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C. W. KELSEY.
PORTABLE VACUUM CLEANER.
APPLICATION FILED DEC. 14, 1908.

Patented Dec. 13, 1910.

2 SHEETS—SHEET 1.

FIG. I

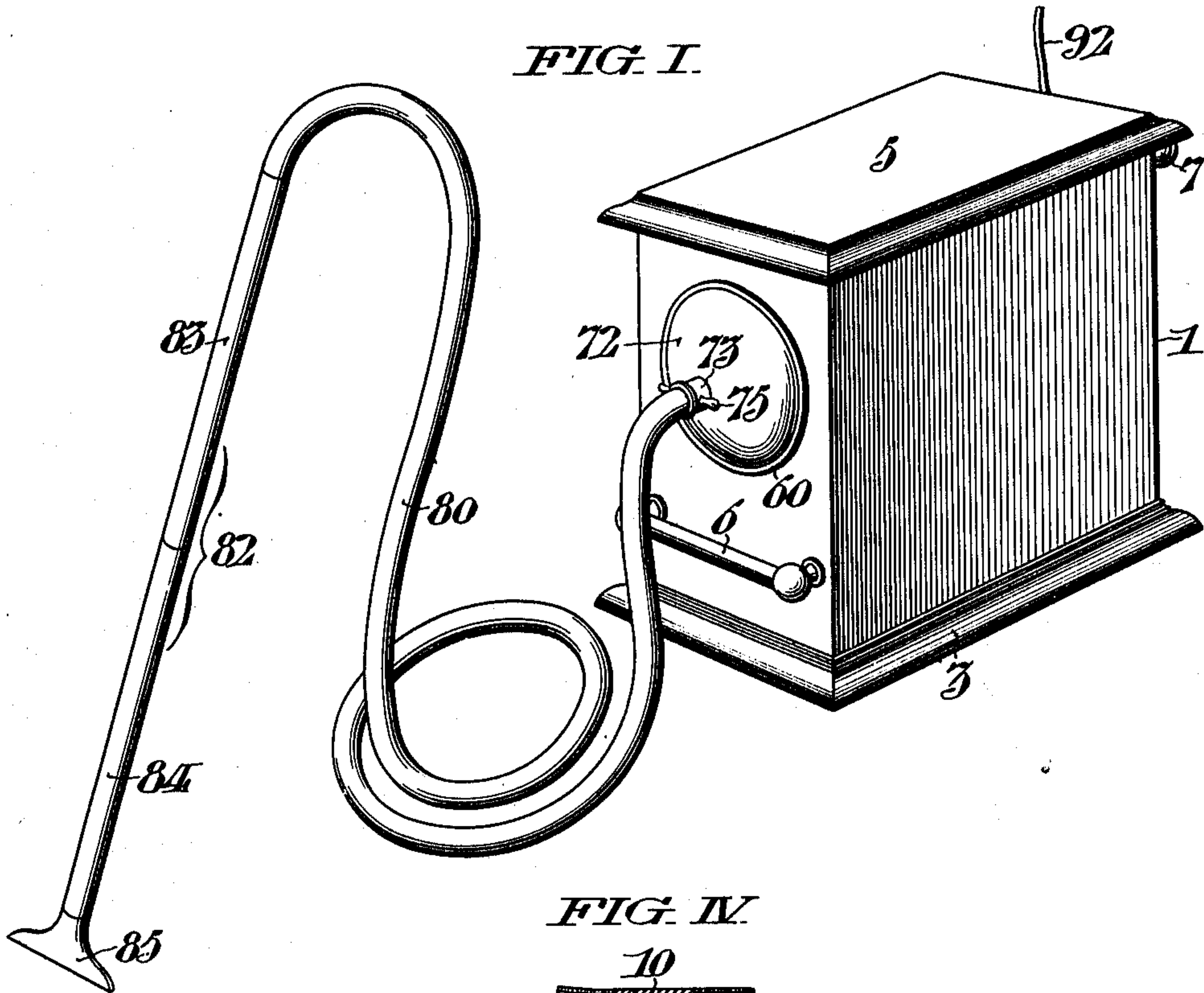
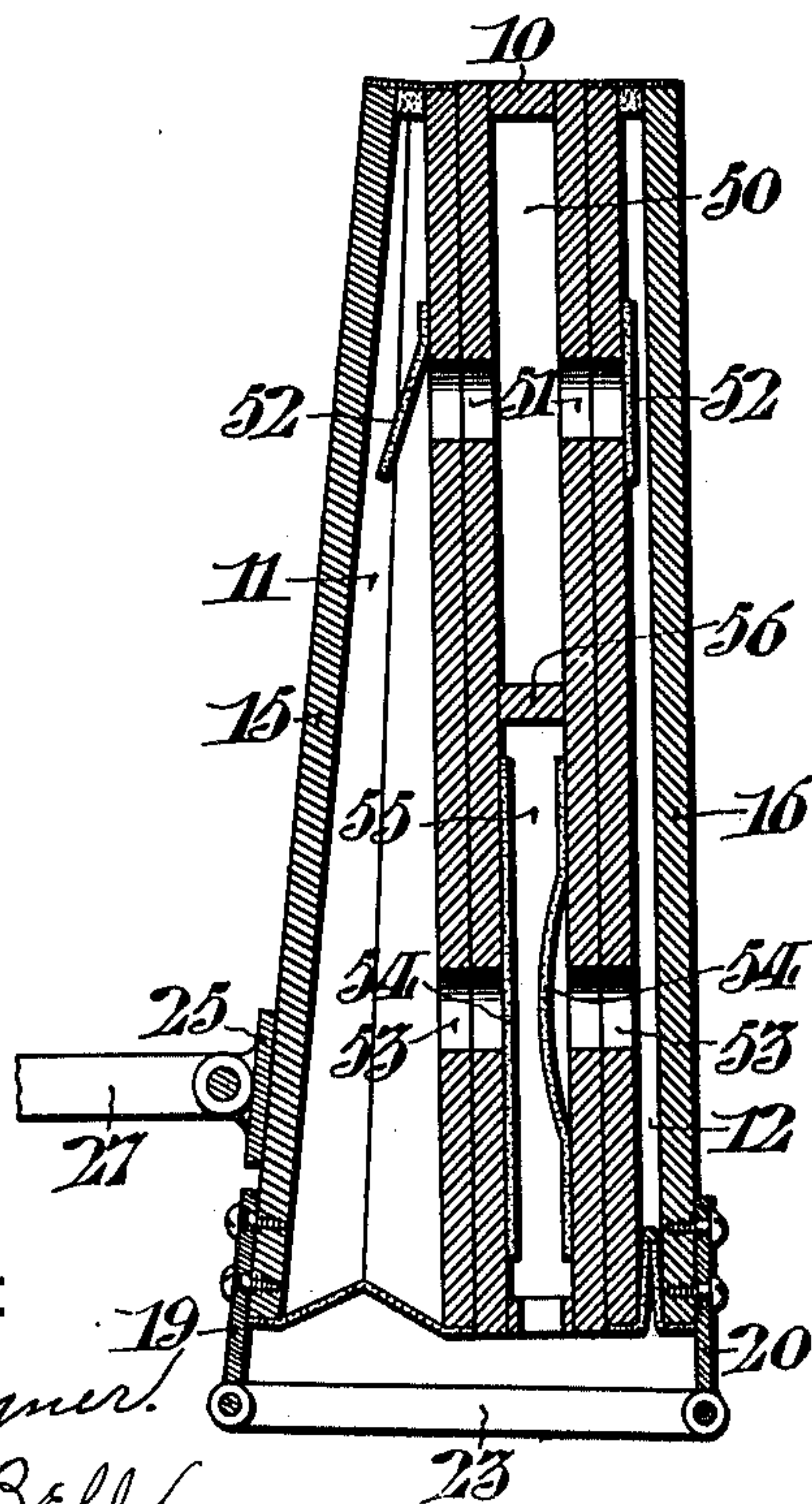


FIG. IV



WITNESSES:

John C. Berger
James H. Bell

INVENTOR:

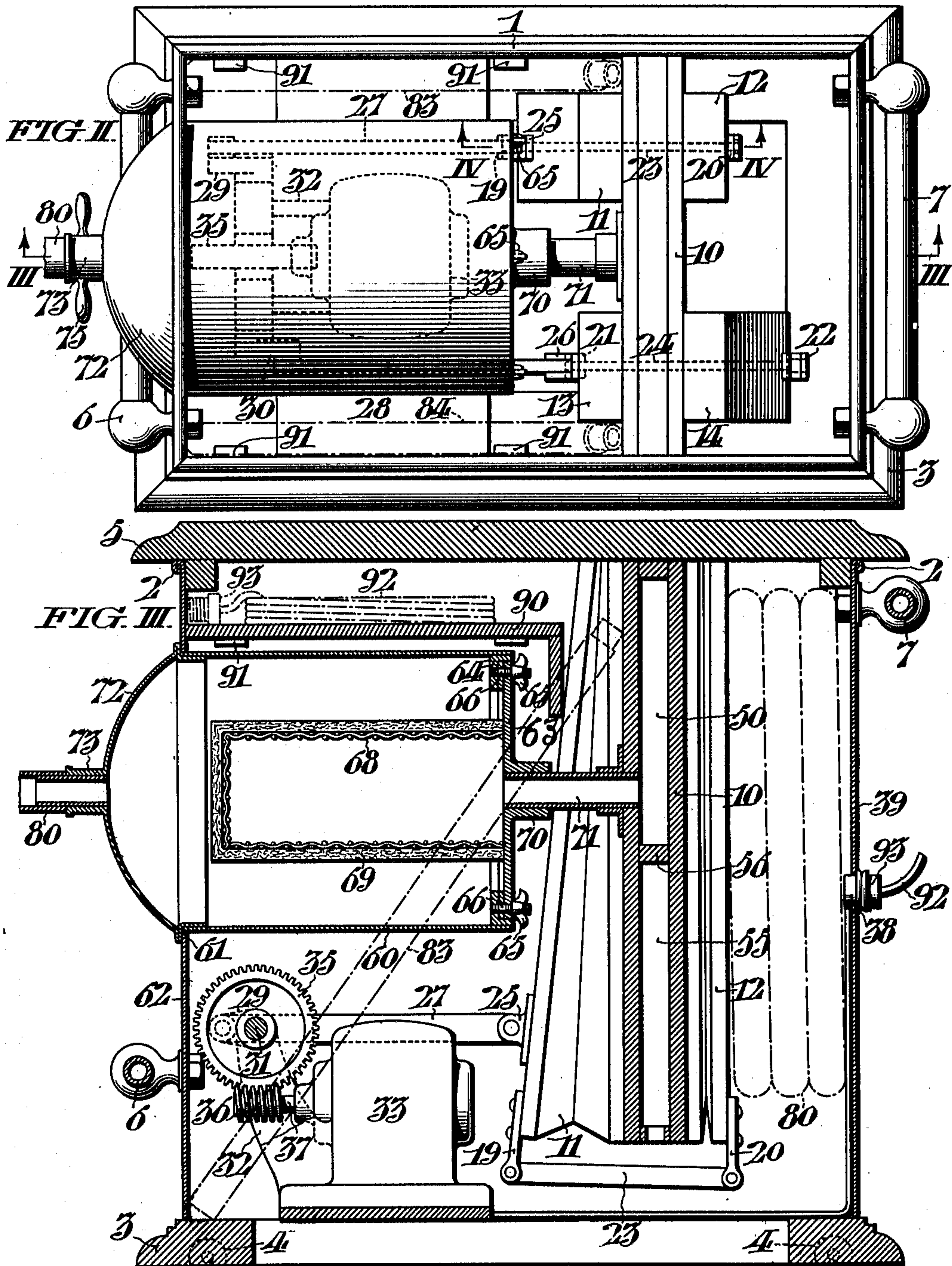
CADWALLADER W. KELSEY,
by his Attorneys
Wiley & Paul

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UNITED STATES PATENT OFFICE.

CADWALLADER W. KELSEY, OF PHILADELPHIA, PENNSYLVANIA.

PORTABLE VACUUM-CLEANER.

978,167.

Specification of Letters Patent.

Patented Dec. 13, 1910.

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To all whom it may concern:

Be it known that I, CADWALLADER W. KELSEY, of Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Portable Vacuum-Cleaners, whereof the following is a specification, reference being had to the accompanying drawings.

My invention relates to portable pneumatic cleaners, and particularly to those which are electrically actuated, the essential parts of such cleaners being the electric motor, the pneumatics and their actuating connections, in combination with a filtering apparatus, the exhaust side of which is connected by a tube fitted with a suction aperture suitable for cleaning purposes.

It is the object of my invention to provide a compact arrangement of the essential parts of a portable cleaner, wherein the vacuum-creating means, the device for operating the same and the filtering compartment, are all located within a single receptacle that may be readily moved from place to place.

An additional valuable function of my invention is found in the removable and rotatable filtering compartment which is capable of operating longer without the necessity of renewal of filtering medium, and of being more readily emptied than those heretofore constructed.

In the drawings, Figure I, is a perspective view in its assembled form, of a vacuum cleaner constructed according to my invention. Fig. II, is a plan view of the containing box with its cover removed. Fig. III, is a central longitudinal sectional view through the containing box taken on the line III, III, in Fig. II. Fig. IV, is a cross-sectional view through a pair of pumping bellows taken on the line IV, IV, in Fig. II.

The containing box 1, is preferably rectangular and made of sheet metal, with its upper edges beaded as indicated at 2. It is mounted upon a wooden frame 3, having rollers 4, by means of which the device may be readily moved about. It is provided with a cover 5, and also with gripping handles 6, and 7, at opposite ends to facilitate its being carried from place to place. The containing box is divided transversely (except for a short distance at the bottom), by paired partitions, the space 10, between

which is horizontally divided by shelf 56, so as to form a vacuum chamber 50, and an exhaust chamber 55, the partitions serving incidentally to brace the containing box, and to afford a support for two vertical pairs of co-acting exhaust bellows 11, 12, and 13, 14, respectively, the components of each pair being mounted upon opposite sides of the partitions, and all being hung at their upper ends.

The oscillating walls 15, and 17, of the bellows 11, and 13, are provided at their lower ends with depending pivot fingers 19, and 21, which are respectively coupled by means of links 23, and 24, to similar fingers 20, and 22, depending from the lower ends of the oscillating arms 16, and 18, of the bellows 12, and 14. By this method of construction and mounting the weight of the movable walls of the bellows of each pair counterbalance each other, so that they require for their actuation no more energy than that actually required for the creation of the suction they are designed to produce. The walls 15, and 17, of the bellows 11, and 13, are also provided with pivot blocks 25, and 26, which are respectively connected by means of links 27, and 28, with crank arms 29, and 30, on the shaft 31, which is supported in a bracket 32, extending from the base of an electric motor 33. The said cranks 29, and 30, are 180 degrees apart, and are located on opposite ends of the shaft 31, which also carries a worm wheel 35, driven by a worm 36, secured on the shaft 37, of the said motor 33, whose connections terminate in a socket 38, in the end wall 39, of the containing box 1. By this means, oscillation is imparted to the paired swinging walls of the exhausting bellows, so that the two pairs are oppositely operated thereby balancing the work of the shaft 31.

Each bellows communicates with the vacuum chamber 50, through circular apertures 51, piercing their fixed walls. These apertures are provided with flap valves 52, which are opened and closed according to the action of bellows containing them. The bellows also communicate by means of apertures 53, with the exhaust chamber 55, which is open to the atmosphere at its bottom. The apertures 53, are also provided with flap valves 54. By reason of the vertical portion of these chambers and the corresponding parallelism of the bellows, all of

these apertures are in the large fixed side walls of the bellows, allowing space for large overhung flaps.

By reference to Fig. IV, it will be seen that as the bellows are opened, the air is exhausted from the chamber 50, through the openings 51, and during this stroke, the valves 52, remain open and the valves 54, are closed, due to the suction created thereby. When the bellows are collapsed, the pressure set up in them closes the valves 52, and opens the valves 54, so that communication is established with the atmosphere through the ports 53, and chamber 55. By the above described action of the bellows, a constant vacuum is maintained within the chamber 50, of the chest 10.

A dust collecting cylinder 60, is rotatably received within an annular opening 61, in the front end 62, of the containing box 1. At its inner end, the said cylinder 60, is provided with a head 63, which is detachably secured to an internal flange 64, on the said cylinder 60, by means of the winged nuts 65, on the studs 66, which project from the said flange 64. The joint thus formed is rendered absolutely air tight by means of an interposed rubber gasket.

A filtering partition in the shape of a skeleton cylinder 68, preferably made of wire gauze, is carried by the head 63, co-axially within the cylinder 60, and is surrounded by a dust filtering medium or fabric 69, which retains any dust, and yet allows air to be sucked therethrough. The head 63, also carries a boss 70, which receives the end of the connecting tube 71, secured to the chest 10, and connecting it with the interior of the filtering cylinder.

The outer hemispherical end 72, of the cylinder 60, comprises a neck 73, having a gripping handle 75, by means of which, the said cylinder 60, may be rotated and removed, which is freely permitted, its connection with the tube 71, being only frictional. After removing the cylinder, the head 63, may be detached and the contents of the cylinder 60, disposed of.

A flexible connecting tube 80, is provided with metal tips, one of which is received in the neck 73, of the dust collecting cylinder 60, and the other in the end of a metallic tubular handle 82. The said handle 82, is made in two sections 83, and 84, and supports at its lower end a slotted suction cleaning implement 85, of any well known construction. The flexible tube 80, when not in use, may be coiled up and stored in the containing box 1, in the space between the chest 10, and its rear end wall 39, as shown in dotted lines in Fig. III. The tubular metallic handle 82, may also be disjointed and placed within the box 1, on each side of the dust cylinder 60, as shown in dotted lines in Figs. II, and III.

A shelf 90, is removably suspended on lugs 91, formed on the sides of the containing box 1, and is for the purpose of holding the lead wires 92, having socket ends 93, whereby connection is made between the socket 38, in the end wall 39, of the said box 1, and some source of electricity not shown.

The operation of my invention is as follows:—The apparatus is set up as shown in Fig. I, and when the motor 31, is set in operation, its motion imparted to the bellows 11, to 14, causes a vacuum to be constantly maintained within the chamber 50, of the chest 10. As the cleaning implement 85, is progressed over the carpet or other surface to be cleaned, a mixture of dust and air is sucked up through the handle 82, into the cylinder 60. The dust is then filtered from the air and retained within the said cylinder 60, by means of the filtering material 69, while the filtered air is drawn by the vacuum into the chamber 50, and constantly pumped out of the exhaust. When the cleaning has been finished the cylinder 60, may be withdrawn from the containing box 1, and after detaching its head 63, its contents can then be readily removed. During the operation the dust collecting cylinder may be rotated at intervals so as to bring all portions of the filtering cylinder 69, at times to the bottom where the larger part of the filtering action takes place, thus distributing the filtering work over the entire surface of said cylinder.

Where I speak in this specification of creating a vacuum, it will be understood that I am referring to the partial vacuum which is customarily used to create suction in vacuum cleaners.

Having thus described my invention, I claim:—

1. A vacuum cleaner comprising a receptacle having an opening in one of the outer walls thereof, a vacuum chamber, a dust collecting receptacle adapted to be inserted in said opening and to close the same, and means for connecting said dust collecting receptacle with the vacuum chamber.

2. A vacuum cleaning apparatus, comprising a receptacle having an opening in one wall thereof, a vacuum chamber, a tube extending into said vacuum chamber, a dust-collecting cylinder rotatably and removably secured in said opening and extending into said receptacle, said cylinder having a connecting boss detachably connected with said tube.

3. A vacuum cleaning apparatus comprising a rectangular receptacle, spaced walls forming a vacuum chamber, and located parallel with one of the walls of the receptacle, which wall has an opening therein, a dust collecting receptacle removably secured in said opening and closing the

5 same and extending into said rectangular receptacle, a tube carried by one of said spaced walls and connecting with said vacuum chamber, said dust collecting receptacle having a projecting boss detachably connected with said tube, and means for withdrawing the dust collecting receptacle from said rectangular receptacle.

In testimony whereof, I have hereunto signed my name, at Philadelphia, Pennsylv- 10
vania, this fifth day of December 1908.

CADWALLADER W. KELSEY.

Witnesses:

A. F. WILKINS,
JAS. P. ROOME.