March 7, 1944. R. M. JONES ET AL 2,343,259

DRAWING MECHANISM FOR SPINNING AND ROVING FRAMES

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Fig. 2

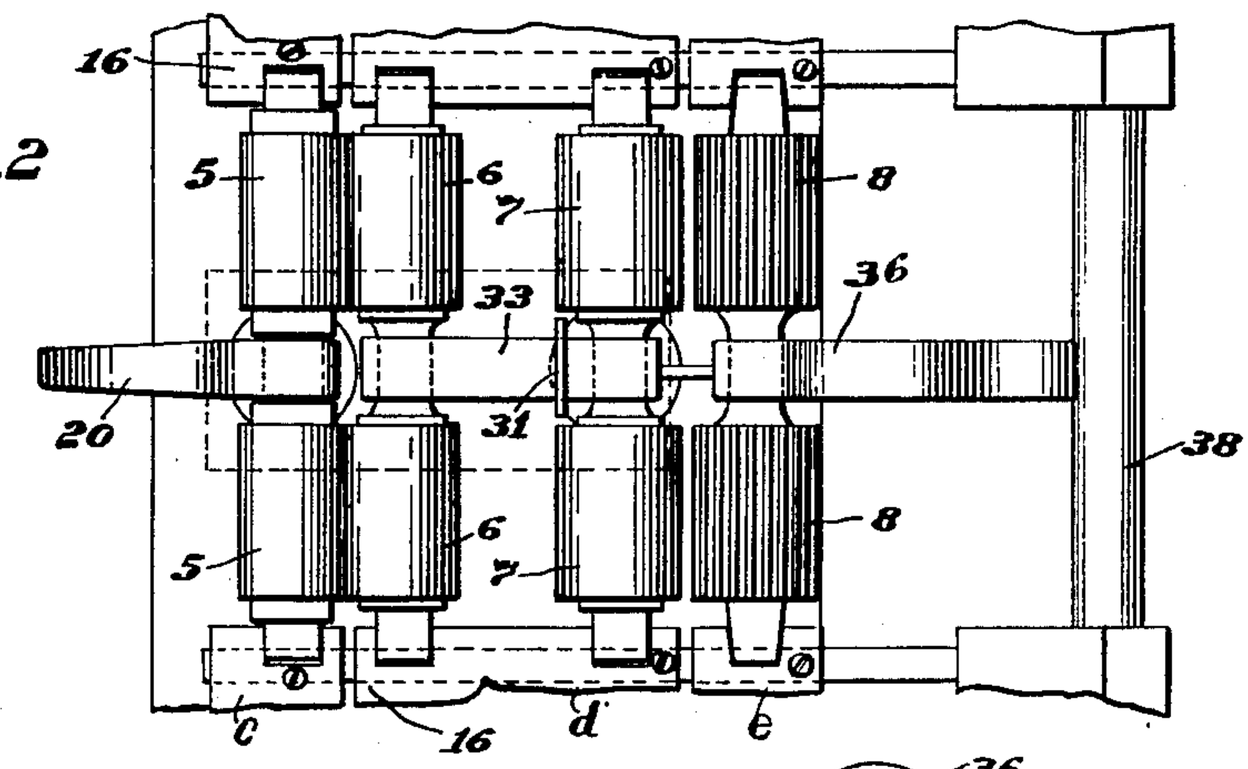

Fig. 1

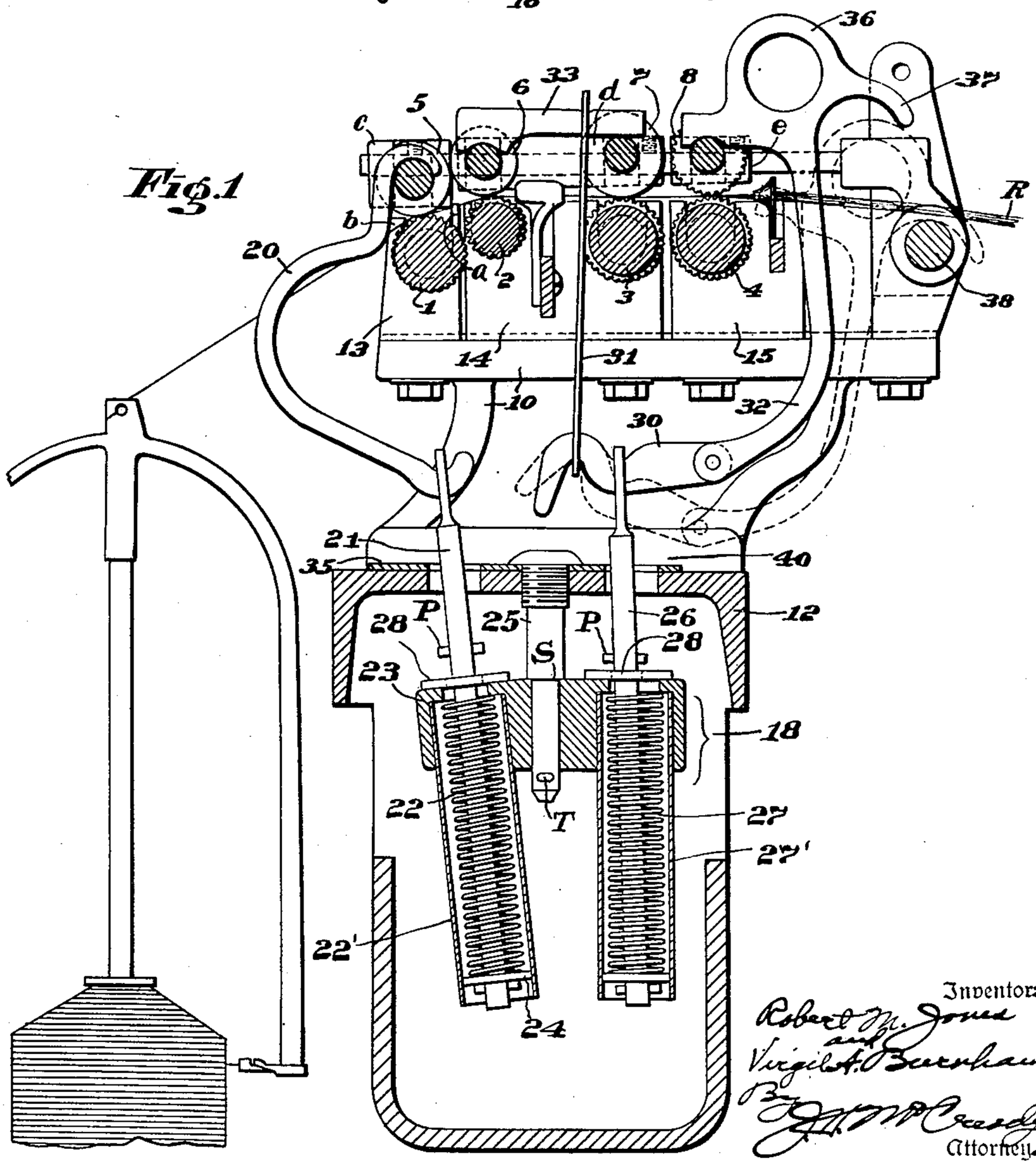

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Fig. 3

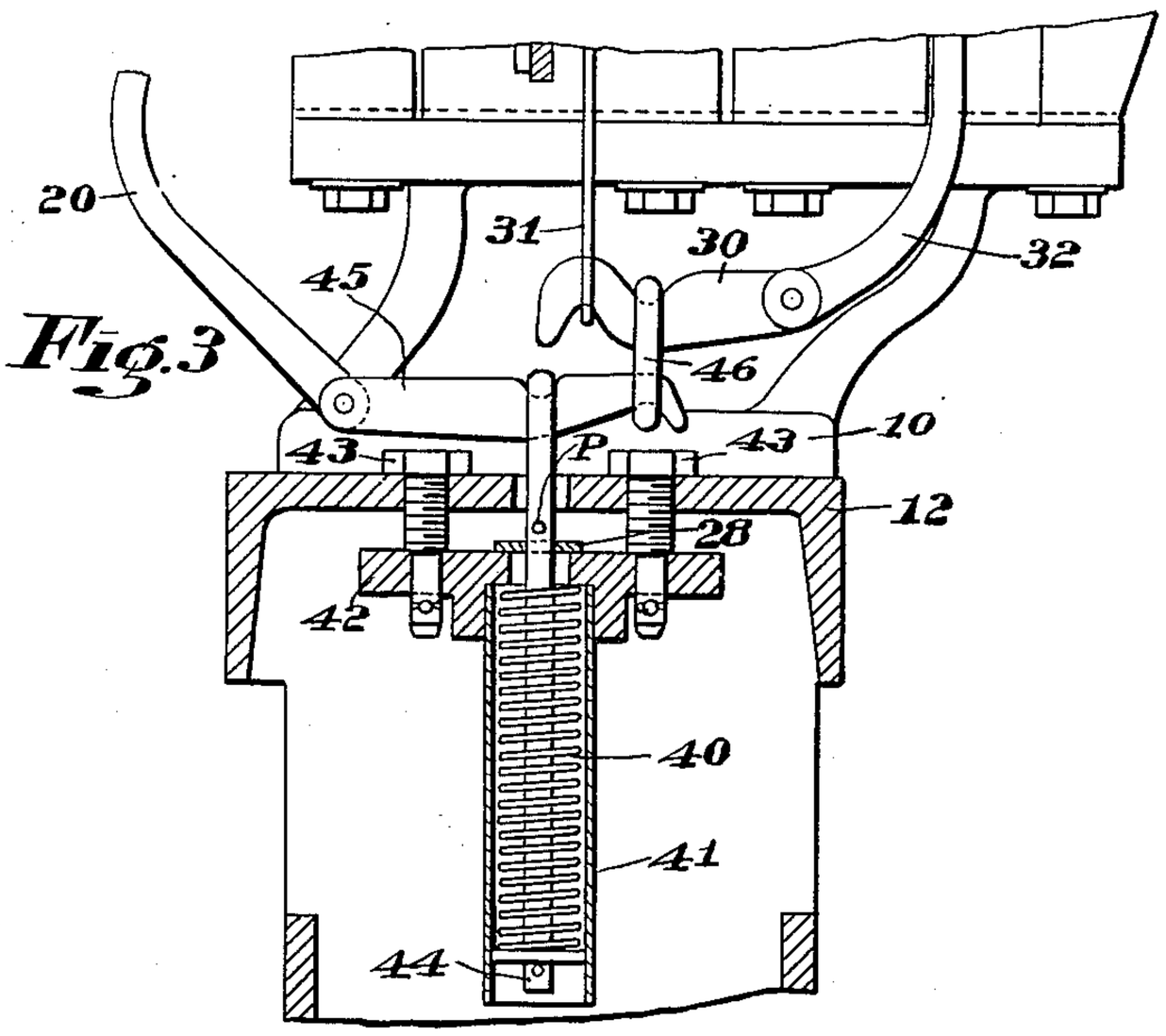
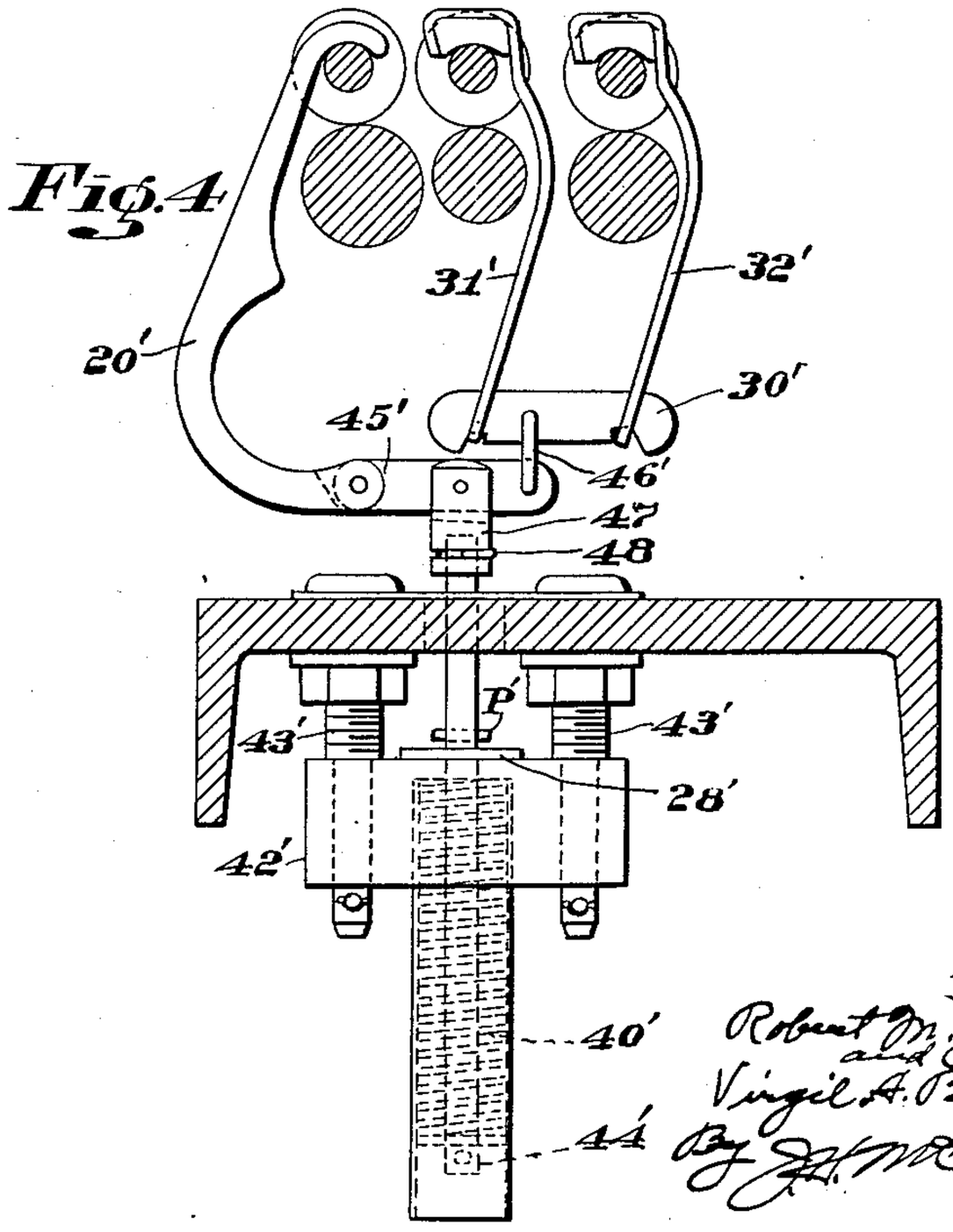


Fig. 4



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DRAWING MECHANISM FOR SPINNING AND ROVING FRAMES

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7 Claims. (Cl. 19—135)

This invention relates to drawing mechanisms of the general type used in spinning and roving frames. It is more especially concerned with the weighting means for these mechanisms.

In such machines it is necessary to apply considerable weight to the top rolls in order to make them grip the roving or sliver with sufficient firmness to perform the drawing functions. This is particularly true of those rolls which produce a high degree of drawing action, as distinguished from those which perform chiefly a feeding and holding function. Any machine of this type includes a multiplicity of drawing units, each of which consists of several pairs of rolls arranged in series and operating successively on a single (or occasionally a double) strand of roving or sliver. In order to simplify the weighting mechanism, it has been attempted to use as few weights as possible on a single series of rolls and to distribute the mass of such weights in accordance with some predetermined plan upon the different top rolls. Both these and other types of weighting mechanisms require re-arrangement or readjustment of the weights, or of the connections through which weight is distributed to the rolls, whenever the spacing of the rolls is changed. Consequently, in changing the roll spacing in a frame, with its multitude of units, much time is required in making the necessary adjustments, testing them, making the additional changes indicated by the results of the tests, and in getting the machine ready again for regular production.

The present invention deals especially with this problem, and it aims to improve the weighting apparatus for drawing mechanisms with a view to simplifying these constructions and reducing the labor involved both in making the original set-up and also in readjusting the mechanisms. More specifically, it is an important object of the invention to devise a weighting mechanism in which the distribution of weight to the rolls will remain practically constant irrespective of changes in the roll spacing.

It is a further object of the invention to provide a mechanism of this type in which the weighting apparatus will be substantially self-aligning and will automatically return to its normal position when moved out of that position and to devise an arrangement in which the weighting connections can be easily removed to facilitate removal of the top rolls.

This application is a continuation, in part, of our pending application Ser. No. 141,606, filed May 10, 1937. That application shows a weighting mechanism in which a single weight only is used for applying the necessary pressure to the top rolls of either a three-roll or four-roll drawing mechanism. It has proved very satisfactory in most situations but it is open to the objection that there is not room under the frame for a single weight of sufficient mass to apply the degree of pressure desired for some kinds of work. It is, accordingly, one of the objects of this invention to avoid this difficulty while still retaining the other advantages which the earlier form of weighting mechanism has proved in practice to have.

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,

Figure 1 is a vertical, sectional view showing a drawing mechanism for a roving frame embodying the present invention;

Fig. 2 is a plan view of the drawing rolls and adjacent parts of the mechanism shown in Fig. 1; and

Figs. 3 and 4 are views, partly in side elevation and partly in vertical section, showing further embodiments of the invention.

Referring first to Figs. 1 and 2, the drawing mechanism there shown comprises a front bottom roll 1, intermediate bottom rolls 2 and 3, and a rear bottom roll 4. Corresponding top rolls 5, 6, 7 and 8 rest on and cooperate with the respective bottom rolls just mentioned. As shown in Fig. 2, these top rolls customarily are made with two fiber working sections on the same roll, said sections being connected by an intermediate neck portion on which the saddle bears. The bottom rolls are supported in suitable roll stands, one of which is shown in Fig. 1 at 10, these stands being spaced apart laterally by appropriate intervals and mounted on the roll stand beam 12. In the particular construction shown the upper surface of the stand 10 is provided with a dove-tail rib on which bearing blocks 13, 14 and 15, respectively, are mounted for adjustment to vary the spacings of the rolls, it being observed that the intermediate rolls 2 and 3 are both mounted in the same block so that their spacing is fixed. The top rolls are held in their cooperative relationship to their respective bottom rolls by means of cap bars of any suitable construction such, for example, as those shown at 16.

The construction so far described is typical in its general arrangement of a four-roll drawing unit, it being understood that in a drawing frame

a series of these units are mounted end to end, and the bottom rolls of the entire series are all connected together and driven from suitable gearing located at one end of the frame.

In operation the roving R, Fig. 1, is fed through the entire series of rolls, which operate on it successively, and it thence travels to a flyer of the usual type where it is twisted and wound on a suitable core. The weighting mechanism shown in Figs. 1 and 2, is individual to a single drawing unit, the entire weight for all of the rolls of the unit being furnished by a single spring weighting unit 18. Suitable elements run from this unit to the various top rolls and are constructed and arranged to distribute the pull of the springs in a predetermined and fixed manner to the respective rolls so that each will be weighted to the desired degree.

Referring first to the front top roll 5, a hook 20 provided with a bearing or saddle portion which rides on the neck of the top roll, acts as a hanger to support the pull of the spring 22. For this purpose it is releasably hooked to a hanger rod preferably in the form of an eye-bolt 21, the shank of which extends through holes in the beam 12 and in a bar or bracket 23 and then through the compression spring 22 above referred to. The upper end of this spring abuts against a part of the bar 23 while its lower end rests on a washer 24 carried by the eye-bolt. The casting 23 supported immediately below, and spaced from, the roll stand beam 12 by means of a bolt 25.

Another hanger rod or eye-bolt 26 is associated with a second spring 27 in the same manner as that just described, and it is suspended from a floating lever 30 which, in turn, is suspended on two hangers 31 and 32. The part 31 consists of a stirrup resting on and supported by a saddle 33 which bears on the necks of the two intermediate top rolls 6 and 7. The other hanger 32 is similar in construction to the weight hook 20 and includes a saddle portion or bearing member riding on the neck of the back top roll 8. It should be observed that the hook-shaped end of the floating lever 30 passes through a slot in the stirrup 31 and also through the eye or hook at the upper end of the bolt 26 while the hanger or weight hook 20 is similarly connected to its bolt 21. Consequently, the parts 20 and 30 can readily be unhooked and released from the spring weighting unit 18.

The unit 18, in addition to including the parts just referred to, preferably comprises also two tubes or sleeves 22'—27' enclosing the respective springs, these tubes having a forced fit in the supporting bar or bracket 23. Both eye bolts project loosely through washers 28 which rest on the bar 23 where they are adapted to be engaged by pins P extending transversely through the bolts above the washers, these pins serving to limit the downward movement of the bolts relatively to the other parts of this unit when they are unhooked or released from the parts 20 and 30. The reduced shank of the bolt 25 passes rather loosely through the bar or bracket 23 but is held thereon by a cotter pin T, the upward thrust of the bar created by the springs, when working, being taken up by a shoulder S on the bolt.

Thus this whole spring assembly forms a unit which can be manufactured, merchandised, installed and removed or replaced as a single piece. Such a unit is of advantage not only from a manufacturing standpoint but also because it facilitates installation in the mill and the making of subsequent change-overs for different kinds of work. In addition, a drawing mechanism organized and weighted in the manner above described has essentially the same operating advantages as that disclosed in our prior application above referred to, while avoiding the limitation of the latter as to heavy weighting. It is not materially affected by changes in spacing of the front and rear rolls, and it can shift to find its own center of gravity or, more accurately, to accommodate itself to a center of spring pull.

It will be observed that with this arrangement the upper ends of the sockets against which the springs abut are spaced by fixed distances from the upper surface of the roll stand beam 12 and that the connection is such that this distance is not affected by variations in the thickness of said beam. When cast beams are used, such variations are considerable, and this fact usually requires some provision for adjustment of the springs, or some other arrangement, for taking care of these conditions. In the construction shown in Fig. 1, however, the stud or bolt 25 is threaded through a hole tapped in the beam, the machined lower surface of its head resting on the upper surface of the beam or on the washer 35, when one is used, and the bracket 23 is spaced a definite distance from said upper surface by the fact that it rests against the shoulder S previously mentioned. Thus variations in thickness of the beam do not affect the position of the bracket. Since the roll stands are manufactured with a high degree of accuracy, this arrangement ensures the positioning of the upper ends of the springs at fixed distances from the rolls, within the usual manufacturing tolerances, throughout the entire frame, and this result is accomplished without requiring any unusual pains in assembly of the parts. Also, it avoids the necessity for making any provision for adjustment of the tension of the springs, which is very likely to lead to more trouble than it cures.

Preferably the left-hand spring 22 is tipped slightly off the perpendicular so that its rod 21 points to the axis of the front top roll 5. Also, when it is desired to release all the weight, as in shutting down the frame at the end of the week, the hook 20 is simply lifted off its roll and allowed to lie on the frame while the rear weight hook is equipped with a finger ring 36 by means of which it may be lifted or knocked backwardly off the top roll where its tail piece 27 will catch on the bar 38. Upon such release of the rods 21 and 26, they are immediately forced downward by their respective springs, but such movement is arrested shortly by the engagement of the pins P with the washers 28.

Preferably a plate 35 having narrow slots therethrough for the passage of the rods 21 and 26 is secured in position under the head of the bolt 25. It performs the function of a finish plate and also to partially close the larger holes which are more conveniently drilled through the roll stand beam 12. It reduces the opportunity, therefore, for lint and fly to pass therethrough where it would collect on the weighting unit and other parts.

In many installations it is not necessary to use two springs as shown in Fig. 1, and a weighting unit having a single spring embodying features

of this invention is shown in Fig. 3 arranged to cooperate with the hangers 20, 31 and 32 of the construction above described. In this arrangement the spring 40 is mounted in a tube 41 which is carried by a bar or bracket 42 in much the same manner as in the construction above described, except that the bracket is connected to the roll stand beam 12 by two bolts 43—43, and the spring is centered between them. A rod 44 is connected with the spring in the same manner as in the construction shown in Fig. 1, and it operates through a linkage arrangement to apply weight to the three hangers 20, 31 and 32. The two latter are connected as before by means of the floating lever or equalizing bar 30, and another equalizer bar or floating lever 45 connects the lower end of the remaining hanger 20 with the bar 30 through the medium of a link 46. Thus a single point only of connection to the spring is necessary, this connection being made through the rod 44.

One advantage of this arrangement is that in releasing the rolls from the action of the weighting mechanism it is merely necessary to unhook the front hanger 20 from its roll. When this is dropped the rod 44 is lowered until the stop pin P strikes its cooperating washer 28, thus relieving all the other connections from any pull of the spring 40.

The same arrangement may be used with a three-roll frame in the manner shown in Fig. 4. Here the parts of the weighting unit are arranged essentially as in Fig. 3, and the corresponding hangers and links are indicated by the same numerals there used except that the numerals are primed. The rod 44' is connected to the floating lever 45' in a slightly different manner consisting of a piece 47 slotted to receive the lever and pivoted to it. This piece is secured to the upper end of the rod by drilling the former to receive the rod and connecting the two together by means of a C-shaped pin, one arm of which passes through both parts while the other partially encircles the member 47 and snaps into a groove in its peripheral surface.

This invention produces all of the advantages set forth in connection with our earlier weighting mechanism disclosed in the application above designated, except those which necessarily attend the use of a weight instead of a spring. However, spring weighting does have certain advantages of its own, particularly in an organization such as that above described. It occupies less room, it is more convenient to handle, and it absorbs minor vibrations within itself. The entire spring assembly is out of sight where it is protected from dust and fly, and the top of the frame is left free of the usual weighting complications. This is a material advantage in maintaining a clean frame, a factor to which much more attention is now given than formerly.

While we have herein shown and described typical embodiments of our invention, it will be understood that the invention may be embodied in other forms without departing from the spirit or scope thereof. Also, since the invention is equally applicable to spinning and roving frames, both will be herein included in the term "spinning."

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

1. In a drawing mechanism for spinning frames, the combination with a series of pairs of top and bottom rolls and a roll stand supporting them for operation successively on a strand of roving, during which they feed the roving continuously through the entire series; of weighting mechanism for the top rolls of said drawing mechanism comprising a spring weighting unit including two compression springs disposed in approximately upright positions, a supporting bracket for said springs, two rods connected, respectively, with the lower ends of said springs and extending upwardly through them to points above the bracket, and means for limiting the movements of said rods relatively to said bracket; means for releasably securing said unit to the machine frame at a point immediately under said drawing mechanism, a weight hook releasably connecting the upper front top roll with one of said rods, and additional weighting elements for the top rolls behind said front roll including a plurality of hangers and an equalizing element connecting them and, in turn, connected with the other rod of said weighting unit.

2. In a drawing mechanism for spinning frames, the combination with a series of pairs of top and bottom rolls and a roll stand supporting them for operation successively on a strand of roving, during which they feed the roving continuously through the entire series, said frame including a beam on which said stand is mounted, of a weighting mechanism for the top rolls of said series comprising three hangers, an equalizing bar connecting two of said hangers at their lower ends, a floating lever connecting the lower end of the remaining hanger with an intermediate point on said bar, a compression spring connected with said floating lever and operating therethrough and through said hangers to apply pressure to all of said top rolls.

3. A weighting unit for the drawing mechanism of a spinning frame, comprising a bracket, means associated with said bracket for releasably securing it at the lower side of the roll stand beam of a spinning frame, two compression springs abutting at their upper ends against said bracket, two rods extending through said respective springs and projecting above said bracket and constructed for the connection thereto of weighting elements running to the drawing rolls, said rods being connected to the lower ends of said springs, and means for limiting the movements of said rods relatively to said bracket under the influence of said springs, whereby said bracket, springs and rods are held in cooperative relationship to each other as an assembled unit adapted to be installed on or removed from a spinning frame.

4. In a drawing mechanism for spinning frames, the combination with a series of pairs of top and bottom rolls and a roll stand supporting them for operation successively on a strand of roving, during which they feed the roving continuously through the entire series, said frame including a beam on which said stand is mounted, of a weighting mechanism for the top rolls of said series comprising a plurality of hangers, means linking the lower ends of said hangers together, a spring weighting unit secured to said beam and located immediately below it and directly under said drawing mechanism; said unit including a compression spring, a rod connected with the lower end of said spring and extending upwardly therethrough and connected to said linkage means whereby it weights all of said top rolls, a supporting

bracket against which the upper end of said spring bears, and means holding said spring, rod and bracket in assembled relationship for installation in or removal from said frame as a unit.

5. In a drawing mechanism for spinning frames, the combination with a series of pairs of top and bottom rolls and a roll stand supporting them for operation successively on a strand of roving, during which they feed the roving continuously through the entire series, said frame including a beam on which said stand is mounted; of a weighting mechanism for top rolls of said series comprising a spring weighting unit secured to said beam and located immediately below it; said unit including a compression spring, a rod connected with the lower end of said spring and extending upwardly therethrough, a supporting bracket against which the upper end of said spring bears and parts cooperating to limit the downward movement of said rod relatively to said bracket and thereby serving to hold said spring under a substantially predetermined degree of initial tension, a bolt supported in said beam and extending loosely through said bracket and means for limiting the movement of the bracket on said bolt including a shoulder against which the bracket normally is held by the upward pressure of the spring.

6. In a drawing mechanism for spinning frames, the combination with a series of pairs of top and bottom rolls and a roll stand supporting them for operation successively on a strand of roving, during which they feed the roving continuously through the entire series, said frame including a beam on which said stand is mounted; of a weighting mechanism for top rolls of said series comprising a spring weighting unit secured to said beam and located immediately below it; said unit including a supporting bracket, a spring connected therewith, a rod connected with said spring to be pulled downwardly thereby, said rod extending upwardly to a point above said bracket and means cooperating with said spring, rod and bracket to hold them in assembled relationship for installation in, or removable from, said frame as a unit, means releasably securing said bracket at the lower side of said beam for swinging movement relatively to the beam, and connections running from said rod to top rolls of said series to weight the latter, said connections being releasable from said rod.

7. In a drawing mechanism for spinning frames, the combination with a series of pairs of top and bottom rolls and a roll stand supporting them for operation successively on a strand of roving, during which they feed the roving continuously through the entire series, said frame including a beam on which said stand is mounted; of a weighting mechanism for top rolls of said series comprising a spring weighting unit secured to said beam and located immediately below it; said unit including a bracket, two springs mounted on said bracket, two rods connected with said respective springs to be pulled downwardly thereby and having end portions projecting above said bracket, means cooperating with said rods, springs and bracket to hold them in their assembled relationship for installation in, or removable from, said frame as a unit, means releasably connected with the upper ends of said rods and running to different top rolls of said series for weighting them, and means for securing said bracket to said beam loosely and releasably.

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