

No. 670,148.

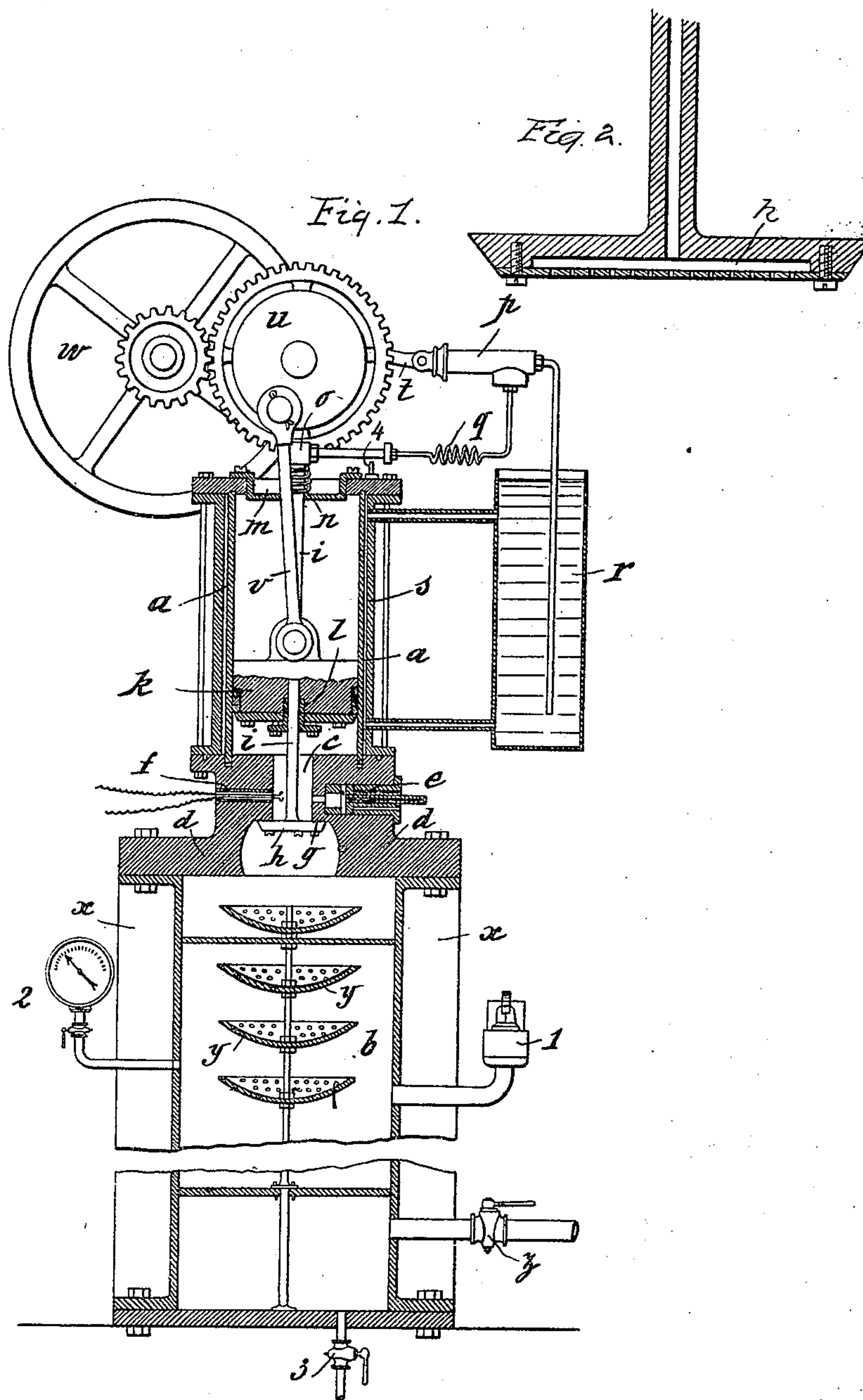
Patented Mar. 19, 1901.

W. J. CRUYT.

ACCUMULATOR FOR MIXED FLUIDS UNDER PRESSURE.

(Application filed Apr. 25, 1899.)

(No Model.)



WITNESSES:

Ella L. Giles
O. J. Cruyt

INVENTOR

William John Cruyt.
BY
Richardson

ATTORNEYS

UNITED STATES PATENT OFFICE.

WILLIAM JOHN CRUYT, OF BRUSSELS, BELGIUM.

ACCUMULATOR FOR MIXED FLUIDS UNDER PRESSURE.

SPECIFICATION forming part of Letters Patent No. 670,148, dated March 19, 1901.

Application filed April 25, 1899. Serial No. 714,455. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM JOHN CRUYT, engineer, a subject of the King of Belgium, residing at 80 Chausseé de Fleurgat, Brussels, in the Kingdom of Belgium, have invented a new and useful Improved Accumulator for Mixed Fluids under Pressure, (for which applications for patent were filed in Belgium on December 28, 1898, granted on December 31, 1899, No. 139,872, and in Germany on April 12, 1899,) of which the following is a full, clear, and exact description.

The accumulator for mixed fluid under pressure, composed of explosion-gases, explosive mixtures, and of steam serving to lower the temperature thereof, which forms the object of this invention, is distinguished by the particular manner in which the steam is formed by the injection of water in the condition of spray into the midst of the hot gases, which converts it into superheated steam, forming with the gases a homogeneous mixture, all the more perfect as the injection of the water is effected more simultaneously with the deflagration in the greatest possible proximity thereto. An example of an accumulator combining these conditions and which may be constructed either in vertical, inclined, or horizontal form is illustrated in the accompanying drawings.

In the drawings, Figure 1 is a central vertical sectional view of the apparatus with parts in elevation. Fig. 2 is a sectional view of the spraying-valve.

The accumulator consists of the explosive-mixture compressor *a*, communicating with the mixed-fluid receiver *b* by the intermediate combustion-chamber *c*, formed in the cover *d*, which joins the compressor and the receiver and in which are also formed, perpendicularly to the combustion-chamber, the smaller chambers *e* and *f*, the one containing a suitable mixing-chamber for the gases and the other an igniter, either incandescent or, as in the present instance, electric, with which whole arrangement the water-spray injector is combined for the purpose mentioned. This water-spray device *h* acts also as a discharge-valve for the combustion-chamber *c*, which it completely covers, having as its seat the shoulder *g*.

The spraying of the water is effected through

the construction of the valve *h*, which is in the form of a special kind of rose, in this sense that it is composed of two plates which rest against each other by their slightly-flanged edges and are joined together by small bolts or screws in such a way as to leave a free space between them of a quasi-capillary kind, whence the water under pressure is discharged in the form of a spray through a large number of perforations formed in the lower plate. As the water-supply of this capillary space should, by preference, be effected through the center of the upper plate of the valve *h*, it is carried out in the present instance by means of the hollow rod *i*, passing into the axis of the compressor *a*, the piston *k* of which is guided by a stuffing-box *l* (for the purpose of preventing any escape of gas) on the hollow rod *i*, which is itself guided at the top in the cover *m* of the head of the cylinder *a* and where it is surrounded by a spiral spring *n*, being supported, besides, by the rim *o* of the rod and serving to keep the discharge-valve *h* normally against its seating, from which it can be separated only by a pressure greater than that of the compression of the explosive mixture, which the spring *n* slightly dominates. Into the spraying-valve thus arranged the water is injected through the medium of a pump *p*, connected with the hollow rod *i* by the pressure-tube *q*, rendered elastic by means of a few coils, which enable it to follow, as required, the motion of the rod *i* under the action of the discharge of the gases. The pump *p* draws the water of injection from a reservoir *r*, which receives, by means of a suitable pipe arrangement always acting, the cooling-water from the casings of the compressor *a*, so that the water, already heated before its entry into the pump, continues to increase its temperature until issuing from the valve *h*—that is to say, upon contact with the deflagration gases, which convert it into superheated steam.

In order that the injection of the water may be effected simultaneously with the deflagration of the gases—that is to say, at the very moment of their discharge and when they are at their highest temperature—the rod *t* of the pump-piston is connected with an eccentric of the shaft which carries the crank-disk *u*, actuating by the rod *v* the compressing-piston

k by its engagement with the pinion of the fly-wheel w of a motor of any kind, so that the pressure on the piston of the pump p determining the injection of the sprayed water acts always at the moment when the piston k is at the dead-point—that is to say, at the moment of the deflagration which determines the discharge of the hot gases in the receiver b .

The receiver b , which consists of a steel cylinder surrounded by a non-conductor x , may be furnished in the interior with perforated cups or basins y , fixed at intervals on an axial rod and serving to collect and vaporize, in consequence of the high temperature obtained from the gases surrounding them, the particles of water passing eventually into the receiver without having been vaporized immediately at the entrance. On the exterior the receiver is furnished with the tap z for the mixed fluid, the safety-valve 1, the manometer 2, and also the purging-cock 3.

Assuming the crank-disk u to be actuated by the fly-wheel w , it will be observed that the piston k in ascending draws up the explosive mixture by means of the mixer e , while at the same time the pump p draws up the water of injection, while the valve h remains in the position of rest, held to its seating by the spring n . In descending the piston k compresses the explosive mixture in the chamber c without, however, affecting the valve h , since this degree of compression does not exceed the power of the spring n ; but in determining the deflagration by the igniter f at the moment when the piston is at the dead-point

the piston cannot be raised in spite of the high pressure created by the formation of the combustion-gases, the whole body of which extends into the receiver, removing the valve h from its seating to an extent sufficient to allow of the passage of the gas, a movement in which, however, the valve is limited by a stop or abutment 4, for example. At the moment when the valve is raised the pressure of the piston k acts on the water drawn up by the pump, which injects it in its spray form at the moment of the passage of the gases, forming with it the mixed fluid serving to supply any kind of expansion-motor, with the fly-wheel w actuating the compressor and the pump.

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

In combination, the cylinder a , the combustion-chamber c , the accumulator-chamber, the valve h acting as a discharge-valve between the combustion-chamber and the accumulator-chamber, the tube leading to said valve h , the piston k through which the tube extends, the spring for controlling the movement of the tube and valve, and the pump connected with the tube with means for operating the pump at the moment the discharge-valve opens, substantially as described.

In witness whereof I have hereunto set my hand in presence of two witnesses.

WILLIAM JOHN CRUYT.

Witnesses:

AUG. JOERISSEN,
GREGORY PHELAN.