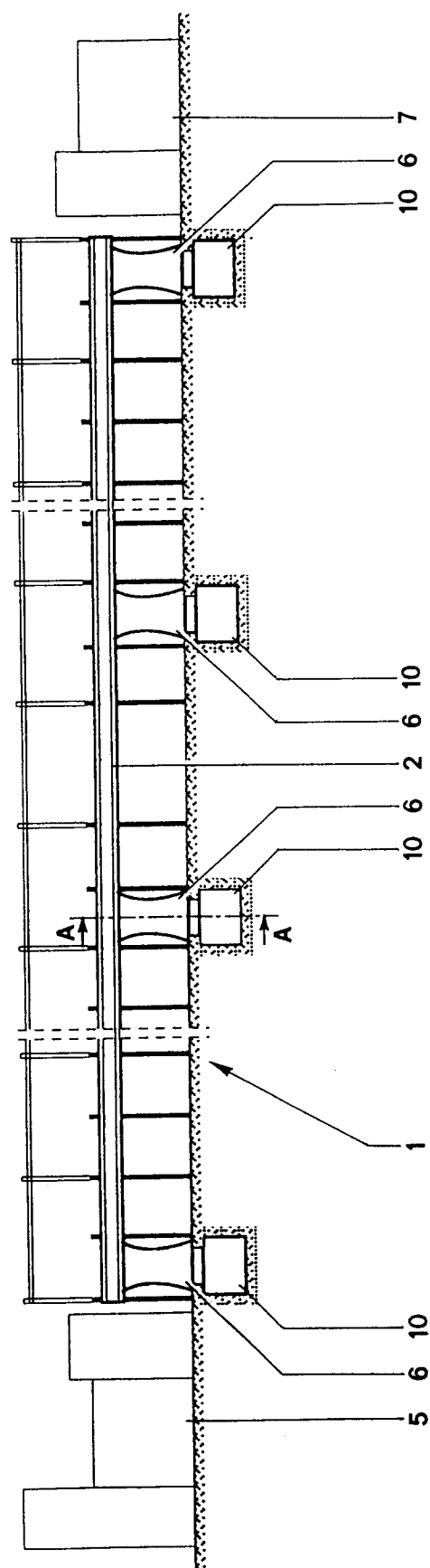
40

45

50

55

Fig. 1



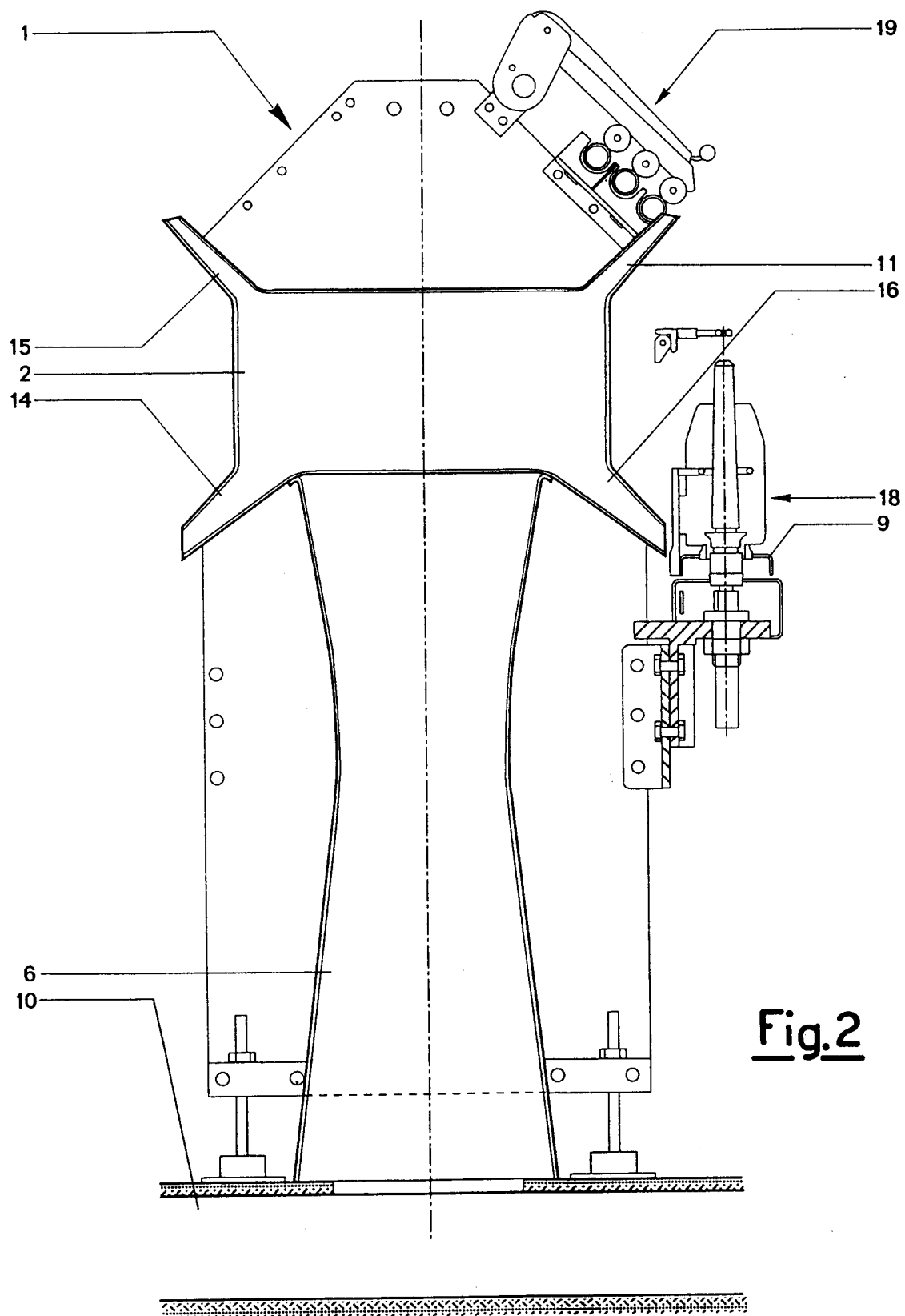


Fig. 2



European Patent
Office

EUROPEAN SEARCH REPORT

Application Number

EP 91 20 2717

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.5)
X	DE-U-8 908 921 (ZINSER TEXTILMASCHINEN) * the whole document * ---	1,2	D01H11/00 B65H54/70
X	PATENT ABSTRACTS OF JAPAN vol. 11, no. 262 (C-442)(2709) 25 August 1987 & JP-A-62 062 936 (NISSHINBO IND) 19 March 1987 * abstract * -----	1,2	
			TECHNICAL FIELDS SEARCHED (Int. Cl.5)
			D01H B65H
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 05 FEBRUARY 1992	Examiner HAGBERG A.M.E.
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			