

March 8, 1932.

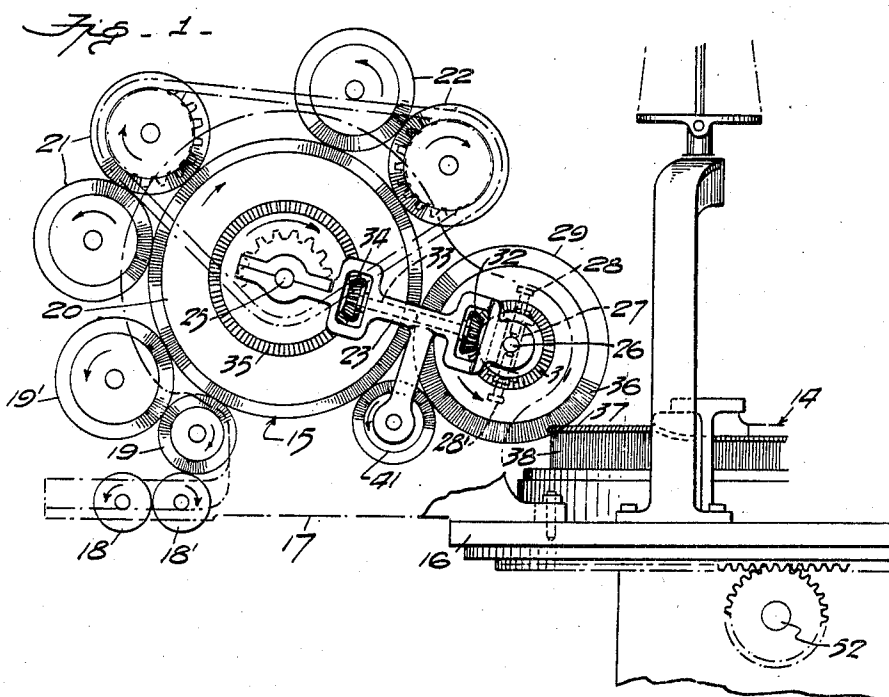
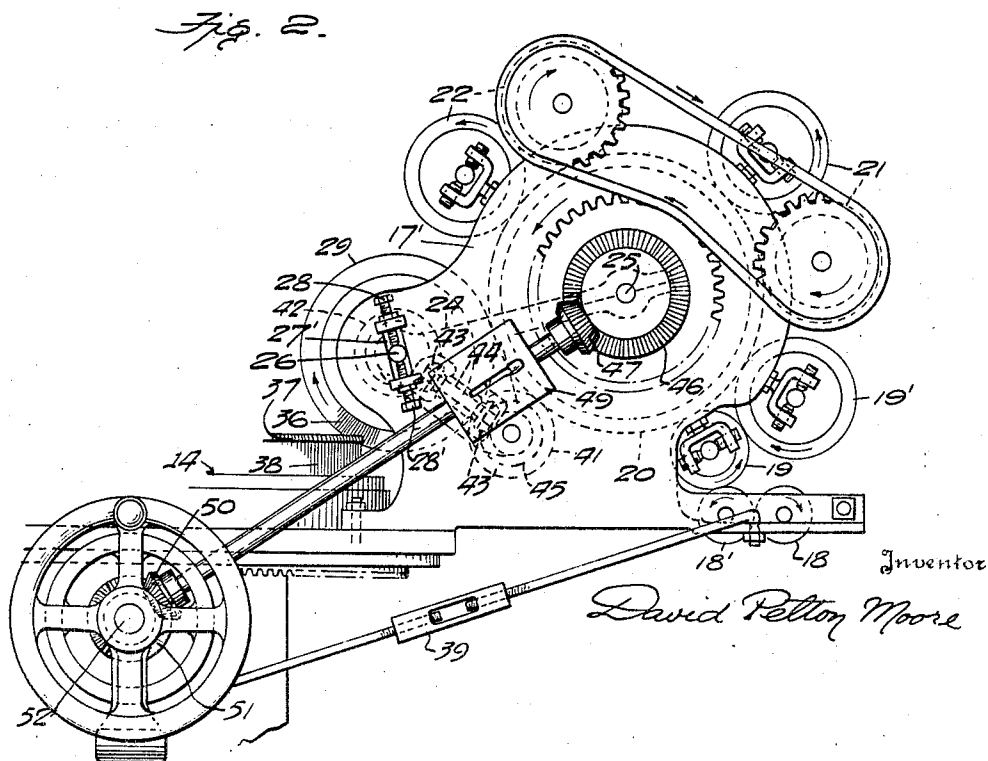
D. P. MOORE

1,848,370

PILE FABRIC KNITTING MACHINE

Filed Nov. 28, 1930

3 Sheets-Sheet 1



March 8, 1932.

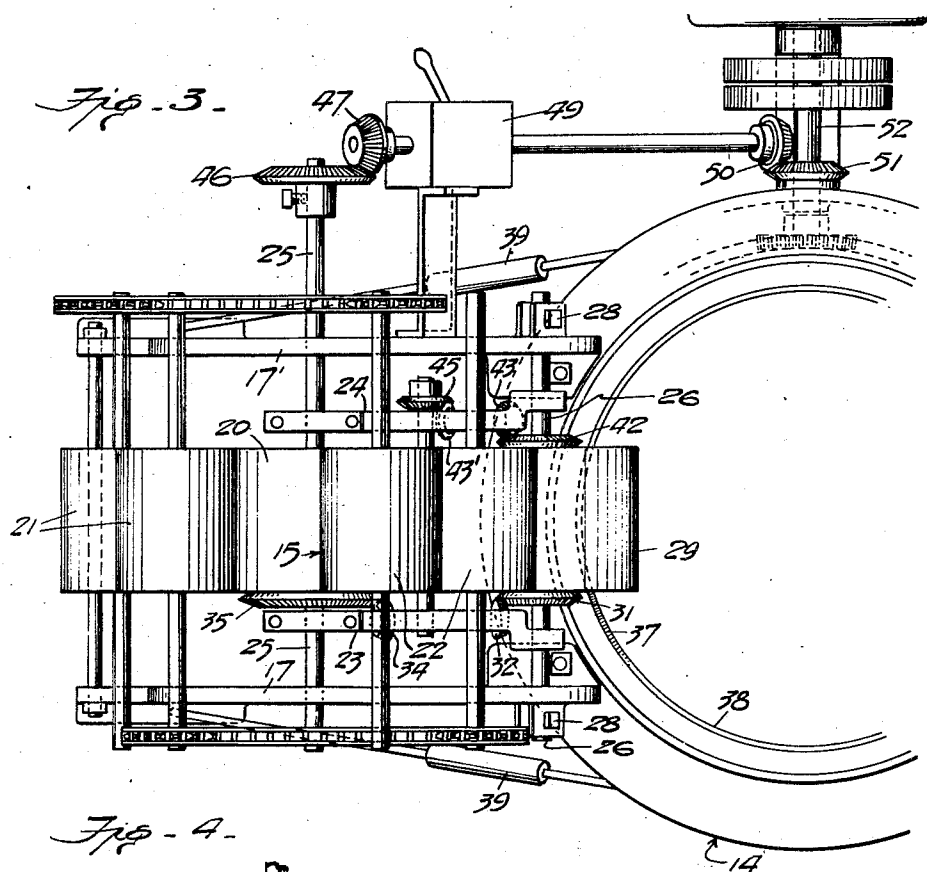
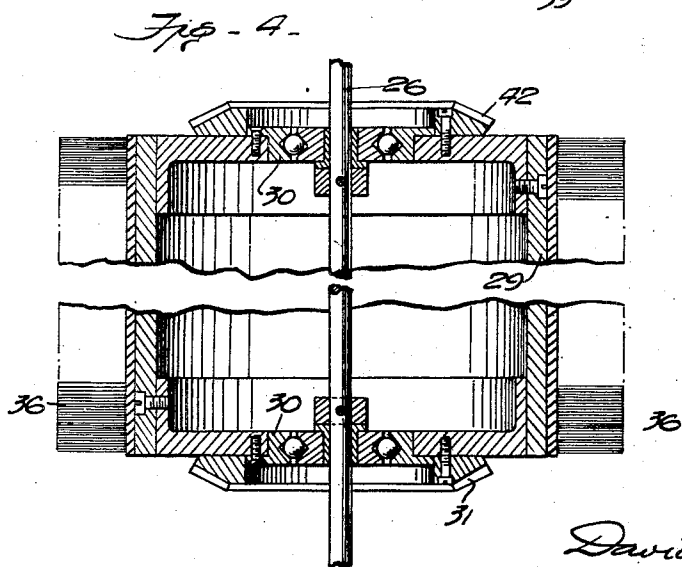
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PILE FABRIC KNITTING MACHINE

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3 Sheets-Sheet 2



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PILE FABRIC KNITTING MACHINE

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3 Sheets-Sheet 3

Fig - 7 -

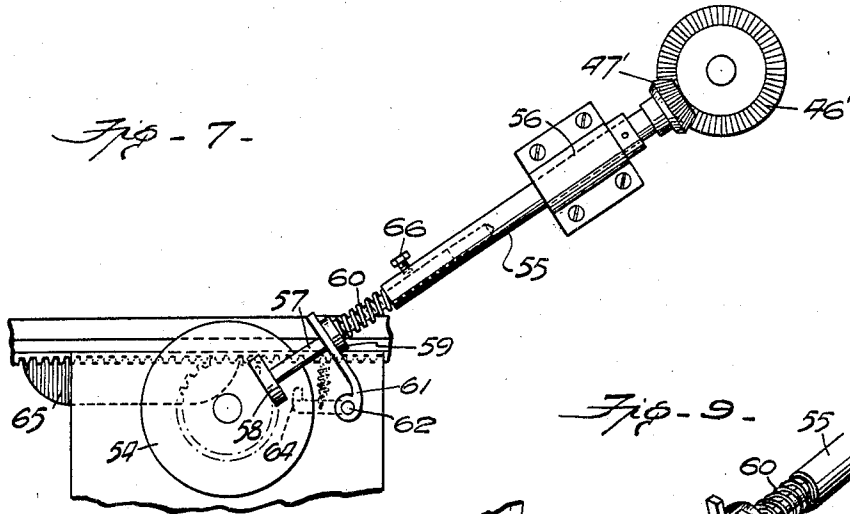


Fig - 8 -

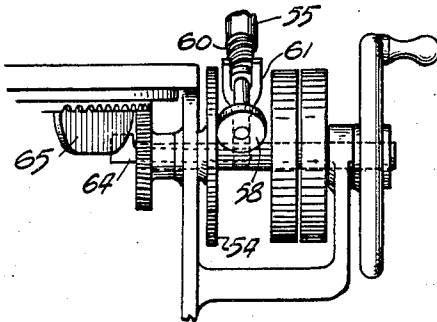


Fig - 9 -

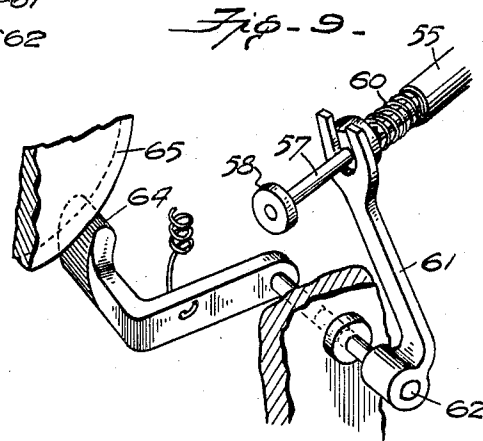


Fig - 6 -

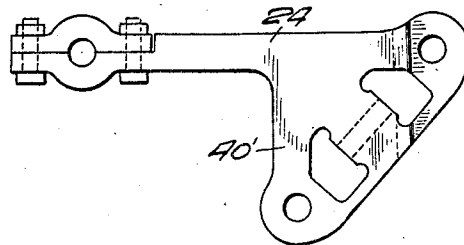
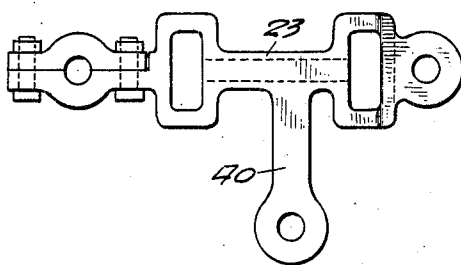


Fig - 5 -



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PILE FABRIC KNITTING MACHINE

Application filed November 28, 1930. Serial No. 498,818.

The present invention relates to improvements in pile fabric knitting machines, one object of the invention being the provision of a combined knitting machine and miniature carding machine having means whereby the speed of one machine relative to the speed of the other machine may be changed at will to thus regulate the quantity of fibers fed to the open needles of the knitting machine.

Another object of this invention is the provision of means whereby the fiber feeding number may be adjusted relative to the needles, to in turn regulate the depth to which the needles penetrate the bristles of the feeding member and consequently the quantity of fibers received by the needles.

Heretofore, the carding machine has been attached to and operated at a predetermined speed from the knitting machine, with the consequence that in order to get "light" or "heavy" fiber feeding, the sliver or slubber had to be made or formed accordingly. This has a decided disadvantage, and if a slubber or sliver of a uniform size can be used, an appreciable saving and a wide variety of material or fabric could be produced. The present invention was therefore designed to employ a uniform slubber and sliver and deliver the fibers in the desired quantity to the needles, the objects of the invention being accomplished with an apparatus as hereinafter set forth and claimed.

In the accompanying drawings:—

Figure 1 is a side elevation of the upper portion of a latch needle knitting machine and carding machine with the adjustably mounted fiber feeding mechanism.

Figure 2 is a similar view taken from the opposite side of the apparatus.

Figure 3 is a top plan view thereof.

Figure 4 is a section through the fiber feeding member showing the same in detail and broken away centrally.

Figure 5 is a plan view of one of the supporting arms for the fiber feeding member.

Figure 6 is a similar view of the other arm.

Figure 7 is a view illustrating a variable friction driving means for the carding machine.

Figure 8 is a view taken from the left of

Figure 7, showing the mechanism adjacent the knitting machine.

Figure 9 is a diagrammatic perspective view illustrating one method of automatically controlling the variable friction driving means.

Although a latch needle knitting machine is here shown it is to be understood that the present invention is also applicable to a spring needle knitting machine.

Referring to the drawings, the numeral 14 designates the knitting machine and 15 the miniature carding machine, the latter of which is fixedly attached to the main ring 16 of the knitting machine.

The carding machine, as here shown, is provided with the side frames 17 and 17', coupled together, and properly supporting the fiber feed-in rollers 18 and 18'. A pair of directing and initial carding rollers 19 and 19', are adjustably mounted in the frames, and as usual direct the fibers from the sliver or slubber fed by the rollers 18—18', to the main carding drum 20, there being two pairs 21 and 22, of assisting carding rollers adjustably supported by the frames and in cooperative relation to the main drum 20, and all rollers are driven as shown by the arrows. The two arms 23 and 24, are removably supported upon the shaft 25 of the main carding drum, and for swinging movement; and in the free ends of these arms is journaled the fixed shaft 26. the free ends of which extend through the elongated slots 27—27' of the side frames and are locked in adjusted position by the pairs 28 and 28' of set screws. Thus by this means the shaft and arms have limited movement in an arc, the center of which is the shaft 25. A fiber feeding drum or member 29 is rotatably mounted upon the shaft 26, through anti-frictional bearings 30, and one end of the drum is provided with a bevel gear 31, which meshes with the driven bevel gear 32, carried by a shaft 33, journaled in the arm 24, and itself provided with another bevel gear 34, meshing with and receiving transmission from the larger bevel gear 35, carried by the main carding drum 20. It will thus be seen that the fiber feeding drum is driven from the main carding drum, so that

its relatively stiff wire bristles 36, will be penetrated by the needles 37 of the needle cylinder 38, in accordance to the position of the shaft 26 in its slots.

That is, when the shaft 26 is in its uppermost position, the needles just barely penetrate the bristles 36, and thus take a light load therefrom, whereas, if moved to the bottom of the slots, the extreme or "heavy" load will be taken. By this arrangement, it will be seen that the carding machine can be secured in a fixed position to the knitting machine and the two turnbuckled braces 39 adjusted to prevent any sidewise movement during the operating of the complete machine.

Carried by the arms 23 and 24 are short arms 40 and 40', which bodily support the return feed drum or roller 41, which in turn is driven by the gear 42 carried by the fiber feeding drum 29 and the two gears 43 and 43' and shaft 44, carried by the arm 40', the latter gear 43' engaging the gear 45 carried by the roller 41. By this means the roller 41 is moved with the fiber feeding drum when adjusted.

The shaft 25 is the main drive shaft for the carding machine, and is provided as shown in Figure 3 with an adjustably mounted gear 46, operated through the gear 47, shaft 48, and the three speed gear change mechanism 49, from a gear 50 meshing with a drive gear 51 of the main driving mechanism 52 of the knitting machine. By this arrangement, the change speed gear mechanism can be manually set for the desired speed, so that the carding machine can be operated at three different speeds, low, intermediate and high speed, and thus the fiber feed to the needles can be more definitely set and regulated, and the same size and character of sliver or slubber can be utilized for making three different fiber weight fabrics. The other members of the carding machine may be driven in any desired manner, it being essential, however, that they be adjusted and move in the directions of the arrows.

As shown in Figures 7, 8 and 9, a modified form of change speed drive mechanism is illustrated, and one that can be set and locked, or operated automatically from the knitting machine needle cylinder, the fabric formed under the automatic operation having portions of varying thickness of fibers, and by means of which different effects may be produced. As there shown, a friction disk 54 is operated by the knitting machine driving mechanism 52', and a shaft 55, tubular at its lower end and provided with a key way, carries a gear 47' at its upper end to mesh with the gear 46' of the main card drum, the journal 56 being adjustably carried by the carding machine frame. Slidably mounted in the lower end of the shaft 55 and rotatable therewith is a shaft 57, whose small friction drive disk 58 frictionally engages the outer face of

the drive disk 54, so that motion is transmitted to the carding machine, in accordance with the point of contact relatively to the center of the disk 54. To hold the disk 58 in "low" speed position, a collar 59 is fixed to the shaft 57, and an extension spring 60, bears against this collar and the lower end of the shaft 55, while to move the disk 58 against the action of the spring and to cause the disk 58 to change its relative position to the drive disk 54, and thus cause the card to be operated at varying increased speeds, a trip lever 61 is journaled at 62, and has a yoke fitting astride of the shaft 57 and engaging the collar 59, so that when the cam or cams 65 carried by the needle cylinder engage the inner end 64 of the trip lever, the lever moves the disk 58 as above described. Should, however, it be desirable to adjust and lock the shaft 57 and disk 58 at a fixed speed, the cams are dispensed with and the set screws 66 carried by the shaft 55 engages and holds the shaft 57 in adjusted position.

From the foregoing description taken in conjunction with the drawings, it is evident that a universal machine for making knitted pile fabrics of varying weights is produced, and that merely by regulating the speed of the miniature carding machine with relation to the speed of the knitting machine, the fiber feed to the needles may be regulated for the minimum to the maximum amount regardless of the size of the sliver or slubber.

Or when a bulk fiber feeding card attachment, such as set forth in my co-pending application filed September 25th, 1930, Serial No. 484,448 is employed, it is merely necessary to drive said attachment through a variable or speed change transmission to obtain the desired pile formation in the fabric.

It is also desirable to increase or decrease the width of the fiber feeding drum so that the distance of needle travel through the brush may be increased or decreased, and the consequent amount of fiber received in the needles will be varied. It is also contemplated to employ various shaped hooks in the needles, so that the receiving area for the fibers may be larger or smaller as the occasion may require.

By this particular arrangement, the relative feed in or delivery of fibers to the miniature carding machine may never vary, or if so, very slightly within certain limits, but the amount fed to the needles may be readily and precisely adjusted through the varying of speed of the latter machine in relation to the knitting machine; and as above noted this will happen with the single sliver taking, or the bulk taking, carding machine attachment.

What is claimed, is:—

1. The combination with a knitting machine having a driving mechanism, and a miniature carding machine for feeding fibers

into the hooks of the needles of the knitting machine, of means for operating the carding machine in synchrony with the knitting machine, and means for varying the feed of the fibers from the carding machine to the needles of the knitting machine.

2. The combination with a knitting machine, and a miniature carding machine for feeding fibers into the hooks of the needles of the knitting machine, of means for operating the carding machine in synchrony with the knitting machine, and means for varying the feed of fibers from the carding machine to the needles of the knitting machine.

3. The combination as claimed in claim 2, in which the latter means includes a variable speed transmission means interposed between the driving mechanism of the knitting machine and the carding machine.

4. The combination as claimed in claim 2, in which the operating means is operated automatically by the knitting machine to automatically vary the quantity of fibers fed to the needles of the knitting machine.

5. The combination as claimed in claim 2, in which a fiber feeding brush forms part of the carding machine and is swingingly mounted to regulate the distance the needles of the knitting machine may penetrate the brush.

6. The combination as claimed in claim 1, in which the carding attachment is provided with a main card drum driven by and from the driving mechanism of the knitting machine, and a variable speed transmission device interposed between the two.

7. The combination as claimed in claim 1, in which the carding attachment is provided with a main carding drum which is operatively connected to the driving mechanism of the knitting machine, and a variable speed transmission device forming a part of said operative connection.

8. The combination as claimed in claim 1, in which there is a driving connection having a variable speed transmission device interposed between the driving mechanism of the knitting machine and the carding machine.

9. The combination as claimed in claim 1, in which the knitting machine has a rotary needle cylinder operated by the driving mechanism, a driving connection having a variable speed transmission device connecting the carding machine to the driving mechanism of the knitting machine, and cooperative means carried by the needle cylinder and the variable speed transmission mechanism, whereby the needle cylinder automatically changes the operating speed of the carding machine during the rotation of the needle cylinder.

10. The combination as claimed in claim 1, in which there is a main carding drum, a fiber feeding brush, and a frame bodily sup-

porting the brush and mounted for swinging movements with the axis of the carding drum its axial supporting point.

11. The combination as claimed in claim 1, in which there is a main carding drum, a fiber feeding brush associated therewith, a swingingly mounted frame carrying said brush and mounted upon a common axis with the carding drum, and means for locking said frame against swinging movement.

12. The combination as claimed in claim 1, in which there is a main carding drum, a fiber feeding brush associated therewith, a swingingly mounted frame carrying said brush and mounted upon a common axis with the carding drum, a carding roller bodily carried by the frame and in cooperative relation with the fiber feeding brush to return surplus fibers from the brush to the main carding drum, and means for locking the swinging frame in adjusted position and against swinging movements.

13. The combination as claimed in claim 1, in which there is a main carding drum, a gear carried thereby, a drive shaft, a gear connected to the drive shaft and meshing with the drum carried gear, and a variable speed transmission device connecting the shaft to the driving mechanism.

14. The combination as claimed as claim 1, in which there is a main carding drum, a gear carried thereby, a drive shaft, a gear carried thereby and meshing with the drum carried gear, a variable speed transmission device connecting the shaft to the driving mechanism, and a fiber feeding brush operably connected to the main carding drum.

15. The combination as claimed in claim 1, in which there is a main carding drum, a frame swingingly mounted upon the axle of the carding drum, a gear carried by said carding drum, a gear transmitting means carried by the frame and operatively connected to the drum carried gear, and a fiber feeding brush mounted in and carried by the frame and operably connected to said gear transmitting means.

16. The combination as claimed in claim 1, in which there is a main carding drum a frame swingingly mounted upon the axle of the carding drum, and a fiber feeding rotary brush mounted in the free end of the frame and in operative relation to the drum.

17. The combination as claimed in claim 1, in which there is a main carding drum, a frame swingingly mounted upon the axle of the carding drum, a fiber feeding rotary brush mounted in the free end of the frame and in cooperative relation to the drum, and a variable speed transmitting driving means between the driving mechanism and the main carding drum.

18. The combination as claimed in claim 1, in which there is a main carding drum, a frame swingingly mounted with its axis the

axis of the drum, a rotary fiber feeding brush mounted in the free end of the frame and in cooperative relation to the drum, a driving connection between the drum and the brush, and a variable speed driving transmission between the driving mechanism of the knitting machine and the main carding drum.

19. A fiber feeding attachment for knitting machines, including a frame, a carding means mounted therein, means for receiving the fibres from the carding means and for delivering the fibers to the needles of the knitting machine, and means for adjusting the relative position of the latter to the needles to regulate the amount of fibers fed to the needles.

In testimony whereof I affix my signature.

DAVID PELTON MOORE.