March 10, 1931. A. STELL 1,795,351

MACHINE FOR PRODUCING YARNS OR THREADS OF FIBROUS SUBSTANCES

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Fig. 4.

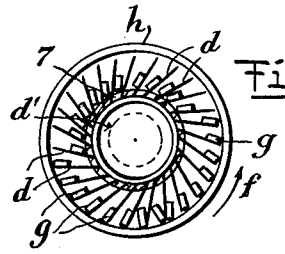


Fig. 1

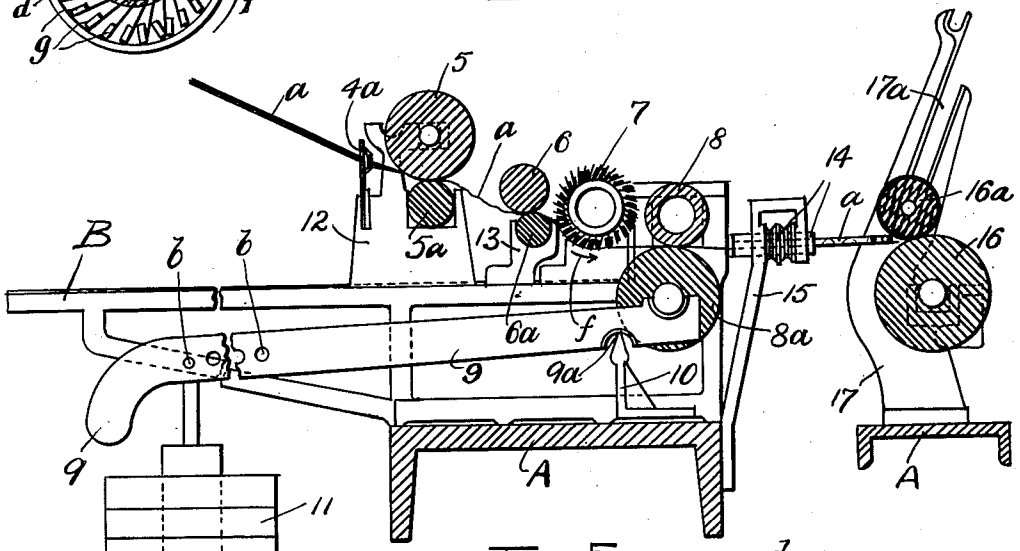


Fig. 5.

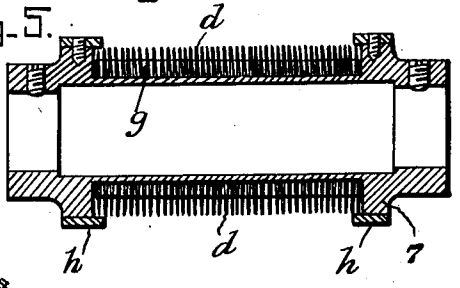
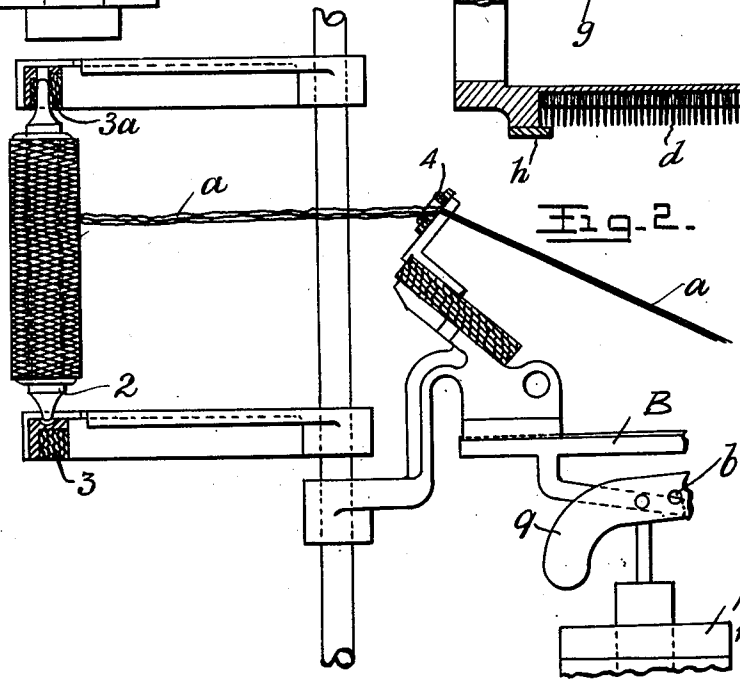


Fig. 2.



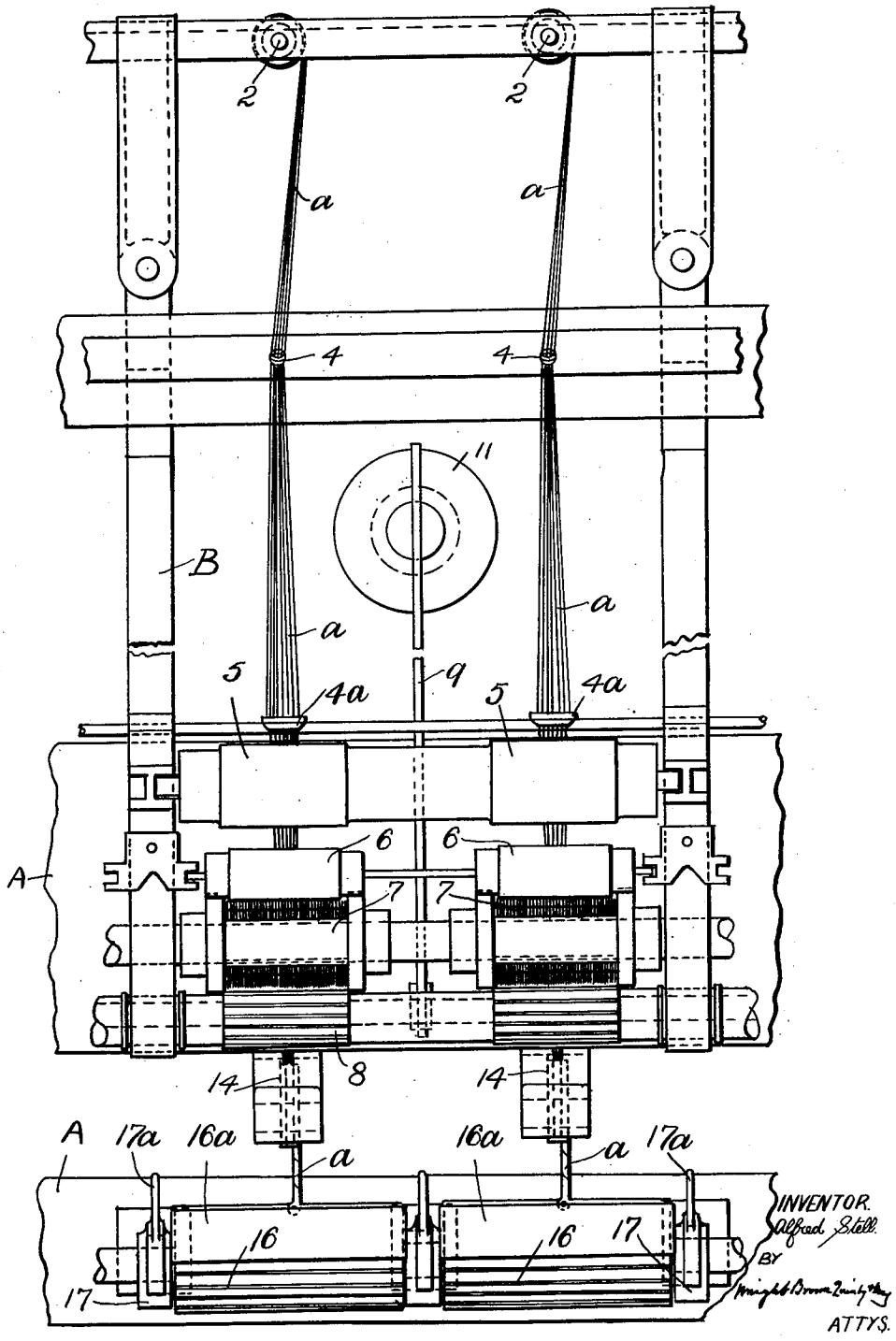
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Fig. 3



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UNITED STATES PATENT OFFICE

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MACHINE FOR PRODUCING YARNS OR THREADS OF FIBROUS SUBSTANCES

Application filed January 12, 1929, Serial No. 331,998, and in Great Britain January 30, 1928.

In the production of yarns or threads of wool, mohair and similar animal fibres under the conditions where the combing of such wool or animal fibres has to be carried out by the ordinary "Noble" or other long-fibre-combing machines, it is found essential to add lubricant (such as oil) to the wool in order to enable the said combing operations to deal with large quantities of said fibres. When the slivers which are thus turned out of the combing machines, under the conditions stated, are subsequently to be drawn out or attenuated one of the processes or series of processes which is mostly followed consists in subjecting said slivers to the actions of the drawing frames, roving frames and the like, until finally the slivers are drawn down to the thickness of threads required. In carrying out the said process from one machine to another each machine gives certain twisting actions to the threads which are discharged from them as they are wound on to the bobbins, consequently the twisting of the threads and the handling of same in the series of stages described greatly limits the output or quantity of the threads produced.

In another process well known where the wool or animal fibre is comparatively short and is treated by another form of combing machine which does not require the fibres to be lubricated, the attenuating of the slivers discharged from the combing machines is effected by a series of machines being used to gradually draw out or attenuate said slivers to bring them down to the thickness of thread required. To carry out this process most of said machines have the delivery and carrying rollers for drawing out the slivers so arranged that the fibres are carried forward without any twisting being required and the subsequent threads are wound into a form of ball or bundle without any twisting being applied thereto.

In this last named arrangement in order to keep the fibres straight and to resist or retard the too rapid advancing of same, porcupine or spiked rollers are made use of for carrying forward the slivers between one pair of drawing rollers and the next pair of drawing rollers. The said slivers after passing certain series of drawing rollers are taken between travelling driving belts of leather which have also reciprocating motion given to them to rub or roll the fibres into a round or more compact thread prior to the delivering of said rolled threads to mechanism for winding them into balls or bundles as desired.

I have found that this latter process cannot be followed when treating lubricated wool because of its entanglement with the pins of the porcupine roller by the lubricant on the fibres causing same to adhere to them as well as causing same to be wrapped or wound around the leather rubbing belts.

My present invention consists somewhat in following the latter process in order to secure the greater out-put of sliver as effected by such process, but to secure this advantage I now make use of an improved form of porcupine roller and do not use the reciprocating travelling belts. Further in my arrangement of devices I make use of the lubricated animal fibres without causing the disadvantages incident to their treatment by the ordinary porcupine rollers and the rubbing belts described, and this I secure by the employment of devices hereinafter fully explained.

In the accompanying sheets of drawings:—

Fig. 1 is a side sectional elevation of the front part of the machine showing the operating members on said part.

Fig. 2 is a similar elevation but shows the hind or rear part of the machine and the members forming same.

Fig. 3 is a plan of the parts shown in Figs. 1 and 2.

Figs. 4 and 5 are sectional end and side elevations showing my improved construction of porcupine roller.

A indicates the base framework of the machine, and B the longitudinal members extending from said framework.

To attain the object of my invention I take the slivers from the ordinary combing machine as they have been wound upon rollers 2 in well known manner. These rollers 2 and their load of sliver I then take and mount on my machine as is shown by Figs. 2 and 3 so that they will rest upon their footstep sup-

port 3 and be loosely mounted within their upper supports 3*a* in order to rotate freely when the sliver *a* is being withdrawn therefrom.

The sliver *a* extends from the bobbins 2 through the usual guide eye 4 to reach into contact with the rear drawing rollers 5, 5*a* to which they are conducted by the guide eye 4*a* as is shown by Fig. 1. These drawing rollers 5, 5*a* deliver the sliver *a* to the pair of the drawing rollers 6, 6*a* which conduct the sliver to the porcupine roller 7. After passing the porcupine roller 7 the sliver *a* is passed between the front drawing rollers 8 and 8*a*, the drawing roller 8 being the driving roller while the roller 8*a* is the driven roller and has its peripheral surface covered with leather or the like.

The driven roller 8*a* has its periphery pressed against the roller 8 by being mounted upon the arms of weighted levers 9. These are pivoted at 9*a* upon supports 10 fixed upon the base A.

The levers 9 are actuated by weights 11 which may be adjusted along the openings *b* made through the lever 9 so that more or less weight may be exerted upon the roller 8*a* as is necessary.

As is well known the rollers 5, 5*a* are mounted upon bearings 12 so that they may be adjusted at any appropriate distance from the drawing rollers 6, 6*a* by the support 12 being made adjustable upon the framework B in known manner.

The rollers 6 and 6*a* are also adjustable by their supports or bearings 13 being moved along the extensions B (also in known manner) in order that they may occupy positions closer to or further from the porcupine roller 7 as the length of the fibres necessitate.

Again the porcupine roller 7 may be adjusted nearer to or further from the front rollers 8, 8*a* and the said adjustment of the roller is made in accordance with the method of mounting same as is well known.

As the sliver *a* is delivered by the front drawing rollers 8 and 8*a* it is conducted through a twist tube 14 which is mounted upon bearings 15 and which has rotary motion transmitted to it in order to fold-in any straying fibres that may extend or radiate from the sliver *a* as it is passing through same on its way to the roller 16 and 16*a*.

The roller 16 is the drawing roller which revolves in order to cause the roller 16*a* which rests upon it also to revolve, while the bearings 17 upon which the roller 16 is mounted have extensions 17*a* reaching above them to form bearings and guides for the roller 16*a*. The shaft of the roller 16*a* travels along or rises in the slide 17*a* as the coils of sliver increase in diameter upon said roller 16*a*.

The rotary motions of the series of rollers 5, 5*a*, 6, 6*a*, the porcupine roller 7 and the rollers 8, 8*a* and 16, 16*a* are derived from the main driving shaft of the machine by well known and appropriate gearing in order that the respective surface-speeds of the said rollers may be secured to meet the requirements of the drawing out that has to be effected upon the sliver *a* as same travels from the rollers or bobbins 2 to the roller 16*a*.

By these means I am enabled to draw-out to a considerable extent the thick sliver delivered from the bobbin 2 so that when it reaches the bobbin 16*a* the resultant sliver is attenuated or drawn out to the degree of fineness required.

I then arrange the slivers which are wound upon the rollers 16*a* to be taken and placed in a machine of like construction to the one described so that the further attenuating or drawing out of said slivers may be effected until the resultant sliver has been drawn down to the required thickness to form a thread, and during all my said attenuating actions there is no twist given to the sliver from the commencement of the attenuating actions to the finishing of same. However when the threads have been drawn-out to the last attenuation, I then take them to ordinary twisting machines to twist and wind them on to bobbins for use in weaving or the like.

In order to be enabled to use the porcupine or spiked roller 7 I make use of means which will forcibly remove any fibres that may have a tendency to adhere to the pins thereof so that the sliver may travel forward and be freely acted upon by pins on the porcupine roller at all times.

According to one formation of the porcupine roller 7, as illustrated by Figs. 4 and 5 I arrange the pins *d* thereof to be fixed on the periphery of the roller 7 at a tangent to a circle d^1 around the axis of said roller 7 thus causing said pins to enter the sliver on one side, as they rotate in the direction indicated by the arrow *f*, and leave said sliver on the opposite side.

Mounted between each of the rows of pins *d* I have a movable bar *g* each of which, as the roller 7 revolves, will slide along the pins *d* so that by passing over the sliver *a* to enter same, the bars *g* are forced backwards and immediately the pins *d* leave the sliver then the bars *g* move along said pins to force any fibres that might tend to adhere to said pins beyond the points thereof.

The sliding bars *g* have their outer ends retained within the flanges *h* formed upon discs at the ends of the roller 7 so that they will not move beyond the points of the pins 7 or beyond their proper paths.

Such being the nature and object of my invention, what I claim is:—

In a machine for attenuating or drawing out slivers of fibrous substances, a pair of drawing rollers for withdrawing the sliver from a bobbin or roller and delivering same to

other drawing rollers, said second pair of drawing rollers, a porcupine roller, loose bars mounted between the rows of pins on the porcupine roller, another pair of drawing rollers, adjustable bearings for all of said rollers, a twist tube for receiving the sliver from the last pair of drawing rollers, another pair of rollers for winding the sliver in coils as delivered from the machine, driving gear for transmitting motion to said four pairs of rollers and to said porcupine roller and the twist tube.

ALFRED STELL.