(No Model.)

A. L. HARRISON.

RELIEF VALVE.

No. 500,891. Patented July 4, 1893.

Fig: 1.

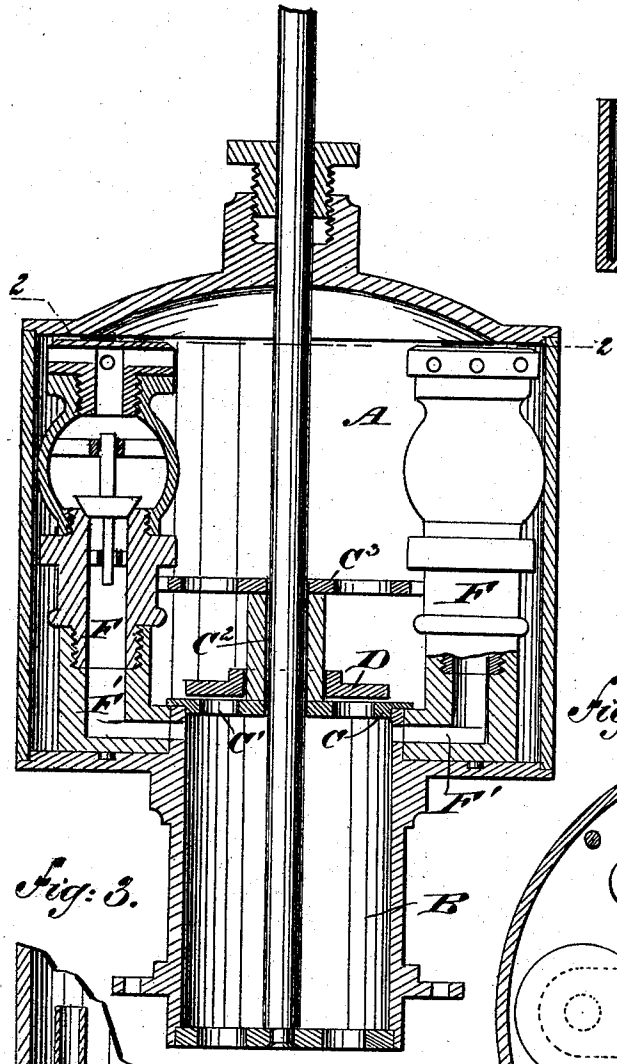


Fig: 5.

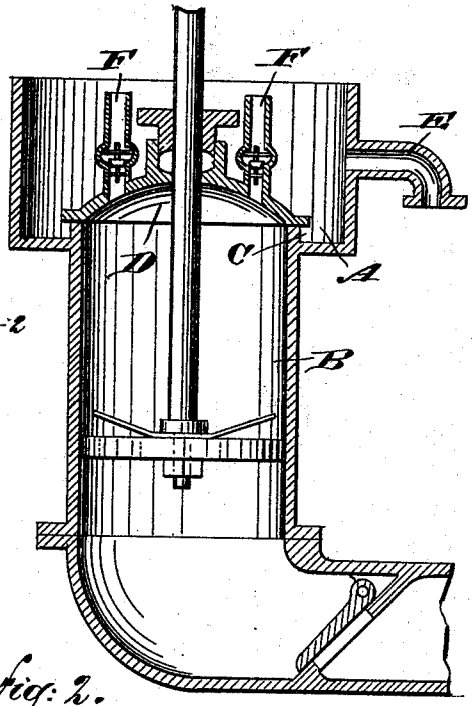


Fig: 2.

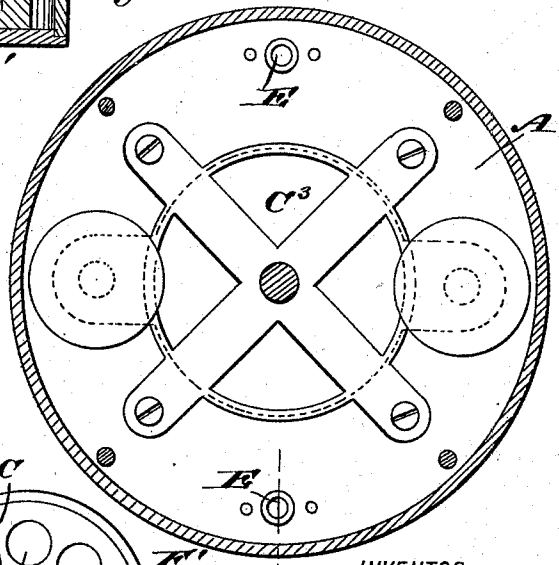


Fig: 3.

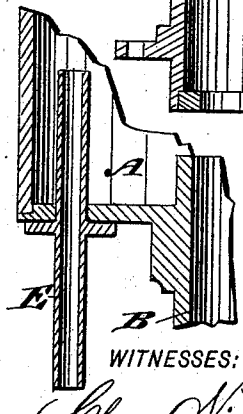
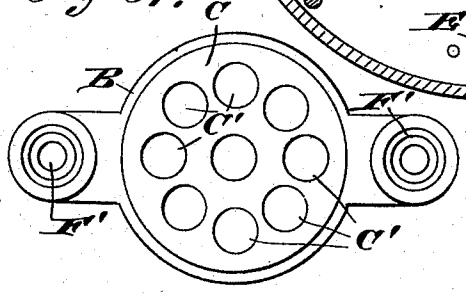


Fig: 4.



WITNESSES:

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UNITED STATES PATENT OFFICE.

ANDREW L. HARRISON, OF WILMINGTON, NORTH CAROLINA.

RELIEF-VALVE.

SPECIFICATION forming part of Letters Patent No. 500,891, dated July 4, 1893.

Application filed June 18, 1892. Serial No. 437,196. (No model.)

To all whom it may concern:

Be it known that I, ANDREW L. HARRISON, of Wilmington, in the county of New Hanover and State of North Carolina, have invented a new and Improved Relief-Valve, of which the following is a full, clear, and exact description.

The object of the invention is to provide a new and improved relief valve, which is simple and durable in construction, and more especially designed for use on air pumps of condensing engines, to insure an easy seating of the inlet and outlet valves to prevent excessive wear of the valves and the lining in the the air pump.

The invention consists of one or more air valves for the water delivery valve to permit the escape of air previous and separate to the discharge of the water through the water delivery valve.

The invention also consists of certain parts and details, and combinations of the same, as will be hereinafter described and then pointed out in the claims.

Reference is to be had to the accompanying drawings forming a part of this specification, in which similar letters of reference indicate corresponding parts in all the figures.

Figure 1 is a sectional side elevation of the improvement as applied to the air pump of a propeller engine. Fig. 2 is a sectional plan view of the same on the lines 2—2 of Fig. 1. Fig. 3 is a transverse section of the water outlet on the line 3—3 of Fig. 2. Fig. 4 is a plan view of the valve seat; and Fig. 5 is a sectional side elevation of the improvement as applied to the air pump of a condensing engine.

The improved relief valve is provided with a casing A, on the bottom of which is formed an inlet tube B, connected in the usual manner with the top of the condenser, so that the water and air rising in the condenser can pass into the said inlet B according to the action of the plunger of the air pump.

On the top or upper end of the inlet B is arranged a valve seat C, formed with openings C′, adapted to be closed by a water delivery valve D, fitted to slide vertically on the hollow stem C^2 of the seat C, the upward stroke of the valve being limited by engaging a spider C^3 secured to the upper end of the shank C^2.

In the bottom of the casing A are arranged one or more outlet pipes E, extending with their upper ends a suitable distance in the casing A, so that the water accumulating in the latter can flow through the said pipes E to the outside of the casing as will be readily understood by reference to Fig. 3.

As shown in Fig. 1, the inner end of the inlet B extends a short distance above the bottom of the casing A, and the spider C^3 is arranged a short distance below the upper end of the pipes E so that the valve D always works under the water accumulating in the lower part of the casing A below the top end of the pipes E. Into the end of the inlet B, extending above the bottom of the casing A, open the inlets F′ of air valves F, of any approved construction, the said valves extending within the casing A and discharging near the top of the same, the air passing out of the casing through pipes E.

The operation is as follows: When the plunger rises, the air enters the inlet B on top of the water and passes through the inlets F′ of the valves F through the same to discharge in the upper end of the casing A, from which the air can escape through the pipes E. The valve D remains seated on its seat C during this operation, so that the air is discharged in advance of the rising water, which latter lifts the valve D from its seat to permit the water to pass through the opening C′ in the seat to the inside of the casing A, from which it can flow to the outside by means of pipes E. When the plunger is on its down stroke the valve D again closes to prevent the previously lifted water from flowing back into the inlet B. This operation is repeated on successive strokes of the plunger, that is, the air is always discharged in advance of the water, the air passing through valves F into the casing and the water past the valve D into the casing. When the water has risen in the latter to the upper end of the pipes E then it flows through the latter to the outside. As the upper ends of the pipes E are above the spider C^3, the valve D always works in the body of water remaining in the lower part of the casing A. It will be seen that by this ar-

rangement that the valve D is not affected by air passing into the inlet in advance of the water on the rising of the plunger, as the air is discharged through the valves F above the level of the water remaining in the casing A. Thus the valve D remains seated until it is opened by the body of water lifted by the action of the plunger. It will be seen that by this arrangement the valve D is not lifted any higher than is necessary to discharge the amount of water brought up from the condenser by the bucket or plunger of the air pump. It will further be seen that as the valve D operates within a quantity of water, it seats itself very easily and consequently an excessive wear of the valve and injury to the lining of the pump is prevented.

As shown in Fig. 5, the air outlet valves F are arranged directly in the valve D which is now a float top valve. The upper ends of the valves F extend above the outflow pipe E arranged in the side of the casing A, as shown. It is understood that in this case the valve D remains seated while the air escapes through the valves F and until it is finally lifted by the rising water carried up by the plunger. Thus the air is discharged in advance of the water and without unseating the delivery valve D.

Having thus fully described my invention, I claim as new and desire to secure by Letters Patent—

1. A relief valve for air pumps of condensing engines, provided with a water delivery valve and one or more air outlet valves adapted to discharge the air in advance of the water, the latter being finally discharged through the said delivery valve, substantially as described.

2. A relief valve for air pumps of condensing engines, comprising a casing formed with an inlet, a water delivery valve for closing the said inlet, and one or more air valves connected with the said inlet below the said water delivery valve, substantially as shown and described.

3. A relief valve for air pumps of condensing engines, comprising a casing formed with an inlet, a water delivery valve for closing the said inlet, one or more air valves connected with the said inlet below the said water delivery valve, and one or more pipes held in the said casing and extending with their upper ends above the top of the said delivery valve, substantially as shown and described.

ANDREW L. HARRISON.

Witnesses:
D. S. FOLEY,
O. G. WILLEY.