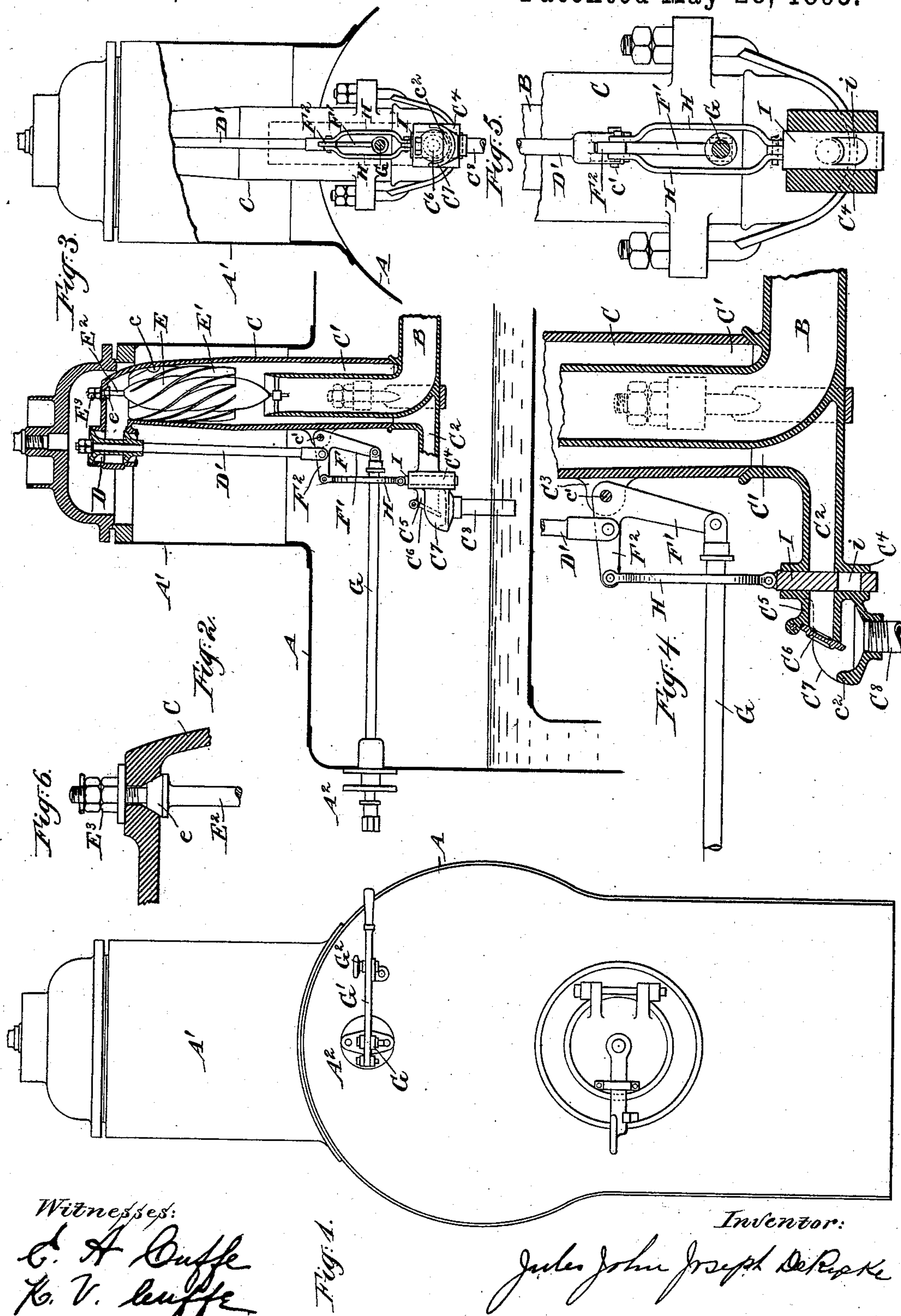


J. J. J. DE RYCKE.
SEPARATOR.

Patented May 28, 1895.



UNITED STATES PATENT OFFICE.

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SEPARATOR.

SPECIFICATION forming part of Letters Patent No. 539,859, dated May 28, 1895.

Application filed August 31, 1894. Serial No. 521,806. (No model.)

To all whom it may concern:

Be it known that I, JULES JOHN JOSEPH DE RYCKE, a citizen of the United States, residing in Brooklyn, county of Kings, and State of New York, have invented a certain new and useful Improvement in Separators, of which the following is a specification.

My improvement relates to separators placed within steam boilers for the purpose of furnishing steam from which the entrained water and moisture has been eliminated, and relates particularly to an attachment to said separator whereby the discharge of the separated water is controlled from the exterior of the boiler. It is especially adapted for use in the boilers of railway locomotives.

It consists of a separator mounted in the throttle pipe of the boiler and connections as a rod leading through the boiler shell for operating a suitable drainage valve.

I prefer to use a connection from the throttle operating mechanism so that the drainage valve will open as the throttle valve opens and close as the throttle valve closes.

The accompanying drawings form a part of this specification and represent what I consider the best means of carrying out the invention.

Figure 1 is an end view of a boiler. Fig. 2 is a central vertical longitudinal section of the upper portion of the same, partly in elevation. Fig. 3 is a corresponding vertical transverse section. The remaining figures are on a larger scale. Fig. 4 is a vertical section of a portion corresponding to Fig. 2. Fig. 5 is a front view of a portion similar to Fig. 3, partly in vertical section; and Fig. 6 is a vertical section of a portion on a still larger scale.

I have shown the invention applied to a locomotive boiler of the usual kind.

A is the shell of the boiler; A', the steam dome; B, the dry pipe, which leads to the exterior of the boiler; C, the throttle pipe, and D the throttle valve.

C' is an annular pocket surrounding a vertical extension of the dry pipe and C² a passage leading therefrom.

In the upper portion of the throttle pipe is secured a separator. I prefer to use the form shown in a patent to me, dated Decem-

ber 24, 1889, No. 417,774, consisting of a conical body E having helical wings E' adapted to throw the water carried over by the steam, outward against the surface of the pipe and downward into a suitable pocket.

The cone of the separator is supported by a rod E² extending through the top of the throttle pipe and secured by nuts E³. A conical collar e on the rod fits into a corresponding recess in the throttle pipe and insures against leakage at this point. It is prevented from turning by the lug c cast in the interior of the throttle pipe and engaged by one of the wings.

The throttle valve D is mounted on the rod D' and performs its usual functions.

F is the throttle bell crank turning on a pin c' set in lugs C³ extending from the exterior of the pipe C. The lower arm F' of this bell crank is connected in the ordinary manner to the throttle stem G extending out through a stuffing box A² and connecting to the throttle lever G' controlled by the adjustable stop G². The upper arm F² is longer than usual and carries at its end two links H H curved as shown to clear the throttle stem G. They are connected to a suitable eye on the top of a sliding drainage valve I to be described. The rod D' is connected to this arm F² at the usual distance from the pin c' and opens and closes the throttle valve D as the throttle stem G is moved outward and inward.

The passage C² leading from the annular pocket C' is controlled by the drainage valve I supported by the links H H, and sliding in the way or guide C⁴ which latter is a rectangular opening extending completely through an enlargement on the drainage pipe C² allowing the valve I complete freedom of motion to any required extent. The opening in the valve I is in the form of a crescent, the upper edge of which coincides with the lower edge of the passage so that a slight vertical motion will uncover a comparatively large area for the escape of any water which may have accumulated in the pocket C'.

The outer end or nozzle C⁵ of the passage C² is covered by a check valve C⁶ opening outward to allow water to flow past it when the valve I is raised, so long as the steam press-

ures in the boiler and in the throttle pipe are equal, and to close immediately when the pressure in the throttle pipe falls.

5 C⁷ is a shield below and projecting beyond the nozzle C⁵. It is provided with a dam or ledge c² and a drain pipe C⁸ extending down nearly to or below the water line. The object is to allow the water to drain away from the nozzle without danger of being picked up by
10 the current of steam rushing upward toward the throttle valve.

The pipe C⁸ is of sufficiently large diameter to allow the steam set free at the water line within the area inclosed by the pipe to escape
15 unobstructedly through the center while the water descends in a thin film on the interior of the pipe.

It is important that the valve I is free to continue its upward movement after it is "wide
20 open," and also that it continues to sink after it has closed the passage C². This allows for wear on the valve D, and also allows the valves D and I to be so set relatively to each other that, while both move together, the drainage
25 valve shall open last and close first, insuring that steam shall not escape through the passage C² and pocket C' to the cylinders of the engine.

Modifications may be made in the forms and
30 proportions.

Although I have described the invention as applied to a boiler of the locomotive type, it will be understood that it may be applied to a boiler of any ordinary construction.

35 The apparatus will work with some success without the check valve C⁶ or the shield C⁷.

The opening *i* in the valve I may be varied and the valve set to give more or less lap as may be found necessary or expedient.

40 The drainage valve may be controlled and operated by a rod similar to but independent of the throttle valve gear if such shall be deemed advisable in any case, but I consider the method shown and described as the best
45 means of carrying out the invention.

I claim as my invention—

1. A separator located within a steam boiler, a drainage pocket in which the water is collected, a passage leading such water from said
50 pocket to the unevaporated water in the boiler a valve controlling said passage, and means as a rod extending through the boiler shell for operating said controlling valve all combined substantially as herein specified.

55 2. A separator located within the throttle pipe of a steam boiler between the throttle valve and the dry pipe, a drainage pocket in which the water is collected, a passage returning such water a valve controlling the pas-
60 sage, and means as a rod extending through the boiler shell for operating said valve in combination with each other and with a shield arranged as shown to allow the drainage water

to escape without being exposed to the ascending current of steam all substantially as 65 herein specified.

3. The combination in a steam boiler of a separator mounted in the throttle pipe between the throttle valve and the dry pipe, a passage for the water eliminated by the sep- 70 arator, a drainage valve controlling such passage, a throttle valve controlling the throttle pipe, and connections from the said throttle valve to the said drainage valve so arranged that the act of opening the throttle valve shall 75 also open the drainage valve all substantially as herein specified.

4. In a steam boiler a separator mounted in the throttle pipe between the throttle valve and the dry pipe, a passage for the water 80 eliminated by the separator, a drainage valve controlling such passage, a throttle valve controlling the throttle pipe, connections as the throttle bell crank, the links and throttle valve rod for imparting motion to both valves in 85 combination with each other and with a check valve as C⁶ all substantially as herein specified.

5. In a steam boiler, a separator, a passage for the water eliminated by the separator, a drainage valve controlling such passage, a 90 throttle valve controlling the throttle pipe, connections as the throttle bell-crank, the links and throttle valve-rod for imparting motion to both valves, in combination with each other, and with means, as the open way 95 C⁴ through which the drainage valve may slide freely to compensate for wear of the throttle valve, all substantially as herein specified.

6. In a steam boiler a separator mounted in the throttle pipe, a passage for the water elimi- 100 nated by the separator, a drainage valve controlling such passage, a throttle valve controlling the throttle pipe, connections as the throttle bell crank, the links and throttle valve rod for imparting motion to both valves, in 105 combination with each other and with a shield C⁷ and drain pipe C⁸ arranged as shown to allow the water to escape without exposing it to the ascending current of steam all sub- 110 stantially as herein specified.

7. A separator as E E' pipe C pocket C' pas- 115 sage C² open way C⁴ in combination with each other and with the drainage valve I fitted to slide in said way and having the crescent shaped opening *i* and means as the links H 115 for moving said valve all substantially as herein specified.

8. The separator E E' supporting rod E² conical collar *e* and nut E³ combined with the throttle pipe C, and lug *c* all substantially as 120 herein specified.

JULES JOHN JOSEPH DE RYCKE.

Witnesses:

E. A. CUFFE,
K. V. CUFFE.