W. BAXTER.

Steam-Engine Reversing-Gear.

No. 223,632. Patented Jan. 20, 1880.

Fig. 1

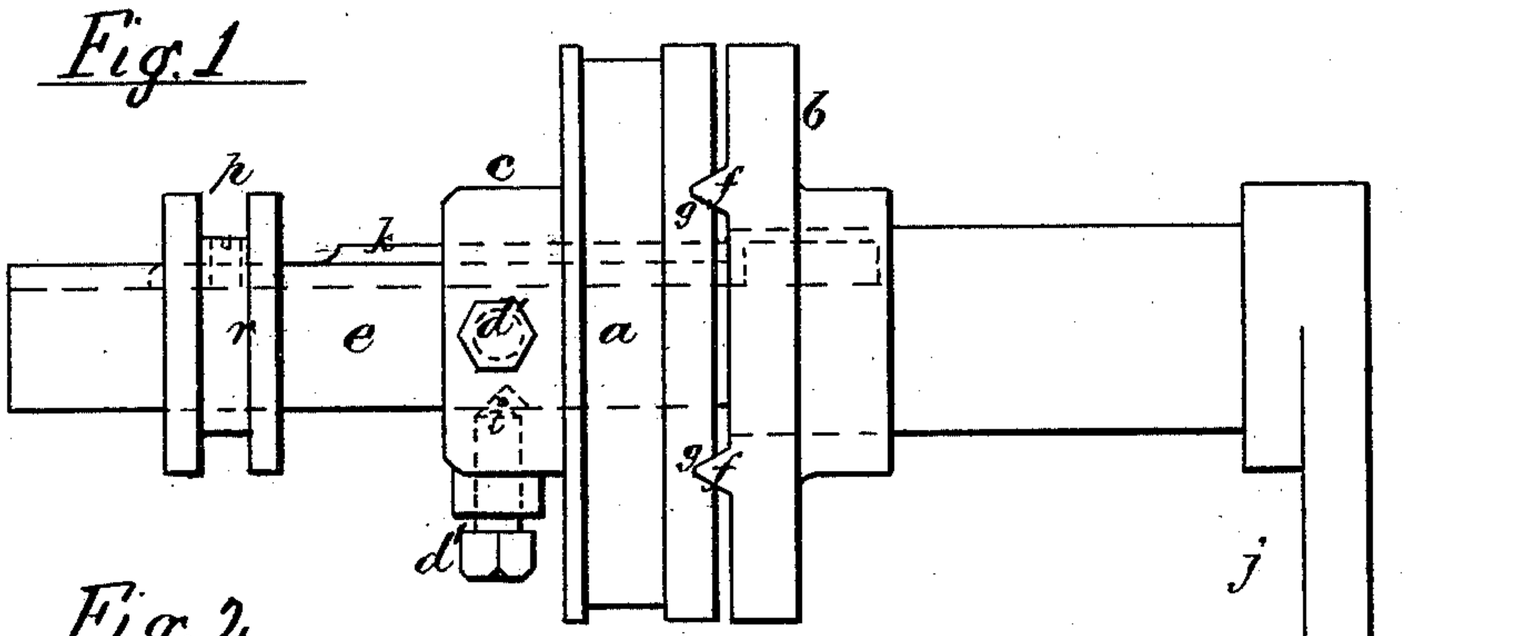


Fig. 2

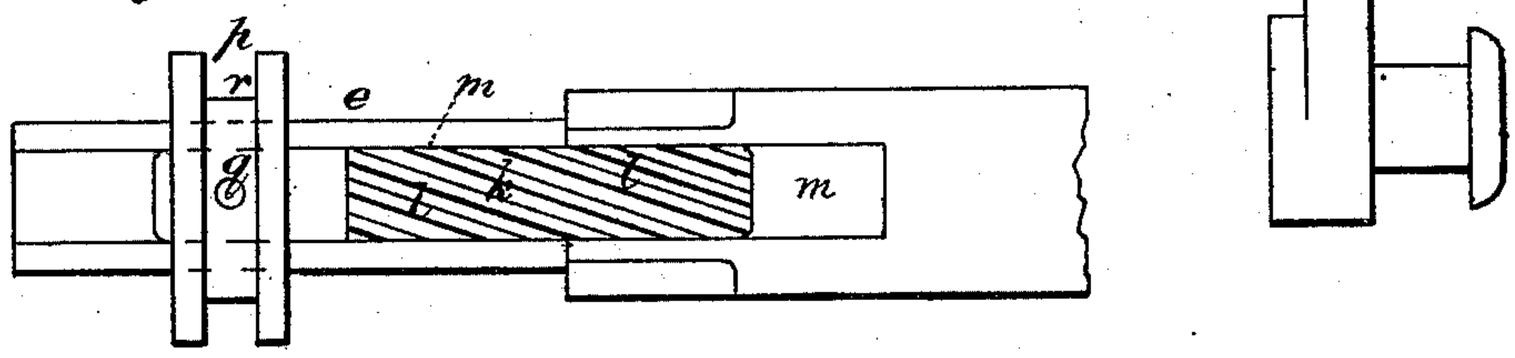


Fig. 3.

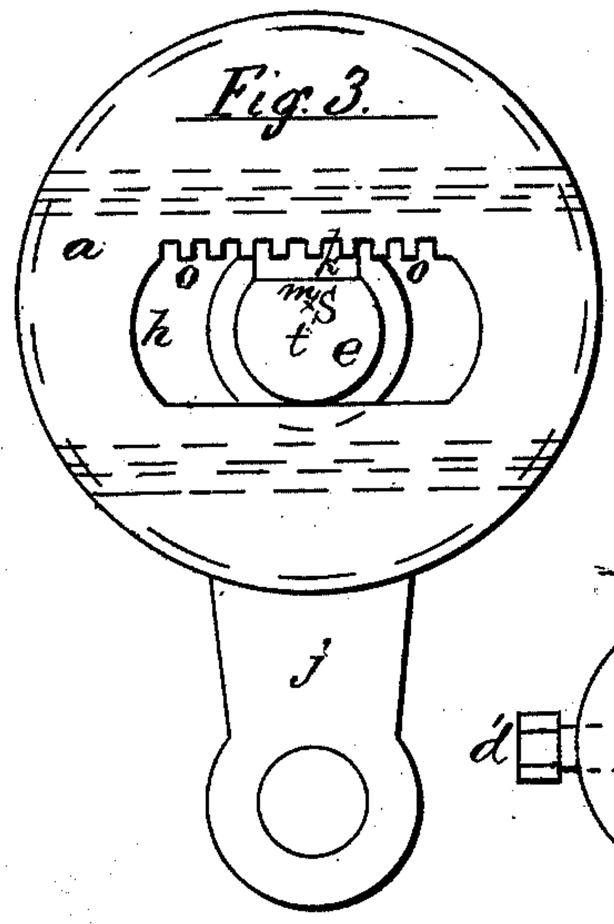


Fig. 4

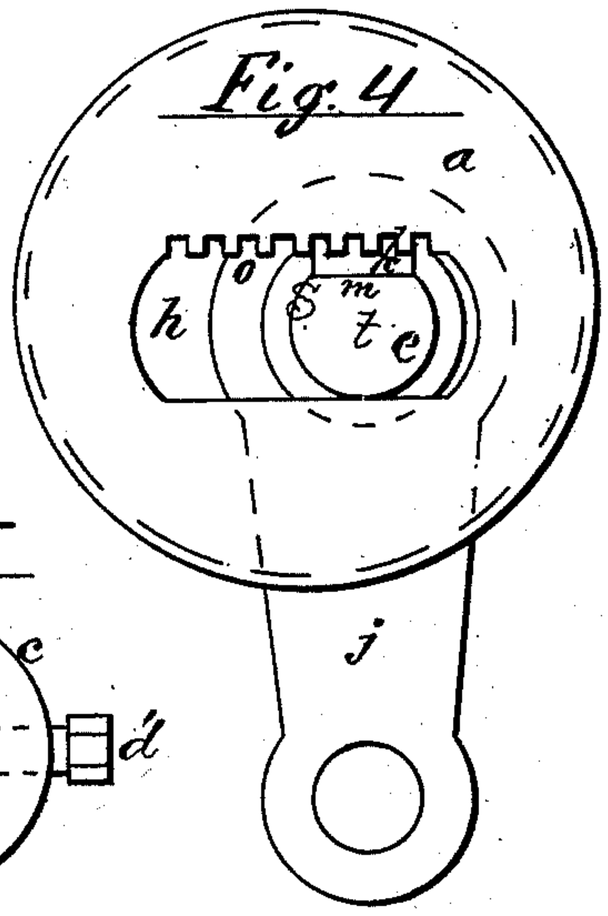
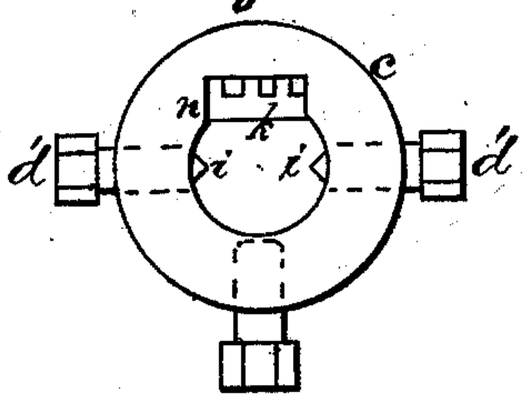


Fig. 5



Attest.

Wm L Fish

Wm L. Breath

Inventor.

Wm Baxter, per

Thos. S. Crane, Atty

UNITED STATES PATENT OFFICE.

WILLIAM BAXTER, OF NEWARK, NEW JERSEY.

STEAM-ENGINE REVERSING-GEAR.

SPECIFICATION forming part of Letters Patent No. 223,632, dated January 20, 1880.

Application filed May 28, 1879.

To all whom it may concern:

Be it known that I, WILLIAM BAXTER, of the city of Newark, in the county of Essex and State of New Jersey, have invented a new and useful Improvement in Steam-Engine Reversing-Gears, which improvement is fully described in the following specification.

My invention relates to an improvement in steam-engine reversing-gears and cut-offs for reciprocating engines; and it consists in a novel mode of securing a shifting eccentric upon the crank-shaft of the engine, and in a peculiar device for shifting the eccentric while the engine is in motion, to reverse the motion of the engine or alter the point of cutting off, and in setting the center of the eccentric in a special relation to the shaft and the engine-crank.

Figure 1 of the drawings is a side view of a crank-shaft provided with my improved eccentric. Fig. 2 is a plan of the shaft with the traveler and clutch-ring. Fig. 3 is an end view of the crank-shaft, showing the traveler fitted thereon and the eccentric in its central position. Fig. 4 is a similar view, showing the eccentric at one extreme position; and Fig. 5 is a detached view of collar *c*.

The eccentric *a* is mounted upon the shaft between two collars or flanges, *b c*, the collar *b* being secured to the shaft and provided on the side toward the eccentric with V-shaped ribs *f*, which fit into corresponding grooves *g* in the side of the eccentric, while the collar *c* is held firmly beside the eccentric by a clamp screw or screws tapped through the collar and pressed against the crank-shaft *e*.

Other set-screws, *d'*, with tapering points *i*, are fitted into the collar *c*, and are applied to tapering holes in the shaft in such a manner as to draw the collar toward the eccentric at pleasure, to compensate for wear upon the ribs *f*.

The eccentric has a slot, *h*, formed in it, through which the shaft *e* is passed, and the slot being parallel with the ribs *f*, the eccentric is easily moved across the shaft between the collars *b c*. The crank-shaft is both enlarged and flattened where it passes through the slot *h*, and formed with a groove or seat, *m*, to receive a key of peculiar construction, which will be hereinafter described. The slot *h* is arranged at right angles to the direction of the driving-crank *j*, and being formed of sufficient length, the eccentric can be moved far enough from its central position to move the engine-valve its full stroke for the backward or forward motion.

To compensate for the lap always formed on plain slide-valves, the slot is not formed across the center *s* of the eccentric, but is placed across the center *t* of the crank-shaft *e*, away from the center a distance equal to the lap on one end of the valve, so that the eccentric, when in its central position, will move the valve just enough to compensate for the lap, while any change of position in the eccentric will cause the steam-ports to be opened and steam to be supplied to the piston during a part of the stroke corresponding to the extent of the eccentric's displacement from its central position.

To shift the eccentric while in motion, I employ a diagonally-grooved traveler, *k*, or key with inclined grooves *l* formed in its top, the key being fitted to the groove *m* or seat in the shaft *e*, and passing through suitable notches *n*, cut opposite the seat in the collars *b* and *c*. One side of the slot *h*, opposite the seat *m*, is formed with inclined teeth *o*, which fit the grooves *l* in the traveler *k*, and any longitudinal movement of the traveler therefore causes a transverse movement of the eccentric between the collars *b* and *c*, any transverse movement of the traveler being prevented by the sides of seat *m* and by its fitting the notches in collars *b* and *c*.

A clutch-ring, *p*, is fitted loosely to the shaft *e*, and secured by a screw or pin, *q*, to the end of the traveler, which projects from the collars *b c*, and a groove, *r*, formed in the periphery of the ring, furnishes the means to move the traveler when the shaft *e* is in motion, as is usual with all revolving clutches.

By this construction the engine can be reversed without the use of any parts extraneous to the eccentric and the few fittings described, and the operation of the engine and its valve is equally perfect in whichever direction it revolves, while the facility with which the stroke of the eccentric can be varied affords the

most convenient means of changing the cut-off point of the valve and adjusting the supply of steam exactly to the work the engine has to perform. This is especially desirable when the speed has to be greatly varied, as in the starting, stopping, and backing of steam-vessels, or when the load upon the engine is frequently changed, as in hoisting, towing, &c.

It is evident that the operation of my grooved traveler would be the same, whatever means are employed to afford the eccentric a transverse movement on the shaft, and as various devices, such as dovetailed and rectangular slides, are already in use for such purposes, I do not limit myself to the exclusive use of the ribs *f* and grooves *g* for that purpose; but

I claim the traveler and eccentric in the following manner:

1. The shifting eccentric *a*, provided with toothed slot *h*, and applied on shaft *e*, between fixed collar *b* and adjustable collar *c*, so that its center *s* is distant from the center *t* of said shaft an amount sufficient to compensate equally for the lap of the slide-valve, whether running the engine backward or forward, in combination with the rectilinear adjustable grooved traveler *k* and the clutch-ring *p*, substantially as described.

2. Eccentric *a*, combined with the adjustable collar *c*, fixed collar *b*, constructed and applied on shaft *e* substantially as described, and having combined therewith the traveler *k*, as set forth, and for the purposes described.

In testimony that I claim the foregoing I have hereto set my hand this 13th day of May, 1879, in presence of two witnesses.

WM. BAXTER.

Witnesses:

WILLIAM L. FISH,

THOS. S. CRANE.