

2 Sheets-Sheet 1.

W. Wright,

Steam-Engine Valve-Gear.

N<sup>o</sup> 15,207.

Patented June 24, 1856.

Fig 1

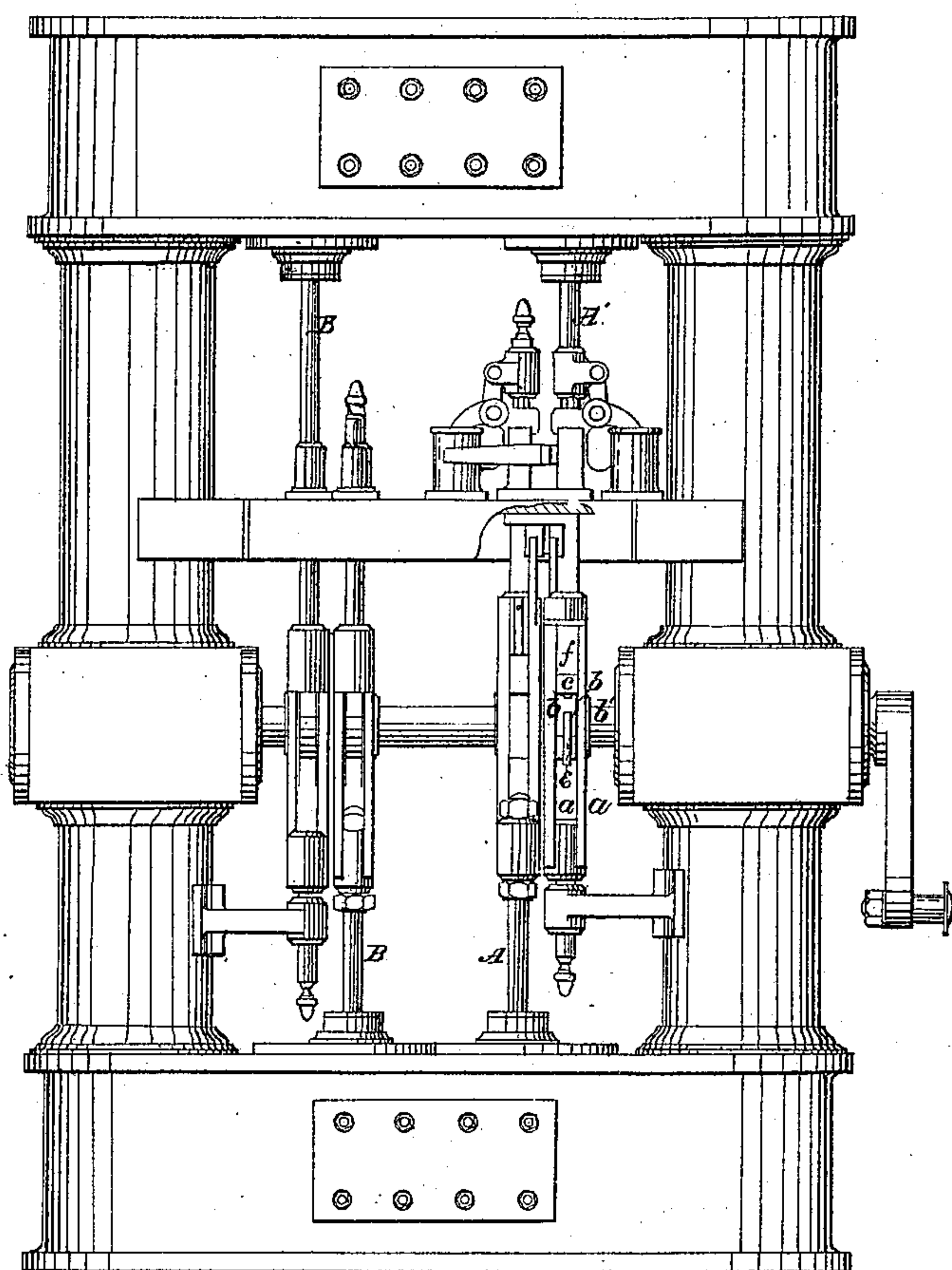
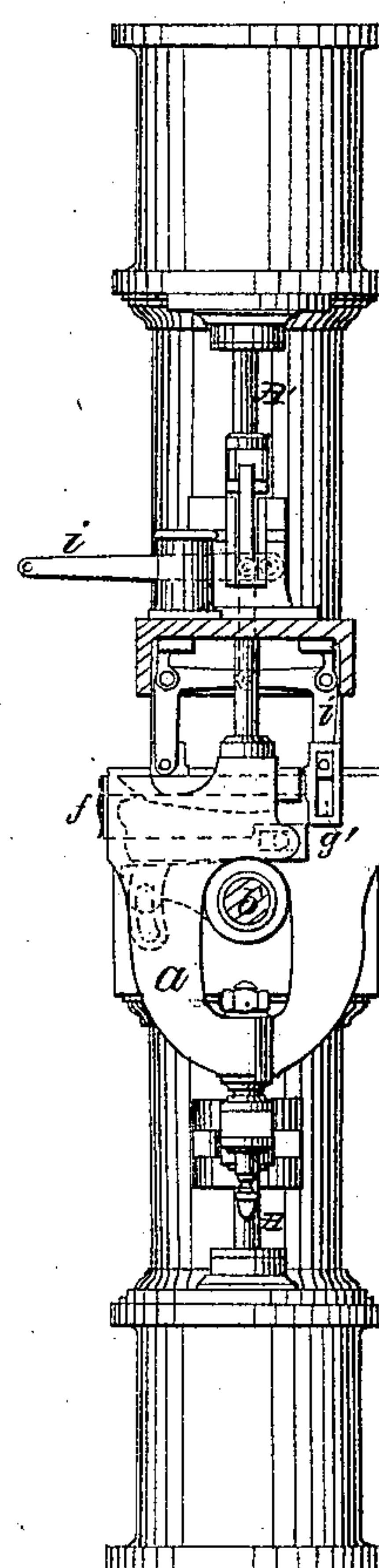


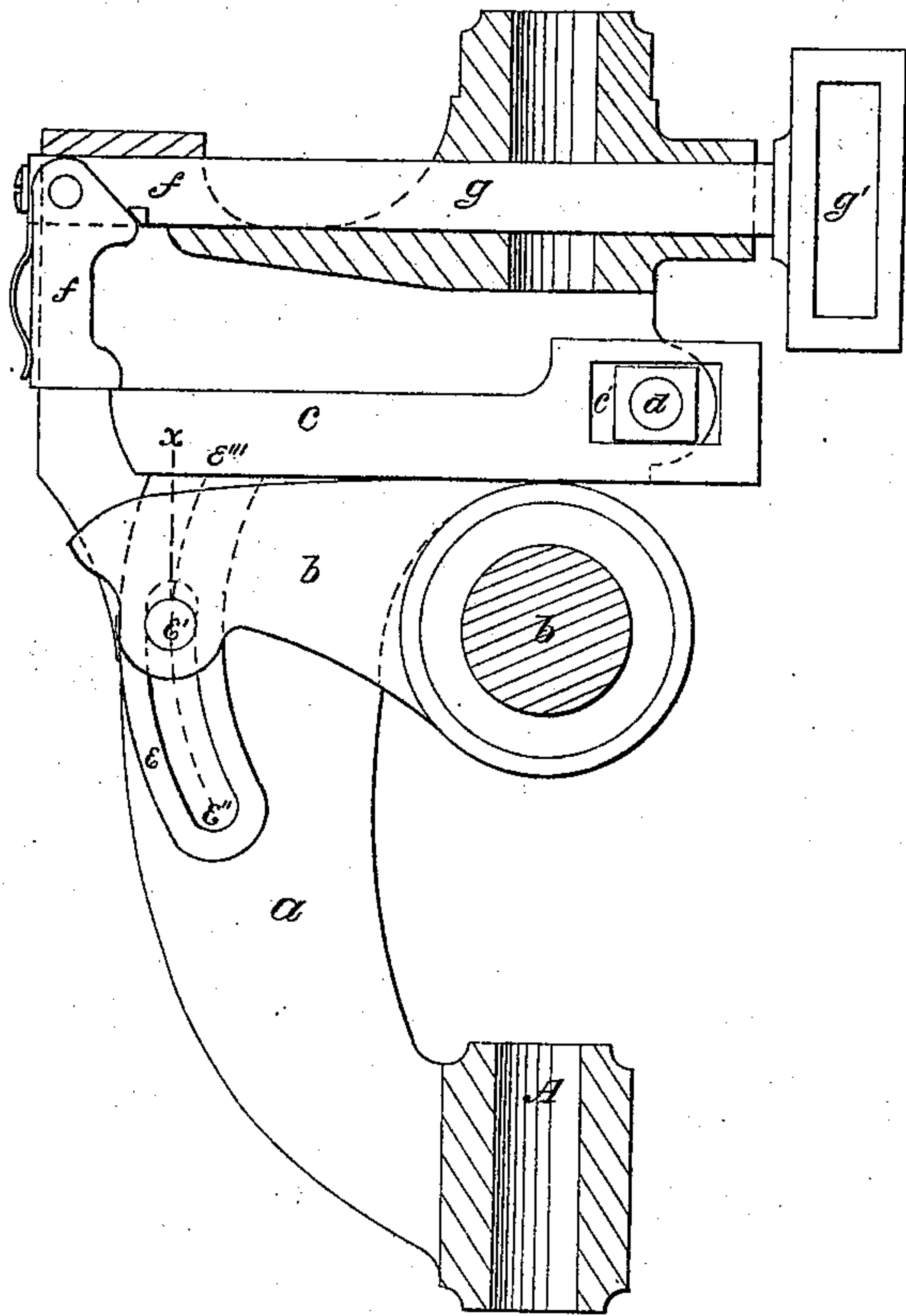
Fig 2



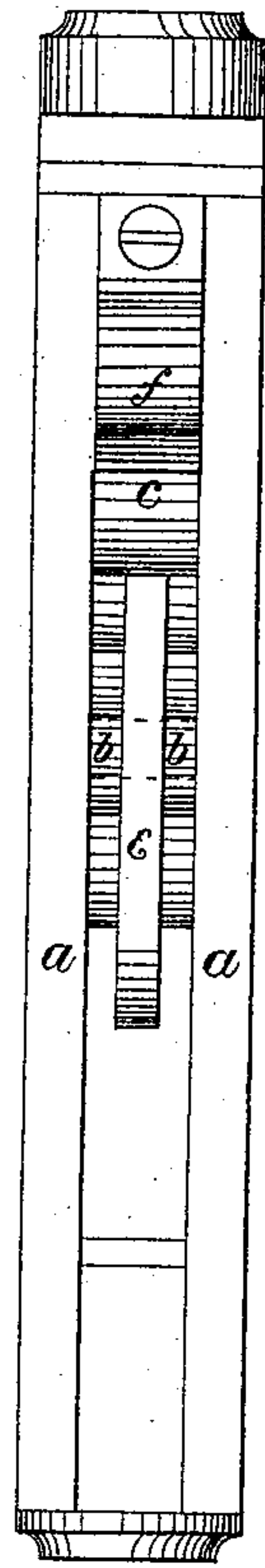
2 Sheets-Sheet 2.

*N. Wright,*  
*Steam-Engine Valve-Gear.*  
*N<sup>o</sup> 15,207.      Patented June 24, 1856.*

*Fig 3*



*Fig 4*





# UNITED STATES PATENT OFFICE.

WILLIAM WRIGHT, OF HARTFORD, CONNECTICUT.

## OPERATING CUT-OFF VALVES FOR STEAM-ENGINES.

Specification of Letters Patent No. 15,207, dated June 24, 1856.

*To all whom it may concern:*

Be it known that I, WILLIAM WRIGHT, of Hartford, county of Hartford, and State of Connecticut, have invented certain new and useful Improvements in Steam-Engines; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being made to the annexed drawings, making a part of this specification, which are fully described herein, and similar letters indicate similar parts throughout.

My invention is for certain improvements in the construction and operation of cut-off valves for steam engines, and consists in an improved method of disengaging the valve from the lifting-toe, and which method is intended to be applied to the working of the ordinary double lifting valves as employed in engines of the reciprocating kind and as represented in Figure I where the steam chests, side-pipes, &c., are as usual. The rock-shaft passes through the center of the steam side pipes and has also toes upon it as usual for lifting the exhaust valves. The toes for the steam valves are somewhat different, as those toes do not act immediately upon the lift rods, but operate first upon the pieces forming the cut off. At A and A' are the steam valve stems or lift rods and B B are the exhaust valve-rods,—to these latter however no further reference need be made.

My improved cut-off is constructed of two pieces combined with the yoke and lifting-toe, one of which pieces may be called a supplemental toe as it lies upon the lifting toe and is operated by it, the second being a slide and latch.

In Fig. III is a detached and enlarged view of the several pieces: at (a) and (a') are seen the yokes to which the lift rods or valve stems A or A' are attached. Each is formed of two plates separated by a slight space as shown in the end view Fig. IV and also in Fig. I, the toes being operated within said space. The toe (b) is keyed to the rock-shaft (b') so as to move with it, and immediately above (b) is the supplemental toe (c). This is a bar having a slot or elongated eye (c') at one end, through which a pin (d) in the yoke passes, whereby it is kept fastened to the latter. By this it will be seen that the bar (c) is to have two motions—one on the pin as an axis—and the other lengthwise in the direction of

the slot (c'). At the opposite end is a curved piece (e) fastened to the underside; this passes down through a split formed in the end of the toe (b), and in said pin there is also a curved slot, the curve being struck from the center of (b'). At (e') is a pin passing through the slot and the toe, whereby the toes (b) and (c) are connected together at this part. At (f) is a latch secured to the end of a sliding bar (g), which latter plays in bearings across the head of the yoke. The latch has a spring on its outer edge tending to press it inward being arrested by the stop (f') in a vertical position, and at the end of the slide (g) is a long vertical slotted opening (g').

The position of the several parts shown in Fig. III is as when the valve is closed, and it will be seen that the lower inside corner of the latch rests upon the point of the supplemental toe (c) and that the latter lies along the top edge of the lift toe (b).

The operation will be as follows. It is understood that the extent of vibration of the toe (b) is equal to twice the lift of the valve, that is to say from (e'') to (e''') the lift being from (e') to (e''') or thereabout, the other half of the vibration being performed merely to allow for the lifting of the other toe, and during the movement of this latter part the pin (e') will play along the slot in (e) toward (e''), all the other pieces remaining at rest; on returning, as the pin arrives at the top of the slot the toe (b) commences lifting the point of the supplemental toe (c) and this latter in turn lifts the valve through the bearings of the latch (f) on the one end and the pin (d) on the other. The operation of the toe (b) imparts two motions to the supplemental toe; the first is to raise it directly upward, and the other is to give a lateral motion along the slot (c'), which motion is effected by means of the curved piece (e), and it is by this latter motion that the valve becomes disengaged from the toe so as to drop and effect the cut-off. As the yoke rises vertically, or in the line (e') (x) the pin describes the arc (e') (e'''), consequently the piece (e) is compelled to move with the pin and causes the supplemental toe (c) to move also in the same direction, or from (x) to (e'''), and the point of (c) will therefore be drawn from under the latch (f) at which moment the valve



will drop, since it requires the engagement of both ends of (c) to support it upon the toe (b). That now descends, causing (c) to follow and engage again under the latch, the spring upon the back yielding to allow the end of the supplemental toe to pass, and the lifting will be again performed as before.

The point of time for dropping the valve, *i. e.* to make it cut off sooner or later is governed as follows. In the slot (g') Fig. II, is a pin attached to one arm of a right angled crank (i), and to the opposite arm is attached a lever (i') by means of a link (shown in dotted lines), and by raising or lowering this lever the arm (i) will push the slide (g) along carrying with it the latch (f). This will vary the distance which the latch laps or rests upon the end of the toe (c) and in accordance therewith will the toe become disengaged sooner or later, and of course effect the cut-off accord-

ingly. This variation can be given during the operation of the engine just as well, and consequently the cut-off supersedes the use of a throttle, which is now the most approved mode, the governor being attached to the lever (i'). As the regulating part is permanently fixed, while (g) is constantly rising and falling, the slot (g') is necessary to allow of the play of the pin in (g').

I claim—

So combining the lifting-toe with the lift-rod by means of a supplemental toe or slide bolt, that the arc or curve described by the vibration of the lifting-toe shall effect a lateral movement of the bolt, thereby tripping the valve as described.

WM. WRIGHT.

Witnesses:

I. P. PIRSSON,  
S. H. MAYNARD.