Nov. 28, 1961 A. C. MAS 3,010,272

DOFFING DEVICE FOR SPINNING AND LIKE TEXTILE MACHINES

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Fig. 1

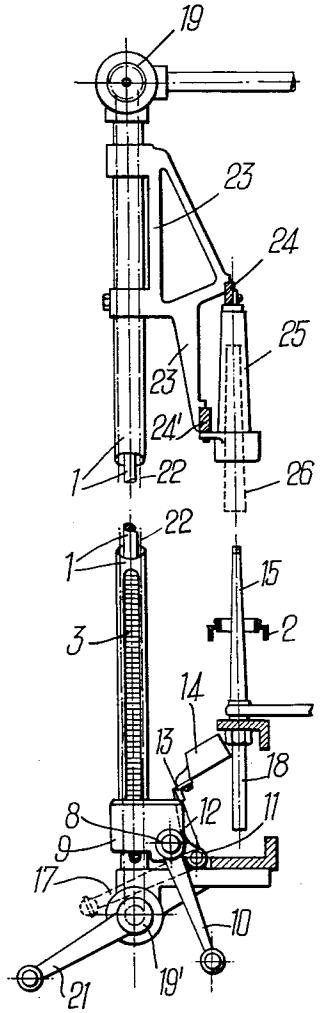
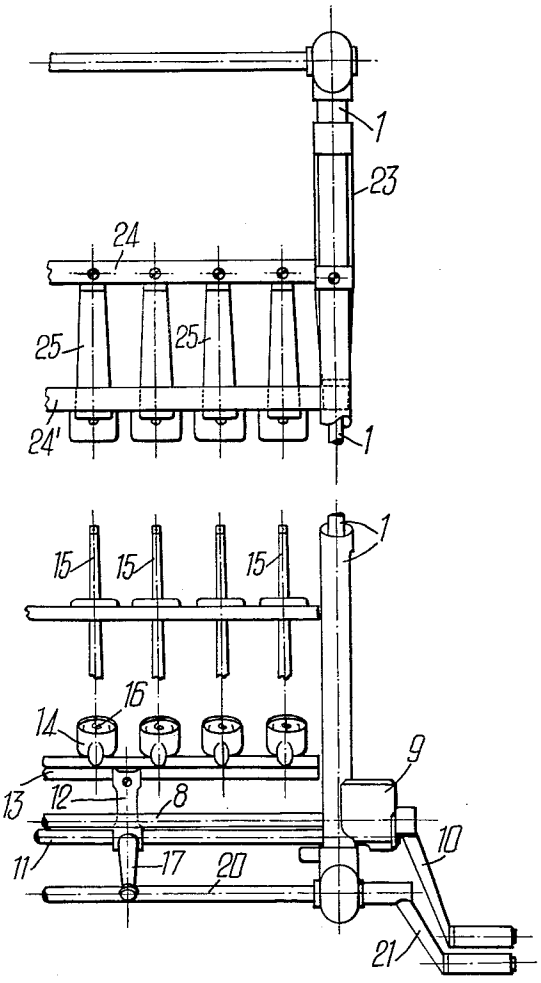


Fig. 2



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Fig. 4

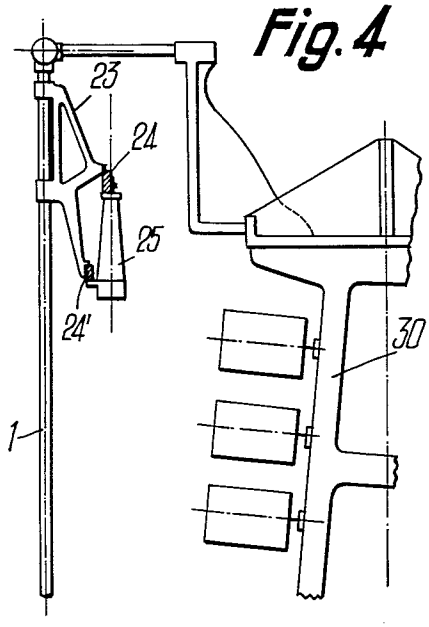


Fig. 5

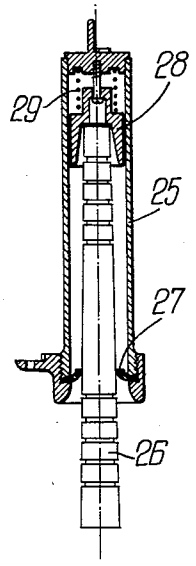


Fig. 6

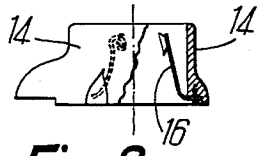
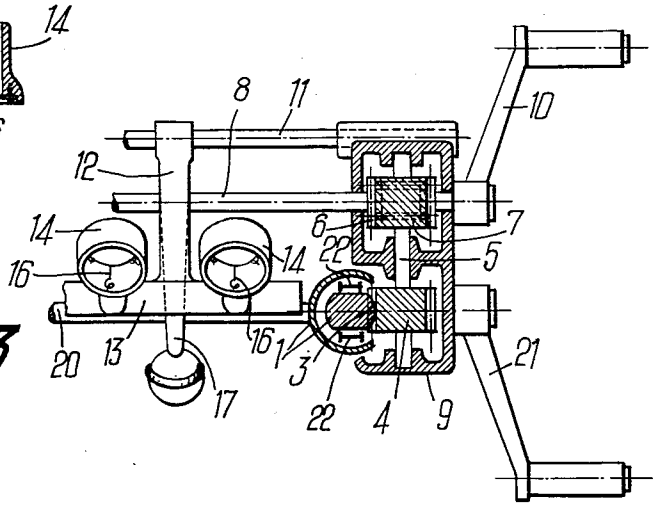


Fig. 3



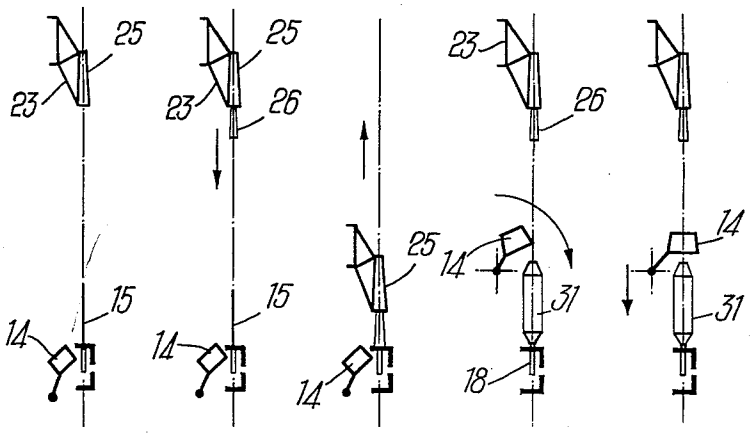
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Fig. 7 Fig. 8 Fig. 9 Fig. 10 Fig. 11



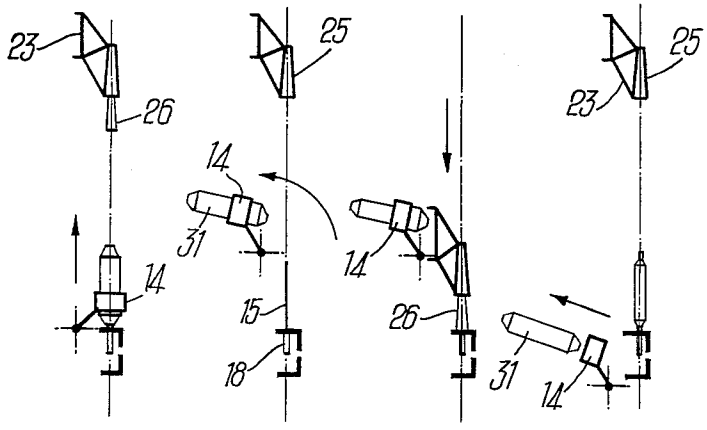


Fig. 12 Fig. 13 Fig. 14 Fig. 15

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DOFFING DEVICE FOR SPINNING AND LIKE TEXTILE MACHINES

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Claims priority, application Spain Jan. 13, 1959
10 Claims. (Cl. 57—52)

The present invention relates to a doffing device for spinning and like textile machines of the kind comprising a plurality of parallel spindles arranged side-by-side in a row, said doffing device having a plurality of first members carried by a movable element extending parallel to said row, said first members being adapted releasably to retain cop formers, the first members being arranged upon displacement of said element to place cop formers on the spindles, said doffing device also having a plurality of second members which are carried by a shaft arranged parallel to said row, the second members being provided with cop engaging means and being movable upon displacement of said shaft in such manner that they can releasably engage and remove full cops from the spindles.

According to the present invention, the doffing device comprises a plurality of uprights, said shaft being carried on the lower parts of said uprights and said movable element being mounted on the upper parts of the same uprights for movement along said upper parts, the arrangement being such that in use cop formers are fitted to said first members when the movable element is at an elevated position, the movable element then being lowered to present the cop formers to the spindles, and the movable element being subsequently returned to said elevated position, the cop formers remaining on the spindles.

For a better understanding of the invention and to show how the same may be carried into effect, reference will now be made to the accompanying drawings in which:

FIGURE 1 is a side elevation partly in section of a part of a doffing device constructed in accordance with the invention.

FIGURE 2 is a front elevation of the part of the device shown in FIGURE 1.

FIGURES 3 to 6 are elevations partly in section of details of the device shown in FIGURES 1 and 2.

FIGURES 7 to 15 show schematically the sequence of operations of the device shown in FIGURES 1 to 6.

Referring to the drawings, the frame of a spinning machine is provided with a number of vertical uprights **1** which are spaced apart from one another along one side of the frame and form part of a doffing device. The spinning machine is provided with a bobbin rail **2**, spindles **15** and a creel **30**, the uprights **1** extending to a point higher than the top of the creel **30**. Each of the uprights **1** comprises an inner cylindrical member co-axially surrounded by an outer tubular cover. A lower portion of the inner cylindrical member is provided with a toothed rack **3** extending for such a distance that it is higher than the bobbin rail **2**, a corresponding longitudinal aperture being provided in the tubular cover adjacent the rack **3**.

A box **9** is associated with each of the uprights **1** and can move up and down the associated upright **1** under the action of a transmission arrangement comprising a shaft **8** rotatably mounted therein, a portion of the shaft **8**, protruding from the box **9**, being provided with a handle **10**, whilst a portion of the shaft **8** within the box **9** is provided with a worm **7** which engages with a helical gear **6** having a spindle **5**, to which is rigidly secured a gear wheel **4** which passes through the aperture on the tubular cover of the associated upright **1** and engages with the rack **3**. A common spindle **11** disposed between the boxes **9** and the machine frame is rotatably secured to an abutment

provided on each of the boxes **9**, the common spindle **11** being rotatable by means of a handle **17**.

The common spindle **11** is provided with a number of radial arms **12** which together support a longitudinal member **13** provided with rings **14** disposed in alignment so that each ring **14** is associated with a corresponding spindle **15**. The central plane of each of the rings **14** is perpendicular to the bobbin rail **2** and coincides with the central plane perpendicular to the bobbin rail and the corresponding spindle **15**, the rings **14** being so spaced from the corresponding spindle **15** that upon rotation of the common spindle **11** each of the rings **14** moves into position so that it is disposed co-axially above the corresponding spindle **15**. The inside diameter of the rings **14** is slightly greater than the outer diameter to which cops **31** are wound on the spindles **15**. The inner surfaces of the rings **14** are provided with a number of spring-loaded pointed penetrating members **16**, the spring-loading biasing the members **16** towards the centre of the rings **14**, the degree of bias being limited by abutments provided on the members **16**.

The tubular cover of each of the uprights **1** has a chain **22** disposed within it, the chain **22** passing over a freely rotatable pinion **19** mounted in the top of the upright **1** and over a further rotatable pinion **19'** mounted in the base of the upright **1**. A common spindle **20** is rigidly secured to each of the pinions **19'** mounted in the uprights **1**, a handle **21** being provided to rotate the common spindle **20**. A bracket **23** is secured (by means not shown in the drawings) to an upper portion of each of the chains **22**.

Each of the brackets **23** supports one or more longitudinal members **24**, **24'**. The longitudinal members **24**, **24'** have secured thereto cartridges **25** corresponding in number to the number of spindles **15**. Each of the cartridges **25** is disposed above a corresponding spindle **15** so that they have a common axis.

Each of the cartridges **25** contains an empty cop-former **26**, the cop-former **26** being releasably held in the cartridge **25** by means of a resilient washer **27**, secured to the cartridge **25**. The internal diameter of the washer **27** is slightly less than the external diameter of the former **26**, which passes through it. A displaceable cover **28**, or alternatively, a plain covering disc is provided within the top portion of the cartridge **25**, a spring **29** biasing the cover **28** away from the top surface of the cartridge **25**. The cover **28** and spring **29** act as a shock absorber for the cop-former **26**.

To allow free access to the creel **30** during operation the bracket **23** is so disposed that the bank of cartridges **25** are at a higher level than the top of the creel **30**.

The sequence of operations of the doffing device will now be described particularly with reference to FIGURES 7 to 15. FIGURE 7 shows the position of one of the rings **14**, spindles **15**, brackets **23** and cartridges **25**, when the spinning machine is ready to begin operating, the rest of these components being similarly disposed relative to one another.

Empty cop-formers **26** are placed in the associated brackets **23** (FIGURE 8) and the brackets **23** are lowered by means of the handle **21** and its associated components until the cop-formers **26** are introduced onto their respective spindles **15** (FIGURE 9). If the brackets are lowered to too great an extent the shock absorber comprising the cover **28** and the spring **29** contained in the cartridge **25** absorbs the excess force. When the brackets **23** are raised again, the cop-formers **26** are left on the spindles **15** since the clamping force of the spindles **15** on the cop-formers **26** is greater than the restraining force applied to the formers **26** by the resilient washer **27** contained in the cartridges **25**. The spinning machine is then started and cops **31** are spun onto the cop-formers

26 retained on the spindles 15. Meanwhile the brackets 23 can be recharged with empty cop-formers 26. During these operations the boxes 9 remain at the bottom of the uprights 1 and rings 14 are inclined inwards towards the shafts 18 of the spindles 15, this position being shown in FIGURE 1. When the cops 31 are complete the rings 14 are rotated by means of the handle 17 so that they are disposed co-axially above the cops 31 on the spindles 15 (FIGURES 10 and 11). The boxes 9 are then lowered by means of the handle 10 and its associated components so that the rings 14 pass over the cops 31 and the penetrating members 16 slide over the thread contained in the cops 31 (FIGURE 12). When the boxes 9 are raised the penetrating members 16 engage with the thread in the cops 31 and the rings 14 lift the cops 31 off the spindles 15. The handle 17 is then used to rotate the rings 14, now containing the cops 31, away from the spindles 15 (FIGURE 13). The brackets 23 are now lowered again to place the new empty cop-formers 26 on the spindles 15 (FIGURE 14) and then raised again to receive more empty cop-formers 26. Cops 31 can again be wound on the spindles 15 and the completed cops 31 can then be removed from the rings 14 as described (FIGURE 15).

Various modifications in the doffing device as described, such as will present themselves to those familiar in the art, may be made without departing from the spirit of this invention. Particularly, the handles 10, 17 and 21 may be replaced by other mechanical or electric driving means.

What I claim is:

1. In a spinning or like textile machine of the kind comprising a plurality of parallel spindles arranged side-by-side in a row, a doffing device having a plurality of first members carried by a movable element extending parallel to said row, said first members being adapted releasably to retain cop formers, the first members being arranged upon displacement of said element to place cop formers on the spindles, said doffing device also having a plurality of second members and a first shaft arranged parallel to said row and carrying said second members, the second members being provided with cop engaging means and being movable upon displacement of said shaft in such manner that they can releasably engage and remove full cops from the spindles, the doffing device comprising further a plurality of uprights, boxes mounted for vertical movement on the uprights, said shaft being carried in said boxes and said movable element being mounted on the upper parts of the same uprights for movement along said upper parts, racks fixed to said uprights, each rack being aligned with the axis of the associated upright, gearwheels in said boxes meshing with said racks, and a second shaft connecting the gearwheels of the boxes whereby turning said second shaft in one direction moves the first shaft upwardly and turning said second shaft in the opposite direction moves the first shaft downwardly, the arrangement being such that in use cop formers are fitted to said first members when the movable element is at an elevated position, the movable element then being lowered to present the cop formers to the spindles, and the movable element being subsequently returned to said elevated position, the cop formers remaining on the spindles.

2. A doffing device as claimed in claim 1, wherein the second members are arranged in a line parallel to and spaced from the axis of the shaft, the arrangement being such that when the shaft is rotated in one direction the second members can be swung downwardly to engage the full cops and upon rotation of the shaft in the opposite direction the second members can be swung upwardly to remove the cops from the spindles.

3. A doffing device as claimed in claim 1, wherein the gearwheel of each box is connected to said further shaft through an irreversible gear train.

4. A doffing device as claimed in claim 1, wherein a handle is provided for turning the first-mentioned shaft.

5. A doffing device as claimed in claim 1, wherein a handle is provided for turning the further shaft.

6. A doffing device as claimed in claim 1, wherein at least one upright has a first pinion at its upper end and a second pinion at its lower end, there being a chain passed around the pinions and connected to said movable element, the arrangement being such that when the second pinion is driven in one direction the movable element and the first members carried thereby are moved downwardly and when the second pinion is driven in the opposite direction said movable element and said first members are moved upwardly.

7. A doffing device as claimed in claim 1, wherein each upright has a first pinion at its upper end and a second pinion at its lower end, there being a chain passed around the two pinions of each upright and connected to said movable element, the second pinions being connected by a spindle which when driven in one direction causes said movable element and said first members to be lowered and when driven in the opposite direction causes said movable element and said first members to be raised.

8. A doffing device as claimed in claim 7, wherein a handle is provided for turning said spindle.

9. A doffing device as claimed in claim 1, wherein each said second member takes the form of a ring which can pass over a full cop, each ring being provided with upwardly and inwardly directed pointed members which are urged towards the centre of the ring and there being abutment means for limiting the penetration of the pointed members into a full cop, the arrangement being such that when the rings are moved downwardly onto the cops the pointed members slide on the wound mass of thread and when the rings are lifted the pointed members penetrate the wound mass as far as the abutment means allow, the cops being pulled off the spindles and carried upwardly with the rings.

10. A doffing device as claimed in claim 1, wherein each first member comprises an upright tubular cartridge open at its lower end to form a mouth the lip of which is provided with a resilient washer, and having in its upper end an abutment which is displaceable longitudinally within the cartridge, the abutment being spring-urged downwardly, the arrangement being such that to fit a cop former to the cartridge, the cop former is entered upwardly through the mouth so that its upper end engages the displaceable abutment, the washer bearing on the side walls of the cop former.

References Cited in the file of this patent

UNITED STATES PATENTS

1,252,404	Crane	Jan. 8, 1918
2,751,746	Busquets et al.	June 26, 1956