

(No Model.)

J. H. MANN.  
REVERSING GEAR FOR ENGINES.

No. 549,576.

Patented Nov. 12, 1895.

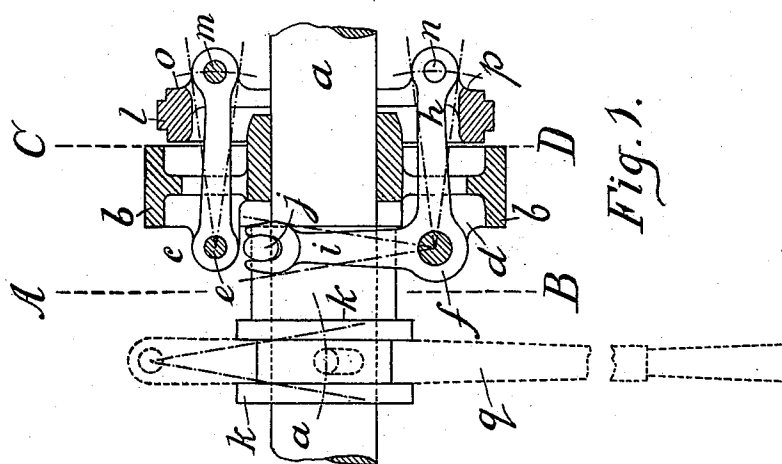


Fig. 1.

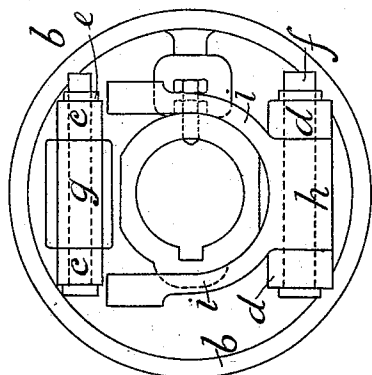


Fig. 2.

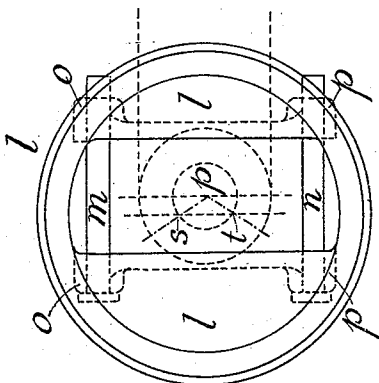


Fig. 3.

WITNESSES

Desider Franka  
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# UNITED STATES PATENT OFFICE.

JAMES HUTCHINSON MANN, OF LEEDS, ENGLAND.

## REVERSING-GEAR FOR ENGINES.

SPECIFICATION forming part of Letters Patent No. 549,576, dated November 12, 1895.

Application filed March 22, 1895. Serial No. 542,862. (No model.) Patented in England July 20, 1894, No. 13,958.

*To all whom it may concern:*

Be it known that I, JAMES HUTCHINSON MANN, a subject of the Queen of Great Britain and Ireland, residing at Leeds, in the county of York, England, have invented certain Improvements in Reversing-Gear for Steam or Other Engines, (for which I have obtained a patent in Great Britain, No. 13,958, bearing date July 20, 1894,) of which the following is a specification.

The object of my invention is to provide a simple arrangement of reversing-gear for steam and other engines, which shall involve the use of only one eccentric and dispense with the use of link motion and at the same time permit of the reversing-gear being employed to obtain varying cut-offs controlled either by hand or automatically by a governor, so that the steam or other expansive fluid may be used with different ratios of expansion, and, further, to maintain the lead constant for the different cut-offs, whereby a better distribution of the steam or other expansive fluid is obtained than is the case with the ordinary link-motion reversing-gears.

My invention consists, essentially, in improved means or method of mounting or carrying the eccentric from the engine-shaft and traversing the eccentric across the shaft from the extreme forward to the extreme backward position, or vice versa, or to any intermediate position, as required, for causing the engine to run in one direction or the other, and also for varying the cut-off or ratio of expansion.

Figure 1 is a side elevation of a reversing-gear constructed in accordance with my invention. Fig. 2 is an elevation transverse to the shaft, as viewed from the left side of line A B, Fig. 1. Fig. 3 is a transverse elevation on line C D of Fig. 1, as viewed also from the left side of Fig. 1. In Fig. 3 the engine-shaft is omitted.

*a* indicates the engine-shaft, on which is keyed or otherwise fixed a disk wheel or boss *b*, which may conveniently be used as a pulley for driving the governor. The wheel or boss *b* carries lugs *c* and *d*, in which are fitted two shafts or long pins *e* and *f*, the pin *e* forming a fulcrum for the lever *g* and the pin *f* a fulcrum for the lever *h i*. The lever *h i* is a bell-crank lever, the arm *h* being equal in length

to the lever *g*, and the arm *i* being a forked arm embracing the shaft *a*, each arm of the fork terminating also in a fork or formed with a slot to receive the end of a pin *j*, carried by a sleeve *k*. The sleeve *k* is loose on the shaft *a*, so that it can be traversed longitudinally thereon. Any other connection to the shaft than the boss *b* may be employed for carrying the pins *e* and *f*.

The free ends of the levers *g* and *i* carry the eccentric *l* by means of the pins *m* and *n*, fitted in the lugs *o* and *p*, cast on or otherwise attached to the eccentric *l*. The eccentric is formed with a rectangular slot-hole to enable it to be passed over and to be traversed across the shaft *a*. The levers *g* and *i* being of equal length, the eccentric *l* is always carried at right angles to the shaft.

The sleeve *k* is provided with a circular groove, in which fits a pin or pins or dies carried by the reversing-lever *g*, (shown in dotted lines,) to enable the sleeve to be moved to and fro by the reversing-lever; or the sleeve *k* may be connected to the governor, to enable the cut-off to be varied automatically, in which case the connection must be made adjustable to suit either the forward or the backward running of the eccentric—i. e., of the engine.

In Fig. 3, *r* indicates the center of the engine-shaft, *s* the extreme forward and *t* the extreme backward position of the center of the eccentric, and the line *s t* the line along which the center of the eccentric is moved. It will be evident that the distance between the line *s t* and a parallel line through *r* indicates the linear advance—i. e., the lap plus the lead—of the valve for all positions of the center of the eccentric between *s* and *t*, and consequently that the lead always remains the same.

I am aware that reversing-gear comprising a single eccentric moved to and fro across the engine-shaft have been previously employed. I do not therefore claim such broadly; but

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

1. A reversing gear comprising a slotted eccentric *l* carried by parallel motion levers *g* and *h* hinged to supports on a boss or disk wheel *b* or other connection fixed to the engine shaft, one of said levers being a bell

crank lever, and a sleeve *k* loose on the shaft and connected to one of the arms of the bell crank lever substantially as set forth.

2. The means for carrying the eccentric *l* 5 about the shaft *a* and traversing the same across the shaft consisting of the boss or disk wheel *b* fixed to the shaft and carrying the shafts or pins *e f* forming fulcrums for the levers *g* and *h i* said levers being of equal 10 length and attached at their free ends by means of the pins *m* and *n* to the eccentric *l* one of the said levers to wit *h i* being a bell crank lever having one of its arms *i* connected

to a sleeve *k* mounted loose on the shaft *a* so as to be capable of being moved longitudi- 15 nally thereon all substantially as set forth.

3. The combination of the slotted eccentric *l*, boss or disk wheel *b* or other connection hinged lever *g* hinged bell crank lever *h i* loose sleeve *k* and reversing rod *q*, substan- 20 tially as described.

JAMES HUTCHINSON MANN.

Witnesses:

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J. CLARK JEFFERSON.