

J. T. HOPE.
CLEANING AND DUST COLLECTING APPARATUS.
APPLICATION FILED APR. 9, 1906.

908,409.

Patented Dec. 29, 1908.
2 SHEETS—SHEET 1.

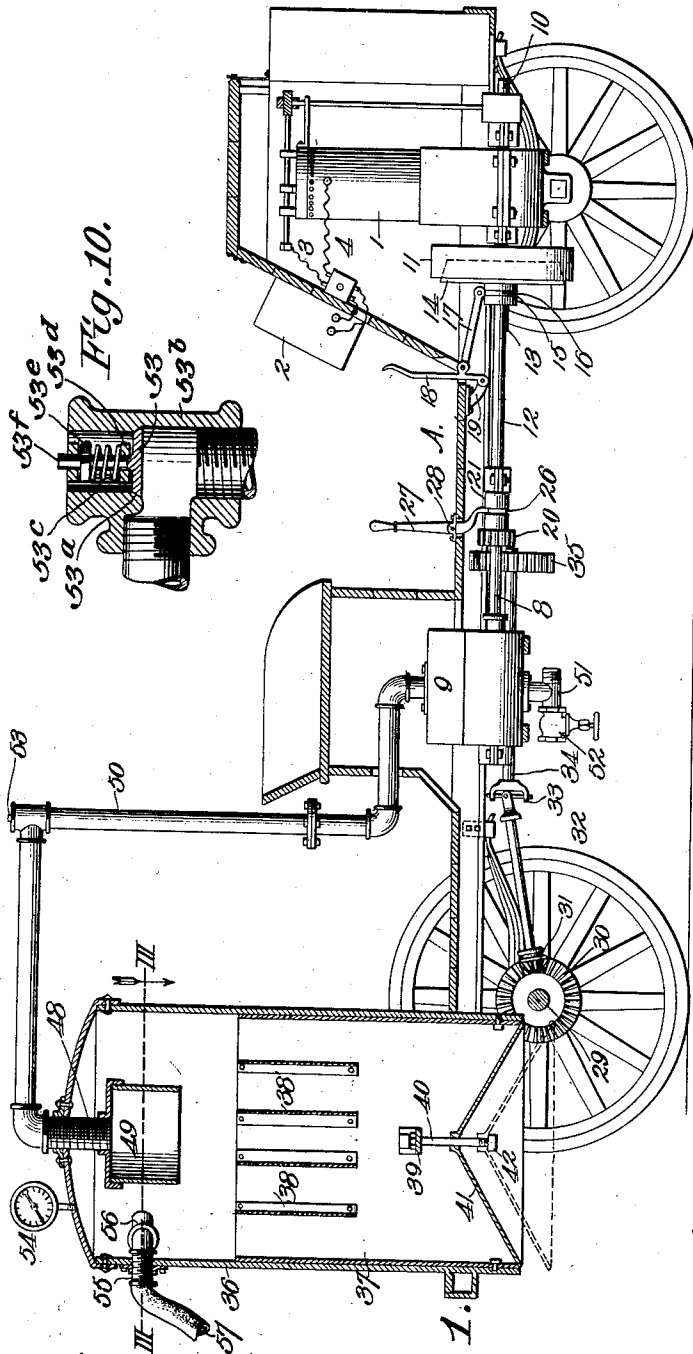


Fig. 1.

Witnesses
Frank R. Eilori.
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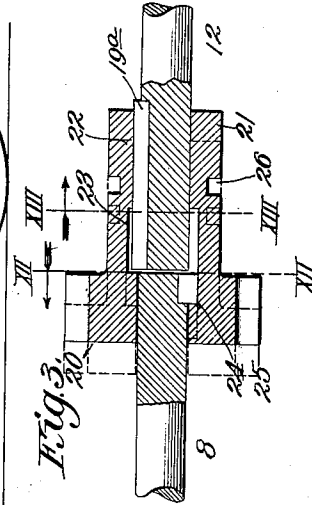


Fig. 2.

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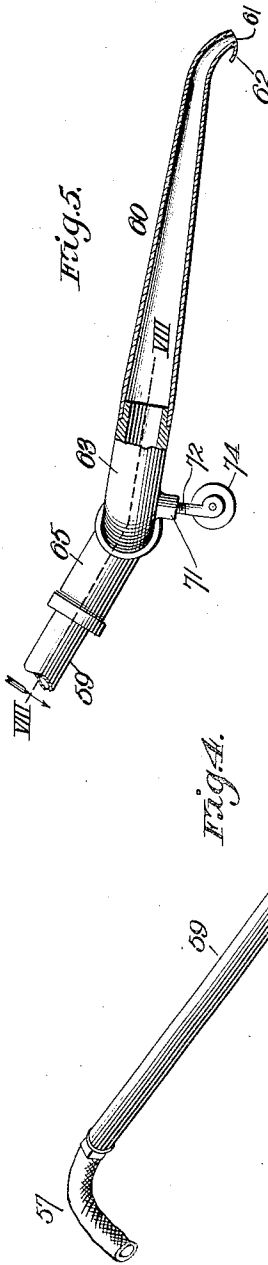


Fig. 5.

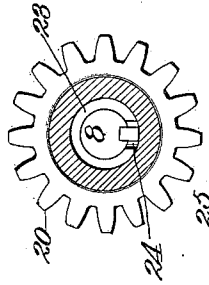


Fig. 8.

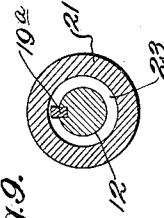


Fig. 6.

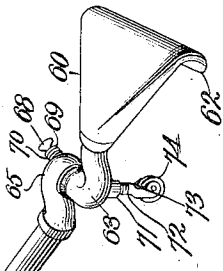


Fig. 7.

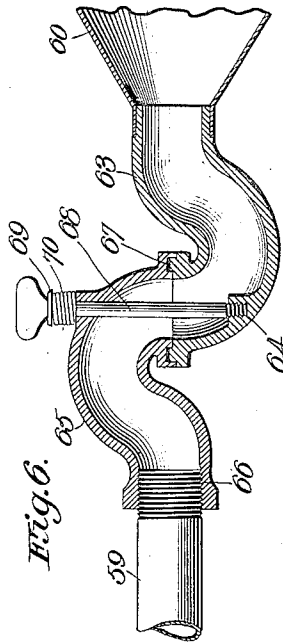


Fig. 6.

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UNITED STATES PATENT OFFICE.

JOHN T. HOPE, OF KANSAS CITY, MISSOURI.

CLEANING AND DUST-COLLECTING APPARATUS.

No. 908,409.

Specification of Letters Patent.

Patented Dec. 29, 1908.

Application filed April 9, 1906. Serial No. 310,843.

To all whom it may concern:

Be it known that I, JOHN T. HOPE, a citizen of the United States, residing at Kansas City, in the county of Jackson and State of Missouri, have invented certain new and useful Improvements in Cleaning and Dust-Collecting Apparatus, of which the following is a specification.

This invention relates to cleaning and dust collecting apparatus, and more especially to apparatus for cleaning carpets and upholstery by suctional action and collecting the dust extracted from the articles cleaned in a suitable receptacle, and my object is to produce apparatus of the character mentioned by which carpets, upholstery and other articles or things may be cleaned thoroughly without removing them from their proper positions or disturbing other articles of furniture, and without raising a dust or incommoding the occupants of the house—if household articles are being cleaned—by the opening of a number of windows or doors.

A further object is to produce means for effectively withdrawing the dust from the dust-laden air and collecting it in a receptacle from which it may be readily discharged when necessary.

A still further object it to produce a cleaning apparatus which operates efficiently and reliably and also involves the advantageous features of simplicity, strength, durability and cheapness of construction and operation.

With these and other objects in view as hereinafter appear, the invention consists in certain novel and peculiar features of construction and organization as hereinafter described and claimed; and in order that it may be fully understood reference is to be had to the accompanying drawings, in which—

Figure 1, is a central longitudinal section of a portable or wheeled apparatus embodying my invention. Fig. 2, is a horizontal section taken on the line III—III of Fig. 1. Fig. 3, represents an enlarged sectional view of the clutch for throwing the vehicle-propelling mechanism in gear when the cleaning apparatus is part of a portable plant. Fig. 4, is a perspective view of the receiver. Fig. 5, is an enlarged edge view, partly in vertical section, of the receiver. Fig. 6, is an enlarged section taken on the line VIII—

VIII of Fig. 5. Fig. 7, is a sectional view of a modified construction of the coupling between the receiver and the handle thereof. Fig. 8, is a section on the line XII—XII of Fig. 3. Fig. 9, is a section on the line XIII—XIII of Fig. 3. Fig. 10 is an enlarged sectional view showing a safety valve forming part of the apparatus.

Referring to the drawings in detail, 1 designates a motor of any suitable type, such for instance as an electric motor Fig. 1, or said motor may be a gas engine or other engine.

2 indicates a battery or other source of electric current supply connected by conductors 3 and 4 to the motor 1, any suitable switch, not shown, being employed for the purpose of throwing the motor in or out of circuit with the battery. The motor and battery are mounted on a wheeled vehicle A of the type of construction illustrated, or of any other suitable or preferred type, and the parts are so constructed and arranged that the power mechanism, as hereinafter explained, is alternately employed for propelling the vehicle and operating the shaft 8 of the blower 9, though it is to be understood in this connection that I do not confine myself to a portable apparatus wherein the vehicle is self-propelled.

The shaft 10, of the armature, not shown, is equipped with a friction wheel 11. 12 is a shaft suitably supported from the wheeled frame and provided at its front end with a key 13, and mounted on said shaft to slide thereon and upon the key which prevents it from rotating, is a friction wheel 14, having an annular groove 15, in its hub, engaged by a fork 16, connected by a link 17, to a foot lever 18, fulcrumed upon a bracket 19, carried by the wheeled frame, the forward movement of the lever forcing the wheel 14 into frictional engagement with wheel 11, to compel shaft 12 to turn, and the backward movement of said lever throwing said wheels out of gear. At its rear end shaft 12 is provided with a second key or spline 19^a.

20 is a gear pinion provided with a hub 21, fitting upon shaft 12, and provided with a longitudinal groove 22, engaging key or spline 19^a, the groove opening into an annular chamber 23. The pinion is journaled on the front end of the shaft 8 of the blower, and is provided with a radial groove 24 to engage at times the radial key 25 secured to the end of shaft 8, the mouth of groove 24

flaring so as to facilitate the reengagement of said groove with said key when it is desired to operate the blower.

26 is an annular groove in hub 21, engaged by the forked end of the lever 27, fulcrumed as at 28, upon the wheeled frame. By pushing the handle end of said lever forward pinion 20 is slid rearward until groove 24 is totally disengaged from key 25, the latter at this time occupying the chamber 23, of the hub of said pinion. As a result, assuming that the motor is in operation, the pinion will be driven without operating the blower. By restoring said lever to its original position as shown in Fig. 2, the original rigid relation between the pinion and shaft 8, is reestablished by effecting the reengagement of groove 24 and key 25, and it will be noticed that when the pinion is pressed forward through the action of said lever, the rotation of the pinion will effect the realinement and hence the reengagement of said groove and key. The rear wheels of the wheeled frame are rigidly mounted upon an axle 29, equipped with a rigid gear wheel 30, meshing with a pinion 31 on a shaft 32, adapted to be journaled in suitable bearings, not shown, the front end of said shaft having a universal joint connection as at 33, with the longitudinal shaft 34, also adapted to be journaled in suitable bearings, not shown. The front end of said shaft 34 is equipped with a gear wheel 35, with which pinion 20 engages when thrown from the position shown in full lines Figs. 1 and 3, to the position shown in dotted lines in the last-named figure.

Secured in any suitable manner to the wheeled frame rearward of the seat by preference, is a dust collector 36, containing a cylinder 37, provided with transverse baffle plates 38, at its upper end, and having a cross bar 39, from which depends centrally a bolt 40, upon which is slidingly mounted a conical bottom 41, for the cylinder 37, a nut 42 on the lower end of the bolt limiting the downward movement of the bottom, which, when the blower is in operation is held in its operative position as shown by full lines Fig. 2, by atmospheric pressure from below, and which when the blower operation ceases gravitates to the position shown in dotted lines, said figure, and thereby effects the discharge of the dust collected in the collector.

The valve 53 is held yieldingly seated against seat 53^a formed in the coupling 53^b by a spring 53^c, said spring bearing at its lower end against a cross bar 53^d of the coupling and at its upper end against nut 53^e on the stem, the stem extending through cross bar 53^d and also through a similar cross bar 53^f, these cross bars forming guides for the reciprocatory movement of the valve which is adapted to open in the event that

the suction on the valve becomes so great as to endanger the collector, the valve being instantly reseated by the spring when such suctional pressure falls below a predetermined point.

Depending centrally through the top of the collector is a pipe 48 terminating in an enlargement or mouth 49, and connected by pipeway 50, to the blower, the latter having a discharge pipe 51 at the opposite side provided with a valve 52. The pipeway 50 has a yieldingly seated valve 53 which acts as a safety valve to admit air to the pipeway in case the atmospheric pressure on the collector becomes so great that injury may result, the collector being equipped with a gage 54 to disclose the pressure to the operator.

55 indicates a pipe extending into the collector in about the horizontal plane of the mouth or enlargement of the pipeway, and provided with a curved nozzle 56, which by preference, parallels the wall of the collector, as shown in Fig. 2, for a purpose which is hereinafter explained, and coupled to the outer end of pipe 55 in any suitable manner, is a hose 57, as in Fig. 1. Coupled to the opposite end of said hose 57 is a tubular handle 59 of metal, by preference, and carried by said handle is a receiver 60, which is preferably of approximately fan-shape and has its mouth in the form of a long narrow slot 61, a lip or runner 62 being adapted to run upon the carpet or other surface to be cleaned so as to facilitate the movement of the receiver over the carpet and prevent the embedment of its mouth in the carpet or article so as to close said mouth to the entrance of air. Said runner furthermore supports the mouth of the receiver in such relation that the suctional action therein will not draw the article being cleaned up against the mouth and therefore close it to the passage of air. The receiver may be carried rigidly with relation to the handle but preferably will be so hinged or coupled to the handle that the latter may have vertical movement and thereby enable the operator holding the same to more effectively manipulate the receiver.

The preferred coupling for the handle and receiver consists of the substantially S-shape pipe section 63, fitted at its front end in the rear end of the receiver, and having a threaded internal socket 64, disposed parallel with the mouth of the receiver and centrally or axially of the rear end of said coupling section, and a similar shaped but reversed coupling section 65, having its rear end internally threaded as at 66, to screw upon the handle 59 and its front end fitting against and registering with the rear end of section 63, a gasket 67 making the joint air tight. The sections are held together

preferably by a transverse rod 68, extending through section 65, and screwed into socket 64, said rod being adapted to be turned by hand and having a collar 69, between which and section 65 is secured an expansive spring 70, said spring holding the sections tightly together and yet permitting them to operate pivotally when the operator applies sufficient force upon the lower end of the handle.

To support the receiver at the proper angle to the carpet to be cleaned, the section 63 is provided with a depending internally threaded boss 71, to be engaged by the threaded stem 72, having its lower end bifurcated as at 73, to receive a roller 74. By means of this roller the mouth of the receiver is retained at the proper angle to the surface over which it passes, the roller also reducing the friction to the minimum.

When carpets or upholstery are to be cleaned through the medium of a plant in a building therewith equipped, hose 57 is coupled to the nozzle of the pipe 55, and then the blower is thrown into gear with the motor. As a result suctional action takes place and creates a partial vacuum in the collector and consequently causes its bottom 41 to move upward and close the lower end of the collector. The operator in the room to be cleaned, then grasps the handle 59 and runs the receiver 60 over the carpet or upholstery and the dust and other dirt accumulated on and ground therein is sucked out and discharged into the collector in the horizontal plane of the pipe enlargement 49, and in a direction substantially parallel with and contiguous to the wall of the collector, so as to give the dust-laden air a centrifugal movement, such air as it whirls moving downward because the mouth or open end of the enlargement 29 is below the plane of the nozzle 56, the heavier portion of this miniature whirlwind continuing to gravitate downward within the sphere of the baffle-plates 38, which by interrupting such circulation create a dead air space through which the dust falls and accumulates upon the bottom. The lighter and purer air, as in practice has been demonstrated, because more susceptible to the suctional action from the blower, is not thrown, by the centrifugal force with which it is discharged into the collector, so far outward as the heavier or dust-laden air and therefore circulates closely around the enlargement 49 until it passes below the plane of the latter, whence it is immediately drawn upward and through pipes 48 and 50 to the blower and discharged by the latter through pipe 51 to atmosphere.

The action described continues until the article is thoroughly cleaned, and in this connection it should be noted as hereinbefore stated that the operation is per-

formed without raising the slightest dust in the room.

It will be understood that the machine may stand upon the street, the pipe 57 being sufficiently long to give access with the receiver to any part of the house, said pipe of course running through a doorway or window opening.

The valve 53 hereinbefore referred to, is not illustrated or described, because it is practically the same as a safety valve of a steam boiler, the only difference being that said valve will open to admit air into pipe 50, whereas the safety valve of the steam boiler opens to permit steam to escape and thereby avoid danger of explosion.

From the above description it will be apparent that I have produced a cleaning and dust collecting apparatus embodying the features of advantage enumerated as desirable in the statement of invention and which obviously is susceptible of modification in its form, proportion, detail construction and arrangement of the parts without departing from the principle of construction involved or sacrificing any of the advantages of the appended claims.

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

1. In a cleaning apparatus, a collector, comprising a vertical cylindrical casing, a pipe projecting into the upper portion of the same and having its mouth disposed downwardly, a pipe projecting into the casing above the plane of the mouth of the first-named pipe and arranged to discharge dust-laden air into said casing so that it shall circulate around the first-named pipe, a vertically movable bottom for the casing adapted to be held in its raised or closed position by atmospheric pressure and to move downward and open when such pressure is overcome, and means to limit the downward opening movement of said bottom.

2. In a cleaning apparatus, a collector, comprising a vertical cylindrical casing, a pipe projecting into the upper portion of the same and having its mouth disposed downwardly, a pipe projecting into the casing above the plane of the mouth of the first-named pipe and arranged to discharge dust-laden air into said casing so that it shall circulate around the first-named pipe, a vertically movable bottom for the casing adapted to be held in its raised or closed position by atmospheric pressure and to move downward and open when such pressure is overcome, means to limit the downward opening movement of said bottom, and transverse baffle-plates bridging the cylinder at a suitable distance above the bottom thereof and below the mouth of the first-named pipe.

3. In an apparatus of the character de-
scribed, a cylindrical casing, a pipe pro-
jecting into the upper portion of the same
and having its mouth disposed downwardly,
5 a pipe projecting into the casing above the
plane of the mouth of the first-named pipe
and arranged to discharge dust-laden air
into said casing so that it shall circulate
around the first-named pipe, a cross bar in
10 the cylinder, a bolt depending from said

cross bar, a conical bottom for the casing
slidably mounted on the bolt, and trans-
verse baffle-plates bridging the cylinder at a
suitable distance above said bottom.

In testimony whereof I affix my signature, 15
in the presence of two witnesses.

JOHN T. HOPE.

Witnesses:

H. C. RODGERS,

G. Y. THORPE.