(No Model.)

F. MARTINOT.

CLOTH NAPPING MACHINE.

No. 494,152. Patented Mar. 28, 1893.

FIG. 1.

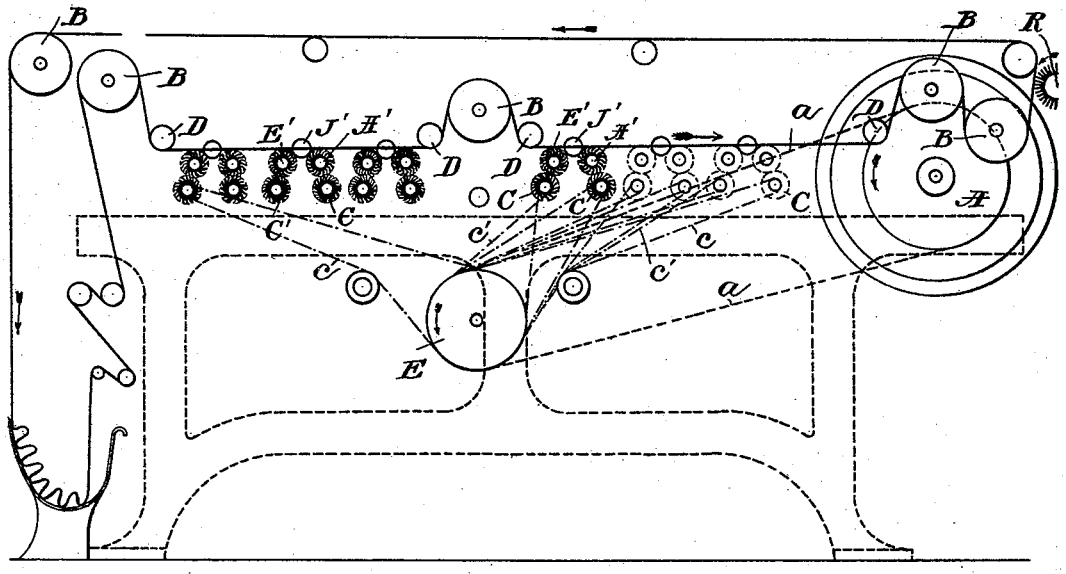


FIG. 2.

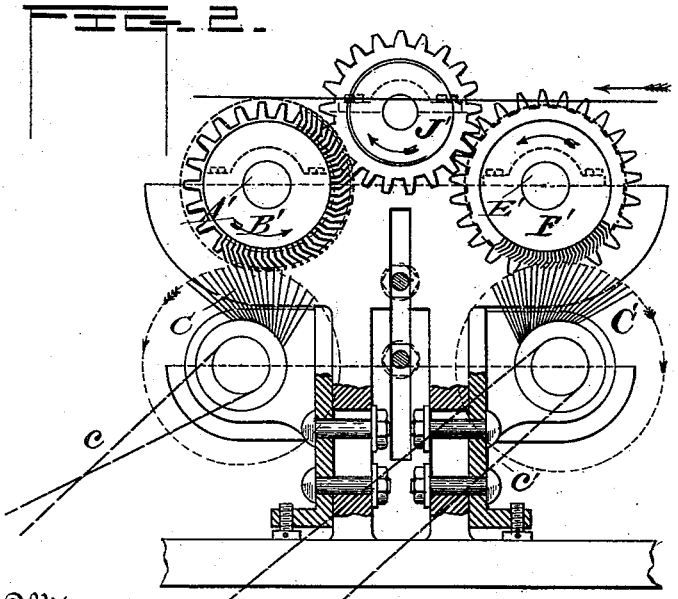
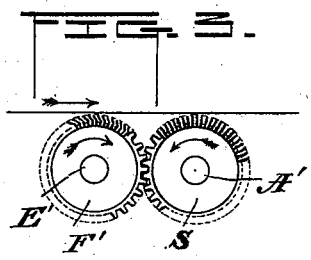


FIG. 3.



Witnesses
L. A. Commerford
P. L. Clark

Inventor
Ferdinand Martinot
By Geo. P. Whittemore
Attorney

UNITED STATES PATENT OFFICE.

FERDINAND MARTINOT, OF SEDAN, FRANCE.

CLOTH-NAPPING MACHINE.

SPECIFICATION forming part of Letters Patent No. 494,152, dated March 28, 1893.

Application filed May 21, 1891. Serial No. 393,665. (No model.) Patented in England July 19, 1887, No. 10,076, and May 18, 1888, No. 7,363, and in Germany July 28, 1887, No. 43,014.

To all whom it may concern:

Be it known that I, FERDINAND MARTINOT, a citizen of the Republic of France, residing at Sedan, France, have invented certain new and useful Improvements in Cloth-Napping Machines; and I do declare that the following is a full, clear, and distinct specification of the same, 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 of reference thereon.

This invention has been patented to me or to others with my consent in the following countries: Germany, July 28, 1887, No. 43,014, England July 19, 1887, No. 10,076, and May 18, 1888, No. 7,363.

In a previous application, filed December 3, 1887, Serial No. 256,993, I have claimed a system of gigging machines composed of one or more series of working rollers lined with cards and connected one with the other by a system of gear wheels of different diameters and changeable at will, so as to produce the teaseling in the two senses, *i. e.* with the fiber and against the fiber, the settings of cards being mounted in opposite sense in each pair of workers.

In the machine described in the above-mentioned application, the workers were adjusted on levers having an alternative motion.

The object of my present invention is to simplify the machine in dispensing with the alternative motion of the levers and in simply making use of the principle of drawing along the workers by the fabric itself the motion of which is accelerated, so as to form natural compensation of the motion of the levers, which are dispensed with. The workers are thus supported in fixed bearings: they are connected with each other by gear-wheels of different diameters, which can be changed *ad libitum*, in order to vary the energy of the action of the cards. The two workers composing each pair, revolve in the same direction, but at different velocities. The card bearings being set in opposite sense, the workers will consequently raise the fiber in opposite directions. The first worker having the points in its cards directed opposite to the direction in which the fabric travels, receives by contact with the fabric a rotary motion, which it transfers to the second worker, the teeth of which are directed opposite to the first. The rotary motion of the second worker is in the same direction as the other, but accelerated, because this second worker has a smaller gear wheel than that with which the first worker is provided. By changing the ratio of diameters of these gear wheels, the energy of the teaseling action can be varied at will, just as in my machine with alternate motion. Any other mechanical motion may be substituted for the gear wheels, such as pulleys with belts, sprocket wheels with chains, friction wheels of paper, leather, &c. The traveling velocity of the fabric is accelerated as the nature of the fabric to be teaseled will admit. Thus, in this new machine, the velocity of the fabric alone is used to give motion to the working rollers.

In the accompanying drawings, Figure 1 is a diagrammatic view of a machine embodying my improvements, and Fig. 2 is a detailed view on a larger scale of a pair of workers, and their clearers, viewed from the other side of the machine from that shown in Fig. 1. Fig. 3 shows a modification.

The machine is composed of two frames held together by cross rails, on which the cast iron bearings are mounted for the cast iron journals of the workers and their clearers. As many elements as necessary are placed on the fabric.

In Fig. 1 there are shown six elements, each composed of a pair of rollers, this number being sufficient for middle-sized fabrics. They are disposed in two groups, separated by a drawing roller designed to guide the fabric, which is led over five drawing rollers of the same diameter, and of uniform motion. The fabric is made to pass several times when thought necessary, in order to obtain the teaseling action by passing over the workers with a more or less close contact. If the space permits of it, a machine may be built large enough to complete the entire operation upon the fabric in one passage.

In Fig. 1 of the drawings, I have in fact, represented six pairs of workers, but I can place eighteen or twenty-four or thirty, or any number, as between each three pairs of workers, a

drawing cylinder is arranged. It is thus a non-interrupted continuation of gig mills of three pairs of workers. The fabric is in no place fatigued. Each group of three pairs taking the space of eighty centimeters, a machine of five meters in length will have thirty workers which is sufficient for the most difficult fabrics.

The raising in each pair of workers is effected in the following way: suppose the fabric is traveling in the direction of the arrow Fig. 2. When passing over the worker A′, it will naturally hold on the teeth of the worker, by simple contact. The pinion B′ of twenty-four teeth, keyed upon the shaft of the worker, transfers the rotary motion to the worker E′ by the pinion F′ of nineteen teeth, by means of the intermediate wheel J′. In this new method of work, the pinion with a sleeve sometimes fixed and sometimes loose, is dispensed with, and in its place is substituted a fixed pinion, since the workers move on in the same way as the fabric, always in the same direction. The worker A′ follows the motion of the fabric, hooking into the fibers, and lifting them up in leaving the fabric, but the worker E′ has an action which becomes stronger as the difference between the pinions B′ and F′ becomes greater.

It will be understood that work of this kind requires varying energy for several reasons viz., the nature of the settings, the proportions of the pinions, and the contact with the fabric. In considering how much these three elements of work can be varied, it becomes evident that it is possible to treat with my new gigging machine, the lightest as well as the strongest fabrics, and the fabrics most difficult to raise.

Each worker is provided with its automatic clearer C but it is obvious that the waste will be next to nothing, as the fibers of the fabric are not brutally torn out. This operation of a pair of workers is repeated in every subsequent pair, and the energy is variable at will.

I will now consider the whole of the machine: The fabric is moved by the drawing rollers B, which all have the same velocity, and receive motion from the principal shaft A. The small guide rollers D press the fabric down against the workers, each pair of which is thereby put in operation. The clearers C are operated by belts passing over a large pulley keyed upon the shaft E, which is driven by a belt *a* from the shaft A. One clearer of each pair is driven by an open belt *c*: the other by a crossed belt *c*′.

According to the kind of raising to be obtained, the fibers may be teaseled upright or they can be brushed down, as for instance, in drapery. In this case, a brushing roller R is added, provided with upright cards, or with any other setting capable of laying down fibers. This roller is rotated by suitable belting, like the drawing rollers B, but so that its surface in contact with the fabric travels in the opposite direction to that of the fabric as indicated by the arrow. The last worker on the last pair may also be replaced by a roller S provided with an upright setting, but then the intermediate wheel must be dispensed with, and the two rollers are moved directly by each other. This roller S commences the brushing down.

Having thus described my invention, what I claim, and desire to secure by Letters Patent, is—

1. A gigging machine having a pair of rotatable teaseling cylinders mounted in proximity to the path of the traveling fabric, and geared together so as to be rotated by the contact of one of them with said fabric, the teeth on one of said cylinders being set in an opposite direction to those on the other cylinder substantially as described.

2. A gigging machine having one or more pairs of teaseling cylinders geared together so as to run in the same direction, one of said cylinders having its teeth so set as to catch into the traveling fabric, whereby both cylinders will be rotated by the movement of the fabric, substantially as described.

3. A gigging machine having one or more pairs of teaseling cylinders geared together to run in the same direction but at different speeds, and adapted to be rotated by the contact of one of them with the traveling fabric, substantially as described.

4. A gigging machine having a plurality of teaseling cylinders, rotatably mounted in proximity to the path of the traveling fabric, said cylinders being suitably connected by gearing so that all will be rotated by the contact of some of them with the fabric, each cylinder having a clearer positively rotated by gearing, substantially as described.

In witness whereof I hereunto set my hand in presence of two witnesses.

FERDINAND MARTINOT.

Witnesses:
TH. POULET,
CAMILIA BRIDOUX.