

(No Model.)

2 Sheets—Sheet 1.

B. S. BENSON.
APPARATUS FOR PURIFYING AIR.

No. 438,464.

Fig. 1.

Patented Oct. 14, 1890.

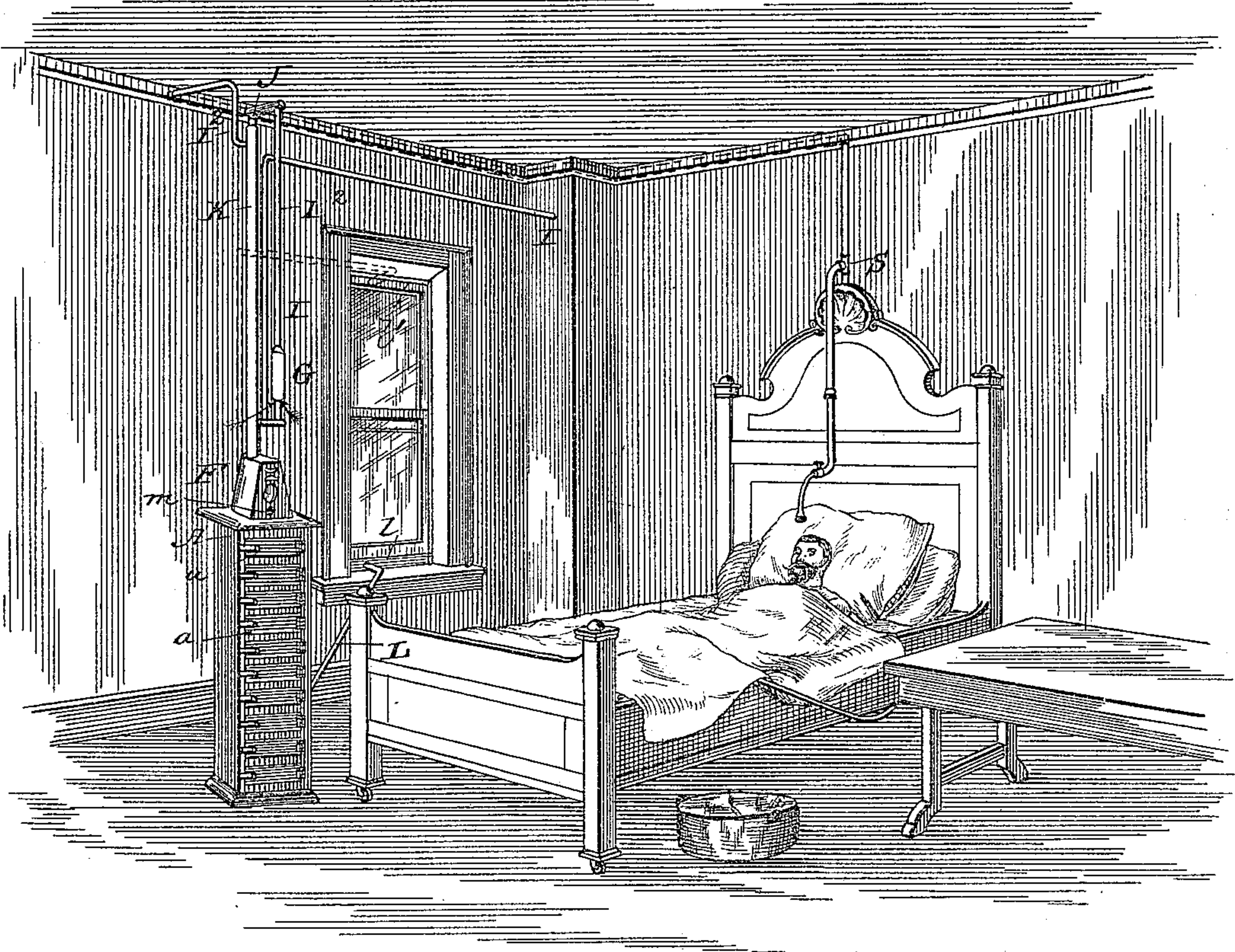
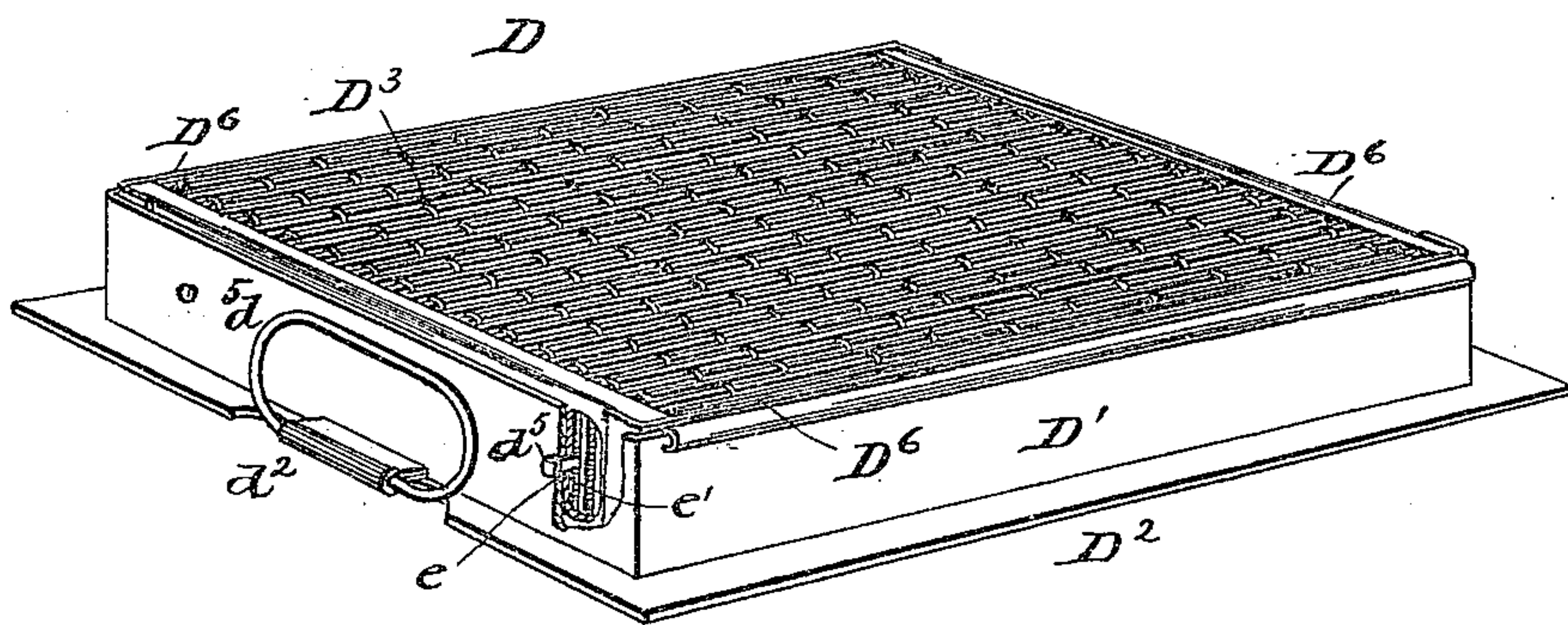


Fig. 3



WITNESSES:
Fred G. Dieterich
W. H. Bloudek

INVENTOR:
B. S. Benson
BY *Wm. L. L.*

ATTORNEYS

(No Model.)

2 Sheets—Sheet 2.

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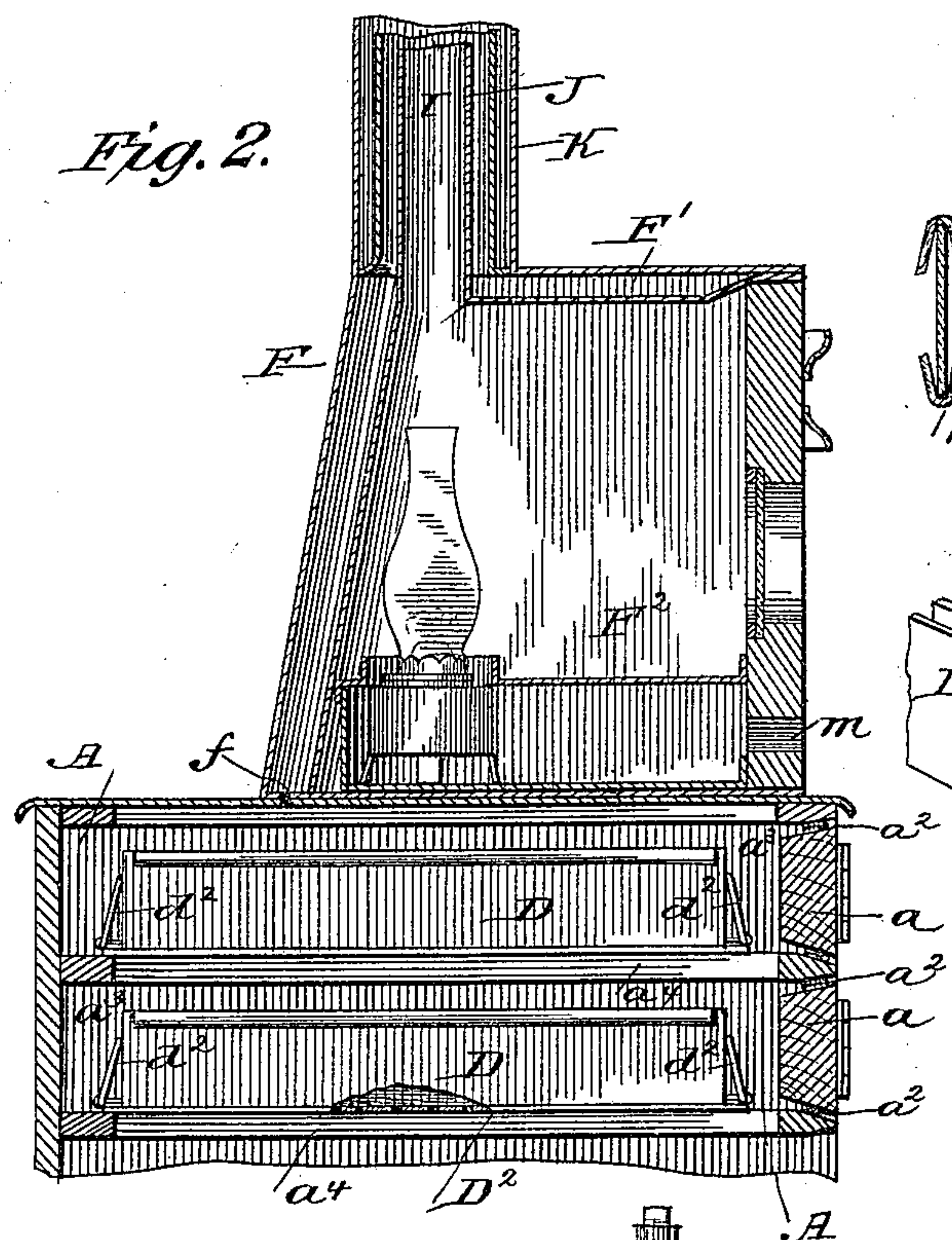
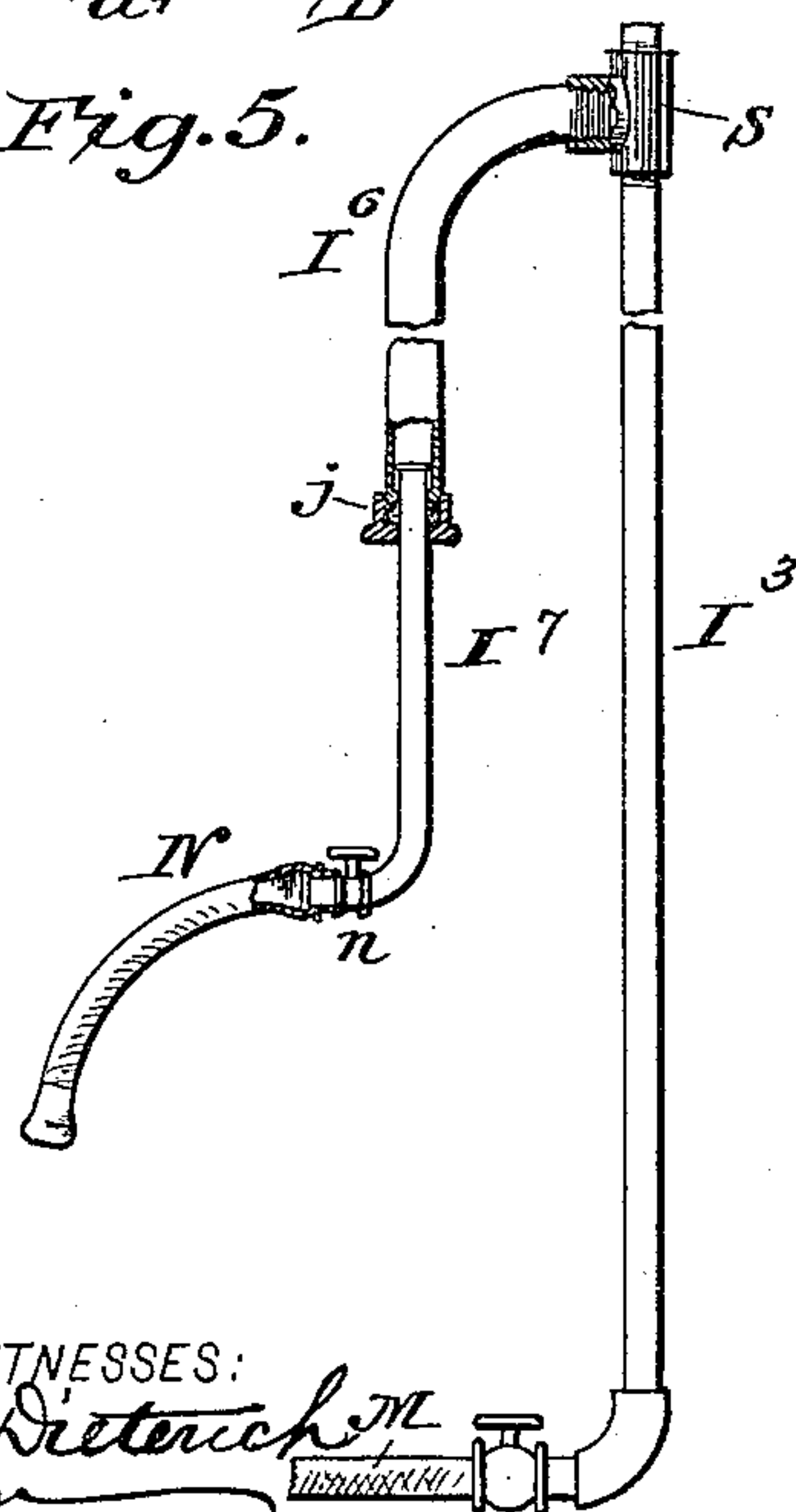


Fig. 5.



WITNESSES:

WITNESSES:
Fred G. Dieterich ML
M. S. Bloumel

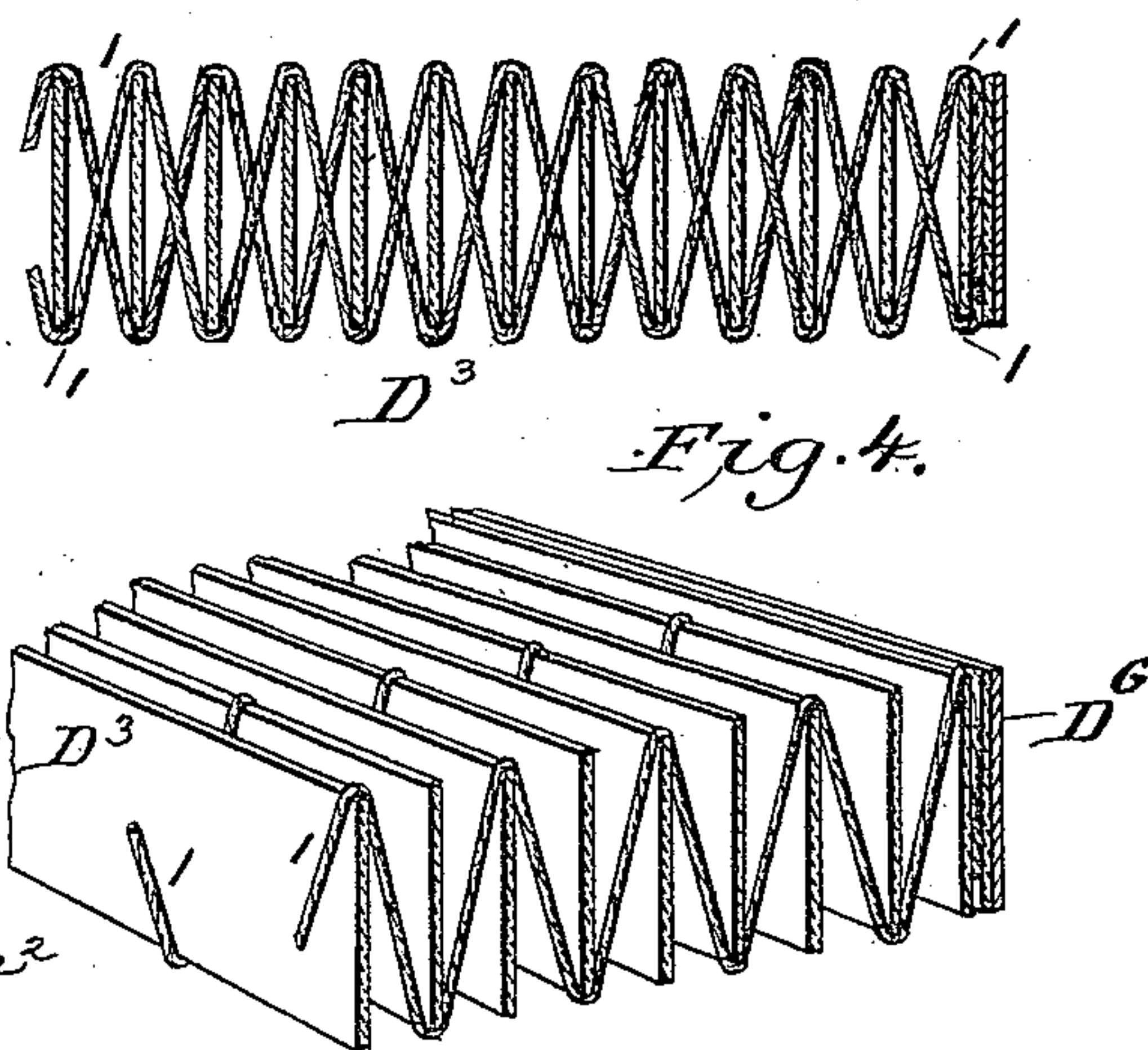
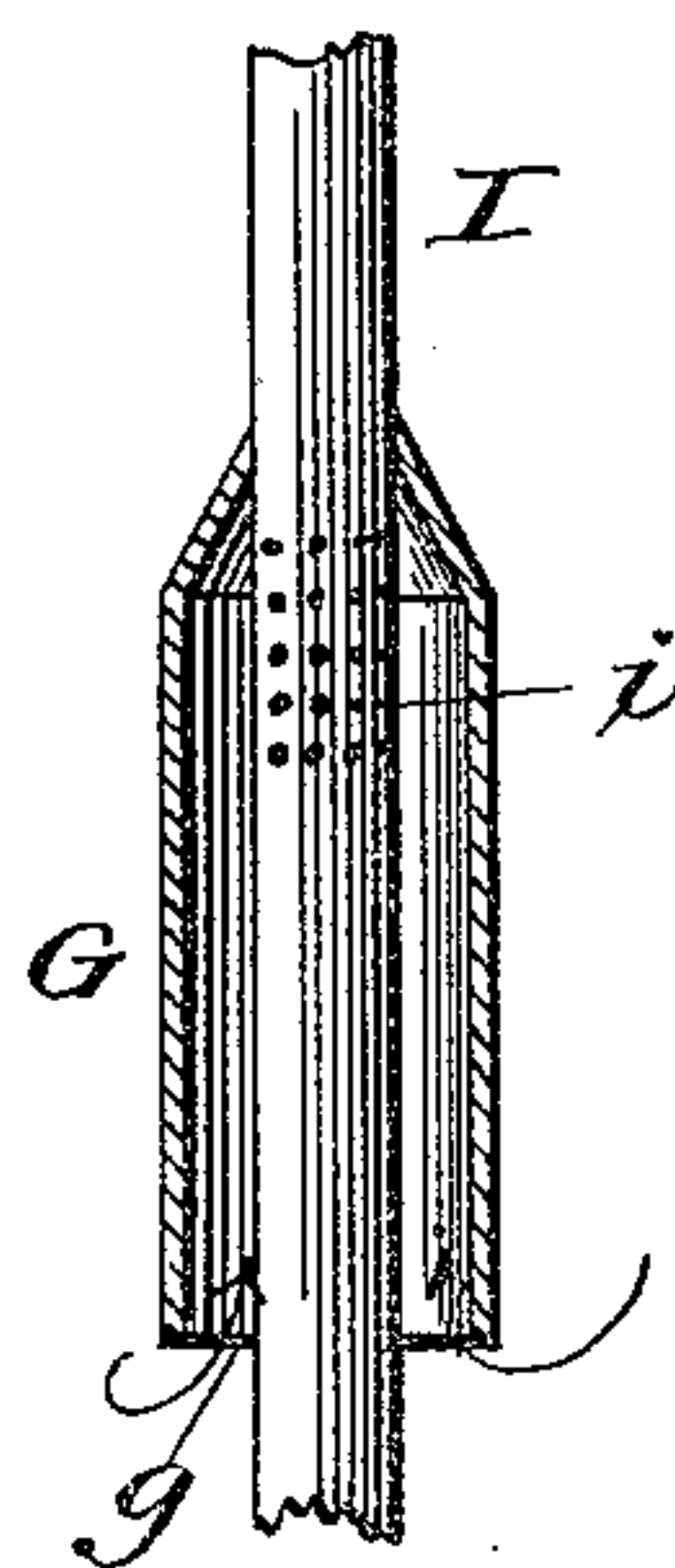


Fig. 4.

Fig. 6.



INVENTOR:

INVENTOR:
B. S. Benson

BY *Norman D*

ATTORNEYS

UNITED STATES PATENT OFFICE.

BENJAMIN S. BENSON, OF BALTIMORE, MARYLAND.

APPARATUS FOR PURIFYING AIR.

SPECIFICATION forming part of Letters Patent No. 438,464, dated October 14, 1890.

Application filed January 17, 1890. Serial No. 337,261. (No model.)

To all whom it may concern:

Be it known that I, BENJAMIN S. BENSON, residing in the city of Baltimore, in the State of Maryland, have invented certain new and useful Improvements in Air-Purifiers, of which the following is a specification.

My invention relates to certain means for purifying the atmosphere for respiration, and it is more especially adapted for use in sick or sleeping rooms, and it relates more particularly to improvements on a similar invention patented by me May 7, 1889, No. 402,714.

My invention consists in the peculiar construction and novel combination of parts, all of which will hereinafter be fully described in the annexed specification and particularly pointed out in the claims, reference being had to the accompanying drawings, in which—

Figure 1 is a perspective view of my improvement, showing the same in operative position. Fig. 2 is a section of the upper part of the filtering-box with the heating-chamber in position thereon. Fig. 3 is a perspective view of one of the filtering-webs. Fig. 4 is a detail view illustrating the manner of arranging the series of tapes to form the spaces in the filtering-webs. Fig. 5 is a detail view illustrating the flexible tubes and the air-delivering nozzle-connections. Fig. 6 is a detail section hereinafter referred to.

In the practical application of my improved purifier I arrange a filtering-case in the room, preferably near a window, such case being formed bureau-like, in a manner similar to that shown in my other patent. In adjusting the several bureau-sections together I arrange the side and end pieces so that the grain of the wood extends around horizontally to prevent a greater shrinkage of the doors than the sides and back of the case. The sides and back in my other case referred to ran up and down, the front wall of each section A being provided with a hinged door a , the grain of which runs horizontally, the abutting edges of which are provided with a corded tape a^2 or similar material to form an air-tight joint when the door is closed.

The case A is formed with a series of compartments a^3 , formed with the ledges a^4 a^4 , into which and supported on the ledges are slid the filtering-webs D, one of which is clearly

shown in Fig. 3 of the drawings. In the construction shown I provide a metallic box or receptacle D', formed with a foraminous base-plate D², having handles d^2 d^2 , which swivel around the ends of the base-plate, so as to form a handle on either side. The web portions D³ consist of a series of strips of muslin tape or other flexible material coated with a suitable antiseptic or absorbent material, such as gypsum.

Each web portion D³ of the filtering-sections is formed of a series of such flexible strips woven together in a manner clearly shown in Fig. 4 of the drawings, by reference to which it will be seen that I attach the ends of a series of cords 1 1 to the end strips, and which are alternately passed over and under the intermediate strips, as shown, and secured to the opposite end strips, a sheet-metal casing D⁶ encompassing the sides and ends of the complete set of strips, said cords serving to hold said tapes at a certain distance apart, such distance being determined by the size of the cord or wire used. Each complete set of strips is seated in the box D', and is detachably held therein by the removable pins d^5 , which pass through the apertures e e' in the end walls of the box D and the metal casing and enter between the strips, as shown.

I sometimes make the strips of woven wire instead of cotton fabric and use annealed wire for weaving them together instead of cord, this form being most desirable where it would take great heat to kill the malaria in the atmosphere.

F denotes the heating-case, which is formed with a hot-air chamber F', similar in construction to the one shown in my other patent referred to. I fixedly secure said case by soldering or otherwise to the top of the filtering-chamber, which in this instance is formed of metal, said top having the air-discharging holes f f , which register with the hot-air chamber F'.

The lamp and lamp-chamber F² are of the construction shown in my other case, except that I raise the bottom of the lamp from the base of the chamber G, so as to permit the air which enters the hole m to pass under as well as around the lamp. The combustion-pipe I extends up from the lamp-chamber,

being surrounded by a hot-air flue J, which in turn is incased by a jacket or tube K, which forms a non-conducting chamber about the hot-air flue to keep the heat of the lamp from heating the room in warm weather and to keep the purified air hot, so as to more effectually destroy the bacteria in it. The hot-air flue extends up to or near the ceiling, where it connects with a branch flue I², which extends to a point over the bed to lead the purified air to the patient, in a manner presently described.

In the practical use of the construction of the combustion-pipe shown in my other patent referred to I found it impossible to keep the lamp burning for any length of time. In the present construction I extend the combustion-pipe above the hot-air flue and then downward, as shown, to a point near the case F, where I form it with a series of apertures *i i*, around which I dispose a sleeve G, open at the lower end, as shown at *g*. This construction admits of the lamp-smoke which may be contained in the combustion-pipe being puffed out into the said sleeve when a room-door is closed quickly instead of being drawn back toward the lamp, as would be the case in the use of the other construction referred to. The combustion-pipe is then again carried upward and extended into the chimney or through the wall, if necessary.

By arranging the combustion-pipe as described additional means are provided for purifying the air, as the hot air in the pipe I produces a partial vacuum and draws the foul air of the room into said pipe I, forming a suction-draft to carry said mixed air out, thus forming an excellent forced ventilation to carry off the exhalations of the patient.

L denotes the cold-air-inlet pipe, which projects to without the building, preferably through the window-strip *l*, as shown, and which connects with the purifying-chamber below the filtering-webs D.

When the outside air is very cold, it will not filter well. In such case I arrange the air-supply pipe to enter through the upper strip *i* (see dotted lines) and carry same down alongside the pipe I², which serves to warm the fresh air before it enters the filter-case.

The purified-air pipe, which extends down to the head-board of the bed, is connected by means of a coupling-piece S, to which is connected a downward extension I³, to which is connected a flexible tube M, provided with a suitable stop-cock, said tube adapted to lead the air beneath the bedclothes.

I⁶ denotes a pipe extended downward and which has a swiveled connection with the coupling S at its upper end, while its lower end is provided with a stuffing-box *j*, through which and in the lower end of said pipe I⁶ slides a short pipe I⁷. To the lower end is connected a flexible tube N, provided with a suitable stop-cock *n*, which tube serves to supply the air to the head of the patient.

By arranging the feed-pipes as described

it will be observed that they have practically a universal movement, and can therefore be raised, lowered, or swung sidewise and around, as the occasion may require.

From the foregoing description, taken in connection with the drawings, the advantages and operation of my complete device will be readily understood.

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

1. An air-purifying apparatus consisting of the filtering-case A, a heating-case mounted thereon, having a heating-chamber F², a combustion-pipe I, connected with said chamber and extended to an outside air-draft, said pipe provided with a perforated portion between its connection with the heating-chamber and its discharge end, a hot-air chamber F', surrounding the heating-chamber F², and a discharge-pipe J, connected with said chamber F', substantially as and for the purpose described.

2. The combination of the filtering-case A, the heating-case F, connected therewith, as shown, said case formed with a heating-chamber F², provided with a combustion-pipe I, connected therewith and extended without the building, the hot-air chamber F', surrounding said heating-chamber F² and extended into a flue surrounding the combustion-pipe, a non-conducting jacket encircling said hot-air flue, and a discharge-pipe connected with the hot-air flue, substantially as and for the purpose described.

3. The combination of the filtering-case A, the heating-case F, connected thereto, provided with a heating-chamber F², the combustion-pipe I, connected at one end to the heating-chamber, its opposite end connected with an outside draft, said pipe provided with a perforated portion, a cover or cap-plate surrounding said perforated portion, having an open bottom, a hot-air chamber and flue F', surrounding the heating-chamber and a portion of the combustion-pipe; and a discharge-pipe connected to said hot-air flue, all arranged substantially as and for the purpose described.

4. In an air-purifier, the combination, with the filtering-case, of the heating-case connected thereto, having a heating-chamber F², a combustion-pipe I, connected therewith, a hot-air drum surrounding said chamber F² and a portion of the pipe I, said drum provided with a discharge-pipe, said combustion-pipe extended downward from the upper end of the hot-air drum, provided in said depending portion with apertures, and a bottomless tube surrounding said apertured portion, said pipe extended upward and connected with a fresh-air outlet, all arranged substantially as and for the purpose described.

5. In an air-purifying apparatus, essentially as described, the combination, with the box or receptacle D, having a foraminous bottom plate D', of removable web-sections D³, de-

tachably held in said box, said sections consisting of a series of flexible webs and the threads interwoven about said sections, said threads secured to the outer webs, substantially as and for the purpose described.

5 6. The combination, with the box or receptacle D, having a foraminous base-plate D' and apertured end walls, of the filtering-sections D³, formed of a series of flexible webs
10 held together, a sheet-metal casing D⁶, encircling the end and sides of said filter-sections, the end portions of said casing having apertures, and the securing-pins adapted to be
15 passed through said apertures in the ends of the box and metal casing, substantially as and for the purpose described.

7. The combination, with the heating-case F, provided with a heating-chamber F² and
20 a hot-air drum surrounding said chamber, said drum provided with fresh-air inlets at its lower side, of the combustion-pipe I, connected to the heating-chamber, and a hot-air flue J, connected to the drum and surrounding said pipe I and provided with a fresh-air-discharge

pipe, said combustion-pipe I provided with a 25 downward extension, said extension formed with a series of apertures *ii*, adapted to suck in the impure air of the room, and with an upward extension adapted to discharge said impure air to without the building, substan- 30 tially as and for the purpose described.

8. The combination of the air-purifying devices consisting of the casing having a heating-chamber, a hot-air drum surrounding said heating-chamber, provided with fresh-air in- 35 lets at its lower side, a fresh-air-discharge pipe connected therewith, and a combustion-pipe I, extended upward, then downward to a point above the heating-chamber, then upward, said upward extension formed with a series of ap- 40 ertures near its lower end, and then outward to a discharging-point, all arranged substantially as and for the purpose described.

BENJAMIN S. BENSON.

Witnesses:

FRED G. DIETERICH,
SOLON C. KEMON.