

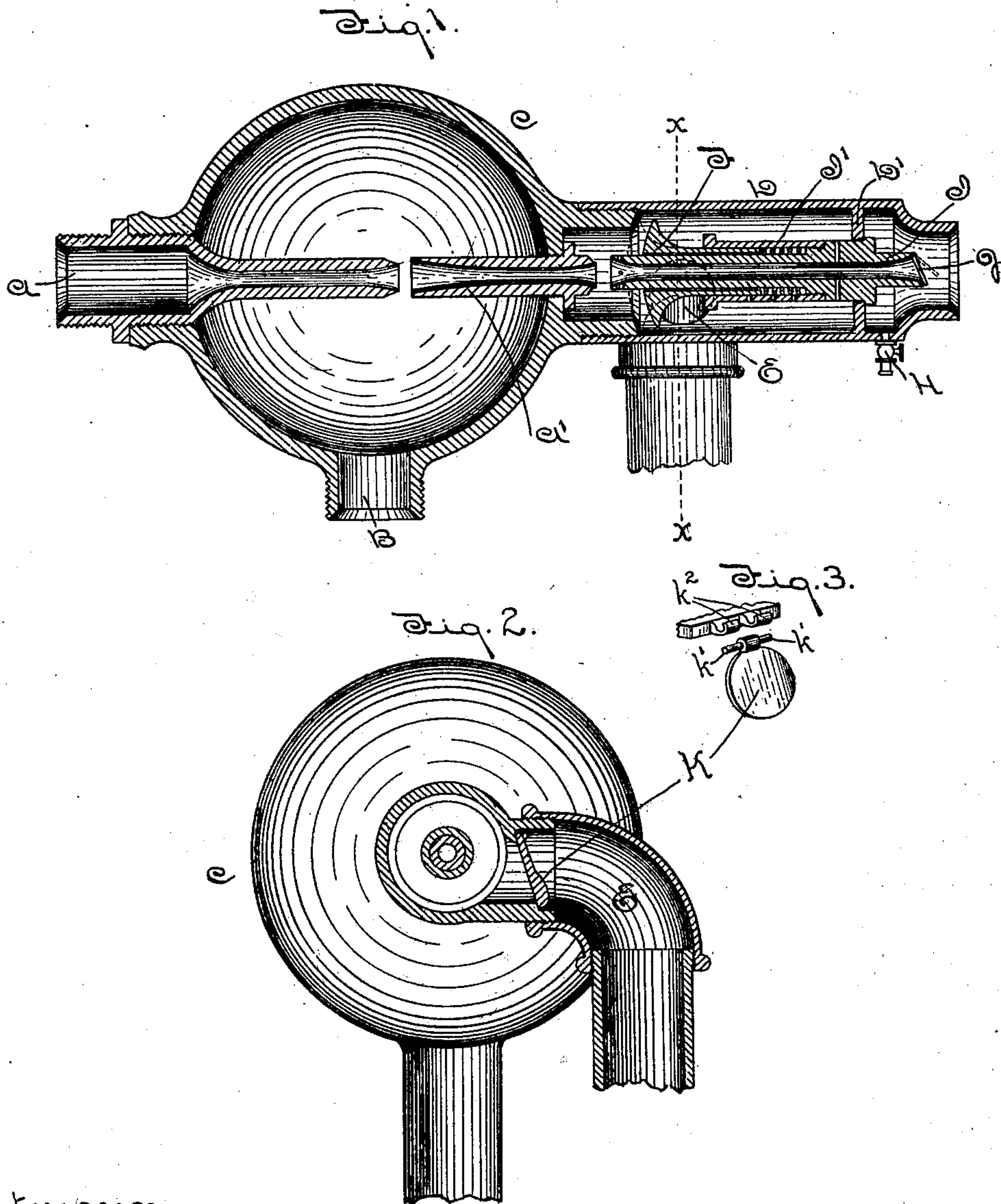
No. 693,553

Patented Feb. 18, 1902.

W. D. LABADIE.  
INJECTOR.

(Application filed Feb. 6, 1901.)

(No Model.)



Witnesses:  
George Oltsch  
Hugo Oltsch

Inventor  
William D Labadie  
by Theodore Dalton  
att'y.



# UNITED STATES PATENT OFFICE.

WILLIAM D. LABADIE, OF SOUTH BEND, INDIANA, ASSIGNOR OF ONE-HALF  
TO JOSEPH G. DUCK, OF MILWAUKEE, WISCONSIN.

## INJECTOR.

SPECIFICATION forming part of Letters Patent No. 693,553, dated February 18, 1902.

Application filed February 6, 1901. Serial No. 46,213. (No model.)

*To all whom it may concern:*

Be it known that I, WILLIAM D. LABADIE, a citizen of the United States, residing at South Bend, in the county of St. Joseph and State of Indiana, have invented certain new and useful Improvements in Automatic Injectors; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to an improvement in steam-injectors, and its object is to automatically exhaust the air from the chamber and create a vacuum therein before injecting the water into the boiler.

My invention consists of a chamber into which the water and steam are admitted and an additional chamber secured thereto having located therein an automatic valve which is controlled by the pressure of the water before the injecting process starts and acts to exhaust the air from the first-mentioned chamber and create a vacuum therein before the water is injected into the boiler.

Other objects and advantages will appear in the following description, and the novel features thereof will be pointed out in the appended claims.

In the drawings, Figure 1 is a vertical longitudinal section. Fig. 2 is a cross-section on the line  $x x$  of Fig. 1. Fig. 3 is a detail view showing the manner of mounting the valve in the overflow-pipe.

C represents a globular shell or casing having the opening B, through which the water is admitted, and the tube A, screwed within the casing and through which the steam is admitted. The inner end of this tube is contracted and in alinement with the tube A', screwed into the other side of the casing.

Secured to the shell or casing is a cylindrical chamber D, having a partition D', which supports the nozzle I and which nozzle is in alinement with the tubes A and A'. Connected with the chamber D is an overflow-pipe E and provided with a check-valve K, pivotally hung therein, a detail view of which is shown in Fig. 3 and which will be more fully described hereinafter. Mounted within the chamber D and upon the nozzle I is a

spring-pressed longitudinally-slidable valve F, which controls the port leading to the overflow-pipe E. The nozzle I is provided with an annular groove, in which is seated the spring I', and which spring is in engagement with the valve F and acts to normally throw the valve F forward and cut off connection with the chamber D and the overflow-pipe. The chamber C being filled with water and air and the steam being turned on causes the water to pass through the tubes and into the chamber D, forcing back the valve F and making its exit through the overflow-pipe E. This action causes a vacuum to form in the chamber C and draws the water into the same. As soon as air is excluded from the chamber C through the pipe E and the water is being properly taken up by the steam the valve F automatically closes by the spring tension and the overflow stops and allows the water to pass through the nozzle I and be injected into the boiler. As there is always more or less pressure from the boiler around the discharging end of the nozzle I, a petcock H is provided near the end of the chamber to relieve such pressure, and when this cock H is open it partially relieves the boiler-pressure and allows the stream of water to enter with less resistance. Upon the end of the cone I is pivotally mounted a check-valve J, which prevents the backward flow of the water from the boiler when the steam is turned off. As shown in Fig. 3, a check-valve K, pivotally hung in the overflow-pipe E, is provided with pintles  $k'$ , which engage the hooked bearings  $k^2$ , integral with the pipe. It will be seen that this valve is easily removed when desired, as when the water-pressure is reduced and not sufficient to cause the water to readily flow through the overflow-pipe, and by assuming an inclined position when closed makes it more sensitive to the action of the water than if it were vertical.

Having thus described my invention, I claim—

1. In an injector, the combination with a water-receiving chamber having steam-injecting tubes therein, of a communicating chamber having a nozzle mounted therein provided with an annular groove, a spring-pressed valve slidably mounted in said groove



and adapted to cut off connection with the chamber.

2. In an injector, the combination with a water-receiving chamber provided with steam-injecting tubes, of a communicating chamber having an overflow-pipe connected therewith and a nozzle provided with a sliding spring-pressed valve normally closed to cut off communication with the chamber and overflow-pipe, but adapted to be opened by the force of the water, means upon the nozzle to prevent the backward flow of water to the injector and means to relieve the back pressure from the boiler, substantially as shown and described.

3. In an injector, a chamber carrying steam-injecting tubes, and another chamber connected thereto carrying a nozzle, a valve pivotally hung upon the end of said nozzle, and a petcock attached to the shell of the chamber adjacent said valve, substantially as described.

4. In an injector, the combination with a water-receiving chamber having steam-injecting tubes therein, of a communicating chamber having an overflow-pipe connected therewith, and a nozzle provided with a slid-

ing spring-pressed valve normally closed to cut off communication with the chamber and the overflow-pipe, a removable check-valve pivotally hung within the overflow-pipe, means upon the nozzle to prevent the backward flow of water to the injector, and means to relieve the back pressure from the boiler, substantially as described.

5. In an injector, the combination with a water-receiving chamber having steam-injecting tubes therein, of a communicating chamber having an overflow-pipe connected therewith, and provided with integral hooked bearings, a check-valve pivotally hung upon the hooked bearings and adapted to be detached therefrom, a nozzle mounted in the communicating chamber and provided with a spring-pressed valve to control the flow of water to the chamber and overflow-pipe, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

WILLIAM D. LABADIE.

Witnesses:

GEORGE OLTSCH,  
MAGGIE OLTSCH.