

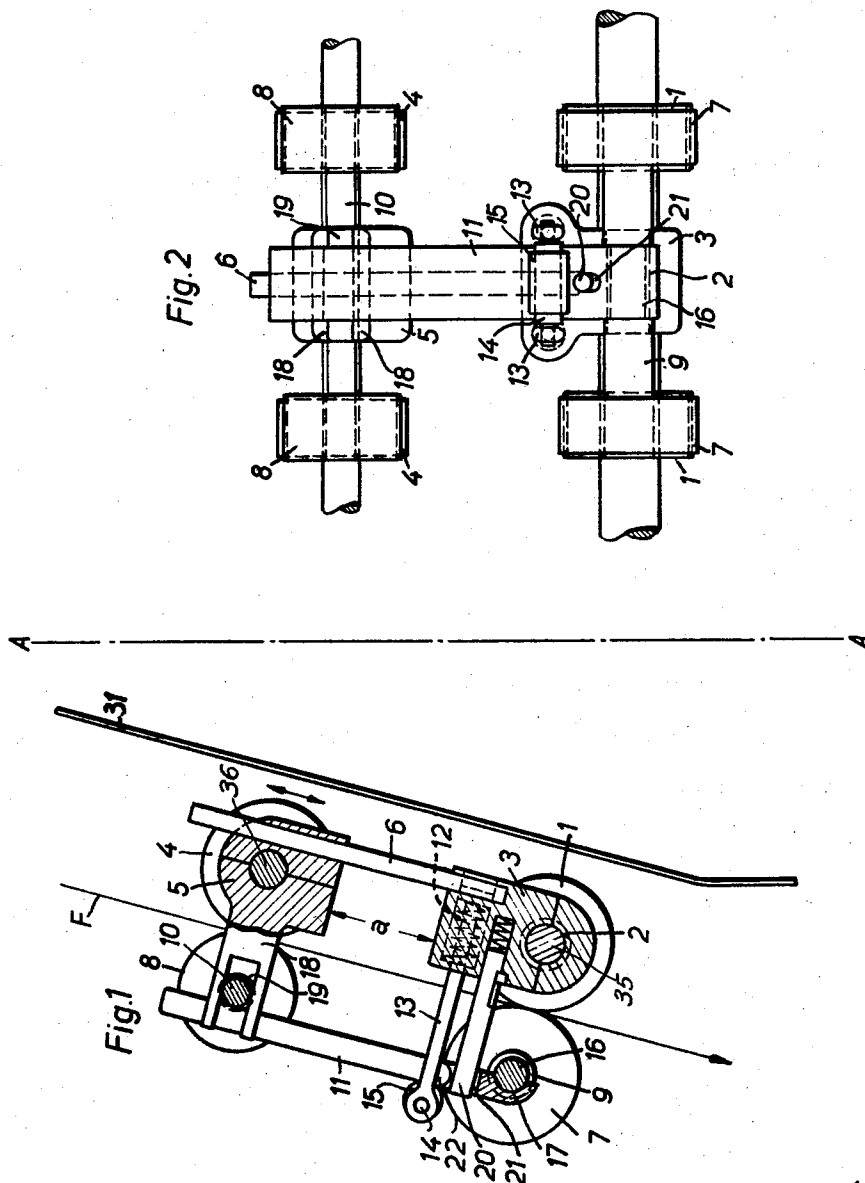
Sept. 8, 1959

H. L. P. UDE  
 SPRING LOADING DEVICE FOR TWIN PRESSURE  
 ROLLERS, ESPECIALLY FOR DRAWING FRAMES  
 OF SPINNING MACHINES

2,902,725

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2 Sheets-Sheet 1



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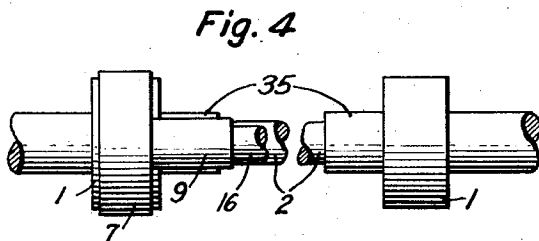
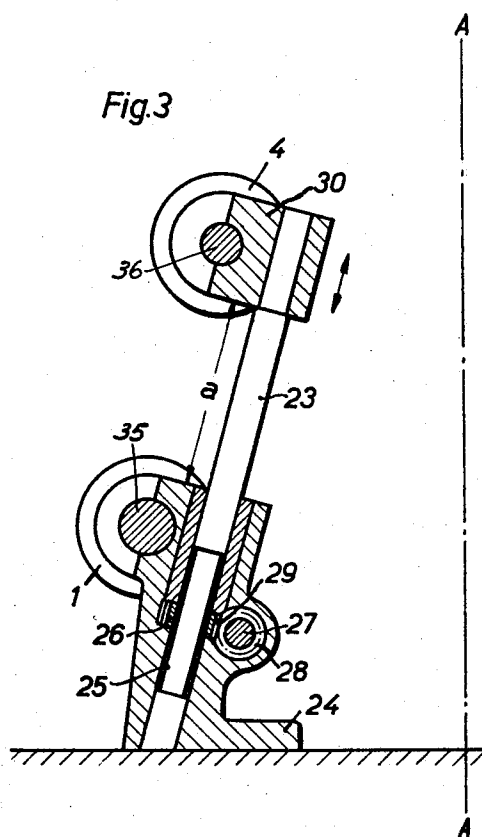
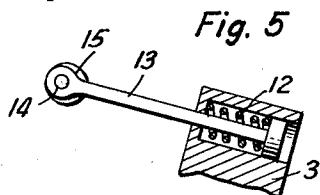
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## SPRING LOADING DEVICE FOR TWIN PRESSURE ROLLERS, ESPECIALLY FOR DRAWING FRAMES OF SPINNING MACHINES

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9 Claims. (Cl. 19—135)

The present invention concerns a spring loading device for twin pressure rollers, especially for drawing frames of spinning machines, in which the pressure rollers are positively connected with the lower roller in axis parallel manner by a supporting arm which is journaled merely on the lower roller pertaining to said rollers.

It is an object of the present invention to provide an arrangement for use in connection with such drawing frames in which more than one pressure roller cooperates with one lower roller pertaining thereto which arrangement will make it possible in a simple manner to connect the spring loading pressure rollers with the lower rollers pertaining thereto.

It is another object of this invention to provide a spring loading device for twin pressure rollers, especially for drawing frames of spinning machines which will make it possible to vary the length of the drafting field in a simple manner and to a great extent, which will be of particular advantage in connection with wet spinning machines.

These and other objects and advantages of the invention will appear more clearly from the following specification in connection with the accompanying drawings in which:

Fig. 1 illustrates partly in section a side view of a spring loading device according to the present invention.

Fig. 2 is a front view of Fig. 1.

Fig. 3 is a longitudinal section through a roller rod with adjusting device for the length of the drawing frame.

Figs. 4 and 5 show some details of the device according to the present invention.

### General arrangement

The primary feature of the present invention consists in that the holding arm for a pressure roller pair is provided with guiding and holding means for the holding arm of a second pressure roller pair by means of which guiding and holding means the last mentioned holding arm is in a force locked and axis parallel manner guided and held with regard to a second lower roller.

### Structural arrangement

Referring now to the drawings in detail, the spring loading device according to the invention which is of particular importance in connection with drawing frames of wet spinning machines makes use of the known arrangement according to which a pressure roller is directly positively connected with the lower roller cooperating therewith. In order, when applying this principle to a drawing frame with a plurality of pressure rollers to obtain an as simple as possible spring loading device which can be easily watched and operated, there is according to the present invention provided an arrangement which comprises at least two pressure roller means which are spaced from each other and by a single pressure urged holding means are positively and in a form closed manner connected with the respective lower rollers pertaining thereto. More specifically with reference to Figs. 1 and 2, which il-

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lustrate the drawing frame of a flax wet spinning machine, each delivery roller means consists of two rollers 1 spaced from each other and supported and rotatably interconnected by a shaft 35 which is provided with a circular groove 2 into which a holding member 3 is fitted so that the member 3 cannot move in axial direction. The axial immovability of the roller means may also be assured in a different manner.

Each feed roller means for the roving F similarly consists of two rollers supported and rotatably interconnected by a shaft 36 which has mounted thereon a holding member 5. The holding member 5 likewise immovable in axial direction because the holding members 3 and 5 are connected with each other by rigid guiding means 6. This guiding means may be connected to the holding member 3, whereas it is arranged so as to be able to slide in a bore of the member 5. The pressure roller means with rollers 7 and 8 respectively pertaining to the lower rollers 1 and 4 are held in position by a rod or bar 11 which acts both upon the shafts 9 and 10 respectively rotatably interconnecting the respective pressure rollers 7 and 8. This rod 11 is under the influence of pressure by tension springs 12 (Figs. 1 and 5) which are preferably mounted in the holding member 3 and the tension of which is conveyed to the rod 11 through rods 13 and an eccentric 15 which is rotatable about the bolt 14 mounted at the end of said rods 13.

While the pressure rollers 7 are held immovable in axial direction for instance by means of a jaw 17 which is provided at the end of the rod 11 and engages the circular groove 16 (Figs. 2 and 4) provided in shaft 9, the shaft 10 interconnecting the pressure rollers 8 is journaled in a fork-like extension 18 of the holding member 5. The fork-like extension 18 engages a circular groove 19 which is provided in shaft 10 interconnecting the rollers 8 so that axial immovability of the pressure roller 8 is assured. The same groove 19 is engaged from the front by the rod 11 which is likewise laterally guided in the fork-like extension 18. Thus, by means of the rod 11 in cooperation with the other holding means, the pressure rollers 7 as well as the pressure rollers 8 are form and force locked with the lower rollers 1 and 4 respectively pertaining thereto. This means that the elements 7, 9, 11, 10, 8, 4, 5, 36, 6, 3, 35 and rollers 1 engaging the rollers 7 form a completely closed system and that the power flow is thus effected in a circuit closed in itself.

In order to assure that the pressure roller unit will remain in position also during the unsaddling by untensioning the springs 12, a special holding member in form of a yieldably journaled pin or bolt 20 is provided. The said bolt 20 is yieldably journaled in the holding member 3 and extends through a longitudinal slot 21 of the rod 11. The extension of said slot in the longitudinal direction of the rod 11 is greater than the diameter of the bolt 20, while one edge 22 of said slot is rounded in order to furnish a certain play for the member 20 in case that the diameter of the cylinders changes due to wear or regrinding. For the purpose of unsaddling, first the springs are relaxed by turning the eccentric 15 or its bolt 14, whereupon the bolt 20 is pushed back i.e. toward the left with regard to Fig. 1 so that the rod 11 together with the pressure rollers 7 and 8 can be removed.

The divided holding mechanism according to the invention in which the individual holding members 3 and 5 are interconnected by means of a rigid guide 6 allows a relative movement of these holding members so that the distance *a* and thus the length of the drafting field can be varied.

Fig. 3 illustrates how the distance between the roller pairs 1, 7 and 4, 8 can be adjusted relative to each other. As will be seen from Fig. 3, one rod 23 is guided

in each of the roller stands 24 of the machine, i.e. the bearings for shaft 35 (one only being shown in Fig. 3). The lower end of said rod 23 is provided with a thread 25 which is threadedly engaged by a nut 26 which latter is not movable in axial direction of the rod 23. The rotation of the nut 26 is effected by means of a shaft 27 and a helical wheel 28 mounted thereon and meshing with corresponding teeth 29 on the periphery of the nut 26. The shaft 27 may extend along the entire length of the machine and, at the individual locations of the bearings of the drafting rollers (roller stands), may respectively be provided with helical gears so that when rotating the shaft 27, all rollers 4 of the entire machine may simultaneously be adjusted for purposes of varying the distance  $a$ , because these rollers are at the other end of the rod 23 journaled in the portions 30 of the roller stands.

Similarly it is possible to extend the eccentric shaft 14 over the entire length of the machine so that when said eccentric shaft is rotated, the tension or load of all springs 12 pertaining to the loading devices in the machine can be varied.

The lower rollers 1 and 4 are not subjected to any material bending stress. The bearings of the rollers in the roller stands are subjected only to the stress caused by the weight of the rollers and the pressure-producing devices for the spinning stations located between said roller stands, so that the number of the roller stands to be provided in a machine can be considerably reduced while the distance between the roller stands can be increased. In connection with a drafting frame for flax wet spinning machines, this means for instance that a reduced number of roller stand bearings have to be sealed against humidity and accumulation of dirt, which in turn decreases the friction losses and thus the required power.

When employing a loading device according to the present invention, which makes it possible with minor power requirement to vary the distance  $a$  between the loaded roller pairs 1, 7 and 4, 8 without unsaddling all pressure rollers, considerable advantages are obtained over the heretofore known drafting frames because with the heretofore known drafting frames, adjustments of the length of the drafting field can be effected only individually and successively in the individual roller stands, and only to a lesser extent in view of the danger of bending the rollers. If, for instance, the rollers 4 are displaced in either direction of the double arrow in Fig. 1, the pressure rollers 8 follow also when under load. If the pressure rollers 8 are mounted on the shaft 10 as rotors, the shaft 10 can during an adjustment roll on the rod 11 so that at the contact point between the shaft 10 and the rod 11, even under full load, only pure rolling friction has to be overcome.

The loading device according to the invention which, as stated above, is completely closed in itself and requires a minimum of space, furthermore makes it possible directly therebehind, for instance by means of cover sheets 31 (Fig. 1) to cover the entire machine against humidity and accumulation of dirt, because no weight mechanism, spring mechanism or lever mechanism protrude in the direction toward the line A—A (Fig. 1) which represents the axis of symmetry of a spinning machine equipped with a device according to the present invention.

It is, of course, understood that the present invention is, by no means, limited to the specific embodiments shown in the drawings but also comprises any modifications within the scope of the appended claims.

What I claim is:

1. A spring loading device for twin pressure rollers, especially for drawing frames of spinning machines, which includes in combination: a first pair of pressure rollers, a second pair of pressure rollers arranged in spaced relationship to said first pair of pressure rollers, a first pair of lower rollers arranged for cooperation with said first pair of pressure rollers, first shaft means supporting said first

pair of lower rollers, a second pair of lower rollers arranged for cooperation with said second pair of pressure rollers, second shaft means supporting said second pair of lower rollers, first holding means supported by said first shaft means and arranged between the rollers of said first pair of lower rollers, second holding means supported by said second shaft means and arranged between the rollers of said second pair of lower rollers for cooperation with said second pair of pressure rollers to hold said second pair of pressure rollers adjacent said second pair of lower rollers, first interconnecting means adjustably connecting said first holding means with said second holding means, second interconnecting means adjustably interconnecting said pairs of pressure rollers, and locking means carried by said first holding means and locking said second interconnecting means to said first holding means.

2. A spring loading device for twin pressure rollers, especially for drawing frames of spinning machines, which includes in combination: a first pair of pressure rollers, a second pair of pressure rollers arranged in spaced relationship to said first pair of pressure rollers, a first pair of lower rollers arranged for cooperation with said first pair of pressure rollers, first shaft means supporting said first pair of lower rollers, a second pair of lower rollers arranged for cooperation with said second pair of pressure rollers, second shaft means supporting said second pair of lower rollers, first holding means supported by said first shaft means and arranged between the rollers of said first pair of lower rollers, second holding means supported by said second shaft means and arranged between the rollers of said second pair of lower rollers for cooperation with said second pair of pressure rollers to hold said second pair of pressure rollers adjacent said second pair of lower rollers, first connecting means connecting said first holding means with said second holding means, second connecting means interconnecting said pairs of pressure rollers, and spring loaded bar means carried by said first holding means and engaging said second connecting means so as continuously to urge the latter toward said first holding means to thereby urge said pairs of pressure rollers toward the respective adjacent lower rollers.

3. A spring loading device for twin pressure rollers, especially for drawing frames of spinning machines, which includes in combination: a first pair of lower rollers, first shaft means supporting said rollers, a first pair of pressure rollers arranged for cooperation with said lower rollers, a second pair of pressure rollers arranged in spaced relationship to said first pair of pressure rollers, a second pair of lower rollers arranged for cooperation with said second pair of pressure rollers, second shaft means supporting said second pair of lower rollers, first holding means supported by said first shaft means and arranged between the rollers of said first pair of lower rollers, second holding means supported by said second shaft means and arranged for cooperation with said second pair of pressure rollers to hold said second pair of pressure rollers adjacent said second pair of lower rollers, connecting means connecting said first holding means with said second holding means and also interconnecting all of said rollers in a closed system, said connecting means including bar means holding said first pair of pressure rollers against axial displacement, and spring loaded pressure exerting means carried by said first holding means and arranged through the intervention of said connecting means to urge said pairs of pressure rollers against said pairs of lower rollers.

4. A device according to claim 3, which includes spring loaded pin means having one end portion slidably extending through a slot provided in said bar means and having its other end portion slidably mounted in said first holding means.

5. A loading device for twin pressure rollers, especially for drawing frames of spinning machines, which comprises in combination: a first pair of lower rollers, shaft

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means supporting said rollers and drivingly interconnecting the same, bearing means supporting said shaft means, a first pair of pressure rollers arranged for cooperation with said lower rollers, the rollers of said first pair of lower rollers and of said first pair of pressure rollers being arranged between said bearing means, a second pair of lower rollers arranged in spaced relationship to said first pair of lower rollers but at a level higher than the latter, a second pair of pressure rollers arranged for cooperation with said second pair of lower rollers, said shaft means being provided with recess means intermediate the rollers of said first pair of lower rollers, holding means mounted on said shaft means intermediate the rollers of said first pair of lower rollers and engaging said recess means, positioning means associated with said pairs of pressure rollers and lower rollers for positioning said first and second pairs of pressure rollers relative to each other and relative to said lower rollers, and pressure exerting means carried by said first holding means and through the intervention of said positioning means urging toward each other said pairs of pressure rollers and the respective pairs of lower rollers cooperating therewith, thereby forming with said positioning means and said pairs of pressure rollers and lower rollers and the shafts supporting the same a closed circuit for the forces acting upon all of said pairs of rollers.

6. A device according to claim 5, in which said positioning means are located in a plane between the rollers of each pair of rollers.

7. A loading device for twin pressure rollers, especially for drawing frames of spinning machines, which comprises in combination: a first pair of lower rollers, first shaft means supporting said rollers and drivingly interconnecting the same and provided with first recess means, bearing means supporting said shaft means, a first pair of pressure rollers arranged for cooperation with said lower rollers, second shaft means rotatably interconnecting the rollers of said first pair of pressure rollers and provided with second recess means, the rollers of said first pair of lower rollers and of said first pair of pressure rollers being arranged between said bearing means, a second pair of lower rollers arranged in spaced relationship to said first pair of lower rollers but at a level higher than the latter, third shaft means drivingly interconnecting the rollers of said second pair of lower rollers, a second pair of pressure rollers arranged for cooperation with said second pair of lower rollers, fourth shaft means drivingly interconnecting the rollers of said second pair of pressure rollers and provided with third recess means, holding means mounted on said shaft means intermediate the rollers of said first pair of lower rollers and engaging said first recess means, positioning means associated with said pairs of pressure rollers and lower rollers for positioning said first and second pairs of pressure rollers relative to each other and relative to said lower rollers, said positioning means including a flat bar engaging said second and third recess means, spring loaded rod means supported by said first holding means and extending through said flat bar, and eccentric means supported by said rod means and operable to press upon said flat bar thereby pressing said pressure rollers and the respective cooperating lower rollers against each other.

8. A loading device for twin pressure rollers, especially for drawing frames of spinning machines, which comprises in combination: a first pair of lower rollers, shaft means supporting said rollers, bearing means supporting said shaft means, said lower rollers being arranged between said bearing means, a first pair of pressure rollers

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arranged for cooperation with said lower rollers, a second pair of lower rollers arranged in spaced relationship to said first pair of lower rollers, a second pair of pressure rollers arranged for cooperation with said second pair of lower rollers, first holding means mounted on said shaft means intermediate the rollers of said first pair of lower rollers, second holding means associated with said second pair of lower rollers and comprising extension means arranged to secure said second pair of pressure rollers in a certain position with regard to said second pair of lower rollers, guiding means supported by said first holding means and slidably engaging said second holding means for guiding the latter, aligning means interconnecting said pairs of pressure rollers for preventing axial displacement of said first pair of pressure rollers, said aligning means being engaged by said extension means, and spring loaded clamping means arranged to engage said aligning means for pressing said pressure rollers and the respective cooperating lower rollers relative to each other, said second pair of pressure rollers together with said second pair of lower rollers being adjustable relative to said first pair of pressure rollers together with said first pair of lower rollers while said clamping means remains in clamping position.

9. A loading device for twin pressure rollers, especially for drawing frames of spinning machines, which comprises in combination: a first pair of lower rollers, shaft means supporting said rollers, bearing means supporting said shaft means, said lower rollers being arranged between said bearing means, a first pair of pressure rollers arranged for cooperation with said lower rollers, a second pair of lower rollers arranged in spaced relationship to said first pair of lower rollers, a second pair of pressure rollers arranged for cooperation with said second pair of lower rollers, first holding means mounted on said shaft means intermediate the rollers of said first pair of lower rollers, second holding means associated with said second pair of lower rollers and comprising extension means arranged to secure said second pair of pressure rollers in a certain position with regard to said second pair of lower rollers, guiding means supported by said first supporting means and slidably engaging said second holding means for guiding the latter, aligning means interconnecting said pairs of pressure rollers for preventing axial displacement of said first pair of pressure rollers, said aligning means being engaged by said extension means, spring loaded clamping means arranged to engage said aligning means for pressing said pressure rollers and the respective cooperating lower rollers relative toward each other, rod means carried by at least one of said bearing means and connected to said second holding means, and means operatively connected to said rod means and operable to engage the latter for effecting movement of said second holding means relative to said first holding means.

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