(No Model.) 2 Sheets—Sheet 1.

A. HARROLD & W. H. PFRIMMER.

STEAM STEERING GEAR.

No. 560,129. Patented May 12, 1896.

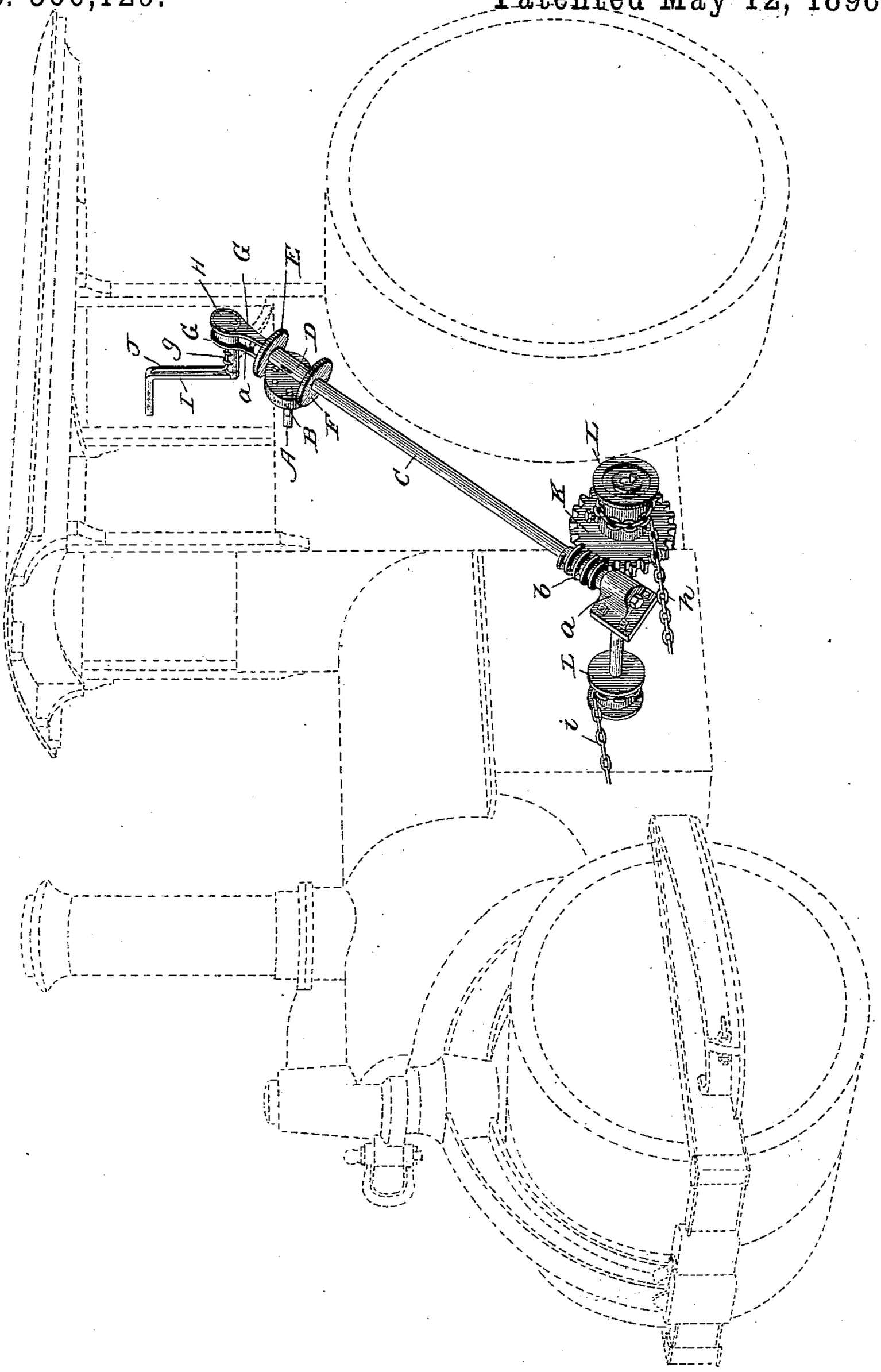

Fig. 1.

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(No Model.) 2 Sheets—Sheet 2.

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Fig. 2.

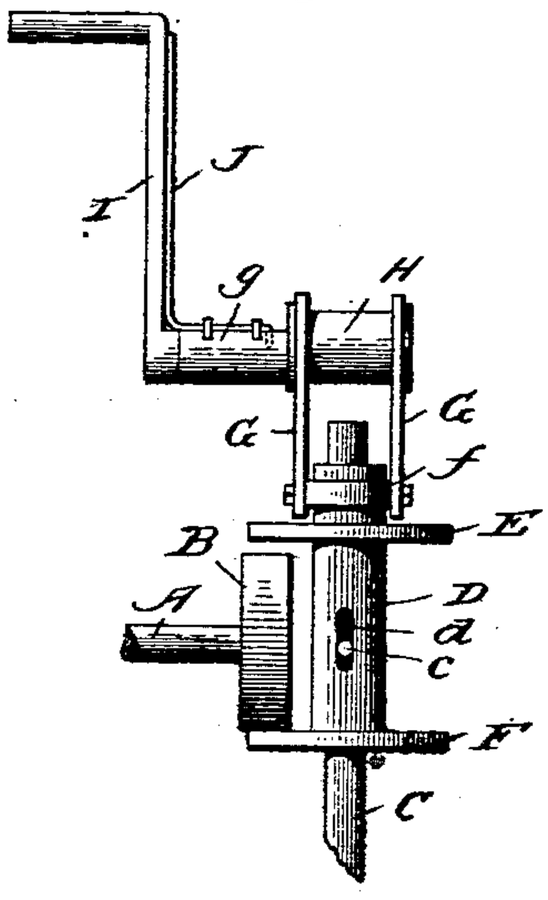


Fig. 3.

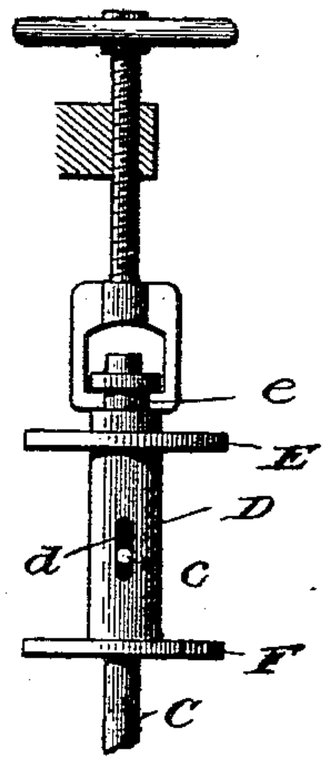


Fig. 4.

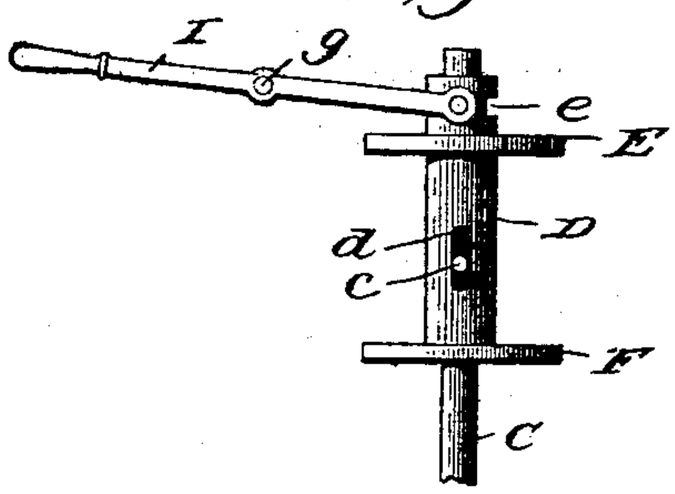


Fig. 5.

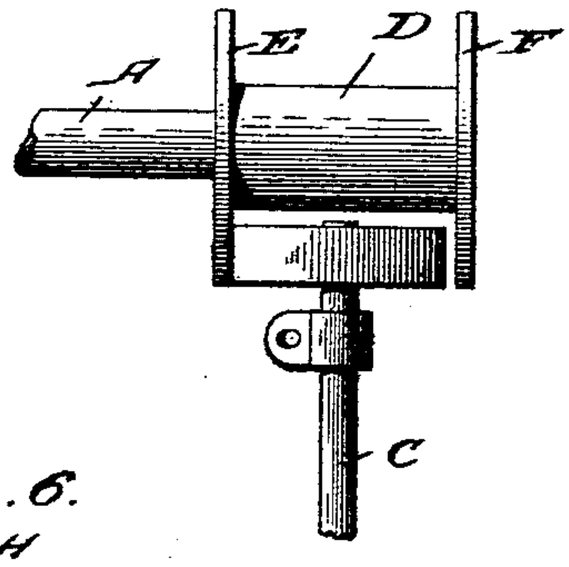
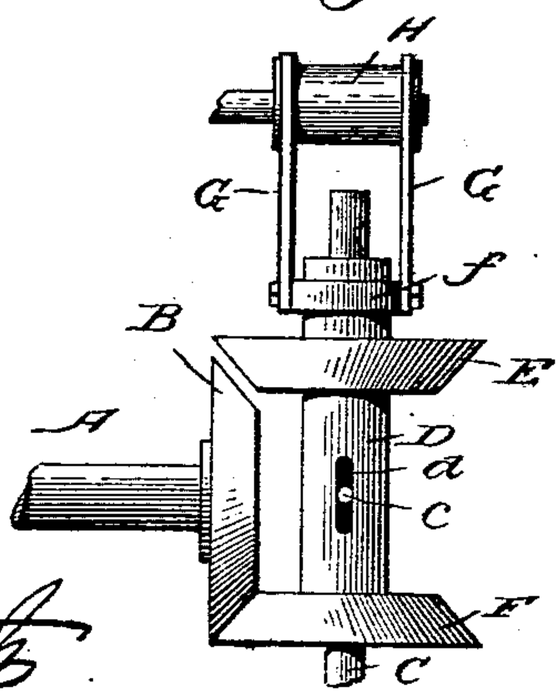


Fig. 6.



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UNITED STATES PATENT OFFICE.

AMOS HARROLD AND WILLIAM H. PFRIMMER, OF COLUMBIANA, OHIO.

STEAM STEERING-GEAR.

SPECIFICATION forming part of Letters Patent No. 560,129, dated May 12, 1896.

Application filed February 13, 1895. Serial No. 538,280. (No model.)

To all whom it may concern:

Be it known that we, AMOS HARROLD and WILLIAM H. PFRIMMER, citizens of the United States, residing at Columbiana, in the county of Columbiana and State of Ohio, have invented certain new and useful Improvements in Steam Steering-Gear; and we do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

Our invention relates to steam steering-gear for traction-engines, road-rollers, agricultural implements, and locomotives in general which depend upon positive movement of a steering-wheel for change of direction.

The object of the invention is the construction of mechanism designed, arranged, and adapted to control such changes of direction with the least possible expenditure of power and the greatest degree of accuracy and precision. Heretofore, on traction-engines and road-rollers particularly, steering has been effected through the agency of a hand-wheel and mechanism interposed between it and the pilot or steering wheel, such means being necessarily tedious, laborious, and unsatisfactory as compared with a system of steam-steering.

The invention will be hereinafter described and particularly pointed out in the claims following.

In the accompanying drawings, whereon like letters indicate like parts wherever employed, Figure 1 represents a perspective view of our improved steering apparatus, showing its application to a road-roller in dotted lines. Fig. 2 is a detail view showing an enlarged side elevation of frictional reversing mechanism, and Figs. 3, 4, 5, and 6 corresponding side elevations illustrating modified forms of parts shown in Fig. 2.

Reference being had to the drawings and letters thereon, A indicates a horizontal engine-shaft, preferably located within the cab and adapted to rotate constantly in a given direction, carrying with it a friction-wheel B, keyed thereto.

C is a main power-shaft journaled in suitable brackets *a a* and bearing at its lower end a worm-gear *b*, for a purpose that will later appear. On the upper end of shaft C is mounted a reciprocating friction-spool D, being limited in its reciprocal movement by a pin *c* on the shaft, in connection with the end walls of a slot *d* in the spool, through which said pin projects.

E F indicate upper and lower spool-flanges or disks, respectively, having frictional inner faces adapted to contact with the periphery of wheel B and impart to shaft C rotation in reverse directions according to the position of spool D upon said shaft and the engagement of upper or lower disk E or F with wheel B. At its upper end, immediately above disk E, spool D has formed therein a reduced neck *e*, which loosely receives a collar *f*, forming a swivel connection. To opposite sides of collar *f* is bolted a yoke or eccentric-arms G G, journaled at their upper ends upon an eccentric H, the latter being integral with and rocked by a crank-lever I in a fixed bearing *g*, as shown by Figs. 1 and 2. The operating or crank lever I stands normally in a vertical position, being there yieldingly retained by the action of a spring J, secured at one end in the handle of said lever I and at its opposite end in the fixed bearing *g*, thus holding each of the disks E and F out of engagement with the revolving friction-wheel B. At the lower end of worm-shaft C, and meshing with the worm *b*, is a gear-wheel K for transmitting power to a double-headed windlass L, upon which it is keyed, while around the heads of said windlass are coiled in opposite directions chains or cables *h i*, communicating with a steering wheel or roller, as in the illustration Fig. 1.

This being substantially the construction of our invention in its preferred form, its use and operation are as follows: Presuming a vehicle equipped with our invention to be running on an even course, the parts will occupy the relative positions shown by Fig. 1 of the drawings, both disks E and F, under influence of spring J, being held out of engagement with revolving wheel B. If, however, it is desired to turn either to the right or left, it is only necessary to elevate or depress spool D by a slight movement of lever I, eccentric H, and arms G, whereupon the upper or lower disk E or F is brought in contact with the periphery of wheel B, and power-shaft C is revolved to the right or left

accordingly. The effect of this movement is to operate, through worm *b*, upon gear K and windlass L, thus simultaneously coiling the steering-chain upon one windlass-head and paying same out from the other, resulting in a turning of the steering-wheel and a consequent change in direction of the vehicle with the greatest ease and nicety. As distinguished from cog-gearing, that above described is possessed of special merit in the fact that the friction-surfaces are adapted to go into instant action regardless of their relative position, and, when desired, more or less slippage may be permitted between such surfaces, according to the degree of pressure applied to lever I, thus avoiding wear and tear upon the parts and insuring ease and regularity of movement.

The construction and operation being substantially as set forth it will be understood that many minor changes may be made and substituted for parts herein shown and described without in the least departing from the spirit of our invention—as, for instance, in place of an eccentric mechanism for reciprocating spool D a hand-wheel and screw may be substituted, as shown by Fig. 3, or a simple lever with a fixed fulcrum, as shown by Fig. 4. Furthermore, if desired, the spool D may be located upon the engine-shaft A, and the friction-wheel B placed upon the worm-shaft C, whereupon the latter may be drawn or forced into contact with the flanges of said spool with precisely the results before described; or, when preferred, the frictional parts may be suitably beveled, as shown by Fig. 6. Likewise other changes and modifications will suggest themselves to the skilled mechanic; but, more particularly stated,

What we claim is—

1. A steering apparatus comprising a power-shaft, a reciprocating friction-spool upon said shaft, a driving-wheel located between the flanges of the spool, and an eccentric for elevating or lowering the spool with relation to the driving-wheel, substantially as described.

2. A steering apparatus comprising a power-shaft, a reciprocating friction-spool thereon, a driving-wheel located between the flanges of said spool, an eccentric crank-lever, and a swiveled connection between said eccentric-lever and friction-spool whereby the latter is raised or lowered, substantially as described.

3. A steering apparatus comprising a power-shaft, a frictional driving and reversing mechanism secured thereto, a frictional driving-wheel for periodically coacting with said mechanism, a lever for controlling said frictional mechanism, and a spring for normally retaining the frictional parts out of engagement, substantially as described.

4. A steering apparatus comprising a power-shaft, a frictional driving and reversing mechanism, a lever for throwing said mechanism into or out of engagement, and a spring located upon the lever for normally retaining the frictional parts out of engagement, substantially as described.

5. A steering apparatus comprising a power-shaft, driving and driven friction-disks for imparting motion to said shaft in reverse directions, a controlling crank-lever, and a yoke eccentrically journaled upon the lever having a swiveled connection with said driven disks, substantially as described.

6. A steering apparatus comprising a power-shaft, driving and driven friction-disks for imparting motion to said shaft in reverse directions, a controlling crank-lever, a spring for normally retaining said disks out of engagement, and an interposed yoke eccentrically journaled upon the lever having a swiveled connection with said driven disks, substantially as described.

In testimony whereof we subscribe our signatures in presence of two witnesses.

AMOS HARROLD.
WILLIAM H. PFRIMMER.

Witnesses:
STANTON HUMES,
E. L. HOLLOWAY.