No. 618,433. Patented Jan. 31, 1899.

G. PALM.

REVERSING GEAR.

(Application filed Dec. 18, 1897.)

(No Model.)

Fig. 1.

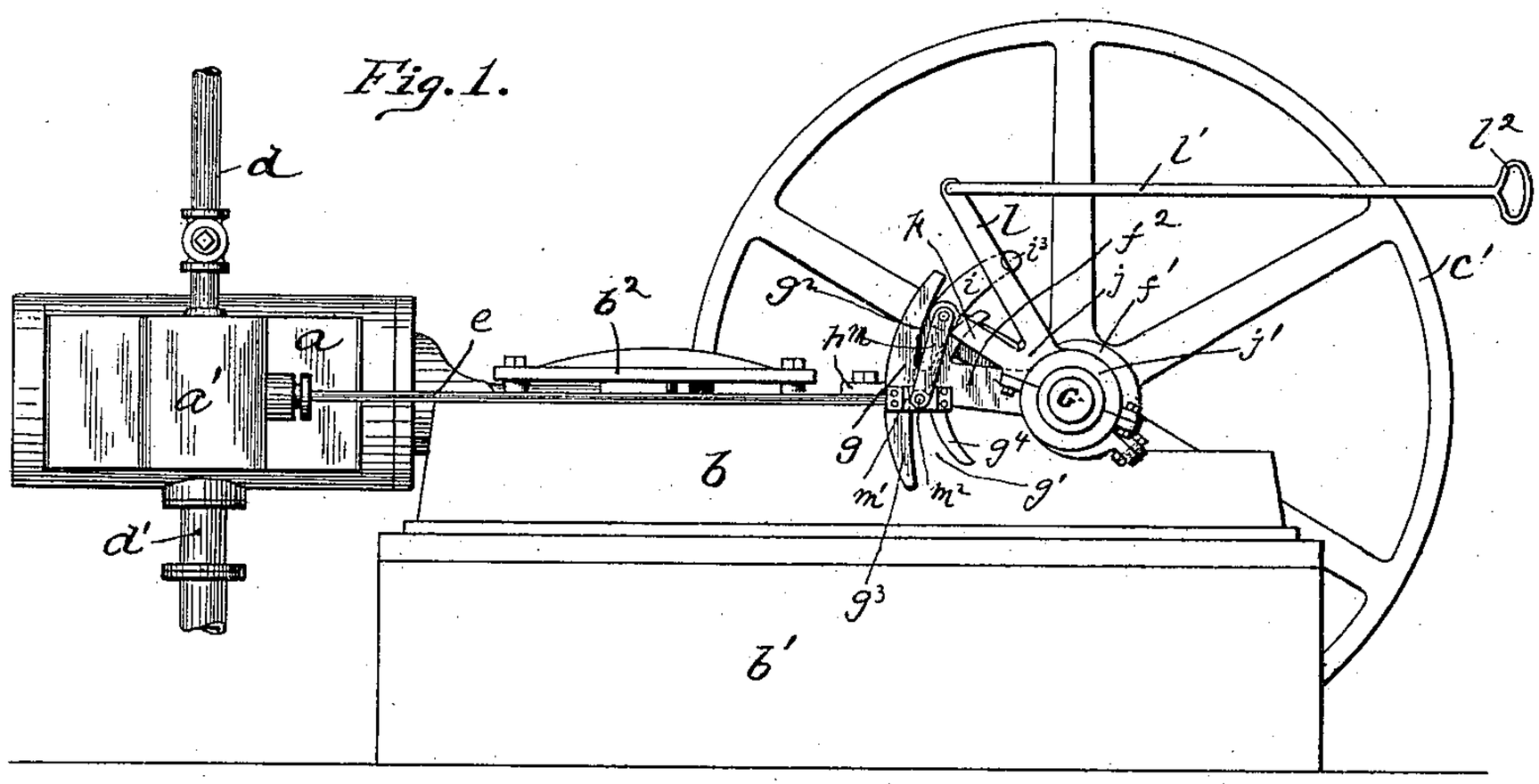


Fig. 2.

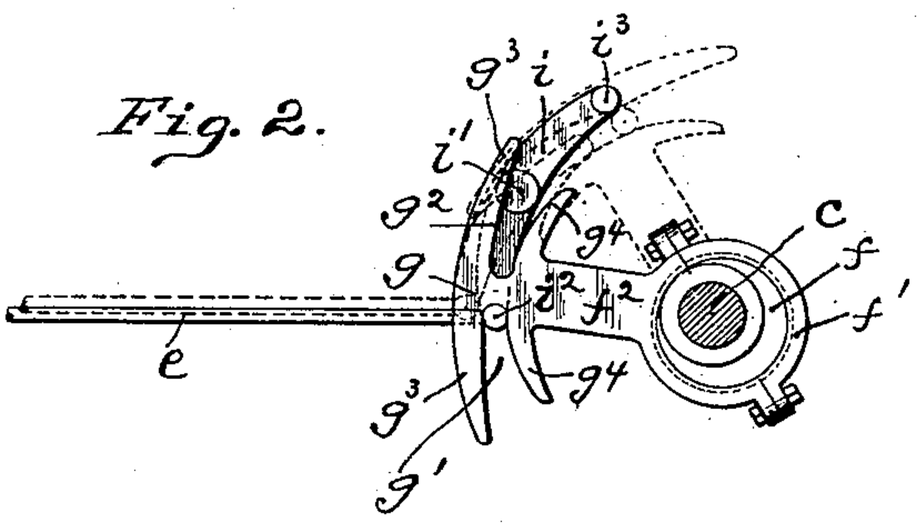


Fig. 3.

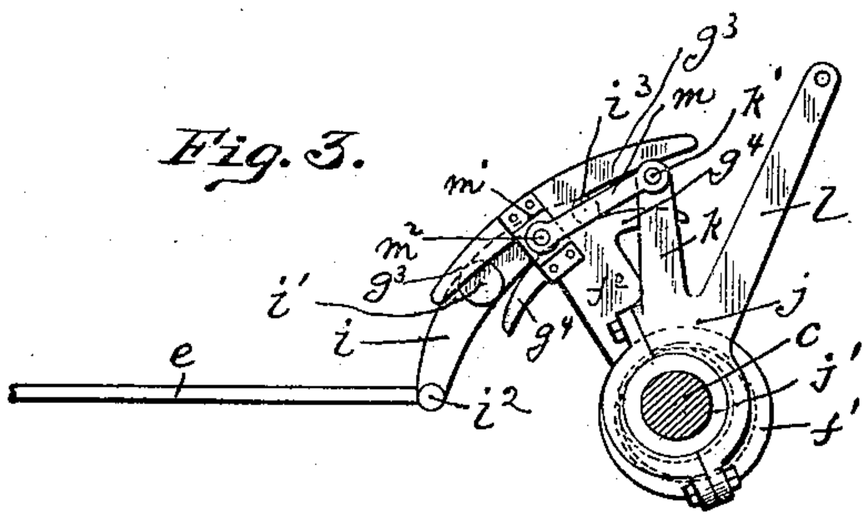
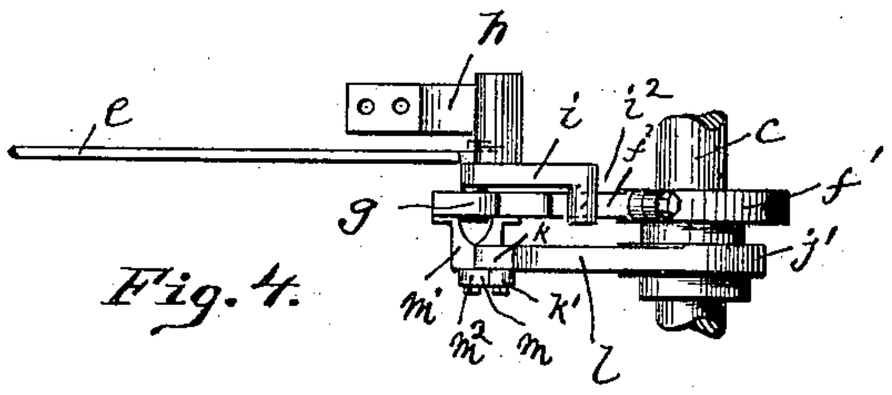


Fig. 4.



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UNITED STATES PATENT OFFICE.

GEORGE PALM, OF BUTLER, PENNSYLVANIA.

REVERSING-GEAR.

SPECIFICATION forming part of Letters Patent No. 618,433, dated January 31, 1899.

Application filed December 18, 1897. Serial No. 662,401. (No model.)

To all whom it may concern:

Be it known that I, GEORGE PALM, a resident of Butler, in the county of Butler and State of Pennsylvania, have invented a new and useful Improvement in Reversing-Gear; and I do hereby declare the following to be a full, clear, and exact description thereof.

My invention relates to reversing-gear for steam or similarly-operated engines, and has for its object the construction of a simple and inexpensive device whereby an engine may be reversed easily and quickly and the parts held substantially from vibration when the engine is running forward.

It also consists in certain novel features of construction, which will be more fully described hereinafter and pointed out in the claims.

In the drawings, Figure 1 is a side view of any ordinary stationary engine with my invention applied thereto. Fig. 2 is an enlarged view of the reversing mechanism. Fig. 3 is a like view of the same, the parts being shown in the position they will assume when reversed. Fig. 4 is a plan view of the reversing-gear.

Like letters indicate like parts in each of the figures.

In the drawings, a represents the cylinder, a' the steam-chest secured thereto, b the bed-plate to which the cylinder is secured, and b' the foundation.

c represents the main drive-shaft, c' the fly-wheel, and b^2 the cross-head upon the bed-plate b.

The cylinder a is supplied with steam in the usual manner through the steam-chest a' by means of the supply-pipe d. The exhaust-pipe is shown at d'.

The steam-chest a' contains the usual slide-valve, (not shown,) which is connected to the valve-stem e and by means of the reversing-gear to the eccentric f. In the usual form of reversing-gear now in general use two eccentrics are necessary. In my construction but one eccentric is used.

The strap f' is mounted upon the eccentric f and has attached thereto, forming a part thereof, the arm f^2. This arm has the segment g at its outer end, which forms a T with the arm f^2. V-shaped openings or guideways are formed in each end of said segment, as shown at g' g^2, said guideways being bounded by the jaws g^3 and g^4.

A bracket h is secured to the bed-plate of the engine, to which is pivoted the rocking lever i at its center i'. To this lever i, at its lower end, is attached the outer end of the valve-stem e. Studs i^2 i^3 project from each end of the lever i, one of which is always in engagement with one of the guideways g' or g^2. A lever j is mounted to swing upon a hub j', which is secured to the shaft c outside of the eccentric. This lever j has the two arms k and l, the arm k having pivoted thereto the link m at the point k', said link in turn being pivotally secured to the yoke m' of the segment g at the point m^2.

When the reversing mechanism is in the position shown in Figs. 1 and 2, the engine will travel forward, and it will be seen that the pivotal point k' of the link m is directly in line with the pivotal point i' of the lever i and the pivotal point m^2 of the link m is directly in line with the stud i^2 of the lever i. The valve-stem e is pivotally connected to the lever i at a point directly behind the stud i^2. A rod l' is connected to the upper end of arm l for the purpose of operating the lever to turn or rock upon the hub j'.

When the engine is in operation and the parts in such a position that the engine is running forward, the eccentric imparts a reciprocating motion to the arm f^2. The stud i^2 fits in the crotch of the guideway g' and reciprocates with the arm, rocking the lever i and, through the valve-stem e, attached thereto, the slide-valve in the steam-chest in the usual manner.

When the operator is desirous of reversing the engine, he operates the rod l' to draw the arm l of the lever to the right, Fig. 1. The link m, attached to the arm k of the lever j, draws the segment g upward to the position shown in dotted lines, Fig. 2.

Suppose the parts to be in the position shown in Figs. 1 and 2 and the engine running forward. To reverse the engine, the operator grasps the handle l^2 of the operating-rod l', drawing the lever j and its arms l and k into the position shown in Fig. 3. The arms f^2 and g of the eccentric-straps will be drawn by the link m into a corresponding position, as shown in said Fig. 3. As the arm

g moves to said position the jaws g^3 and g^4 of the guide g^2 will carry the stud i^3 from the position shown in full lines to the position shown in dotted lines, Fig. 2, or in full lines, Fig. 3, and the lever i is rocked, throwing the lower end of said lever backward. The valve-rod e, being attached to said lever i at its lower end, will also be moved to reverse the position of the slide-valve in steam-chest a' and the engine will be reversed.

The lever i is curved so that when the slide-valve is centrally located in the steam-chest the studs i^2 and i^3 and the pivotal point i' of the lever i will all be at equal distances from the center of the shaft c, upon which the eccentric f is located, and consequently the center upon which the arm f^2 of the eccentric-strap rocks.

When the engine is running forward, the point k', as previously stated, is directly in line or coincident with the pivotal point i' of rocking lever i and the point m^2 of the yoke m' directly in line or coincident with the center of stud i^2, at which point the valve-stem e is attached thereto. It will thus be seen that while the engine is running forward the link m will cause no vibration of the lever j, and the gearing is not liable to displacement.

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

1. In reversing-gear for engines, the combination of the main driving-shaft, an eccentric mounted thereon, a strap, a segmental arm extending from said strap, said arm having curved notches therein, a curved rocking lever, a valve-stem connected directly to said rocking lever, studs at each end of said rocking lever engaged by the curved notches of said segmental arm, and a double lever mounted on said shaft and adapted to turn thereon, and connections between one arm of said lever and said segmental arm, substantially as set forth.

2. In reversing-gear for engines, the combination of the main driving-shaft, an eccentric mounted thereon, a strap, a segmental arm extending from said strap, said arm having curved notches therein, a curved rocking lever pivoted at its mid-point, a valve-stem connected to one end of said rocking lever, studs on each end of said rocking lever engaging said notches, a double reversing-lever, a link connected to one arm of said lever, the opposite end of said link being connected to said segmental arm, and the pivotal point of said link with the arm of said reversing-lever being coincident with the pivotal point of said rocking lever, and the pivotal point of said link with said segmental arm being coincident with the pivotal point of valve-stem when the engine is running forward, substantially as set forth.

In testimony whereof I, the said GEORGE PALM, have hereunto set my hand.

GEORGE PALM.

Witnesses:
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