No. 817,607. PATENTED APR. 10, 1906.

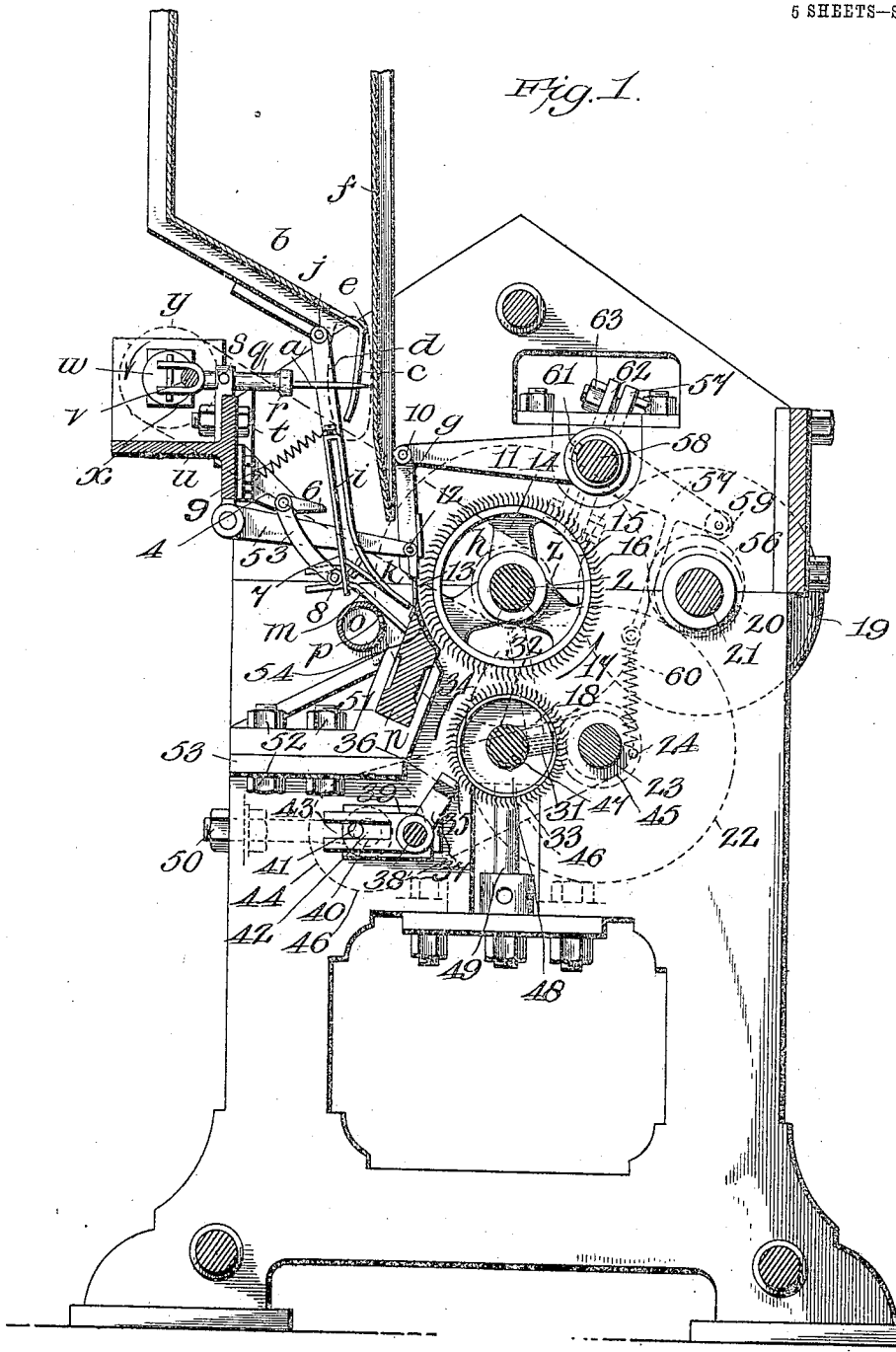
W. YOULTEN.

GINNING OR BURRING MACHINE.

APPLICATION FILED AUG. 17, 1903.

5 SHEETS—SHEET 1.

Fig. 1.



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5 SHEETS—SHEET 2.

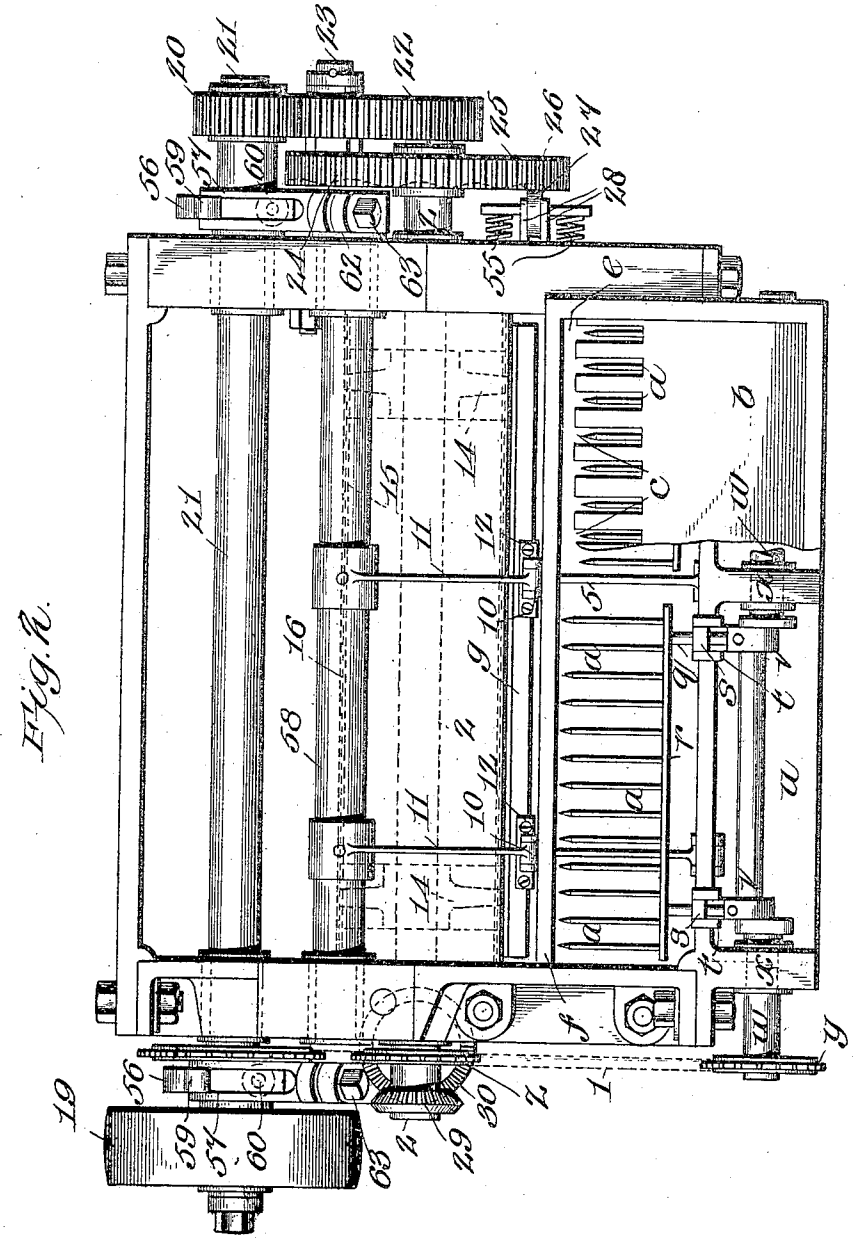

Fig. 2.

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5 SHEETS—SHEET 3.

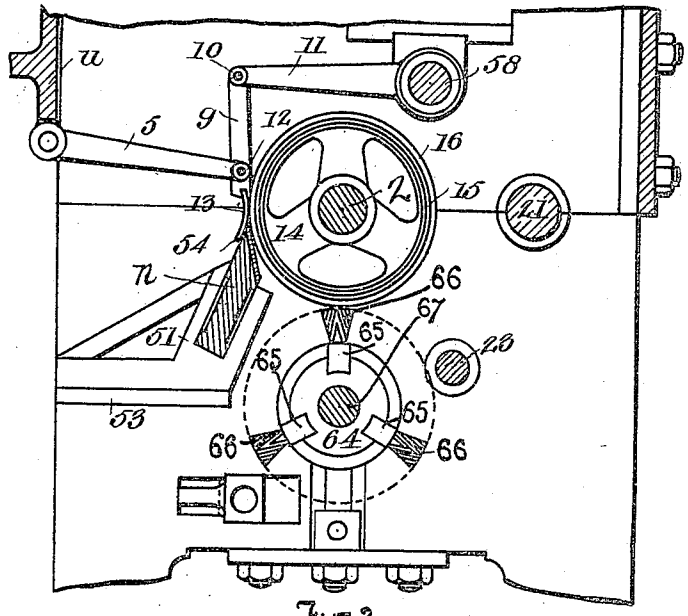

Fig. 3.

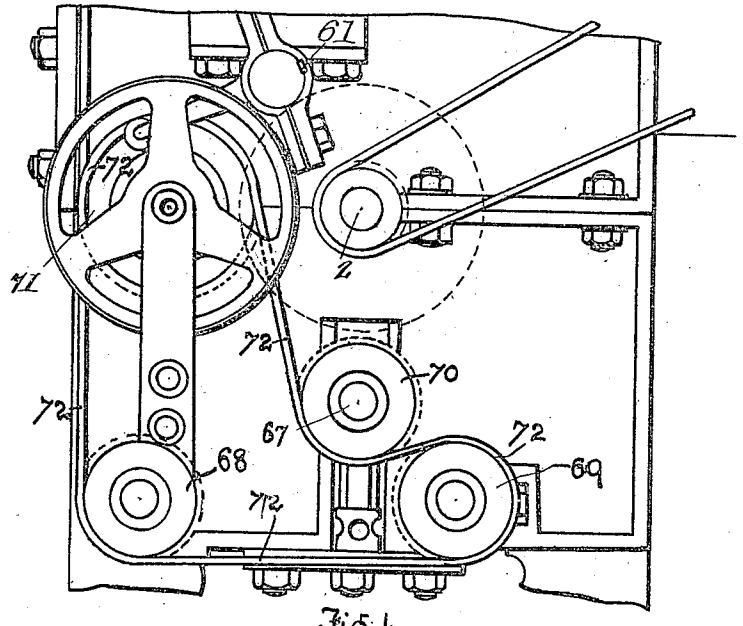

Fig. 4.

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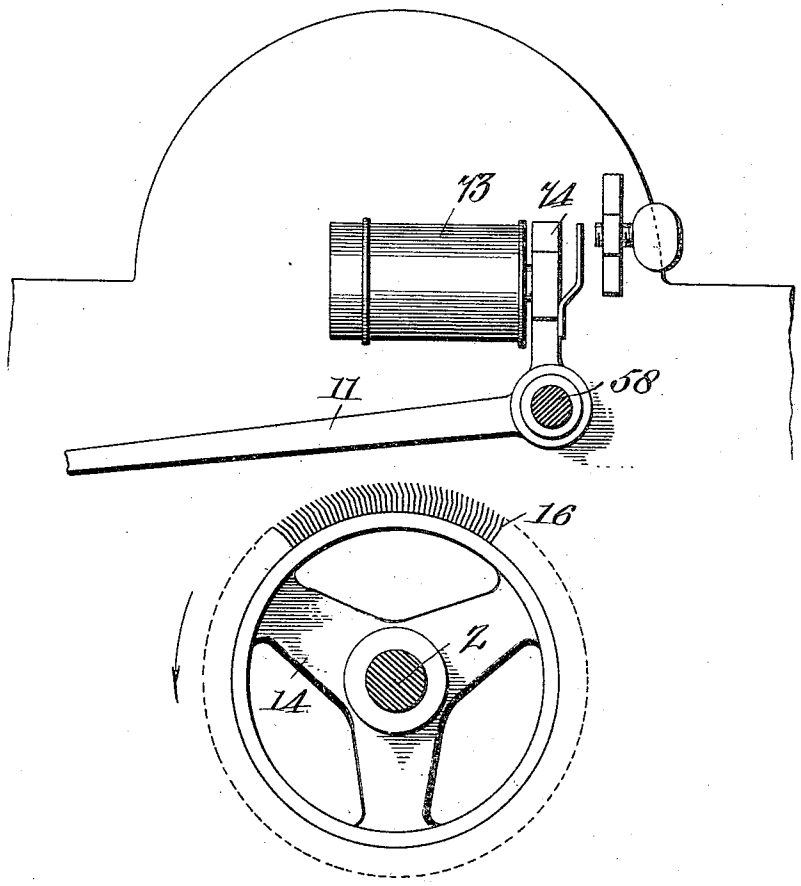
5 SHEETS—SHEET 4.

Fig. 5.



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5 SHEETS—SHEET 5.

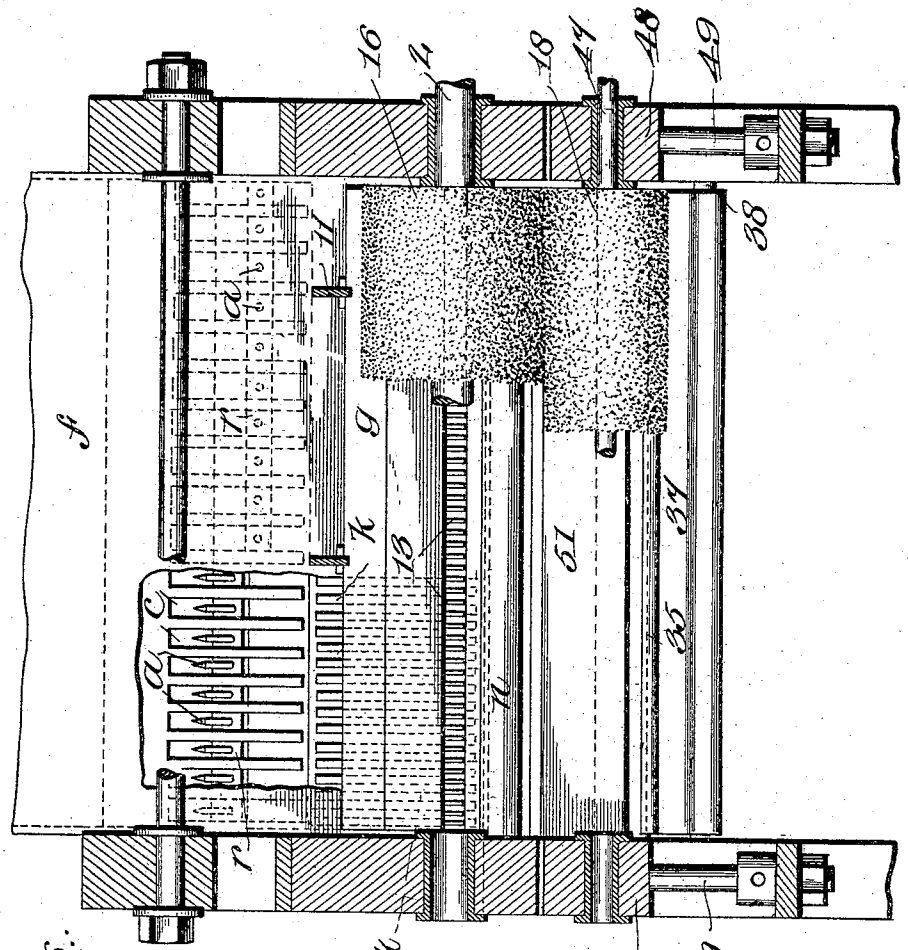

Fig. 6.

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UNITED STATES PATENT OFFICE.

WILLIAM YOULTEN, OF WESTMINSTER, ENGLAND.

GINNING OR BURRING MACHINE.

No. 817,607. Specification of Letters Patent. Patented April 10, 1906.

Application filed August 17, 1903. Serial No. 169,826.

To all whom it may concern:

Be it known that I, WILLIAM YOULTEN, a subject of the King of England, residing at 159 Victoria street, Westminster, London, England, have invented certain new and useful Improvements in Ginning or Burring Machines; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to ginning or burring machines, the object being to effect improvements in the means for separating the undesirable extraneous substances from utilizable fibers for the purpose of manufacture—such, for example, as the seeds from raw cotton during ginning, the broken leaf and crushed seed from the product after ginning, and the burs from wool.

The invention refers to various improvements in the parts of the machines for the aforesaid purposes, which improvements may be applied separately to existing fiber-machines or combined to form a machine of essentially novel construction.

The more important features of the invention are the following: improved automatic feed mechanism and various arrangements for actuating the combs.

In order that the invention may be understood, I shall first describe the various parts combined into one machine for the purpose of ginning cotton, for example.

In the accompanying drawings, Figure 1 is a sectional elevation of a machine constructed according to my invention. Fig. 2 is a plan of same with a portion of the hopper broken away to show the mechanism beneath. Fig. 3 shows modified doffing means, parts being shown in section. Fig. 4 shows the method of gearing for actuating this doffing means. Fig. 5 is a detail view of one of the adjusting-levers and coöperating parts, showing a modification of the same. Fig. 6 is a longitudinal vertical section of the machine.

The same letters and numerals of reference refer to the same parts in all the views.

a a are a row of rakes extending across the machine at the bottom of a feed-hopper *b*. *c c* are slots in the lower part of one side of an extension of the hopper *b*, through which the teeth of the rakes *a* work, said rakes describing a curved elliptical path *d*, so located that each of the points of the rake-teeth rises sufficiently to seize a boll of the fiber at the bottom of the hopper. The bolls thus seized are carried downward by the movement of the rakes *a* to a continuous slot *e* along the bottom and next the back *f* of the hopper, this back *f* of the hopper *b* being a smooth metallic surface, nearly vertical, within the hopper *b* and extended downward in front of the vertical vibrating combs or clearers *g* of the fiber-machine, so as to form a guard. Below the level of the bottom of the hopper *b* this guard slopes backward toward the ginning mechanism, so as to set free the bolls in order that they may fall freely to the level of the center of the ginning-roller *h*. The falling bolls are guided in front by a row of toothed feed-combs *i*, loosely suspended from hinges *j* on the hopper-bottom *b*. These toothed combs *i* are of a suitable formation and curvature to let the bolls fall freely down to the teeth *k* of the feed-combs, which vibrate out and in horizontally in front of the ginning-roller *h* and are so adjusted that they vibrate at the same speed as the vertical combs or clearers *g*, advancing as the vertical combs or clearers *g* rise or retire and retiring as the vertical combs or clearers *g* fall or advance. In addition to this movement a sliding lateral movement may be given to the feed-combs *i* by connecting them by pins *m* to the reciprocating bar *n*. These movements of the feed-comb teeth *k* present the bolls to the ginning-roller *h* and clear the seeds away.

I may employ in combination with the above-described feed-combs a pneumatic device consisting of a tube *o*, extending the length of the ginning-roller *h* and provided with orifices *p* at suitable intervals along the whole length facing the ginning-roller, so as to feed in the bolls and clear them of dust or other light impurities.

The gearing and mechanism which I prefer to employ for actuating the feed-rakes *a* are the following: Each rake *a* has a pair of rods or handles *q*, fixed in the rake-stock *r* and carried backward (through a pair of trunnions *s*, oscillating in bearings *t* in the front of the frame-plate *u*, to a shaft *v*, eccentrically mounted on the shaft *w*, running in bearings *x* on the front frame-plate *u*, the shaft *v* fitting loosely in the forked ends of the parts *q*. The crank-shaft *w* is rotated by a sprocket-chain 1, running from the wheel *y* to the wheel *z* on the ginning-roller shaft 2. The combined motion of sliding and oscillation of the rake-rods *q q* in the trunnions *s s* causes the rake-teeth *a* to ascend slowly in a

curved path *d* convex toward the cranks and to descend at a quicker speed in the other portion of the curved path *d* convex toward the ginning-machine.

The gearing and mechanism which I prefer to employ for actuating the feed-combs *i* are the following: A set of bell-crank levers 3 are pivoted on bearings 4, fastened on the front plate *u* immediately over the lower vertical comb or clearer lever 5, hereinafter described. The ends of the upper arms 6 of the bell-cranks 3 extend over the lower vertical comb-levers 5, and the lower arms of the bell-cranks 3 curve inward to the back plate 7 of the feed-comb *i*. The lower arms 3 of the bell-cranks 3 6 have bearing parts 8, resting against the back plates 7 of the feed-combs *i*. The upward movement of the lower vertical comb-levers 5 pushes the bearing-plates 8 inward, swinging the feed-combs in toward the ginning-roller *h*, and a pair of spiral springs 9 on each feed-comb makes the return stroke.

The vertical vibrating combs or clearers *g* are preferably mounted in the following manner: The vertical comb is mounted on a light hard-wood stock *g*, extending across the machine, the same length as the ginning-roller *h*. The stock *g* is suspended on bearings 10 from the pivoted levers 11 and guided in an up-and-down path suitably curved to reach into the angle formed by the ginning-roller *h* and the sliding bar *n* by a second set of levers 5 in vertical alinement with the levers 11, pivoted to the lower portion of the comb-stock *g* by bearings 12 immediately above the comb 13. The comb consists of fine curved steel teeth with rounded points curved to the same curvature as the path of travel of the comb and with solid backs screwed onto the lower edge of the comb-stock *g*. In the downstroke of the comb the teeth penetrate between the fibers and separate the seeds, and the rise of this comb and its suspension to the top of the stroke allows the fiber to be seized by the ginning-roller.

The ginning-roller *h* may be constructed with a perforated or roughened surface or according to the following method, which I have found to answer well in practice.

2 is a shaft with spiders 14, carrying a tube 15, on which is wound or placed fine-gage tempered-steel card-clothing 16, or bristles or the like may take the place of the steel wires in the card. The steel wires or bristles may be bent or placed at an angle with the radial, pointing toward the direction of motion of the roller *h*, (indicated by the arrow 17,) so as to seize the fibers over the sliding bar *n* and part with them readily to the doffer-roller 18 or rotary brushes 66 or other doffer which may be employed. The roller *h* after the wire card or bristles are placed thereon is immersed in a suitable composition capable of forming a hard bed, from the periphery of which the embedded wires or bristles protrude sufficiently to seize the fibers of the cotton being ginned, wool being burred, or other fiber under treatment.

A composition which I have found to answer well in practice is one composed of glue and whiting with an admixture of treacle or other saccharine matter.

The gearing which I preferably employ for actuating the ginning-roller *h* and the other parts actuated from the ginning-roller shaft 2 is the following: 19 is a driving-pulley, and 20 a toothed pinion on the driving-shaft 21, gearing into a toothed wheel 22 on an idle shaft or pin 23, carrying a toothed pinion 24, gearing into a toothed wheel 25 on the ginning-roller shaft 2 in order to reduce the speed. On the inside face of the web of the toothed wheel 25 on the ginning-roller shaft 2 I mount a side-acting cam 26 to bear on a friction-roller 27 in the Y-fork 28 of the sliding bar *n*. A pair of bevel-pinions 29 and 30 and worm 31 and wheel 32 actuate the doffing-roller 18 from the ginning-roller shaft 2.

The doffing-roller 18 is covered with fine steel-wire card-clothing 33, pointing at an angle with the radial against the direction of motion, (indicated by the arrow 34,) the periphery of the doffing-roller 33 moving in the same direction as the periphery of the ginning-roller 16 at a slower speed.

The doffer-comb 35 is a steel bar vibrating at nearly the same linear velocity as the periphery of the doffing-roller 18, from which it removes the ginned fiber against the direction of its travel. The doffer-comb 35 is mounted on a frame consisting of a bar 36 on a set of arms 37, the centers of which are fixed on a spindle or rocking shaft 38, carried in the same bearing-blocks 39 as the crank-shaft 40, the rotation of which causes the vibration of the doffer-comb 35. The crank-pins 41 are inserted in slots 42 in the crank-levers 43, and the crank-shaft 40 is driven by sprocket-wheels 44 and 45 and chain 46 from the idle-wheel and pinion 22. The doffing-roller shaft 47 is carried in adjustable bearing-blocks 48 on screws 49, by which the proximity of the peripheries of the doffing-roller 18 and the ginning-roller *h* may be regulated. The doffer-comb bearing-blocks 39 may also be adjusted by screws 50 to regulate the closeness of the edge of the doffer-comb 35 to the periphery of the doffer-roller 18.

Referring to the sliding bar *n*, this consists, preferably, of a rigid metal plate sliding in adjustable guides 51, fixed by screwed bolts and nuts 52 on brackets on the side frame 53 of the machine. A tempered-steel edge-plate 54 is fastened on the top of the sliding bar *n* to form a hard wearing-surface to coact with teeth of ginning-roller. The sliding movement is effected by a side-acting bevel-faced cam 26, fastened on the inside face of the web of the toothed wheel 25, which ac-

tuates the ginning-roller *h*. The cam 26 bears upon a friction-roller 27 in Y-bearings 28, screwed into the end of the sliding plate *n*. The return stroke may be effected by springs 55.

The vertical comb or clearer *g* is actuated as follows: A pair of cams 56 on the ends of the driving-shaft 21 raise the ends of a pair of levers 57, which oscillate the comb-lever shaft 58. The levers 57 carry a friction-roller 59, bearing on the cam 56, and the downstroke of the lever 57 is effected by a strong spiral spring 60, attached to the frame of the machine and the lever 57. The cam-levers 57 are keyed to the end of the comb-lever shaft 58 by rectangular keys 61, sunk in a pair of grooves in the shaft 58 and in a cover 62, forming half the eye of the cam-lever 57. The two halves of the eye of the cam-lever 57 are bolted together with a small space between the halves to allow for the adjustment of the combs 13 by means of the bolts and nuts 63. To adjust the height of vibration of the combs 13, it is simply necessary to loosen the covers 62, turn shaft 58, and retighten covers 62, and it will be readily seen that as the levers 11 are keyed to the shaft 58 they will move with the shaft. The cams 56 may be made of any suitable curvature on the bearing-surface or perimeter to regulate the interval of time between the vibrations of the comb *g*, and with a view to leaving the surface of the ginning-roller *h* exposed as long as possible to the fiber presented by the feed and promote the grip of the ginning-roller surface on the fibers I make about a quadrant of the cam 56 concentric with the driving-shaft 21, thereby causing the vertical comb or clearer *g* to pause at the top of each stroke or vibration.

Fig. 3 shows a clearer or doffing-brush which may be employed instead of the doffing-roller 18. In this figure 64 is a horizontal roller, with two or more arms 65 mounted radially on it and carrying the brushes 66 on the outer end of each arm. The roller 64 may be made of hard wood mounted on an iron shaft 67, actuated, as shown in Fig. 4, by sprocket-wheels 68 69 70 71 and a chain 72 from the driving-shaft 21.

The operation of the machine is as follows, taking ginning of raw cotton as an example: The raw cotton is thrown in a mass into the hopper *b*, where the feed-rakes *a* intermittingly seize a row of bolls about once for each two revolutions of the ginning-roller *h*. These bolls are carried forward to the continuous slot *e* in the bottom and along the back *f* of the hopper *b* and pulled down clear of the mass of cotton in the hopper *b*. The teeth of the rakes *a* retiring in the course of travel let the bolls fall clear between the sloping part of the hopper-back *f* and the shield down to the vibrating feed-combs *i*, by which they are fed into the ginning-roller *h*. The bolls are pushed toward the ginning-roller *h* by the feed-combs *i* at the moment when the vertical vibrating comb *g* is suspended at the top of its stroke, leaving the surface of the ginning-roller *h* exposed for the protruding wires or bristles to seize the fibers of cotton. While the fibers are drawn down by the ginning-roller between the periphery of the ginning-roller *h* and the sliding bar *n*, the vibrating comb-teeth 13 are combing out the seed from the bolls by sliding down close in front of the sliding bar *n*, passing in between the fibers of the cotton and pressing out the seeds, which drop out in front of the sliding bar *n*. The longitudinal movement of the sliding bar *n* presents the bolls and seeds to the action of the teeth of the vibrating comb 13 and spreads them out, so that every portion of the cotton bolls and seeds is subjected to treatment. The lineal velocity of the movement of the comb-teeth is approximately equal to the lineal velocity of movement of rotation of the periphery of the ginning-roller in the same direction. The ginned fibers are then doffed or removed from the ginning-roller either by the rotary brushes 66, above described, which rotate at a higher speed than the ginning-roller *h* in the same direction, brushing the ginned fibers lightly off the surface free of extraneous material, or alternatively the ginned fibers are removed by the doffing-roller 18, which rotates at a lower speed than the ginning-roller *h* in the same direction, carding by its slow motion the fibers off the ginning-roller and conveying them in a continuous sheet on its periphery round to the doffer-comb 35. The doffer-comb vibrates in close proximity to the card periphery 33 of the doffing-roller 18, and the edge of the doffer-comb 35 pointing in the contrary direction to the direction of motion of the card removes the fiber in a continuous sheet. The lineal velocity of the edge of the doffer-comb is approximately equal to the lineal velocity of movement in rotation of the periphery of the doffing-roller.

In Fig. 5 is shown an alternative method of actuating the vertical combs or clearers *g*. 73 is an electromagnet, the armature 74 of which is connected to the lever 11, pivoted at 58. A suitable make-and-break arrangement, in connection with a source of electricity for exciting the magnet at frequent intervals as desired, is attached to any suitable part of the machine.

What I claim, and desire to secure by Letters Patent of the United States, is—

1. In a machine of the character described, the combination of a hopper, oscillating feed rakes and combs, a ginning-roller and a pneumatic device for directing jets of air upon the fiber when it is brought in contact with said roller, substantially as described.

2. In a machine of the character described, the combination of a hopper, oscillating feed-

ing-rakes, a ginning-roller, a feed-comb for said roller, means for oscillating said feed-comb, a bar arranged in proximity to said roller, a cam for moving said bar parallel to said roller, and springs for returning said bar to its initial position, substantially as described.

3. In a machine of the character described, the combination of a ginning-roller, a sliding bar arranged to coact therewith, means for reciprocating said sliding bar parallel to said roller, vibrating combs, means for actuating the same, and means for adjusting the height of the comb-teeth relatively to the sliding bar, substantially as described.

4. In a machine of the character described, the combination of a hopper, means for feeding the material under treatment down through the bottom of said hopper, a ginning-roller, a feed-comb for said roller, means for oscillating said feed-comb, a bar arranged adjacent to said roller, a cam for moving said bar parallel to said roller, and springs for returning said bar to its initial position, substantially as described.

In testimony whereof I have signed my name to this specification in presence of two subscribing witnesses.

WILLIAM YOULTEN.

Witnesses:
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