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H. P. FARIS ET AL
CARPET MAKING APPARATUS

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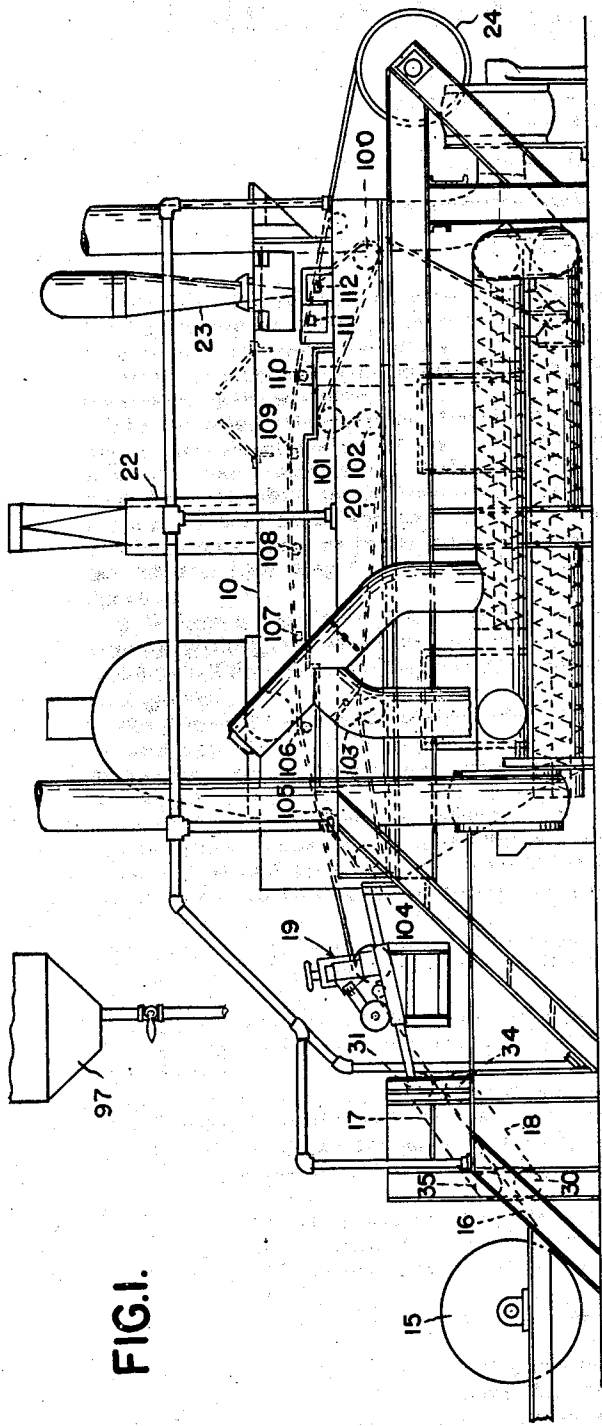
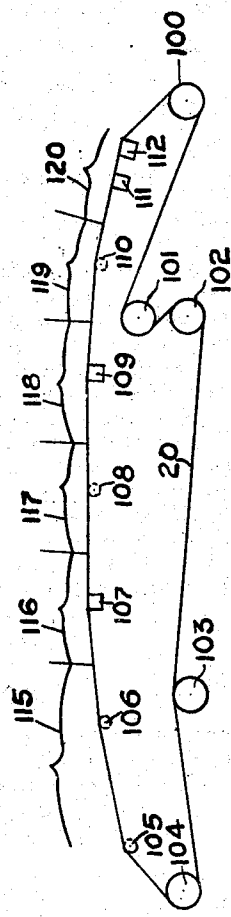


FIG. 1.

FIG. 2.



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CARPET MAKING APPARATUS

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9 Claims. (Cl. 91—8)

The present invention relates to carpet making apparatus and more particularly to apparatus for manufacturing carpet of the type disclosed in patent to Faris et al. 2,187,140.

One of the objects of the invention is to provide efficient means for imparting vibration of different intensity at different points in the travel of the carpet as it is being made.

Another object is to provide zones of different vibration for the initial attachment and for succeeding imbedding action of the fibers.

Another object is to provide vibration means capable of insuring the desired imbedding action of the fibers.

Other objects, advantages and novel details of construction of this invention will be made more apparent as this description proceeds, especially when considered in connection with the accompanying drawing, wherein:

Figure 1 is a side elevation of apparatus embodying my invention; and

Figure 2 is a diagrammatic view showing the relationship between the supporting conveyor and the beaters.

Referring first to Figure 1 the apparatus includes a framework for supporting a housing indicated generally at 10.

An openwork fabric to which unvulcanized blowing rubber stock is calendered may conveniently be provided in roll form as indicated at 15, the material 16 being withdrawn from the roll and advanced between a pair of cooperating belts 17 and 18. The material 16 next advances to the adhesive applicator indicated generally at 19 where a uniform coating of a fluid adhesive or cement is applied. The adhesive applicator may be supplied with adhesive by any suitable means, such as the elevated reservoir 97.

Within the housing 10 a continuous supporting and protecting belt 20 is provided over which the calendered rubber and fabric 16 is advanced. A plurality of beaters engage the underside of the belt 20 and vibrate the same, thus transmitting the vibrations to the material 16.

Fibers of predetermined length are fed downwardly to a sieve (not shown) which is constantly rotated and which sifts the fibers onto the cement coated surface of the carpet material as the same is vibrated. Some of the fibers which do not adhere to the carpet or which pass endwise through the sieve mentioned are collected and are applied to the carpet at a point further along in its direction of advance through a distributor 22, which includes means for breaking up balls or pills of the fibers.

A little further along in the direction of advance of the carpet we provide a suction nozzle 23 which has an inlet opening extending across the carpet material in close proximity thereto and directly above the last of the series of beaters previously referred to. This nozzle picks up such of the fibers which are not firmly adhered to the cement and returns them to the system for use, as will later be described in detail.

A relatively large roll 24 is provided adjacent the exit end of the fiber applying machine, the roll 24 preferably being covered with carding cloth so as to engage the carpet material strongly and draw the same through the machine with a uniform tension.

Referring to Figures 1 and 2, reference is now made to the means for vibrating the carpet. The belt 20 has previously been referred to and this belt may conveniently take the form of a canvas belting or the like. In Figure 2 in which the belt and its cooperating rolls and beaters are shown separated from the machine, the belt 20 passes around the rolls 100, 101, 102, 103 and 104. The rolls 101 and 102 are relatively adjustable by conventional means to vary the tension in the belt 20. The beaters are arranged in a particular sequence for a particular purpose, as will now be pointed out. The beaters, which are polygonal bars rotated at relatively high speed, are arranged as follows: The beaters 105 and 106, which are the first two engaged by the advancing carpet fabric, are adapted to vibrate the fabric very rapidly and relatively lightly. In the specific embodiment illustrated these are shown as octagonal. The beater 107, which is the next one in the sequence, is adapted to vibrate the fabric more strongly and, accordingly, the bar is of a lesser number of sides, in the specific embodiment illustrated a square bar being employed at this point. The next beater 108 is again adapted to continue the vibration of the fabric relatively lightly and, accordingly, is provided with a greater number of sides, in the specific embodiment illustrated the beater 108 being octagonal. The following beater 109 is again adapted to vibrate the material more strongly and, accordingly, has a lesser number of sides, in the embodiment illustrated a four-sided bar being employed. The beater 110 is again adapted to continue the vibration relatively lightly and, accordingly, a bar having a greater number of sides, as for example eight, is employed. The last two beaters 111 and 112 are adapted to vibrate the material strongly and, accordingly, these beaters are bars of lesser number of sides, in the embodiment illustrated be-

ing square bars or rods. As seen in Figure 1, the last bar 112 is located directly beneath the suction pick-up 23. Since the beater 112 is adapted to vibrate the material strongly, it will loosen all of the fibers which are in excess of the fibers necessary to thickly cover the surface. These excess fibers are vibrated in a free condition above the surface of the fabric by the last two beaters 111 and 112. These free fibers are picked up by suction nozzle 23 and returned to the flock cycling system for further use on advancing material 16.

It may be stated that the precise arrangement of the beaters need not be followed, but it is desirable that the beating be carried out at different intensities. It is important that the initial vibration be very rapid and relatively light. At this time the freshly cut fibers are being sifted onto the fabric and the rapid, light vibration tends to fix a relatively large number of these fibers on end. As the material advances a short distance it is then desirable to vibrate the same much more strongly. This will serve to drive the fibers into the adhesive, and in some cases it is found that some of the fibers are driven completely through the adhesive and into the upper surface of the sponge rubber stock.

Referring to Figure 2, it will be noted that the zone of first application is indicated generally by the bracket 115, and throughout this zone the fabric is being vibrated very rapidly and relatively lightly. In the second zone indicated by the bracket 116, no fiber is being applied, and the fabric in this zone is vibrated strongly and less rapidly. The third zone of fiber application is indicated by the bracket 117, and again in this zone the material is vibrated very rapidly. Following this, in the zone 118, the carpet is vibrated strongly so as to cause the fibers to be deeply embedded into the cement. In the next succeeding zone indicated by bracket 119 the material is vibrated lightly to give an opportunity for loose unattached fibers to become attached endwise in the cement. In the final zone indicated by the bracket 120, the material is strongly vibrated for the purpose of deeply embedding all of the fibers, including those which have become attached in the zone 119 and also to cause such fibers as remain unattached to be vibrated free of the surface of the carpet in position to be picked up by the suction nozzle 23. It is found that the particular arrangement described substantially improves the result obtained and while the particular number of sides of the vibrating elements, and the fact the precise arrangement may be somewhat modified, it is desirable to follow the teachings herein set forth, at least to the extent of providing zones of differential vibration for the initial attachment and succeeding embedding of the fibers.

What we claim as our invention is:

1. A machine for making a cemented pile carpet having means for advancing adhesively coated sheet material in a predetermined direction, means above said advancing means for depositing cut fibers onto the adhesive coating of the material as the latter is advanced, and means beneath the advancing means at a series of separate points thereof for successively vibrating at different intensities the adhesively coated sheet material as it is advanced, said vibrating means including a series of spaced rotating beater bars engageable with the underside of the advancing means, the first two bars of the series being octagonal in cross section, the next four succeeding

bars of the series being alternately substantially square shape and octagonal in cross section, and the last two bars of the series being square shape in cross section.

2. A machine for making a cemented pile carpet having means for advancing adhesively coated sheet material in a predetermined direction, means above said advancing means for depositing cut fibers onto the adhesive coating of the material as the latter is advanced, and means beneath the advancing means at a series of separate points thereof for successively vibrating at different intensities the adhesively coated sheet material, said vibrating means including a series of spaced rotating beater bars engageable with the underside of the advancing means, some of said bars being octagonal in cross section and some being square shape in cross section.

3. In a machine having means for advancing in a predetermined direction sheet material having an adhesive coating, and means above said advancing means for depositing cut fibers onto the adhesive coating of the material as the latter is advanced; means beneath the advancing means at a series of separate points thereof for successively vibrating at different intensities the adhesively coated sheet material, said vibrating means including spaced beater elements engageable with the underside of the advancing means, some of said elements being rapidly rotating polygonal members, and some of said elements being relatively slowly rotating four sided members.

4. In a machine having means for advancing in a predetermined direction sheet material having an adhesive coating, and means above said advancing means for depositing cut fibers onto the adhesive coating of the material as the latter is advanced; means beneath the advancing means at a series of separate points thereof for successively vibrating at different intensities the adhesively coated sheet material, said vibrating means including spaced beater elements engageable with the underside of the advancing means, some of said elements being rotatable octagonal members, and some of said elements being rotatable members having fewer beater sides.

5. In a machine having means for advancing in a predetermined direction sheet material having an adhesive coating, and means above the advancing means for depositing cut fibers onto the adhesive coating as the material is advanced; means beneath the advancing means at a series of separate points thereof for successively vibrating at different intensities the adhesively coated sheet material as it is advanced, said vibrating means including beaters of different cross sectional configuration arranged so that the vibration at the first point of the series is very rapid and relatively light to place a relatively large number of the deposited fibers on end at the surface of the adhesive coating, the vibration at the next point of the series being less rapid but sufficiently strong to drive the deposited fibers on end into the adhesive coating, and the vibration at succeeding points to the last point of the series being alternately rapid and light and less rapid and strong so that any loose fibers will be imbedded endwise into the adhesive coating, and all fibers imbedded endwise into the adhesive coating will be imbedded more deeply into said adhesive coating.

6. In a machine having means for advancing in a predetermined direction sheet material having an adhesive coating, and means above the ad-

vancing means for depositing cut fibers onto the adhesive coating as the material is advanced; means beneath the advancing means at a series of separate points thereof for successively vibrating at different intensities the adhesively coated sheet material as it is advanced, said vibrating means including spaced beater elements of different cross sectional configuration arranged in a predetermined sequence and engageable with the underside of the advancing means, the first two beater elements of the series being octagonal in cross section, the next four succeeding beater elements of the series being alternately substantially square shape and octagonal in cross section, and the last two beater elements of the series being square shape in cross section.

7. In a machine having means for advancing in a predetermined direction sheet material having an adhesive coating, and means above the advancing means for depositing cut fibers onto the adhesive coating as the material is advanced; means beneath the advancing means at a series of separate points thereof for successively vibrating at different intensities the adhesively coated sheet material as it is advanced, said vibrating means including a series of spaced beater elements arranged in a predetermined sequence and engageable with the underside of the advancing means, some of said beater elements being octagonal in cross section, the other of said beater elements being substantially square shape in cross section.

8. In a machine having means for advancing in a predetermined direction sheet material having an adhesive coating, and means above the advancing means for depositing cut fibers onto the

adhesive coating as the material is advanced; means including beater bars of different cross sectional configuration beneath the advancing means at a series of separate points thereof for successively vibrating at different intensities the adhesively coated sheet material so that the deposited fibers will be placed on end at the surface of the adhesive coating and then will be imbedded endwise into said adhesive coating.

9. In a machine having means for advancing in a predetermined direction sheet material having an adhesive coating, and means above said advancing means for depositing cut fibers onto the adhesive coating of the material as the latter is advanced; means beneath the advancing means at a series of separate points thereof for successively vibrating at different intensities the adhesively coated sheet material as it is advanced, said vibrating means including rotatable beater bars of different cross sectional configuration arranged so that the vibration at the first point of the series is very rapid and relatively light to place a relatively large number of the sifted fibers on end at the surface of the adhesive coating, the vibration at the next point of the series being less rapid but sufficiently strong to drive the fibers on end into the adhesive coating, and the vibration at succeeding points to the last point of the series being alternately rapid and light and less rapid and strong so that any loose fibers will be imbedded into the adhesive coating and all fibers imbedded endwise into the adhesive coating will be imbedded more deeply into said adhesive coating.

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