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C. SCHLEIFER  
SUPPORTING AND ACTUATING MEANS FOR A  
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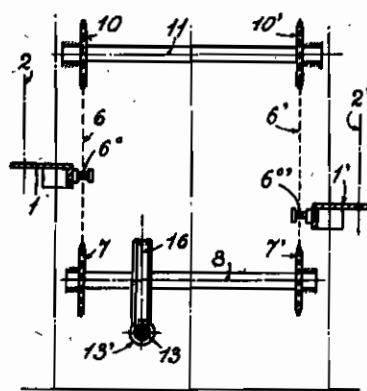
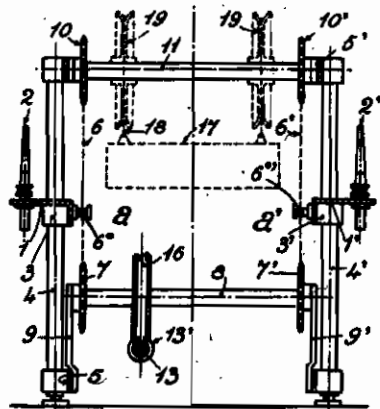
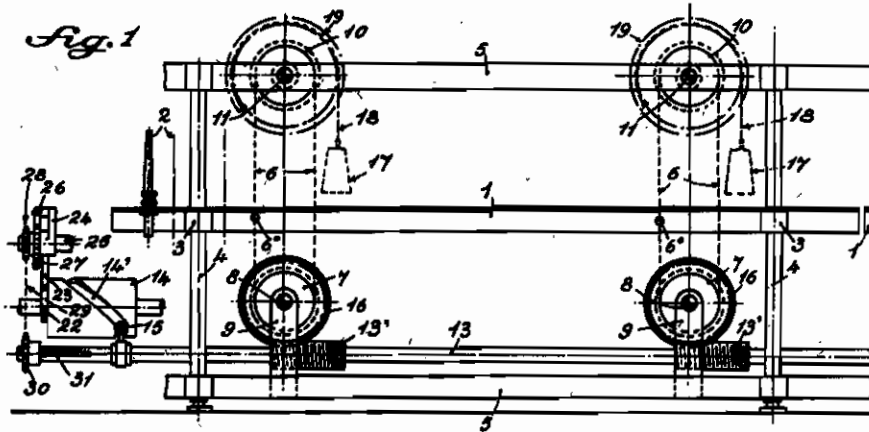
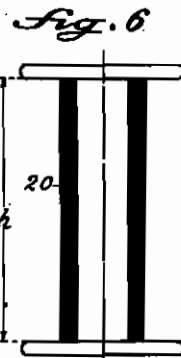
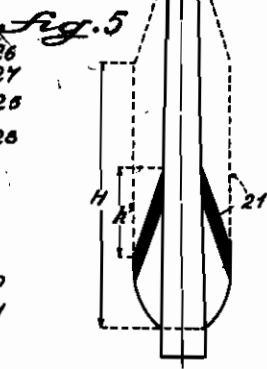
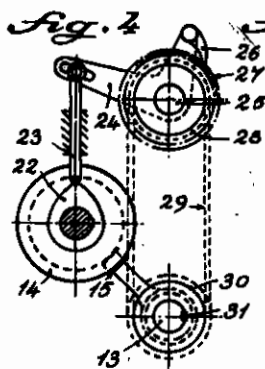


Fig. 2

Fig. 3



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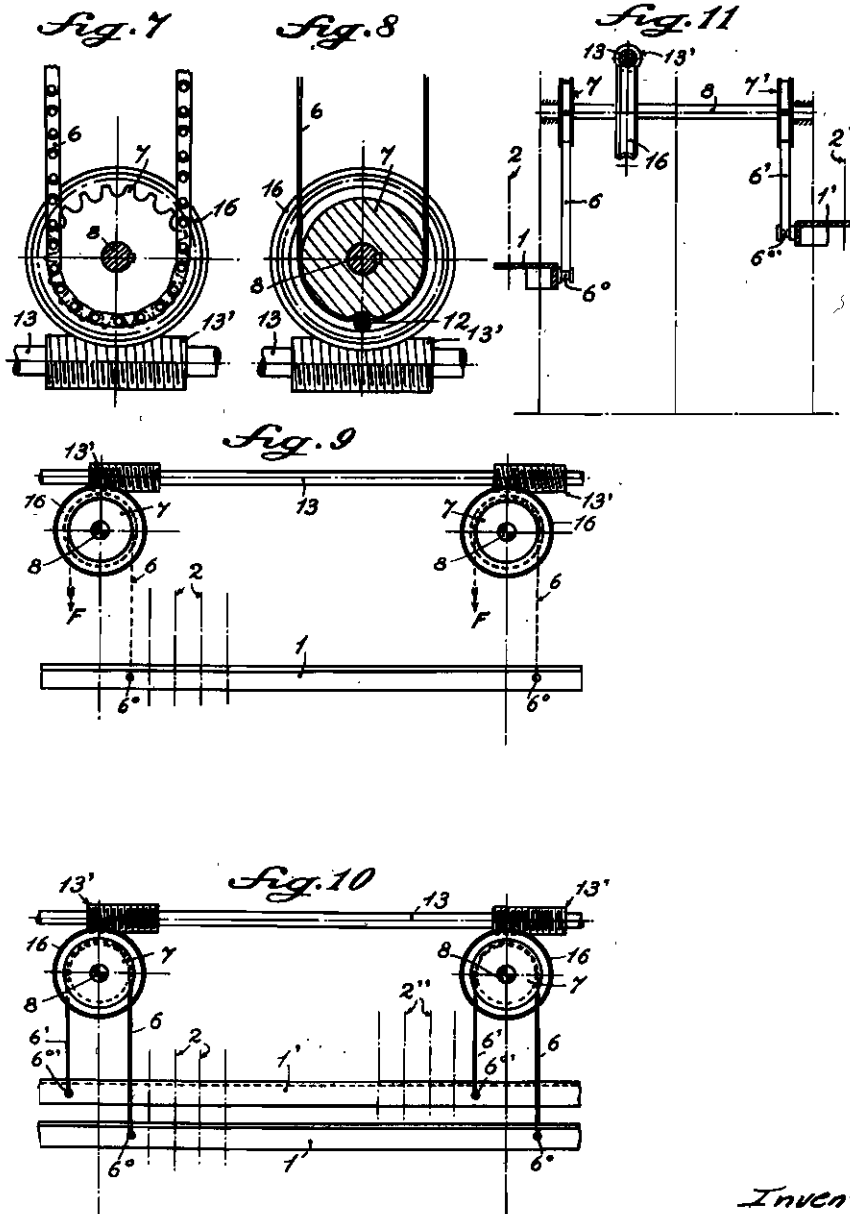
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2 Sheets-Sheet 2



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# ALIEN PROPERTY CUSTODIAN

## SUPPORTING AND ACTUATING MEANS FOR A VERTICALLY RECIPROCATING MEM- BER

Carlo Schleifer, Milan, Italy; vested in the Alien  
Property Custodian

Application filed February 20, 1940

In existing machines for spinning, twisting, winding-on and doubling, there are movable members actuated with a vertical reciprocating movement. The carriage that carries the spindles in fly frames, the spindle carriage or ring rail in continuous spinning or twisting ring frames, and the ring rail that carries the thread guides or bells in certain special spinning machines, are members of this nature.

In the constructions hitherto known, these movable members are supported, guided and actuated by the aid of vertical rods or pointers sliding in the sleeves or couplings substantially integral with the frame of the machine, and actuated through the medium of suitable transmission members by a rod extending in the longitudinal direction of the machine and actuated with a reciprocating motion by the winding-on eccentric or other equivalent kinematic drive.

This arrangement exhibits various disadvantages. Above all in machines of considerable length, such as spinning machines, it is difficult to ensure and maintain correct parallelism between the guiding rods, and it is also difficult to effect the lubrication thereof for the purpose of ensuring smooth sliding in the interior of the coupling sleeves in which the said rods slide with accurate adjustment. There are consequently considerable losses by friction, and a great expenditure of motive power. Furthermore, owing to the fact that the movable member is positively driven only during its ascent, whereas its descent is accomplished under the action of gravity, this member cannot be accurately balanced for the purpose of reducing the expenditure of motive power.

Now the present invention, the object of which is to obviate the aforementioned disadvantages, relates to a device for supporting and actuating the said movable members, according to which each member is not supported and actuated by rigid rods, but is on the contrary suspended by the aid of flexible members from driving members having an oscillating rotary movement, with which the said flexible members are positively engaged, and in relation to which they unwind now in one direction and now in the opposite direction, so that the movable member suspended therefrom executes a vertical ascending and descending movement.

These flexible members may be continuous, that is to say, in the form of a closed ring, unwinding also in engagement with tensioning members, so as to ensure the actuating of the movable member both during its ascent and during its descent, thereby enabling the weight to be accurately balanced.

According to a further feature of the present invention the unit comprising all the movable members of the entire machine is subdivided

into a plurality of unit movable members of small length, which are separately actuated. In this way the disadvantages arising from any lack of parallelism between the vertical guiding members and the totality of the movable members is reduced to a minimum.

Some forms of construction of the invention are diagrammatically illustrated merely by way of example in the accompanying drawings, in which

Figures 1 and 2 show in side elevation and in transverse section respectively the drive for the spindle carriage of a spinning or twisting machine;

Figure 3 is a view similar to Figure 2 showing a modification;

Figure 4 shows an end view of a device for superposing upon the alternating movement of the spindle carriage an intermittent slow vertical movement which is always in the same direction;

Figures 5 and 6 show two forms of bobbins that may be constructed with this spindle carriage drive;

Figures 7 and 8 show on a larger scale two forms of flexible suspension members for the movable member, and the drive associated therewith;

Figure 9 shows in side elevation a modification in the drive of the spindle carriage; and

Figures 10 and 11 show in side elevation and in transverse section respectively another modification.

According to the embodiment illustrated in Figures 1 and 2, each of the spindle carriages of the two halves  $a$  and  $a'$  that constitute the continuous spinning or twisting frame is subdivided into a plurality of elements  $1$  and  $1'$  of limited length. Each of these elements, carrying the spindles  $2$  and  $2'$ , is so guided as to be capable of sliding in a vertical direction by the aid of sleeves or couplings  $3$  and  $3'$  along the guide rods  $4$  and  $4'$ , which are substantially integral with the frame  $5$  of the machine. Each of the elements  $1$  and  $1'$  is suspended by the aid of a flexible member  $6$  or  $6'$ , in the form of a closed or continuous ring, to which it is anchored at a point  $6^{\circ}$  and  $6'^{\circ}$ , while these members are in positive engagement with driving wheels  $7$  and  $7'$ , keyed on to transverse shafts  $8$ , rotatably supported by fixed bearing brackets  $9$  substantially integral with the frame  $5$ . These flexible members are also engaged with tensioning wheels  $10$  and  $10'$ , keyed on to transverse shafts  $11$ , which are also rotatably supported by the frame  $5$ .

The flexible suspension members may consist of chains, as shown in Figure 7, and in this case the wheels  $7$  and  $7'$  are ordinary toothed wheels with which the chains mesh; or alternatively they may be constituted by a cable or by a me-

tallic tape, anchored by the aid of a peg 12 to the periphery of the wheel 7 or 7', which is then in the form of a flanged cylinder, as shown in Figure 8.

For the actuating of the various elements of the spindle carriage a rod 13 is provided, which is so guided as to be capable of sliding in the longitudinal direction of the machine, and is actuated with a reciprocating motion by the winding-up eccentric 14 or other equivalent member. In the example illustrated this member is constituted by a cylinder cam with a groove 14', in which there engages a roller 15, which is secured to the rod 13. The rod 13 is provided at suitable points with screw threaded portions or worms 13', which mesh with worm wheels 16, keyed on to the shafts 8. During the reciprocating movement of the rod 13 these threaded parts 13', by functioning as racks, impart to the wheels 16, and consequently to the shafts 8 and to the wheels 7 and 7', an oscillating rotary movement, which, through the medium of the flexible members 6 and 6', is converted into an alternating vertical movement, which is positively controlled both during the ascent and during the descent of the elements 1 and 1' of the spindle carriage.

With a view to reducing the force required for the raising of the elements 1 and 1' of the carriage, these elements may be accurately balanced by the aid of counterpoises 17, acting through the medium of flexible members 18 upon pulleys 19 keyed on to the shafts 11. Alternatively the weight of the elements 1 may be directly balanced with the weight of the elements 1' on the other half of the machine, through the medium of the same flexible suspension members 6 and 6', by so arranging matters that while one element 1 is ascending the other is descending, and conversely, as diagrammatically indicated in the modification illustrated in Figure 3.

With the simple vertical alternating movement impressed upon the elements 1 and 1' of the spindle carriage, cylindrical bobbins such as the bobbin 20 of Figure 6 may be obtained, having a height  $h$  equal to the amplitude of the alternating movement impressed upon the said elements. It is however also possible to obtain bobbins with a conical point, such as the bobbin 21 of Figure 5, if there is impressed upon the longitudinal rod 13, in addition to the alternating movement necessary for impressing upon the elements 1 and 1' of the carriage a vertical alternating movement of amplitude  $h'$  equal to the height of winding of the stretch, an intermittent rotary movement in a suitable direction. The screw threaded portions 13', by also functioning as endless screws or worms, will then impress upon the worm wheels 16 an intermittent rotary motion, so that upon the alternating movement of amplitude  $h'$  of the elements 1 and 1' there will be superposed an intermittent progressive raising or lowering movement of amplitude  $H$ , which will determine the formation of the bobbin 21 of Figure 5.

In order to impress upon the rod 13 an intermittent rotary movement, recourse may be had for example to the device shown in Figure 1, and in detail on a larger scale in Figure 4. According to this device, there is made substantially integral with the rewinding eccentric 14 a heart-shaped cam 22, designed to actuate, with a reciprocating motion, a push rod 23, which, owing to the fact that it is jointed to one of the arms of a bent lever 24 oscillatably mounted upon a shaft 25, causes this lever to oscillate. The other

arm of the lever 24 is provided with a pawl 26, engaging with a ratchet wheel 27, which is substantially integral with a wheel 28, which, by the aid of a chain 29, transmits the motion to another wheel 30, which is keyed by means of a sliding key 31 to the end of the rod 13. At each revolution of the rewinding eccentric 14 there is impressed upon the rod 13 a small intermittent rotary movement, so that upon the alternating vertical movement of the elements 1 and 1' of the carriage there is superimposed a slow descending movement, in such a manner as to obtain the bobbin 21 shown in Figure 5. If, instead of the spindle carriage, it was a question of the ring rail, the said slow movement would have to be an ascending movement, which would be obtained by impressing a reverse rotation upon the rod 13, or else by making use of an inverse pitch for the screw 13'.

The flexible members 6 and 6' that support the elements 1 and 1' of the carriage may equally well be discontinuous, as shown in Figure 9. In this case the said flexible members, still engaging with the actuating wheels 7 and 7' keyed on to the shafts 8, which are actuated with an oscillating rotary motion, are anchored at one end, at 6" and 6"', to the element of the carriage, while at the other end they are urged by a force  $F$ , constituted by a counterpoise or a spring, with a view to balancing the weight of the elements 1 and 1' of the carriage. Alternatively the weight of the elements 1 may be balanced directly against the weight of the elements 1' on the other half of the machine through the medium of the same flexible suspension members 6 and 6', on the actuating wheels 7 and 7' and on the shafts 8, by arranging matters in such a way that when one element 1 rises the other element 1' descends, and conversely, as indicated diagrammatically in Figures 10 and 11.

When discontinuous flexible elements are employed, as in the examples illustrated in Figures 9, 10 and 11, the positive actuation of the elements 1 and 1' of the carriage takes place only during the ascent, whereas the descent is effected under the action of gravity.

In the device for supporting and actuating the movable members hereinbefore described, owing to the suspension and the actuation of these movable members by the aid of flexible members, and furthermore owing to the subdivision of these movable members into a plurality of short elements, the friction along the guiding members 4 and 4' is reduced to a minimum, either owing to the fact that accurate adjustment of the guiding sleeves 3 and 3' is no longer required, or else owing to the fact that any defects of parallelism between the guiding members of the various elements have no influence. The expenditure of motive power for the actuation of the machine is thus considerably reduced, while all the disadvantages presented by the actuating devices hitherto known are eliminated.

Although the invention has been described in its application to the actuation of the spindle carriage of a ring spinning frame or ring doubler, it is obvious that with appropriate modifications, and without going outside the scope of the invention, it is equally applicable to the actuation of the ring rail of these same spinning or twisting machines, or to the bell-carrying rail or thread guide rail in certain special spinning machines, and in general to any movable member of spinning, twisting, winding-on and like machines.

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