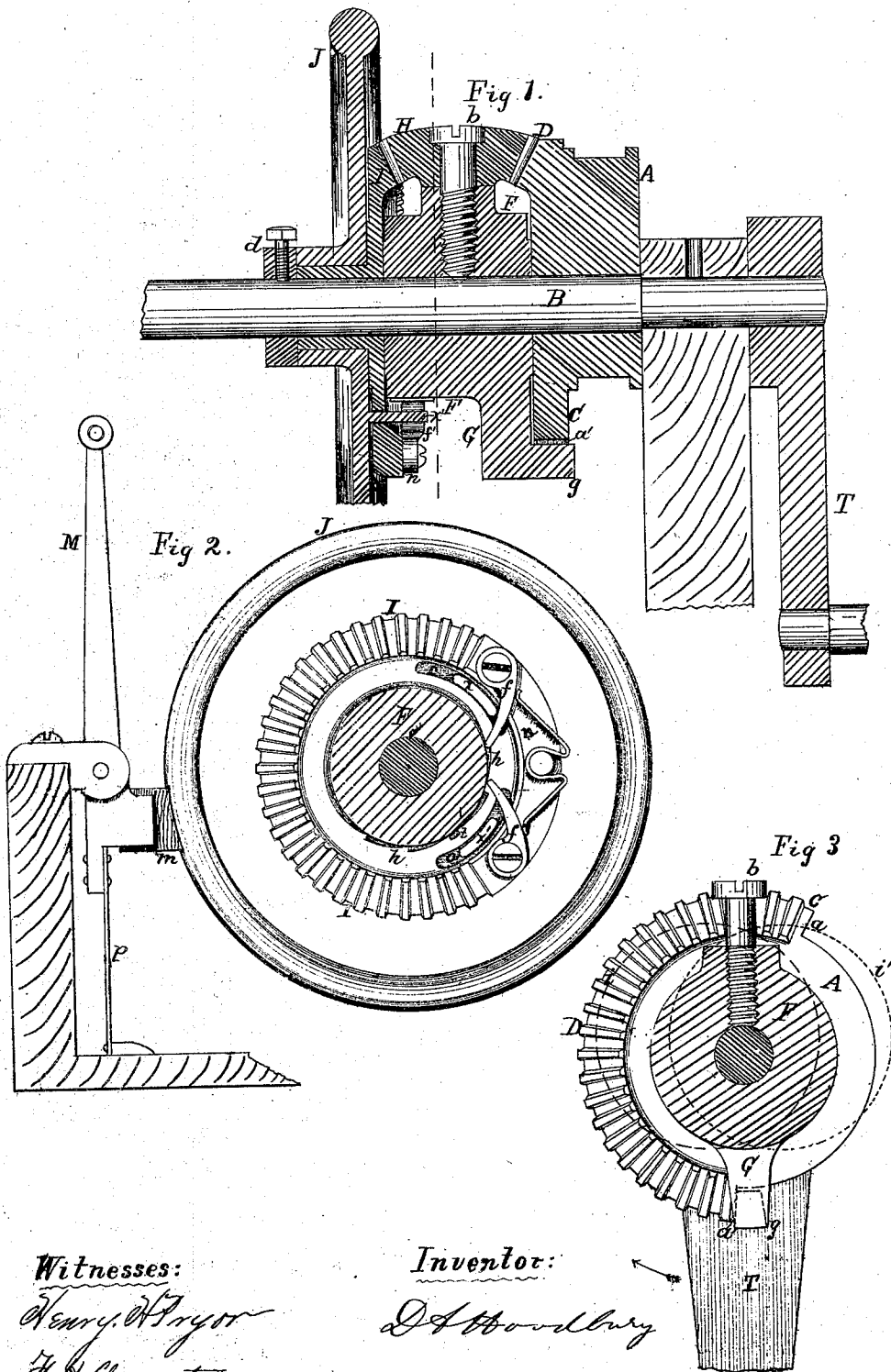


J. A. Woodbury,

Valve Gear.

No. 100483

Patented Mar. 1. 1870.



Witnesses:

Henry W. Fryor
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Inventor:

J. A. Woodbury

United States Patent Office.

D. A. WOODBURY, OF ROCHESTER, NEW YORK.

Letters Patent No. 100,483, dated March 1, 1870.

REVERSING-GEAR FOR STEAM-ENGINES.

The Schedule referred to in these Letters Patent and making part of the same.

To all whom it may concern:

Be it known that I, DANIEL A. WOODBURY, of Rochester, in the county of Monroe, and State of New York, have invented certain new and useful Improvements in Reversing-Gear for Steam-Engines; and do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings making part of this specification, in which—

Figure 1 is a vertical section of my invention.

Figure 2 is an elevation of those parts to the left of the dotted line x , fig. 1.

Figure 3 is a similar view of those portions to the right of said dotted line.

The nature of my invention consists in a novel mode of shifting the eccentric of a steam-engine to the backward or forward position; and

To enable others to make and use the same, I will describe its construction and operation.

The eccentric A is fitted loosely to the crank-shaft B, and upon one side of it a flange, C, is cast, concentric with the crank-shaft.

A segment, D, figs. 1 and 3, of this flange is provided with bevel-gear teeth, while the remaining portion is cut away, as shown in fig. 3, forming shoulders a or a' upon the periphery.

The fixed collar F is secured at any desired circumferential position upon the crank-shaft by the set-screw b , and has cast upon it the arm G, extending beyond the periphery of the reduced portion of the flange C, over which the stop g projects, as shown in fig. 1.

When the eccentric is revolved on the shaft one of the shoulders a or a' comes in contact with the stop g , by which the movement of the eccentric is limited.

The bevel pinion H, fig. 1, meshing into the segment D, and also into the segmental gear I, figs. 1 and 2, has a bearing either upon the set-screw b or a projecting portion of the fixed collar F.

The gear I is loose upon the crank-shaft, and upon its hub the disk J may have a bearing, as shown in fig. 1.

The collar d , secured to the shaft by a set-screw retains the gear and disk against the pinion H.

Upon the disk J, I provide the studs x or x' , figs. 1 and 2, projecting through circular slots o or o' in the web of the gear I. These slots are long enough to allow a slight rotary movement to the disk, independently of the gear I.

The plain portion of the rim of this gear is faced off at right angles to the crank-shaft, as shown at n , figs. 1 and 2, and the pawls f or f' are pivoted upon it so as to act in opposite directions, as shown in fig. 2.

A segmental ratchet, h , is provided on the periph-

ery of the fixed collar F, upon which the pawls f or f' are retained by suitable springs.

Both edges of the central tooth t of the ratchet are vertical with relation to the crank shaft, while the teeth upon one side of it are inclined in an opposite direction to those upon the other.

It will be observed that while one of the pawls, f or f' , operating upon its respective portion of the ratchet h , holds the gear I, and consequently the eccentric A in a certain relative position to the fixed collar F, yet a slight axial movement of the disk J relieves either pawl, as desired by the action of the studs x or x' .

The brake-lever M, fig. 2, is pivoted to a convenient portion of the engine-frame and is provided with a block, m , which is made to impinge upon the periphery of the disk J, when desired, by a movement of the brake-lever.

The reaction spring p retains the brake from such contact when not in use.

The operation of my invention is as follows:

When the crank-shaft is revolving in the direction of the arrow in fig. 3, the eccentric stands with reference to the crank in the position shown by the heavy dotted circle i . If now the operator presses the brake lever the disk I is stopped for an instant, by which operation the stud x lifts the pawl f and arrests the motion of the gear I, by striking the end of the slot o .

The motion of the crank-shaft and eccentric still continuing, the latter is thrown over ahead of the crank by means of the pinion H, segment D, and the momentarily fixed gear I.

This independent movement of the eccentric continues till the stop g strikes the shoulder a , when the eccentric will be in the position in relation to the crank, shown by the light dotted circle i' , fig. 3, and retained by the pawl f' and ratchet h . The valve is now reversed and the engine moves in the opposite direction, when a similar operation returns the eccentric to its former position, again reversing the engine.

If it is desired to reverse the valve when the engine is at rest, the disk J is revolved by the hand in an opposite direction to that in which the eccentric is to be shifted.

The engine may be reversed when in motion by the pressure of the hand upon the disk J, but the use of the brake is preferred, since the operation may be performed at any desirable distance, by a cord attached to the end of the brake-lever.

By means of the counter-inclined teeth on the ratchet h , the eccentric, if partly thrown over, cannot be thrown back by friction of the straps, since the pawls hold it in such intermediate position till the brake is again applied and the movement completed.

The ratchet and pawls are not essential to the op-

eration of this apparatus since the friction of the eccentric straps will always retain the shoulders *a a'* in contact with the stop *g*, in which case the disk *J* and gear *I* may be cast in one piece.

It is obvious that this device, being cheap, simple, and easily operated, is applicable in many places where the adoption of a link-motion or other expensive gear would not be warranted.

Other arrangements of gearing may be used between the disk *J* and the eccentric, to move them in opposite directions so each other, as described, or a system of levers may be introduced between them for a like purpose.

Any desirable means of stopping the disk *J* may be adopted in place of the brake *M*.

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

1. The fixed hub *F*, provided with the stop *g*, and

carrying the pinion *H*, in combination with the reversible eccentric *A*, when the latter is operated by suitable segmental gears, substantially as and for the purposes set forth.

2. The ratchet *h* and pawls *f f'*, operating as described, in combination with the reversible eccentric *A*, for the purposes set forth.

3. The studs *x x'* in combination with the pawls *f f'*, arranged to operate conjointly, as and for the purposes set forth.

4. The studs *x x'* on the disk *J* in combination with and operating upon the segment *I*, for the purposes set forth.

D. A. WOODBURY.

Witnesses:

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