Nov. 13, 1923. 1,474,020

R. COTTAM ET AL

ROLLER FOR DRAWING MECHANISMS FOR FIBROUS MATERIAL

Filed Jan. 26, 1923 2 Sheets-Sheet 1

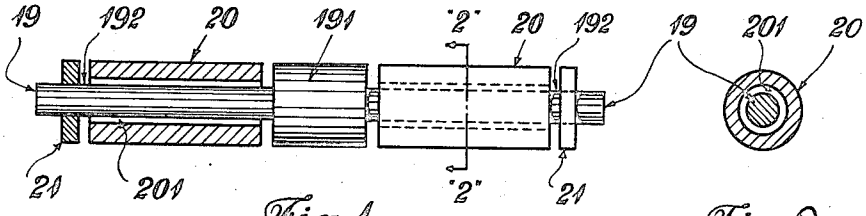


Fig. 1.

Fig. 2.

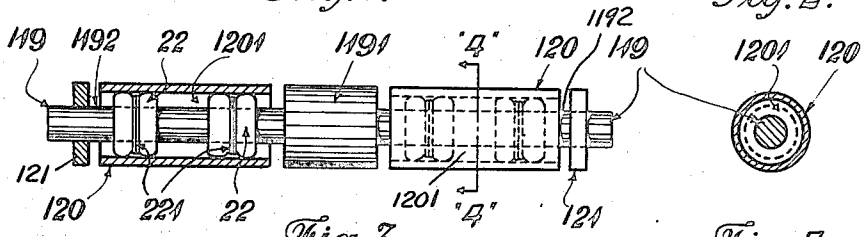


Fig. 3.

Fig. 4.

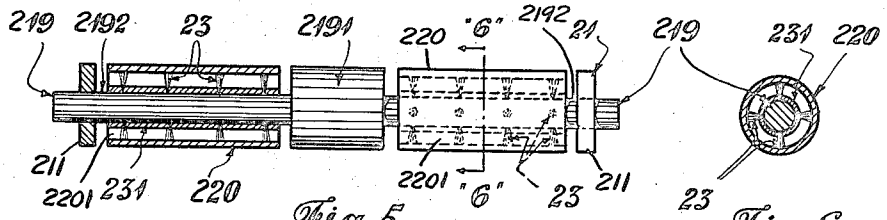


Fig. 5.

Fig. 6.

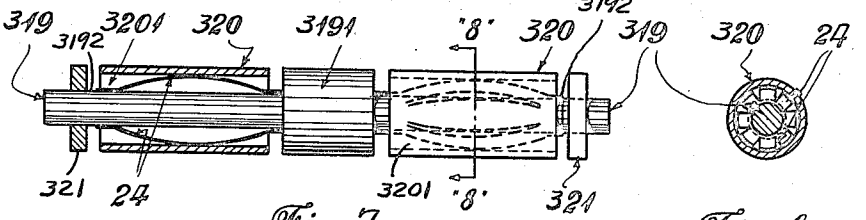


Fig. 7.

Fig. 8.

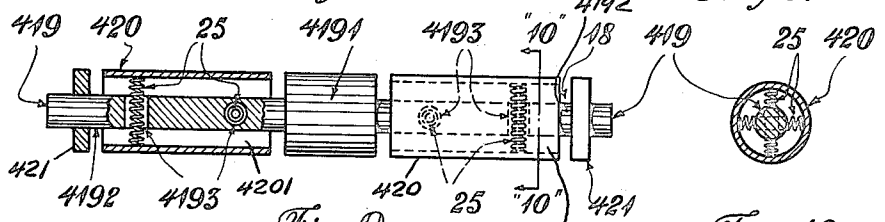


Fig. 9.

Fig. 10.

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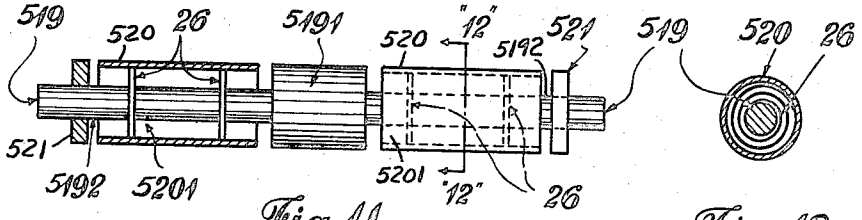


Fig. 11. Fig. 12.

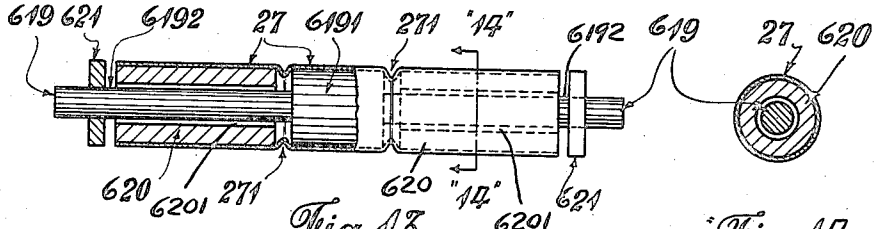


Fig. 13. Fig. 14.

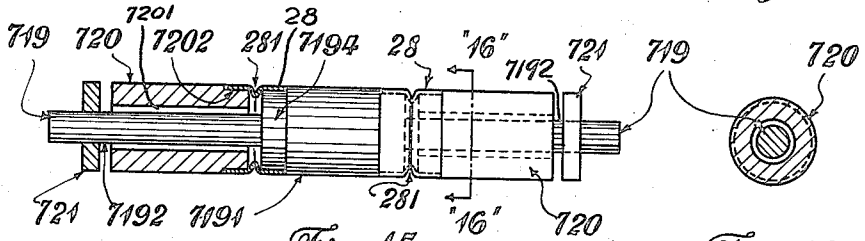


Fig. 15. Fig. 16.

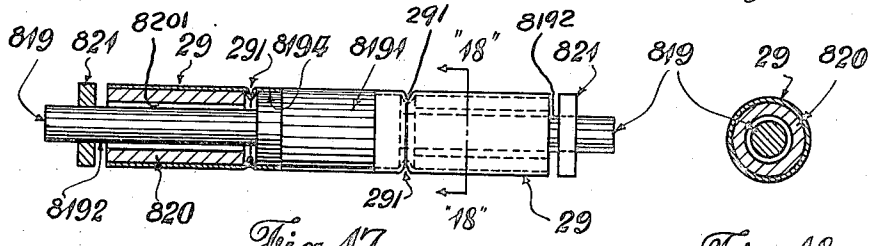


Fig. 17. Fig. 18.

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UNITED STATES PATENT OFFICE.

ROBERT COTTAM, OF OLDHAM, THOMAS SEFTON, OF SHAW, AND JAMES EDWARD LEES, OF OLDHAM, ENGLAND.

ROLLER FOR DRAWING MECHANISMS FOR FIBROUS MATERIAL.

Application filed January 26, 1923. Serial No. 615,177.

To all whom it may concern:

Be it known that we, ROBERT COTTAM, THOMAS SEFTON, and JAMES EDWARD LEES, subjects of the King of the United Kingdom of Great Britain and Ireland, and residents of 55 Worcester Street, Oldham, in the county of Lancaster, England; 10 Oak Street, Shaw, in the county of Lancaster, England; and 41 Queens Road, Oldham, in the county of Lancaster, England, respectively, have invented new and useful Improvements in Rollers for Drawing Mechanisms for Fibrous Material, of which the following is a specification.

This invention consists in improvements in the rollers ordinarily called "self weighted rollers" which are made to bear with only their own weight on fibrous material in the form of strands, slivers or rovings in drawing or drafting mechanisms of any kind in order to press such fibrous material against rollers made to revolve or against other surfaces made to revolve or to travel and particularly relates to self weighted rollers for drawing or drafting mechanisms used to effect high drafting or great extensions of fibrous material.

The principal object of this invention is to obviate the defects experienced in the use of self weighted rollers in the methods hitherto customary in drawing or drafting mechanisms, especially in cases in which the self weighted rollers are very light, through such rollers failing to be revolved with approximate regularity by friction against the fibrous material on which they are made to bear or the rollers or surfaces with which they co-operate.

With this principal object the invention consists in "self-weighted rollers" formed of sleeves which are mounted freely around and eccentrically movable relatively to axles made to revolve in use for holding them in position and promoting their revolution and the provision with such sleeve and axles of devices for promoting turning of the sleeves with the axles, devices for limiting the relative turning of the sleeves and axles and devices for compelling the sleeves to turn with the axles in all cases without or substantially without the axles imparting or transmitting pressure to the sleeves.

The accompanying drawings show rollers forming illustrative examples of this invention. Figs. 1, 3, 5, 7, 9, 11, 13, 15 and 17, are side elevations partly in longitudinal section and Figs. 2, 4, 6, 8, 10, 12, 14, 16 and 18 are transverse sections, the lines numbered in correspondence with the figures indicating the several planes on which sections are taken. The same numerals of reference indicate corresponding parts in all the figures.

In the roller shown in Figs. 1 and 2, 19 is the axle formed with a central boss 191 and two arbors or smaller parts 192 loose and eccentrically movable around which two smooth cylindrical sleeves 20 are mounted and on which are pushed tightly or otherwise secured two collars 21 for keeping the sleeves 20 on the arbors 192. The boss 191 is made of a diameter such that it will hold up the axle 19 by bearing upon the fluted roller or other surface with which the roller shown is to co-operate while the diameters of the arbors 192 and the external diameters of the sleeves 20 and the diameters of the longitudinal holes 201 through them are made such that the sleeves 20 can move so far eccentrically in relation to the arbors 192 as to bear by or substantially by only their own weight on fibrous material to be operated upon or the fluted roller or other co-operating surface on which fibrous material is to be pressed. The arbors 192 are prevented by the boss 191 from applying pressure or substantial pressure to the sleeves 20. The boss 191 bears on the fluted roller or other co-operating surface on which fibrous material is to be pressed and promotes or ensures turning of the axle 19 and the turning of the axle 19 frictionally promotes the turning of the sleeves 20 without or substantially without imparting or transmitting pressure to them. The collars 21 are shown as equal in diameter to the boss 191 so as like it to bear on the fluted roller or other co-operating surface and to transmit movement from it to the axle 19. The arbors 192 project through the collars 21 so that the roller can be revolved in guides similarly to ordinary top rollers of drawing or drafting mechanisms. In the roller shown in Figs. 3 and 4, the axle 119 generally similar to that shown in Figs. 1 and 2 is formed with a central boss 1191 and two cylindrical arbors or rods 1192 extending from that boss 1191. The axle 119 is provided

with two sleeves 120 loose around the arbors 1192 and each free to move for a convenient distance eccentrically in relation to them. The holes 1201 through the sleeves 120 are larger in diameter than those shown in Figs. 1 and 2 and bands 22 of plush or like fabric are tied by wire or cord 221 around the arbors 1192 and made to present parts of the pile surface to bear lightly against the interior surfaces of the sleeves 120.

Two collars 121 equal in diameter to the boss 1191 so as like it to bear on the fluted roller or other co-operating surface and to transmit movement to the axle 119 are pushed tightly or otherwise secured on the arbors 1192. The arbors 1192 project through the collars 121 so that the roller can be revolved in guides similarly to ordinary top rollers of drawing or drafting mechanisms.

In the roller shown in Figs. 5 and 6, the axle 219 generally similar to that shown in Figs. 1 and 2 is formed with a central boss 2191 and two cylindrical arbors or rods 2192 extending from that boss 2191. The axle 219 is provided with two sleeves 220 loose around the arbors 2192 and free to move for a convenient distance eccentrically in relation to them and having holes 2201 larger than those shown in Figs. 1 and 2.

Around the arbors 2192 are fixed sleeves 231 provided with tufts 23 of bristles to bear lightly against the interior surfaces of the sleeves 220. The boss 2191 is made of a diameter such that it will hold up the axle 219 by bearing upon the fluted roller or other surface with which the roller is shown is to co-operate while the diameters of the arbors 2192 and the external diameters of the sleeves 220 and the diameters of the longitudinal holes 2201 through them are made, such that the sleeves 220 can move so far eccentrically in relation to the arbors 2192 as to bear by only or substantially only their own weight on fibrous material or the fluted roller or other co-operating surface on which fibrous material is to be pressed while the bristles of the tufts 23 bear lightly against the interior surfaces of the sleeves 220 and the arbors 2192 are prevented by the boss 2191 from applying pressure or substantial pressure to the sleeves 220. The boss 2191 bears on the fluted roller or other co-operating surface on which fibrous material is to be pressed and promotes or ensures the turning of the axle 219 and the tufts 23 of bristles touching the interiors of the sleeves 220 frictionally cause the sleeves 220 to turn with the axle 219 while bearing by only or substantially only their own weight on fibrous material or against the co-operating roller or surface and without or substantially without the axle 219 imparting or transmitting pressure to them.

Two collars 211 equal in diameter to the boss 2191 so as like it to bear on the fluted roller or other co-operating surface and to transmit movement to the axle 219 are pushed tightly or otherwise secured on the arbors 2192. The arbors 2192 project through the collars 211 so that the roller can be revolved in guides similarly to ordinary top rollers of drawing or drafting mechanisms.

In Figs. 7 and 8 an axle 319 generally similar to that shown in Figs. 1 and 2, with a central boss 3191 from which extend cylindrical arbors 3192 is provided with two sleeves 320 which are applied around the arbors 3192 and made movable eccentrically in relation to them.

The longitudinal holes 3201 larger than the corresponding holes in Figs. 1 and 2 of the sleeves 320 have barrel shaped or tubular springs 24 applied in them around the arbors 3192 to bear lightly against the interior surfaces of the sleeves 320 and preferably made to grip the arbors 3192. The springs 24 are made light and easily yielding so that while bearing against the sleeves 320 and against the arbors 3192 so as to ensure the turning of the sleeves 320 with the axle 319 they will not make the sleeves 320 bear with more or substantially more than just their own weight on fibrous material beneath them. More than one spring 24 may be used in each sleeve 320 if desirable. Two collars 321 equal in diameter to the boss 3191 so as like it to bear on the fluted roller or other co-operating surfaces and to transmit movement to the axle 319 are pushed tightly or otherwise secured on the arbors 3192.

In Figs. 9 and 10, an axle 419 generally similar to that shown in Figs. 1 and 2 with a central boss 4191 from which extend cylindrical arbors 4192 is provided with two sleeves 420 which are applied around the arbors 4192 and made movable eccentrically in relation to them by being formed with longitudinal holes 4201 larger in diameter than the arbors 4192. The arbors 4192 are furnished with transverse holes 4193 in which are loosely fitted light and easily yielding springs 25 in compression to bear lightly with their ends against the interior surfaces of the sleeves 420 and to afford frictional connection between the sleeves 420 and the arbors 4192 to ensure the turning of the sleeves 420 with the axle 419. Although the springs 25 are free to move lengthwise in the holes 4193 and so are little liable to bind in the holes 4193 they are preferably made light and easily yielding so that even should they bind in the holes 4193 they will not make the sleeves 420 bear with substantially more than just

their own weight on fibrous material beneath them. There may be one spring 25 or more in each arbor 4192, two being shown. Preferably in the use with a sleeve 420 of a plurality of springs 25 in holes 4193 in an arbor 4192 the holes 4193 for the springs 25 are formed in position to present the springs 25 in such relative positions that the sleeves 420 may be moved with approximately equal ease in all directions eccentrically in relation to the axle 419. In each arbor 4192 shown, the transverse holes 4193 are formed with their center lines in planes at right angles so that when one is horizontal the other is vertical. Two collars 421 of the same diameter as the boss 4191 so as like it to bear on the fluted roller or other co-operating surface and to transmit movement to the axle 419 are pushed tightly or otherwise secured on the arbors 4192.

In Figs. 11 and 12, an axle 519 generally similar to those shown in Figs. 1 and 2 with a central boss 5191 from which extend cylindrical arbors 5192 is provided with two sleeves 520 which are applied around the arbors 5192 and made movable eccentrically in relation to them by being formed with holes 5201 of larger diameter than the arbors 5192. Between the sleeves 520 and the arbors 5192 carrying them are applied flat coiled springs 26 adapted to bear lightly against the interior surfaces of the sleeves 520. There may be one spring 26 or more used with each sleeve 520 two being shown and preferably the springs 26 are made to grip the arbors 5192 to which they are applied so as to be held to them while bearing sufficiently against the interiors of the sleeves 520 around them to afford the friction requisite to ensure that the sleeves 520 shall turn with the axle 519. The springs 26 are made light and easily yielding so as to afford the requisite frictional connection between the sleeves 520 and the arbors 5192 without causing the sleeves 520 to bear with substantially more than just their own weight on fibrous material beneath them. Two collars 521 of the same diameter as the boss 5191 so as like it to bear on the fluted roller or other co-operating surface and to transmit movement to the axle 519 are pushed tightly or otherwise secured on the arbors 5192.

In the roller shown in Figs. 13 and 14, 619 is the axle formed with a central boss 6191 from which extend two cylindrical arbors or rods 6192. The axle 619 is provided with two sleeves 620 loose around the arbors 6192 and free to move for a convenient distance eccentrically in relation to them. A tube 27 of leather such as is ordinarily used for roller coverings is made to extend over and secured to both sleeves 620 and the boss 6191 so as ordinarily to hold the sleeves 620 a little away from the boss 6191 and is subjected as is preferable to pressure and friction in the parts 271 between the sleeves 620 and the boss 6191 so as to be made more flexible or capable of yielding to allow the sleeves 620 to move eccentrically in relation to the axle 619.

The boss 6191 is made of a diameter such that with the part of the tube 27 surrounding it, it will hold up the axle 619 by bearing upon the fluted roller or other surface with which the roller shown is to co-operate while the diameters of the arbors 6192 and the external diameters of the sleeves 620 and the diameters of the longitudinal holes 6201 through them are made such that the sleeves 620 can move so far eccentrically in relation to the arbors 6192 as to bear by only their own weight and that of the attached portions of the tube 27 on the fibrous material on the fluted roller or other co-operating surface on which fibrous material is to be pressed and the arbors 6192 are prevented by the boss 6191 and attached portion of the tube 27 from applying pressure to the sleeves 620 and so serve practically only to keep the sleeves 620 in position. The leather covering formed by the portion of the tube 27 surrounding the boss 6191 bears on the fluted roller or other co-operating surface on which fibrous material is to be pressed, promotes or ensures the turning of the axle 619 by friction there against and the tube 27 compels the sleeve 620 to turn with the axle 619 while bearing by only their own weight and that of the surrounding portions of the tube 27 on fibrous material or against the co-operating roller or surface and without or substantially without the axle 619 imparting or transmitting pressure to them.

Two collars 621 of the same circumference as the portion of the tube 27 surrounding the boss 6191 so as like it to bear on the fluted roller or other co-operating surface and to transmit movement to the axle 619 are pushed tightly or otherwise secured on the arbors 6192. The arbors 6192 project through the collars 621 so that the roller can be revolved in guides similarly to ordinary top rollers of drawing or drafting mechanisms.

In Figs. 15 and 16 an axle 719 generally similar to that shown in Figs. 1 and 2 with a central boss 7191 from which extend cylindrical arbors 7192 is provided with two sleeves 720 which are applied around the arbors 7192, and made movable eccentrically relatively to them by having longitudinal holes 7201 larger than the arbors 7192 and are connected to the axle 719 by means of short tubes 28 or rings of flexible leather, such as is ordinarily used for roller coverings, secured on short parts 7194 and 7202 of less diameter formed respectively at the ends of the boss 7191 and at the adjacent ends of the sleeves 720. Friction and pres-

sure are preferably applied to the tubes 28 as is indicated at 281 in the parts between the sleeves 720 and the boss 7191 so that the tubes 28 will yield more easily in allowing the sleeves 720 to be moved eccentrically in relation to the axle 719. Collars 721 similar to the collars 21 and of diameter equal to that of the boss 7191 are secured upon the arbors 7192.

In Figs. 17 and 18 extensions of tubular leather coverings 29 of sleeves 820 intended to bear on fibrous material like the sleeves 620 in Figs. 13 and 14 mounted to be eccentrically movable about, and having longitudinal holes 8201 larger than cylindrical arbors 8192 extending from the central boss 8191 of an axle 819 generally similar to that shown in Figs. 1 and 2 are secured to parts 8194 of less diameter formed at the ends of the boss 8191 and preferably the leather is subjected to friction and pressure in the parts 291 between the sleeves 820 and the boss 8191 so that it will yield more readily in allowing the sleeves 820 to be moved eccentrically in relation to the axle 819. Collars 821 similar to the collar 21 and of diameter equal to that of the boss 8191 are secured on the arbor 8192.

The provision of means including frictional devices, springs and tubular connecting devices for promoting or compelling the turning of the eccentrically movable sleeves with the axles around which they are applied, while the axles impart or transmit very slight or no pressure to the sleeves may be made in different ways. For example springs applied as in Figs. 11 and 12 to bear lightly against the sleeves may bear lightly against the axle but sufficiently to ensure the turning of the sleeves with the axle or may be held as by their expansion to the sleeves and be made to bear against the axle lightly but sufficiently to ensure the turning of the sleeves with the axle. Also a spring applied as in Figs. 11 and 12 may be mounted in a groove formed circumferentially around a boss formed on the arbor with which it is used.

In different constructions the axles and roller sleeves may be of different materials and be formed and disposed in other ways without departure from the spirit of this invention as embodied in the claims following:

Thus the roller sleeves may be of any formation and material appropriate to the ways, mechanisms or machines in which they are to be used, as for example they may be formed of metal, wood, vulcanite or other material suitable, and smooth, fluted or of other form or may be formed of cores of metal, wood or other material with coverings of leather or other material appropriate or one sleeve or more may be provided around one axle. Similarly the axles may be formed or furnished in any suitable way with bosses or driving parts for revolving the axles through bearing against or being made to engage with and also to be revolved by the rollers or surfaces made to travel against which the sleeves are to press fibrous material, or by parts provided on such rollers or surfaces. The bosses or driving parts provided on the axles for revolving them may be smooth or plain or fluted or roughened or covered with leather or adapted in any other way for bearing against or engaging with and receiving motion from fluted rollers or other surfaces against which fibrous material is to be pressed by the sleeves of the rollers.

The weight of the axles and bosses of driving parts may be made to serve alone for causing the bosses or driving parts to bear against or engage with the rollers or surfaces made to travel, such an axle being called a self weighted axle, or the axles may be weighted or made subject to spring pressure in any way convenient as, for example, by weights or springs applied to bear on the axles or in circumferential grooves therein in the parts between sleeves in each of the cases shown excepting that shown in Figs. 13 and 14 so that their revolution may be promoted while they will have no or approximately no part in pressing the sleeves against the fibrous material and the fibrous material against the roller surfaces against which it is to be pressed. The tufts 23 of bristles, the springs 24, 25 and 26 the tubes or coverings 27 and 29 and tubes 28 besides affording frictional connections for turning the sleeves with the axles on which they are respectively mounted fulfill also the function of resisting movement of the sleeves from the co-operating rollers or surfaces with which they are used and counteracting the tendency of the inertia of the sleeves to delay or hinder the return of the sleeves to proper bearing on the fibrous material against the co-operating rollers or surfaces and to interfere with the equable bearing of the sleeves on such fibrous material.

Rollers comprising eccentrically movable sleeves mounted around revoluble axles contrived to promote or to ensure the revolution of the sleeves according to this invention may be employed to co-operate with any kind or form of rollers or other surfaces in any forms of drawing or drafting mechanisms and may be used as the only means for pressing fibrous material against the rollers or surfaces with which they co-operate or may be used in pressing fibrous material against rollers or surfaces with which other co-operating pressing rollers or devices are used.

What we claim is:

1. A self weighted roller for a drawing mechanism as hereinbefore indicated, comprising a revoluble axle having means for

bearing upon and being revolved by a moving part with which the roller is to co-operate and so supporting and bringing about the revolution of the axle and also comprising a sleeve mounted around and eccentrically movable relatively to the axle for bearing substantially by only its own weight on fibrous material.

2. A self weighted roller for a drawing mechanism as hereinbefore indicated, comprising a revoluble axle having means for bearing upon and being revolved by a moving part with which the roller is to co-operate and so supporting and bringing about the revolution of the axle and also comprising sleeves mounted around and eccentrically movable relatively to the axle for bearing substantially by only their own weight on fibrous material.

3. In a self weighted roller for a drawing mechanism as hereinbefore indicated a revoluble axle having means for bearing upon and being revolved by a moving part with which the roller is to co-operate and so supporting and bringing about the revolution of the axle, a sleeve mounted around and eccentrically movable relatively to the axle for bearing substantially by only its own weight on fibrous material and means for enabling the revolution of the axle to promote the turning of the sleeve therewith.

4. In a self weighted roller for a drawing mechanism as hereinbefore indicated a revoluble axle having means for bearing upon and being revolved by a moving part with which the roller is to co-operate and so supporting and bringing about the revolution of the axle, sleeves mounted around and eccentrically movable relatively to the axle for bearing substantially by only their own weight on fibrous material and means for enabling the revolution of the axle to promote the turning of the sleeves therewith.

5. In a self weighted roller for a drawing mechanism as hereinbefore indicated, a revoluble axle having means for bearing upon and being revolved by a moving part with which the roller is to co-operate and so supporting and bringing about the revolution of the axle, a sleeve mounted around and eccentrically movable relatively to the axle for bearing substantially by only its own weight on fibrous material and means for limiting relative turning of the sleeve and axle.

6. In a self weighted roller for a drawing mechanism as hereinbefore indicated, a revoluble axle having means for bearing upon and being revolved by a moving part with which the roller is to co-operate and so supporting and bringing about the revolution of the axle, sleeves mounted around and eccentrically movable relatively to the axle for bearing substantially by only their own weight on fibrous material and means for limiting relative turning of the sleeves and axle.

7. In a self weighted roller for a drawing mechanism as hereinbefore indicated, a revoluble axle having means for bearing upon and being revolved by a moving part with which the roller is to co-operate and so supporting and bringing about the revolution of the axle, a sleeve mounted around and eccentrically movable relatively to the axle for bearing substantially by only its own weight on fibrous material and means for compelling the sleeve to turn with the axle.

8. In a self weighted roller for a drawing mechanism as hereinbefore indicated, a revoluble axle having means for bearing upon and being revolved by a moving part with which the roller is to co-operate and so supporting and bringing about the revolution of the axle, sleeves mounted around and eccentrically movable relatively to the axle for bearing substantially by only their own weight on fibrous material and means for compelling the sleeves to turn with the axle.

9. A self weighted roller for a drawing mechanism as hereinbefore indicated, comprising a self weighted revoluble axle having means for bearing upon and being revolved by a moving part with which the roller is to co-operate and so supporting and bringing about the revolution of the axle and also comprising a sleeve mounted around and eccentrically movable relatively to the axle for bearing substantially by only its own weight on fibrous material.

10. A self weighted roller for a drawing mechanism as hereinbefore indicated, comprising a self weighted revoluble axle having means for bearing upon and being revolved by a moving part with which the roller is to co-operate and so supporting and bringing about the revolution of the axle and also comprising sleeves mounted around and eccentrically movable relatively to the axle for bearing substantially by only their own weight on fibrous material.

11. In a self weighted roller for a drawing mechanism as hereinbefore indicated, a self weighted revoluble axle having means for bearing upon and being revolved by a moving part with which the roller is to co-operate and so supporting and bringing about the revolution of the axle, a sleeve mounted around and eccentrically movable relatively to the axle for bearing substantially by only its own weight on fibrous material and means for enabling the revolution of the axle to promote the turning of the sleeve therewith.

12. In a self weighted roller for a drawing mechanism as hereinbefore indicated, a

self weighted revoluble axle having means for bearing upon and being revolved by a moving part with which the roller is to co-operate and so supporting and bringing about the revolution of the axle, sleeves mounted around and eccentrically movable relatively to the axle for bearing substantially by only their own weight on fibrous material and means for enabling the revolution of the axle to promote the turning of the sleeves therewith.

13. In a self weighted roller for a drawing mechanism as hereinbefore indicated, a self weighted revoluble axle having means for bearing upon and being revolved by a moving part with which the roller is to co-operate and so supporting and bringing about the revolution of the axle, a sleeve mounted around and eccentrically movable relatively to the axle for bearing substantially by only its own weight on fibrous material and means for limiting relative turning of the sleeve and axle.

14. In a self weighted roller for a drawing mechanism as hereinbefore indicated, a self weighted revoluble axle having means for bearing upon and being revolved by a moving part with which the roller is to co-operate and so supporting and bringing about the revolution of the axle, sleeves mounted around and eccentrically movable relatively to the axle for bearing substantially by only their own weight on fibrous material and means for limiting relative turning of the sleeves and axle.

15. In a self weighted roller for a drawing mechanism as hereinbefore indicated, a self weighted revoluble axle having means for bearing upon and being revolved by a moving part with which the roller is to co-operate and so supporting and bringing about the revolution of the axle, a sleeve mounted around and eccentrically movable relatively to the axle for bearing substantially by only its own weight on fibrous material and devices for compelling the sleeve to turn with the axle.

16. In a self weighted roller for a drawing mechanism as hereinbefore indicated, a self weighted revoluble axle having means for bearing upon and being revolved by a moving part with which the roller is to co-operate and so supporting and bringing about the revolution of the axle, sleeves mounted around and eccentrically movable relatively to the axle for bearing substantially by only their own weight on fibrous material and devices for compelling the sleeves to turn with the axle.

In testimony, that we claim the foregoing as our invention, we have signed our names this ninth day of January, 1923.

ROBERT COTTAM.
THOMAS SEFTON.
JAMES EDWARD LEES.