

E. TURNER.
VALVE GEAR.

APPLICATION FILED DEC. 1, 1910.

1,028,158.

Patented June 4, 1912.

2 SHEETS—SHEET 1.

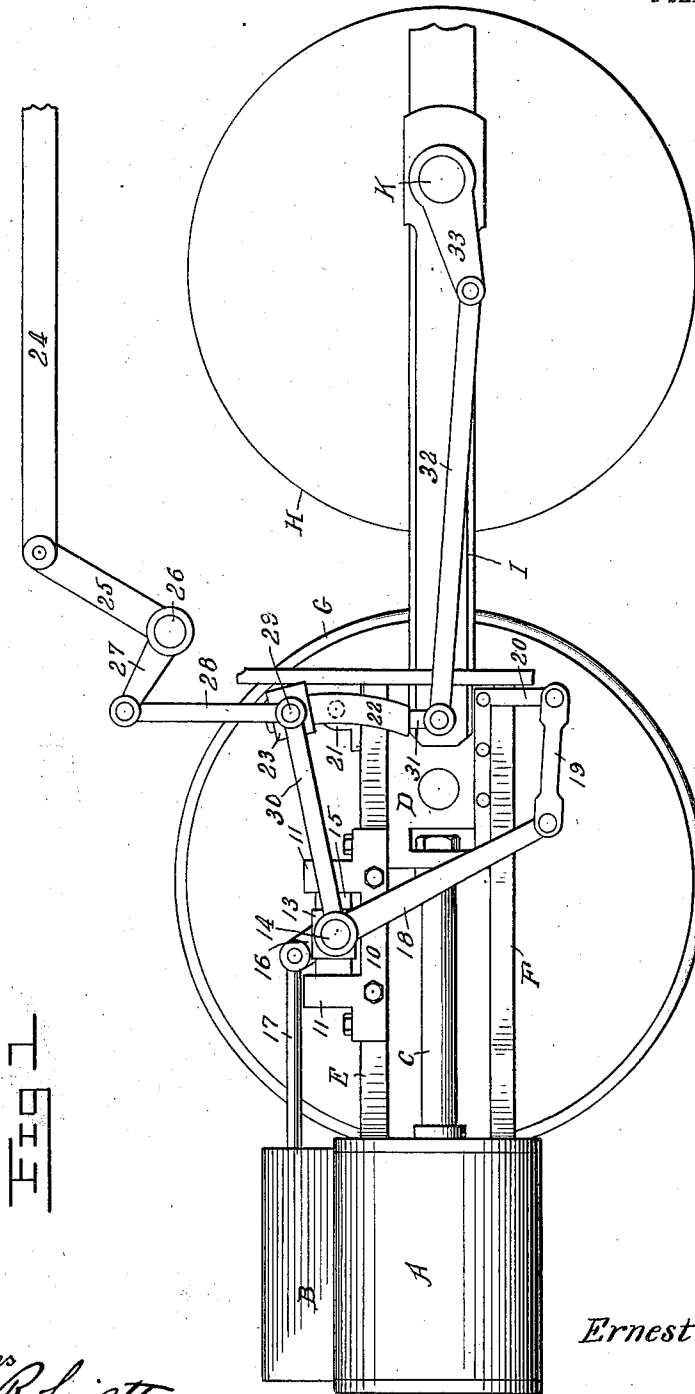


Fig 1

Witnesses
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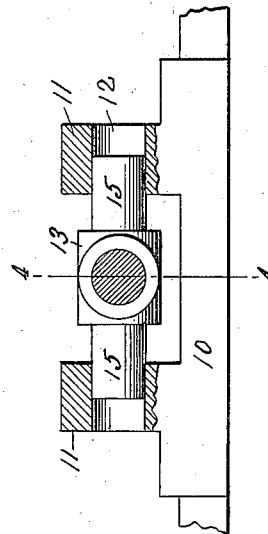
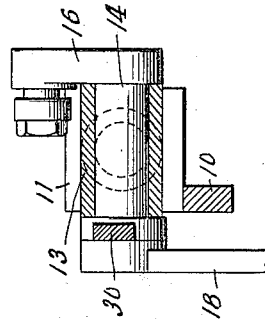
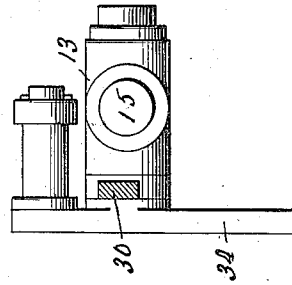
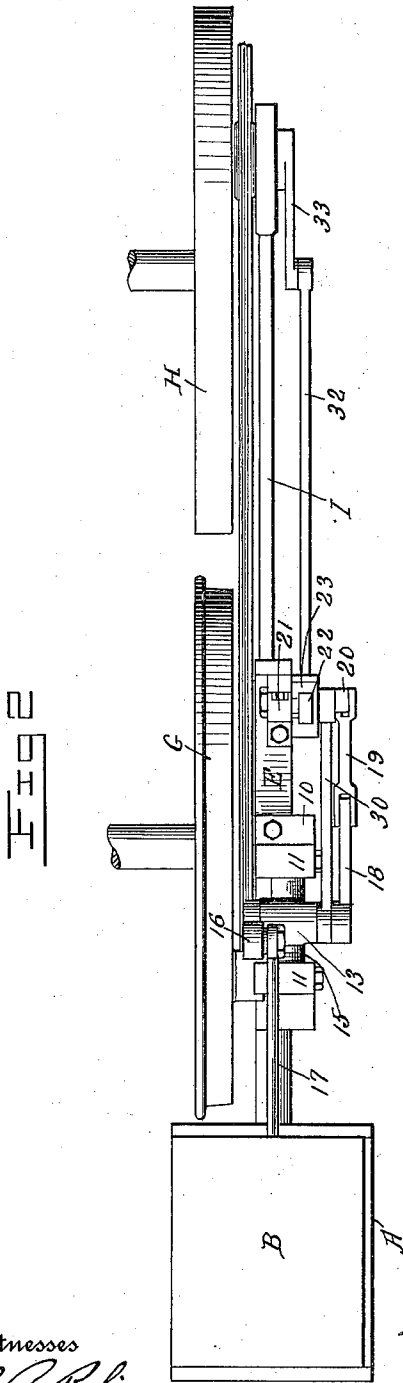


Fig. 3

Fig. 4

Fig. 5

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UNITED STATES PATENT OFFICE.

ERNEST TURNER, OF DADEVILLE, ALABAMA.

VALVE-GEAR.

1,028,158.

Specification of Letters Patent.

Patented June 4, 1912.

Application filed December 1, 1910. Serial No. 595,079.

To all whom it may concern:

Be it known that I, ERNEST TURNER, a citizen of the United States, residing at Dadeville, in the county of Tallapoosa and State of Alabama, have invented certain new and useful Improvements in Valve-Gear, of which the following is a specification.

This invention relates to valve gear designed more especially for use on locomotives; and is an improvement on what is known as the Walschaert valve gear in that it has fewer parts, is more simple in construction, can be applied to any style of locomotive without change in cylinders or valves, and is more easily kept in good working condition as all the parts are outside and the wearing members being principally pins, can be readily and cheaply renewed when necessary.

The object of this invention is to provide a variable cut-off which is obtained by mounting the valve operating rocker arm on a shaft, the bearing of which is movable in a straight line parallel to the direction of movement of the slide valve and transversely of the shaft, said movement being caused by the oscillation of the reversing link through the medium of a radius-bar extending from the sliding link-block to the rock shaft. The extent of lateral movement imparted to the rock shaft depends upon the position of the link-block relative to the center of oscillation of the link, the movement increasing directly as the link-block is moved from said center.

With this object in view, the invention consists in the combination and arrangement of parts hereinafter described in detail, illustrated in the accompanying drawings and pointed out in the appended claims, it being understood that but one embodiment of the invention is shown and described herein, and that various changes in size, proportion and other features may be made within the scope of the claims without departing from the spirit of the invention.

In the accompanying drawing,—Figure 1 is a side elevation of the improved mechanism applied to a locomotive. Fig. 2 is a plan view of the same. Fig. 3 is an elevation of a detail of the invention partly in section. Fig. 4 is a sectional view on the line 4—4 of Fig. 3, and Fig. 5 is a view of a modification.

In the drawings, A indicates one of the cylinders of a locomotive engine, B the steam chest within which is a slide valve of any kind, C the piston rod, D the cross head, E and F cross-head guides, G, H two of the driving wheels, and I the connecting rod extending from the cross head to the crank pin K on the driving wheel H, such parts being common to all types of locomotives.

Bolted fast on the upper cross-head guide E is a plate 10 from which project two lugs 11 spaced apart, one in front of the other. Through each lug is bored a hole 12, the axes of said holes alining and in parallel relation to the piston rod C. Between the lugs 11 is a bearing 13 for a rocking shaft 14, said bearing being narrower than the space between the lugs, and having oppositely projecting pins 15 snugly fitting the holes 12 in the lugs 11 and adapted to slide therein in a direction parallel to the movement of the slide valve. Fastened on the inner end of the rock shaft 14 is a short lever arm or rocker 16 pivotally connected with the valve stem 17 as shown. The opposite or outer end of the rock shaft 14 carries a long lever arm or rocker 18, preferably extending below the lower guide F where it is attached by a pin joint to a connecting rod 19 pivoted to a bracket or arm 20 secured on the cross-head D. As the cross-head reciprocates the lever arm 18 is rocked which, through the connections described, operates the valve in the valve chest B in the usual way.

Bolted on the upper guide E at its rear end is a bearing 21 to which is pivoted at its center a curved plate or link 22, its axis of curvature corresponding to the axis of the rock shaft 14. Slidably mounted on the link 22 is a link-block 23 which can be moved from one end of said link to the other by means of a rod 24 running to the reversing lever in the cab of the locomotive. The rod 24 is connected with one arm of a bell-crank lever 25 mounted on a tumbling shaft 26. The other arm 27 of said lever, through a suspension rod 28, is connected to a pin 29 on the link-block 23. A radius bar 30 extends from the rock shaft 14 on which it is journaled to the link-block 23, on the pin 29 of which it is mounted. An arm 31 depends from the lower end of the link 22 for one end of the eccentric rod 32 pin journaled thereto, the other end of said

rod being pivoted on the free end of an arm 33 keyed on the crank pin K in the manner common to the Walschaert type of valve gear mechanism.

5 In operation, the rocker arm 18 is oscillated in the movable bearing 13 by means of the cross-head D through the connecting rod 19, and gives the slide valve in the steam chest B its reciprocatory move-
10 ment. When the link-block 23 is in on the center of oscillation of the link 22, the bearing 13 and rock shaft will have no transverse movement, and the lead and lap of the slide valve will be caused entirely by the swing of the rocker arm. To get a variable
15 cut-off, the link-block is moved above or below the center of the link 22, and as said link is oscillated by the eccentric arm 22, the bearing and shaft will be moved in the
20 direction of reciprocation of the slide valve, said valve will be given a shorter movement and increase the cut-off of said valve.

The rock shaft is shown in the preferred form of the invention with the arms 16 and
25 18 attached to its opposite ends. A modified construction is illustrated in Fig. 5, wherein the two arms are made from a single straight piece 34 fastened on the outer end of the rock shaft.

30 It is to be understood that locomotives equipped with the Stephenson or ordinary link motion for operating the valves can be easily and quickly provided with the above described valve gear at small cost as the
35 present cylinders, valve chests and valves are retained, and the parts added are few and supported on the cross head guides.

This device is a great improvement over the Walschaert valve gear which necessitates the addition of new cylinders because
40 a wider spread of the steam chest is demanded, or else an additional rocker must be employed which makes the operation indirect, is expensive, and does not give satisfaction because of the complication involved.
45

What I claim is:—

1. A valve gear mechanism comprising a support secured upon the upper cross-head guide, having upstanding spaced apart lugs

thereon, said lugs having alining openings 50 transversely therethrough, a bearing disposed between said lugs having laterally projecting pintles adapted to enter the openings in said lugs whereby said bearing is slidably supported, a shaft rotatably
55 mounted in said bearing, a rocking arm secured to said shaft intermediate its ends, said rocking arm being pivoted at its upper end to the valve for operating the same, a cross-head connected to the opposite end of
60 said arm for rocking the arm, and a link motion loosely connected to said shaft whereby said bearing may be moved sideways on its pintles in a straight line parallel to the direction of movement of the cross-
65 head for varying the lap and lead of said valve.

2. A valve gear mechanism comprising a support secured upon the upper cross-head guide having upstanding spaced-apart lugs 70 thereon, said lugs having alining openings transversely therethrough, a bearing disposed between said lugs having laterally projecting pintles adapted to enter the openings in said lugs whereby said bearing is
75 slidably supported, a rocking shaft mounted in said bearing, an upstanding arm fast on said shaft at one end thereof, said arm connected at its upper end to the valve for operating the same, a combination lever fast
80 on said shaft at its opposite end, a cross-head connected to said lever for rocking the same, a radius bar of a link motion loosely connected to said shaft between the bearing and the combination lever, whereby said
85 bearing may be moved sideways on its pintles in a straight line parallel to the direction of movement of the cross-head for varying the lap and lead of said valve, the sideways movement of said bearing being limited
90 by said lugs.

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

ERNEST TURNER.

Witnesses:

WM. LACKEY,
B. B. BRIDGES.