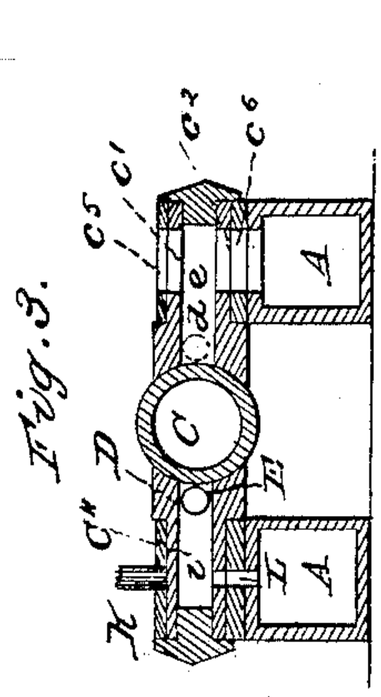
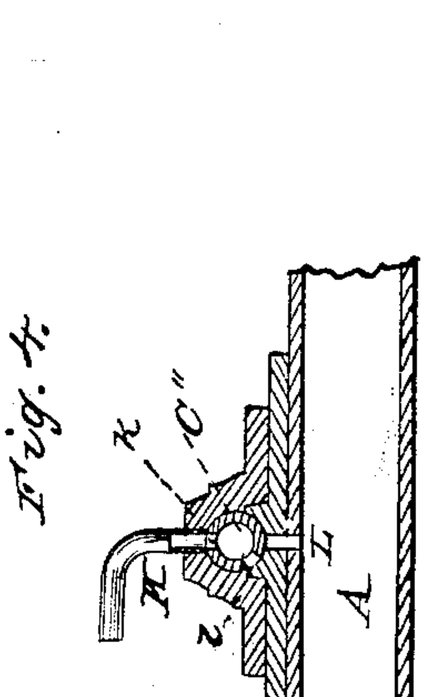
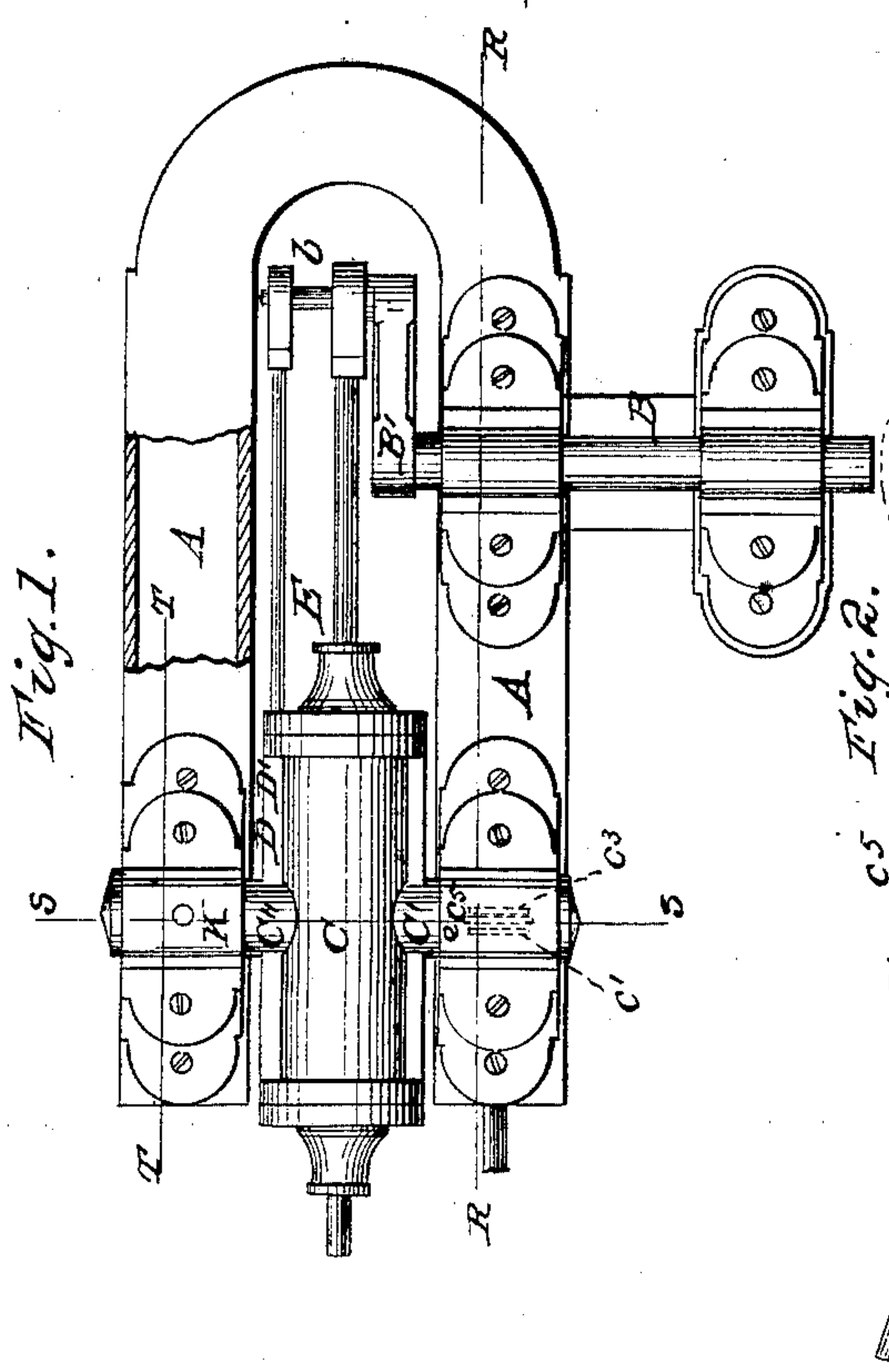
BASFORD & SPRENKEL.

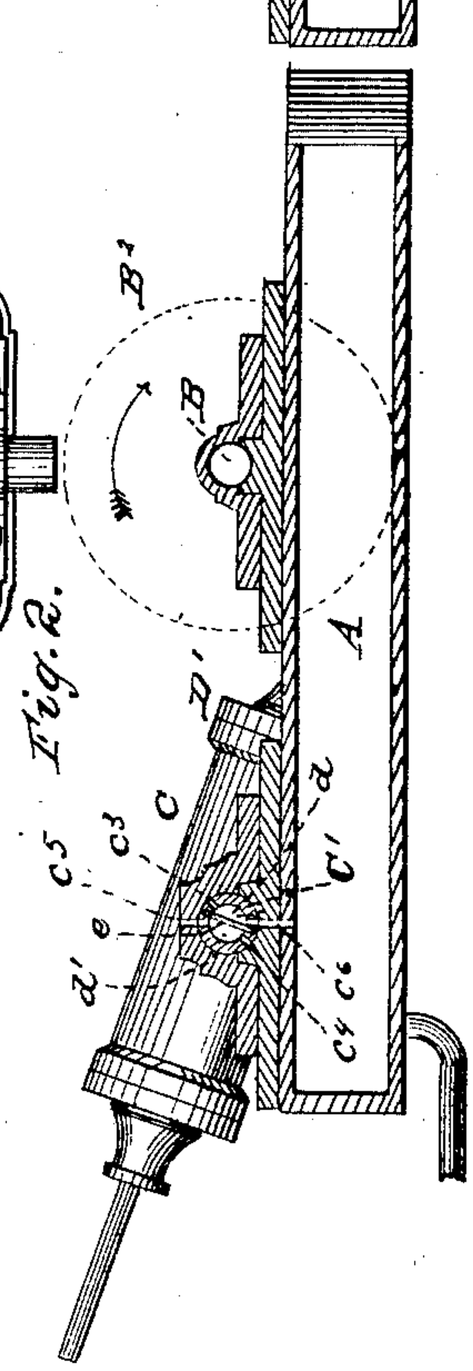
Steam Engine.

No. 18,933. Patented Dec. 22, 1857.









UNITED STATES PATENT OFFICE.

G. SPRENKEL AND THOS. W. BASFORD, OF HARRISONBURG, VIRGINIA.

ARRANGEMENT OF OSCILLATING ENGINES AND PUMPS.

Specification of Letters Patent No. 18,933, dated December 22, 1857.

To all whom it may concern:

Be it known that we, GAMBILL SPRENKEL and THOMAS W. BASFORD, of Harrisonburg, in the county of Rockingham and State of Virginia, have invented a new and improved arrangement of pumps in relation to oscillating engines and of the induction and eduction of fluids in the same; and we hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1, is a plan view of our invention complete. Fig. 2, a vertical section in the line R, R. Fig. 3, a transverse section in the line S, S. Fig. 4, a vertical section in the line T, T.

Similar letters of reference in each of the several figures indicate corresponding parts.

The nature of our invention consists in locating the pump in the side of the main cylinder so that it forms a portion of the same casting, the plunger of the same being attached to an extension of the crank pin and the water being received and discharged through openings in the sides of a single trunnion in the manner fully described below.

Our invention consists, 2nd, in the peculiar arrangement whereby the trunnion receives and discharges the steam, allowing it to flow from the boiler through the trunnion to one end of the cylinder while it escapes through the same trunnion from the other end, thus leaving the other trunnion at liberty to be used for the induction and eduction of water for the pump.

To enable others skilled in the art to make and use our invention, we will proceed to describe its construction and operation.

The framing or foundation A, is of any ordinary construction, preferably a single hollow casting as represented, so that it may serve as a heater or condenser. The shaft B, the crank B′, and the crank pin *b* are of the ordinary character except that the crank pin *b*, is longer than usual, and these parts are arranged in the usual manner, in relation to each other and to the main cylinder. C, represents the said main cylinder oscillating on trunnions C′ and C″. The trunnion C′, receives and discharges the steam allowing it to flow from the boiler through the trunnion C′, to one end of the cylinder, while it escapes through the same trunnion to the other end, thus leaving the other trunnion C″ at liberty for the induction and eduction of water for the pump. The side of the cylinder C, nearest to the trunnion C″, is thicker than usual, and is cored out so that a pump chamber D, sufficiently large to receive the plunger of the feed pump extends in a line parallel to the piston rod. At the end nearest the crank pin is a stuffing box D′, through which the plunger E, is free to play. The plunger E, being connected to the crank pin *b*, has the same stroke as the steam piston, and the pump chamber D, must be of sufficient length to allow of such motion. Said pump chamber D, is also of such diameter that the plunger E, does not touch its interior but only the sides of the stuffing box D′, leaving a space on all sides of E. The trunnion C″, is hollow and its interior space is in free communication with the joint chamber D. At each revolution of the engine the effective capacity of the joint chamber D, is enlarged and diminished by reason of the motion of the plunger E.

The trunnion C″, is provided with two openings *k*, *l*, and the bearing also is provided with two openings K, L. These openings are arranged as represented so that during the motion of the crank B′, through the lower half of its revolution and consequently while the capacity of the pump chamber D, is being enlarged, the opening *k*, coincides with the opening K, and while in this condition, the water flows into the pump behind the piston ready to be discharged into the condenser, when the crank begins to form its return or upper half revolution, and the trunnion C″, turns and brings the opening *l*, in line with the opening L, and throws the opening *k*, out of line with K. The trunnion C′, is also provided with four openings c', c^2, c^3, c^4, and the bearing with two similar openings c^5, c^6 and is divided from the outer circumference of the cylinder C, to its outer end into two chambers *d*, *d′* by a partition *e*, which is arranged diagonally to the openings c', c^2, c^3, c^4, and so that the two openings c', and c^2, come on one side of it, and the other two openings c^3, c^4, on the other side of it. By this arrangement it may be obvious that when the steam is entering at c', c^5, and passing in to the cylinder behind the piston, as the crank makes its first lower half revolution, the

exhaust steam is being discharged at c^2, c^6, through the chamber d, of the trunnion and vice versa or through chamber d', when the opening c^3, is in line with c^5, and c^4 in line with c^6, and the crank performing its return or upper half revolution.

The arrangement for pumping the feed water is very simple and exceedingly compact and economical and the arrangement for managing the steam while being peculiarly well adapted for use in connection with the same, is also a very perfect and simple contrivance wherewith to control the steam without the aid of auxiliary valves, such as are used by Wm. Morris Smith, and others.

What we claim as our invention, and desire to secure by Letters Patent, is—

1. The arrangement of the pump, in such relation to the main cylinder and crank of an engine, that its pistons and valves shall be operated simultaneously with the piston and valves of the cylinder, and by the same means that actuates them.

2. The peculiar arrangement, consisting of boxes with inlet and outlet passages, c^5, c^5, hollow trunnion with two chambers d, d', formed by diagonal partition e, and with two sets of ports c', c^2, c^3, c^4, substantially as and for the purposes set forth.

The above specification of my improved manner of attaching pumps to oscillating engine and inducting and educting steam into same signed by us this 3d day of November 1857.

GAMBILL SPRENKEL.
THOMAS W. BASFORD.

Witnessed.
CHAS. A. SPRENKEL,
J. W. BEAR.