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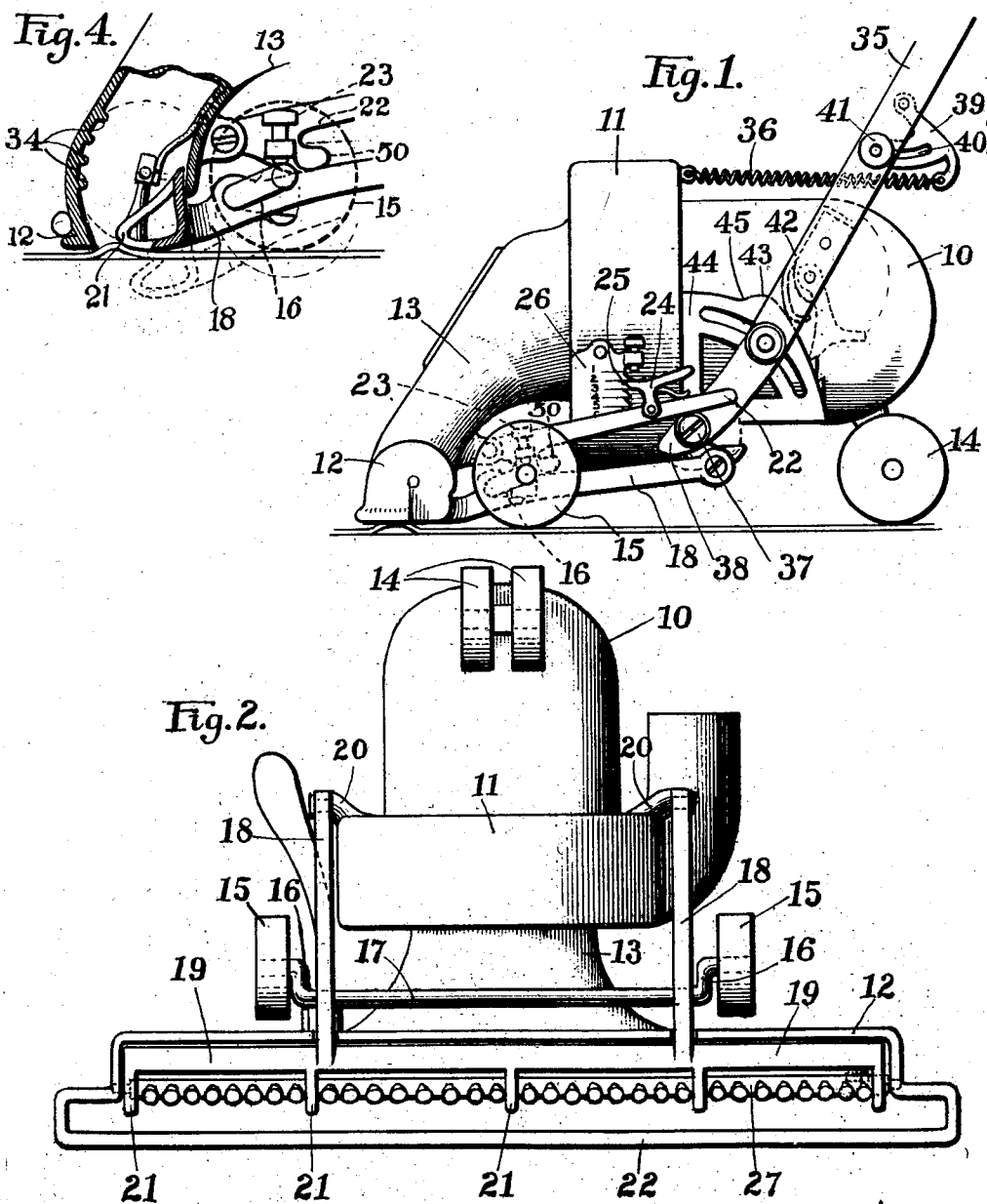
N. A. THROOP

VACUUM CLEANER

Filed Jan. 17, 1925

1,642,518

2 Sheets-Sheet 1



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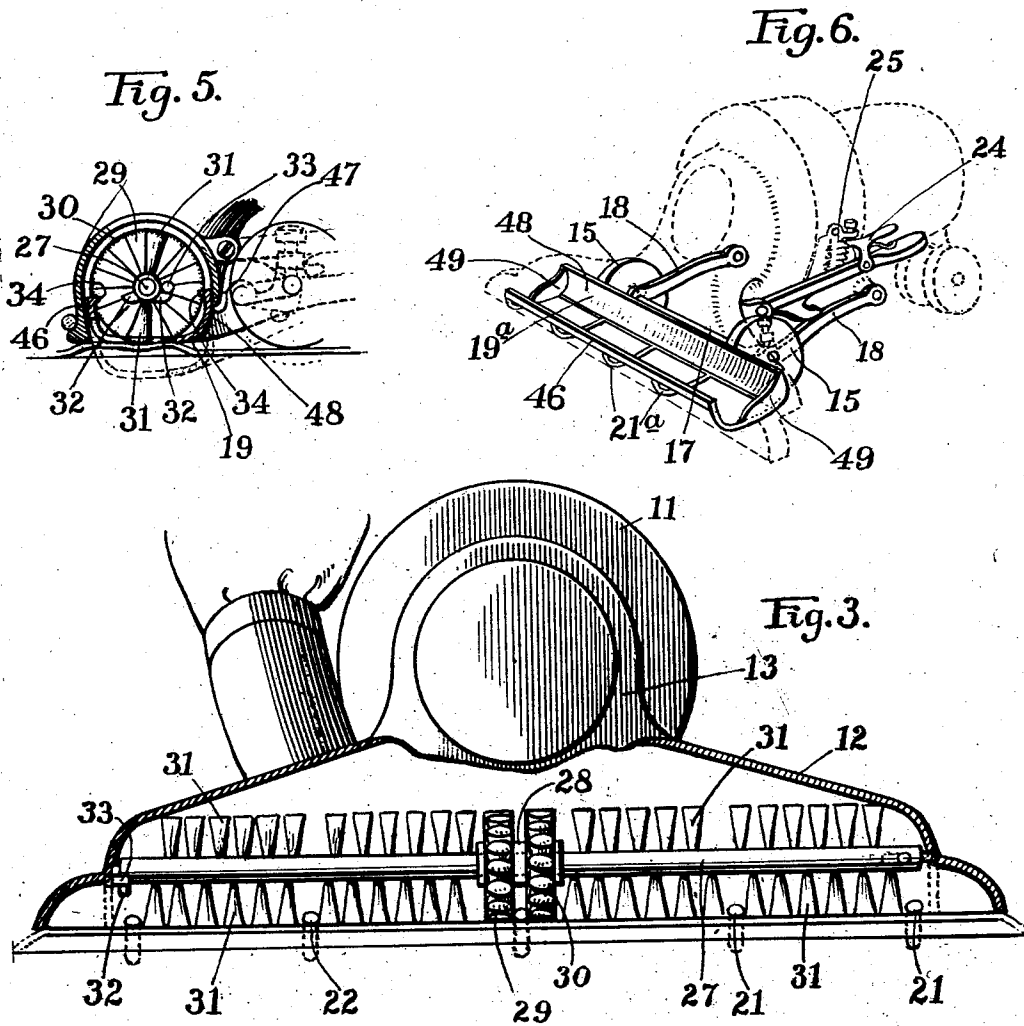
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## UNITED STATES PATENT OFFICE.

NEWTON A. THROOP, OF CHICAGO, ILLINOIS.

VACUUM CLEANER.

Application filed January 17, 1925. Serial No. 3,040.

My present invention relates to a vacuum cleaner and has more particular reference to a cleaner wherein a brush is employed to engage the surface being cleaned

5 My invention has numerous objects and advantages among which is provided means that will automatically lift the nozzle from the engaged surface whenever the motor is left running and when not actually in use  
10 so that the suction will be ineffective on the floor, rug or carpet. I have provided means for adjusting the nozzle with respect to the surface being cleaned so that the cleaner is rendered effective upon rugs and carpets  
15 having divers lengths of nap. These means are in the form of a central control so located that it is readily accessible to the foot of the operator and so constructed that its operation is audible thereby permitting the  
20 operator to hear, as well as see, the divers adjustments when made. Heretofore, where shoes or runners have been employed in the nozzle the carpet or rug is usually sucked up against the same so that a wavy surface  
25 extends from end to end of the nozzle. With my present structure the relation of the shoes and nozzle permits a transverse arching of the carpet in the mouth in parallel relation to the longitudinal axis of the  
30 nozzle. The brush I have employed is automatically reversible and whenever it is reversed, which occurs at the end of each reciprocation of the cleaner, the bristles or fiber or tufts of the brush will be rapidly  
35 moved past an element that cleans the same of loose threads and other matter that usually clog a brush in a cleaner. The foregoing objects are accomplished in a novel manner and with a structure that is dependable and sturdy. I prefer to carry out my  
40 invention in the following manner, reference being made to the accompanying drawings that form a part of this specification.

In the drawings:—

45 Fig. 1 is a side elevation of my vacuum cleaner.

Figure 2, is a bottom plan thereof.

Fig. 3, is a front elevation with a portion of the nozzle broken away to illustrate the  
50 brush.

Fig. 4, is a fragmentary view showing the nozzle in transverse section.

Fig. 5, is a similar view showing a modified shoe construction.

55 Fig. 6, is a perspective of the shoe frame

and control devices, the casing or housing being in dotted lines.

The elongated casing 10 encloses the motor and has a cylindrical enlargement 11 in which the fan rotates which sucks the dirt 60 through a nozzle 12 connected to said enlargement by a neck or throat 13. Rollers 14 support the rear of the structure centrally of the rear lower portion of the casing 10 and the forward portion is adjustably supported on casters 15 disposed upon each side of the neck 13 and to the rear of the nozzle. These casters are mounted upon the lateral portions of L-shaped extensions 16 of a  
65 rocker shaft or rod 17 that is mounted adjacent its ends on the rearwardly extended parallel arms 18 that are pivotally secured at their rear ends to lugs 20 projecting from the fan-casing 11. At their forward ends the arms 18 are connected to a frame consisting of an elongated bar 19 that is positioned longitudinally in the nozzle 12 adjacent the rear wall of the latter and extending forwardly from this bar is a plurality of shoes 21 that project into the opening of the nozzle. The casters 15 are adjusted by rocking the shaft or rod 17 through the medium of a lever 22 that is fulcrumed at its outer end upon the rear of the neck 13 and carries an adjusting screw 23 that  
85 engages the adjacent L-shaped extension 16 of said shaft rod. Adjacent its fulcrum lever 22 has a lug or finger 50 that engages the upper edge of the adjacent frame arm 18 so that when the lever 22 is depressed or  
90 raised the shoes 21 on the end of the frame will move respectively downwardly or upwardly and thus adjust the relation of the nozzle to the surface that is being cleaned. Intermediate its ends, lever 22 is provided  
95 with a spring controlled pawl 24 that coacts with ratchet teeth 25 on the edge of an index plate 26 on the side of the fan-casing, said index plate bearing numerals or other indicia to designate different heights the nozzle has  
100 been raised to accommodate the same to divers lengths of nap.

The brush I prefer to employ comprises an elongated spindle 27 rotatably mounted at its ends in the end walls of the nozzle and  
105 at its center of length is provided with a hub 28 from which projects a plurality of bundles of bristles 29 so that a brush roller 30 is provided that is of sufficient diameter to position its periphery in the plane of 110

the lower edge of the nozzle and engage with the surface being acted upon by the cleaner. Between this brush roller and the ends of the spindle I mount two opposite rows of  
 5 radially disposed bristle bundles 31 upon each side of the roller which rows are positioned slightly oblique to the vertical (Fig. 5) so that they incline opposite to the forward direction of movement of the cleaner. Lugs 32 project from the ends of the spindle  
 10 27 and respectively engage stops 33 projecting from the interior of the nozzle. When the cleaner is pushed forward the brush-roller 30 will rotate the spindle 27 anti-  
 15 clockwise (Fig. 5) and when pulled backwards the rotation will be clockwise and will move the upper row of bristles down into engagement with the carpet or rug so as to sweep the latter. During this move-  
 20 ment of trans-position the outer portions of the bristles will come into contact with and move past the ribs 34 on the nozzle wall (Fig. 4) or upon the frame of the shoes (Fig. 5) which causes them to shed the  
 25 foreign matter, lint, etc., that may be adhering to them, which foreign matter will be sucked into the casing by the fan, thus automatically keeping the brush clean. By providing brushes in this manner that en-  
 30 gage with the nap of the rug or carpet I prevent undulations of the carpet or rug in the mouth of the nozzle in the spaces between the shoes.

In order to raise the nozzle when the  
 35 cleaner is not in use, and especially when the operator has inadvertently permitted the motor to run, I have connected the handle 35 to the casing by a coiled spring 36 and I have extended the lower end of  
 40 the handle beyond its pivot or fulcrum 37 and provided it with a cam 38 that is adapted to engage with the adjacent portion of the arm 18. When in use the handle is in approximately the position shown in  
 45 Fig. 1, but upon the handle being released by the operator, the spring will pull it up to a vertical position causing the cam 38 to press down on arm 18. This action forces  
 50 the shoes down onto the carpet or rug but raises the casing and consequently lifts the nozzle far enough above the surface of the carpet or rug to be ineffective on the nap. The tension of the spring 36 may be regu-  
 55 lated by adjusting the bell-crank 39 that is provided on the handle and has one end of the spring connected to it, and said bell-crank has a segmental slot 40 to receive the shank of a clamp screw 41. In order to prevent a too rapid or accelerated motion  
 60 of the handle 35 when raised in the manner above described I have provided a brake or drag in the form of a leaf-spring 42 mounted on the handle in such position that will en-  
 65 gage the cam edge 43 of a segmental plate 44 secured to the casing, and beyond this

cam edge 43 is a depression 45 on said plate so that the braking action of the spring is stopped. The handle at this position will have begun to raise the nozzle and the weight  
 70 of the casing and structure will tend to maintain the handle upright.

In Figs. 5 and 6 I have illustrated a nozzle structure that will permit the main body of the nozzle to be lifted or elevated slightly if desired to raise the brush off the surface  
 75 being cleaned. In carrying out this construction I have cut away a small longitudinal portion of the back wall of the nozzle as at 47, and the bar 19<sup>a</sup> has an upwardly curved rear portion 48 in the form  
 80 of a concavo-convex flange that fits against and overlaps the lower portion of the nozzle wall above the cut away part. At the end of the bar the respective shoes are widened in a vertical direction to provide suitable  
 85 end walls 49 that are positioned adjacent or against the end walls of the nozzle. As the shoes 21<sup>a</sup> are in constant contact with the surface being operated on, while the mouth of the nozzle may be either close to  
 90 or above the said surface, it will be obvious that the concavo-convex flange will close the space between the rear wall of the nozzle and the surface and the walls 49 will extend  
 95 between the lower edge of the end walls of the nozzle and the said surface. This restricts the suction area both immediately below the nozzle mouth and also in the zone surrounding the lower edges of the nozzle  
 100 and avoids a waste of the suction at places where it cannot be used.

While I have illustrated a preferred or typical embodiment of my invention, it will be obvious that changes and modifications  
 105 of the structure may be made without departing from the principles disclosed. For example, the shoes may extend across the nozzle in Figures 5 and 6 and at their outer ends are curved upwardly where they are  
 110 connected together by a strip 46. Such changes and modifications are fully contemplated within the scope of the appended claims.

What I claim is:—

1. In a vacuum cleaner an elongated air  
 115 nozzle, a frame fulcrumed upon a horizontal axis adjacent said nozzle and including a bar extended longitudinally within the nozzle, shoes extended downwardly from said  
 120 bar into contact with the surface being cleaned, and means for adjusting said frame whereby said shoes raise or lower said nozzle with respect to the surface being cleaned.

2. In a vacuum cleaner an elongated air  
 125 nozzle, a frame pivoted upon a horizontal axis adjacent said nozzle and including a bar positioned within said nozzle, a plurality of shoes integral with said bar and extended downwardly across the mouth of the  
 130 nozzle, a plurality of bearings on said frame

between the bar and said axis, rollers journaled on said bearings, and means for raising and lowering said bar with relation to the nozzle.

5 3. In a vacuum cleaner a casing, having an air nozzle extending therefrom, arms pivoted to the casing back of said nozzle, means extending from the forward ends of said arms to said nozzle, a handle pivotally  
10 mounted on said casing, and an extension projecting beyond the fulcrum of said handle and adapted to engage one of said arms when said handle is moved to a substantially vertical position whereby to raise said nozzle  
15 above the surface being cleaned.

4. In a vacuum cleaner a casing, an air nozzle extending therefrom, a handle fulcrumed adjacent its lower end on said casing and disposed in an oblique plane when in  
20 use, and a frame pivoted on said casing and having portions extended into said nozzle, said frame adapted to be engaged adjacent its fulcrum by the lower end of said handle when the latter is moved to a substantially  
25 vertical position, and means for automatically moving the handle to a vertical position when released whereby to elevate said nozzle above the surface being cleaned.

5. In a vacuum cleaner a casing, an air  
30 nozzle extending therefrom, a handle fulcrumed on said casing, a contractible spring connected with said casing and handle for automatically returning the latter to a vertical position when released, means mounted  
35 upon the casing adjacent the nozzle and operated by the handle to elevate the nozzle whenever the handle moves to vertical position, and a brake device operatively connected with said casing and handle for re-  
40 tarding the movement of said handle into a vertical position.

6. In a vacuum cleaner a casing, a nozzle extending therefrom, a frame pivoted to said casing, a shaft mounted adjacent said  
45 nozzle in said frame, rollers mounted on the ends of said shaft, a lever fulcrumed adjacent said nozzle and having a lateral element engageable with a portion of said frame, and walls extended upwardly from said  
50 frame within said nozzle, whereby the walls of said frame provide an extension for the nozzle and the movement of said lever moves said frame to raise or lower the nozzle with respect to the surface being cleaned.

55 7. In a vacuum cleaner an elongated air nozzle having parallel front and rear walls, a bar extending adjacent said nozzle and pivoted exteriorly of said nozzle upon an axis parallel to the side walls of said nozzle,  
60 a wall projecting from said bar and extend-

ing longitudinally within the nozzle contiguous the rear wall thereof, and end walls projecting forwardly from said first-mentioned wall and coacting with the end walls of the nozzle, whereby when said nozzle is  
65 raised from the surface being cleaned said bar will remain stationary upon the surface and said walls will provide continuations of the nozzle walls and thereby close the space between the nozzle and said surface. 70

8. In a vacuum cleaner an elongated air nozzle, a movable brush mounted within said nozzle and having an edge adapted to engage the surface being cleaned, a bar extending longitudinally of and movable vertically within said nozzle, shoes carried by said bar and extended below said nozzle, walls extending from said bar upwardly into the nozzle, a bead projecting inwardly from the nozzle wall and positioned longitudinally of the nozzle mouth where it is adapted to be engaged by the brush when the latter is moved, and means for adjusting said bar whereby said shoes raise or lower said nozzle and brush with respect to the  
85 surface being cleaned and suspend said surface out of contact with the nozzle.

9. In a vacuum cleaner an elongated air nozzle, a brush having a horizontal spindle movably mounted longitudinally of and  
90 within said nozzle and having an edge adapted to engage the surface being cleaned, a bar reciprocable vertically adjacent said nozzle, shoes extending from said bar below said nozzle, walls projecting upwardly from said bar into the nozzle, means for adjusting said bar vertically whereby said shoes raise or lower said nozzle and brush with respect to the surface being cleaned and suspend said surface out of contact with the nozzle, 100 and a longitudinal rib projecting from a longitudinal wall into the path of the edge of the brush to be engaged thereby, to remove foreign matter therefrom.

10. In a vacuum cleaner an elongated air  
105 nozzle, an elongated brush journaled in said nozzle, an unbroken rib extending longitudinally of said nozzle above the mouth thereof and in the path of movement of the outer sweeping portion of the brush whereby during the movement of said brush, the bristles thereof are separated to permit the air to pass therethrough whereby the brush is cleared of foreign matter during its movement. 115

Signed at Chicago, in the county of Cook and State of Illinois, this 10th day of January, 1925.

NEWTON A. THROOP.