Sept. 18, 1962 H. SCHURR ETAL 3,054,250

SPINNING AND TWISTING MACHINES

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Fig.1

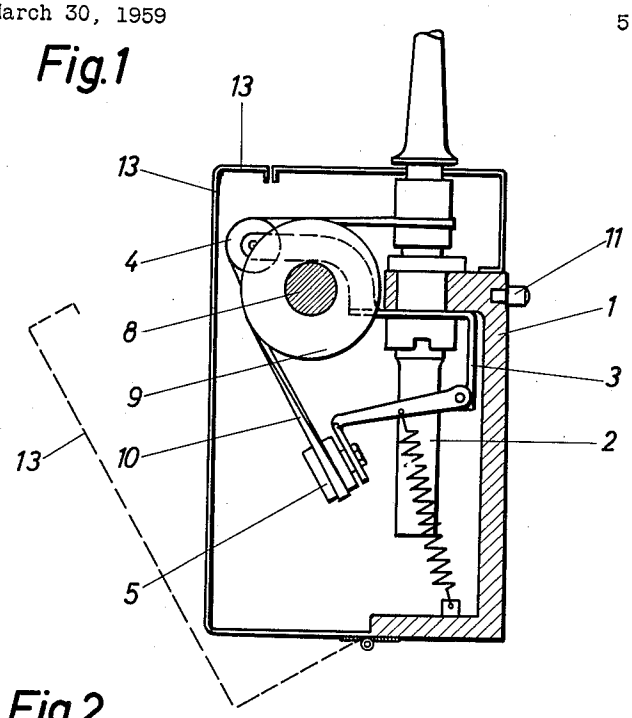
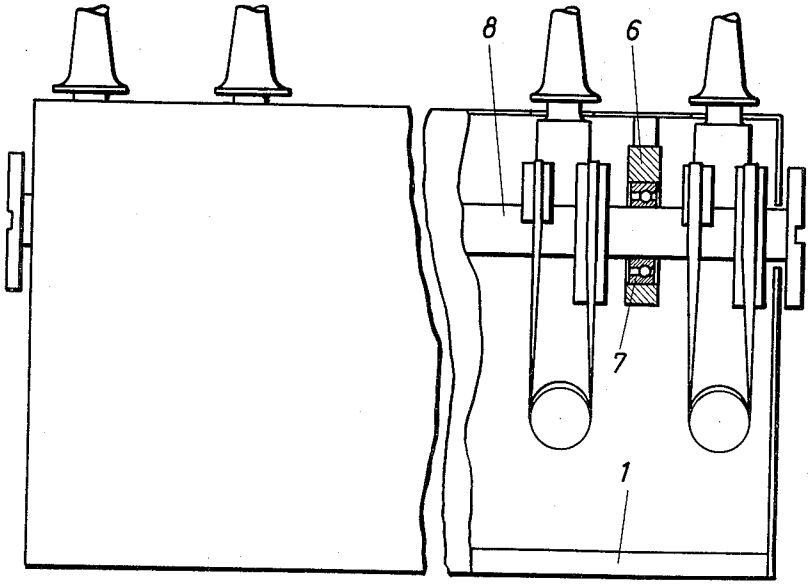


Fig.2



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SPINNING AND TWISTING MACHINES

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Fig. 3

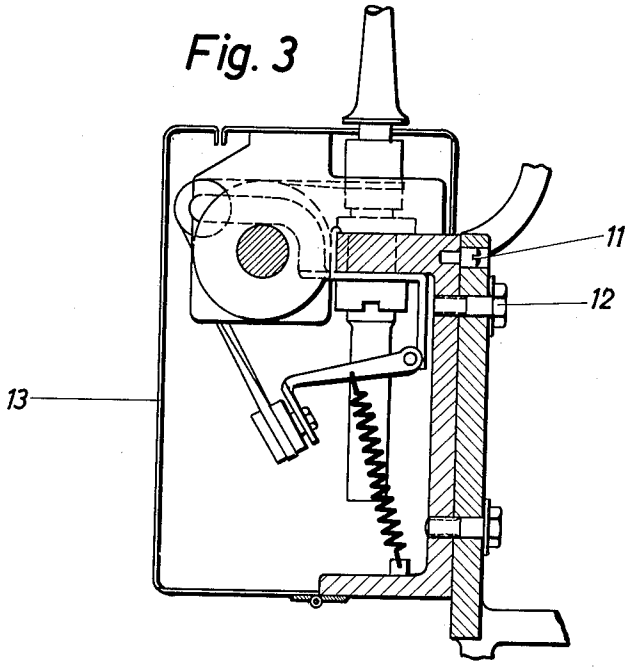
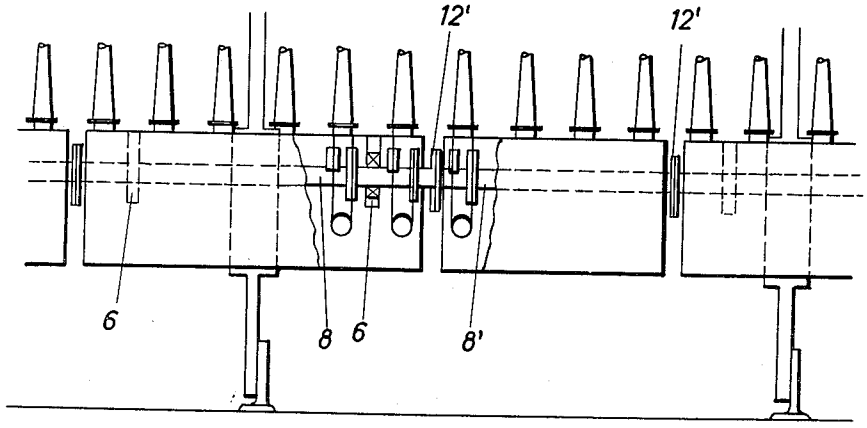


Fig. 4



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SPINNING AND TWISTING MACHINES

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Fig. 5

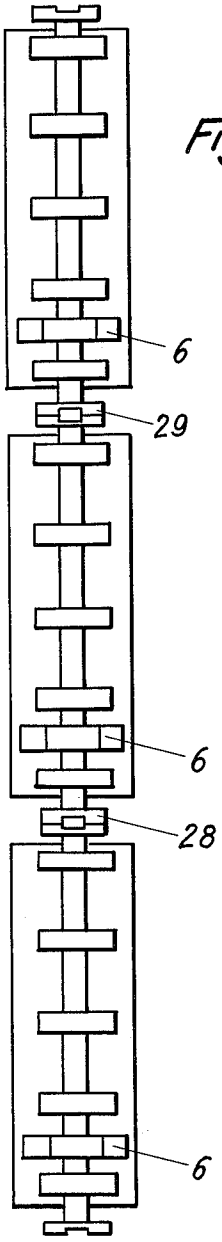
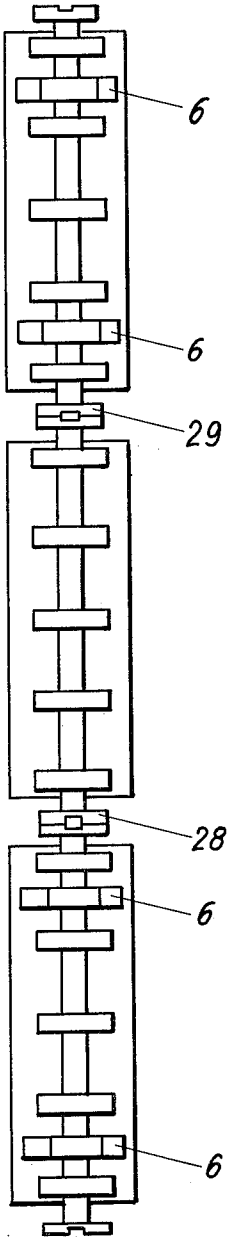


Fig. 6



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SPINNING AND TWISTING MACHINES

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Fig. 7

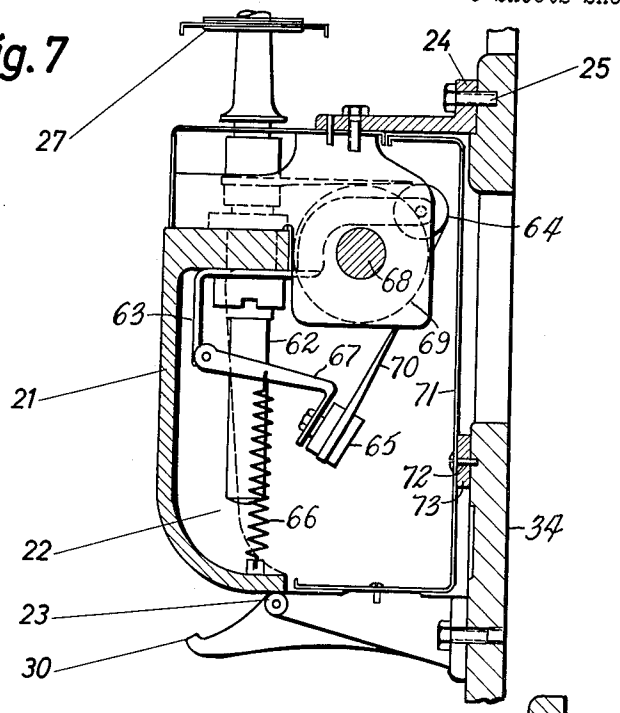
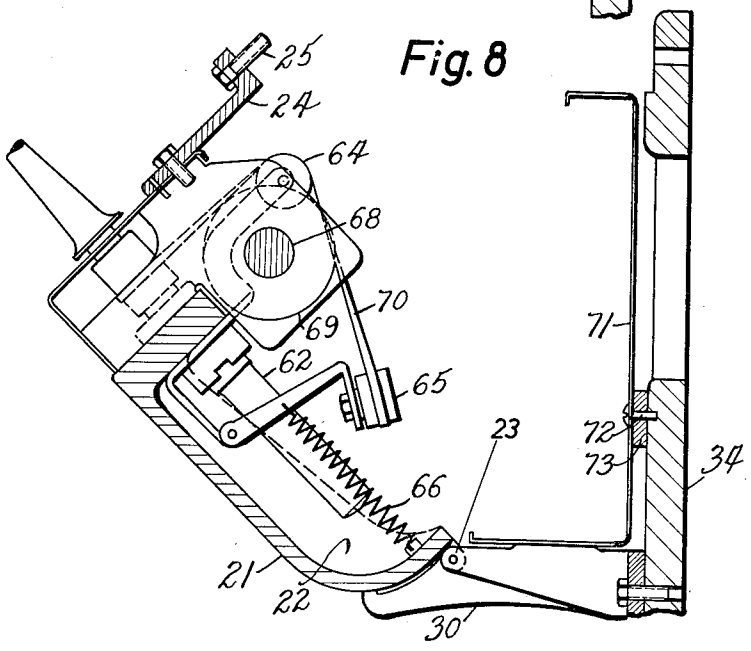


Fig. 8



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SPINNING AND TWISTING MACHINES

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Fig. 9

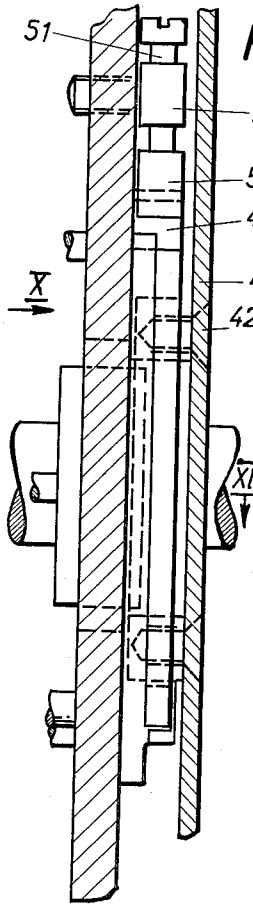


Fig. 10

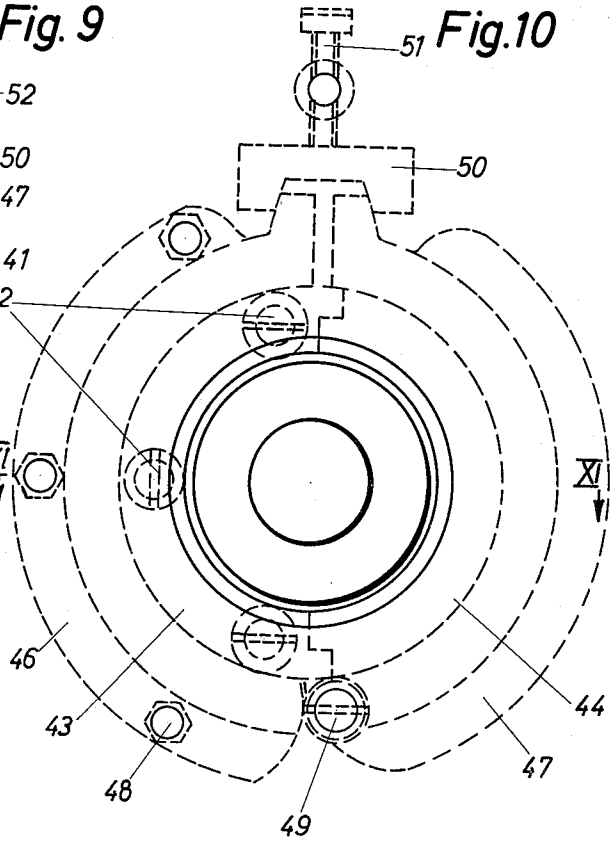
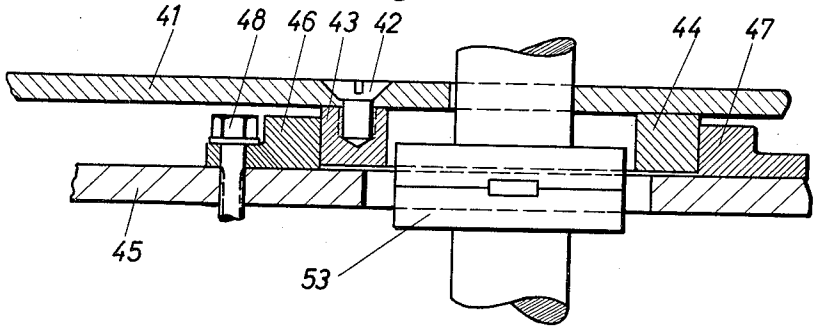


Fig. 11



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Patented Sept. 18, 1962

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SPINNING AND TWISTING MACHINES

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11 Claims. (Cl. 57—104)

The present invention relates to improvements in spinning and twisting machines, and more particularly to such machines in which the spindles are driven by belts, cords or bands and the drive shafts and drive pulleys are mounted close to the spindles so as to save in space as much as possible. Such compact construction usually permits the drive elements and the spindles to be covered so as to avoid the surrounding air from being agitated by these moving parts.

It is an object of the present invention to simplify the construction and assembly of such machines as well as any repairs which might become necessary thereon. For this purpose the present invention provides the covering of the drive elements and spindles to be made in the form of box-shaped casings which are fully or partly closed and may be installed in the machine and removed therefrom as individual units which are separated from each other by coupling elements for connecting the adjacent sections of the drive shaft. These novel spindle casings, each of which encloses a group of the spindles and their driving elements, may be made so small that they can be easily manipulated and transported, and they are made of such a simple design that they may be removed from the machine and reinstalled thereon even by persons who have no particular skill.

Further objects, features, and advantages of the present invention will become apparent from the following detailed description thereof, particularly when read with reference to the accompanying drawings, in which—

FIGURE 1 shows a side view, partly in section, of a spindle casing with the spindles and driving elements therein;

FIGURE 2 shows a front view, partly in section, of the spindle casing according to FIGURE 1;

FIGURE 3 shows a side view, partly in section, of the spindle casing according to FIGURES 1 and 2 in the installed position on the machine;

FIGURE 4 shows a front view of several adjacent spindle casings, parts of which are broken away to disclose the elements therein;

FIGURE 5 shows a diagrammatic view of a casing arrangement in which each spindle casing is only provided with one bearing for the drive shaft;

FIGURE 6 shows a diagrammatic view of a casing arrangement in which every second spindle casing contains no bearing for the drive shaft and wherein such drive shaft is designed so as also to serve as a coupling member;

FIGURE 7 shows a side view, partly in section, of a modification of the spindle casing according to the invention in which the drive pulleys on the drive shafts are disposed behind the spindles;

FIGURE 8 shows a side view, partly in section, of the spindle casing according to FIGURE 7, with the front part of the casing being pivoted forwardly;

FIGURE 9 shows a cross section of a device for pivoting the spindle casing about the axis of the drive shaft, said cross section being taken through the supporting wall of the machine and one wall of the casing;

FIGURE 10 shows a view of the device according to FIGURE 9, as seen in the direction of the arrow X in FIGURE 9; while

FIGURE 11 shows a plan view, partly in cross section, of the parts as shown in FIGURES 9 and 10.

Referring to the drawings, the spindle casings according to the invention include a solid rail **1** as shown, for example, in FIGURES 1 to 4, on which the spindles **2** and the brackets **3** for supporting the guide and tension pulleys **4** and **5** are rotatably mounted. Rail **1** also supports the bearing casings **6**, as shown in FIGURES 2 and 4, containing the ball bearings **7** for the drive shaft **8**. The driving forces of shaft **8** are transmitted to the spindles **2** by the pulleys **9** through endless belts or bands **10**. The spindle casing is held in the desired position on the machine frame by locating pins **11** (FIGURE 3) and is secured thereto by bolts **12**. The adjacent shaft sections **8**, as shown in FIGURE 4 which are rotatably mounted within the bearing casings **6**, are connected to each other by means of relatively short shaft portions **8'**. These intermediate shafts portions **8'** are only supported by the connecting members **12'** which should be slightly resilient so that each intermediate shaft portion **8'** will act similar to a Cardan shaft and compensate any slight deviations from a straight-line connection between the shaft sections which are supported by the bearings.

Depending upon the available space on the respective machine, the spindle casings may, however, also be of a design as shown, for example, in FIGURE 5, in which only one bearing casing **6** is mounted in each spindle casing. It is also possible, as shown, for example, in FIGURE 6, to provide two different types of spindle casings, one of which is provided with two bearings, while the other contains no bearing but only a connecting shaft **8'** similar to but longer than that shown in FIGURE 4.

The spindle casings as shown in FIGURES 1 to 6 are provided with covers **13** which may be pivoted forwardly to the open position, as indicated in dotted lines in FIGURE 1, even while the machine is in operation. It is thus possible to inspect the driving elements at any time.

The arrangement of the spindle casings as shown in FIGURES 7 and 8, in which the driving elements are disposed behind the spindles, is especially adapted for closely confined conditions and therefore for attaining very narrow machines. For facilitating the inspection and service of the driving elements, the spindle casings or the front parts thereof may be connected to the machine in a manner so as to permit them to be pivoted from the position as shown in FIGURE 7 to the position as shown in FIGURE 8.

Referring to FIGURE 7, the spindle housings according to the embodiment shown therein are mounted on and supported by a solid member **34**. An angular rail **21** and a supporting or locating strip **24** secure the spindle housings to the solid member **34**. Within the angular rail **21** and the supporting strip **24**, the spindles **62** and the brackets **63** for supporting the guide and tension pulleys **64** and **65** are mounted. A pivotally mounted lever **67** supports the pulley **65** on bracket **63**, and a spring **66** applies tension to the lever **67**. A driving shaft transmits driving forces to the spindles **62** by means of pulleys **69** and endless belts or bands **70**. The driving shaft **68**, pulleys **69**, **64** and **65**, and the endless belt are located behind the spindle **62**. The spindle housing is held in the desired position on the machine frame by the supporting strip **24** and by bolts **25**. A back cover **71** is supported and secured to the solid rail by a member **72** and a screw **73**.

The angular rail **21** supporting these spindle casings is provided with two or more webs **22** which are disposed between the spindles and the lower ends of which carry bearings for supporting the hinge bolts **23** which are mounted on the machine frame. In its operative position, the spindle casing is held in the desired position by a

supporting or locating strip 24 and secured to the machine frame by bolts 25. Before pivoting the spindle casings forwardly, the annular retaining member 27 is removed, thereupon bolts 25 are unscrewed, and the coupling members 28 and 29 are loosened and removed together with the intermediate shaft portions, as shown in FIGURE 6. The casing may then be pivoted forwardly about the hinge bolts 23 until it engages with the stop member 30. The driving elements of the spindles are then easily accessible. For returning the casing to the operative position, the reverse procedure is followed.

In order to permit an easy inspection and servicing of the driving elements without requiring any disassembly of the intermediate shaft portions, the means for pivoting the spindle casings may also be arranged in a manner as illustrated in FIGURES 9, 10, and 11 so as to permit the casings to be pivoted about the axis of the drive shaft.

In this embodiment of the invention, one section 43 of a two-piece ring 43, 44 is bolted to the casing wall 41 by screws 42, and one section 46 of a flange ring 46, 47 is secured by bolts 48 to the supporting wall 45 of the machine frame. The other section 47 of the flange ring is pivotably mounted on a bolt 49 and may be rigidly connected to the first section 46 of the flange ring by means of a wedge lock 50. For pivoting the casing, it is only necessary to release the wedge lock 50 by loosening the screw 51, the nut 52 of which is secured to the supporting wall 45. For exchanging a casing, the flange ring section 47 is pivoted to the open position, whereupon section 44 of ring 43, 44, the other half of which is bolted to the casing wall 41, is removed so that the shaft coupling 53 will become accessible. It is further advisable to provide safety bolts near the lower edge of the casing which ensure the exact perpendicular position of the spindles, and which have to be loosened before the housing is pivoted or removed.

The spindle casings are generally assembled at the place of their manufacture where suitable tools are available for carrying out such work more economically. Since the spindle casings according to the invention are designed to form individual units which are installed as such on the machine, and since supporting bolts or the like may be secured at any desired points on the casing walls, it is also possible to accommodate additional means within the spindle casings which otherwise, when the individual spindles are installed in the machine, could only be provided therein with considerable difficulty.

Although this invention has been illustrated and described with reference to the preferred embodiments thereof, it is to be understood that it is in no way limited to the details of such embodiments or to the specific examples described, but is capable of numerous modifications within the scope of the appended claims.

The invention having thus been fully disclosed, what is claimed is:

1. A spinning or twisting machine, comprising frame means, a plurality of independent sectional spindle casings each including a framework enclosing and supporting at least one spindle and a driving mechanism therefor, said driving mechanism including a drive shaft extending longitudinally of said framework, bearing means in at least some of said casings for supporting said drive shaft, coupling means interposed between and operatively connecting the drive shafts of adjacent ones of said casings, and means for securing said spindle casings at said frame, said last-mentioned means being adapted to allow easy and independent removal of said spindle casings to thereby provide a spinning machine composed of individually-housed spindle units which are adapted for easy and independent removal and installation.

2. A spinning or twisting machine as defined in claim 1, further including means for mounting at least part of each said spindle casings together with said spindle and driving mechanism therein so as to be pivotal outwardly about an axis near the lower edge of said casings.

3. A spinning or twisting machine as defined in claim 1, further comprising means for mounting at least a part of said spindle casings so as to be pivotal about the axis of said drive shaft.

4. A spinning or twisting machine as defined in claim 1, wherein each of said spindle casings contains a bearing means, said bearing means each comprising a bearing casing and a bearing therefor.

5. A spinning or twisting machine as defined in claim 1, wherein only every second spindle casing contains bearing means, said bearing means comprising two bearings arranged at opposite ends of said casing, and wherein the drive shaft in each intermediate casing also serves as a coupling member for connecting the drive shafts in the adjacent casings to each other.

6. A machine as defined in claim 1, wherein said driving mechanism for said spindle is disposed in front of said spindle after said spindle casings are installed in said spinning machine.

7. A machine as defined in claim 1, wherein said driving mechanism for said spindle is disposed behind said spindle after said spindle casings are installed in said spinning machine.

8. In a spinning or twisting machine having a plurality of spindles and driving mechanisms therefor, each said driving mechanism including a drive shaft disposed longitudinally of said machine close to said spindle, a drive pulley driven by said drive shaft and positioned alongside of said spindle, a second pulley disposed in offset position with respect to said first-mentioned pulley, and an endless belt having looped portions adjacent its opposite extremities, one of which looped portions engages and partially encircles said spindle and the other of said looped portions engaging and partially encircling said second pulley, and intermediate portions of said belt between said looped portions engaging and partially encircling said drive pulley, the improvement comprising forming said spinning machine of a plurality of independent sectional spindle casings, each of said casings including a framework enclosing and supporting at least one spindle and the driving mechanism therefor, each of said sectional spindle casings including a section of the drive shaft, and coupling means interposed between and operatively connecting said drive shaft sections of adjacent ones of said casings, said spindle casings being secured within said machine so as to allow easy and independent removal thereof to thereby provide a spinning machine composed of individually-housed spindle units which are adapted for easy and independent removal and installation.

9. A machine as defined in claim 8, wherein said driving mechanism for said spindle is disposed in front of said spindle after said spindle housings are installed in the machine.

10. A machine as defined in claim 8, wherein said driving mechanism for said spindle is disposed behind said spindle after said spindle housings are installed in the machine.

11. In a spinning or twisting machine, frame means, a plurality of independent sectional spindle casings, each of said casings including a framework enclosing at least one spindle and a driving mechanism therefor, each said driving mechanism including a drive shaft disposed longitudinally of said framework behind and close to said spindle, a drive pulley driven by said drive shaft and positioned behind and close to said spindle, an idler pulley disposed adjacent said drive pulley, a third pulley disposed in offset position with respect to said first-mentioned pulley, and an endless belt, said endless belt having looped portions adjacent its opposite extremities, one of which looped portions engages and partially encircles said spindle, and the other of said looped portions engaging and partially encircling said third pulley, and intermediate portions of said belt between said looped portions engaging and partially encircling said drive

pulley and said idler pulley, means for pivotally mounting at least part of some of the spindle casings so that said part pivots about an axis near the lower edge of the spindle casing, means for releasably mounting said independent spindle casings at said frame means, said last-mentioned means being adapted for easy removal and replacement of said casings, bearing means in at least some of said spindle casings for supporting the drive shafts, and coupling means interposed between the drive shafts of each of said casings for operatively connecting the individual drive shafts of said casings to each other to thereby provide in said spinning machine individual

housed spindle units which are adapted to be easily removed and installed.

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