

(No Model.)

2 Sheets—Sheet 1.

M. F. HILL & C. W. EASLEY.

VALVE GEAR.

No. 546,925.

Patented Sept. 24, 1895.

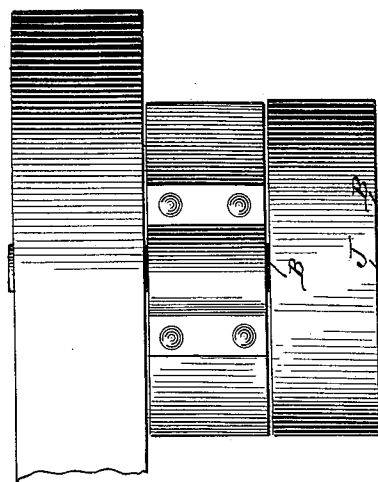
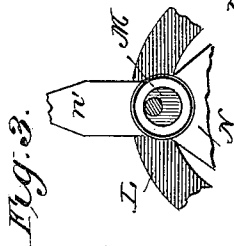
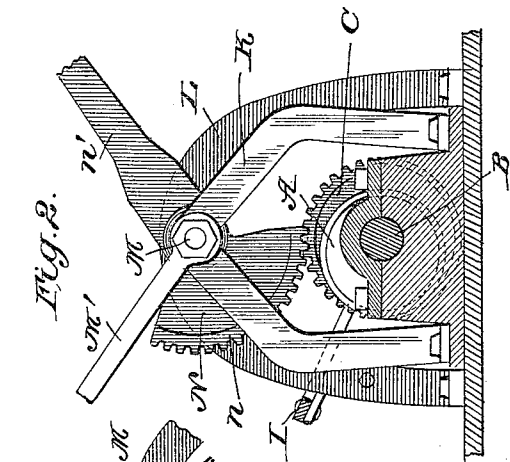
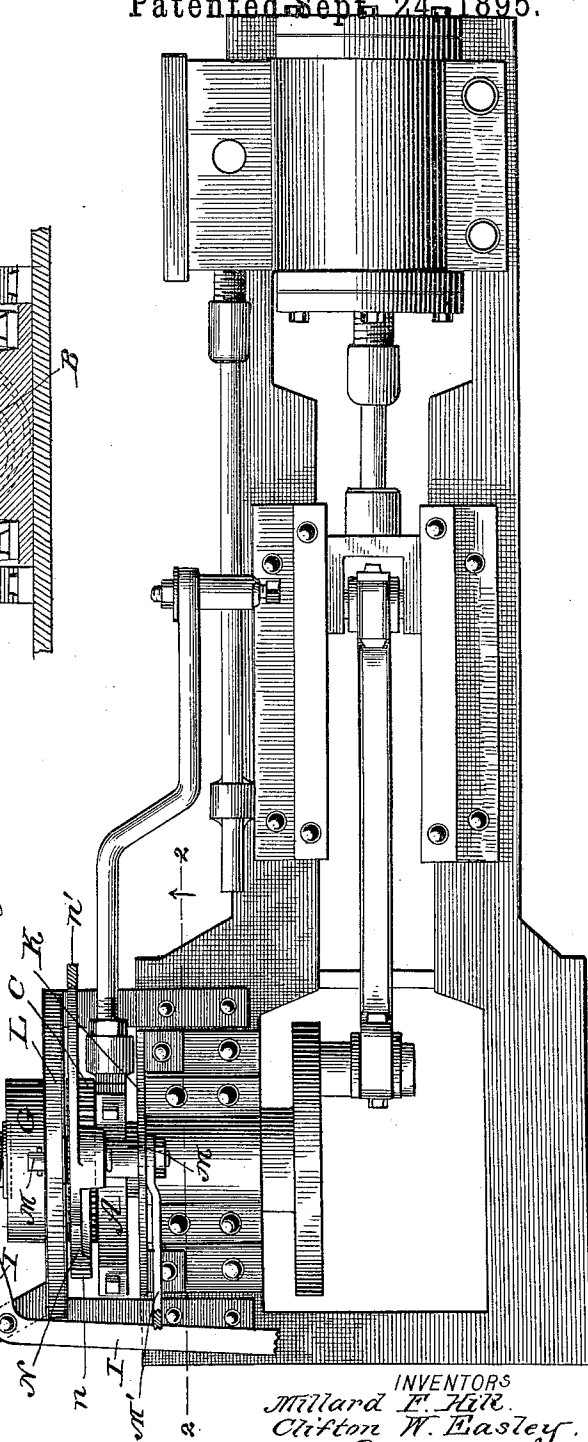


Fig. 1.



WITNESSES:

Fred G. Dieterich
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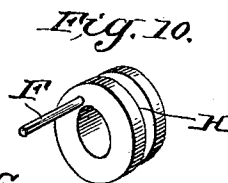
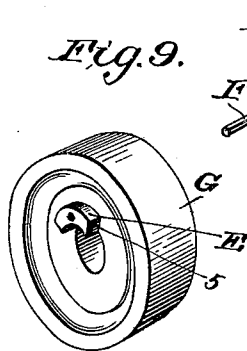
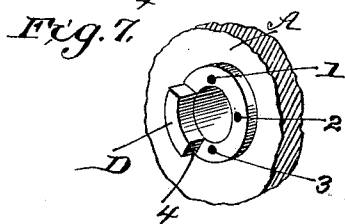
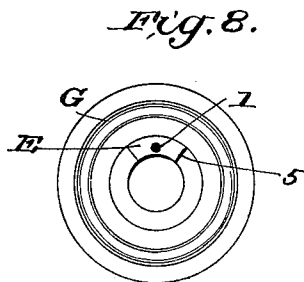
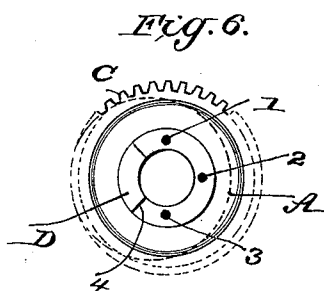
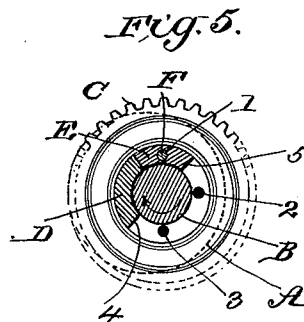
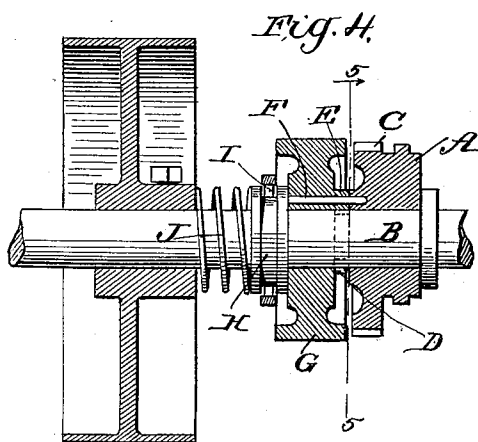
INVENTORS
Millard F. Hill
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BY *Munn & Co.*

ATTORNEYS.

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UNITED STATES PATENT OFFICE.

MILLARD F. HILL AND CLIFTON W. EASLEY, OF HENRIETTA, TEXAS; SAID
EASLEY ASSIGNOR TO WILLIAM B. WORSHAM, OF CLAY COUNTY, TEXAS.

VALVE-GEAR.

SPECIFICATION forming part of Letters Patent No. 546,925, dated September 24, 1895.

Application filed January 11, 1895. Serial No. 534,560. (No model.)

To all whom it may concern:

Be it known that we, MILLARD F. HILL and CLIFTON W. EASLEY, of Henrietta, in the county of Clay and State of Texas, have invented a new and useful Improvement in Valve-Gears, of which the following is a specification.

Our invention is an improvement in valve-gears in which but a single eccentric is used, together with devices by which such eccentric may be shifted upon the shaft and locked in its various positions to effect either a reversal of the engine or a stoppage thereof with a full head of steam on, and to run the engine in one or the other direction, as may be desired.

The invention consists in certain novel constructions, combinations, and arrangements of parts, as will be hereinafter described, and pointed out in the claims.

In the drawings, Figure 1 is a top plan view of an engine having our improvements. Fig. 2 is a section on about line 2 2 of Fig. 1. Fig. 3 is a detail view showing the eccentric shaft supporting the rack-bar. Fig. 4 is a detail section alongside the crank-shaft. Fig. 5 is a cross-section on about line 5 5 of Fig. 4, and Figs. 6, 7, 8, 9, and 10 are detail views.

By our invention we provide means by which the engine can be reversed when in motion and locked in either position, may be stopped when in motion and locked in stopped position, or may be reversed or set to run in either direction when at rest and be locked. While we have shown the invention as embodied in a stationary engine, it will be evident that it is applicable to and useful upon locomotives, and that it could be so applied by those skilled in the art.

In the construction shown the engine may in general respects be of ordinary construction, the cylinder, valve, valve-rod, piston-rod, crank-shaft, and fly-wheel, being, except as hereinafter described, of ordinary construction and requiring no detailed description.

The eccentric A is loose upon the shaft B and has rigid with it a toothed wheel C, which may be integral with or suitably attached to the eccentric. This toothed wheel C is concentric with the shaft and forms a part of the eccentric, as will be readily understood. The

eccentric is also provided on one of its sides with a lug or stop-abutment D, and has three seats—1, 2, and 3—for the bolt, presently described. When the bolt is in one of these seats, 1, the eccentric is locked upon the shaft to cause the engine to move in one direction; when in the other seat, 3, the eccentric is set to cause the valve to move the engine in the reverse direction, and when in seat 2 the engine will be stopped without any adjustment or manipulation of the throttle. On the shaft is fixed a lug or abutment E, in position to engage the abutment C, and we also provide a lock or bolt F, keyed to and movable along the shaft and capable of being set into or out of engagement with its seats.

In the construction shown the lug E is upon the side of a collar or pulley G, which is rigid on the shaft, and the bolt F plays through the lug E and is supported on a grooved pulley H, keyed on the shaft and engaged by a shifting-lever I, pivoted to the framing, as shown, and by which the bolt may be shifted from locked to unlocked position, a spring J being arranged to adjust the bolt normally into locked position.

Two stand-frames K and L are mounted on the bed of the engine and extend above and on opposite sides of the toothed wheel C of the eccentric. The frame I affords a pivotal support for the shifting-lever I, which lever is practically L-shaped and has its handle-arm extended transversely across the rear or shaft end of the engine, as shown. In these frames is journaled an eccentric-shaft M, on which is journaled a rack N, having a toothed segment *n* and a handle *n'*, the toothed segment or portion being in line with, adapted to, and movable in the direction of the plane of the toothed wheel C, toward and from the same, by turning the shaft M through the aid of a handle M' attached thereto. By this means the rack portion may be set directly into mesh with the teeth of the wheel C, as may be desired, and may be used as a means of shifting the eccentric when the engine is at rest. Therefore it will be seen we provide means for reversing when the engine is at rest by shifting the eccentric through the aid of the toothed rack and wheel, and we also provide for au-

tomatically reversing when the engine is in motion, the operation of which we will now describe.

In Fig. 5 the eccentric, stop lugs, &c., are shown, with the lock-bolt in its seat 1, and the valve, for instance, will be shifted to drive the engine with the shaft moving in the direction indicated by the arrow, Fig. 5. Now if the bolt be released by manipulating its shifting-lever, the eccentric will stop because of the drag or resistance of the valve and connections and the shaft will continue turning in the direction indicated in Fig. 5. If it be desired to stop the engine, the bolt should be released immediately it escapes from seat 1, so it will automatically enter seat 2 and stop the engine, while if it is desired to reverse the engine the lock should be held until the edge 4 of the lug on the eccentric strikes the edge 5 of the lug on the shaft, or at least until the bolt has passed the seat 2. Then when the lugs contact at 4 and 5 and are locked at such point, the valve will have been shifted to reverse the engine and it will move in the opposite direction to that indicated by the arrow in Fig. 5. It will be seen, therefore, that we provide means for reversing or stopping while in motion, and also means by which to effect a reversal when the engine is at rest, the automatic or non-automatic reversal being so constructed as to in no wise interfere with each other.

It should be stated that in the use of the rack-lever for shifting the eccentric the lock should be released by hand before manipulating the said rack-lever.

It should be noticed that the lock-bolt extends through the abutment of the collar. This is important, as by it the bolt is braced throughout its length and its strength, and the certainty of its action is thereby improved. The abutments on the shaft and eccentric form stops to limit the movement of the eccentric and the lock is entirely independent of the abutments and forms a fastening to secure the eccentric in one or the other of its extreme positions or in its intermediate position, as before described.

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

1. In an engine the combination of the shaft, an eccentric loose thereon abutments on the shaft and eccentric whereby the latter may be stopped in different positions on the shaft, a lock engaging directly with the eccentric whereby the same may be fastened securely in either one of such positions means by which to release the lock whereby the eccentric may shift automatically when the engine is in motion and means by which to positively shift the eccentric when the engine is at rest substantially as set forth.

2. In an engine the combination of the shaft, the eccentric loose on the shaft, and lock devices whereby such eccentric may be held in

position to direct the engine in one or the other direction or in an intermediate position to stop the engine substantially as set forth.

3. In an engine the combination of the shaft eccentric loose on the shaft and having an abutment and provided with three lock seats, the collar or portion on the shaft having an abutment engaging that of the eccentric the lock bolt entering the seats of the eccentric and means for operating said lock bolt substantially as set forth.

4. In an engine the combination of the shaft, the eccentric having an abutment the lug fixed with respect to the shaft and forming an abutment for engaging that of the eccentric and the lock having a bolt playing through the lug of the shaft and into and out of engagement with the eccentric all substantially as and for the purposes set forth.

5. In an engine the combination of the shaft, the eccentric loose on the shaft, and having an abutment rigid with respect to the shaft and engaging the abutment of the eccentric and whereby the eccentric may be stopped in certain positions on the shaft and an independent lock device engaging directly with and adapted to positively secure the eccentric in its different positions substantially as set forth.

6. The combination in an engine of the shaft, the eccentric loose on the shaft, the collar fixed on the shaft such collar and eccentric having abutting stop portions and an independent lock device engaging with the eccentric such device being adapted to lock the eccentric and to transmit thereto the motion of the shaft, substantially as set forth.

7. The combination in an engine of the shaft, the eccentric loose on the shaft, and having an abutment, an abutment carried by the shaft and engaging that of the eccentric, the lock devices by which such eccentric is held in its different adjustments a toothed wheel fixed with relation to the eccentric and a toothed rack movable into and out of engagement with said toothed wheel substantially as and for the purposes set forth.

8. In an engine the combination of the shaft, the eccentric loose on the shaft and having a toothed wheel, such eccentric also having an abutment, an abutment carried by the shaft and engaging that of the eccentric, a lock device by which to secure the eccentric in its different adjustments and a rack movably supported in a plane common to that of the toothed wheel and movable in such plane into and out of mesh with the toothed wheel substantially as and for the purposes set forth.

9. In an engine the combination of the shaft, having an abutment, the eccentric loose on the shaft and having an abutment engaging that of the shaft, such eccentric also having a toothed wheel, the framing, the eccentric shaft carried by said framing and having an operating handle, and the rack pivoted on said eccentric shaft in a plane with the

toothed wheel and movable in such plane toward and from the toothed wheel substantially as set forth.

10. The combination in an engine of the shaft
5 having a collar provided with an abutment
lug having a bolt opening formed through it
the lock having a bolt playing through said
opening, a lever by which to operate said
lock, the eccentric loose on the shaft and hav-
10 ing an abutment lug and also end seats for
the bolt and an intermediate seat therefor
whereby the engine may be reversed with a
full head of steam on or stopped independent

of the throttle, the eccentric being also pro-
vided with a toothed wheel the framing, the 15
eccentric shaft journaled in said framing and
having a handle, the rack pivoted or jour-
naled on said eccentric shaft and movable by
the turning thereof into and out of mesh with
the toothed wheel substantially as set forth. 20

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Witnesses:

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