Aug. 14, 1934. R. D. TARR ET AL 1,970,528

DRAWING MECHANISM FOR SPINNING FRAMES AND SIMILAR MACHINES

Filed Feb. 29, 1932

Fig. 2

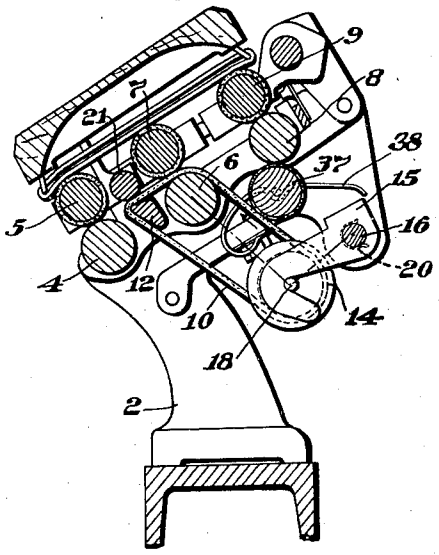


Fig. 1

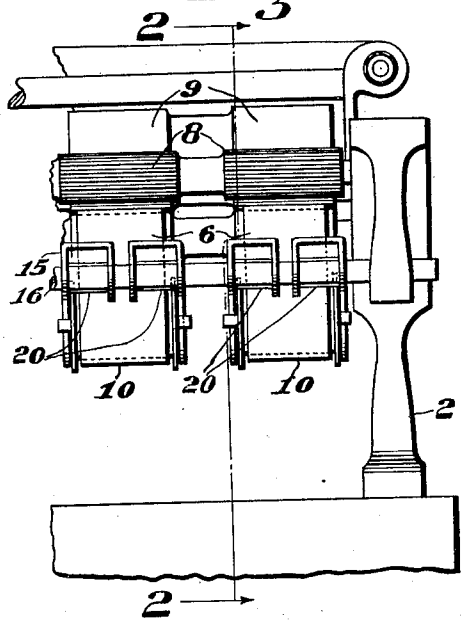
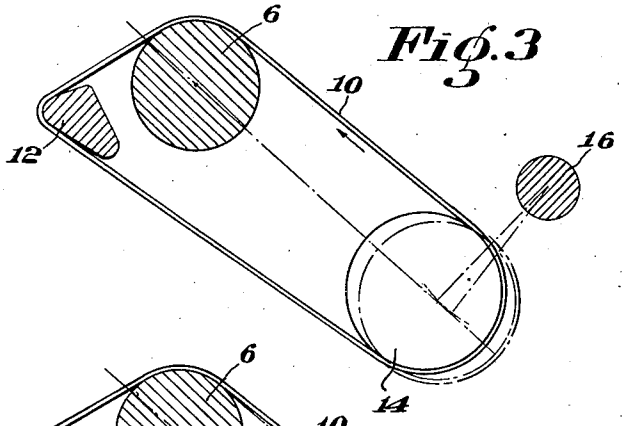


Fig. 3



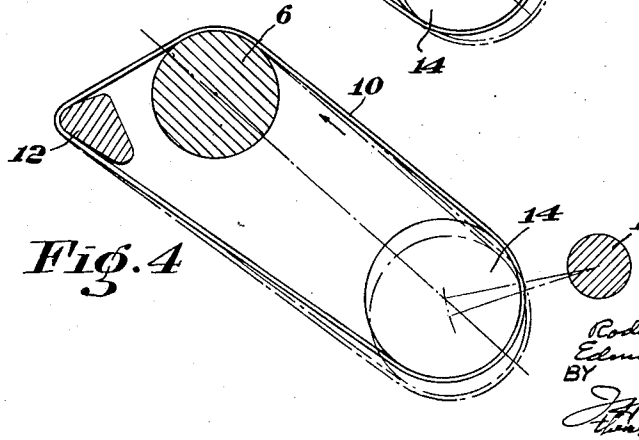


Fig. 4

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Patented Aug. 14, 1934 1,970,528

UNITED STATES PATENT OFFICE

1,970,528

DRAWING MECHANISM FOR SPINNING FRAMES AND SIMILAR MACHINES

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Application February 29, 1932, Serial No. 595,770

6 Claims. (Cl. 19—131)

This invention relates to drawing mechanisms for spinning frames and similar machines. It is more especially concerned with mechanisms of this type used in what is known as "long draft" spinning frames, the best example of which is shown in United States Letters Patent No. 1,804,968, dated May 12, 1931.

Long draft spinning has been known to a limited extent for many years, but the invention disclosed in the patent above mentioned has for the first time made long draft spinning available in a commercially satisfactory form. The mechanism shown in said patent has gone into very extensive use and has been exceptionally successful.

It is the chief object of the present invention further to improve mechanisms of the general type shown in the patent above designated with a view to making them even more reliable.

The nature of the invention will be readily understood from the following description when read in connection with the accompanying drawing, and the novel features will be particularly pointed out in the appended claims.

In the drawing,

Figure 1 is a rear elevation of a drawing mechanism similar to that shown in the patent above designated, but modified in accordance with the present invention;

Fig. 2 is a vertical, sectional view approximately on the line 2—2, Fig. 1, but indicating the clearer roll in place;

Fig. 3 is a diagrammatic view illustrating certain features of the mechanism shown in Figs. 1 and 2; and

Fig. 4 is a view similar to Fig. 3 but showing the prior art arrangement.

The drawing mechanism shown in Figs. 1, 2 and 3 comprises a roll stand 2 having suitable bearings in which three driven rolls 4, 6 and 8, respectively, are mounted. Upper rolls 5, 7 and 9 cooperate with the respective rolls 4, 6 and 8 to form three pairs of rolls, namely, front rolls 4 and 5, middle or intermediate rolls 6 and 7, and back rolls 8 and 9. Usually the lower front and rear rolls are fluted or grooved while the lower middle roll 6 is knurled. Usually, also, the upper rolls are leather covered. A belt or apron 10 passes between the intermediate rolls 6 and 7, runs forward over a stationary bar 12, and then extends downwardly and rearwardly around a tensioning roll 14 which is provided with end flanges to limit the lateral movement of the belt relatively to the roll. A slip roll 21 rests on the belt 10 immediately above the bar 12.

The mechanism so far described may be, and preferably is, substantially like that shown and described in the patent above referred to. The sliver is led through the rolls in succession, the preparation draft being applied to it between the rear rolls 8 and 9 and the intermediate rolls 6 and 7, and it is then subjected to a main draft between the intermediate and the front rolls.

The lower intermediate knurled roll 6 drives the belt or apron 10 and the roll 14 is made of sufficient mass or weight to keep the belt taut. In the arrangement heretofore used this belt tensioning roll 14 has been guided to swing about the axis of a rod 16, Fig. 4, which has been located in approximately the relationship to the belt and the roll 14 shown in said figure, and the guiding device has been arranged to maintain the axis of the belt tensioning roll at a constant distance from the axis of the rod 16 and constantly parallel also to the axis of the driving roll 6. It has been the usual custom, also, to make these belts of leather, calfskin being very commonly employed, and whether made of this material or not it has been necessary to cut them out of sheet material and to cement the ends together so as to make an endless belt. It occasionally happens that a belt will not be cut or cemented exactly straight so that one side or margin of the belt will be slightly longer than the other, or one margin of the belt may stretch more than the other after it has been in use for a time. When any substantial difference in the lengths of the two margins of the belt occurs, it has been found that the belt crowds against one flange of the roll 14 and curls over, thus producing after a time an unsatisfactory operating condition. While this does not occur very frequently and the crooked belts can be removed and replaced, nevertheless this condition is not satisfactory. To devise an effective solution for the problem presented by these conditions constitutes the chief object of the invention.

A considerable variety of arrangements have been used for guiding belt tensioning rolls in drawing mechanisms in which endless belts or aprons are employed, but all of them of which we have been able to learn are objectionable because of the action above described. A careful analysis of the causes responsible for this result and exhaustive experiments indicate that the difficulty is caused in some cases, as for example in the arrangement above described,

by an action between the belt tensioning roll and the belt, similar to that which occurs in a crowned pulley. In other cases the underlying cause appears to be a slight twisting action exerted on the belt by the tensioning pulley due to the fact that the axis of the pulley gets out of alinement with the axis of the driving roll.

We have found that these difficulties can be avoided by splitting the guide shown in the patent above designated for the belt tensioning roll so as to permit the two arms of the guide to swing independently of each other, and by so mounting these guiding arms that the axis of the roll 14 will be held approximately in a plane passing through the axis of the driving roll 6 notwithstanding differences which ordinarily are found, and must be reasonably expected, in the lengths of the two margins of the belt 10.

Referring to Figs. 1 and 2 it will be seen that the opposite projecting ends of gudgeons of the belt tensioning roll 14 are guided by swinging arms 15—15 both mounted on the rod 16 which is supported in parts of the stands 2. Also, that the location of this rod has been changed as compared to the arrangement shown in Fig. 4, and that it occupies such a position that the arms 15—15 guide the roll 14 for belt tensioning movement in a plane passing through the axis of the driving roll 6. In other words, the arms 15—15 permit the tensioning roll to take any position required to maintain the tension on both margins of the belt approximately equal, notwithstanding differences in the lengths of said margins, while at the same time so guiding the two gudgeons of said roll as to maintain the axis of the roll approximately in a plane extending through the axis of the driving roll. With this arrangement, therefore, the tensioning roll may assume various angular relationships to the driving roll, its axis either being parallel to the axis of the latter roll or not, but the axes of the two rolls always lie approximately in the same plane. This arrangement has been found to operate highly satisfactorily.

In an ideal arrangement the plane connecting the axes of the roll 14 and rod 16 would lie at right angles to the plane connecting the axes of the rolls 6 and 14. Considerations of economy, however, and the necessity for avoiding interference with the removal of the clearer roll 37 from the machine and its replacement therein, make it preferable to locate the rod 16 approximately as shown in Fig. 2, so that the plane connecting the axes of the roll 14 and the rod 16 are not quite perpendicular to the plane through the axes of the rolls 14 and 6. However, the relationship is so close to the ideal arrangement above described that the practical effect is the same, and the belt is guided without any appreciable tendency to crowd endwise of the roll 14 notwithstanding substantial differences in the lengths of the two margins of the belt.

The differences in the belt tensioning movement produced with the present arrangement as compared to a typical prior art construction is illustrated in dotted lines in Figs. 3 and 4, although the extreme range of movement of the belt is somewhat exaggerated in proportion to the other elements. In practice a difference in the length of one-quarter of an inch in the two margins of the belt would represent what might properly be considered an extreme case. The belt tensioning roll, however, is so supported that its opposite ends can drop independently of each other into positions determined solely by the operating lengths of the two margins of the belt. At the same time any twisting of the belt is prevented and the guiding arrangement is such that approximately the entire weight of the roll is effective to tension the belt.

The arms 15—15 are held properly spaced from each other and in correct lateral positions by means of spring clips 20 which are snapped over and grip the rod 16 and which bear lightly against the sides of the guiding arms.

The invention thus improves in a very simple and inexpensive way the running conditions in a drafting mechanism of the type above described, and completely avoids a difficulty which has been annoying heretofore. It also avoids the presence of any surfaces on which the tensioning roll can climb due to its rotation and thus move out of its proper running position. This has been an objectionable feature of some of the prior art constructions.

A further advantage of this construction is that it results in a more uniform and better cleaning of the belt 10 by the clearer roll or scavenger roll 37. A customary arrangement is to provide a single clearer roll running in contact with all of the belts 10 of a series of adjacent drafting units, the roll 37 also bearing lightly against the lower rear rolls 8. Such a clearer roll has gudgeons at its opposite ends which are supported in springs and one of these springs is shown in Fig. 2 at 38. Consequently, the clearer roll is maintained yieldingly in a fixed position and it is revolved slowly by its contact with the rolls 8 and belts 10. In the arrangements heretofore employed, if one of the belts stretched more than the others it allowed its belt tensioning roll to drop away from the clearer roll 37 and resulted either in moving the belt out of contact with the clearer roll, or in reducing the pressure of the belt against the clearer roll, with a consequent tendency to reduce the cleaning action of the clearer on the belt. On the other hand, if one side of any belt stretched more than the other, the resulting twisting action which would be produced in this manner, as above described, would tend to move the longer margin of the belt away from the clearer roll and might either actually produce this result, or so reduce the pressure against the clearer roll that this part of the belt could not be properly cleaned.

The present arrangement overcomes both of these difficulties due to the fact that it maintains the taut sides of all the belts of adjacent units constantly in substantially the same plane notwithstanding variations in the lengths of the belts or differences in the lengths of the two margins of an individual belt. Each drafting unit, therefore, is kept constantly in a better and more uniform condition than has been possible with prior arrangements.

While we have herein shown and described a preferred embodiment of our invention, it will be evident that the invention may be embodied in other forms without departing from the spirit or scope thereof.

Having thus described our invention, what we desire to claim as new is:

1. In a drawing mechanism of the type in which an endless belt cooperates with additional devices to grip the roving or sliver during the drawing operation, the combination of a driving

roll for said belt, a roll supported by said belt for tensioning the belt, and swinging guides for the opposite ends of said belt tensioning roll arranged to allow the two ends of the latter roll to drop independently of each other and due to the weight of the roll into positions determined by the operating lengths of the two margins of the belt, while still preventing the belt from twisting to any substantial degree and while also obtaining substantially all of the belt tensioning effect of the latter roll.

2. In a drawing mechanism of the type in which an endless belt cooperates with additional devices to grip the roving or sliver during the drawing operation, the combination of a driving roll for said belt, a belt tensioning roll supported by said belt, two pivoted arms for engaging and guiding opposite ends of said belt tensioning roll, and means for supporting said arms for swinging movement independently of each other about a fixed axis.

3. In a drawing mechanism of the type in which an endless belt cooperates with additional devices to grip the roving or sliver during the drawing operation, the combination of a driving roll for said belt, a belt tensioning roll supported by said belt, two pivoted arms for engaging and guiding opposite ends of said belt tensioning roll, and means for supporting said arms for swinging movement independently of each other about an axis positioned to cause said arms to maintain the axis of said belt tensioning roll approximately in a plane extending through both said axis and the axis of said driving roll notwithstanding normal differences in the lengths of opposite margins of said belt.

4. In a drawing mechanism of the type in which an endless belt cooperates with additional devices to grip the roving or sliver during the drawing operation, the combination of a driving roll for said belt, a roll supported by said belt for tensioning the belt, swinging guides for the opposite ends of said belt tensioning roll arranged to allow the two ends of the latter roll to drop independently of each other into positions determined by the operating lengths of the two margins of the belt while maintaining the taut side of said belt in substantially the same plane notwithstanding differences in the lengths of said margins, a clearer device engaging the taut side of said belt, and means for supporting said clearer device in its operative position.

5. In a drawing mechanism of the type in which an endless belt cooperates with additional devices to grip the roving or sliver during the drawing operation, the combination of a driving roll for said belt, a roll supported by said belt for tensioning the belt, and swinging guides for the opposite ends of said tensioning roll arranged to maintain the axis of the latter roll approximately in a plane extending through the axes of both of said rolls while enabling the opposite ends of the belt tensioning roll to rise and fall independently of each other due to its own weight to cause said roll to equalize the tension on both margins of the belt notwithstanding differences in the lengths of said margins, and means supporting said guides for independent swinging movement.

6. In a drawing mechanism of the type in which an endless belt cooperates with additional devices to grip the roving or sliver during the drawing operation, the combination of a driving roll for said belt, a belt tensioning roll supported by said belt, two pivoted arms for engaging and guiding opposite ends of said belt tensioning roll, and means for supporting said arms for swinging movement independently of each other about an axis located behind and above the axis of said belt tensioning roll.

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