

Aug. 24, 1954

V. A. BURNHAM

2,686,940

TEXTILE DRAWING MECHANISM

Filed Aug. 28, 1947

4 Sheets-Sheet 1

Fig. 1.

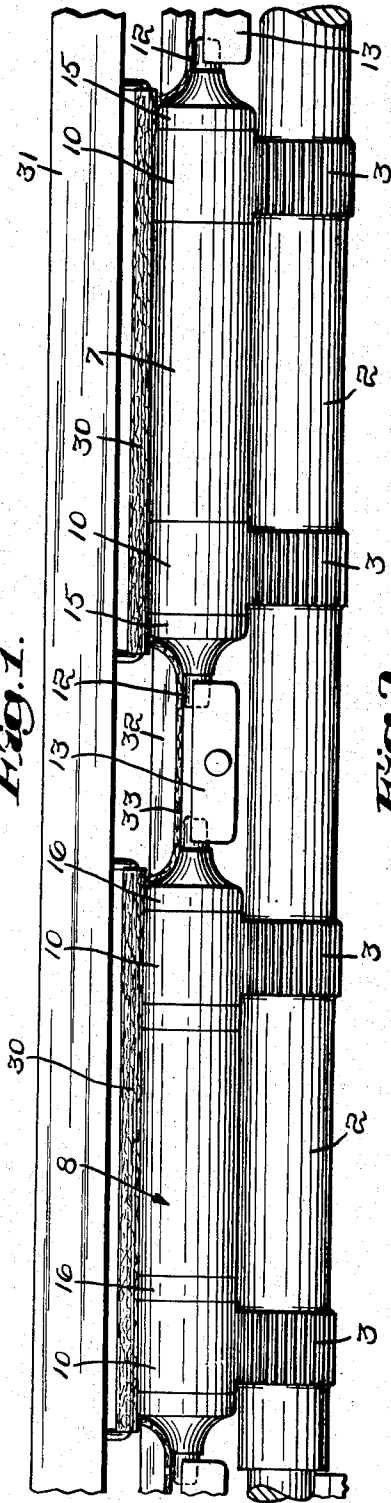
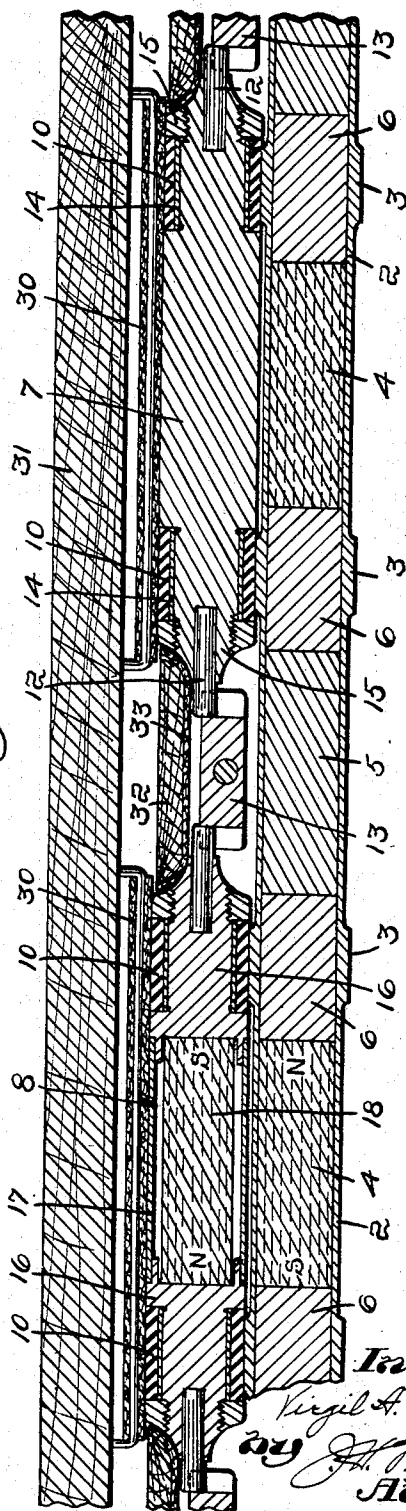


Fig. 2.



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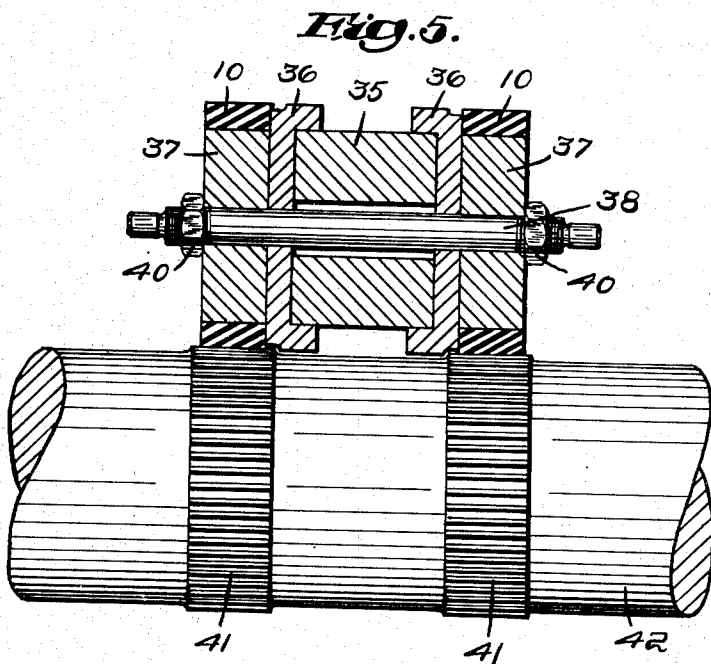
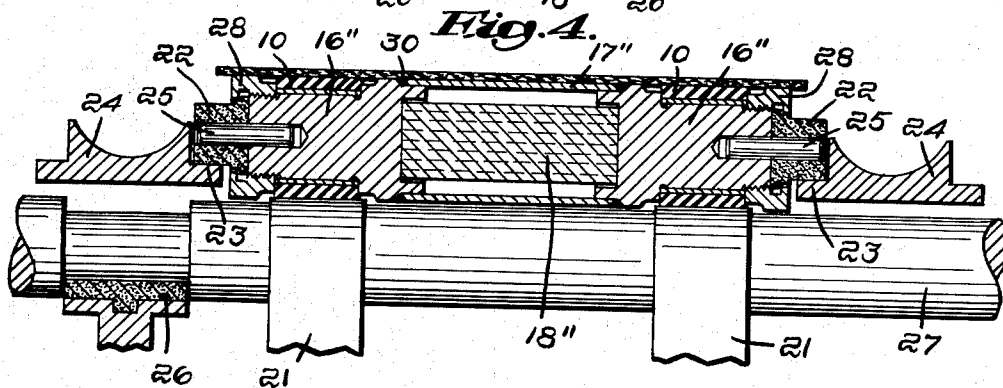
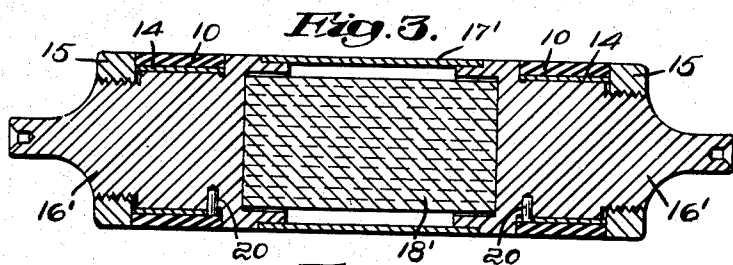
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4 Sheets-Sheet 2



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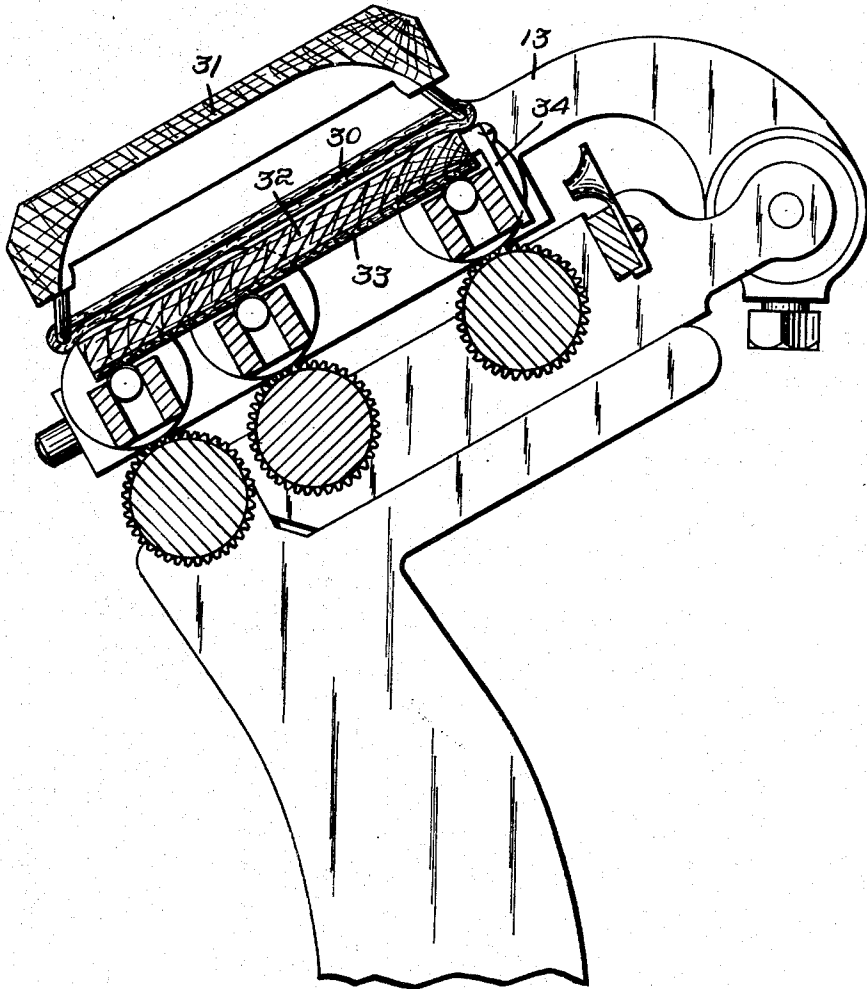
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Fig. 6.



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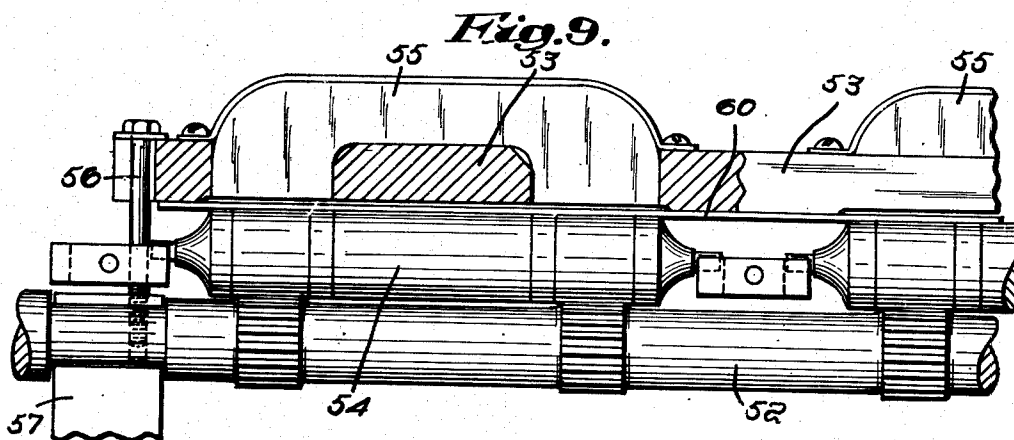
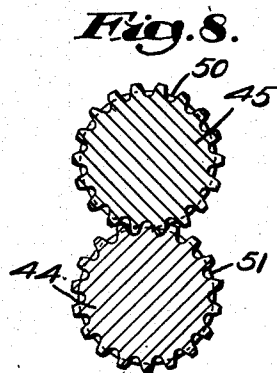
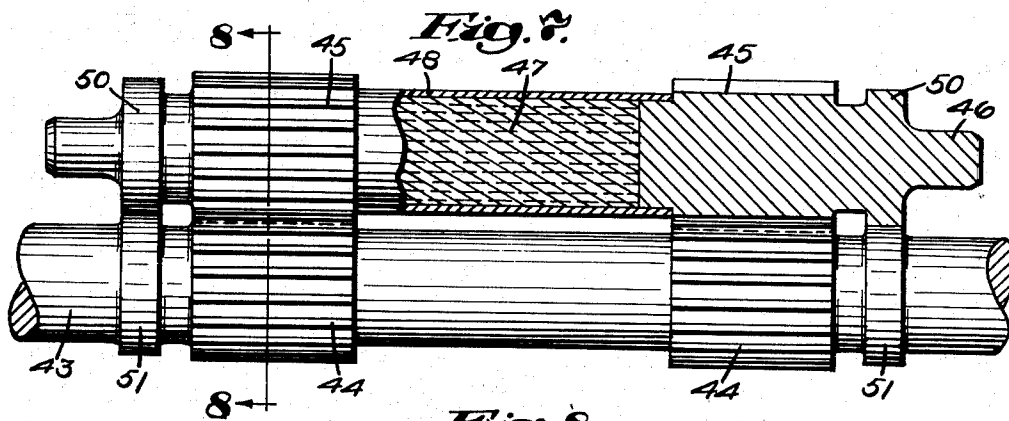
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TEXTILE DRAWING MECHANISM

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4 Sheets-Sheet 4



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UNITED STATES PATENT OFFICE

2,686,940

TEXTILE DRAWING MECHANISM

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Application August 28, 1947, Serial No. 770,977

8 Claims. (Cl. 19—135)

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This invention relates to drawing mechanisms of the type used in textile machines, such as spinning, roving, drawing frames, comber draw boxes, and the like, where pressure must be applied by the rolls to the fibrous material passing between them.

As is well known by those skilled in this art, these drafting mechanisms have always formed important parts of such machines as those above mentioned and they are widely used in textile mills. In order to apply the degree of pressure necessary to grip the roving, sliver, or other fibrous material, with sufficient firmness to perform the drawing or drafting function, various combinations of saddles, stirrups, levers, and springs or weights have been employed. In drawing frames this pressure is customarily applied by a simple combination of hooks and weights or springs, but other machines, such as roving and spinning frames, require a more complicated weighting system.

In all of these weighting arrangements a high degree of friction is created at those surfaces of the top rolls on which the saddles, stirrups, or hooks bear. Also, the pressure so produced is transmitted to the bottom rolls and creates additional friction on the bearings which support the latter rolls. Thus a very large part of the power required to operate a drawing mechanism is spent in overcoming the friction at the points just mentioned.

It will be observed that all of the power required to overcome the top roll bearing friction must be transmitted through the bosses or the cots on the top rolls in order to maintain the surface speed of these rolls the same as that of the bottom rolls on which they run, and to provide power to effectively draft the material. Moreover, the friction will vary from roll to roll due to the fact that it is practically impossible to maintain uniform lubrication on all of these friction surfaces; and many of the surfaces are such, as for example those where the saddles bear on the necks of the top rolls, that the friction varies widely at a given time on different rolls and at different times on an individual pair of contacting surfaces. For these reasons it has been found necessary in practice to apply an excessive amount of pressure to the rolls.

That such pressures do create adverse running conditions and increase the rate of wear on the cots, saddles and bearings has been recognized, but it has been regarded as a necessary evil, and essentially the same types of weighting apparatus have been used year after year from time out of mind. Almost the only means employed to overcome these difficulties has been to improve the lubrication at the friction surfaces. But except for this one virtue of reducing friction, lubricants, in other respects, are highly undesirable in a

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drawing mechanism. They greatly increase the tendency to accumulate lint and fly; make the cleaning operations on the machines more difficult and expensive; and increase the likelihood of injury to the goods under operation.

The present invention deals especially with the problems presented by the foregoing conditions. It aims to improve drawing mechanisms, and particularly the weighting means for these mechanisms, with a view to simplifying the weighting systems; greatly reducing the roll pressures required; eliminating much of the need for lubrication; increasing the life of the roll covers or cots; and generally improving the organization and operation of drawing mechanisms.

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 front elevation of a pair of drawing rolls embodying this invention;

Fig. 2 is a vertical, sectional view of the rolls shown in Fig. 1;

Fig. 3 is a sectional view of a top roll embodying features of this invention;

Fig. 4 is a similar view of a somewhat different form of top roll showing it in cooperative relationship to a bottom roll;

Fig. 5 is a view similar to Fig. 4 showing another form in which the invention may be embodied;

Fig. 6 is a transverse, sectional view of a drawing mechanism for a spinning frame constructed in accordance with this invention;

Fig. 7 is a front elevation, partly in section, showing another form in which the invention may be embodied;

Fig. 8 is a section on the line 8—8, Fig. 7; and

Fig. 9 is a view similar to Fig. 1 showing a modification.

The present invention accomplishes the objects above described by applying the weighting pressure of one roll on another magnetically. In other words, one or both rolls of as many pairs in a drawing mechanism as may be desired consists of, or includes, a magnet, the rolls being so associated that the magnetic force pulling them together applies sufficient pressure on the material being drafted to enable these rolls to perform their drafting function, preferably without the aid of weights, levers, springs, or other equipment additional to the rolls themselves.

The invention may be embodied in numerous forms, and Figs. 1 and 2 illustrate two such forms combined in a single pair of rolls. In that construction the lower roll consists of a tube 2 preferably of non-magnetic metal, such as stainless steel, brass, or some copper base alloy or an alu-

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minum alloy, having the desired mechanical characteristics. This roll is provided with spaced areas 3 which are fluted in essentially the manner common in the prior art lower rolls. Fitting snugly in this tube are several permanent magnets 4, spaced from each other partly by non-magnetic sections 5 and partly, also, by soft iron or soft steel pole piece sections 6, one of these latter sections being placed inside each of the fluted sections 3.

Cooperating with the lower roll 2 are two top rolls 7 and 8, here shown for convenience as of different constructions. The right-hand top roll 7 has a soft iron or soft steel body provided with reduced ends on which are mounted cots 10—10, these cots being positioned to run in contact with the fluted sections 3—3 of that portion of the roll 2 immediately under the top roll 7. Gudgeons 12—12, rigid with the body 7, project from opposite ends of it to run in the slots of cap bars 13—13 like those employed in the ordinary forms of spinning or roving frames. In this particular construction each cot 10 is mounted on a metal sleeve 14 which is fitted on a reduced end section of the roll body, this cot and sleeve forming a replaceable unit which is normally held on the roll by a screw-threaded collar 15.

As is well known, a single top roll customarily acts on two slivers, and in the arrangement shown the rolls are designed to operate in accordance with this custom, two slivers being fed between the cots 10—10 and their cooperating fluted sections 3—3 of the lower roll. The pressure with which these strands of sliver are gripped is produced entirely by the magnetic flux created by the magnet 4. This flux flows through the soft steel or iron pole pieces 5—5 at opposite ends of the magnet and through the magnetizable body 7 of the top roll. Because the circuit of any magnet tends strongly to contract, it acts to pull the top roll 7 down hard against the bottom roll 2 and the total pressure so created is divided equally between the two cots 10—10 and the respective fluted sections 3—3 on which they bear. While I prefer to use soft iron or steel pole pieces, they are not absolutely necessary.

Because the magnet tends to pull the two rolls together, none of the roll weighting force is transmitted to the bearings but, on the contrary, they are subjected only to the pressure due to the static weight of the rolls themselves. Saddles, stirrups, weights and springs are completely eliminated, together with the frictional load which they impose on a drawing mechanism. The cots are relieved of the excess pressure which customarily is transmitted through them and also of the drag or torque load which they ordinarily must carry in order to rotate at the same surface speed as the lower rolls by which they are driven.

The other top roll 8 differs fundamentally from the roll 7 in two respects, first, it includes a magnet and, second, the body of the roll is made in sections to accommodate the magnet. Referring again to Fig. 2, it will be seen that in this construction the roll body includes two end pole pieces 16—16 and a sleeve 17 telescoped on the adjacent end portions of said pole pieces and welded, brazed, or otherwise secured to them. Also, the inner end faces of these two parts 16—16 are hollowed out to receive the opposite ends of the magnet 18.

It should be observed, however, that the poles of the magnet 18 in the top roll are reversed with reference to those of the magnet 4 in the bottom

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roll. Thus the force pulling the two rolls together is greatly increased.

Fig. 3 shows a roll constructed in essentially the same manner as the roll 8 and illustrates the parts on a larger scale. Aside from some changes in proportions, this construction is like that shown in Figs. 1 and 2 with a sleeve 17' and a magnet 18' except that the gudgeons are made integral with the pole pieces 16', and the sleeves 14' carrying the respective cots 10 are slotted at their inner ends to receive pins 20 extending into said pole pieces and compelling the sleeves to revolve in unison with the pole pieces.

It is contemplated that when it is not necessary to use magnets in both the upper and lower rolls, as shown at the left-half end of Fig. 2, it will be found sufficient to use magnets in the top rolls only, the bottom roll being of a common form but, of course, made of magnetic material. Fig. 4 shows a construction in which the bottom roll is of the orthodox form, and the top roll includes a magnet. In addition, the construction shown in this figure is adapted for use in the type of drawing mechanism shown in the Shaw Patent No. 2,329,655. Here the body of the roll is, in general, very similar to that shown in Fig. 3, comprising pole pieces 16'' united by a sleeve 17'' and supporting a magnet 18'' between them. The cots 10, in this instance, run on aprons 21 or are spaced slightly from them, as described in said patent, by providing the top roll with bearing disks 22 which rest on steps 23 provided on positions of the cap bars 24. These disks 22 revolve on short shafts 25 fixed in the end pole pieces 16''. At their inner ends the disks are provided with circumferential flanges overlapped axially by screw-threaded collars 28 which perform the dual function of preventing the disks from moving appreciably away from the ends of the roll and also holding the cots releasably in their operative positions on the roll. In this particular construction the disks are shown as made of nylon, as is also the bearing 26 for the bottom roll 27. This is a polymeric amide readily obtainable from the Du Pont Corporation. The use of nylon is permissible here because of the light pressure to which these parts are subjected. Under these conditions it can be used without lubrication.

Preferably the exposed peripheral surfaces of the body portions of the top rolls, in all of these constructions, are made substantially flush with the outer surfaces of the cots 10 and the collars 15, so that the entire peripheral surface of the larger diameter portions of the top rolls are of cylindrical form and of approximately the same diameter. This is a material advantage in keeping the top rolls clean. If the clearer used with one of these rolls is itself of cylindrical form, then it contacts substantially the entire outer surface of the major portion of the roll. On the other hand, if a flat clearer is used, as illustrated at 30 in Figs. 1, 2 and 6, then the same clearer will bear on almost the entire length of each of the top rolls. This is shown in Fig. 6 where such a clearer is illustrated as supported on a holder or clearer board 31 of a common form.

In order to clean the surfaces of the end portions and gudgeons of the roll, an additional or supplemental clearer 32 may be provided consisting of a solid support made of wood, or any other suitable material, carrying a cover 33 of felt, or the like. These small clearers 32 are located between the main clearers, the latter running on the cylindrical surfaces of the top rolls and the additional clearers fitting on the

smoothly curved and somewhat concaved end portions of the rolls and on the gudgeons. With this arrangement, therefore, practically the entire surfaces of the top rolls can be cleaned automatically, a result which has not been possible with any prior art constructions of which I am aware. The intermediate clearers are simply held in place by their own weight but are prevented from sliding forward by a metal lug, such as that shown at 34 in Fig. 6, this lug engaging a portion of the cap bar adjacent to the rear top roll. This figure shows a set of upper and lower rolls mounted in a roll stand of the orthodox form, and some, or all, of these rolls may be of one or more of the constructions above described.

Fig. 5 shows a construction suitable for large rolls of the character used in wool and worsted spinning frames. It comprises a magnet 35 mounted in a body which consists of two spacing collars 36—36 telescoped on opposite ends of the magnet and two end sections 37—37 outside of, and bearing against, said collars, all of these parts 36 and 37 being made of soft magnetic metal. Extending centrally through all of these members is a non-magnetic spindle 38, and nuts 40—40 threaded on this spindle hold the parts in their assembled relationship. The projecting ends of the spindle may be utilized to position the roll. The sections 37 carry cots 10 which bear on the fluted portions 41 of the lower roll 42. In this construction the entire magnetic attraction relied upon to weight the top roll is produced by the permanent magnet 35 and it is made of sufficient size to perform this weighting function adequately.

Another application of this invention is illustrated in Figs. 7 and 8 in which the top roll is positively driven by the bottom roll and both are metallic rolls, usually of steel. Such constructions are found in drawing frames; are used for the back rolls of spinning and roving frames, and for other purposes. The bottom roll 43 has fluted or toothed sections 44 meshing with similar sections 45 of the top roll 45, the sections 45 acting as pole pieces. The latter roll contains a magnet 47, mounted between the two sections of the top roll and enclosed in the non-magnetic sleeve 48 which connects these sections. The strands of fibrous material to be drafted are fed through the rolls by the intermeshing toothed sections. Preferably the approach of these toothed areas to each other is limited by spacing collars 50—50 running on the bottom roll. Because it is desirable to have the circumference of these collars agree with the pitch circles of the fluted sections 45—45, similar collars 51—51 are machined on the lower roll 43, the latter collars having the same diameter as the pitch diameter of the toothed sections 44—44.

In this arrangement the magnet 47 is enabled to operate very efficiently because its flux circulates through the intermeshing toothed sections and the intervening metal portion of the bottom roll which connects the toothed sections 44—44, and these fluted or driving areas are in substantially metal-to-metal contact. Such a roll construction is often used where it is desired to feed the fibrous material at a very uniform rate, notwithstanding the presence of variations in the thickness of the roving or similar material fed to the rolls, as explained more fully, for example, in the Armstrong et al. Patent No. 2,260,130.

The rolls provided by this invention can be used in the desired numbers in any drawing mechanism. In some cases all of the rolls may

depend on magnetism to weight them. In other situations magnetic rolls will be used in various combinations with non-magnetic rolls, certain of which may, if desired, be weighted in some conventional manner.

Permanent magnets only have been mentioned above, and it will rarely be found necessary, or advantageous, to use anything else. Electromagnets can be used, but where permanent magnets will satisfy the requirements, it is preferable to use them because such use eliminates circuit connections and other equipment that must necessarily be employed with electromagnets. Moreover, the better types of permanent magnets, such as those sold commercially under the name of "Alnico Magnets" give excellent service.

From the foregoing it will be evident to those skilled in this art that the use of magnets to perform the weighting function and the consequent elimination of springs, weights, levers, saddles and hooks produces a very important simplification of the entire organization of a drawing mechanism. In addition to that fact, the expense of manufacture is substantially reduced and the elimination of the friction of the saddles and hooks on the top rolls and much of the bearing pressure on the lower rolls effects an important economy in the power required to operate a machine in which the drawing mechanism is incorporated.

As above indicated, the degree of pressure applied to the nip of the rolls can be reduced simply to that necessary to perform the drafting function, and excess pressure, which has been customarily found necessary heretofore, can be avoided with a consequent saving in power and wear. For example, it has been found possible to reduce the pressure on the bearings for the lower rolls for the drafting mechanism of a spinning frame by over 80% while still producing a thoroughly satisfactory drafting performance. This reduced pressure also makes it feasible to use oilless bearings for the lower rolls in spinning frames where such use otherwise would not be satisfactory. In addition to the foregoing, the elimination of most of the lubrication which has been required heretofore effects an important operating economy in the use of these machines. This is also true of the reduction in labor required for cleaning, particularly the picking of the lint and fly off the gudgeons and roll ends which must be performed by hand in the orthodox forms of drafting mechanism.

A practical advantage accomplished by the pre-mounting of the cot on an inexpensive drawing sleeve or shell, as above described, permits replacement of this member, when worn, in a fraction of the time required when the cots are mounted directly on the rolls and secured there by cement. In the forms of the invention shown, these cots are made much narrower than has been customary, thus permitting a further reduction of the pressure necessary to grip the stock adequately. This practice becomes feasible with the pre-mounting of the cots.

A further and very important practical advantage of the magnetic rolls provided by this invention is the saving in labor which it effects in connection with the matter of changing the spacing of the rolls of the drafting mechanisms for spinning and roving frames. Such changes in roll spacing become necessary when the length of staple is changed materially. It involves going through the entire drafting mechanism; releasing

the weighting devices; readjusting the rolls to the desired spacings; and then replacing the drafting mechanisms for the different units and adjusting them properly. It is an arduous and time-consuming operation. With the magnetic rolls, however, the labor involved in making this change-over is greatly reduced because there is no weighting mechanism to dismantle, replace, or readjust.

Some of the advantages of this invention may be obtained by utilizing the mutually repulsive characteristics of magnets. That is, instead of arranging them to apply the loading pressure by magnetic attraction, the magnets may be so arranged as to apply that pressure by magnetic repulsion. This may be done, for example, in an arrangement such as that shown in Fig. 9. This arrangement is much like that illustrated in Figs. 1 and 2, but without the magnets in the lower roll 52. A clearer 53 rests on the upper roll 54 which carries a series of magnets arranged with their poles in opposed relationship to the poles of the stationary magnets mounted on the clearer. One of the latter magnets is shown at 55. Its poles are positioned in opposed relationship to like poles of the upper rolls, as shown in Fig. 9. Screws, such as that shown at 56 threaded in to the roll stand 58, hold the clearer in its normal position and prevent it from moving upwardly out of that position, so that the thrust created magnetically between the two magnets is expended in forcing the upper roll 54 down against the bottom roll 52. The clearer cloth is shown at 60.

It should be observed, however, that such an arrangement designed to utilize the repelling effects of the magnets results in some loss of advantages which are achieved in the preferred constructions previously described. The repelling arrangement involves a more complicated organization, one less convenient to use, and much of the reduction in bearing pressure, which attends the use of the preferred constructions shown, is sacrificed.

It has been proposed heretofore in the patents to Paul De Vaux Nos. 1,784,659, 2,178,627 and 2,133,657 to use a magnetized roll to drive a so-called "slip roll" at the same surface speed as the magnetized roll. But none of these rolls is employed for drafting purposes. Slip rolls do not perform this function but are used for the purpose of affording added control of the fibers of a sliver at a point immediately preceding its passage into the nip of the front rolls, but they perform neither the holding nor feeding function required of drawing rolls. The magnetic attraction between the driving roll and the small slip roll is provided solely for driving purposes and not for weighting. A slip roll is so light in weight that the fibers can be drawn freely from under it without damage to them or to the resulting strand, whereas the fibers cannot be so withdrawn from between two drafting rolls.

While I have herein shown and described several embodiments of my invention which are at present preferred, it will be evident that the invention is susceptible of embodiment in other forms without departing from the spirit or scope thereof. Also, that the invention is equally applicable to drafting mechanisms in which the rolls are arranged in a vertical series, or in other ways differing from that shown in the drawings.

Having thus described my invention, what I desire to claim as new is:

1. A textile drafting mechanism comprising

a pair of rolls including a lower driven ferrous roll and an upper roll driven therefrom and resting thereon with said upper roll adapted firmly to grip strands of fibers passing therebetween at two separated areas in the vicinity of the respective ends of said upper roll, in combination with magnetic weighting means tending strongly to pull said upper roll towards said lower roll with the pressure necessary to enable them to provide said grip of said strands with such pressure localized at and equally divided between said areas with the intermediate portion of said upper roll spaced from said lower roll, said weighting means comprising a permanent magnet in the upper roll between the strand-contacting areas thereof and longitudinally-spaced pole-piece portions of opposite polarity located at the ends of said magnet and constituting the respective end portions of said upper roll and positioned in close proximity to the underlying ferrous roll through which the flux path is completed.

2. A textile drafting mechanism comprising a pair of rolls including a lower driven ferrous roll and an upper roll driven therefrom and resting thereon with said upper roll adapted firmly to grip strands of fibers passing therebetween at two separated areas in the vicinity of the respective ends of said upper roll, said upper roll having an intermediate sleeve section, in combination with magnetic weighting means tending strongly to pull said upper roll towards said lower roll with the pressure necessary to enable them to provide said grip of said strands with such pressure localized at and equally divided between said areas with the intermediate portion of said upper roll spaced from said lower roll, said weighting means comprising a permanent magnet in said sleeve section of the upper roll between the strand-contacting areas thereof and longitudinally-spaced separate pole-piece portions of opposite polarity located at the ends of said magnet and constituting the respective end portions of said upper roll and positioned in close proximity to the underlying ferrous roll through which the flux path is completed, the magnet portion of said upper roll being radially more remote from the underlying roll than its pole-piece portions.

3. A textile drafting mechanism comprising a pair of rolls including a lower driven ferrous roll and an upper roll driven therefrom and resting thereon with said upper roll adapted firmly to grip strands of fibers passing therebetween at two separated areas in the vicinity of the respective ends of said upper roll, the strand pressing areas of at least one of said rolls including means constructed and adapted to enhance the frictional grip of said rolls upon said strands, in combination with magnetic weighting means tending strongly to pull said upper roll towards said lower roll with the pressure necessary to enable them to provide said grip of said strands with such pressure localized at and equally divided between said areas with the intermediate portion of said upper roll spaced from said lower roll, said weighting means comprising a permanent magnet in the upper roll between the strand-contacting areas thereof and longitudinally-spaced pole-piece portions of opposite polarity located at the ends of said magnet and constituting the respective end portions of said upper roll and positioned in close proximity to the underlying ferrous roll through which the flux path is completed.

4. A textile drafting mechanism comprising a pair of rolls including a lower driven ferrous roll and an upper roll driven therefrom and resting thereon with said upper roll adapted firmly to grip strands of fibers passing therebetween at two separated areas in the vicinity of the respective ends of said upper roll, the strand pressing areas including apron means to enhance the frictional grip of said rolls upon said strands, in combination with magnetic weighting means tending strongly to pull said upper roll towards said lower roll with the pressure necessary to enable them to provide said grip of said strands with such pressure localized at and equally divided between said areas with the intermediate portion of said upper roll spaced from said lower roll, said weighting means comprising a permanent magnet in the upper roll between the strand-contacting areas thereof and longitudinally-spaced pole-piece portions of opposite polarity located at the ends of said magnet and constituting the respective end portions of said upper roll and positioned in close proximity to the underlying ferrous roll through which the flux path is completed.

5. A textile drafting mechanism comprising a pair of rolls including a lower driven ferrous roll and an upper roll driven therefrom and resting thereon with said upper roll adapted firmly to grip strands of fibers passing therebetween at two separated areas in the vicinity of the respective ends of said upper roll, the upper roll having cots at said areas to enhance the frictional grip upon said strands, in combination with magnetic weighting means tending strongly to pull said upper roll towards said lower roll with the pressure necessary to enable them to provide said grip of said strands with such pressure localized at and equally divided between said areas with the intermediate portion of said upper roll spaced from said lower roll, said weighting means comprising a permanent magnet in the upper roll between the strand-contacting areas thereof and longitudinally-spaced pole-piece portions of opposite polarity located at the ends of said magnet and constituting the respective end portions of said upper roll and positioned in close proximity to the underlying ferrous roll through which the flux path is completed.

6. A textile drafting mechanism comprising a pair of rolls including a lower driven ferrous roll and an upper roll driven therefrom and resting thereon with said upper roll adapted firmly to grip strands of fibers passing therebetween at two separated areas in the vicinity of the respective ends of said upper roll, the lower of said rolls having flutes in its said areas and the upper roll having cots on its corresponding areas to enhance the frictional grip of said rolls upon said strands, in combination with magnetic weighting means tending strongly to pull said upper roll towards said lower roll with the pressure necessary to enable them to provide said grip of said strands with such pressure localized at and equally divided between said areas with the intermediate portion of said upper roll spaced from said lower roll, said weighting means comprising a permanent magnet in the upper roll between the strand-contacting areas thereof and longitudinally-spaced pole-piece portions of opposite polarity located at the ends of said magnet and constituting the respective end portions of said upper roll and positioned in close prox-

imity to the underlying ferrous roll through which the flux path is completed.

7. A textile drafting mechanism comprising a pair of rolls including a lower driven ferrous roll and an upper roll driven therefrom and resting thereon with said upper roll adapted firmly to grip strands of fibers passing therebetween at two separated areas in the vicinity of the respective ends of said upper roll, said upper roll having an intermediate sleeve section, the lower of said rolls having flutes in its said areas and the upper roll having cots on its corresponding areas to enhance the frictional grip of said rolls upon said strands, in combination with magnetic weighting means tending strongly to pull said upper roll towards said lower roll with the pressure necessary to enable them to provide said grip of said strands with such pressure localized at and equally divided between said areas with the intermediate portion of said upper roll spaced from said lower roll, said weighting means comprising a permanent magnet in said sleeve section of the upper roll between the strand-contacting areas thereof and longitudinally-spaced pole-piece portions of opposite polarity located at the ends of said magnet and constituting the respective end portions of said upper roll and positioned in close proximity to the underlying ferrous roll through which the flux path is completed.

8. A textile drafting mechanism comprising a pair of rolls including a lower driven ferrous roll and an upper roll driven therefrom and resting thereon with said upper roll adapted firmly to grip strands of fibers passing therebetween at two separated areas in the vicinity of the respective ends of said upper roll, the lower of said rolls having flutes in its said areas and the upper roll having flutes on its corresponding areas to enhance the frictional grip of said rolls upon said strands, in combination with magnetic weighting means tending strongly to pull said upper roll towards said lower roll with the pressure necessary to enable them to provide said grip of said strands with such pressure localized at and equally divided between said areas with the intermediate portion of said upper roll spaced from said lower roll, said weighting means comprising a permanent magnet in the upper roll between the strand-contacting areas thereof and longitudinally-spaced pole-piece portions of opposite polarity located at the ends of said magnet and constituting the respective end portions of said upper roll and positioned in close proximity to the underlying ferrous roll through which the flux path is completed.

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