

Aug. 17, 1926.

1,596,446

J. P. NELSON

VACUUM CLEANER

Filed Jan. 25, 1923

2 Sheets-Sheet 1

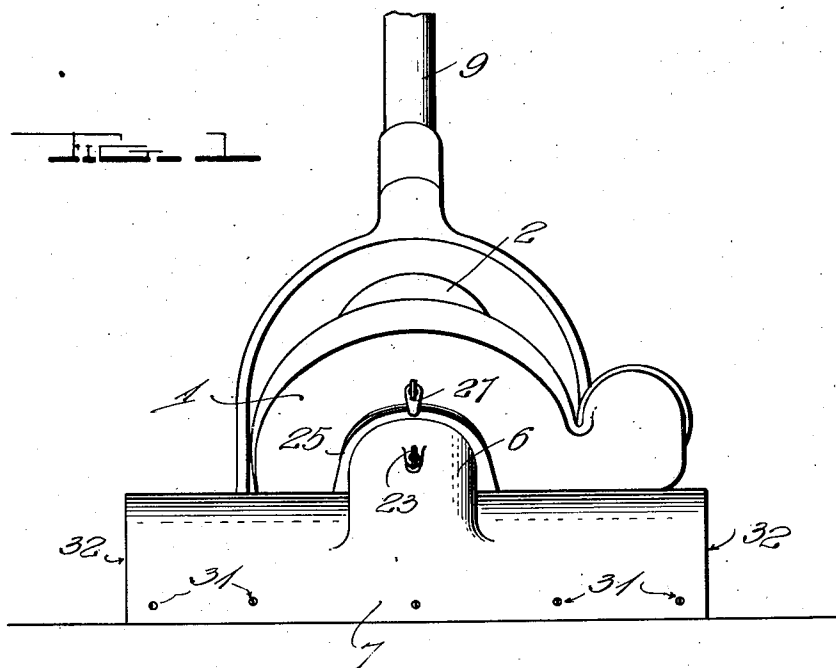
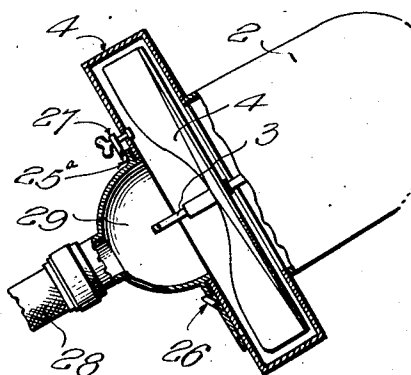
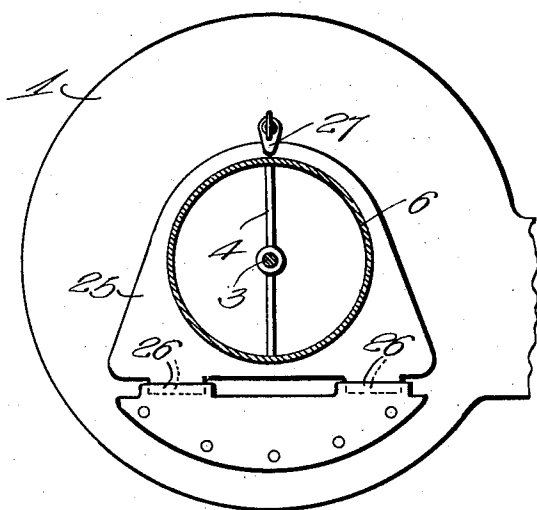


FIG. 1

FIG. 4



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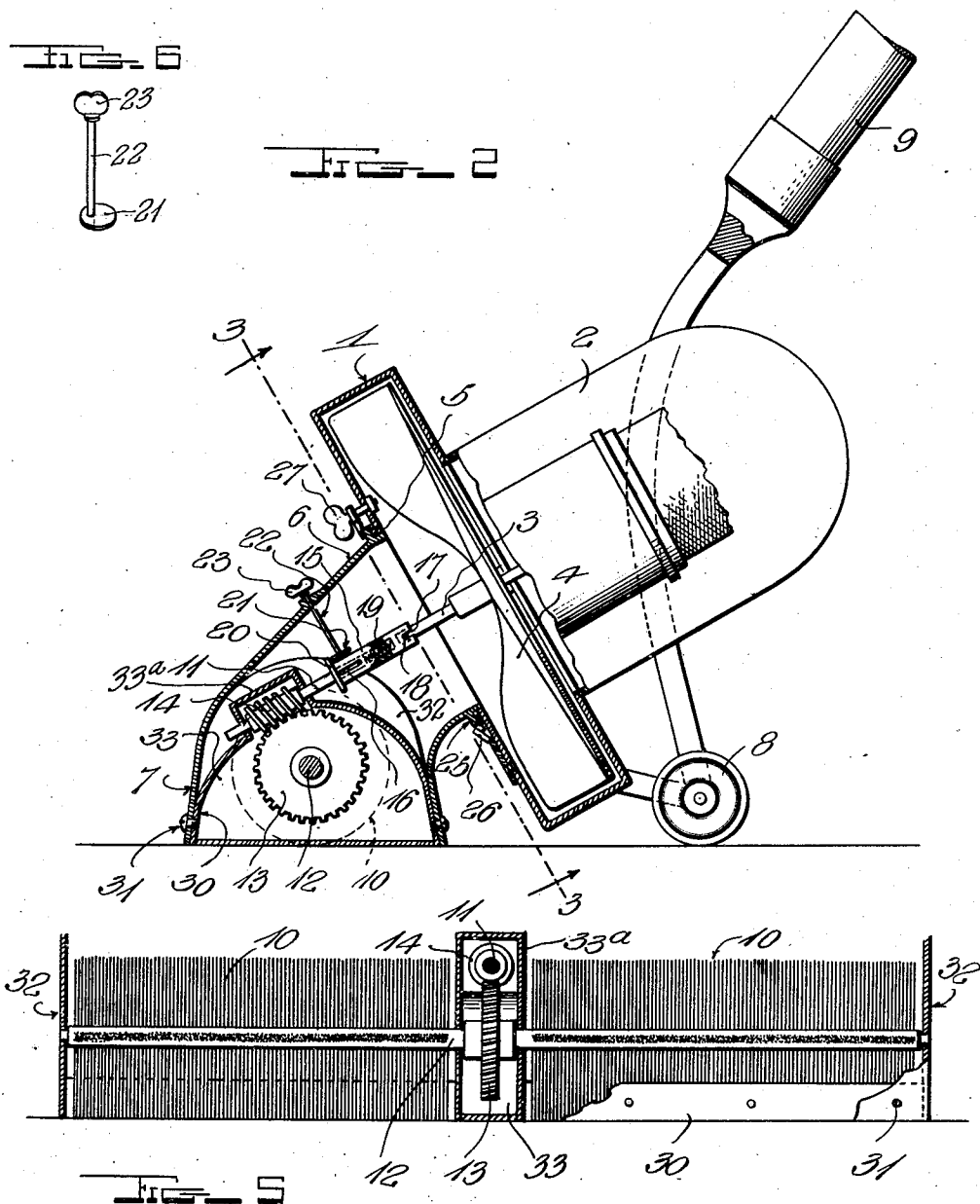
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2 Sheets-Sheet 2



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UNITED STATES PATENT OFFICE.

JOHN P. NELSON, OF JOHNSONBURG, PENNSYLVANIA.

VACUUM CLEANER.

Application filed January 25, 1923. Serial No. 614,862.

My invention relates to improvements in vacuum cleaners of the electrically driven type in which the suction nozzle is detachable from the fan housing or other suction housing, in order that a suction hose may be substituted for the nozzle, for cleaning draperies and the like.

One object of the invention is to provide a vacuum cleaner of the type set forth provided with driving means for a brush within the nozzle, which is formed of two separable units carried respectively by the nozzle and the suction housing, whereby this nozzle and the brush with a portion of the driving means for the latter, may be bodily removed when the suction hose is to be applied.

Another object of the invention is to provide quickly and easily operable means for detachably holding either the nozzle or the suction hose in place upon the suction housing.

A still further object is to provide means extending through the suction passage between the fan housing and the nozzle, for the purpose of driving the brush of said nozzle directly from the fan shaft, this arrangement being adapted for cleaners in which the nozzle is not removable, as well as those above referred to.

A further aim is to provide a unique carrying frame for the brush within the nozzle and certain gearing which is used for driving the same.

With the foregoing in view, the invention resides in the novel subject matter hereinafter described and claimed, the description being supplemented by the accompanying drawings.

Figure 1 is a front elevation of a vacuum cleaner constructed in accordance with my invention.

Figure 2 is a longitudinal sectional view partly in elevation.

Figure 3 is a vertical transverse sectional view as indicated by line 3—3 of Fig. 2.

Figure 4 is a detail sectional view partly in elevation, showing a suction hose substituted for the suction nozzle.

Figure 5 is a vertical sectional view partly in elevation, illustrating more clearly the construction of the carrying frame for the brush and its gearing.

Figure 6 is a detail perspective view of the cam and its shaft for retracting the sleeve which connects the fan shaft with the brush operating shaft.

In the drawings above briefly described, the numeral 1 designates a suction housing of substantially flat form with a circular side wall, this housing being connected to the front end of a suitable electric motor 2 whose shaft 3 extends axially into the housing and carries a suction fan 4. The front side of the housing 1 is formed with a suction inlet opening 5 with which the discharge passage or neck 6 of a floor engaging suction nozzle 7 communicates, when the cleaner is to be used for cleaning floor coverings, appropriate wheels 8 and handle 9 being provided in order that the device may be moved over the floor in the usual manner. When draperies or the like are to be cleaned, the entire nozzle 7 may be removed and the hose substituted therefor as will be hereinafter described.

An appropriate brush 10 is rotatably mounted in the suction nozzle 7 and is provided with an operating shaft 11 which may be operatively yet detachably connected with the fan shaft 3, whereby the rotation of the fan will simultaneously drive the brush. In the preferred form of my invention, the shaft 12 of the brush 10 is provided with a worm gear 13 meshing with a worm 14 on the shaft 11 to drive the brush at a relatively slow speed and the detachable connection between the two shafts 3 and 11, preferably consists of a sleeve 15 slidably carried by one shaft and projectable into engagement with the other shaft. In the present showing, the sleeve 15 is slidably carried by the shaft 11 and has a pin and slot driving connection 16 therewith, the free end of the sleeve being formed with notches 17 to engage a transverse pin 18 carried by the shaft 3. A coil spring 19 has been shown housed within the sleeve 15 for normally projecting the latter to hold it in operative engagement with the shaft 3 and its pin 18 and for the purpose of retracting the sleeve against the action of the spring, when the nozzle 7 is to be detached from the housing 1, I prefer to provide the sleeve with an outstanding flange 20 engaging a cam 21 on the inner end of a short shaft 22 which extends to the exterior of the neck 6, the outer end of this shaft being provided with a suitable knob or the like 23, whereby it may be turned by hand.

It will be seen from the above that by turning the knob 23, the sleeve 15 may be disengaged from the shaft 3, whereupon dis-

connection of the neck 6 from the housing 1 will permit the suction nozzle 7, the brush and gearing within this nozzle, and the driving connections 11—15, to be bodily removed from the housing 1.

For detachably connecting the neck 6 with the housing 1, I prefer to provide the rear end of said neck with a substantially triangular plate 25 to contact with the front side of the housing, the lower edge of said plate and said housing being provided with co-acting lips 26, while a suitable releasable fastener 27 engages the upper edge of the plate. When this fastener is released, the lips of the plate 25 may be disengaged from those of the housing to permit easy detachment of the nozzle.

In order that a hose, illustrated at 28 in Fig. 4, may be substituted for the nozzle, I provide the rear end of this hose with a bell or the like 29 having a plate 25^a which is identical with the plate 25, so that it may be readily engaged with the lips 26 of the housing 1 and with the fastener 27.

By reference more particularly to Figs. 2 and 5, one adequate means of mounting the brush in the nozzle, will be seen. In these views, I have illustrated an elongated frame 30 adapted for horizontal disposition in the lower portion of the nozzle 7, any desired means such as the screws 31, being employed to secure the frame in place. Upright plates 32 rise from the ends of the frame 30 and rotatably support the ends of the brush shaft 12, while the intermediate portion of said frame is provided with an upstanding housing 33 containing the worm gear 13 and having on its upper side a pocket forming extension 33^a containing the worm

14. Suitable provision (not shown) may be made for filling the housing 33 with grease for constantly lubricating the gearing, or for merely supplying oil to this gearing whenever desired.

By employing the construction shown, or a substantial equivalent thereof, it will be seen that a simple and inexpensive, yet a highly efficient and reliable cleaner has been provided. As excellent results may be obtained from the details disclosed, they may be followed if desired, but it is understood that the present disclosure is for illustrative purposes only and that within the scope of the invention as claimed, numerous changes may be made.

I claim:

A vacuum cleaner comprising a suction housing, a suction nozzle detachably connected with said housing, a driving shaft in said housing having a free end adjacent the suction passage between the housing and the nozzle, a brush in said nozzle having an operating shaft axially aligned with said driving shaft, a coupling sleeve surrounding the adjacent ends of said shafts and mounted on one of said shafts and having on one end an outstanding annular flange, a spring for projecting said sleeve into operative engagement with the other shaft, and a shaft rotatably mounted in said nozzle and extending to the exterior thereof to be manually turned, said manually turned shaft having a cam on its inner end engaging said flange to retract the sleeve against said spring.

In testimony whereof I have hereunto affixed my signature.

JOHN P. NELSON.