

No. 726,069.

PATENTED APR. 21, 1903.

E. JOSSE
FEED PUMP.

APPLICATION FILED JAN. 26, 1903.

NO MODEL.

Fig. 1.

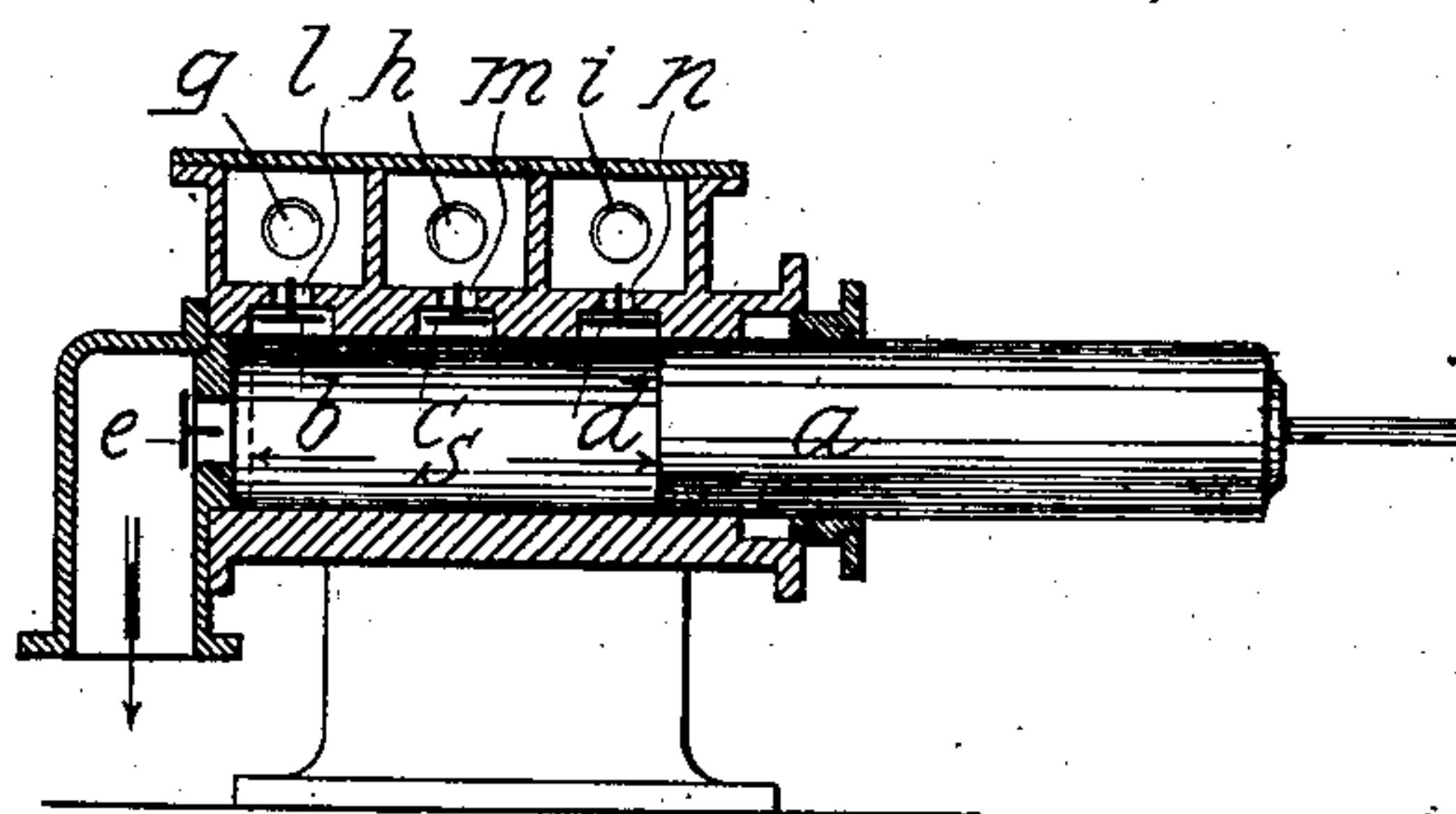
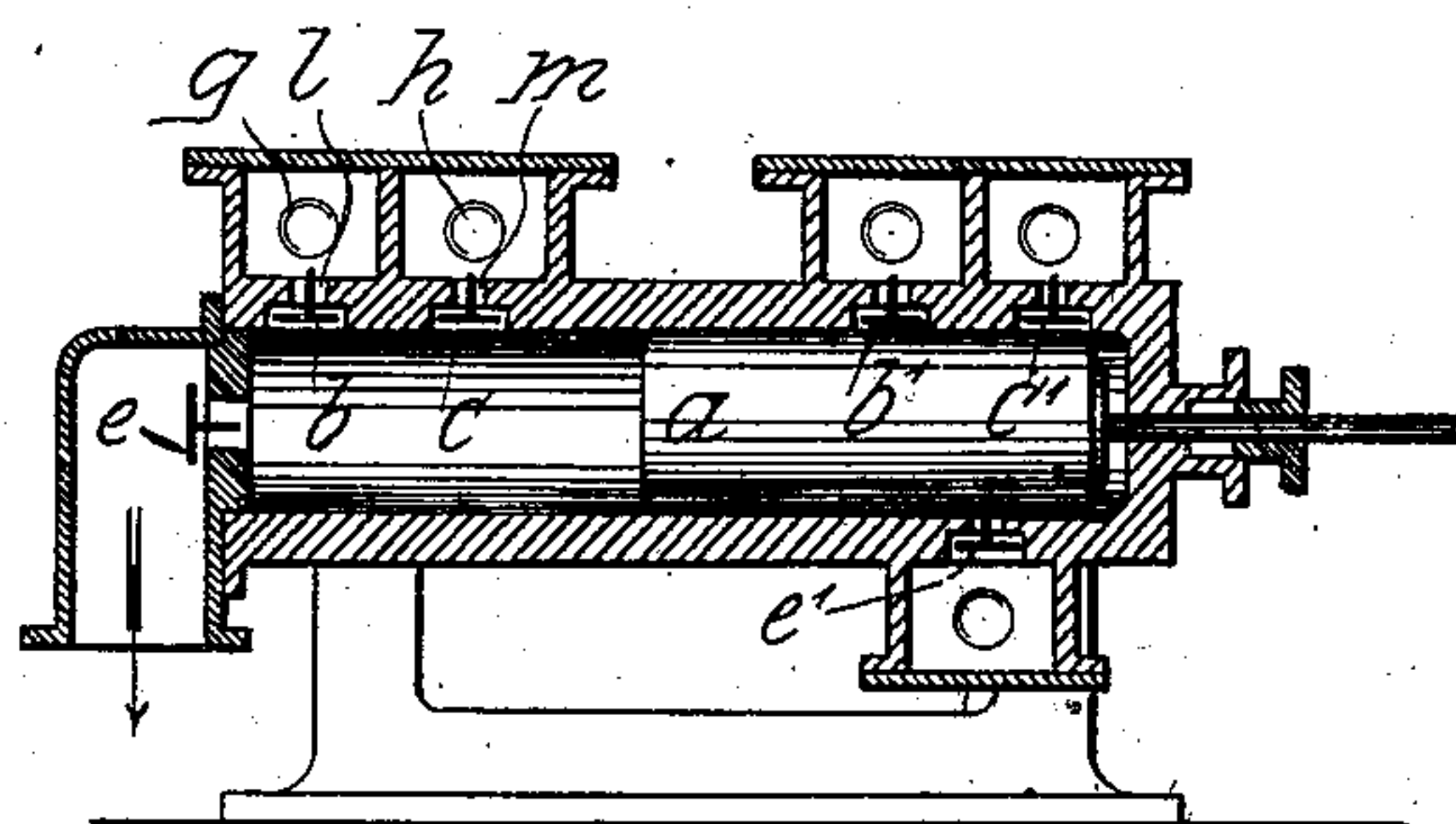


Fig. 2.



Witnesses:

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UNITED STATES PATENT OFFICE.

EMIL JOSSE, OF CHARLOTTENBURG, GERMANY.

FEED-PUMP.

SPECIFICATION forming part of Letters Patent No. 726,069, dated April 21, 1903.

Application filed January 26, 1903. Serial No. 140,665. (No model.)

To all whom it may concern:

Be it known that I, EMIL JOSSE, a subject of the Emperor of Germany, residing at Charlottenburg, Germany, have invented certain new and useful Improvements in Feed-Pumps, of which the following is a specification.

The steam-traps heretofore employed for removing the water of condensation from the heating-jackets and intermediate receivers of steam-engines are expensive and have the disadvantage that the hot water to be removed is released into the atmosphere, and that, moreover, by this means a considerable amount of steam passes through, which steam becomes lost for the doing of useful work.

My invention relates to a pump which while obviating the use of any steam-trap is capable of returning directly to the boiler any liquid of condensation that may form in an engine without losses in temperature or pressure.

In Figure 1 the pump is shown single-acting, and *a* indicates a broad extended piston or plunger which reciprocates through the travel *s* and is driven either by the driving-gear of the steam-engine or by a special steam-cylinder or in any other suitable manner. In the extreme left-hand position of the plunger *a*—that is to say, at the beginning of the suction-stroke—the said plunger covers an opening *b*, which it uncovers after moving a short distance toward the interior of the cylinder. In the opening *b* is a valve *l*, which opens toward the interior of the cylinder. Through a connecting-passage *g* the inlet-valve *l* is in communication with that chamber or space to be freed from water of the steam-engine which has the lowest steam-pressure, and under the action of this pressure the valve *l* opens. At the moment at which the piston *a* uncovers the opening *b*, which connects the suction-valve *l* with the interior of the pump, the liquid of condensation under a definite pressure will enter the interior of the cylinder through the opening suction-valve *l*, and this will continue until the piston *a* uncovers a second opening *c*. In the second opening there is likewise a suction-valve *m* opening toward the interior of the pump, which valve makes communication with a chamber into which the liquid of condensation of the next higher pressure enters from the engine through the

passage *h*. After the piston *a* has uncovered the opening *c* the liquid of condensation will flow from *h* directly under the action of the higher pressure through *m* and *c* into the interior of the cylinder, and by reason of the excess pressure in *h* beyond that in *g* the valve *l* will be closed. In the forward motion of the piston the liquid of condensation is thus drawn into the pump out of the chamber or space of the engine opening through the passage *h*. The same series of operations is gone through with the third opening *d*, the third valve *n*, and the third passage *i*, in which there are products of condensation of higher pressure than in *h*.

If there are products of condensation to be removed from a number of chambers in the engine of similar pressure, these chambers can be united in one of the said passages; also, instead of three, as shown here, any desired number of passages and openings in the cylinder-wall can be employed in cases where products of condensation of more than three different pressures are to be removed.

It is an essential feature of the invention that the products of condensation be successively drawn into the pump from chambers of increasing pressure and that the inlet-valve of the preceding chamber or passage be closed by the pressure of the entering products of condensation.

At the end of the suction period the piston *a* moves backward and the liquid of condensation drawn into the pump, together with any steam that may have entered with it, is forced out of the pump through one or more delivery-valves *e* and returned to the boiler, so that the hot water is again available for use in the boiler without loss of the heat and of the steam, if any, carried away with the products of condensation.

If desired, in the pressure-chamber *f* of the delivery-valve *e* special conduits can also be provided for the steam and the hot water in such a manner that the steam is returned directly to the engine, while the hot water alone passes to the boiler. A similar action of the pump can also be attained with a double-acting arrangement of the pump, which may, furthermore, comprise several cylinders.

Fig. 2 of the drawings shows, for example, a double-acting pump arranged according to

the present invention. On the one side of the plunger the products of condensation are filled in by the valves *b* and *c*, which open toward the interior of the cylinder when the plunger advances from the left to the right, and they are forced out of the pump through the delivery-valve *e* when the plunger returns. On the other side of the plunger corresponding inlet-valves *b'* and *c'* and a delivery-valve *e'* are arranged, by which the same effect is attained as on the other side of the plunger, with the only difference that while on the one side the products of condensation are filled in on the other side they are forced out of the pump, and vice versa.

What I claim is—

1. A pump comprising a cylinder having a series of independent inlet-openings which are arranged at different distances from the outlet end thereof, inwardly-opening valves in said inlet-openings, an outlet-opening, an

outwardly-opening valve in said outlet-opening, and a piston or plunger of sufficient length to cover all the inlet-openings, substantially as hereinbefore described.

2. A double-acting pump comprising a cylinder having near each end a series of independent inlet-openings which are arranged at different distances from the cylinder ends, inwardly-opening valves in said inlet-openings, an outlet-opening for each end, an outwardly-opening valve in said outlet-openings, and a piston of sufficient length to cover either series of inlet-openings, substantially as described.

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

EMIL JOSSE.

Witnesses:

WOLDEMAR HAUPT,
WILHELM BEER.