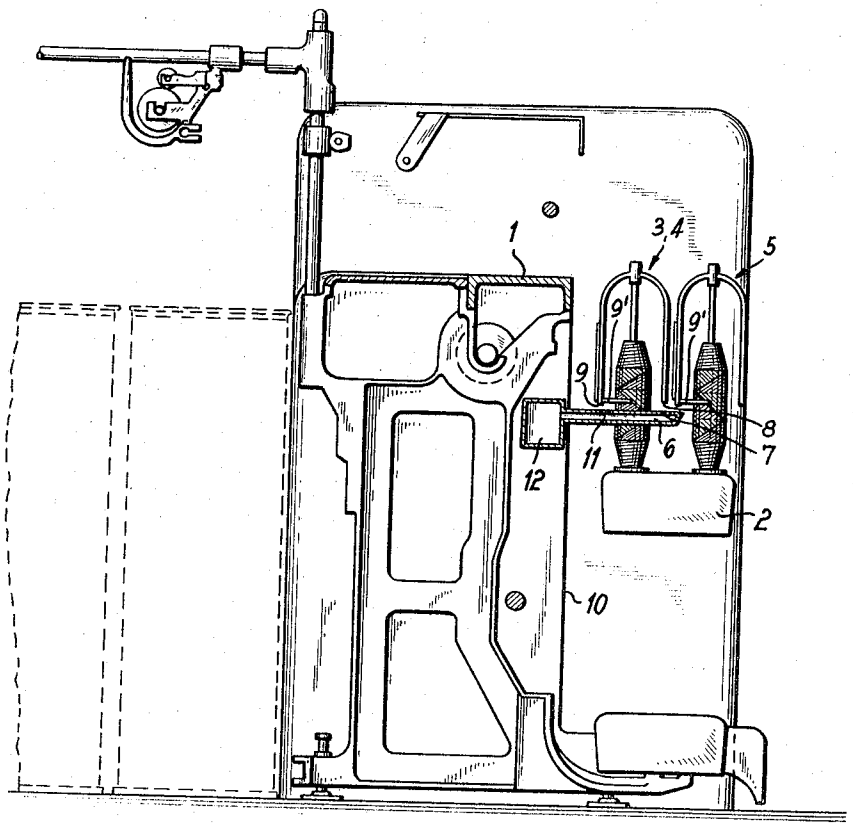
Feb. 28, 1967 E. BREUNING 3,306,024

BROKEN ROVING COLLECTORS FOR FLYER SPINNING FRAMES

Filed June 10, 1964

4 Sheets-Sheet 1

FIG. 1



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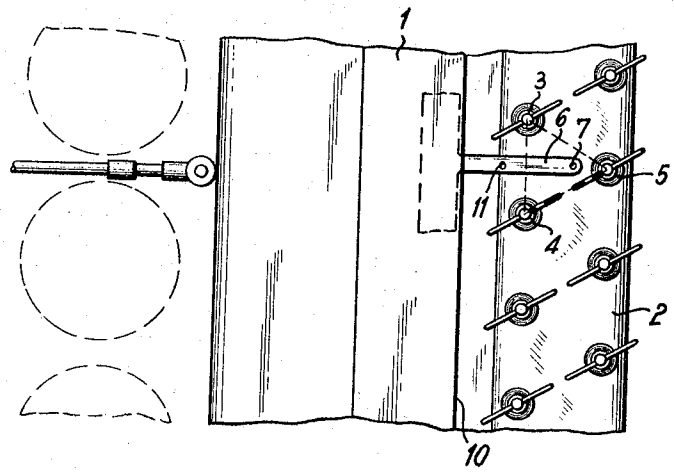
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4 Sheets-Sheet 2

FIG. 2



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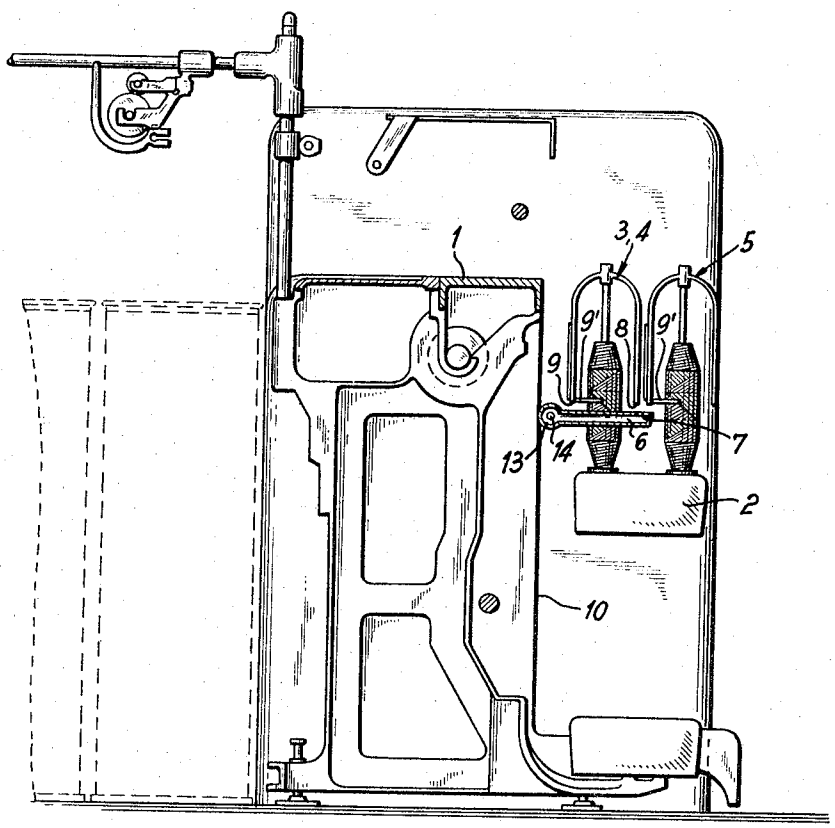
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BROKEN ROVING COLLECTORS FOR FLYER SPINNING FRAMES

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FIG. 3



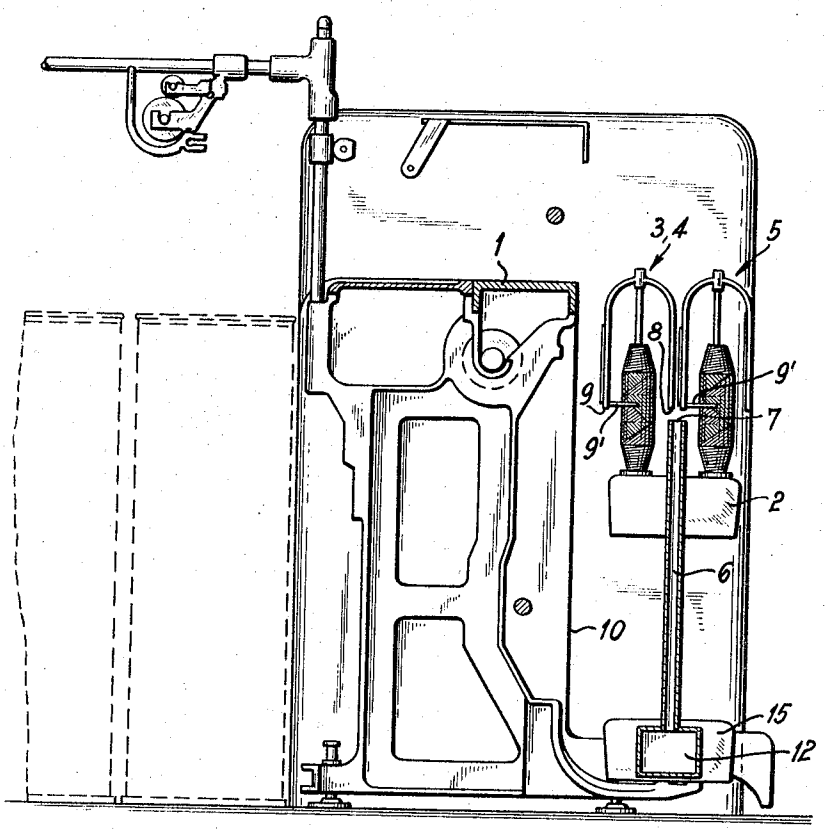
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FIG. 4



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3,306,024

BROKEN ROVING COLLECTORS FOR FLYER SPINNING FRAMES

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Claims priority, application Germany, June 11, 1963, B 72,237
8 Claims. (Cl. 57—34.5)

The present invention relates to devices on flyer spinning frames for removing broken rovings by suction.

Suction devices hitherto proposed for use on spinning frames operate only in the case of roving breaks which occur near the drawing frame or on the path between the drawing frame and the spindle head or flyer. Roving breaks occur, however, not only in the drawing frame or between the latter and the spindle head, but also within the region or confines of the flyers of the spinning frame, particularly in the region of the press fingers co-operating with the flyers. Breaks of rovings which occur in the latter places have either not been collected at all or collection has been much too late, resulting in undesirable breakdowns.

It is an object of the present invention to eliminate this defect by the provision of suction tubes which are mounted on a stationary part of the spinning frame and extend into the zone immediately below the ends of the flyers or zone of the plane of rotation of the press fingers co-operating with the flyers, said tubes being provided with at least one opening through which roving breaks occurring in the area of the flyers are collected by suction and removed.

Various arrangements of the suction ducts within the scope of the present invention are possible. Thus the ducts may be disposed horizontally or if desired they may be arranged vertically. A preferred sphere of application of the apparatus of the present invention for the collection of broken rovings are flyer speed frames which are provided with two rows of spindles, one row of spindles being axially spaced from or relatively to the other row of spindles. In this connection and in accordance with the present invention the suction ducts advantageously extend into and terminate in the region of the rotating area of the flyers of three adjacent spindles disposed at the corners of a triangle bounded by three imaginary lines one connecting the axes of two adjacent spindles in one row and the other two lines connecting the same two spindle axes to that of an intermediate spindle in the next adjacent row. Very good results are achieved if the suction opening in each suction duct is in the centre or near the centre of the thus-defined triangular area.

Further features of the present invention and details of the advantages achieved thereby will be apparent from the following description of several embodiments of the new thread exhauster device which are illustrated in the accompanying drawings in which:

FIG. 1 is a schematic side elevation of one embodiment of a suctional roving exhauster according to the present invention for a flyer frame fitted with two rows of spindles.

FIG. 2 is a corresponding plan view of part of the apparatus of FIG. 1.

FIG. 3 is a view in side elevation of another embodiment of the suction device as applied to a flyer frame provided with two rows of spindles.

FIG. 4 is a view in side elevation of a third embodiment of a suction device of the present invention.

In all the illustrated embodiments, the cylinder bank is indicated by the numeral **1**, the reference numeral **2** denotes the spindle bed, while reference numerals **3**, **4** and **5** indicate the spindles fitted with flyers which are provided in two spaced parallel rows. As shown in FIG. 2, the positions of the spindles **3** and **4** of the left hand row of spindles are displaced in the longitudinal direction relative to the spindle **5** of the right hand row.

In an arrangement as shown and described in the foregoing, the chain dotted line in FIG. 2, which connects the axes of two adjacent spindles **3** and **4** in the left row of spindles and the chain dotted lines which respectively connect the axes of the same adjacent spindles of the left row with the axis of the intermediate spindle **5** in the right row, define an equilateral or approximately equilateral triangle.

Each spindle is enclosed in a known manner by a flyer, the ends of which are shown at **8** and **9**. In addition, the press or spring finger for each spindle is indicated by **9'** in FIGS. 1, 3 and 4. Each finger or spring connected in a known manner to the respective flyer frames rotates in a horizontal plane. The object and the mode of operation of press or spring fingers are so well known that they require no further explanation.

The apparatus of the present invention for removing roving thread breaks, fly and other impurities by suction comprises a system of suction tubes which are mounted on a stationary part of the spinning frame. A number of these suction tubes and particularly, their position i.e. horizontal or vertical, may vary to meet particular requirements.

In the embodiment shown in FIGS. 1 and 2 a suction tube **6** is associated with each group of three spindles located at the corners of the triangle hereinbefore referred to and shown in dotted lines in FIG. 2. This suction tube extends horizontally until just below the ends **8** and **9** of the flyers. Each suction tube **6** is provided with suction nozzles **7** and **11**, the suction nozzle **7** preferably being disposed near the centre of the triangle shown in broken lines in FIG. 2, while the other suction opening **11** is disposed in the area between the chain dotted line connecting the spindles **3** and **4** and the front **10** of the cylinder bank.

The suction tubes **6** are distributed over the entire length of the spindle bank at suitable spaced intervals from each other but for greater clarity a single suction tube only is shown in FIGS. 1 and 2. All the suction tubes **6** communicate with a collecting duct **12** provided below the cylinder bank **1**.

The suction tubes may be arranged to pivot. A construction of this kind is shown in FIG. 3 wherein the suction tube **6** is mounted on a collecting tube **13** which may be common to all the suction tubes and is adapted to rotate about its axis **14**. This embodiment enables each suction tube to be raised either separately or collectively. The raising of the suction tubes avoids any impediment to the removal of full bobbins and to the subsequent mounting of new or empty bobbins.

The suction tubes on pivotal and rotary movement thereof may be locked in such manner that changes of position of the suction tubes can be effected only when the flyers do not impede such positional changes. This is possible, for example, by the use of a disc which is rigidly coupled to a flyer shaft and is provided with recesses for releasing a cam rigidly coupled to the collecting tube **13** only when a flyer is in a position where it does not impede.

Moreover, a conventional arresting mechanism may be provided to ensure that the suction tubes can be moved out of their end positions only when the flyers or the whole machine are stationary.

The suction tube **6** may have any desired cross section such as a rectangular or oval section. Preferably the horizontal dimensions of the cross section are greater than the difference between the spacing of the axes of two rear spindles and the outer diameter of the flyers, but smaller than the difference between the spacing of the spindle axes

and the maximum bobbin diameter. This makes it possible to achieve the best possible cross section and a particularly good stability of the suction tubes.

Whilst FIGS. 1 to 3 show embodiments incorporating horizontal suction tubes, in the embodiment shown in FIG. 4 a vertical arrangement of the suction tubes is utilised.

In this embodiment the suction tube **6** is mounted perpendicularly on a lower part **15** of the frame and passes through the spindle bank **2**. Its suction opening **7** is approximately in the centre of the triangular area shown in FIG. 2. The lower end of each suction tube communicates with the collecting duct **12**.

There is thus provided by the invention apparatus for the exhaustion and removal of broken rovings in flyer spinning machines of the type including at least one row of juxtaposed flyer frames the lower rotating ends of the legs of which define a predetermined circular rotation zone, said apparatus comprising a plurality of stationary suctional exhaustion tubes each arranged to extend, either horizontally or vertically, to a point close to the peripheral region of one of said zones and being provided with at least one suction opening on the side facing the lower ends of the respective flyer frames, in such a manner as to exhaust and remove broken rovings occurring within the confines of the flyer frames. According to a preferred embodiment comprising two relatively displaced rows of flyer frames, a suction tube, common to each set of three frames, composed of two adjacent frames of one row and a third frame midway there between of the other row, extends into the triangular area defined by the axes of said frames and advantageously has a suction opening located in the center of said area, to exhaust broken rovings occurring within the areas of the flyer frames.

It will be appreciated that the suction tubes may also form part of an control apparatus supervising thread breaks and serving to signal or control the machine drive, in which case the suction tube may serve as a carrier of parts of said apparatus.

In the foregoing the invention has been described with reference to specific illustrative devices. It will be evident, however, that modifications and variations, as well as the substitution of equivalent parts and elements for those shown and disclosed herein for illustration, may be made without departing from the broader scope and spirit of the invention as set forth in the appended claims. The specification and drawings are accordingly to be regarded in an illustrative rather than in a restrictive sense.

I claim:

1. Apparatus for removing broken rovings in flyer spinning machines of the type including at least one row of spindles having juxtaposed flyer frames each having a pair of depending legs the lower rotating ends of which define a predetermined circular rotation zone, said apparatus

comprising a plurality of stationary suctional exhaustion tubes, each of said tubes arranged below the lower ends of said legs and extending to a point close to the peripheral region of one of said zones, said tubes being provided with at least one suction opening on the side facing the ends of the respective frames whereby to exhaust and remove broken rovings occurring within the confines of said frames.

2. In apparatus as claimed in claim **1**, said tubes extending horizontally and substantially tangentially to said rotation zones.

3. In apparatus as claimed in claim **2**, including means to pivot said tubes vertically from an operative to an inoperative position, and vice versa.

4. In apparatus as claimed in claim **1**, said tubes extending vertically to a point close to the periphery of said rotation zones.

5. In apparatus as claimed in claim **1**, said frames being fitted with pressfingers extending transversely and inwardly from the lower end of one of the legs of the frames.

6. In apparatus as claimed in claim **1** for spinning machines embodying two rows of flyer frames arranged with one row displaced in relation to the other row such as to define a substantially equilateral triangle by the axes of each two adjacent frames of one row and the axis of the frame of the other row midway between said first frames, wherein said suction tubes extend into the areas of said triangles and the openings thereof coincide approximately with the centers of the triangles.

7. In apparatus as claimed in claim **6**, said tubes being provided with a further suction opening at a point coinciding with the rear row of frames and opposite the front of the cylinder head of the machine.

8. In apparatus as claimed in claim **6**, including roving collecting bobbins coaxial with said frames, wherein the cross-section of the suction tubes is greater in the horizontal direction than the difference between the spacing of the axes of the frames and the outer diameter of the frames, but smaller than the difference between the spacing of the frame axes and the maximum bobbin diameter.

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