B. N. BISHOP.

VACUUM CLEANER NOZZLE.

APPLICATION FILED MAY 31, 1916.

1,228,176.

Patented May 29, 1917.

2 SHEETS—SHEET 1.

Fig. 1.

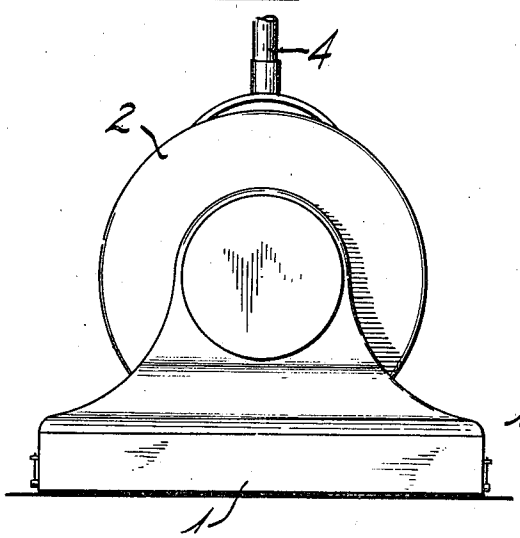


Fig. 2.

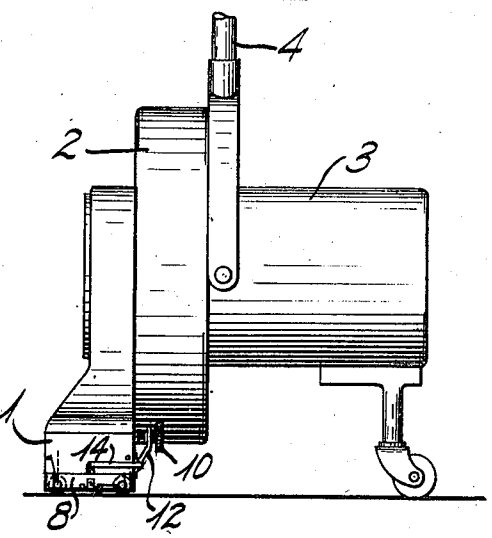
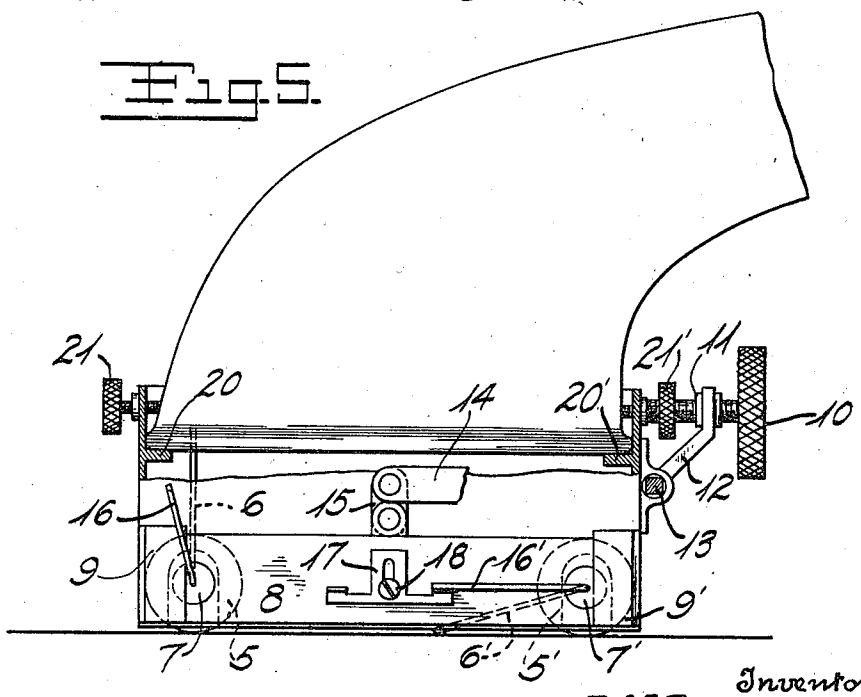


Fig. 5.



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2 SHEETS—SHEET 2.

Fig. 6a

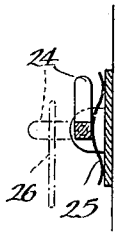


Fig. 3.

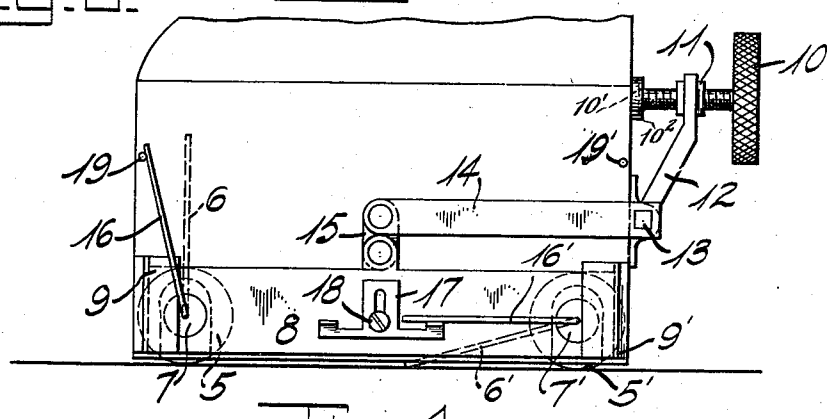


Fig. 4.

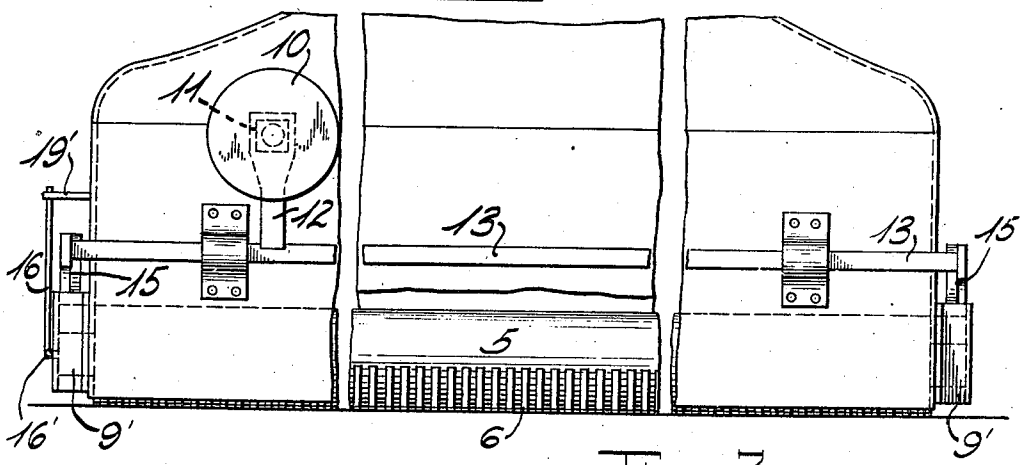


Fig. 6.

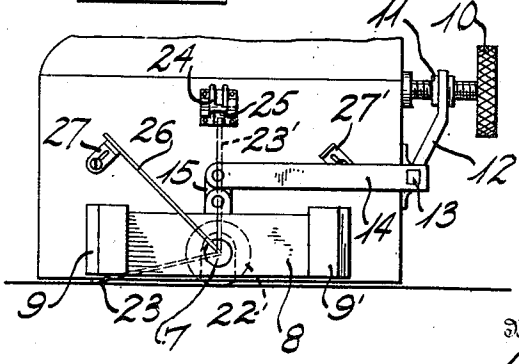


Fig. 7.

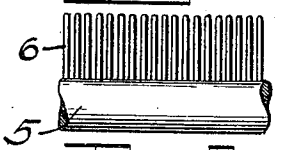


Fig. 8.

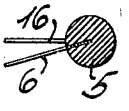


Fig. 9.

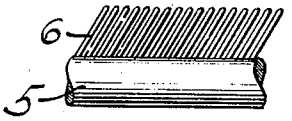
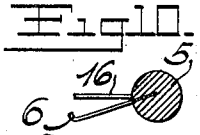


Fig. 10.



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UNITED STATES PATENT OFFICE.

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VACUUM-CLEANER NOZZLE.

1,228,176. Specification of Letters Patent. Patented May 29, 1917.

Application filed May 31, 1916. Serial No. 100,806.

To all whom it may concern:

Be it known that I, BARRY N. BISHOP, a subject of the King of Great Britain, residing at Newark, county of Essex, State of New Jersey, have invented certain new and useful Improvements in Vacuum-Cleaner Nozzles, of which the following is a full, clear, and exact description.

My invention relates to improvements in vacuum cleaner nozzles and has for its object to provide a nozzle which is adapted to mechanically pick up threads and the like from the surface of the carpet or floor being cleaned and deliver them to the interior of the nozzle. It further has for its object to provide controlling and adjusting means for the pick-up device and further has for its object to provide a nozzle having such mechanical pick-up means which is attachable to nozzles now in use.

The following is a description of an embodiment of my invention, reference being had to the accompanying drawings, in which—

Figure 1 shows in end elevation a vacuum cleaner having a nozzle embodying my invention.

Fig. 2 is a side elevation of the same.

Fig. 3 is an end elevation of the mouth portion of the nozzle, showing the details upon an enlarged scale.

Fig. 4 is a rear side elevation of the same, some of the parts being broken away.

Fig. 5 shows my invention as embodied in a supplemental nozzle to be attached to the mouth portion of an ordinary nozzle.

Fig. 6 shows in end elevation a modification employing a single movable comb roller.

Fig. 6^a shows on an enlarged scale a sectional detail of a detent of Fig. 6.

Fig. 7 is a plan view of a portion of the comb or collecting device.

Fig. 8 is a transverse section of the collecting device in the form shown in Fig. 7.

Fig. 9 is a plan view similar to Fig. 7 showing another form of tooth.

Fig. 10 is a section showing another modified form of tooth.

Referring more particularly to the drawings 1 is the mouth portion of a nozzle of a vacuum cleaner, through which air is sucked by a fan contained within the casing 2 and actuated by a motor in the casing 3, the cleaner being guided by the handle 4, the dust being discharged into a collecting bag (not shown) in the ordinary manner. The mouth portion of the nozzle is provided with an opening within which are mounted two rollers 5—5′ carrying teeth 6—6′ constituting a scooping thread-lifting means. The trunnions 7—7′ extending from the rollers pass through slots or openings in the ends of the mouth portion and are journaled in bearings in movable bars 8. These bars slide in ways formed on the ends of the mouth portion by angle plates 9—9′ secured to the mouth portion so that they can be raised and lowered. In order to raise and lower them I provide a thumb screw 10, the inner end of which is rotatably secured to the rear wall of the nozzle portion being provided with a head 10′ held within a chamber 10^2 secured to the wall. The screw thread upon this thumb screw engages a nut 11 carried in a lever arm 12 which is connected to a countershaft 13 to which are connected levers 14 which are connected to the bars 8 by links 15. Turning the thumb screw in one direction acts to raise the bar 8 together with the rollers 5—5′, while turning it in the other direction lowers said bar and rollers. In this way the rollers can be adjusted according to the nature of the surface to be cleaned or can be withdrawn sufficiently so as to entirely remove the rollers from contact with the surface being cleaned. The rollers at one of their ends are provided with external projecting arms 16—16′ which are adapted to engage surfaces upon an adjustable stop 17 secured to the bar 8 by the set screw 18. By raising or lowering the stop 17 the downward movement of teeth 6—6′ can be set at any desired point. The nozzle mouth is provided with projecting pins 19—19′ which limit the movement of the teeth in an upward direction by blocking the movement of the projecting arms 16—16′. If it is desired to hold the teeth clear of the carpet, the arms 16—16′ can be snapped back of the stops 19—19′ whereupon the teeth will be held in vertical position even though the rollers are in contact with the floor. The teeth may be straight teeth, as shown in Figs. 7

and 8, or if it is desired to make it less easy for the threads when once upon the teeth to slip off, they may be slightly upturned as in Fig. 10, or they may be placed at an angle to the axis of their supporting rollers as shown in Fig. 9.

The operation of the apparatus is as follows: When the nozzle is pushed forward upon the floor, the rollers 5—5′ being in engagement with the surface to be cleaned, the roller 5 will be rotated so as to draw the teeth 6 entirely from the carpet and in the construction shown move them to a substantially vertical position. The roller 5′, however, will be revolved in such a manner as to make the teeth 6′ bear upon the surface to be cleaned, the engagement therewith being determined by the position of the stop 17. Upon the rearward motion of the nozzle the reverse action takes place, the teeth 6 being brought into contact with the surface to be cleaned and the teeth 6′ being removed therefrom. As the teeth rise from the surface to be cleaned and approach the vertical position shown at the left of Fig. 3, the upwardly rushing air tends to draw the threads from the teeth and discharge them through the apparatus into the dust-receiving chamber, and in this manner, short threads at least will be picked up and removed upon one reciprocation of the apparatus, while longer threads will in many cases be picked up and removed upon a plurality of reciprocations, thus obtaining the desired end. During either the forward or backward movement the scooping thread-lifting device when in contact with the surface to be cleaned protrudes into the space between its axis of oscillation and the wall that is advancing toward a thread which is being approached by the nozzle.

In order to provide a nozzle which may be applied to nozzles now in use, I embody my improvements in a supplemental nozzle, see Fig. 5 adapted to fit the mouths of nozzles now in use and provided with internal rests 20—20′ and clamping thumb screws 21—21′ which pass through the walls of the supplemental nozzle and make screw threaded engagement therewith. The operation of the attachment is the same as the operation of the device above described.

Instead of two rollers a single roller 22 may be employed located in the center of the nozzle, as shown in Fig. 6, said roller being provided with teeth, preferably two sets 23—23′ of radially disposed teeth. The action of this arrangement is substantially the same as the action of the arrangement of Figs. 1 to 4, the teeth being held in engagement with the surface to be cleaned and during such engagement always pointing in the direction in which the nozzle is moved over such surface. A movable detent 24 movably held in a position vertical to the end of the nozzle or parallel thereto by a spring 25 will hold the arm 26 and the roller 22, to which it is connected, from turning when desired. Adjustable stops 27—27′ limit the range of movement of the teeth so as to control their engagement with the surface to be cleaned.

Where two rollers are employed, I preferably make the rollers with continuous contact surfaces as shown, though obviously this is not absolutely necessary.

As will be evident to those skilled in the art, my invention permits of various modifications without departing from the spirit thereof or the scope of the appended claims.

What I claim is:

1. The combination of a vacuum cleaner nozzle, an oscillating roller carried thereby, oscillating thread-lifting means actuated by said roller and when in contact with the surface to be cleaned protruding into the space lying between the axis of oscillation of said thread-lifting means and the advance wall of said nozzle so that the plane passing through said axis and the contacting portion of the thread-lifting means is inclined at an acute angle to said surface, said roller coöperating with the surface to be cleaned.

2. The combination of a vacuum cleaner nozzle, a roller carried thereby, scooping teeth carried by said roller and when in contact with the surface to be cleaned protruding into the space lying between the axis of oscillation of said roller and a wall of said nozzle, said roller being oscillatingly mounted relatively to said nozzle.

3. The combination of a vacuum cleaner nozzle, a roller carried thereby, scooping teeth carried by said roller and when in contact with the surface to be cleaned protruding into the space lying between the axis of oscillation of said roller and a wall of said nozzle, said roller being oscillatingly mounted relatively to said nozzle, and a stop for limiting the downward movement of said teeth.

4. The combination of a vacuum cleaner nozzle, a roller carried thereby, scooping teeth carried by said roller and when in contact with the surface to be cleaned protruding into the space lying between the axis of oscillation of said roller and a wall of said nozzle, said roller being oscillatingly mounted relatively to said nozzle, and means for raising and lowering said roller.

5. The combination of a vacuum cleaner nozzle, a roller carried thereby, scooping thread-lifting means carried by said roller and when in contact with the surface to be cleaned protruding into the space lying between the axis of oscillation of said roller and a wall of said nozzle, said roller being oscillatingly mounted relatively to said nozzle, and means for holding said lifting means in elevated position relatively to its axis so

as to be held from operation, the plane passing through the point of contact of the thread-lifting means with the surface to be cleaned and its axis of oscillation being inclined to said surface.

6. The combination of a vacuum cleaner nozzle with oscillating scooping thread-lifting means carried thereby and when in contact with the surface to be cleaned protruding into the space lying between its axis of oscillation and a wall of said nozzle, and means for oscillating said thread lifting means relatively to said nozzle, said means for oscillating coöperating with the surface to be cleaned.

7. The combination of a vacuum cleaner nozzle with a scooping comb carried thereby and having its teeth when in contact with the surface to be cleaned protruding into the space covered by said nozzle and lying between the axis of oscillation of said comb and a wall of said nozzle, means for oscillating said comb relatively to said nozzle, and stops for limiting the downward movement of said comb, said means for oscillating cooperating with the surface to be cleaned.

8. The combination of a vacuum cleaner nozzle with an oscillating scooping comb carried thereby and having its teeth when in contact with the surface to be cleaned protruding into the space covered by said nozzle and between the axis of oscillation of said comb and a wall of said nozzle, means for oscillating said comb relatively to said nozzle, and means for holding said comb in elevated position relative to its axis of oscillation so as to be held from operation.

9. The combination of a vacuum cleaner nozzle with an oscillating scooping comb carried thereby and having its teeth when in contact with the surface to be cleaned protruding into the space covered by said nozzle and lying between the axis of oscillation of said comb and a wall of said nozzle, means for oscillating said comb relatively to said nozzle, and means for bodily raising and lowering said comb.

BARRY N. BISHOP.