

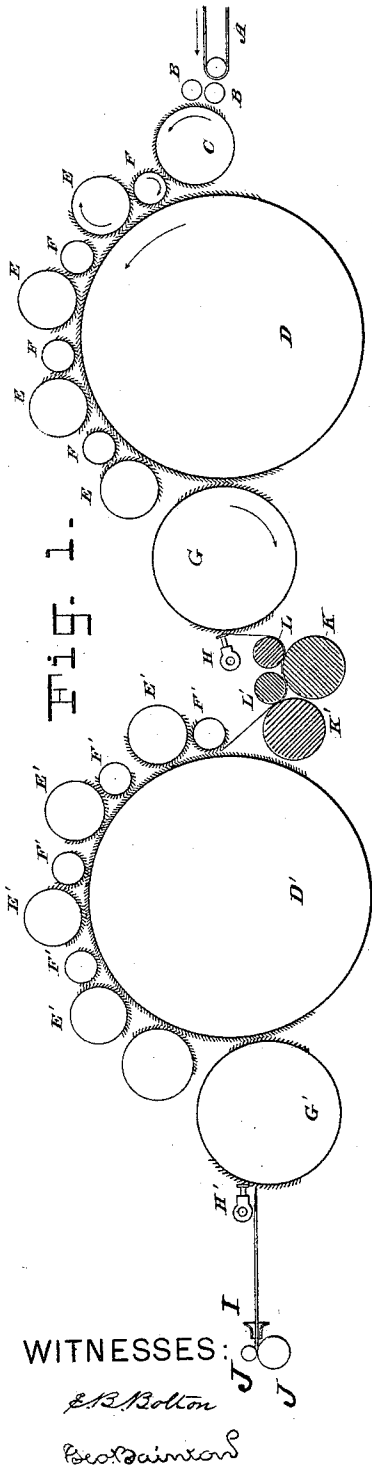
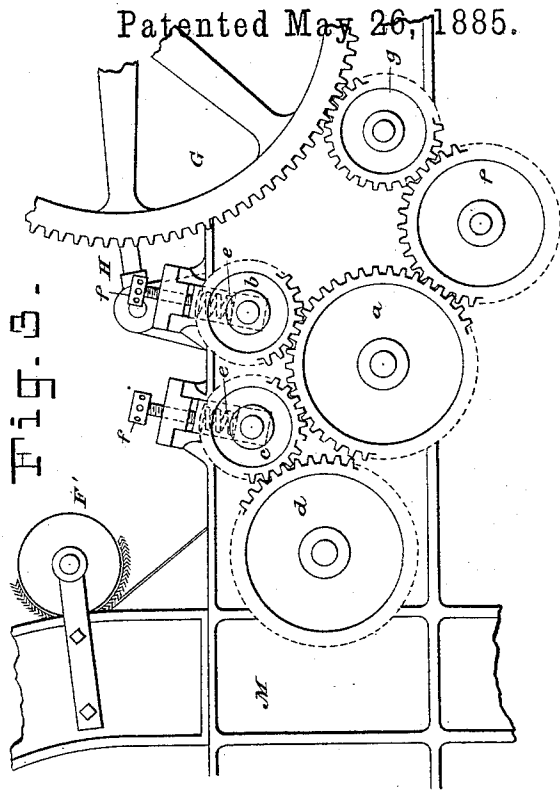
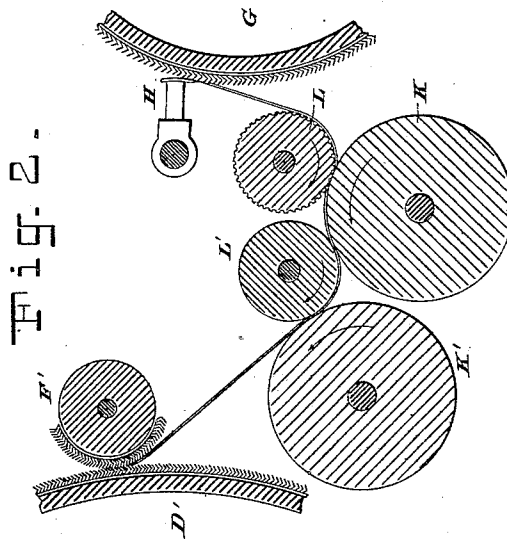
(No Model.)

E. HARMEL.

ART OF REMOVING FOREIGN SUBSTANCES FROM WOOL AND OTHER
TEXTILE FIBERS.

No. 318,730.

Patented May 26, 1885.



INVENTOR:

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ART OF REMOVING FOREIGN SUBSTANCES FROM WOOL AND OTHER TEXTILE FIBERS.

SPECIFICATION forming part of Letters Patent No. 318,730, dated May 26, 1885.

Application filed January 13, 1883. (No model.) Patented in France May 15, 1882, No. 148,946; in England July 29, 1882, No. 3,602;
in Belgium August 3, 1882, No. 58,602, and in Italy November 20, 1882, No. 14,787.

To all whom it may concern:

Be it known that I, ERNEST HARMEL, a citizen of the French Republic, and a resident of Val des Bois, Marne, France, have invented an improvement in the art of removing foreign substances from wool and other textile fibers, of which the following is a specification.

Wool, cotton, and other textile fibers are found to contain always more or less of foreign substances in the nature of burrs, stalks, stems, hulls, &c., the separation of which has always been attended with great difficulty, and the presence of which in the fiber has occasioned much trouble with the delicate machinery employed.

The object of my invention is to provide an effective method of removing such foreign substances from the fiber.

To this end my invention consists in passing the fiber through a carding-machine or breaker, thus reducing it to the form of a thin lap, then passing this attenuated lap between pressure-rollers, which crush and granulate the burrs, sticks, and other foreign substances, and, finally, completing the operation of carding the fibers by means of the "second breaker" (in the case of wool) or the "finisher," during which carding operation the crushed or pulverized particles in the fiber are separated and fall out. In this manner my process is effective in wholly freeing the fibers from all such foreign matters as have not heretofore been successfully removed from the fibers previous to the carding operation.

My process is designed most particularly for wool fibers, although it may also be advantageously employed for cotton, and perhaps, also, for other fibers. It is essential that the carded lap be so loose, thin, and open as to expose the burrs and other foreign substances to the action of the rollers, and that the latter be pressed together with sufficient force to thoroughly crush and disintegrate the foreign substances that it is desired to remove. In case one pair of rollers is found insufficient two or more pairs may be employed.

In the accompanying drawings I have

shown the necessary apparatus for carrying out my invention; but I have not deemed it necessary to illustrate the details of the carding-engine, as the construction of such machines is well understood.

Figure 1 is a vertical longitudinal section of the carding-engines or breakers, provided with cushioning-rollers arranged to carry out my invention. Fig. 2 is a fragmentary enlarged section of the crushing-rollers, and Fig. 3 is a fragmentary side elevation showing the mounting of and means for driving the crushing-rollers.

Referring to Fig. 1, A is the endless apron for conveying the layer of wool to the machine.

B B are the feeding-rollers for drawing the wool into the machine and presenting it to the action of the lick-in C.

D is the carding-cylinder of the breaker, and E E are the workers, and F F the cleaners thereof. G is the doffer, and H the doffer-knife. These parts constitute the breaker in case two carding-machines, a breaker, and finisher are used, or the first breaker in case three machines are employed.

D' is the carding-cylinder of the second machine, being the finisher or second breaker, as the case may be.

E' E' and F' F' are respectively the workers and cleaners thereof, and G' and H' are respectively the doffer and doffer-knife thereof.

I is the trumpet, and J J are the drawing-rolls for gathering the fleece or web into a sliver and drawing the latter from the machine.

Between the first and second machines are arranged the crushing-rollers required by my invention, which have hard surfaces, so as to be capable of crushing the hard substances in the fibers. They are preferably made of cast iron, but other hard materials may be suitable. I have shown two lower rollers, K K', and two upper rollers, L L'. These are arranged between the doffer-knife H of the first machine and the first squirrel or cleaner F' of the second machine, and the thin fleece or lap taken from the first machine is caused to pass between these rollers before entering

the second machine. This is clearly shown in Figs. 1 and 2. The pressure-rollers are driven in the directions denoted by the arrows in Fig. 2, and all with a uniform surface-speed, which should be sufficient to draw off the fleece or lap from the doffer-knife as thin as is desirable. One suitable arrangement of gears for driving them is shown in Fig. 3, where M is a portion of the exterior supporting-frame of the machine. *a* is a gear fixed on the shaft of a roller, K. *b* and *c* are gears meshing with gear *a*, but not with each other, and fixed, respectively, on the shafts of the two rollers L L'; and *d* is a gear fixed on the shaft of the roller K' and meshing with *c*. Either of these gears may be the driver, and its shaft is to be driven from the main shaft or other moving part of the machine by suitably-proportioned gears, as will be readily understood. According to the arrangement shown, the gear *a* is driven through idlers *f g* from the gear *h* on the shaft of the doffer G. The rollers K K' are in fixed bearings, and the rollers L L' are in slotted bearings and provided with means for adjusting their pressure against the rollers K K'. The construction shown consists of bearing-blocks sliding in inclined guides and pressed down by stiff springs *e e*, the tension of which is adjusted by screws *f f*, or the adjusting-screws may bear directly on the bearing-blocks in case an unyielding pressure is desired, or the pressure may be due wholly to the weight of the upper rolls.

The precise method of attaining the pressure is immaterial to my invention, any known and suitable method being admissible. This pressure, however attained, should be sufficient to thoroughly crush or granulate the foreign substances that it is desired to remove from the wool, and the lap of partially-carded fibers should be drawn so thin as to fully expose the foreign substances therein to the crushing action of the rolls. The lap being very thin, the foreign substances that may be in it are crushed and broken into small pieces, which partly fall of themselves from the crushing-rolls, and are partly removed by the subsequent carding operation. The portions which remain, being in the form of dust or very fine particles, will not interfere with the spinning of the wool into yarn. Those particles which instead of falling out under the machine remain in the carding will go, of course, into the

noils or short wool, and the wool spun into yarn will be left entirely free from any appreciable quantity. The rolls K K', L L' may be either plain or fluted; but I prefer to flute one or more of the rolls, leaving the others plain. The fluted surfaces serve to more thoroughly cut up and disintegrate the burrs and other substances than the pressure of plain surfaces; but the flutes or corrugations should not be so sharp or abrupt as to injure the textile fibers. I have shown the lower rollers plain and the first upper roller, L, fluted, while the second is plain.

In order to insure the utter destruction of the foreign substances, several sets of crushing-rolls may be employed, being arranged at different points in the machine, so as to act upon the fiber in successive stages of the carding operation.

I am well aware that fluted feeding-rolls are commonly employed in carding-engines to draw the lap to be carded into the machine; but I am not aware that such rolls have been forced together with sufficient pressure to crush the foreign particles in the wool, nor am I aware that a lap of fibers to be carded has been fed to a carding-engine in so thin a web as to enable the foreign substances in it to be crushed by pressure.

My invention requires a lap so thin as to expose the foreign particles, and a pressure sufficient to crush them.

Having thus described my invention, I claim—

The improved method of treating wool and other textile fibers for the removal of burrs, stems, and other foreign substances, which consists in first carding or partially carding the fibers and forming them into a lap sufficiently thin to expose the foreign substances, then passing each lap between pressure-rollers, whereby the foreign substances are crushed, and then completing the carding of the fibers, whereby the greater portion of the crushed substances is removed from the fiber, substantially as set forth.

In witness whereof I have hereunto signed my name in the presence of two subscribing witnesses.

ERNEST HARMEL.

Witnesses:

GÉDÉON LAZARD,
MATTELDE KAHN.