

(No Model.)

O. E. BROWN & P. STETSON.
CUT-OFF VALVE FOR ENGINES.

No. 482,516.

Patented Sept. 13, 1892.

Fig-1.

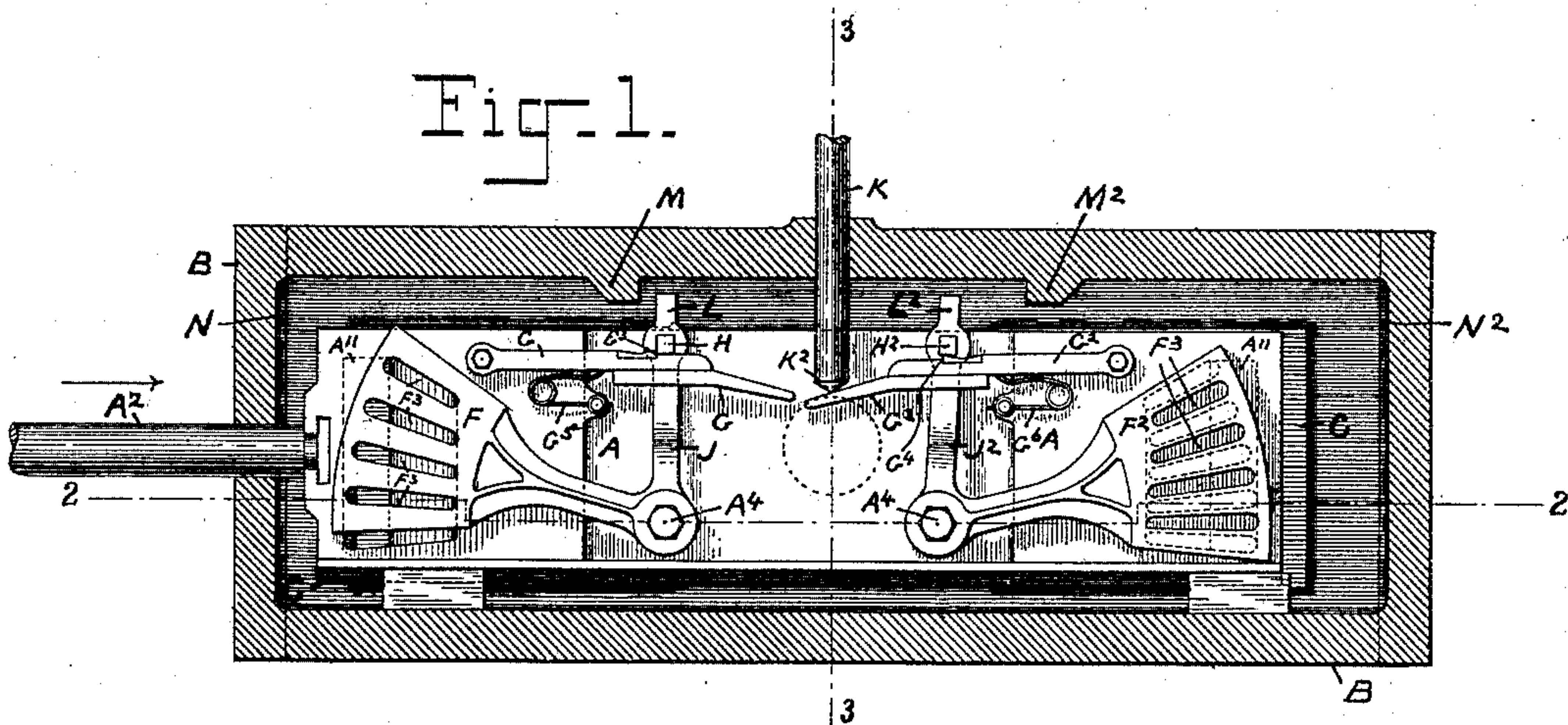


Fig 2.

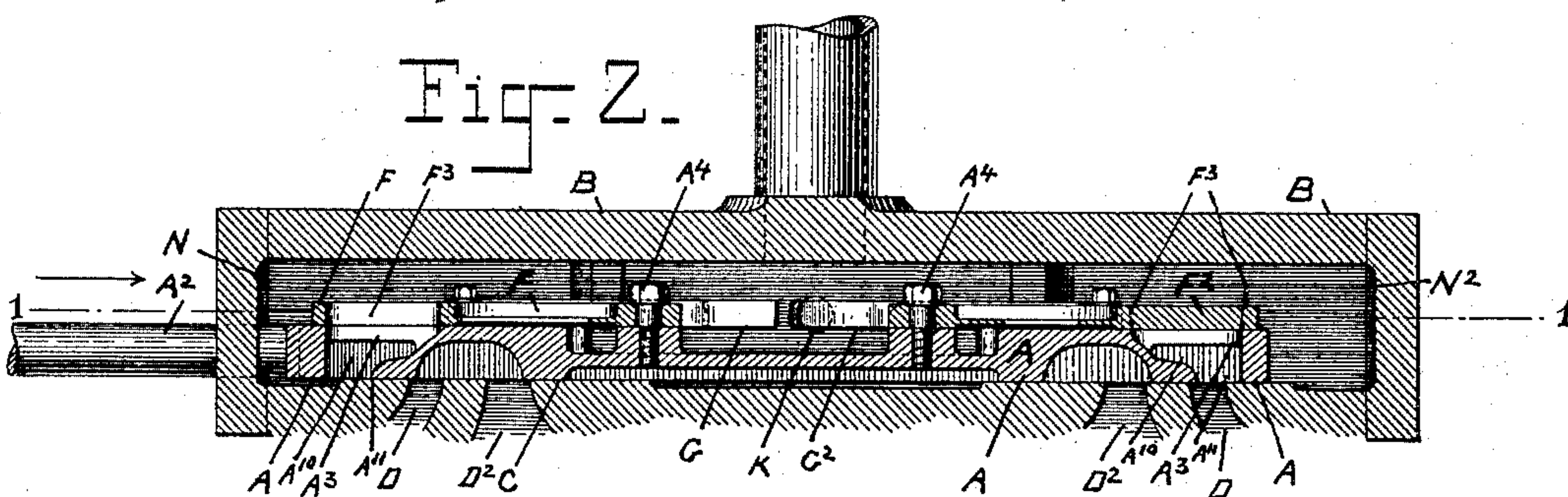
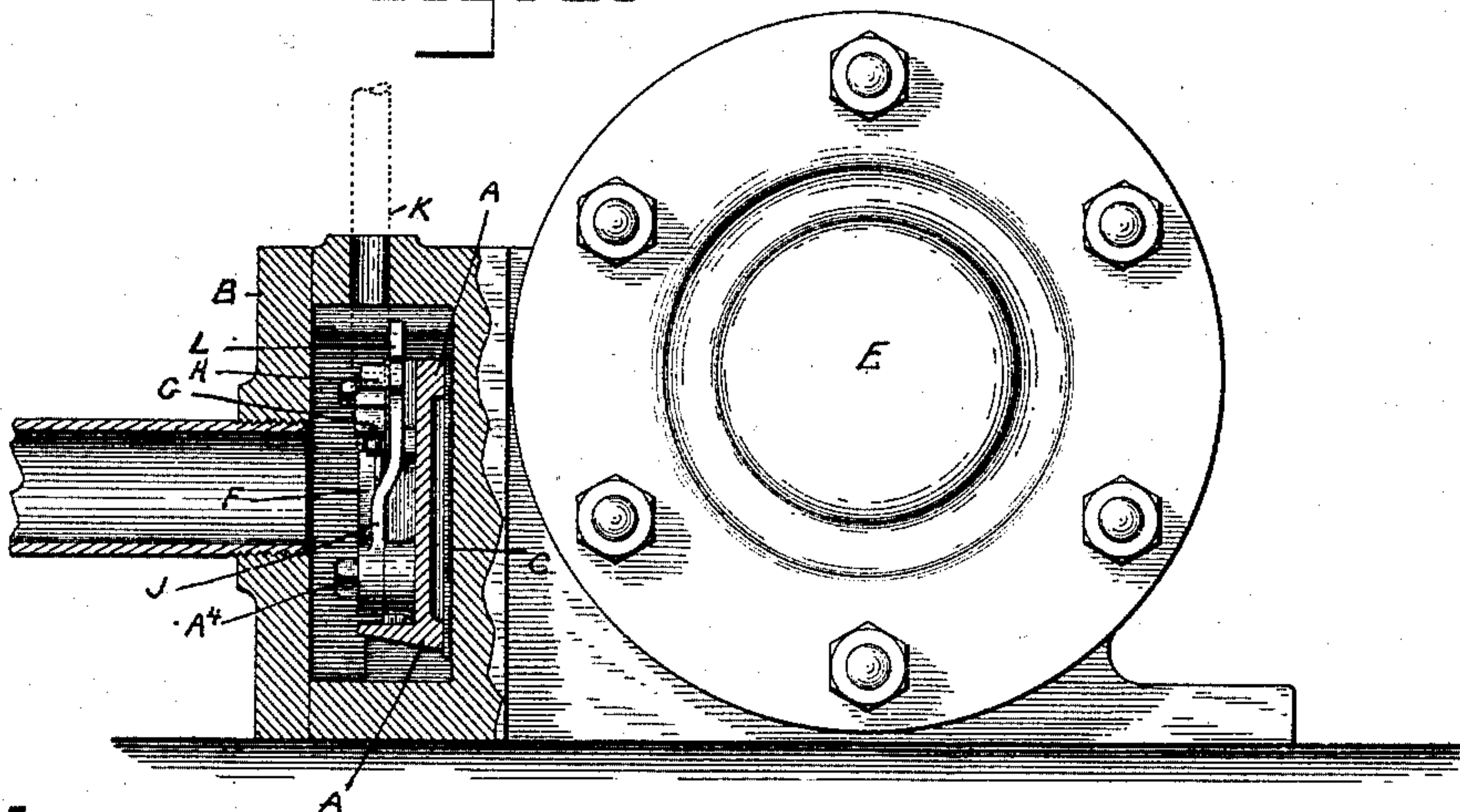


Fig 3.



Witnesses.

John F. Nelson.
Marion E. Brown.

Inventors.

Otis E. Brown and
Peleg Stetson
by their Attorneys
Brown Bros.

UNITED STATES PATENT OFFICE.

OTIS E. BROWN AND PELEG STETSON, OF BROCKTON, MASSACHUSETTS.

CUT-OFF VALVE FOR ENGINES.

SPECIFICATION forming part of Letters Patent No. 482,516, dated September 13, 1892.

Application filed January 22, 1892. Serial No. 418,941. (No model.)

To all whom it may concern:

Be it known that we, OTIS E. BROWN and PELEG STETSON, citizens of the United States of America, and residents of the city of Brockton, in the county of Plymouth and State of Massachusetts, have jointly invented certain new and useful Improvements in Automatic Cut-Off Valves for Steam-Engines, of which the following is a full, clear, and exact description.

This invention relates to that class of automatic cut-offs for steam-engines in which the ordinary slide-valve is provided with supplemental valves to open and close the steam-ports of the slide-valve.

The invention consists of a construction and arrangement of these supplemental valves and other parts, all as hereinafter appears, and pointed out in the claim.

In the drawings forming part of the specification, Figure 1 is a vertical and longitudinal section of the slide-valve or steam-chest and a face view of the slide-valve and the automatic cut-off of this invention. Fig. 2 is a horizontal section, line 2 2, Fig. 1. Fig. 3 is a transverse vertical section, line 3 3, Fig. 1.

In the drawings, A is a slide-valve, having a valve-stem A², and B is the chamber or chest for the valve. The slide-valve has steam-ports A³ A³, one across each of its opposite end portions, and otherwise it is constructed and arranged to be moved forward and backward in its chamber over its seat C and as it is so moved to open and close the steam and exhaust ports D D² at opposite ends of the piston-cylinder E of a steam-engine, all and otherwise as well known and forming no part of this invention.

F F² are two cut-off or supplemental valves, one for each of the steam-ports A³ A³ of the slide-valve. Each steam-port A³ of the slide-valve is divided into separated sections, severally radiating, for each part from a common center of a cylindrical stud or pin A⁴ of the slide-valve and on which stud the valve is hung and swings. Each cut-off valve has a steam-port F³ in corresponding separated divisions and in conjunction with the steam-port of the slide-valve, such that by swinging either cut-off valve in one direction about its center pin A⁴ the separated divisions of its steam-port will register with the separated di-

visions of the steam-port of the slide-valve to which it belongs, thereby opening the steam-port of the slide-valve to the passage of steam from the valve-chest, and by swinging it in the opposite direction they will be placed out of register, thereby closing the steam-port of the slide-valve to the steam of the valve-chest. The swinging cut-off valve and the slide-valve to which they are applied are vertical in position, and each cut-off valve is arranged to close its steam-port of the slide-valve by gravity, swinging downwardly on the slide-valve, and to open it by swinging upwardly on the slide-valve.

G G² are spring-lever catches, one for each cut-off valve. Each catch is at one end fulcrumed on the slide-valve, and the two catches extend toward each other. Each catch, Figs. 4, 5, 6, 7, and 8, is at one end fulcrumed on a cut-off valve, and the two catches extend toward each other. The free end of each catch G G² has an abutment face G³ G⁴ in position to engage a stud or lug H H², suitably located therefor on a vertical arm J J² of the cut-off valve F. With either catch engaged with its lug the cut-off valve to which such catch belongs is thereby made secure against movement, and for the purposes of this invention, and as will hereinafter appear, this holding of a cut-off valve is, when said valve is in its position, opening the steam-port to which it belongs of the slide-valve.

K is a rod located midway of the length of and entered into the slide-valve chamber B, (not shown, however, as of itself it forms no part of this invention,) and it is to be under the action and control of the engine-governor; or, in other words, it is to be by the action of the engine-governor moved into or out of the valve-chest, so as to project therein to a greater or less extent, according as the speed of the engine is greater or less than the speed desired. The end K² of this governor-actuated rod K within the valve-case is preferably of a conical shape and it is in position for the free end of the catch of each cut-off valve as the slide-valve moves forward and backward on its seat to come into contact therewith, and thereby to be operated to disengage it from and release the cut-off valve to which it belongs to the action of gravity. The engagement of the catch of each cut-off valve

with its lug to hold the valve opened is secured by the tension of its spring $G^5 G^6$ when the cut-off valve shall have become suitably situated therefor, as will hereinafter appear.

5 Each cut-off valve has a projection $L L^2$ in position to abut against the inner side or face of the slide-valve chest as the slide-valve moves forward and backward over its seat, and thereby to secure an opening of the cut-

10 off valve to an extent sufficient for its steam-port to register with the steam-port to which it belongs of the slide-valve, and for its catch to engage its lug, and so hold the cut-off valve open until said catch is released by the ac-

15 tion thereon of the governor-actuated rod K . Each projection $L L^2$ of the cut-off valve consists of an elongation of each vertical arm $J J^2$ of the cut-off valve beyond the catch-engaging lug $H H^2$ of said arms, and, again, for

20 the abutment, as explained, of the projections $L L^2$ of the cut-off valve against the valve-chest the inner wall of the valve-chest has lug projections $M M^2$ in suitable relative positions, the one M to work on the projec-

25 tion L of the cut-off valve F when the slide-valve is moving toward the end N of the slide-valve chest B and the other M^2 to work on the projection L^2 of the cut-off valve F^2 when the slide-valve is moving toward the

30 end N^2 of the slide-valve chest B , and all in a manner to secure the opening, by the movement of each cut-off valve produced thereby, of the steam-port of the slide-valve at the proper time, as well known for admission of

35 steam to the piston-cylinder, and for which the cut-off valve remains and is held open until by the return movement of the slide-valve in each instance it is released and allowed to close because of the release of the catch hold-

40 ing the cut-off valve opened by the action thereon of the governor-rod K , it being understood, of course, that this closing of the cut-off valve in each instance is to be at such point in the return of the slide-valve as to

45 secure a cutting off of steam to the piston-cylinder when the piston-head thereof has completed only a portion of its stroke and as

to have for the balance of the stroke the steam working under expansion. The separated divisions of the slide-valve preferably open 50 into a chamber A^{10} , common to them all, and this chamber in turn opens to a slotted opening or mouth A^{11} , which, as shown, is somewhat greater in width than, but otherwise corresponds substantially to, the steam-port 55 D of the piston-cylinder.

The swinging cut-off valves obviously can be actuated by a spring or other suitable means to close them instead of depending upon the gravity of the valves for that pur- 50 pose, as has been explained.

Having thus described our invention, what we claim, and desire to secure by Letters Patent, is—

The combination, with the steam or valve 65 chest, of a slide-valve having at each of its opposite ends a steam-port A^3 divided into separated and radiating sections, a cut-off valve for each steam-port of the slide-valve, and having a steam-port F^3 divided into sepa- 70 rated and radiating sections corresponding to and fulcrumed to swing on said slide-valve, and thereby have the said separated sections of its steam-ports placed either into or out of register with those of the slide-valve, spring- 75 lever catches $G G^2$, fulcrumed on the slide-valve and at their free ends extended toward each other, radial arms $J J^2$ of the cut-off valves $H H^2$, studs on said arms to be engaged by said catches, extensions $L L^2$ of said arms $J J^2$ beyond their said studs, and fixed abut- 80 ments $M M^2$ of the valve-chest to work on said arms' extensions $L L^2$, substantially as described, for the purposes and operation specified. 85

In testimony whereof we have hereunto set our respective hands in the presence of two subscribing witnesses.

OTIS E. BROWN.
PELEG STETSON.

Witnesses:

ALBERT W. BROWN,
MARION E. BROWN.