July 14, 1931. W. T. STRIDE 1,814,866

CARPET CLEANING MACHINE

Filed Sept. 30, 1926 4 Sheets-Sheet 1

Fig. 1

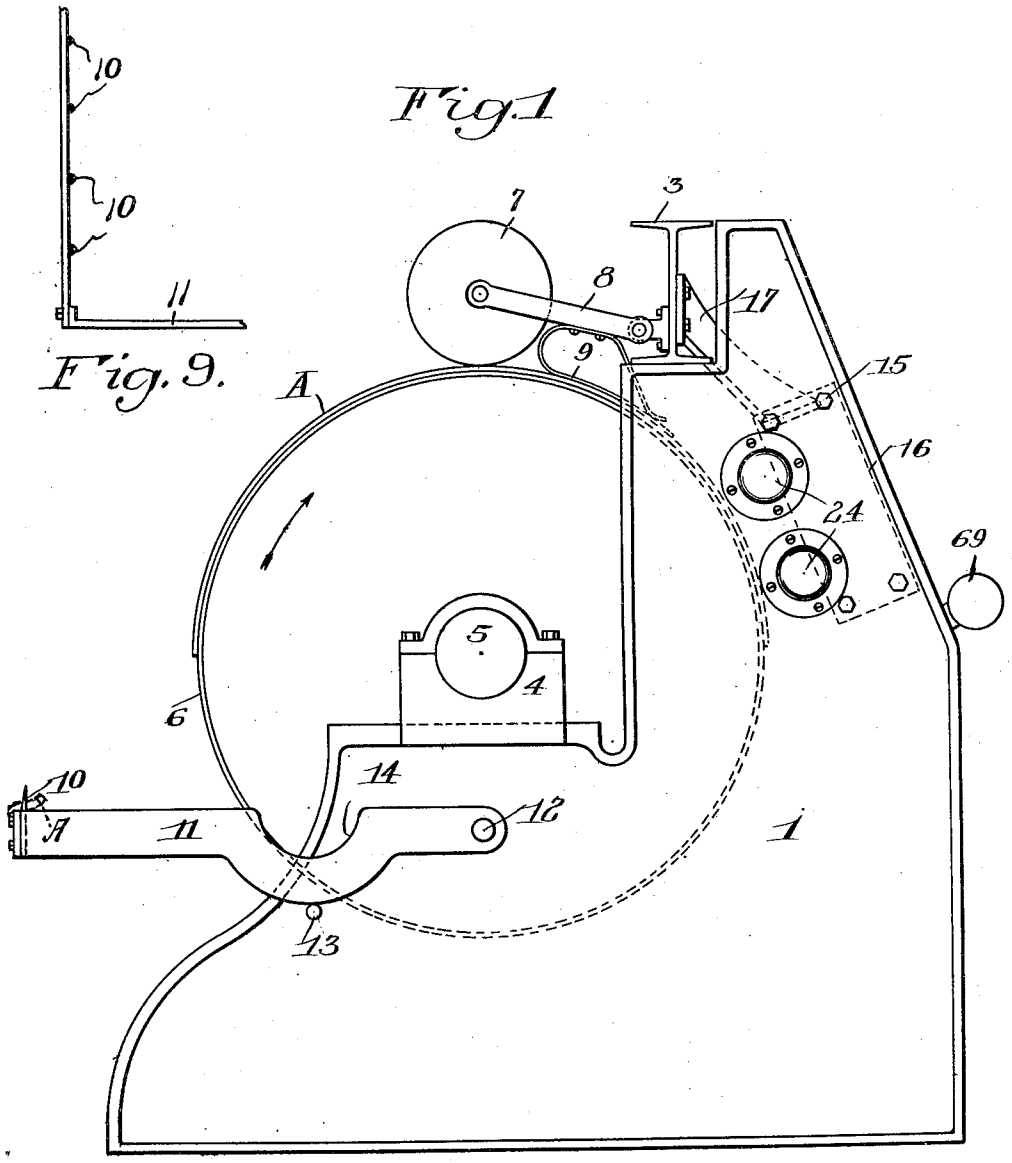


Fig. 9.

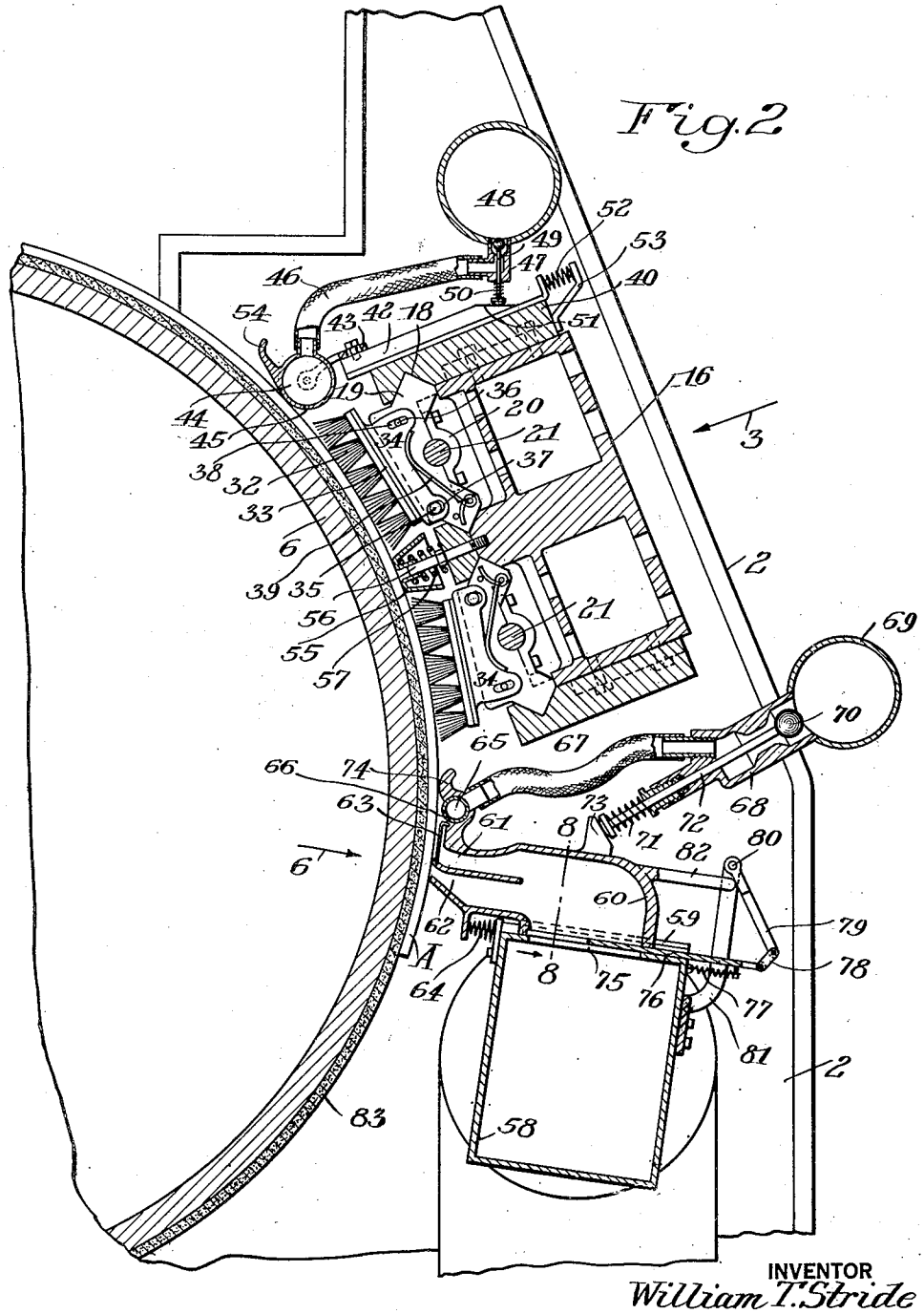
INVENTOR.
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CARPET CLEANING MACHINE

Filed Sept. 30, 1926 4 Sheets-Sheet 2

Fig. 2



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CARPET CLEANING MACHINE

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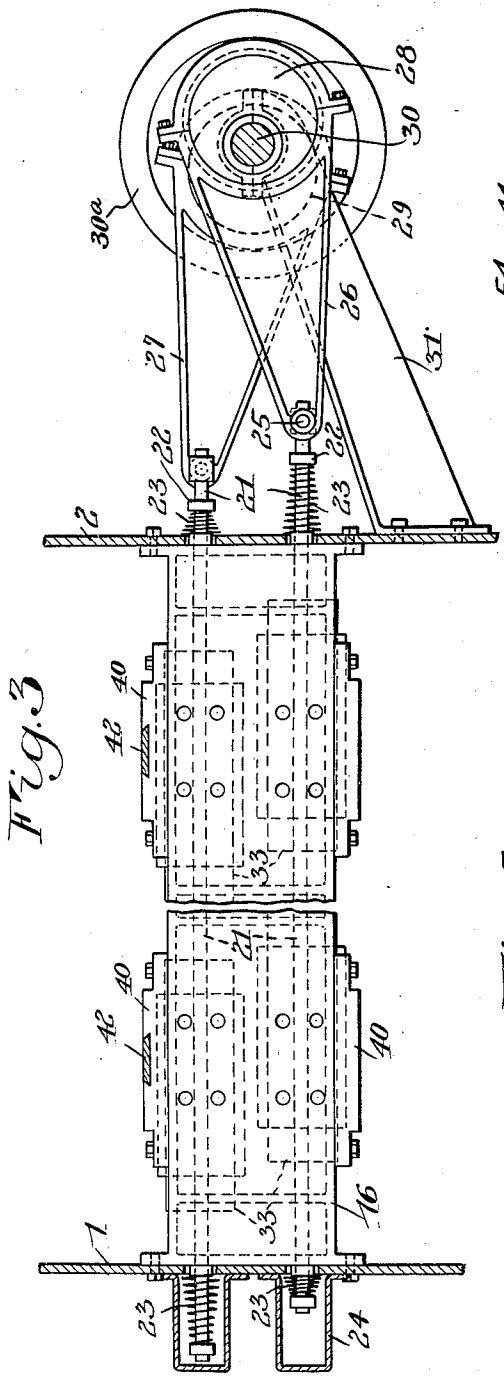


Fig. 3

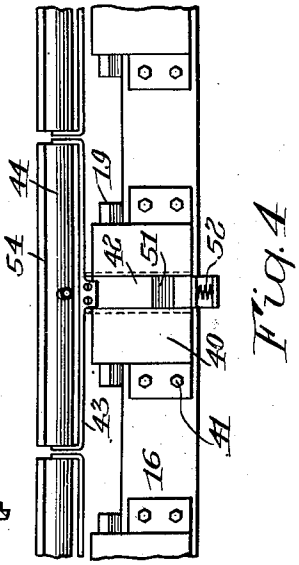


Fig. 4

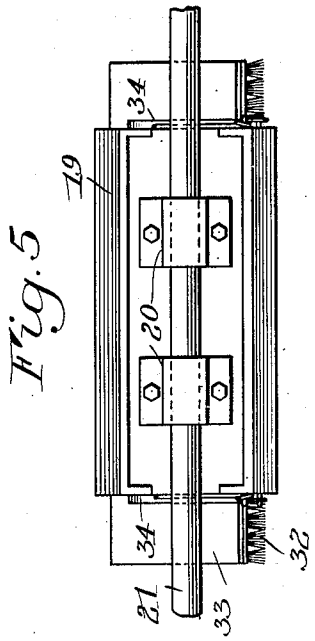


Fig. 5

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CARPET CLEANING MACHINE

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Fig. 6

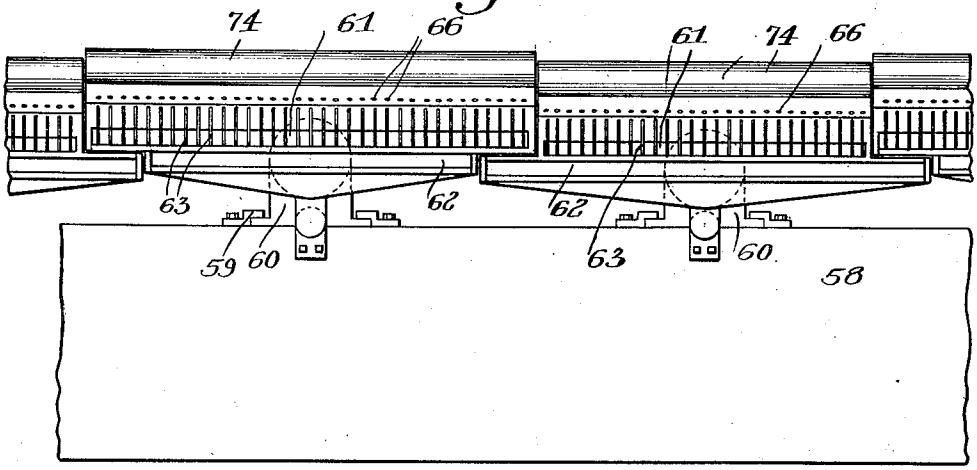


Fig. 7

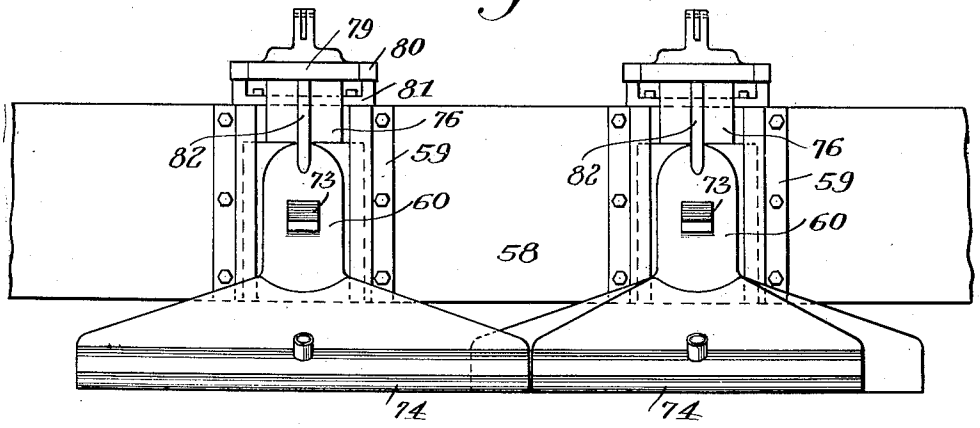
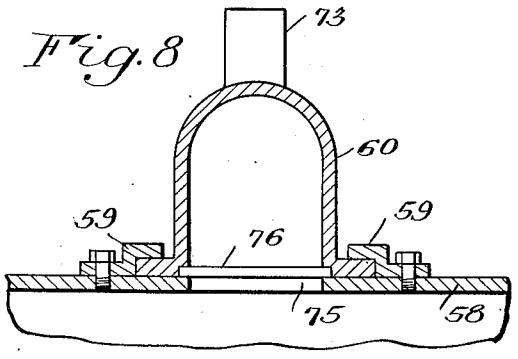


Fig. 8



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Patented July 14, 1931 1,814,866

UNITED STATES PATENT OFFICE

WILLIAM T. STRIDE, OF ROCHESTER, NEW YORK, ASSIGNOR, BY MESNE ASSIGNMENTS, TO THE AMERICAN LAUNDRY MACHINERY CO., A CORPORATION OF OHIO

CARPET CLEANING MACHINE

Application filed September 30, 1926. Serial No. 138,631.

My present invention relates to cleaning and scrubbing, and more particularly to machines for cleaning carpets, rugs and the like. The object of my invention is to provide a simple and efficient machine of this character adapted to operate upon carpets and rugs of different widths and to clean, scour and partially dry the rug or carpet as a continuous operation. The invention contemplates a particular arrangement whereby the cleaning agent is totally removed from the rug or carpet prior to its delivery from the machine.

To these and other ends the invention consists in certain improvements and combinations of parts, all as will be hereinafter more fully described, the novel features being pointed out in the claims at the end of the specification.

In the drawings:

Figure 1 is an end view of a carpet cleaning machine constructed in accordance with and illustrating one embodiment of my invention;

Figure 2 is an enlarged fragmentary section taken through the cleaning and scrubbing devices in a plane parallel to the face of Figure 1;

Figure 3 is an elevation of the scrubbing mechanism, partly in section, viewing the same from the direction of the arrow marked 3 in Figure 2;

Figure 4 is a fragmentary top view of the rinsing device shown in Figure 2;

Figure 5 is a fragmentary view of one of the brush elements;

Figure 6 is a fragmentary front view of the rinsing device taken from the direction of the arrow marked 6 in Figure 2;

Figure 7 is a fragmentary top view of the same mechanism as shown in Figure 6;

Figure 8 is an enlarged section taken on the line 8—8 of Figure 2 and

Fig. 9 is a fragmentary top view of the rug feeding element shown in Fig. 1.

Similar reference numerals throughout the several views indicate the same parts.

My present invention as embodied in the particular machine illustrated contemplates the use of a rotating feeding and supporting drum upon which the rug or carpet is carried. In the following description the feeding end of the machine or that at which the material is introduced will be called the "front" and the delivery end from which the cleaned rug issues will be called the "rear".

In a general way the present machine comprises a slowly rotating drum on to which the rug or work piece is fed by suitable means and around which it progresses. It first receives an injection of liquid soap or other cleaning fluid, the delivering apparatus for which is automatically tripped by the engagement of the rug therewith. Immediately following this injection the rug is scoured by a plurality of reciprocating brushes which work the cleaning fluid into the fabric and pile. Following the action of the brushes, and next in position around the circumference of the drum, is a rinsing device that forces water into the body of the fabric. This is followed immediately by the action of a vacuum device which draws out the water together with the dirt that has been loosened by the successive action of the soap and the water. It may be here stated that an important feature of my invention consists in this immediate action of the vacuum cleaning device following the application or injection of the rinsing water, so that while the latter is forced into the fabric to thoroughly circulate among the fibres, it has no opportunity to spread or perform any function other than to pick up the dirt for immediate removal by and into the vacuum throat.

Referring more particularly to the drawings, 1 and 2 indicate end frames of the machine rigidly secured together by a transverse beam 3. The end frames are provided with bearings 4 supporting the shaft 5 of a supporting drum or cylinder 6. Riding upon the top of this cylinder or drum is a jockey-roll 7 which is merely a weighted element for holding the rug on the drum at the feeding point. It is carried by links 8 pivoted to the beam 3 and I prefer to provide the undersides of these links with suitably curved spring fingers 9 which conform to the surface of the drum and exert a further pressure

against the rug as it is carried around thereon to hold it flat.

The rug or workpiece operated upon is indicated at A in Figures 1 and 2. In introducing it into the machine its advance edge is engaged at the front of the latter by suitable impaling devices 10 on the free ends of arms 11 pivoted to the frames 1 and 2 at 12. The arms 11 normally rest upon stop pins 13 as shown in Figure 1 and are curved at 14 to partially clear the shaft 5 so that when the rug is attached at 10 and the arms swung upwardly they will carry the impaled edge of the rug into the bite of the rolls 6 and 7 from which point the rug progresses because of its close frictional contact with the roll or drum 6.

Extending between the frames 1 and 2 parallel with the shaft 5 of the drum 6 and suitably attached to said frames as by the bolts shown at 15 is a frame or casting 16. This also preferably has bracket connections at 17 with the I-beam 3. This frame is provided with V-shaped guides 18 (Figure 2) in which reciprocate a plurality of brush holders 19.

It had best be here explained that the length of the drum 6 is perferably such as to accommodate rugs or carpets of the maximum width that the machine is intended to clean. The devices including the brushes about to be described extend in more or less independent units across the machine or longitudinally of the axis of the supporting drum and transversely across a rug supported on the latter. When a relatively narrow rug is being cleaned or run through the machine it will engage and be acted upon by only such of these cleaning units as are opposite to it, the others being idle. This is what I mean by my reference to a plurality of brush holders. At the same time I also prefer to employe more than one set of brushing and cleaning units taken in the direction of the progress of the rug or around the drum 6 which also constitutes a plurality, but it will be understood that with regard to the general construction and mode of operation of the machine in its broadest sense only one brush and accompanying cleaning unit may be employed.

To return to the particular construction of the embodiment shown, the brush holders 19 are secured by clamping plates 20 to a pair of push rods 21, two of which are provided in the present instance, there being two sets of scouring brushes in the present machine. These push rods are slidably mounted in suitable bearings in the frames 1 and 2 and terminate at each end in caps or collars 22 between which and the frame pieces are interposed springs 23 to take up lost motion and prevent the rods from whipping. Cages 24 covering the springs and bearings at one end are shown in Figures 1 and 3. At their opposite ends the push rods are connected by wrist pins 25 with eccentric straps 26 and 27 cooperating respectively with eccentrics 28 and 29 on a shaft 30 suitably supported and bearing on a bracket 31 extending from frame piece 2. This shaft has a pulley 30* thereon which may be driven independently or by suitable gearing from the cylinder shaft 5 (not shown). Its function is, obviously, to reciprocate the push rod 21 through the eccentrics and carry the brush holders 19 back and forth longitudinally of the drum in alternation.

The brushes 32 have backings 33 provided with flanges 34 that fit closely against and interlock with the ends of the brush holders. Pins 35 and 36 on the latter take into slots 37 and 38 in the brush flanges so that the brushes have a combined in and out and tilting or rocking movement. In other words they are mounted to float on the surface of the drum against which they are pressed by suitable springs 39 on the brush holders 19.

Slidable transversely of the frame piece 16 in gib plates 40 bolted thereto and which gib plates furnish part of the bearings 18 for the brush holders, are a plurality of carriage slides 42 each of which is provided with an adjustable bracket or arm 43 supporting a soap nozzle 44. These nozzles are in the form of pipes having perforations or discharge orifices 45 in the lower sides thereof adjacent to the brushes and the surface of the drum 6. Each is connected by a pipe 46 with the valve casing 47 of a suitable stationary reservoir 48 for a liquid soap supply. The said connecting pipe 46 is flexible and the valve stem 49, normally held closed by spring 50, rides on a cam surface 51 on the carriage 42. The carriage 42 is normally thrust toward the drum 6 by a spring 52 interposed between the end of the carriage and a bracket 53 so that the nozzle 44 is against the drum. At this time the valve 49 is closed. As soon as the rug A turning with the drum 6 in the direction of the arrow in Figure 2 engages an inclined shoe or tripping flange 54 on the nozzle 44, the carriage 42 is thrust rearwardly so that the cam 51 opens the valve 49 and automatically supplies soap to the nozzle and to the rug before the latter reaches the brushes 32 which scrub the soaped surface.

In order to hold the rug flat against the surface of the drum and to prevent it from wrinkling while being scrubbed, I prefer to provide the frame piece 16 at points between the two sets of brushes with a plurality of suitably shaped presser feet 55 shown in Figure 2 and comprising in the present instance cups guided on pins 56 and pressed by springs 57 contained therein and encircling the pins.

After the rug has received liquid soap or other cleansing fluid from the nozzle 44 and been scrubbed by the brushes 32, it is subjected, during its progress around the supporting drum 6, to a rinsing process. This

rinsing is conducted in connection with a vacuum process that is intimately combined therewith and inasmuch as the rinser is mounted, in the present embodiment, upon the vacuum device, the latter will be first described.

Located below the scrubbing brushes 32 is a vacuum chest 58 extending across the machine and suitably supported by the end frames 1 and 2. Slidable on the top of this chest toward and from the drum 6 (Figures 2, 6 and 7) in gibs 59 are a plurality of vacuum hoods 60. Each hood has an upper throat 61 and a lower throat 62, the former being preferably provided at its mouth with a suitable grille or screen 63. The hoods 60 are normally pressed outwardly so that the mouths of the throats 61 and 62 will bear against the rug A on drum 6 by springs 64. Carried on the top of each hood 60 is a rinsing nozzle 65 in the present form of a pipe perforated at 66. The said pipe or nozzle is fed by a flexible connection 67 from the valve chamber 68 of a fixed water reservoir 69, the valve 70 of which is normally held closed by a spring 71 on the end of the valve stem 72. The latter bears upon an inclined or cam-shaped lug 73 on the hood casting 60. An inclined or cam-shaped foot or flange 74 on the nozzle pipe 65 is adapted to bear, under the influence of spring 64, upon the surface of the carrying drum 6. This foot or flange 74 also forms a wall which serves as a scraper to remove a large portion of the cleaning fluid from the surface of the rug and at the same time serves to enclose one side of the rinsing and vacuum nozzle unit from free communication with the atmosphere.

If the rug A occupies the drum, it trips or displaces this foot 74 and forces it back sliding the hood 60 in each instance on the gibs 59 so that the cam 73 opens the valve 70 and allows rinsing water to be discharged from the reservoir 69 through pipe 67 and out at the nozzle 65 directly upon the rug or carpet surface. At the same time and through the same instrumentalities the rug or carpet is exposed to a vacuum that immediately sucks the rinsing water therefrom. This is accomplished in the following manner.

Each vacuum hood 60 opens into the vacuum chest 58 through a port 75 that is normally closed by a slide valve 76 under the influence of a spring 77. The slide valve is connected through a link 78 with an arm 79 pivoted at 80 to a bracket 81 on the chest 58. A plunger 82 engages this arm 79 close to its pivot, said plunger being fixed to the vacuum hood 60. Thus when the hood is moved rearwardly in its guides by the trip 74 coming in contact with the rug it not only opens the valve 70, but opens the slide valve 76 and communicates the vacuum from chest 58 through hood 60 to throats 61 and 62 in contact with the rug. If there is no rug on the drum or if the rug that is on the drum is so narrow that it does not contact with a particular rinsing and vacuum unit, then the latter will remain closed as to both the discharge of rinsing water and the operation of sucking that rinsing water immediately from the fabric.

In this connection I wish to make a point of the close association of the rinsing nozzle 65 with the vacuum throats 61 and 62. The idea is that when the rug A has tripped these devices through contact with the foot 74 and turned on both the rinsing water and the vacuum, a brief but violent action takes place. Water from the nozzle 65 is projected with great force upon the rug or carpet and forced into the interstices of the fabric to reach all the particles of dirt that may be lodged therein. It is immediately, however, withdrawn together with the dirt by the vacuum and hence the rug issues beyond the vacuum device in an unsaturated condition free from the running or dripping of any of the cleaning liquids that have been applied thereto.

It will be noted further that the rinsing and vacuum nozzles act upon the rug within a substantially closed chamber formed by the foot or flange 74 bearing against the rug on the one side, and by the lower wall of the vacuum throat 62 bearing against the rug on the other side, thus effectually serving to limit the action of the nozzles to the area between the two sealing walls thus provided.

Of course the vacuum chest 58 has a suitable outlet for the drainage of the cleanings, which outlet, however, is a matter of detail and has not been shown herein.

To review the general operation of the machine as first described, the rug is first safely fed to the machine by the devices 10—11; it is held closely to the surface of the drum 6 by the devices 7—9—55; it is first subjected to a spray from the liquid cleaning nozzle 44, which it automatically trips; it is next subjected to the transverse scrubbing action of the brushes 32; it is then rinsed by the water supply nozzle 65 which it also automatically trips and is finally at least partially dried by the immediate application of the vacuum at 61 and 62, which allows the rinsing water to remain in the rug, once it has impregnated the same, for only a brief period.

The feeding drum 6 is preferably provided with a suitable soft, frictional covering 83 so that the rug or carpet will adhere thereto with the aid of the devices described and hold its position while being variously acted upon.

It will also be noted from an inspection of Figure 6, particularly, that the vacuum units are staggered or overlap in a manner whereby the throat 62 of one unit, for instance, extends beyond the principal dividing line between the units or beyond the meeting ends of the throats 61. In other words, as shown

in Figure 6, the throat 62 of one unit may be made short and the throats 62 of the adjoining unit made longer to meet the same and prevent there being a line or area on the rug which is not reached by the vacuum action.

What I claim as my invention is:—

1. In a rug cleaning machine, the combination with a rotatable bearing drum for the rug, of means associated with the drum for scouring a rug carried thereon, a vacuum device also associated with the drum and adapted to suck water out of a rug thereon and a rinsing device arranged in the throat of the vacuum device and adapted to project water under pressure into the rug.

2. In a rug cleaning machine, the combination with a rotatable bearing drum for the rug, of means associated with the drum for scouring a rug carried thereon, a vacuum device also associated with the drum and adapted to suck water out of a rug thereon, said vacuum device having two walls adapted to contact with the surface of the rug, and a rinsing device arranged in the throat of the vacuum device between the said walls and adapted to project water under pressure into the rug.

3. In a rug cleaning machine, the combination with a carrying and supporting drum and a device cooperating therewith to hold a rug against the drum, of a swinging arm having impaling devices thereon adapted to engage the advance edge and carry it into feeding relationship between the drum and said device.

4. In a rug cleaning machine, the combination with a rotatable carrying drum upon which the rug is adapted to be supported, of means for applying a liquid cleanser to the rug, transverse guides arranged adjacent to the periphery of the drum, a push rod reciprocatable in the guides, brushes and brush holders caried by the push rod, the latter being arranged longitudinally of the drum, means for reciprocating the push rod and compression springs at the ends of the push rod and affecting their endwise movement in both directions.

5. In a rug cleaning machine, the combination with end supporting frames, a rug carrying drum turning in said frames and a transverse support extending between the frames longitudinally of the drum, of scouring devices guided longitudinally on the support and means guided transversely of said support for delivering cleaning fluid to a rug carried on the drum in advance of the scouring devices and comprising a nozzle moved by the rug, a reservoir, a valve leading from the latter to the nozzle, and means for operating the valve by the movement of the nozzle by the rug.

6. In a rug cleaning machine, the combination with a rug carrier and a frame extending transversely of the direction of movement of a rug thereon and provided with longitudinal and transverse guides, of a reservoir for cleaning fluid provided with a valve, a nozzle communicating therewith and adapted to be moved by the rug and to deliver cleaning fluid against the latter, a carriage for the nozzle provided with a cam adapted to trip the valve, and scouring devices movable in the longitudinal guides, the nozzle carriage being movable in the transverse guides.

7. In a rug cleaning machine, the combination with a rug carrier, of a vacuum chest and rinsing and vacuum nozzles adapted to act upon a rug upon the carrier successively in the order named, said nozzles being movably mounted upon the vacuum chest and being disposed in a position so as to be displaced by the rug in passing, said vacuum nozzle being adapted to communicate with the vacuum chest, valves for controlling said rinsing and vacuum nozzles, and means actuated by the movement of said nozzles for controlling said valves.

8. In a rug cleaning machine, the combination with a rug carrying means, of a rinsing nozzle and a vacuum nozzle movable in unison toward and from the same, a source of supply for each nozzle, and means for controlling each source of supply, with which means the respective nozzles cooperate to actuate the same.

9. In a rug cleaning machine, the combination with a rug carrying device and a liquid reservoir and a vacuum chest, of a rinsing nozzle and a vacuum nozzle, guiding means on said vacuum chest for movably supporting said nozzles, valves respectively controlling communication between the liquid reservoir and the rinsing nozzle and the vacuum chest and the vacuum nozzle and means for actuating said valves through the movement of the nozzles on the chest.

10. In a rug cleaning machine, the combination with a pair of end frames, a rug supporting and carrying drum turning therein and a vacuum chest extending between the supporting frames longitudinally of the drum and provided with transverse guides, of a fluid reservoir, a rinsing nozzle communicating therewith, a valve controlling such communication, a vacuum nozzle carrying the rinsing nozzle and movable in the guides on the vacuum chest and communicating with the latter, a valve controlling such communication and means for actuating both valves through the movement of both nozzles in the guides.

11. In a rug cleaning machine, the combination with a rug carrier and a frame extending transversely of the direction of travel of the rug thereon and provided with transverse guides, of a reservoir for cleaning fluid provided with a valve, a nozzle communicat-

ing therewith, a nozzle carriage on said guides and adapted to be moved by contact with a rug against said nozzle, and cam means on said carriage adapted to trip said valve when said carriage is moved.

12. In a rug cleaning machine, the combination with a rug carrying means, of a nozzle for liquid cleaner movable toward and from the same and adapted to be displaced by the passage of a rug through the machine, and means for controlling the supply for said nozzle actuated by movement of the latter.

13. In a rug cleaning machine, the combination with a rug carrying device, a plurality of spaced guiding means disposed transversely of the movement of said carrying device, a plurality of brushes movable in said guiding means, and means interposed between said brushes for yieldingly engaging a rug on the carrying device to hold the rug flat against said carrying device and prevent wrinkling of the rug by the brushes.

14. In a rug cleaning machine, the combination with a rug carrier, a guiding means disposed adjacent thereto, a reservoir for a cleaning fluid provided with a valve, a nozzle communicating therewith and adapted to be moved by contact with a rug on the carrier, a carriage for the nozzle movable in said guiding means and provided with a cam adapted to trip the valve, and means for adjusting the position of the nozzle on said carriage.

15. In a rug cleaning machine, the combination with a carrying drum for a rug and a support having two sets of guides thereon, of a nozzle movable in one set of guides and cooperating with the drum to be moved by a rug carried thereon, a reservoir for cleaning fluid provided with a passage leading from the latter to the nozzle and having a valve therein operated by the movement of the nozzle, scouring devices movable in the other set of guides, and means for operating the scouring devices.

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