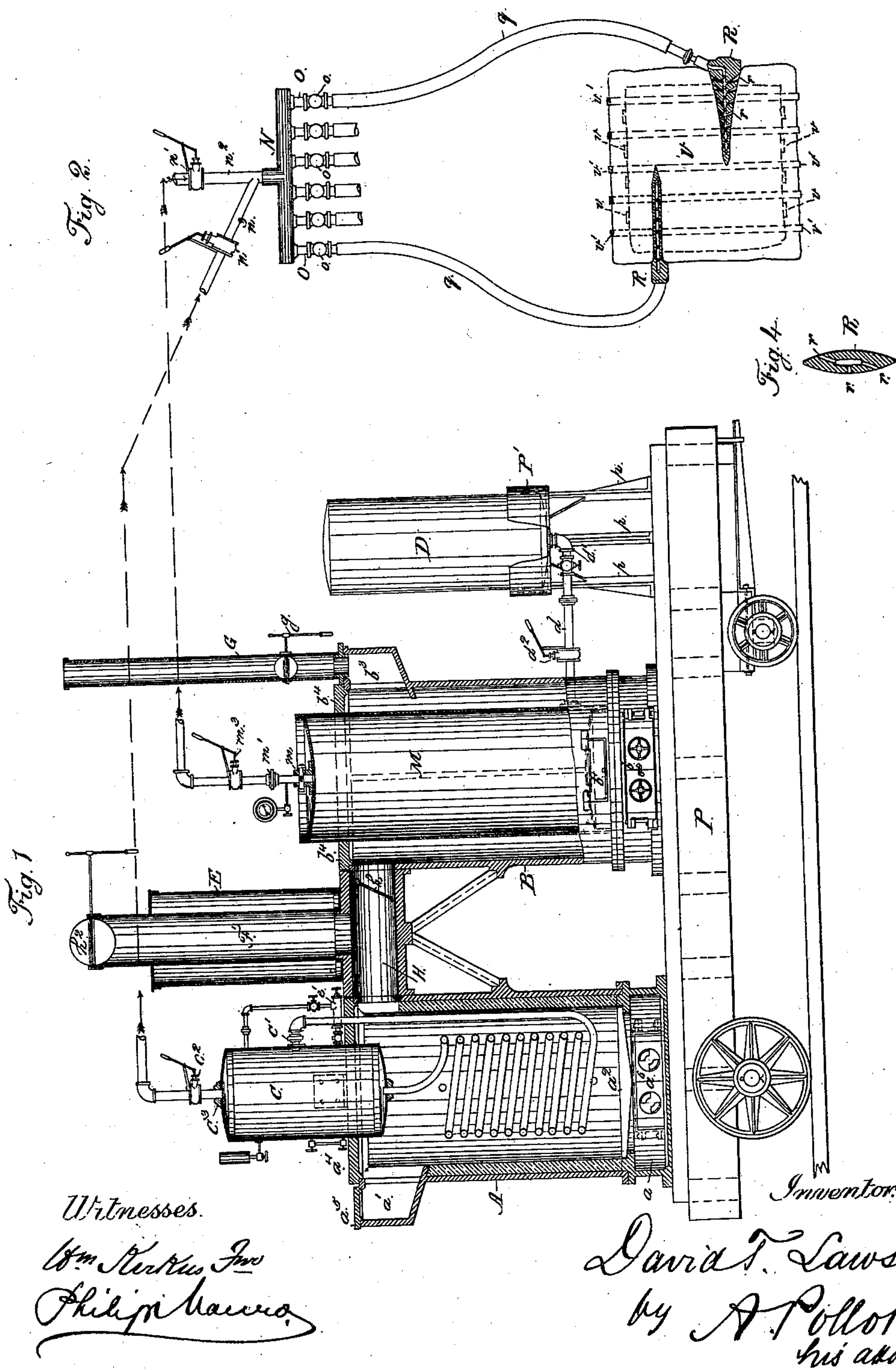


D. T. LAWSON.

# PROCESS OF AND APPARATUS FOR DISINFECTING.

No. 360,893.

Patented Apr. 12, 1887.



(No Model.)

2 Sheets—Sheet 2.

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Fig. 3.

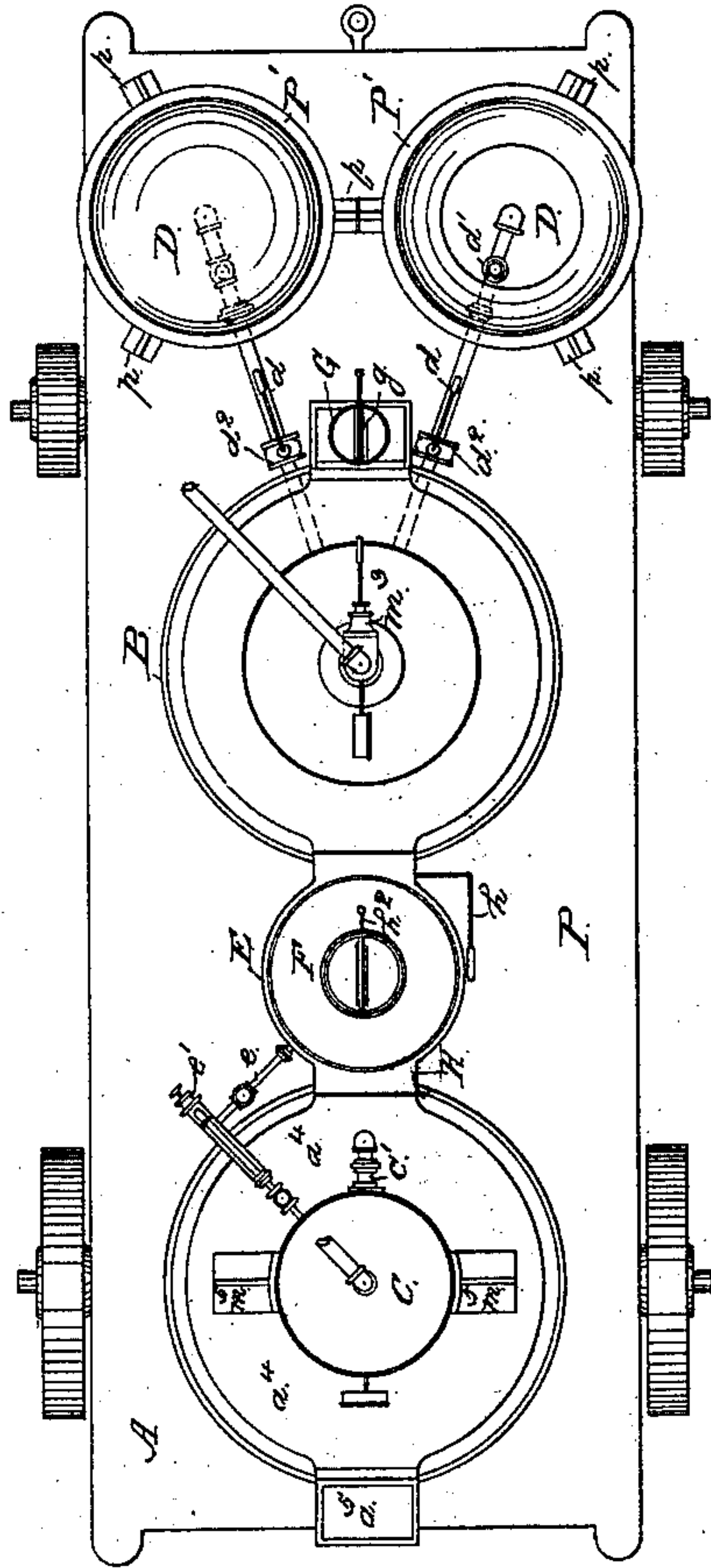
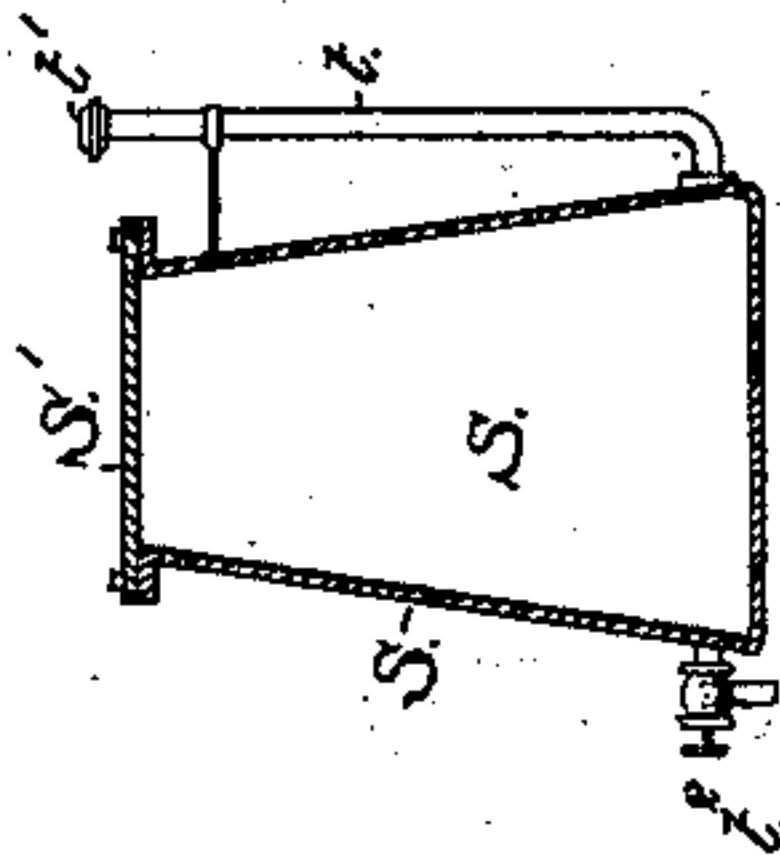


Fig. 5.



Witnesses.

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# UNITED STATES PATENT OFFICE.

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## PROCESS OF AND APPARATUS FOR DISINFECTING.

SPECIFICATION forming part of Letters Patent No. 360,893, dated April 12, 1887.

Application filed May 5, 1885. Serial No. 164,471. (No model.)

*To all whom it may concern:*

Be it known that I, DAVID T. LAWSON, of Jersey City, in the county of Hudson and State of New Jersey, have invented a new and  
5 useful Improvement in Processes of Disinfecting and Apparatus therefor, which improvement is fully set forth in the following specification.

This invention has reference to the disinfection of dwellings and stores, and infected  
10 places generally, and of the holds or storage-compartments of vessels, and particularly of goods—such as bales of rags and the like—which contain or are suspected of containing  
15 the germs of contagious diseases.

The invention comprises a new mode of disinfecting such places and articles as above specified by means of alternate streams of sulphurous acid gas at high tension and of steam  
20 at high pressure; and it also comprises an apparatus for carrying out the operation in an efficient and practical manner.

The accompanying drawings, which form a part of this specification, illustrate an apparatus for carrying the invention into effect, Figure 1 being a longitudinal vertical section,  
25 partly in elevation, of the principal parts of the apparatus mounted upon a truck or platform; Fig. 2, a view of the distributor, showing two nozzles, one in vertical and the other in horizontal section; Fig. 3, a plan view of the principal part of the apparatus shown in Fig. 1; Fig. 4, a cross-section of the distributing nozzle, and Fig. 5 a vertical section of a  
30 vessel designed to receive the wastes of a sick-room to be disinfected prior to being deposited in the drain-pipes of the building.

Referring to Figs. 1 and 3, a cylindrical iron vessel, A, lined with fire-brick, is mounted  
40 upon a suitable platform, P, and is provided with an ash-pit, *a*, feed-hopper *a'*, grate-bars *a''*, an outlet, *a'''*, for smoke and products of combustion, a two-part cover, *a''''*, a cover, *a'''''*, for the feed-hopper, and doors *a''''''*. The cover  
45 *a''''* supports a steam-dome, C, provided with the usual safety appliances—such as steam and water gages, cocks, valves, &c.—the dome being secured to said cover by angle-pieces *m''*.

The dome C is connected at the bottom with  
50 a superheating-coil, *c*, for generating high-

pressure steam, which passes from said coil into the dome at *c'*. The vessel A is designed to act as a furnace or heater to generate steam in the coil *c*. The water is supplied as required from water-tank E, supported on top  
55 of a casting, H, through a supply-pipe, *e*, by an injector, *e'*.

The cylindrical vessel B is made from the same patterns as A, and may also be provided with doors *b'*, an inlet, *b''*, communicating  
60 with the hollow casting H, and an outlet, *b'''*, leading to a flue or chimney, G, provided with a damper, *g*. It also has a cover, *b''''*. This vessel B contains a steel flask, M, capable of withstanding a high pressure, which may rest  
65 on grate-bars similar to those in vessel A. Flask M has an outlet, *m*, at the top provided with a cock, a joint at *m'*, and a stop-valve, *m''*. The flask is designed to contain the disinfecting agent—sulphurous acid, (SO<sub>2</sub>.)  
70

The hollow casting H, which connects the vessels A B, is semicircular in cross-section, being flat on top. About midway between its ends it connects with a flue or chimney, F, having a damper, *h''*. The passage H is also  
75 provided with a damper, *h*, for cutting off the communication between vessels A and B when desired. The flue F passes through the water-tank E, and the smoke and gases, when passing through the flue, heat the water to a  
80 certain extent before it is supplied to the chamber C.

The annular castings P', upheld by legs *p*, are designed to support the vessels or carboys D, containing sulphurous acid, (SO<sub>2</sub>.) The  
85 supports P' are designed to accommodate any degree of convexity of the bottoms of the carboys. The latter, when in place, are connected by pipes *d* with the flask M, said pipes containing cocks *d'* and valves *d''*.  
90

The whole of the apparatus, as thus far described, is mounted upon the platform P, which, as shown, is supported on wheels, so as to be readily transported from place to place where its use may be required.  
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In operation, the proper cocks being turned to supply the steam-generator with water and the flask M with the disinfecting agent, a fire is kindled in vessel A, the heat thereof generating high-pressure steam in coil *c*, which is  
100



stored in dome C for use. At first the damper  $h^2$  is closed and the dampers  $h$   $g$  open. Consequently the smoke and hot gases pass into chamber B and circulate around the flask M, which circulation may be aided by a movable diaphragm in vessel B. (Indicated by the dotted line in Fig. 1.) The heat of the smoke and gases produces sulphurous acid gas of high tension in flask M, and the products of combustion then pass off by flue G. When the gage on flask M indicates sufficient tension, dampers  $g$  and  $h$  are closed and damper  $h^2$  opened, the smoke and gases then passing through flue F. The steam and gas are now ready to be supplied to the distributing device shown in Fig. 2. This consists of a hollow T-shaped casting, N, provided with two branches,  $n^2$   $n^3$ , containing the stop-valves  $n$   $n'$ . The casting N is also provided with a number of branch pipes, O, each having a valve,  $o$ . The pipes  $n^2$   $n^3$  are designed to be connected by flexible tubing with the flask M and dome C through outlets  $m$  and  $c^3$ , respectively, as indicated in the drawing.

Flexible tubing  $q$  connects the branches O with the insertion-nozzles R, two of which are shown in the figure, being in longitudinal section in planes at right angles to each other. These nozzles are wedge-shaped, coming to a point, and are oval in cross-section, as shown in Fig. 4. They are shown in the figure as being inserted in a bale of goods, V. The dotted line indicates the form of the bale as received. The full line shows its expansion after the lashings  $v$  have been cut, such expansion being limited by placing about the goods cotton ties or similar fastenings, as indicated by  $v'$ .

The nozzles R are provided with a number of outlets or orifices,  $r$ , for the escape of the steam or gas. If the apparatus is to be used to disinfect a vessel containing a cargo suspected of infection, the apparatus is drawn to the deck of the vessel, the distributor N being placed at a convenient place on the deck. The insertion-nozzles R are driven into the bales of goods to be disinfected, (bales of rags for paper-stock, for example,) and the valves  $m^2$   $n$  are opened to admit a stream of high-tension sulphurous acid into the pipe, which, issuing from the orifices  $r$ , permeates the goods in every direction. Valves  $m^2$   $n$  are then closed and valves  $c^2$   $n'$  opened, whereby jets of high-pressure steam are discharged into the goods, and this is followed by a further introduction of the sulphurous-acid gas.

The introduction of high-tension sulphurous acid heated to a high degree is the most effective and economical application of this disinfecting agent, the gas permeating every part of the goods in the least possible time. The subsequent introduction of steam-vapor serves to take up and retain in solution the residue of gas and the second introduction of the gas saturates the watery vapor derived from the steam, producing in the goods a finely-divided

and well-distributed solution of hydrated sulphurous acid, which continues active for disinfection after the actual process is concluded, without making the goods in the least damp or subject to any deterioration.

For disinfecting rooms or apartments in dwellings, hospitals, and other buildings, the apparatus is used in a similar way, discharging first a stream of the gas, then a jet of high-pressure steam, and finally another stream of the gas.

The above apparatus on a small scale, heated by a gas or oil flame, is also very useful for disinfecting the wastes of a sick-chamber prior to depositing these in the sewers, and thereby preventing the spread of the disease. For convenience in this operation, the vessel S, Fig. 5, may be used to contain the wastes while under treatment. This vessel consists of a body part,  $s$ , in which the wastes are placed, being hermetically closed during use by a cover,  $s'$ , and an inlet-pipe,  $t$ , opening into the part  $s$  at the bottom. The tube leading from the gas and steam generators is connected with pipe at  $t'$ . The vessel has an outlet at  $t''$ , provided with a cock for discharging its contents when the disinfecting process is completed.

While the above description and drawings explain the best mode contemplated by me of carrying my said process into effect, it is obvious that I am not confined to the precise details of construction and arrangement therein set forth, as these may be varied and modified without departing from the spirit of the invention.

Having now fully described my said invention and the manner of carrying the same into effect, what I claim, and desire to secure by Letters Patent, is—

1. The described method of disinfecting by applying to the place to be disinfected a stream of high-tension sulphurous-acid gas and subsequently a jet or spray of high-pressure steam, substantially as set forth.

2. The described method of disinfecting by applying a stream of sulphurous-acid gas at high tension, then a jet or spray of steam, and subsequently another stream of the gas, substantially as set forth.

3. In a disinfecting apparatus, the combination of the superheater for supplying high-pressure steam, the flask for producing disinfecting-gas at high tension, separate exit-pipes for the steam and gas, and a furnace or other source of heat, substantially as described.

4. The combination of the superheater and steam-dome, the water-tank connected with the latter, the flask for producing a gas at high tension, and a furnace or similar source of heat, said steam-dome and flask being provided with suitable outlets, substantially as described.

5. The combination of the connected vessels or chambers, one inclosing a superheating-coil and a fire-chamber and the other a flask for



generating gas at high tension, a steam-dome connected with said coil, a water-tank, inlets and outlets for the steam-generator and flask, and suitable flues for the escape of smoke and gases, the whole being mounted on the same platform or truck, so as to constitute a portable apparatus, substantially as described.

6. The combination of the two vessels A B, the one containing a fire-chamber, a passage connecting said vessels, so as to conduct the waste heat from one to the other, a regulating-damper in said passage, a steam-generator in vessel A, and a flask in vessel B, for producing a disinfecting-gas at high tension, substantially as described.

7. The combination of the vessel containing a steam-generator and fire-chamber and the vessel containing a flask for the disinfecting agent, said vessels being connected by a suitable passage, so that the waste heat from the first-named vessel may be utilized to impart a high tension to the gas in said flask, substantially as described.

8. In a disinfecting apparatus, the combination, with the steam-generator and the fire-chamber, of the water-tank connected with the generator and the flue for the escape of the products of combustion passing through said tank, substantially as described.

9. The combination, in a disinfecting apparatus, with the steam-generator and fire-chamber, of the flask for producing gas at high tension, discharge-pipes for the steam-generator and flask, and the vessels or carboys for supplying the disinfecting agent to said flask, substantially as described.

10. A portable disinfecting apparatus comprising, in combination, a vessel having a fire-chamber, a superheater in said vessel, a pipe for conducting away the high-pressure steam, a second vessel connected with the former by a suitable passage, a flask in said second vessel adapted to contain a disinfecting agent to be raised to a high tension by the waste heat coming through said passage, a pipe for conveying said high-tension gas, a water-tank connected with the superheater, and a carboy or

carboys connected with said flask, the whole being mounted on a common platform or truck, substantially as described.

11. The combination, with the superheater and gas-generator, of the distributor provided with discharge-nozzles, and pipes provided with cocks or valves connecting said distributor with said superheater and gas-generator, substantially as described.

12. The combination, with the steam-dome and flask, of the distributor consisting of a hollow casting having two branches leading, respectively, to said steam-dome and flask, discharge-nozzles connected with said distributor, and suitable cocks for regulating the discharge of the disinfecting agents, substantially as described.

13. The combination, with the steam-dome and flask and pipes leading therefrom, of the distributor comprising a hollow T-shaped casting having two inlet branches, provided with cocks and connected with said dome and flask, respectively, and provided, also, with a number of outlet branches leading to discharge-nozzles, substantially as described.

14. The combination, with the pipes for conveying a disinfecting agent, of the wedge-shaped discharge-nozzle having a number of small orifices, substantially as described.

15. The discharge-nozzle for disinfecting purposes, oval in cross-section, and provided with a number of orifices on all sides, and adapted for insertion into a bale of goods, as set forth.

16. The combination, with the distributor and pipes leading thereto, of the branch pipes leading therefrom, and connecting each by a flexible tube with a wedge-shaped insertion-nozzle provided with discharge-orifices, substantially as described.

In testimony whereof I have signed this specification in presence of two subscribing witnesses.

DAVID T. LAWSON.

Witnesses:

THOS. B. LAWSON,  
JOHN H. MARTIN.