

(No Model.)

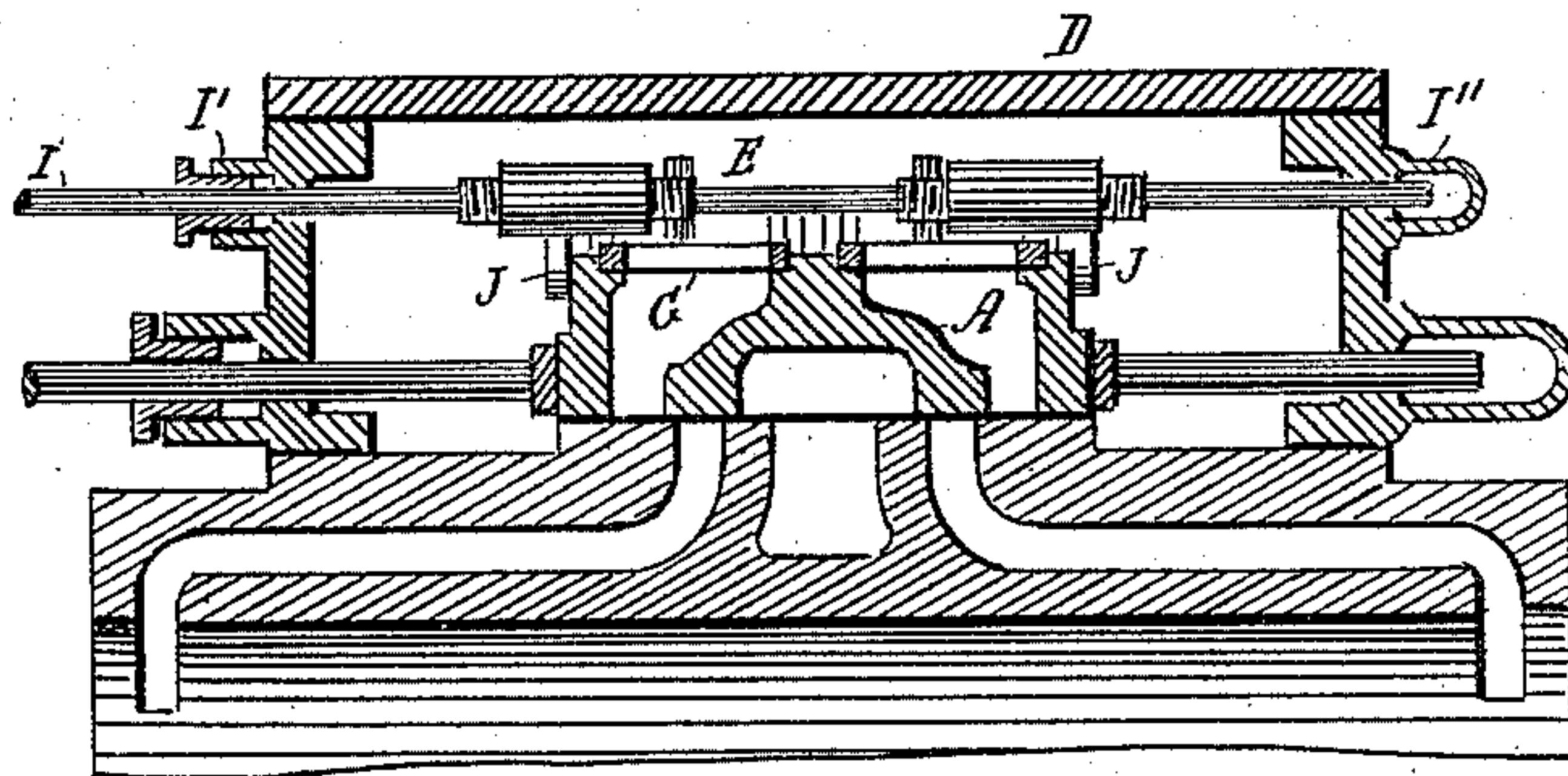
2 Sheets—Sheet 1.

C. A. MARRDER.  
CUT-OFF VALVE.

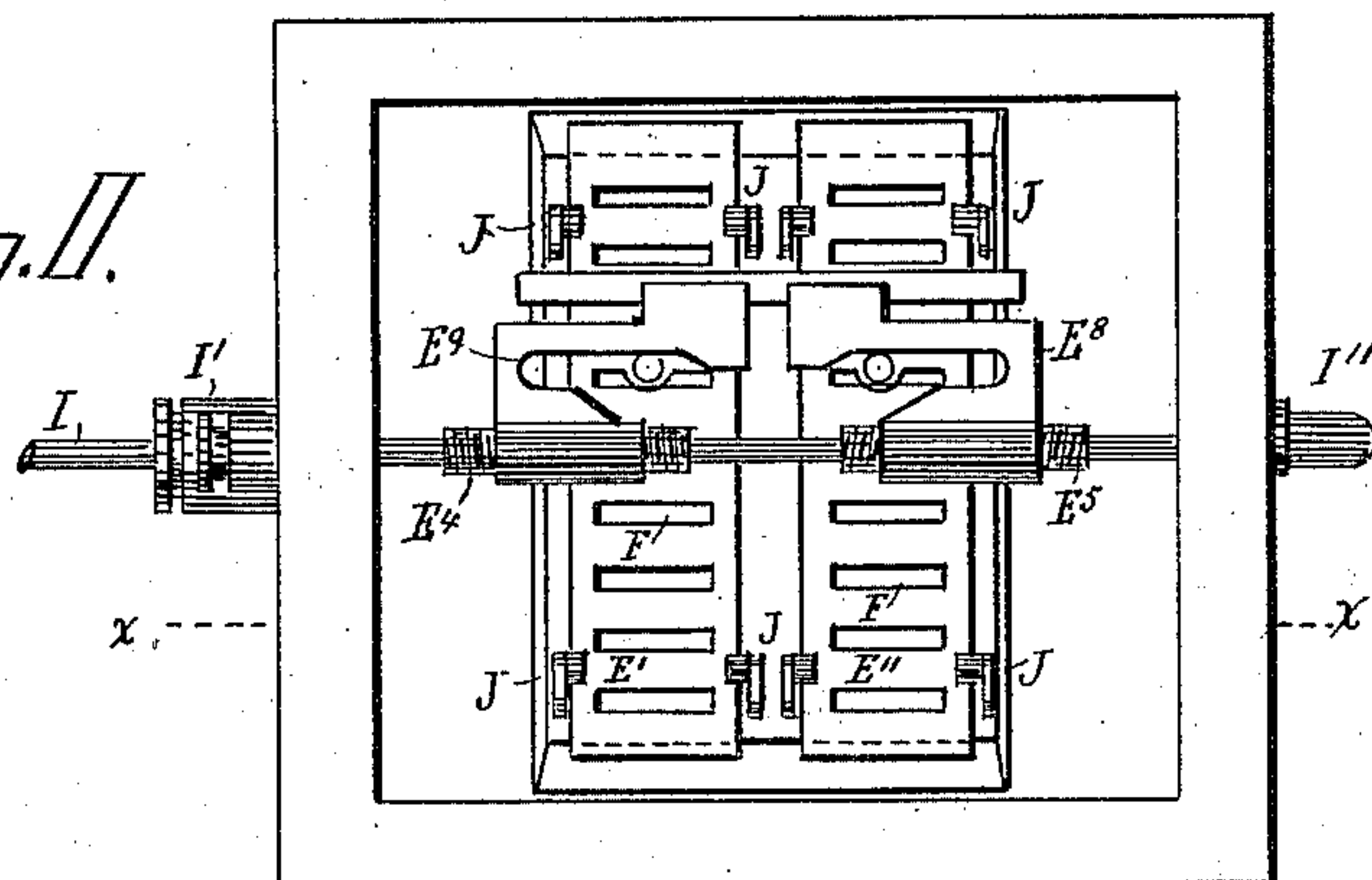
No. 533,366.

Patented Jan. 29, 1895.

*Fig. 1.*



*Fig. II.*



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*INVENTOR*

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(No Model.)

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*Fig. III.*

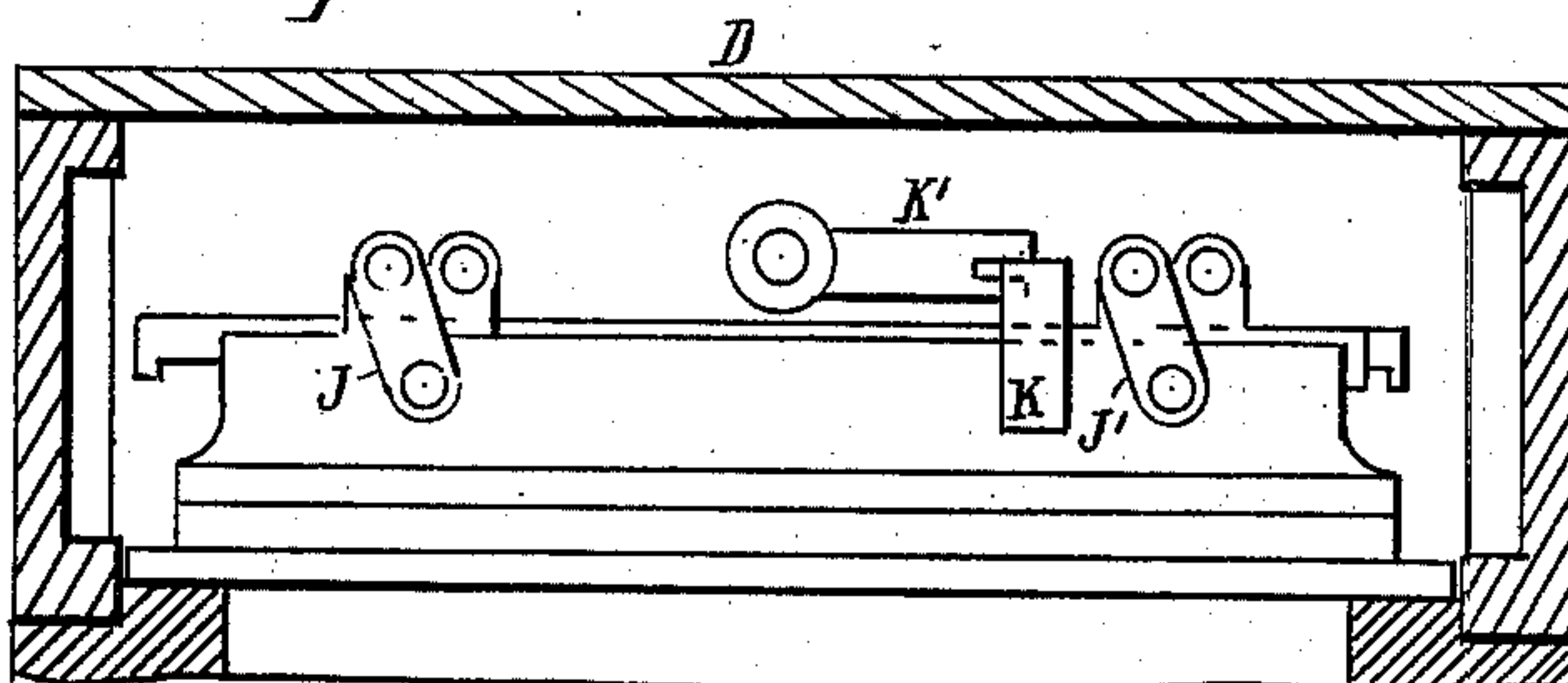
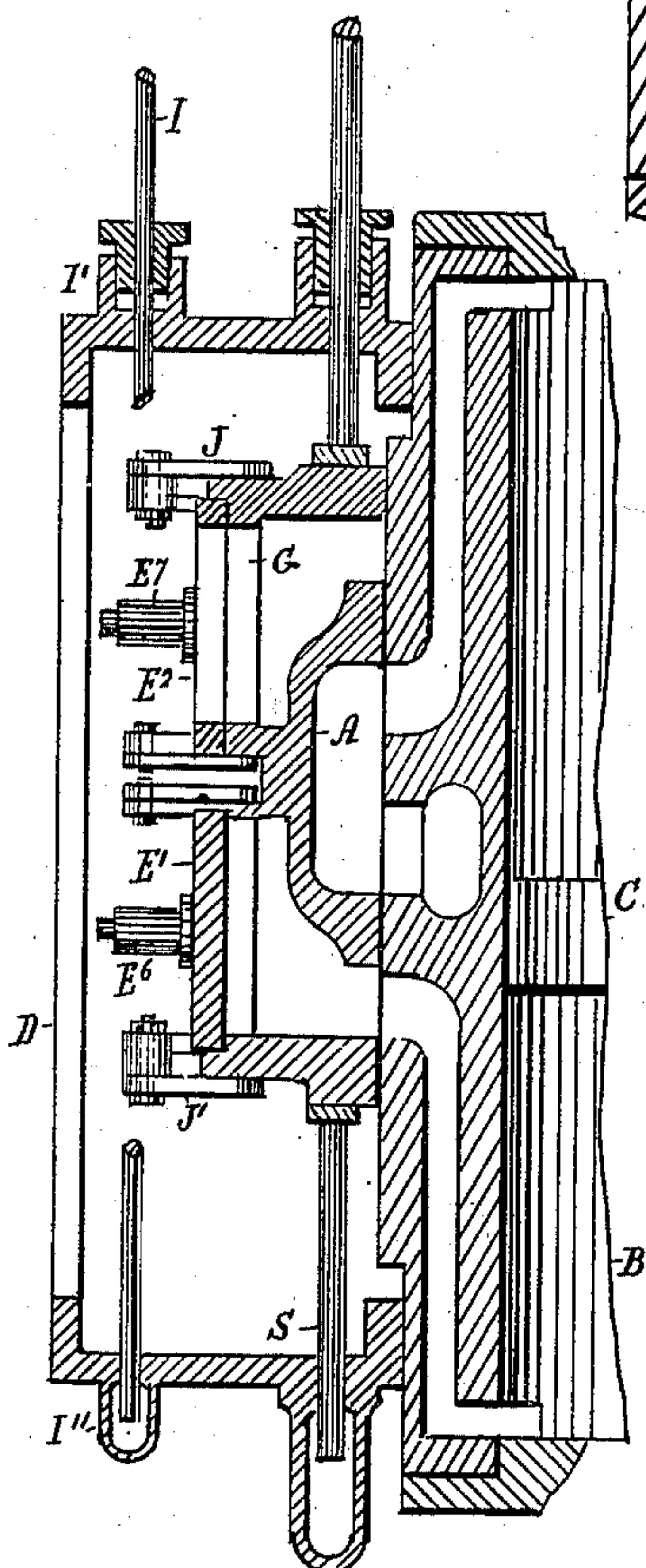
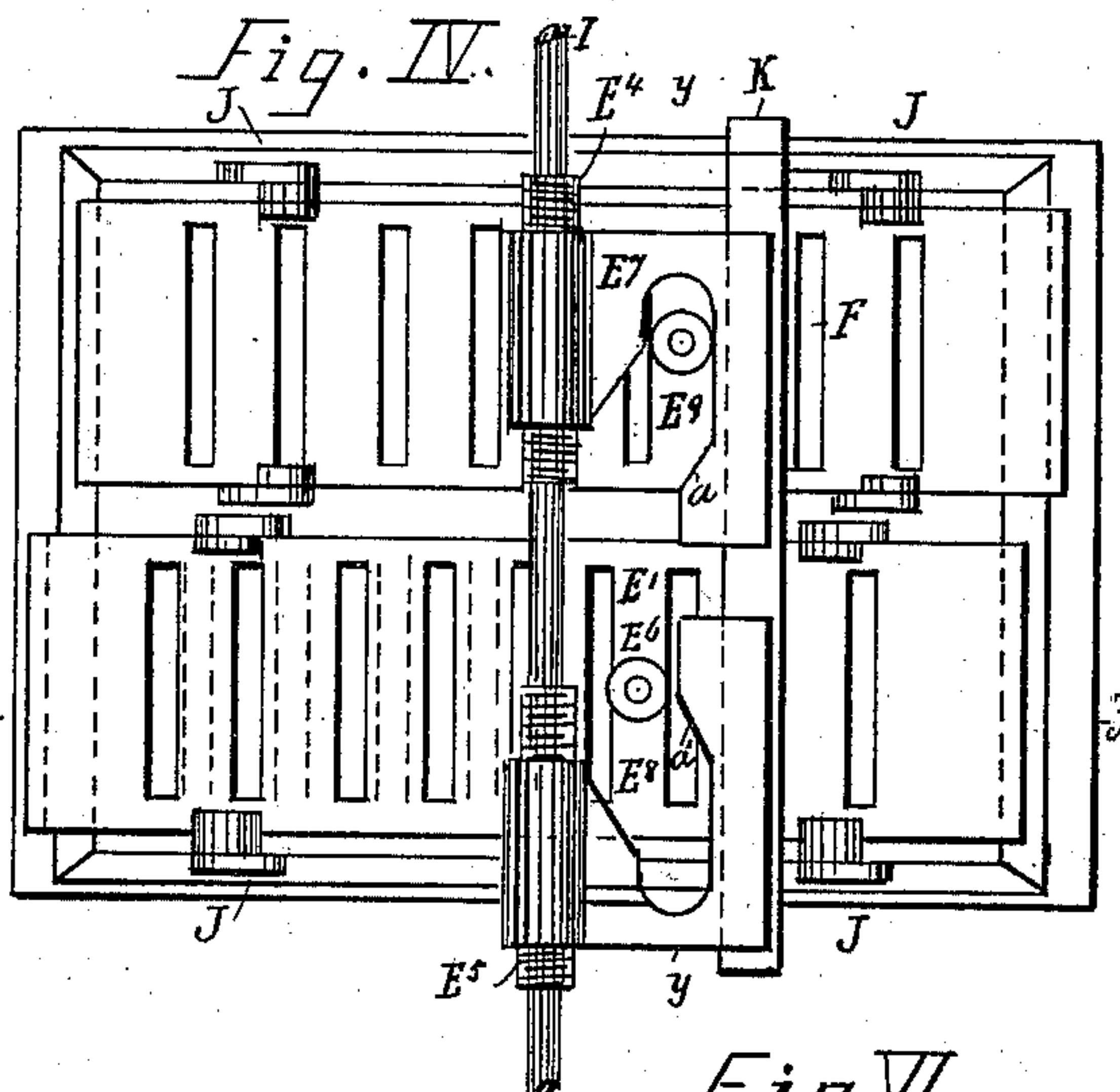


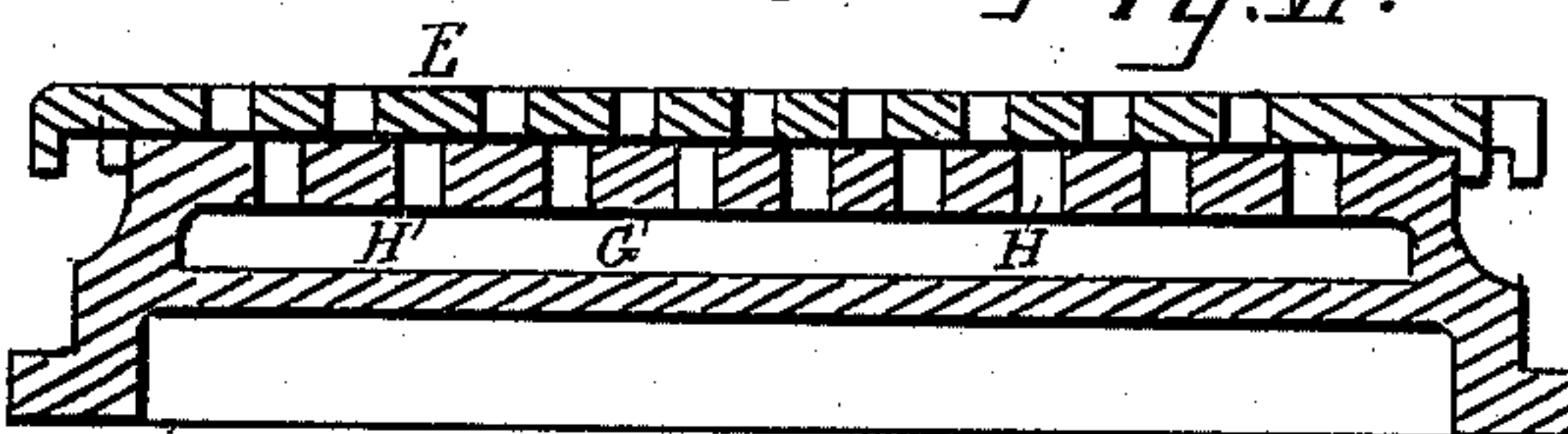
Fig. V



*Fig. IV.*



*Fig. VII.*



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# UNITED STATES PATENT OFFICE.

CHARLES ADOLPH MARRDER, OF NEW YORK, N. Y.

## CUT-OFF VALVE.

SPECIFICATION forming part of Letters Patent No. 533,366, dated January 29, 1895.

Application filed November 16, 1893. Serial No. 491,060. (No model.)

*To all whom it may concern:*

Be it known that I, CHARLES ADOLPH MARRDER, a citizen of the United States, and a resident of New York, in the county of New York and State of New York, have invented certain new and useful Improvements in Automatic Variable Cut-Off Valves, of which the following is a specification.

My invention consists of an automatic variable cut-off valve arranged on the top of the ordinary slide-valve actuated by "link-motion," for use on steam engines or locomotives, as more particularly described and illustrated in the following specification and accompanying drawings, in which—

Figure I represents a vertical cross section of the slide-valve and the expansion valve on top thereof. Fig. II represents a plan view of the expansion valve. Fig. III represents an end view of Fig. IV. Fig. IV represents a plan view of the expansion valve, on a larger scale than Fig. II, showing the expansive position of the valve. Fig. V represents a cross section of Fig. IV through line  $y-y$  in said figure. Fig. VI represents a cross section of Fig. IV through line  $z-z$ , showing the valve closed.

Similar letters of reference indicate corresponding parts.

The letter A designates an ordinary slide-valve and its concomitants, constructed, arranged and operating in the well known way when applied to the proper parts of a steam engine or a locomotive.

B indicates the cylinder; C, the piston, and D the steam chest of ordinary construction.

The letter E designates the top of the expansion valve located on the top of the steam valve and made in two parts  $E^1 E^2$ , which have a series of ports F, arranged at suitable intervals therein and adapted to move on a bed G, also provided with ports H.

The letter S designates the usual slide-valve-rod.

The letter I indicates the valve rod of the expansion-valve, working in chambers  $I^1 I^2$ , at each end of the steam-chest D, and provided with right and left hand screws  $E^4 E^5$ , on its intermediate portion, to receive sleeves carrying cams  $E^8 E^9$  and serving to regulate the stroke of the expansion valve by means of the cams  $E^8 E^9$ .

$E^6 E^7$  indicate friction rollers on the expansion valves to engage with cams  $E^8 E^9$ . As soon as the inclined portion  $\alpha$  of the cams  $E^8 E^9$ , touches the friction rollers  $E^6 E^7$ , the links J, next referred to, are forced to rise and are thrown past the center of gravity to a reversed position, thereby acting as a cut-off.

The letter J indicates the links carrying the expansion valves. These links J are suitably connected to the slide valve A and have the effect of causing the expansion valve to lift instead of sliding, thereby reducing friction besides keeping the expansion valve always in position.

The letter K designates a stationary guide, to engage with a groove  $K'$ , on the cams so as to prevent the latter from being displaced.

The operation of the valve is as follows: When the engine is on the center and the piston stands to commence full stroke, both the expansion valves are open. When the slide valve A, commences to move and opens the ports in the cylinder, steam will go into the cylinder on one side and exhaust on the other side, and as soon as the roller  $E^6$  touches the inclined portion  $\alpha$  of the cam  $E^9$ , it closes the expansion valve on one side and throws it over in the other direction and piston C, will finish its stroke with the expansion of the steam. When the valve A, returns to its starting point and ready to take steam for its return stroke, the expansion valve  $E^2$  remains open; and when the valve A, commences to move in the other direction, it will open the ports on the valve seats again, steam will enter the cylinder and exhaust on the other side, and as soon as roller  $E^7$  touches the inclined portion  $\alpha$  and closes the expansion valve, the piston finishes the stroke with the expansion of the steam. At the same time as roller  $E^6$  touches the inclined portion of the cam and opens expansion valve  $E^1$ , it will be ready for the next stroke. When the valve is to be worked without cut-off, suitable links will be used to produce a shorter stroke so as not to touch the inclined portion  $\alpha$ ; or the cams can be brought nearer together by the right and left hand screws so as not to touch the inclined portion  $\alpha$ , and thereby work without cut-off.

What I claim as new, and desire to secure by Letters Patent, is—

1. An automatic variable cut-off valve for steam engines or locomotives, an expansion valve located on top of the slide valve, actuated by the movement thereof, in combination with the slide valve, links causing the expansion valve to intermittingly lift, thereby reducing friction and keeping the valve in position, substantially as shown and described.

2. An automatic variable cut-off valve consisting of a slide valve, in combination with

a cut-off valve operated from the slide valves by cams mounted on a cam-rod by a right and left hand screw, which permits changing the situation of the cams, thereby giving more or less cut-off, as may be desired, substantially as shown and described. 15

C. ADOLPH MARRDER.

Witnesses:

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