

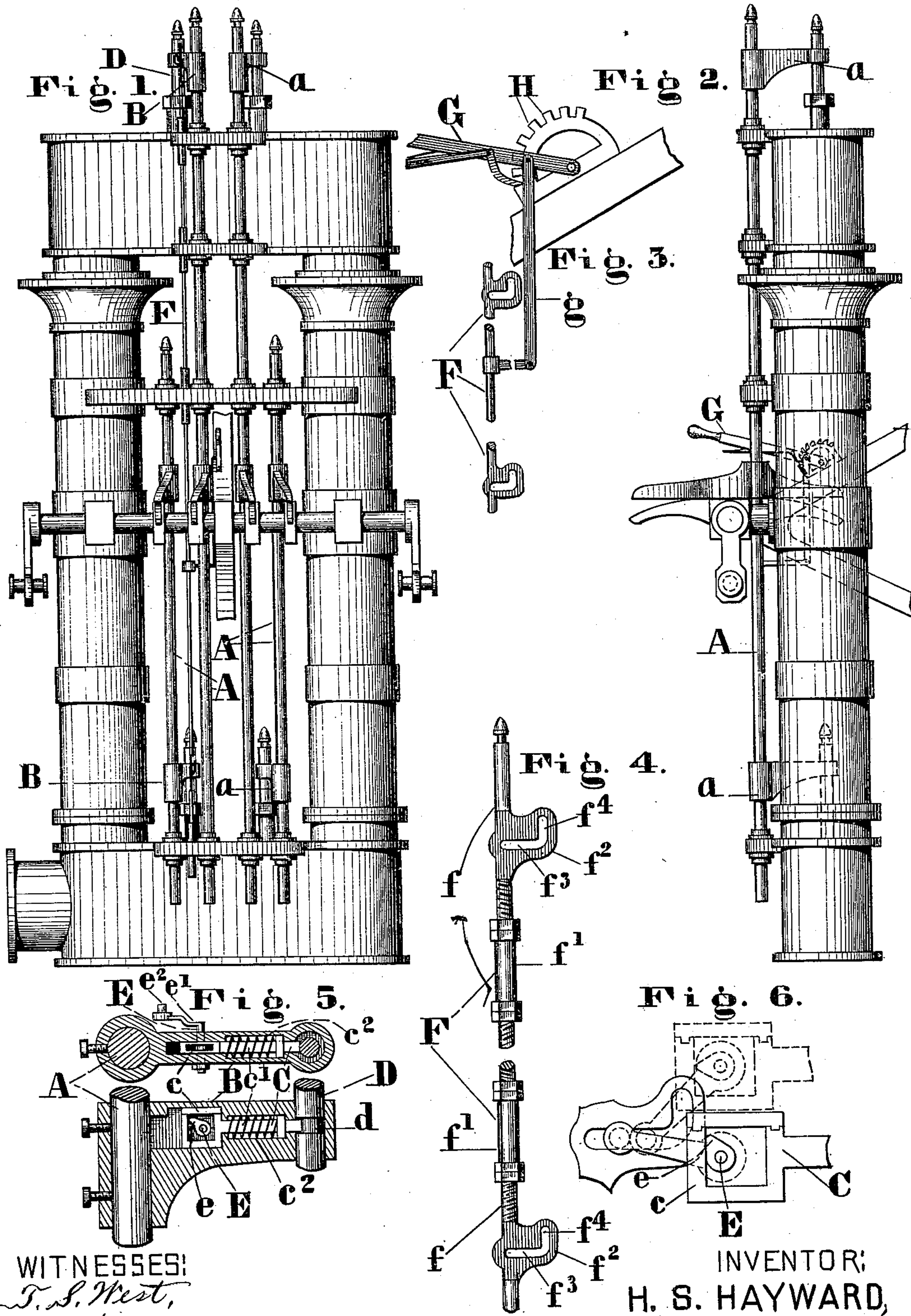
(No Model.)

2 Sheets—Sheet 1.

H. S. HAYWARD.
CUT-OFF VALVE GEAR.

No. 250,729.

Patented Dec. 13, 1881.



WITNESSES:
T. S. West,
J. M. Talbot

INVENTOR:
H. S. HAYWARD,
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ATTYS.

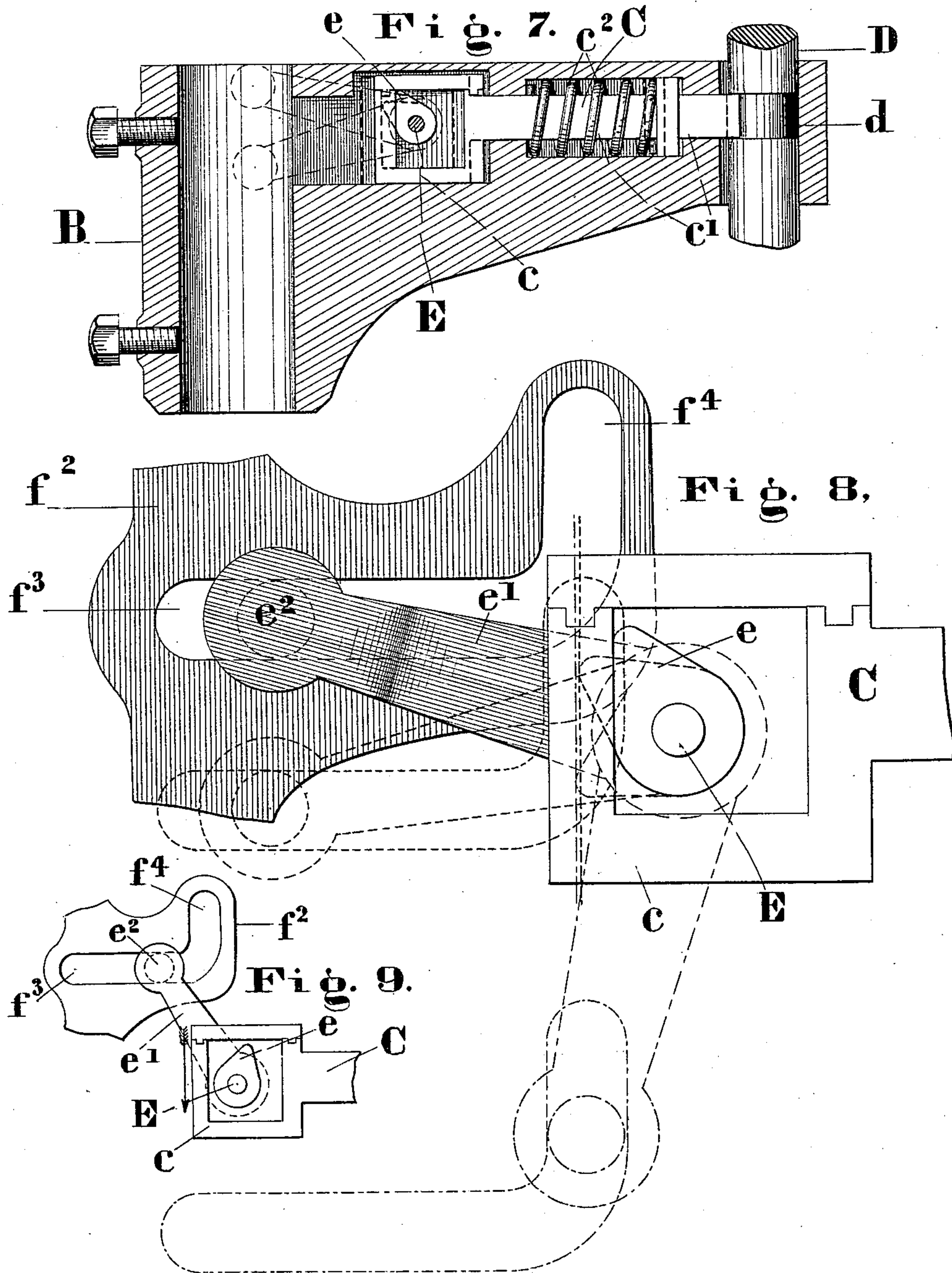
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2 Sheets—Sheet 2.

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CUT-OFF VALVE GEAR.

No. 250,729.

Patented Dec. 13, 1881.



WITNESSES:
B. S. Meek,
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UNITED STATES PATENT OFFICE.

HENRY S. HAYWARD, OF JERSEY CITY, NEW JERSEY.

CUT-OFF-VALVE GEAR.

SPECIFICATION forming part of Letters Patent No. 250,729, dated December 13, 1881.

Application filed June 13, 1881. (No model.)

To all whom it may concern:

Be it known that I, H. S. HAYWARD, of Jersey City, county of Hudson, and State of New Jersey, have invented new and useful Improvements in Cut-Off-Valve Gear for Marine Engines; and I do hereby declare that the following is a full and exact description of the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon.

This invention consists, mainly, in the combination, with an adjusting-rod, of a lift-arm provided with an independent valve-stem and with certain bolt mechanism, as will be fully described hereinafter.

In the drawings, Figure 1 represents a front elevation of a marine engine having my improvements applied thereto; Fig. 2, a side elevation of the same; Figs. 3 and 4, detached views of the adjusting-rod; Figs. 5 and 7, detached views of the steam lift-arms and the bolt mechanism employed in connecting therewith; and Figs. 6, 8, and 9, views illustrating the parts in their proper positions relatively to each other.

To enable others skilled in the art to make my improved cut-off, I will proceed to describe fully the special construction of the same.

A A represent the ordinary lift-rods of a marine engine, and *a a* the lift-arms on the exhaust side, which are of the usual well-known construction.

B B represent the lift-arms upon the steam side, each of which is provided with a central space extending in a longitudinal direction, in which space is located what may be termed, for convenience, the "bolt mechanism."

C represents what may be termed the "bolt proper," consisting of the rectangular head portion or yoke *c* and the square shank portion or pin *c'*, the end of the latter of which is adapted to extend into the annular recess *d* of the valve-stem, as shown.

*c*² represents a coiled spring surrounding the shank of the bolt, which is adapted, when free to act, to move the bolt end into the recess of the valve-stem and hold it there.

D, Fig. 5, represents the steam-valve stem, which is supported in a proper opening in the lift-arm in such manner as to be capable of movement in a vertical direction, and is pro-

vided with an annular recess, *d*, before referred to.

E, Figs. 5, 6, and 8, represents a shaft supported in proper bearings in the lift-arm, which is provided near its center with a cam, *e*, and upon one end with an arm, *e'*, having a stud or pin, *e*², as shown. The cam *e*, it will be observed, is held in such relation to the yoke *c* as to give movement to the same when the shaft is rotated in the proper direction, as will be fully described hereinafter.

F represents (Figs. 1, 3, and 4) an adjusting-rod extending the height of the engine, which is provided (Fig. 4) at each end with the terminal portions *f*, united to the central portion by threaded sockets *f'*, as shown.

*f*² represents a plate portion of the terminal *f*, which is provided with a slot having the horizontal portion *f*³ and the vertical portion *f*⁴, as shown.

G, Figs. 2 and 3, represents a lever pivoted to the engine at any proper point, which is united by means of the rod *g* to a stud upon the adjusting-rod F, as shown.

H, Figs. 2 and 3, represents a quadrant rack-bar, by means of which and a proper latch device upon the lever the latter is held in any desired position.

The relation of the parts to each other when all are in place is shown in Figs. 6 and 8.

The operation is substantially as follows: When the lever G is held in its extreme upward position, the adjusting-rod connected thereto is consequently held in its highest position. The relation of the parts when the rod is in this position and the lifting-arm has completed its upward movement is shown in full lines in Fig. 8. In this it will be observed that the stud *e*² of the arm *e'* is held by the bearing-face of the slot in such position that the bearing-face of the cam lies in contact with the adjacent bearing-face of the yoke, but that at the same time the latter remains in its normal forward position—that is, with its end resting in the recess of the valve-stem, as shown in Fig. 7. The lift-arm, it will be understood, has reached the limit of its upward movement without affecting the bolt mechanism. By the descent of the lift-arm the shaft E is of course rotated in such manner as to move the bearing-face of the cam away from the bearing-face of the

yoke, as shown in Fig. 9, and hence no movement of the latter can occur. From this it follows that when the adjusting-rod is in its highest position the lifting-arms may move their entire distance without detaching the valve from the lift-arm. The relation of the parts when the adjusting-rod is in a lower position is shown in Fig. 6. In this it will be observed that the stud e^2 of the arm e' is held by the bearing-face of the slot, when the lift-arm is in its lowest position, in such position that the bearing-face of the cam lies in contact with the adjacent bearing-face of the yoke. By the ascent of the lift-arm the shaft E is rotated in such manner as to move the bearing-face of the cam against the bearing-face of the yoke and give the latter movement in a rearward direction, as indicated in dotted lines, Fig. 6, against the action of the spring c^2 . In consequence of this action the end of the bolt is disengaged from the recess of the valve-stem, and the latter consequently is permitted to descend. After the disengagement of the valve-stem the lift-arm may ascend to complete its movement, provision being made for the full movement of the stud by the vertical portion of the slot, as shown in Fig. 8. When the adjusting-rod is in its lowest position, the shaft will be so held as to cause the cam to bear against the yoke and hold the bolt out of contact with the valve-stem. The latter then will not be lifted at all by the arm, and hence the supply of steam will be entirely cut off.

By properly adjusting the position of the rod the valve-stem may be released at any desired time in the upward movement of the lifting-rod.

By means of this special construction the supply may be readily cut off at any desired point when the engine is in motion.

The adjusting-rod, by means of its sockets and terminal portions, may be adjusted in length according to the necessities of the case, varying the point of cut-off on top or bottom of stroke, if so desired.

Having thus fully described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In combination with an adjusting-rod, a lift-arm provided with an independent valve-stem and with bolt mechanism, substantially as described.

2. A lift-arm having the bolt C, with yoke, and the shaft with cam, as described.

3. In combination with an independent valve-stem, a lift-arm having bolt mechanism inclosed therein, substantially as described.

4. In combination with a lift-arm having bolt mechanism, substantially as described, an independent valve-stem having a recess adapted to receive the end of the bolt, as described.

5. The adjusting-rod F, having the terminal portions with plates f^2 , and the threaded and socketed portions, as described, the construction being such that the vertical position of the plates may be adjusted, as and for the purpose described.

This specification signed and witnessed this 10th day of June, 1881.

HENRY SELBY HAYWARD.

Witnesses:

OSCAR AUTZ,
JAMES H. ELLIOTT.