R. Gornall,

Steam Cut-Off.

No. 21,493. Patented Sep. 14, 1858.

Fig. 3

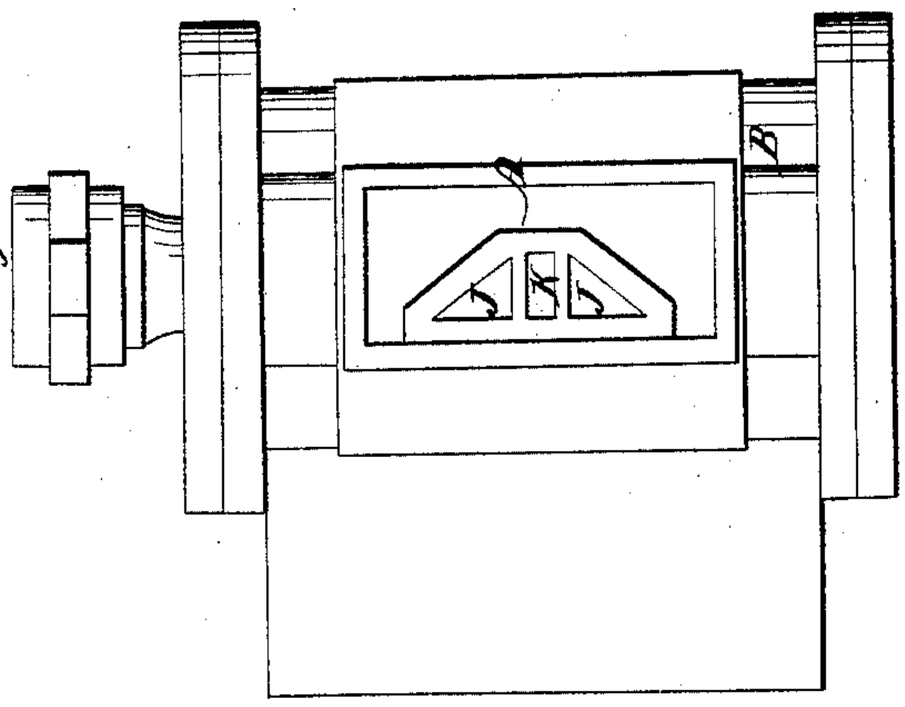


Fig. 4

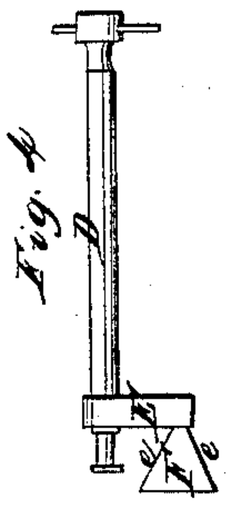


Fig. 5

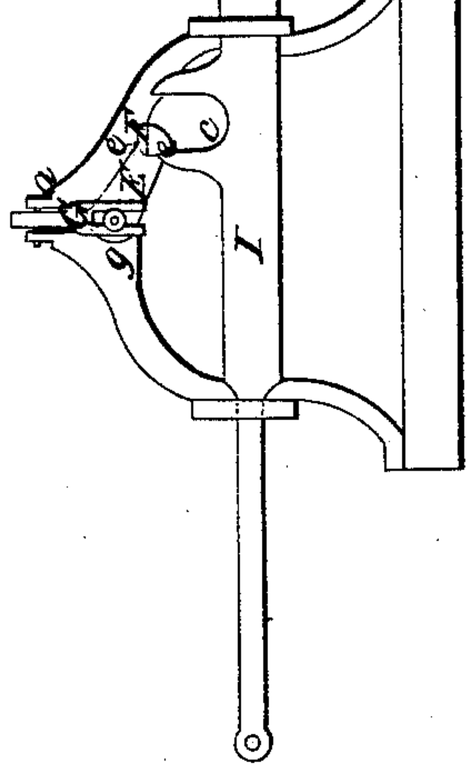


Fig. 2

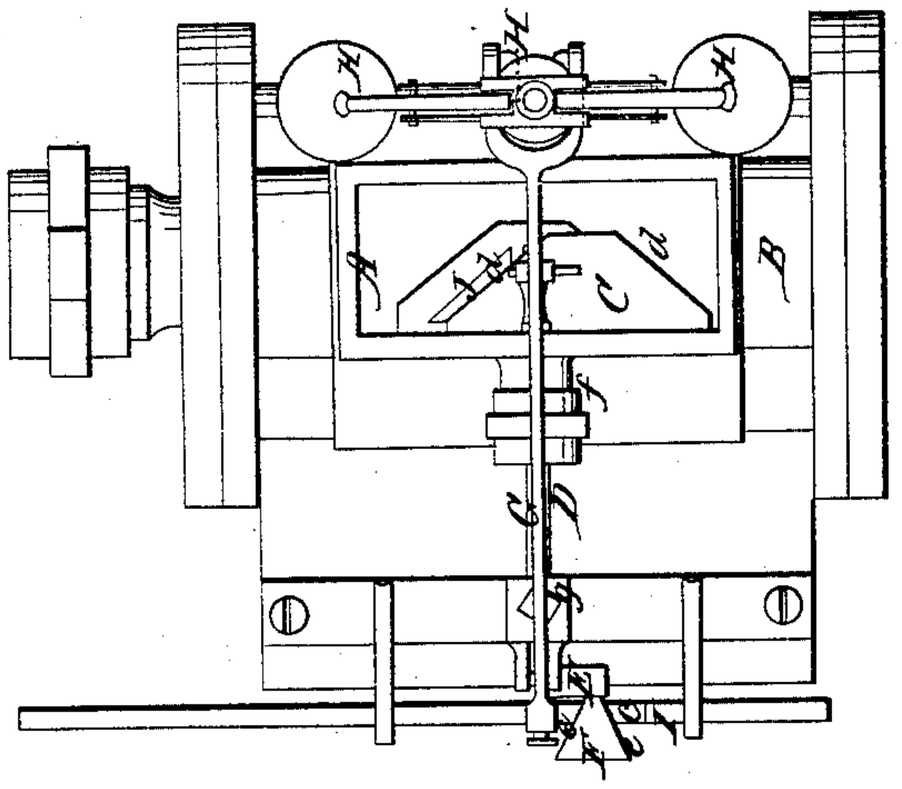
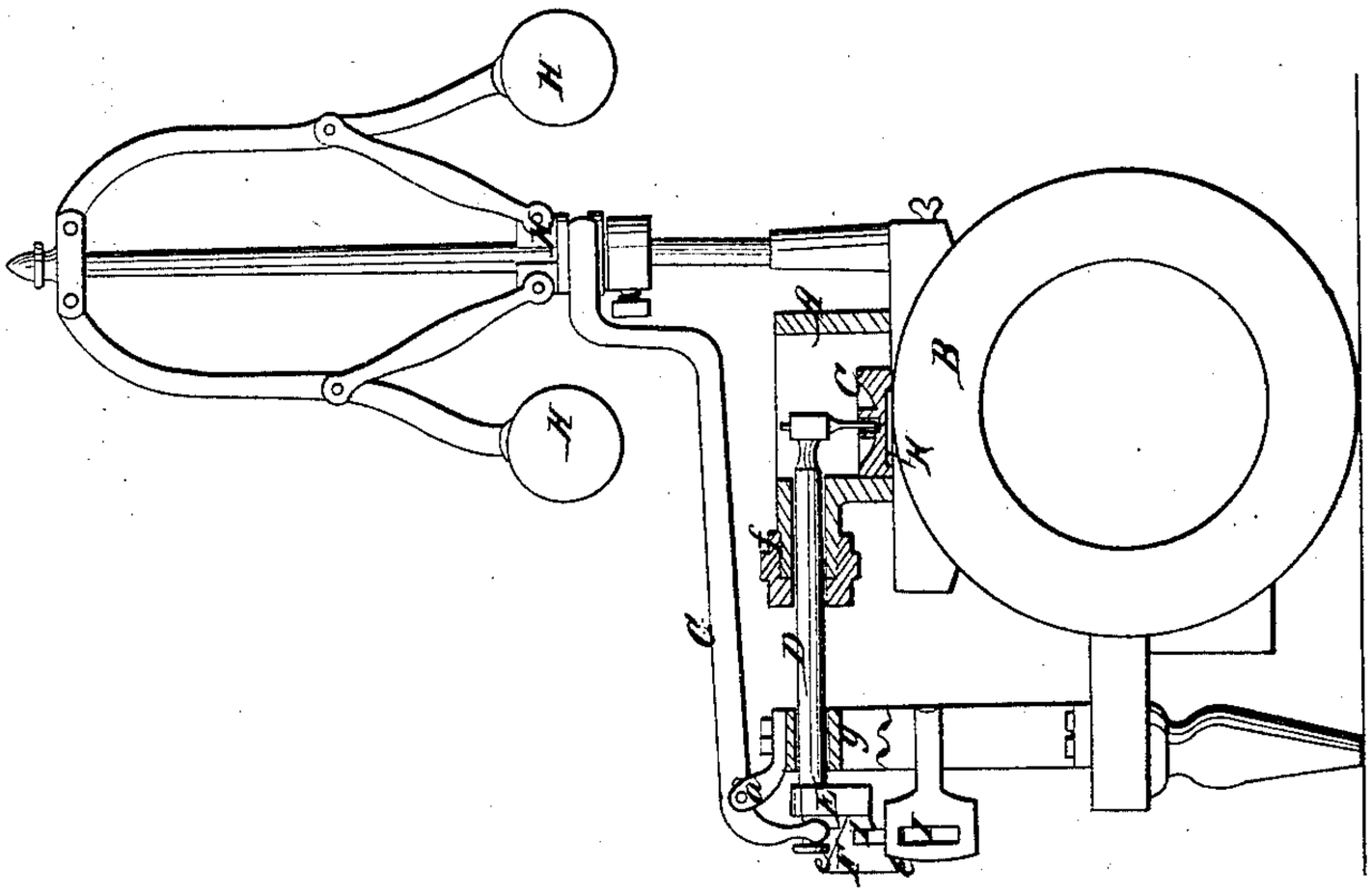


Fig. 1.



UNITED STATES PATENT OFFICE.

RICHARD GORNALL, OF BALTIMORE, MARYLAND.

COMBINATION OF A GOVERNOR WITH A SLIDE-VALVE.

Specification of Letters Patent No. 21,493, dated September 14, 1858.

To all whom it may concern:

Be it known that I, RICHARD GORNALL, of the city of Baltimore and State of Maryland, have invented a new and useful Improvement in Cut-Offs for 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, forming a part of this specification, in which—

Figure 1, is a vertical transverse section of the steam cylinder with my improvements applied to it. Fig. 2, is a plan of the same with all the attachments. Fig. 3, is a plan of the steam chest, valve and cylinder. Fig. 4, is a side view of the rock shaft detached. Fig. 5 is a detached side view of the connecting rod, rock shaft, &c.

Similar letters of reference, in each of the several figures indicate corresponding parts.

My invention consists in the combination in the manner substantially as specified of the governor with a slide valve which is so constructed and arranged that it has its usual back and forward movement and a movement in a contrary direction from its regular course whenever the speed of the engine gets too high, and when moved in said contrary or transverse direction, it closes up or partially cuts off the feed port and leaves open the exhaust port, at any position of the piston.

My invention also consists in giving the crank pin by which the rock shaft is operated, a flaring or V shape in combination with the oblique or bevel ends of the slide valve and the enlarged slot of the connecting rod, whereby the slide valve, notwithstanding having a contrary or transverse movement is always caused to work with "lead."

By the first feature of my invention an exceedingly simple and effective automatic cut off is produced, it dispensing with the complicated arrangement of lifters and their connections, and by the second feature the valve is always sure to work with a "lead" just the same as it would if it was not arranged to act as a cut off in the manner described.

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, B, steam cylinder, C, slide valve, D, sliding rock shaft to work slide valve C, E, crank of rock shaft, F, flaring or V shaped crank pin.

G, is an elbow lever pivoted to the frame at *a*, and serving to combine the rock shaft with the governor H, as shown.

I, is a sliding bar or connecting rod, combining through an enlarged slot *c*, in its upper side and the flaring crank pin F, the rock shaft with the eccentric or driving mechanism commonly used on engines for actuating the rock shaft.

The feed ports J, J, and exhaust port K, are nearly the same as any ordinary steam engine, the only difference being in the shape of the feed ports which are of triangular or other similar form which will produce the cut off of the steam by the contrary or transverse movement of the slide valve.

The ports of the slide valve are of corresponding form to the ports of the cylinder, and the slide valve is constructed with its ends partly beveled off at an angle corresponding with the angle of the ports of the cylinder as shown. It will be seen that by this arrangement and form of steam ports and valve, the steam can be worked in just the same manner in which it is worked with a common slide valve so far as the longitudinal vibrations of the valve are concerned and that in addition thereto the steam can be cut off by the transverse movement of the valves no matter what be the position of the piston, as the longest parts of the valve are, by the transverse movement, brought over the steam ports of the cylinder in a manner to close the, then, receiving port, but not the, then, exhausting port,

The bevel *d*, *d*, given to the ends of the valve corresponds with the flare *e*, *e*, given to the crank pin and consequently after the valve has once been set to work with a certain "lead" it will retain such "lead" no matter how great may be the transverse movement given to the valve owing to the flaring sides of the crank pin coming in contact with the sides of the slot *c*, as the rock shaft slides transversely to the cylinder. It is proper here to remark that the rock shaft is fitted loosely in the stuffing box *f*, of the steam chest and in the bearing box *g*, of the frame and loosely combined with the connecting rod or bar I, in order that it may be moved transversely to the cylinder.

From the foregoing description of parts in connection with the following, the operation will be readily understood. The engine being set in motion as usual, the crank pin of the rock shaft is struck by the opposite sides of the slot *c*, of the connecting bar or rod and the valve is vibrated back and forth, the same as in any ordinary engine, but in case the speed of the engine should get too high, then the governor balls rise and elevate the long end of the elbow lever and depress the short end thereof and thereby cause it to give the rock shaft a movement transverse to the cylinder, sufficiently long to effect the cut off of the steam and consequently cause a reduction of the speed of the engine. I do not limit myself to any particular character of taper steam ports, as various forms of taper ports might be made to answer the end in view, nor do I limit the use of my invention to flat surfaced slide valves, as it can be applied in connection with a cylinder valve or a valve forming part of a circle, with equal advantage.

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

1. The combination in the manner substantially as specified of the governor with a slide valve which is constructed, arranged and operating as specified, for the purposes set forth.

2. Giving the crank pin F, by which the rock shaft D, is operated a flaring or V shape in combination with the oblique or bevel ends *d*, of the slide valve and the enlarged slot *c* of the connecting rod I, substantially as and for the purposes set forth.

The above specification of my improvement in cut offs for steam engines signed and witnessed this 14 day of July 1858.

RICHARD GORNALL.

Witnesses:

R. W. FENWICK,

J. P. JACOBS.