H. & J. L. Young.

Reciprocating Engine.

No. 108,426. Patented Oct. 18, 1870.

Fig. 1.

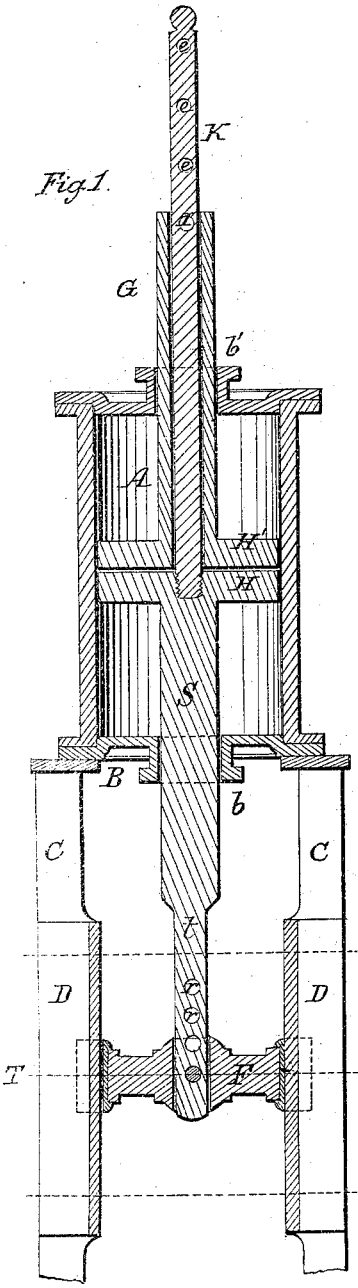
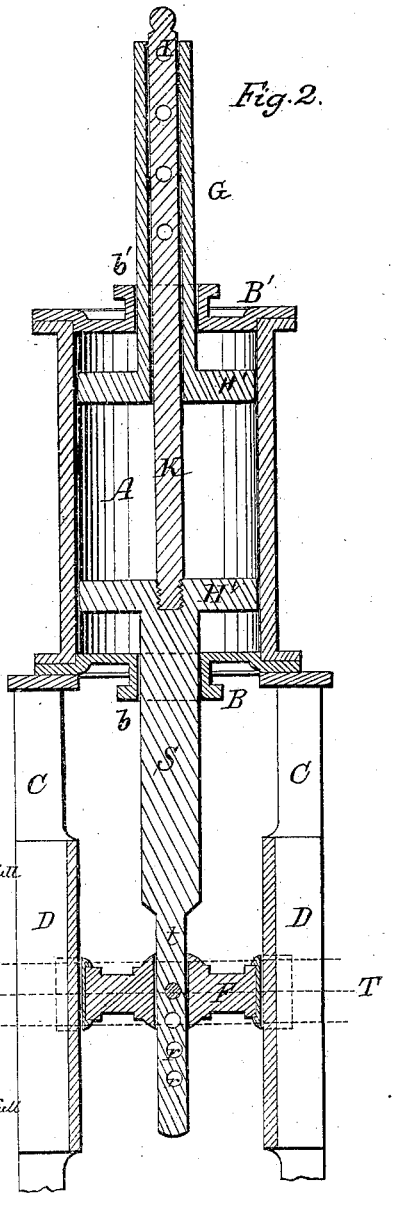


Fig. 2.



Witnesses.

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HUGH YOUNG, OF MIDDLETOWN, CONNECTICUT, AND JAMES L. YOUNG, OF NEW YORK, N. Y.

Letters Patent No. 108,426, dated October 18, 1870; antedated October 8, 1870.

IMPROVEMENT IN STEAM-ENGINES.

The Schedule referred to in these Letters Patent and making part of the same.

We, HUGH YOUNG, of Middletown, in the county of Middlesex and State of Connecticut, and JAMES L. YOUNG, of New York, in the county and State of New York, have invented certain Improvements in Steam-Engines, of which the following is a specification.

Nature and Objects of the Invention.

This invention relates to steam-engines which, for certain purposes, may at pleasure be worked at different lengths of stroke; and

The improvement consists in the combination of two pistons, with piston-rods arranged so as to form an expansive piston, adjustable for different lengths of stroke, whereby, at any of these different strokes, the pistons will work as close to the cylinder-heads as if working full stroke in ordinary engines, and thereby avoid the great loss of steam attending the working at reduced stroke the ordinary steam-piston in a steam-cylinder.

Description of Drawings.

Figure 1 is a sectional elevation through center of one of our variable-stroke steam-engines, set for working at full stroke; and

Figure 2 is a similar view of the same engine, set for working at one-quarter stroke; steam-ports, valves, and arrangement for the distribution of steam not being shown, as being supposed to be of any approved arrangement, and not claimed in our invention.

General Description.

A is the cylinder, of any construction, shape, and system of steam-engine, having heads, B and B', with suitable stuffing-boxes, *b* and *b'*.

C C is the frame of the engine, and

D D are the slides fastened thereto.

F is the cross-head, or any other piece of machinery which is to be moved backward and forward by the pistons.

H H' are two pistons, which are provided with any desired and proper packing to make them steam-tight in the cylinder A.

G is the piston-rod of the piston H'.

This piston-rod G is hollow or tubular shape, and of the proper length, so that, when the piston H' is entirely in, the rod G will still project out of the stuffing-box *b'*, through which it works; and in that projecting part there is a key-seat or pin-hole bored, to receive the pin or key I.

K is a solid piston-rod fastened to the piston H, and passing through the hollow piston-rod G.

This rod K has a number of key-holes or pin-holes, *e e e*, &c., so as, by making one of these holes *e* correspond with the pin-hole of the hollow piston-rod G, to expand or contract the piston of the engine, by spreading apart or bringing together the pistons H and H'.

S is the piston-rod through which the pistons H H' are connected to, and transmit motion to, the machinery. It has a cylindrical part of proper length to work full stroke in the stuffing-box *b*, and an extension or end, *t*, fitting into and sliding through the cross-head F.

In the extension *t*, which may be round, or flat, or square in its cross-section, there are holes or key-seats, *r r*, allowing of the piston-rod S being fastened to or keyed to the cross-head F at different places, so that, when the length of the stroke is changed by expanding the pistons H H', the cross-head F will always work in the slides D D equally on each side of the dotted center line T T', which is the center line of any stroke of the engine.

X is a scale indicating fractions of full length of stroke.

The distances between the center of the holes *r r r* are to be one-half the distances betwen the center of the holes *e e e*, on the rod K; and to avoid mistakes in changing the stroke of the engine, the corresponding holes upon the rod K and the rod S may be marked by letters or numbers, so as to indicate a certain length of stroke, full, one-half, three-quarters, one-quarter, &c.

The dotted lines upon the slides D D indicate the center line of the cross-head F, at different points, viz: at the center of the stroke and at both ends of the stroke.

It is assumed that, if the steam-engine is to be worked with a crank and balance-wheel, the crank will have a variable crank-pin, to correspond to the different lengths of stroke fixed upon and limited by the expanding device of the pistons H H' and expansive piston-rod S; but, as there is nothing new in such variable crank-pin upon the crank, we have not thought necessary to illustrate it, but we contemplate using it more especially as a direct-acting engine, with suitable air or steam-cushions, for working stone-cutting machines.

We have described and illustrated in our drawings a set of holes and pins to regulate the expansion of the pistons and the length of the piston-rod S, but it is evident that, if a screw was cut upon the rod K, and part *t* of rod S, and that proper nuts and swivels be used, so as to accomplish the same result, it would answer the same purpose.

Again, although we speak of our invention as of a steam-engine, it is evident, and we do contemplate,

that compressed air may be used in our engine, and answer for certain objects as well as steam. Also, we have contemplated the same arrangement for a pump, and it would make an excellent double-acting variable-stroke pump.

Claims.

1. The combination of the piston H, piston-rod K, piston H′, and hollow piston-rod G, having the pin I, or its equivalent regulating and holding device, with the cylinder A of a steam or compressed-air engine.

2. The combination of the piston-rod S, having a regulating and fastening device in the cross-head F, or other piece of machinery to be moved by said piston-rod S, with the expansive pistons H and H′, so as to work in the manner set forth.

3. The expanding piston, substantially as described, in steam-engines or compressed-air engines, for working the same at different lengths of stroke, without the loss of steam or compressed air, as herein set forth.

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Witnesses:
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