H. F. GRAY.

CARPET CLEANING MACHINE.

APPLICATION FILED OCT. 12, 1917.

1,268,963.

Patented June 11, 1918.

5 SHEETS—SHEET 1.

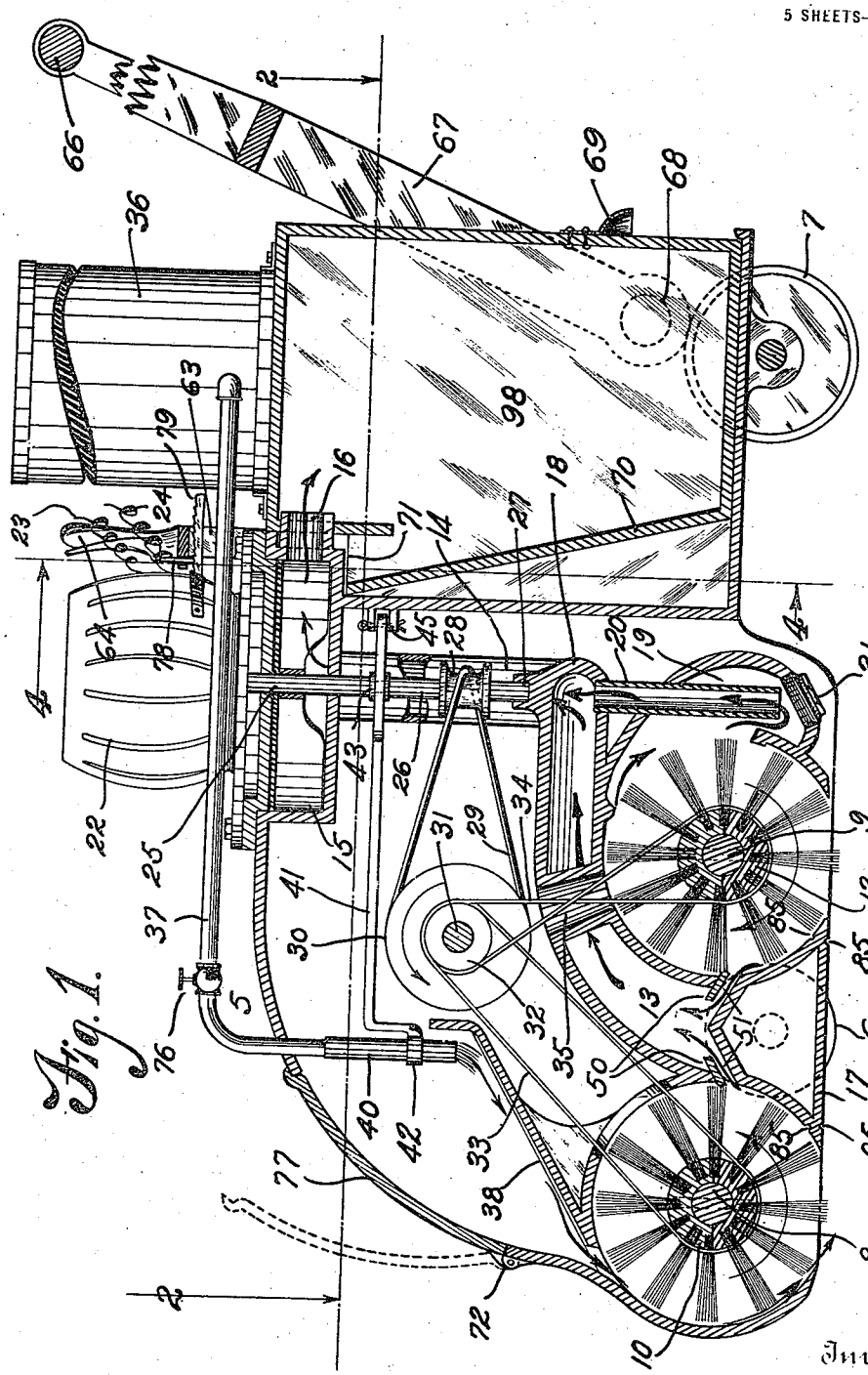


Fig. 1.

Inventor

H. F. Gray.

By A. J. Boyd

Attorney

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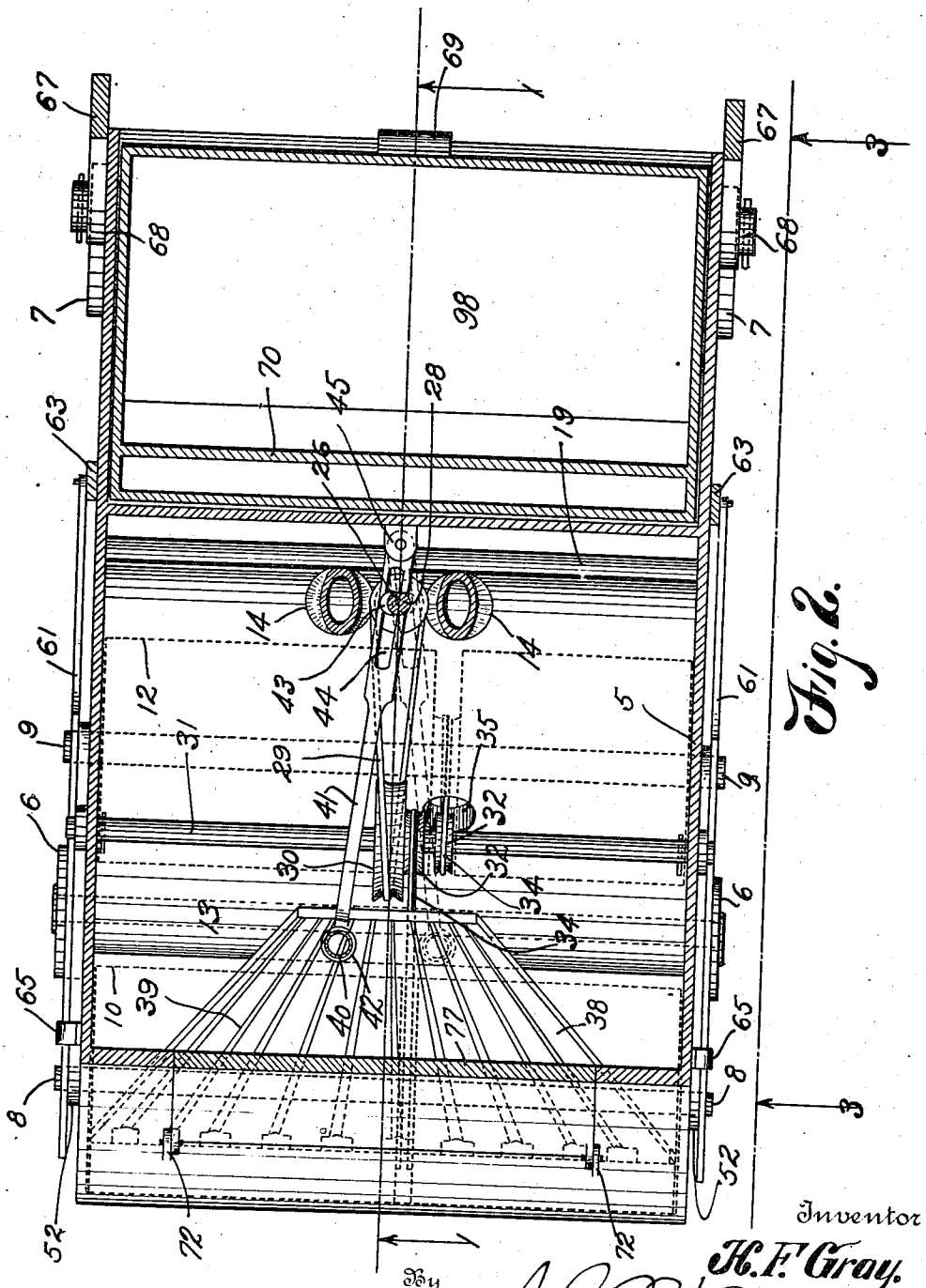


Fig. 2.

Inventor

H. F. Gray.

By

Attorney

H. F. GRAY.

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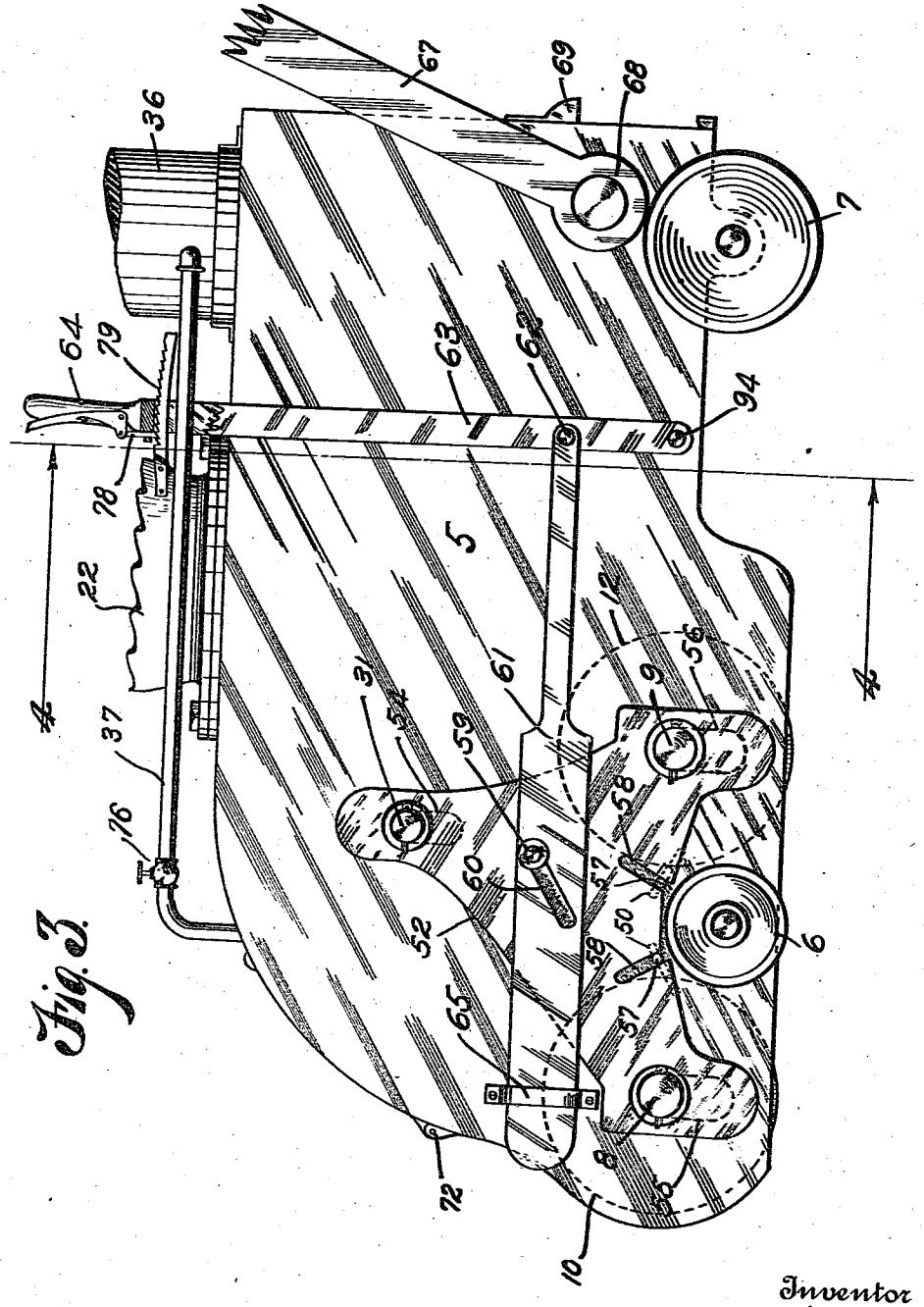


Fig. 3.

Inventor

H. F. Gray.

By A. J. Brown

Attorney

H. F. GRAY.

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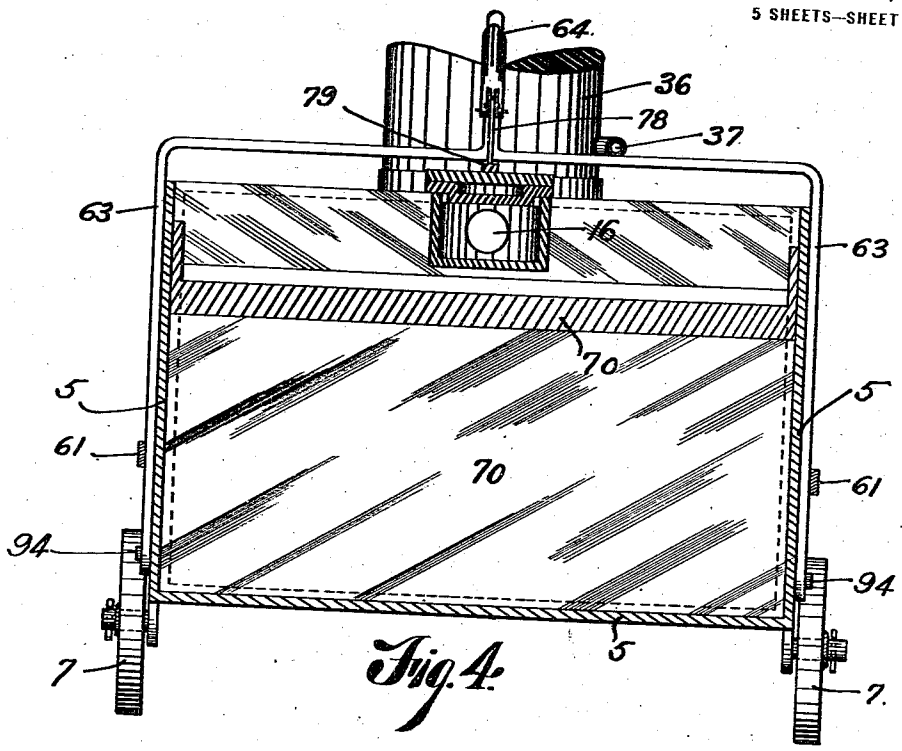


Fig. 4.

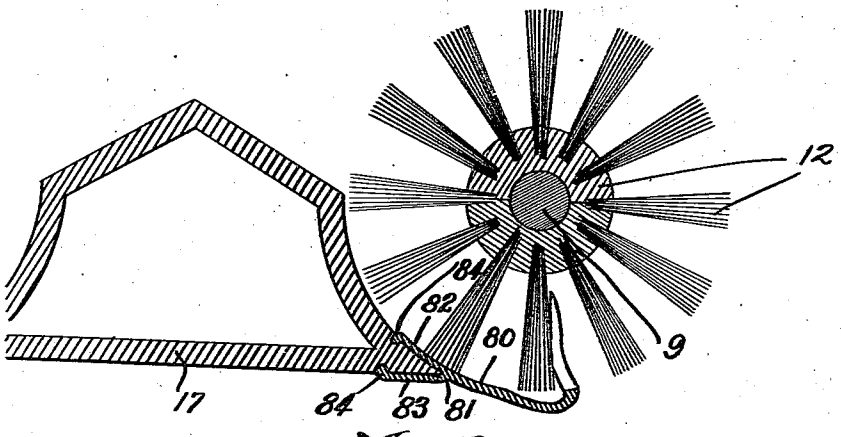


Fig. 5.

Inventor

H. F. Gray.

By A. J. Boone

Attorney

H. F. GRAY.

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5 SHEETS—SHEET 5.

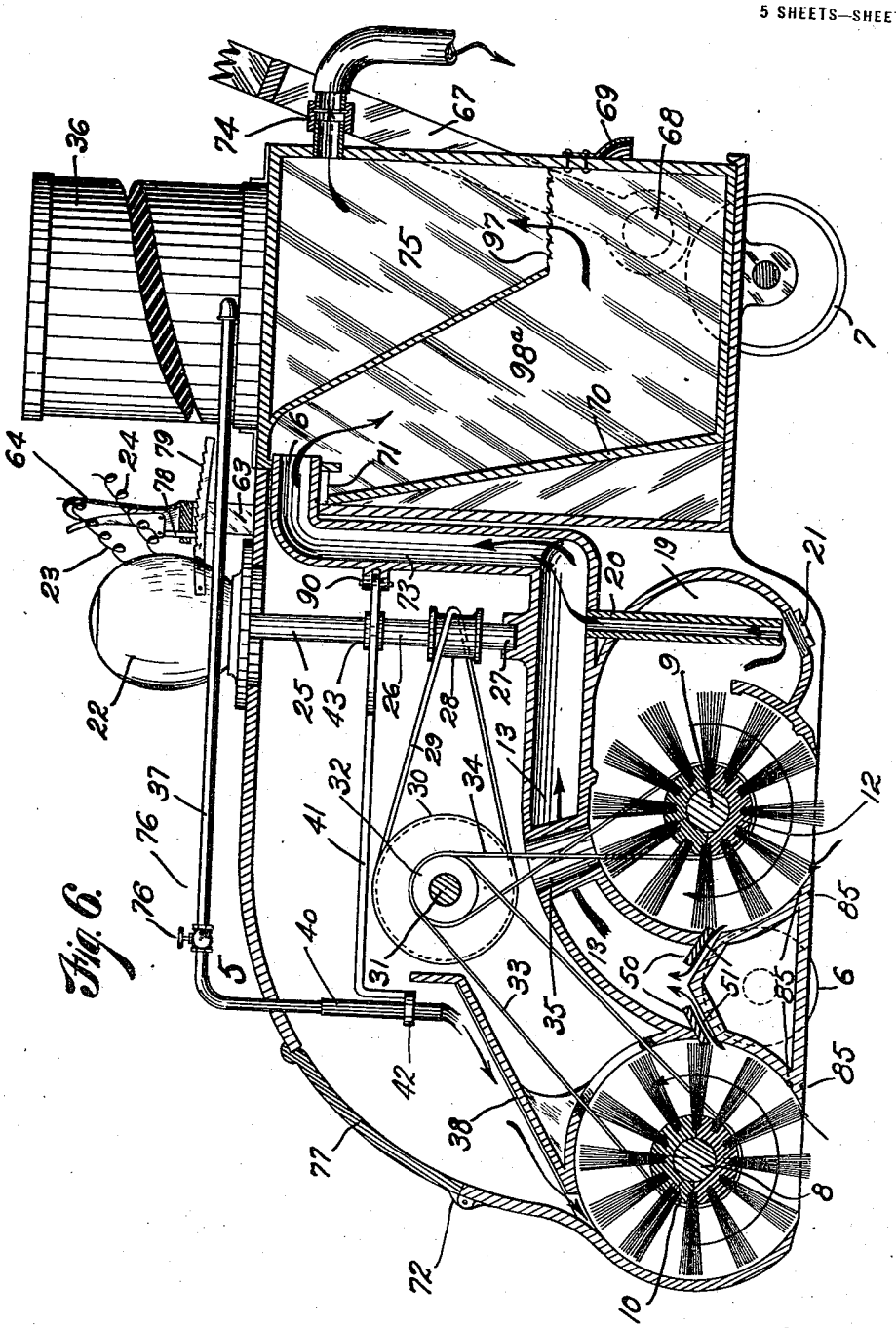


Fig. 6.

Inventor

K. F. Gray.

By

Attorney

UNITED STATES PATENT OFFICE.

HALLA F. GRAY, OF DENVER, COLORADO.

CARPET-CLEANING MACHINE.

1,268,963. Specification of Letters Patent. Patented June 11, 1918.

Application filed October 12, 1917. Serial No. 196,202.

To all whom it may concern:

Be it known that I, HALLA F. GRAY, a citizen of the United States, residing at the city and county of Denver and State of Colorado, have invented certain new and useful Improvements in Carpet-Cleaning Machines; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the characters of reference marked thereon, which form a part of this specification.

My invention relates to improvements in machines for cleaning carpets and rugs. My improvement is primarily intended for use as a machine for washing carpets, rugs and other similar articles, having a nap or pile, and though more particularly intended for this use, it is also adapted for washing or scrubbing floors, and further may be employed as a dry vacuum cleaner, the only modification or change necessary in order to convert the structure from a wet to a dry machine being the cutting off of the supply of cleaning liquid, and making provision for depositing the dust in a suitable receptacle and allowing the air to escape therefrom. However, the main features of the wet and dry machines may be the same as will be understood as this specification proceeds.

So far as the function intended to be performed by the wet machine is concerned, it is the same as that of the machine covered in my Patent #1,240,799 dated September 18, 1917.

In my present invention, I employ as the distinguishing feature two rotary brushes, arranged transversely to the direction of the machine's travel, said brushes being spaced by a member which closes the suction nozzle at the bottom sufficiently to obtain the necessary partial vacuum condition between the brushes, in order to remove the dirty, soapy liquid as it is brought into position to be acted on by the suction, by the brushes, and particularly by the rear brush which during the wet cleaning process, is a dry brush in the sense that no liquid is delivered directly to this brush, its function being to remove the dirty soapy liquid from the nap or pile of the carpet or rug and bring it into position to be removed through the agency of the suction nozzle whose lower extremity is located between the two rotary brushes. In other words, the rear brush serves to comb out the dirty, soapy liquid or refuse material from the nap or pile of the carpet and in this respect it is believed well adapted to act upon this nap or pile which is delicate and cannot be subjected to the harsh scrubbing condition incident or necessary in the scrubbing of floors and other hard surfaces. The nap or pile of the carpet or rug must be carefully handled during the wet, cleaning process, otherwise it will be injured or destroyed. Again, if too much liquid is supplied it will cause the colors to run and ruin the article. Hence, my present machine, as heretofore indicated, is constructed with special reference to the carrying out or practising of the wet cleaning process for carpets, rugs and other similar delicate articles having nap or pile, and whose structure is characterized by the qualities heretofore indicated; though as heretofore stated, the structure may be employed as a floor scrubber, in which case it is also a wet machine, and also as a vacuum cleaner or dry machine for removing the dust and dirt from carpets and rugs in a dry or dust-like form.

Having briefly outlined my improvement I will proceed to describe the same in detail, reference being made to the accompanying drawing in which is illustrated an embodiment thereof. In this drawing:

Figure 1 is a vertical section of my improved machine taken approximately on the line 1—1, Fig. 2.

Fig. 2 is a horizontal section taken on the line 2—2, Fig. 1, looking downwardly.

Fig. 3 is a side elevation of the machine partly broken away at the top and illustrating means for adjusting the brushes and the adjacent coöperating plates to compensate for the wear of the brushes.

Fig. 4 is a cross section taken on the line 4—4, Fig. 1 looking toward the right.

Fig. 5 is a sectional view in detail showing the rear brush and the spacer in coöperative relation with a brush cleaning device, the parts being shown on a larger scale.

Fig. 6 is a vertical longitudinal section similar to Fig. 1, but showing a slightly modified form of construction.

The same reference characters indicate the same parts in all the views.

Let the numeral 5 designate a suitable frame or housing mounted on front and rear wheels 6 and 7. Within this frame work or housing are journaled front and rear shafts 8 and 9 upon which are mounted rotary brushes 10 and 12, said brushes extending transversely of the machine the full width thereof and arranged preferably to be rotated in reverse directions as indicated by the arrows adjacent the brushes in Figs. 1 and 6, the rotary movement being such as to carry the material taken up by the brushes inwardly into the space between the brushes, whereby it is brought into position to be acted on by the suction nozzle 13, whose passage extends upwardly and communicates by two branches 14 with a suction producing device or fan 15, which discharges the wet material through an outlet 16 into a receptacle 98 which as illustrated in the drawing, is supported on the rear portion of the main housing or frame work. Just below the mouth of the nozzle 13, is a spacing member 17 which also extends transversely of the machine the full width thereof and parallel with the two brushes, this spacing member being so arranged as to properly close the space between the brushes and below the mouth of the nozzle in order to maintain a proper vacuum condition, whereby the suction may be sufficient to remove the heavy wet refuse material which is taken out of the nap or pile of the carpet, rug or similar article through the coöperation of the brushes, and particularly through the instrumentality of the rear brush 12, which is intended to perform this function as well as to further aid in the removal of any dirt or foreign matter that otherwise might be clinging to the nap or pile in the event that it has not all been entirely loosened or separated from the nap or pile by the action of the forward brush 10 whose special duty is to bring the soapy cleaning liquid into cleaning or scrubbing contact with the nap or pile of the carpet in such a manner as to loosen and disengage the dirt and foreign matter from its normal, clinging contact with the nap or pile of the article acted on. This brush 10, however, will remove some of the dirt or refuse material from the carpet and carry it inwardly and upwardly into position to be acted on by the suction nozzle 13. The spacing member 17 and the suction nozzle 13 may together be considered a suitable suction nozzle means.

Attention is called to the fact that the two rotary brushes are hooded or housed in by the housing or frame work of the machine, in such a manner as not only to properly maintain the necessary vacuum condition for the proper performance of their function, but also for the purpose of facilitating the bringing of the refuse material taken from the carpet upwardly, whereby it is brought under the influence of the suction nozzle.

This nozzle is bifurcated at the point or location indicated by the numeral 18 from which point the two branches 14 extend upwardly and communicate with the suction producing device or fan 15, whence it is expelled through the outlet 16, as heretofore indicated.

It is assumed that a portion of the wet refuse material taken out of the nap of the carpet, rug or other article by the rotary brush 12, will be carried to the rear of the brush and be deposited in a cavity or chamber 19, and for the purpose of removing this material, an auxiliary conduit 20 which is vertically disposed, communicates at one extremity with the chamber 19 and at its opposite extremity with the suction nozzle at the junction 18. The housing of the chamber 19 is provided with an opening normally closed by a screw plug or other suitable device 21. When the closure is removed, the conduit 20 may be passed therethrough and threaded into an opening formed in the suction nozzle for the purpose of making the connection for the proper performance of its function, as heretofore indicated. It should also be explained that each of the brushes 10 and 12 is formed in two or more sections in order that they may be passed through the openings in the bottom of the housing in order to connect them with the shafts 8 and 9 upon which they are mounted, since, as shown in the drawing, the brushes in their entirety would not pass through these openings and the drawing does not illustrate other provision for introducing them, though such provision could undoubtedly be made by forming openings in the housing and providing removable closures. However, these features are details with which it is not my present purpose to deal, as they will be left to the skill of the mechanical engineer when the commercial machine is produced.

The movement is imparted to the rotary brushes from a motor 22, which as illustrated in the drawing is of the electric type and may be connected to any suitable source of current through the medium of the conductors 23 and 24 (see Fig. 1). The motor shaft 25 extends downwardly and operates the fans or blades of the suction producing device and also rotates an extension 26 of the shaft whose lower extremity is journaled in a socket 27 formed in the frame work or housing which it is believed may be made of a single casting, proper openings being left and provided with closures as that designated 77 in Fig. 1. Upon the shaft 26 is mounted a pulley 28 which is connected by means of a belt 29 with a larger pulley 30, fast on a shaft 31 which

is also provided with smaller pulleys 32, from which respectively lead belts 33 and 34, to pulleys fast on the shafts 8 and 9 for operating the brushes 10 and 12, suitable provision being made for reducing the speed of the motor shaft which would normally be far too great for the brushes in question, and while I have indicated speed reducing or stepping down mechanism in a general way, it must be understood that any suitable construction may be employed with this end in view. The belt 34 is crossed in order to cause its brush 12 to rotate in the opposite direction from the brush 10, the lower portions of both belts moving inwardly as indicated by the arrows in order to bring the refuse material into proper relative position to be acted on by the suction nozzle, as heretofore explained. Furthermore, the belt 34 passes through an opening 35 formed in the suction nozzle, said opening being housed in, whereby the passage through the nozzle is maintained intact, the only difference being that the space extends around the housed opening 35 on both sides.

Suitably mounted upon the machine is a tank 36 which contains a suitable soapy compound or cleaning liquid which passes by way of a conduit 37 and is delivered at the lower extremity of said conduit upon an inclined distributing plate 38 which is fluted, as shown at 39, to discharge the liquid approximately evenly upon the brush 10 throughout the entire length of the latter. The lower portion 40 of the conduit 37 is flexible and adapted to be oscillated through the medium of a horizontal oscillatory arm 41, one extremity of which is provided with a sleeve 42 through which the flexible member 40 passes. The oscillatory movement of the sleeve extremity of the arm 41 is imparted by a short crank 43 which passes through a slot 44 formed in the arm 41, the rear extremity of the last named arm being pivotally connected with the frame, as shown at 45. The length of the arm 41 will be so regulated with reference to the throw of the crank 43 of the shaft 26, that the discharge extremity 40 of the conduit 37 will move back and forth over the entire width or area of the upper extremity of the distributer 38 for the aforesaid purpose. As shown in the drawing, the distributer is shown as an integral part of the casting, constituting the housing or frame work of the structure, though it must be understood that it is not necessary in practice or for commercial purposes that this particular construction should be adhered to, unless it is found practicable so to do from a commercial standpoint.

From the foregoing description, the use and operation of my improved machine so far as the wet cleaning of carpets, rugs and other articles is concerned will be readily understood. The motor being set in motion will, through the medium of the construction heretofore described, operate the suction producing device 15 and rotate the two brushes 10 and 12 in opposite directions and at the proper speed for the performance of their function. At the same time, the soapy liquid or cleaning compound will be delivered to the distributer 38, and thence discharged upon the brush 10, whereby it will be carried downwardly to the carpet or rug, with the result that a sort of suds is produced through the action of the brush upon the article, whereby the dirt and foreign matter is loosened from the nap or pile of the carpet and mixed with the said soapy substance, a portion of which will be carried upwardly and removed by the suction of the nozzle 13. It is assumed, however, that the greater portion of the soapy compound mixed with the dirt or foreign matter will be taken up by the brush 12 which will, as heretofore indicated, comb the refuse material out of the nap of the carpet and bring it into position to be acted upon by the suction nozzle. Assuming that the two brushes are rotated in opposite directions, as indicated in the drawing and as heretofore explained, the brush 10 will comb the nap the wrong way for instance, while the brush 12 will reverse the position of the nap and leave it all combed or laid in the proper direction. Hence, my improved machine performs the nap combing as well as the cleaning function. The wet refuse material removed from the article to be cleaned will be carried upwardly and discharged into the receptacle 98, from which it may be removed by detaching the said receptacle and emptying the same whenever there is a sufficient accumulation to require it.

The manner of effecting the vertical adjustment of the brushes is illustrated in Fig. 3. It should also be explained that a corresponding adjustment will be necessary with reference to two suction regulating plates 50 which are movably connected with the housing and are located at the front and rear sides of the mouth of the nozzle 13 and just above the spacing member 17, exit passages 51 from the brush chambers being formed between the plates 50 and the top of the spacing member 17. These plates 50 are indicated by dotted lines in Fig. 3.

Mounted on each side of the housing or frame work of the machine is a plate 52 in which are respectively journaled the opposite extremities of the three shafts 8, 9 and 31. The extremities of these shafts also pass through vertically disposed elongated openings 54, 55 and 56 in the housing. Pins or spindles 57 with which the opposite extremities of the plates 50 are provided, extend through inclined slots 58 formed in each plate 52, the main housing being also

slotted or open to allow the pins or spindles 57 to move therein. Each of the plates 52 is provided with a wrist pin or projection 59 which passes through an inclined slot 60 formed in an arm 61 which is pivotally connected at one extremity, as shown at 62, with one of the parts 63 of a bifurcated lever 64, which extends above the top of the machine, while the two arms 63 extend downwardly on opposite sides thereof and are pivotally connected at their lower extremities as shown at 94, the opposite extremity of each arm 61 being slidably supported in a guide 65 carried by the housing. Consequently, as the hand lever 64 is moved in one direction or the other, as for instance toward the right (see Fig. 3) the two plates 51 will be moved downwardly by virtue of the engagement of the wrist pins 59 with the inclined slot 60 of the arm 61. This downward movement will carry the shafts 8, 9 and 31 downwardly in the slots 54, 55 and 56 respectively, whereby the brushes 10 and 12, the shaft 31 and their connections are moved downwardly to compensate for the wear of the bristles of the brushes, while at the same time the plates 50 are moved inwardly toward their respective brushes by virtue of the engagement of the pins or spindles 57 with the inclined slots 58 of the plates 52. Again, as the opposite movement is imparted to the hand lever 64, the reverse movement, of course, will be imparted to the aforesaid elements. The length of the belt 29 is such that the change of position of the shaft 31 and its pulleys 30 and 32 will not interfere with the proper operation of the belts 33 and 34 from the shaft 26 through the medium of the pulley 28. By virtue of this adjustment the brushes 10 and 12 may be used until their bristles are practically worn off, thus greatly economizing so far as the brush element is concerned, while at the same time the adjustment is quickly and easily accomplished to move the brushes either upwardly or downwardly as may be required.

When the machine is in use it is moved over the carpet, rug or other article by the person in charge thereof, who grasps the handle part 66 of the arms 67 which are connected with the frame work of the machine on opposite sides, as shown at 68.

The removable tank or receptacle 98 is provided on its rear wall with a hand hold 69 to facilitate the emptying of the refuse material from the tank after it is removed from the machine. The tank is further provided with an inclined wall 70 which leads toward the opening 71 to facilitate the emptying operation.

When it is desired to gain access to the interior of the housing or frame work of the structure for assembling, repairs or otherwise, the door 77 which is hinged at 72 may be opened. The area or size of this door together with the opening which it closes may be regulated as may be necessary or desirable.

The form of construction shown in Fig. 6 is adapted for use when the machine is employed in buildings or other localities having their own suction producing plants, in which event the suction fan 15 is omitted and a single pipe 73 extends upwardly from the suction nozzle 13, its upper extremity being in direct communication with the tank 98^a for receiving the refuse material, and with which the house suction is connected as shown at 74. As shown in this figure the tank 98^a is provided with an auxiliary compartment 75 in communication with the main tank chamber by a bottom opening covered by a fine screen 97, for use more especially in order to strain out the dust from the air as it leaves the tank. This form of construction may be employed as a vacuum or dry cleaner by simply closing a valve 76 in the pipe 37 leading from the tank 36 carrying the cleaning liquid. In this form of construction, the arm 41 is connected at its rear extremity with the pipe 73 as shown at 90. Of course, with the dry machine there will be no occasion for the oscillatory arm 41, but the operation of this will do no harm; but, if desired it may be disconnected or rendered inactive in any suitable manner. This statement is made on the assumption that the same machine is employed for both wet and dry cleaning, and is, therefore, convertible. But, if the machine is constructed for dry cleaning alone, the features peculiar to the wet machine, as the tank 36, the conduit 37, the fluted distributing plate 38 and the oscillatory arm 41, may be omitted entirely.

Any suitable means may be employed in connection with the hand lever 64 for securing the same in the desired position of adjustment. In the drawing, I have shown a pawl 78 coöperating with a ratchet 79 which is shown attached to the motor frame. It is evident that these are details that may be changed or modified as circumstances or mechanical skill may dictate or suggest.

In Fig. 5 I have illustrated a device for cleaning the brushes in the event that they become clogged or filled with refuse material of any kind. This device as shown consists of a plate 80 bifurcated at 81 to form two spring arms 82 and 83 and having inwardly projecting lips 84 adapted to enter grooves 85 of counterpart shape formed in the adjacent portions of the spacing member 17. When it is desired to clean the brushes, the device may be successively applied to the spacing member on opposite sides adjacent the brushes which will be rotated by starting

the motor until the desired effect is accomplished, after which the device will be detached, as it is only employed when the brushes are operated for cleaning purposes alone.

When the plates 52 are employed for adjusting the brushes and their connections to compensate for wear and also to cause the brushes or their bristles to penetrate more or less deeply into the nap or pile of carpets or rugs, it is important that the shape and size of the plates should be such that the slots 54, 55 and 56, as well as the other slots through which the pins 57 pass, will remain covered at all times. This is practicable, since the plates fit closely against the sides of the housing, but gaskets or packing material of any kind may of course be employed for the purpose of maintaining the necessary vacuum condition, without in any way departing from the spirit of the invention.

Having thus described my invention, what I claim is:

1. A portable machine for cleaning carpets, rugs, floors and the like, comprising a frame adapted to be moved over the article or surface to be cleaned and having mounted thereon two rotary brushes the frame including a housing forming a chamber in which the brushes are located and a suction nozzle means spacing the brushes and communicating with the portions of the housing chamber in which the brushes are located and shaped to draw the refuse material from approximately all of the scrubbed portion of the carpet or other surface engaged by the brushes and adjacent thereto.

2. A portable machine for cleaning carpets, floors and the like, comprising a frame movable over the article or surface to be cleaned, and having mounted thereon a scrubber, a rotary brush the frame including a housing forming a chamber in which the brush is located and a suction nozzle means adjacent the rotary brush, extending downwardly in close proximity to the article to be cleaned, and having an opening in communication with the portion of the housing chamber in which the brush is located, the nozzle means and rotary brush being located in the rear of the scrubber, and the nozzle means being shaped and arranged to draw the refuse material from approximately all of the scrubbed portion of the article or surface engaged by the scrubber and adjacent thereto.

3. A portable machine for cleaning carpets, rugs, floors and the like, comprising a frame adapted to move over the article or surface to be cleaned and having mounted thereon two rotary brushes and a suction nozzle arranged between the brushes and shaped to draw the refuse material from approximately all the scrubbed portion of the carpet or other surface engaged by the brushes and adjacent thereto, and a member arranged between the brushes and spaced therefrom and from the suction nozzle.

4. A portable machine for cleaning carpets, rugs, floors and the like, comprising a frame adapted to move over the article or surface to be cleaned and having mounted thereon two rotary brushes and a suction nozzle arranged between the brushes and shaped to draw the refuse material from approximately all the scrubbed portion of the carpet or other surface engaged by the brushes and adjacent thereto, the frame being constructed to form chambers in which the brushes are respectively located, and a spacing member arranged between the brushes and coöperating therewith and with the suction nozzle, between which and the spacing member are arranged passages forming communication between the brush chambers and the nozzle.

5. A portable machine of the class described, comprising a frame, a scrubbing brush carried thereby, means for imparting rotary scrubbing movement to the brush, and means for feeding a cleansing medium to the brush including a stationary inclined plate, a conduit arranged above the plate and in communication with the source of the cleansing medium, and means for oscillating the conduit.

6. A portable machine of the class described, comprising a frame adapted to be moved over the article or surface to be cleaned and having mounted thereon two rotary brushes, one being arranged forward of the other and having their axes parallel with the surface over which the machine travels, and means for simultaneously adjusting the brushes vertically to compensate for the wear, said means including side plates in which the brushes are journaled, and movable arms having inclined slots, wrist pins on the plates engaging said slots, and means for actuating the said arms.

7. A portable machine of the class described, comprising a frame adapted to be moved over the article or surface to be cleaned and having mounted thereon two rotary brushes, a suction nozzle arranged between the brushes, a spacing member also arranged between the brushes and below the mouth of the nozzle and so positioned that passages are formed between the lips of the nozzle and the said spacing member, a plate arranged on one side of each of these passages, and means for adjusting the same to compensate for the wear of the brushes.

8. A portable machine of the class described, comprising a frame adapted to be moved over the article or surface to be cleaned and having mounted thereon two rotary brushes, a suction nozzle arranged

between the brushes, a spacing member also arranged between the brushes and below the mouth of the nozzle and so positioned that passages are formed between the lips of the nozzle and the said spacing member, a plate arranged on one side of each of these passages, and means for adjusting the same to compensate for the wear of the brushes, said means including side plates having inclined slots through which end pins pass, with which pins the suction regulating plates are equipped, and movable arms having inclined slots which receive wrist pins with which the side plates are provided, and means for adjusting the said arms.

9. A portable machine of the class described, comprising a frame adapted to be moved over the article or surface to be cleaned and having mounted thereon two rotary brushes, the frame including a housing forming chambers in which the brushes are respectively located, a suction nozzle arranged between the brushes and in communication with the brush chambers by suitable passages, vertically disposed side plates arranged on the opposite sides of the frame, in which the said brushes are journaled, movable arms having inclined slots which receive wrist pins formed on the said plates, suction regulating plates having end pins which engage inclined slots formed in the said side plates, the suction regulating plates being arranged adjacent the passages forming communication between the suction nozzle and the brush chambers, and means for actuating the said arms.

10. A portable machine of the class described, comprising a frame adapted to be moved over the article or surface to be cleaned and having mounted thereon two rotary brushes, the frame including a housing forming chambers in which the brushes are respectively located, a suction nozzle arranged between the brushes and in communication with the brush chambers by suitable passages, vertically disposed side plates arranged on the opposite sides of the frame, in which the said brushes are journaled, movable arms having inclined slots which receive wrist pins formed on the said plates, suction regulating plates having end pins which engage inclined slots formed in the said side plates, the suction regulating plates being arranged adjacent the passages forming communication between the suction nozzle and the brush chambers, and means for actuating the said arms, the stationary frame of the machine being slotted to permit vertical adjustment of the side plates.

In testimony whereof I affix my signature.

HALLA F. GRAY.