(No Model.)

A. B. HANSCOM.

FEED ROLLS FOR CARDING MACHINES, &c.

No. 481,024. Patented Aug. 16, 1892.

Fig. 1.

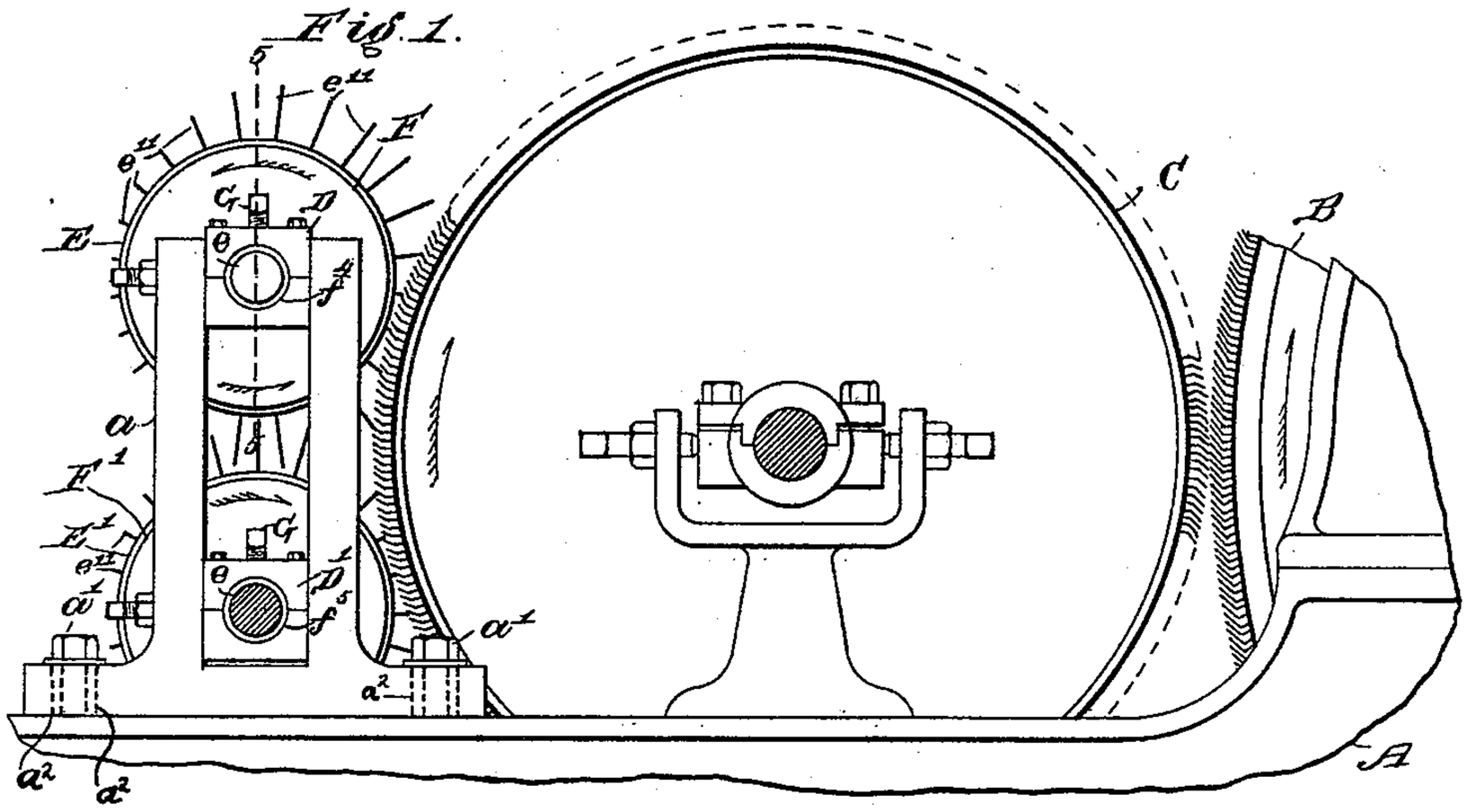


Fig. 2.

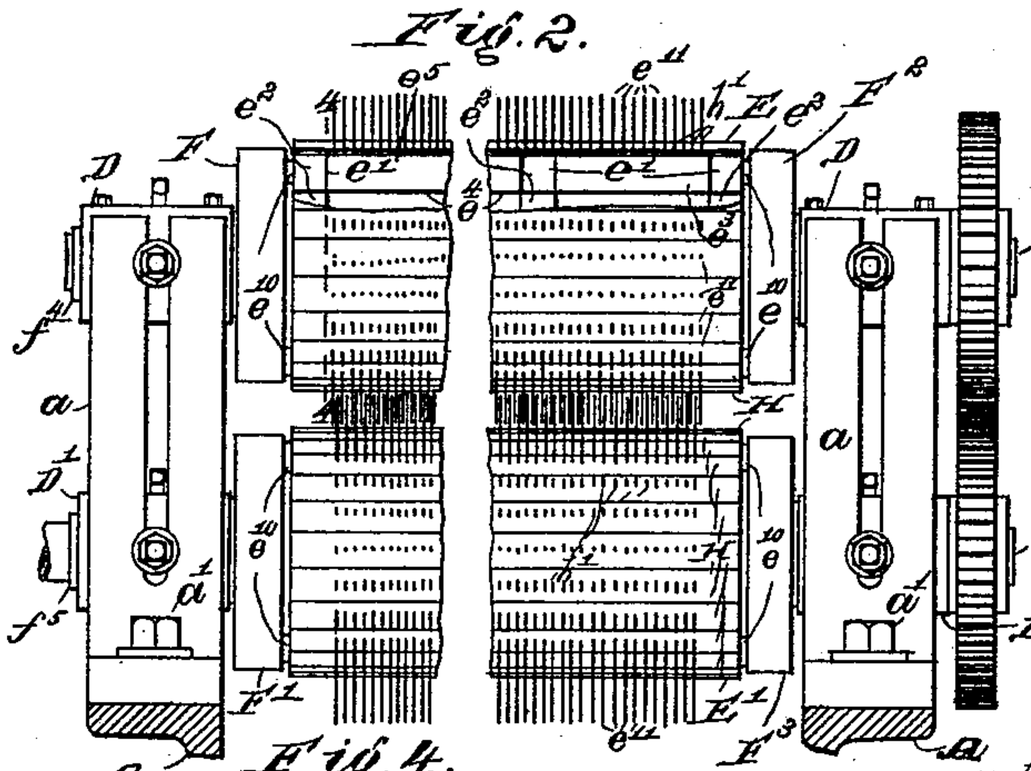


Fig. 3.

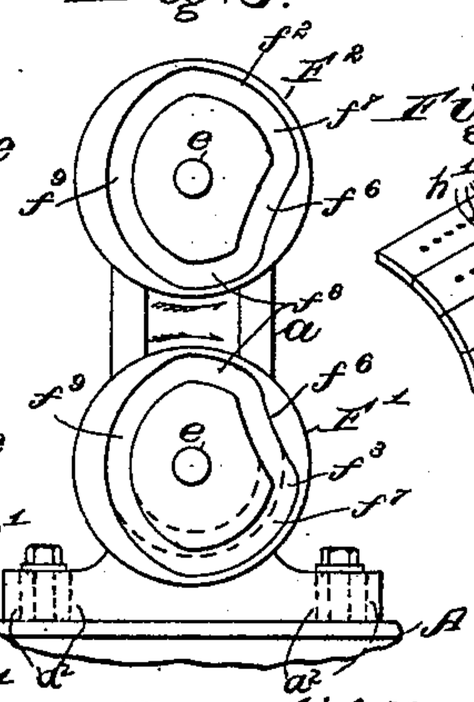


Fig. 6.

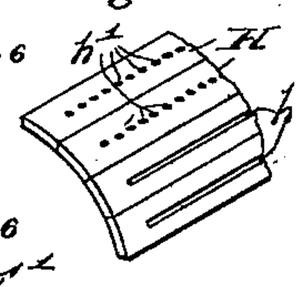


Fig. 4.

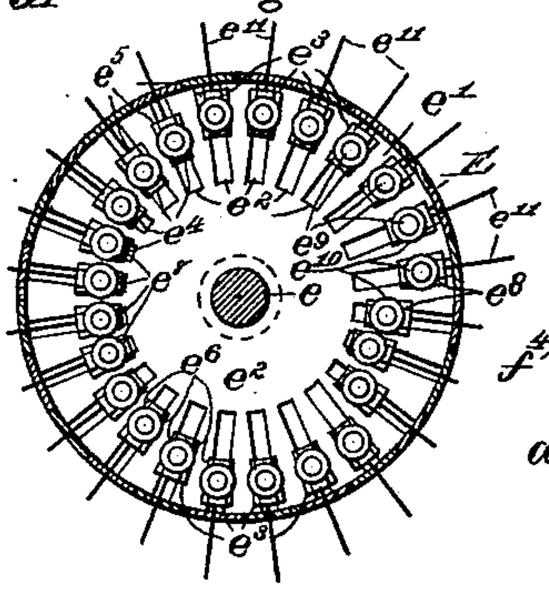


Fig. 5.

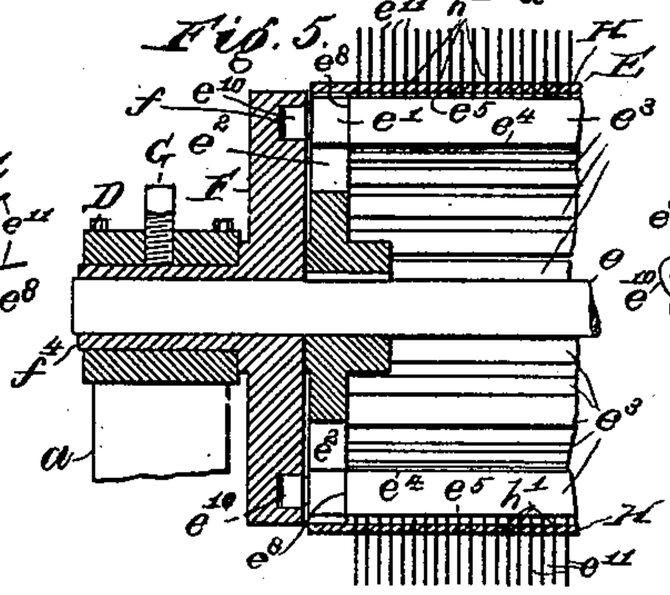


Fig. 7.

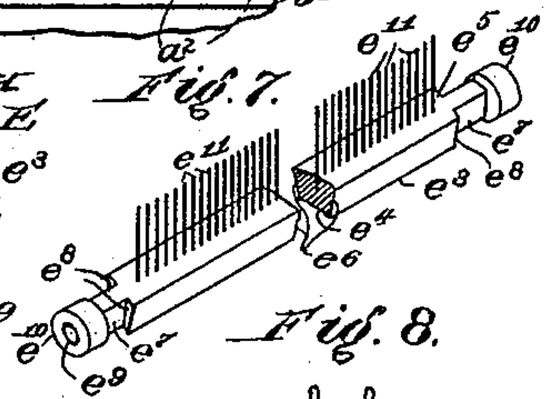
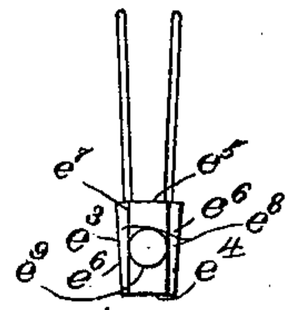


Fig. 8.



Witnesses—
Kirkley & Hyde.
Myrtie L. Beals.

Inventor—
Aaron B. Hanscom,
By Albert M. Moore,
His Attorney.

UNITED STATES PATENT OFFICE.

AARON B. HANSCOM, OF NORTH ANDOVER, MASSACHUSETTS.

FEED-ROLL FOR CARDING-MACHINES, &c.

SPECIFICATION forming part of Letters Patent No. 481,024, dated August 16, 1892.

Application filed April 8, 1891. Serial No. 388,165. (No model.)

To all whom it may concern:

Be it known that I, AARON B. HANSCOM, a citizen of the United States, residing at North Andover, in the county of Essex and Commonwealth of Massachusetts, have invented a certain new and useful Improvement in Feed-Rolls for Carding-Machines, &c., of which the following is a specification.

My invention relates to feed-rolls for machines for working wool and other fibers; and the object of said invention is to deliver the fibers from the feed-rolls to the roll next in operation uniformly and uninjured—that is, to avoid feeding short fibers in irregular masses or bunches and to avoid breaking long fibers.

In the accompanying drawings, Figure 1 is a right-side elevation of a part of the frame of a carding-machine, part of the main cylinder, the licker-in, a pair of feed-rolls constructed according to my improvement, their cams and journal-boxes, and the pillow-block in which said journal-boxes are supported; Fig. 2, a front elevation of a part of the frame, the feed-rolls, and their cams; Fig. 3, an elevation of the inner sides of the cams which at the left of the machine vary the position of the teeth of the feed-rolls; Fig. 4, a section on the line 4 4 in Fig. 2 of the upper feed-roll; Fig. 5, a longitudinal section on the line 5 5 in Fig. 1 of the upper feed-roll; Fig. 6, an isometric perspective view of some of the perforated lags which form the cylindrical surface of each feed-roll and which guide, brace, and strip the teeth or pins of the feed-rolls; Fig. 7, an isometric perspective view of one of the teeth-carrying bars provided with a single row of teeth; Fig. 8, an end elevation of a teeth-carrying bar having two rows of teeth.

The frame A, main cylinder B, and licker-in C are of the usual construction and operation as found in carding-engines. The pillow-block a is also of the usual construction and operation, being secured on the top of the main frame by bolts a', which pass down through the feet of said pillow-block into the top of the sides or main part of said frame, the slots (indicated by vertical dotted lines at a^2 in Figs. 1 and 3) in said pillow-block through which said bolts pass being long enough from front to back to allow the pillow-block to be adjusted nearer to or farther from the licker-in C.

In journal-boxes D D′, of the usual construction, are journaled the feed-rolls E E′, the upper one of said journal-boxes being vertically adjustable by the usual means to vary the distance between the feed-rolls, none of the parts above named being of my invention except the feed-rolls.

Feed-rolls in the class of machines to which this invention most nearly relates are commonly covered either with leather-card clothing having very strong teeth or else with steel clothing, in which the teeth are serrations formed in the edge of a steel ribbon or strip set on edge in a spiral groove with which each roll is provided. It is found that feed-rolls of the ordinary construction deliver the short fibers to the roll next in operation (which in the second breaker or finisher of a set of carding-engines is usually a licker-in C, but which in a first breaker may be a burr-cylinder covered with steel clothing, substantially like that above described) in irregular bunches, which require a greater amount of carding properly to open them, necessitating a greater amount of carding-surface and rendering the fibers liable to be broken and injured by overcarding. It is also found that with the feed-rolls in common use the long fibers—such as the more valuable combing wools—are broken by the action of the next roll upon said fibers, the feed-rolls retaining a strong hold upon the fibers, owing to the nature of their teeth, and also because they are usually placed as near as possible to the next roll, in order, as far as possible, to hold the shorter fibers until the latter are seized by said next roll. Hence some manufacturers use very small feed-rolls to bring the bite of the feed-rolls nearer to the next roll, thus diminishing the carding-surface between said feed-rolls and next roll, while others use larger feed-rolls, getting more carding-surface, but removing the bite of said feed-rolls farther from the next roll and increasing the difficulty of properly delivering the short fibers.

I am enabled by the means hereinafter described to arrange the licker-in or other next roll nearer to the bite of the feed-rolls than

usual and at the same time to get a greater carding or opening surface on the feed-rolls and next roll than heretofore.

Each of my improved feed-rolls E E′ comprises a shaft *e*, having two or more disks *e′* fast thereon, and having radial slots e^2, extending from the periphery inward. Each feed-roll is provided with as many teeth-carrying bars e^3 as there are radial slots in one of its disks and each of said bars is preferably shaped in cross-section like the frustum of a wedge—that is, the width of that face e^4 of the bar nearest the shaft of the feed-roll is necessarily limited to allow the bars to be drawn inward to the proper amount without interfering with a similar movement of the adjacent bars; but the teeth-carrying surface e^5, parallel with said surface e^4, is made wider to give said bar a greater strength and lateral stiffness when the teeth e^{11} are engaged with the stock, the inclined surfaces e^6 of said bar lying in radial planes when the bar is nearest the shaft of its feed-roll. Each bar e^3 has a portion near each end rectangular in cross-section, as shown at e^7, which enters a slot e^2 in one of the disks *e′* and has a sliding fit in said slot.

In very long feed-rolls it may be advisable to use other slotted disks *e′* between the end disks of a feed-roll, in which case each bar e^3 must be rectangular in cross-section at each such disk to enter a slot thereof. Obviously the rectangular parts of the bars will be narrower than the general width of the bar, so that each bar will be provided with shoulders e^8, which, coming in contact with the inner faces of the end disks *e′* of the feed-roll, will prevent any longitudinal movement of the bars. Each bar e^3 is provided at each end with a stud e^9, circular in cross-section and carrying an anti-friction roll e^{10} outside of the end disks of the feed-roll of which such bar forms a part.

At each end of each feed-roll is arranged a stationary cam-disk F F′ F^2 F^3, having a central hollow stem f^4 f^5, which serves as a bushing for the corresponding journal-box D D′ and surrounds a journal of a feed-roll shaft, each such stem being held from rotation by a set-screw G, which enters the corresponding journal-box and thrusts radially against such stem. By loosening the set-screw G any cam may be slightly turned to adjust the position of its cam-groove *f f′* f^2 f^3.

Each cam-disk is arranged between the end of a feed-roll and a pillow-block, and each cam-groove receives all the anti-friction rolls e^{10} at one end of one of the feed-rolls, so that a rotation of a feed-roll will cause the bars e^3 of said feed-roll to move toward and from the center of the feed-roll shaft, and the cam-grooves at opposite ends of the same feed-roll being parallel with each other said bars e^3 will always be parallel with said shaft.

Each cam-groove is provided with a portion f^6, curved concentrically with the licker-in or other roll next after the feed-rolls to carry the bars e^3, and therefore the points of their teeth, for a certain distance parallel with the carding-surface of the licker-in, and this portion f^6 of said groove is arranged at such a distance from the axis of said licker-in or similarly-placed roll as to bring the teeth of the feed-rolls, or at least of the upper feed-roll, as close as possible to such licker-in or other next roll without touching the latter. The portion f^6 of the cam-groove is immediately preceded in operation by a portion f^8 of said groove concentric with said disk, and is immediately followed in the direction in which the feed-rolls revolve by another portion f^7, also represented as concentric with said disk and having an equal radius with the portion f^8, and the remaining part f^9 of the cam-groove connects the portions f^7 f^8 and is of such configuration as to draw the bars, with their teeth e^{11}, toward the center of the feed-roll, and then just as the stock comes in contact with the feed-rolls to push said bars outward, crowding the teeth of said bars into said stock until the teeth have their greatest projection when pointing directly toward the shaft of the other feed-roll. The teeth of each feed-roll being drawn in nearest the shafts of their respective feed-rolls when said teeth first come in contact with the stock are less liable to be bent or broken by the resistance of the teeth of the other feed-roll and are less liable to double the fibers about the teeth of the other feed-roll, and the subsequent projection of said teeth better enables them to penetrate the bunches of stock and with the aid of the licker-in to open said bunches. The concentric portion f^7 of the cam-groove is not essential, because it merely causes the teeth e^{11} to retain for a time the same amount of projection they have at the end of the portion f^6 of said groove, but at a time when the amount of said projection is immaterial, so that the portions f^7 and f^9 of said groove may be a single continuous curve from the end of the portion f^6 to the point in said portion f^9 which is nearest the center of the cam-disk. Furthermore, the cam-grooves of the cam-disks which operate the bars e^3 of the lower feed-roll may in some cases be concentric with said disks from the middle of the portions f^6 of said grooves in the direction in which said lower feed-roll rotates to the middle of the portions f^9 of said grooves, when the machine is intended to be operated upon long coarse fibers, as carpet-wools, to prevent fibers which may be carried entirely around by the licker-in from being caught by the teeth of said lower roll.

For ordinary stock cams constructed in accordance with the drawings will be found to be satisfactory and can be made by the use of two patterns only, the cam-disk at each end of each roll being a duplicate of the cam at the opposite end of the other roll.

Metallic lags H, secured to the disks *e′*, keep dirt and fibers out of the feed-rolls and are provided with perforations, which may be slits, a single slit *h* for an entire row of teeth

carried by the same bar, but are preferably small holes h', arranged in a row longitudinally of the feed-roll and equal in number to the number of teeth in a row. The perforations h h' guide the teeth, brace them against the pull of the fibers, and relieve or strip the teeth from the fibers when the teeth are retracted into the feed-rolls.

The feed-rolls above described may be used to deliver fibers to any revolving cylinder provided with teeth.

I claim as my invention—

1. The combination of a cylindrical feed-roll having longitudinally-movable teeth, another roll adapted to receive fibers from said teeth, and means of causing the points of said teeth at the side of said feed-roll adjacent to said receiving-roll to lie in a curved surface concentric with the axis of said receiving-roll, as and for the purpose specified.

2. In combination with a receiving-roll, as a licker-in or burr-cylinder, of two rotary feed-rolls parallel with said receiving-roll, each of said feed-rolls having bars arranged to move radially therein, outwardly-projecting teeth carried by said bars, and stationary cams engaging said bars to vary the distance of said bars from the centers of said feed-rolls and to move said bars during a portion of each revolution of said feed-rolls in a curved path concentric with said receiving-roll and in proximity thereto, as and for the purpose specified.

3. The combination of two parallel rotary feed-rolls, each having bars arranged to move radially therein, outwardly-projecting teeth carried by said bars, stationary cams having cam-grooves to engage said bars, to vary the distance of said bars from the centers of said feed-rolls, portions of said cam-grooves on the receiving sides of said rolls having an increasing radius to cause the teeth of each feed-roll in approaching the teeth of the other to enter the stock gradually and to attain their greatest projection when opposite the shaft of the other feed-roll, as and for the purpose specified.

4. The combination of a shaft, radially-slotted disks fast on said shaft, bars movable in the slots of said disks toward and from said shaft and projecting through said slots, lags secured to the peripheries of said disks, teeth carried by said bars and projecting outwardly through openings with which said lags are provided, and stationary cams engaging the ends of said bars to vary the distance of said bars from said shaft when said shaft is rotated, as and for the purpose specified.

5. The combination of a shaft, radially-slotted disks fast on said shaft, bars movable in the slots of said disks toward and from said shaft and projecting through said slots, outwardly-projecting teeth carried by said bars, journal-boxes and cams having hollow cylindrical stems arranged in said journal-boxes and surrounding the journals of said shaft, and having cam-grooves to enable said cam-grooves to be brought into parallelism with each other by the rotation of said cams, as and for the purpose specified.

6. The combination of a shaft, radially-slotted disks fast on said shaft, bars movable in the slots of said disks toward and from said shaft and projecting through said slots, outwardly-projecting teeth carried by said bars, journal-boxes, cams having cam-grooves and having hollow cylindrical stems arranged to turn in said journal-boxes and surrounding the journals of said shaft to enable said cam-grooves to be brought into parallelism with each other by the rotation of said cams, and set-screws turning in said journal-boxes and thrusting against said stems to prevent the rotation of said cams, as and for the purpose specified.

In witness whereof I have signed this specification, in the presence of two attesting witnesses, this 28th day of March, A. D. 1891.

AARON B. HANSCOM.

Witnesses:
ALBERT M. MOORE,
MYRTIE C. BEALS.