

No. 862,856.

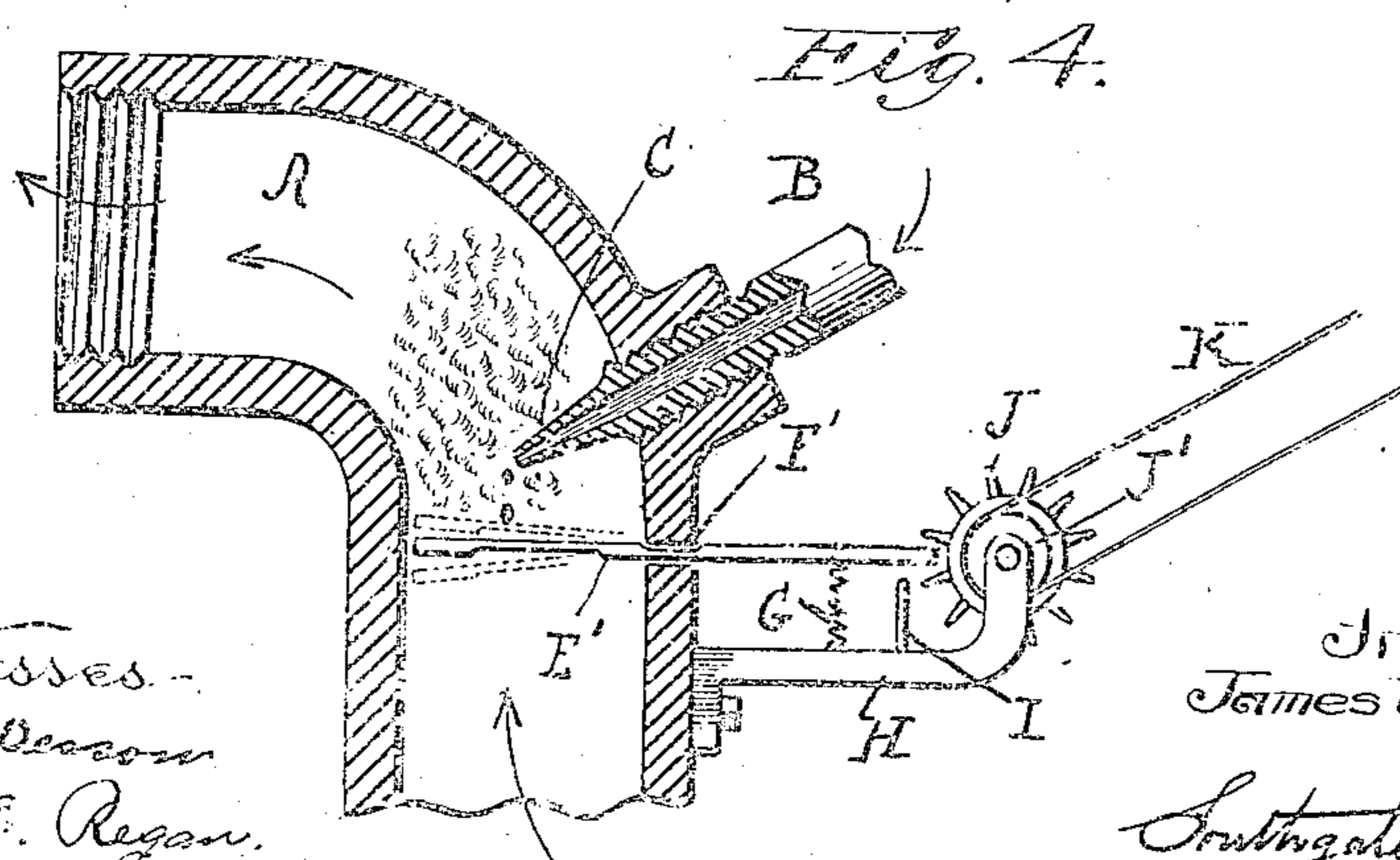
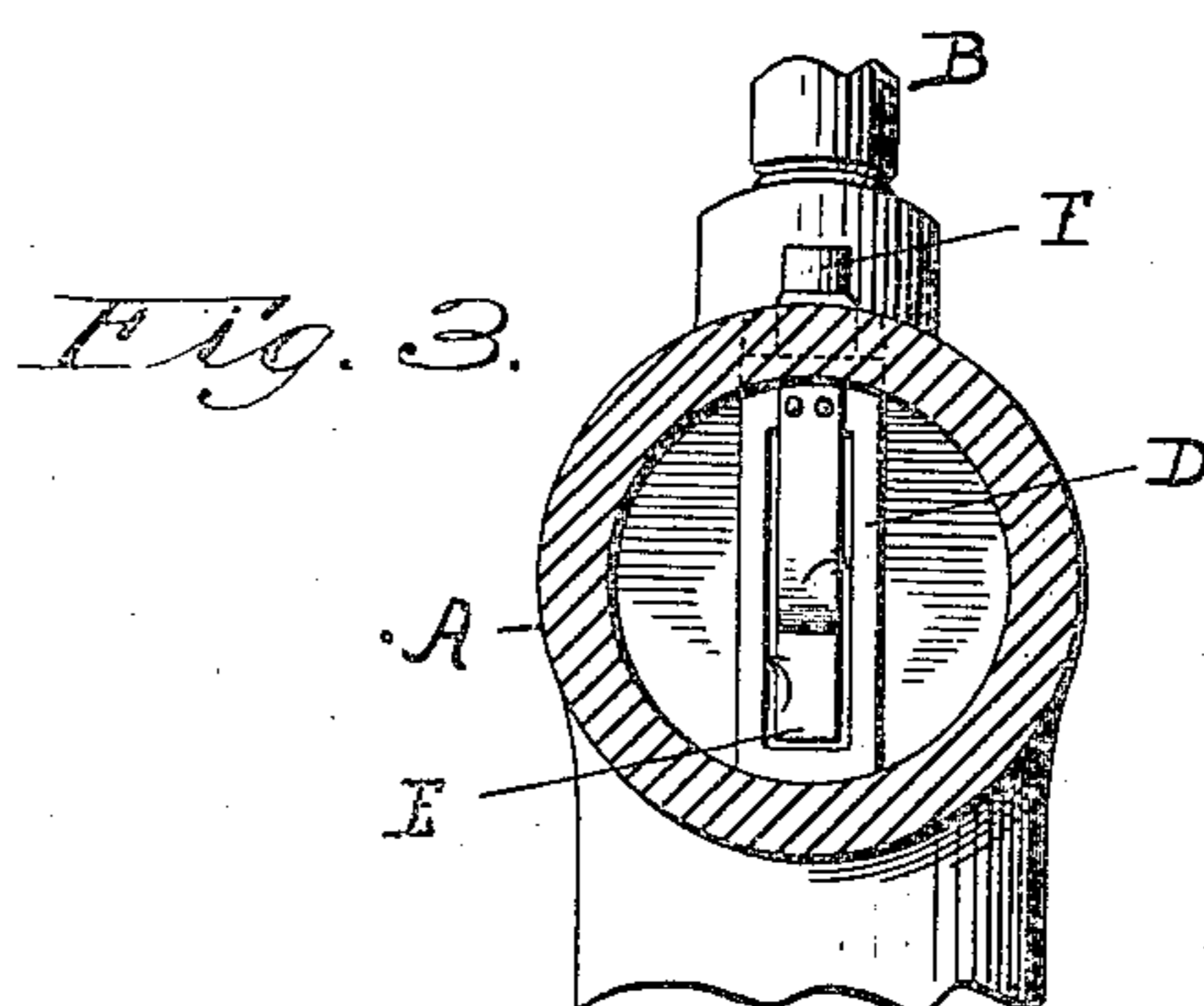
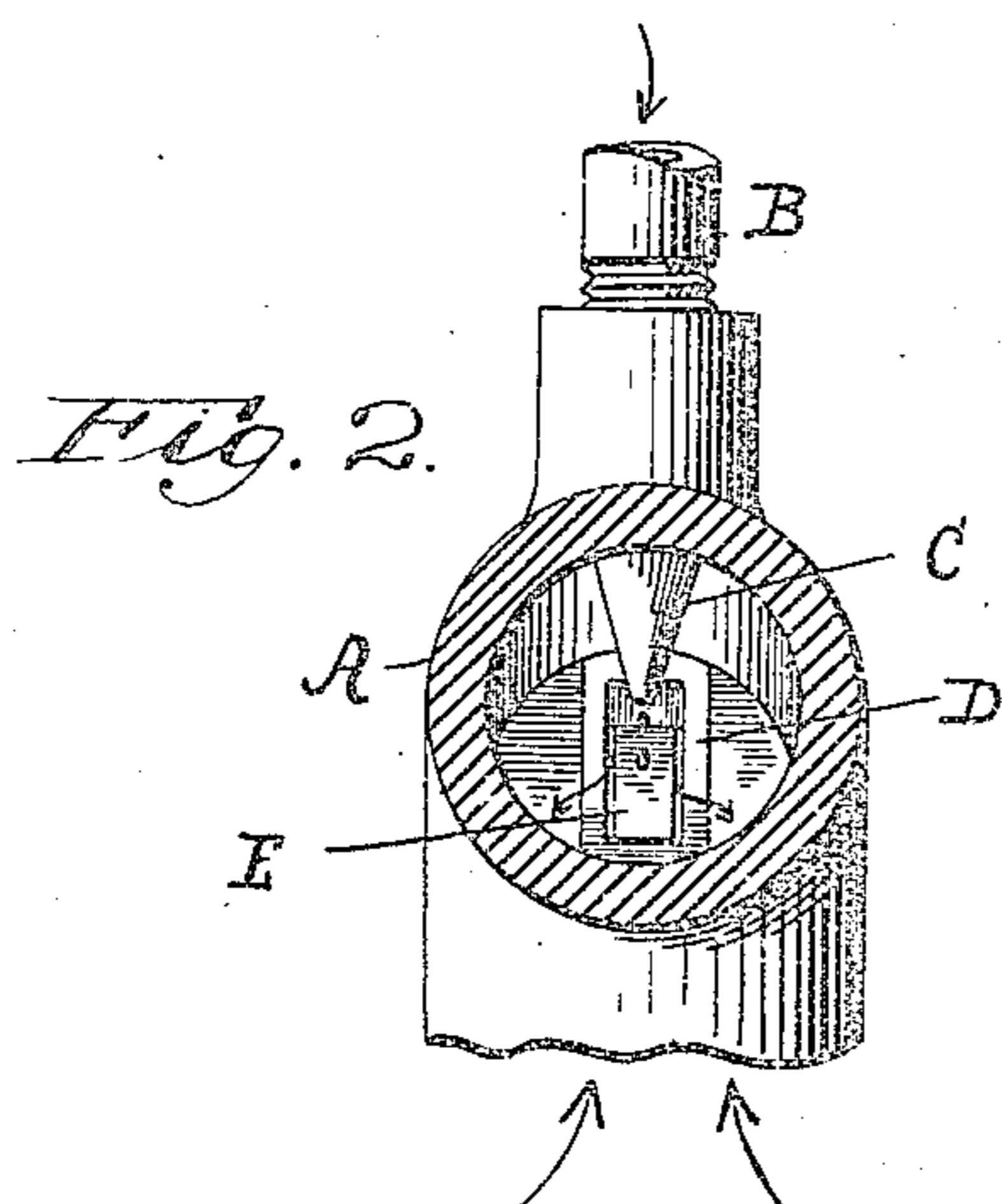
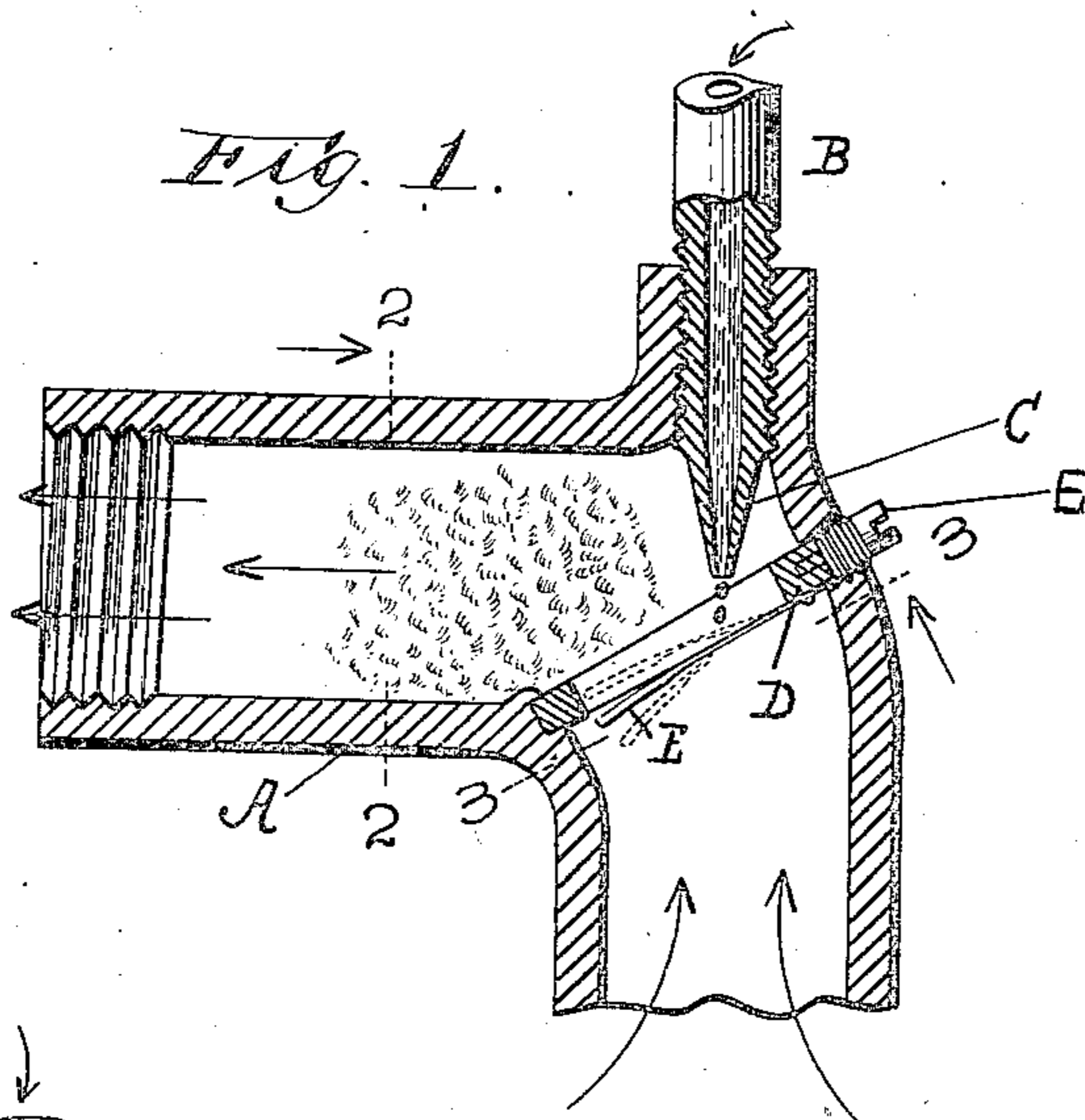
PATENTED AUG. 6, 1907.

J. W. TYGARD.

# VIBRATIVE LIQUID ATOMIZER AND MIXER.

APPLICATION FILED DEC. 20, 1900. RENEWED JAN. 21, 1907.

2 SHEETS—SHEET 1.



Witnesses -  
 L. J. Wesson  
 M. E. Regan.

Inventor.  
James Wallace Tygard  
By  
Sontagath & Sontagath  
attorneys

No. 862,856.

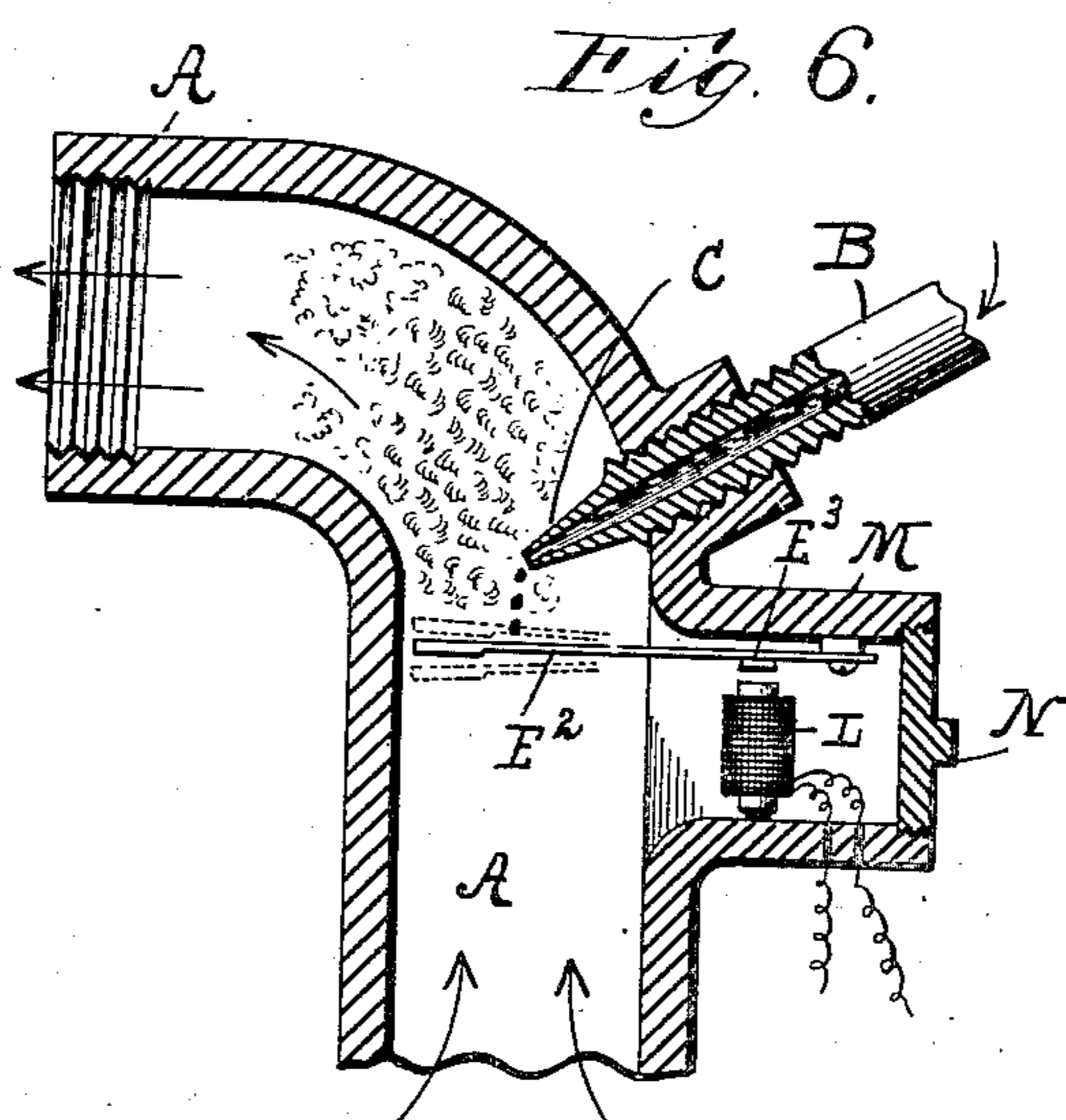
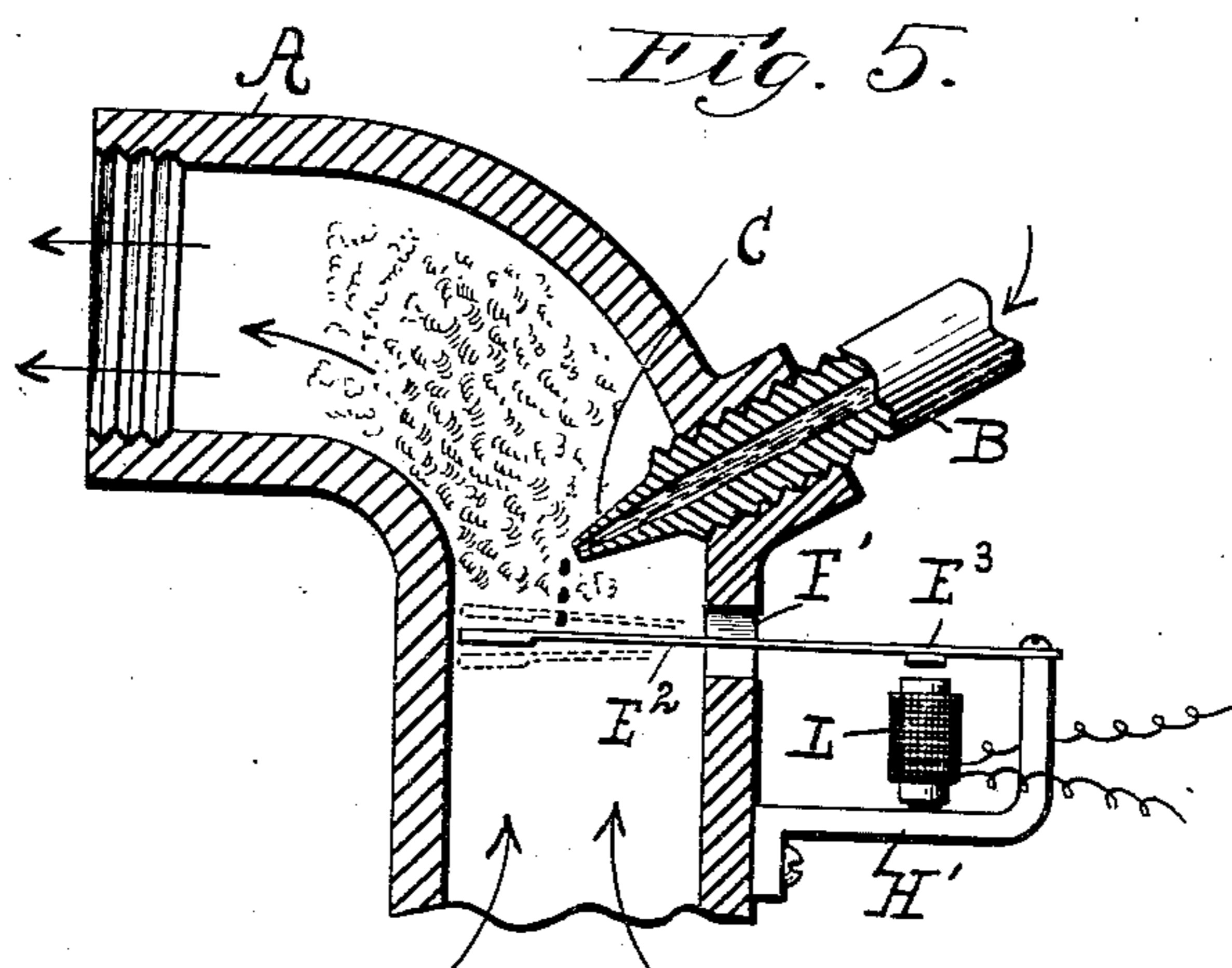
PATENTED AUG. 6, 1907.

J. W. TYGARD.

VIBRATIVE LIQUID ATOMIZER AND MIXER.

APPLICATION FILED DEC. 20, 1900. RENEWED JAN. 21, 1907.

2 SHEETS—SHEET 2.



Witnesses  
C. F. Wesson  
M. E. Regan.

Inventor  
James Wallace Tygard.  
By  
Southgate & Southgate  
attorneys

# UNITED STATES PATENT OFFICE

JAMES WALLACE TYGARD, OF NEW YORK, N. Y., ASSIGNOR OF ONE-HALF TO HENRY A. WISE  
WOOD, OF NEW YORK, N. Y.

## VIBRATIVE LIQUID ATOMIZER AND MIXER.

No. 862,856.

Specification of Letters Patent.

Patented Aug. 6, 1907.

Application filed December 20, 1900, Serial No. 40,577. Renewed January 21, 1907. Serial No. 353,364.

To all whom it may concern:

Be it known that I, JAMES WALLACE TYGARD, a citizen of the United States, residing at New York, in the county of New York and State of New York, have invented a new and useful Vibrative Liquid Atomizer and Mixer, of which the following is a specification.

The purpose of this invention is to disintegrate or atomize any liquid into minute individual particles so that the same will float in and become commingled with any fluid or gaseous substance, as air or gas, etc., thereby forming a saturated or mixed vapor. This method of vaporizing or atomizing liquid may be utilized for a variety of uses, such as surcharging the air entering a room or building with a definite proportion of moisture, for commercial or disinfecting purposes, or for manufacturing certain gases from liquid hydrocarbons. It may also be advantageously employed in some forms of explosive motors where a liquid actuating medium, such as gasoline or petroleum, is employed. In this style of motor it is necessary to vaporize the charge and thoroughly mix the same with a certain amount of air before introducing the mixed charge into the expansion or explosion chamber.

The present invention covers a very simple and efficient device for accomplishing any of the above stated purposes. The same consists in interposing a part or diaphragm in a fluid inlet pipe, in vibrating the same by the incoming fluid, or by extraneous mechanical or electrical means at great speed, and in introducing the liquid in such position as to drop or fall on the rapidly vibrating part of diaphragm. This will throw the liquid medium immediately into vapor, and thoroughly mix and commingle the same with the incoming fluid, thus rendering the mixture ready for use.

In the accompanying two sheets of drawings forming part of this application for patent, I have shown various ways by which the invention may be practiced.

Referring to said drawings and in detail, Figure 1 is a sectional elevation of one form of device, Fig. 2 is a transverse sectional view taken on the line 2—2 of Fig. 1, Fig. 3 is a transverse sectional view taken on the line 3—3 of Fig. 1, and Figs. 4, 5 and 6 are views similar to Fig. 1, illustrating modifications hereinafter described at length.

Referring first to the device shown in the first three figures, A designates a suitable inlet pipe, through which the fluid is drawn or forced. B designates an inlet for directing the liquid medium into the pipe A. The end of the inlet pipe is shaped to form a fine nozzle C from which the liquid medium will drip or flow in small quantity. D designates a reed, which has a suit-

able tongue or lip E, which reed is detachably fitted into the pipe A, and held in place therein by screw F. With this construction, as the fluid rushes in through pipe A, the tongue E of the reed will be caused to vibrate at a high speed, and the liquid medium falling thereon from the nozzle C, will be quickly vaporized, and thoroughly mixed with the incoming fluid.

In Fig. 4 a modified construction is shown. In this construction a vibrating part of diaphragm E' is pivotally fitted in a hole F' cut in the pipe A. A spring G normally keeps the part E' in one position. H designates a small bracket or arm which is secured to the pipe A. A stop or projection I is arranged in this bracket to limit the movement of the part E'. A small toothed wheel J is journaled on a stud or shaft J' secured in said bracket H, and is rapidly rotated by a belt K from any suitable source of power. This will cause the part E' to vibrate rapidly in the pipe A, whereby the action previously described will be obtained.

In Fig. 5 a vibrating part or diaphragm E<sup>2</sup> is shown as secured at its ends to a bracket H' secured to the pipe A. This diaphragm E<sup>2</sup> carries an armature E<sup>3</sup>, under which is arranged an electro magnet L. A suitable intermittent or pulsating current of electricity is carried through the magnet. This causes the part E<sup>2</sup> to vibrate at high speed to accomplish the result previously described. In Fig. 6 substantially the same construction is shown, except that the end of the vibrating part E<sup>2</sup> is secured in an extension M from the pipe A, and that the electro-magnet L is also housed within this extension. A detachable screw-cap N allows access to these parts. This construction operates as those previously described.

The mechanical means shown to vibrate the surface may be employed when the pressure or draft of the fluid or gaseous medium is insufficient to vibrate the surface otherwise.

It will be seen that the various forms of mechanism which may be employed for practicing the invention are very simple and efficient for the purpose.

Other forms and arrangements may be devised without departing from the scope of the invention as expressed in the claims.

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

1. A vaporizer and mixer for commingling minute particles of liquid and incorporating the same with a gaseous medium to form a moistened or saturated vapor for any of the purposes described, consisting of an inlet-pipe for liquid, a vibrating part with motion substantially transverse to the direction of the feed of the liquid thereto.

and which by its motion throws said liquid into fine particles, and means for directing the gaseous medium so that the latter will mix with the atomized liquid.

2. A vaporizer and mixer for the purposes described,  
5 consisting of an inlet-pipe for delivering liquid, a vibrating part whose motion is substantially transverse to the direction in which the liquid is fed thereto, and an inlet pipe for the gaseous medium.  
3. A vaporizer and mixer for the purposes described,  
10 consisting of an inlet pipe for liquid having a nozzle from

which the liquid is permitted to drop or fall, a vibrating part whose motion is substantially transverse to the falling liquid, and an inlet pipe for the gaseous medium.

In testimony whereof I have hereunto set my hand, in the presence of two subscribing witnesses.

JAMES WALLACE TYGARD.

Witnesses:

SEYMOUR CONOVER,  
HAROLD M. BENNETT.