

(No Model.)

2 Sheets—Sheet 1.

E. REYNOLDS.
Air-Pump.

No. 227,652.

Patented May 18, 1880.

Fig. 1.

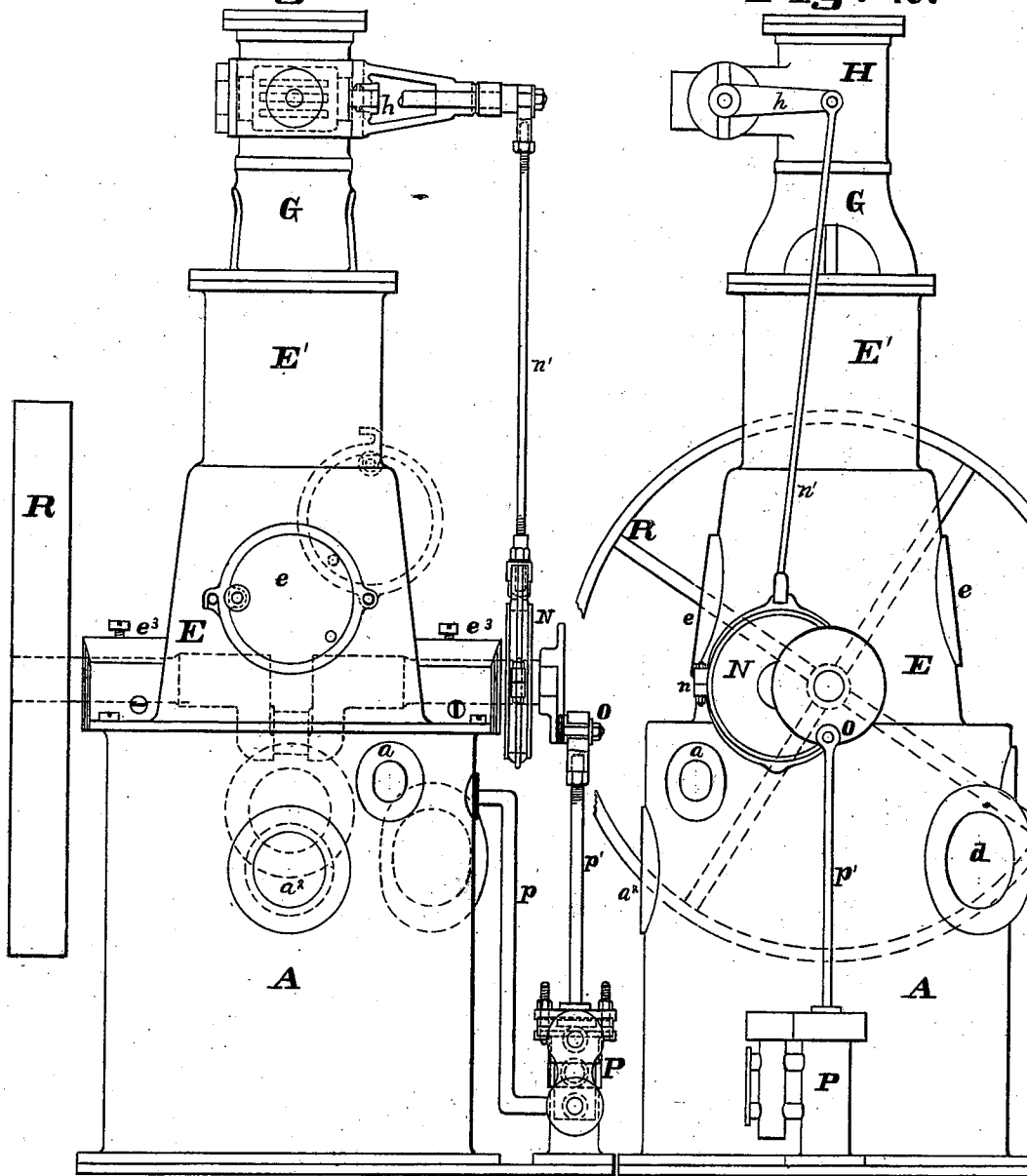


Fig. 2.

Attest

Collins Ford, Jr.
Ambrose Temple

Inventor.

Edwin Reynolds
By John H. Hill
Attorney

(No Model.)

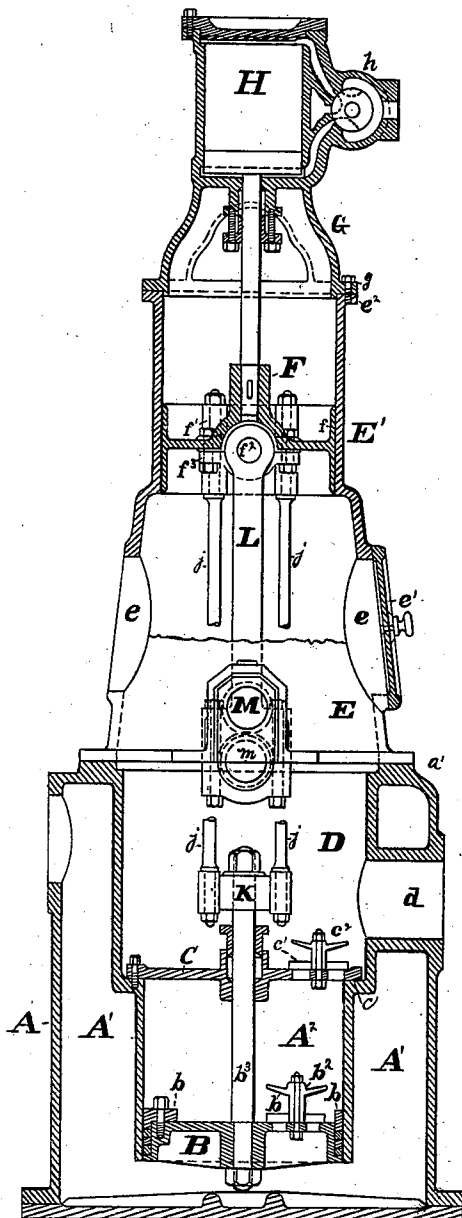
2 Sheets—Sheet 2.

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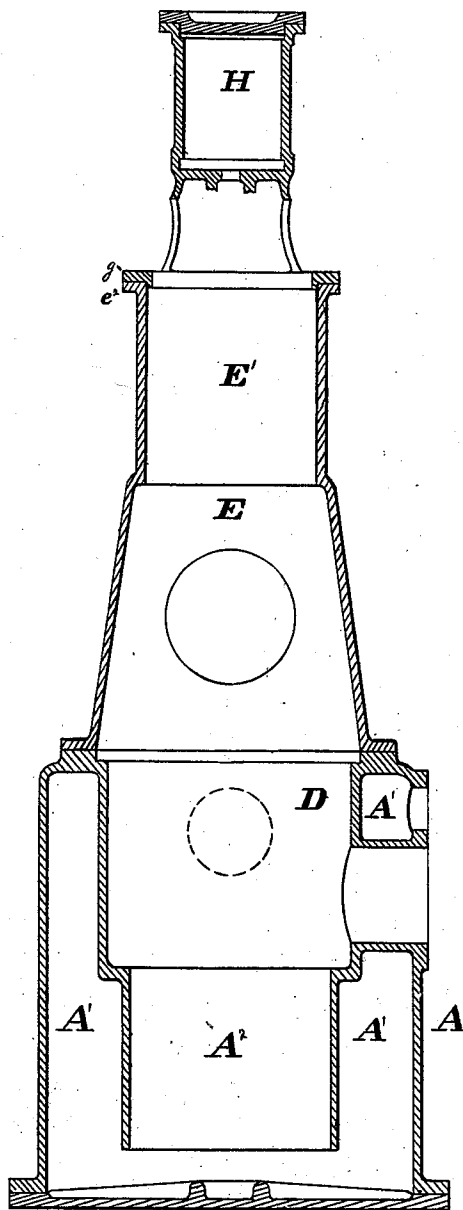
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Fig. 3.



Attest
Collin Ford, Jr.
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Fig. 4.



Inventor.
Edwin Reynolds.
By John H. Hill
Attorney.

UNITED STATES PATENT OFFICE.

EDWIN REYNOLDS, OF MILWAUKEE, WISCONSIN.

AIR-PUMP.

SPECIFICATION forming part of Letters Patent No. 227,652, dated May 18, 1880.

Application filed March 8, 1880. (No model.)

To all whom it may concern:

Be it known that I, EDWIN REYNOLDS, of Milwaukee, in the county of Milwaukee and State of Wisconsin, have invented certain new and useful Improvements in Air-Pumps, of which the following is a specification.

My invention is in the nature of an improvement upon that class of air-pumps for condensing steam-engines and for other purposes which are worked by an independent steam-engine or by a pulley and belt; and it consists in so arranging and uniting the condenser, air-pump, and steam-engine when used for driving the air-pump as to form in appearance a single ornate column of comparatively small base. By this compact construction I am able to use an air-pump and condenser in many instances where, for lack of space, the ordinary construction of independent condensing apparatus would be inadmissible.

In the accompanying drawings, Figure 1 is a front elevation of my invention. Fig. 2 is a side elevation thereof. Fig. 3 is a vertical section through the axis of the machine, taken at right angles to the axis of the engine-shaft; and Fig. 4 is a vertical section on the axis of the steam-cylinder, tubular connecting-frame, and air-pump and condenser.

Similar letters of reference indicate similar parts.

A is a base-casting containing the condenser A' and a concentric air-pump cylinder, A². *a* is the seat for the flange of the injection-pipe, and *a*² is the seat for the flange of the exhaust-pipe from the engine with which the condensing apparatus is connected.

B is the air-pump bucket or piston, provided with the usual packing-rings *b*, suction or bucket valves, and guards *b*¹ and *b*². C is the cover of the air-pump, fitted and bolted to the surface *c*, and containing the usual delivery-valves and guards *c*¹ and *c*². The cover of the air-pump is furnished with the usual stuffing-box, through which passes the piston-rod *b*³. D is the hot-well, with an overflow-nozzle, *d*.

The upper surface of the base-casting A is provided with a turned seat, *a*¹, upon which rests and is bolted the tubular frame E, the axis of the frame E being vertically over the axis of the air-pump. In the lower portion of the casting E are entrance-holes *e*, with pivoted

caps or covers *e*¹, through which easy access is had to the working parts of the machine.

The upper portion of the tubular frame at E' (which is axially over the center of air-pump) is bored out to receive the cross-head F. The cross-head is simply a disk provided with a broad flange or rim, *f*, which is turned to slide freely up and down in the guide-shell E'. The steam-cylinder H is placed centrally over the guide-shell, and is cast with a tastily-designed stand, G, the lower end of which terminates in a horizontal flange, *g*, fitted and bolted to the flange *e*² of the tubular frame or shell E.

The cross-head F is provided with bosses *f*¹ *f*², which receive the upper ends of the struts or rods *j j*. A cross-head, K, on the piston-rod of the air-pump receives the lower ends of these rods. The under side of the cross-head F has jaws *f*³ and connecting-rod pin *f*², upon which is hung the shackle-bar L.

M is the engine-shaft, provided with a crank, *m*, and revolving in journal-bearings *e*³. N is an ordinary eccentric; *n*, the eccentric-yoke; and *n*¹, the eccentric-rod, connected with and giving motion to the arm *h* of the slide-valve. O is a small crank to work the boiler-feed pump. P is the ordinary plunger-pump for feeding the boiler, connected to the hot-well by means of the pipe *p*. R is the fly-wheel of the machine.

Steam is conveyed to the engine H, and the motion of the steam-piston is transmitted to the crank-shaft by the shackle-bar L, and to the piston of the air-pump by means of the cross-heads F and K and struts or rods *j j*.

It is obvious that the arrangement and form of certain elements may be varied without departing from the principle of my invention. For instance, the struts *j j*, shackle-bar L, and cross-head K may be omitted, and the well-known Scotch yoke be substituted; but I prefer the construction described as being subject to less wear and as furnishing a smoother motion to the crank-shaft.

The cross-head is shown as a circular flanged disk, and the guide-shell as a simple bored tube, and, for cheapness of first cost and for facility of construction, I prefer this mode of making the cross-head and guide. At the same time any of the well-known forms of cross-heads

and guides can be used as well as that shown, if it be desirable in any instance to do so, and in the same manner any of the usual forms of single or double acting air-pumps can be substituted for the air-pump shown and described.

When the machine is to be worked by belt the steam-cylinder H, eccentric N, and eccentric-yoke *n*, and rod *n'* are omitted, and an ordinary pulley turned for a belt displaces the fly-wheel R. The machine otherwise remains unchanged.

I am aware that the arrangement of the condenser, air-pump, and hot-well as I have shown and described them is not new, and that I am not the first to propose an independent air-pump and condensing apparatus where the air-pump is driven by a steam-engine or by belt. My invention is therefore limited to the peculiar arrangement of the several elements constituting the machine—to the production of an independent air-pump which, while it is compactly and neatly arranged, shall present pleasing outlines to the eye of an observer.

Having described my invention, what I claim is—

1. In an independent air-pump, the combination of the base-casting A, containing the

condenser A', air-pump cylinder A², and hot-well D', with the tubular frame E, guide-shell E', and steam-cylinder H, when arranged substantially as shown and described.

2. In an independent air-pump, the combination of the base-casting A, containing the condenser A', air-pump A², B, C, b³, and K, and hot-well D', and the tubular frame E, containing a crank-shaft *m*, mounted on bearings e³ e³, and the guide-shell E', with a steam-engine, H, F, L, N, *n*, and *n'*, and struts *j j*, for the purpose and substantially as described.

3. In an independent air-pump, the combination of the base-casting A, containing the condenser A', air-pump A², B, C, b³, and K, and hot-well D, tubular frame E, containing the crank-shaft *m*, mounted in bearings e³ e³, guide-shell E', cross-head F, shackle-bar L, and struts *j j*, for the purpose and as described.

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

EDWIN REYNOLDS.

Witnesses:

WILLIAM S. CHASE,
OTTO PUPIKOFER.