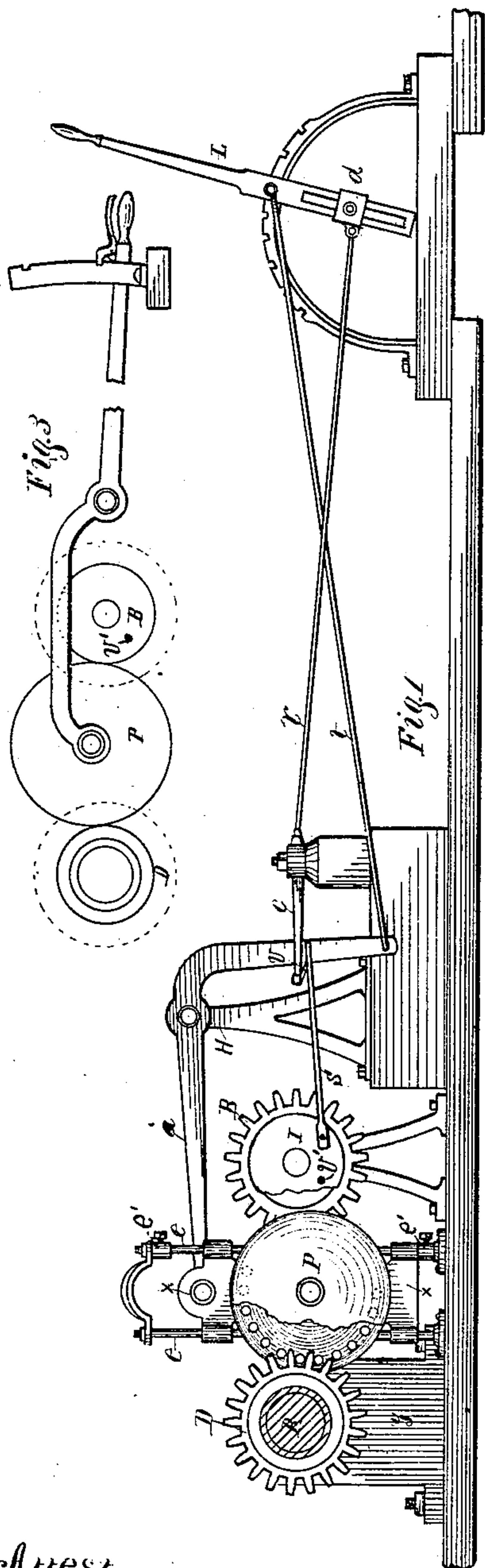


(No Model.)

F. W. RANDALL.
REVERSING GEAR FOR ENGINES.

No. 270,842.

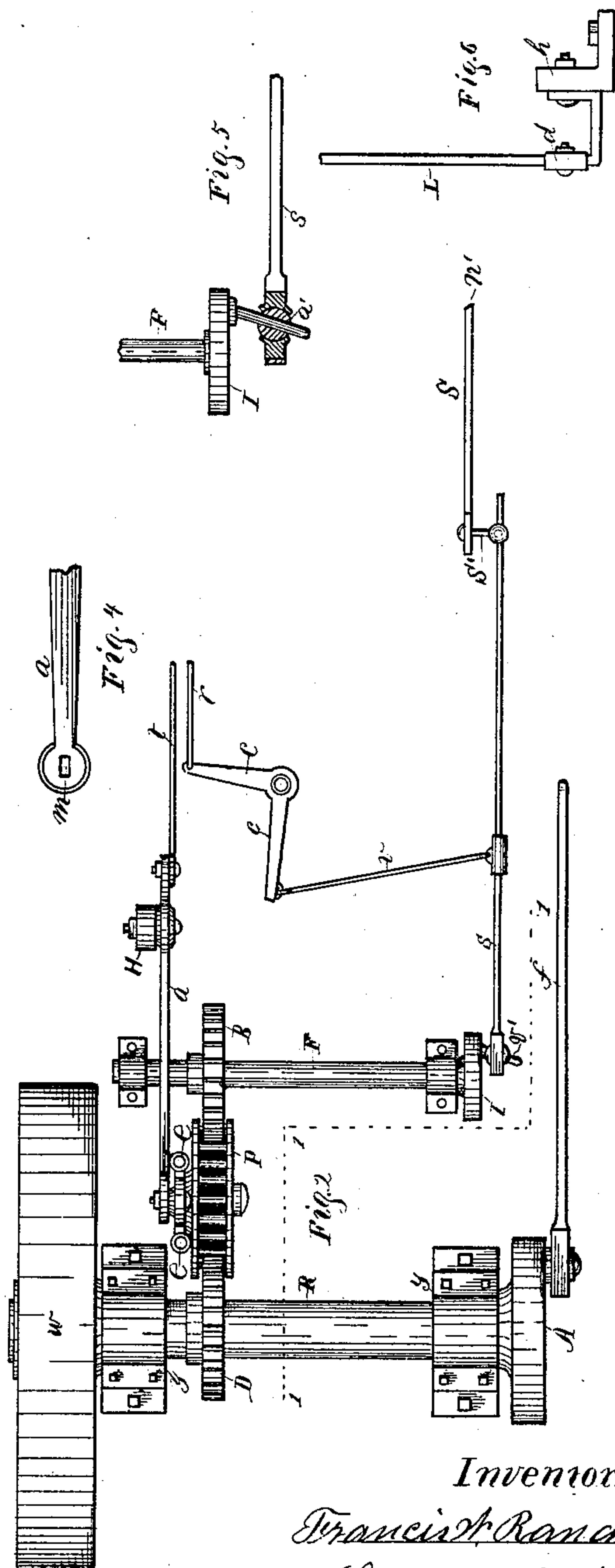
Patented Jan. 16, 1883.



Attest.

John C Perkins

Frank C Gibbs



Inventor.

Francis A. Randall

By Lucine C. West

Atty-

UNITED STATES PATENT OFFICE.

FRANCIS W. RANDALL, OF TEKONSHA, MICHIGAN.

REVERSING-GEAR FOR ENGINES.

SPECIFICATION forming part of Letters Patent No. 270,842, dated January 16, 1883.

Application filed September 23, 1882. (No model.)

To all whom it may concern:

Be it known that I, FRANCIS W. RANDALL, a citizen of the United States, residing at Tekonsha, county of Calhoun, State of Michigan, have invented a new and useful Reversing-Gear for Steam-Engines, of which the following is a specification.

The object of my invention is to effect certain improvements in reverse-gears to facilitate their operation.

A further object is to control the stroke of the pitman with the same lever which operates the reverse-gear.

In the drawings forming a part of this specification, Figure 1 is a side view, looking from line 1 1 in Fig. 2, the shaft at this point being in section; Fig. 2, a top view with portions at the right broken away. Fig. 3 shows a modification in the construction of the reversing-lever; Figs. 4, 5, and 6, broken or detached parts, hereinafter described.

R is the main crank-shaft, with which the connecting-rod *f* of the engine is connected. The connecting-rod is here shown broken, with the end for locating in the cylinder left out.

F is the crank-shaft for operating the valve, located horizontally and parallel with the main shaft R; S, valve-rod, which in an engine extends into the steam-chest. The ends of shafts R F farthest removed from the crank-disks A and I are provided with gear-wheels D B. P is a pin-wheel meshing with said gear-wheels. This pin-wheel is pivoted to a slide, *x x*, which is movably located on rods *e e* in a manner to be raised or lowered. The vertical rise and fall of slide *x x* is limited by stops *e' e'*, which are set at given points on the rod by a set-screw.

a is a double lever in the form of a bell-crank, pivoted to a support, H, with its upper arm pivotally connected with slide *x* in a lengthened slot, *m*, Fig. 4. This slot *m* prevents any cramping of parts during the operation, as lever *a* describes the arc of a circle, while slide *x x* moves vertically. Rod *t* connects lever *a* with hand-lever L, Fig. 1. Said hand-lever is hinged to bracket *h*, Fig. 6.

The crank-pin *v'* of the valve-shaft is set at an angle with shaft F, and valve-rod S is laterally movable thereon by means of a perforated ball-joint, *a'*, said joint permitting the bearing to accommodate itself to any position in which the pin *v'* may assume during the revolution of the valve-shaft. Rod *v* connects the valve-rod S with bell-crank *c c*, and

rod *r* connects said bell-crank with hand-lever L. Rod *r*, where it connects with the hand-lever, is hinged to collar *d*, said collar being vertically movable in a slot in lever L. The distance which valve-rod S is to be moved on pin *v'* is controlled by the location of collar *d* on the lever L. When at its lowest point, opposite hinge *h*, Fig. 6, the lever L has no effect upon valve-rod S.

In Fig. 3 a change is shown in the mode of forming the lever for operating the pin-wheel, the lever here being pivoted directly with said pin-wheel P. The movement of the pin-wheel describes the fractional part of a circle; but as the teeth of the gear-wheels D B are made long and the movement is slight there is no liability of any disengagement of said gears with the pin-wheel.

In the operation, by raising pin-wheel P by means of lever L and connections the relative position of the gear-wheels D and B is changed, which also changes the position of the pin upon which the valve-rod is attached, thereby moving the valve to any predetermined position, or far enough to reverse the engine. The same movement of lever L throws the valve-rod S to a different location on the oblique crank-pin *v'*, Fig. 2, shortening or lengthening the throw of the valve, as desired.

Having thus described my invention, what I claim as new is—

1. The movable slide provided with the pin-wheel, the double pivoted lever, the hand-lever, and connecting-rods, in combination with the valve-rod and piston-shafts provided with the gear-wheels.

2. The pitman and piston shafts provided with the gear-wheels, and the slide bearing the pin-wheel, in combination with the post-supports provided with the stops for limiting the movement of said slide, substantially as specified:

3. In a steam-engine, the slotted hand-lever, in combination with the valve-rod located on the oblique crank-pin in a manner to move laterally; the movable pin-wheel, and connecting means, all substantially as specified and shown, whereby the gear is reversed and the throw of the valve is controlled by one lever and at the same time.

FRANCIS W. RANDALL.

Witnesses:

FRANK C. GIBBS,
ARTHUR A. DAVIS.