(No Model.) 3 Sheets—Sheet 1.

E. GESSNER.

FEEDING DEVICE FOR CARDING MACHINES.

No. 312,456. Patented Feb. 17, 1885.

Fig. 1.

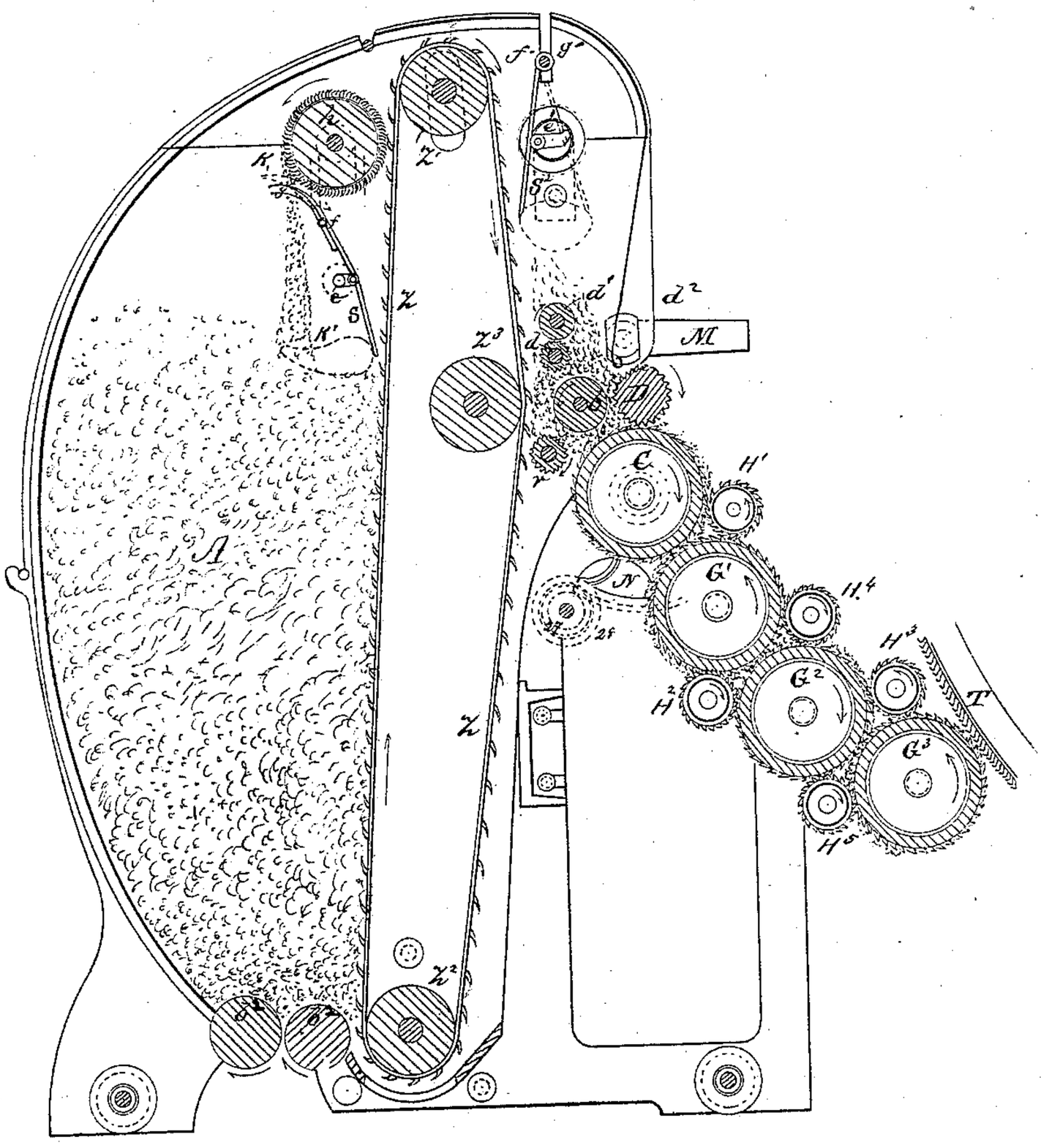

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Fig. 2.

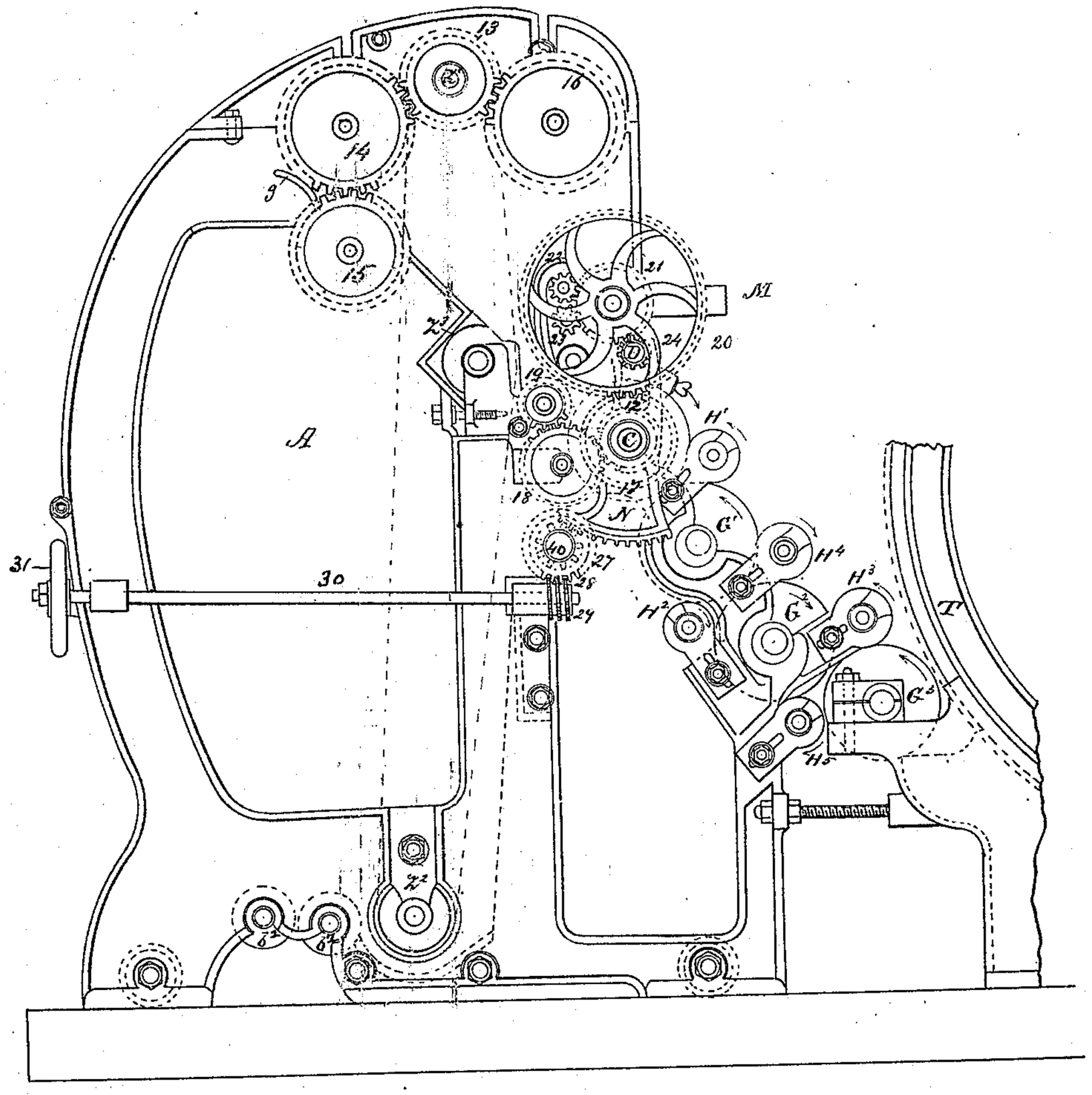

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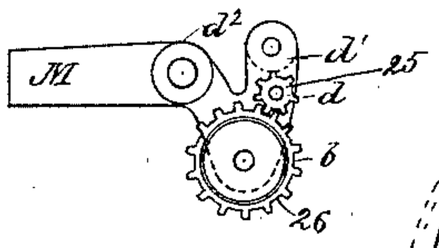
Fig. 3.

Fig. 4.



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UNITED STATES PATENT OFFICE.

ERNST GESSNER, OF AUE, SAXONY, GERMANY.

FEEDING DEVICE FOR CARDING-MACHINES.

SPECIFICATION forming part of Letters Patent No. 312,456, dated February 17, 1885.

Application filed October 10, 1883. (No model.)

To all whom it may concern:

Be it known that I, ERNST GESSNER, of Aue, Saxony, Germany, have invented a new and useful Improvement in Feeding Devices for Carding-Machines; 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.

The object of my invention is to provide a device for taking away or feeding regularly and evenly from a receptacle or bulk-box wool or other fibrous material, and to carry the same forward and deposit it at some desired space or place, or to deliver it over to another machine in even amounts. It may serve in all cases where wool or other fibrous material is to be fed on to wool washing, drying, deburring, carbonizing, wool preparing, and carding machines, &c.

Figure 1 is a vertical section of the card-feeder, taken transversely to the rolls, and showing also a fractional part of the carding-machine. Figs. 2 and 3 are side elevations of the same parts from opposite sides; and Fig. 4 is a detail of one of the movable arms carrying lap-roll *b* and rolls *d* and *d'*.

As in my Patent No. 257,313, the wool is taken from its receptacle by a spiked or toothed apron, Z, Fig. 1, running in an upright direction; but instead of its being stripped of its lumpy surplus of stock by a revolving beater, as in my patent referred to, I now use in its place a new stripping device, which consists of a peculiar eccentrically-moving rake or comb-plate, S, Fig. 1, made out of a series of needle-pointed wires or of a sheet of toothed tin or the like. The upper edge of this comb-plate is fastened to a rod, *f*, whose two protruding ends move upon either side in slots *g* of the frame A when set in motion. As indicated in Fig. 1, the upper edge of the comb-plate extends above the rod *f* up to the worker-roll *h*. In this instance the comb-plate is double-acting—stripping on one side the apron Z, and upon the other side the worker-roll *h*. The crank-shaft *e* is hinged to comb-plate S, and gives it, when revolved, a peculiar eccentric motion, describing at its lower end a curve, K', as shown in dotted lines in Fig. 1. As the edge of the comb-plate S comes in contact with the wool hooked on the toothed apron Z in its forward or downward motion, and recedes only after it has passed a row of hooks, it will thus, when placed in proper proximity to the apron, strip the latter of all that wool which comes within its reach. The same is the case of the upper edge of comb-plate S in relation to worker-roll *h*, describing there another and smaller curve, K. In Fig. 1 this combing device is used in front of the apron to knock off its lumpy surplus of stock when going up, while upon the back side another similar device, S^2, is used to knock off all that has been carried over by the now descending apron Z. This other comb, S^2, is hung at the top upon a rod, *f'*, which plays in slots *g'* of the case, and is actuated by a crank-shaft, *e'*, in like manner to the comb on the other side of the apron. After apron Z has passed the comb-plate S, it next will pass worker-roll *h*, which may be covered with card-clothing or teeth after another fashion. There the amount of wool going up will receive another regulating effect. Worker *h* runs at a slower speed than that at which the apron Z is moving, and thus any lumpy bunch of wool which possibly might have escaped the comb-plate S will now run against the teeth of worker-roll *h*, while those teeth of apron Z which came up empty have here an opportunity to gather up some of the stock accumulated on said slow-going worker *h*, while finally that amount of wool which has passed around again with roll *h* will be thrown back to the bulk-box by the upper edge of comb-plate S in its rear or backward motion. After apron Z, with its almost evenly-distributed amount of wool on its teeth, has passed worker *h*, it runs over roll Z', and in descending is cleared of all its stock by the other combing device, S^2. As shown in Fig. 1, the material brought by apron Z is deposited, through its stripping device S^2, in a sort of receptacle formed by a series of rollers, of which *b* is the core or lap roll, and around which the fluted rolls D, *r*, and *d*, with its smooth top guide-roll, *d'*, are disposed. These fluted rolls crowd the stock onto the lap-roll, around which it will form a sort of wadding or lap, from which lap the feed-roll C will fill its teeth, said feed-roll being constructed with a grooved periphery, in the groove of which is set a row of teeth, as shown in my former patent before named.

There are two open places around lap-roll *b*—one between rolls *d* and D, and another between rolls *d* and *r*. The open place between *d* and D is necessary to allow the constant supply of wool from the stripping device S^2 to enter there and accumulate around roll *b*, which, like all the other rolls, keeps moving. If the supply brought down from the stripping device would be exactly the same at all times, and if the feed-roll C would take away the stock at about the same ratio, then the lap around roll *b* would always be of the same thickness. This, however, is impossible, as the stripper sometimes brings more or less stock, although it may seem even to one's eye. To overcome this irregularity I leave this open space between rolls *d* and *r*, through which the lap on the roller *b*, when exceeding a certain size, protrudes into position to be grazed by the descending portion of the toothed apron Z, which is held up to its work in a constant line of travel by the back-thrust roller Z^3. Now, if the lap around roll *b* should at one time grow in size, when it passed the fluted roll *d*, it would at once swell out and grow in circumference as soon as freed from its pressure there; but as the teeth of the apron Z are always traveling within a certain distance from the center of lap-roll *b*, they will, whenever the lap swells over and above its certain regular size, take all that comes in their reach, and thus cut the lap down to its normal size. Thus any irregularity in the size of the lap around roll *b*, caused by the sometimes uneven supply, will be counteracted and balanced by the descending portion of the toothed feed-apron Z, thus leaving the lap around *b* always of the same size. When the lap-roll *b* is located some distance below upper roll, Z', the back-thrust roll Z^3 is very necessary to keep the apron from yielding.

The feed-roll C, as will now be seen, is taking its stock from an always even amount of wool, and effects a perfectly-even feed. In my Patent No. 257,313, for a card-feeder, the material, after leaving feed-roll C, is by means of a brush or beater dropped upon the feed-table of the carding-engine. In my improved feeder, however, I take away the feed-table of the carding-engine or other wool-preparing machine, and take the stock directly from feed-roll C by a series of worker-rolls, which deliver the stock directly to the cylinder of the carding-engine, which is a decided improvement over the feed-table. The feed-roll C takes the wool off the lap around *b* in long shreds, because, pulling against the fluted roll D, the material becomes straightened and lengthened out fully, which is the main object in carding wool. Now, in using the old-fashioned feed-table of the card, the once-straightened staple is dropped upon the table, and, being freed from tension, it crawls up, crimps, and mixes together again to a great extent before finally reaching the carding-engine. In my improved machine, Fig. 1, the wool hanging in long shreds upon the teeth of feed-roll C is delivered over in that stretched condition to worker G'. Worker G' runs a little faster than feed-roll C, worker G^2 faster than G', and worker G^3 faster than G^2. Thus the staple is transferred from one roll to another until G^3 finally delivers it directly to main cylinder T of the carding-engine. In passing from one roller to another faster-going one, and so on, the wool of course is kept under tension and becomes more nearly straight and more open as it goes along, saving the carding-engine all this preparatory work, which, where a feed-table is still used, it has to perform entirely alone.

Between the rolls G' G^2 G^3, which are provided with suitable teeth in the shape of card-clothing or other form of teeth, are placed smaller workers H' H^2 H^3 H^4 H^5, covered in a similar way, which run at a slower speed, and thus help to work up, even out, spread, and mix the material considerably. Feed-roll C gives part of its wool to the slower-going small worker H', while most of it goes directly to roll G', which also takes or strips everything from H'. Worker H^2 runs at a slower speed than G', and takes from G', delivering to G^2, and worker H^3 runs at a slower speed than G^2, and takes from G^2, delivering to G^3. Worker H^5 takes back some stock from G^3, returning it to G^2, and worker H^4 takes back a share of stock from G^2, returning it to G', which mixes that part of the already-worked material with a fresh supply, thus securing a thorough mixture of the different kinds or colors of stock which may be used.

The mechanism is driven (see Fig. 3) from the main cylinder of the carding-engine, to which it is attached by a belt connecting with pulley 1. Pulley 1 has fastened to it a small gear, 4, that meshes into large gear 5 upon the shaft of feed-roll C, thus giving motion to it. A small pulley, 2, upon the journal of pulley 1 is connected by belt R to pulley 3, which has fastened to it gear 6, meshing into double gear 7 8, gear 7 meshing again into gear 11 upon carrier-roll Z^2, setting the apron in motion, and gear 8 driving gear 9 and 10, and with it the two bottom rolls, b^2 b^2, which revolve in the direction of the arrows in Fig. 1, and carry the wool to the lift-apron. Apron Z drives its own upper roll, Z', which has fastened to it on one side gear 13, Fig. 2, which imparts motion to gear 14 of the worker-roll *h*, which gear 14 turns gear 15 on the crank-shaft, which operates front stripper-comb, S, and which gear 13 turns gear 16 on crank-shaft of back stripper-comb, S^2.

The feed-roll C has upon one end gear 5 and upon the other end the double gear 17 and 12, Fig. 2, of which latter the gear 12 meshes with gear 20, while gear 17 drives the gear 18, and gear 18 drives gear 19 on roll *r*. Gear 20, Fig. 2, has on its inner side gear 21, which, through gears 22 and 23, drives rolls *d' d*, and through gear 24 drives the fluted iron roll D. On the other side, roll *d* drives through gear 25, Fig. 3, the gear 26 upon lap-roll *b*. Rolls *d* and

d' and lap-roll b are mounted on each side in a movable arm, M. (See Fig. 4.) These arms are hung in slots in the side frame of the feeder at the point d^2, Fig. 3, so as to give the rolls which they carry a slight adjustment to or from the rolls r C D. The object of this adjustment is to make the said rolls b, d, and d' slightly yielding to prevent the too rigid jamming of the stock between them and rolls D r, and the breaking of the staple that would otherwise result.

Fluted roll D rests in movable arms or segments N, (see Figs. 2 and 3,) which swing at their center upon the bushing of feed-roll C, and are provided with segmental toothed racks at their lower ends, which mesh into the teeth of gears 27 on the shaft 40 of worm-wheel 28, which wheel is turned by worm 29, shaft 30, and hand-wheel 31. Thus by turning the worm 29 the roll D on top of segment N may be carried backward or forward and adjusted at will.

One of the three worker-rolls G' G^2 G^3 (preferably roll G') is driven from the driving mechanism of the carding-engine through a belt, and (see Fig. 3) imparts motion to the other two rolls through pulleys 130 131 132 and belt 136, in the place of which gears could be used.

The small worker-rolls H' to H^5 are driven through chain-wheels and chain 134 from the slow-going fluted roll D by means of chain-wheel 133.

The last of the workers, G^3, is journaled in and supported by the frame of the carding-engine, as shown in Fig. 2.

Having thus described my invention, what I claim as new is—

1. The combination, with the toothed lift-apron and means for operating it, of a comb-plate, S, a crank-shaft for operating said comb, means for rotating said shaft, and guides for controlling the movement of the upper edge of the comb-plate, substantially as and for the purpose described.

2. The combination, with the toothed lift-apron and means for operating it, of a toothed regulating-roll, h, located on the rising side of the lift-apron, and means for causing its side adjacent to the lift-apron to travel in the same direction with the lift-apron, but at a slower rate of speed, whereby a part of the stock is taken off of such teeth of the lift-apron that have too much and is delivered to the teeth of the lift-apron that have none or too little, as set forth.

3. The combination of the toothed lift-apron, the regulating-roll h, the double-acting comb-plate operating both on the lift-apron and the regulating-roll, and means for operating these parts, substantially as shown and described.

4. The combination of the bulk-box, a toothed lift-apron, a lap-roll, with rollers surrounding the same for forming the lap, located on the descending side of the lift-apron, and means for operating these parts, the said lift-apron being arranged in a definite relation to the lap-roll for a constant line of travel, and adapted to carry back to the bulk-box any excess of fiber over and above the normal feed, as described.

5. The combination, with the delivery-roll C, means for operating the same and feeding fibers thereto, of a series of toothed worker-rolls and means for operating them, the said rolls being arranged to take the stock from said delivery-roll and hold it stretched and under tension until delivered to the cylinder of the carding-engine, to prevent it from crawling up and regaining its crimped form, as and for the purpose described.

6. The combination, with the rolls D and r, of the movable arms M, rolls d and b, carried by said arms, means for supporting said arms, and means for rotating said rolls, substantially as shown and described.

7. The combination, with the delivery-roll C, of the series of constantly-accelerated rolls G' G^2 G^3, the forwardly-feeding workers H' H^2 H^3, and the backwardly-feeding workers H^4 and H^5, with means for operating said rolls and workers, substantially as shown and described.

8. The combination, with lap-roll b, feed-roll C, and the roll D, and means for rotating them, of the toothed segments N, means for supporting the same, and the shaft with gears 27, worm-wheel 28, worm 29, the shaft 30, and hand-wheel 31, and means for supporting the same, substantially as described.

The above specification of my invention signed by me in the presence of two subscribing witnesses.

ERNST GESSNER.

Witnesses:
ALFRED NOEZOLD,
CHRISTIAN FRIEDRICH WOETZEL.