No. 758,950. PATENTED MAY 3, 1904.

B. C. BALL.

CUT-OFF MECHANISM FOR REVERSING ENGINES.

APPLICATION FILED AUG. 25, 1902.

NO MODEL. 2 SHEETS—SHEET 1.

Fig. 3.

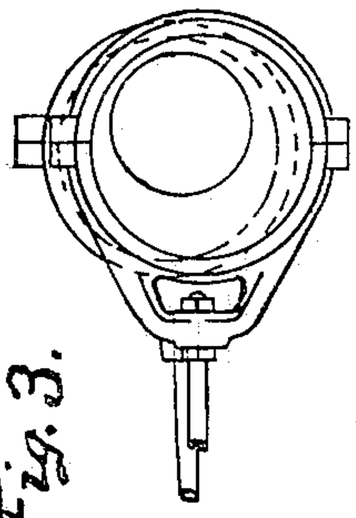


Fig. 1.

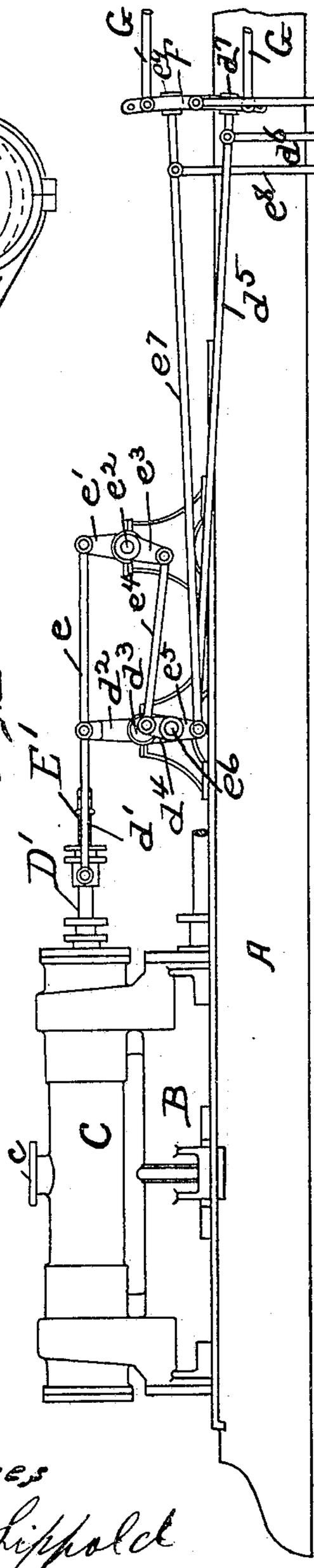
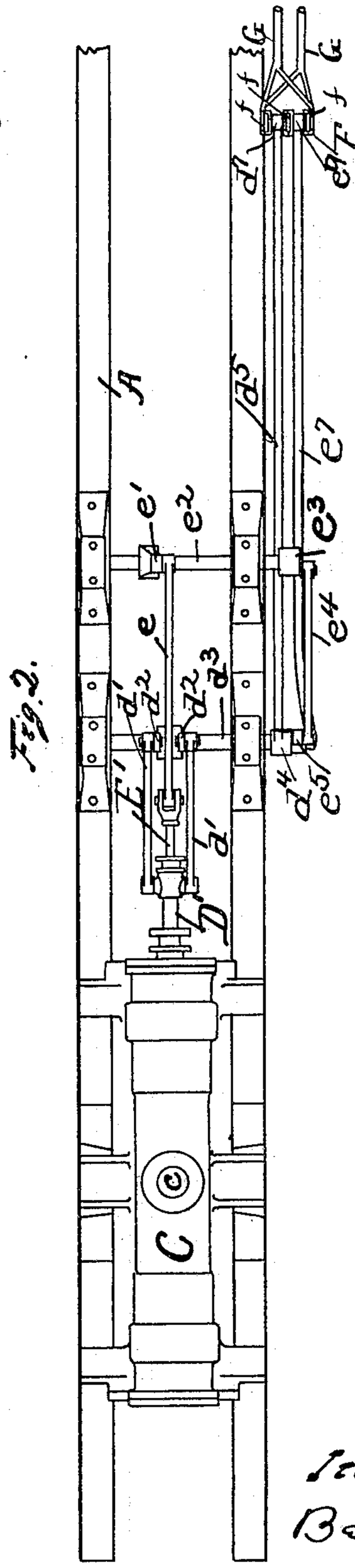


Fig. 2.



Witnesses
Henry Lichfoldt
Margaret Sullivan.

Inventor
Benj C Ball
by T. C. Lind
his Atty.

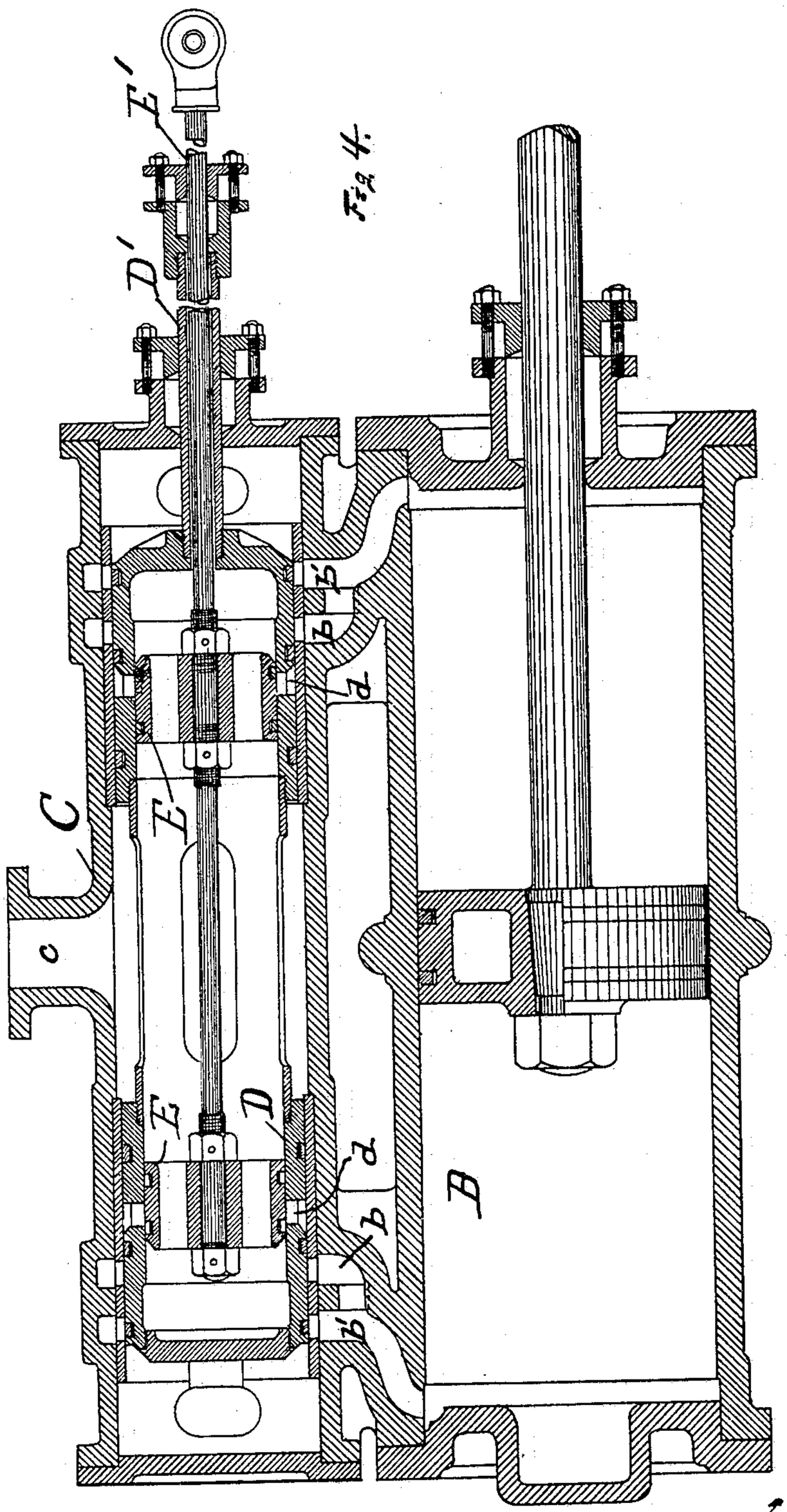
No. 758,950. PATENTED MAY 3, 1904.

B. C. BALL.

CUT-OFF MECHANISM FOR REVERSING ENGINES.

APPLICATION FILED AUG. 25, 1902.

NO MODEL. 2 SHEETS—SHEET 2.



Witnesses
Henry Liffpold
Margaret Sullivan

Inventor
Burt C Ball
by H. C. Lund
his Atty.

No. 758,950. Patented May 3, 1904.

UNITED STATES PATENT OFFICE.

BERT C. BALL, OF PORTLAND, OREGON.

CUT-OFF MECHANISM FOR REVERSING-ENGINES.

SPECIFICATION forming part of Letters Patent No. 758,950, dated May 3, 1904.

Application filed August 25, 1902. Serial No. 120,989. (No model.)

To all whom it may concern:

Be it known that I, BERT C. BALL, a citizen of the United States, residing at Portland, in the county of Multnomah and State of Oregon, have invented new and useful Improvements in Cut-Off Mechanism for Reversing-Engines, of which the following is a specification.

This invention relates to cut-off mechanism for reversing-engines; and it consists in certain improvements in the construction thereof, as will be hereinafter fully described, and pointed out in the claims.

The invention is illustrated in the accompanying drawings as follows:

Figure 1 shows a side elevation of the engine; Fig. 2, a plan view of the engine; Fig. 3, a side elevation of the eccentric mechanism. Fig. 4 is a vertical central longitudinal section through the cylinder, steam-chest, and valve mechanism.

A marks the engine-bed; B, the cylinder; C, the steam-chest. The main valve D is preferably cylindrically-shaped and arranged to take steam from the center through the steam-passage *c*. Ports *d* lead from said valve and are brought into register with the steam-port *b* for supplying the steam in the usual manner. The engine exhausts by the end of the valve through the branch port *b'*. The cut-off valve E is arranged within the main valve and operates upon the passages or ports *d*.

The main valve is provided with the hollow stem D', to which are connected the links d'. The links d' are also connected to the rock-arms d^2. The rock-arms d^2 are fixed on the rock-shaft d^3. Extending from the outer end of the rock-shaft d^3 is a rock-arm d^4. The radius-rod d^5 extends from the lower end of the rock-arm d^4 to the link F. It is provided with the usual link-block d^7, which may be shifted in the link F for reversing the engine. The radius-rod is carried by the rod d^6, and the link is carried by the rod *f*. The eccentric-rods G connect the eccentric G' with the link.

The cut-off valve is provided with the stem E', which extends through the hollow stem D'. The link *e* connects this stem with the rock-arm e'. The rock-arm e' is fixed on the rock-shaft e^2. The rock-arm e^3 is fixed at the outer end of this rock-shaft. The link d^4 connects the rock-arm e^3 with the upper end of a rock-arm e^5. The rock-arm e^5 is pivoted at e^6 on a rock-arm d^4, making what may be termed a "floating" rock-arm. The radius-rod e^7 connects the lower end of this rock-arm with the link F. The link-block e^9 is provided and is operated to slide in the link so as to adjust the cut-off. The rod e^7 is carried by the rod e^8. The link F is formed of the bars *f*, forming two ways, so that the link-blocks e^9 and d^7 may be adjusted independently of each other and as required.

By shifting the block e^9 the point of cut-off may be varied as desired up to the point of cut-off of the main valve. By placing the link-block e^9 in the center of the link F the point of cut-off of the cut-off valve will be after the cut-off of the main valve, so that in this position the cut-off valve is practically thrown out of operation. This being so, the engine may be reversed without paying any attention to the cut-off feature. This is a matter of great importance in engines of this class. It will be noted also that if the link-block e^9 is placed at the same end of the link as the link-block d^7 the lower end of the rock-arm e^5 will move with the rocker-arm d^4. The upper end of the rocker-arm e^5 will remain stationary, being practically opposite the pivot formed by the shaft d^3. In this position also the cut-off valve will not effect a cut-off until after the main valve has so operated. It will be noted also that with any variation of cut-off the main valve operates uniformly and has the same point of admission, release, and compression.

What I claim as new is—

1. In a reversing-engine, the combination with a main and cut-off valve of a floating rock-arm; mechanism connecting one of the valves with said rock-arm and a reversing mechanism for actuating said rock-arm and valves.

2. In a reversing-engine, the combination with a main and cut-off valve; reversing mechanism actuating the main valve; a floating rock-arm carried by an element of said mechanism; and a connection between said floating rock-arm and the cut-off valve.

3. In a reversing-engine, the combination of a link; a rock-arm; a rod connecting said link with said rock-arm; a floating rock-arm carried by said rock-arm; and a connection between said floating rock-arm and the link.

4. In a reversing-engine, the combination of a link; a rock-arm; a rod connecting said link with said rock-arm; a floating rock-arm carried by said rock-arm; and a rod connecting said floating rock-arm with the link.

5. In a reversing-engine, the combination of a link; a rock-arm; a rod connecting said link with said rock-arm; a floating rock-arm carried by said rock-arm; a connection between said floating rock-arm and the link; and means for reversing said rod on the link.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

BERT C. BALL.

Witnesses:
C. E. GRELLE,
H. C. LORD.