

(No Model.)

A. J. STEVENS.

VALVE GEAR FOR STEAM ENGINES.

No. 288,133.

Patented Nov. 6, 1883.

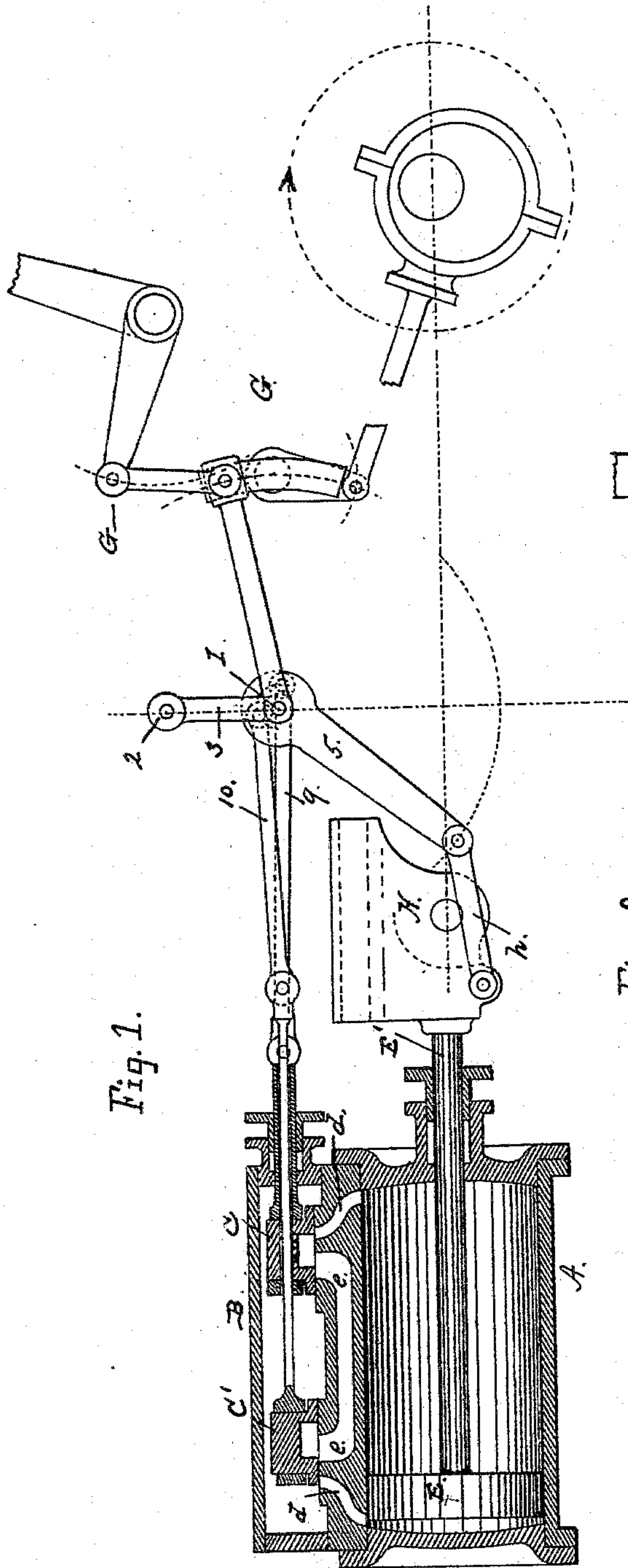


Fig. 1.

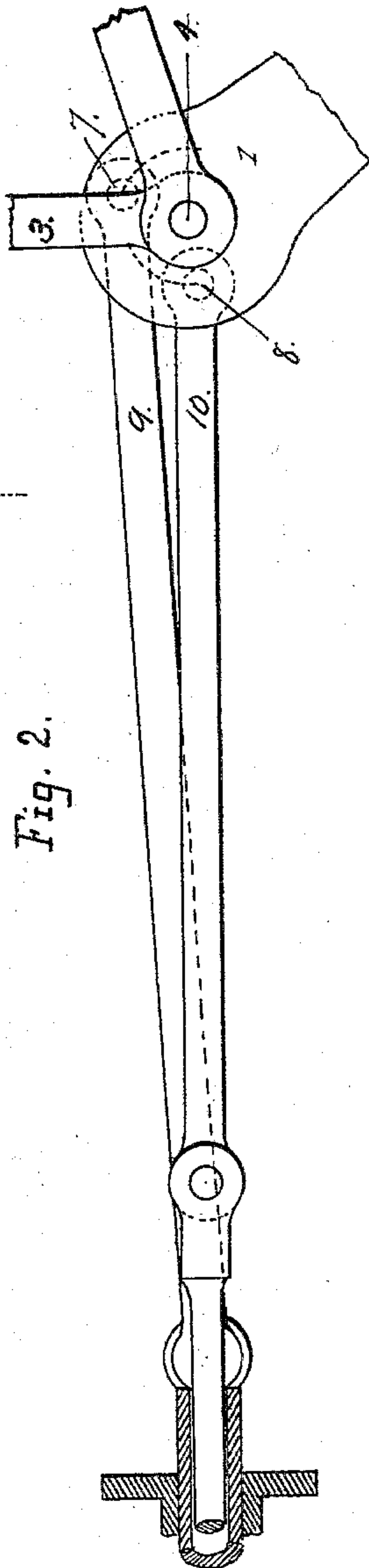


Fig. 2.

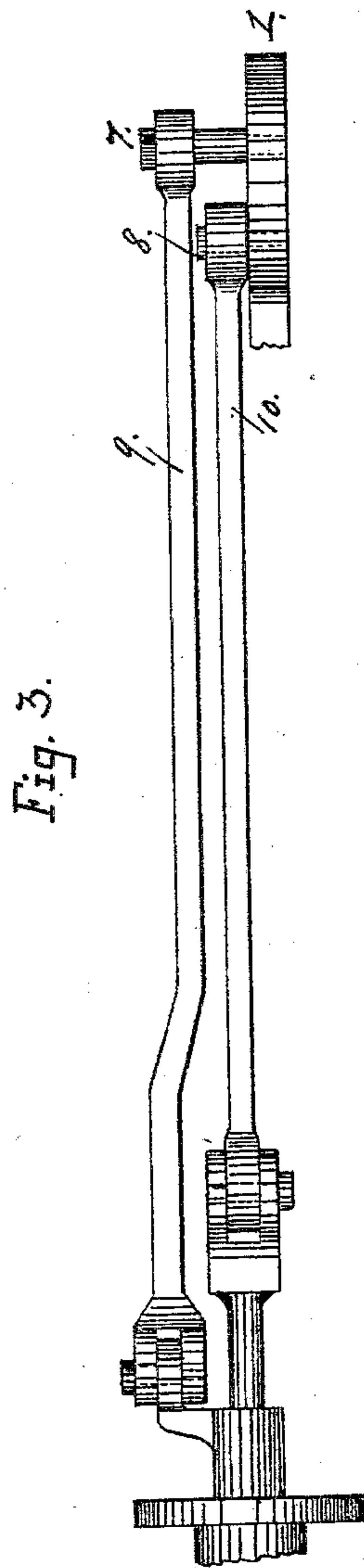


Fig. 3.

Witnesses:

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UNITED STATES PATENT OFFICE.

ANDREW J. STEVENS, OF SACRAMENTO, CALIFORNIA.

VALVE-GEAR FOR STEAM-ENGINES.

SPECIFICATION forming part of Letters Patent No. 288,133, dated November 6, 1883.

Application filed February 24, 1883. (No model.)

To all whom it may concern:

Be it known that I, ANDREW J. STEVENS, a citizen of the United States, residing in the city and county of Sacramento, State of California, have made and invented certain new and useful Improvements in Valve-Operating Mechanism for Engines; and I do hereby declare that the following is a full, clear, and exact description of my said invention, reference being had to the accompanying drawings.

My invention relates to improvements in operating valves of steam-engines.

It consists in imparting to the valves an independent variable movement in connection or in combination with their general movements, whereby a differential instead of a regular movement and action of the valves upon their parts is obtained, the effect of which is to enable one valve to cut off at any required point and the other valve to retard the exhaust until the stroke is completed.

The following description fully explains my improvement in operating engine-valves and the manner in which I proceed to construct and apply it, the accompanying drawings being referred to by figures and letters—that is to say:

Figure 1 shows the application to valve-gear of a locomotive-engine. Figs. 2 and 3 are side and top views of mechanism by which the variable movements of valves are obtained.

A represents a steam-cylinder; B, its valve-chamber; C C', the valves; *d d e e*, the supply and exhaust ports, respectively, and E E' the piston and piston-rod.

G is valve mechanism of well-known construction, operated by an eccentric. Connection between the valve mechanism G and valves is made by suitable rods and an oscillating disk, 1, which is suspended and moved back and forth on a fixed point of oscillation, 2. The point of motion 2 is fixed in the end of a link, 3, to which the disk 1 is pivoted at 4, Fig. 1, so that it can turn also upon this point 4 as a center, in addition to its back-and-forward movement from center 2. A lever, 5, forms an extension of said disk 1, is carried down and attached to the cross-head H of the piston-rod by a link, *h*. This lever is either formed as a part of the disk or is a separate rod secured to it.

By the reciprocations of the engine-piston a partially rotary movement of the disk backward and forward on its center 4 is obtained at the same time that the disk is being moved by the valve-gear in a longitudinal direction.

Projecting from one face or side of the disk are two wrist-pins, 7 8, to which are attached the outer ends of two valve-rods, 9 10, by means of links or connections 11 12. The wrist-pins 7 and 8 are set upon the disk 1 at points between ninety and one hundred and eighty degrees apart, so as to give a differential movement to the valves, which cannot be obtained when the pins are opposite on the disk, as when in such position—*i. e.*, opposite—one valve will be at one limit of throw and the other at the opposite limit.

Each valve has its own rod and a separate connection with the disk 1. The front valve, C, is fixed to the inner end of the rod 9, while the rod 10 extends into the valve-chamber beyond the first valve, and is connected to the rear valve, C'.

In the application of my invention shown in the drawings, the rod of the front valve is a hollow tube, and the second rod, 10, is carried through it to make direct connection with the rear valve. I do not confine my improvement to this particular arrangement of valve-rods, however, as the attachment of the valves to the wrist-pins 7 and 8 by independent connections can be done in other ways that would be the equivalent of this construction. The valves C C' being coupled in this manner by independent rods to the valve-gear, they will reciprocate together and in the same general direction from the action of the eccentric on the links and levers; but besides these movements, common to both, each valve is controlled and acted on by that change in the angular position of the two wrist-pins which results from the rotary movement of the disk 1 upon its center 4, and each valve, instead of having a uniform rate of travel, has a variable movement. The degree of this variable movement is governed both by the distance of the wrist-pins from the center 4 of the disk and the length of the lever 5, and it can be increased or diminished by the changing the position of the one or the length of the other in the construction.

Having thus fully described my invention,

what I claim, and desire to secure by Letters Patent, is—

1. The improvement in operating slide-valves of steam-engines, consisting in employ-
5 ing a separate valve-rod for each valve, in connecting each rod to a rotary disk having a movement of rotation upon its center imparted to it directly or indirectly from the engine-piston, and then making connection of
10 this disk by its center or axis with the general valve-gear or valve-actuating mechanism, whereby said valves receive independent movements from the rotation of the said disk, which movements qualify and counteract the
15 general movements received from the valve-gear, substantially as described.

2. In valve-operating mechanism of steam-engines, slide-valves, as C C', having connection with their valve-gear through the medium
20 of separate valve-rods 9 10, and a disk, 1, to which the rods are connected, said disk be-

ing provided with pins or connections 7 8, set upon the said disk at points between ninety and one hundred and eighty degrees apart, substantially as and for the purpose herein 25 described.

3. In mechanism for operating valves of steam-engines, the disk 1, having connection by points 7 8 with the valves by independent valve-rods 9 10, and suspended from a point 30 of oscillation, 2, mechanism connecting said disk directly or indirectly with the engine-piston, to impart a rotary or a partially rotary motion from the stroke of the piston, and the connecting-rod g, by which said disk receives 35 an oscillating movement from the valve-driving mechanism, substantially as herein described, for the purpose set forth.

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Witnesses:

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