

E. ECKMANN.
STEAM REGENERATIVE ACCUMULATOR.
APPLICATION FILED SEPT. 23, 1908.

969,257.

Patented Sept. 6, 1910

2 SHEETS—SHEET 1.

Fig. 1

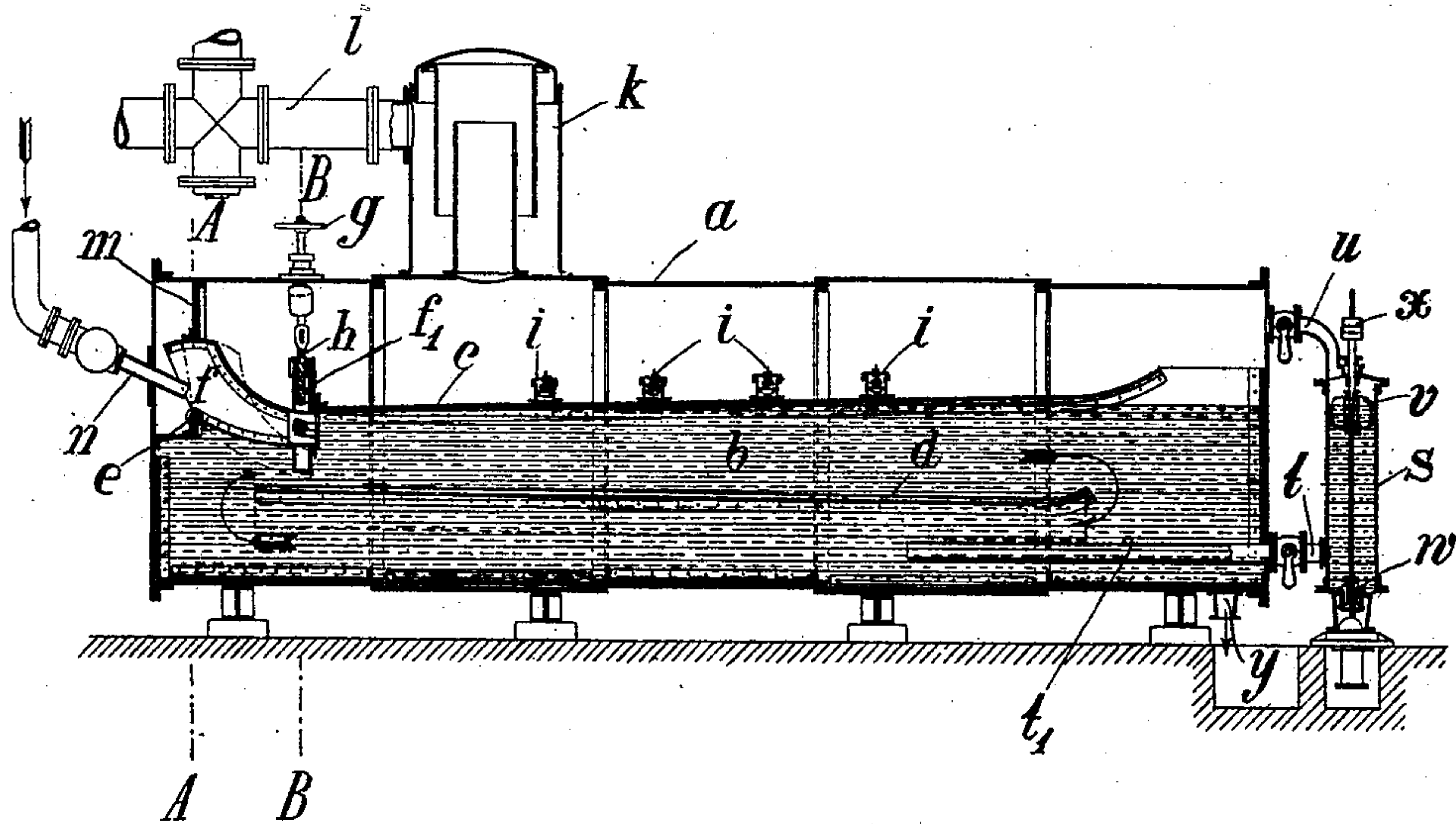


Fig. 2

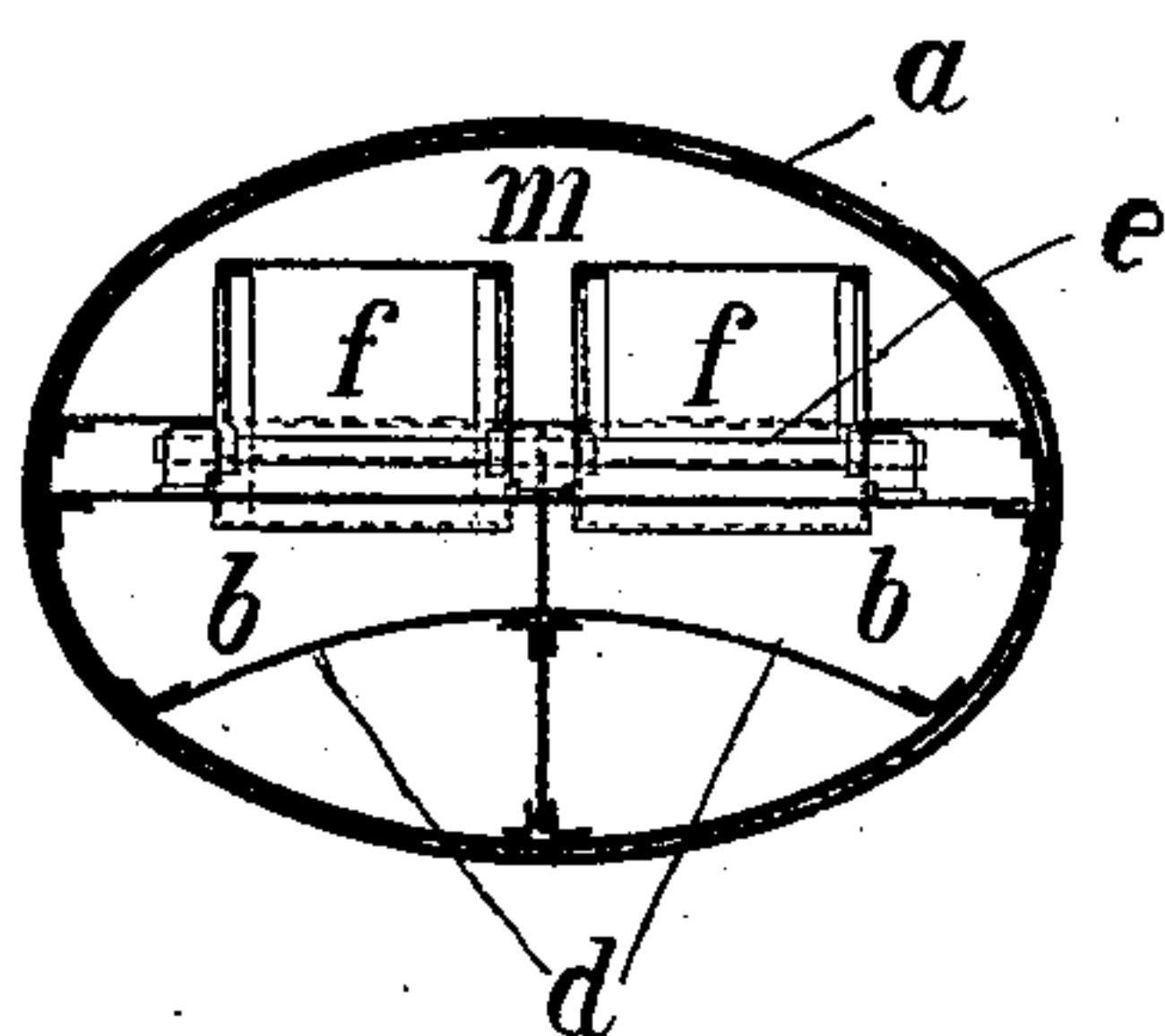
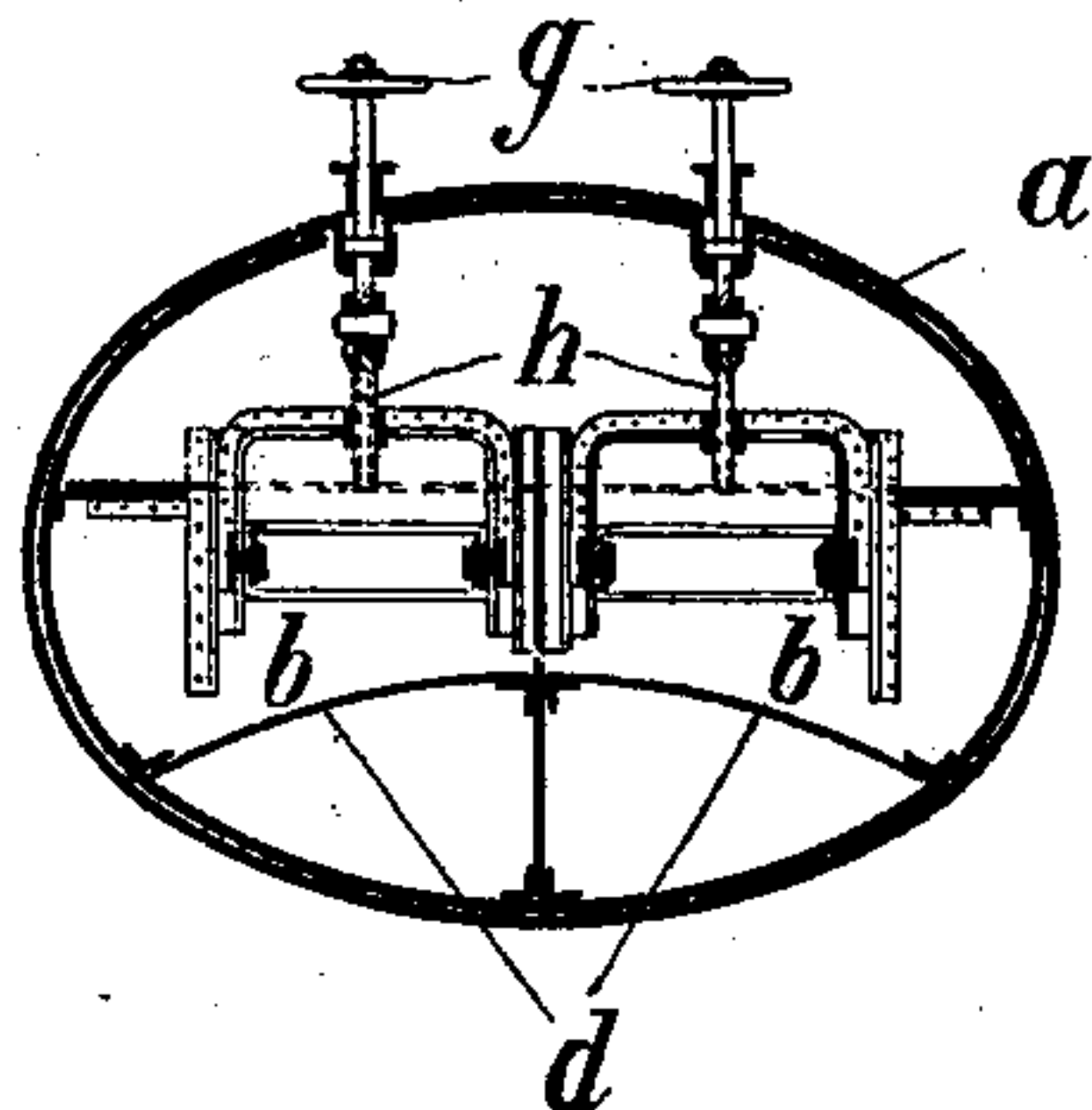


Fig. 3



Witnesses:
A. E. Babcock
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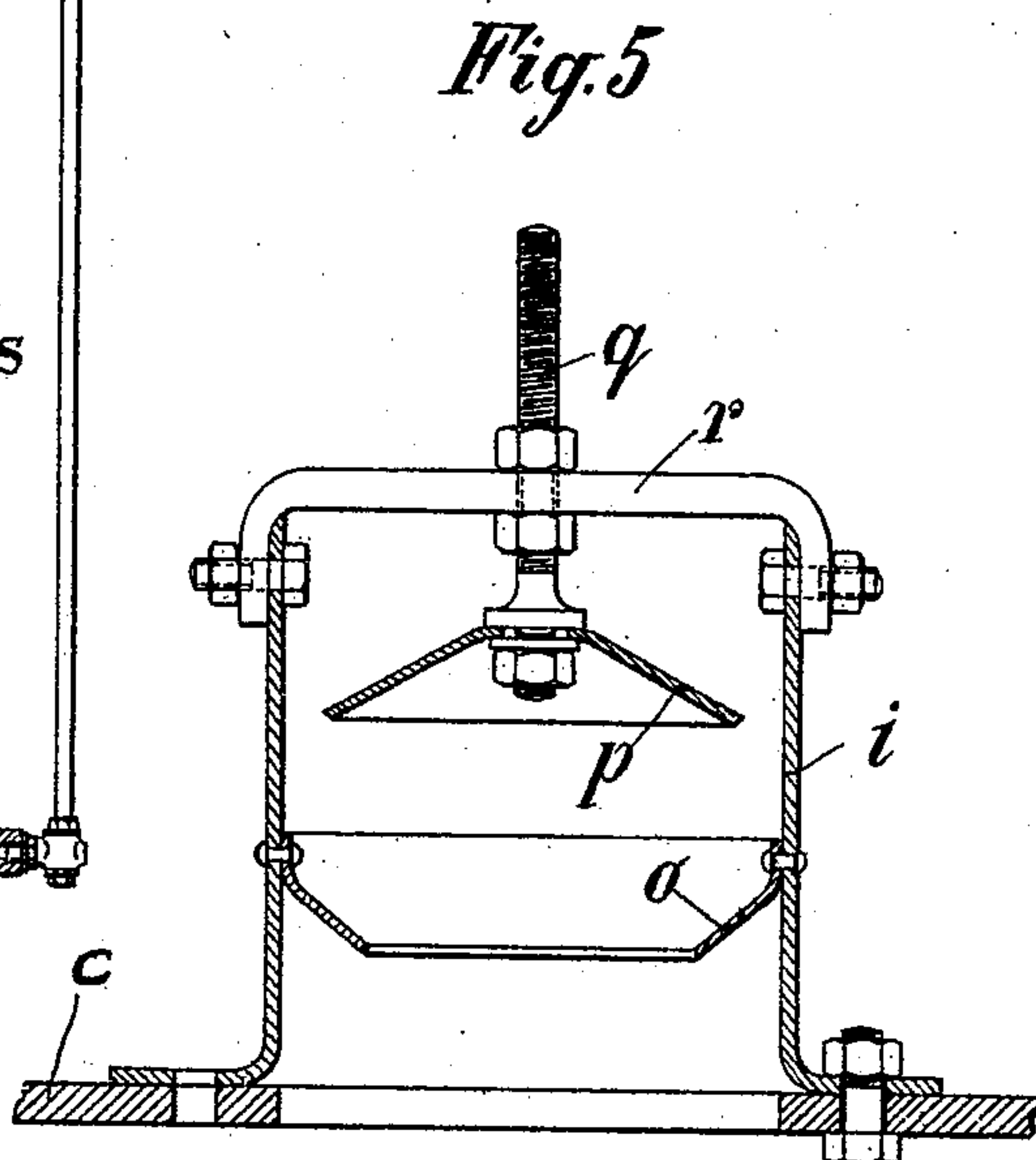
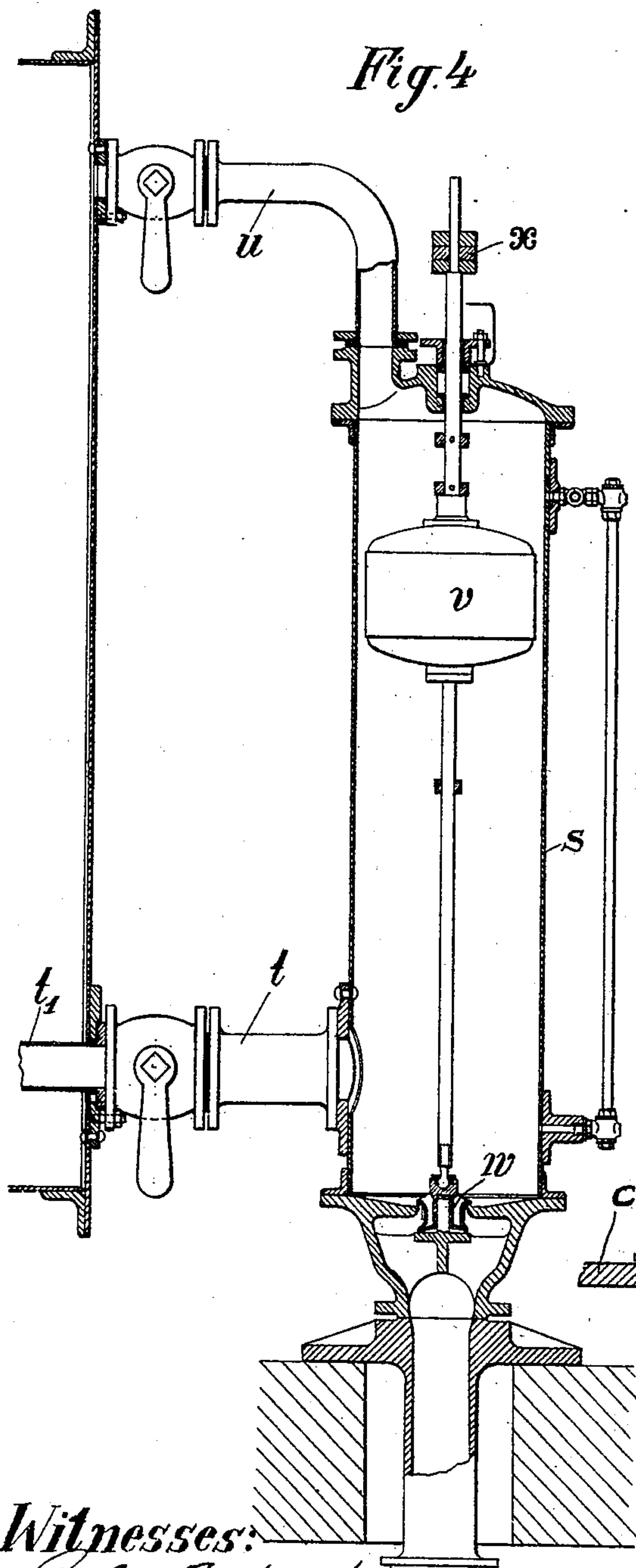
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UNITED STATES PATENT OFFICE.

EMIL ECKMANN, OF NEUBECKUM, GERMANY.

STEAM REGENERATIVE ACCUMULATOR.

969,257.

Specification of Letters Patent.

Patented Sept. 6, 1910.

Application filed September 23, 1908. Serial No. 454,428.

To all whom it may concern:

Be it known that I, EMIL ECKMANN, a citizen of the German Empire, residing at Neubeckum, in the Province of Westfalia and Kingdom of Prussia, Germany, have invented certain new and useful Improvements in Steam Regenerative Accumulators; 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.

One form of apparatus according to the present invention is illustrated, by way of example, in the accompanying drawing, in which:—

Figure 1 is a longitudinal section of the accumulator, Fig. 2 a cross-section of the same on the line A—A of Fig. 1, and Fig. 3 a cross-section on the line B—B of Fig. 1. Fig. 4 shows to an enlarged scale the water-level regulator in vertical section, and Fig. 5 a regulating valve in vertical section.

In the shell *a* of the accumulator a trough-shaped channel *b b* is formed, the bottom *d* of which is open at both ends and thus constituting a deflector for the current of water and steam in said water space. The upper wall or partition *c* or roof of the channel and water space rises somewhat behind and is open at the back end. It separates the water-space of the accumulator from the steam-space of the same. At the front end in a vertical wall *m* two shovel-shaped steam inlet passages *f* are pivotally supported at *e*, into the wide back openings of which the steam is introduced through the pipes *n*. The tight fit of the passages *f* in the wall *m* as well as the latter itself prevent the steam from passing directly from the passages *f* backward into the steam-space. The front ends of the passages *f* open below the wall *c* into the water-space and are adjustable in height by means of the hand-wheel *g* and spindle *h*, so that the steam can be caused to enter as desired more or less below the water-level in order to cause it to overcome more or less resistance in the water for the purpose of regulating the pressure of the steam. A wall *m* connected with the passages *f* fits during the height-adjustment of the passages against the wall *c* and prevents the passage of steam at this place into the steam-space.

In the upper wall *c* of the trough-shaped channel there are provided valve-like outlet-

devices *i* one behind the other, which devices according to requirement sooner or later give an outlet into the steam accumulating space to the steam bubbles in the water space and consequently serve to regulate the steam pressure, the outlet opening at each device *i* being greater or less according to its adjustment below stated. According to the construction illustrated, particularly by Fig. 5, each of these valves consists of a short casing *i* open above and connected with the wall *c*, in which casing a substantially funnel-shaped valve-seat *o* is arranged, and of an umbrella-like valve-body *p* which by means of a screwed spindle *q* is so guided in a bridge *r* secured on the casing *i* that it can be adjustable in height. The adjustment of the outlet valves *i* must in the case of the form shown be effected from the interior of the apparatus before the commencement of the running of the plant. If these valves be adjusted say as in Fig. 5 they will let the steam pass from the channel *b b* as rapidly as it comes into said channel, but if the steam come in large quantities under pressure and therefore goes out through the devices *i* in irregular amounts instead of in a steady volume this evil may be corrected by adjusting the valve *p* nearer the valve-seat *o* according to the amount of steam being introduced into the channel *b b*. Of course this may oftentimes be judged or ascertained from the style of engine from which it is to receive exhaust steam. The water-level in the accumulator is always kept at such a height with the aid of a suitable regulating device that the steam bubbles cannot pass into the steam-space along a path other than that through the outlet-valves *i*. From said steam space the steam ascends into a steam-dome *k* and passes thence through an outlet tube *l* to the motor. In the example illustrated, this regulating device consists of a vertical cylindrical receptacle *s* which is connected by means of the unions *t, u* with the water-space and the steam-space of the accumulator. In the receptacle *s* a float *v* is guided so as to be capable of moving vertically, the lower guide-rod of which is connected with a valve *w* while the upper guide-rod carries an adjustable load *x*. If the water-level in the accumulator mounts too high, then the float *v* in the receptacle communicating with the accumulator is raised and the valve *w* thereby opened, so that water flows away

until the water-level reaches its normal height and until the float has closed the valve.

The union t is connected with a fairly long pipe t^1 which runs horizontally inside the accumulator and the end of which is situated in a zone of the accumulator in which the flow of the water is less violent than at the back end of the bottom of the accumulator, so that violent fluctuations in the water-level regulator are avoided. A closable union y arranged at the back end of the accumulator at the deepest part of the same serves to empty the accumulator.

The steam is led to the secondary machine through the pipe l connected to the steam-dome k .

What I claim as my invention and desire to secure by Letters Patent is:—

1. An accumulator shell for steam regenerators having its interior divided into a water space and a steam space by the top of the former, said spaces communicating at one point only, in combination with valves in said top which may be opened when the pressure of the steam below them reaches a certain degree, means for supplying steam to the water compartment and means for regulating the depth below the surface of the point of such supply for the purpose set forth.

2. An accumulator having water and steam spaces and means for permitting the passage of steam from the latter to the former valves opening additional passages between them, means for supplying steam to said water space and a deflecting plate arranged in said water space and dividing it into parts but permitting the passage of water around its ends.

3. In combination with an accumulator shell and a deflecting plate arranged within the same and providing water passages at both ends, a partition dividing the interior of said shell into a water space containing said deflector and an upper steam space, means for supplying steam to said water space, means for permitting steam under

pressure to escape from said water space to said steam space and means for regulating the water-level, said regulating means being in connection with said steam space, and comprising a tube adapted to admit water and extending far under said deflector to a point where the water is less agitated than at the ends of the water space.

4. An accumulator comprising a water-space, a steam-space and means of communication between them, in combination with a steam pipe, a tapering inlet passage receiving said steam and having an adjustable inner end for discharging it into said water space and means for adjusting said end of the passage to vary the depth at which the steam therefrom will enter the water and the degree of resistance encountered substantially as set forth.

5. An accumulator provided with a water-space, in combination with a double channel arranged within the same, a pair of steam inlet passages discharging into the water space above said channel and having their inner ends vertically adjustable and means for supplying steam to said inlet passages substantially as set forth.

6. An elongated horizontal accumulator shell, in combination with a steam dome and outlet pipe above the same, a partition dividing the interior of said shell into a steam space communicating with said dome and a water space below said steam space, valves making communication between said spaces, means for adjusting said valves, adjustable means for supplying steam to said water space, a water-level regulator connected to both spaces and a deflector arranged in said water space but having water passages at each end substantially as set forth.

In testimony whereof, I have signed my name to this specification in the presence of two subscribing witnesses.

EMIL ECKMANN.

Witnesses:

HENRY HASPER,
WOLDEMAR HAUPT.