

No. 672,127.

Patented Apr. 16, 1901.

W. P. KIDDER.

AUTOMATIC BOILER FEED APPARATUS.

(Application filed July 21, 1900.)

(No Model.)

3 Sheets—Sheet 1.

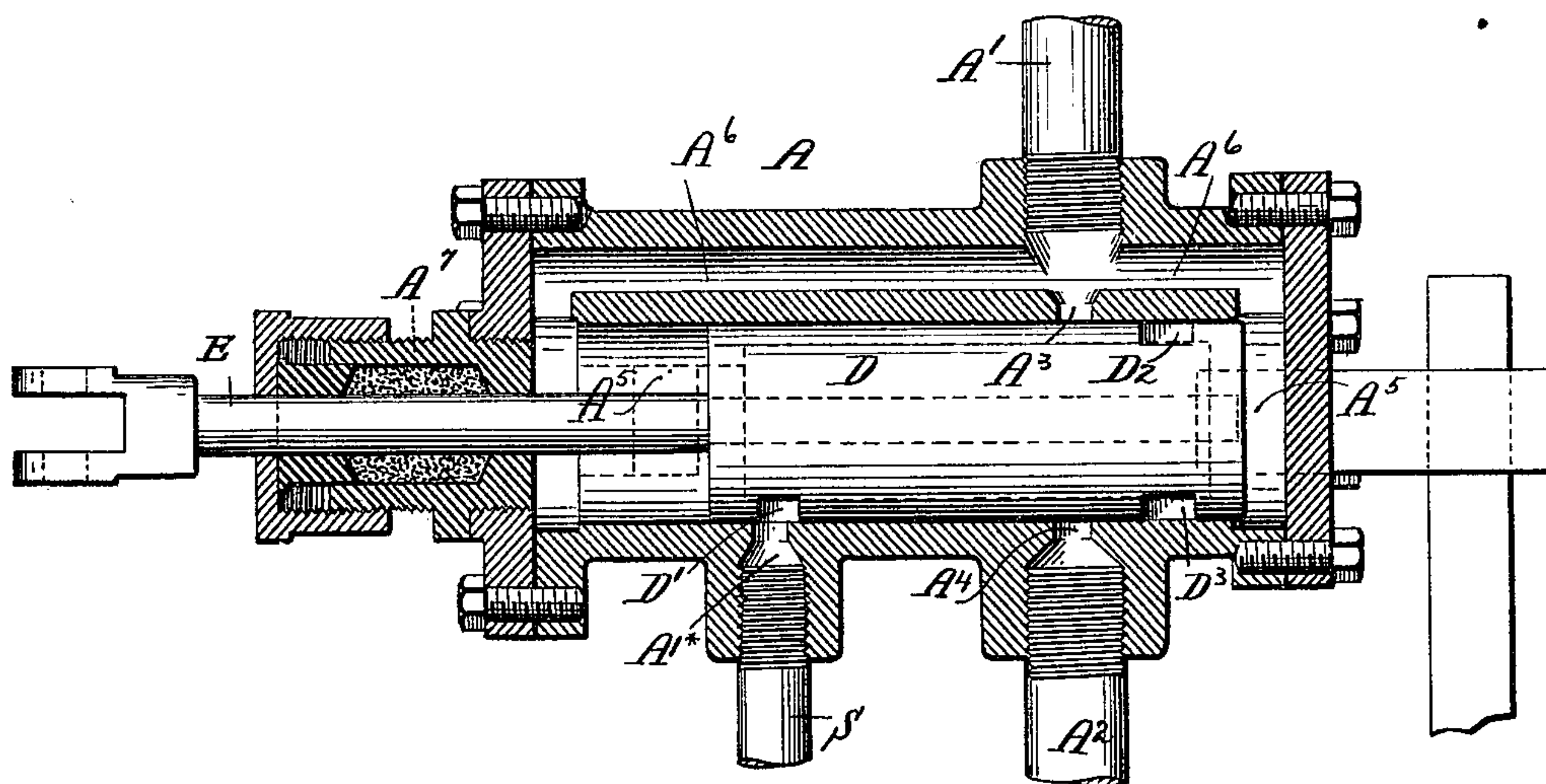


Fig. 1.

Witnesses:
Charles F. Richardson
E. A. Allen.

Inventor:
William P. Kidder
by his attorney
Edward J. Beach

No. 672,127.

Patented Apr. 16, 1901.

W. P. KIDDER.

AUTOMATIC BOILER FEED APPARATUS.

(Application filed July 21, 1900.)

(No Model.)

3 Sheets—Sheet 2.

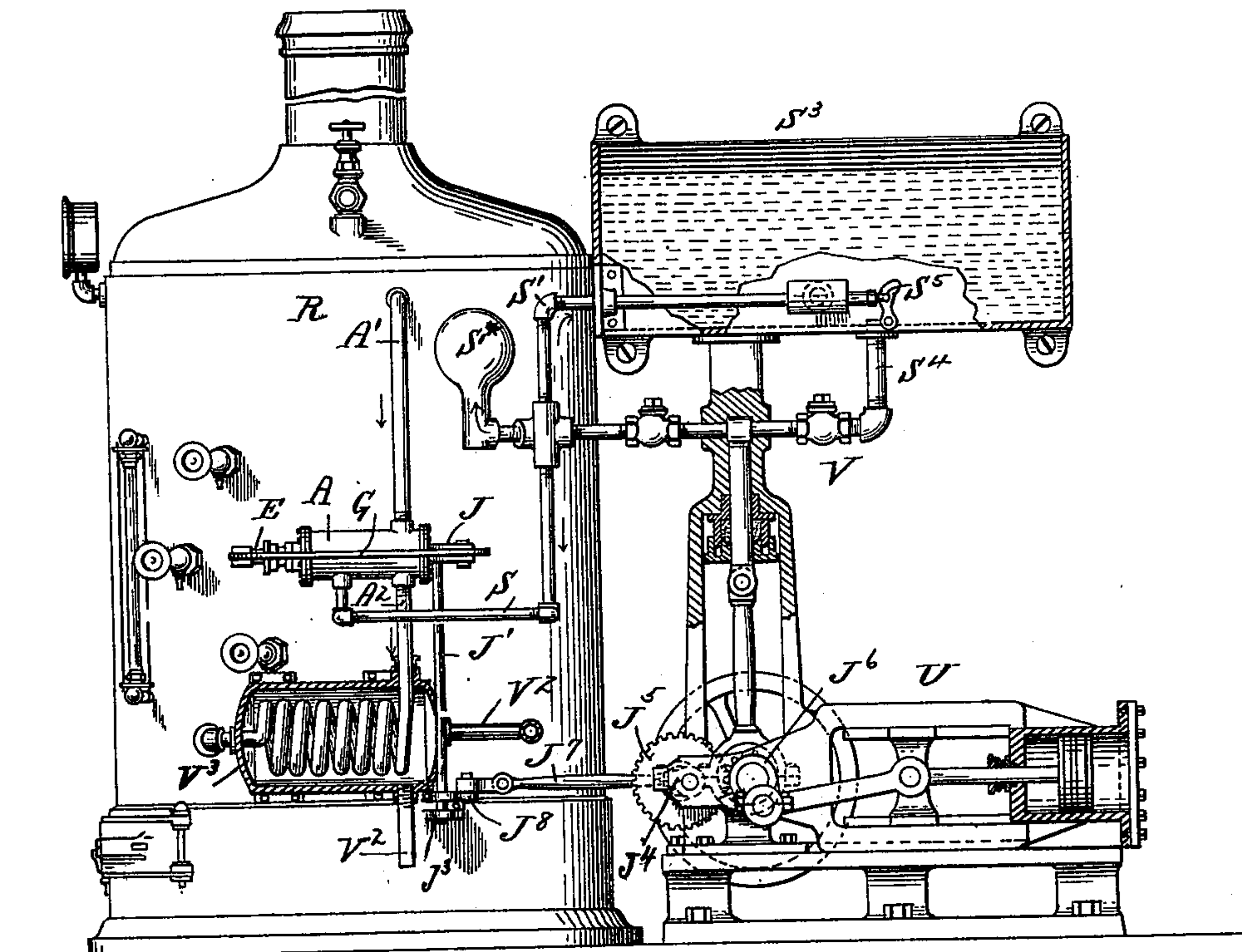


Fig. 2.

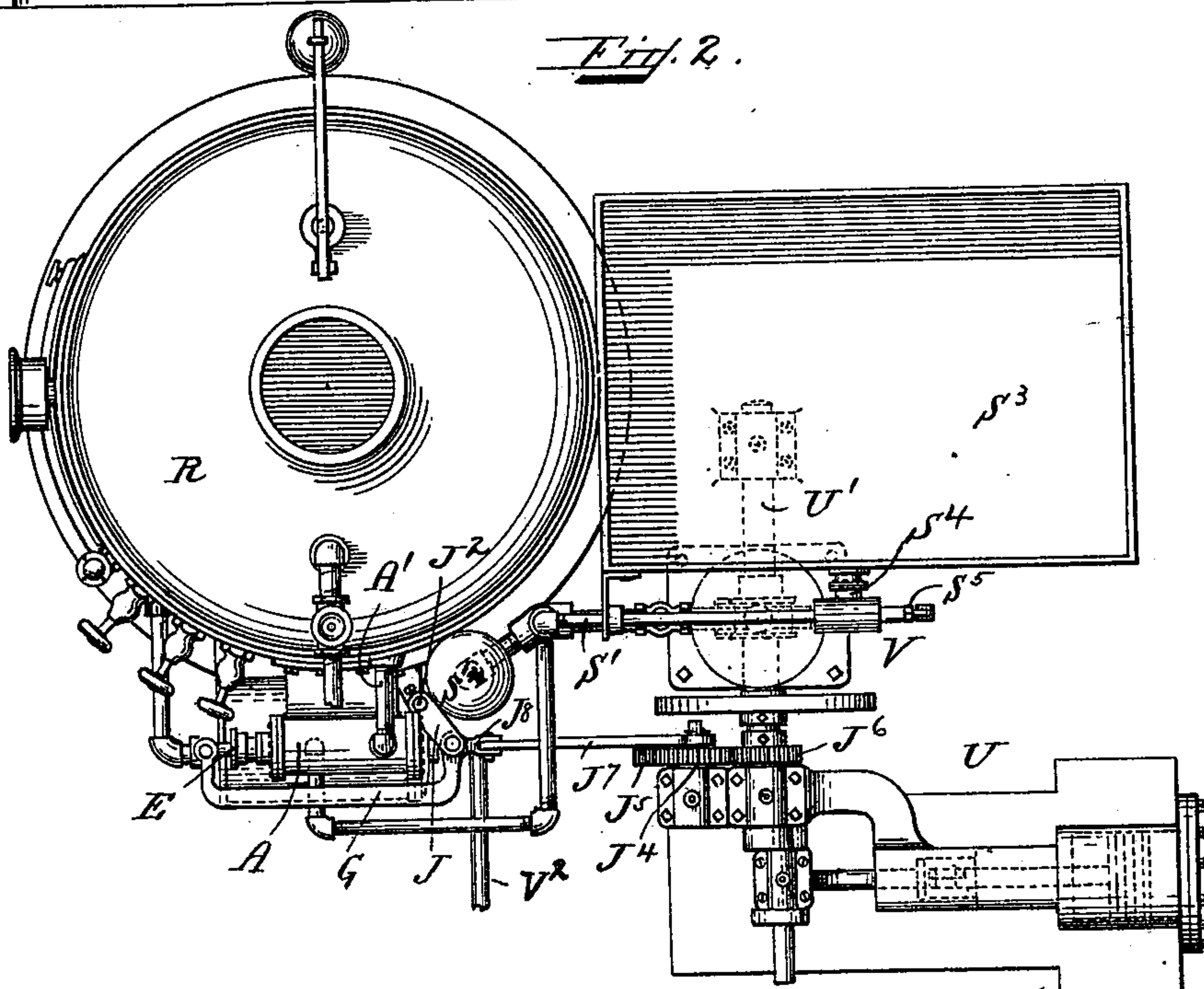


Fig. 3.

Witnesses:
Charles F. Richardson
E. A. Allen.

Inventor:
William P. Kidder
by his attorney
Edward J. Beach

No. 672,127.

Patented Apr. 16, 1901.

W. P. KIDDER.

AUTOMATIC BOILER FEED APPARATUS.

(Application filed July 21, 1900.)

(No Model.)

3 Sheets—Sheet 3.

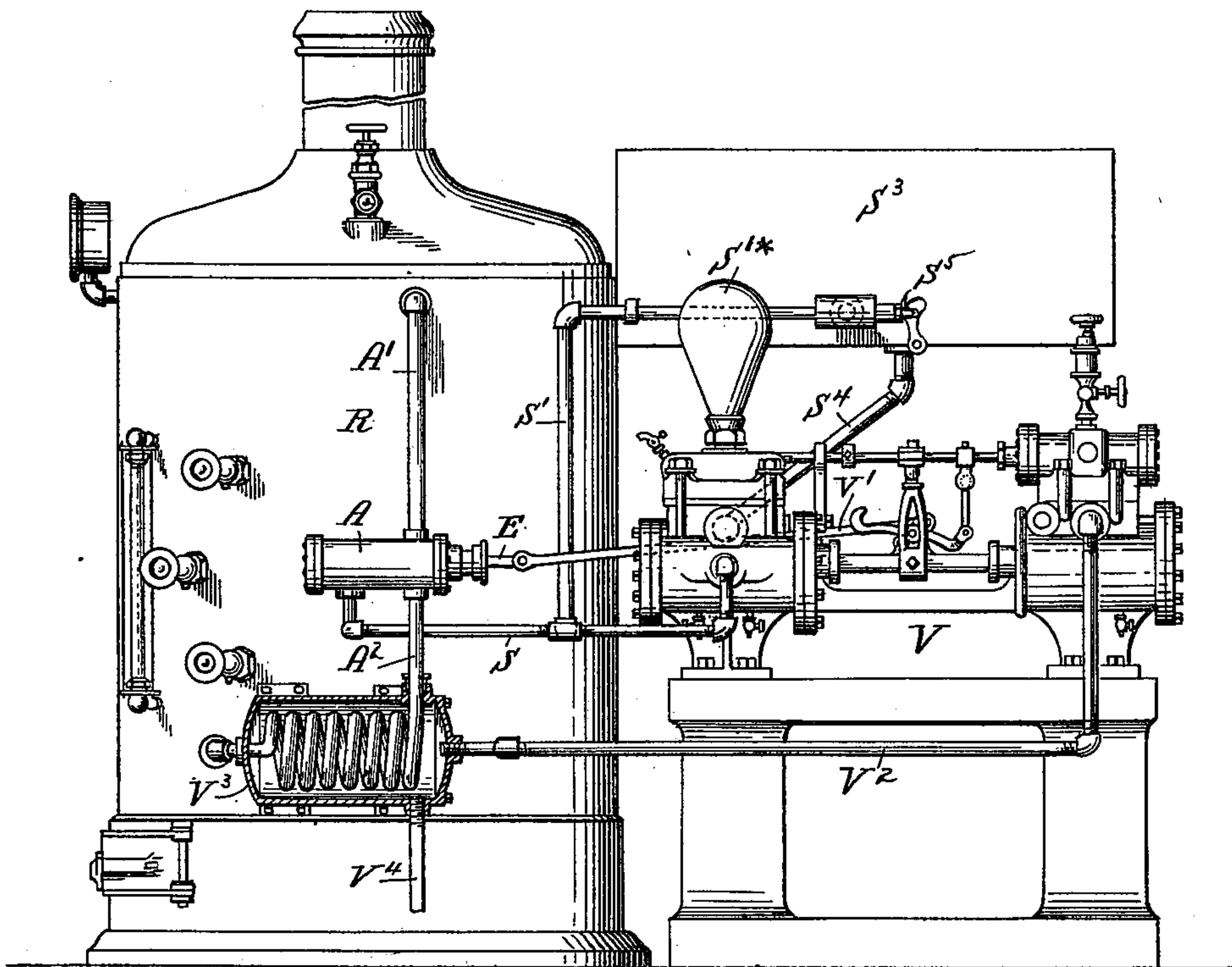


Fig. 4.

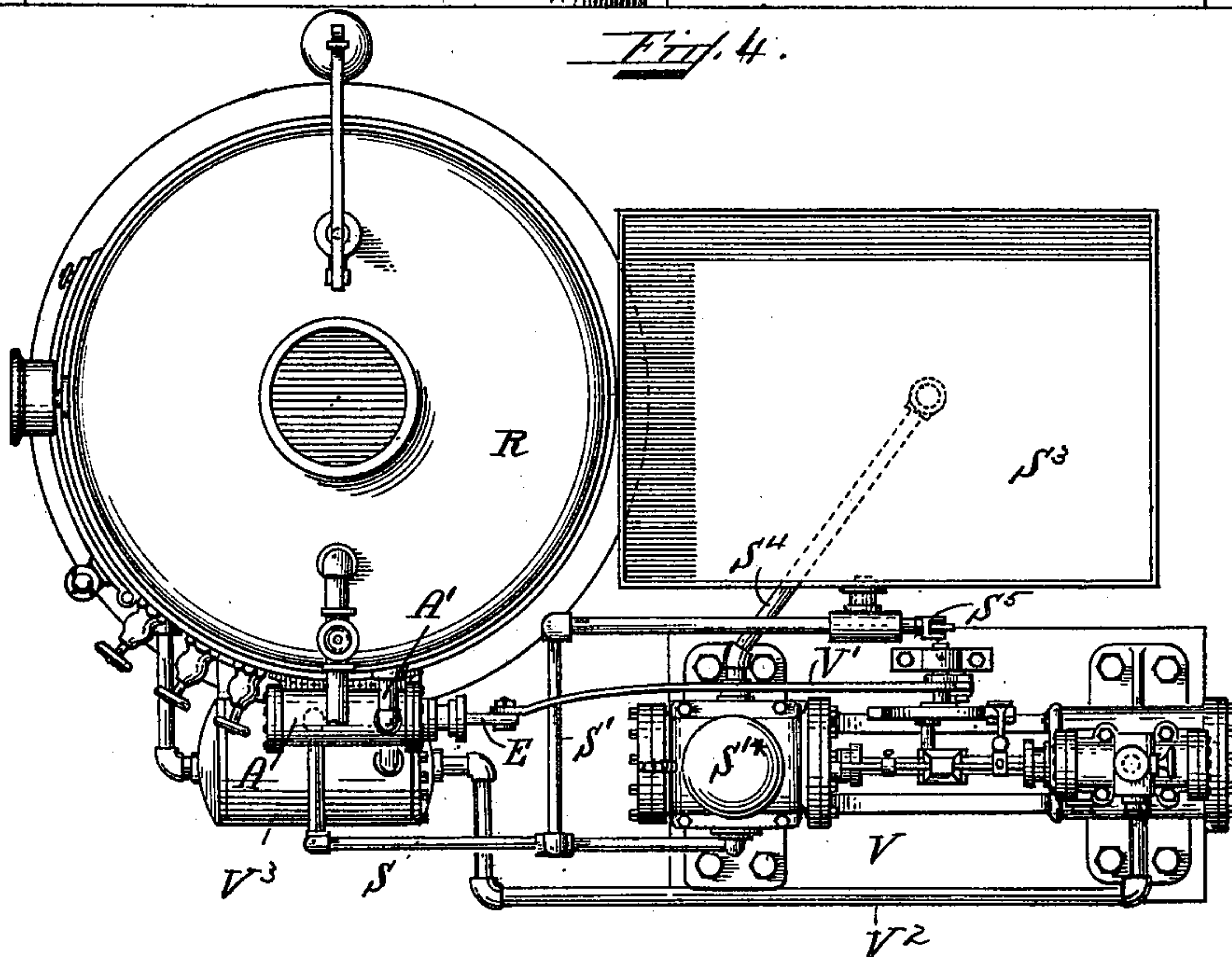


Fig. 5.

Witnesses:
Charles F. Richardson
E. A. Allen.

Inventor:
Willington Parker Kidder
by his attorney
Edward J. Beach

UNITED STATES PATENT OFFICE.

WELLINGTON PARKER KIDDER, OF BOSTON, MASSACHUSETTS.

AUTOMATIC BOILER-FEED APPARATUS.

SPECIFICATION forming part of Letters Patent No. 672,127, dated April 16, 1901

Application filed July 21, 1900. Serial No. 24,403 (No model.)

To all whom it may concern:

Be it known that I, WELLINGTON PARKER KIDDER, a citizen of the United States, residing at Boston, in the county of Suffolk and State of Massachusetts, have invented certain new and useful Improvements in Automatic Boiler-Feed Apparatus, of which the following is a specification, reference being had therein to the accompanying drawings.

Figure 1 is a lengthwise sectional view of the gravity feeder forming a part of my new boiler-feed apparatus. Fig. 2 is a side elevation, partly in section, showing one form of apparatus embodying my invention. Fig. 3 is a top plan view of the apparatus shown in Fig. 2. Figs. 4 and 5 are respectively a side elevation and a top plan view of a modification or different form of apparatus embodying my invention.

The object of my invention is to feed automatically either cold or hot water from any suitable source of supply to the boiler, so as to maintain a fixed water-level in the boiler. My apparatus herein set forth is intended for use in motor-vehicles, as well as for use in marine, stationary, locomotive, or other boilers.

My apparatus comprises, among other elements, a pump which at a pressure always equal to or in excess of the boiler-pressure forces water into a gravity water-regulator (sometimes called a feeder) that communicates with the boiler.

A novel feature of my apparatus lies in connecting the pump with a tank (or any other source of water-supply, such as a reservoir or street-conduit) and in providing the discharge-conduit connecting the pump with the regulator with a branch having a safety or relief valve, this branch discharging into the tank or elsewhere, as desired.

In the drawings illustrating the principle of my invention and the best mode now known to me of applying that principle, A is a gravity-feeder. Its cylinder is similar to that of a steam-engine and is fixed to the side of a boiler R at the same elevation as that of the normal water-level in the boiler. Reciprocating in said cylinder is a hollow piston or water-pocket D, (see Fig. 1,) communication with the interior of which is by an inlet water-port D', an inlet steam-port D², and an out-

let water-port D³. A water-feed-pipe inlet-port A^x, a steam-inlet-pipe port A³, and a water-outlet-pipe port A⁴ are made in the cylinder and are so located that when the piston is at one end of its stroke its port D' will register with the water-feed-pipe inlet-port A^x in the cylinder, and at the other end of the stroke its ports D² and D³ will respectively register with the steam-inlet port A³ and the water-discharge port A⁴ in the cylinder, said water-feed inlet-port being connected to a pump V by a water-feed pipe S, while the boiler R, both above and below its normal water-level, is in communication with the feeder A by means of a steam-pipe A' and a water-pipe A². Steam at boiler-pressure is freely admitted from steam-pipe A' through steam-passages A⁶ to both ends A⁵ of the cylinder, so that balanced pressure will permit the water-pocket to be easily reciprocated. Above the pump V is water-tank s³, which by means of a pipe s⁴ supplies the pump with the necessary water.

Between the pump and the regulator A is both an air-pressure dome s^x and a discharge-conduit s, from which there is a branch s', discharging into the tanks s³, the branch s' being provided with a release or safety valve s⁵, adjusted to permit water to flow into the tank only at a pressure greater than that in the boiler.

A piston-rod E, fast to the water-pocket D, (see Fig. 1,) extends through an ordinary stuffing-box A⁷, the outer end of the piston-rod E being connected with any suitable actuating mechanism—such, for instance, as steam-engine U, as is shown in Figs. 2 and 3—the piston-rod E being connected thereto by means of a link G, pivoted to a lever J, fast on a vertical rocker-shaft J', pivoted at its upper end at J² to the cylinder A, the lower end at J³ in a bracket fast to the boiler R, a rocking motion being imparted to this shaft J' by a crank J⁴ on gear J⁵, driven by pinion J⁶, fast on crank-shaft U' of an ordinary steam-engine, a connecting-rod J⁷ on the crank being pivoted at its opposite end to a lever J⁸, similar to J, fast on shaft J'.

The operation of my invention is as follows: The water in the boiler being, for example, below its normal level—viz., below that of the gravity-feeder—water in the supply-tank

s^3 is delivered to the pump V, which forces said water through the feed-water pipe S, its inlet-port A'^x , and the inlet water-port D' into the pocket D, as shown in Fig. 1. The pocket
 5 being filled with feed-water, it moves into position at the other end of its stroke, is closed to the incoming feed-water, but in open communication with the boiler R by the steam-pipe A' , steam-inlet port A^3 , and the inlet-
 10 port D^2 in the pocket, and also by the water-discharge port D^3 of the pocket, the discharge-port A^4 , and the discharge-pipe A^2 . As the feed-water in the pocket is now part of the boiler circulation, is at boiler-pressure, and
 15 is above the water-level in the boiler, it flows down into the boiler, thus leaving the pocket empty. On the next reciprocation of the pocket more water from the pump is fed into the pocket and then, as before, in turn allowed
 20 to flow down into the boiler. When the feed-water is prevented from discharging into the water-pocket D, the escape-valve s^4 in the escape-pipe permits the feed-water to flow through s^2 into the tank.

25 Figs. 4 and 5 show modifications of my invention. The piston-rod E is reciprocated by yoke V' , attached to the reciprocating piston-rod of an ordinary steam-pump V. In this arrangement it is seen that the piston-rod E
 30 is attached to the opposite end of the water-pocket, and the stuffing-box is changed correspondingly. Further, a steam-pump is substituted for a pump and engine.

If desired, the feed-water may be heated before entering the boiler R by flowing through
 35 a coil in the discharge-pipe A^2 , (see Fig. 4,) which coil is contained in a steam-chamber V^3 , heated by the pump's exhaust-steam, said steam flowing to said chamber V^3 by the pipe
 40 V^2 and escaping to the atmosphere by the drip-pipe V^4 .

What I claim is—

1. The combination of a water-supply reservoir; a pump having a thereunto water-

supplying connection with the reservoir and 45 having also a water-discharge from the pump; a relief-valve for said water-discharge; a water-regulator in communication with the water-discharging connection from the pump; a boiler in operative communication with the 50 water-regulator; and means for actuating the pump and regulator.

2. The combination of a water-supply reservoir; a pump having a thereunto water-supplying connection with the reservoir and 55 having also a water-discharge from the pump into the reservoir; a relief-valve for said water-discharge; a water-regulator in communication with the water-discharging connection from the pump; a boiler in operative 60 communication with the water-regulator; and means for actuating the pump and regulator.

3. The combination of a water-supply reservoir; a pump having a thereunto water-supplying connection with the reservoir; and 65 having also a water-discharge from the pump; a relief-valve for said water-discharge; a water-regulator in communication with the water-discharge connection from the pump; a boiler in communication with the water-reg- 70 ulator; means for actuating the pump and regulator; and means for heating the feed-water, said means being between the water-regulator and the boiler.

4. In boiler-feed apparatus, the combina- 75 tion of a pump connected with a water-supply and having a discharge-pipe provided with a branch having a safety-valve; a gravity-regulator connected with said pump; a boiler; a conduit connecting with the steam- 80 space of the boiler and a conduit connecting the regulator with the water side of the boiler.

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

WELLINGTON PARKER KIDDER.

Witnesses:

EDWARD S. BEACH,
 E. A. ALLEN.