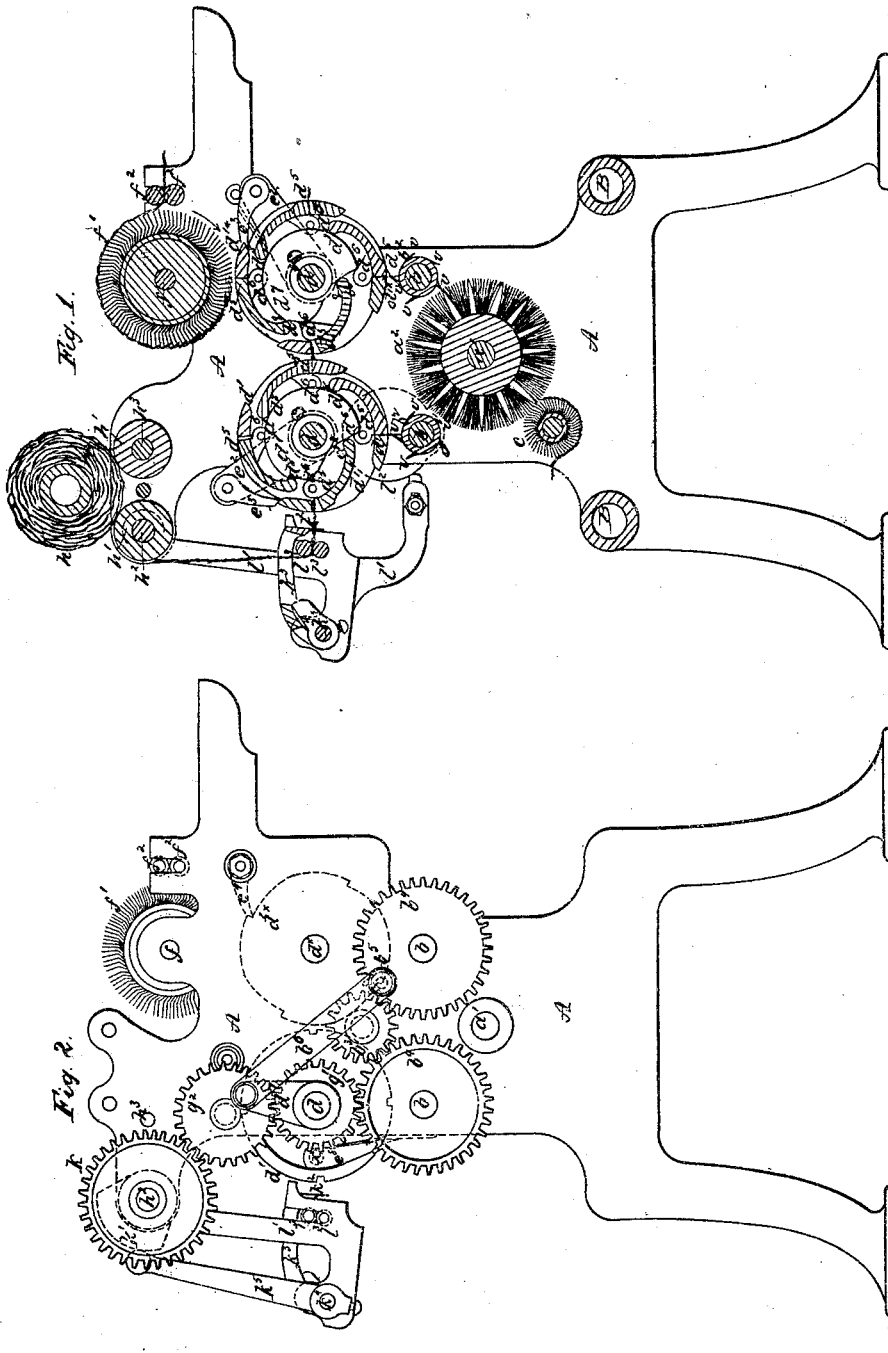


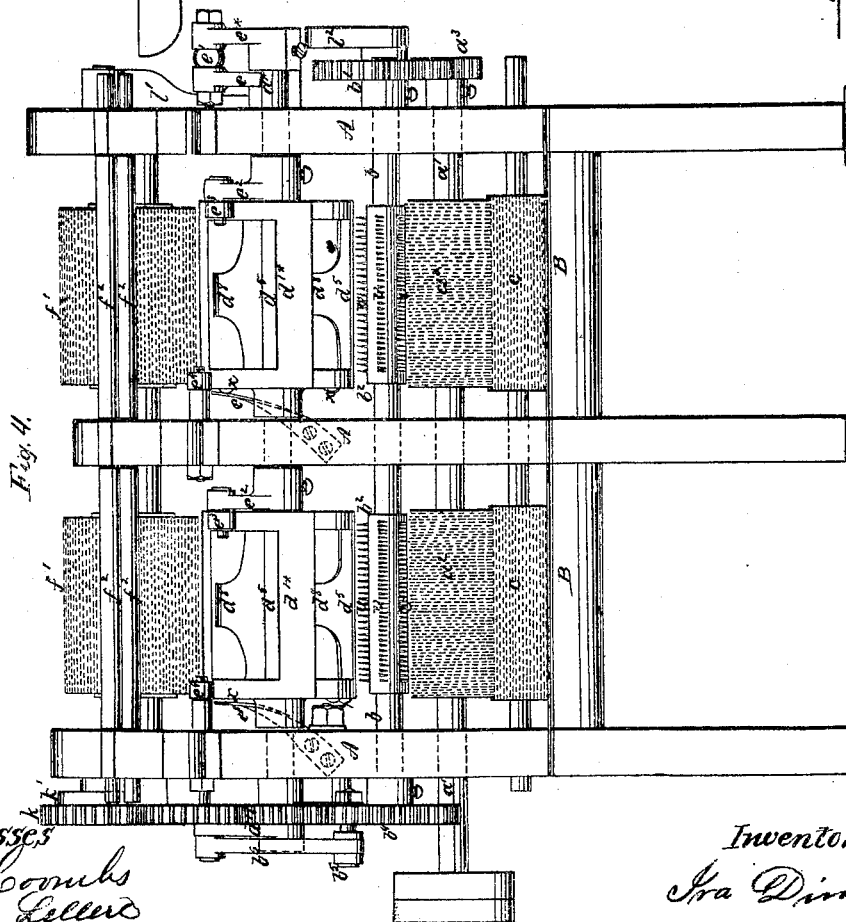
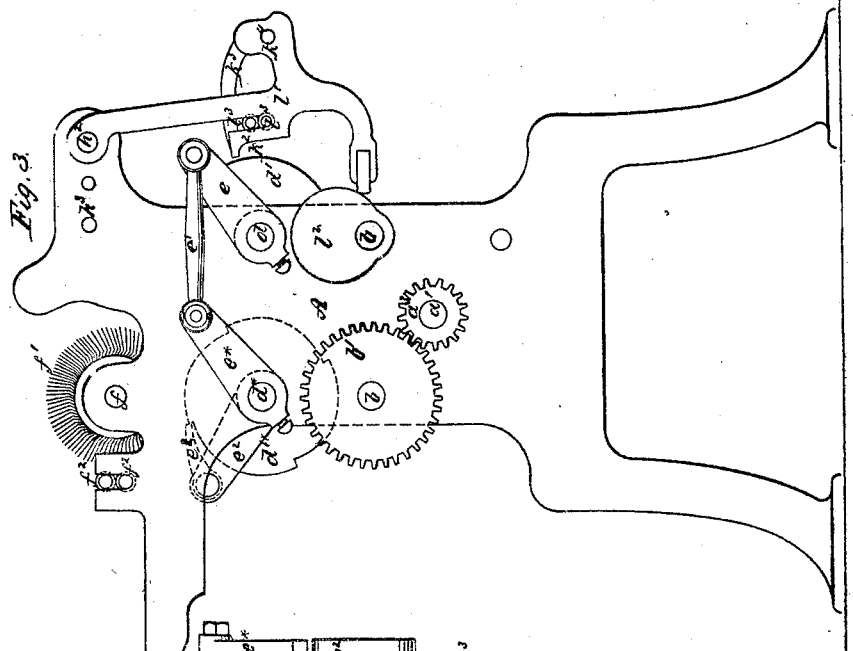
I. Dimock,
Machine for Combing Cotton,
No 49,865, Patented Sept. 12, 1865.



Witnesses
J. W. Coombs
A. L. Luce

Inventor.
Sra Dinwiddie

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Witnesses
J. W. Corbush
A. Leland

Inventor
Ira Dimock

UNITED STATES PATENT OFFICE.

IRA DIMOCK, OF FLORENCE, MASSACHUSETTS.

IMPROVEMENT IN MACHINES FOR COMBING COTTON, &c.

Specification forming part of Letters Patent No. **49,865**, dated September 12, 1865.

To all whom it may concern:

Be it known that I, IRA DIMOCK, of Florence, in the county of Hampshire and State of Massachusetts, have invented certain new and useful Improvements in Machinery for Combing Cotton and other Fibrous Materials; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a transverse vertical section of a machine with my improvements. Fig. 2 is an elevation of that end of the machine on which the driving-pulleys are placed. Fig. 3 is an elevation of the opposite end of the machine. Fig. 4 is a longitudinal elevation of that side of the machine opposite to the side at which the material which is to be combed is fed in.

Similar letters of reference indicate corresponding parts in the several figures.

The invention relates to combing-machines in which the fibers are presented to the combs to be combed, first toward one and afterward to the other end, by means of nippers with opening and closing jaws attached to intermittently-rotating cylinders.

It consists, first, in an improved arrangement of the parts of such a machine whereby the space which it occupies is very considerably reduced, the parts are made easily accessible either from the front or back of the machine, and provision is afforded for arranging the parts in a frame of any number of heads so that the same shafts, gearing, cams, and connections may operate several heads instead of only one head, and the machine is thereby so simplified that the cost of construction is greatly reduced.

It consists, secondly, in applying friction to counteract the momentum of the intermittently-rotating nipper-cylinders during the latter part of each movement, thereby enabling the machine to be run at a higher speed.

It consists, thirdly, in so arranging and gearing a rotary series of combs of different degrees of fineness in relation with a rotating nipper-cylinder that the fibers will be acted upon first by a coarse-toothed comb and afterward successively by combs of finer teeth.

It consists, fourthly, in applying a comb so arranged in connection with the feed-rollers

and in relation to each nipper-cylinder that when the nippers have seized the ends of the fleece fed to them the teeth of such comb may be caused to pass through the fleece near the nippers as they are detached from the fleece, the said comb serving to keep back the short fibers and dirt which might but for this comb be carried away on the tail end of the tuft detached.

To enable others skilled in the art to make and use my invention, I will proceed to describe its construction and operation.

The framing of the machine is composed of a number of upright standards, A A, connected by longitudinal beams or stretchers B B. The number of these standards will be one more than the number of combing-heads in the machine, the several working parts of each head being arranged between two standards. The machine which we have illustrated has two heads and three standards.

a' is the first-motion or driving shaft, extending the whole length of the machine and having attached to it the cylindrical brushes a^2 for removing the noil from the combing-cylinders and delivering it to the noil-doffers c . Motion is conveyed from the shaft a' to the two combing-shafts b by a spur-wheel, a^3 , on the former, which gears with a spur-wheel, b' , Fig. 3, upon one of the combing-shafts b .

The brush-shaft a' may be arranged in vertically-adjustable brackets, so that by altering the diameter of the spur-wheels a^3 and b' the brushes a^2 may be adjusted to the combing-cylinders b^2 as they wear, and the noil-doffers can be also readily adjusted to the cylindrical brushes a^2 .

The noil-doffers c are of ordinary construction, covered with card-teeth, and the noil is doffed by a comb, (not shown,) the noil from each doffer being collected and delivered by rollers in the form of a sliver in the usual manner. The shaft of the noil-doffers receives motion from the shaft f of the doffers f' for the combed material by means of an endless belt and a pulley (not shown) on the end of each shaft.

The two combing-cylinders b^2 are geared together by means of an intermediate spur-wheel, b^3 , Fig. 2, which gears with a spur-wheel, b^4 , on each of the combing-shafts b , and it is

by means of a crank-pin, b^5 , Figs. 2 and 4, on one of these wheels that the intermittent motion is given to the nipper-cylinders, so that the combing-shaft makes one revolution for each movement of the nipper-cylinders, the combs v (of which there are several on each cylinder) being of different degrees of fineness and being so arranged that the coarsest comb will first act upon the tuft, then those which are finer in regular succession, according to their fineness.

The combs and combing-cylinder may be constructed in the usual manner, the comb-cylinders b^2 being made in two halves, so as to be screwed together, and thus fixed upon the combing-shaft or removed therefrom without disturbing it.

The oscillating-shafts d of the first nipper-cylinders, d' , which receive the tuft from the fleece, are represented as placed in fixed bearings in the standards. The oscillating-shaft d^* of the second nipper-cylinder, d'^* , is in similar bearings. The shaft of the second nipper-cylinder may, however, be arranged in bearings in adjustable arms to allow the said cylinder d'^* to be readily adjusted to allow the proper space between the nipper-cylinders to suit the length of the staple to be combed, the two sets of nipper-cylinders being kept parallel to each other.

The nipper-cylinders d' d'^* are fitted to turn on their shafts, which have only an oscillatory movement. These nipper-cylinders are cast in one piece. They are then bored and turned, and those edges forming one jaw of each pair of nippers are planed and grooved or fluted, so as to take firm hold of the ends of the tuft to be operated upon. The movable jaws d^5 are then fitted, each jaw being jointed upon a pivot, d^6 , in each end of the cylinder, being accurately fitted to shut close from end to end. Each movable jaw d^5 may have a groove formed in it to receive a piece of india-rubber or other elastic material, which is cemented or otherwise secured to the jaw, and to this india-rubber there may be secured, by cement or other means, a facing of leather, which will come in contact with the tuft when placed between the jaws, the elastic material being a provision against little inequalities in the tuft.

The jaws of each cylinder are actuated by a cam, d^7 , secured upon each nipper-cylinder shaft d , this cam acting upon tail-pieces d^8 , projecting from about the center of each movable nipper-jaw d^5 . The cams d^7 act upon the movable jaws of the nipper-cylinders during the back movement. These cams are so shaped and arranged that at the completion of a movement in the nipper-cylinders those jaws of the first nipper-cylinder opposite the fleece will be wide open and those jaws having the two tufts last detached will be closed and the fourth jaw slightly open; but in the second nipper-cylinder only those jaws will be open opposite the point where the transfer takes place from one nipper-cylinder to the other. All the other

jaws will be shut, as shown in Fig. 1. When the cams have finished their movements all the jaws in both nipper-cylinders that were wide open will be shut, the jaws of the first cylinder delivering the tuft to the second cylinder will be slightly opened, and the jaws next to receive the tuft from the fleece will be wholly opened, and the jaws delivering the tuft to the doffer will be wholly opened.

The nipper-cylinder shafts d d^* receive an oscillatory motion from the crank-pin b^5 in the wheel on the end of one of the combing-shafts, as before mentioned, by means of a connecting-rod, b^6 , Figs. 2 and 4, jointed with an arm, d^{17} , secured upon the shaft d of the first nipper-cylinders, motion being communicated from that shaft to the shaft d^* of the second cylinders by means of an arm, e , on the first and a rod, e' , connecting the said arm with a similar arm, e^* , on the second.

Upon each of the nipper-cylinder shafts d d^* an arm, e^2 , is secured for each nipper-cylinder, and to each of such arms a click or pawl, e^3 , is jointed, which works upon the edge of its nipper-cylinder d' or d'^* , so as to enter into one of the four ratchet-notches in each nipper-cylinder at each oscillation, and thus propel each nipper-cylinder one-fourth of a revolution for each oscillation of the shafts d d^* .

The ratchet-notches, it will be understood, must correspond with the number of nippers in a cylinder.

A retaining-pawl, e^4 , centered on a stud in the framing is employed for each nipper-cylinder to prevent any return movement when the back oscillation of the shafts d d^* takes place. To retard and prevent the nipper-cylinders d' from overrunning or moving too far the pawls e^3 , jointed on the arms e^2 , for propelling the nipper-cylinders may be made to fit and enter square notches—such as are shown in the cylinder d' in Fig. 2—in the edges of the several nipper-cylinders, and at the end of each movement each pawl may be lifted out of its notch by a finger on a rotating shaft arranged for the purpose, there being one such finger for each pawl and one such rotating shaft for each nipper-cylinder shaft.

When pawls of the common kind—such as are indicated by the letters e^3 in Fig. 1—are used in connection with ratchet-shaped teeth on the nipper-cylinders, it is necessary, in order to prevent the momentum of the said cylinders from carrying them beyond the proper positions to which they are brought by the pawls, that some means of counteracting this momentum at the ends of the movement should be applied to the said cylinders; and when the square-toothed pawls hereinabove mentioned are used, operating in square notches in the cylinders, although the pawls themselves would stop the cylinders, some means of overcoming and neutralizing the momentum acquired by the said cylinders is necessary to prevent them from being stopped with a shock to the machinery in running at a high speed. For this

purpose I apply a friction-spring, e^2 , Figs. 2 and 4, secured to the framing near one end of each nipper-cylinder, the free end of such spring being arranged to come in contact with a projection, x , upon each nipper-cylinder at the end of each movement of such cylinder, there being one projection, x , on each nipper-cylinder for each pair of nippers in the cylinder.

The projections x represented consist of the heads of the pins d^6 , which constitute the pivots upon which the movable jaws of the nippers work.

The doffers f' for combed material are placed on a shaft, f , above the second nipper-cylinder, and above these doffers may be placed a shaft having rotary cylindrical brushes, which serve to mix the fibers in the card-surface of the said doffers. The combed material is stripped from each doffer by a pair of rollers, f^2 , and the fleece withdrawn from each doffer is delivered in the form of a sliver by another pair of rollers, (not shown,) these parts being of ordinary construction.

The laps of fibrous material h for each head rest on a pair of rollers, h' , and these rollers are free to rotate on the shafts h^2 h^3 . The lap-rollers h' are driven by any suitable arrangement of gearing.

The feed-rollers l^2 are mounted in bearings in an oscillating frame, l' , which is suspended from the shaft h^2 of one of the lap-rollers. This frame receives an oscillating motion from a cam, l^2 , upon the end of one of the combing-shafts b , which cam acts upon a stud or anti-friction roll on the frame l' . The cam is constructed so that when the nippers have closed upon the end of the fleece it will cause the feed-rollers to move back and detach that portion of the fleece held by the nippers before the nipper-cylinders begin to move, and then to move forward again to insert the end of the fleece within the open nippers after the movement of the nipper-cylinder has been completed.

The feed-rollers l^2 have the necessary rotary motion imparted to them by any suitable means, such motion being intermittent and only taking place as the frame l' advances toward the first nipper-cylinder d' .

The detaching-combs k^2 , which constitute the fourth part of my invention, are mounted on arms k^3 fixed upon a rock-shaft, k^4 , extending from end to end of the feed-roller frame and having its bearings thereon. This rock-shaft receives movements from the cam k' , Figs. 2 and 4, which acts upon a stud or roller carried on a stud in the end of an arm, k^5 , secured upon the end of the shaft k^4 .

The cam k' for actuating the detaching-combs is so constructed as to cause the insertion of the combs in the fleece when the nippers have pinched the end of it, and to remain in the fleece during the back movement of the feed-rollers l^2 , and then lift out ready to be again inserted. The said cam k' is secured to a spur-wheel, k , Fig. 4, which turns on the lap-

roller shaft h^2 , and which derives rotary motion from the spur-wheel b^4 on the front comb-shaft, b , through a spur-wheel, g' , on the front nipper-cylinder shaft and a stud-gear, g^2 , attached to the framing.

The operation of the machine is as follows: The material from the lap h descends from the outside lap-roller to the feed-rollers l^2 , as shown in red color in Fig. 1. It protrudes from the feed-rollers in advance of the detaching-combs k^2 . If the nipper-cylinders d' d'^* are supposed to have just completed a movement the nipper-jaws of the first nipper-cylinder opposite the ends of the fleece are then open, and the protruding ends of the fleece having just arrived close to the jaws are immediately pushed within the jaws, which are in the act of closing. When the jaws have pinched the ends of the fleece the detaching-comb enters the material and the feed-rollers begin to withdraw, and thus detach the lap, leaving a tuft within the jaws by the time the nipper-cylinders begin to move. These movements are repeated for each movement of the nipper-cylinders. When the tufts are detached from the fleece the first movement of the nipper-cylinders brings those tufts detached opposite the first combing-drum, b^2 , so that when the nipper-cylinders are stationary the coarse-pitched comb first begins to enter and then the finer-pitched combs in succession. The next movement of the first nipper-cylinder brings the combed tuft opposite the jaws of the second nipper-cylinder, when the transfer takes place, the opposite end of tuft now being free, and by the first movement of the second nipper-cylinder after the transfer the tufts are brought opposite the second combing-cylinder, and in two more movements of the nipper-cylinders the tufts are delivered to the doffer f' for combed material. The rotary cylindrical brush hereinbefore mentioned as being arranged above the said doffer acts, as the doffer rotates, to mix the fibers together before they are stripped from the doffer by the rollers f^2 , and gathered together and delivered in the form of a sliver. The slivers from each head may be collected together to form one united sliver at the end of the machine in the usual manner, if required. The noil extracted by the combing-cylinders is removed by the cylindrical brush a^2 and delivered to the noil-doffer c , from which it is stripped and carried away in the usual manner.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. The arrangement of the two nipper-cylinders d' d'^* , the doffer f' for the combed fiber, the two comb-cylinders d^2 d^2 , the rotary brush a^2 , and noil-doffer c , substantially as herein described, to operate as set forth.

2. Applying friction to counteract the momentum of the nipper-cylinders during the latter part of each movement, substantially as and for the purpose herein specified.

3. So arranging a rotary series of combs of different degrees of fineness in relation to a

nipper-cylinder that the fibers will be acted upon first by a coarse-toothed comb and afterward successively by combs each having teeth finer than its predecessor, substantially as herein specified.

4. The comb k^2 , applied in connection with the feed-rollers and in relation to the nipper-

cylinder of a combing-machine, substantially as herein described, and operating as herein set forth.

IRA DIMOCK.

Witnesses:

HENRY T. BROWN,

J. W. COOMBS.