

Jan. 4, 1944.

H. P. FARIS ET AL

2,338,499

RUG MANUFACTURE

Filed July 20, 1942

5 Sheets-Sheet 2

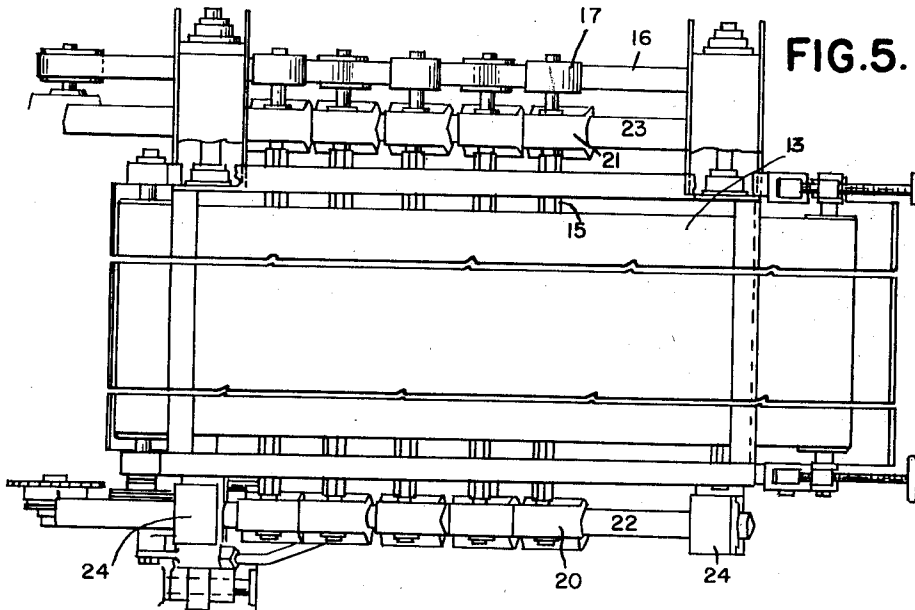


FIG. 5.

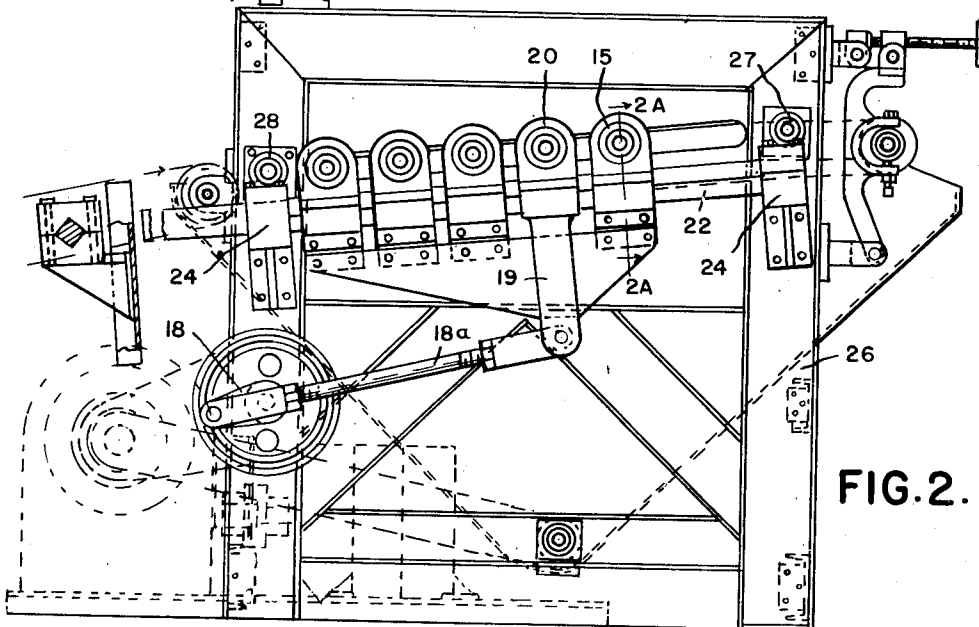


FIG. 2.

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FIG. 4.

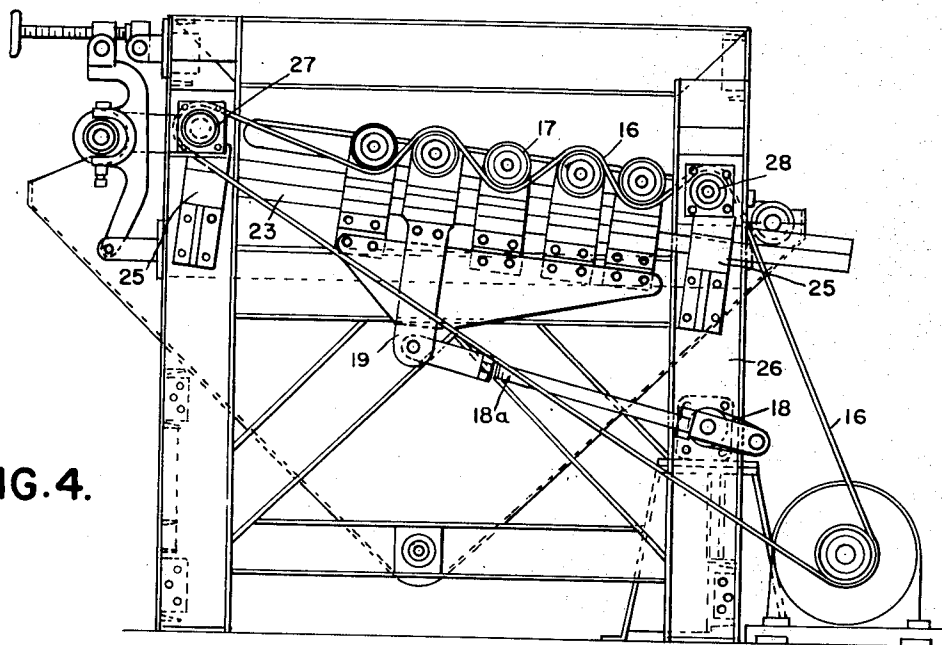


FIG. 2A.

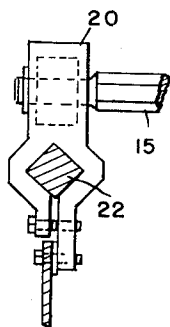


FIG. 9.

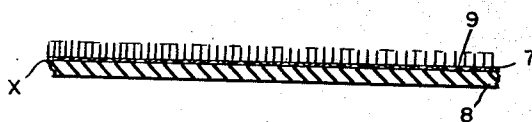
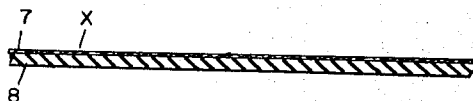


FIG. 10.

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FIG.3.

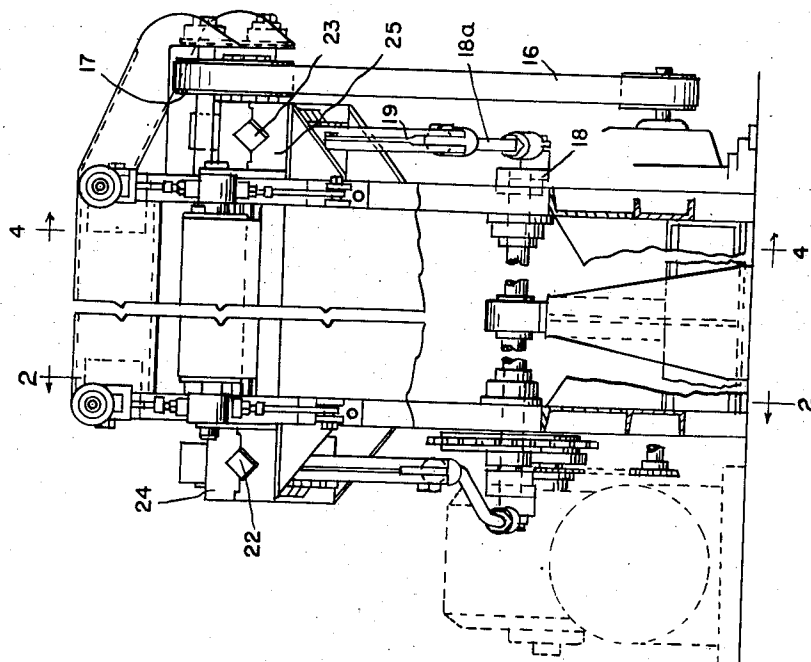
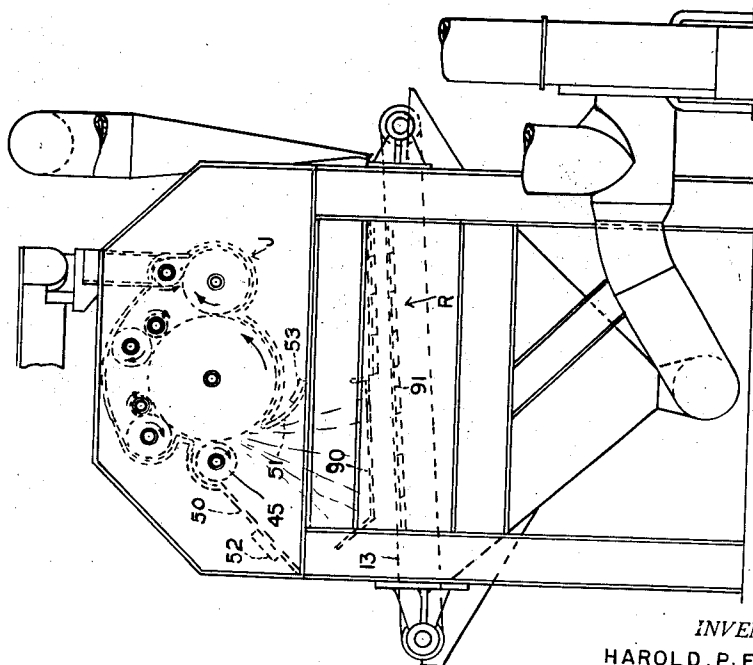


FIG.8.



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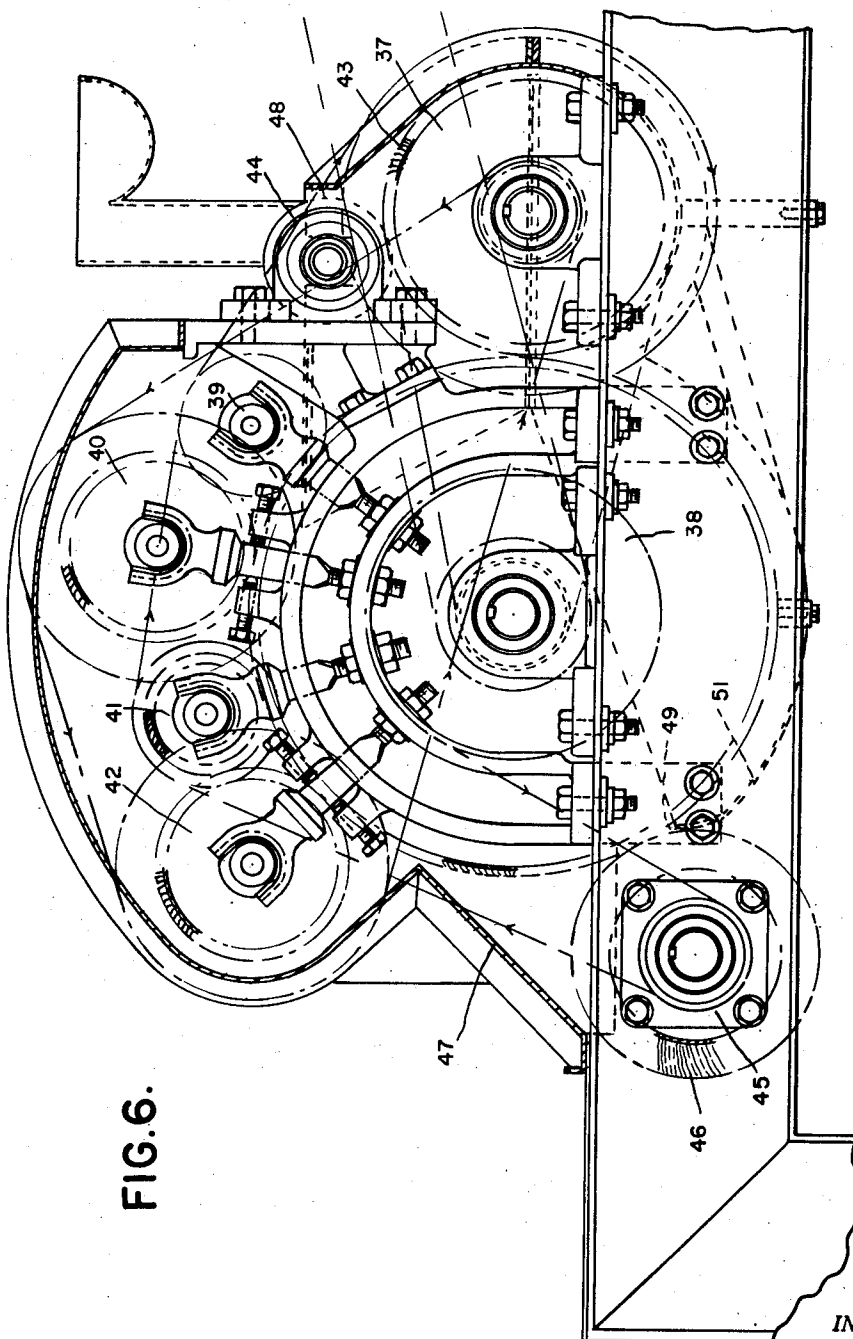


FIG. 6.

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UNITED STATES PATENT OFFICE

2,338,499

RUG MANUFACTURE

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Application July 20, 1942, Serial No. 451,626

19 Claims. (Cl. 91—8)

This invention relates generally to the manufacture of carpets, rugs and the like and refers more particularly to the manufacture of cemented pile carpets wherein the pile surface of the carpet is composed of a multiplicity of individual upstanding fibers that simulate ordinary woven pile in appearance.

Preferably the carpet is made by depositing the individual fibers onto a cement or adhesive covered base while the latter is being vibrated, however in the present instance the invention is characterized by (1) successive deposits of different types or grades of fibers onto the adhesively covered base, (2) the uniform feeding and uniform deposition of the fibers, (3) the removal from the base of loose or excess fibers before successive deposits are made, (4) the uniformity in weight and length of the fibers initially deposited, (5) a more perfect initial formation of the fibers, (6) the use of a longer pile material than ordinarily employed, (7) the positive breaking up and carding of the flock into individual fibers, (8) the controlled supply of fibers from the feed units, and (9) the improved or more equalized vibrating means for the base to obtain a more uniform and deeper penetration of the fibers into the adhesive or cement covering on the base.

Thus, one of the essential objects of the invention is to obtain a better carpet, i. e., a carpet having a better pile surface.

Another object is to provide an improved means for making such a carpet.

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 drawings, wherein:

Figure 1 is a side elevational view of a machine embodying our invention for making the carpet, with parts broken away and in section;

Figure 2 is a vertical sectional view taken on line 2—2 of Figure 3;

Figure 2A is a sectional view taken on the line 2A—2A of Figure 2;

Figure 3 is a rear end view of the assembly illustrated in Figure 2;

Figure 4 is a sectional view taken substantially on the line 4—4 of Figure 3;

Figure 5 is a top plan view of the structure illustrated in Figure 2;

Figure 6 is an enlarged elevational view of the first feed unit, with parts broken away and in section;

Figure 7 is a fragmentary side elevation of

the rear end of the machine illustrated in Figure 1 and showing a slight modification;

Figure 8 is a side elevation of the first feed unit as illustrated in Figure 1 but showing a modified agitator assembly in combination therewith;

Figure 9 is a vertical sectional view through the material X before being flocked;

Figure 10 is a vertical sectional view through a carpet made in accordance with my invention.

Referring now to the drawings, A and B, respectively, are feed rolls of calendered material to be flocked, C is a vertical series of tension rolls for said material, D is an adhesive doctor knife or cement spreader knife, E, F and G, respectively, are vibrator or beater assemblies for the material, H is a roll for pulling material from the feed rolls A and B over the vibrator assemblies E, F and G, respectively, J, K and L, respectively, are flock feed units, and M, N and O, respectively, are suction nozzles for cleaning off or removing loose or excess fibers from the adhesive or cement upon said material.

As shown, the rolls A and B are spaced vertically apart and are carried by a suitable frame 10 at one end of the machine. Preferably the material on the lower roll A is used first and then the material on the upper roll B is used. If desired, the lead end of the material on the upper roll B may be spliced or otherwise secured to the tail end of the material on the lower roll A to provide a continuous operation. In each instance, the material X may be burlap 7, woven cloth or a synthetic sheet or paper having the proper tensile strength, or a smooth sheet of any other suitable material calendered to uncured sponge rubber 8, or some other suitable substance having resilient qualities. Such material is drawn from the rolls A and B around the tension rolls C and over the vibrator or beater assemblies E, F and G, respectively, by the puller roll H at the other end of the machine.

The tension rolls C may be any suitable construction and are arranged to keep the material X firm and under tension as it passes through the machine. Suitable means (not shown) may be employed for driving the tension rolls C at approximately five (5) per cent slower speed than the puller roll H.

After leaving the tension rolls C the material having the rubber side thereof lowermost passes over idler rolls 11 and 12, respectively, onto the first agitator or beater assembly E. However, before it reaches the assembly E, the upper surface of the material is covered substantially with a layer 9 of suitable adhesive substance or cement

somewhat inferior grade of flock is preferably used in this feed unit. Such flock is selected as a secondary fill for the initial formation on the adhesive or cement covered material X to help build up a solid pile on said material.

The third flock feed unit L is also spaced above the second agitator assembly F and preferably comprises a vertical chute provided at its lower discharging end with suitable carding rolls 60 and 61, respectively. The same grade of flock used in the second feed unit K or a more inferior grade of flock may be used in the third unit to make the final fill for the pile previously formed on the material X.

The suction nozzles M, N and O, respectively, are preferably located at spaced points of the machine to clean off or remove loose or excess fibers from the adhesive or cement covered material X after the fibers have been deposited thereon from the feed units J, K and L, respectively. As shown, the first nozzle M is between the first and second feed units J and K for cleaning up the material X after the initial deposit is made thereon and before the deposit from the second feed unit K is made; the second nozzle N is between the second and third feed units K and L for cleaning up the material X after the second deposit and before the deposit from the third feed unit is made; and the third suction nozzle O is at the rear of the third feed unit L for making a final clean up. Such nozzles M, N and O may be connected by suitable ducts to the storage bins from which the flock for the respective feed units is obtained. Preferably the first nozzle M is connected to a duct 62 that leads to the storage bin 35 for the first feed unit J and contains a suitable suction fan or blower 63 for drawing off the material X and returning to the first bin 35 any loose fibers that did not become imbedded in the cement or adhesive substance on said material after being discharged from the first feed unit J. In this connection, the duct 62 has a branch 64 that extends from the bottom of a trough 65 located below the first agitator assembly E for receiving any fibers overflowing the sides of the endless conveyor 13. Thus, the fibers that are discharged from the first feed unit J and fail to be imbedded in the cement or adhesive substance on the material X are returned to the storage bin 35 for the first feed unit J to be used again.

Likewise, the second suction nozzle N is connected to a duct 66 that leads to a second storage bin (not shown) for the second feed unit K and contains a suction fan or blower 67 for drawing off the material X and returning to the second bin mentioned any loose fibers that did not become imbedded in the cement or adhesive substance on the material X after being discharged from the second feed unit K.

The third suction nozzle O is connected to a duct 68 that leads to the third feed unit L and that contains a suction fan or blower 69 for drawing off the material X and returning to the third feed unit L any loose fibers that did not become imbedded in the cement or adhesive substance on the material X after being discharged from the third feed unit L. However, in this instance, there is a branch duct 70 that leads from the duct 68 to the second bin mentioned, and there is also a supply duct 71 that leads from the second bin mentioned to the duct 68 on the intake side of the blower 69. A suitable directional damper 72 may be provided at the juncture of the ducts 68 and 70 to control the flow there-through of fibers from the blower 69.

Thus, with this arrangement, it will be apparent that provision has been made in the first instance for depositing one type of flock onto the material X, then cleaning the material X, then depositing another type of flock onto said material, then again cleaning the material X, finally depositing the same type of flock again onto the material X, and finally again cleaning the material X before completing the process. Hence, the surface of the adhesive substance or cement on the material X is clean in each instance before the flock is deposited thereon. Actually, each successive deposit of fibers may be accomplished without interference on the material X with loose fibers that would form obstacles that would prevent the deposited fibers from becoming imbedded in the adhesive substance or cement on such material. As a result more of the fibers deposited will become imbedded in the adhesive substance or cement to provide a denser pile formation. Moreover, it will be apparent that the three agitator assemblies E, F and G, respectively, are located at such points relative to the feed units J, K and L, respectively, that the fibers imbedded in the adhesive substance or cement on the material X will sink farther and farther into such adhesive substance or cement as the material advances over and is agitated by the respective assemblies E, F and G. In fact, by the time the fibers pass over the third and final agitator assembly G they will sink to a point near the bottom of the cement or adhesive substance on the material X, hence such fibers will not only be dense as aforesaid but will also be anchored firmly and solidly as desired. As a result, a solid, well-anchored pile is provided on the material X.

If desired, some other means such as the cooperating rolls 80 and 81, respectively, may be employed instead of the electric vibrators 32 and 33 after the pile has been formed as aforesaid on the material X to push the fibers of the pile down farther into the cement or adhesive substance on said material for better anchorage purposes. As shown, the lower roll 81 is an idler roll and engages the underside of the material X, while the upper roll 80 is a pressure roll and has suitable adjusting means 82. Preferably the periphery of at least the upper roll 80 is covered with sponge rubber 83 or the like for engagement with the pile formed on the material X.

After the pile mentioned is formed, the material X provided with such pile is advanced through an oven or other heating chamber (not shown) where the sponge rubber 8 on the underside of the material X is cured and where the adhesive substance or cement 9 in which the pile is anchored is dried or cured to provide the finished product.

In Figure 8 I have illustrated a slight modification wherein electro-static equipment R is provided instead of the agitator assembly E beneath the first feed unit J. As shown, an electrically charged reciprocating screen 90 of conventional design is supported between the fancy roll 45 and the endless conveyor 13 in position to receive the fibers discharged from the unit J, while an electrically charged electrode 91 is located immediately below the top flight portion of the endless conveyor as an agitator for the material X. Thus, the electrically charged screen 90 causes the fibers to dance up and down and fall in a straightened condition into the adhesive substance or cement 9 on the material X, while the charged electrode 91 will vibrate the material X so that such fibers will be imbedded endwise in the cement or ad-

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 heative substance mentioned. Otherwise the construction and operation of the parts illustrated in Figure 8 are the same as in Figure 1.

In use, the material X from the feed rolls A and B will be covered by the doctor blade D with a suitable layer 9 of adhesive substance or cement which will receive successively three deposits of fibers from the feed units J, K and L, respectively, as the material is advanced over and vibrated successively by the three agitator assemblies E, F and G, respectively. The initial deposit from the feed unit J consists of selected, well-balanced fibers of substantially uniform length and weight to provide a better and more uniform initial formation on the material X, while the second and third deposits may be of an inferior grade of fibers. The suction nozzles M, N and O, respectively, will effectively remove loose fibers from the adhesive substance or cement 9 on said material to insure a clean surface for each successive deposit of fibers. Hence, a denser formation of the fibers on the material X may be obtained. The arrangement of the agitators E, F and G for the material X insures the proper anchorage of the fibers in the adhesive substance or cement 9 because successive vibrations cause such fibers to sink farther and farther into such adhesive substance or cement. Thus, the pile formed by the fibers on the material X will be denser and anchored better than heretofore.

What we claim as our invention:

1. A machine for making a cemented pile carpet, comprising means for covering a base material with a cement or adhesive substance, means at three separate points spaced from said covering means for successively vibrating the adhesively covered base material, means above the vibrating means at the first of the three points mentioned for feeding uniformly onto the adhesively covered material individual fibers of substantially uniform weight and length to make an initial pile formation, two separate means above the vibrating means at the second of the three points mentioned for successively feeding an inferior grade of fibers onto said adhesively covered material to make successively denser pile formations, means between the first and second mentioned feeding means for cleaning loose and excess fibers from the initial pile formation, and means between the two separate feeding means for cleaning loose and excess fibers from the pile formation existing at that point.

2. A machine for making a cemented pile carpet, comprising means for covering a base material with a cement or adhesive substance, means at three separate points spaced from said covering means for successively vibrating the adhesively covered base material, means above the vibrating means at the first of the three points mentioned for feeding selected fibers onto the adhesively covered material to make an initial pile formation, and two separate means respectively above the vibrating means at the second of the three points mentioned for successively feeding an inferior grade of fibers onto said adhesively covered material to make successively denser pile formations.

3. A machine for making a cemented pile carpet, comprising means for covering a base material with a cement or adhesive substance, three separate means for vibrating successively said covered base material, and means over at least two of said vibrating means for feeding substan-

tially uniformly individual fibers of predetermined grades onto said covered base material.

4. A machine for making a cemented pile carpet, comprising means for covering a base material with a cement or adhesive substance, three separate means for vibrating successively said covered base material, and means over at least two of said vibrating means for feeding substantially uniformly individual fibers of predetermined grades onto said covered base material, one of said feeding means having carding rolls for engagement with the fibers, a roll for feeding the fibers to the carding rolls, and a roll for throwing the fibers from the carding rolls to the covered base material.

5. A machine for making a cemented pile carpet, comprising means for covering a base material with a cement or adhesive substance, three separate means for feeding successively onto said covered base material individual fibers of predetermined grades and three separate means for vibrating successively the covered base material as the fibers are fed onto said covered base material to cause such fibers to sink into said covering substance.

6. A machine for making a cemented pile carpet, comprising means for covering a base material with a cement or adhesive substance, three separate means for feeding successively onto said covered base material individual fibers of predetermined grades, and means beneath each feeding means for vibrating the covered base material as the fibers are fed onto said covered base material to cause such fibers to sink into said covering, one of said vibrating means having a battery of vibrating bars mounted for both rotary and longitudinal movement relative to the base material.

7. A machine for making a cemented pile carpet, comprising means for covering a base material with a cement or adhesive substance, three separate means for feeding successively onto said covered base material individual fibers of predetermined grades, and means beneath each feeding means for vibrating the covered base material as the fibers are fed onto said covered base material to cause such fibers to sink into said covering substance, one of said vibrating means having a battery of vibrating bars mounted for both rotary and longitudinal movement relative to the base material, a common drive for the bars of said battery, and means for moving the bars as a unit longitudinally of the base material.

8. A machine for making a cemented pile carpet, comprising means for covering a base material with a cement or adhesive substance, means for feeding successively onto said covered base material individual fibers of predetermined grades, and means for vibrating the base material as the fibers are fed onto said covered base material to cause such fibers to sink into said covering substance, including a battery of vibrating bars mounted for both rotary and longitudinal movement relative to the base material.

9. A machine for making a cemented pile carpet, comprising means for covering a base material with a cement or adhesive substance, means for feeding successively onto said covered base material individual fibers of predetermined grades, and means for vibrating the base material as the fibers are fed onto said covered base material to cause such fibers to sink into said covering substance, including a battery of vibrating bars mounted for both rotary and longi-

tudinal movement relative to the base material, and individual vibrating bars mounted for rotary movement only in advance and in rear of said battery.

10. A machine for making a cemented pile carpet, comprising means for covering a base material with a cement or adhesive substance, means for feeding successively onto said covered base material individual fibers of predetermined grades, means for vibrating the base material as the fibers are fed onto said covered base material to cause such fibers to sink into said covering substance, including a battery of vibrating bars mounted for both rotary and longitudinal movement relative to the base material, and individual vibrating bars mounted for rotary movement only in advance and in rear of said battery, the individual bars and the bars of said battery having a common drive means.

11. A machine for making a cemented pile carpet, comprising means for covering a base material with a cement or adhesive substance, means for feeding successively onto said covered base material individual fibers of predetermined grades, and means for vibrating the base material as the fibers are fed onto said covered base material to cause such fibers to sink into said covering substance, including a battery of vibrating bars mounted for both rotary and longitudinal movement relative to the base material, alternate bars of the battery rotating in opposite directions.

12. A machine for making a cemented pile carpet, comprising means for covering a base material with a cement or adhesive substance, means for feeding successively onto said covered base material individual fibers of predetermined grades, and means for vibrating the base material as the fibers are fed onto said covered base material to cause such fibers to sink into said covering substance, including a battery of vibrating bars mounted for longitudinal movement relative to the base material.

13. A machine for making a cemented pile carpet, comprising means for covering a base material with a cement or adhesive substance, three separate means for feeding successively onto said covered base material individual fibers of predetermined grades, and means beneath each feeding means for vibrating the covered base material as the fibers are fed onto said covered base material to cause such fibers to sink into said covering substance, one of said vibrating means having a battery of vibrating bars mounted for both rotary and longitudinal movement relative to the base material, and a common drive for the bars of said battery.

14. A machine for making a cemented pile carpet, comprising means for covering a base material with a cement or adhesive substance, means for feeding successively onto said covered base material individual fibers of predetermined grades, means for vibrating the base material as the fibers are fed onto said covered base material to cause such fibers to sink into said covering substance, including a battery of vibrating bars mounted for longitudinal movement relative to the base material, and individual vibrating bars mounted for rotary movement in advance and in rear of said battery.

15. A machine for making a cemented pile carpet, comprising a puller roll for advancing a base material in a predetermined direction, means for covering the base material with an adhesive substance, first and second endless conveyors

spaced longitudinally apart between the covering means and puller roll for supporting the base material as it is advanced, first, second and third agitator assemblies at spaced points between the covering means and puller roll, the first of said assemblies including a battery of rotatable beater bars extending across and engaging the underside of the top flight of the first endless conveyor, and means for moving the rotatable bars back and forth lengthwise of the first conveyor, the second of said assemblies including a battery of rotatable beater bars extending across and engaging the underside of the top flight of the second endless conveyor, the third of said assemblies including one or more vibrators engageable with and forming a vibrating support for the underside of the base material as it advanced from the second conveyor to the puller roll, first, second and third flock feed units at spaced points between the covering means and puller roll, the first of said feed units being above the first agitator assembly and including means for breaking up and carding selected flock of predetermined weight and length into individual fibers, and means for projecting such individual fibers substantially uniformly onto the adhesively covered base material as it is agitated by the first agitator assembly, the second feed unit being above the second agitator assembly and being similar in construction to the first feed unit so that flock of somewhat inferior grade may be projected in the form of individual fibers onto the adhesively covered base material as it is agitated by the second agitator assembly, the third feed unit being also above the second agitator assembly and including means for carding an inferior grade of flock and projecting the individual fibers thereof onto the adhesively covered base material as it is agitated by the second agitator assembly, and first, second and third suction means at spaced points between the covering means and puller roll for removing loose and excess fibers from the adhesively covered base material, the first suction means being between the first and second feed units, the second suction means being between the second and third feed units, and the third suction means being between the third feed unit and the puller roll.

16. In a machine for making a cemented pile carpet, means for advancing a base material in a predetermined direction, means for covering the base material with an adhesive substance, endless conveyor means between the covering means and advancing means for supporting the base material as it is advanced, first and second agitator assemblies at spaced points between the covering means and advancing means, the first of said assemblies including a battery of rotatable beater bars extending across and engaging the underside of the top flight of endless conveyor means, the second of said assemblies including a battery of rotatable beater bars extending across and engaging the underside of the top flight of the endless conveyor means, first and second flock feed units at spaced points between the covering means and advancing means, the first of said feed units being above the first agitator assembly and including means for breaking up and carding selected flock into individual fibers, and means for projecting such individual fibers substantially uniformly onto the adhesively covered base material as it is agitated by the first agitator assembly, the second feed unit being above the second agitator assembly

and having means whereby flock of somewhat inferior grade may be projected in the form of individual fibers onto the adhesively covered base material as it is agitated by the second agitator assembly, and first and second suction means at spaced points between the covering means and advancing means for removing loose and excess fibers from the adhesively covered base material, the first suction means being between the first and second feed units, and the second suction means being between the second and third feed units.

17. In a machine for making a cemented pile carpet, means for advancing a base material in a predetermined direction, means for covering the base material with an adhesive substance, first and second endless conveyors spaced longitudinally apart between the covering means and advancing means for supporting the base material as it is advanced, first, second and third agitator assemblies at spaced points between the covering means and advancing means, the first of said assemblies including a battery of beater bars extending across and engaging the underside of the top flight of the first endless conveyor, the second of said assemblies including a battery of beater bars extending across and engaging the underside of the top flight of the second endless conveyor, the third of said assemblies including one or more vibrators engageable with and forming a vibrating support for the underside of the base material as it advances from the second conveyor to the advancing means, first, second and third flock feed units at spaced points between the covering means and advancing means, the first of said feed units being above the first agitator assembly and including means for projecting individual fibers substantially uniformly onto the adhesively covered base material as it is agitated by the first agitator assembly, the second feed unit being above the second agitator assembly and having means whereby flock of predetermined grade may be projected in the form of individual fibers onto the adhesively covered base material as it is agitated by the second agitator assembly, the third feed unit being also above the second agitator assembly and including means for projecting individual fibers onto the adhesively covered base material as it is agitated by the second agitator assembly, and first, second and third suction means at spaced points between the covering means and advancing means for removing loose and excess fibers from the adhesively covered base material, the first suction means being between the first and second feed units, the second suction means being between the second and third feed units, and the third suction means being between the third feed unit and advancing means.

18. In a machine for making a cemented pile carpet, means for advancing a base material in a predetermined direction, means for covering the base material with an adhesive substance, first and second endless conveyors spaced longitudi-

nally apart between the covering means and advancing means for supporting the base material as it is advanced, first, second and third agitator assemblies at spaced points between the covering means and advancing means, the first of said assemblies including a battery of beater bars extending across and engaging the underside of the top flight of the first endless conveyor, the second of said assemblies including a battery of beater bars extending across and engaging the underside of the top flight of the second endless conveyor, the third of said assemblies including one or more vibrators engageable with and forming a vibrating support for the underside of the base material as it advances from the second conveyor to the advancing means, and first, second and third flock feed units at spaced points between the conveying means and advancing means, the first of said feed units being above the first agitator assembly and including means for projecting individual fibers onto the adhesively covered base material as it is agitated by the first agitator assembly, the second feed unit being above the second agitator assembly and having means whereby flock of predetermined grade may be projected in the form of individual fibers onto the adhesively covered base material as it is agitated by the second agitator assembly, and the third feed unit being also above the second agitator assembly and including means for projecting individual fibers onto the adhesively covered base material as it is agitated by the second agitator assembly.

19. In a machine for making a cemented pile carpet, means for advancing a base material in a predetermined direction, means for covering the base material with an adhesive substance, first and second endless conveyors spaced longitudinally apart between the covering means and advancing means for supporting the base material as it is advanced, first and second agitator assemblies at spaced points between the covering means and advancing means, the first of said assemblies including a battery of beater bars extending across and engaging the underside of the top flight of the first endless conveyor, the second of said assemblies including a battery of beater bars extending across and engaging the underside of the top flight of the second endless conveyor, and first and second flock feed units at spaced points between the covering means and advancing means, the first of said feed units being above the first agitator assembly and including means for projecting individual fibers onto the adhesively covered base material as it is agitated by the first agitator assembly, and the second feed unit being above the second agitator assembly and having means whereby flock of predetermined grade may be projected in the form of individual fibers onto the adhesively covered base material as it is agitated by the second agitator assembly.

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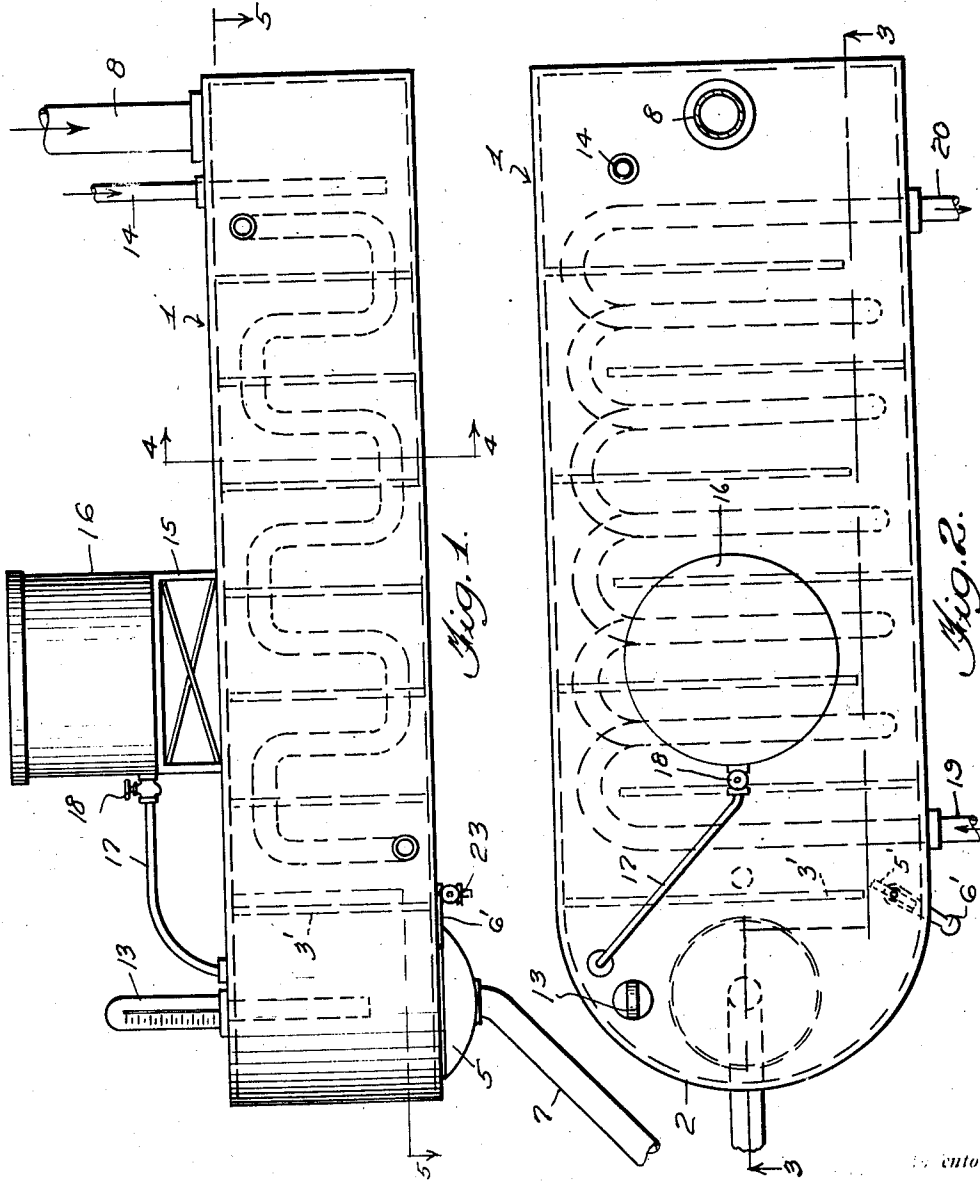
J. FELSCH

2,338,500

WATER CONDITIONING APPARATUS

Filed Feb. 11, 1942

2 Sheets-Sheet 1



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