

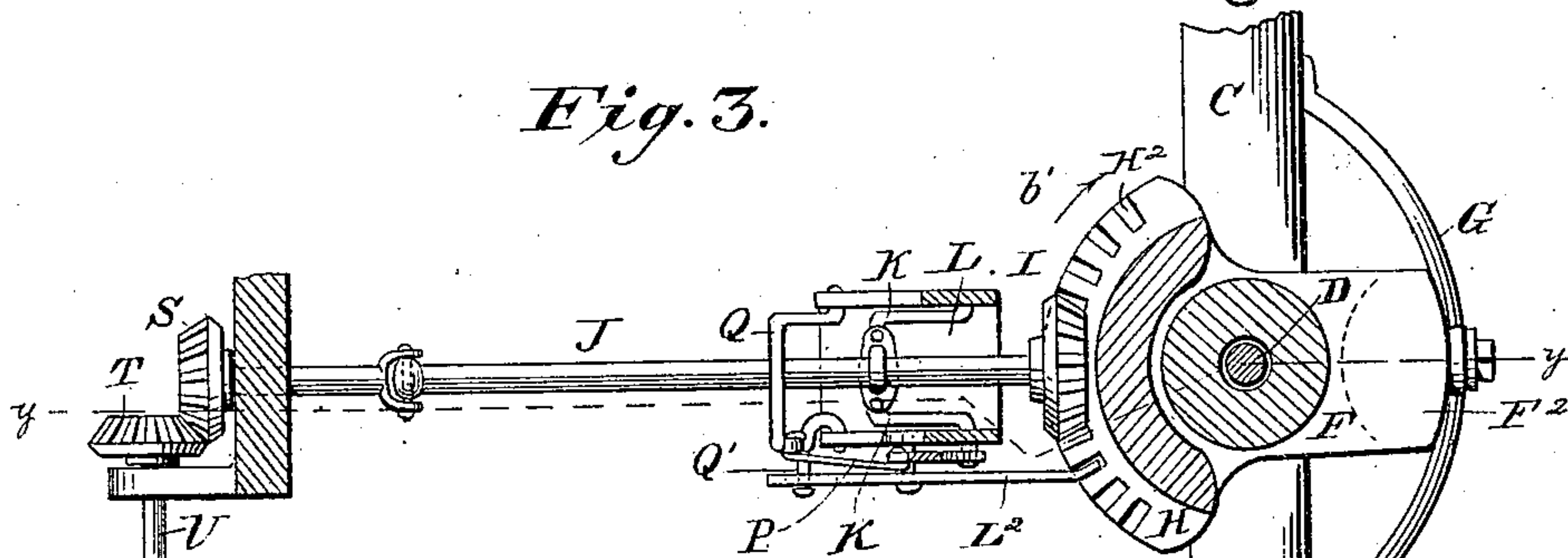
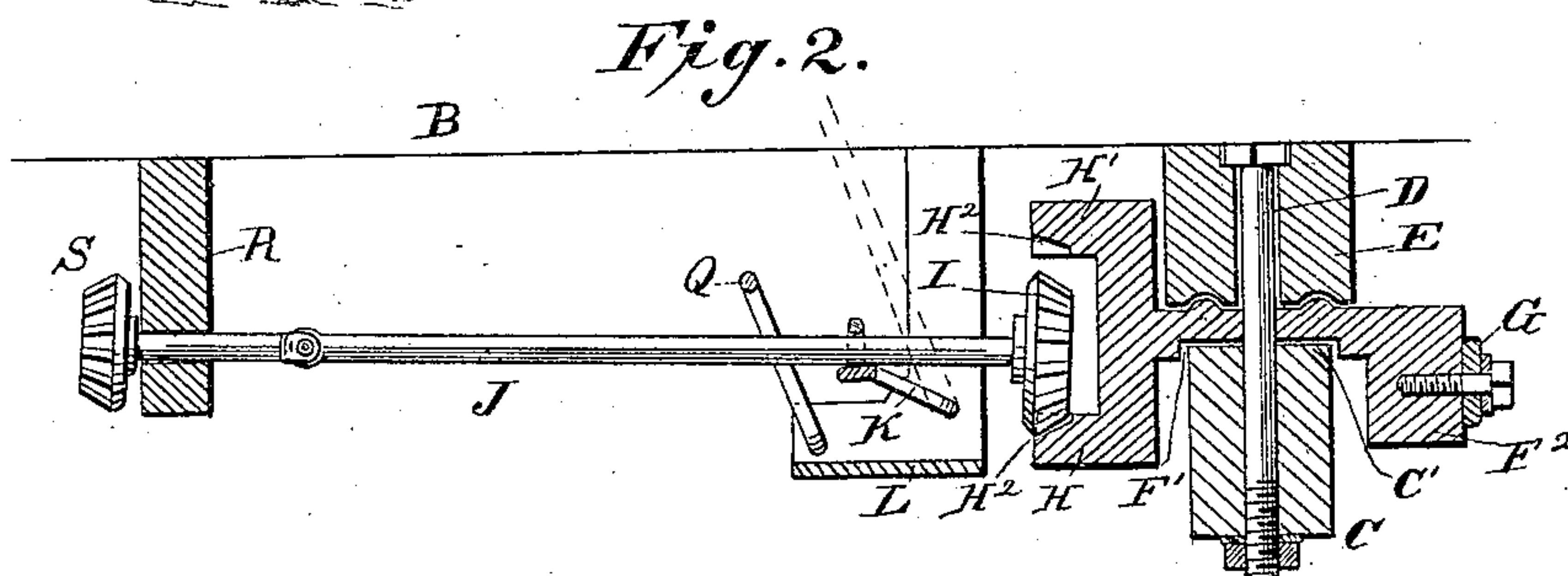
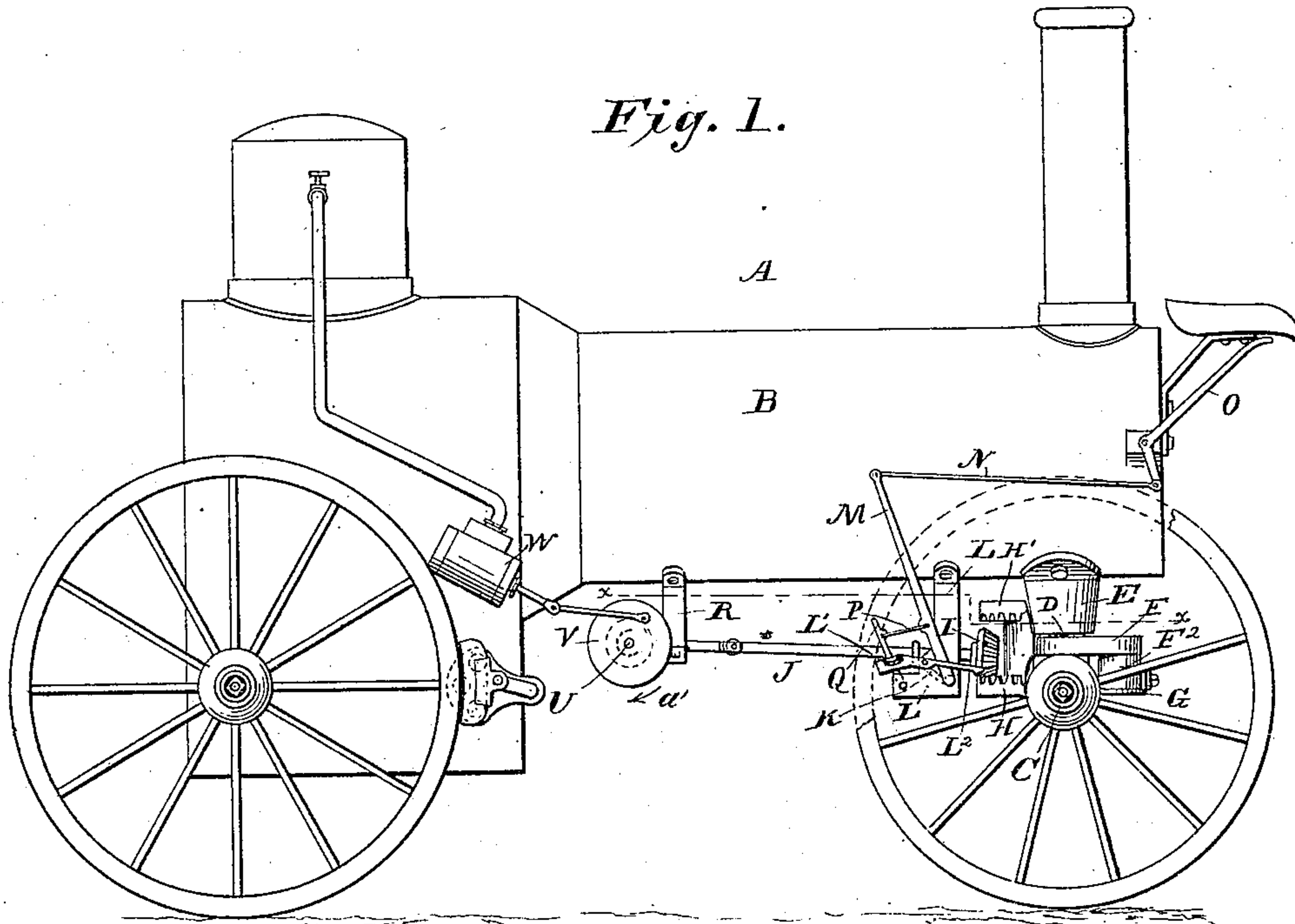
(No Model.)

J. F. SMITH.

STEERING APPARATUS FOR TRACTION ENGINES.

No. 356,265.

Patented Jan. 18, 1887.



WITNESSES:

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# UNITED STATES PATENT OFFICE.

JAMES F. SMITH, OF ANDREW COUNTY, MISSOURI.

## STEERING APPARATUS FOR TRACTION-ENGINES.

SPECIFICATION forming part of Letters Patent No. 356,265, dated January 18, 1887.

Application filed October 16, 1886. Serial No. 216,422. (No model.)

*To all whom it may concern:*

Be it known that I, JAMES F. SMITH, of the county of Andrew and State of Missouri, have invented a new and Improved Steering Apparatus, of which the following is a full, clear, and exact description.

The object of my invention is to provide a new and improved steering apparatus for traction-engines and other machinery which is simple in construction and easily operated.

The invention consists of a toothed arm connected with the front axle of the traction-engine, and of a device for imparting a turning motion to the said arm in either direction by suitable means operated from an engine attached to the said traction-engine.

The invention also consists of various parts and details and combinations of the same, as will be fully described hereinafter, and then pointed out in the claims.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar letters of reference indicate corresponding parts in all the figures.

Figure 1 is a side elevation of a traction-engine provided with my improvement. Fig. 2 is a longitudinal sectional elevation of part of my improvement on the line  $y y$  of Fig. 3, and Fig. 3 is a sectional plan view of the same on the line  $x x$  of Fig. 1.

The traction-engine A, of any approved construction, is provided with the usual boiler, B, and the front axle, C, through the center of which passes the king-bolt D, held in the casing E, attached to the boiler B, in any suitable manner. Between the axle C and the casing E is placed the arm F, which turns on the king-bolt D, and which is provided on its under side with a slot or notch, F', into which fits loosely a projection, C', formed on the top of the axle C. The arm F is provided on its front with a downwardly-extended projection or lug, F<sup>2</sup>, to which is secured a spring, G, which extends to both sides of the axle C, its free ends resting on the front edge of the said axle C.

The arm F is provided with two segmental extensions, H and H', one placed above the other, and each being provided with gear-teeth H<sup>2</sup>. A pinion, I, adapted to mesh in the said gear-teeth H<sup>2</sup> of either the projection H or H', is secured to a shaft, J, which has its bearing

at its front end on the crank-arm K, pivoted to the frame L, secured to the under side of the boiler B. The crank-arm K is connected with the lever M, which connects by means of the rod N with the lever O, pivoted to the boiler near the driver's seat. A rod, P, connects the lever M with the crank-arm Q, pivoted on the frame L and provided with a pin, Q', which projects into a curved slot, L', of the lever L<sup>2</sup>, pivoted on the frame L, and projecting with one end onto the gear-teeth of the segmental projection H.

The inner end of the shaft J has its bearing in the bracket R, secured to the boiler B, and is provided with the gear-wheel S, which meshes into the gear-wheel T, secured to the transverse shaft U, provided with a crank-disk, V, which is connected in the usual manner with the engine W, of any approved construction, and secured to the side of the boiler B, which supplies the steam to the said engine W.

The operation is as follows: The operator can steer the traction-engine A to either side by imparting a rotary motion to the crank-disk V by means of the steam-engine W, so as to turn the shaft J by means of the gear-wheels T and S. The turning of the shaft J causes the pinion I to act on either the teeth H<sup>2</sup> on the projection H or on the teeth of the projection H'; or the pinion may turn loosely between the said projections H and H' without gearing with either one, according to the position in which the shaft J is held by the crank-arm K, operated by the lever O near the driver's seat. It will be seen that when the pinion I is in contact with the lower projection, H, as shown in the drawings, and the crank-disk B is turned by the action of the engine W in the direction of the arrow  $a'$ , then the arm F will be turned on the king-bolt D in the direction of the arrow  $b'$ . This turning of the arm F causes the axle to swing in the same direction, as the projection C' of the axle is engaged with the notch F' in the arm, and the spring G also exerts a pressure, by one of its free ends, on the front edge of the axle C. The axle C is swung in an opposite direction when the operator throws the lever O backward, so that the crank-arm K elevates the front end of the shaft J, whereby the pinion I becomes disengaged from the teeth on the projection H and is thrown in gear with the teeth on the projection H'.



When the front wheels of the traction-engine pass over an obstruction in the roadway, no sudden jerk is transmitted to the arm F and the gearing, but it is taken up by the spring G.

5 When the pinion I is thrown out of contact with both the toothed segmental projections H and H' by the lever M, then the lever L<sup>2</sup> is thrown with its front end in contact with the teeth H<sup>2</sup> of the lower segmental arm, H, 10 whereby the arm F is locked in position so that the axle C stands at right angles to the boiler B. This movement of the lever L<sup>2</sup> is accomplished by the link P, connected with the said lever M, and operating the lever Q, 15 which, with its pin Q', operates in the curved slot L' of the lever L, and causes the latter with its front end to engage the teeth of the disk H whenever the pinion is out of gear with both the segmental arm H and H'.

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

1. In a steering apparatus, the combination of an arm connected with the axle and having 25 two toothed projections, a gear-wheel adapted to mesh in either of the toothed projections, and means for throwing the said gear-wheel in or out of contact with the said toothed projections, substantially as shown and described.

30 2. In a steering apparatus, the combination of an arm connected with the axle and turning on the king-bolt of the same and provided with toothed projections, a gear-wheel adapted to mesh in either of the toothed projections 35 and secured to a shaft receiving a rotary motion from an engine connected with the traction-engine, and means for throwing the said gear-wheel in and out of contact with the said toothed projections, substantially as shown 40 and described.

3. In a steering apparatus, the combination of the arm F, having the toothed projections H and H', with the pinion I, adapted to mesh 45 into the said toothed projections H and H', the shaft J, carrying the said pinion I, and means for rotating the said shaft J, substantially as shown and described.

4. In a steering apparatus, the combination of the arm F, having the toothed projections 50 H and H', with the pinion I, adapted to mesh into the said toothed projections H and H', the shaft J, carrying the said pinion I, and receiving a rotary motion from an engine secured to the said traction-engine, and a device 55 for raising and lowering the front end of the said shaft J, so as to throw the pinion I alternately in or out of contact with the said toothed

projections H and H', substantially as shown and described.

5. In a steering apparatus, the combination, 60 with the rotating shaft J, carrying the pinion I, operating the arm F, of the crank-arm K, supporting the outer end of the said shaft J, and the lever M, connected with the said crank-arm K and operated by the lever O, pivoted 65 near the driver's seat, substantially as shown and described.

6. In a steering apparatus, the shaft J, carrying the pinion I, operating the arm F and provided with the gear-wheel S, in combination 70 with the gear-wheel T, meshing into the said gear-wheel S, the shaft U, carrying the said gear-wheel T, the crank-disk V, secured to the said shaft U, and means for rotating the said crank-disk V from the engine W, secured 75 to the boiler B, substantially as shown and described.

7. In a steering apparatus, the axle C, having the projection C', and the king-bolt D, held in the casing E, in combination with the arm 80 F, having the notch F' and the downwardly-extending lug F<sup>2</sup>, and the spring G, secured to the said lug F<sup>2</sup>, and having its free ends resting against the front edge of the said axle C, 85 substantially as shown and described.

8. In a steering apparatus, the axle C, the arm F, having the toothed segmental arms H and H', the pinion I, and the shaft J, carrying 90 the said pinion I, in combination with the crank-arm K, operating on the said shaft J, the lever M, connected with the crank-arm K, and a device operated by the said lever M for locking the arm F in place when the pinion I is out of mesh with the said toothed seg- 95 mental arms H and H', substantially as shown and described.

9. In a steering apparatus, the arm F, having the toothed segmental arms H and H', the pinion I, mounted on the shaft J, the crank- 100 arm K, and the lever M, connected with the said crank-arm, in combination with the link P, the lever Q, connected with the said link P, and provided with a pin, Q', and the lever L<sup>2</sup>, having a slot, L', in which operates the pin Q', 105 and the front end of the said lever engaging the teeth of the segmental arm H whenever the pinion I is out of mesh with the said segmental arms H and H', substantially as shown and described.

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Witnesses:

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