(No Model.) 3 Sheets—Sheet 1.

C. F. X. OTT.

CLOTH NAPPING MACHINE.

No. 500,347. Patented June 27, 1893.

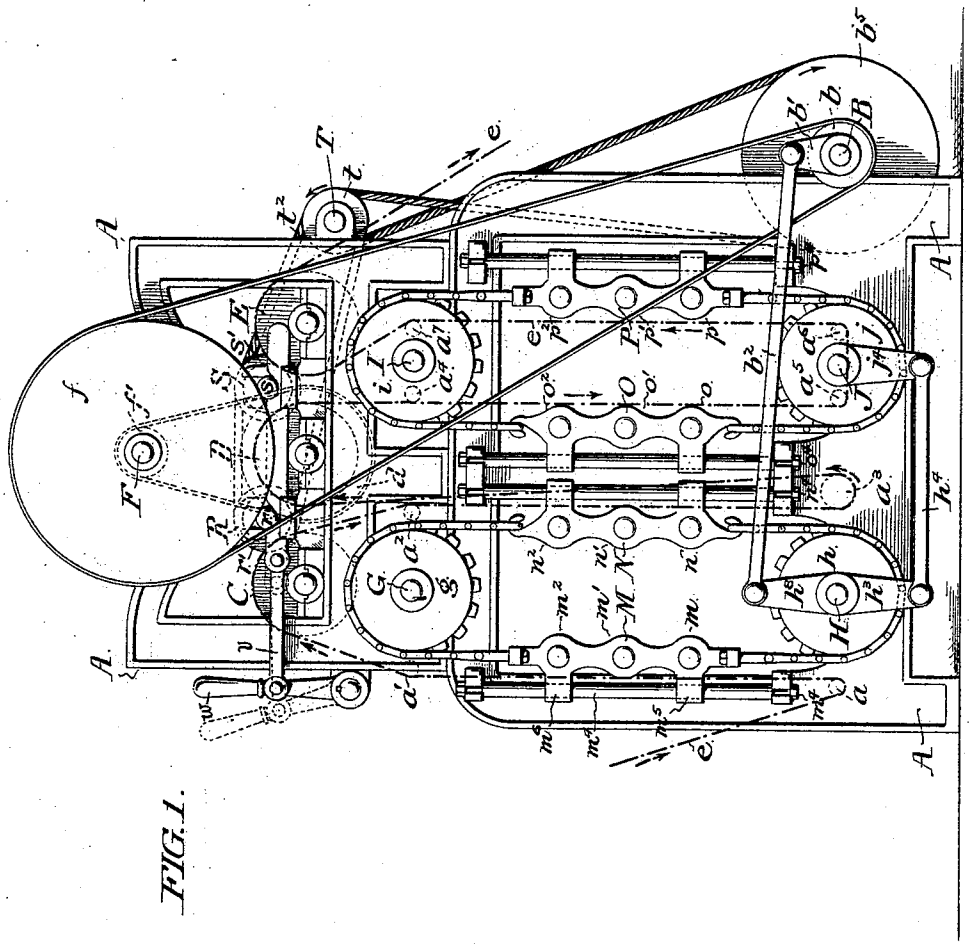

FIG. 1.

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(No Model.) 3 Sheets—Sheet 2.

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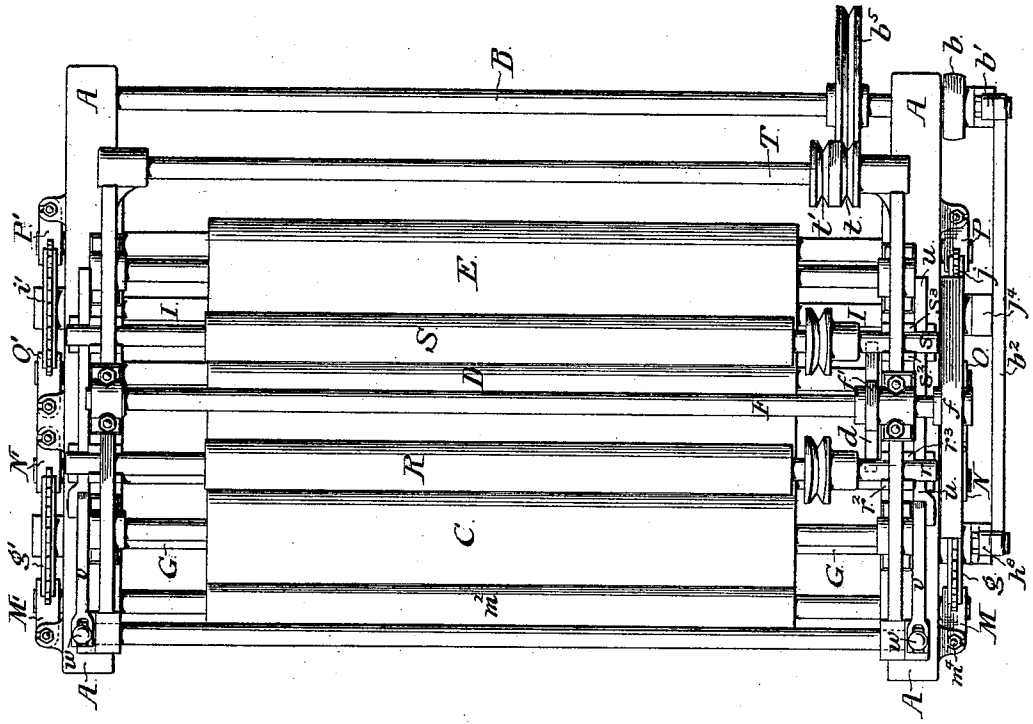

FIG. 2.

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(No Model.) 3 Sheets—Sheet 3.

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CLOTH NAPPING MACHINE.

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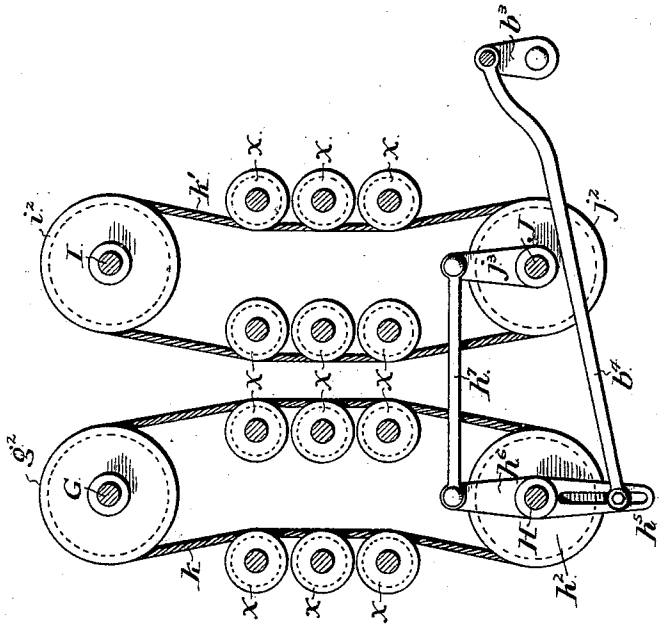

FIG. 3.

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UNITED STATES PATENT OFFICE.

CHARLES FRANCIS XAVER OTT, OF PAWTUCKET, RHODE ISLAND, ASSIGNOR TO GEORGE WILLIAM SMITH, OF PHILADELPHIA, PENNSYLVANIA.

CLOTH-NAPPING MACHINE.

SPECIFICATION forming part of Letters Patent No. 500,347, dated June 27, 1893.

Application filed March 21, 1891. Serial No. 385,921. (No model.)

To all whom it may concern:

Be it known that I, CHARLES FRANCIS XAVER OTT, a subject of the Emperor of Germany, residing at Pawtucket, in the State of Rhode Island, have invented certain new and useful Improvements in Cloth-Napping Machines, whereof the following is a specification, reference being had to the accompanying drawings.

My invention has reference to a machine in which the fabric to be napped is, in the course of its passage through it, successively subjected to the action of reciprocating groups of napping rollers; and also in which laterally vibrating napping rollers act directly upon the reverse side of the fabric as it passes over cloth rollers of the ordinary description.

In the drawings, Figure 1 is an end view of my machine. Fig. 2 is a view of the same from above, and Fig. 3 is a detached view of the mechanism used to drive the napping rollers.

A is the frame work of the machine.

B is the main driving shaft.

C, D and E are cloth guiding rollers of the ordinary description.

$a, a', a^2, a^3, a^4, a^5, a^6, a^7$, are stretching rods or small cloth guiding rollers which guide the fabric in the course of its passage through the machine.

e is the fabric, the course of which may be traced around the rods in the following order: a, a', C, a^2, a^3, D, a^4, a^5, a^6, a^7, E.

From the pulley *b*, upon the main driving shaft, is driven through the intervention of the pulley *f*, the supplemental shaft F. The shaft F, in turn, through the intervention of the pulleys *f'* and *d*, drives the shaft which carries the cloth roller D, thus imparting motion to the fabric. It is obvious that motion may also be imparted to any of the other cloth rollers if necessary.

M is an oblong reciprocating plate, between which and its fellow, M', upon the other end of the machine (seen only from above in Fig. 2) are carried three revolving napping rollers, m, m', m^2, of the usual construction mounted each above the other. An upright rod, m^4, affixed at its extremities to the frame work of the machine passes through the lugs m^5, m^6, projecting from the reciprocating plate M. Guided by this rod, the plate M is able to slide vertically to the extent of the length of the rod. Its fellow, M', is similarly mounted.

N, O and P, are precisely similar reciprocating plates, sliding vertically upon the upright rods n^4, o^4, p^4, and carrying each between itself and its fellow, N', O', P', upon the opposite end of the machine, a similar group of three napping rollers, $n\ n', n^2$; o, o', o^2; p, p', p^2. There are therefore four vertically reciprocating groups of napping rollers, each group consisting of three rollers, and each group so mounted that for the full extent of its vertical play, each napping roller has presented to its action one side of the fabric passing through the machine.

The four groups of rollers will be spoken of respectively as groups 1, 2, 3 and 4. Midway between groups 1 and 2, are two rock-shafts, G, H, the one situated above, and the other below, the respective extremes of the vertical play of the groups of napping rollers. The shafts carry at both extremities, sprocket wheels, g, g', and h, h', and around these sprocket wheels pass sprocket chains. The sprocket chain passing around the wheel g, is affixed at one end to the top of the reciprocating plate M, and at the other, to the top of the reciprocating plate N. The sprocket chain passing around the wheel h, is affixed at one end to the bottom of the reciprocating plate M, and at the other, to the bottom of the reciprocating plate N. The plates M' and N', at the other end of the machine are slung in a precisely similar manner upon sprocket chains passing around the wheels g', h'. The rock-shafts I and J, are similarly situated with reference to groups 3 and 4, and upon the sprocket wheels at their extremities are similarly slung the reciprocating plates O, P, O', P'. The result of this arrangement of the napping rollers is that the reciprocation of group 1 alternates with that of group 2, and the reciprocation of group 3 alternates with that of group 4. The reciprocating motion is imparted to them as follows: The main shaft B, carries the crank b', which is connected by the connecting rod b^2, with the crank h^3, upon the rock-shaft H. Similarly another crank h^3 upon the shaft H, connected by the rod h^4

with a crank j^4 upon the rock-shaft J communicates the motion to the latter shaft. Thus far no means of imparting a motion of revolution to the napping rollers has been described, and for the purpose of napping some kinds of fabric none is needed, the teaseling action of the rollers, though approximately stationary, as they rub up and down against the fabric being sufficient. Fig. 3, however, shows a device adopted by me for the purpose of producing such revolution, when it is advisable. Pulleys x, x, are placed upon one extremity of each napping roller, and near the same extremity of the four rock-shafts, G, H, I, J, are four larger pulleys, g^2, h^2, i^2, j^2, mounted upon the rock-shafts but independent of their motion. The main shaft B carries the crank b^3 which is connected by the connecting rod b^4, with the crank h^5 fastened to the pulley h^2, thus imparting to the latter a reciprocating motion of revolution. Similarly another crank h^6, fastened to the pulley h^2 connected by the rod h^7 with a crank j^3 fastened to the pulley j^2 communicates the reciprocating motion to this latter pulley. The extent of the rocking motion of the pulleys h^2, j^2, may be varied at will by adjusting the connecting rod b^4, upon the crank h^5 nearer or farther from the center of oscillation. An endless cord k passes over the pulley g^2, is wrapped once around each of the pulleys x, x, x, belonging to the first group of napping rollers, passes under the pulley h^2, is wrapped once around each of the pulleys x, x, x, belonging to the second group of napping rollers, and passes again around the pulley g^2. Likewise a similar cord k', connects the pulleys i^2, j^2, and wraps once around each of the pulleys x, x, belonging to the third and fourth groups of napping rollers. The reciprocating motion of the cords k, k', imparted to them from the pulleys h^2, j^2, produces an alternating rotation of the pulleys x, x, and if the downward motion of any group of napping rollers is rendered coincident with the upward motion of the cord which is wrapped around the pulleys at the extremities of the napping rollers of that group the amount of the alternating motion of the napping rollers will be correspondingly increased. The coincidence of these two motions evidently depends upon the relative position of the cranks b' and b^3 upon the shaft B and may be controlled at will. If desired the connecting rod b^4 may be removed and the position of the crank h^5, and consequently of the pulleys h^2, j^2 rendered stationary. In this case the cords k, k', will have no motion, but the reciprocation of the napping rollers along the line of the cord which wraps around the pulleys x, x, at their extremities will itself impart an alternating rotation to the napping rollers.

By closely following the course of the fabric with reference to the groups of napping rollers, as shown in Fig. 1, it will be seen that but one side of the fabric is acted upon by them in the course of its complete passage through the machine. By slightly varying the position of the cloth rods and the course of the fabric, it is plain that the napping of both sides of the fabric may be effected. Thus for example the cloth may be passed from a^3 directly under a^5 up around a^4, around D, around a^7, down under a^6 and out, by which arrangement both sides will be equally napped. In most cases, however, it is not advisable to nap the reverse side of the fabric to any considerable extent, and I therefore prefer to so arrange the course of the fabric that only one side is acted upon by the reciprocating groups of napping rollers, and provide for any napping of the reverse side which may be necessary by means of the further device now to be described.

Somewhat above and between the cloth rollers C and D is placed a napping roller R, its napping surface being tangent to the surfaces of both the cloth rollers C and D. Another napping roller S is similarly placed above and between the cloth rollers D and E. The shafts r and s of these two napping rollers project at each end through their bearings and are capable of lateral motion within the same. They also carry near one extremity pulleys r' and s', both of which are driven by a cord t^2 passing, as seen in Fig. 1, around both of them and also around the pulley t', upon the supplemental shaft T, which is driven through the intervention of pulleys t and b^5 from the main shaft B. The grooves of the pulleys r' and s', within which the cord t^2 runs, describes around the circumferences of the pulleys a wavy line, as seen in Fig. 2, passing from one side of the pulley to the other in the course of its passage around it. The natural tendency of the cord t^2, especially when driven rapidly, is to revolve in a constant plane, and thus its action upon the pulleys r' and s', owing to the wavy grooves upon the circumferences of the same, causes them to vibrate laterally in the course of their revolution, which in turn communicate a slight lateral reciprocation to napping rollers R and S. This lateral motion is very desirable in facilitating and easing the action of the napping rollers upon the fabric.

The bearings within which the shafts r and s revolve, are open at the top and their sides r^2, r^3, s^2, s^3, project upward a sufficient distance to allow the shaft to rise from its socket without being completely displaced. A sliding bar u passes through these bearings immediately beneath the shafts, and in contact with their lower sides. The upper surface of this bar presents two inclined planes rising from the points of contact with the shafts when in its primary position. A slight forward movement of this bar forces the shafts r and s to rise along these inclined planes, the projecting sides of the bearings keeping the shafts from horizontal displacement. The movement of the bar is effected by the link-arm v and the lever w. This bar and lever are duplicated at the other end of the machine, and

if both are simultaneously driven forward, both the shafts r and s are sufficiently raised to free the fabric upon the cloth rollers from the action of the napping rollers R and S.

The operation of the machine is evident from the foregoing description. As the cloth is drawn through the machine by the revolution of the cloth roller D, the groups of napping rollers are reciprocated over the surface of the fabric which is subjected to their action, and at the same time, if desired, the other surface of the fabric is acted upon by the napping rollers R and S, whose action is independent of the rest of the machine.

Many parts of the machine may be varied without departing from the spirit of my invention. Thus it is clearly immaterial how many of the napping rollers m, m', m^2 there are in a group, or how many groups of the same are placed in the machine. The course of the fabric through the machine may be varied almost indefinitely by slightly altering the position of the cloth rollers.

The action of the napping rollers R and S is quite independent of the rest of the machine, and this part of the device may obviously be applied to napping machines of different construction in order to nap that side of the fabric which is not ordinarily napped by such machines. Thus the napping machines of the class ordinarily termed rotary nappers are capable of having this device applied to them with little or no change in the arrangement of the parts and are thus enabled to nap both sides of the fabric.

Having thus described my invention, I do not claim the wavy groove of the pulleys s and r, whereby the lateral motion of the napping rollers S and R is obtained.

What I do claim, and desire to secure by Letters Patent, is—

1. In a napping machine the combination of a series of napping rollers mounted in permanent correlation to each other and tangent to a single plane; mechanism whereby the group of napping rollers thus formed is continuously reciprocated in a line parallel to this plane; and cloth rollers whereby the fabric to be napped is guided along the said plane to which the napping rollers are continuously tangent, substantially as described.

2. In a napping machine the combination of two or more groups of napping rollers, each group consisting of a series of napping rollers mounted in permanent correlation to each other and tangent to a single plane; mechanism whereby said groups of napping rollers are continuously reciprocated each along lines parallel to the planes to which the napping rollers which form the group are tangent; and cloth rollers whereby the fabric to be napped is guided along the said planes to which the napping rollers are continuously tangent, substantially as described.

3. In a napping machine the combination of a series of napping rollers mounted in permanent correlation to each other and tangent to a single plane; mechanism whereby the group of napping rollers thus formed is continuously reciprocated in a line parallel to this plane; cloth rollers whereby the fabric to be napped is guided along the said plane to which the napping rollers are continuously tangent and mechanism whereby each of said napping rollers is caused to revolve on its own axis alternately in opposite directions, substantially as described.

4. In a napping machine the combination of two or more groups of napping rollers, each group consisting of a series of napping rollers mounted in permanent correlation to each other and tangent to a single plane; mechanism whereby said groups of napping rollers are continuously reciprocated each along lines parallel to the planes to which the napping rollers which form the group are tangent; cloth rollers whereby the fabric to be napped is guided along the said planes to which the napping rollers are continuously tangent; and mechanism whereby each of said napping rollers is caused to revolve on its own axis alternately in opposite directions, substantially as described.

5. In a napping machine the combination of cloth rollers whereby the fabric to be napped is guided in its course through the machine; one or more napping rollers whereby one side of the fabric is napped as it passes from one cloth roller to another; and one or more laterally vibrating secondary napping rollers tangent to one or more of said cloth rollers and acting upon the other side of said fabric, substantially as described.

6. In a napping machine the combination of cloth rollers whereby the fabric to be napped is guided in its course through the machine; one or more napping rollers whereby one side of said fabric is napped as it passes from one cloth roller to another; one or more laterally vibrating secondary napping rollers tangent to one or more of said cloth rollers and acting upon the other side of said fabric; and mechanism whereby said secondary napping rollers may be raised off from the fabric to whose surface it is tangent, substantially as described.

CHARLES FRANCIS XAVER OTT.

Witnesses:
THOMAS W. ROBINSON,
WILLIAM H. SCOTT.