

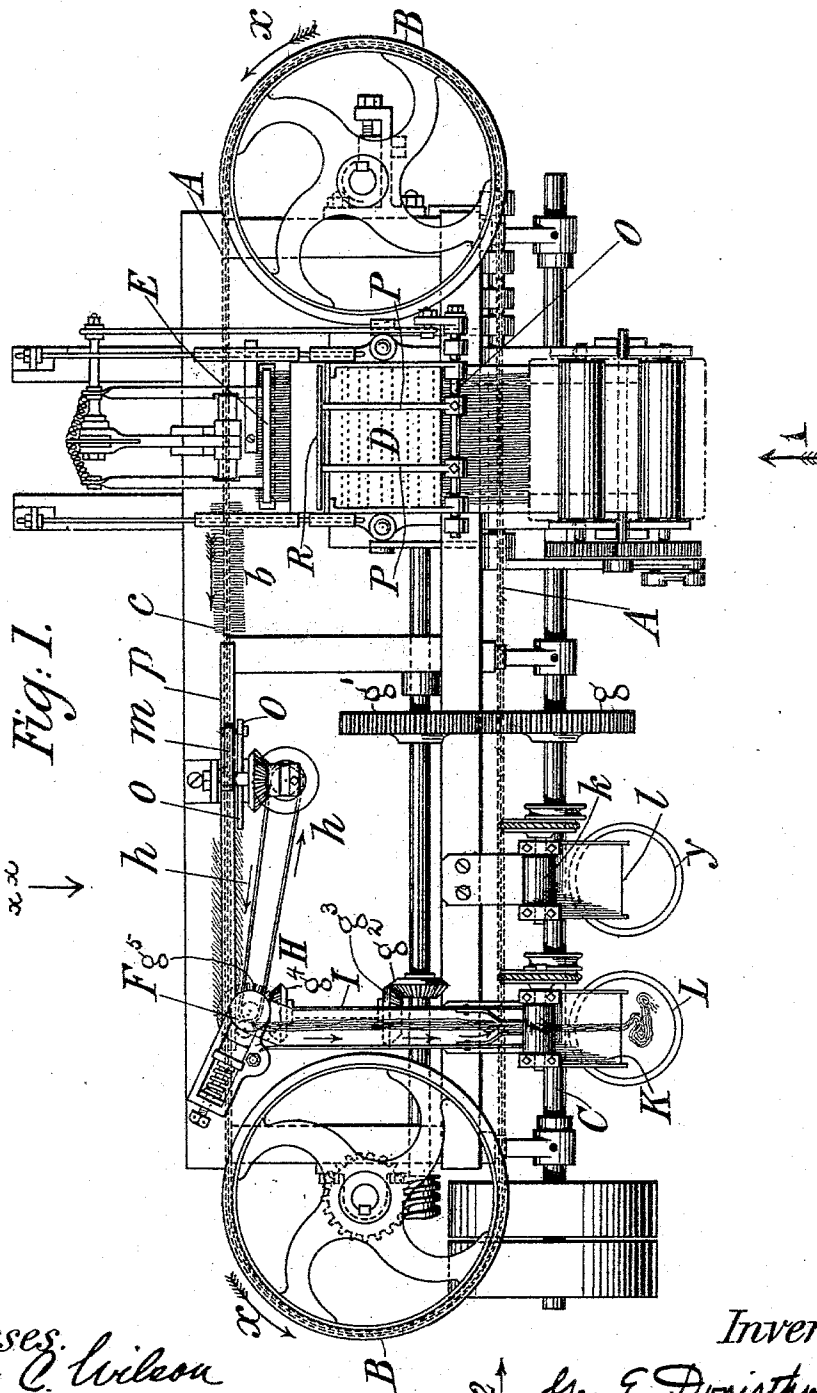
(No Model.)

5 Sheets—Sheet 1.

G. E. DONISTHORPE & T. BURROWS.
MACHINE FOR COMBING FIBROUS MATERIALS.

No. 511,128.

Patented Dec. 19, 1893.



Witnesses.
John C. Wilson
Ney C. Bowen

Inventors.
Geo. E. Donisthorpe, &
Taylor Burrows,
by *Whitman & Wilkinson Attys.*

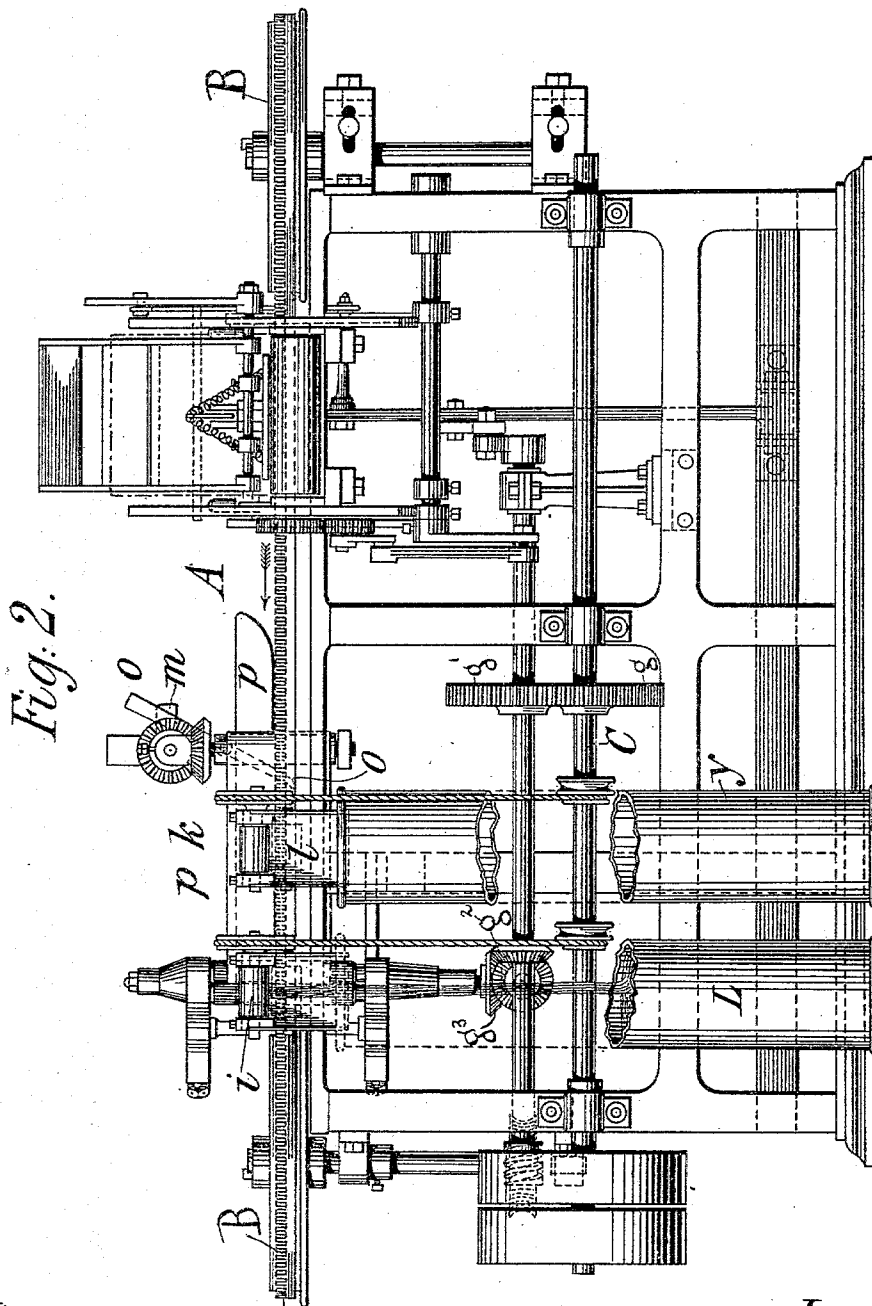
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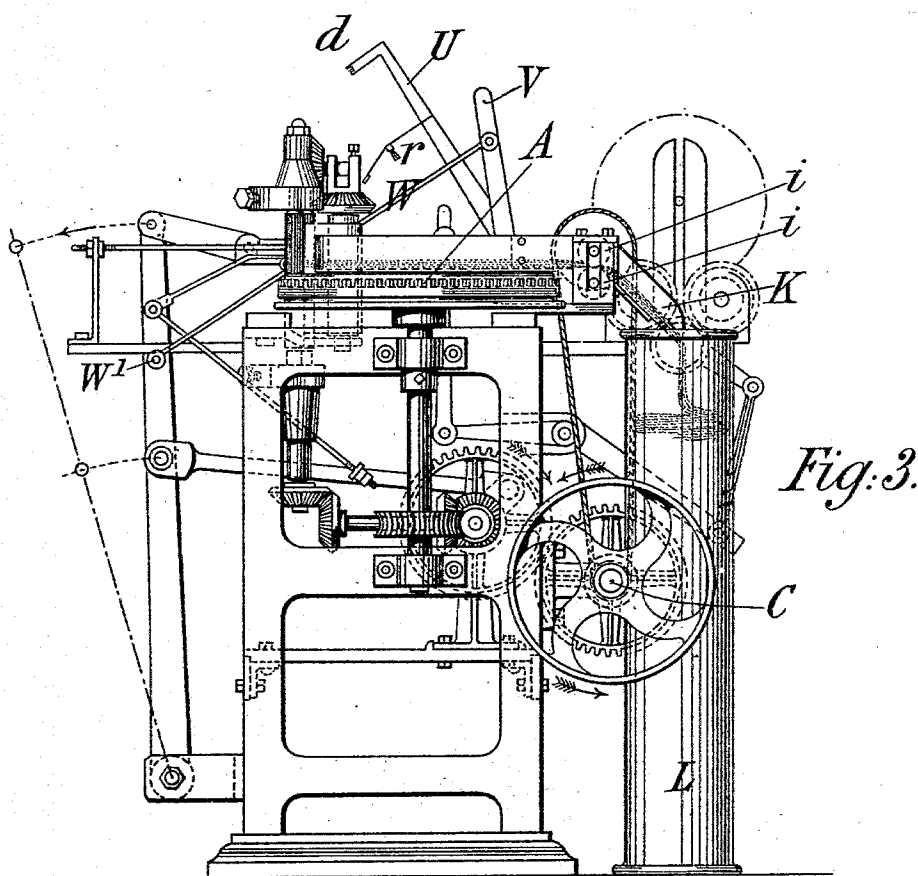
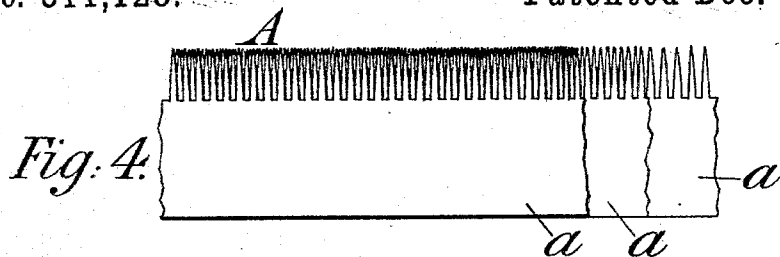
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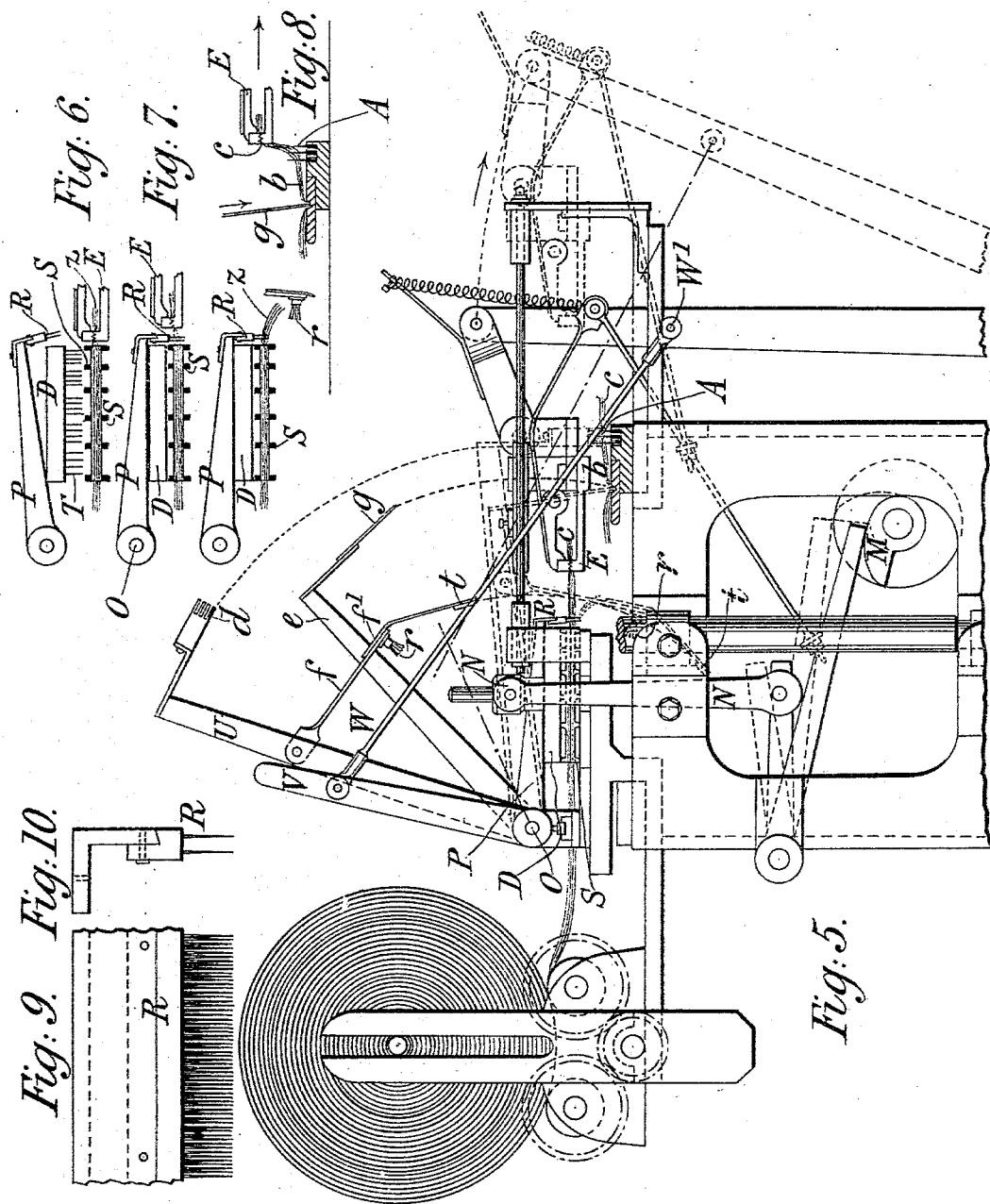
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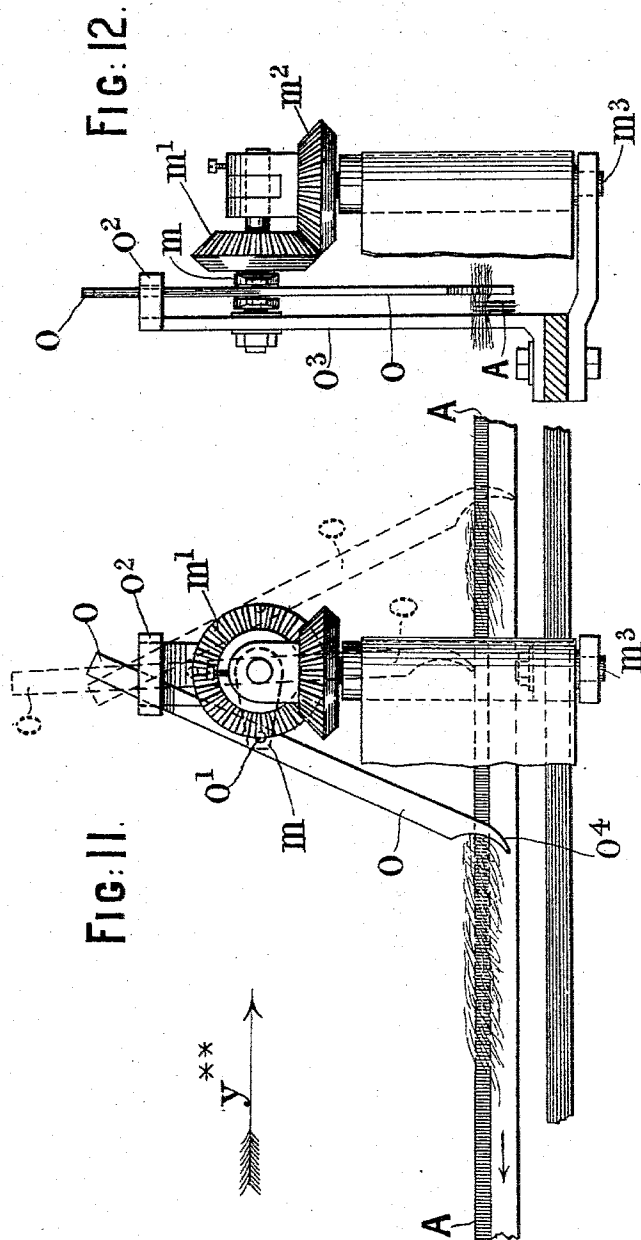
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WITNESSES.

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UNITED STATES PATENT OFFICE.

GEORGE EDMUND DONISTHORPE AND TAYLOR BURROWS, OF LONDON,
ENGLAND.

MACHINE FOR COMBING FIBROUS MATERIALS.

SPECIFICATION forming part of Letters Patent No. 511,128, dated December 19, 1893.

Application filed August 30, 1892. Serial No. 444,580. (No model.) Patented in England November 25, 1891, No. 20,509.

To all whom it may concern:

Be it known that we, GEORGE EDMUND DONISTHORPE, merchant, of 12 Oat Lane, and TAYLOR BURROWS, engineer, of 88 Upper Kennington Lane, London, England, subjects of the Queen of Great Britain, have invented a Machine for Combing Fibrous Materials, (for which invention we have obtained a patent in Great Britain, No. 20,509, dated November 25, 1891,) of which the following is a specification.

This invention relates to machinery or apparatus for combing more or less coarse fibrous materials such as wool, flax, tow and the like and analogous materials and the object of our invention is to produce a simple and effective machine to comb at a rapid speed and in a highly effective and economical manner such more or less coarse fibrous material to eliminate the short fibers and impurities therefrom so as to obtain a high percentage of fiber of suitable length for textile fabrics in a very rapid manner.

Our present invention comprises certain features and characteristic parts—all of which will be hereinafter fully set forth and finally pointed out in the claims; and in order that our present invention may be easily understood and readily carried into practice we will proceed to fully describe the same with reference to the drawings hereunto annexed.

In the drawings, Figure 1 is a plan of our complete machine. Fig. 2 is a side elevation of the machine looking in the direction of the arrow 1 Fig. 1. Fig. 3 is an end elevation looking in the direction of the arrows 2 Figs. 1 and 2. Fig. 4 is a side elevation of the carrier comb formed of three bands. Fig. 5 is an end elevation on an enlarged scale, and Figs. 6, 7 and 8 are detail views showing the manner and means of combing one end of the fibrous material as it is fed onto the carrier comb while the impurities, &c., thus combed out remain behind in the fibrous material on the feed head in such a manner that the nip jaws (on their next approach) seize such impurities in the uncombed part of the next tuft to be drawn out and deposit the same (*i. e.*, the impurities and uncombed part) entirely on the opposite side of the carrier comb to the drawing off device—while only

clean or combed fiber lies in the teeth of the carrier and on the drawing off side thereof. Fig. 9 is a front view of a part of the "nacteur" comb and Fig. 10 is an edge view of such comb. Fig. 11 is a detail view in elevation of the stroking appliance looking in the direction of the arrow x^{**} Fig. 1. Fig. 12 is an edge view of Fig. 11 in elevation looking in the direction of the arrow y^{**} Fig. 11.

A is the carrier comb; B the drums or pulleys around which the carrier A is caused to travel.

C is the main driving shaft.

D is the pin plate of the feed head.

E is the nip jaw.

F is the point where the fiber is drawn off out of the carrier comb A.

H is the drawing off band.

I is a trough to conduct the combed fiber or sliver across the machine and down the chute K into the sliver can or vessel L.

M is a cam to actuate the upright rods N connected to the tin plate D so as to cause the rise and fall thereof at the right moments.

P P are arms or rods loosely mounted on the axle O at one end and at the other carrying the fine comb or "nacteur" comb R—these arms P being perfectly free to turn or pivot on O.

S are the bars forming the grid between which bars the fibrous material is drawn by the nip jaw E. See Figs. 6, 7 and 8.

T are the pins on the pin plate D advantageously graded finer from left to right.

U is the reciprocating arm (carrying the dabbing device, &c.) fixed on the axle O and oscillated by the lever arm V rigidly fixed on the axle O which arm V is actuated by the connecting rod W pivoted at W' to a moving part of the machine for actuating the nipping jaws E.

Any suitable system of cams and levers or other mechanism may be used for giving the desired motion to the nip jaws E (and also the arm U) and this will be easily understood and readily carried into practice by any person skilled in the art of building this character of machinery.

a a a are the individual bands composing the carrier comb A.

b is the combed end and *c* the uncombed

end of the tufts of fiber as the same are dabbed into the teeth of the carrier comb A by the dabbing device *d* on the arm U.

e is another arm mounted loosely on the axis O and resting on a cross bar *f'* fixed by the arms *f* to U—while the outer end of *e* carries a blade or bar *g* to nip the end *b* of the tuft of fibrous material just before the dabbing device *d* descends to dab the tuft into the teeth of the traveling carrier comb. *r* is a brush on the arms or frame *f* carried by U to brush upward the ends of the fibrous material left projecting from the pin plate D ready for the next advance of the nip jaw. *t* is an arm or blade also fixed on *f* extending below the brush *r* and serving to part the fibrous material as the jaw E recedes.

i i are driven rollers for drawing the sliver out of the trough I.

k k are a pair of driven rollers for drawing the impurities (or residuum) out of the teeth of the endless carrier comb A and thus cleaning same on its way round to the feed head.

l is a chute down which the refuse, &c., are guided into a can or vessel *y* to receive same.

m is a crank for actuating the stroking appliance *o*.

p is the pressing plate for keeping the fibrous material pressed into the teeth of the carrier comb A and insure the fiber being drawn through the teeth thereof.

The endless traveling carrier comb A is composed of three metal bands *a* (advantageously thin bands or ribbons of steel similar to band saws) traveling in a horizontal plane and having teeth or pins formed thereon integrally therewith and in the case illustrated we have shown this traveling endless carrier comb A composed of three such bands *a* see Fig. 4—but we would remark that we do not limit ourselves to the number of such bands *a* composing the carrier comb A.

The operation is as follows: The carrier comb A is caused to travel around in a horizontal plane by passing around the drums or pulleys B which are revolved by any suitable train of wheels or mechanism actuated from the main driving shaft C. The jaws E open and advance toward the pin plate D and receive the protruding ends *z* of the fibrous material and snap hold of the same (see Fig. 6) close up to the pin plate D and at that moment the said plate D is in the raised position and the pins T clear of the fibrous material—while the “nacteur” comb is also raised up clear and out of the way of the jaws E. The jaws E then begin to recede from D and draw the whole body of fibrous material through the grid S about one-half an inch or thereabout—whereupon the plate D suddenly descends and pins T pass through the fibrous material—and (at the same moment the pin plate D drops down) the “nacteur” comb R also descends into the fibrous material just clear of the pin plate D and close up to same—as in Fig. 7. The jaws E (continuing to retire) now commence to tear out the tuft

of fibrous material, one end being pulled through the comb R and then the blade *t* falls across the path of the fibrous material and helps to part the tuft from the main body and the jaws still retiring, the nip-blade *g* then falls and holds the combed end *b* of the tuft see Fig. 8 or the nip blade *g* may be dispensed with. The jaws E finally retire quite clear of the carrier comb A and then open and the dabbing plates (or device) *d* fall and dab the tuft right down into the teeth of the traveling carrier comb A and it passes along. The arm U is then rapidly raised and as it returns carries up with it the arm *e* and nip blade *g* thereon—while the brush *r* brushes up the end *z* ready to be seized by the jaws E on their next advance. The pin plate D is then raised and thereby raises the comb R as in Fig. 6 and the jaws E again advance and snap hold of *z* and pull out (and thereby comb one end of) another tuft and so on continuously. The action of the “nacteur” comb or fine comb R descending into and through the fiber between the jaw E and the holding plate D—immediately before the jaw E begins to pull out the tuft of fiber from the body of the fiber held by D—insures that the jaw E draws the end (not held in said jaw) through this “nacteur” or fine comb R and thus combs said free end and then deposits this tuft upon the teeth of the traveling carrier comb A (and so on) with the impurities, &c., and uncombed part on one side of the said carrier and the cleaned ends on the opposite and drawing off side.

The introduction of the “nacteur” comb in the manner and for the purposes described is a very important and essential point in our invention.

The tufts of fiber thus laid in the teeth of the carrier comb A are carried along by said carrier (in the direction of the arrows *x*) *c* being the now uncombed end and *b* the combed end—until the combed end *b* is seized at the point F by the drawing off endless apron or band H (revolved from the main shaft C in the direction of the arrows *h*) by means of the gear wheels *g*, *g'*, *g''*, *g'''*, *g''''*, and *g''''''*, or any other suitable train of gearing, and the uncombed part *c* of the fiber is forcibly drawn through the teeth or fine pins on the carrier comb A thereby completing the combing or cleaning of the respective tufts or lengths of fibrous material and the resulting clean fiber or sliver is led across the machine in the guide trough I having power rollers *i* at the end thereof and through a chute K which delivers the combed fiber into the sliver can L or other suitable receptacle. It will thus be seen that the herein described machine pulls out tufts from the bulk of the fibrous material and in so doing cleans or combs one part thereof and deposits said tufts, with the cleaned ends on one side of the traveling endless band comb, and the uncombed ends on the opposite side of the said endless band comb, to be afterward drawn through said

band comb and so cleaned. Thus it will be noted that alternate lengths of the fibrous material are combed by the reciprocating devices, and the uncombed lengths between said alternate combed portions are subsequently combed by being drawn through the endless band comb.

The addition of a stroking appliance is very beneficial and advantageous and we have illustrated an appliance suitable for our purpose, viz:

m is a crank or crank arm rotated by the bevel cog-wheel m' which in its turn is driven by the bevel cog-wheel m^2 , the spindle m^3 of this latter being rotated by a pulley and belt thereon or by spur gear (this driving gear not shown in the drawings). The outer end of the crank m is pivoted at o' to the stroking appliance o . This stroking appliance or rod o besides being pivoted to the outer end of the crank arm m has its upper end passed through a slot much wider than itself forming a guide-way in the head stock o^2 of the upright o^3 . Thus the upper part of the stroking appliance or rod o while free to move up and down in the longitudinal slot or guideway in the head stock o^2 is of such a length that the upper end of the rod o can never come below the guiding slot in the head stock o^2 , by reason of the length from the top of the rod o to the pivot o' being greater than the most extreme distance that the pivot o' can move from the head stock o^2 . Thus it will be seen that on the crank m being revolved by the bevel gear wheels m' m^2 (or by any other suitable mechanism) such crank arm acting in combination with the guide-way in the head stock o^2 causes the stroking appliance o to be raised up through the guide o^2 and the lower end o^4 will be raised clear of the teeth of the endless traveling band a and will be passed backward in the direction of the arrow y^{**} clear of such teeth and the fiber therein (see the middle position shown in dotted lines in Fig. 11) until at its rearmost position the crank m will cause said rod o to descend (see the rearmost position shown in dotted lines in Fig. 11) below the teeth on the carrier a and the fiber therein and then the further rotation of crank m will cause the rod o to sweep right along from the said rearmost position to the position shown in full lines in Fig. 11 at a much more rapid rate of travel than that of the carrier a . Thereby the fiber in the carrier a is stroked or swept forward so as to present the same to the drawing-off device.

The tow or waste fiber or residuum left in or on the carrier comb A (after passing the point F) is lifted out or removed therefrom in any suitable manner, so that the carrier comb may be always thoroughly clean when it arrives under the feeding device.

p is a compressor plate or device fixed over the carrier comb A and fitting down closely thereon or therein between to prevent the fiber from rising out over the top of the teeth of

the carrier comb A while the same is being stroked and especially while being drawn off.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent of the United States, is—

1. In a machine for combing fibrous material, the combination with a suitable frame, of drums or pulleys journaled in said frame and revolving in an approximately horizontal plane, a traveling endless carrier comb mounted on said pulleys and composed of a plurality of thin metal bands or ribbons having teeth formed integrally therewith upon their upper edges, and means for feeding said fibrous material to said comb and for withdrawing the same from said comb, substantially as and for the purposes described.

2. In a machine for combing fibrous material, the combination with a suitable frame, of drums or pulleys journaled in said frame and revolving in an approximately horizontal plane, a traveling endless comb carrier mounted on said pulleys and composed of a plurality of thin metal bands or ribbons having teeth formed integrally therewith upon their upper edges, means for feeding said fibrous material to said comb, a compressor plate for pressing the fibrous material on to said comb, and means for withdrawing the cleaned fiber from said comb and said compressor plate, substantially as and for the purposes described.

3. In a machine for combing fibrous material, the combination with a suitable frame, of drums or pulleys journaled in said frame and revolving in an approximately horizontal plane, a traveling endless comb carrier mounted on said pulleys and composed of a plurality of thin metal bands or ribbons having teeth formed integrally therewith upon their upper edges, reciprocating combing devices adapted to comb alternate lengths of the fibrous material; means for engaging the combed portion in said endless comb; and for withdrawing the combed fiber from one side of the endless comb; and means for carrying off the refuse and uncombed portion from the other side of said endless comb, substantially as and for the purposes described.

4. In a machine for combing fibrous material, the combination with a suitable frame, of drums or pulleys journaled in said frame and revolving in an approximately horizontal plane, a traveling endless carrier comb mounted on said pulleys and composed of a plurality of thin metal bands or ribbons having teeth formed integrally therewith upon their upper edges, reciprocating combing devices adapted to comb alternate lengths of the fibrous material; means for engaging the combed portion in said endless comb; means for stroking the combed fiber, means for forcibly withdrawing the same from one side of the endless comb; and means for carrying off the refuse and uncombed portion from the other side of said endless comb, substantially as and for the purposes described.

5. In a machine for combing fibrous material, the combination with a suitable frame, of drums or pulleys journaled in said frame and revolving in an approximately horizontal plane, a traveling endless carrier comb mounted on said pulleys and composed of a plurality of thin metal bands or ribbons having teeth upon their upper edges, a feed head for supplying the material to be combed, a reciprocating pin plate adapted to alternately engage in and to release said fibrous material, reciprocating nip jaws adapted to seize the ends of said fibrous material near said pin plate and draw the fibers therefrom, a reciprocating comb adapted to descend on said fibrous material between said pin plate and said nip jaws, and means for releasing said fibrous material from said nip jaws and attaching it to said traveling comb, substantially as and for the purposes described.

6. In a machine for combing fibrous material, the combination with a suitable frame, of drums or pulleys journaled in said frame and revolving in an approximately horizontal plane, a traveling endless carrier comb mounted on said pulleys and composed of a plurality of thin metal bands or ribbons having teeth upon their upper edges, a feed head for supplying the material to be combed, a reciprocating pin plate adapted to alternately engage in and to release said fibrous material, reciprocating nip jaws adapted to seize the ends of said fibrous material near said pin plate and draw the fibers therefrom, a reciprocating comb adapted to descend on said material between said pin plate and said nip jaws, a reciprocating blade adapted to strike said fibrous material when said nip jaws near the end of their vibration, and means for releasing said fibrous material from said nip jaws and attaching it to said traveling comb, substantially as and for the purposes described.

7. In a machine for combing fibrous material, the combination with a suitable frame, of drums or pulleys journaled in said frame and revolving in an approximately horizontal plane, a traveling endless carrier comb mounted on said pulleys and composed of a plurality of thin metal bands or ribbons having teeth upon their upper edges, a feed head for supplying the material to be combed, a reciprocating pin plate adapted to alternately engage in and to release said fibrous material, reciprocating nip jaws adapted to seize the ends of said fibrous material near said pin plate and draw the fibers therefrom, a reciprocating comb adapted to descend on said fibrous material between said pin plate and said nip jaws, a reciprocating blade adapted to strike said fibrous material when said nip jaws near the end of their vibration, a reciprocating brush adapted to brush the parted ends of the fibrous material next to the feed head, and means for releasing said fibrous material from said nip jaws and attaching it to said traveling comb, substantially as and for the purposes described.

8. In a machine for combing fibrous material, the combination with a suitable frame, of drums or pulleys journaled in said frame and revolving in an approximately horizontal plane, a traveling endless carrier comb mounted on said pulleys and composed of a plurality of thin metal bands or ribbons having teeth upon their upper edges, a feed head for supplying the material to be combed, a reciprocating pin plate adapted to alternately engage in and to release said fibrous material, reciprocating nip jaws adapted to seize the ends of said fibrous material near said pin plate and draw the fibers therefrom, a reciprocating comb adapted to descend on said fibrous material between said pin plate and said nip jaws, a dabbing device for pressing said combed fiber on the traveling comb, and a compressor plate for holding it thereon, and means for drawing said fiber from said traveling comb, substantially as and for the purposes described.

9. In a machine for combing fibrous material, the combination with a suitable frame, of drums or pulleys journaled in said frame and revolving in an approximately horizontal plane, a traveling endless carrier comb mounted on said pulleys and composed of a plurality of thin metal bands or ribbons having teeth upon their upper edges, a feed head for supplying the material to be combed, a reciprocating pin plate adapted to alternately engage in and to release said fibrous material, reciprocating nip jaws adapted to seize the ends of said fibrous material near said pin plate and draw the fibers therefrom, a reciprocating comb adapted to descend on said fibrous material between said nip jaws and said pin plate, a nip blade engaging said fiber at one side of the traveling comb while the nip jaws let it go at the other, and a dabbing device for pressing said combed fiber on the traveling comb, and a compressor plate for holding it thereon, and means for drawing said fiber from said traveling comb, substantially as and for the purposes described.

10. In a machine for combing fibrous material, the combination with a traveling endless carrier comb, of a feed head for supplying the material to be combed, a reciprocating pin plate adapted to alternately engage in and to release said fibrous material, reciprocating nip jaws adapted to seize the ends of said fibrous material near said pin plate and draw the fibers therefrom, a reciprocating comb adapted to descend on said fibrous material between said pin plate and said nip jaws, and means for releasing said fibrous material from said nip jaws and attaching it to said traveling comb, substantially as and for the purposes described.

11. In a machine for combing fibrous material, the combination with a traveling endless comb, of a feed head for supplying the material to be combed, a reciprocating pin plate adapted to alternately engage in and to release said fibrous material, reciprocating

nip jaws adapted to seize the ends of said fibrous material near said pin plate and draw said fibers therefrom, a reciprocating comb adapted to descend on said fibrous material
 5 between said pin plate and said nip jaws, a reciprocating blade adapted to strike said fibrous material when said nip jaws near the end of their vibration, and means for releasing said fibrous material from said nip jaws
 10 and attaching it to said traveling comb, substantially as and for the purposes described.

12. In a machine for combing fibrous material, the combination with a traveling endless carrier comb, of a feed head for supplying the material to be combed, a reciprocating pin
 15 plate adapted to alternately engage in and to release said fibrous material near said pin plate and draw the fibers therefrom, a reciprocating comb adapted to descend on said
 20 fibrous material between said pin plate and said nip jaws, a reciprocating blade adapted to strike said fibrous material when said nip jaws near the end of their vibration, a reciprocating brush adapted to brush the parted
 25 ends of the fibrous material next to the feed head, and means for releasing said fibrous material from said nip jaws and attaching it to said traveling comb, substantially as and for the purposes described.

30 13. In a machine for combing fibrous material, the combination with a traveling endless carrier comb, of a feed head for supplying the material to be combed, a reciprocating pin
 35 plate adapted to alternately engage in and to release said fibrous material, reciprocating nip jaws adapted to seize the ends of said fibrous material near said pin plate and draw the fibers therefrom, a reciprocating comb adapted
 40 to descend on said fibrous material between said pin plate and said nip jaws, a dabbing device for pressing said combed fiber on the traveling comb, and a compressor plate for holding it thereon, and means for drawing said
 45 fiber from said traveling comb, substantially as and for the purposes described.

14. In a machine for combing fibrous material, the combination with a traveling endless carrier comb, of a feed head for supplying the material to be combed, a reciprocating pin
 50 plate adapted to alternately engage in and to release said fibrous material, reciprocating nip jaws adapted to seize the ends of said fibrous material near said pin plate and draw the fibers therefrom, a reciprocating comb adapted
 55 to descend on said fibrous material between said nip jaws and said pin plate, a nip blade engaging said fiber at one side of the traveling comb while the nip jaws let it go at the other, and a dabbing device for pressing said
 60 combed fiber on the traveling comb, and a compressor plate for holding it thereon, and means for drawing said fiber from said traveling comb, substantially as and for the purposes described.

65 15. In a machine for combing fibrous material, the combination with a suitable frame, of

drums or pulleys journaled in said frame and revolving in an approximately horizontal plane, a traveling endless carrier comb mounted on said pulleys and composed of a plurality
 70 of thin metal bands or ribbons having teeth formed integrally therewith upon their upper edges, means for combing one end of the tufts of fibrous material and feeding the uncombed
 75 end to said traveling comb, and means for drawing the uncombed end through said traveling comb thereby completing the combing, substantially as and for the purposes described.

16. In a machine for combing fibrous material, the combination with a suitable frame,
 80 of drums or pulleys journaled in said frame and revolving in an approximately horizontal plane, a traveling endless carrier comb mounted on said pulleys and composed of a
 85 plurality of thin metal bands or ribbons having teeth formed integrally therewith upon their upper edges, means for combing one end of tufts of fibrous material and feeding the uncombed end to said traveling comb, and
 90 means for drawing the uncombed end through said traveling comb thereby completing the combing, and means also for carrying off the refuse and uncombed portion from the other side of said endless comb, substantially as
 95 and for the purposes described.

17. In a machine for combing fibrous material, the combination with a traveling endless carrier comb, of a feed head for supplying the material to be combed, a reciprocating
 100 pin plate adapted to alternately engage in and to release said fibrous material, reciprocating nip jaws adapted to seize the ends of said fibrous material near said pin plate and draw the fibers therefrom, a reciprocating
 105 comb adapted to descend on said fibrous material between said pin plate and said nip jaws, means for releasing said fibrous material from said nip jaws and attaching it to said traveling comb, a compressor plate adapted
 110 to press said material down on said traveling comb, a stroking device adapted to stroke the fiber in the direction the comb travels, and a device adapted to seize said fiber, drag it from and through the teeth of
 115 said traveling comb and carry off the said fiber, substantially as and for the purposes described.

18. In a machine for combing fibrous material, the combination with a suitable frame,
 120 of drums or pulleys journaled in said frame and revolving in an approximately horizontal plane, a traveling endless carrier comb mounted on said pulleys and composed of a plurality of thin metal bands or ribbons having
 125 teeth formed integrally therewith upon their upper edges, means for combing one end of the tufts of fibrous material and feeding the uncombed end to said traveling comb, and a compressor plate for holding said
 130 fiber on said traveling comb, a device for stroking said fiber, and means for drawing the uncombed

end through said traveling comb thereby completing the combing, substantially as and for the purposes described.

19. In a machine for combing fibrous material, the combination with a suitable frame, of drums or pulleys journaled in said frame and revolving in an approximately horizontal plane, a traveling endless carrier comb mounted on said pulleys and composed of a plurality of thin metal bands or ribbons having teeth formed integrally therewith upon their upper edges, means for combing one end of the tufts of fibrous material and feeding the uncombed end to said traveling comb, a compressor plate for holding said fibrous material on said traveling comb, a device for strok-

ing said fiber, means for drawing the uncombed end through said traveling comb thereby completing the combing, and means also for carrying off the refuse and uncombed portion from the other side of said endless comb, substantially as and for the purposes described.

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