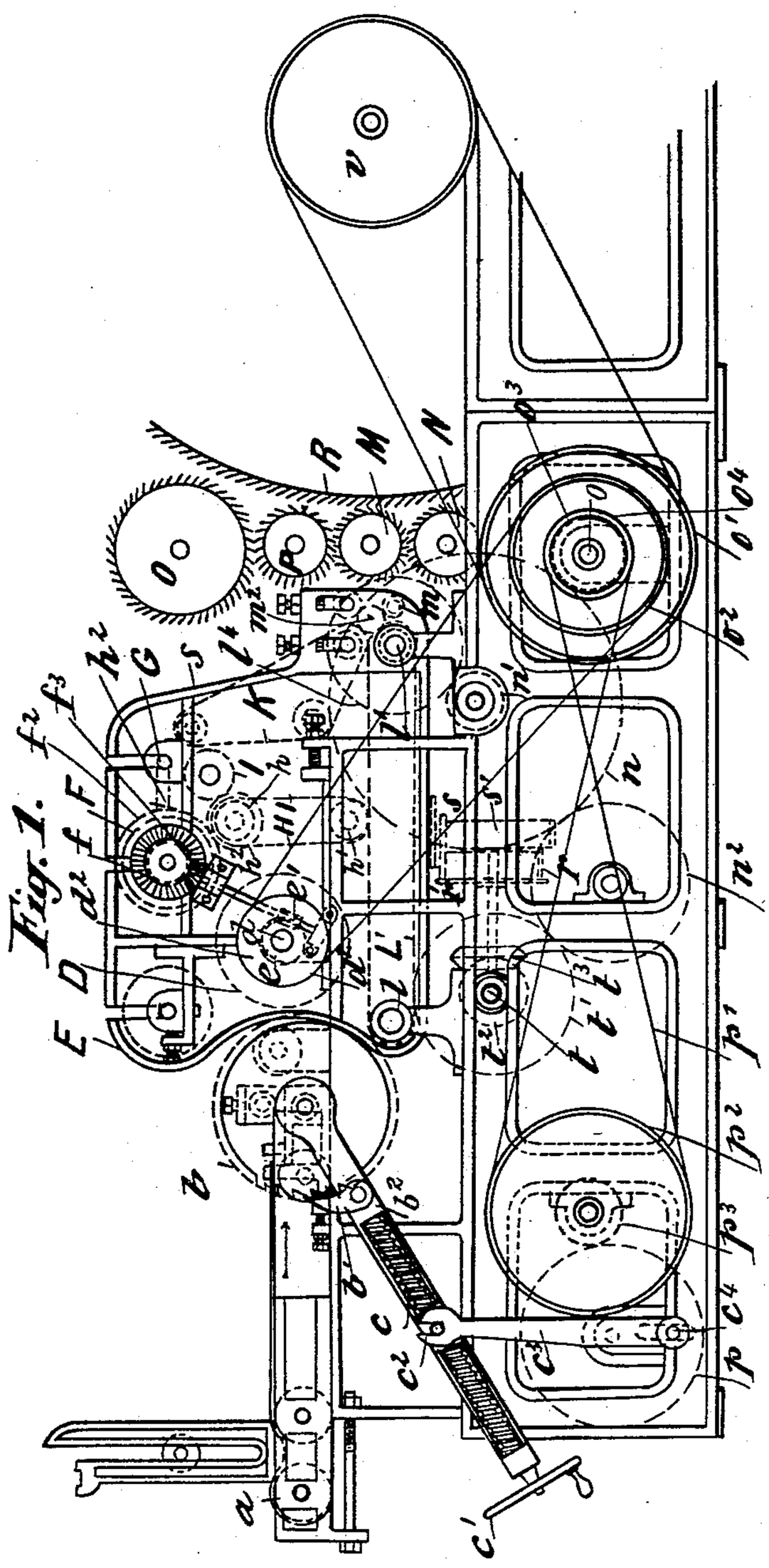
(No Model.) 3 Sheets—Sheet 1.

A. BORIOS.

FEEDING APPARATUS FOR CARDING ENGINES.

No. 572,153. Patented Dec. 1, 1896.



Witnesses:
Benjamin H. Ridgely
Robert

Inventor:
Alphonse Borios

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A. BORIOS.

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Fig. 3.

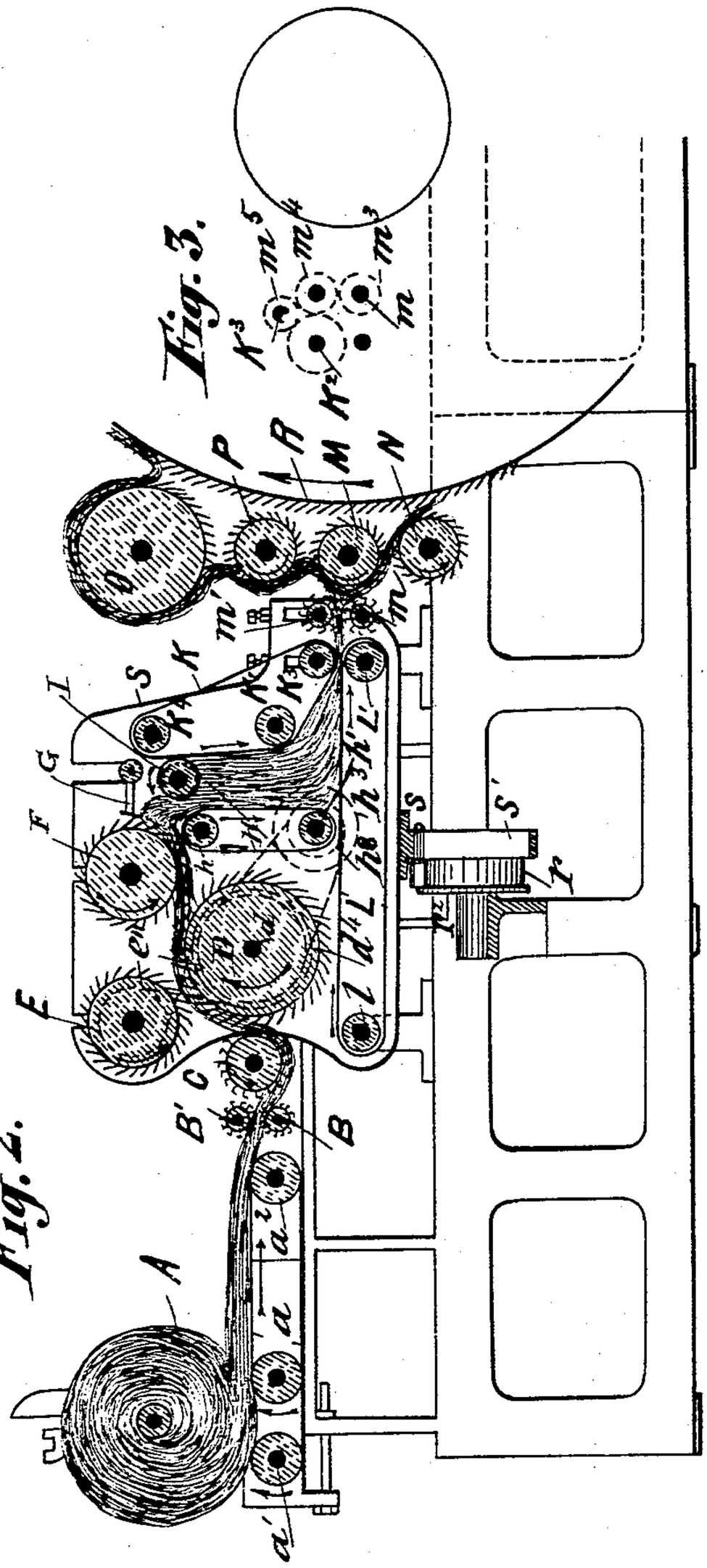

Fig. 2.

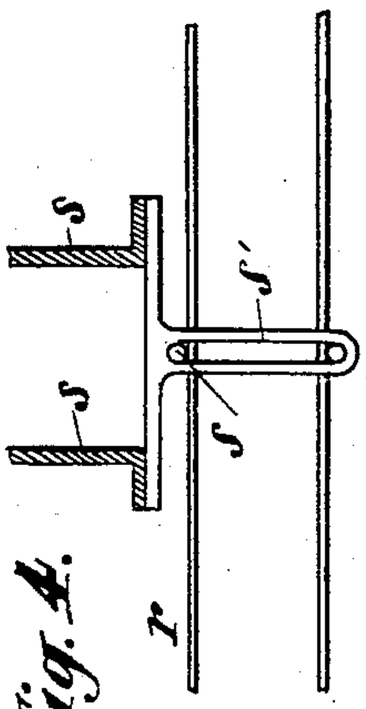

Fig. 4.

Witnesses:
Benjamin H. Ridgely
Robert Sherwood

Inventor:
Alphonse Borios

(No Model.) 3 Sheets—Sheet 3.

A. BORIOS.

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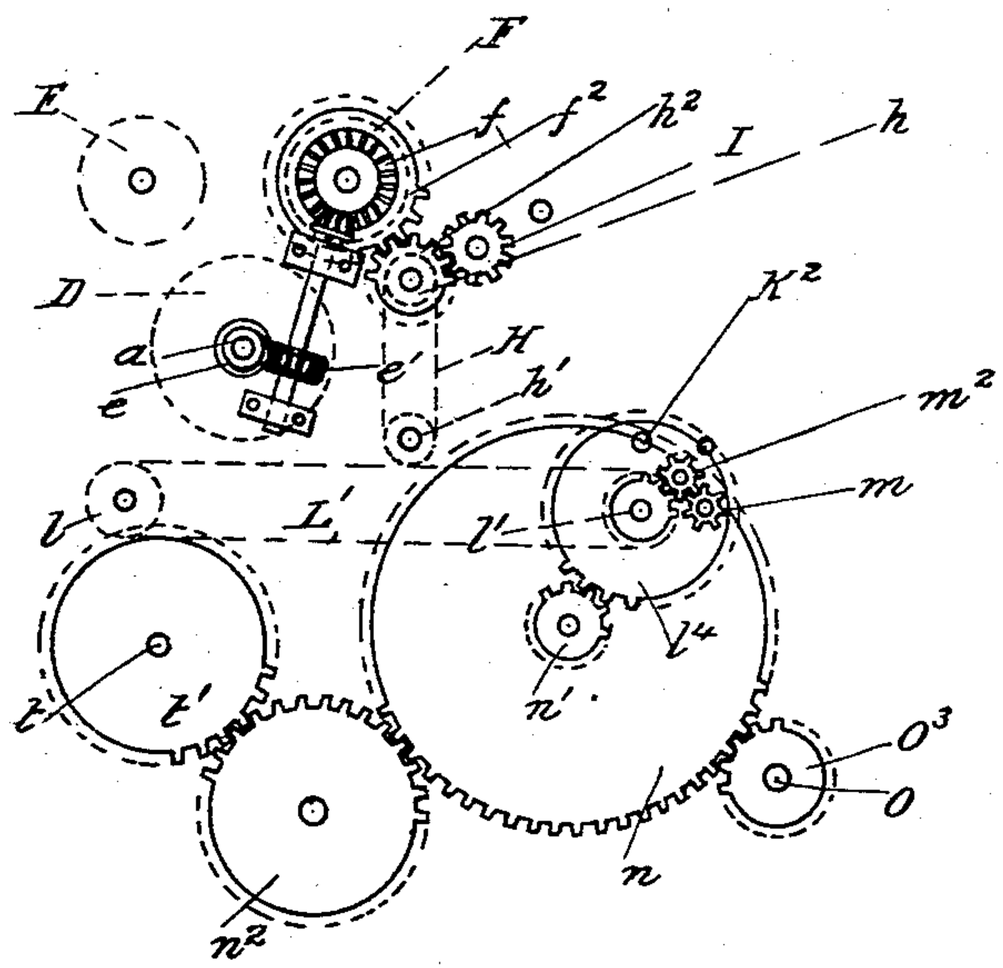
FIG. 5.



Witnesses
J. Smiga Poole
Frank L. Gregory

Inventor
A. Borios.

By Attorney Herbert W. J. Jennes.

UNITED STATES PATENT OFFICE.

ALPHONSE BORIOS, OF LA SARRAZ, SWITZERLAND.

FEEDING APPARATUS FOR CARDING-ENGINES.

SPECIFICATION forming part of Letters Patent No. 572,153, dated December 1, 1896.

Application filed November 18, 1895. Serial No. 569,356. (No model.)

To all whom it may concern:

Be it known that I, ALPHONSE BORIOS, spinner's mechanician, a citizen of the Swiss Republic, residing at La Sarraz, Canton de Vaud, Switzerland, have invented certain new and useful Improvements in Feeding Apparatus for Carding-Engines, of which the following is a specification.

This invention relates to carding-engines for wool and other fibers treated in a similar manner as wool; and it consists in improvements in the feeding apparatus for the said carding-engines, the object of my invention being to supply the cylinder of the condenser-engine uniformly with wool and to equalize the irregularities in the lap or fleece obtained from the preceding engine while carding the fibers in the same direction or without crossing the fleece, as is ordinarily done. These objects I attain by arranging between the usual long feed-rollers forwarding the lap and the taker-in supplying it to the main cylinder a narrow carriage which supports a short cylinder, doffer, endless aprons, and feed-rollers, and which travels to and fro across the carding-engine, takes the fibers from the long feed-rollers, accumulates them between the aprons, and distributes them to the long taker-in of the main cylinder, and, further, by actuating the long feed-rollers and feed-apron at a speed proportional to the weight of the lap by means of mechanism readily adjustable for varying the speed.

On the drawings herewith, Figure 1 shows a side view of the improved feeding apparatus; Fig. 2, a longitudinal section; Figs. 3 and 4, details. Fig. 5 is a diagram showing some of the driving-wheels.

Only those parts forming the subject of this invention are shown more particularly. The other parts of the carding-engine are indicated only.

On the drawings, A, Fig. 2, represents the lap, obtained by dividing the fleece lapped on the lap-drum of the preceding carding-engine and rolling it up or in any other ordinarily-used way for obtaining laps of uniform length. The lap A is supported, as usual, upon the feed-apron a, passing around the rollers a' a^2, and is forwarded to the feed-rollers B B′ and taker-in C, the apron and rollers extending, as usual, across the full width of the carding-engine and being otherwise arranged and connected by gearing in any usual way.

For the purpose of readily varying the speed of the feed-rollers proportionally to the weight of the lap I actuate the bottom roller B in the following way:

Upon the end of the roller a ratchet-wheel b is mounted, into which a pawl b' engages, which is hinged on the long slotted pawl-lever b^2. In the latter a screw-spindle c is mounted, which can be turned by the hand-wheel c' and is threaded through a nut c^2, sliding in the slot of the lever b^2. The nut is formed with pivots on each side, which are embraced by the forked end of the connecting-rod c^3, the lower end of which is mounted on a crank-pin c^4, fixed in the side of spur-wheel p, which is driven from the main-cylinder shaft in the manner hereinafter described. By shifting the nut c^2 nearer to or farther away from the center of the ratchet-wheel the throw of the lever b^2 and the number of teeth by which the ratchet-wheel is turned at each throw is increased or reduced and the length of lap fed forward for each revolution of the main cylinder varied. The lever c^3 is raised and lowered bodily by the crank-pin c^4 and oscillates the lever b^2.

The laps A are, as stated, of uniform length, but may vary in weight. Preferably the sizes and speeds of the parts are so arranged that when the nut c^2 is placed at a zero-mark about the middle of the length of the screw and the lap has the normal weight the desired weight of fibers is fed forward for each revolution of the main cylinder. The laps are weighed previous to being placed upon the feed-apron, and according to the difference in ounces between the ascertained weight and the standard weight of laps the attendant turns the hand-wheel c' and shifts the nut nearer to or farther from the center of the ratchet-wheel, according as the lap is under or over weight, and it will be fed forward quicker or slower, as required, to supply the same weight of fleece in all cases during each revolution of the main cylinder, whether the laps placed on the engine have the standard weight or not. In this way differences in the weights of the laps are equalized, so that the fleeces delivered by the engine are uniform in weight or thickness in a longitudinal direction. Al-

though this arrangement of feed mechanism equalizes differences in the weight of the laps longitudinally, it does not equalize inequalities in a transverse direction of the lap, which result from irregularities in spreading the wool upon the feed-apron or its equivalent of the first teaser or breaker-engine, as these would reappear in the fleece combed off the doffer of the finishing or condenser carding-engine if the lap is fed in its full width to the cylinder of this engine. Ordinarily, the lap from the first engine is fed transversely or laid diagonally to the following engine in order to equalize these irregularities, which, however, has the disadvantage that fibers are rather severely handled and not laid perfectly parallel by the condenser-engine, so that the yarn produced in this way has many ends protruding and is rough and is not suitable for those kinds of fabric where a smooth yarn is required.

The further object of my improvements is to equalize the irregularities occurring in the lap in a transverse direction without crossing or while carding the wool or other fiber in the same direction it has in the lap. For this purpose I arrange a carriage consisting of two side frames S, suitably stayed together at a short distance from each other, which carriage traverses across the carding-engine to and fro between the feed-rollers and the main cylinder of the engine and carries rollers and endless aprons so arranged and driven that they collect the fibers from the feed-rollers or other wide roller placed behind them and accumulate or condense them between the aprons and then redistribute them again to the main cylinder. Preferably the parts mounted on the carriage consist of a small carding-cylinder with fancy roller, doffer, and doffing-comb by which the wool is taken off the taker-in C and delivered into a space inclosed by several endless aprons, which forward the wool to a pair of short feed-rollers mounted on the carriage, by means of which the wool is distributed along a taker-in extending for the full width of the engine in front of the main cylinder.

On the drawings, S are the sides of the carriage, in which are mounted the small carding-drum D, a fancy roller E, a doffer F, and comb G, an endless apron or belt H passing around the rollers h and h', Fig. 2, an intermediate or holding-down roller I, an endless apron or belt K passing over rollers k, k', and k^3, another horizontal endless apron L passing around rollers l and L′ and two feed-rollers m m'. The width of all these rollers and aprons is equal to the distance of the sides of the carriage from each other and may be about eight or nine inches for carding-engines sixty to seventy inches wide.

M is the taker-in, and N a holding-back or stripping roller which makes one revolution during each run of the carriage.

O is the first worker, and P the first clearer. R is the main cylinder of the engine. These, as well as the feed-rollers B B′ and taker-in C, have the full width of sixty or seventy inches.

The rollers on the carriage are formed with shafts working in bearings in the carriage sides S or in brackets fixed thereon, with the exception of the drum D and rollers l and L′, which slide on shafts extending across the engine from one frame side to the other, and supported, respectively, on pedestals d^2, l^2, and l^3, Fig. 1, fixed upon the frame sides. The carriage rides on the shafts of rollers l and l', the shaft of l' being grooved and the roller fitted with a key sliding in the groove. The same is done as regards the drum D and its shaft d, or equivalent means may be used for rotating the drum and roller by the respective shafts, while allowing them to slide thereon. The drum D and roller l' are driven from the main-cylinder shaft, and the other rollers on the carriage are driven from the shafts of the drum and roller in any convenient manner.

The driving may be arranged as follows: A pulley V on the main-cylinder shaft drives a pulley O′ on a stud or short shaft O. A pulley O^2, connected to O′, drives pulley d^2 on the end of the shaft of drum D. To the pulley O′ a pinion O^3 is connected, gearing with a spur-wheel n, revolving on a stud, to the boss of which a pinion n' is fixed, driving the spur-wheel l^4 on the end of the shaft of roller l'. These pulleys and wheels are arranged outside the frame and do not slide with the carriage. The doffer F is driven from the shaft d by means of a worm e, Fig. 1, sliding with the carriage and driving a small worm-wheel e' on a slanting shaft, a bevel-pinion on which gears with a bevel-wheel f on the shaft of the doffer F. A spur-wheel f^2 on the same shaft gears with another spur-wheel h^2 on the shaft of roller h and thus drives the vertical apron H, another pair of wheels driving the roller I from h. A spur-wheel, sliding with the carriage on the shaft of the roller l', drives, through a carrier-wheel m^2, a spur-wheel on the end of the bottom feed-roller m. On the opposite side of the carriage, Fig. 2, a band-pulley d^4, sliding on the drum-shaft d, drives a band-pulley h^8, loose on the shaft of roller h', a second band-pulley h^3, cast or fixed on pulley h^8, driving by means of a crossed band a pulley mounted loose upon the shaft of roller I. The fancy roller E is driven by a crossed band from a band-pulley e^{11}, connected to pulley d^4 on shaft d. On the end of the bottom feed-roller m a spur-wheel m^3, Fig. 3, drives a similar wheel m^4 on the top roller m', and this drives, through a broad carrier-wheel m^5, a wheel k^3 on the shaft of roller k^2 and thus drives the endless belt or apron K.

By means of the gearing described the different rollers and endless aprons on the carriage are driven in the directions indicated by arrows on Fig. 2. Obviously any other arrangement of gearing rotating them in the same direction may be employed.

The carriage is traversed across the face of the wide taker-in rollers C and M by means of an endless belt or its equivalent r, which passes around two pulleys r' and r^2, Figs. 1 and 2, which are placed inside the frame of the engine, near to the sides, on shafts carried in suitable brackets fixed to the frame. Upon the belt a driver or finger s is fixed, projecting beyond the edge of the belt and engaging a slot in a bracket s', fixed to the under side of the carriage sides S at about their middle. The pulley r' is driven from the large spur-wheel n, which drives, through a carrier-wheel n^2, a spur-wheel t', mounted on the end of a shaft t, which passes through the frame side and carries inside of the frame a bevel-wheel t^2, which gears with another bevel-wheel t^3 on the shaft of pulley r'.

As the carriage traverses along the taker-in C the quickly-revolving drum D takes the fibers off it and transfers them to the doffer F, whence they are combed off by the comb G and accumulated in the space inclosed by the vertical endless aprons H and K, the horizontal apron L, and the roller I, and the aprons L and K forward it to the feed-rollers m m', which in traveling along the second taker-in M transfer the fibers to the same. By this action the inequalities in thickness occurring in the lap A in a transverse direction are equalized, while the fibers are always combed in the same direction, the effect being similar as if the lap sixty or seventy inches wide were folded up into a ribbon eight or nine inches wide and this again pulled evenly out to a width of sixty or seventy inches. On the shaft o another pulley o^4 is mounted, driving, by a belt p', a pulley p^2, which carries a pinion p^3, gearing with the wheel p, in which the crank-pin c^4, actuating the lap-feed motion, is fixed.

What I claim is—

1. In a carding-engine, the combination, with the feed-rollers B and B'; of a ratchet-wheel secured to roller B, a slotted pawl-lever pivoted on the end of roller B, a pawl b' pivoted to the said lever and engaging with the said ratchet-wheel, a screw-threaded spindle journaled longitudinally in the said lever and provided with means for revolving it, a slidable nut arranged in the slotted lever and operated by the said spindle, a revoluble wheel provided with a laterally-projecting crank-pin, and a lever pivoted at one end on the said crank-pin and provided with a fork on its other end engaging with pins projecting from the said nut, substantially as set forth.

2. In a carding-engine, the combination, with the two long takers-in C and M; of equalizing devices interposed between the said parts and comprising, frames S, a carding-drum D; a fancy roller E above and in front of the carding-drum, a doffer F and a comb G above and at the rear of the carding-drum, a holding-down roller I below the said comb, endless aprons H, K, and L, carried by rollers and forming a space under the roller I for the accumulation of the fibers, the feed-rollers m m' at the bottom and rear of the said space, for delivering the fibers to the taker-in M; and driving mechanism operating to reciprocate the said equalizing devices longitudinally of the said takers-in, substantially as set forth.

ALPHONSE BORIOS.

Witnesses:
BENJAMIN H. RIDGELY,
OTTO H. MAY.