

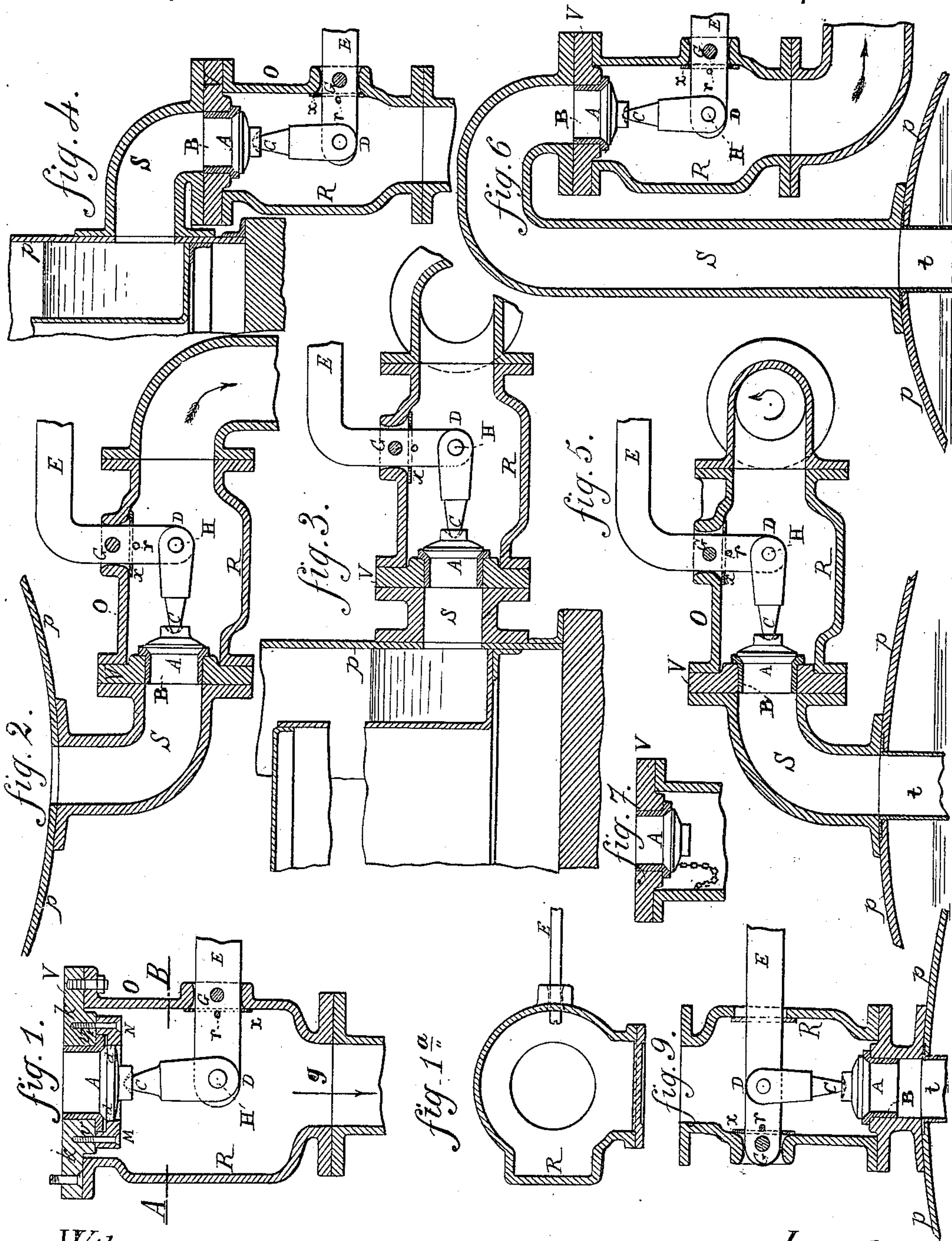
(No Model.)

2 Sheets—Sheet 1.

J. BARBE, E. FAUVEL & P. CHALON.  
SAFETY VALVE.

No. 350,285.

Patented Oct. 5, 1886.



Witnesses,  
*Joseph Barbe*  
*H. Roussel*

Inventors,  
*Joseph Barbe*  
*E. Fauvel*  
*P. Chalon*



(No Model.)

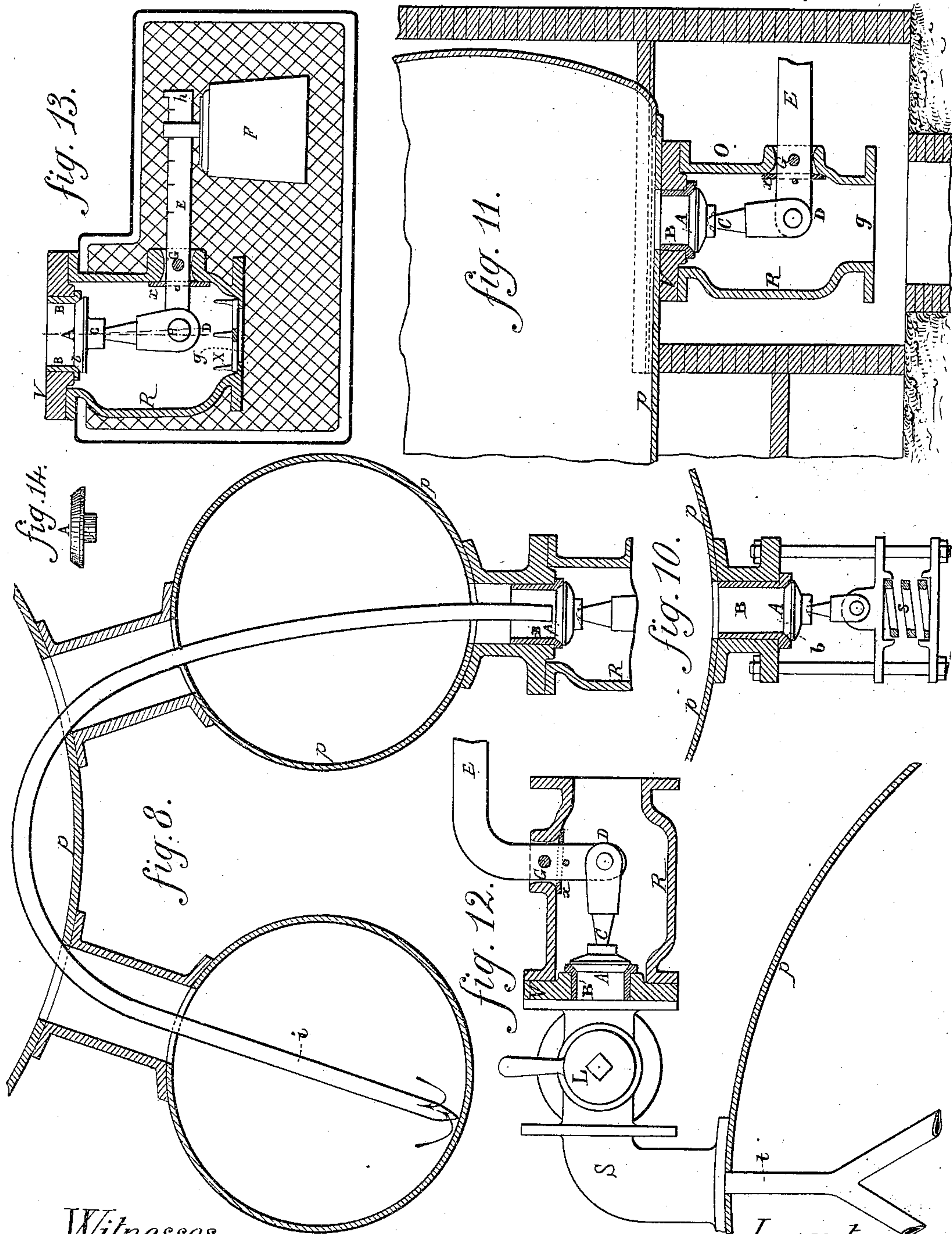
2 Sheets—Sheet 2.

J. BARBE, E. FAUVEL & P. CHALON.

SAFETY VALVE.

No. 350,285.

Patented Oct. 5, 1886.



Witnesses,  
*J. J. Jones*  
*H. Koush*

Inventors,  
*J. Barbe*  
*E. Fauvel*  
*P. Chalon*



# UNITED STATES PATENT OFFICE.

JOSEPH BARBE, EDMOND FAUVEL, AND PAUL CHALON, OF PARIS, FRANCE.

## SAFETY-VALVE.

SPECIFICATION forming part of Letters Patent No. 350,285, dated October 5, 1886.

Application filed June 25, 1886. Serial No. 296,255. (No model.) Patented in France November 18, 1885, No. 172,368, and in Belgium November 18, 1885, No. 70,901.

*To all whom it may concern:*

Be it known that we, JOSEPH BARBE, EDMOND FAUVEL, and PAUL CHALON, citizens of France, residing at Paris, in the Département of the Seine, have invented a new and useful Improvement in Safety-Valves, (for which we have obtained a patent in France, No. 172,368, bearing date November 18, 1885, and in Belgium, No. 70,901, bearing date November 18, 1885,) of which the following is a specification.

This invention relates to the construction of safety-valves which allow the water to escape when the pressure in the boiler has reached a predetermined limit. Such a valve is shown and described in Letters Patent of the United States No. 328,451, granted to the above-named Joseph Barbe October 20, 1885.

All safety-valves known or employed prior to the invention described in the above-mentioned patent were arranged to prevent explosions by blowing off steam only, which valves afford very inadequate protection against explosions.

By means of the improvements hereinafter described valves constructed to let out the water may be applied to steam generators or boilers of all descriptions.

In the accompanying drawings, which form a part of this specification, Figure 1 shows in vertical section, and Fig. 1<sup>a</sup> in cross-section on line A B, a safety-valve constructed in accordance with the invention. Figs. 2 to 13 are views in vertical section illustrating different modes of applying the invention, and Fig. 14 is a detail of the valve proper.

The valve proper, A, is formed of a plain disk or cone ground to fit accurately its seat B, against which it is pressed by a pointed link, C D, pivoted at H to the lever E. Lever E is pivoted at G, and at its outer end it carries a counter-weight, F. The lever E turns on its center when the pressure in the boiler p exerted upon the inner surface of the valve becomes sufficient to overcome the resistance applied on the exterior of the valve by means of the counter-weight through the intervention of the lever E and link C D. When, owing to excess of pressure, the valve A has been moved away from its seat B, the pointed

piece or link C D, which is slightly inclined on its axis, as shown in Fig. 13, assumes a still more inclined or oblique position, and the valve A, which is not guided in any way, cannot return to its original position, but is permanently removed. Thus the interior of the boiler is placed in direct communication with the exterior by the entire area of the orifice previously covered by the valve. Consequently, if this orifice be connected with the water which partly fills the boiler, the water is instantly discharged and the primary source of explosions is removed. It is sufficient to load the lever E suitably to insure that the valve will act with certainty whenever the pressure within the boiler exceeds a certain limit.

In order to reduce to a minimum the leakage at the opening where the lever E passes into the box or case O, the opening is covered by a washer, x, which may be attached to the lever E by a pin, r, as shown in Figs. 2, 3, and 5, or otherwise. This washer is preferably placed on the inside of the box or case O, so that the pressure therein, when the water is escaping, may force the washer more tightly against the side of the box. Preferably the lever and counter-weight are arranged, as shown, outside the box or case inclosing the valve; but if desired for any purpose they could be placed entirely in said box. The washer x may be placed at the side of the box or at the bottom. For portable boilers a spring, s, may be employed instead of the counter-weight, as shown in Fig. 10; but for all stationary boilers the counter-weight is preferred.

In order that the pressure exerted by the link upon valve A may suffice to prevent the latter from leaking, it is necessary to fit and grind the conical part accurately to its seat. To effect this a circular guide, M N, (see Fig. 1,) may be fixed temporarily to the flanged union k by screws v v'. The valve is thereby guided at its cylindrical part d d, and the grinding is performed in a regular or uniform manner. The circular guide is afterward removed, it being essential that the valve should be free from any guide, so that it may act certainly and efficiently.



These valves are designed to be applied to boilers or generators of any description, and are of uniform pattern. The boxes are connected to the generators by junction pieces or tubes S, which are of different form, according to circumstances. By properly constructing the junction-piece, the valve may be placed vertically or horizontally, and above or below the boiler or at the side thereof, as clearly shown in the drawings. The junction or connecting tube S may be connected either to a plate of the boiler in contact with the water, or to one in contact with the steam. In the former case the action of the valve may be supplemented by a siphon. When applied to the upper part of the boiler *p*, as shown in Figs. 5, 6, and 9, the latter is provided with a long pipe, *t*, descending to the lower part of the boiler. In place of a special pipe the feed-pipe may be utilized for this purpose. In all cases the valve-box is placed in the most convenient position either vertically or horizontally, the lever E being bent accordingly. The pivot of the latter should be on a part independent of the boiler.

To facilitate the fall of the valve A, it is provided with a shallow concave recess for the reception of the rounded point of link CD, which engages loosely therewith. The latter should not be steadied on its axis or penetrate too far into valve, as this would interfere with the operation of the valve. Lever E is preferably graduated, and it may be provided with a heel, *h*, at its outer extremity, as shown in Fig. 13, to prevent the counter-weight from slipping off; but the heel may be omitted and the counter-weight arranged so as to slip off when the lever falls, thus preventing the injury that might be occasioned by the end of the lever flying up and striking the valve.

It is desirable to prevent the valve from falling, after it has opened, into the outlet-passage *g* and stopping it up. For this purpose a grating, X, is placed over the hole in the lower part of the box, said grating being provided with projections standing up to guard the entrance to the passage. This construction is shown in Fig. 13. Any other suitable means may be adopted for the same purpose—as, for instance, the valve may be fastened by a short chain, as shown in Fig. 7.

In order to permit freedom of movement to the parts without increasing more than necessary the size of the box or case O, the latter is provided with a hollow or depression, R, opposite the end of lever E, and of sufficient size to allow the free movement of the link CD and the fall of the valve A.

The entire apparatus may be inclosed in a grating or the like, as shown in Fig. 13, to prevent tampering by the stoker or others. In the case of externally-fired boilers the apparatus, being necessarily placed in the flue, is protected from the flame by a suitable screen or partition. (See Fig. 11.)

Elephant boilers may be emptied by means of a single safety-valve applied to one of the

lower chambers by simply connecting the chambers by a tube, *i*, laid loosely on the plates, Fig. 8. The tube *i* should, as shown, extend down to the outlet in close proximity to the valve. When the latter is removed by excessive pressure, the discharge of water and steam through the outlet around the orifice of the tube *i* produces a suction in the latter, (such as is produced in an injector,) whereby the contents of the left-hand cylinder or element of the boiler are drawn through said tube. In case the valve is applied to the upper part of such a boiler the same arrangement may be employed, or, as shown in Fig. 12, the valve may be provided with a bifurcated pipe, *t*, descending into the two lower chambers.

A stop-cock, L, Fig. 12, may be interposed between the valve and the boiler, in order to enable access to be conveniently obtained to the apparatus when the boiler is under pressure.

We claim—

1. The combination of the box or case having openings at opposite ends for communication with the boiler and with the discharge-passage respectively, a valve within said box or case, a lever and counter-weight for applying suitable pressure to said valves, and a link loosely jointed to said lever within said case or box and having a pointed end bearing against said valve, said box or case having a hollow or depression opposite the end of said lever, as set forth.

2. The combination, with a boiler, of a tubular connection or union, a valve box or case connected therewith, an inclosed valve adapted, when the pressure in the boiler exceeds the determined limit, to open and discharge all the water therefrom, a link bearing on the head of said valve and being loosely jointed to a lever carrying a counter-weight, and being also inclined to the horizontal, so as to readily fall over when the valve is opened, substantially as described.

3. The combination of the valve having a concave head, the link having a rounded point bearing thereon and being loosely jointed to its support, and means for applying pressure to said valve through said link, substantially as described.

4. The combination, with a boiler, of the safety-valve applied to the upper part of the same and so held to its seat that when once removed it will not return to close the valve-orifice, and a pipe or tube descending from the valve-orifice to the lower part of the boiler, so that when the valve is opened by excessive pressure the water will be discharged through said pipe, substantially as described.

5. The combination of the valve adapted, when opened, to fall permanently away from its seat, the box or case inclosing said valve and having an opening for communicating with the boiler, and on the opposite side a discharge-opening, and means for preventing



the valve from falling into and closing said discharge-opening, substantially as described.

6. The combination of the valve, the valve-box, the link bearing on said valve and holding it in place, the lever to which said link is jointed passing through an opening in said box and carrying on its outer end a counterweight, and a washer or plate for making a tight joint where the lever passes through the box, substantially as described.

In testimony whereof we have signed this specification in the presence of two subscribing witnesses.

JOSEPH BARBE.  
EDM. FAUVEL.  
P. CHALON.

Witnesses:

H. YOSSE,  
A. ROUSSEL.

It is hereby certified that the name of one of the patentees in Letters Patent No. 350,285, granted October 5, 1886, upon the application of Joseph Barbe, Edmond Fauvel, and Paul Chalou, of Paris, France, for an improvement in "Safety-Valves," should have been written and printed *Paul Chalou* instead of "Paul Chalon;" and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed, countersigned, and sealed this 14th day of December, A. D. 1886.

[SEAL.]

D. L. HAWKINS,  
*Acting Secretary of the Interior.*

Countersigned:

R. B. VANCE,  
*Acting Commissioner of Patents.*