

March 22, 1927.

1,621,919

C. C. BAIN

VACUUM SWEEPER

Filed Aug. 3, 1925

2 Sheets-Sheet 1

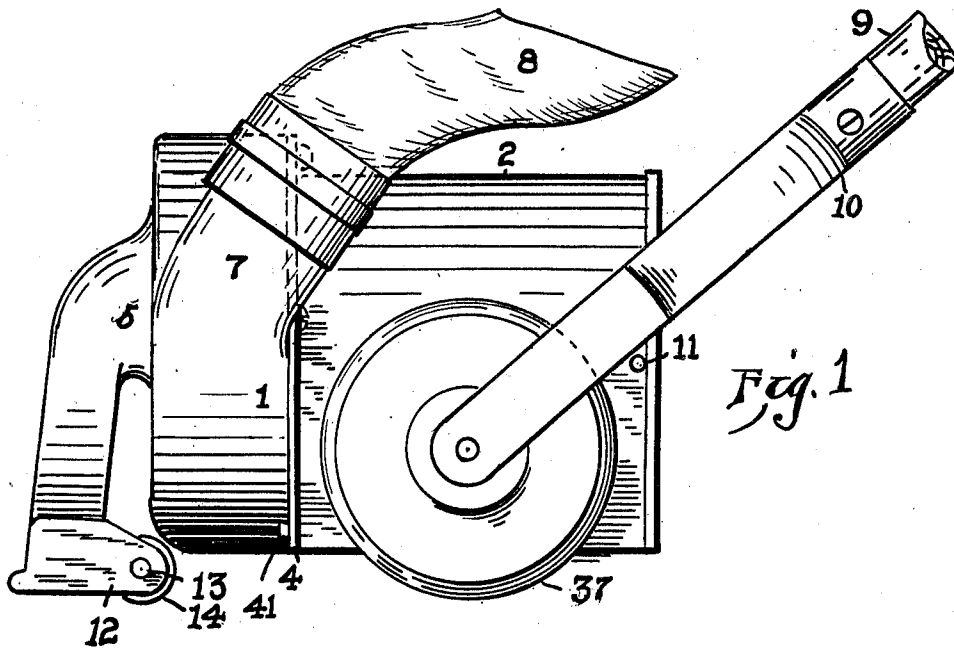


Fig. 1

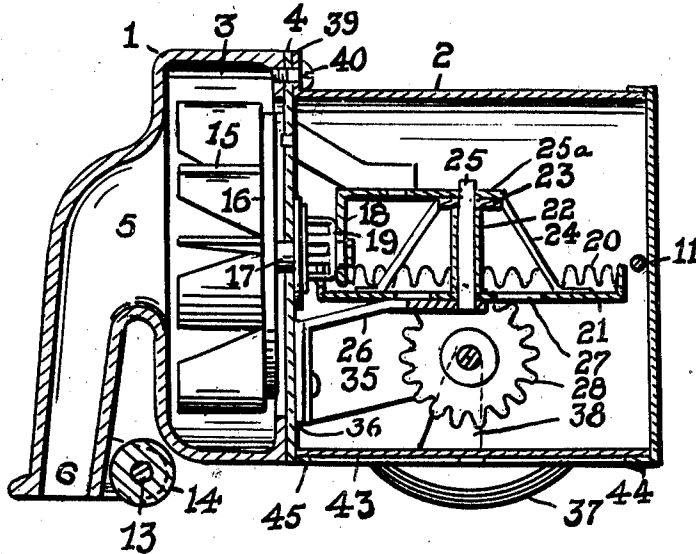


Fig. 2

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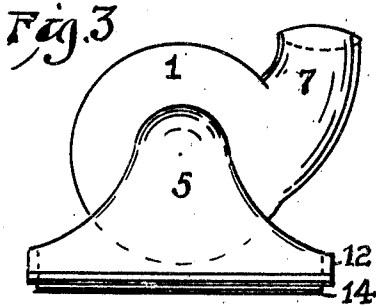
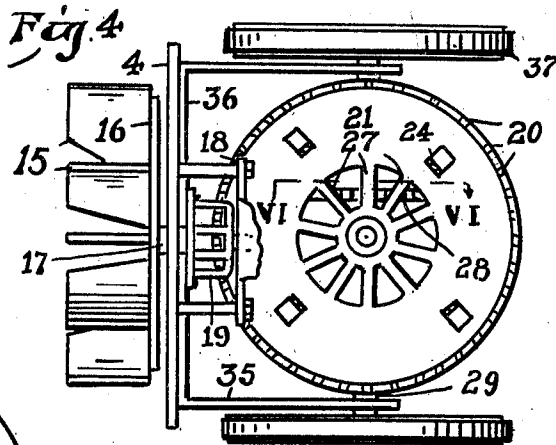
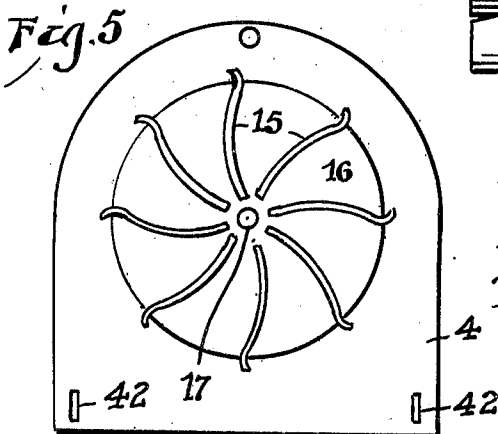
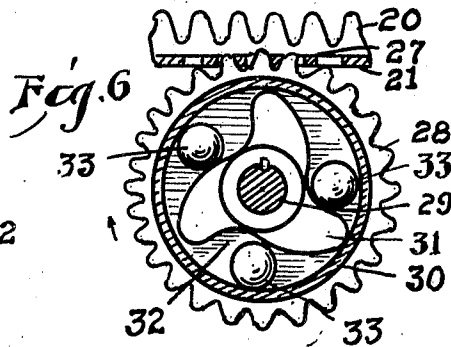
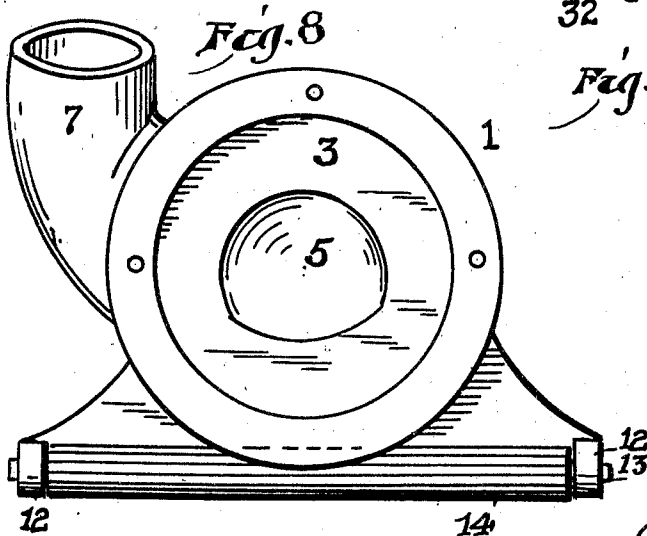
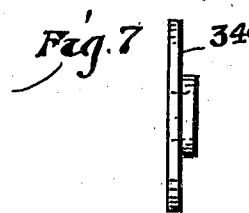
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C. C. BAIN

VACUUM SWEEPER

Filed Aug. 3, 1925

2 Sheets-Sheet 2



INVENTOR.
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UNITED STATES PATENT OFFICE.

CARL C. BAIN, OF PITTSBURGH, PENNSYLVANIA, ASSIGNOR TO WOLVERINE SUPPLY AND MANUFACTURING COMPANY, OF PITTSBURGH, PENNSYLVANIA, A CORPORATION OF PENNSYLVANIA.

VACUUM SWEEPER.

Application filed August 3, 1925. Serial No. 47,744.

The object which I have in view is the provision of a toy vacuum sweeper for children's use, which will operate to pick up dust and dirt and deposit the same in a dust bag, in simulation of a full sized vacuum sweeper.

For this purpose I have invented a vacuum sweeper provided with a slotted suction-opening which runs over the surface to be swept and which is connected by a throat to the intake of a rotary fan whose discharge is connected to a dust bag suspended from the handle of the sweeper. The fan is driven from the axle of the traction wheels of the sweeper, and the contractions are such that, when the sweeper is moved forwardly the fan is driven in the proper direction to produce suction at the slotted opening, and when the sweeper is moved rearwardly the fan continues to cause suction at suction opening. I have invented new and improved means for driving the fan from the axle.

Other novel features of construction and also of arrangement of parts will appear from the following description.

In the accompanying drawings which illustrate a practical embodiment of my invention Fig. 1 is a side elevation of the sweeper, the handle being broken off to save space; Fig. 2 is a vertical, longitudinal section of the sweeper; Fig. 3 is a front elevation on reduced scale of the fan chamber casting; Fig. 4 is a plan view of the operating parts with the fan chamber casting and the casing removed; Fig. 5 is a front elevation of the same; Fig. 6 is an enlarged detail in section along the line VI—VI in Fig. 4 showing a part of the driving mechanism; Fig. 7 is a side view of the closure disk, and Fig. 8 is a rear view of the fan chamber casting detached.

The following is a detailed description of the drawings.

The outer closure of the mechanism is comprised of a fan chamber casting 1 and a casing 2, which latter is preferably made of sheet metal. The casting 1 is provided with a circular fan chamber 3 which is disposed in a vertical plane and which is closed at the rear by a detachable plate 4.

5 is the throat of the fan chamber communicating with its central front, and extending downwardly and forwardly and having the laterally extended and slotted mouth or suction-slot 6 which is moved over the

surface to be swept. The throat 5 is preferably cast integral with the fan chamber. Leading off from the perimeter of the fan chamber 3 is the discharge neck 7 also integral with the casting 1 and extending upwardly and rearwardly. substantially as shown in Figs. 1, 3 and 8. The textile dust bag 8 has its open, lower end secured on the neck 7 and has its upper end suspended from the handle 9 in the manner usual with vacuum sweepers. The handle 9 has its lower end inserted into the neck of a yoke 10 whose legs have inturned ends which are mounted on the protruding ends of the main axle, so that the handle is pivotally attached to the sweeper on a horizontal axis. 11 represents a rod transversely mounted in the casing 2 at the rear of and above the main axle, yoke 10 being adapted to engage the protruding ends of said rod to limit the drop of the handle.

12 represents brackets extending rearwardly from either end of the suction-slot 6 and 13 is a shaft journaled in and extending between the same, and upon which is mounted the roller 14 which movably supports the suction slot at the proper elevation above the surface to be swept.

A rotary fan is mounted in the chamber 3. This fan may be of any suitable type. In its preferred form it is comprised of curved vanes 15 mounted on a back disk 16 which in turn is fixed on the front end of a shaft 17 which extends forwardly through a bearing-hole in the plate 4 axially of the fan chamber. The rear end of the shaft 17 is journaled in a bearing-hole in a bracket 18 mounted on and extending rearwardly from the plate 4. Between its bearings said shaft has rigidly mounted thereon a pinion 19 which is preferably of the basket or spider type shown, being struck-up into shape from sheet metal.

The spokes of the pinion 19 are engaged from below by the vertical teeth 20 arranged in annular series around the edge of the horizontal compound gear 21.

The gear 21 is provided with an axial upwardly extending sleeve hub 22 to whose upper end is attached the disk 23 from which outwardly and downwardly inclined legs 24 extend to and are attached to the gear 21. The extended or sleeve bearing insures the gear rotating truly on its axis. The ver-

tically disposed pivot shaft 25 upon which said gear rotates and which extends through the sleeve bearing of the gear is secured at its top to the horizontally disposed bracket 25^a extending rearwardly from the bracket 18 and at its bottom to a bracket 26.

Adjacent to its axis the gear 21 is cut away to form the radially disposed spokes 27, as shown in Fig. 4, with which the pinion 28 meshes from below. The pinion 28 is loose on the main axle 29, a clutch device being provided whereby when the sweeper is moved forwardly, said pinion is rotated in the proper direction to drive the fan in the direction necessary to apply suction at the slot 6, but when the sweeper is moved rearwardly the pinion 28 and, consequently, the fan continues to rotate by its inertia in the direction to cause suction at slot 6.

The clutch device which I prefer to employ for this purpose is of the following construction.

The pinion 28 is provided on one side with an annular concentric flange 30 within which is contained a cam-disk 31 fixed to the axle 29 and consequently revolving at all times therewith. The disk 31 has its edge cut away at a plurality of spaced apart points to form the cam recesses 32 in which are contained the balls or rollers 33, the recesses being so formed that when the axle is turning in the direction imparted thereto by the forward movement of the sweeper, the balls 33 become wedged between the disk 31 and the annular flange 30, thus causing the pinion 28 to rotate with the disk and axle, but when the axle is rotated in a reverse direction, as when the sweeper is moved rearwardly, the balls retreat to the deeper ends of the recesses, and the pinion 28 continues to revolve with the fan which runs from inertia. A closure disk 34 fits within the annular flange 30 and is keyed or otherwise secured to the axle 29 to hold the balls 33 in the recesses 32.

The axle 29 is journaled in the twin arms 35 integral with and extending rearwardly from a bracket 36 fixed at the rear face of the plate 4. The bracket 26 may be fixed to the rear face of the bracket 36.

37 represents rubber tired wheels which are fixed on the axle 29 and whose friction against the floor, as the sweeper is caused to travel, drives the axle 29 and the disk 31.

The casing 2, which, as stated is preferably formed of sheet metal, is provided with slots 38 in its side walls extending upwardly from the bottom to give clearance for the protruding ends of the main axle 29. At its front the casing is provided with an upwardly extending pierced ear 39 which fits against the plate 4 and through which one of the screws 40, which attach the plate to the fan casing, extends. At either side near the bottom the casing is provided with forwardly

wardly extending hooked ears 41 which engage slots 42 in the plate 4.

43 is the removable bottom which is supported in place by the bent in tongues 44 integral with the bottom of the rear wall of the casing 2 and similar, rearwardly extending tongues 45 integral with the bottom edge of the plate 4.

It is evident from the foregoing that as the sweeper is moved forwardly, the fan will be driven in proper direction to suck the dust and dirt up through the slot 6, the throat 5 into the fan chamber whence it will be driven through the neck 7 into the bag 8. However, when the sweeper is moved rearwardly, the fan and gears will continue to revolve in a direction to cause suction at slot 6.

It is evident that the fan and driving mechanism is a very simple and compact unitary structure which may be first assembled and then inclosed in the casting 1 and the casing 2.

My improved sweeper is quite inexpensive to manufacture, but at the same time it is substantial and durable, so as to withstand the rough usage to which toys are usually subjected. It is also an entirely operative device, and thus is especially attractive to children.

What I desire to claim is:—

1. In a vacuum sweeper, the combination of a substantially vertically disposed fan chamber provided with a suction inlet opening and a discharge opening, a fan in said chamber rotating on a substantially horizontal axis, a fan shaft extending rearwardly of the fan chamber, a pinion on said fan shaft, a gear wheel journaled on a substantially vertical axis at the rear of said fan chamber, said gear wheel being provided with an annular series of teeth arranged about the perimeter of the gear wheel and meshing with the pinion and said gear wheel being also provided with radially disposed spokes, an axle, traction wheels fixed on said axle, a second pinion loosely mounted on the axle and meshing with said spokes, and a one-way clutch interposed between the second pinion and the axle whereby when the sweeper moves forwardly the second pinion is caused to rotate.

2. In a vacuum sweeper, the combination of a substantially vertically disposed fan chamber provided with a suction inlet opening and a discharge opening, a fan in said chamber rotating on a substantially horizontal axis, a fan shaft extending rearwardly from the fan chamber, a pair of horizontally disposed brackets extending rearwardly from said fan chamber and spaced apart vertically, a gear wheel journaled on a vertical axis between said brackets, said gear wheel having inner and outer concentric series of teeth, a pinion on said fan shaft

meshing with teeth of one of said series, a driving axle, traction wheels fixed on the driving axle, a second pinion loosely mounted on the driving axle and meshing with teeth of the other series, and a clutch mechanism for locking the second pinion to the driving axle when the sweeper is moved forwardly.

3. In a vacuum sweeper, the combination of a substantially vertically disposed fan chamber having a suction inlet opening and a discharge opening, a fan in said chamber rotating on a substantially horizontal axis, a fan shaft extending rearwardly from said chamber, a pair of horizontally disposed brackets extending rearwardly from said fan chamber and spaced apart vertically, a

vertically disposed hub member rotatably mounted between said brackets, a gear concentrically disposed to and rigid with said hub member, said gear having inner and outer concentric series of teeth, a pinion mounted on the fan shaft meshing with teeth of one of said series, a driving axle, traction wheels fixed on the driving axle, a second pinion loosely mounted on the driving axle and meshing with teeth of the other series, and a clutch mechanism for locking the second pinion to the axle when the sweeper is moved forwardly.

Signed at Pittsburgh, Pa., this 28th day of July, 1925.

CARL C. BAIN.