

No. 689,256.

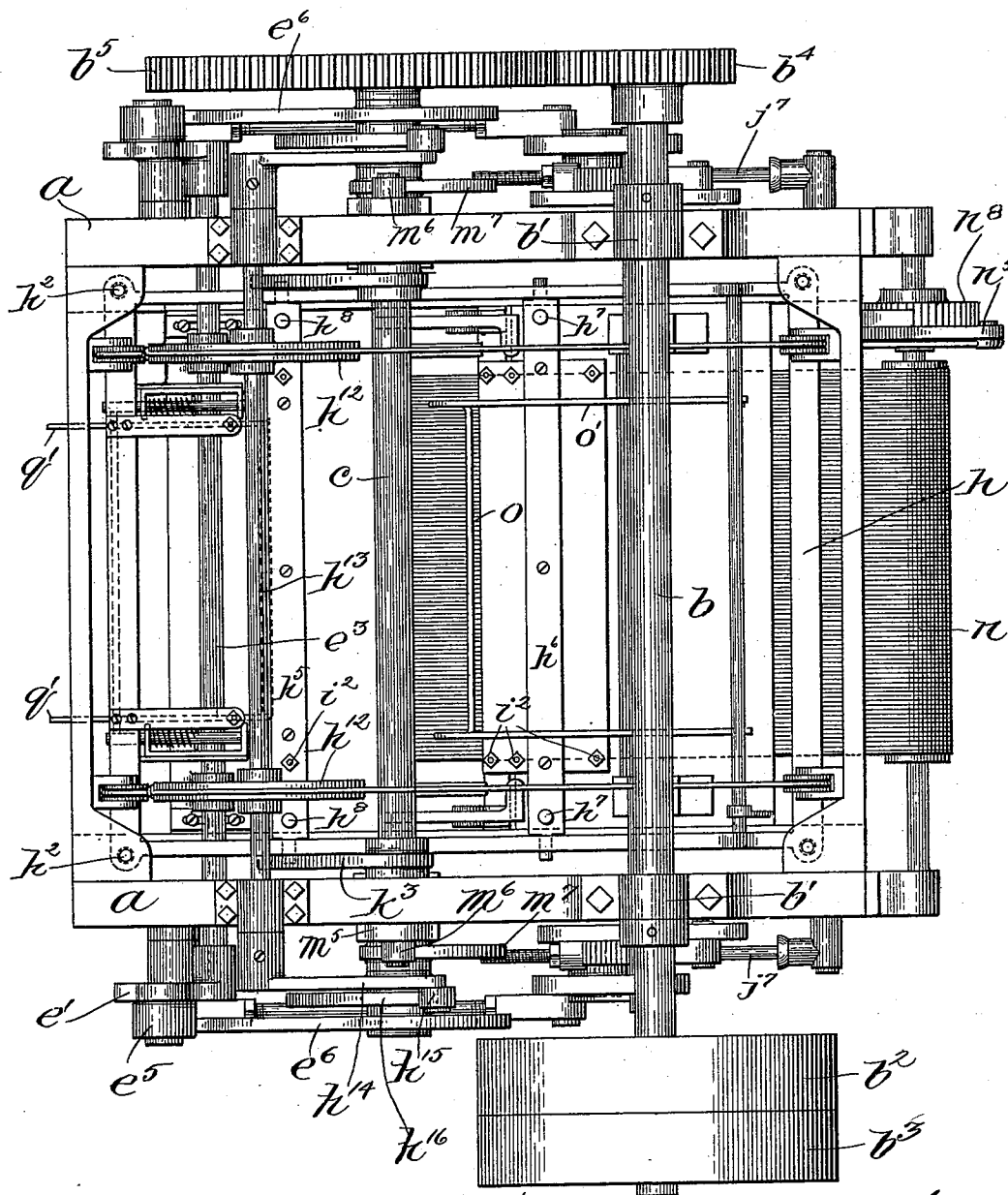
Patented Dec. 17, 1901.

W. E. WALSH.
WOOL COMBING MACHINE.

(Application filed Mar. 22, 1899.)

(No Model.)

6 Sheets—Sheet 1.



Witnesses:
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Fig. 1.

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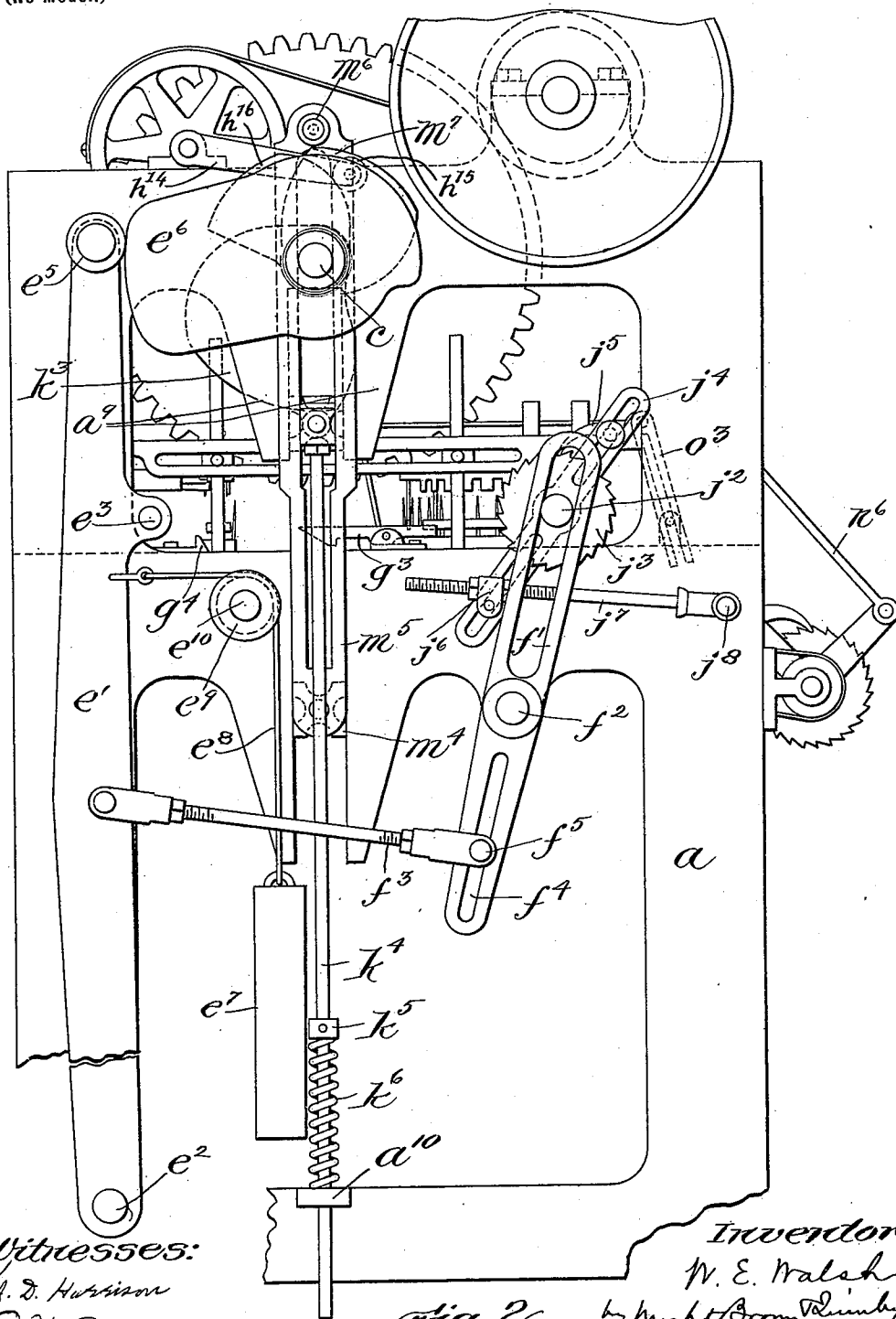
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Fig. 2.

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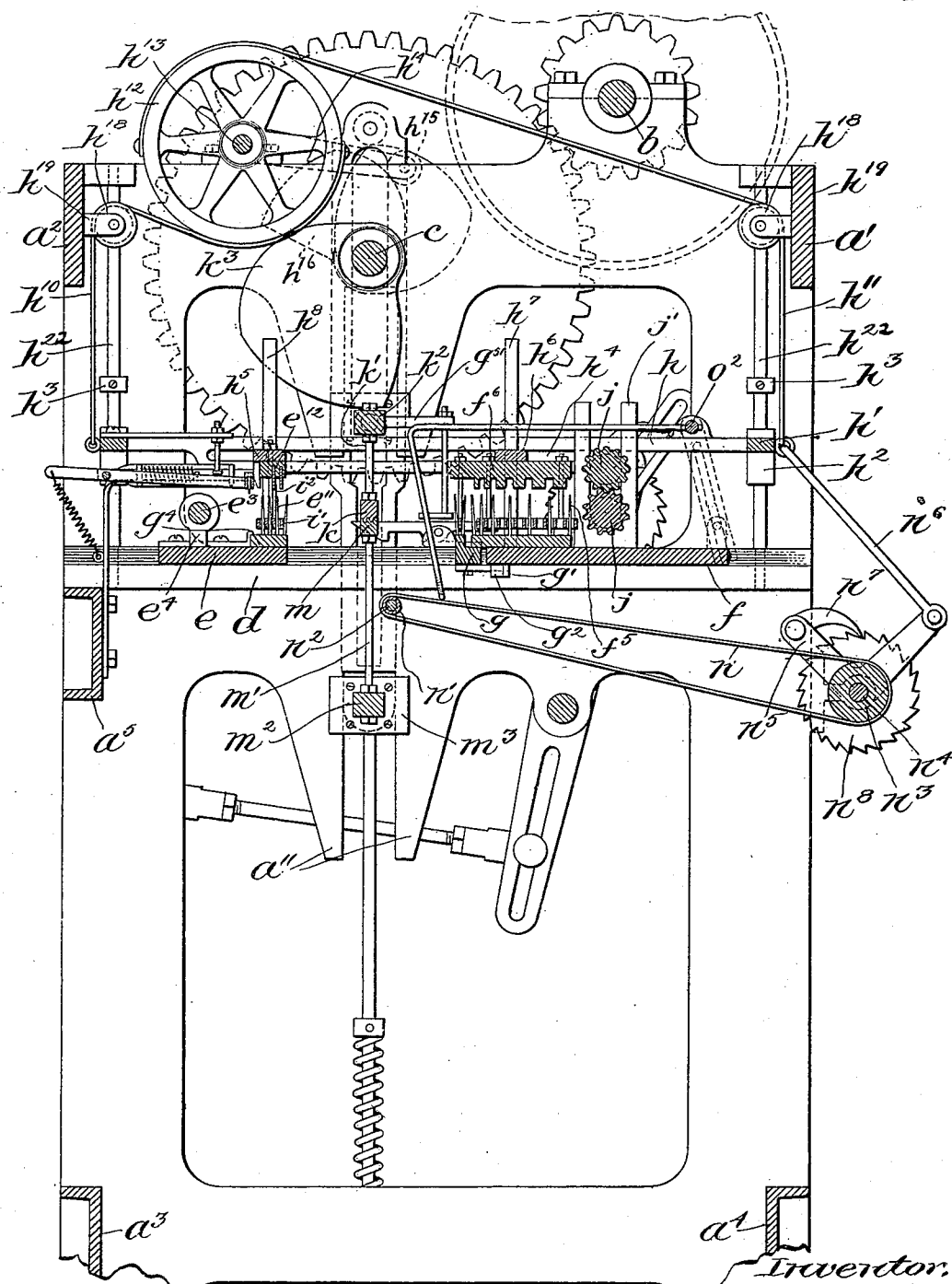
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(No Model.)

6 Sheets—Sheet 3.



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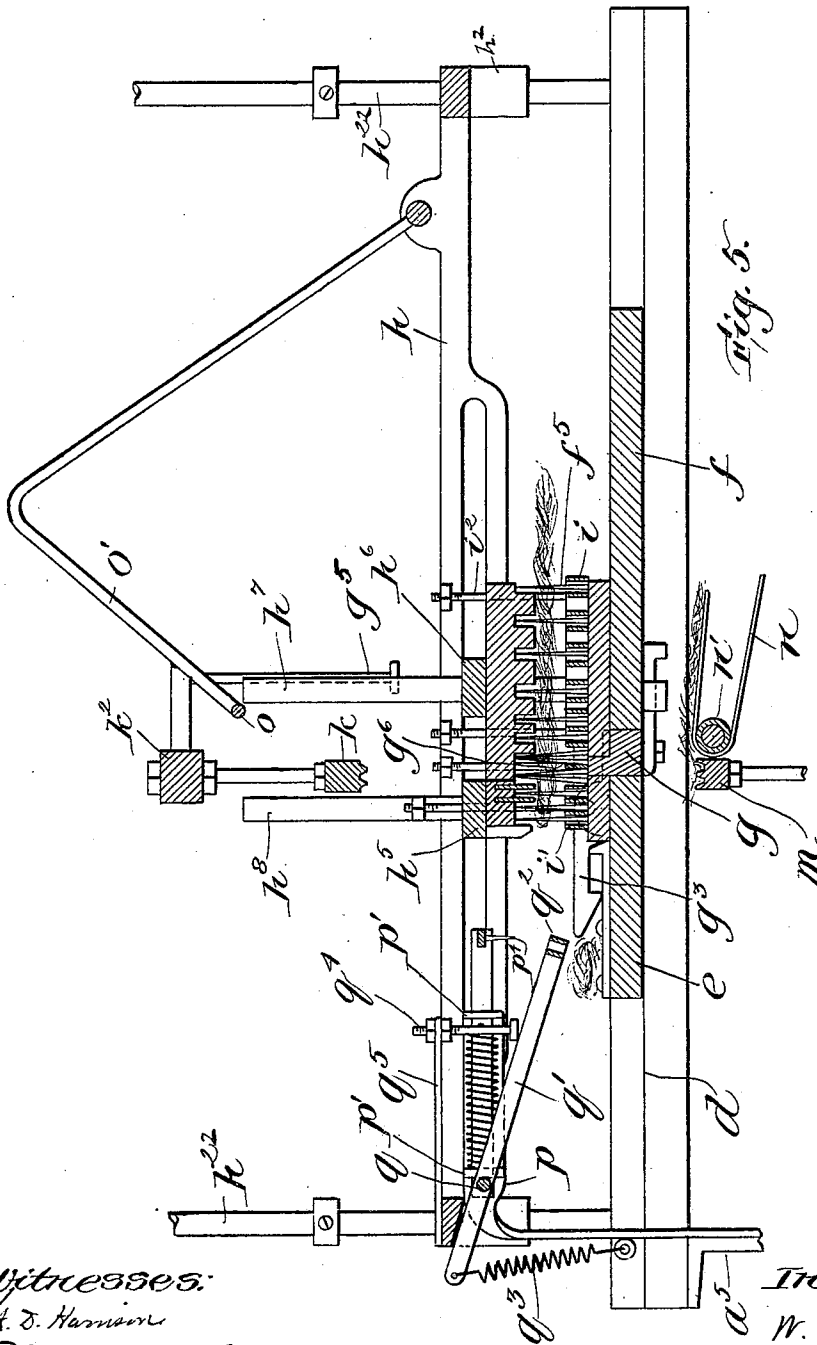
Patented Dec. 17, 1901.

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6 Sheets—Sheet 5.



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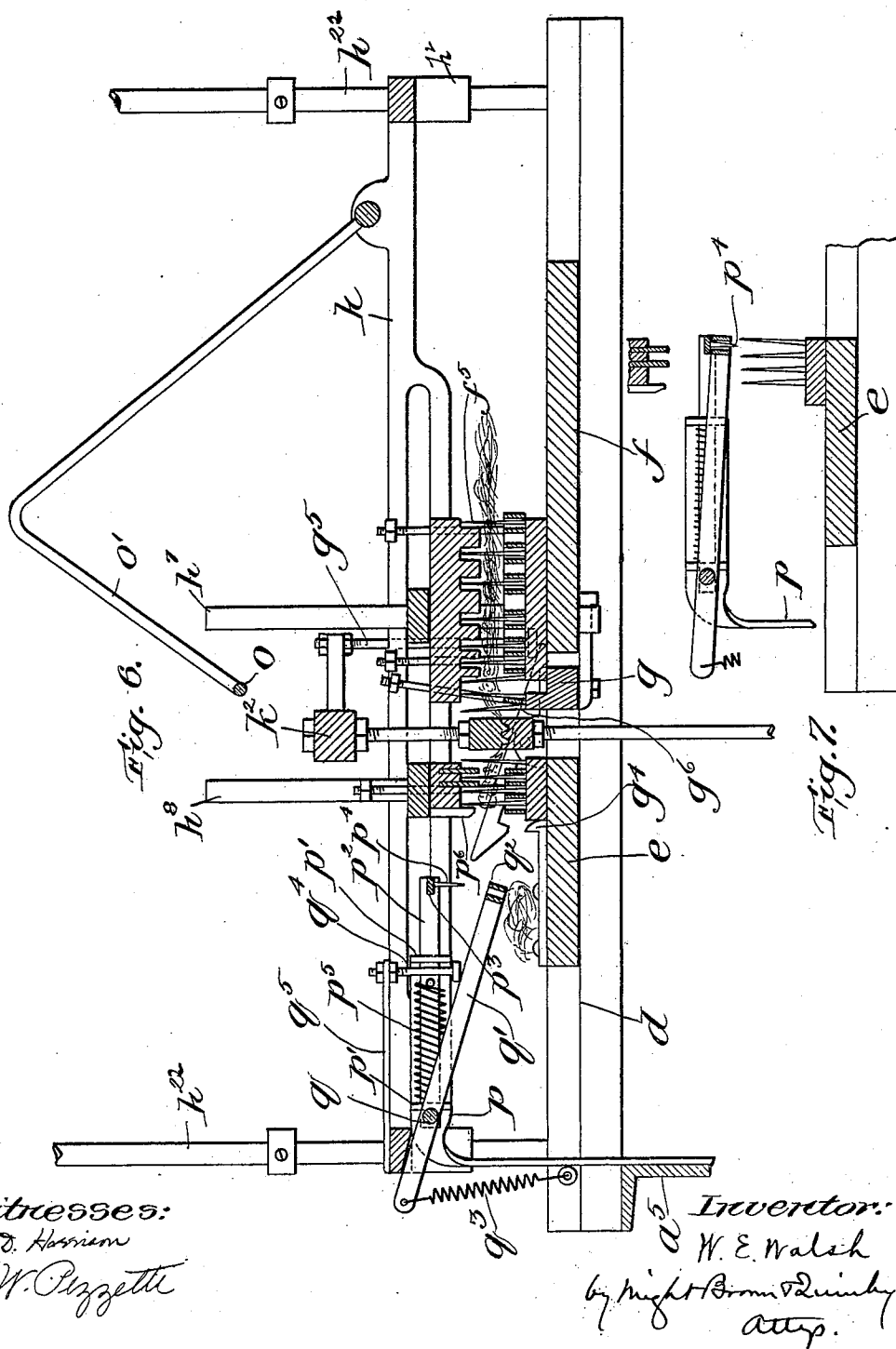
Patented Dec. 17, 1901.

W. E. WALSH.
WOOL COMBING MACHINE.

(Application filed Mar. 22, 1899.)

(No Model.)

6 Sheets—Sheet 6.



UNITED STATES PATENT OFFICE.

WILLIAM E. WALSH, OF LOWELL, MASSACHUSETTS, ASSIGNOR OF ONE-HALF
TO M. T. STEVENS & SONS, OF NORTH ANDOVER, MASSACHUSETTS.

WOOL-COMBING MACHINE.

SPECIFICATION forming part of Letters Patent No. 689,256, dated December 17, 1901.

Application filed March 22, 1899. Serial No. 710,111. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM E. WALSH, of Lowell, in the county of Middlesex and State of Massachusetts, have invented certain new and useful Improvements in Wool-Combing Machines, of which the following is a specification.

This invention has relation to wool-combing machines, and has for its object the provision of mechanism by means of which the long wool or staple may be combed and separated from the noil or waste from circular and other combs.

The invention consists of a machine of the character specified possessing certain features of construction and relative arrangement of parts, as illustrated upon the drawings and hereinafter described and claimed.

Reference is to be had to the accompanying drawings, and to the letters marked thereon, forming a part of this specification, the same letters designating the same parts or features, as the case may be, wherever they occur.

Of the drawings, Figure 1 represents in plan view a machine embodying my invention. Fig. 2 represents a side elevation of the same with the lower portion of the framework broken away. Fig. 3 represents a longitudinal vertical section through the machine with the parts in the positions assumed by them after a length of wool has been combed and separated from the stock and prior to its being delivered to the apron. Figs. 4, 5, and 6 represent in sectional view the parts in the other different positions which they assume during the operation of the machine. Fig. 7 represents the stripper and the doffer for the separating-combs.

Before proceeding to describe the machine, which is illustrated upon the drawings thus briefly referred to, I desire to have it understood that the said machine is but one embodiment of the invention, that I am not limited to the various details of construction which I have found it expedient to employ, and that many of the parts may be changed or modified without departing from the spirit and scope of the invention.

By examining the drawings it will be seen that the machine is provided with two side or end standards a a , which are connected by

cross-braces a' a^2 at the top and a^3 a^4 at the bottom, with an additional brace a^5 at the rear, substantially midway between the top and the bottom. The initial power-shaft b is mounted in bearings b' , afforded by the side standards, and is provided with the usual fast and loose pulleys b^2 b^3 on one end thereof. Upon the other end the shaft is equipped with a pinion b^4 , intermeshing with and driving a gear-wheel b^5 on the end of a shaft c , suitably journaled in bearings in the side standards a and hereinafter termed the "cam-shaft." From this said shaft power is imparted to the various operative parts of the machine in proper sequence. On their inner faces the side frames a a are provided with horizontal guide-bars d , upon which are slidably mounted the parts of a separable slide to which the combs are secured. The slide is divided into two main portions e f , which are movable toward and from each other to bring their combs into proximity and then to separate them for the purpose of drawing out and combing long staple from the wool, which may be engaged thereby, after which the wool which is between the sets of combs is engaged by suitable means and carried to the delivery mechanism, the waste wool being doffed and discarded. The section e of the slide is moved upon the guide-bars by the mechanism which is best illustrated in Fig. 2 in connection with Fig. 3. Levers e' are fulcrumed at e^2 on the outside of the frame, and I connect them by a cross-bar e^3 , which is formed or provided with one or more lugs e^4 , engaging the slide e . At their upper ends the levers e' are provided with rolls e^5 , which bear against cams e^6 on the shaft c , said rolls being held against said cams by weights e^7 , attached to the lower end of chains or cords e^8 , passing around the pulleys e^9 , journaled on studs e^{10} , projecting from the frames a , the other ends of said chains or cords being attached to the levers e' . It will be seen that for each rotation of the cam-shaft c the section e of the slide is reciprocated once. The other section f of the slide is moved simultaneously with the slide e , but in the opposite direction. This is accomplished by means of centrally-pivoted levers f' , fulcrumed on studs f^2 , projecting out from the frames a .

A connecting-rod f^3 connects the lower end of each of the last-mentioned levers with one of the levers e' , said connecting-rods being longitudinally adjustable and being adjustably connected with the levers f' by means of the slots f^4 and screws f^5 , passing there-through to secure the ends of the rods to the levers f' . The upper ends of the levers f' are likewise longitudinally slotted to receive the studs of feeding-rolls, which are journaled in bearings upon the section f , so that when the lever f' is rocked about the fulcrum f^2 the section f is reciprocated. The last-mentioned section f , for a purpose which will be subsequently explained at large, is divided to provide a third section g , which is loosely connected thereto by headed pins g' , passing through eyes g^2 , connected to the under side of the section f . On the ends of section g are latches g^3 , which temporarily engage stops or hooks g^4 , carried by the section e , so that when the sections e and f move away from each other the temporary engagement of the latches will cause a separation between the section g and the section f , which is limited by the length of the pin g' . The latches are subsequently disengaged from their hooks or stops by tripping-fingers g^5 , connected to parts to be subsequently described.

Connected to the sections e , f , and g are a plurality of rows of comb-teeth e^{11} , f^5 , and g^6 , some of the rows being so inclined, as shown in the various figures, that of the two rows carried by the section g one row intermeshes with one row on the section e and the other intermeshes with another row on the section f , as clearly shown in Fig. 4.

Arranged above the slide is a frame which is movable toward and from it and which is provided with lifter-bars and dabbers for the combs, said frame consisting of side bars h and cross-bars h' , forming a rectangle and having at the corners tubular guides h^2 to receive and slide upon vertical guide-bars h^{22} , which are secured at their ends to the guide-bars d and the cross-bars $a' a^2$. Stops h^3 are adjustably secured upon the guide-bars h^{22} to limit the upward movement of the frame. The side bars h are slotted at h^4 to receive slidable cross-bars $h^5 h^6$, to which are secured dabbers e^{12} and f^6 . The ends of the said bars are provided with apertures to receive upright rods $h^7 h^8$, which arise from the sections of the slide f and e , respectively, whereby when the said sections are moved toward or from each other the dabbers are moved therewith.

The lifter-bars are indicated at i and i' and consist of frames having cross-bars extending between the rows of teeth and are loosely connected by rods $i^2 i^3$ with the dabbers. Said rods i^2 pass loosely through apertures in the dabbers and are provided with nuts on their threaded ends, as best indicated in Figs. 5 and 6, to permit a movement of the dabbers toward and from them. When the frame is raised to its upper extreme of movement, the

dabbers and lifters are elevated to the position shown in Fig. 4, whereby the wool is disengaged from the combs and is adapted to pass freely over the teeth of the latter; but when the said frame is depressed the lifter-bars sink below the ends of the teeth and the dabbers force the wool down into engagement with the said teeth, as shown in Fig. 5. The said dabbers are provided with ribs which extend between the rows of teeth, so as to cause the material or stock to be forced below the upper ends thereof. The frame is raised and lowered intermittingly, being connected by chains or cords $h^{10} h^{11}$ to wheels h^{12} , rigidly secured upon a rock-shaft h^{13} , mounted in bearings on the top of the standard a . On the ends of the rock-shaft are rigidly secured arms h^{14} , having on their ends rolls h^{15} , resting upon cams h^{16} on the cam-shaft c . The ends of the chains or cords h^{11} are secured by fastenings to the said wheels h^{12} , and they pass over sheaves h^{18} , journaled in brackets h^{19} , secured to the cross-bars $a' a^2$, as best shown in Fig. 3. The cams h^{16} actuate the arms h^{14} to rock the shaft h^{13} and wind the chains or cords h^{11} around the wheels h^{12} to raise the frame; the said frame being lowered by its own weight when the cams permit it.

The stock or wool is fed automatically in a sheet or web across the combs during the time that the lifter-bars are in the position shown in Fig. 4, such feeding taking place during the time that the sections of the slide are being carried toward each other. The feeding devices consist of two intermeshing corrugated or fluted rolls $j j$, whose ends are loosely journaled in the slots in brackets arising from the section f . The trunnions j^2 of the lower roll j project into the slots in the levers f' , previously described, and rigidly secure the said pinions and ratchet-wheels j^3 . A lever j^4 is centrally fulcrumed on each trunnion and carries a pawl j^5 , which is adjustably secured thereto, and to the lower slotted end of each lever is adjustably secured a nut j^6 , through which is passed a threaded or screw rod j^7 , pivoted at its ends to a stud j^8 , projecting outwardly from the standard a . From this construction it will be seen that as the section f is carried rearward or toward the section e the levers j^4 will be swung around their fulcrums j^2 to rotate the rolls several steps by reason of the engagement of the pawls j^5 with the ratchet-wheels j^3 , and as the section f is returned to normal position the ratchet j^5 will be swung backward over the teeth of the rolls.

To grip the long staple or fibers of wool between the combs carried by the two sections of the slide, I employ nips $k m$, which at their meeting surface are grooved or corrugated to fit into each other, as shown in Figs. 3 and 6. Each nip consists of a bar, that at k being attached by adjustable rods k' to a cross-bar k^2 , having its ends projecting through slots in the side standards a and formed to bear against

cams k^3 on the shaft c . The said slots just referred to are formed by the downwardly-extending portions a^9 of the frame, as best shown in Fig. 2. Rods k^4 project downwardly from the bars k^3 through lugs a^{10} on the standards a , and between the said lugs and clips k^5 , secured to the said rods, are spiral springs k^6 , which hold the rollers on the bars k^2 against the cams k^3 . The cams k^3 , as will be observed in Fig. 3, are located inside of the side standards, while the other cams which have been described, as well as those which will be subsequently referred to, are located outside of the side standards. The lower nip m consists of a bar, as previously stated, and is attached by adjustable rods m' to a cross-bar m^2 , having its ends secured to plates m^3 . (See Fig. 3.) Said plates are connected by blocks sliding in slots or guideways formed by the depending portions a^{11} of the side standards. The connecting-rods m^5 are slotted to receive the ends of the bar k^2 , which project therethrough, and also to receive the shaft c , and on the inner face of the upper end of each connecting-rod is a roll m^6 , which bears against a cam m' on the cam-shaft c . The cams k^3 m' are so formed and timed that the nips are caused to approach each other, as shown in Fig. 6, immediately after the combs have received their initial movement away from each other and to tightly grip the stock between the combs carried by the sections e and g . Then after the sections of the slide have been carried to their opposite and outward extreme of movement the nips are separated, and the lower one delivers the wool to an endless belt n , which is shown in Fig. 3, as indicated in Fig. 5. The belt just referred to passes around a roll n' , journaled on a cross-bar n^2 , and also around a roll n^3 , secured to a shaft n^4 , mounted in suitable bearings carried by the standards a . Mounted loosely on one end of the shaft is an elbow-lever n^5 , one arm of which is connected by a link n^6 with the vertically-movable frame, while the other arm is provided with a pawl n^7 to intermittently engage and rotate the ratchet-wheel n^8 , rigidly secured to said shaft. As the said frame is raised and lowered the movement of the lever around the shaft n^4 causes the step-by-step rotation of the roll n^3 and the consequent advance of the belt n to deliver the combed stock to any suitable receptacle placed to receive it.

After the sections of the slide are fully separated it is necessary to separate or break the wool grasped by the nips from that on the combs carried by the sections g and f of the slide, and to that end I provide what I term a "break-bar," which consists of a transverse rod o , connected by bent arms o' with a cross-shaft o^2 , journaled in the standards a . Said shaft is provided with a slotted arm o^3 , rigidly secured thereto, as indicated in dotted lines in Figs. 2 and 3, there being in the section f of the slide a bracket having a pin extending into the slot in the said arm.

Consequently when the section f reaches its outward extremes of movement the shaft o^2 is rocked sufficiently to carry the break-bar toward the belt n for the purpose of breaking the fibers connecting the wool in the nips with that in the combs on the section g of the slide, and when the section f begins its movement toward the section e the said rod o is quickly raised out of its path and also out of the path of the dabbers. The noil or short wool which remains upon the combs e^{11} in the section e after the nip has removed the long wool is stripped and doffed therefrom by mechanism shown in Figs. 3, 6, and 7.

Secured to the cross-bar a^5 are two strips p , which are given a quarter-turn and extended forwardly to provide supports for ears or lugs p' , through which are passed rods p^2 , connected at their front ends by a cross-bar p^3 , having a row of downwardly-projecting teeth p^4 . Spiral springs p^5 are coiled about the rods p^3 to hold them yieldingly forward. Pivoted upon a cross-bar q , extending between the rear ends of the rods p^2 , are levers q' , having parallel cross-bars q^2 at their front ends to receive the teeth p^4 between them. The rear ends of the levers are connected by springs q^3 to eyes on the guide-bars d , and the springs normally hold the levers in the position shown in Figs. 3 and 7. The rods p^2 , cross-bar p^3 , and teeth p^4 form what I have chosen to term a "stripper," for they operate to detach from the rear combs—i. e., those carried by the section e —the short staple drawn from the wool held by the nips, and the rods or bars q and the cross-bars q^2 constitute what I term a "doffer," in that they remove said short-staple wool from the stripper. When the sections e and f of the slide are being moved in opposite directions to comb the stock, stops p^6 on the rear end of the first-mentioned section engage the ends of bars or rods p^2 and force the stripper and doffer rearward. Then when the dabber-frame rises the stops p^6 release the rods p^2 and the doffer and stripper are sprung forward by the springs p^5 to cause the teeth p^4 to engage and remove the noil from the combs e^{11} . Subsequently the downward movement of the dabber or lifter-bar frame permits an adjustable screw q^4 , passed through strips q^5 on the frame, to engage the bars q' and operate the doffer, as shown in Fig. 6, to remove the noil from the stripper.

Referring once again to the sections f and g of the comb-slide and to the latch g^3 , it will be seen by an examination of Fig. 3 that the screw g^5 is passed adjustably through a bar g^{51} , carried by the nip k^2 .

The operation of the machine is as follows: Assuming that a web or sheet of wool or noil from another machine is between the feed-rollers and that the dabber and lifter-bar frame is at the upper extreme of its movement, with the sections of the slide separated, the belt is shifted from the loose to the fast pulley. The first movement is that of the sections of the slide toward each other, which causes the ro-

tation of the feeding-rolls to carry the stock across the lifter-bars, as shown in Fig. 4. At this time the nips are separated and are at their extremes of movement, as indicated in the last-mentioned figure, and the break-bar is raised. Then the lifter-bars and the dabbers are depressed to carry the stock down into engagement with the combs, as shown in Fig. 2. As the frame which carries the dabbers and the lifter-bars continues its downward movement the end of the screw q^4 engages the doffer and removes from the stripper-comb p^4 the noil or short staple which was taken from the combs by the stripper during a previous cycle of operations. Then while the dabbers are depressed the sections of the slide are moved to slightly separate the combs, as shown in Fig. 6. The distance between the combs on the sections e and g is sufficient to permit the nips to pass between them, said nips being actuated simultaneously with the operation of the sections of the slide. The operation of the combs on the slides g and f causes an initial combing of the stock, for the same stock which is then combed is during the next cycle of operations advanced by the feed-rolls, so as to be engaged by the combs on the section e of the slide. Consequently the stock receives an initial and then a final combing, first by one pair of the sections and then by the second pair of sections. While the nips remain quiescent and in engagement with the stock between the combs on the sections e and g the sections f and g of the slide are moved to their outward extremes of movement to draw from the stock engaged by the nip all of the fine or short staple and leave the long staple in their grasp. This operation of the sections of the slide occurs while the dabbers are depressed, the parts retaining the positions shown in Fig. 3 when the said sections reach their extremes of movement. It will be remembered that when the sections of the slide are moved from the positions shown in Fig. 5 the latch g^3 engages the strip g^4 on the slide e to cause the separation of the sections g and f and that when the dabber-frame is depressed the pin g^5 engages the latch g^3 , so as to permit the sections to be moved to their outward extremes of movement at the proper time. While the sections are being separated the break-bar o is depressed to break the fibers which may be stretched between the combs g^6 on the section g of the slide, and immediately thereafter the nips are separated, that indicated at m being lowered until the staple which is carried thereby is engaged with the apron n and the stock is removed thereby. When the nips have reached the ends of their movement, the dabber-frame (consisting of the bars $h h'$) is raised, permitting the springs p^5 , which were compressed when the sections were separated, to carry the stripper and the doffer forward to remove from the combs on the section e the noil or short staple which is to be discarded, the stripping occurring when the sections of the

slide approach each other during the next cycle of operations.

My improved machine may be used in treating cotton, silk, and other fabrics as well as wool.

Having thus explained the nature of the invention and described a way of constructing and using the same, although without attempting to set forth all of the forms in which it may be made or all of the modes of its use, I declare that what I claim is—

1. A wool-combing machine comprising rectilinearly-reciprocating combs projecting in the same direction, means for delivering stock to said combs, and mechanism for successively operating said combs to partially or initially comb said stock and then complete said combing.

2. A wool-combing machine comprising a plurality of sets of combs, all projecting in the same direction, of which two initially comb the stock and two complete the combing, means for operating said combs in succession, and rolls for feeding the stock across said combs.

3. A wool-combing machine comprising a plurality of sets of reciprocatory separable combs, and feeding-rolls for presenting the stock first to a pair of separable combs, and then to another pair of separable combs, whereby the stock is initially and then completely combed.

4. A wool-combing machine comprising a plurality of reciprocatory separable combs arranged in pairs, means for causing said pairs of combs to approach and separate, and mechanism including feeding-rolls for presenting the same stock to successive pairs of combs.

5. A wool-combing machine comprising a reciprocatory slide having a plurality of separable sections, combs carried by said sections, and mechanism for presenting the same stock successively to the action of the combs on a plurality of pairs of sections.

6. A wool-combing machine comprising nips coacting to grasp the stock, rectilinearly-reciprocating combs acting on both ends of the stock in said nips, and intermittently-actuated rolls for feeding the stock across said combs.

7. A wool-combing machine comprising means for grasping a mass of stock with the ends of the staple free, intermittently-actuated rolls for feeding the stock, and combs acting on both ends of said stock to leave the long staple in the grasp of said means.

8. A wool-combing machine comprising means for grasping a mass of stock consisting of long and short staple, intermittently-actuated rolls for feeding the stock to said means, and means for drawing the short staple from the mass at both ends thereof whereby the long staple remains in the grasp of the said means.

9. A wool-combing machine comprising combs adapted to reciprocate toward and from each other, nips located between said combs

and movable in a plane at an angle to the plane of movement of said combs, and means including intermittently-actuated rolls for feeding the wool to said combs.

5 10. A wool-combing machine comprising nips arranged to grasp a mass of wool, rectilinearly reciprocatory combs acting on both sides of said nips to remove the short staple from the wool, and intermittently-actuated
10 rolls for feeding the wool between said nips to the combs.

11. A wool-combing machine comprising a slide having separable sections, upwardly-projecting combs on said sections, nips arranged to reciprocate between said sections,
15 intermittently-actuated rolls for feeding the stock, and dabbers movable with said sections to cause the engagement of the stock with the combs thereon.

20 12. A wool-combing machine comprising a slide having separable sections, upwardly-projecting combs on said sections, nips arranged to reciprocate between said sections, lifter-bars located between the combs and
25 movable with the sections, and means for feeding the wool when the lifter-bars release the wool.

30 13. A wool-combing machine comprising a slide having separable sections, combs carried by said sections, and feeding-rolls carried by one of said sections.

35 14. A wool-combing machine comprising a slide having separable sections, combs carried by said sections, feeding-rolls carried by one of said sections, and means operable on moving said section to rotate the rolls.

15. A wool-combing machine comprising separable upwardly-projecting combs, nips arranged to grasp the stock stretched between said combs, a frame movable toward and from
40 said combs, and lifter-bars and dabbers on said frame for all of said combs.

16. A wool-combing machine comprising separable upwardly-projecting combs, nips arranged to grasp the stock stretched between
45 said combs, a frame movable toward and from said combs, lifter-bars and dabbers carried by said frame, and means for actuating said frame to move said dabbers and lifter-bars alternately into operative position. 50

17. A wool-combing machine comprising a slide having a plurality of sections, each carrying combs, mechanism for feeding the same stock, first to the combs of one pair of sections and then to the combs of another pair
55 of sections, mechanism for separating said sections, and nips arranged between the sections of the last-mentioned pair for grasping the long staple of the wool whereby said combs remove the short staple. 60

18. A wool-combing machine comprising a slide having separable sections, nips arranged to operate between said sections, and combs on said sections, the teeth of the combs on one section being inclined toward the teeth of the
65 combs on the other section.

In testimony whereof I have affixed my signature in presence of two witnesses.

WILLIAM E. WALSH.

Witnesses:

JOHN L. BOYLE,

WELLS H. JOHNSON.