(No Model.) 2 Sheets—Sheet 1.

F. J. MAUBORGNE.

HAIR CARDING MACHINE.

No. 454,175. Patented June 16, 1891.

Fig. 1.

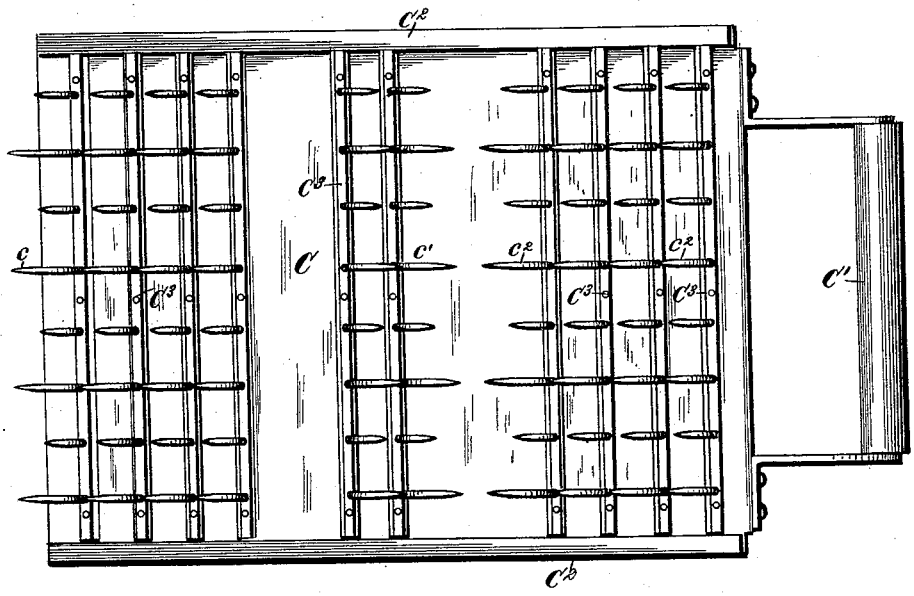


Fig. 2.

Fig. 3.

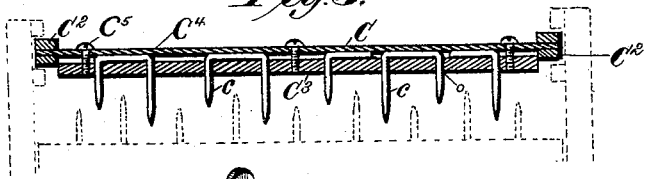
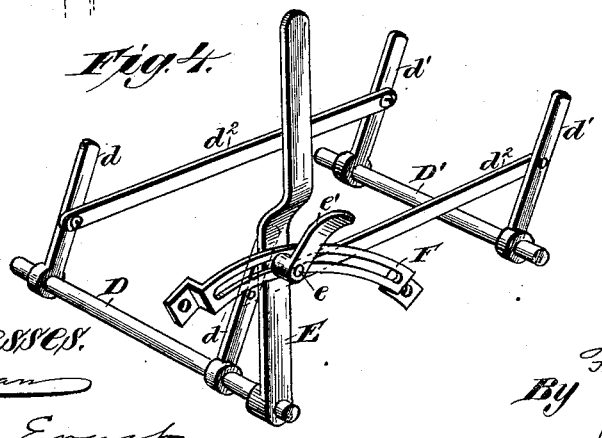


Fig. 4.



Witnesses.
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Wm. M. Ernst

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(No Model.) 2 Sheets—Sheet 2.

F. J. MAUBORGNE.

HAIR CARDING MACHINE.

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Fig. 5.

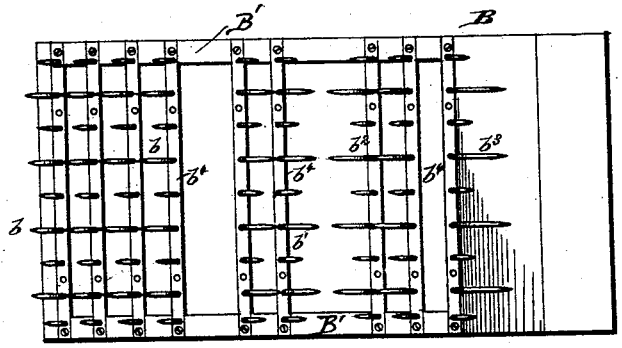


Fig. 6.

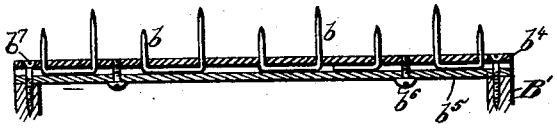
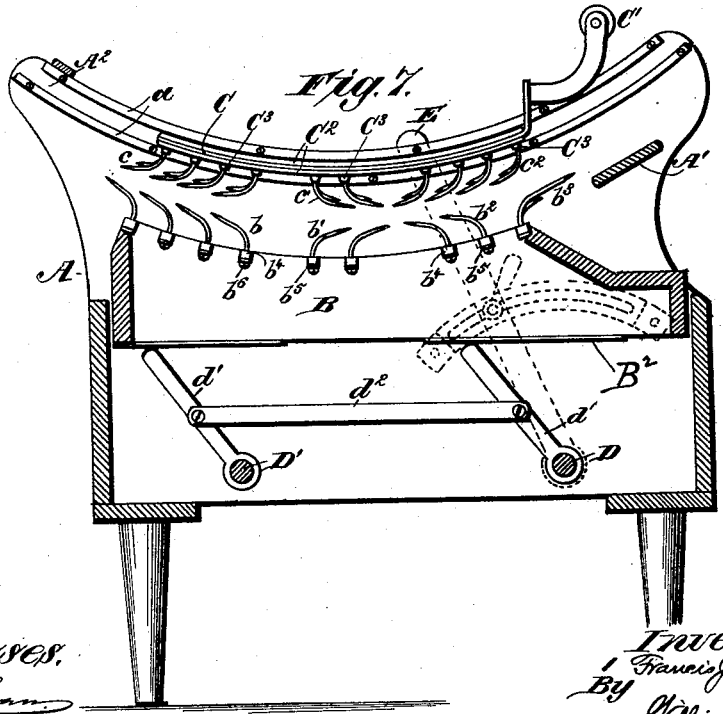


Fig. 7.



Witnesses.
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Wm. M. Ernst

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UNITED STATES PATENT OFFICE.

FRANCIS J. MAUBORGNE, OF NEW YORK, N. Y.

HAIR-CARDING MACHINE.

SPECIFICATION forming part of Letters Patent No. 454,175, dated June 16, 1891.

Application filed October 24, 1889. Renewed April 10, 1891. Serial No. 388,399. (No model.)

To all whom it may concern:

Be it known that I, FRANCIS J. MAUBORGNE, a citizen of the United States, residing at New York, in the State of New York, have invented certain new and useful Improvements in Hair-Carding Machines; and I do 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, reference being had to the accompanying drawings, and to the letters marked thereon, which form part of this specification.

My invention relates to hair-carding machines and is an improvement upon the machine described in the patent issued to Louis Zaller, No. 342,945, dated June 1, 1886, and its novelty consists in the construction and adaptation of the parts, as will be more specifically pointed out in the claims.

In the use of Zaller's machine above referred to several practical difficulties were encountered which it is my purpose in my present invention to overcome. The hooks were not set at the proper distances to insure the highest efficiency. They were all of uniform size and were secured to the frames in which they were set in such a manner that the machine had to be taken to pieces at a great loss of time and at considerable expense, in order to replace a hook which had been bent or broken. The method of supporting the oscillating frame from above and by which it was subjected to a constant strain on its shaft was defective. It was liable to become displaced and prevented the best action of the hooks. The adjusting mechanism for raising and lowering the oscillating frame was too coarse to admit of accurate adjustment to varying kinds of work. The spaces between the hooks on each frame were not correct, and the solid floor of the bed-frame with its one small transverse aperture prevented the escape of the foreign matter removed from the material carded and practically destroyed one-half of the value of the machine. In addition, the construction of the machine necessitated the employment of a solid and heavy structure, which was not readily movable and was expensive to carry from place to place.

In my improved device I have succeeded in remedying all of the defects mentioned and in producing a machine which is simple in construction, readily repaired by unskilled labor, the use of which is easily learned, the adjustment of which is accurate, and which is portable and cheaply made.

In the drawings, Figure 1 is a bottom plan view of the oscillating frame. Fig. 2 is a perspective detail view illustrating the method of inserting the hooks in the hook-bar. Fig. 3 is a longitudinal central section of the hook-bar and fastenings, showing the inserted hooks in elevation. Fig. 4 is a perspective view of the lifting mechanism of the bed-frame. Fig. 5 is a top plan view of the bed-frame. Fig. 6 is a longitudinal section of the hook-bar and its connections with the bed-frame; and Fig. 7 is a central vertical section of the entire machine, showing parts in elevation.

In the drawings, A is the supporting-frame of my device, consisting of a rectangular frame or shell supported upon legs or in any suitable manner, and which incloses the bed-frame B, of which the side walls are extended upward and terminate in a concave-shaped top, each of which walls is provided with rails *a*, also curved concavely, which serve as guideways A^2 for the oscillating frame C. The front and rear of the supporting-frame are open, but at its rear end it is provided with a transversely-sloping shelf A′, underneath which the hair or other material to be carded is fed into the machine.

The oscillating frame C is convexly curved, and consists of the rails C^2, which run in the guideways A^2, and of the hook-bars C^3, and is provided with a handle C′, extending backward for the convenience of the operator, and the spaces between the hook-bars are left open. The hook-bars are secured to the rails in any approved manner and support the hooks *c*, which are arranged in the particular machine illustrated in the drawings in three sets. One set c^2 has its prongs turned forward and consists of four rows of hooks. These are nearest to the mouth of the machine. Next to this is another set of hooks *c*′, consisting of two rows, which has its prongs turned in the opposite direction. At the front of the oscillating frame is a set *c* of four rows, arranged as the first set c^2. The distance between the several sets at their bases should be about twice the distance between any two

adjacent hook-bars. The hooks on each bar are of unequal length, each alternate hook on any bar being longer than the one next to it. The method which I employ for securing the hooks to the hook-bar is more fully illustrated in Figs. 2 and 3. A groove is channeled in the under side of each bar deep enough to receive the wire of which the hooks are composed, and apertures, as *o*, are drilled in its upper side through which the hooks project. A retaining-bar C^4 of the same general width as the back of the hook-bar is secured to it by suitable means, such as the screws C^5, and serves to hold the hooks in place. While I may bend two adjacent hooks out of one piece of wire, I usually prefer to make each hook with its own shank. Should any hook bend or break, it can be easily removed and another inserted in its place by removing the retaining-bar and inserting a new hook in place of the injured one.

The bed-frame B consists of concavely-curved strips, as B′, which support its transverse hook-bars b^4. These hook-bars are constructed in the same manner as those upon the oscillating frame. The hooks *b* are arranged in a channeled groove in the hook-bar, and are held in place by a retaining-bar b^5 and screws b^6, the whole being secured to the strips B′ by means of the screws b^7. The hooks projecting upward from the bed-frame intermesh with those in the oscillating frame, which are turned in the opposite direction, and which are similarly arranged in groups of four rows, two rows as *b* and b^2 and two rows as *b′* and b^3. The hooks of the bed-frame have each set pointing in the direction in which the hooks of the corresponding set of the oscillating frame point. The first row of hooks b^3 are provided with the longer hooks, much longer than those of any other row, and these serve to assist the operator in feeding the material to the machine. It will be observed that a space is left between the groups *c* and *c′* on the oscillating frame and the groups *b* and *b′* on the bed-frame. This prevents the hair from rolling up into a ball, which I found that it had a tendency to do at that point in the machine described in Zaller's patent. My present arrangement permits it to fall to the ground should such a tendency develop. The spaces between the hook-bars of the bed-frame are open, which not only makes the machine much lighter than when it was made solid, but allows the impurities and dust carded out of the hair to fall to the ground.

The bottom of the bed-frame is level and consists of two strips B^2, which rest upon four inclined levers *d′*. These levers are connected by links d^2, which stiffen them, and are rigidly secured at their lower ends to two rock-shafts D and D′, supported in suitable bearings on the supporting-frame A. One of the rock-shafts has secured to its outer end and outside of the supporting-frame a lever E, by which it is turned and the levers *d′* moved and the bed-frame raised or lowered in consequence. This or some similar means of vertical adjustment of the distance between the bed-frame and the oscillating frame is necessary, because different materials require different distances between the corresponding and intermeshing sets of hooks on each frame to secure the best results in carding. This distance should be greater when the material to be carded is long and tough than when it is short and soft.

In Fig. 7 I show the concave bed-frame at its lowest position and adjusted to card long and tough materials. In order to card shorter and softer materials, the bed-frame is raised by the mechanism described until the hooks *b*, *b′*, and b^2 intermesh with the hooks *c*, *c′*, and c^2 on the oscillating frame. Also secured to the outside of the supporting-frame is the slotted arc-shaped bearing F, through the slot of which passes a pin *e*, which can be tightened by means of the nut or button *e′* and the lever E and the lifting mechanism retained in any desired position.

The operation of the device is obvious. The hair or other material to be carded is fed into the machine at its throat under the sloping shelf A′ by the operator, who stands or sits at the rear end of the machine. At the same time that he feeds the material he grasps the handle C′ of the oscillating frame and draws it toward him until the set of hooks *c* are opposite to the set b^3. He then pushes the oscillating frame forward as the hair is fed. By the action of the hooks on the oscillating frame the hair is evenly distributed through the machine, and gradually travels forward until it falls out at the front end. By raising or lowering the bed-frame by the mechanism provided for that purpose the distance between the hooks can be regulated and fine or coarse work may be done at pleasure. The hair has a tendency to choke or bunch between the sets *c* and *c′*, and this I avoid by leaving an open space just at that point. By making the hooks alternately long and short the efficiency of the machine is greatly increased, as fibers of unequal length are equally carded. By leaving the bed-frame open at the bottom and the oscillating frame open at the top the dirt and other impurities taken from the hair escape as soon as they are removed, and are not carried out of the machine with the hair. The teeth, if bent or broken, are quickly replaced by unskilled labor.

By using my device for adjusting the bed-frame instead of the oscillating frame I am enabled to dispense with the heavy mechanism heretofore employed for adjusting the oscillating frame, and my machine is accordingly made light and portable.

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

1. In a machine of the class described, the combination, with a concave bed-frame having groups of hooks arranged in rows, the

hooks of one group being bent in opposite direction to the hooks of the adjoining group, of an arc-shaped convex oscillating frame having groups of hooks also arranged in rows, each group having the hooks turned in opposite direction to the hooks of the adjoining group and arranged to intermesh with the hooks of the bed-frame, each alternate hook on each row on the bed-frame and oscillating frame being longer or shorter than the hook adjacent to it.

2. In a machine of the class described, a concave bed-frame having groups of hooks arranged in rows, the hooks on each row being alternately long and short, and the long hooks in the row nearest to the mouth of the machine being longer than any other hook in any group.

3. The combination, with the bed-frame provided with groups of hooks, of the adjusting mechanism for the same, consisting of the levers d', the rock-shafts D and D', the lever E, the slotted arc F, and means, substantially as described, for securing the lever E at any desired point.

4. The combination of the supporting-frame provided with the concave guideways A^2, of the convex oscillating frame C, provided with rails C^2, adapted to run in said grooved bearings, substantially as described.

5. The convex oscillating frame C, provided with three groups of rows of hooks c, c', and c^2, the hooks in the outer rows c and c^2 pointing forward and the hooks in the middle rows c' pointing backward, the bases of the rows in the middle group being distant from the bases of the rows in the outer groups a greater distance than the distance between the adjacent rows in any one group.

6. The concave bed-frame B, provided with four groups of hooks b, b', b^2, and b^3, the hooks of the groups b and b^2 pointing forward and those of the groups b' and b^3 pointing backward, the bases of the hooks in the group b' being distant from the bases of the hooks in the adjacent groups a greater distance than the distance between two adjacent rows of hooks in any one group.

7. The combination of the convex oscillating frame C, provided with groups of hooks c, c', and c^2, bent as described and adapted to move in guideways A^2 on the supporting-frame, with the concave bed-frame B, provided with groups of hooks b, b', b^2, and b^3, bent as described and provided with means whereby the bed-frame may be raised or lowered.

8. The hook-bar C^3, provided with a longitudinal slot to receive the shanks of the hooks c, and apertures, as o, through which the said hooks are adapted to pass, as set forth.

9. The combination, with the slotted hook-bar C^3, provided with apertures, as o, for receiving the hooks c, of the said hooks c, the retaining-bar C^4, and means, as C^5, for securing the retaining-bar to the hook-bar, as described.

In testimony whereof I affix my signature in presence of two witnesses.

FRANCIS J. MAUBORGNE.

Witnesses:
WM. RAIMOND BAIRD,
JAMES L. DE FLEMERY.