

H. G. KIMBALL.
DETACHING ROLL MOTION.
APPLICATION FILED JUNE 13, 1911.

1,003,612.

Patented Sept. 19, 1911.

4 SHEETS—SHEET 1.

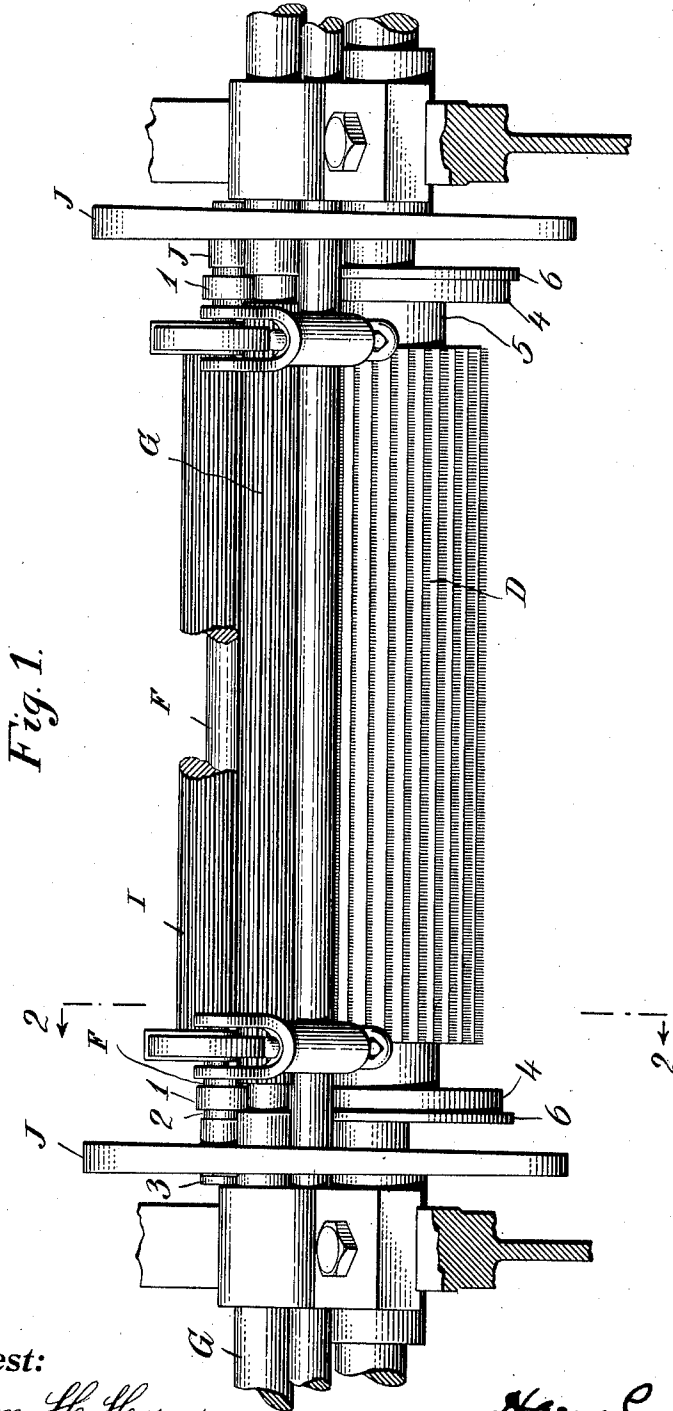


Fig. 1.

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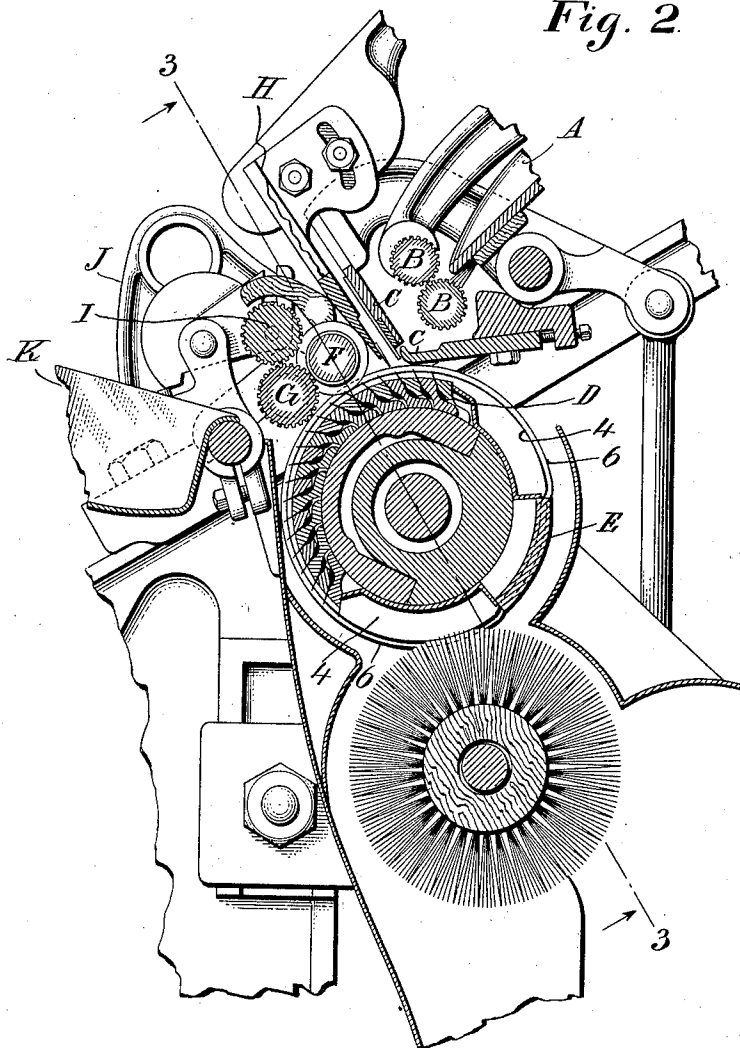
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Fig. 2



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4 SHEETS—SHEET 3.

Fig. 4.

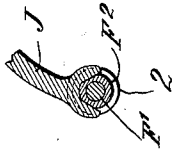
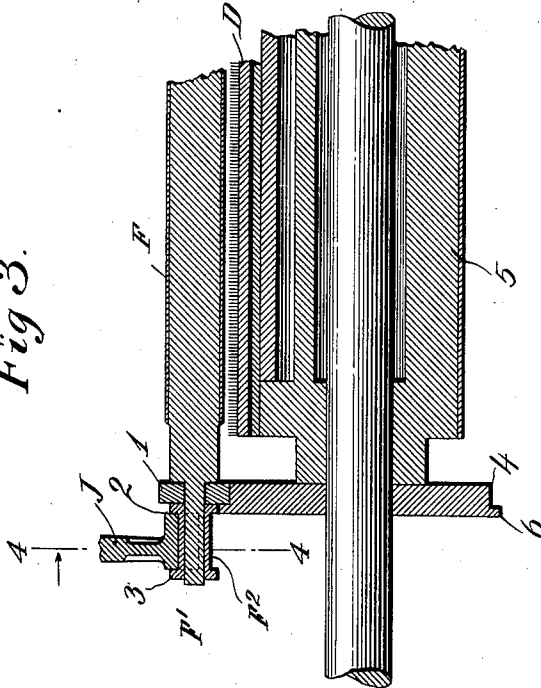


Fig. 3.



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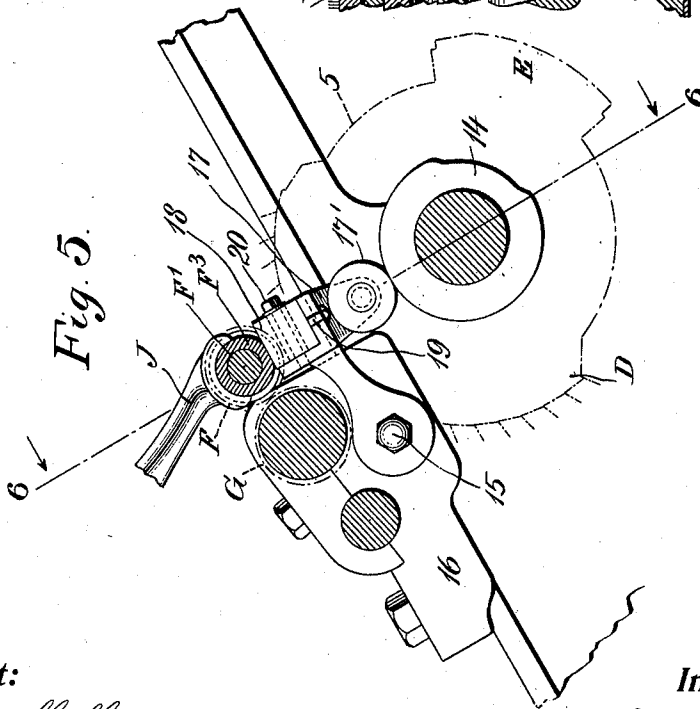
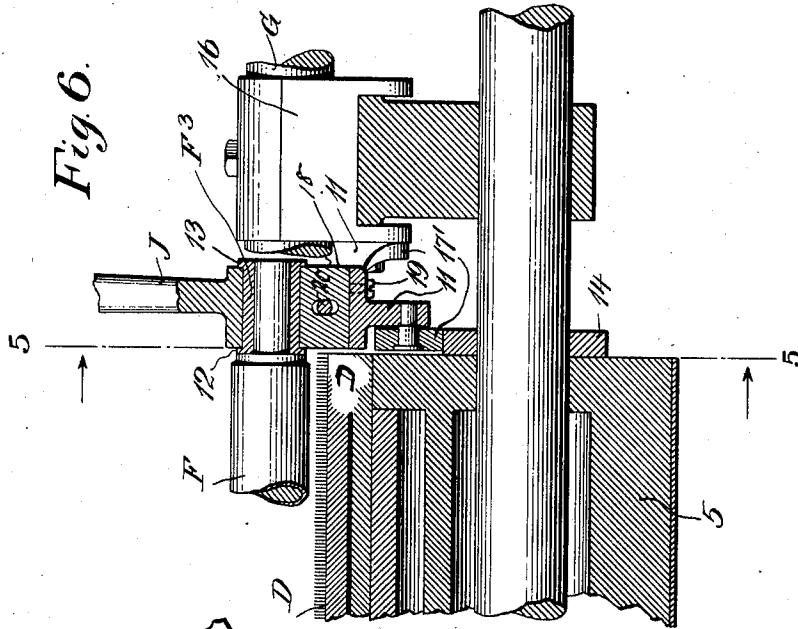
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4 SHEETS—SHEET 4.



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UNITED STATES PATENT OFFICE.

HARRY G. KIMBALL, OF BRONXVILLE, NEW YORK, ASSIGNOR TO THE WHITIN MACHINE WORKS, OF WHITINSVILLE, MASSACHUSETTS, A CORPORATION OF MASSACHUSETTS.

DETACHING-ROLL MOTION.

1,003,612.

Specification of Letters Patent. Patented Sept. 19, 1911.

Application filed June 13, 1911. Serial No. 632,924.

To all whom it may concern:

Be it known that I, HARRY G. KIMBALL, a citizen of the United States, and residing at Bronxville, Westchester county, New York State, have invented the new and useful Improvements in Detaching-Roll Motions set forth in the following specification.

The invention relates to the detaching mechanism of combing machines, and its object is to simplify the construction and mode of operation, of such machines with the view of increasing the efficiency thereof and the speed at which the same may be operated.

Referring to the accompanying drawings forming a part hereof and in which like reference characters designate like parts throughout, Figure 1 is an elevation of a portion of one of the combing heads of a cotton combing machine, showing the improved roll motion, Fig. 2 is a vertical transverse sectional view of the parts of Fig. 1 on lines 2—2 thereof, and showing also the related parts of the combing machine head with which the roll motion is employed, Fig. 3 is a detail sectional view through the operating means of the detaching roll on line 3—3 of Fig. 2. Fig. 4 is a section on the line 4—4 of Fig. 3, Fig. 5 is a side elevation of a different form of support for the detaching roll, and Fig. 6 is a sectional view on line 6—6 of Fig. 5.

The invention relates more particularly to combing machines of the so-called Heilmann type, and although this type of machines is well known and familiar to those skilled in this art, a brief description of the principle of operation thereof will be useful for understanding the present invention.

Referring to Fig. 2, the lap of cotton is fed intermittently down the apron A, the lower end only of which is shown, and through the feed rollers B, B into the jaws C, C of the nipper mechanism, which are properly opened at the time of feeding and immediately thereafter close upon the lap. The forward end or tuft of the lap which projects from the nipper jaws is thereupon first encountered by the needle half-lap D of the constantly revolving combing cylinder and is thereby combed in obvious manner. It is next encountered by the detaching half-lap or segment E on said cylinder and is by it pressed or pinched upwardly against the detaching roll F and drawn out of the nip-

per jaws as a separate tuft and conducted into the pass between the detaching roll and the drawing-off roll G. The detaching roll F is in contact with the drawing-off roll G and ordinarily receives from it an intermittent rotary motion alternately in opposite directions, the said rolls being moved forwardly about two-thirds of a revolution and backwardly about one-third of a revolution for each cycle or nip of the combing machine. At the time when the combed staple is pinched between the detaching half-lap E and the detaching roll F, the latter is beginning its forward rotation and the detached tuft of staple, after passing into the nip of the rolls F and G as above stated, is immediately returned a portion of its forward travel by the immediate reverse rotation of said rolls so that its tail ends are left protruding rearwardly therefrom. In leaving the nipper jaws the tail ends of the tuft of staple have been drawn through the depending teeth of a top comb H and thereby also combed, and in the meantime the nipper jaws have again opened to receive the next succeeding tuft of lap which is fed into them by the rollers B, combed by the needle half-lap D in its next succeeding revolution, and then detached as before and carried over to the drawing-off roll G, where it is overlapped upon the rearwardly protruding tail ends of the first detachment. The continuing forward rotation of the rolls F and G again conducts the staple which has thus been pieced under the clearer roll I and out into the sliver-can K, but the ensuing backward rotation leaves the tail ends of the second detachment protruding from the roll G ready to be overlapped by the combed staple of the next detachment, as occurred with respect to the first detachment, and so on.

In the performance of its functions above described, the detaching roll F is required to be in intimate engagement with the detaching segment E while the latter is acting upon the staple, and it must also be clear of the path of the needle half-lap while the latter is acting upon the staple. This invention is an improved means and method of supporting and shifting the said detaching roll from one position to the other, so that it will properly cooperate with the detaching segment in the performance of its functions above described.

In the form of the invention shown in Figs. 1, 2 and 3, the detaching roll is or may be of the usual construction, being a metal roller covered with leather and having gudgeons F' , at its two ends. The gudgeons are incased in sleeves F^2 within which they may freely rotate. Upon or adjacent each sleeve there is provided a roller bearing 1 which constitutes the direct means of support of the detaching roll, being confined in place between the collar 2 of the sleeve and the end of the body portion of the roll, as clearly shown in Fig. 3. The sleeve F^2 is also provided with an end collar 3, and a weighted stirrup J is adapted to rest thereon between the collars 2 and 3 so as to press the roll downwardly in the usual manner, there being a similar sleeve, roller and stirrup similarly arranged at the opposite end of the detaching roll, as will be readily understood. The roller bearings 1, at opposite ends of the detaching roll, rest upon the edges of a pair of disk cams 4 fixed on or adjacent to the ends of the combing cylinder 5 and revolving therewith, and said rollers are sustained in proper angular position upon the cams by the bearing which the body of the detaching roll has upon the drawing-off roll G . The latter roll and the edges of the two cams form a crotch, shown more plainly in Fig. 2, into which the detaching roll is pressed by the vertical pressure of the stirrups, the roller bearings resting on the cams and the body of the roll upon the drawing-off roll G as above stated. The relation and relative dimensions of the disk cams and the combing cylinder are such that while the rollers 1 are engaged with the high portions of the cams, the needle half-lap D will be in a position underneath the detaching roll and the latter will be elevated about one thirty-second of an inch above the points of the needles so as not to contact therewith. The lower portions of the cams are adjacent in respect of their angular position, to the detaching segment E of the combing cylinder, so that when the latter revolves to bring the segment into contact with the projecting staple, the detaching roll is thereby lowered into contact with the segment, being pressed against the same by the pressure of the weighted stirrups J , thereby providing the proper nipping engagement for detaching the tuft from the lap. As the cylinder and cams revolve, the detaching roll is thus alternately raised and lowered, and the contour of the cams is such, as indicated by Fig. 2, that the roll is held in its elevated position during the greater part of the cylinder rotation, becoming depressed into the position in which it engages, or is engaged by, the detaching segment, only when and as the latter reaches the detaching position. Prefer-

ably the cams are so shaped that the detaching roll F will descend evenly upon the forward edge of the segment, which will at that moment be covered by the forward, projecting ends of the combed tuft. If the descent is later the effect will be obviously to reduce the effective area of the segment; if earlier, the segment will be apt to bump into the roll and perhaps injure it unless the forward margin of the segment is appropriately beveled on this account. In any event, the detaching roll becomes engaged with the segment while the latter is engaged and covered by the projecting tuft, so that the ensuing detachment of the tuft from the lap in the nipper-jaws is thereby promptly and positively accomplished.

I am aware that rolls have been heretofore used in engagement with combing cylinders for the purpose of conveying a detached tuft of staple from one side thereof to the other and have been lifted from such engagement by means of cams on the cylinder shaft, for the purpose of allowing the needles to pass under the said rolls without contact. Such construction is shown by Staub Patent No. 580,472 dated April 13, 1897 and differs wholly from that hereinabove described in that the said lifted roll, or rolls, does not operate to detach the staple from the body of the lap or from the nippers, but merely operates without pressure and as a conveyer of the tuft with no other function whatever. I therefore believe myself to be the first to have produced a tuft-detaching roll that is lifted from and lowered upon the combing cylinder by motion derived directly from such cylinder itself or the shaft on which the cylinder is carried. The advantages of such arrangement, in respect of the reduction of the time required for imparting such motion and the saving in the lost motion that exists in other lifter-motion mechanisms, will be obvious to those skilled in cotton combing without further description. It may be here said, however, that the promptness of the movement of the detaching roll from its lower to its raised position and vice versa, enables the vacant spaces on the cylinder between the combing half-lap and the detaching segment to be reduced in width by the addition of more rows of needles, which of course results in more efficient combing of the cotton.

Fig. 2 of the drawings illustrates a larger number of rows of combing needles than employed with other combers having lifter-motions for their detaching rolls, but more can be added than is there shown, with corresponding advantage.

As the detaching roll in the present instance rotates part of the time in the same direction as the combing cylinder and at other times in the opposite direction, the rollers 1 are mounted to revolve with re-

spect to the sleeve F^2 and the detaching roll, and in order that the said rollers 1 may be at all times confined in proper registry with their respective cams 4, the latter are provided with peripheral edge flanges 6, but other means can obviously be employed for this purpose.

If it is desired to keep the sleeve F^2 from rotating either with the roller 1 or with the detaching roll F , that portion of it upon which the stirrup rests may be made angular, and the stirrup J may be fitted over such angular portion as clearly indicated in Fig. 4. As in other combers of the Heilmann type the top-comb H may have the usual rising and falling motion if desired so as to penetrate deeper into the tail ends of the tufts as they are being drawn beneath it, rising out of the path of the needles when the combing half lap comes uppermost. Such motion may be imparted to the top-comb by quickly acting means which will operate during the interval between the action of the combing and detaching half-laps upon the staple, although such interval may be extremely brief by reason of the increased number of combing needle rows as above explained.

In the form of the invention shown in Figs. 5 and 6, the parts have generally the same relation as before, excepting that the support for the detaching roll is here pivoted to a fixed part on the frame of the machine and is capable of adjustments which are not conveniently produced in the form first described. In these figures the detaching roll has its gudgeons F^7 incased in a sleeve which is slightly flattened on its bottom but which is adapted to receive the foot of the stirrup J between its collars 12 and 13 thereon as before, there being, of course, a similar sleeve and stirrup at each end of the roll. The support for the sleeve and its roll consists of an arm 11, pivoted on a fixed axis by the bolt or pin 15 to the pillow block 16, which latter constitutes one of the adjustable journal seats of the shaft of the detaching roll G , there being one of these seats adjustably mounted on the frame at each end of the combing head. The arm 11 has a depending portion or nose 17 which is provided with a roller bearing 17' adapted to ride upon the revolving edge of a disk cam 14, which latter is similar to the cam 4 of the preceding figures, except that it is shown as of less diameter. It may be directly carried upon the combing shaft or upon the end of the combing cylinder as desired. In the operation of this form of apparatus the revolution of the cams 14 produces the rising and falling of the arm 11 on its pivot and thereby lifts and lowers the roll F , the timing of the cam being such that the roll is raised during the passage of the combing needles, and then low-

ered so as to have proper engagement with the detaching segment. In order to compensate for wear of the nose 17, and the roller 17' and to make adjustments, the sleeve F^3 is mounted on a bearing block 18 interposed between it and the main body of the supporting arm, the bearing block being adjustable in obvious manner by means of the gage screw 19 at the bottom and the set screw 20 screwed into the arm through a vertical slot in the block.

In both of the two forms of the invention above described, it will be observed that the mechanism for imparting the rising and falling movement of the detaching roll is positive in action and devoid of lost motion, which fact permits the extent of the said movement to be adjusted to the actual minimum and thereby contributes to the saving in time, above referred to, whereby the combing cylinder is enabled to carry a greater number of rows of needles than heretofore.

It will be understood that the drawings hereto are merely schematic of the principle of my invention.

Having described my invention, what I claim and desire to secure by United States Letters Patent is:—

1. In a combing machine, the combination with a revolving combing shaft having combing and detaching half-laps thereon, and a detaching roll adapted to cooperate with said detaching half-lap, of means carried by said shaft, independent of said detaching half-lap, for imparting movement to said detaching roll relatively to said half-lap.

2. In a combing machine, the combination with a revolving combing shaft having combing and detaching half-laps thereon, and a detaching roll adapted to cooperate with said detaching half-lap, of a cam revolved by said shaft and acting on said detaching roll, to produce lifting and falling movement thereof relatively to said combing shaft.

3. In a combing machine, the combination with the combing shaft having combing and detaching half-laps thereon, of cam-surfaces at the ends of said half-laps, a drawing-off roll, and a detaching roll supported by its ends on said cam surfaces and resting by its body portion against said drawing-off roll.

4. In a combing machine, a drawing-off roll, a combing cylinder having cam surfaces at its ends, a detaching roll resting in the crotch formed by said cam surfaces and drawing-off roll and stirrup means for pressing said detaching roll into the crotch.

5. In a combing machine, the combination of means for feeding and holding the lap with the end thereof projecting, and means for combing and detaching said pro-

jecting end comprising a combing shaft with combing and detaching half-laps thereon, cam disks revolving with said shaft, and a detaching roll supported by said disks and adapted to pinch the said projecting end upon the detaching half-lap.

6. In a combing machine, mechanism for advancing the forward end of the lap, a combing cylinder beneath said end and a top comb above the same, in combination with cam disks at the ends of the cylinder, and a roll supported thereon for engagement with the cylinder and cooperating therewith to detach a tuft from said projecting end.

7. In a Heilmann combing machine, a combing cylinder, a top-comb above the same, a detaching roll in front of the top comb adapted to engage the said cylinder, cam-disks at the ends of the cylinder supporting said detaching roll, a drawing-off roll in contact with the forward side of said detaching roll, and stirrup means acting to press the detaching roll upon its seat.

8. In a combing machine, the combination with a revolving combing cylinder comprising combing and detaching half-laps thereon, and a detaching roll adapted to cooperate with said detaching half-lap, of a cam at each end of said cylinder having movement imparting connections with the ends of said detaching roll and adapted to move the same out of the path of the combing half-lap.

9. In a combing machine, the combination with a revolving combing cylinder and a detaching roll adapted to cooperate therewith, of means revolving with said cylinder for producing movement transverse to the detaching movement, and an intermediate supporting member actuated by said revolving means and imparting said transverse movement to said detaching roll.

10. In a combing machine, a revolving combing shaft, a combing cylinder thereon, and a detaching roll, in combination with movable supports for said roll, with respect to which the latter is free to rotate, and means revolved by said shaft for imparting movement to the movable support transverse to the direction of the detaching movement of the tuft.

11. In a combing machine, a detaching roll and a member against which said roll nips the staple and a support for said roll pivoted on a fixed axis, in combination with the combing cylinder shaft and means carried thereon for moving said support on its pivot, thereby raising and lowering said detaching roll from and toward the said member.

12. In a combing machine, a detaching roll, movable supports for the ends thereof, and means for adjusting the position of said roll with respect to said supports, in combination with a revolving combing shaft having a detaching half-lap thereon and means carried on said shaft for moving said supports and the detaching roll into and out of engagement with said detaching half-lap.

13. In a combing machine, the combination with the combing shaft having a cylinder provided with combing and detaching half-laps, of a drawing-off roll, a detaching roll resting thereagainst and means for converting the rotary movement of said shaft into lifting and falling movement of said detaching roll, whereby the latter cooperates with the detaching half-lap.

In testimony whereof, I have signed this specification in the presence of two witnesses.

HARRY G. KIMBALL.

Witnesses:

JAMES ADAMS,
HARRY PRAEGER.