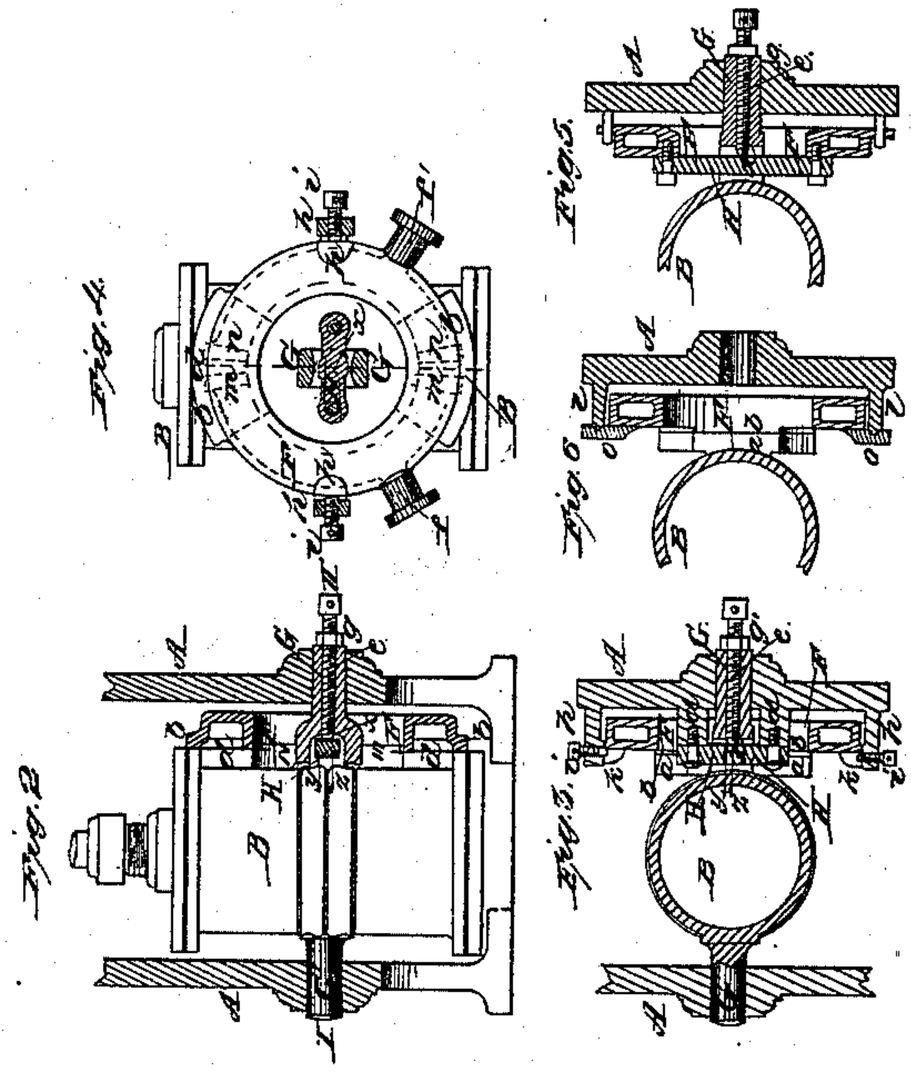
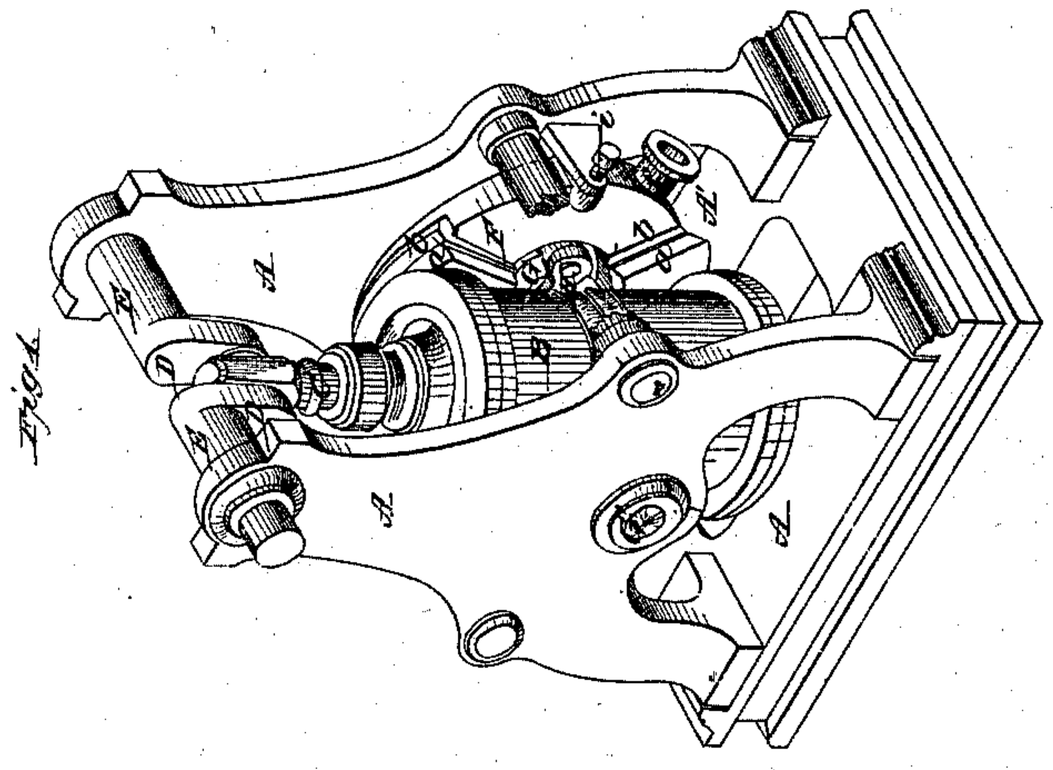
M. CRIDGE & S. WADSWORTH.

OSCILLATING STEAM ENGINE.

No. 26,664. Patented Jan. 3, 1860.





Inventors:
Matthew Cridge
Samuel Wadsworth

UNITED STATES PATENT OFFICE.

M. CRIDGE AND S. WADSWORTH, OF PITTSBURG, PENNSYLVANIA.

STEAM-ENGINE.

Specification of Letters Patent No. 26,664, dated January 3, 1860.

To all whom it may concern:

Be it known that we, MATTHEW CRIDGE and SAMUEL WADSWORTH, both of Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Oscillating Steam Engines; and we hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, making a part of this specification.

The engine represented in the drawings, and to which our improvement has reference, is of the class of engines, generally known by the name of "sidepipe engines" in which the steam is admitted and also escapes from the cylinder, through a stationary valve or "sidepipe" at the side of the cylinder; the distribution of the steam, or the opening and closing of the steamports being effected by the oscillations of the cylinder.

Our invention consists in an improved arrangement of keeping the steamport-surfaces of the sidepipe and of the cylinder in proper steamtight contact in such a manner, that the expansion and contraction of the cylinder and sidepipe, caused by variations in their temperature, has no influence thereon.

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

In the accompanying drawings: Figure 1, is a perspective view of the engine; Fig. 2, a vertical section through the sidepipe, trunnions of the cylinder, and part of the framework, showing also a side view of the cylinder; Fig. 3 is a horizontal section of the same parts, taken in the line I—II (Fig. 2); Fig. 4, is a view of the backside of the sidepipe showing also a section through the line III—IV (Fig. 2).

In all these figures the same letters of reference are marked on alike parts.

A, A, A′ is the framework of the engine, composed of the base A′, and stands A A; B is the cylinder; C the piston rod; D the crank; E the crank shafts; F is the valve or "sidepipe" *f f′* pipes for the introduction of the steam into, and for the escape of the same from the sidepipe. *b*, *b*, are the steamport faces of the sidepipe, resting against the port faces *a*, *a*, of the cylinder.

G, G′, are the trunnions of the cylinder. The trunnion G is forked, so as to allow a strong bar H, to pass transversely and freely through it. The bar H is firmly bolted on the projections *d*, *d*, cast on one of the stands A. *e*, is a set screw, through the center of the trunnion G; it is provided with a jam nut *g*, and its point bears against the transverse bar H at a point which is exactly (or at least nearly) in one plane with the steamports—or contact-surfaces (*a* and *b*) of the cylinder and sidepipe; *i*, *i* are pivots secured to the flanges *h*, *h*, (cast on the framework) and tapped into the projections *k*, *k*, provided at the sidepipe F. These pivots are opposite each other and at right angles with a line *α*, *β*, (Fig. 4,) taken through the center of the steamport surfaces *b b* of the sidepipe. By these pivots the sidepipe, F, is kept in its position, and they prevent it from turning sidewise, or following the oscillations of the cylinder; but they allow the surfaces *b b* of the sidepipe, to accommodate themselves to the surfaces *a*, *a*, of the cylinder.

The portholes in the sidepipe (which are indicated at *m* and *n*, Fig. 4), and in the cylinder, through which the steam is admitted and exhausted, are arranged precisely in the same manner as in the ordinary sidepipe engines; the cylinder portholes coming in alternate communication with the sidepipe-portholes by the oscillations of the cylinder.

In the described engine our improvement consists in the arranging the set screw *e*, (passing through the center of the trunnion), to butt against a transverse bar (H) at a point (*x*), which is in one plane with the port or valve surfaces (*a*, *a*, and *b*, *b*,). It is obvious, that hereby, the cylinder may (in consequence of variations in its temperature) expand and contract, without affecting in the least the true position or proper contact of the surfaces *a*, *a*, and *b*, *b*, the point *x*, and consequently the surfaces *a*, *a*, which are in one plane with it, being the starting point, from which the expansion acts away (as indicated by arrow *y*) and toward which the contraction acts back again (as indicated by arrow *z*).

Our improvement further consists in arranging the pivots *i*, *i*, (which form the points of abutment for the sidepipe,) in such a manner, that they are also in one plane with the contact surfaces *b*, *b*, for the purpose of allowing the sidepipe to expand

and contract, without producing thereby any effect on the correct and proper contact of the same, with the surfaces *a*, *a*, of the cylinder, the expansion acting away from these points and the contraction toward them, in a similar manner as above described in reference to the cylinder. Thus the port surfaces of the cylinder as well as of the sidepipe, being not influenced by the expansion and contraction of those parts, will always preserve a perfect contact with each other under an invariable degree of pressure. The proper degree of pressure, sufficient to make the joint between the port surfaces steam tight, is effected by the set screw, which in pressing against the transverse bar H, draws the cylinder against the sidepipe.

The described arrangement may be modified in various ways, without changing the distinguishing feature of our improvement. Thus Fig. 5, shows the transverse bar H fastened to the sidepipe (in place of securing it to the framework, as above shown); but the point *x*, on which the screw *e* acts, is in a line (or nearly so) with the port surfaces *a a* and *b b* of the cylinder and sidepipe (as has been the case in the arrangement above described).

Fig. 6, shows a modification of the parts for keeping the side pipe in its position; in place of using pivots (*i i*) (as above described), there are two projections *l*, *l*, cast or fastened on the framework, the points of which enter into cavities in the flanges *o*, *o*, provided at the sidepipe, and thus form the abutment for the same. The end points of the projections *l*, *l*, have to be in one plane (or nearly so) with the port surfaces.

The expansion and contraction of the cylinder and sidepipe has always been a very serious objection in "sidepipe engines" as arranged heretofore; to keep the port surfaces in proper contact it required a constant attention in the way of adjusting, and readjusting, in order to avoid leakage at one time, and an undue pressure between them at another time. By our improved arrangement this objection is completely overcome. We finally wish to state, that, having subjected our improved arrangement to practical trials, it fully and practically exhibited the advantages, we claim for it, and which we have fully set forth herein.

We are perfectly aware, that set screws and other equivalent means have been used before and applied in various ways, for the purpose of keeping the sidepipe and cylinder faces in contact, we therefore do not claim any of these means, or of an arrangement of the same, already known; but

What we do claim and desire to secure by Letters Patent, is:

1. The arrangement of a set screw, or its equivalent, passing through the center of the trunnion and butting against a transverse bar H at a point, which is in one plane (or nearly so) with the port- or valve-surfaces (*a*, *a*, *b*, *b*) of the cylinder and sidepipe, in the manner substantially as described and for the purpose herein set forth.

2. We also claim, the arrangement of the pins *i*, *i*, or other means, for the support of the sidepipe, F, in such a manner, that the points of abutment are also in one plane (or nearly so) with the port- or valve-surfaces of the cylinder and sidepipe; substantially as described and for the purpose herein fully set forth.

MATTHEW CRIDGE.
SAMUEL WADSWORTH.

Witnesses:
HENRY MOSER,
AUG. HARTJE.