

N<sup>o</sup> 17,433



A.D. 1901

Date of Application, 30th Aug., 1901

Complete Specification Left, 28th May, 1902—Accepted, 17th July, 1902

PROVISIONAL SPECIFICATION.

**"Improvements relating to the Extraction of Dust from Carpets and other Materials."**

I, HUBERT CECIL BOOTH, of 5 Langham Chambers, Portland Place, in the County of London, Civil Engineer, do hereby declare the nature of this invention to be as follows:—

This invention has reference to the extraction of dust and similar impurities  
5 from carpets, rugs, curtains, bedding, upholstered furniture, the surfaces of walls and the like and has for its chief object to effect such extraction by passing over the surface of the carpet or the like, suitably formed hollow implements whose interior is maintained at a lower pressure than the atmosphere, by the  
10 action of a suction pump connected therewith by a pipe or conduit which also serves to conduct the extracted impurities along with the air to an appropriate contrivance or contrivances for separating and collecting them from the air so that the latter reaches the pump in a cleanly condition.

According to my invention the suction pump is actuated by an oil, steam,  
15 electric or other motor, the motor and the pump being both mounted on a portable frame or carriage which is adapted to stand outside the building wherein the dust extracting operation is to be performed. The said pump is connected by flexible piping with the dust extracting implement or implements which are formed with an opening or openings at the part contiguous to the surface of  
20 the carpet or the like, for the dust and other impurities to enter the interior of the implement and pass away through the said flexible piping by the suction produced by the pump. At suitable intervals in the length of the piping I provide the aforesaid contrivances for collecting the extracted impurities, such contrivances being preferably located at points outside the room wherein the  
25 dust extracting operation is taking place.

One of the collecting contrivances may comprise a casing containing water  
or other liquid through which the current of air charged with the extracted  
impurities passes from the lower part of said casing into a space at the upper  
part thereof above the level of the liquid and in so doing becomes filtered or  
deprived of its impurities and reaches the pump in a cleansed condition. In order  
30 to split up the air into fine streams or bubbles as it passes through the liquid and so assist in removing the impurities therefrom, I may provide perforated or reticulated partitions or screens near the bottom of the said casing in the path of the air; and for the purpose of abstracting the moisture from said air prior to its return to the pump, I may provide within the space within the casing  
35 above the level of the liquid, suitably arranged baffle plates or similar devices against which the moist air will flow in a circuitous course on its way to the pipe leading to the pump. The said casing may be furnished with a gauge glass for indicating the level of the liquid therein and may also be furnished with inlet and outlet openings controlled by valves or cocks for enabling the  
40 dirty liquid to be discharged therefrom and clean liquid to be supplied thereto. This contrivance may be situated on the aforesaid portable frame or carriage.

In addition to this contrivance another collecting contrivance may be employed which may comprise a box or casing having near its lower part a

[Price 8d.]



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series of inclined or other suitably arranged baffle plates and a dome shaped or other suitably shaped partition which divides the box or casing into two compartments. This partition may consist of some such material as cotton wool or linen and canvas and have rigidity imparted to it by a facing or facings of perforated or reticulated metal. The said box or casing may be made in two parts capable of being hermetically but detachably secured together and the edges of the partition may be held between frames or rings, one of which may project beyond the sides of the box or casing and lie between external flanges formed on the aforesaid two parts and connected together in any suitable manner. This construction permits of the said partition being readily disconnected from the box or casing when the parts of the latter are separated. The said baffle plates direct the heavier portions of the impurities towards the bottom of the lower compartment of the box or casing and prevent them from being unduly disturbed by air currents or when the said box or casing is opened for removing the impurities collected therein. Above the said partition I may provide a pipe having branch passages therein for the air to flow through and reach the pipe leading to the other collecting contrivance. The inlet pipe leading the air from the dust extracting implement to the lower compartment of said box or casing may be prolonged upwardly to a point a short distance below the said partition and may be furnished with a deflecting cap for preventing the air striking directly against said partition and for causing it to be more equally distributed within the space below said partition. It will not always be found necessary to employ both of the aforesaid dust collecting contrivances, in some cases only one of them need be used.

The dust extracting implements may be made in a variety of forms in accordance with the kind of materials they are intended to operate on. For carpets I may make the implement with a hollow base portion having an opening in its surface that lies next to the carpet and such opening may be capable of adjustment so as to regulate its area in accordance with requirements. A handle may be hinged to the said base for facilitating its movement over the surface of the carpet and the pipe for the air may pass along said handle and may be furnished with a cock or valve provided with means for readily enabling the latter to be actuated for opening the same. This valve is preferably so arranged that it normally assumes a closed position.

In some cases the hollow base portion may be formed or provided with a chamber to which the air pipe is connected, said chamber having a transverse or dome shaped partition composed of porous or other appropriate material serving as a separator of the dust or other impurities withdrawn from the carpet. The said partition may be provided with a spring controlled or other stem extending to the exterior of the chamber for the purpose of enabling said partition to be shaken or vibrated to remove therefrom the dust or other impurities that may collect thereon or therein. The inlet from the hollow base portion to the said chamber may be prolonged some distance into the latter and may be furnished with a flap or clack valve at its upper end.

When the dust extracting implements are of small size the aforesaid hinged handle may be dispensed with and a hollow handle be substituted therefor, the air which is sucked through the implement then passing through the handle which may be provided with a suitable cock or valve for opening the passage therein, such cock or valve normally remaining closed. An additional handle may if desired be provided at the front part of the implement for facilitating its movement.

If desired the face of the dust extracting implement may be mounted on adjustable wheels or rollers and springs may be provided between the said wheels or rollers and the implement. The surface of the implement above the surface of the carpet or other material to be cleansed may be slightly concave.

I am aware that it has before been proposed to employ dust extracting implements for removing dust and similar impurities from carpets and the like by

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the action of compressed air but in such cases it has been necessary to provide a pipe for conveying the compressed air to the implements and another pipe or conduit for conveying the dust-laden air to the collector. It is an essential feature of my invention that I do not use compressed air and that the same pipe or conduit which is used for conveying the aspirated air from the dust extracting implement is also used for conducting away the dust with which such air is charged.

Dated this 30th day of August 1901.

HASELTINE, LAKE & Co.  
45 Southampton Buildings, London, W.C. Agents for the Applicant.

COMPLETE SPECIFICATION.

**"Improvements relating to the Extraction of Dust from Carpets and other Materials."**

I, HUBERT CECIL BOOTH, of 5 Langham Chambers, Portland Place, in the County of London, Civil Engineer, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

This invention has reference to the extraction of dust and similar impurities from carpets, rugs, curtains, bedding, upholstered furniture, flour sacks, tapestry and the like, and has for its chief object to effect such extraction by passing over the surface of the carpet or the like, suitably formed hollow implements whose interior is maintained at a pressure considerably lower than that of the atmosphere, by the action of a power driven suction pump connected therewith by a pipe or conduit which also serves to conduct the extracted impurities along with the air to an appropriate contrivance or contrivances for separating and collecting them from the air so that the latter reaches the pump in a cleanly condition so as not to interfere with the action of the pump.

According to my invention the suction pump is actuated by an oil, steam, electric, gas or other motor, the motor and the pump being both mounted on a frame, carriage, or base which is adapted to stand outside or inside the building wherein the dust extracting operation is to be performed. The said pump is connected by flexible piping with the dust extracting implement or implements which are formed with an opening or openings at the part contiguous to the surface of the carpet or the like, for the dust and other impurities to enter the interior of the implement and pass away through the said flexible piping by the suction produced by the pump. At suitable intervals in the length of the piping I provide between the implements and the pump, the aforesaid contrivances for collecting the extracted impurities, such contrivances being preferably located at points outside the room wherein the dust extracting operation is taking place.

The dust extracting implement has a hollow base portion provided with an opening in its surface which lies next the article to be cleaned, and the pipe or tube connecting the implement with the impurity collectors and the pump, may be provided with a cock or valve so arranged that it normally assumes a closed position and is capable of being readily and expeditiously opened when required.

In some cases the hollow base of the implement is provided with a chamber to which the air pipe is connected, said chamber having a transverse or dome shaped partition composed of porous or other appropriate material serving as a separator of the dust or other impurities withdrawn from the carpet or other article. The said partition is provided with a stem extending to the exterior of the chamber for the purpose of enabling said partition to be shaken to remove

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therefrom dust or other impurities. The inlet from the base portion to the said chamber may be prolonged and furnished with a flap or clack valve.

One of the impurity collectors may comprise a box or casing provided with a dome shaped porous partition. Beneath this partition is situated a deflecting cap upon which the impure air impinges, and a suitable outlet for the cleansed air is provided on the opposite side or above said partition. In the lower part of the collector there may be placed a series of inclined or other suitably arranged baffle plates for directing the heavier portions of the impurities toward the bottom of the box or casing.

Another impurity collector comprises a casing containing water or other liquid through which the current of impure air passes. Perforated or reticulated partitions or screens are arranged near the bottom of the casing in such manner as to split up the impure air into fine streams or bubbles as it passes through the liquid. Above the level of the liquid I provide suitable baffle plates to cause the air to flow in a circuitous course and be thereby dried before leaving the collector.

In order that my invention may be more clearly understood and readily carried into effect I will proceed to describe the same more fully in connection with the accompanying drawings in which:—

Figure 1 is a plan of the apparatus.

Figure 2 is a side elevation of an implement and its connections, partly in section.

Figure 3 is an under side view of the implement shown in Figure 2.

Figure 4 is a sectional side elevation of a modified form of implement.

Figure 5 is an under side view of the implement shown in Figure 4.

Figures 6 and 7 are a sectional side elevation and an under side view, respectively, of a further modification of the implement.

Figure 8 is a sectional elevation of the implement provided with a dust collecting chamber.

Figure 9 is an under side view of the implement shown in Figure 8.

Figures 10, 11 and 12 are vertical sectional views of the contrivances for collecting the impurities.

The same letters of reference indicate similar parts in the various figures.

In Figure 1, 1 is the hollow implement provided with a handle 2 and connected by flexible piping to a preliminary dust or impurity collector 3. The dust collector 3 is connected to a second dust collector 4 which communicates with the suction pump 5 actuated by the motor 6 driven by power from a generator or store 7; the dust collector 4, pump 5, motor 6 and generator 7 being carried by a suitable frame or base 8 mounted upon wheels.

In Figures 2 and 3, the implement 1 is provided with a base 9 having an orifice 10 which communicates with the hollow interior of the implement. The area of the orifice 10 can be adjusted by a plate 11 secured to the base 9 by screws 12 which pass through slots 13 in said plate. To adjust the area of the orifice 10, the screws 12 are loosened, the plate 11 then moved into the required position and the screws 12 tightened. The hollow interior of the implement 1 is connected to the dust collectors and the pump by flexible piping 14. 15 is a rotary valve which is rigidly connected to the handle 2 and is normally held closed by a spring rod 16 connected to the valve lever 17 by a pin and slot connection and retained in its closed position, as shown in the drawing, by a spring 18. To open the valve, the rod 16 is depressed against the resistance of the spring 18 by a hand lever 16<sup>a</sup>.

Referring to Figures 4 and 5 the hollow implement 1 is provided with a curved base 19 an orifice 20 and a handle 21. Between the flexible pipe 14 and the implement, is situated a tube 22 provided with a rotary valve 23. The lever 24 of the valve 23 is connected by a link 25 to one end of a spring 26 the other end of which is fixed to a lug carried by the tube 22. The spring tends to hold the valve 23 closed as shown in the drawing. When the implement is in

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use, the operator grasps the tube 22 and the spring 26, drawing the spring 26 toward the tube 22 into the position shown in dotted line in Figure 4 and thereby opening the valve 23 and putting the implement in communication with the dust collectors and suction pump.

5 Figures 6 and 7 show an implement having a base 27, a handle 2 and a flexible pipe 14 similar to those shown in Figures 2 and 3. The base 27 is, however, provided with a non-adjustable orifice 28.

The implement shown in Figures 8 and 9 comprises a hollow dome-shaped chamber 29 having a similar base to that shown in figures 2 and 3. The orifice 10 30 of this implement is prolonged and extends some distance within the chamber 29 and is provided with a flap-valve 31. Above the valve 31 is situated a transverse or dome-shaped partition or diaphragm of flexible resilient porous material 32 to filter the air drawn through the orifice 30 and valve 31 so that cleansed air leaves the chamber 29 by the pipe 14. A rod or stem 33 extends through the 15 top of the chamber 29. One end of the stem 33 rests upon or is connected to the partition 32 and the other end of said rod is provided with a suitable push piece 34 situated outside the chamber 29. A spring 35 tends to hold the stem 33 in the position shown in the drawing. By pressing upon the push piece 34 and thereby depressing the stem 33, the partition 32 is also depressed. When the 20 stem 33 is released, it is raised by the spring 35 and the partition 32 springs upwardly thereby shaking any dust or impurity collected on the under side of said partition, to the bottom of the chamber 29.

Referring to Figure 10, which is a vertical sectional view of the impurity collector 3, the said collector comprises a box or casing having two parts 25 36 and 37, provided with flanges bolted together and having a packing ring 38 between them; the two parts 36, 37 being thus hermetically but detachably secured together. There is also situated between the parts 36, 37, a dome-shaped partition 39 of cotton-wool, linen, canvas or similar material made rigid by being faced with perforated or reticulated metal. The partition 39 is held in 30 a groove 40 in the ring 38, so that the parts 36, 37 may be readily disconnected for removing the impurities from the part 37. The pipe 14 enters the part 37 and is prolonged upwardly to a point a short distance below the centre of the partition 39. 41 is a deflecting cap distributing the air drawn through the pipe 14, and preventing it striking directly against the partition 39. In the 35 lower portion of the part 37, are arranged a series of inclined baffle plates 42 which direct the heavier particles of impurities, drawn in through the pipe 14, toward the bottom of the part 37 and prevent said particles from being unduly disturbed by air currents or when the casing is opened for removing the impurities collected therein. Air is drawn from the part 36 through a pipe 42 to the dust collector 4.

40 Figure 11 is a modification of the impurity collector shown in Figure 10. A dome-shaped porous partition of calico 53, is supported by a coiled spring 54 within the casing 55. The pipe 14 enters the casing 55 below the partition 53, and is provided with a deflecting cap 41 as above described. The casing 55 is 45 provided, below the partition 53, with a hinged door 56 forming an outlet for impurities. The apparatus is provided with pressure gauges 57, 58. Strings 59 are connected to the top of the partition 53, whereby said partition may be drawn down against the resistance of the spring 54 when the door 56 is opened. Upon the release of said strings, the spring 54 will again raise the partition 53 50 thereby imparting to said partition a shock and shaking dust and impurities from it. Impure air enters the collector through the pipe 14, the impurities are collected by the partition 53 and the cleansed air leaves the casing by the pipe 42. The inlet and outlet pipes in this form of impurity collector are carried by a single casting so as to avoid disconnecting the apparatus from the 55 engine when it is required to open the collector for the removal of impurities or for repairs, or to replace the filtering medium.

The partition 39 in Figure 10 and also the partition 53 in Figure 11, is open

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at the bottom, so that the impurities tend to fall by gravity away from the filtering medium.

Referring to Figure 12, which is a vertical sectional view of the dust collector 4, the pipe 42 enters the bottom of the collector which is partially filled with water or cleansing liquid. 43 is a perforated baffle plate situated immediately above the mouth of the pipe 42, and 44 is a reticulated partition extending across the collector above the baffle plate 43. The baffle plate 43 and partition 44 split up the air drawn into the collector through the pipe 42, into fine bubbles or streams as it passes through the liquid and so assist in removing impurities therefrom. 45 is a gauge for indicating the level of the liquid in the collector, 46 is the liquid inlet, and 47 is an outlet for liquid and impurities. Within the space above the liquid in the collector 4, are arranged baffle plates 48, 49 and 50 which cause the cleansed air to flow in a circuitous course and be thereby dried before entering a pipe 51 through perforations 52 and being thence conducted to the pump 5.

The dust extracting implements shown in Figures 2, 3, 6, 7, 8 and 9 are more particularly adapted for the treatment of carpets and the like, while the implement shown in Figures 4 and 5 is more particularly adapted for the treatment of upholstery.

The operation of the apparatus is as follows:—The under side of the implement 1 is passed over the surface to be cleansed, the valve 15 or 23 controlling the pipe 14 being opened and the suction pump 5 at work, a current of air and impurities extracted thereby from the article being cleaned is drawn through the orifice of the implement and thence through the pipe 14, and the impurity collectors 3, 4 to the pump 5 from which practically pure air is discharged.

If required the valve 15 or 23 may be omitted.

I find that it is essential to practical success to drive the pump, as above stated, by power, and to maintain a vacuum of at least 5 lbs. per square inch in the filter on the side of the filtering medium where the air and dust enter, when the apparatus is at work, and therefore it is only to extractors working with a considerable vacuum that my claims relate.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim in apparatus for extracting dust from carpets and other materials is:—

1. The combination of an extracting implement connected with a power driven suction pump, and dust collecting means interposed between the said implement and pump, substantially as and for the purpose specified.

2. In apparatus of the type claimed in the first claim a valve controlling the communication between the extracting implement and the impurity collectors and suction pump, said valve being so arranged that it normally assumes a closed position, substantially as described for the purpose specified.

3. In apparatus such as is claimed in the first claim a hollow extracting implement having a transverse vibratory porous diaphragm, an inlet orifice closed by a valve on one side of said diaphragm, and an outlet suction pipe on the other side of said diaphragm, substantially as described, for the purpose specified.

4. In apparatus such as is claimed in the first claim an impurity collector provided with a dome-shaped porous partition having beneath it a deflecting cap upon which the impure air is discharged, and having an outlet for cleansed air above said partition, substantially as described for the purpose specified.

5. In apparatus such as is claimed in the first claim an impurity collector containing liquid, in which are arranged perforated reticulated partitions for distributing the impure air, and having baffle plates arranged above the level of said liquid to cause the air to flow in a circuitous course before leaving the collector, substantially as described for the purpose specified.

6. An impurity extracting implement constructed arranged and adapted to operate substantially as described with reference to Figures 2 and 3, or to

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Figures 4 and 5, or to Figures 6 and 7, or to Figures 8 and 9 of the accompanying drawings for the purpose specified.

7. An impurity collecting implement constructed, arranged and adapted to operate substantially as described with reference to Figure 10 or to Figure 11  
5 or to Figure 12 of the accompanying drawings for the purpose specified.

8. Apparatus having its members constructed and arranged to co-operate substantially as described with reference to the accompanying drawings for the purpose specified.

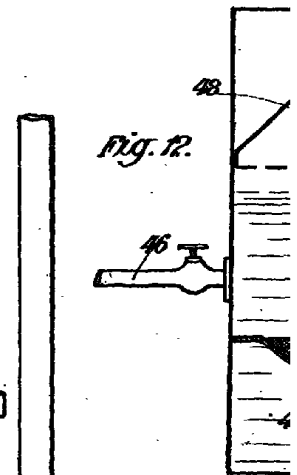
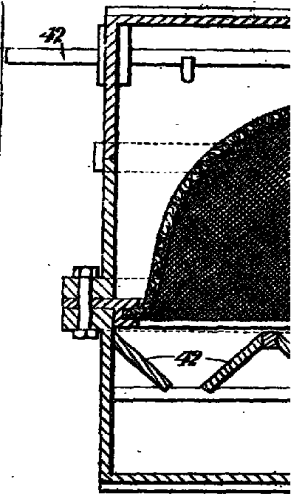
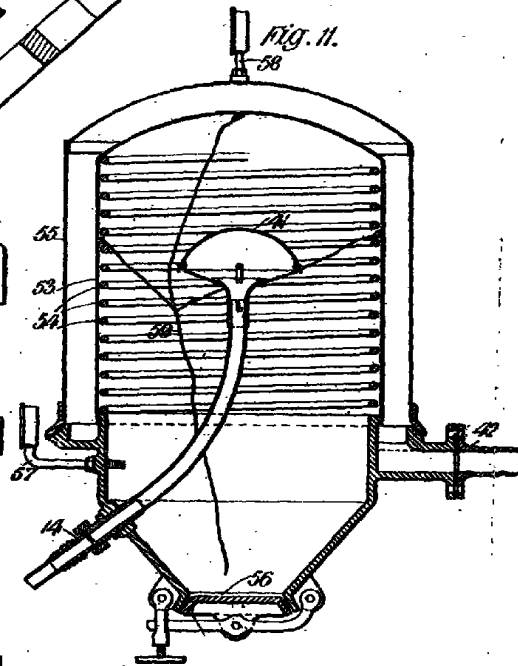
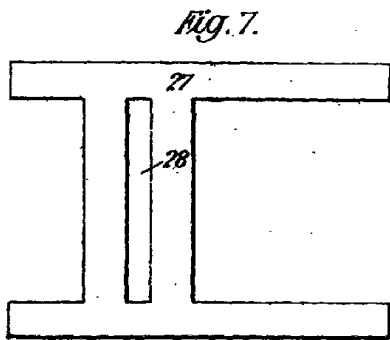
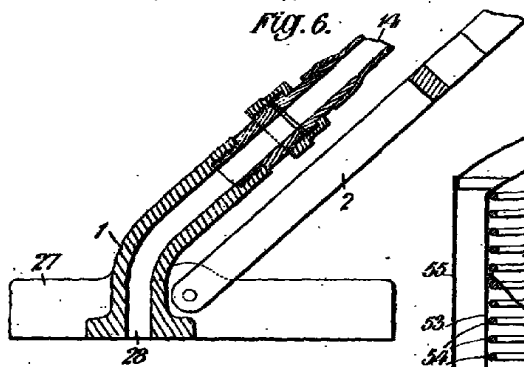
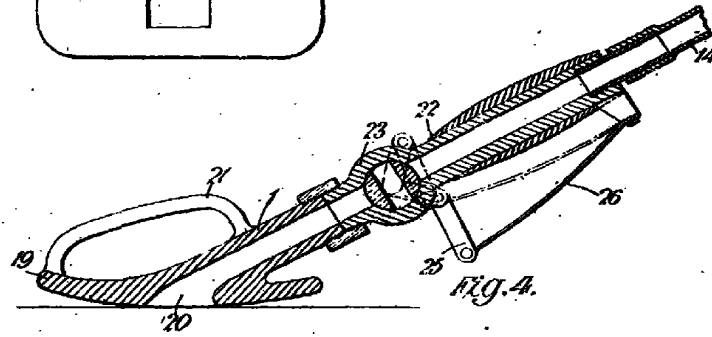
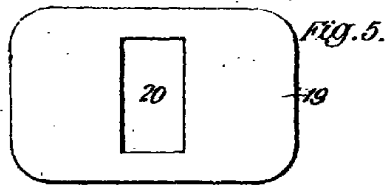
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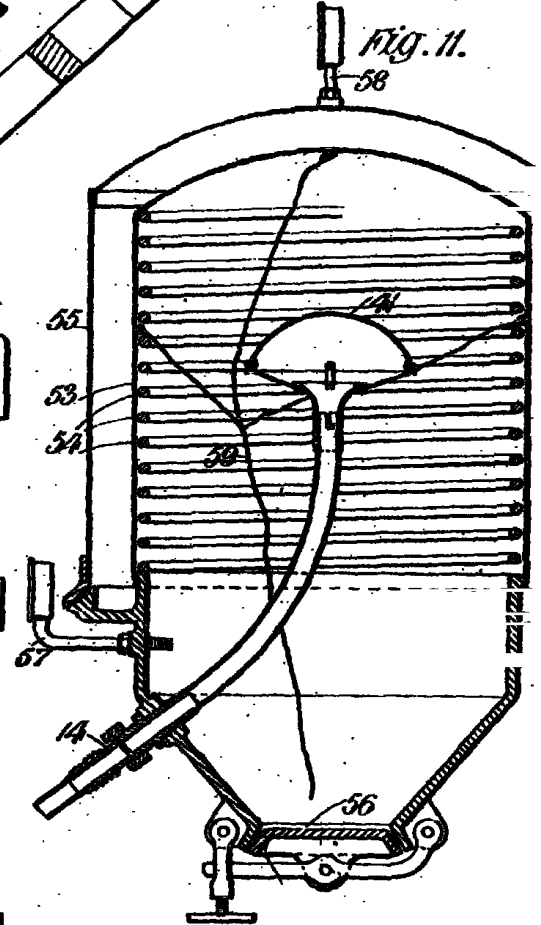
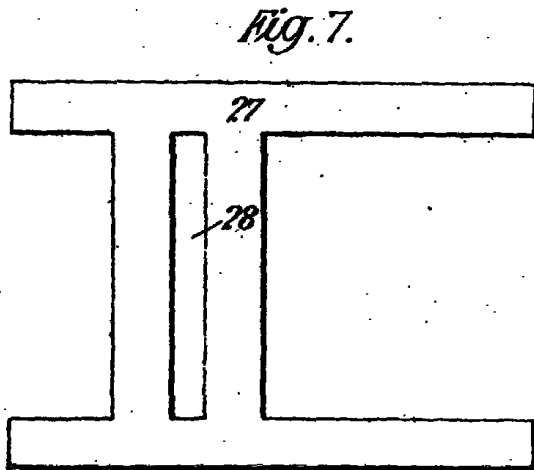
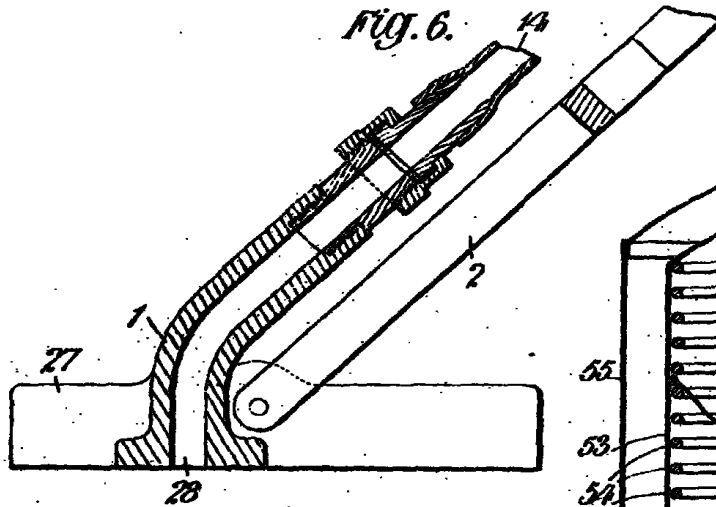
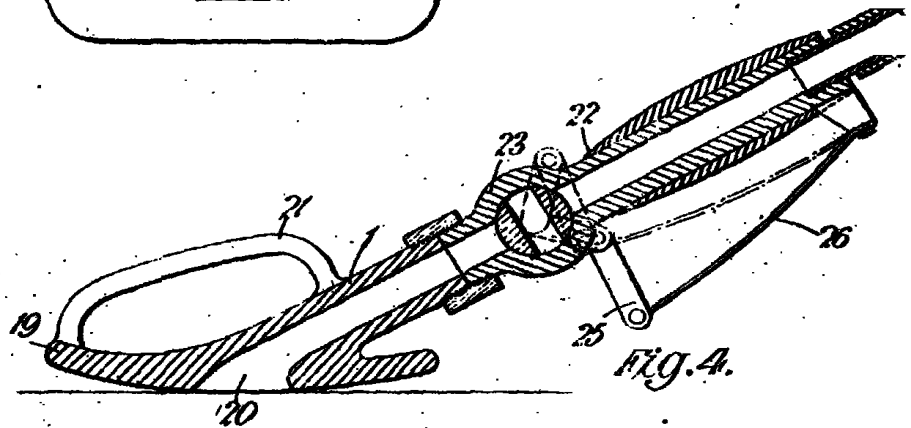
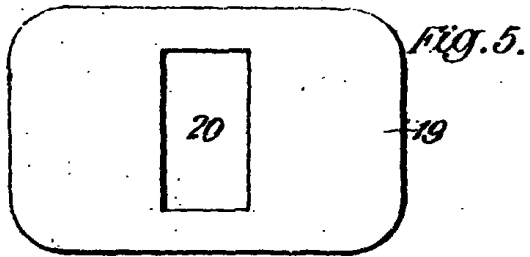
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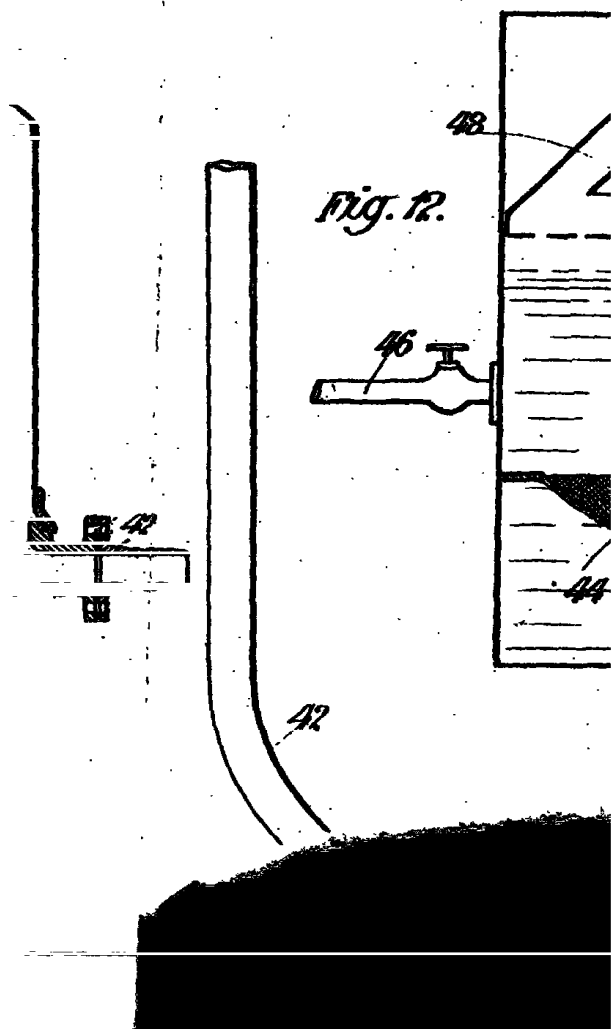
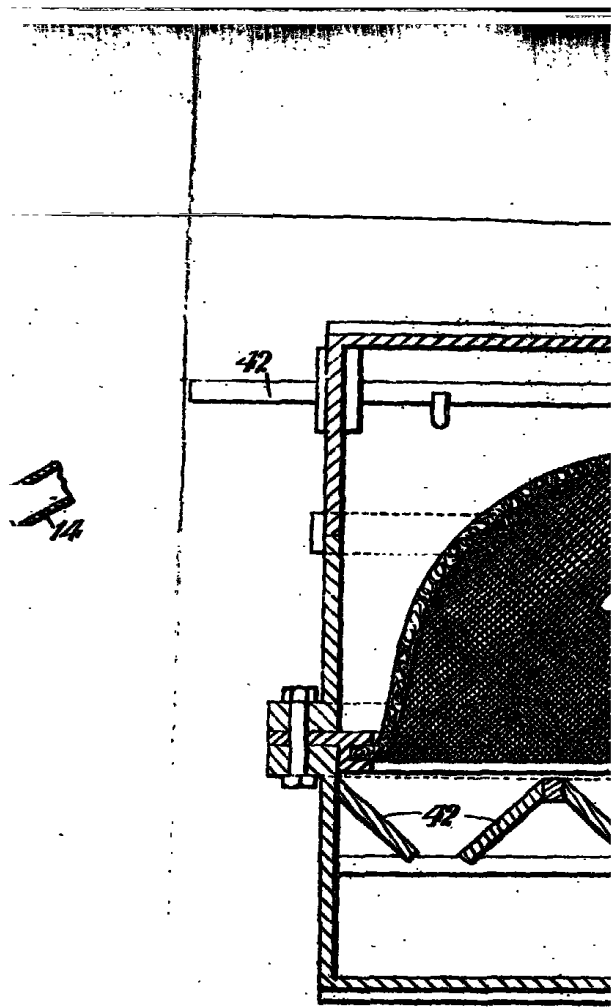
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BOOTH'S COMPLETE SPECIFICATION.

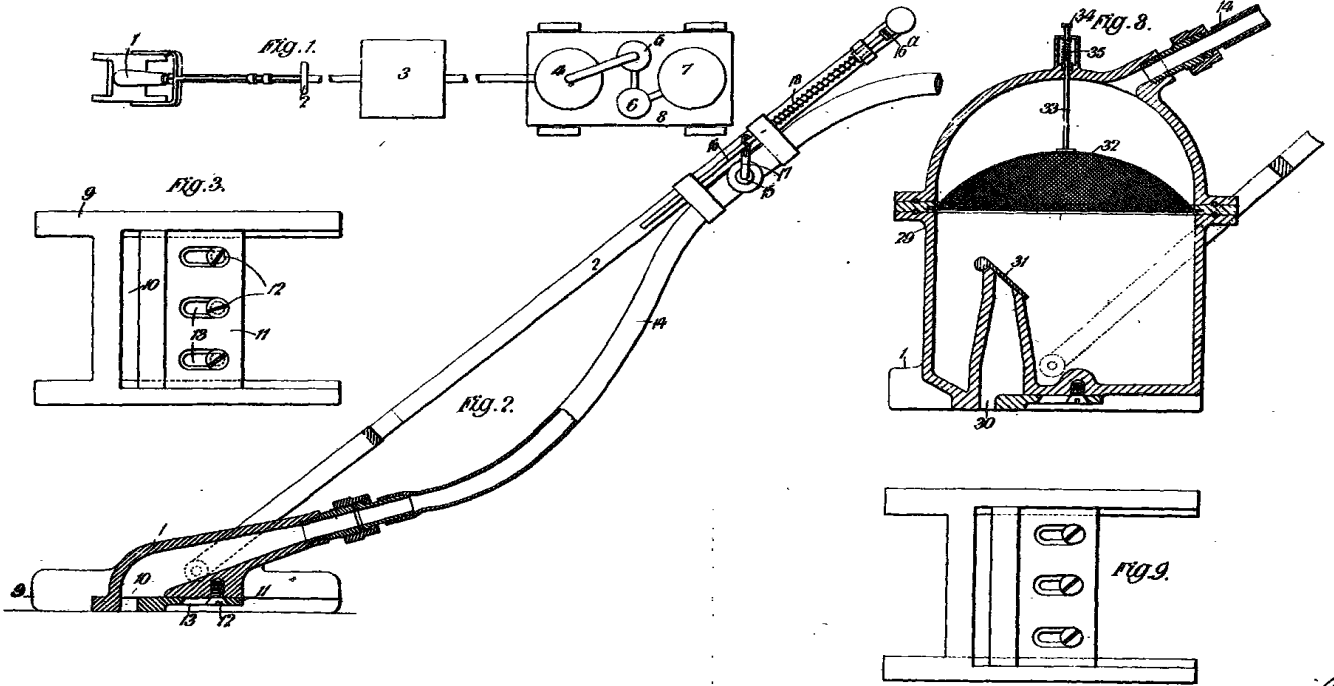




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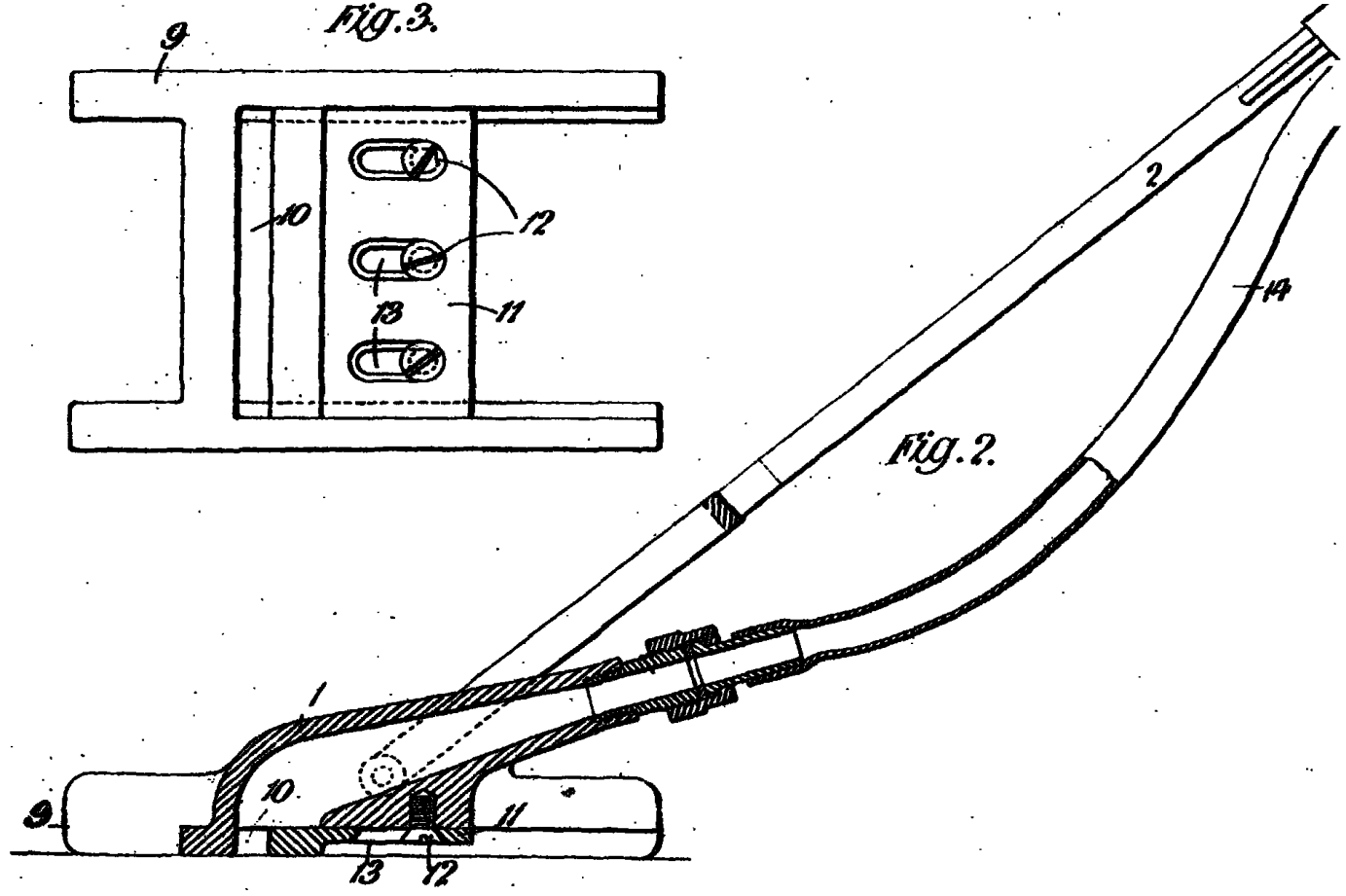
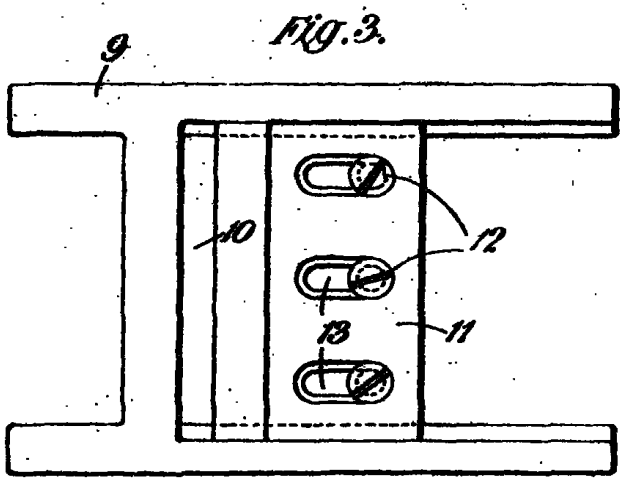
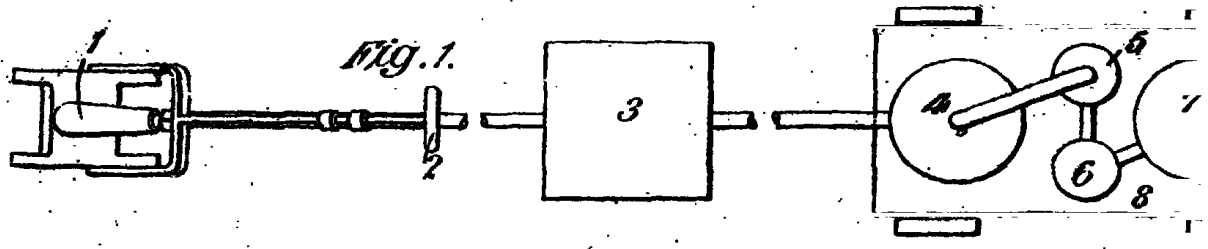


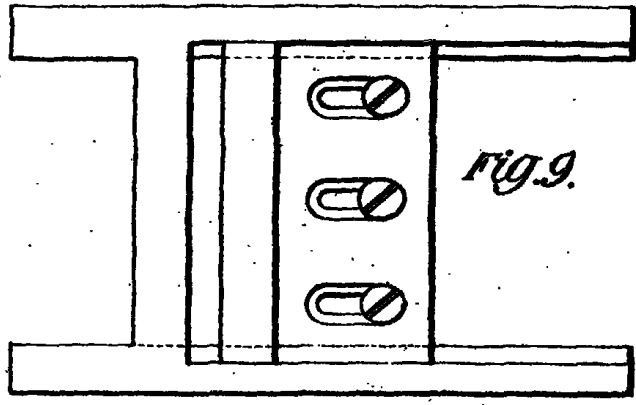
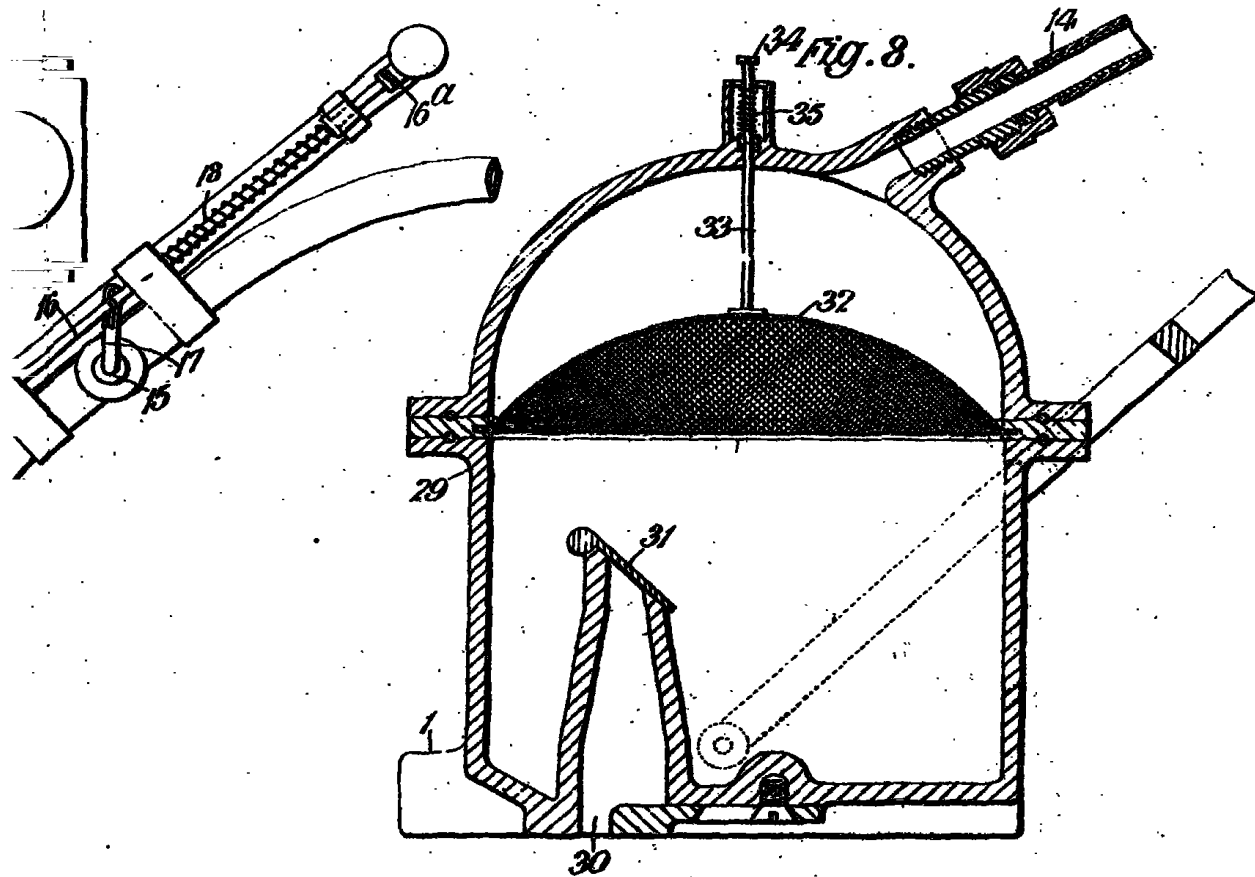


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