March 11, 1930. W. T. STRIDE 1,750,496

RUG CLEANING MACHINE

Filed Oct. 19, 1928 4 Sheets-Sheet 1

Fig. 1

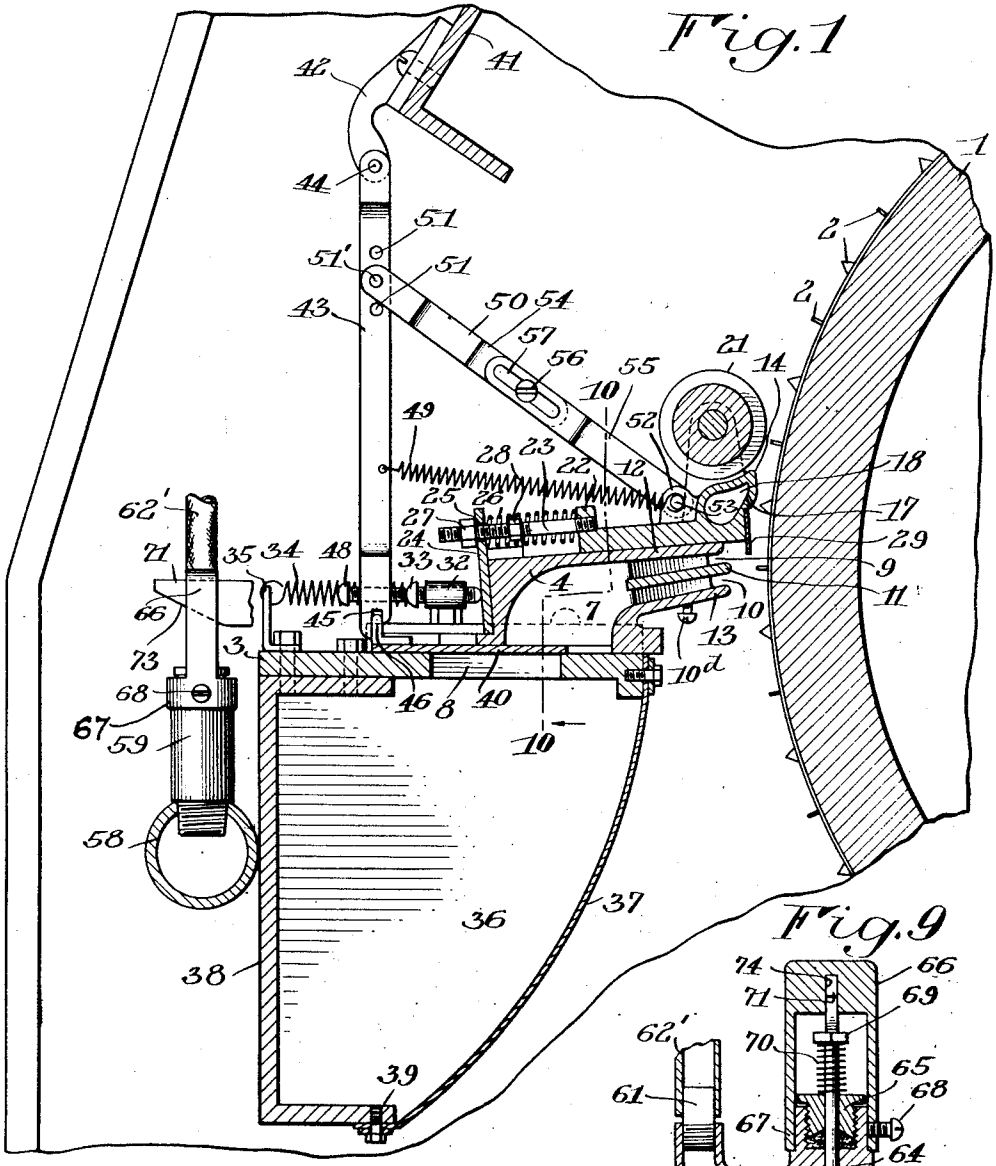
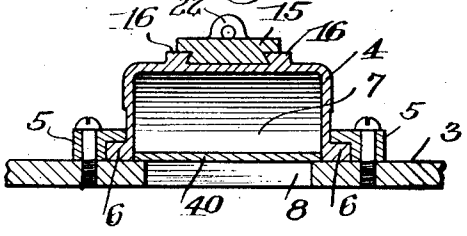


Fig. 9

Fig. 10



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RUG CLEANING MACHINE

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Fig. 2

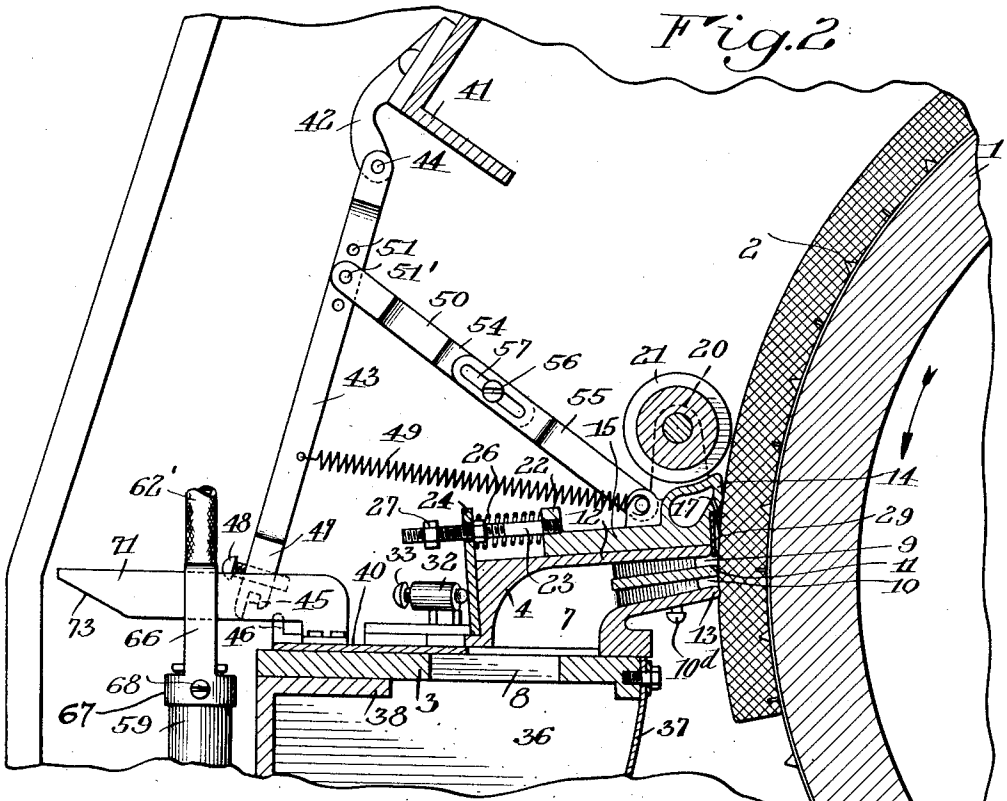
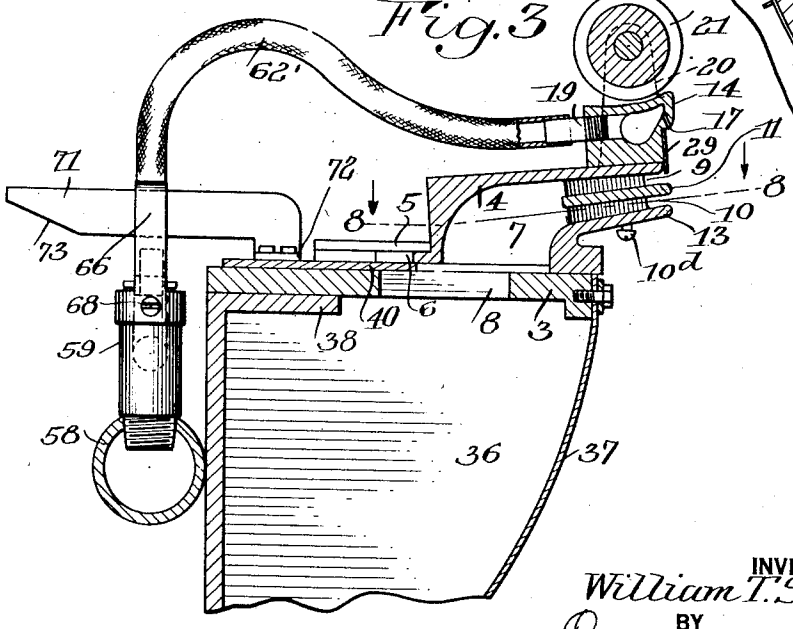


Fig. 3



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RUG CLEANING MACHINE

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Fig. 4

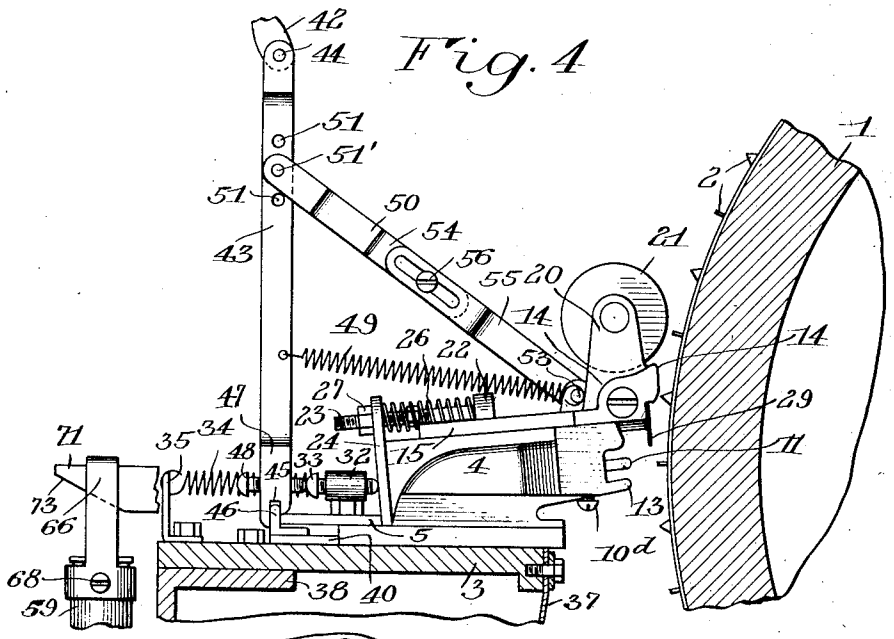
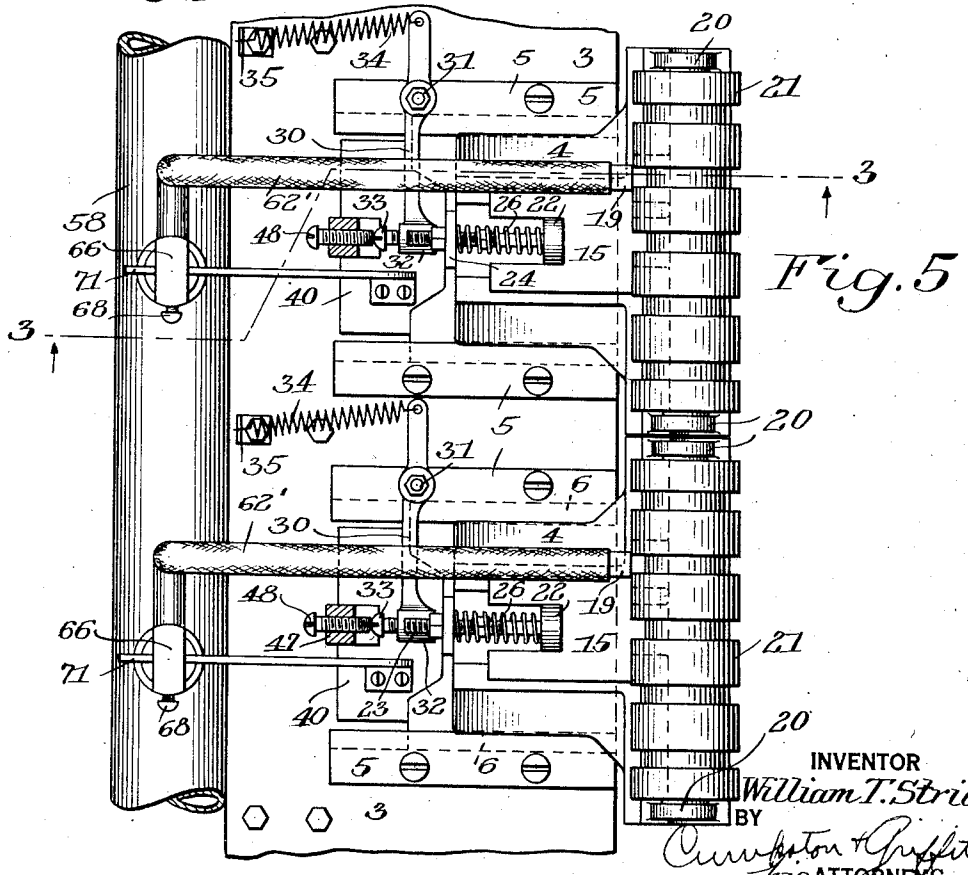


Fig. 5



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RUG CLEANING MACHINE

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Fig. 6

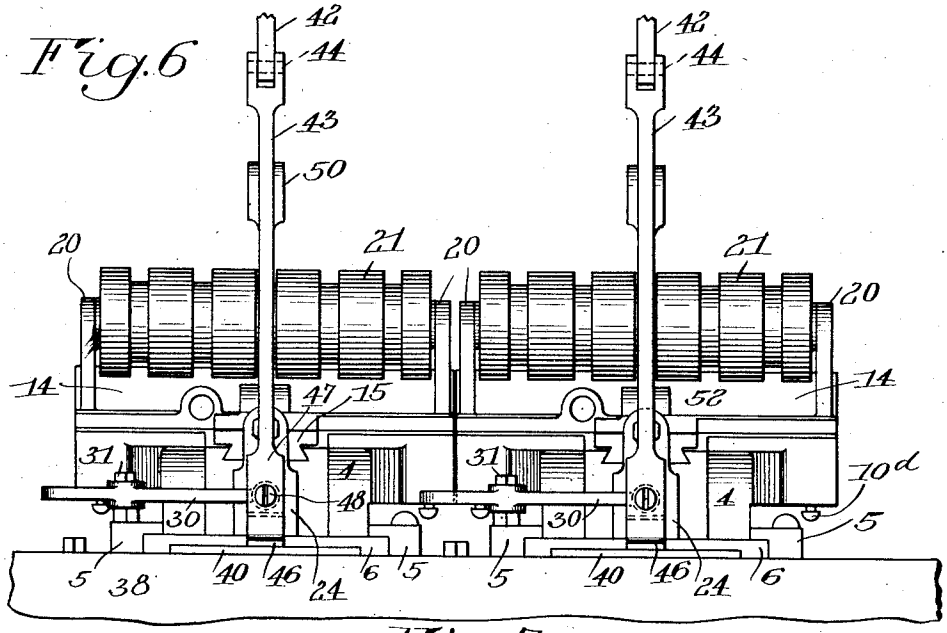
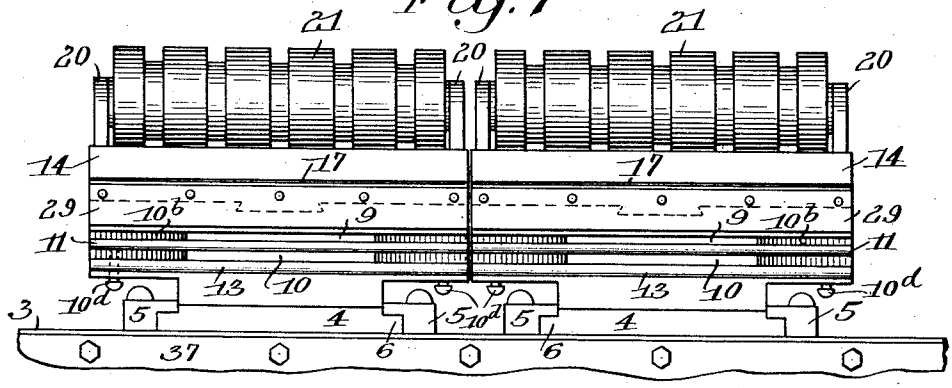


Fig. 7



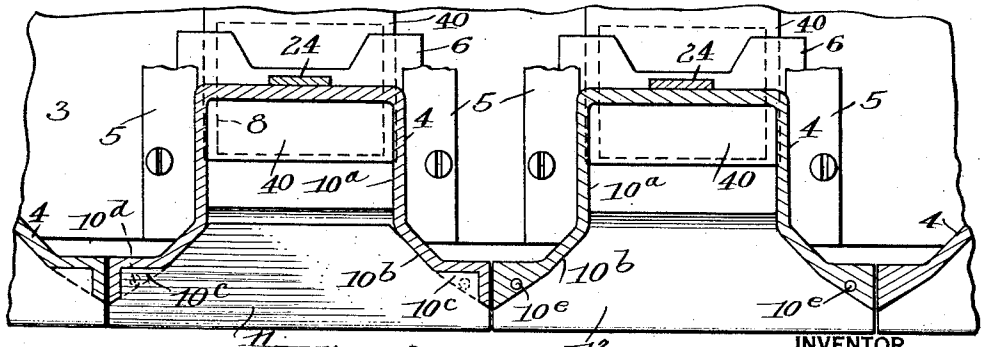


Fig. 8

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UNITED STATES PATENT OFFICE

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RUG-CLEANING MACHINE

Application filed October 19, 1928. Serial No. 313,453.

The present invention relates to rug or carpet cleaning machines, and more particularly to machines of this nature having a relatively simple and effective mechanism for removing dirt and cleaning materials remaining in a rug or carpet after a prior washing operation thereon. Another object of the invention is the provision of a machine of this character having an efficient rinsing mechanism for effectively carrying away all traces of dirt in a thorough and uniform manner without injurious effects upon the fabric being treated.

Another object is the provision of mechanism in a device of this character for causing an effective circulation of the rinsing fluid into and out of the fabric and at the same time causing the nap of the rug to be thoroughly raised to give the surface of the rug a bright, new appearance.

A further object is the provision of an efficient arrangement for circulating rinsing fluid into the fabric and withdrawing it therefrom which operates selectively over a width substantially coincident with that of the fabric being treated.

A further object is the provision of novel and effective control means for the operating elements of the machine as well as simple means for an adjustment of such parts.

Still a further object is the provision of a device of this character having a sturdy and compact construction of relatively few parts which will withstand hard usage without likelihood of getting out of order.

To these and other ends the invention resides 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 a partial sectional view showing the rug supporting cylinder and the rinsing and vacuum elements as they appear in normal position where no rug is present in the machine;

Figure 2 is a view similar to Figure 1 showing a rug passing through the machine with the water and vacuum valves open;

Figure 3 is a sectional view taken substantially along 3—3 of Figure 5, with certain parts omitted for clearness, showing the manner of conducting the water to the rinsing nozzle;

Figure 4 is a view similar to view Figure 1 showing the outside of the rinsing and vacuum elements;

Figure 5 is a partial plan view of Figure 1 with certain parts removed;

Figure 6 is an elevation looking from the rear of the machine, or from the left of Figure 1;

Figure 7 is a detail view of the front of the rinsing and vacuum members looking from the right at Figure 3;

Figure 8 is a horizontal sectional view taken substantially along on line 8—8 of Figure 3;

Figure 9 is a detail view of the water valve; and

Figure 10 is a fragmentary sectional view taken on line 10—10 of Figure 1.

Similar reference numerals refer to similar parts throughout the several views of the drawings.

In a general way the present machine comprises a rotary drum on which the rug is fed past the rinsing and vacuum elements. The movement of the rug into position adjacent the rinsing element automatically operates the valve mechanism for the rinsing and vacuum devices.

The rinsing and vacuum elements are so positioned that the rinsing water passes into the fibers of the rug, and is thereafter immediately withdrawn by the action of the vacuum element. The soap and dirt thus loosened by a previous washing operation is thus thoroughly removed.

An important feature of the present invention is the proper timing of the rinsing and vacuum elements, so that the vacuum element begins its operation before the rinsing element and ceases its operation after the operation of the rinsing element has ceased. This insures that the water projected from the rinsing element is thoroughly removed after circulating among the fibers so that it has no opportunity to cause any undesirable effects upon the rug such as the running of the colors.

The rinsing and vacuum elements are composed of a plurality of independent units and are so arranged that only those units engaged by a rug are actuated as the rug passes through the machine. Those units which are not engaged by the rug remain idle.

After the rug has cleared the rinsing and vacuum elements the parts are automatically returned to their normal inoperative positions and are thus ready to receive the next rug to be rinsed.

The present invention is in the nature of an improvement over the rinsing and vacuum devices disclosed in my copending application, Serial No. 138,631 filed September 30, 1926, for a carpet cleaning machine.

Refering more particularly to the drawings, 1 designates the rug cylinder or drum journaled on the frame of the machine in any suitable manner. This cylinder is provided with spines 2 for holding the rug in position thereon. The rinsing and vacuum elements are mounted adjacent the cylinder 1 on another portion of the machine and will now be described. A plate member 3 is positioned along the face of the drum or cylinder 1 and slidably supports a plurality of vacuum hoods 4. Each hood is located between gibs 5, 5 secured upon the plate 3 and overlying a flange 6 upon said hoods 4, to hold said hoods firmly against said plate. The vacuum hood 4 is formed with a downwardly directed opening 7 in its interior, communicating with a port 8 in the plate 3. At the front of this vacuum hood 4, which is that portion adjacent the cylinder 1, is a throat opening formed with two independent passages 9 and 10, one lying above the other, as shown in Figures 1 and 7.

The side walls 10^a of the passages or openings 9 and 10 of the vacuum hood 4 are flared outwardly as shown at 10^b in Figure 8. The flaring portion 10^b in one hood member meets the flaring portion 10^b in an adjacent hood member, and extends to a point somewhat inwardly from the end of the passages.

An inner wall or partition 11 separates the passages 9 and 10 and normally projects outwardly to a slight distance beyond the ends of the upper wall 12 and lower wall 13 for a purpose to be later brought out. The wall or partition 11 comprises a metal plate of the form shown in Figure 8, and is removably positioned in the vacuum hood by means of cut out portions 10 in the flaring walls 10^b, as shown at the left in Figure 8. Set screws 10^d, shown in Figures 3 and 4, are screwed into holes 10^c and bear firmly against the lower side of plate 11 to hold it in proper position.

The rinsing nozzle casting generally indicated at 14, is slidably positioned on each vacuum hood 4 for slight forward and rearward movement thereon. This member 14 is cast integral with a slide element 15 which is engaged between guide lugs 16, 16 which are cast integral with the vacuum hood 4. The rinsing nozzle proper is formed in an enlarged portion of the casting 14, and has a downwardly directed elongated slot 17 communicating with a hollow portion 18 for the purpose of projecting a long thin stream or sheet of water against the rug upon the cylinder 1. At the rear of the casting 14 and communicating with the enlarged hollow portion 18 I provide a screw threaded opening 19 for connection to a source of water supply to be later described. Upon the rinsing nozzle casting 14 and preferably integral therewith are bosses 20, 20 upon which are journaled rollers 21 which are adapted to engage the rug before it reaches the rinsing and vacuum elements.

I provide spring means for urging the casting 14 outwardly on the vacuum hood 4. This means comprises a lug 22 on the casting 14 and provided with a screw threaded opening therein to receive a stud 23. Plate 24 is secured at the rear of the hood member 4 in any desired manner, and projects thereabove to a height approximately equal to lug 22. The plate has an opening 25 therein aligned with the aperture in lug 22 so that the end of stud 23, when secured in lug 22, may pass freely through said opening 25. A compression spring 26 surrounds the stud 23 and bears at one end against lug 22 and at the other end against plate 24. The end of stud 23 is threaded a considerable distance on each side of plate 24. Upon this threaded portion I provide adjusting nuts 27 and 28 which serve to limit the reciprocating movement of casting 14 upon the vacuum hood 4. Thus it will be seen that by adjusting the nuts 27 and 28 to varying positions along the stud 23, I may vary the compression of spring 23 and also vary the distance which the rinsing nozzle may move with relation to the vacuum hood. A stop member 29 in the form of a plate is secured at the front of casting 14 and extends downwardly therefrom to a slight extent, so as to contact with the upper wall 12 of the hood 4 when the casting 14 has moved rearwardly upon the hood 4.

As heretofore pointed out, the vacuum hood 4 is slidably mounted upon plate 3 for forward and rearward reciprocation. This vacuum hood is preferably arranged to be urged outwardly toward the cylinder 1 by the following mechanism: An arm 30 (Figure 5) is pivotally mounted on the gib 5 at 31, and has an end 32 screwthreaded to accommodate a set screw 33, the end of which bears against the plate 24 secured to the rear of the vacuum hood 4. The opposite end of the arm 30 is connected to a tension spring 34. This spring is connected at its other end to a member 35 secured upon the plate

3. Thus it will be seen that the spring 34 causes the end 32 of the arm 30 to exert an outward pressure upon the vacuum hood 4.

Referring to Figure 1, it will be seen that the plate 3 forms the upper wall of a vacuum chest 36 having side walls 37 and 38 secured to the plate 3 and secured to each other at their lower edges at 39 in any desired manner. As heretofore pointed out the plate 3 is provided with a port 8 adapted to connect the vacuum hood 4 with the vacuum chest 36. The vacuum chest 36 is suitably connected to a vacuum or suction pump not illustrated.

A slide valve member 40 is mounted to close the passage between the vacuum chest and the vacuum hood 4.

This slide valve 40 may be operated by the following mechanism: Upon a fixed portion 41 of the frame of the machine I provide a bracket member 42 to which a lever arm 43 is pivotally connected at 44. The lower end of the lever arm 43 is bifurcated at 45 to receive a lug 46 on slide valve 40. It will be seen that the bifurcations on the lever arm 43 are of unequal length for a purpose which will be hereinafter brought out. The lever arm 43 is provided with a screw threaded aperture 47, (Figure 5) just above its bifurcated portion. A set screw is threaded into said aperture and is so positioned that its end contacts with the end of the screw 33 upon arm 30. It is readily apparent that the position to which the slide valve 40 may be moved can be varied by turning said screw 48 within the lever arm 43. A tension spring 49 is connected at one end to lever arm 43 and at the other end to casting 14. An adjustable link member, designated generally at 50, is connected at one end to the upper part of arm 43 in any one of the series of holes 51 by means of a pin 51′ and at its other end is connected to a lug 52 on casting 14 by means of a pin 53. The link 50 is composed of two sections 54 and 55 adapted to be adjustably connected by a screw 56 and slot 57 in the respective sections. This screw and slot connection is a well known means for readily changing the length of a link such as link 50.

I provide a source of water supply which is illustrated in Figure 1, comprising a conduit 58 to which a valve 59 is connected in a well known manner. This valve member is clearly shown in detail in Figure 9 and comprises chambers 60 and 61 connected by a passage 62. The flow of water through passage 62 may be controlled by means of a valve element 63 provided with a stem 64 projecting upwardly from valve casing through a packing nut 65. A yoke member 66 having a ring section 67 is secured to the top of the valve casing 59 by means of a set screw 68. The valve stem is threaded at the upper end and provided with a nut 69. Between the nut 69 and the packing nut 65 I provide a compression spring 70 which is adapted to urge the valve element 63 upwardly to normally close the passage 62. The chamber 60 has an upwardly turned portion which is interiorly threaded and adapted to receive a nipple 61 secured in the end of a hose section 62′. The other end of the hose 62′ is connected in a similar manner to the screw threaded opening 19 in the casting 14 heretofore mentioned.

I provide mechanism whereby when the slide valve 40 is moved rearwardly or to the left as seen in Figure 1, the valve stem 64 of the valve 59 will be depressed. This mechanism comprises a cam arm 71 secured at 72 on the plate 40 and provided with a cam surface 73 at its outer end. This outer end of the cam arm 71 is adapted to pass within the yoke 66 through a slot 74 formed therein. The cam surface 73 thus engages the end of the valve stem 64 and depresses it when the cam arm moves rearwardly with the slide 40.

As shown in Figure 2, the lower end of the lever arm 43 may have a movement greater than that to which it is desirable to stop slide 40. In this event, the shorter bifurcation on lever 43 allows the end of 43 to be disengaged from the lug 46 on slide 40 until its return movement when the bifurcated portion again engages with said lug so as to bring the parts to their normal inoperative position.

The operation of the device is as follows:

Assuming that the rug has been placed upon cylinder 1 and the cylinder is rotated downward toward the rinsing and vacuum mechanisms, it will be seen that the rug will first engage the rollers 21 journaled on the rinsing nozzle 14. The rug will cause the rollers 21 to move rearwardly against the compression of spring 26 until the stop plate 29 strikes the upper wall 12 of the vacuum hood. This movement, though slight, produces a much greater movement of the end of the lever arm 43, causing the slide valve 40 to open substantially to the position shown in Figure 2 to connect the vacuum chest with the vacuum nozzle, and at the same time moves the cam surface 73 on the cam arm 71 against the end of valve stem 64, thereby depressing the valve, allowing water to flow from the conduit 58 through the hose to the rinsing nozzle in casting 14.

The relation of the parts is such that the slide valve 40 will have been opened a substantial distance before the valve stem 64 is actuated by the cam surface 73. This insures that the vacuum nozzles will be operating effectively by the time the flow of water from the rinsing nozzles is started. The valves controlling the nozzles are closed in the reverse order. First the rinsing nozzle is allowed to close by reason of the movement of the cam away from the valve stem 64. At the time when the valve 59 is completely

closed, the slide 40 will still have a short distance to move before it closes the vacuum chest. After all of the water discharged from the rinsing element is drawn in through the vacuum element the slide 40 will reach its closed position.

It will be understood that I provide a plurality of nozzle units across the face of the cylinder 1, each unit having its own set of contact members or rollers 21. If the rug is narrow it may actuate only two or three of these units, thus leaving the remaining units idle which are not necessary in treating the rug passing through the machine.

When the rinsing and vacuum nozzles are operating with a rug in position on the cylinder, it will be seen that a stream of water is projected downwardly at an angle into the fibers of the rug, thoroughly removing any soap and dirt remaining from the prior washing operation. It will also be seen that the water after passing into the fibers of the rug is immediately withdrawn through the upper portion 9 of the vacuum hood 4. The lower passage 10 serves to remove the residue of the water not taken up through passage 9, so that the rug leaves the machine in an unsaturated condition free from the running or dripping of any of the cleaning liquids that have been applied thereto. This feature has been shown and described and broadly claimed in my copending application above mentioned.

The vacuum chest is provided with suitable means for receiving and carrying off the water that flows into it through the vacuum hood 4. Such means is a matter of detail and has not been shown herein.

The projecting edge of the wall or partition 11 serves to effect a very thorough preliminary separation of the rinse water from the fibers of the rug and thereby permits the lower throat opening 10 to produce a maximum effect upon the nap of the rug to thoroughly raise all of the fibers so that they will lie free and untangled, thus giving the rug a bright new appearance.

I claim as my invention:

1. In a rug cleaning device, the combination with a rotary supporting drum, a combined rinsing and vacuum device positioned adjacent said drum and arranged to act upon the rug in the order named, and a roller associated with said rinsing device against which the rug is adapted to engage as it rotates upon said drum.

2. In a rug cleaning device, the combination with a rotary supporting drum upon which the rug is adapted to be supported, a rinsing device and a vacuum device positioned adjacent the drum and arranged to act upon the rug in the order named, said rinsing device being slidably mounted on said vacuum device for limited movement with respect thereto.

3. In a rug cleaning device, the combination with a rotary supporting drum, upon which the rug is adapted to be supported, a rinsing device and a vacuum device positioned adjacent the drum and arranged to act upon the rug in the order named, said rinsing and vacuum device being slidably connected to each other and slidable as a unit toward and from said drum.

4. In a rug cleaning device, the combination with a rotary supporting drum upon which the rug is adapted to be supported, a rinsing device and a vacuum device positioned adjacent the drum and arranged to act upon the rug in the order named, and spring means urging said rinsing device outwardly of said vacuum device and toward said drum.

5. In a rug cleaning device, a rug supporting drum, a vacuum device operatively positioned adjacent said drum to engage a rug thereon, means for constantly urging said vacuum device outwardly so as to press upon a rug passing around said drum, and means for varying the pressure exerted by the vacuum device on said rug.

6. In a rug cleaning device, a rug supporting drum, a vacuum device operatively positioned adjacent said drum to engage a rug thereon, spring means urging said vacuum device outwardly so as to press upon a rug passing around said drum, and means for varying the tension of said spring means.

7. In a rug cleaning device, the combination with a rotary drum upon which the rug is adapted to be supported, a vacuum chest located adjacent said drum, a vacuum nozzle positioned on said vacuum chest and slidable toward and from said drum, a rinsing nozzle supported upon said vacuum nozzle and slidable toward and from said drum, a contact member mounted upon said rinsing nozzle and adapted to be engaged by the rug in its passage around the drum, a valve for said rinsing nozzle, and means whereby said rinsing nozzle in moving rearwardly with respect to said vacuum nozzle will open the valve to allow a flow of water to said rinsing nozzle.

8. In a rug cleaning device, relatively slidable rinsing and vacuum nozzles, means for presenting a rug into operative relation to said nozzles, and means engaged by said rug causing relative movement between said nozzles whereby the flow of water through said rinsing nozzle is initiated.

9. In a rug cleaning device, a vacuum nozzle, a rinsing nozzle slidably mounted thereon, control valves for said nozzles, means for moving a rug past said nozzles, means actuated by the rug for producing relative movement between said nozzles, and means whereby said relative movement actuates said control valves.

10. In a rug cleaning device, means for

operatively supporting a rug to be cleaned, a vacuum device comprising a throat element provided with a plurality of superposed passageways communicating with said vacuum device and comprising a partition member constituting and separating said passageways, upper and lower wall members forming the outside of said passageways, said partition member extending outward to a greater distance than said upper and lower wall members.

11. In a rug cleaning device, a vacuum hood element with which the rug is adapted to be brought operatively into contact, said hood element formed from a central chamber communicating with a source of vacuum, and a throat element adapted to engage the rug, passageways formed in said throat element separated by a partition wall, said wall projecting outward toward the rug to a greater distance than the remainder of the throat element.

12. In a rug cleaning device, a vacuum hood element with which the rug is adapted to be brought operatively into contact, said hood element formed from a central chamber communicating with a source of vacuum, and a throat element provided with a plurality of independent passageways formed between substantially horizontally positioned upper and lower walls with a partition wall therebetween, one of said walls projecting outward toward the rug to a greater distance than the others.

13. In a rug cleaning machine, the combination of a rug carrying means, of a rinsing nozzle and a vacuum nozzle positioned in operative relation thereto, means providing for relative movement between said nozzles, means for controlling the supply to said nozzles, and means whereby relative movement between said nozzles will actuate said controlling means.

14. In a rug cleaning machine, the combination of a rug carrying means, of a rinsing nozzle and a vacuum nozzle movable as a unit toward and from the same, means providing for relative movement between said nozzles, means for controlling the supply to said nozzles, and means whereby relative movement between said nozzles will actuate said controlling means.

15. In a rug cleaning machine, the combination of a rug carrying means, of a rinsing nozzle and a vacuum nozzle movable as a unit toward and from the same, means providing for relative movement between said nozzles, means for controlling the supply to said nozzles, means whereby relative movement between said nozzles will actuate said control means, and means engaged by the rug in its movement past said nozzles for producing relative movement between said nozzles.

16. In a rug cleaning machine, the combination with a rug carrying device, a liquid reservoir and a vacuum chest, of a vacuum nozzle supported and guided on said vacuum chest, a rinsing nozzle supported and guided on said vacuum nozzle, 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 movement of the rinsing nozzle on said vacuum nozzle.

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

18. In a rug cleaning machine, the combination with a rug carrying device, a plurality of independently mounted vacuum nozzles adapted to engage said rug, said vacuum nozzles each comprising a throat section having outwardly flaring side walls joining the upper and lower walls, the side walls extending to a position short of the edges of the upper and lower walls and meeting a complementary flaring portion of an adjacent nozzle.

19. In a rug cleaning device, a vacuum nozzle, a rinsing nozzle slidably mounted thereon, control valves for said nozzles, and means whereby relative movement between said nozzles actuates at least one of said control valves.

20. In a rug cleaning device, a vacuum nozzle, a rinsing nozzle slidably mounted thereon, control valves for said nozzles, and means whereby relative movement between said nozzles actuates said control valves to first open the vacuum control valve and subsequently open the rinsing control valve.

21. In a rug cleaning device, a vacuum nozzle, a rinsing nozzle slidably mounted thereon, control valves for said nozzles, and means whereby relative movement between said nozzles actuates said control valves to first close the rinsing control valve and subsequently close said vacuum control valve.

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