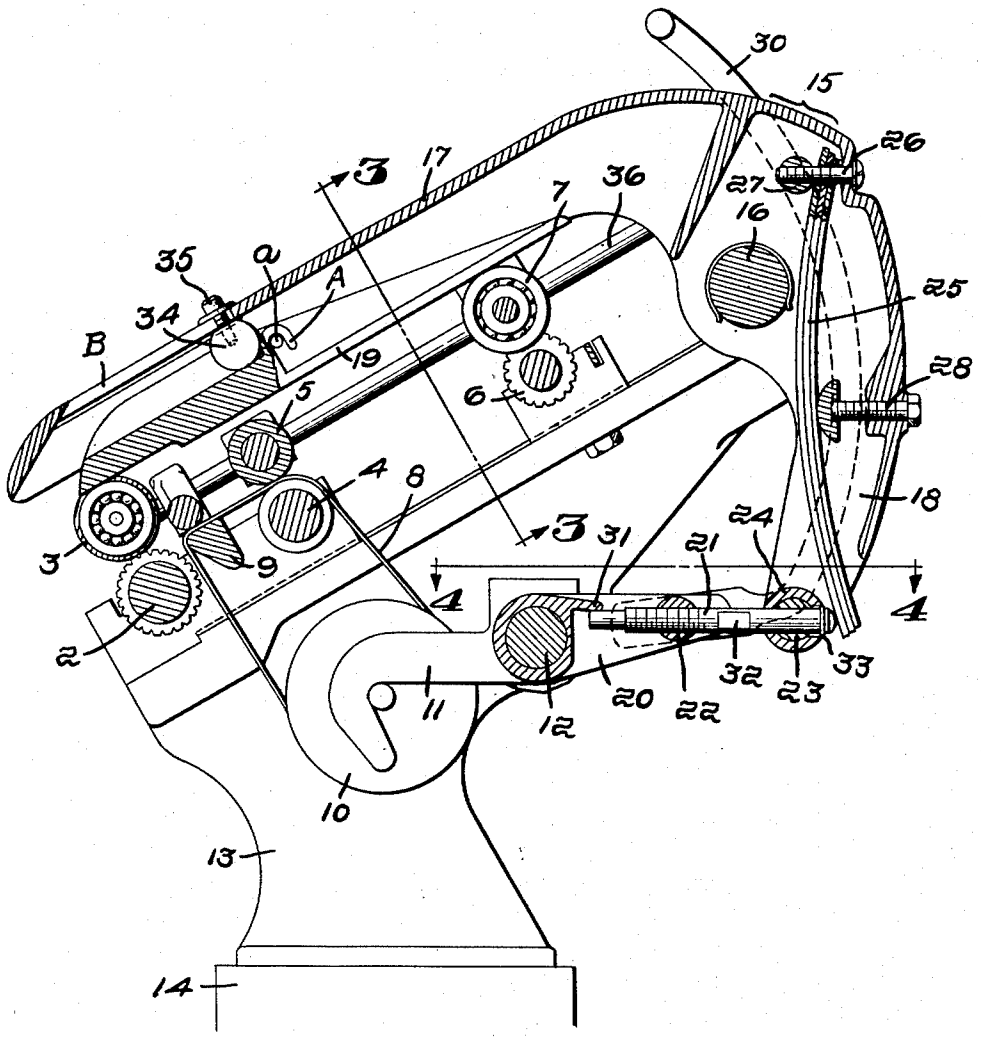
Oct. 10, 1950 V. A. BURNHAM ET AL 2,525,647

WEIGHTING MECHANISM FOR TEXTILE DRAWING MACHINES

Filed Aug. 18, 1948 4 Sheets-Sheet 1

Fig. 1.



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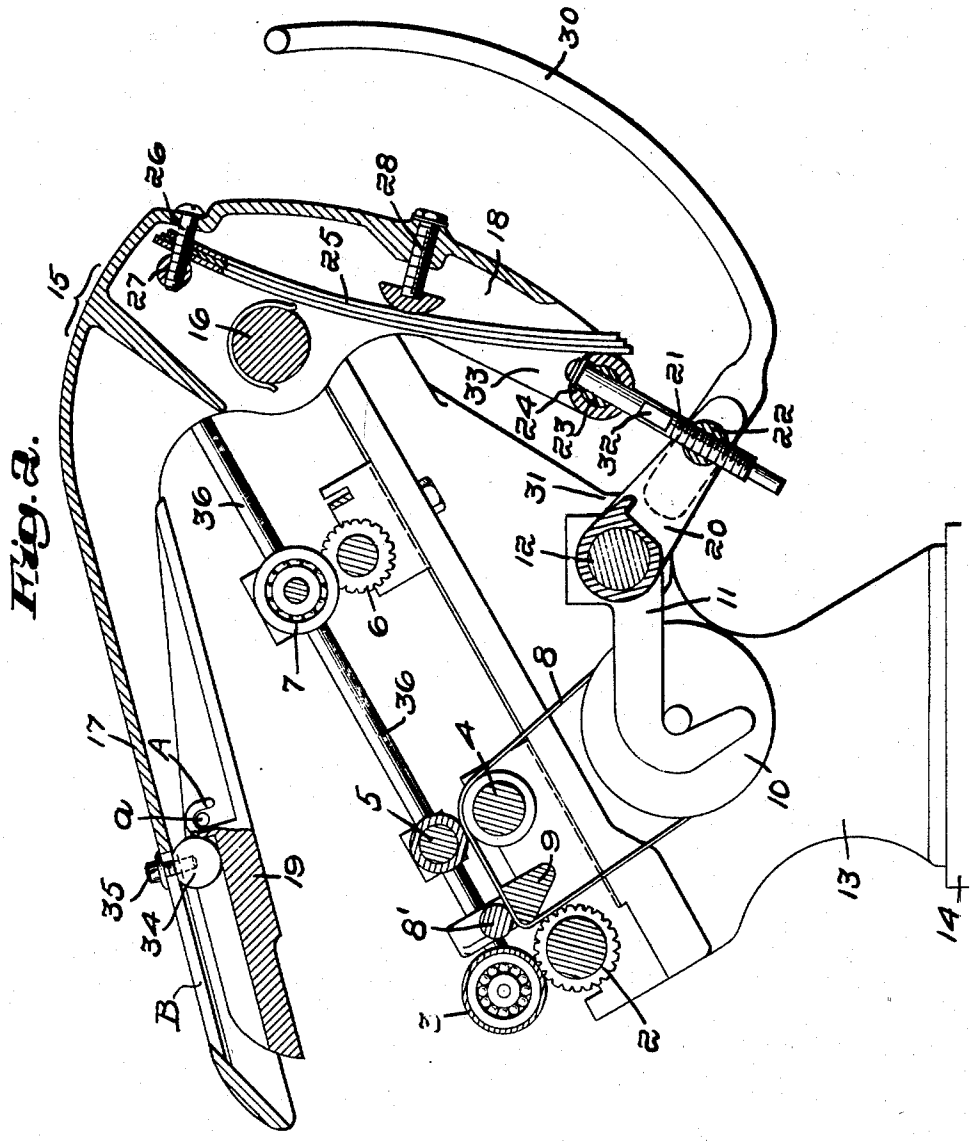
Filed Aug. 18, 1948 4 Sheets-Sheet 2

Fig. 2.



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WEIGHTING MECHANISM FOR TEXTILE DRAWING MACHINES

Filed Aug. 18, 1948 4 Sheets-Sheet 3

Fig. 3.

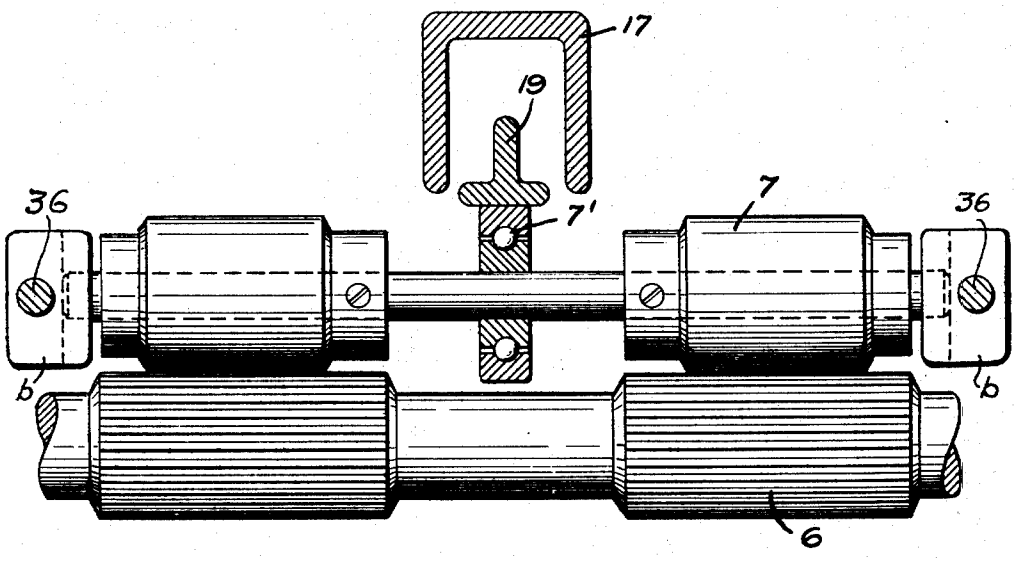


Fig. 4.

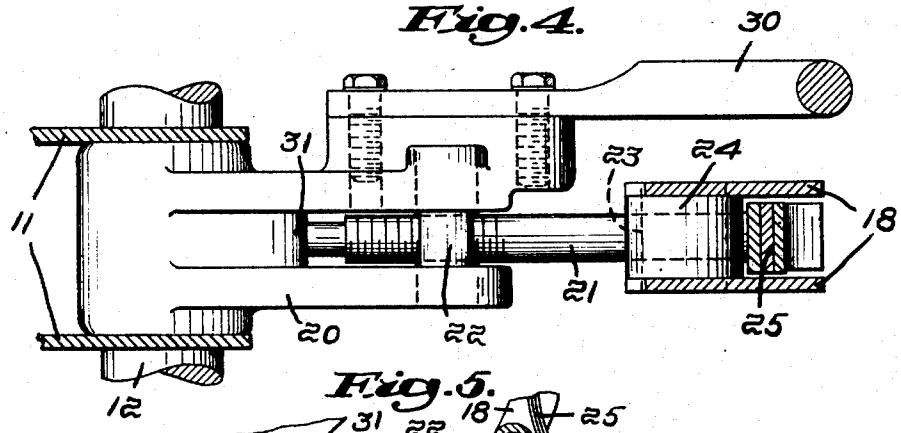
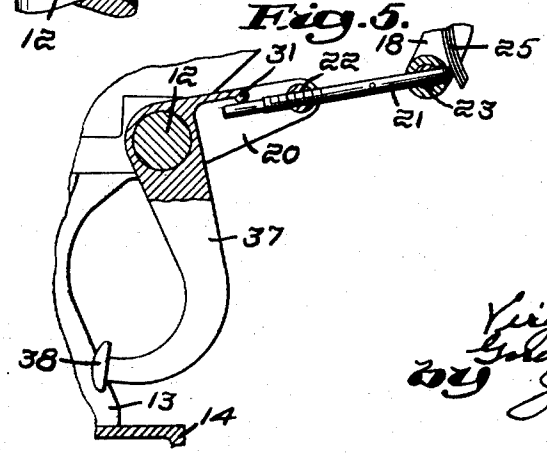


Fig. 5.



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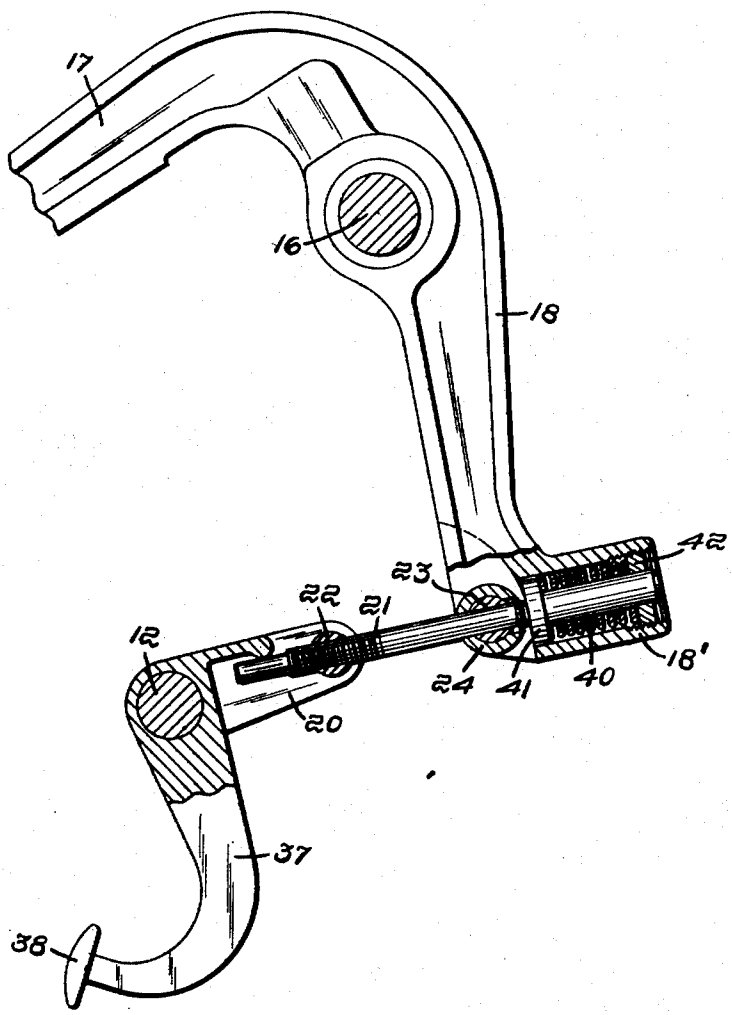
WEIGHTING MECHANISM FOR TEXTILE DRAWING MACHINES

Filed Aug. 18, 1948 4 Sheets-Sheet 4

Fig. 6.



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WEIGHTING MECHANISM FOR TEXTILE DRAWING MACHINES

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Application August 18, 1948, Serial No. 44,832

23 Claims. (Cl. 19—135)

1

This invention relates to the weighting apparatus used in drawing mechanisms of the type with which spinning and roving frames are equipped.

In such mechanisms the drafting operation is performed by a series of pairs of rolls, or equivalent drafting devices, through which the slivers are fed, and the loading or weighting of the top rolls has, from time out of mind, been accomplished by saddles or weight hooks connected by stirrups or rods with springs, weights, or weighted levers, which apply the desired degree of pressure to the rolls. The fact that these stirrups or weight transmitting elements must run from in the neighborhood of the rolls down through the space between them and the roll stand beam, necessarily encumbers this space with parts which interfere seriously with cleaning and with other operations which the machine tenders are required to perform.

The present invention aims to devise a weighting mechanism in which this objectionable feature of prior art mechanisms of this type will be eliminated.

A further object of the invention is to provide a weighting mechanism in which the limitations of the conventional saddle and stirrup mechanisms, when used with extreme variations in roll settings, will be overcome.

It is also an object of the invention to devise a weighting mechanism which will be simpler in constructions; easier to use; more convenient for the operator to release the pressure on the rolls and reapply it again; and which, generally, will be superior to the constructions heretofore devised.

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

In the drawings,

Fig. 1 is a vertical, sectional view illustrating a weighting mechanism embodying this invention;

Fig. 2 is a similar view showing the weighting mechanism released;

Fig. 3 is a transverse view taken approximately on the line 3—3, Fig. 1;

Fig. 4 is a plan view of the toggle mechanism, with some parts in section, on the line 4—4, Fig. 1;

Fig. 5 is a side elevation of a modified lever arrangement for operating the toggle mechanism; and

Fig. 6 is a side elevation, partly in section, showing a further modification.

2

Referring first to Figs. 1 and 2, the construction there shown comprises a drafting mechanism which may be of any suitable or common form. As illustrated, it comprises a pair of front rolls 2 and 3, intermediate rolls 4 and 5, and rear rolls 6 and 7. These may be arranged, driven and operated in the orthodox manner. The particular construction shown includes an apron or belt 8 driven by the roll 4, running over an apron bar 9, and tensioned by a pulley 10 controlled by the usual guide 11. This guide is mounted to swing about a stationary rod or bar 12. A slip roll 8' rests on the apron directly above the bar 9. The entire drafting mechanism is supported by a series of roll stands 13 mounted on a roll stand beam 14 which supports a line of these drafting mechanisms. Also, the bearings for certain of the lower rolls are mounted on the roll stand for adjustment to vary the spacing of the rolls. Cap bars 36 at opposite sides of each set of top rolls carry guide blocks *b*, Fig. 3, which hold said rolls properly spaced.

The weighting mechanism provided by this invention comprises, in the form here shown, a bell crank lever 15 fulcrumed on a stationary bar 16 which extends lengthwise of the frame. This lever includes a weighting arm 17 which overlies the entire series of top rolls above mentioned and which carries one or more saddles serving to weight these rolls.

In the particular construction shown, a saddle 19 is supported on the arm 17 by means of a pin *a* releasably engaged by a hook A formed on the saddle. The forward end portion of this saddle bears on the neck of the front top roll 3, while the rearward part of the saddle, which is of T-section, weights the top rear roll 7, Fig. 3. An additional intermediate member may be provided to weight the roll 5 from the saddle, if desired. Distribution of the weight between these rolls can be adjusted, as desired, by means of a cylindrical fulcrum block 34 into which a cap screw 35 is threaded. The latter extends through a slot B in the arm 17 and secures the block in its adjusted position, with the block resting on the bottom of a channel section of the saddle 19. By adjusting this fulcrum member 34 forward or backward the pressure of the arm 17 may be divided between the front and rear top rolls, as desired. It will be understood, however, that the particular saddle arrangement used will depend upon the nature of the drafting mechanism employed and the preferences of individual users.

In addition to the arm 17 the lever 15 also includes a power arm 18 extending downwardly

for a considerable distance below the fulcrum 16. In order to force the weighting arm 17 down to apply the necessary pressure to the top rolls, a toggle mechanism is provided comprising a link 20 pivoted on the bar 12, a second link 21 which is pivoted to the lower end of the power arm 18, and a middle pivot 22 connecting the two links together. The link 21 consists essentially of a bolt threaded through a hole in the middle pivot 22 and slidable through the pivot 23 which connects the toggle mechanism with the power arm. This pivot extends through a sleeve 24, Fig. 4, which is interposed between the two members of the forked lower end section of the power arm so that both the sleeve and the pivot are free to rock with the swinging motion of the link 21. Bearing against the right-hand end of this link is a strong leaf spring 25 which is housed in the cavity formed in the arm 18, the spring being suspended on a screw 26 which extends through the rear wall of the lever 15 and is threaded into the rod 27. Bearing against the spring at about the middle thereof is an adjusting screw 28 which is threaded through the rear wall of the arm 18.

For the purpose of operating the toggle mechanism, the lower end of a long arm 30 is screwed securely to one side of the forked link 20, Fig. 4, and extends upwardly, terminating in a handle positioned closely beside the rear end of the arm 17. It will readily be seen, therefore, that if the handle at the upper end of the arm 30 is pushed backwardly from its position shown in Fig. 1 to that illustrated in Fig. 2, this entire arm and the link 22 to which it is secured will be swung down around the bar 12 as an axis, thus carrying the middle toggle pivot 22 downwardly past the line extending through the centers of the two pivots 12 and 23 of the toggle. This will collapse or "break" the toggle in a downward direction; will release the toggle pressure on the lever 15; and the arm 17 then can be easily raised, carrying the saddle unit 19 up with it. As shown in the drawings (Fig. 2), the pressure of spring 25 is communicated to sleeve 24 when the toggle mechanism is broken, thus tending to prevent the rotation of sleeve 24 and holding the arm 17 in its raised position as shown. Similarly, in the structure of Fig. 6, the plunger head contacts the sleeve 24 when the toggle is broken.

To re-apply the pressure to the top rolls it is merely necessary to swing the arm 17 down in to its operative position and then to pull the arm 30 forward into its original position, thus straightening the toggle. During this movement the axis of the middle pivot 22 moves upwardly past its dead center position, the lug 31 limiting this straightening movement. It should be observed, however, that before the toggle reaches its dead center position, the right-hand end of the link 21 has slipped through the pivot 23 and against the lower end of the spring 25, forcing that end of the spring backwardly. The pressure so exerted on this spring is transmitted to the power arm 18 through the screw 28 and forces the weighting arm 17 down into its roll weighting or operative position. This screw may be utilized to adjust the overall pressure applied to the arm and additional adjustment is afforded by screwing the link 21 backward or forward through the pivot 22, this link being provided with a flattened portion 32 to facilitate such adjustment. The latter adjustment has the effect of increasing or decreasing the overall length of the toggle mechanism. After the mechanism is initially set up and adjusted, however, further adjustment of the spring pressure applied through the saddle 19 to the top rolls is usually made by operating the screw 28. Threading this screw inwardly increases the pressure applied to the top rolls, while backing this screw out has the reverse effect, and, as above indicated, the distribution of this pressure between the front and rear rolls can be varied by adjusting the fulcrum 34 backward or forward.

Thus the invention provides a weighting mechanism which eliminates all of the parts formerly extending from the line of top rolls to points adjacent or through the roll stand beam, pressure being applied entirely from above the rolls. The degree of pressure so applied can be adjusted in the manner above described and that pressure can be applied or removed practically instantly by operating the lever 30. Moreover, if adjustment of the spacing of the rolls becomes necessary, the arm 17 can easily be raised far enough away from them to avoid any interference with the adjusting operation. In the particular case shown, the cap bar 36 which carries the guides for positioning the top rolls is mounted to pivot on the bar 16. Also, the saddle can be changed quickly and replaced by another to suit different conditions.

In order to prevent the link 21 from sliding out through its pivot 23, either in connection with assembling the parts, or at any other time, a snap ring 33 is fitted into a groove in the end of the link where it limits inward movement of the latter.

Fig. 5 shows an arrangement like that above described except that instead of the operating rod 30, an arm 37 is secured to the link 20, or may be made integral with it, and this arm extends downwardly and forwardly, terminating in a knob or handle 38. When the toggle is in its straightened condition the knob lies just above the roller beam 14 where it is within convenient reach of the operator, so that by pulling it forward the toggle is collapsed or broken and the pressure on the weighting arm is released. It may be applied again simply by pushing the knob 38 backwardly. This arrangement is preferred by some operators.

A further modification is illustrated in Fig. 6 in which the leaf spring 25, of the design above described, is replaced by a coiled spring 40 interposed between the head of a plunger 41 and an adjusting nut 42 housed in an extension 18' of the arm 18 to perform the same function that is performed by the leaf spring in the other design. The tension of the spring 40 can be adjusted by screwing the nut 42 more or less into the bore of the extension 18'.

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 for spinning and roving frames, the combination with drawing rolls, of means for applying weight to them, comprising a lever provided with a weighting arm mounted to swing up and down from and toward said rolls, a frame supporting said lever for vertical swinging movement, a toggle mechanism on said lever and operable when straightened to force said arm down into its weighting relationship to said rolls and when broken to release said arm, and a support for said toggle mechanism.

2. In a drawing mechanism for spinning and roving frames, the combination with drawing rolls, of means for applying weight to them, comprising a bell crank lever provided with a weighting arm overlying said rolls and mounted to swing up and down from and toward them, said lever including a power arm extending downwardly from the fulcrum point of the lever, a frame supporting said lever for vertical swinging movement, a toggle mechanism on said power arm operable to force said weighting arm down in to its operative position, and a support for said toggle mechanism.

3. A drawing mechanism according to preceding claim 2, in combination with an arm connected with one link of the toggle mechanism for operating it.

4. A drawing mechanism according to preceding claim 2, in which said toggle mechanism comprises two links, one pivoted to the machine frame and the other to said power arm, one of said links being longitudinally adjustable.

5. A drawing mechanism according to preceding claim 2, in which said toggle mechanism comprises two links, one pivoted to said support for the toggle mechanism and the other to said power arm, a middle pivot connecting said links, and an arm connected with said middle pivot whereby it is operable to straighten or break said toggle, the latter arm extending to a point within convenient reach of the machine operator.

6. A drawing mechanism according to preceding claim 2, in which said toggle mechanism comprises two links, one pivoted to the machine frame and the other to said power arm, and a middle pivot connecting said links together, one of said links slidably connected with one of its pivots.

7. A drawing mechanism according to preceding claim 2, in which said toggle mechanism comprises two links, one pivoted to the machine frame and the other to said power arm, and a middle pivot connecting said links together, one of said links being threaded through said middle pivot and slidable in the pivot which connects it with said power arm.

8. In a drawing mechanism for spinning and roving frames, the combination with drawing rolls, of means for applying weight to them, comprising a bell crank lever provided with a weighting arm overlying said rolls and mounted to swing up and down from and toward them, said lever including a power arm extending downwardly from the fulcrum point of the lever, a frame supporting said lever for vertical swinging movement, a toggle mechanism on said power arm operable to force said weighting arm into its operative position, a support for said toggle mechanism, and a spring through which the pressure of said toggle mechanism is transmitted to said power arm.

9. A drawing mechanism according to preceding claim 8, in which said spring is of the leaf type and is substantially housed within said power arm.

10. A drawing mechanism according to preceding claim 8, in which said spring is of the leaf type and extends from said fulcrum to the connection of the toggle with said power arm, and means in said power arm for adjusting the pressure of said spring.

11. A drawing mechanism according to preceding claim 8, in which said toggle is pivotally connected to the end of said power arm and said spring is of the leaf type and bears against the toggle member pivoted to said power arm, and a screw in said arm bears against said spring and is operable to vary the degree of pressure of the spring against said toggle member.

12. A drawing mechanism according to preceding claim 8, in which said toggle mechanism comprises two links, one pivoted to said support for the toggle mechanism and the other to the end of said power arm, a middle pivot connecting said links, one of said links being slidable through the pivot at the end of the power arm and also being threaded through the middle pivot of said toggle, said spring being interposed between said power arm and the latter link, and means operable to adjust the pressure of said spring.

13. A drawing mechanism according to preceding claim 2, in combination with an arm connected with one link of the toggle mechanism for operating it, and extending up to a point adjacent to and beside the upper part of said lever.

14. A drawing mechanism according to preceding claim 2, in combination with an arm connected with one link of the toggle mechanism for operating it and extending forwardly to a position below the drawing rolls.

15. A drawing mechanism according to preceding claim 8, in which said spring is of the coiled type.

16. A drawing mechanism according to preceding claim 8, in which said power arm is provided near its lower end with a housing, a coiled spring positioned in said housing, a plunger transmitting the pressure of said spring to said toggle mechanism, and a nut threaded into said housing and backing up said spring.

17. In a drawing mechanism according to preceding claim 8, a construction comprising a saddle carried by said arm and bearing on two of said rolls, and means adjustable lengthwise of said arm for varying the distribution of the pressure applied to said rolls through said saddle.

18. In a drawing mechanism for spinning and roving frames, in combination with upper and lower drawing rolls, a weighting mechanism for said upper rolls comprising a lever, a frame supporting said lever for vertical swinging movement, said lever having a forwardly-extending weighting arm overlying said rolls and having a power arm extending downwardly, and spring means pivotally urging said power arm to weight downwardly said movable upper arm and rolls.

19. In a drawing mechanism for spinning and roving frames, in combination with front and rear sets of drawing rolls, a weighting mechanism comprising a lever, lever support means rearwardly of said rear drawing rolls supporting said lever for vertical swinging movement, said lever having a weighting arm extending forwardly from said lever support means and overlying said rolls and having a power arm extending downwardly, and means pivotally urging said power arm to weight said rolls.

20. In a drawing mechanism for spinning and roving frames, in combination with drawing rolls, a weighting mechanism comprising a lever, lever support means supporting said lever for vertical swinging movement, said lever having a weighting arm overlying said rolls and having a power arm extending downwardly, and releasable spring means pivotally urging said power arm to weight downwardly said movable upper arm and said rolls.

21. In a drawing mechanism for spinning and roving frames as claimed in claim 20, and locking means adapted to retain said movable upper arm in a raised position.

22. In a drawing mechanism for spinning and roving frames as claimed in claim 20, in which said releasable spring means is adapted to retain said movable upper arm in a raised position.

23. In a drawing mechanism for spinning and roving frames as claimed in claim 20, and locking means retaining said spring means to pivotally urge said power arm.

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