(No Model.)

N. H. GROSSELIN.

CLOTH NAPPING MACHINE.

No. 560,207. Patented May 19, 1896.

Fig. 1.

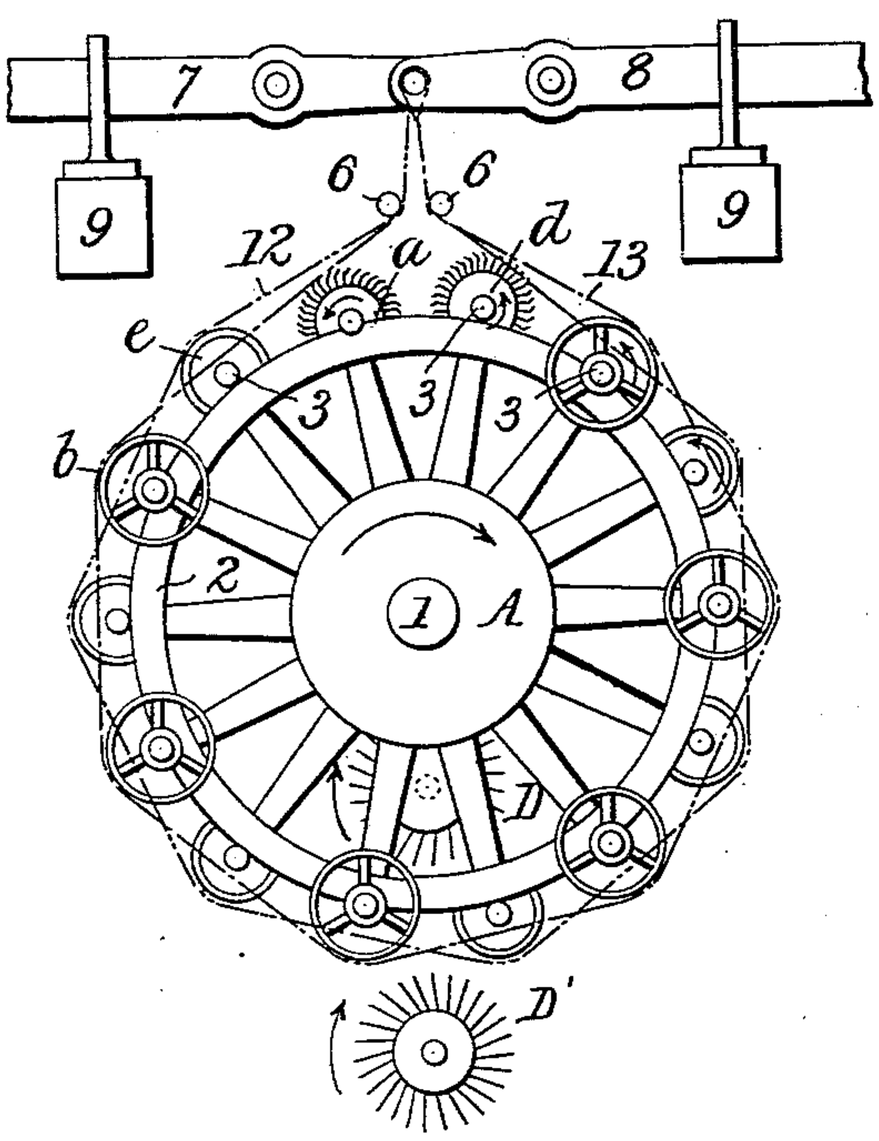


Fig. 3.

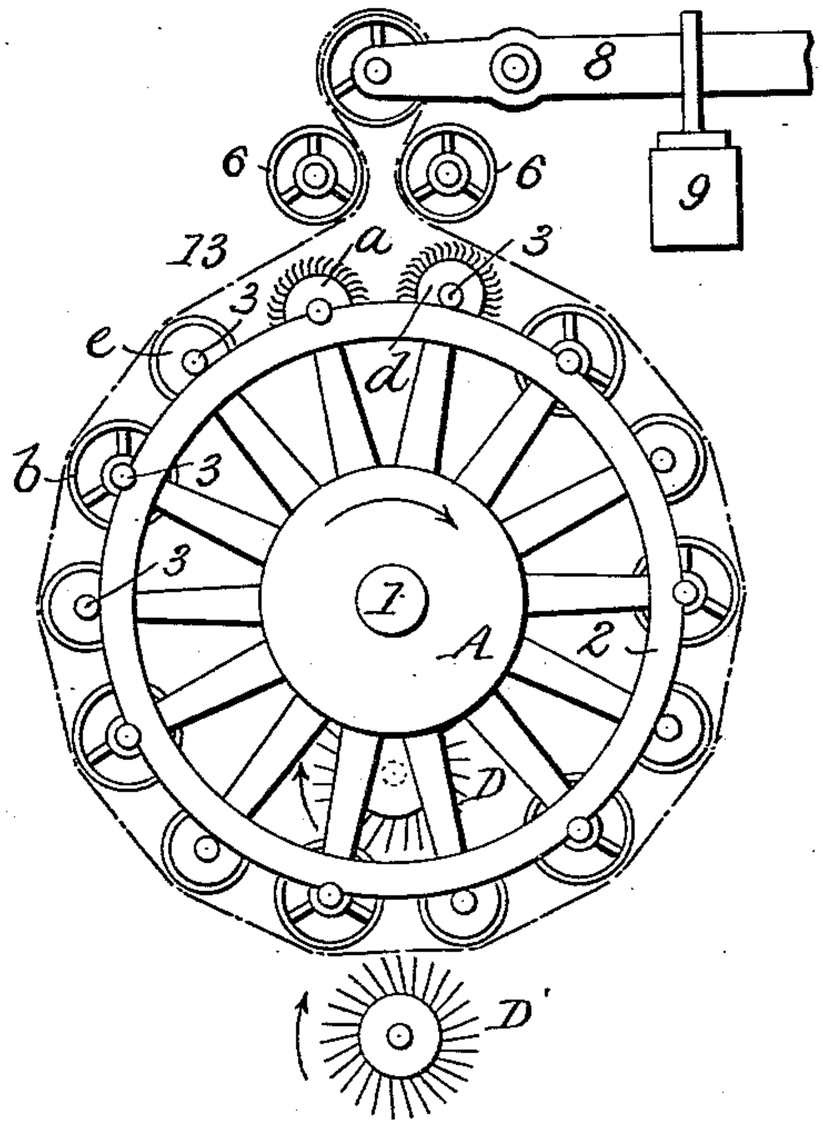


Fig. 2.

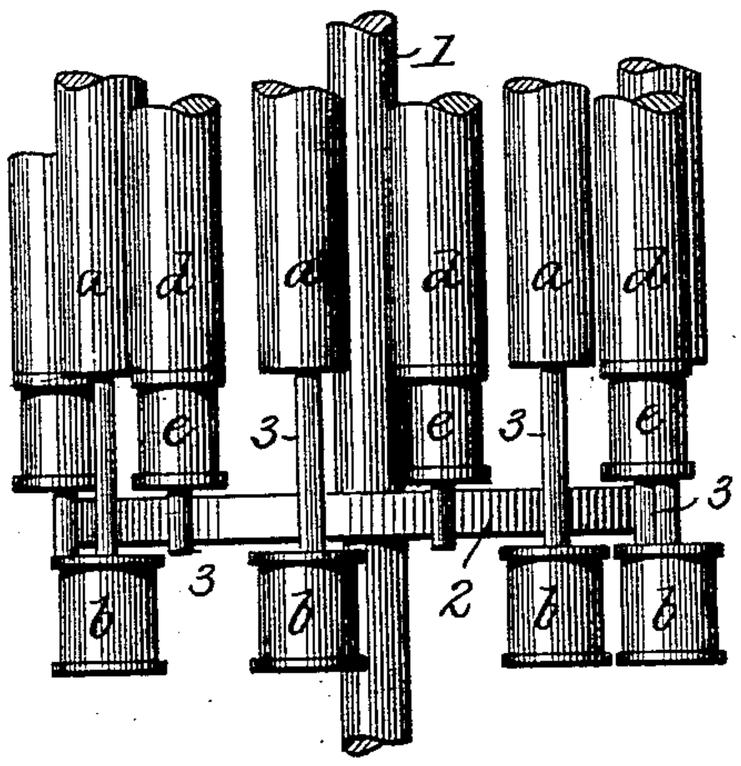
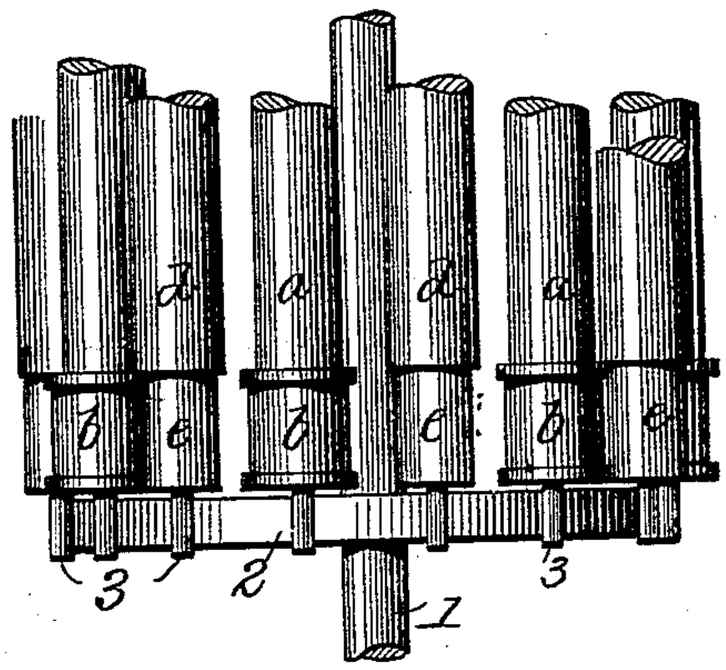


Fig. 4.



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UNITED STATES PATENT OFFICE.

NICOLAS HENRY GROSSELIN, OF SEDAN, FRANCE, ASSIGNOR TO CHARLES HEAP, OF ROCHDALE, ENGLAND.

CLOTH-NAPPING MACHINE.

SPECIFICATION forming part of Letters Patent No. 560,207, dated May 19, 1896.

Application filed June 9, 1894. Serial No. 514,068. (No model.) Patented in France May 30, 1890, No. 206,004; in Germany June 10, 1890, No. 65,078, and in England December 6, 1890, No. 19,929.

To all whom it may concern:

Be it known that I, NICOLAS HENRY GROSSELIN, a citizen of the French Republic, residing at Sedan, France, have invented certain new and useful Improvements in Cloth-Napping Machines, of which the following is a specification.

My invention (set forth in French Letters Patent No. 206,004, dated May 30, 1890, in German Letters Patent No. 65,078, dated June 10, 1890, and in British Letters Patent No. 19,929, dated December 6, 1890,) relates to that class of napping-machines in which a revolving drum carries revolving napping-rollers, and more especially to that class of machines in which there are two series of napping-rollers; and my invention consists in the means hereinafter fully set forth for varying the energy of the napping-rollers, for imparting the requisite movements thereto, for cleaning the same, and generally for increasing the efficiency of the machine.

In the accompanying drawings, Figure 1 is an end view of sufficient of a napping-machine to illustrate the improvements herein set forth. Fig. 2 is a plan view of one end of the drum. Fig. 3 illustrates in elevation an arrangement in which one or more driven belts are used. Fig. 4 is a plan of Fig. 3, showing one end of the drum.

As the general construction and arrangements of napping-machines having revolving heads with rotating napping-rolls is now well known and is illustrated in Letters Patent granted to me January 31, 1888, No. 377,151, I have not illustrated in my drawings any other features than those directly connected with my improvement.

In the construction illustrated in the drawings there is a revolving head A, consisting of a shaft 1 and two frames or disks 2, having bearings for the shafts 3, of two series of alternating napping-rolls *a d*, the shafts of the rolls *a* having each, at one or both ends, driving-pulleys *b*, and the shafts of the napping-rolls *d* having each, at one or both ends, guiding-pulleys *e*. Preferably the two series of driving-pulleys are arranged upon two different vertical planes at opposite ends of the head, or, as shown, at the same end of the head, upon opposite sides of the disks 2, as thereby each set of pulleys may be of greater diameter than would be possible if they were all arranged upon one vertical plane at one end of the drum. With each set of pulleys is combined a driving-belt, which may be driven positively in any suitable manner—for instance, as set forth in my aforesaid Letters Patent No. 377,151; but I have preferred to illustrate the same in the present instance, Figs. 1 and 2, as being stationary belts or straps, a strap 12 to the series of pulleys *e*, and a strap 13 to the series of pulleys *b*, the ends of each strap passing between guides 6 6 to a suitable support, which may be fixed, but preferably is movable and counterweighted by a weight or spring, so as to maintain the straps taut. As shown, the ends of the straps are connected with pivoted arms or levers 7 8, each having an adjustable counterweight 9, which may be set to any desired position to impart such a tension to the straps as will secure practically a positive action in driving the pulleys and napping-rolls, or loosened to so reduce the friction as to permit of a certain amount of slip to vary the energy. While these features may be used in connection with napping-rolls having the teeth set in various ways, I prefer to employ the same in connection with teazeling-rollers set in the drum, some in a reverse direction to the others, so as to produce a simultaneous teazeling or dressing of the cloth, both in the direction of the nap and against the nap. All of the rollers turn in the same direction, but at different speeds, which may be varied by different driving mechanism when the belts are driven, or when the belts are stationary, as shown, by varying the sizes of the pulleys of the different series. Thus the pulleys which are mounted on the rolls *a*, which act with the nap, will have a diameter greater than that of the roll itself exceeding the latter by, say, fifteen or twenty per cent., while the pulleys mounted on the rolls *d*, acting against the nap, will have a diameter of, say, fifteen or twenty per cent. less than the diameters of the rollers. Suppose the diameter of the rolls *a* to be eighty millimeters. The diameters of the pulleys of said rollers acting with the nap will preferably be about one hundred millimeters. If the belts be strongly tightened when the drum is put in operation, all the rollers acting with the nap will turn

in the direction the reverse of the drum's travel, with a speed less by twenty per cent. than the circumferential speed of the drum. All the rolls traveling against the nap will be driven positively in the direction the reverse of the drum's travel with a speed greater by twenty per cent. than the circumferential speed of the drum. There is, therefore, a working energy of twenty per cent. in the two sets of rolls, which will represent the maximum energy of the machine. This maximum can of course be increased by modifying the diameters of the pulleys. To diminish the energy of the drum the belts may be slackened to permit more or less slip of the pulleys in traveling upon the belts. The more they are slackened the greater the slip and the less action the machine will have. If the belts are rendered quite loose, the rollers will be quite free and produce their minimum effect. Where the belts are driven, as in my patented machine, No. 377,151, the result will be the same according to the different speeds imparted to the different belts. While the effect produced when there is slipping of the pulleys upon the belts is not so positive and precise, as is desirable in some cases, the arrangement shown is simple and economical in its construction and offers sufficient precision for some kinds of cloth which it is required to dress or teazel.

When driven belts are used, movements, as before described, may be imparted to them in different ways, an arrangement connected with one of which is illustrated in Figs. 3 and 4, consisting in imparting movement to the belt or belts 13 by the action of the larger pulleys of the rolls *a*, that have their teeth set forward in the direction of the drum's rotation, and which by their adhesion with the cloth are turned backward, thereby driving backward the belt, which in turn drives in the same direction the smaller pulleys *e* of the other set of rolls *d*, having their teeth turned in the opposite direction, the energy also being varied, if desired, by varying the sizes of the pulleys of the two sets of rolls. The energy or useful effect will increase in proportion to the difference in speeds between the two sets of rolls, that of the rolls which act with the nap being less than that of the rolls which act against the nap. I do not, however, claim broadly driving one set of rolls by the other, as this constitutes the subject of my Letters Patent of March 26, 1895, No. 536,516; nor do I here claim the combination of two sets of rollers, one working with and the other against the nap, as the same is claimed in my Letters Patent No. 485,929.

When the two sets of teeth of the two sets of rollers are in opposite directions, they cannot be cleaned by the same brush, and I therefore provide two brushes D D′, each set to clean the teeth of one set of rolls and rotating in opposite directions, as indicated by the arrows.

While the two independent cleaning-rolls above described may be used in connection with rollers the shafts of which are upon one circle, I prefer to arrange the two sets of napping-rollers with their shafts upon two concentric circles, as shown, with one of the cleaning-rolls arranged to clean the teeth of the napping-rolls from the inner circle and the other to clean the napping-rolls upon the outer circle. It will be evident that a difference of the energy of the two sets of rollers would result if one set of napping-rollers was greater in diameter than the other with two sets of pulleys of the same diameter. It will also be evident that the fabric may travel in either direction, as required, and that while I have referred to straps or belts I may use equivalent means, as chains, ropes, &c.

Without limiting myself to the precise construction and arrangements of parts shown and described, I claim—

1. A napping-machine provided with a revolving head carrying two sets of rolls with teeth set in different directions, having the pulleys of one set of different diameters from those of the other set, and a driving-belt to drive each set of pulleys, substantially as set forth.

2. The combination in a napping-machine of a revolving drum provided with two sets of napping-rolls having their teeth set in different directions, with shafts carrying pulleys, those connected with one set being of different diameter from those of the other set, and a separate driving-belt for each set of pulleys, substantially as set forth.

3. The combination with a revolving head having two sets of napping-rolls, each set with pulleys of different diameter from the other set, and a stationary strap passing around each set of pulleys, substantially as described.

4. A driving-head provided with two sets of rolls one having the teeth set to act with and the other against the nap, each provided with driving-pulleys, the pulleys on the rolls that act with the nap being greater in diameter than those which act against the nap, and a driving-belt for each set of pulleys, substantially as described.

5. The combination in a napping-machine of a revolving drum, rolls having teeth set in different directions so that some act with and the others against the nap, pulleys upon the rolls which act with the nap greater in diameter than said rolls, and pulleys upon the rolls that act against the nap less in diameter than said rolls, and means for driving all the pulleys in the same direction, substantially as set forth.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

NICOLAS HENRY GROSSELIN.

Witnesses:
R. DE LOËVES,
CLYDE SHROPSHIRE.