

EUROPEAN PATENT APPLICATION

Application number: 86115660.2

Int. Cl.4: D01H 11/00

Date of filing: 11.11.86

Date of publication of application:
 18.05.88 Bulletin 88/20

Designated Contracting States:
 AT BE CH DE ES FR GB GR LI LU NL SE

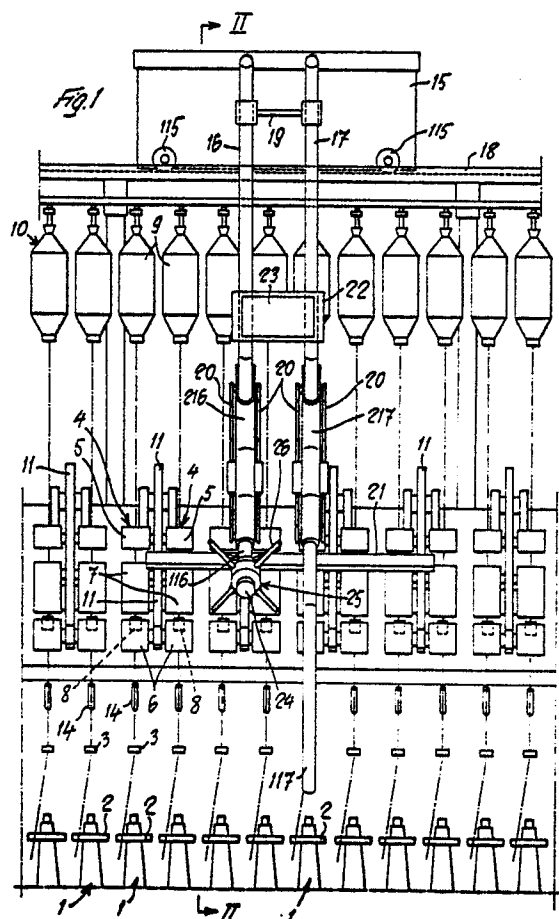
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Spinning machine.

In a spinning machine with a plurality of aligned spinning places (1,2,3,4) and with arms (11) which are associated with drafting assemblies (4) and project upwardly therefrom, a pneumatic cleaning device (15,16) is provided, which can run along the spinning machine and comprises a spoke wheel (25) being mounted for rotation around its axis (116) which is orientated transversely to the direction of movement of the pneumatic cleaning device, and is located over the upper edge of said projecting arms (11). The suction nozzles (26) in operative position extend as close as possible to the area to be cleaned of the drafting assemblies (4). While the pneumatic cleaning device is being moved along the spinning machine, each projecting arm (11) is met by a suction nozzle (26) being in operative position, so that it automatically brings about the rotation of the spoke wheel (25) so as to cause the same to pass over arm (11) and to move another suction nozzle (26) into operative position.



"Spinning machine"

The invention refers to the spinning machines with a plurality of spinning places set in an aligned side-by-side relation, and comprising each a drafting assembly and a successive spinning unit, a fiber condenser being possibly arranged in the area of the pair of outlet rollers in the drafting assembly, and constructional elements that project in the upward direction sensibly over the operating members of the drafting assemblies, being provided between each one of the spinning places, or between groups of two or more spinning places.

In one known embodiment of the spinning machines of this type, the said constructional elements projecting upwardly from the drafting units, consist of arms which carry the pressure rollers and/or other members performing a function, or being meant for adjusting the drafting assemblies, particularly both the drafting assemblies of two adjacent spinning places, which arms may be either stationary or movable arms and, more particularly, they may consist of so-called rocking or swing arms.

Both the drafting assemblies and the spinning units may be of any suitable type. In one known construction of the spinning machines of the above stated type, the spinning units consist of ring spinning units.

In spinning machines of a type differing from the above disclosed one, it is known to provide pneumatic cleaning devices which are moved in the one and the other direction along the spinning machine, and comprise a suction member which is meant for sucking any fly fibers, any spinning fly, and the like, from the drafting assemblies, particularly from the area of the fiber condenser. The application of these pneumatic cleaning devices to the spinning machines of the type as disclosed in the preamble, however was till now impossible. In fact, in order to enable the suction member to pass over the constructional elements projecting upwardly beyond the drafting assemblies, between each one of the spinning places, or between groups of spinning places, the suction member comes to be located at a too far distance from the operating members of the drafting assemblies, particularly from their fiber condensers. Consequently, in order to obtain an efficient cleaning action, the suction applied by the suction member must have an excessive intensity, which may disturb the regular operation of the drafting assemblies and/or of any other devices associated with the spinning places, and such an intensity cannot be always obtained or, to be obtained, it requires high power aspirators having then great overall dimensions and prohibitive costs for their purchase and operation.

The invention aims to eliminate the above stated problems, and to provide also the spinning machines of the type as described in the preamble, with a pneumatic cleaning device applying an efficient suction on the drafting assemblies, and particularly on their fiber condensers, without increasing the suction intensity of the suction member above the one which was up to now applied in the other spinning machines having no upwardly projecting constructional elements, between each one of the spinning places, or between groups of spinning places.

This problem is solved by the features as set forth in claim 1.

According to the invention, the suction member of the pneumatic cleaning device which is movable in the one and the other direction along the spinning machine, consists of two or more suction nozzles forming a spoke wheel which is mounted for rotation around its axis that is orientated transversely to the direction of movement of the pneumatic cleaning device, and is located over the upper edge of the upwardly projecting constructional elements, between each one of the spinning places, or between groups of spinning places. When the pneumatic cleaning device is at, or passes by, for example, a spinning place or spinning places between two of the said upwardly projecting constructional elements, one suction nozzle in the suction nozzles spoke wheel is directed toward the area to be cleaned of the drafting assembly in each spinning place, particularly toward the area of the fiber condenser, and in operative position it extends as close as possible to said area. When the cleaning device being moved along the spinning machine passes to the adjacent spinning place or to the adjacent group of spinning places, a suction nozzle which is in operative position, abuts against the upwardly projecting constructional element between two successive spinning places or between two successive groups of spinning places, and thus automatically brings about the rotation of the spoke wheel formed by the suction nozzles, so as to cause the suction nozzles spoke wheel to pass over the said upwardly projecting constructional element, and to turn another suction nozzle in this spoke wheel toward the area to be cleaned of the drafting assembly in the successive spinning place or places. Such an operation is obtained in both of the travel directions of the pneumatic cleaning device along the spinning machine. It is also apparent that in the spinning machine according to the invention, the suction member of the pneumatic cleaning device is allowed to come in the highest possible degree

near to the area to be cleaned of the drafting assemblies in the several spinning places of the spinning machine, notwithstanding the constructional elements that project in the upward direction over the operative members of the drafting assemblies, between each one of the spinning places, or between groups of spinning places. Consequently, the suction intensity of the suction member can be maintained within acceptable limits from the viewpoint of operation and economy.

Further features of the invention are set forth in the dependant claims, and the advantages afforded thereby will result from the following specification of one preferred embodiment, diagrammatically shown by way of a non-limiting example in the accompanying drawings, in which:

Figure 1 is a front elevational view showing a section of a spinning frame according to the invention.

Figure 2 is a vertical cross-section through the said spinning machine, taken on line II-II in figure 1.

Figure 3 is an axial sectional view showing the rotatable spoke wheel formed by the suction nozzles.

The shown spinning machine consists, in known manner, of a plurality of spinning places set in an aligned side-by-side relation, and comprising each a spinning unit 1, such as, for example, a ring spinning unit, with an anti-balloon ring 2 and a supply thread guide ring 3 being associated therewith. Each spinning place comprises also a drafting assembly 4 arranged upstream of the respective spinning unit 1, between this unit and a relative delivery bobbin 9, which is mounted in an overlying bobbin creel 10. The drafting assemblies 4 may be made in any suitable manner, and comprise each a pair of inlet rollers 5 and a pair of outlet rollers 6. In the shown embodiment, between the two pairs of rollers 5 and 6 there is arranged a pair of tapes 7, which however may be omitted, or may be replaced with any other guide means, for example, with only one lower tape cooperating with an overlying roller, or with one or more pairs of rollers, or the like. In the region of the pair of outlet rollers 6, a fiber condenser which may be made in any suitable known manner, is arranged between these rollers and the tapes 7.

Between the drafting assemblies 4 of every two spinning places set side-by-side, there is provided an arm 11, so-called swing arm, which is pivotally connected at 12 to the spinning machine frame 13, and carries the upper rollers (pressure rollers) of the pairs of inlet rollers 5 and outlet rollers 6, as well as the upper tape of the two superposed tapes 7 or the upper roller cooperating with the lower tape 7, of both of the drafting assemblies 4 which are associated with a swing arm 11 and are ar-

ranged at both sides thereof. Each swing arm 11 may also carry the cleaning rollers (not shown) for the two drafting assemblies 4 that are associated therewith. The arms 11 extend in the upward direction sensibly over the operating members of the drafting assemblies 4, particularly over the path of the threads or rovings through the said drafting assemblies 4, and thus over the condensers 8, as it appears particularly in figure 2. Since the swing arms 11 are each associated with two side-by-side set drafting assemblies 4, between every two successive swing arms 11 there is a pair of spinning places, comprising each a drafting assembly 4 and a spinning unit 1.

Between each drafting assembly 4 and the relative spinning unit 1 there may be provided a suction opening 14 for the end of the thread hanging down from a drafting assembly 4, in the event of the thread breaking.

The spinning machine is additionally provided with a pneumatic cleaning unit comprising a wheeled box 15, which contains means for producing a suction within a pipe 16, and means for supplying an air pressure through a pipe 17. The wheeled box 15 can run along the spinning machine, and has its wheels 115 supported for this purpose on rails 18 provided on the spinning machine frame 13 over the bobbin creel 10. Associated with the wheeled box 15 are any suitable driving and control means (not shown) for moving it in the one and the other direction along the spinning machine. The two suction and blowing pipes 16, 17, respectively, are attached to the box 15 by, for example, a bracket 19, and extend downwardly along the front side of the spinning machine, and they are so constructed that it is possible to alter and adjust the position and/or the orientation of their lower end sections 116, 117. For this purpose, the end section 116 of the suction pipe 16 is connected through an intermediate flexible pipe section 216 to the suction pipe 16, and by means of a pair of articulated hanger arms 20 with a preferably variable length, is supported by the said suction pipe 16, as it appears particularly in figure 2. In a similar manner, also the end section 117 of the blowing pipe 17 is connected through an intermediate flexible pipe section 217 to the said pipe 17, and by means of a pair of articulated arms 20 with a preferably variable length, is suspended from the pipe 17. The end sections 116, 117 of the two suction and blowing pipes 16, 17 can be adjustably secured to an underlying supporting crosspiece 21 slidably bearing on the upper sides of a few swing arms 11 in the drafting assemblies 4. At a higher level than their intermediate flexible sections 216, 217, the two side-by-side pipes 16, 17 are interconnected by a further shorter crosspiece 22, which carries also the board 23 for controlling

the pneumatic cleaning device.

The end section 117 of the blowing pipe 17 extends as far as the spinning units 1, and is so positioned and orientated that its open mouth is directed toward the region of the thread guide rings 3 and the anti-balloon rings 2, to clean these rings by removing therefrom any fly fibers, any dust, and the like. The end section 117 of the blowing pipe 17 may also have a blowing nozzle 317 directed toward the region of the suction openings 14, to facilitate the penetration of the broken threads into the said openings 14.

The end section 116 of the suction pipe 16 is instead located at a height over the upper edge of the swing arm 11 projecting upwardly from the drafting assemblies 4, and has its extremity closed by, for example, a cap 24, as shown particularly in figure 3. On this end section 116 of the suction pipe 16 a suction member is mounted for a free rotation, and consists of a spoke wheel 25 formed by four suction nozzles 26, which are radially orientated and are angularly equispaced from each other. This spoke wheel 25 consists of a hub 27 which is rotatably mounted between the cap 24 closing the end section 116 of the suction pipe 16, and of a collar 28 which is secured to the said end section 116 of pipe 16. The single suction nozzles 26 consist of pipe lengths which are fitted in respective radial through bores in the hub 27. In correspondence of the ring of suction nozzles 26, a slot 29 is provided in the lower portion of the end section 116 of the suction pipe 16, and extends in the circumferential direction over, for example, an angle of about 95-100°, so that it connects to the suction pipe 16 the inward extremities of the suction nozzles 26 which come to be located in correspondence of said slot. The suction nozzles 26 are strengthened by a starlike plate 30 which is integral with the hub 27 of the spoke wheel 25 and has its points coinciding with the said suction nozzles 26.

The above disclosed pneumatic cleaning device can be moved automatically and alternatively in the one and the other direction along the spinning machine, either continuously or intermittently, so as to cause the lower end section 117 of the blowing pipe 17 to stop at each successive spinning place, and so as to cause simultaneously the end section 116 of the suction pipe 16 to stop between two successive drafting assemblies 4, this device can be otherwise moved by a hand-operated control or by an automatic, for example a programme control, into any one of the said positions along the spinning machine, wherever its action is required.

In any case, the spoke wheel 25 rotatably mounted onto the end section 116 of the suction pipe 16, is so positioned and orientated, and is so

sized that the following operation is obtained.

When the spoke wheel 25 formed by the suction nozzles 26 is located in a position between two swing arms 11 or over one swing arm 11 (figure 1), two downward suction nozzles 26 in the said spoke wheel are in operative position, i.e., they are each directed with their radially outward extremities toward the region of the fiber condenser 8 of one of the two drafting assemblies 4 lying at both sides of the axis of rotation (pipe section 116) of the spoke wheel 25, while their radially inward extremities communicate through the slot 29 with the suction pipe 16. Therefore, through these two downward suction nozzles 26 a suction is applied which is fit for cleaning the corresponding area of the drafting assemblies 4 and particularly the fiber condenser 8, by removing therefrom any fly fibers, any spinning fly, and any like dirt. Moreover, these two downward suction nozzles 26 which are in operative position, extend downward beyond the upper edge of the swing arms 11, as close as possible to the area to be cleaned of the respective drafting assemblies 4. Thus, the required cleaning is accomplished with a relatively low suction intensity, and so with suction devices having a limited power and an acceptable cost.

Any time the pneumatic cleaning device is moved in the one or the other direction along the spinning machine, by one step corresponding to the distance between two successive spinning places, so as to, for example, move the spoke wheel 25 formed by the suction nozzles 26, from the position astride of a swing arm 11, according to figure 1, to the intermediate position between this swing arm and the next-following one, one of the two downward suction nozzles 26 which are in operative position, abuts against the swing arm 11 lying still under the axis of rotation (pipe end section 116) of the spoke wheel 25, so that it causes this spoke wheel 25 to rotate automatically by 90°, thus enabling the same to pass over the underlying swing arm 11 and to move into the required intermediate position between this arm and the next-following one. In such a new position, two downward suction nozzles 26 in the rotatable spoke wheel 25 are again located in their operative position, in which they communicate through the slot 29 with the suction pipe 16, and are directed toward the region of the fiber condensers 8 of the two drafting units 4 lying at both sides of the axis of rotation (pipe section 116) of the suction nozzles spoke wheel 25.

The above described operation is repeated at the successive step by which the pneumatic cleaning device is moved. In the case of the pneumatic cleaning device being continuously moved along the spinning machine, the spoke wheel 25 formed by the suction nozzles 26 is caused to rotate

automatically by 90°, as disclosed above, every time one of its nozzles 26 abuts against a swing arm 11, so that it behaves like a suction wheel rolling along the spinning machine, passing automatically over the single swing arms 11, and applying a practically continuous cleaning suction along a zone coinciding with the area to be cleaned of the drafting assemblies 4.

Preferably, the points of the strengthening star plate 30, which are provided in correspondence of the single suction nozzles 26, are made so long that the swing arms 11 are met by the points of the strengthening star plate 30, and not directly by the suction nozzles 26. Thanks to the slot 29 provided in the bottom side of the end section 116 of the suction pipe 16, only the suction nozzles 26 which come to be in their downwardly turned operative position, are connected to the suction, while the other upwardly turned suction nozzles 26 do not apply any suction, and then they do not cause any functional nuisance or trouble.

The invention may be applied with the same advantages as above set forth, also to spinning machines in which between each one of the spinning places or between successive groups of two or more spinning places there are any other constructional elements which project upwardly into the region of the drafting assemblies 4, and which form obstacles like the above described swing arms 11.

Claims

1. A spinning machine with a plurality of spinning places set in an aligned side-by-side relation, and comprising each one drafting assembly (4) and a successive spinning unit (1), a fiber condenser (8) being possibly arranged in the area of the pair of outlet rollers (6) in the drafting assembly (4), and constructional elements that project in the upward direction sensibly over the operating members (5,6,7) of the drafting assemblies (4), being provided between each one of the spinning places or between groups of two or more spinning places, characterized in that it is provided with a pneumatic cleaning device (15; 16,116,216; 17,117,217,317) being movable in the one and the other direction along the spinning machine, and comprising a suction member (25) meant for sucking any fly fibers, any spinning fly, and the like, from the area of the drafting assemblies (4), particularly from the area of the possible fiber condenser (8), and comprising a plurality of suction nozzles (26) forming a spoke wheel (25) which is mounted for rotation around its axis (116) that is orientated transversely to the direction in which the pneumatic cleaning device is moved, and is located over the upper edge of the

constructional elements (11) projecting upwardly between the spinning places or between groups of spinning places, while the single suction nozzles (26) are so long that in operative position they extend as close as possible to the area to be cleaned of the drafting assemblies (4), particularly to the area of the possible fiber condenser (8), so that while the pneumatic cleaning device is being moved along the spinning machine, in correspondence of each upwardly projecting constructional element (11), such element is met by a suction nozzle (26) located in operative position, which automatically brings about the rotation of the spoke wheel (25) so as to cause the same to pass over the projecting constructional element (11), and as to move another suction nozzle (26) into operative position.

2. The spinning machine according to claim 1, characterized in that the constructional elements projecting upwardly between each one of the spinning places or between groups of spinning places, consists of arms (11) which are associated with the drafting assemblies (4), particularly of so-called swing arms, which carry the upper rollers (pressure rollers) in said drafting assemblies (4).

3. The spinning machine according to claims 1 and 2, characterized in that a common intermediate arm (11) is associated with every two drafting assemblies (4) set in a side-by-side relation, while the spoke wheel (25) has four suction nozzles (26) which are angularly offset by 90° from each other, and after each rotation of the spoke wheel (25), the two downward suction nozzles (26) are both located in operative position, and are each directed toward a drafting assembly (4).

4. The spinning machine according to any one or more of claims 1 to 3, characterized in that the spoke wheel (25) formed by the suction nozzles (26) is connected to a vacuum generating unit by means of suction distributing means which are automatically controlled by the rotation of the spoke wheel (25), and which connect to the vacuum generating unit only the downward suction nozzle or nozzles (26) being in operative position.

5. The spinning machine according to any one or more of claims 1 to 4, characterized in that by a hub (27) the spoke wheel (25) is rotatably mounted onto the end section (116) of a suction pipe (16) extending toward the area of the drafting assemblies (4) of the spinning machine from an overlying carriage (15) which can run on rails (18) along the spinning machine, while the suction nozzles (26) extend through the hub (27) of the spoke wheel (25) to the end section (116) of the suction pipe (16), and are set in communication with this pipe through a slot (29) provided in the lower portion of

the end section (116) of said pipe (16), in correspondence of the hub (27) of the spoke wheel (25).

6. The spinning machine according to claim 5, characterized in that the suction pipe (16) is connected to its end section (116) carrying the spoke wheel (25) formed by the suction nozzles (26), through an either flexible or articulated intermediate pipe section (216), and possibly by means of one or more hanger arms (20), which are articulated and/or of a variable length, so that it is possible to adjust the position and/or the orientation of the spoke wheel (25) formed by the suction nozzles (26).

7. The spinning machine according to any one or more of claims 1 to 6, characterized in that the pneumatic cleaning device additionally comprises blowing members (117,317) which are directed toward the region of the thread guide or thread guides (3) provided between the drafting assemblies (4) and the spinning units (1), as well as toward the region of the anti-balloon rings (2) for the said spinning units (1) and toward the region of possible suction openings (14) for the broken threads.

8. The spinning machine according to claims 5 and 7, characterized in that the blowing cleaning members comprise at least one blowing pipe (17) which is connected to an air pressure generating unit and extends toward the region of the spinning units (1), from the carriage (15) which can run on rails (18) along the spinning machine, and carries also the suction pipe (16) for the spoke wheel (25) formed by the suction nozzles (26), the end section (117) of the said blowing pipe (17) being open toward the region of the anti-balloon rings (2), and being possibly provided also with at least one blowing nozzle (317) which is directed toward the region of the suction openings (14) for the broken threads.

9. The spinning machine according to claim 8, characterized in that the blowing pipe (17) is connected to its end section (117) through an either flexible or articulated intermediate pipe section (217), and possibly by means of one or more hanger arms (20), which are articulated and/or of a variable length, so that it is possible to adjust the position and/or the orientation of said end section (117) of the blowing pipe (17).

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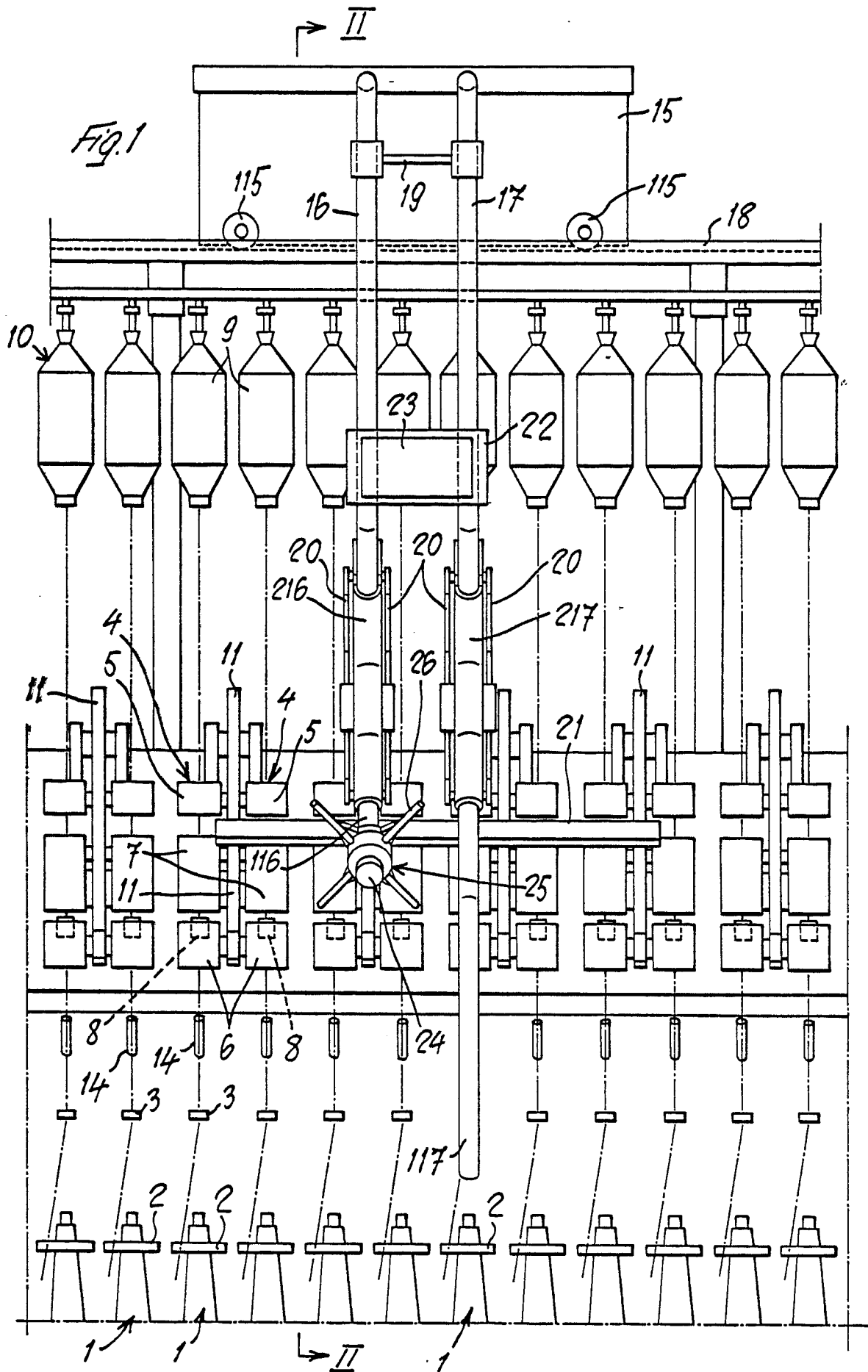
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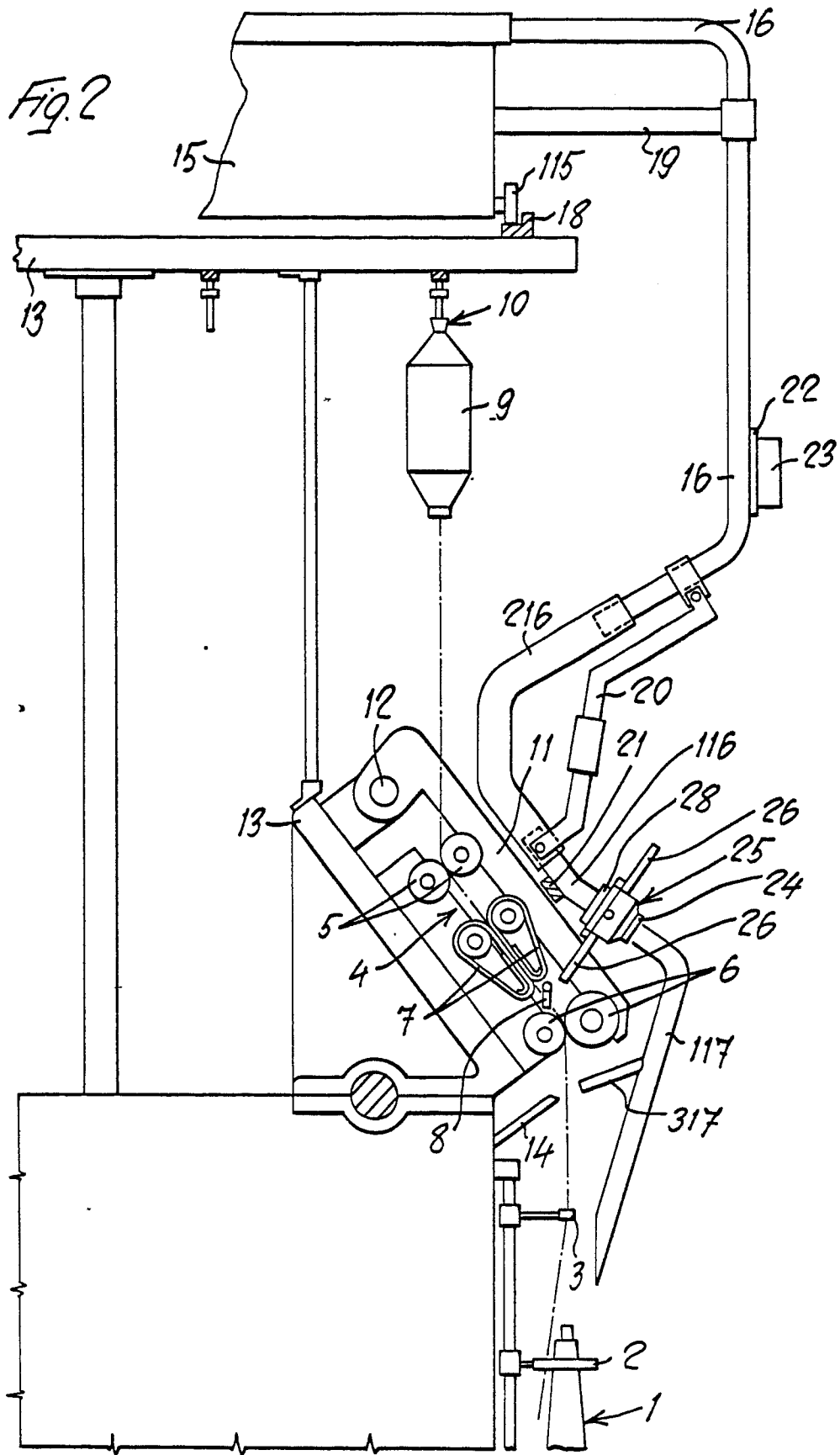
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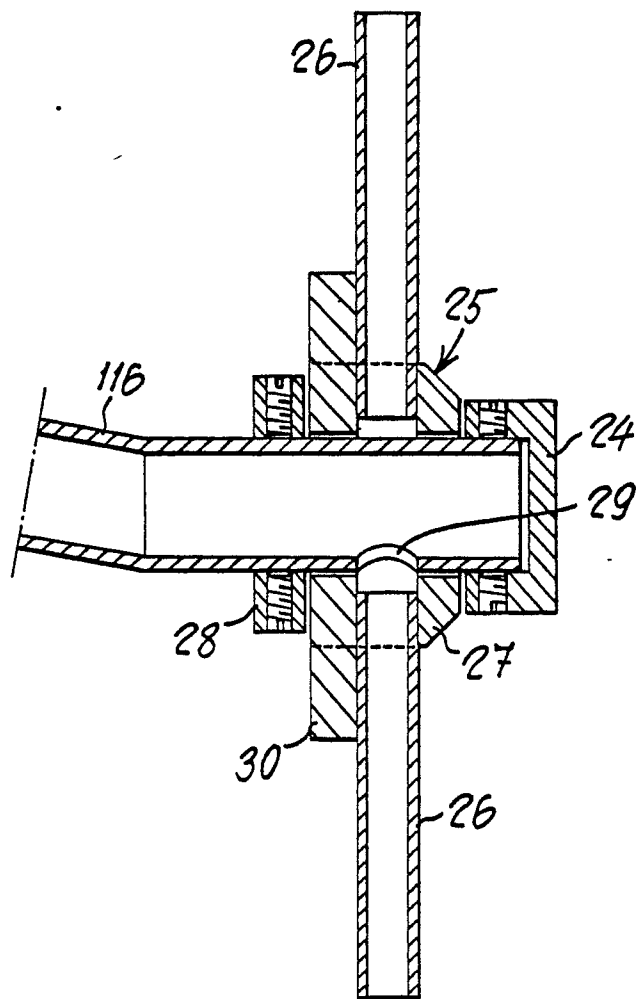


Fig. 3



European Patent
Office

EUROPEAN SEARCH REPORT

Application Number

- EP 86 11 5660

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.4)
A	US-A-4 484 434 (W. RÜMMELE) * Column 3, lines 7-23 *	1	D 01 H 11/00
A	CH-A- 436 060 (PARKS-CRAMER CO.) * Column 5, lines 17-24 *	1	
A	US-A-3 305 184 (G. SERESS) * Column 7, lines 37-52 *	1	
			TECHNICAL FIELDS SEARCHED (Int. Cl.4)
			D 01 H
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 21-01-1988	Examiner HOEFER W.D.
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	