F. C. MASON.

VACUUM CLEANER.

APPLICATION FILED DEC. 6, 1915.

1,302,192.

Patented Apr. 29, 1919.

2 SHEETS—SHEET 1.

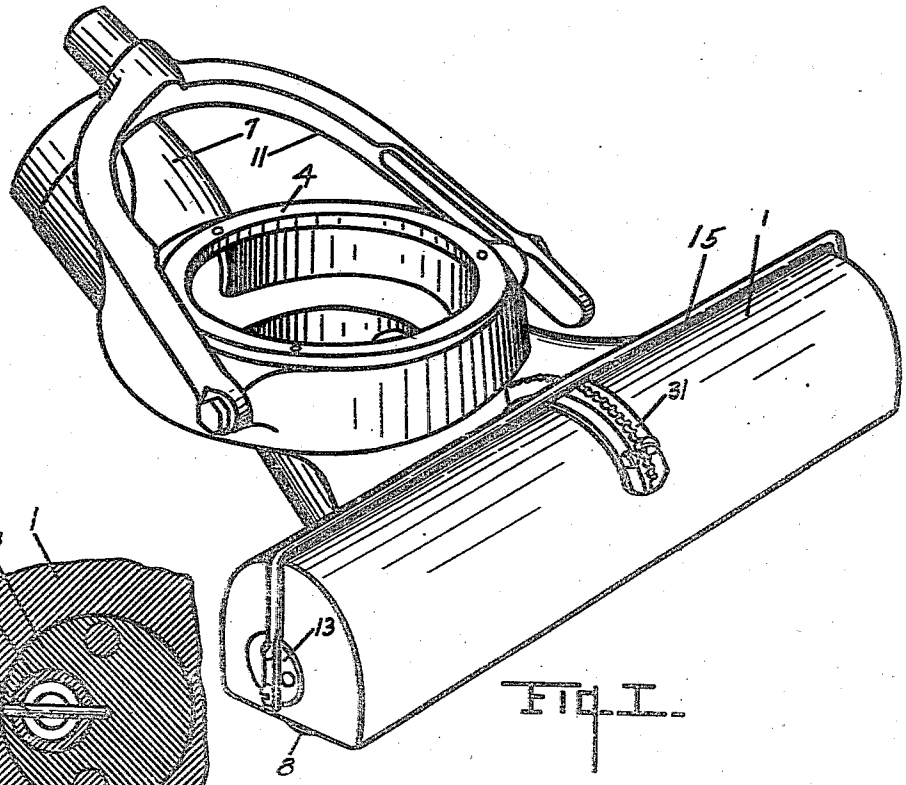

FIG. I.

FIG. VII.

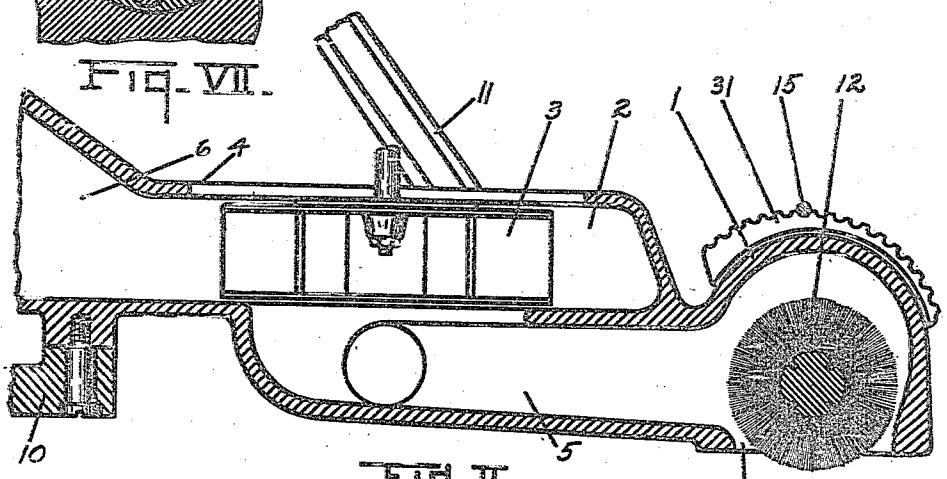

FIG. II.

WITNESSES:

Margaret Glasgow.

Martha J. Gregory

INVENTOR.

FRANCIS G. MASON.

BY Chappell & Earl

ATTORNEYS.

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2 SHEETS—SHEET 2.

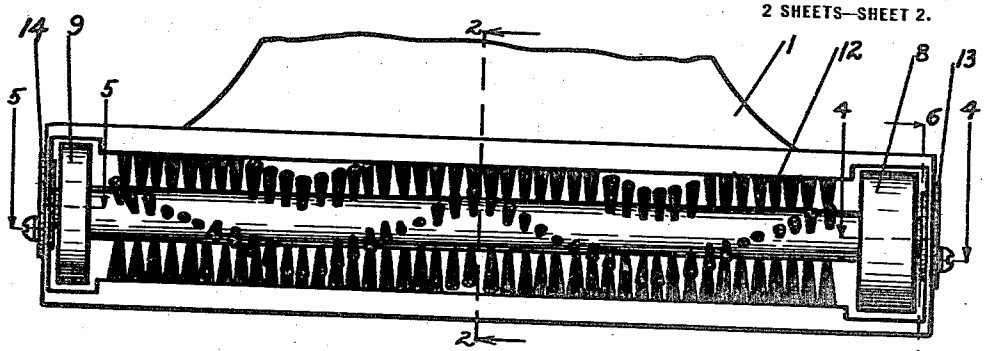

FIG. III.

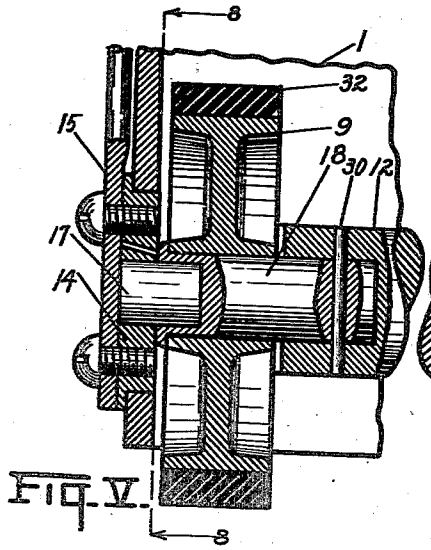

FIG. V.

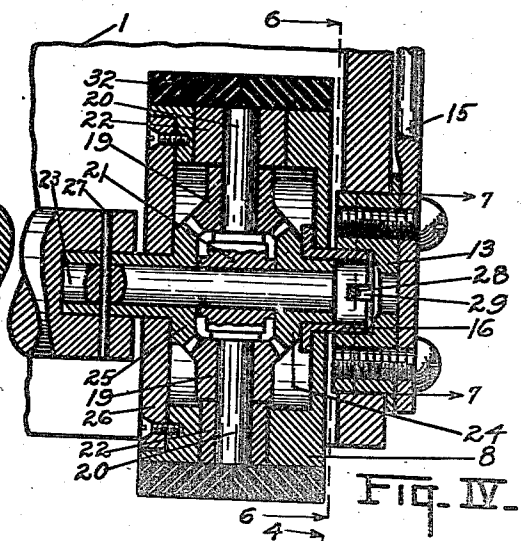

FIG. IV.

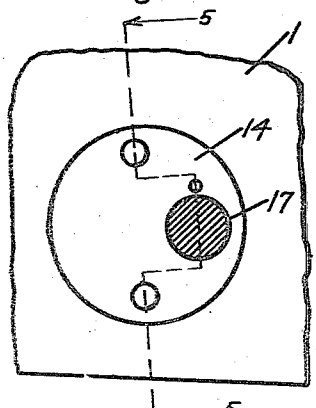

FIG. VIII

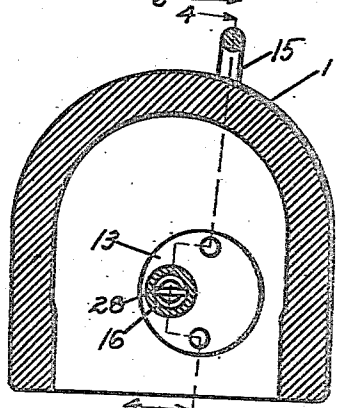

FIG. VI.

WITNESSES:

Margaret Glasgow.

Martha J. Gregory.

INVENTOR.

FRANCIS C. MASON.

BY Chappell & Earl

ATTORNEYS.

UNITED STATES PATENT OFFICE.

FRANCIS C. MASON, OF GRAND RAPIDS, MICHIGAN, ASSIGNOR TO BISSELL CARPET SWEEPER COMPANY, OF GRAND RAPIDS, MICHIGAN, A CORPORATION OF MICHIGAN.

VACUUM-CLEANER.

1,302,192. Specification of Letters Patent. Patented Apr. 29, 1919.

Application filed December 6, 1915. Serial No. 65,247.

To all whom it may concern:

Be it known that I, FRANCIS C. MASON, a citizen of the United States, residing at Grand Rapids, Michigan, have invented certain new and useful Improvements in Vacuum-Cleaners, of which the following is a specification.

This invention relates to an improved vacuum cleaner and particularly those which have a rotary brush in the nozzle thereof.

The main objects of this invention are:

First, to provide an electric or power driven vacuum cleaner within which the rotary brush is driven independently of the fan motor.

Second, to provide an electric vacuum cleaner where the brush is geared so as to turn faster than the brush driving floor wheels.

Third, to provide in an electric vacuum cleaner a variable setting means for the nozzle of the cleaner.

Further objects relating to details and economies of construction and operation will definitely appear from the detailed description to follow.

I accomplish the objects of my invention by the devices and means described in the following specification. The invention is clearly defined and pointed out in the claims.

A structure which is a preferred embodiment of my invention is clearly illustrated in the accompanying drawing, forming a part of this specification, in which:

Figure I is a perspective view of my improved vacuum cleaner with the fan and motor removed.

Fig. II is a transverse vertical section with the motor removed, taken on a line corresponding to the section line 2—2 of Fig. III.

Fig. III is an inverted plan view of the suction nozzle of my improved cleaner with the brush in place, the remainder of the machine being broken away.

Fig. IV is an enlarged detail vertical section showing the adjustment and driving mechanism of the rotary brush, taken on a line corresponding to the broken line 4—4 of Figs. III and VI.

Fig. V is an enlarged detail vertical section through the brush idler carrying wheel and nozzle adjusting means, taken on the broken line 5—5 of Figs. III and VIII.

Fig. VI is an enlarged detail vertical section through one end of the suction nozzle, showing the connection of the bearing retainer to the driving wheel and adjusting eccentric, taken on the line 6—6 of Figs. III and IV.

Fig. VII is an enlarged detail vertical section through the adjusting eccentric, showing how the stationary bevel gear is pinned, taken on a line corresponding to the section line 7—7 of Fig. IV.

Fig. VIII is an enlarged detail vertical section through one end of the suction nozzle, showing how the adjusting eccentric is set, taken on a line corresponding to the section line 8—8 of Fig. V.

In the drawing, similar reference characters refer to similar parts throughout the several views, and the sectional views are taken looking in the direction of the little arrows at the ends of the section lines.

Referring to the drawings, I consider the reference characters representing the parts themselves, in which the vacuum cleaner casing or housing consists of a nozzle 1, a fan chamber 2 in which revolves the suction fan 3 driven by a motor, not shown herein, but mounted on the wall 4 of said fan chamber.

The fan chamber 2 is connected to the nozzle 1 by the suction passage 5 and discharges through the discharge passage 6 formed by the discharge nozzle 7 which connects to a dust bag or other collector, not herein shown. On the side of the fan chamber walls is the handle bail 11.

The whole machine runs on the front driving wheel 8 and the front carrying wheel 9 situated in the nozzle 1 and a single rear trailing caster 10, partially shown in Fig. II. Between the two front wheels 8 and 9 and carried by them is the rotary brush 12. Both of the wheels 8 and 9 are carried in journal bearings in the adjusting eccentrics 13 and 14 respectively. These adjusting eccentrics are rotatably mounted in the end

walls of the nozzle 1 and are held in place by the bail shaped adjusting handle 15, said handle being screw fastened to the adjusting eccentrics, as shown.

Offset from the true center of the adjusting eccentric 13 is a bearing for carrying the bushing 16 upon which turns the main driving wheel 8. In the other adjusting eccentric 14 and offset from the center thereof and alined with the bushing 16 is a stud 17 on which turns the rotary brush bushing 18, the idler driving wheel 9 turning on said bushing.

The driving wheel 8 contains the mechanism for driving the rotary brush 12, the mechanism here used being a differential gearing. This movement comprises two intermediate bevel gears 19 rotatably mounted on the two end trunnion shafts 20 of the trunnion 21. The trunnion shafts are securely fastened in bushings 22, said bushings being rigidly held in the rim of the driving wheel 8. Through the trunnion 21 and turning therein is the rotary brush shaft 23. The outer end of the shaft 23 is loosely carried by the stationary bevel gear 24, said gear meshing with the intermediate bevel gears 19 and rigidly secured in the bushing 16 by a driving fit. On the other end of the rotary brush shaft is the rotary brush driving gear 25. This gear meshes with the intermediate bevel gears 19. The hub of said gear 25 passes through the driving wheel cover 26 and into the rotary brush 12 and is fastened thereto by the pin 27 securely connecting the gear 25 and the shaft 23 to said roll.

In the adjusting eccentric 13 the bushing 16 is prevented from rotation within said eccentric by pin 28 passing through the slot 29 in said bushing. The other end of the rotary brush 12 is securely fastened by pin 30 to bushing 18.

It is evident, therefore, that when driving wheel 8 revolves, gear 24 being held stationary, the intermediate gears will rotate, thus driving the rotary brush, the gears being dimensioned so that the rotary brush will rotate faster than the driving wheel. One of the intermediate gears may be dispensed with but is here used so as to make the mechanism more substantial and balanced.

On top of nozzle 1 is a curved notched setting plate 31 for the adjusting bail handle 15, the notches of which are adapted to engage the longitudinal portion of the said bail 15. From an inspection of Figs. I and VI it will be noted that the eccentrics 13 are mounted to the rear side of the vertical center line of the nozzle casing and that as a result when the bail 15 is tilted toward the rear of a nozzle casing it will move farther and farther away from the top of the said casing. This makes it necessary to increase the radius of the curve of the setting piece 31 on the back side of the nozzle casing in order that the bail 15 may engage therewith. Therefore, when adjusting eccentrics are turned to various positions by the bail 15, the nozzle will be adjusted to different heights above the article to be cleaned by the eccentrically set driving and carrying wheels, the suction slot 29 being wide enough to take care of the horizontal shifting of the brush in such adjustment. It will be noted that the brush never changes its position relative to the driving wheels. Both wheels have on their peripheries the friction treads 32.

By this particular arrangement and structure, the gearing is substantially self contained within the driving wheel, whereby the same may be effectively adjusted by the adjusting eccentrics, which permit the complete control of the relative position of the sweeper brush and the nozzle mouth so that the relative sweeper and suction effect can be completely regulated to meet any particular requirement.

With the train of gears that I have shown, a practical peripheral speed of the brush can be obtained without having the motor drive the same, which usually means too high a speed for the brush and its connecting mechanism, causing a greater wear and tear of the same and making the whole machine noisy.

I have shown my invention in the form preferred by me, but I desire to state that it is capable of considerable variation without departing from the features of my invention.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent is:

1. In a combined vacuum cleaner and carpet sweeper, the combination of a nozzle casing, a rotary carpet sweeper brush supported within the nozzle casing having eccentric adjusting means, floor wheels at the ends of said carpet sweeper brush, a gearing disposed within one of said wheels comprising beveled pinions carried by the outer shell thereof, a stationary beveled gear secured to the adjusting eccentric and meshing with the said pinions, and a driven beveled gear meshing with the said pinions at the opposite side and connected to drive the said brush, coacting substantially as described.

2. In a combined vacuum cleaner and carpet sweeper, the combination of a nozzle casing, suction creating means, a rotary carpet sweeper brush supported within the nozzle casing, floor wheels at the ends of said carpet sweeper brush, and a gearing disposed within one of said floor wheels comprising beveled pinions carried by the outer shell thereof, a stationary beveled gear

meshing with the said pinions, and a driven beveled gear meshing with the said pinions at the opposite side from said fixed beveled gear and connected to drive the said brush, as specified.

In witness whereof, I have hereunto set my hand and seal in the presence of two witnesses.

FRANCIS C. MASON. [L. S.]

Witnesses:

ANGELA J. LAFFERTY,

FRED LINDNER.