W. S. KINSLEY.

FEEDER FOR FIBROUS MATERIAL.

APPLICATION FILED DEC. 26, 1916.

1,235,328.

Patented July 31, 1917.

3 SHEETS—SHEET 1.

Fig. 5.

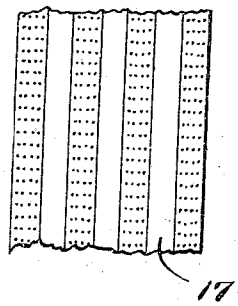
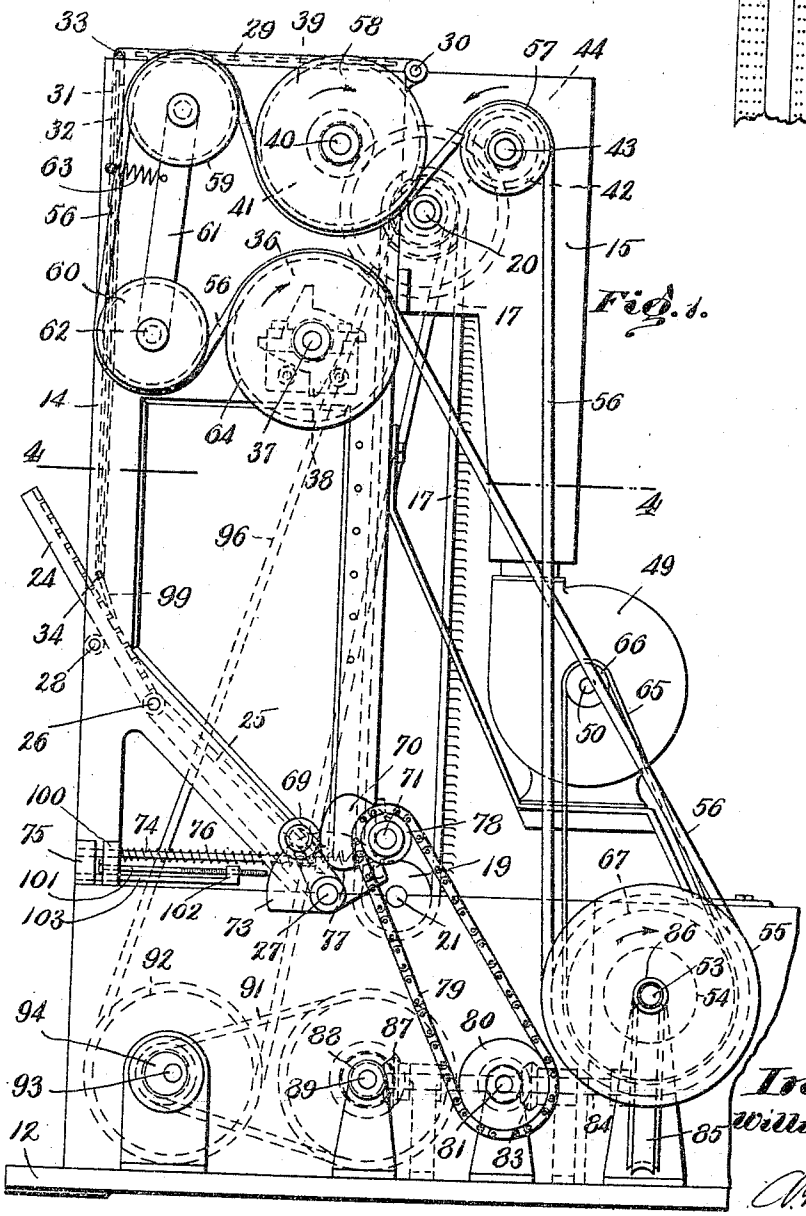


Fig. 1.



Inventor
William S. Kinsley
by
A. M. Harrigan
Atty.

W. S. KINSLEY.

FEEDER FOR FIBROUS MATERIAL.

APPLICATION FILED DEC. 26, 1916.

1,235,328.

Patented July 31, 1917.

3 SHEETS—SHEET 2.

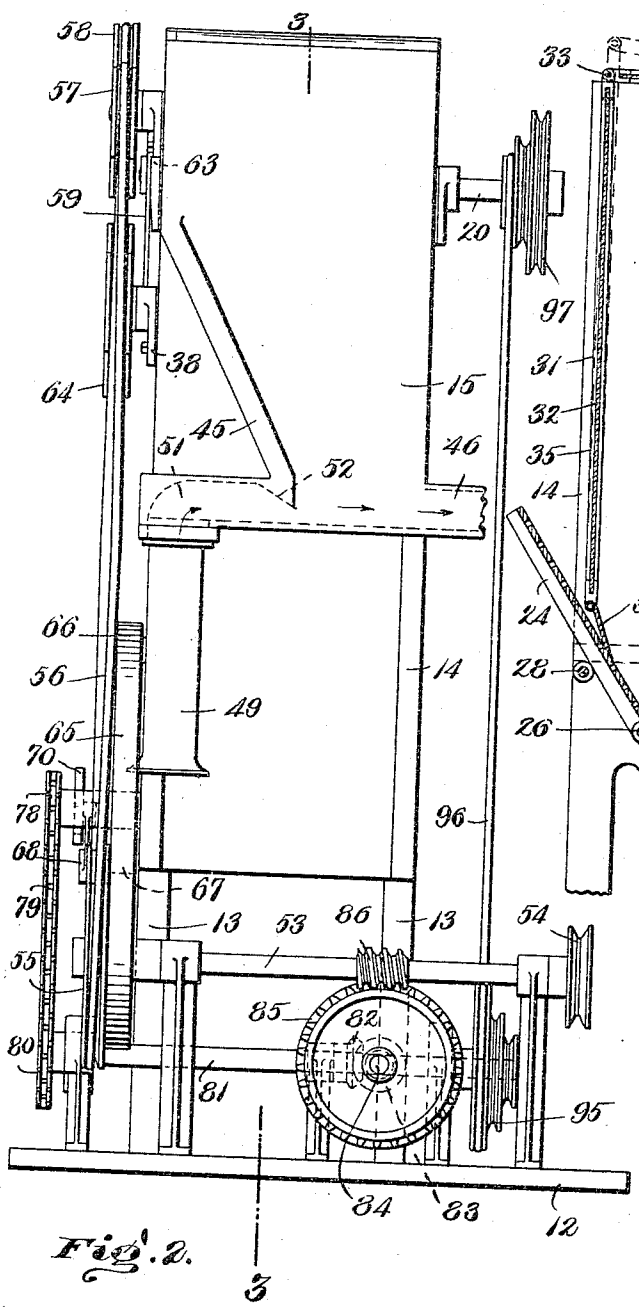


Fig. 2.

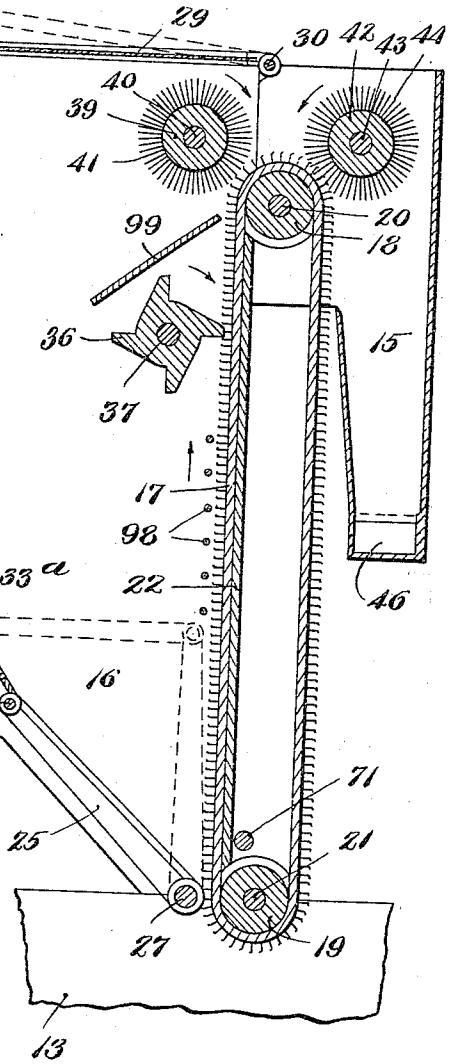


Fig. 3.

Inventor

William S. Kinsley

by A. M. Harrison Atty

W. S. KINSLEY.

FEEDER FOR FIBROUS MATERIAL.

APPLICATION FILED DEC. 26, 1916.

1,235,328.

Patented July 31, 1917.

3 SHEETS—SHEET 3.

Fig. 4.

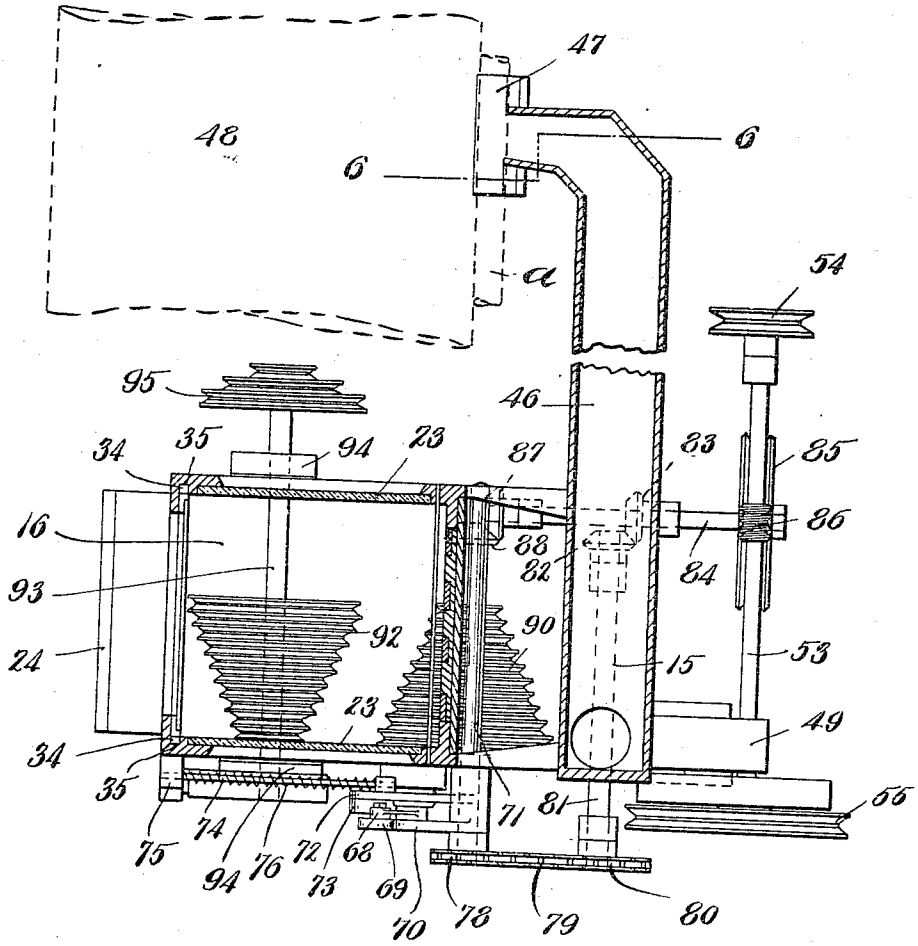
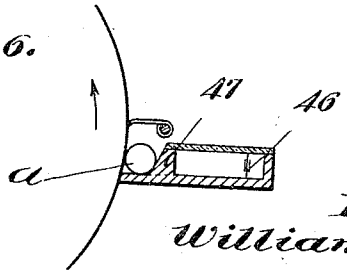


Fig. 6.



Inventor
William S. Kinsley
by A. W. Harrison
Atty.

UNITED STATES PATENT OFFICE.

WILLIAM S. KINSLEY, OF READING, MASSACHUSETTS, ASSIGNOR TO THE RUSSELL COMPANY, OF BOSTON, MASSACHUSETTS, A CORPORATION OF MAINE.

FEEDER FOR FIBROUS MATERIAL.

1,235,328. Specification of Letters Patent. Patented July 31, 1917.

Original application filed April 10, 1916, Serial No. 90,121. Divided and this application filed December 26, 1916. Serial No. 139,065.

To all whom it may concern:

Be it known that I, WILLIAM S. KINSLEY, of Reading, in the county of Middlesex and State of Massachusetts, have invented certain new and useful Improvements in Feeders for Fibrous Material, of which the following is a specification.

This invention relates to means for taking wool or other fibrous material from a mass in a chamber or hopper, and transferring the same in proper and uniform or regular quantities to a carding or similar machine.

In such mechanism, the transferrer usually consists of a toothed or spiked apron which elevates the fibers from a stock hopper and delivers the fibers for further treatment, means being employed to facilitate the proper distribution of the fibers upon the pins or hooks of the apron. For the best results, it is essential that the apron shall take up a regular, even, amount of stock regardless of how much stock is in the hopper.

The principal object of my invention claimed herein, is to provide an improved feeder for pressing the stock against the apron, which feeder will automatically operate variably according to the amount of stock in the hopper, to insure uniformity of delivery by the transferring apron.

Another object is to provide an improved construction of feeder that will obviate the tendency of fibers to get behind it and so interfere with its proper operation.

With these and other objects in view, my invention consists in the construction and combination of parts substantially as hereinafter described and claimed.

Of the accompanying drawings in which I have illustrated one embodiment of mechanism including my improvements:—

Figure 1 is a side elevation of the machine.

Fig. 2 is an elevation looking from the right of Fig. 1.

Fig. 3 represents a section on line 3—3 of Fig. 2.

Fig. 4 represents a section looking down from the line 4—4 in Fig. 1.

Fig. 5 is a detail elevation of a portion of the conveyer or apron.

Fig. 6 is a detail view looking from the line 6—6 in Fig. 4.

As my improved feeder was especially designed for use in one of the preliminary operations of producing "knickerbocker" cloth, which preliminary operation requires the introduction of nubs or knickers of one nature of material into main stock of another nature of material, as explained in my application filed April 10, 1916, Serial No. 90121, of which my present application is a division, the following description will, for convenience, mainly follow that of said application 90121. It is to be understood however, that I do not limit myself to the use of my improved feeder for operating on nubs or knickers, but intend to cover it wherever it may be used for feeding fibrous material from a hopper or chamber to other machinery for treatment.

The frame of the machine comprises a suitable base 12, two lower side frame members 13, and two upper side frame members 14, the upper portions of the latter supporting the walls of a distributing chamber 15.

The space or chamber which forms the main hopper into which a quantity of the fibrous stock such as nubs will be deposited, has one wall consisting of a toothed traveling conveyer or apron 17, which preferably has the hook-shaped pins arranged in spaced rows as indicated in Fig. 5, to avoid having too much stock carried up by the apron. I have demonstrated that the arrangement of the hooks or pins in rows as described, better facilitates the elevation of the proper quantity of stock than to have the pins extending over the entire area of the apron, even if the pins were more widely spaced than illustrated.

The belt or apron 17, is mounted on rolls or drums, 18, 19, carried by shafts 20, 21, a support or backing 22, being preferably employed to prevent deflection of the rising stretch of the apron out of its proper plane of movement.

The bottom of the main hopper constitutes a feeder and comprises two members 24, 25, hinged together at 26, the member 25 being carried by a rock-shaft 27, while the member 24 is free to ride over a roll 28,

when the members 24, 25, vibrate from the full line to the dotted line position of Fig. 3, or the reverse, the object of which operation will be hereinafter explained. A top or cover member 29, is pivoted at 30, so that it can be elevated. A wall or closure for the upper portion of the main hopper, above the member 24, consists of a frame 31, preferably having a glass panel 32, said frame being pivotally connected at 33 to the cover member 29. The lower edge of the frame 31, is provided with small rolls 34 (Fig. 4) entering grooves 35 (see also Fig. 3) formed in the inner faces of the side frame members 14, so that, when the cover is elevated, the frame 31 will also be elevated sufficiently to enable the stock to be deposited in the hopper through the space thus opened between the lower edges of the raised frame 31, and the bottom member 24. A flexible apron 31^a depends from the lower edge of the frame 31.

Through driving means and connections hereinafter described the conveyer or apron 17, travels in the direction of the arrow in Fig. 3, the hook pins thereof separating a number of nubs or quantity of other fibrous material from the stock in the main hopper. To prevent the complete elevation of an excessive number of nubs, I provide a rotary doctor 36, carried by a shaft 37, the latter being mounted in bearings 38, which are preferably horizontally adjustable as indicated in Fig. 1 so that accuracy of operation of the doctor may be effected according to the quality and condition of the stock of nubs operated upon.

Above the doctor 36, is a supplemental doctor comprising a roll 39, carried by a shaft 40, and having straight pins or wires 41, this doctor rotating in the same direction as the doctor 36, and serving to remove from the apron any excess of nubs that might have escaped removal by the doctor 36.

A clearer 42, carried by a shaft 43 and having straight pins or wires 44, revolves in a direction to remove from the teeth or pins of the apron all of those nubs which have reached a point within the radius of action of said clearer, so as to throw the nubs into the chamber 15, which I refer to as a distributing chamber because when the nubs have reached said chamber they are entirely separate from each other and scattered in a manner that might be compared with snow flakes.

From one side of the outlet from this chamber, a tube or passageway 46, extends the required distance and in the proper direction to a somewhat trough-shaped member 47, (see Figs. 4 and 6). This member 47, is located in proper position to support the side drawing *a* as it leaves the usual doffer roll 48, into which drawing *a* the nubs are blown by a current of air supplied by a suitable fan indicated at 49, said fan being carried by a shaft 50. The air outlet from the fan casing enters the box 51 (Fig. 2) and the outlet from said box is directed across the bottom of the distributing chamber 15 and toward the tube or passageway 46.

The main drive shaft 53 having a drive pulley 54 at one end, carries a belt pulley 55 at its other end (Figs. 1 and 2). A belt 56 extends nearly around the pulley 55, and also engages a pulley 57 on the shaft 43, a pulley 58 on the shaft 40, two pulleys 59 and 60, and a pulley 64 on the shaft 37. The pulleys 59, 60 are practically idle pulleys, the pulley 59 being carried by an arm or arms 61 pivotally supported on the axis 62 of the pulley 60, and having a suitably connected spring 63, to enable the pulley 59 to act as a belt tightener.

A belt 65, to operate the fan connects a pulley 66 carried by the fan shaft 50, with a pulley 67 on the main drive shaft 53.

I will now describe the means for vibrating or oscillating the hopper bottom members 24, 25, so as to keep the stock of nubs subject to intermittent and yielding pressure or impulses toward the conveyer or apron to feed the nubs to the apron. Mounted loosely on shaft 27 (Figs. 1 and 4) is an arm 68 carrying a roll 69, which is acted on by a cam 70, carried by a shaft 71. A segment 72 is rigidly carried by rock-shaft 27, and has a stop block 73 for the arm 68 to contact with. A rod 74 pivotally connected to the segment extends through a guide bracket 75, a spring 76 coiled upon the rod acting, through the segment and its block 73, to cause the feed member 25 to act yieldingly on the stock when moving toward the apron. The guide opening in bracket 75 is, of course, of such size as to permit the rod 74 to slide therein without binding.

Any suitable means may be employed to vary the force of the spring 76, as by mounting a block 100 on the rod 74 for one end of the spring to bear against, said block being adjustable by means of a screw 101 passing loosely through it and engaging a threaded aperture in an enlargement or nut 102 at the end of an arm 103 carried by bracket 75. Adjustment of block 100 varies the force of spring 76 to vary the number of nubs taken up by the apron. The greater the pressure, the more nubs will be taken up.

A spring 77 connects the arm 68 with the segment so that the roll 69 of the arm will keep in constant contact with the cam 70.

As the feed member 24 shifts, as indicated by the full and dotted lines in Fig. 3, there would necessarily be an open space at times between the frame 31, through

which stock might escape when the main hopper is filled above that level. The apron 31ª prevents such escape, and at the same time yields to permit the member 24 to shift.

A sprocket 78 carried by shaft 71, is connected by a chain 79, with a sprocket 80, carried by a shaft 81 (Figs. 1 and 4) said shaft 81 having a bevel pinion 82 meshing with a bevel pinion 83, carried by a shaft 84, having a worm-wheel 85 which is engaged with and actuated by a worm 86, carried by the main drive shaft 53. From this it will be understood that the rotation of the cam 70, is quite slow, said cam serving to shift the bottom members 24, 25, to substantially the full line position of Fig. 3, after which the spring 76 serves to yieldingly carry the bottom members toward the dotted line position of said figure. So long as there is considerable stock in the main hopper 16, the bottom members cannot of course reach the dotted line position referred to, but the member 25, will even then act through the stock to keep intermittently pressing the stock of nubs toward the conveyer or apron. As the amount of stock decreases, the very last of it will be taken up by the conveyer or apron because, as the amount of stock gradually decreases to almost nothing, any nubs that are on the member 24, will slide therefrom onto the member 25, when said members are in the full-line position of Fig. 3 and will then be pressed up to position to be taken by the hook pins of the apron.

As is well-known, the drawing or roving issuing from a set of cards is caused to vary in size and speed of travel, in order to produce different sizes of yarn to be woven. It is of course desirable to vary the number of knickers or nubs delivered by my machine through the passageway 46, so that the yarn or the final fabric will have the proper, or any desired, percentage of knickers. One way to vary the said percentage as illustrated in Figs. 1, 2 and 4, is to vary the speed of travel of the apron.

The shaft 84 has a bevel pinion 87 (see Figs. 1, 2, 4) meshing with a bevel pinion 88, carried by a shaft 89, carrying a cone step pulley 90, which is connected by a shiftable belt 91, with a cone step pulley 92, carried by a shaft 93 mounted in adjustable eccentric bearings 94. The shaft 93 has step pulleys 95 connected by a belt 96, with step pulleys 97 carried by the upper shaft 20 for the conveyer or apron. By adjusting the belts 91 and 96, relatively to the step pulleys on which said belts run, the speed of travel of the apron may be varied without, of course, affecting in any way the speed of operation of the other moving parts.

Practically the bottom members 24, 25 of the main hopper constitute a mechanism which enables the feed to take care of itself. This is because the point to which the member 25 moves toward the conveyer or apron depends upon the amount of stock between the member 25 and the apron, and the amount of pressing force imparted by the spring 76.

While the feeder members 24, 25, might, for some purposes, be continuous or solid, I prefer to make them as grids, with crevices to permit small particles of foreign matter to fall through, thus acting as clearers or sifters. This result is best obtained by constructing said members of a series of slats, as indicated in Fig. 3, parallel with the axis of oscillation and with the hinge 26, whereby an action on the stock is obtained, as the members oscillate, similar to the rubbing contact between a wash-board and goods being washed.

A series of transverse rods 98, supported by the side frame members 14, and adjacent to the tips of the pins of the apron, serve to prevent any of the stock of nubs that are above the plane of action of the feeder from interfering with the operation of the apron or with the nubs that have been taken from the supply at the lower part of the hopper 16. Without a guard such as provided by the rods 98, it would be difficult to properly control the quantity of nubs carried up, because there might be a greater surplus elevated than could be removed by the doctor mechanism.

To prevent the nubs which are removed by the upper doctor 39, from falling onto the lower doctor and back on the apron, a deflector 99 is employed to direct the removed and falling nubs behind the doctor 36.

By the employment of the terms "side drawing" or "roving" herein, I do not limit myself to the definition employed by any one authority, because the authorities are not in accord in their definitions on this subject. According to some, the term "sliver" would better define the condition of the main stock as it leaves the doffer 48 as hereinbefore described, but in many woolen mills the term "roving" or "side drawing" is employed, and I prefer to employ these terms although with no intention of limiting myself thereby, because I believe myself to be the first to introduce nubs of one kind of fibrous material into material of another kind by blowing one into the other while said other is traveling, regardless of whether said other material be slightly twisted or not, and called "sliver", "roving" or "drawing". Of course it is essential, for successful operation, that said other material be in sufficiently loose and fluffy condition to permit the nubs to be blown into it enough to cause the nubs to be then carried along for the further treatment including final spinning.

Having now described my invention in

one of its embodiments without attempting to disclose all possible modifications thereof, what I claim is:

1. A machine having a chamber for fibrous stock, an elevating apron in said chamber, a presser pivotally mounted in the lower part of said chamber, a flap member hingedly connected to the upper part of said presser, means for oscillating the presser, and means for supporting the flap member against backward and downward pressure of stock above it.

2. In a machine of the character described having a chamber for fibrous stock, a transferrer, a pivoted oscillator in said chamber, means for operating the oscillator, and a hinged member connected with the upper part of the oscillator, means being provided to cause the hinged member to swing to different planes relatively to the stock and to the oscillator as it follows the movements of said oscillator.

3. In a machine of the character described, having a chamber for fibrous stock, a transferrer for removing stock from the chamber, and a feeder for supplying stock to the transferrer, said feeder comprising two members hingedly connected by means for vibrating the feeder relatively to the transferrer.

4. In a machine of the character described, having a receptacle for fibrous material, an elevating apron in said receptacle, and a feeder for insuring the constant supply of material to the apron, said feeder having a hinged member forming the bottom of the receptacle, means being provided for yieldingly moving the hinged member toward the apron and positively moving it away from the apron.

5. In a machine of the character described, having a receptacle for fibrous material, an elevating apron in said receptacle, and a feeder for insuring the constant supply of material to the apron, said feeder consisting of two supports hinged together, and means for oscillating one of said supports.

6. In a machine of the character described, having a receptacle for fibrous material, a transferrer in said receptacle, a feeder for insuring the constant supply of material to the transferrer, said feeder being mounted to shift back and forth beneath the stock of material and constituting a support for the material, said feeder having openings for the escape of foreign particles.

7. In a machine of the character described, having a receptacle for fibrous material, a transferrer in said receptacle, a feeder for insuring the constant supply of material to the transferrer, said feeder consisting of two members hinged together, said members having openings for the escape of foreign particles, and means for oscillating the feeder.

In testimony whereof I have affixed my signature.

WILLIAM S. KINSLEY.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents. Washington, D. C."