July 17, 1928. 1,677,293

H. V. PROTHERS

BLANKET NAPPING MACHINE

Filed Oct. 19, 1925 4 Sheets-Sheet 1

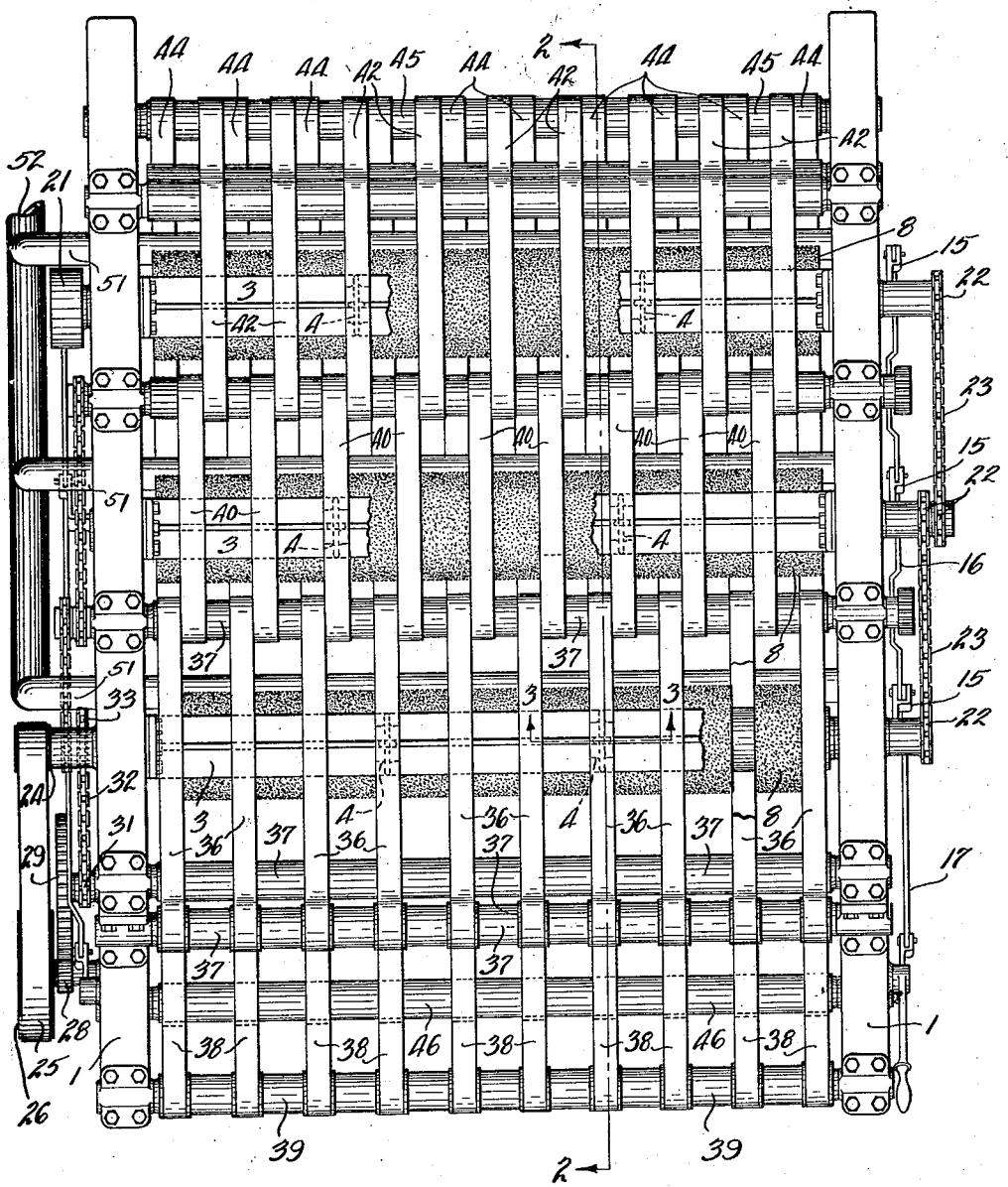


Fig. - 1

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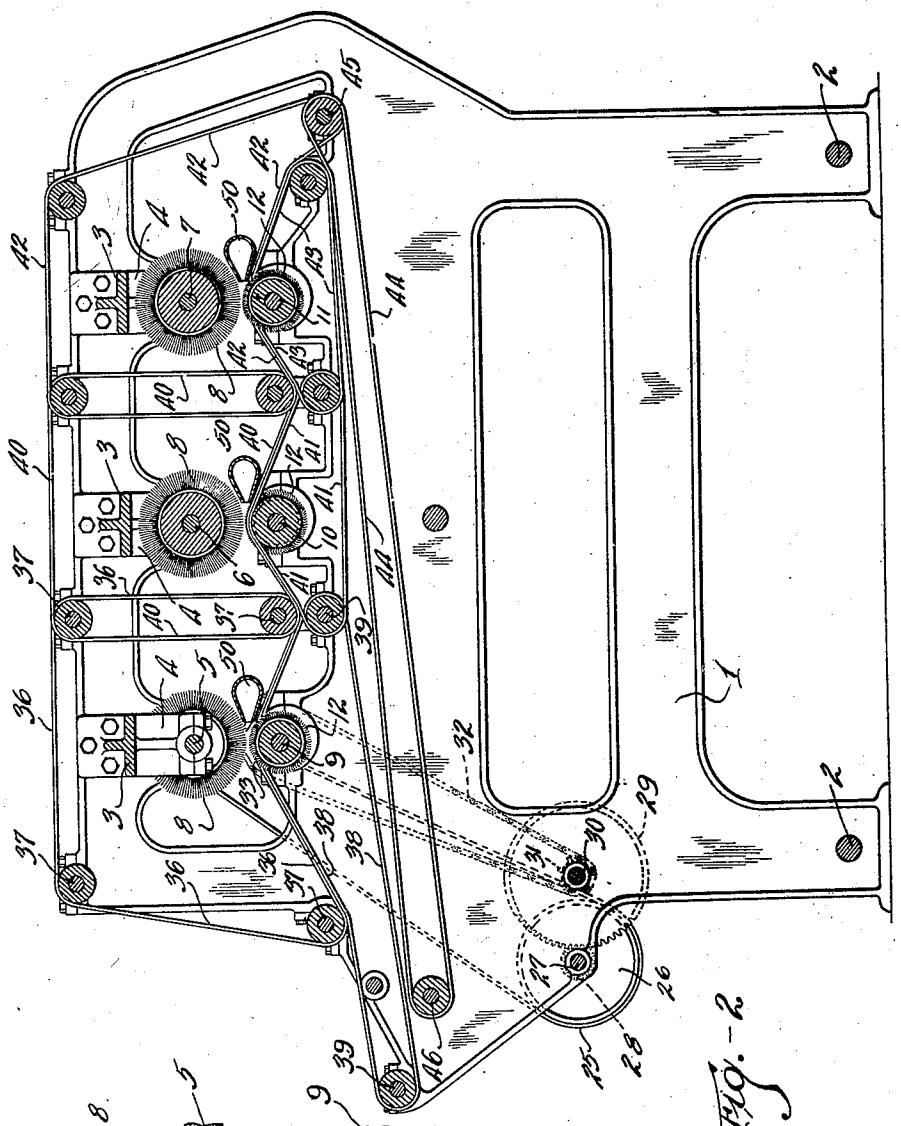


Fig. - 2

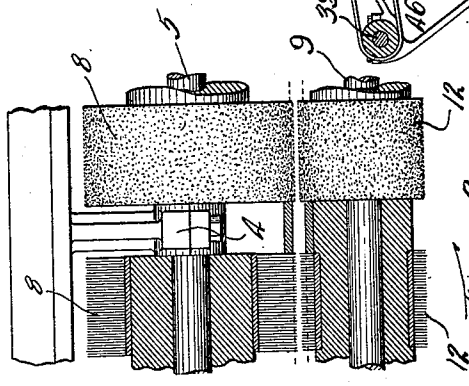


Fig. - 3

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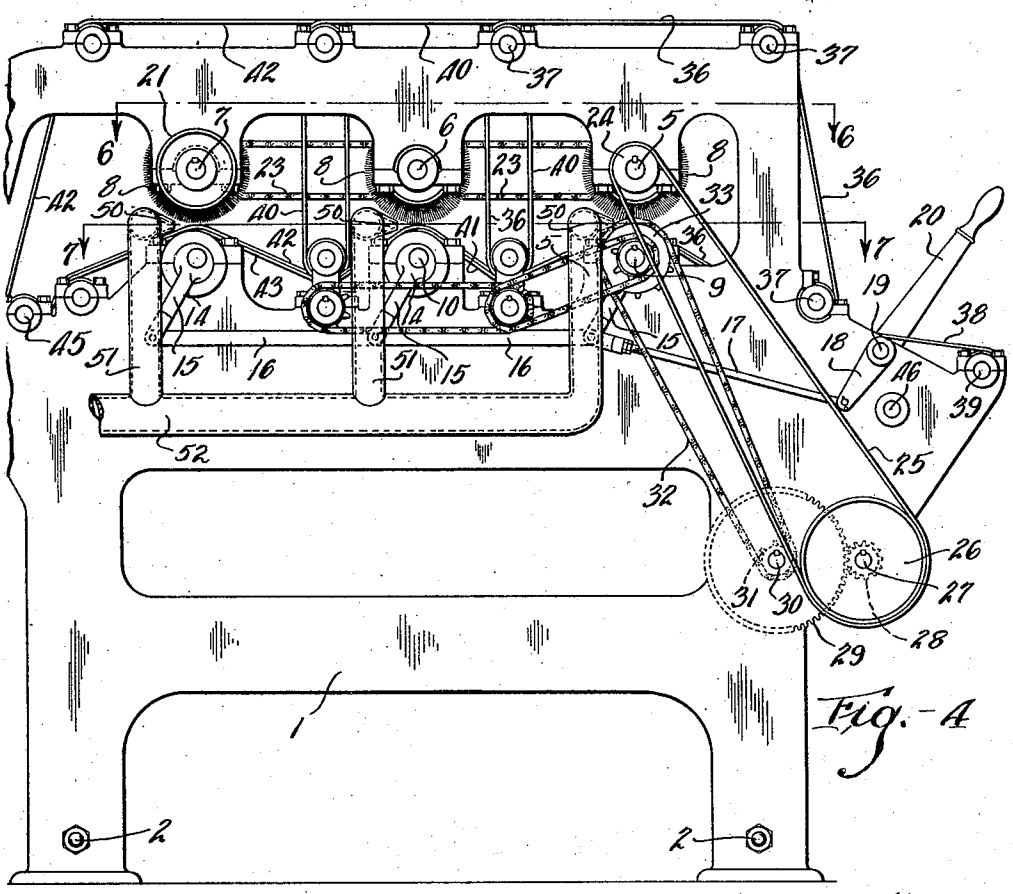


Fig. - 4

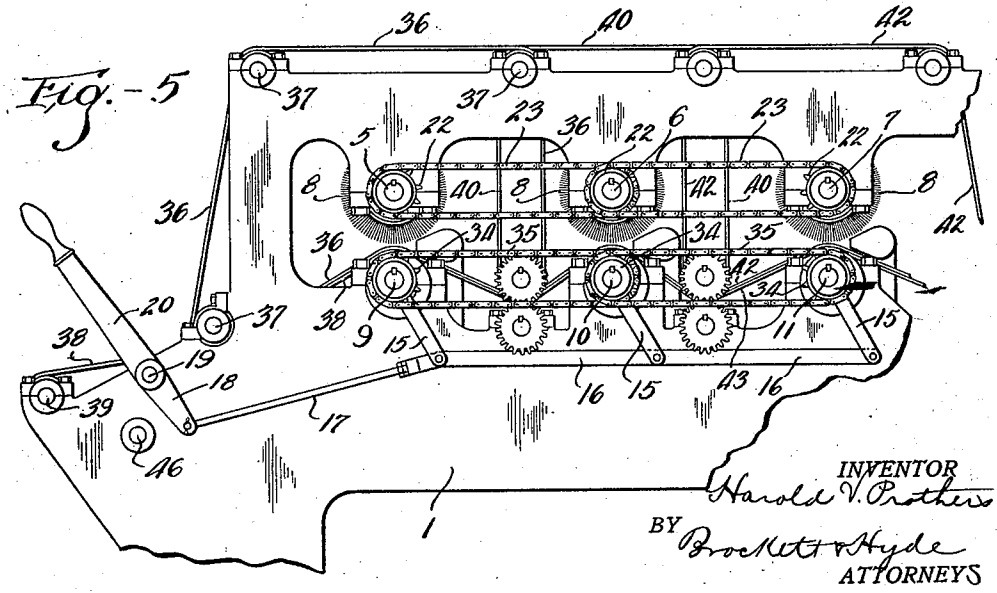


Fig. - 5

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BLANKET NAPPING MACHINE

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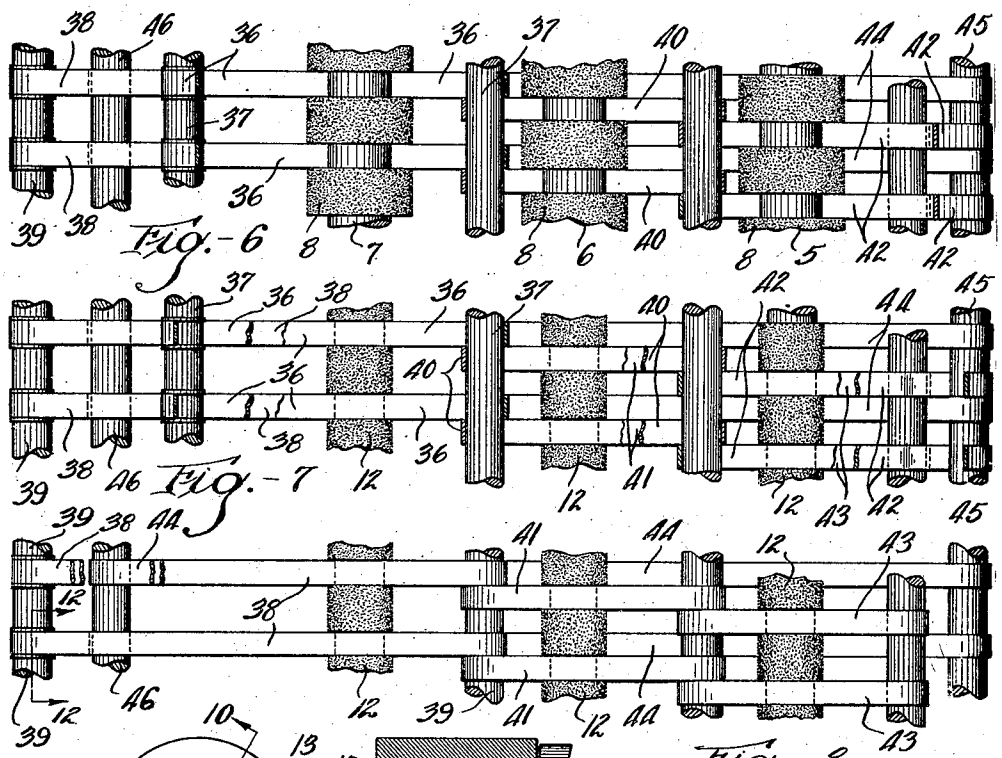


Fig. -6

Fig. -7

Fig. -8

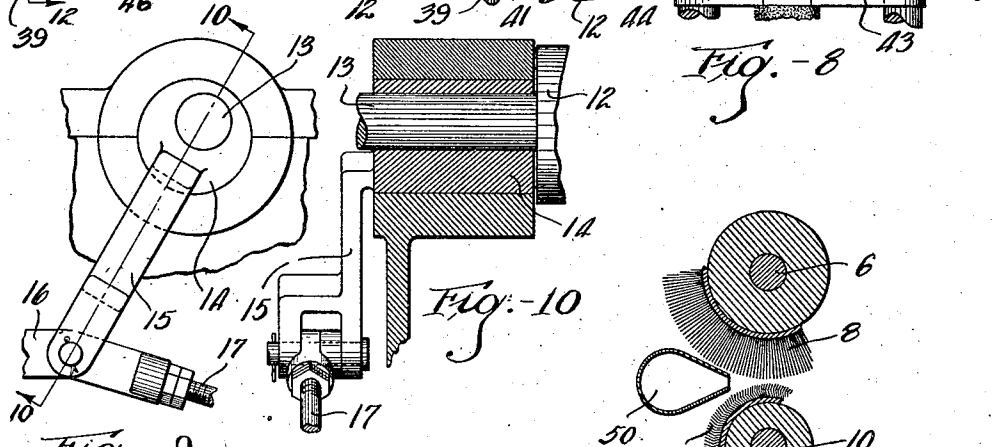


Fig. -9

Fig. -10

Fig. -11

Fig. -12

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Patented July 17, 1928. 1,677,293

UNITED STATES PATENT OFFICE.

HAROLD V. PROTHERS, OF NEW YORK, N. Y., ASSIGNOR, BY DIRECT AND MESNE ASSIGNMENTS, TO THE AMERICAN LAUNDRY MACHINERY COMPANY, OF CINCINNATI, OHIO, A CORPORATION OF OHIO.

BLANKET-NAPPING MACHINE.

Application filed October 19, 1925. Serial No. 63,350.

This invention relates to machines for napping fabrics, such as blankets or the like.

The object of the invention is to provide an improved napping machine in which the work is carried past or across napping rolls or brushes by tapes or bands, the napping brushes being arranged to nap successive series of overlapping stripes or zones of the work, whereby not only is the entire face of the fabric subjected a plurality of times to the action of the napping brushes, but the latter in roll form may be well supported in spaced bearing and rotate at the necessary high speed.

Another object of the invention is to provide an improved arrangement of napping brushes in roll form which enables the work to be carried past the napping brushes by tapes or bands and affords proper provision for support of said tapes or bands.

A further object of the invention is to provide improved means for securing relative adjustment between the feed controlling and napping rolls to compensate for or accommodate the machine to fabrics of various thicknesses.

A further object of the invention is to provide improved means for removing from the machine such lint or other material as may be removed from the work by the action of the napping brushes.

Further objects of the invention are in part obvious and in part will appear more in detail hereinafter.

In the drawings, which represent one suitable embodiment of the invention, Fig. 1 is a plan view of the machine with some parts broken away to show interior construction; Fig. 2 is a longitudinal section on the line 2—2, Fig. 1; Fig. 3 is a detail sectional elevation on the line 3—3, Fig. 1; Fig. 4 is a side elevation of the machine from the left in Fig. 1, showing a portion of the driving mechanism for the rolls and also the suction producing device; Fig. 5 is an elevation of a part of the right hand side of the machine, Fig. 1, showing additional mechanism for driving the rolls; Fig. 6 is a detail sectional plan view on approximately the line 6—6, Fig. 4; Fig. 7 is a detail sectional plan view on approximately the line 7—7, Fig. 4; Fig. 8 is a detail sectional plan view, somewhat similar to Fig. 7 and illustrating in further detail the lower feeding ribbons and return conveying belt; Fig. 9 is a detail end view, on a larger scale, illustrating the eccentric mechanism for varying the space between the feed controlling and napping rolls; Fig. 10 is a sectional view thereof on the line 10—10, Fig. 9; Fig. 11 is a detail sectional view illustrating the suction nozzle; and Fig. 12 is a detail section on the line 12—12, Fig. 8.

The machine shown in the drawings comprises suitable side frames 1 connected by the cross rods 2 and at the top by bars 3 which serve as supports for depending split bearing members 4. In said bearing members and in suitable aligned bearings in the frame are journalled three napping rolls, 5, 6 and 7, along each of which are distributed a series of nap brush portions 8 of usual form, each of said brush portions being separated longitudinally of its shaft from its neighbors by a distance equal to approximately one-half the length of each brush portion, for a purpose which will later appear. Below the napping rolls 5, 6 and 7 are located three work feed controlling rolls 9, 10 and 11 carrying brush portions 12 distributed along the shafts in spaced relation opposed to and similar to the relation of the brush portions 8 before referred to, and the shafts of said rolls 9, 10 and 11 at their ends having reduced portions 13 journalled eccentrically in eccentric members 14 journalled in the frame.

The three napping rolls 5, 6 and 7 are of relatively large diameter and rotate at relatively high speed, for which reason they are provided with the intermediate bearings 4, two for each roll, as described, while the feed controlling rolls 9, 10 and 11 are of smaller diameter and rotate at low speed, for which reason said feed controlling rolls require no intermediate bearings, but their journals in the eccentrics 14 are sufficient.

At each side of the machine each of the eccentrics 14 is provided with an arm 15, the several arms 15 being interconnected by links 16 and being also connected by a link 17 with an arm 18 on a shaft 19 provided with a hand lever 20, by operation of which lever the eccentrics 14 may be turned in the frame to raise or lower the rolls 9, 10 and 11 and thereby vary the distance or space between the feed controlling and napping rollers.

The driving mechanism for the napping and feeding rollers may be of any suitable form. As shown however, one of the napping rolls, say roll 7, is provided at one end with a belt pulley 21 from which a belt will pass to any suitable driving pulley, either on a line shaft or on the shaft of an electric motor or the like. At the opposite side of the machine, say at the right in Fig. 1, the three napping rolls are suitably inter-connected so that all rotate together and in the same direction, for example by the sprockets 22 connected by chains 23. The last one of the napping rolls from the driver 7, to wit roll 5, is provided at the left hand side of the machine, Fig. 1, with a belt pulley 24, from which a belt 25 passes to a pulley 26, on a shaft 27 provided with a pinion 28 driving a gear 29 on a shaft 30, said shaft having a sprocket 31 from which a chain 32 passes to a sprocket 33 on one of the feed controlling rolls, say roll 9, and said feed rolls are inter-connected by the sprockets 34 and chains 35 in the same manner as the napping rolls, as in Fig. 5. The drive chains and sprockets from the napping roll 5 to the feed roll 9 secure a material speed reduction, so that while the feed rolls are driven from the nap rolls they rotate at a much slower speed and in the opposite direction.

The work is fed to the machine from the left in Fig. 2 and in that view the napping shafts 5, 6 and 7 rotate in the counter-clockwise direction. The function of the brushes 12 on rolls 9, 10 and 11 is to hold back the work against the action of the brushes 8 on the more rapidly rotating rolls 5, 6 and 7. Therefore, to positively feed the work through the machine, I have provided three groups of pairs of upper and lower belts or bands, one group of such pairs of belts for feeding the work between the shafts 5 and 9, a second group for feeding it between the shafts 6 and 10, and a third group for feeding it between shafts 7 and 11. The first group includes a series of upper endless belts 36 passing over idler shafts 37, some of which may be provided with grooved belt guiding portions, as indicated in Fig. 12, and lower endless belts 38 travelling over similar idler shafts 39. The belts 36, 38 run parallel with each other and are distributed along the shafts 5, 9 in the spaces between the brush portions on said shafts, and each of the upper belts 36 lies directly above or in facing relation with a lower belt 38. The work is fed past the second pair of napping and feed controlling rolls, 6, 10 by a group of upper endless belts 40 and a group of lower endless belts 41, and past the third pair of napping and feed controlling rolls 7, 11, by a third series of upper endless belts 42 and lower endless belts 43 arranged in like manner with the first group. The last group of upper and lower feed belts deliver the work upon a series of return belts 44, located below the upper belts, as shown in Fig. 2, and travelling over idler shafts 45, 46, so that when the work has been passed once through the machine it is returned to the place of feeding to be again sent through the machine reversed for napping its opposite side.

Inspection of Figs. 1, 6, 7 and 8 will show that the brush portions of the three upper napping rolls are directly opposite the feed controlling rolls which lie beneath them, but the brushes of the three succeeding rolls are in offset or staggered relation with each other. Also, as before stated the belts are of a width equal to half the length of each of the brush portions. Therefore, each of the napping brushes produces a napping effect upon two-thirds of the surface of the work, the other third being covered by the carrying belts travelling in the spaces between the brush portions of the napping and the feed controlling shafts, the brush portions of each shaft therefore napping a series of stripes upon the work. Also, the second set of brush portions produces a napping effect upon one-half of the surface napped by the first set of napping brushes and also a napping effect upon that surface of the work which was covered by the belts at the first napping brushes, while the third set of napping brushes naps the other half of the previously napped surface and produces a second napping action upon the surface newly napped by the second set of brushes. The net result is that the work in passing between the three sets of napping and feed controlling brushes is subjected over its entire area to two complete napping actions, the napping effect, of course, being applied only to one surface of the work. The action of these napping brushes is to comb out the fibres or threads of the work and in the operation of a certain amount of lint or short fibres will be removed from it.

Preferably, suitable means is provided for removing such lint from the machine, such as a series of suction nozzles 50, one located with its slot opposite the space between each pair of napping and feeding controlling rolls and extending the full length of said rolls, the three nozzles extending out to one side of the machine where they are connected by conduits 51 to any suitable source of producing suction, such as a common conduit 52 leading to a suction pump or the like.

The arrangement described provides continuously moving belts for supporting the work and carrying it past the napping and feed controlling rolls, together with means for varying the distance between the napping and feed controlling rolls in accordance with the thickness of the work. The work carrying belts are properly supported

for their travel in the machine and the arrangement also permits the use of intermediate bearings for the rapidly rotating napping rolls, which can therefore rotate at relatively higher speed than would otherwise be the case. The work is napped or brushed in stripes with repeated action upon different portions thereof and is finally delivered at the front end of the machine so that it is unnecessary to station operators at both ends of the machine. It will also be noted that the action of the feeding belts is not only to carry the work through the machine, but to strip it from the napping and especially from the feed controlling rolls, in case the nap points become entangled with the fabric and tend to hold the same and wrap it around one or the other of said rolls. There is also no tendency to draw or pull the work out of shape.

What I claim is:

1. A napping machine, comprising a series of successive napping rolls, a feed controlling roll opposite each of said napping rolls, all of said rolls having interrupted brush portions spaced along their length, and work feeding belts moving in the spaces between said brush portions, the interrupted brush portions of the napping and feed rolls of each pair being in opposed relation and the interrupted brush portions of succeeding pairs of rolls being in offset relation to each other.

2. A napping machine, comprising a series of successive napping rolls, a feed controlling roll opposite each of said napping rolls, all of said rolls having interrupted brush portions spaced along their length, and work feeding belts moving in the spaces between said brush portions, the interrupted brush portions of the napping and feed rolls of each pair being in opposed relation and the interrupted brush portions of succeeding pairs of rolls being in offset relation to each other, each brush portion being approximately twice the length of each space between brush portions.

3. A napping machine, comprising a plurality of successive napping rolls provided with interrupted brush portions spaced along the same, co-operating feed controlling rolls, endless tapes or bands for supporting the work and conveying the same forwardly between said napping and feed controlling rolls from the feeding end of the machine to the far end, and return belts for conveying the work rearwardly from the far end back to the feeding end of the machine, the interrupted brush portions of successive rolls being in offset or staggered relation with each other, and said forwardly and rearwardly conveying belts being in staggered relation with each other.

4. A napping machine, comprising co-operating napping and feed controlling rolls arranged in superposed relation, means for supporting the work and feeding it between said rolls, and lint removing suction means having its receiving mouth arranged between portions of said superposed rolls thereby rendering said suction means highly effective.

5. A napping machine, comprising a series of successive napping rolls each having interrupted brush portions, and conveyor members for supporting the work and moving the same past said napping rolls, said conveyor members engaging said rolls between the interrupted brush portions thereof.

6. A napping machine, comprising a series of successive napping rolls each having interrupted brush portions, and conveyor members for supporting the work and moving the same past said napping rolls, said conveyor members engaging said rolls between the interrupted brush portions thereof, the interrupted brush portions of the several rolls being in offset relation.

7. A napping machine, comprising a plurality of pairs of cooperating rolls each having interrupted brush portions and conveyor members for supporting the work and moving the same past said napping rolls, said conveyor members moving in the spaces between said brush portions.

8. A napping machine, comprising a plurality of pairs of cooperating rolls each having interrupted brush portions, conveyor members for supporting the work and moving the same past said napping rolls, said conveyor members moving in the spaces between said brush portions, and intermediate bearings for one of said rolls having engagement therewith in the spaces between the brush portions of said roll.

In testimony whereof I hereby affix my signature.

HAROLD V. PROTHERS.