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CARPET AND RUG CLEANING MACHINE

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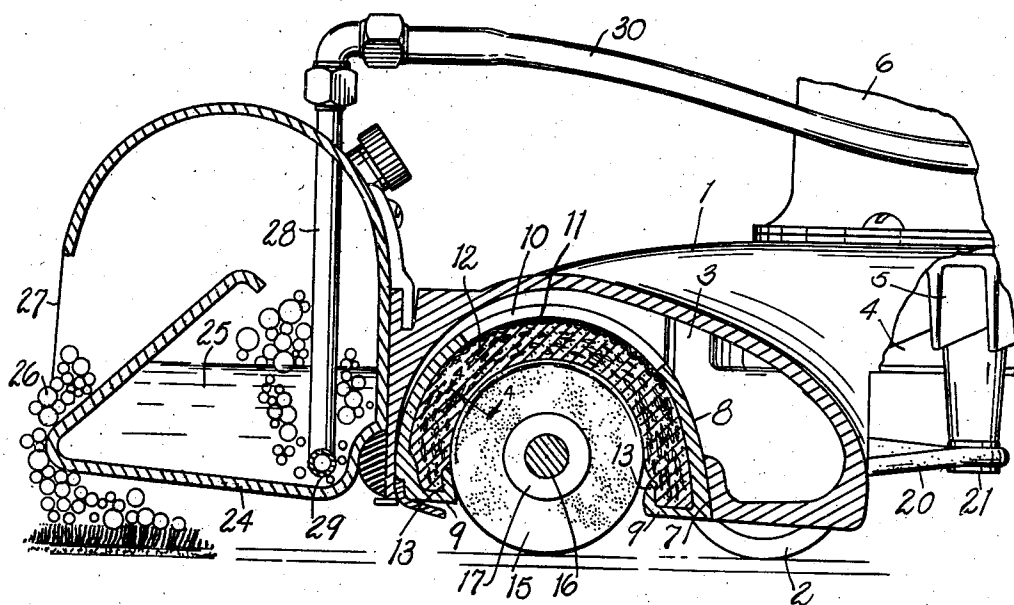


Fig. 1.

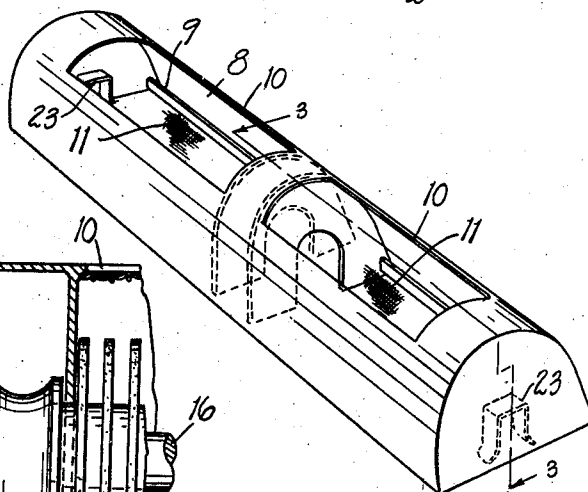


Fig. 2.

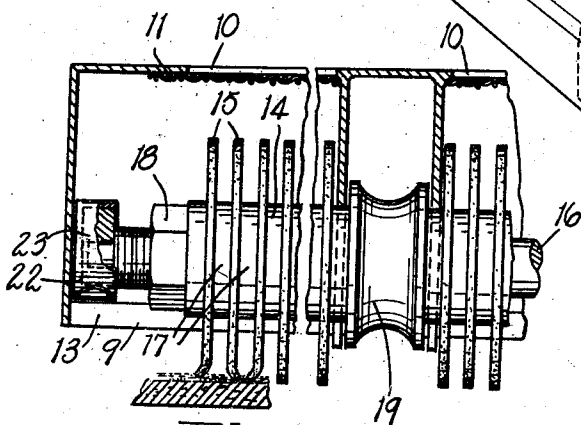


Fig. 3.

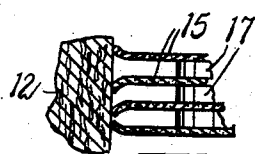


Fig. 4.

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CARPET AND RUG CLEANING MACHINE

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Application September 18, 1943, Serial No. 502,857

9 Claims. (Cl. 15—98)

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This invention relates to improvements in carpet and rug cleaning machines.

The main objects of this invention are:

First, to provide a carpet or rug cleaning machine or apparatus which is highly efficient and at the same time is not severe on the rug or carpet cleaned.

Second, to provide a carpet or rug cleaning machine of the vacuum type with means for applying moisture to the surface to be cleaned without substantial wetting thereof, in combination with means for effectively wiping and picking up the loosened dirt.

Third, to provide a structure having these advantages in which the wiping element is kept free from accumulations of moistened dirt.

Fourth, to provide a rotatable driven brushing and wiping member which is highly efficient in picking up moistened dirt without subjecting the nap of the rug or carpet to a severe brushing action.

Fifth, to provide a structure having these advantages which is readily freed or cleaned from the picked up dirt.

Objects relating to details and economies of the invention will appear from the description to follow. The invention is defined in the claims.

A preferred embodiment of the invention is illustrated in the accompanying drawing, in which:

Fig. 1 is a fragmentary view partially in longitudinal section of a vacuum cleaner embodying my invention.

Fig. 2 is a top perspective view of the housing for supporting the cleaner and filter element and the brushing and wiping member.

Fig. 3 is an enlarged fragmentary view partially in longitudinal section on line 3—3 of Fig. 2, the relation of certain of the brushing and wiping elements to the surface being cleaned being indicated somewhat conventionally.

Fig. 4 is an enlarged fragmentary section on a line corresponding to line 4—4 of Fig. 1, the relation of the brushing and wiping elements to the cleaner element being illustrated somewhat conventionally.

The embodiment of my invention illustrated comprises a casing 1 with carrying wheels 2, only one of which is illustrated. This casing is provided with a vacuum chamber 3 communicating with the fan casing 4, the fan being conventionally shown at 5. The fan is driven from the motor 6.

The vacuum chamber 3 has a downwardly facing opening 7 extending transversely across

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the same. This opening is adapted to receive the housing 8 which is of channel cross section facing downwardly. This housing is provided with inturned flanges 9 at the lower edges of its walls and with longitudinal openings 10 at the top thereof communicating with the vacuum chamber 3. These openings are provided with screens 11.

The combined cleaner and filter element 12 is arranged in this housing, being supported by the flanges 9 which have upturned edges 13 in an inverted U or channel section form as is shown in Fig. 1.

I provide a combined brushing and wiping member designated generally by the numeral 13, this in the embodiment illustrated comprising a plurality of circular disks 15 formed of chamois skin, these disks being mounted adjacent but in spaced and independent relation upon the shaft 16.

The disks are supported in spaced relation by means of annular clamping and spacing elements 17 which are arranged in alternating relation with the disks, the parts being clamped together by means of nuts 18 threaded upon the ends of the shaft. The shaft is provided with a pulley 19 with which the belt 20 engages, the belt being driven from a pulley 21 on the shaft of the fan.

The shaft 16 is detachably mounted in bearings 22 provided therefor on the ends of the housing member, being removably retained in the bearings by the members 23.

It will be observed that substantial portions of the peripheral edges of the disks are free. Very satisfactory results can be had when these elements are spaced about $\frac{1}{8}$ inch apart. I have not attempted to illustrate the parts in proportion.

When the brushing and wiping member and the filtering and cleaning element are in assembled relation, the peripheral edges of the disks will be compressed or deflected somewhat by the cleaner and filter element as shown in Fig. 4. As the disks 15 are of flexible material, they are deflected laterally more or less when they are brought into contact with the surface to be cleaned as shown in Fig. 3. This deflection is, however, an important feature of the functioning of the structure both in picking up the dirt and in transferring it to the filtering and wiping element. The filtering and wiping element is of foraminous material. Certain types of sponge rubber, particularly certain synthetic sponge rubber now on the market have been found highly satisfactory. These do not objectionably cut

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down the flow of air to the suction chamber but they are highly effective in cleaning the peripheral portions of the disks and holding the dirt, at the same time they can be readily freed from the dirt by washing and rinsing.

My improvements are especially well adapted for use in practicing the method of my application for patent, Serial No. 251,181, filed January 16, 1939, and issued November 23, 1943, as Patent No. 2,334,914, which involves the application of a cleaning fluid to the rug or carpet or surface to be cleaned in advance of and independently of the brush, the apparatus there illustrated disclosing a bristle type of brush.

In the embodiment here illustrated, I provide a tank 24 for the cleaning fluid, this tank being mounted on the front end of the carriage or vacuum cleaner and being adapted to receive a quantity of cleaning fluid as shown at 25. The cleaning fluid is discharged from this tank in the form of suds or bubbles 26 through a downwardly directed opening 27 at the front of the tank. The bubbles are created by means of an air pipe 28 having a series of jet orifices 29 therein, air being supplied to the pipe through the conduit 30 leading from the discharge of the fan. This provides means for moistening the surface to be cleaned without substantial wetting and working of the moisture into the nap. Sufficient moisture, however, is applied to loosen the dirt which is wiped and brushed up by means of the wiping and brushing element 14. This is of particular advantage not only on account of the effectiveness with which it picks up the dirt but it is known that moistening of the nap tends to substantially weaken or destroy the strength thereof and consequently brushing of the moistened nap results in greater wear than is occasioned when a brush is used on a perfectly dry nap, and while they do restrict the amount of moisture delivered, the brushing and wiping member, as stated, is not only efficient but, it minimizes wear on the rug or carpet cleaned. The moisture might be supplied in the form of a spray as shown in my copending application, Serial No. 499,926, filed August 25, 1943.

In Fig. 3, I have shown somewhat conventionally the relation of certain of the brushing and wiping elements to the surface being cleaned. It will be understood that in practice the edges of these elements are deflected laterally and the degree of this deflection and the direction of course depends on various factors and the illustration is merely intended to show that they are so deflected. The same condition exists in the relationship of the elements 15 to the filtering and wiping element 12. I have conventionally illustrated this in Fig. 4 but again it should be borne in mind that this is mainly a conventional illustration.

I have illustrated and described my improvements in an embodiment which I have found highly satisfactory. I have not attempted to illustrate or describe certain other embodiments or adaptations which I contemplate as it is believed that this disclosure will enable those skilled in the art to embody or adapt my invention as may be desired.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent, is:

1. In combination in a vacuum cleaner including a casing adapted to be translated over the surface to be cleaned and having a vacuum chamber therein with a downwardly facing open-

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ing, of a downwardly facing elongated housing member of channel section having inturned flanges at its edges and a longitudinal screened opening at the top thereof communicating with said vacuum chamber for passage of air from said housing into said vacuum chamber when the housing member is in operative position within said opening in said vacuum chamber, a driven brushing and wiping member rotatably and removably mounted in said housing member to be removed therewith and comprising a shaft, a plurality of circular disks arranged on said shaft in spaced relation with substantial portions of their peripheral edges free, a foraminous cleaner and filter element of resilient cellular material removably arranged in said housing with its edges in supported engagement with said flanges thereof to present a downwardly facing curved transverse channel embracing a substantial portion of said brushing and wiping member, the edge portions of said disks being in wiping engagement with said cleaner element as the brushing and wiping member rotates, said cleaner element absorbably removing moisture with dirt from said disks, said cleaner element being disposed over said screened opening for passage of air therethrough from said housing into said vacuum chamber, and means for discharging a cleaning fluid upon the surface to be cleaned in advance of and independently of said brushing and wiping member.

2. In combination in a vacuum cleaner including a casing adapted to be translated over the surface to be cleaned and having a vacuum chamber therein with a downwardly facing opening, of a downwardly facing elongated housing member of channel section communicating with said vacuum chamber for passage of air from said housing into said vacuum chamber when the housing member is in operative position within said opening in said vacuum chamber, a driven brushing and wiping member rotatably and removably mounted in said housing member to be removed therewith and comprising a shaft, a plurality of circular disks arranged on said shaft in spaced relation with substantial portions of their peripheral edges free, a foraminous cleaner and filter element arranged in said housing to present a downwardly facing curved transverse channel embracing a substantial portion of said brushing and wiping member, the edge portion of said disks being in wiping engagement with said cleaner element as the brushing and wiping member rotates, said cleaner element absorbably removing moisture with dirt from said disks, said cleaner element being disposed for passage of air therethrough from said housing into said vacuum chamber, and means for discharging a cleaning fluid upon the surface to be cleaned in advance of and independently of said brushing and wiping member.

3. The combination in a vacuum cleaner including a casing adapted to be translated over a surface to be cleaned and having a vacuum chamber therein, of a housing member removably mounted on said casing and communicating with said vacuum chamber for passage of air from said housing into said vacuum chamber when the housing member is in operative position, a rotary brushing and wiping member removably mounted in said housing and comprising a shaft, a plurality of disks of flexible fibrous material arranged on said shaft in spaced relation with substantial portions of their peripheral edges free, a cleaner and filter element removably

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arranged in said housing and presenting a curved channel embracing a substantial portion of said brushing and wiping member, the edge portions of the disks being in wiping engagement with said cleaner element as the brushing and wiping member rotates, said cleaner element absorbably removing moisture with dirt from said disks, said cleaner element being disposed for passage of air therethrough from said housing into said vacuum chamber, and means for discharging a cleaning fluid upon the surface to be cleaned in advance of and independently of the brushing and wiping member in finely divided particles and in such quantity as to moisten but not substantially wet such surface.

4. The combination in a vacuum cleaner including a casing adapted to be translated over a surface to be cleaned, comprising a shaft, a driven brushing and wiping member, a plurality of disks of flexible material arranged on said shaft in spaced relation with substantial portions of their peripheral edges free, a cleaner and filter element of channel section embracing a substantial portion of said brushing and wiping member as it rotates, the edge portions of the disks being in wiping engagement with said cleaner element as the brushing and wiping member rotates, and means for discharging a cleaning fluid upon the surface to be cleaned in advance of and independently of the brushing and wiping member in finely divided particles and in such quantity as to moisten but not substantially wet such surface, said disks removing moisture with dirt from the surface to be cleaned and transferring the same to said cleaner element, said cleaner element absorbably removing the moisture with dirt from said disks.

5. The combination in a carpet cleaner including a carriage adapted to be translated over a surface to be cleaned, of a driven brushing and wiping member rotatably and removably mounted on said carriage and comprising a driven shaft, a plurality of disks of flexible material arranged on said shaft in spaced relation with substantial portions of their peripheral edges free, and a cleaner element of resilient and spongy material in wiping engagement with a substantial segment of the edge portions of the disks as the brushing and wiping member rotates, said disks removing moisture with dirt from the surface to be cleaned and transferring the same to said cleaner element, said cleaner element absorbably removing the moisture with dirt from said disks.

6. The combination in a carpet cleaner including a carriage adapted to be translated over a surface to be cleaned, of a driven rotary brushing and wiping member mounted on said carriage and comprising a plurality of relatively thin disks of flexible fibrous material arranged in closely spaced relation but with substantial portions of their peripheral edges free, and a cleaner element of absorbent material disposed to wipingly engage substantial portions of the periphery of said wiping member as the member rotates and radially spaced from the axis of said member to laterally deflect the peripheral portions of the disks while they are in wiping engagement with

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the wiping member, said disks removing moisture with dirt from the surface to be cleaned and transferring the same to said cleaner element, said cleaner element absorbably removing the moisture with dirt from said disks.

7. The combination in a carpet cleaner including a carriage adapted to be translated over a surface to be cleaned and having a vacuum chamber therein with a downwardly facing opening, of a driven rotary brushing and wiping member mounted on said carriage and in said downwardly facing opening and comprising a plurality of flexible elements to wipingly and brushingly engage the surface to be cleaned, a cleaner element of a moisture absorbent material disposed on said carriage to be wipingly engaged by said flexible elements said cleaning element being disposed for passage therethrough of air entering through said downwardly facing opening to said vacuum chamber and means for discharging a cleaning fluid upon the surface to be cleaned in advance of and independently of the brushing and wiping member in finely divided particles and in such quantity as to moisten but not substantially wet such surface said flexible elements removing cleaning fluid with dirt from the surface to be cleaned and transferring the same to said cleaner element, said cleaner element absorbably removing the cleaning fluid with dirt from the flexible elements.

8. In a carpet cleaner, the combination with a carriage adapted to be translated over the surface to be cleaned and having a vacuum chamber therein with a downwardly facing opening, of a driven rotary brushing and wiping member mounted on said carriage and in said downwardly facing opening and comprising a plurality of flexible elements to brushingly and wipingly engage the surface to be cleaned, a cleaner element of moisture absorbent material mounted on said carriage and disposed to be wipingly engaged by said flexible elements, said cleaner element being disposed for passage therethrough of air entering through said downwardly facing opening to said vacuum chamber, said flexible elements removing cleaning fluid with dirt from the surface to be cleaned and transferring the same to said cleaner element, said cleaner element absorbably removing said cleaning fluid with dirt from said flexible elements.

9. In a carpet cleaner, the combination with a casing adapted to be translated over the surface to be cleaned, said casing having an opening in the bottom thereof, a rotary brushing and wiping member disposed in said opening and comprising a plurality of flexible elements to brushingly and wipingly engage the surface to be cleaned, a moisture absorbent material disposed to have one side thereof wipingly engaged by said flexible elements to absorbably remove moisture with dirt therefrom, means associated with the opposite side of said moisture absorbent material whereby air is drawn therethrough to facilitate disposition of dirt in the moisture absorbent material and evaporation of moisture therefrom.

CARL E. ERICKSON.