

(No Model.)

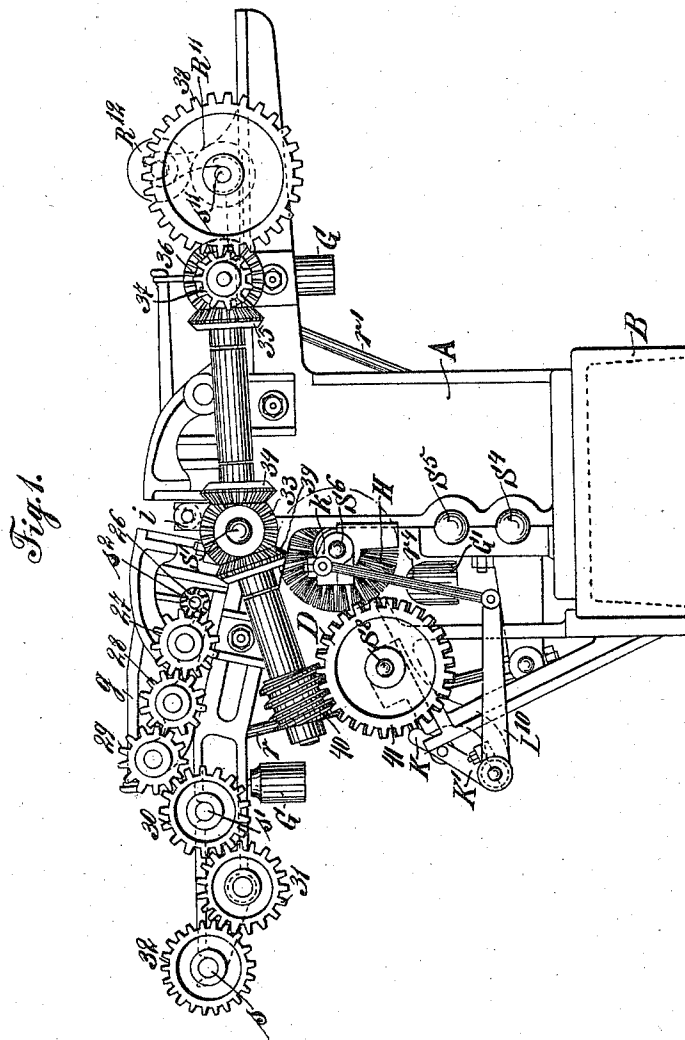
3 Sheets—Sheet 1.

R. STAUB.

MACHINE FOR COMBING COTTON OR OTHER FIBERS.

No. 580,472.

Patented Apr. 13, 1897.



Witnesses:  
B. S. Ober.  
Henry M. J.

Inventor:  
Robert Staub.  
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By J. H. J.

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Fig. 12.

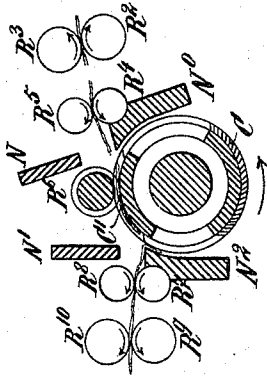


Fig. 13.

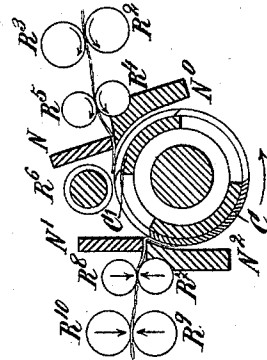


Fig. 14.

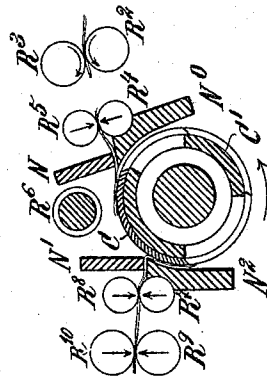


Fig. 15.

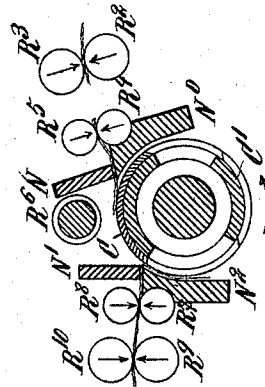
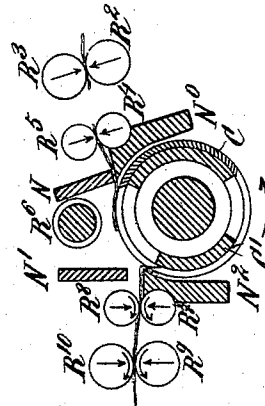


Fig. 16.



Witnesses:

B. S. Ober.

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By *[Signature]* Atty.

(No Model.)

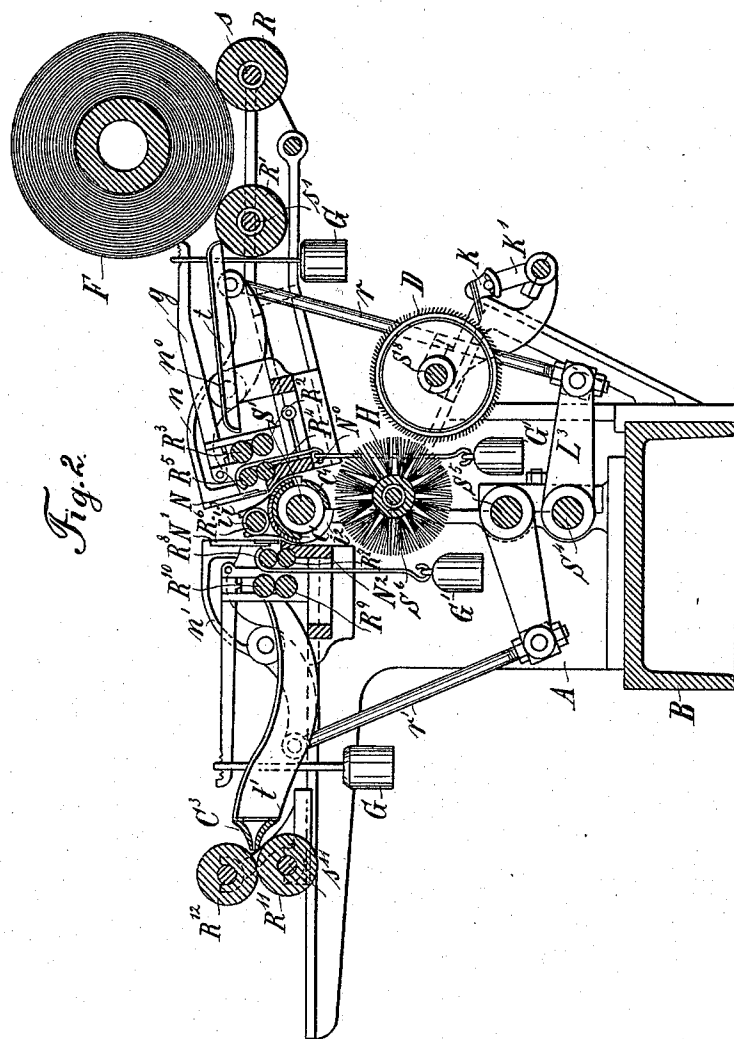
3 Sheets—Sheet 3.

R. STAUB.

MACHINE FOR COMBING COTTON OR OTHER FIBERS.

No. 580,472.

Patented Apr. 13, 1897.



Witnesses.

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# UNITED STATES PATENT OFFICE.

ROBERT STAUB, OF MÜNCHEN-GLADBACH, GERMANY, ASSIGNOR OF ONE-HALF TO AUGUST MONFORTS, OF SAME PLACE.

## MACHINE FOR COMBING COTTON OR OTHER FIBERS.

SPECIFICATION forming part of Letters Patent No. 580,472, dated April 13, 1897.

Application filed October 11, 1894. Serial No. 525,598. (No model.) Patented in England May 30, 1894, No. 10,500; in Belgium May 30, 1894, No. 110,216; in Germany May 30, 1894, No. 78,110; in France May 30, 1894, No. 238,887; in Switzerland May 30, 1894, No. 8,599; in Austria September 4, 1894, No. 44/4,610; in Italy September 30, 1895, XXX, 39,760, LXXVIII, 69, and in Spain January 18, 1896, No. 18,023.

*To all whom it may concern:*

Be it known that I, ROBERT STAUB, engineer, a citizen of Switzerland, residing at München-Gladbach, Germany, have invented certain new and useful Improvements in Machines for Combing Cotton and other Fibers, (for which Letters Patent have been obtained in the following countries, to wit: England, dated May 30, 1894, No. 10,500; Belgium, dated May 30, 1894, No. 110,216; Germany, dated May 30, 1894, No. 78,110; France, dated May 30, 1894, No. 238,887; Italy, dated September 30, 1895, XXX, 39,760, LXXVIII, 69; Austria, dated September 4, 1894, No. 44/4,610; Switzerland, dated May 30, 1894, No. 8,599, and Spain, dated January 18, 1896, No. 18,023;) and I do hereby declare the following to be a clear and exact description of the invention.

In the treatment of cotton fiber for spinning purposes the process of combing, notwithstanding its incontestable value in the production of a faultless material for spinning, has, up to the present day, found but a restricted use. The reason for this lies in the fact that the combing-machines heretofore employed, in so far as their capacity and the profitable use of the fleece obtained are concerned, do not come up to the requirements of the spinner in the desired manner.

This invention has for its object to obviate certain difficulties and disadvantages found in the various existing intermittently-operating combing-machines, and to provide means whereby the shorter and longer cotton and other fibers may be combed with the same advantage, whereby the greatest possible quantitative yield can be obtained and a fleece or lap of a uniform texture for further use in the art of spinning can also be obtained.

In the operation of combing fibrous materials as heretofore practiced the severing of a tuft from the web and the combing of the rear portion of such tuft have been effected simultaneously through the agency of a top comb, so that only a comparatively thin web of fibrous material can be combed whether

the fibers be long or short; and it is the aim of my invention to provide means whereby webs of fibers of abnormal thickness, as compared with the thickness of web heretofore combed, can be combed and repieced and then drawn out into a smooth coherent lap ready for condensation or other purposes. To these ends I provide severing or tearing mechanism whose operation is such that the usual top comb is dispensed with and whereby the tufts or beards of fiber are severed from the lap or web before they are subjected to the action of the combing appliances.

In view of the fact that the severed tufts or beards of fiber are separately and successively acted upon by the combing appliances and that both halves of the tufts are operated upon in the same manner, it is obvious that the greatest possible masses of fibers can be combed and a web obtained of the same width and thickness as those of the lap being combed, which web may then be drawn out into a smooth pliant lap that is readily condensed for spinning.

That my invention may be fully understood, I will describe the same in detail, reference being had to the accompanying drawings, whereof—

Figure 1 is a side elevation, and Fig. 2 a longitudinal vertical section, of a combing-machine embodying my invention. Figs. 1<sup>a</sup> to 1<sup>e</sup> are sectional views illustrating the operations of combing.

The severing-rolls are mounted in bearings which are adjustable relatively to each other and relatively to the nippers N and N<sup>o</sup>, so that said rolls can be adjusted in accordance with the length of the fiber to be combed. By means of their severing-rolls the severance is effected in such manner that the fibers lying loosely between the two pairs of rolls are seized by that pair lying nearest them, so that the severance is effected in a very rapid manner with a regular and smooth split or tear.

The machine shown in the drawings is provided with combing appliances of any suitable or well-known construction, the comb-

ing-cylinder being provided with the corrugated segmental portion C', and the various mechanisms may be driven in any suitable manner from a prime mover.

5 In general it may be stated that the comb-shaft S' is continuously rotated, while the rotation of the feed-rolls R<sup>3</sup> R<sup>2</sup> is periodically reversed to sever the beards of fiber from the lap, the upper roll R<sup>3</sup> being revolved by frictional contact, said roll being held to roll R<sup>2</sup> 10 by a weighted lever g G'. The feed-rolls R<sup>4</sup> R<sup>5</sup> are revolved from shaft S<sup>6</sup> and suitable intermediate mechanism, said shaft also carrying the comb-cleaning brush H. The roll 15 R<sup>4</sup> is periodically revolved, and thereby its companion roll R<sup>5</sup>, through suitable gearing adapted to be periodically thrown into and out of operation by means of suitable automatically-operated clutches, a substantially 20 similar mechanism imparting periodical motion to the roll R<sup>7</sup> and therethrough to its companion roll R<sup>8</sup>, suitable gearing being also provided for periodically revolving the drawing-roll R<sup>9</sup> and therethrough its companion roll R<sup>10</sup>, this driving mechanism being so arranged and operated that rolls R<sup>7</sup> 25 and R<sup>9</sup> will be revolved simultaneously, but said roll R<sup>9</sup> at a slightly greater surface speed than roll R<sup>7</sup>, to draw out the repieced web. Suitable mechanism is also provided 30 to periodically open and close the nippers.

Motion is imparted to rolls R and R', that carry and feed the lap, from a gear 26 on journal s<sup>2</sup> of roll R<sup>2</sup> through the gearing 27, 35 28, 29, 30, 31, and 32, the latter being secured to the journal of roll R and the gear 30 to the journal of roll R'.

The delivery-roll R<sup>11</sup>, and therethrough its companion roll R<sup>12</sup>, is driven from the comb-shaft S', that carries a bevel-pinion 33 in gear with a like pinion 34, whose shaft carries at its opposite end a bevel-pinion 35 in gear with a like pinion 36, whose shaft carries a gear-wheel 37 in gear with one 38 on the journal of roll R<sup>11</sup>. A second pinion 39 45 in gear with pinion 33 is mounted on a shaft that carries at its opposite end a worm 40 in gear with a worm-wheel 41 on a shaft S<sup>8</sup>, that also carries the stripping-cylinder D for the brush H. 50

The doffer-knife K K' is actuated by a lever L<sup>10</sup>, connected by a rod r<sup>4</sup> to a crank on the cleaner-brush shaft S<sup>6</sup>.

Of course the described mechanisms whereby the desired or required movements are imparted to the working elements of the machine may be variously modified without departing from the nature of my invention, and are here given as operative examples only. 55

The operation of combing, repiecing, and drawing out into a thin fleece hereinbefore referred to may be briefly and best described in reference to Fig. 2 and Figs. 1<sup>a</sup> to 1<sup>e</sup>. 60

The web or lap F of fiber to be combed, of any desired thickness and width and in the form of a roll, and hereinafter referred to as the "lap," is placed on two rolls R and R', by which it

is fed over the sheet-metal guide t to the nip of the rolls R<sup>2</sup> R<sup>3</sup> and therethrough to the rolls R<sup>4</sup> R<sup>5</sup>. The two pairs of rolls R<sup>2</sup> R<sup>3</sup> and 70 R<sup>4</sup> R<sup>5</sup> constitute a severing device in such manner that after the rolls have drawn in a suitable length of lap the rotation of the rolls R<sup>2</sup> R<sup>3</sup> is reversed, while rolls R<sup>4</sup> R<sup>5</sup> continue to revolve in the proper direction. The lap 75 held by the rolls R<sup>2</sup> R<sup>3</sup> is therefore drawn away from rolls R<sup>4</sup> R<sup>5</sup> and severed from the portion held by the latter rolls. The severed fibers, constituting what I will hereinafter refer to as the "beard of fibers," or, for short, 80 the "beard," are then transferred by said rolls R<sup>4</sup> R<sup>5</sup> between the fixed and movable nipper-jaws N<sup>0</sup> and N, said jaw N having previously receded from jaw N<sup>0</sup>, and said jaws, as well as others to be described, will hereinafter be 85 referred to as the "nippers." At the same moment the rolls R<sup>4</sup> R<sup>5</sup> cease to revolve, while the beard transferred to nippers N N<sup>0</sup>, so that one-half thereof, more or less, will project therefrom, is nipped by the descending nipper 90 N and held to fixed nipper N<sup>0</sup>, during which time the front or projecting portion of the fiber is combed by segmental comb C on a revoluble shaft S' until nipper N again recedes, at which time a corrugated feed-segment C', also on shaft S', will lie under the 95 combed portion of the beard, which latter, by the aid of the roll R<sup>6</sup> and the rolls R<sup>4</sup> R<sup>5</sup>, which are again set in motion, is carried between the second pair of nippers N' N<sup>2</sup> to the nip of 100 rolls R<sup>7</sup> R<sup>8</sup>, the movable nipper N' having meanwhile receded from the fixed nipper N<sup>2</sup>. The rolls R<sup>7</sup> R<sup>8</sup> move the beard forward until its uncombed portion lies in rear of the nippers N' N<sup>2</sup>, when the movement of said rolls is interrupted and the nipper N' descends and holds the uncombed portion within reach of 105 the comb-segments, to be combed thereby. Meanwhile a second beard has been severed from the lap and its front half combed. The nipper N' is now raised and the forward combed portion of the second beard laid onto the rear combed portion of the first beard, after which both beards are drawn forward until the rear uncombed portion of the second 115 beard lies within reach of the combing devices. The continuation of these operations will result in the formation between the rolls R<sup>7</sup> R<sup>8</sup> of a thick scaly web of combed fiber composed of superposed overlapping layers of beards, 120 which is gradually fed by said rolls to the drawing-rolls R<sup>9</sup> R<sup>10</sup>, that revolve at a greater surface speed than said rolls R<sup>7</sup> R<sup>8</sup>, and is thereby drawn into a thin pliant fleece that is fed onto the sheet-metal guide t' and thence 125 to the condenser-cone C<sup>3</sup>, to be thereby condensed into a thin sliver for roving or other purposes.

In Figs. 1<sup>a</sup> to 1<sup>e</sup>, inclusive, I have illustrated diagrammatically the operative elements necessary to the operations above described in their different positions. The position of these elements as shown in Fig. 1<sup>a</sup> corresponds with that shown in Fig. 2, when 130

the last row of teeth of the comb is acting upon the front portion of the tuft or beard, while the uncombed rear portion of the preceding beard is being acted upon by the first rows of teeth of the comb, the rolls  $R^2 R^3$  beginning to revolve while those  $R^4 R^5$ ,  $R^7 R^8$ , and  $R^9 R^{10}$  are stationary, both pairs of nippers being closed.

Fig. 1<sup>b</sup> shows the position of the operative elements at the time when the comb-cylinder has so nearly completed its rotation that the last comb of the series of such has passed beyond the nip of the nippers  $N' N^2$  and the feed-segment  $C'$  has reached a position under roll  $R^6$ . Rolls  $R^2 R^3$  are still moving forward, and have fed the web or lap sufficiently so as to be within reach of the nip of rolls  $R^4 R^5$ , which now begin to revolve and feed the previously-severed beard between the nippers  $N N^0$ . Roll  $R^6$  begins to descend, the combing of the rear portion of the preceding beard is being completed, and the nippers  $N' N^2$ , and rolls  $R^6 R^7 R^8$  and  $R^9 R^{10}$  remain in their relative positions.

Fig. 1<sup>c</sup> shows that the comb-cylinder has revolved sufficiently far to bring the feed-segment  $C'$  to the nip of nippers  $N' N^2$ , the rotation of rolls  $R^2 R^3$  having meanwhile been reversed in order to accomplish the severance of the beard from the lap  $F$ , which beard is fed forward by the rolls  $R^4 R^5$  between nippers  $N N^0$ . The comb is now out of reach of either the tuft or beard in nippers  $N N^0$  and  $N' N^2$  or the tuft or beard on segment  $C'$ , the roll  $R^6$  has descended upon feed-segment  $C'$ , thereby pressing the combed end of the beard in nippers  $N N^0$  onto said segment, nipper  $N$  ascends, and roll  $R^6$  commences to revolve with the comb-cylinder, thereby transferring the combed end of the beard on feed-segment  $C'$  between nippers  $N' N^2$  within reach of the nip of rolls  $R^7 R^8$ , which latter rolls, as well as rolls  $R^9 R^{10}$ , now begin to revolve. The comb-cylinder, Fig. 1<sup>d</sup>, will now be in such a position that the first row of teeth will enter the uncombed portion of the beard held in nippers  $N N^0$ , said nipper  $N$  having just closed on nipper  $N^0$ , while the rolls  $R^4 R^5$  complete their partial rotation. In the meantime the rolls  $R^2 R^3$  have completed their backward rotation and are now

at rest. The roll  $R^6$  is raised and nipper  $N'$  closes upon nipper  $N^2$  while the rolls  $R^7 R^8$  and  $R^9 R^{10}$  are now completing their movement. In the position of the mechanical elements shown in Fig. 1<sup>e</sup> the rear portion of the beard held by nippers  $N' N^2$  is being combed, the pair of rolls  $R^2 R^3$  being still at rest, while the remaining elements again assume their respective positions. (Shown in Fig. 1<sup>a</sup>.)

Instead of an intermittent motion a continuous motion may be imparted to the rolls  $R^4 R^5$ . In the latter case the nipper  $N$  closes on nipper  $N^0$  as soon as the desired length of beard has been fed thereto, and while the beard is held by the said nippers the rear portion of said beard is gradually freed from said rolls. When nipper  $N$  recedes from nipper  $N^0$ , roll  $R^6$  lies on feed-segment  $C'$  and draws the beard, which is now free to move, from between said nippers.

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

1. In a combing-machine, mechanism for severing tufts or beards of fiber from a lap of such, consisting of two pairs of rolls, mechanism for revolving the rolls of each pair in the same direction, and a reversing mechanism for reversing the rotation of one pair of said rolls.

2. In a combing-machine, the combination with a pair of nippers, of two pairs of rolls, means for operating the same to sever tufts or beards of fiber from a lap and feed said tufts to the nippers, and suitable actuating mechanism.

3. In a combing-machine, the combination with the combing appliances, a nipping device proximate thereto, and a severing device consisting of two pairs of rolls proximate to the nipping device; of mechanism operating to periodically revolve both pairs of rolls in the same direction, reversing mechanism for periodically revolving one pair of said rolls in a reverse direction, and mechanism operating to periodically open and close the nippers, for the purpose set forth.

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Witnesses:

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