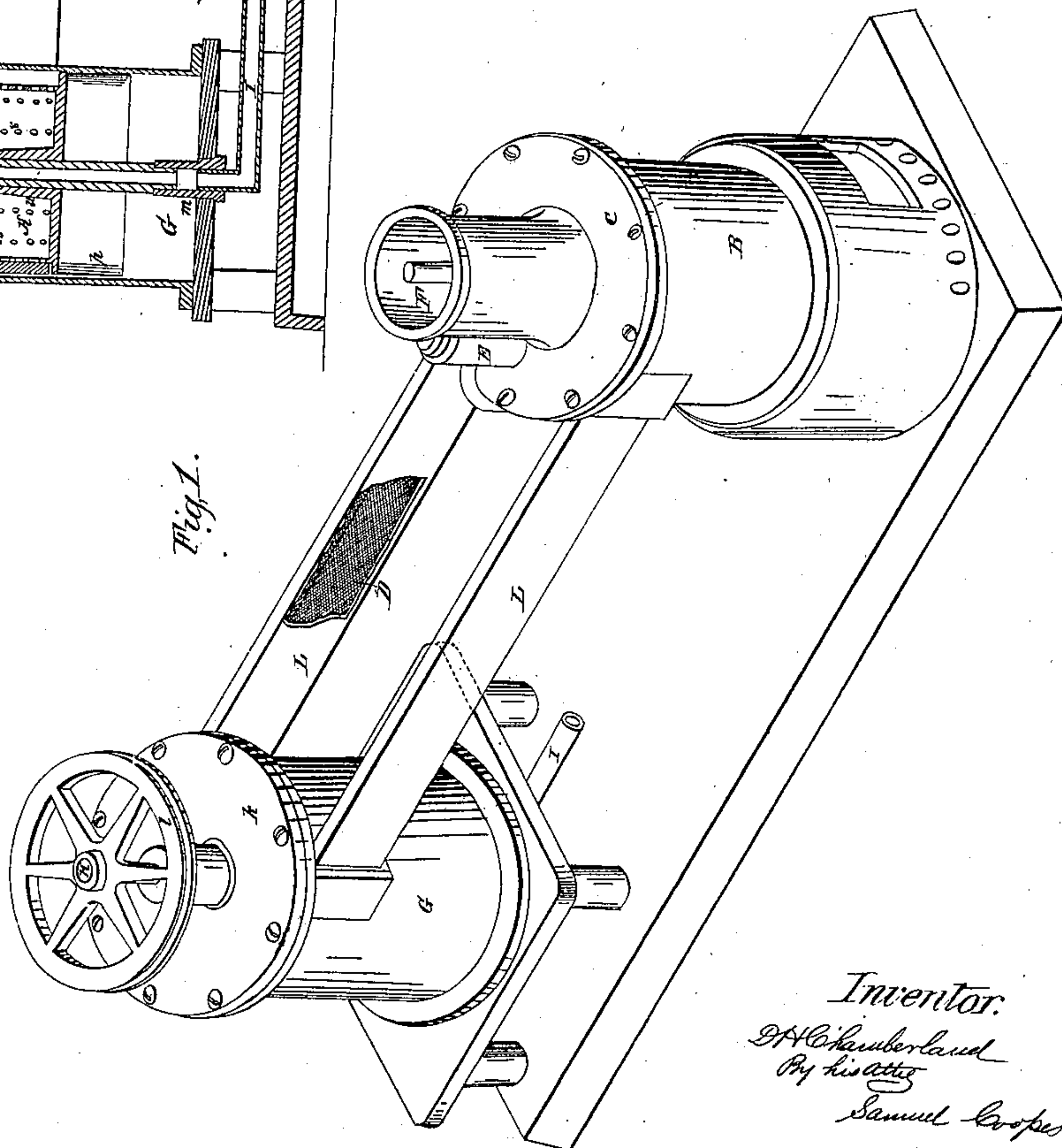
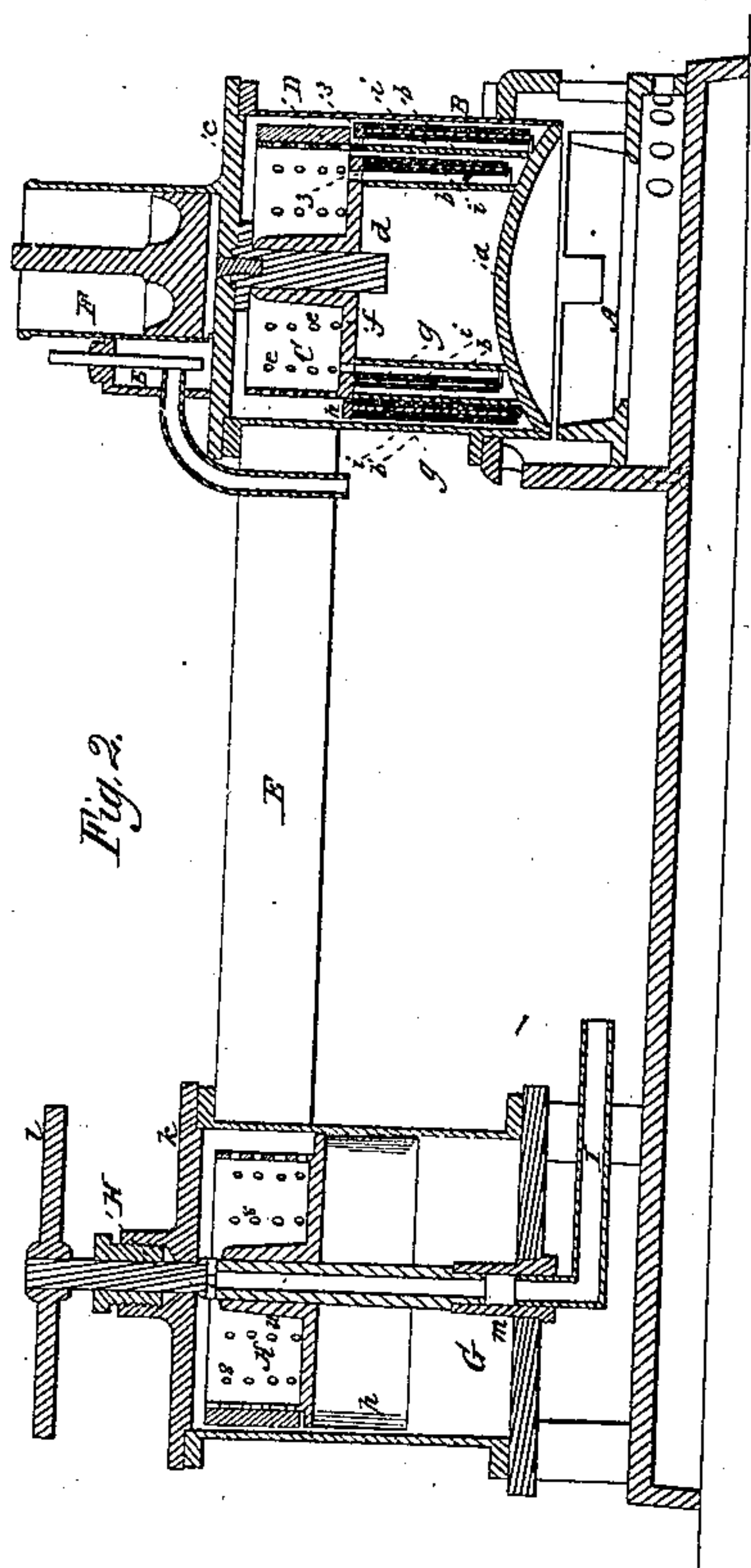


D. H. CHAMBERLAIN.
APPARATUS FOR GENERATING VAPOR.

No. 34,392.

Patented Feb. 11, 1862.



Witnesses.

P. E. Paschenscher.
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UNITED STATES PATENT OFFICE.

DEXTER H. CHAMBERLAIN, OF WEST ROXBURY, MASSACHUSETTS, ASSIGNOR
TO HIMSELF AND JOHN HARTSHORN.

IMPROVED APPARATUS FOR GENERATING VAPOR.

Specification forming part of Letters Patent No. 34,392, dated February 11, 1862.

To all whom it may concern:

Be it known that I, DEXTER H. CHAMBERLAIN, of West Roxbury, in the county of Suffolk and State of Massachusetts, have invented certain new and useful Improvements in Apparatus for Generating Vapor, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, making part of this specification, in which—

Figure 1 is a perspective view of the apparatus for generating vapor for an alcohol or vapor engine, and in which my improvements are embodied; Fig. 2, a longitudinal section through the middle of the same.

In the class of engines known as "vapor-engines," and which are driven by the vapor from alcohol or some other fluid which can be vaporized at a comparatively low temperature, various devices have been employed to introduce the fluid into the boiler or vapor-generator—such as pumps and injections—but it is well known that the more minutely the fluid is divided when it is brought into contact with the heat, which is applied for the purpose of vaporizing it, the more rapid and economical will its vaporization be.

To effect this end is the object of my present invention, which consists in a vapor-generating apparatus in which the fluid is presented to the heat on a series of cloth or felt covered partitions, which are supplied with the necessary amount of fluid to keep them properly saturated by means of an endless belt of felt or other suitable material, which is passed, by the movement of some suitable part of the machinery, from the fluid-reservoir to the generator through tubes. I have found by experiment that when the tubes through which this endless belt passes are of such a size that the belt will fill them snugly and yet be able to move in them, and are of a sufficient length in proportion to the pressure produced by the vapor in the generator, the fluid may be carried by the belt from the fluid-reservoir into the generator without the vapor being permitted to escape from the generator into the reservoir. In practice I have found a length of fifteen inches of tube between the generator and reservoir sufficient when a pressure of sixty pounds to the inch was being developed.

That others skilled in the art may understand and use my invention, I will proceed to describe the manner in which I have carried out the same.

In the said drawings, A is the furnace, over which is placed the generator B—a heavy metal cylinder—the bottom *a* of which is arched or convexed and has rising from it concentric metal partitions *b*. (Two are here shown, but I sometimes employ more.) The head *c* of the cylinder B has attached to its under side a shaft, *d*, which passes through the hub *e* of a perforated cylinder, C, the bottom *f* of which rests on the top edges of the partitions *b*. This cylinder is free to revolve around the shaft *d* when moved by the endless belt D, which surrounds it, as shown in Fig. 2. From the bottom *f* of this cylinder hang concentric plates *g*, which are covered on both surfaces with cloth or felt, *i*, and revolve one in the space between the partitions *b* and the other outside of the outer partition. The bottom, being of greater diameter than the body of the cylinder, forms a ledge, *h*, on which the belt D rests.

That the fluid brought into the generator B by the belt D may have free access to and be properly distributed upon the covering *i* on the plates *g*, the sides of the cylinder C are perforated with holes 2, through which the fluid passes to the interior of the cylinder, thence through two series of holes, 3 and 4, in its bottom to either side of the inner plate, *g*. The ledge *h* is also perforated with a series of holes, 5, which permit the fluid to run down on the inner side of the outer plate *g*, while enough runs directly down from the outer surface of the belt D to supply the outer surface of this plate or the cloth which covers it.

On top of the head *c* of the cylinder B is placed the valve chest E and working-cylinder F; but a further description of these parts is not essential to the understanding of my invention. G is the fluid-reservoir. It is a cylinder through a packing in the head *k* of which passes a shaft, H, which carries a pulley, *l*, by which it is revolved by a band from some suitable portion of the machinery. The lower portion of this shaft H is hollow, and its lower end enters a hollow step, *m*, on the bottom of the cylinder G. A pipe, I, passes through the bottom of the cylinder into the hollow step, and thus a communication is

made from a condenser or a pump or other means of supply through the pipe I and hollow shaft H and lateral openings 7 in the shaft to the interior of the reservoir G, which is intended to be kept partially filled with fluid. A cylinder, K, somewhat like the one, C, previously described, has its hub *n* fitted to the shaft H, so that the cylinder is revolved with the shaft. The belt D is passed round this cylinder, the sides of which are perforated with holes 8. The bottom, however, is tight. The fluid, which is thrown in through the hollow shaft H, falls into this cylinder K, and passing through the holes 8 saturates the belt D. The surplus, if any, flows over the edge of the cylinder and falls into the body of the reservoir G. To assist in keeping the belt saturated in case the supply through the pipe H should not be sufficient at all times, I append to the edge of the bottom of the cylinder K a drip-cloth, *p*, which hangs down into the fluid in the reservoir G, and being itself saturated helps to moisten the belt D, the lower edge of which runs in contact with the cloth. Two stout flat metal tubes, L, one on each side, form a communication from the reservoir G to the generator B. The internal form and capacity of these tubes is such that the band D shall fill them snugly and yet be permitted to be drawn through them as the shaft H is revolved. The length of these tubes should be sufficient to prevent the escape of the vapor from the generator B back through them into the reservoir G. This will depend on the pressure to be maintained in the generator, and on the tight fitting of the belt in the tubes, and on the texture and consistency of the belt itself. I prefer to make the belt of a close firm woolen felt. A round tube and cylindrical belt may be used instead of a flat one.

The following is the operation of the apparatus: A fire is started in the furnace A, the belt D is saturated, and the reservoir G is par-

tially filled with alcohol or other quickly-vaporizing fluid. The shaft H is revolved by hand or otherwise. This carries the belt D through the tubes L, and also revolves the cylinder C, to which the saturated belt gives up a part of its fluid, and through the openings 2 3 4 5, as before described, moistens the coverings *i* of the plates *g*, where, coming in contact, in a finely-divided state, with the heat radiated from the hot partition-plates *b* and the inner surface of the cylinder B, the fluid is quickly vaporized; or the engine may be started by injecting a small amount of fluid directly into the generator B. If the vapor thus raised is applied to the working of an engine, the exhaust from the working cylinder may be thrown into a condenser and be taken thence by the pipe I and hollow shaft H back to the reservoir G with but trifling loss. The operation may thus be rendered continuous, care being had to supply occasionally to the reservoir G so much fluid as may be lost by leakage, &c.

The above constitutes an economical and reliable apparatus for generating vapor from alcohol and other fluids.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. In combination with a reservoir for containing the fluid and a generator for evaporating it, the endless belt D, and tubes L for conveying the fluid to the generator, substantially as described.
2. The generator B, with its partitions *b*, in combination with the cylinder C and its covered plates *g*, substantially as set forth.
3. The reservoir G, in combination with the cylinder K, substantially as specified.

D. H. CHAMBERLAIN.

Witnesses:

THOS. R. ROACH,
P. E. TESCHEMACHER.