May 21, 1929. P. L. MABREY 1,714,273

RUG CLEANING MACHINE

Filed May 8, 1925 4 Sheets-Sheet 1

Fig. 1

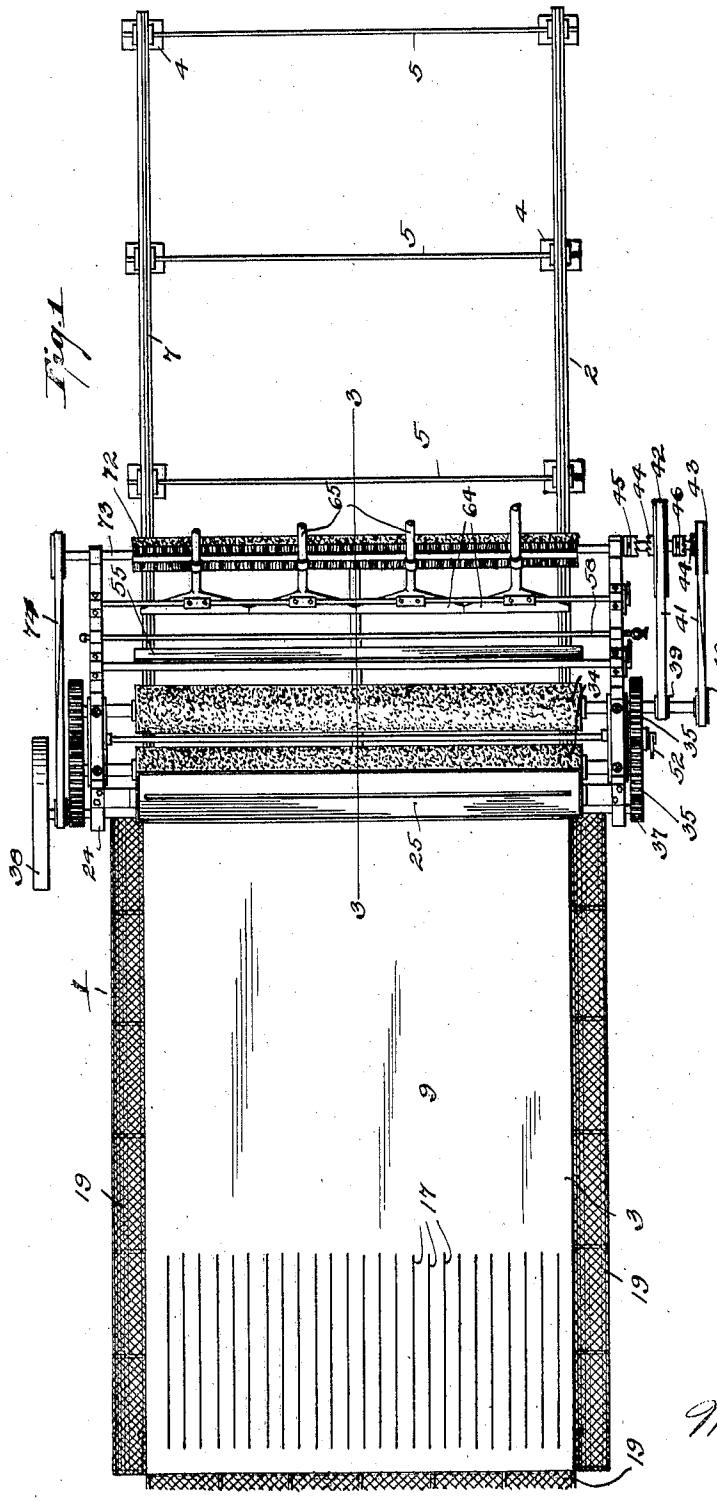
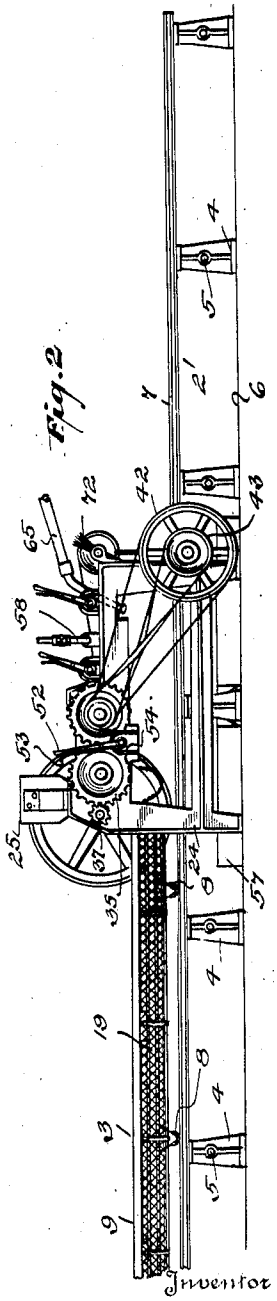


Fig. 2



Inventor

Phil L. Mabrey

W. J. McDowell

Attorney

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RUG CLEANING MACHINE

Filed May 8, 1925 4 Sheets-Sheet 2

Fig. 3

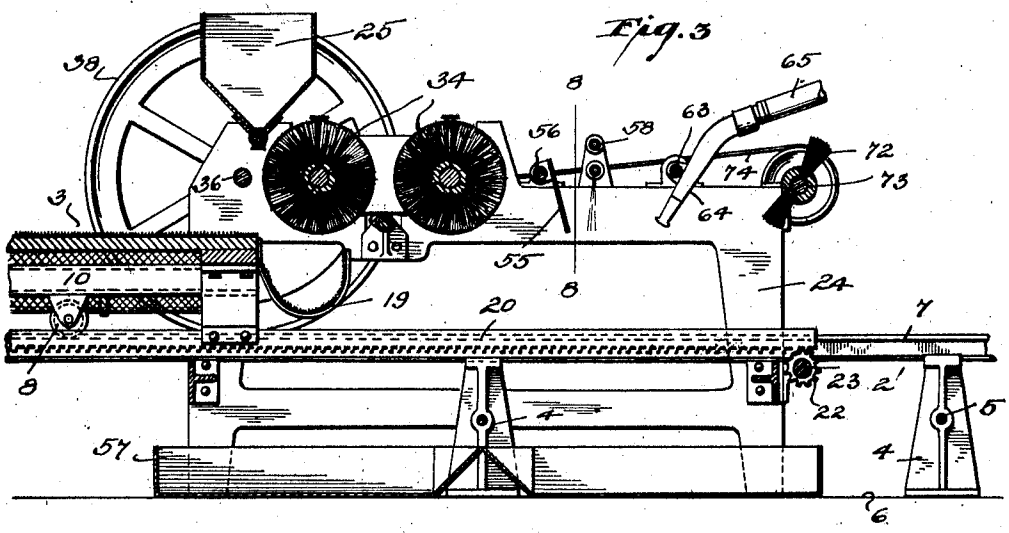


Fig. 4

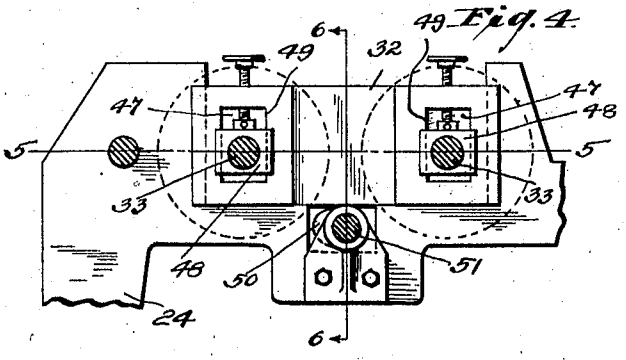


Fig. 6

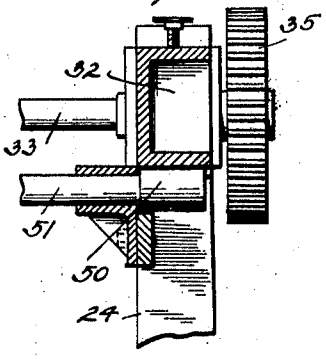
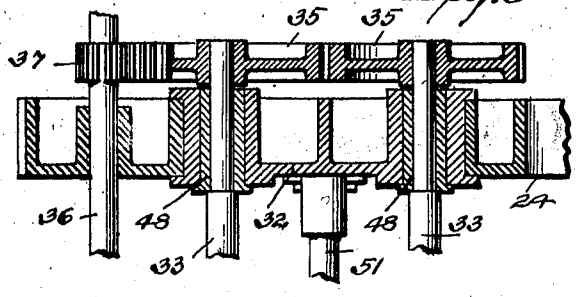


Fig. 5



Inventor

Phil L. Mabrey

By W. D. McDowell.

Attorney

May 21, 1929. P. L. MABREY 1,714,273

RUG CLEANING MACHINE

Filed May 8, 1925 4 Sheets-Sheet 3

Fig. 7

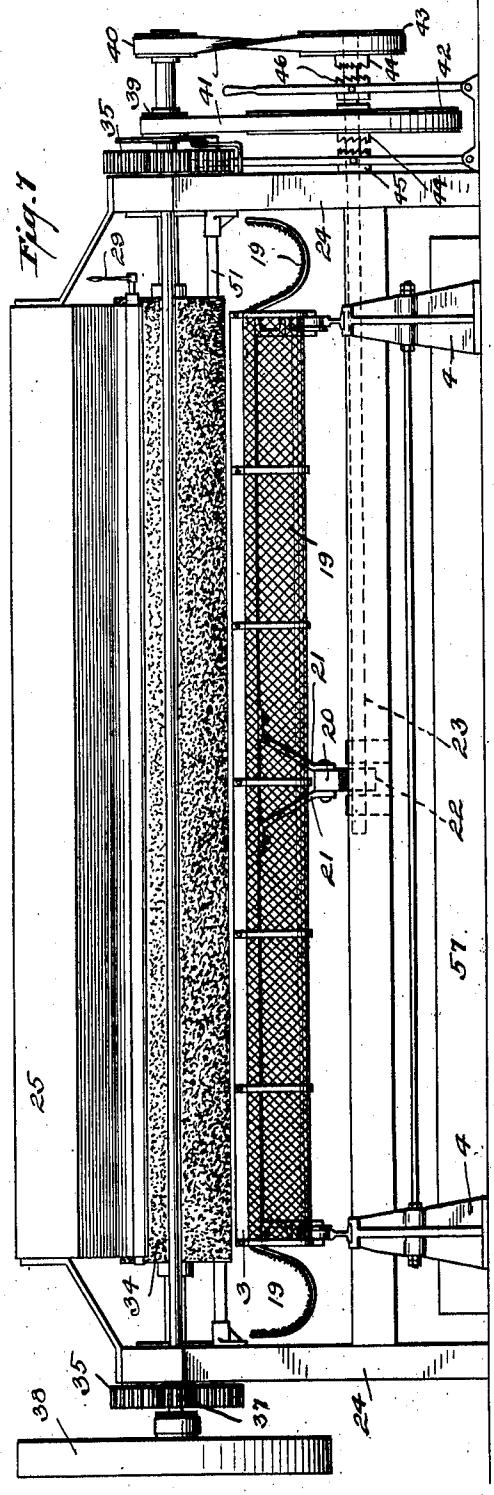


Fig. 8

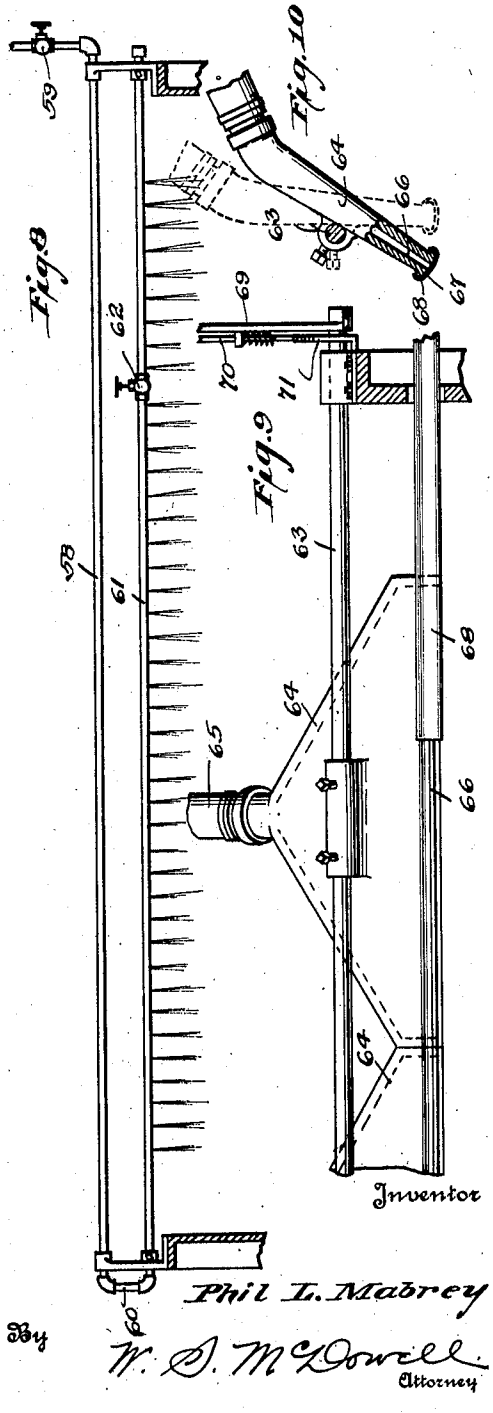


Fig. 9

Fig. 10

Inventor

Phil L. Mabrey

By W. S. McDowell

Attorney

May 21, 1929. P. L. MABREY 1,714,273

RUG CLEANING MACHINE

Filed May 8, 1925 4 Sheets-Sheet 4

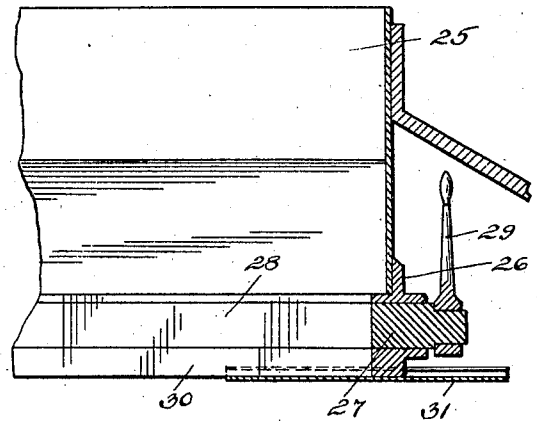


Fig. 11

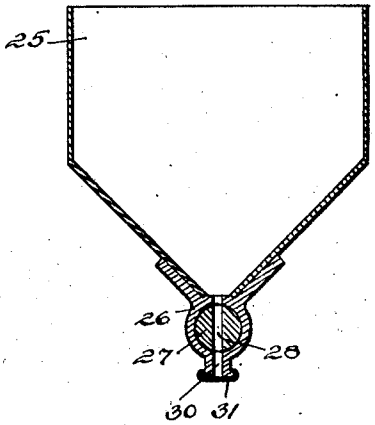


Fig. 12

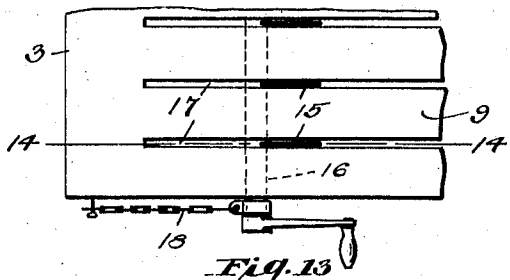


Fig. 13

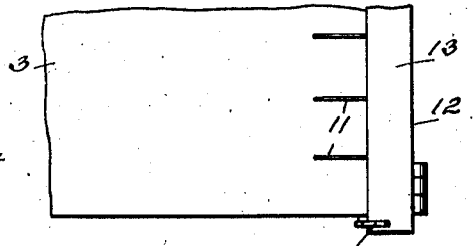


Fig. 15

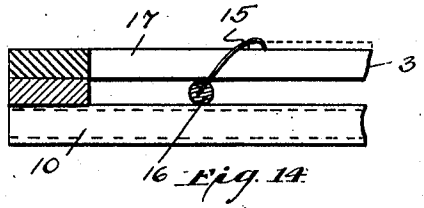


Fig. 14

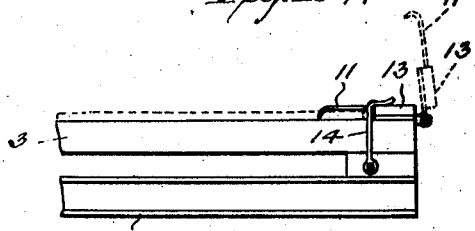


Fig. 16

Inventor

Phil L. Mabrey

By W. J. McDowell.

Attorney

Patented May 21, 1929. 1,714,273

UNITED STATES PATENT OFFICE.

PHIL L. MABREY, OF COLUMBUS, OHIO; MARY B. MABREY ADMINISTRATRIX OF SAID PHIL L. MABREY, DECEASED.

RUG-CLEANING MACHINE.

Application filed May 8, 1925. Serial No. 28,946.

This invention relates particularly to an improved rug cleaning machine involving a novel arrangement of cleaning appliances which operate to scour or scrub the rug to remove therefrom quickly and positively all soil traces and to permit the operation to be properly and effectively accomplished in an economical time and labor saving manner. The invention consists, among other features, in the provision of a rug cleaning machine involving a travelling rug carrier which operates to present a rug or carpet carried thereon to the successive action of rotary scrubbing or scouring brushes, to a scraper member which removes the soiled soap solution from the rug following the action of the scrubbing rolls or brushes, to the action of a rinsing bath and in finally subjecting the rug to the action of a suction device which removes the larger percentage of the moisture or cleaning liquids from the rug and leaves the latter in a thoroughly renovated condition adapted to be finally dried.

The invention further consists in the provision of a carrier for the rug which is in the form of a flat reciprocatory table upon which the rug is placed and tautly stretched so that the table may be advanced to subject the rug to the action of the several successively operating cleaning appliances, provision being made for advancing the table and the rug into engagement with the cleaning appliances at a relatively slow speed and the return or inactive movement of the table to a normal position at a relatively accelerated speed; in the provision of means associated with the table for quickly and securely fastening a rug upon the surface of the table so that the entire surface of the rug will be presented to the action of the cleaning appliances; adjustably associating the rug clamping device with the table so as to accommodate rugs or carpets of varying proportions; and in the provision of other features and advantages hereinafter described and set forth in detail.

For a further understanding of the invention, reference is to be had to the following description and to the accompanying drawings, in which:

Figure 1 is a top plan view of the rug cleaning machine comprising the present invention,

Figure 2 is a side elevation thereof,

Figure 3 is a vertical longitudinal sectional view on the line 3—3 of Figure 1,

Figure 4 is a fragmentary view of the brush adjusting mechanism,

Figure 5 is a horizontal sectional view taken on the line 5—5 of Figure 4,

Figure 6 is a vertical sectional view taken on the line 6—6 of Figure 4,

Figure 7 is an end elevation of the rug cleaning machine,

Figure 8 is a transverse sectional view taken on the line 8—8 of Figure 3,

Figure 9 is an enlarged fragmentary view showing the suction apparatus,

Figure 10 is an end view thereof, partly in section,

Figure 11 is a fragmentary vertical sectional view of the soap container,

Figure 12 is a transverse vertical sectional view thereof,

Figure 13 is a fragmentary plan view of the rear end of the table showing the rug clamping means,

Figure 14 is a sectional view taken on the line 14—14 of Figure 13,

Figure 15 is a fragmentary plan view of the front end of the table showing the rug clamping means, and

Figure 16 is a side elevation thereof.

Referring more particularly to the drawings the numeral 1 designates my improved rug cleaning machine in its entirety. Broadly, the machine consists of a bed frame 2, a reciprocatory rug carrier or table 3, and a plurality of cleaning appliances which are mounted in connection with the bed frame and operate successively upon the upper surface of the rug as the latter is moved into engagement with the cleaning appliances by the reciprocatory motion of the table.

The bed frame consists of a plurality of vertically disposed legs 4, united by transversely extending tie rods 5 so as to produce a rigid substantial stretcher, the lower ends of the legs 4 resting upon the floor surface 6 and are fastened thereto in any desired manner. Secured to the upper ends of the

legs 4 are longitudinally extending transversely spaced tracks 7, and disposed for engagement with these tracks are wheels 8 which are carried by the under surface of the table 3, the said wheels serving as anti-friction devices to permit of the free frictionless travel of the table over the ways or tracks 7 of the bed frame. The table itself is formed to include a wooden rug receiving surface 9, which rests upon longitudinally extending metallic channel bars 10 and the bars 10, in turn, carry the depending wheels 8. This structure imparts to the table or carriage a considerable degree of mechanical strength so that the surface 9 will be maintained at all times in a true horizontal plane, devoid of undulations or the like which would seriously interfere with the proper operation of the machine.

In practice, a rug is placed horizontally upon the upper surface 9 of the table or carrier with the surface of the rug to be cleaned faced upwardly. The rug is retained in this position by the provision of a plurality of hooks 11, which are arranged along the forward edge 12 of the table. These hooks have their shank ends embedded in a transversely extending pivoted bar 13, and are adapted, when the bar is swung rearwardly, to embed themselves within the weft or body of the rug so that by being thus connected with the rug the said hooks will not interfere or obstruct in any manner the operation of the subsequently operating cleaning appliances, hereinafter specifically described. Hooks or the like 14 are pivoted on the sides of the table and are adapted to retain the bar 13 and the hooks 11 in secured engagement with the rug, preventing undue upward movement on the part of the bar 13. The bar 13 also serves to limit the movement of and effect the positioning of the forward edge of the rug on the table. It will be observed that the bar does not in any way cover the forward edge of the rug. The rear edge of the rug is secured to the table by the provision of a plurality of hooks 15, which are carried in connection with a shaft 16 extending transversely of the table between the surface 9 and the bars 10. The shaft 16 is adjustable longitudinally of the table, and for this reason the table is provided, adjacent to its rear end, with a plurality of longitudinally extending slots 17, through which the upper ends of the hooks 15 project. The elongated slots 17 are provided in order to adapt the fastening structure to rugs of different lengths or proportions. It will be seen that by rotating the shaft 16, the hooks are capable of being embedded in the rear edge of the rug to substantially and firmly grip the latter at a plurality of points and, in a manner similar to the hooks 11, to so engage the rug as to prevent the hooks from interfering with the operation of the cleaning appliances. The shaft 16 has associated with the ends thereof a pair of chains or the like 18, so that when the hooks 15 are engaged with the rug, the chains 18 may be adjusted to draw the shaft 16 longitudinally and in this manner place and retain the rug under tension, so that the latter will be tautly stretched and held in a true horizontal plane upon the surface 9 of the table. By the provision of this construction it will be seen that a rug is capable of being quickly and securely connected with the table in a position to permit the cleaning appliances to operate to the best advantage. The longitudinal side edges and the rear edge of the table may be provided with baskets or the like 19 by means of which when larger sized rugs or carpets are being handled are capable of receiving that portion of the rug or carpet which is not to be subjected to the action of the cleaning appliances. For example, in very large sized rugs the latter are subjected to the cleaning appliances in accordance with the effective width of the table. When the rug is wider than the table, that portion of the rug which exceeds the width of the table is placed in one or the other of the baskets 19 and then as the process of cleaning the rug continues, that portion which has not been cleaned is withdrawn from the baskets and presented to the action of the cleaning appliances and the formerly cleaned portions of the rug are rolled and placed in the other basket until the entire surface of the rug has been cleaned.

To effect the reciprocation of the table the latter in this instance is provided with a longitudinally extending rack bar 20, which is disposed beneath the table proper and is secured thereto by means of brackets or other fastening appliances 21. Engaged with the teeth of the rack bar 20 is a spur pinion 22, which is carried by a shaft 23 journaled in connection with the bed frame 2. Power is imparted to the shaft by means to be hereinafter described, and it will be seen that when the pinion is rotated reciprocatory motion will be imparted to the table, causing the latter to traverse the ways 7 so as to bring the rug into engagement with the cleaning appliances and also to return the table to a normal position.

Arranged mid-way of the length of the bed frame 2 is a pair of side frames 24, which occupy vertical positions and are transversely spaced a greater distance than the width of the table 3. Mounted upon the frames 24 and extending transversely across the table is a soap solution container 25, which is proportioned to receive and contain a desired quantity of a soap solution employed in the cleaning of rugs. The bottom of the container 25 is provided with converging side walls which terminate in a valve casing 26. Within this casing there is located a longitudinally extending rotatable valve member

27, provided with a slot 28 which extends substantially the full length of the container 25. The outer end of the valve member will be provided with an actuating portion 29, so that the flow of solution from the container may be readily controlled and manually adjusted. The slotted outlet 30 in the bottom of the container, below the valve member 27, has its effective length controlled by the provision of a sliding plate 31, which is capable of being moved longitudinally relative to the outlet 30 so that the latter may be lengthened or shortened in accordance with the width of the rug passing beneath the container. It will be manifest that as the valve member is opened, the soap solution may flow from the container and deposit itself upon the upper surface of the rug carried by the table when passing beneath the cleaning appliances.

The side frames 24 are provided with vertically adjustable journal boxes 32, in which are mounted brush shafts 33. These shafts carry between the extremities thereof oppositely rotating brushes 34 which are disposed to engage with the upper surface of the rug as the table moves forwardly through the machine. The brushes 34 revolve as indicated by the arrows in Figure 3, and this is secured by providing the shafts 33 with meshing gears 35. Also journaled in connection with the side frames 24 is a transversely extending shaft 36, which carries at its ends spur pinions 37, meshing with certain of the gears 35 so as to cause the latter to rotate and to effect the positive rotation of the brushes 34. The shaft 36 may be equipped at one end with a relatively enlarged belt wheel 38 by means of which power is applied to the machine from any suitable prime mover (not shown). One of the shafts 33 is provided with a pair of belt wheels 39 and 40 of different diameters, over which pass belts 41, which lead to belt wheels 42 and 43 also of different relative diameters. The belt 41 that establishes driving relation between the wheel 40 and the wheel 43 is crossed mid-way of its length so that the wheel 43 will rotate in opposed relation to the wheel 42. The wheels 42 and 43 are loosely mounted upon the shaft 23, and have their hubs provided with opposed clutch faces 44, with which are adapted to be engaged clutch sleeves 45 and 46, that are feathered or otherwise secured to the shaft 33. These sleeves are manually operated, and it will be seen that when the sleeve 45 is in engagement with the clutch face 44 of the wheel 42, the table 3 will be advanced forwardly at a relatively slow speed to bring the rug thereon into engagement with the cleaning appliances and, conversely, when the clutch sleeve 46 is in clutching engagement with the wheel 43, and the clutch sleeve 45 thrown out, the table will be moved in the opposite direction at an accelerated rate of speed so as to return the table to its normal position. These varying rates of speeds are obtained by the different relative proportions existing between the wheels 39 and 40, 42 and 43.

Upon the forward or cleaning travel of the rug the soap solution is discharged or deposited upon the upper surface of the rug and the latter is then immediately subjected to the rotary brushing action of the stiff bristled brooms or brushes 34, which engage with the rug, and by rotating in the directions indicated, lift the nap of the rug, and effectively securing all portions of the lather to remove dirt and soil traces and restore the rug to its original color and luster. The shafts 33 upon which the brushes are mounted are journaled in the boxes 32, which are individually adjustable in slots 47 provided in connection with cross heads 48 which are, in turn, vertically adjustable in fixed guides 49 carried by the side frames 24. The individual adjustment afforded by the boxes 32 permits the relation between the brooms or brushes and the rug to be readily controlled so as to adapt the brushes to rugs of different thickness and to compensate for the effects of wear. However, by the provision of the cross heads 48 a mechanism is provided for lifting the brushes to a position removed from engagement with the table 3. Advantage is taken of this feature when the table is returned to its normal or starting position. Since in operation the brushes become soap laden, it is desirable when the table is returned to its normal position, and the cleaned rug removed therefrom that the brushes be kept out of engagement with the table to prevent the latter from becoming surfaced with the soap solution carried on the brushes. The lifting of the cross heads and the brushes carried thereby may be quickly accomplished by the provision of cams 50, which are mounted upon a rotatable cross shaft 51 which upon manual adjustment causes the cams to assume elevated or lowered positions, thereby governing the relation between the brushes and the table. The outer end of the shaft 51 may be provided with an operating lever 52, carrying a hand controlled latch 53, engaging with a toothed segment 54 which serves to hold the cross heads in fixed positions of adjustment.

Upon the advance of the table with the rug thereon the latter, after release from engagement with the rotary brushes, contacts with a transversely extending scraper bar 55. This bar is carried by a cross shaft 56, journaled in connection with the side frames 24, and the lower edge of the bar 55 frictionally engages with the upper surface of the rug to remove therefrom the soiled soap solution which is left upon the upper surface of the rug following the operation of the revolving brushes. The position of the bar 55 confines the soiled soap solution to the region of the brushes 34, and the surplus lather or

soap suds is permitted to drop into an outlet vat or container 57 located on the floor beneath the brushes 34. The vat 57 may have connection with any suitable outlet drain (not shown).

Carried by the side frames 24 in advance of the scraper bar is a pipe 58, the latter including a control valve 59 and is connected with a source of clear water supply. The pipe 58 extends across the full width of the table 31 and terminates in a vertically disposed section 60, which in turn is in communication with a perforated spray pipe 61 extending across the table 3 parallel to and below the pipe 58. The spray pipe 61 is provided at intervals with a control valve, 62, by means of which the width of the spraying action may be regulated, adapting the spraying action to rugs of varying width. By this construction a bath or rinse is provided for the rug following the operation of the revolving brushes and serving to more thoroughly cleanse the rugs.

In advance of the pipe 61 there is provided a rockshaft 63, journaled in connection with the side frames 24. This rock shaft has fastened thereon a plurality of suction hoods 64, which by means of conduits 65 are connected with any suitable type of power driven vacuum or suction creating apparatus (not shown) so as to produce the requisite suction at the entrance slots 66 of the hoods. This suction serves to effectively remove all accumulated moisture and water from the rugs, leaving the latter free from soil traces and in a perfectly clean and renovated condition. The lower edges of the hoods 64 may be rounded as at 67 so as to facilitate the sliding of the rugs across the hoods. If desired the slots 66 in the hoods may have their effective length controlled by means of a sliding closure plate 68, which adapts the hoods to the exact width of the rug being cleaned and serves to insure at all times an effective suction on the rugs. The rock shaft has associated therewith a handle 69 carrying a latch 70 which engages with the rack segment 71, by means of which the hoods 64 may be raised and lowered and maintained in these positions. The provision of the added clear, rinse afforded by the pipe 61 and the applied suction, as provided by the hoods 64 and associated apparatus constitute one of the very important features of the present invention, in that by the provision of these cleaning appliances soil traces are completely removed from the rug and the latter restored to a condition closely comparable with the appearance of the rug when new.

In front of the hoods 64 the machine may be provided with a rotating nap raising brush 72, carried by a shaft 73. This shaft is rotated by a belt 74, which transmits power from the shaft 36 to the shaft 73. The brush 72 rotates as indicated by the arrow, lifting the nap of the rug so as to permit the latter to dry more quickly and to present a better appearance after final drying.

The entire length of the rug is passed through the cleaning appliance in the order described, when the table reaches its outer extreme of movement its reciprocation is arrested, and the cleaned rug freed from engagement with the fastening devices which secure it to the table. The rug may then be removed from the table and placed in an ordinary drying room for more complete drying. Following the removal of the rug from the table the latter is restored to its receiving position and the cycle of operation previously described repeated.

In summary, it will be observed that the present invention provides a rug cleaning machine wherein the carrier for the rug reciprocates in a horizontal plane. This is in contrast to other prior machines involving carriers in the form of enclosed drums and belts which prevent the rug from being viewed at all times during the cleaning operation. Further, a novel form of clamping means is provided for enabling the entire surface of the rug to be cleaned and subjected to the action of the cleaning appliances. Prior structures for this purpose have usually included frictional devices engageable with the edge of a rug by holding the latter on the carrier. Such frictional devices of necessity prevent the cleaning appliances from engaging the rug completely, and as a result it is necessary in such former devices to clean the edges of the rugs manually following the removal from the machine. In the present invention the cleaning appliances clean the edges of the rugs as well as the main body thereof. Another outstanding feature of the present invention resides in the use of the suction appliances for effecting the final cleaning of the rug. Prior machines include rotary scrubbing brushes but it has been found that these brushes are not sufficient of themselves to completely remove all soil traces and streaks from the rugs. In the present invention the use of the vacuum results in the complete and thorough removal of all of such soil traces and produces a cleansing action materially superior to the use of the mere action of the rotatable brushes. It will be observed that by the use of the machine hand operations are reduced to a minimum, the only manual operations being the placing of the rug on the table and the manipulation of the several controls.

What is claimed is:

1. In a machine of the character set forth, in a frame, a rug carrier mounted for reciprocating movement upon said frame, means carried in connection with said frame for applying a soap solution to a rug arranged on said carrier, movable brush means

carried in connection with said frame and engageable with said rug, scraper means for removing the soap solution from the rug following the operation of the brush means, means for applying a rinsing bath to said rug subsequent to the operation of the scraper means, and suction appliances for removing moisture from said rug following the operation of the rinsing of the rug.

2. In a machine of the character set forth, a frame, a carrier mounted for movement in connection with said frame, means for securing a rug or the like to said carrier, means for applying a cleaning solution to said rug, brush mechanism operating upon the cleaning solution and the upper surface of said rug to scrub the latter, scraping means for removing the solution from the rug following the operation of the brush mechanism, and a suction device engageable with said rug for removing moisture from the latter subsequent to the operation of said brush mechanism and scraping means.

3. In a rug cleaning machine, a reciprocatory rug holding table mounted for movement in a horizontal plane, clamping means for removably maintaining a rug in a substantially stretched and taut condition upon the upper surface of said table, consisting of a plurality of hooks arranged in one end of said table for engagement with a rug, a second set of hooks carried by said table and arranged for connection with an opposed edge of said rug, means permitting of the adjustment of the second set of hooks longitudinally of said table to stretch a rug engaged thereby, and means for maintaining said second set of hooks in their adjusted positions.

4. In a rug cleaning machine, a reciprocatory rug holding table mounted for movement in a horizontal plane, clamping means at one end of said table for securing one edge of a rug flat upon the upper surface of said table, said table having at its opposite end a plurality of longitudinally extending slots provided therein, a rock shaft, and a plurality of hooks carried by said rock shaft and operable within said slots, said hooks upon rotation of said shaft being adapted to be embedded in the edge of a rug to maintain the latter in secured relation with said table.

5. In a rug cleaning machine, a reciprocative rug holding table mounted for movement in a horizontal plane, clamping means provided adjacent to one edge of said table for securing one edge of a rug in a flat horizontal position upon the upper surface of said table, said table having a plurality of longitudinally extending slots provided therein, a rock shaft adjustable longitudinally of said table beneath said slots, fixed hooks carried by said shaft and arranged for adjustment within said slots, whereby upon the rotation of said shaft the extremities of said hooks may be embedded in the edge of said rug opposite to said first named clamping means, and means permitting of the adjustment and maintenance of said rock shaft relatively to said table to stretch and hold in a stretched condition a rug on the upper surface of said table.

6. In a rug cleaning machine, a rug holding reciprocating table movable in a horizontal plane, means for securing the rug in a flat horizontal position upon the upper surface of said table, cleaning appliances occupying fixed positions in relation to said table including a solution containing trough, said trough having a longitudinally extending outlet slot provided in the bottom thereof, a longitudinally extending valve arranged for rotation about a horizontal axis provided in connection with said trough for regulating the outflow of the solution through said slot, brush mechanism engageable with a rug on said table, means operating subsequent to said brush mechanism for scraping the solution from said rug, and means for imparting reciprocating motion to said table.

7. In a rug cleaning machine, a frame, a rug carrier mounted for reciprocation relatively to said frame, said carrier including a flat horizontally disposed rug receiving surface, a pair of revolving brushes carried in connection with said frame, means for adjusting said brushes vertically and independently with respect to each other, and means for raising and lowering said brushes simultaneously with relation to said carrier independently of said first named adjusting means.

8. In a rug cleaning machine, a frame, a rug carrier movable in said frame, a pair of brushes adapted for cooperation with the rug on said carrier, journal boxes carried in connection with said frame for the support of said brushes, means provided in connection with said boxes permitting of the individual and selective adjustment of said brushes in vertical directions, and means operating on said boxes to adjust the latter simultaneously and bodily in vertical directions independently of said first named adjusting means.

9. In a rug cleaning machine, a rug carrier mounted for reciprocatory travel, a supporting frame stationary with respect to said carrier, a soap solution trough arranged over said carrier and provided with an outlet slot in the bottom thereof, means for regulating the effective length of said slot, a brush mechanism carried in connection with said frame and operable to scrub the surface of a rug during the advance of the latter with said carrier, scraping means for removing the solution from said rug following the operation of said brushes, and means for applying a rinsing bath to said rug subsequent to the action of said scraping means.

10. In a rug cleaning machine, a table movable in a horizontal plane, a stationary

frame supporting said table, means for securing a rug to be cleaned to the upper surface of said table, revoluble brushes carried by said frame and engageable with the rug on said table during the advance of the latter along said frame, a rinse applying means carried by said frame and operating on said rug subsequent to the operation of said brushing mechanism, a suction hood for withdrawing the rinsing solution from said rug, and means for varying the effective width of said hood to adjust the latter to the width of the particular rug under treatment.

In testimony whereof I affix my signature.

PHIL L. MABREY.