

*A. S. Walbridge,
Steam Cut-Off.*

No 33,274.

Patented Sep. 10, 1861.

Fig. 1

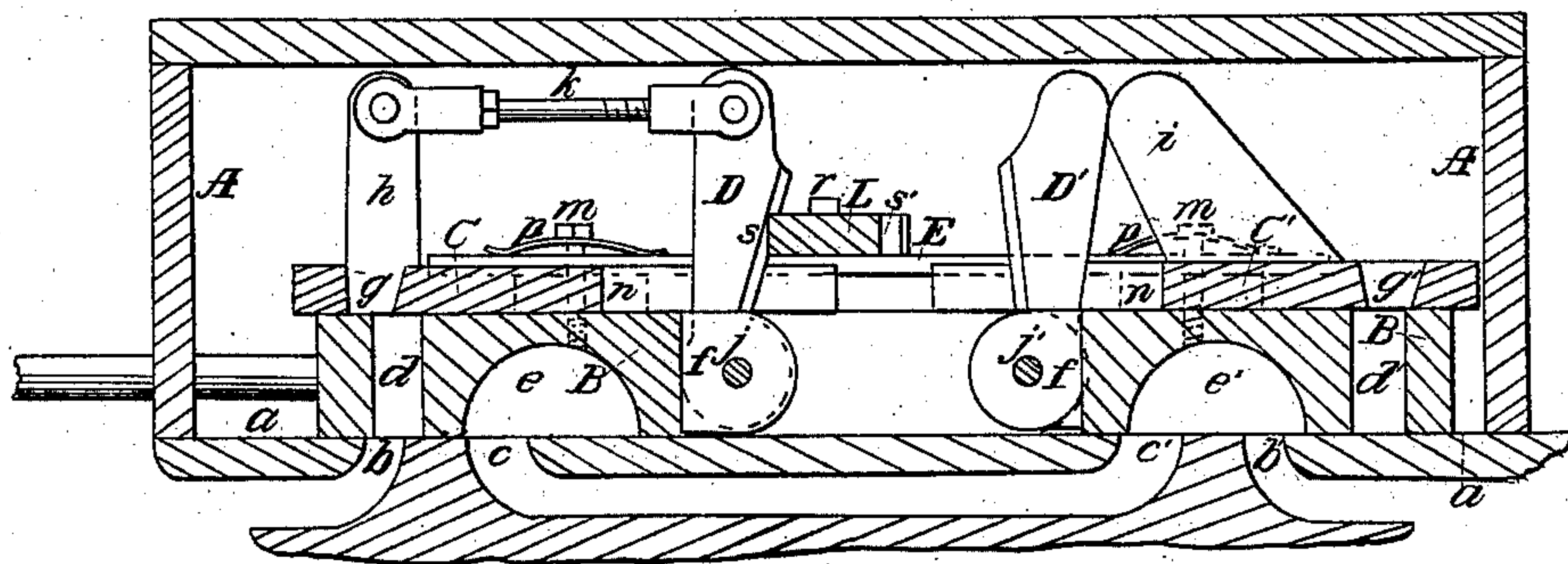
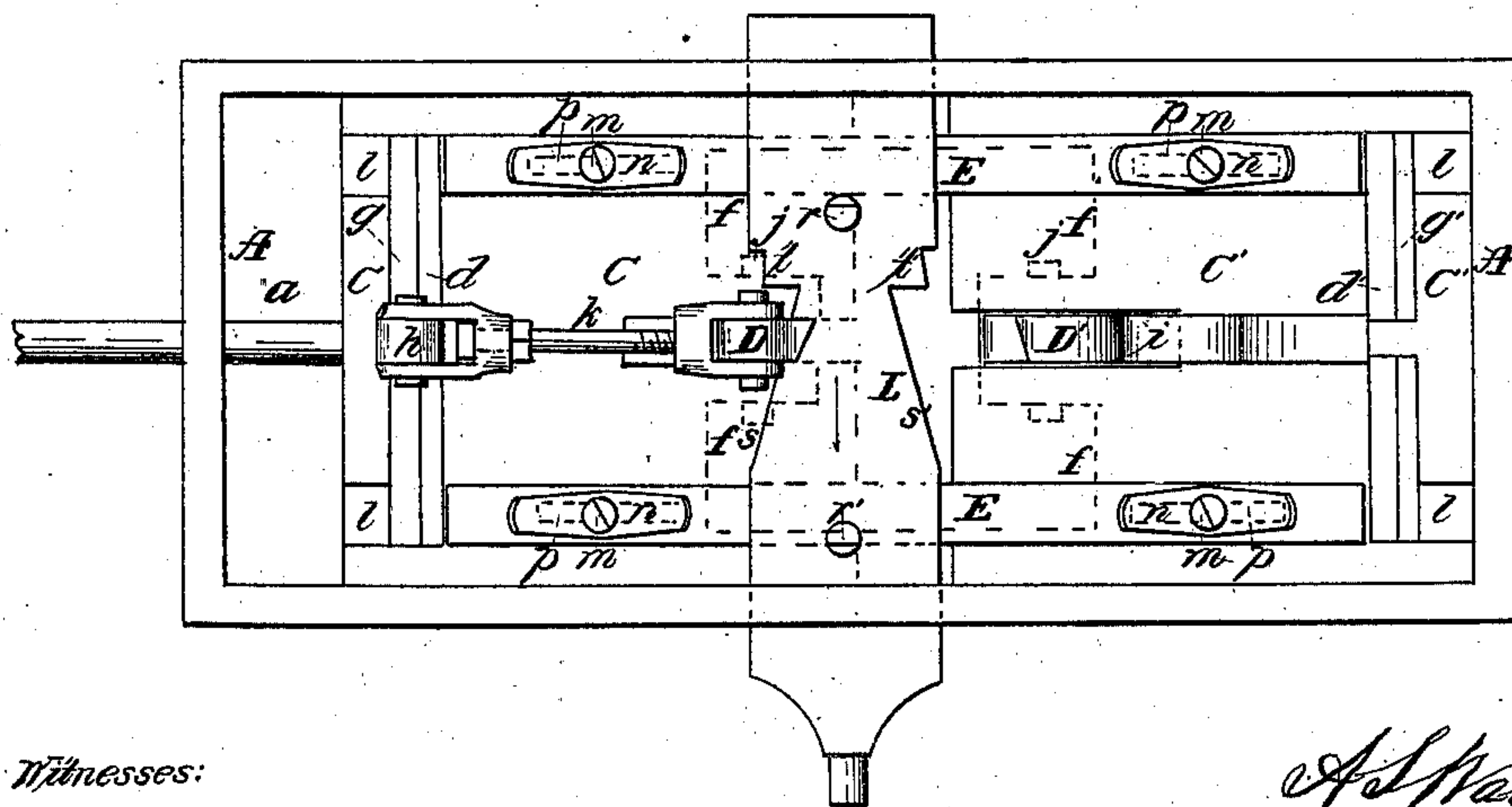


Fig. 2



Witnesses:

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Inventor:

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UNITED STATES PATENT OFFICE.

A. S. WALBRIDGE, OF MALONE, NEW YORK.

IMPROVEMENT IN CUT-OFF APPARATUS FOR STEAM-ENGINES.

Specification forming part of Letters Patent No. 33,274, dated September 10, 1861.

To all whom it may concern:

Be it known that I, A. S. WALBRIDGE, of Malone, in the county of Franklin and State of New York, have invented a new and useful Improvement in the Cut-Offs of Steam-Engines; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, making a part of this specification, in which—

Figure 1 is a longitudinal section of the valve-chest of a steam-engine, the main valve, and the cut-off, illustrating my invention. Fig. 2 is a plan of the same with the cover of the valve-chest removed to expose the valve and cut-off to view.

Similar letters of reference indicate corresponding parts in both figures.

This invention relates to that kind of cut-off composed of two slide-valves riding on the back of a main slide-valve.

It consists in certain novel means of combining the cut-off valves with the main valve for the purpose of enabling the movement of the former to close the parts in the latter at various points in the stroke of the engine-piston, to be derived from the movement of the main valve itself under the control of a governor or of any device adjustable by the engineer for regulating the engine.

To enable others skilled in the art to make and use my invention, I will proceed to describe its construction and operation.

A is the steam-chest; *a a*, the valve-seat; *b b'*, the steam-ports in the seat, and *c c'* the exhaust-ports.

B is the main valve, having two induction-ports *d d'* and two eduction-cavities *e e'*, and a wide opening *f* between the latter cavities to reduce the pressure upon it and its friction on the seat.

C C' are the riding cut-off-valves having ports *g g'*, (one each,) corresponding with the ports *d d'* of the main valve. The valve C has formed upon or rigidly secured to it and standing out from its back a perpendicular post *h*, and the valve C' has formed upon or rigidly secured to it and standing out from its back an inclined projection *i*, the end of which points toward the middle of the steam-chest, as shown in Fig. 1. The above differ-

ence in the valves illustrates two modifications of my invention.

D is a lever connected with the main valve at the end of the opening *f*, next the cut-off valve C, by a pin-joint *j*, and connected at the other end by a rod *k* with the post *h* of that cut-off valve. D' is a similar lever connected in a similar manner with the main valves at the opposite end of the opening *f* by a pin-joint *j'*, but not connected with the cut-off valve.

L is what I call a "fulcrum-wedge," consisting of a plate tapering on both sides and working transversely within the steam-chest through a stuffing-box in one or in each side thereof. The edges *s s'* of this wedge serve as fulera against which the levers D D' are brought by the movement of the main valve, so that by the continued movement of the latter the said levers may be made to give the cutting-off movement to the valves C C', the lever D acting on the valve C through the rod *k*, and the lever D' acting on the valve C' by simply pressing against the projection *i*, against which it always rests.

By shifting the fulcrum-wedge L the fulera of the levers D' D are shifted and the lever caused to operate on the cut-off valves earlier or later in the stroke of the piston, according as a wider or narrower portion of the wedge is presented opposite the levers. The said wedge constitutes a regulating device which may be connected with a governor or adjusted by the engineer to regulate the engine, as will be presently described. To control the length of its movement, the said wedge is furnished with two stop-pins *r r'*, which by coming in contact with the sides of the chest A prevent the movement of the said wedge beyond a certain distance in either direction, the pin *r'* being so arranged that the narrowest portion of the wedge may pass the levers D D' and bring opposite to the said levers the sides of two shoulders or projections *t t'*, formed upon the narrow end of the said wedge, the width across the said shoulders being about or nearly equal to that of the widest part of the said wedge.

E E are friction-bars fitted to grooves *l l* in the backs of the cut-off valves and secured to the main valve by screws *m m*, which pass

through slots *n n* in the cut-off valves, and which have springs *p p* applied under their heads to prevent the cut-off valves binding on the main valve. The screws *m m* and friction-bars *E E* produce friction enough between the cut-off and main valves to prevent the former sliding on the latter when not required to do so.

The cut-off valves being caused to move with the main valve by friction are brought to positions in which their ports *g g'* are over their respective ports *d d'* of the main valve by coming in contact with the ends of the steam-chest *A*, and so being arrested while the main valve completes its stroke, and hence at the commencement of the stroke of the main valve the port which is to give steam to the cylinder *d* or *d'* is wide open. As the stroke of the valve proceeds the lever *D* or *D'* belonging to the cut-off valve which is required to operate comes into contact with the edge *s* or *s'* of the fulcrum-wedge *L*, and the said lever, by being arrested against the said wedge while the movement of its lower end with the main valve continues, has its upper end moved in the opposite direction to the main valve, and is so caused by its action on the projection *i* or post *h* to move back its respective cut-off valve and close the port *d* or *d'* of the main valve which has been giving steam.

Fig. 1 shows the main valve moving to the right and the engine taking steam through the left-hand ports *g d b*; but the lever *D* has come in contact with the fulcrum-wedge and the cut-off valve is being consequently moved in the opposite direction to close the port *d*. The cut-off valve *c'* is in contact with the right-hand end of the steam-chest, and is consequently arrested, and the port *d'* of the main valve is being opened to the port *g'* of the said valve *c'* by the movement of the main valve.

By moving the fulcrum-wedge horizontally in a direction to bring a wider portion of it opposite to the levers *D D'* the cut-off is

caused to be effected earlier in the stroke, and by moving the said wedge in the opposite direction an opposite effect is produced, but in case of the said wedge being used in connection with a governor the breakage of the governor-driving belt or the fall of the balls of the governor from any cause draws the wedge as far in the direction of the arrow shown on it in Fig. 2 as the stop-pin *r'* permits, and this is far enough to bring the sides of the shoulders or projections *t t* opposite to the levers *D D'*, which cause the cut-off valves to be operated so early in the stroke as to prevent the engine "running away."

To prevent injury to the ends of the cut-off valves *C C'* by striking the ends of the steam-chest, the ends of the steam-chest may be fitted with buffers of vulcanized india-rubber.

I will remark that though the two modes represented and described by which the movements of the levers *D D'* are communicated to the cut-off valves are equivalent so far as their operation is considered, the connection by the rod *k*, when made with a screw in the rod, as represented in the drawings, possesses the advantage of providing for the adjustment of the two cut-off valves, one to the other, that both may operate alike, and also of adjusting them to cut off sooner or later in the same position of the fulcrum-wedge.

I do not claim of itself the use of a wedge working transversely within the steam-chest for the purpose of varying the cut-off; but

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

The arrangement and combination of the fulcrum-wedge *L*, levers *D D'*, and friction-bars *E*, substantially as herein specified.

A. S. WALBRIDGE.

Witnesses:

GEO. W. KINGSLEY,
H. C. REYNOLDS.