

N. K. RENS LAND.
 LINK MOTION VALVE GEAR.
 APPLICATION FILED MAY 6, 1911.

1,006,275.

Patented Oct. 17, 1911.

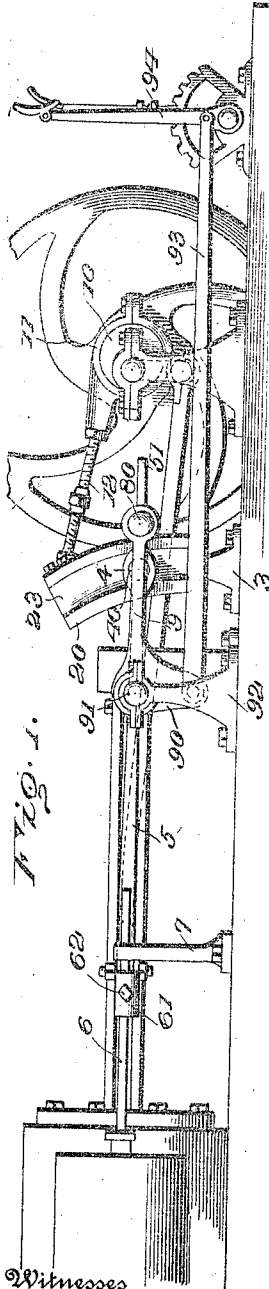


Fig. 1.

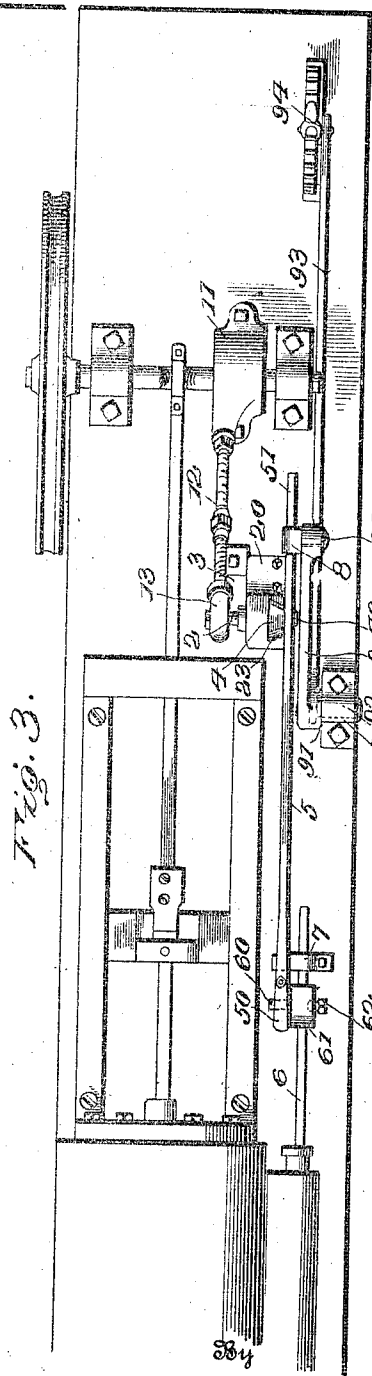


Fig. 3.

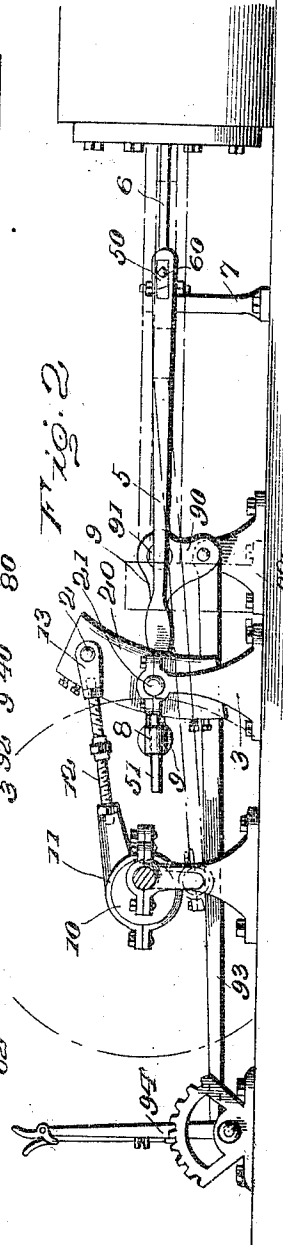


Fig. 2.

Witnesses
 W. A. Williams
 L. L. Burkett.

Inventor
 N. K. Rensland.
 Hubert Peck
 Attorney

UNITED STATES PATENT OFFICE.

NELS K. RENSLAND, OF UPHAM, NORTH DAKOTA.

LINK-MOTION VALVE-GEAR.

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Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, NELS K. RENSLAND, a citizen of the United States, residing at Upham, McHenry county, North Dakota, have invented certain new and useful Improvements in Link-Motion Valve-Gear; and I 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.

This invention relates to certain improvements in valve gear for steam engines; and the objects and nature of the invention will be readily understood by those skilled in the art in the light of the following explanation of the accompanying drawings illustrating what I consider to be my preferred embodiment from among other formations and arrangements within the spirit and scope of my invention.

The invention consists in certain novel features in construction and in combinations and arrangements as more fully and particularly set forth hereinafter.

Referring to the accompanying drawings;—Figure 1, is a side elevation of the link motion valve gear. Fig. 2, is an elevation from the opposite side thereof. Fig. 3 is a top plan view, parts being broken away.

In the drawings, I show a portion of the engine crank shaft, provided with the valve operating eccentric 10. The eccentric strap 11, is provided with the eccentric rod 12, at its outer end having a journal box 13, receiving the wrist pin 2, projecting laterally from the rear or back side of the upper end of the oscillatory link 20. This link is vertically disposed to rock in a vertical plane about a horizontal axis arranged about midway the length of the link. In the particular example illustrated, I show the link provided with a horizontal journal 21, fixed thereto about at the center thereof and projecting laterally from the rear or back side thereof, and mounted to rotate in a journal box carried by a fixed pillar or support 3, arranged a suitable distance from the engine crank shaft. At its front side, the link is formed or provided with a longitudinal curved open-front slideway 23, and if so desired, this slideway can be undercut to retain the slide 4, therein, and permit adjustment of the slide to any point within the length of the link or its slideway. This slide is formed with a wrist pin 40, project-

ing laterally and forwardly therefrom, to receive the valve-stem-propelling pitman 5. The pitman 5, at one end is formed with a suitable journal box 50, receiving the pin 60, rigid with and extending laterally from a block 61, normally fixed on the reciprocating valve stem 6. The valve stem 6, actuates and controls the steam engine slide valve, not shown, and if so desired said stem can be mounted to reciprocate in guides 7.

The block 61 is preferably adjustable longitudinally of the valve stem and is normally clamped rigidly thereto by set screw 62, or other suitable means. By this arrangement the desired relative positions of the engine slide valve, link and eccentric can be attained.

The pitman 5, extends transversely across the front faces of the oscillatory link 20, and the slide therein and is formed intermediate its length with a bearing box or opening receiving the pin 40, of said slide and by which said pitman is confined to the slide and is actuated to reciprocate the valve stem.

The pitman extends in a direction toward the engine crank shaft and beyond the slide and link and this extended or free end 51, of the pitman is straight and otherwise formed to reciprocate through the head or housing 8, in which said extended end of the pitman is confined and through which it transversely passes. This head 8, is mounted to rotate or oscillate about a horizontal axis. For instance, I show said head carried by and rigid with a horizontal journal or pin 80, mounted in and carried by a journal box at the end of the laterally extending long arm 9, of a vertically rockable elbow or bell crank lever having the depending arm 90. This elbow lever is fulcrumed at 91, to and is carried by a pillar 92, or other suitable support. The elbow lever is rocked and held in the desired adjustment by any suitable means. For instance, I show connecting rod or link 93, pivotally joined to the depending arm 90, of the elbow lever and from thence extending to upright hand lever 94, provided with any suitable means for locking the same in the desired adjustment. For instance, I show the hand lever provided with a toothed sector, and a hand-clip-operated dog for locking the lever in the position desired to hold the slide in the desired adjustment.

Those skilled in the art will understand that the eccentric rocks the link on its fixed

central axis, and that the valve stem is thereby reciprocated through the medium of the slide, and pitman, when the slide is either above or below the center or axis on which the link rocks. When the slide is at the dead center, that is, at the center of the link, the oscillation of the link will not impart motion to the valve stem. The slide is adjusted in the link, and is held at the desired adjustment by the elbow lever, connecting rod and hand lever, through the medium of the extended end of the pitman and the rockable head or housing thereon and carried and raised and lowered by the elbow lever. To reverse the engine, the hand lever is manipulated to throw the slide through the medium of the pitman, to the opposite side of the center on which the link rocks, and the throw or stroke of the engine valve is determined by the distance of the slide from the center on which the link rocks, as will be well understood by those skilled in the art. The arrangement of the slide adjusting elbow lever is such that the connecting rod thereto can extend in either direction so that the hand lever can be located at the most convenient point according to the particular type of engine or boiler.

The connecting rod can extend from the elbow lever toward the valve chest and cylinder or can extend in the opposite direction toward and past the crank shaft so that the hand lever will be on one side of the crank shaft and the link on the other side thereof.

The pitman is steadied and guided by the rockable housing and extended pitman end and the slide is thereby most easily and readily adjusted through the medium of the elbow lever.

The construction disclosed is simple, durable and effective and employs a minimum number of parts in view of the results attained, and can be readily attached to and employed on various constructions of road or traction engines.

It is evident that various changes and modifications might be resorted to in the forms, constructions and arrangements de-

scribed without departing from the spirit and scope of my invention, and hence I do not wish to limit myself to the exact disclosure hereof.

What I claim is:—

1. In combination, a rocking link, an actuating eccentric therefor, a slide adjustable longitudinally of said link, a valve stem reciprocating pitman pivotally joined to and actuated by said slide and having an end extended beyond said slide, a vertically rockable elbow lever having a laterally extending arm operatively and pivotally coupled to said extended end for swinging said pitman vertically to adjust said slide longitudinally of said link and having a depending arm, a manually controlled lever having locking means, and a connecting rod from said last mentioned lever to said depending arm.

2. In combination, a rocking link, actuating means therefor from the engine crank shaft, a slide adjustable longitudinally of said link, a valve-stem-reciprocating pitman pivotally joined to and actuated by said slide, a rockable head on and in which said pitman reciprocates, an elbow lever carrying said head and in which the same is mounted to rock and provided with manually actuated means whereby the lever can be rocked to swing said pitman through the medium of said head to adjust said slide longitudinally of said link.

3. In combination, a rocking link, actuating means therefor, a slide adjustable longitudinally of said link, a valve-stem-reciprocating pitman pivotally joined to and actuated by said slide and having a free end extended beyond said slide, a rockable head loosely receiving said end, and manually controlled means for raising and lowering said head and for holding the same at the desired elevation.

In testimony whereof I affix my signature, in presence of two witnesses.

NELS K. RENSLAND.

Witnesses:

H. M. ERICKSON,
CARL BALTZER.