

(No Model.)

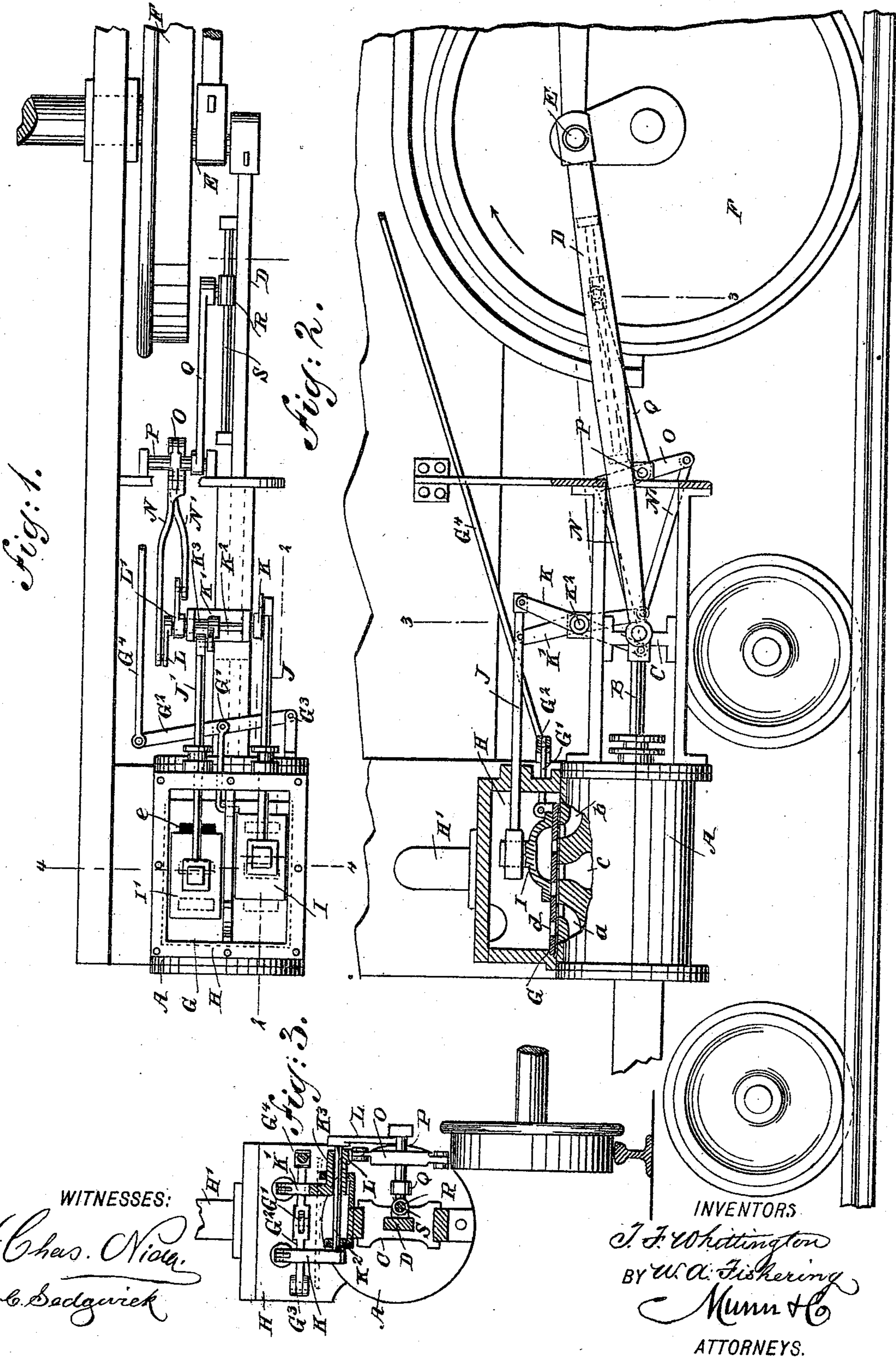
2 Sheets—Sheet 1.

T. F. WHITTINGTON & W. A. FISHERING.

REVERSING GEAR FOR ENGINES.

No. 500,985.

Patented July 4, 1893.



(No Model.)

2 Sheets—Sheet 2.

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Fig: 5.

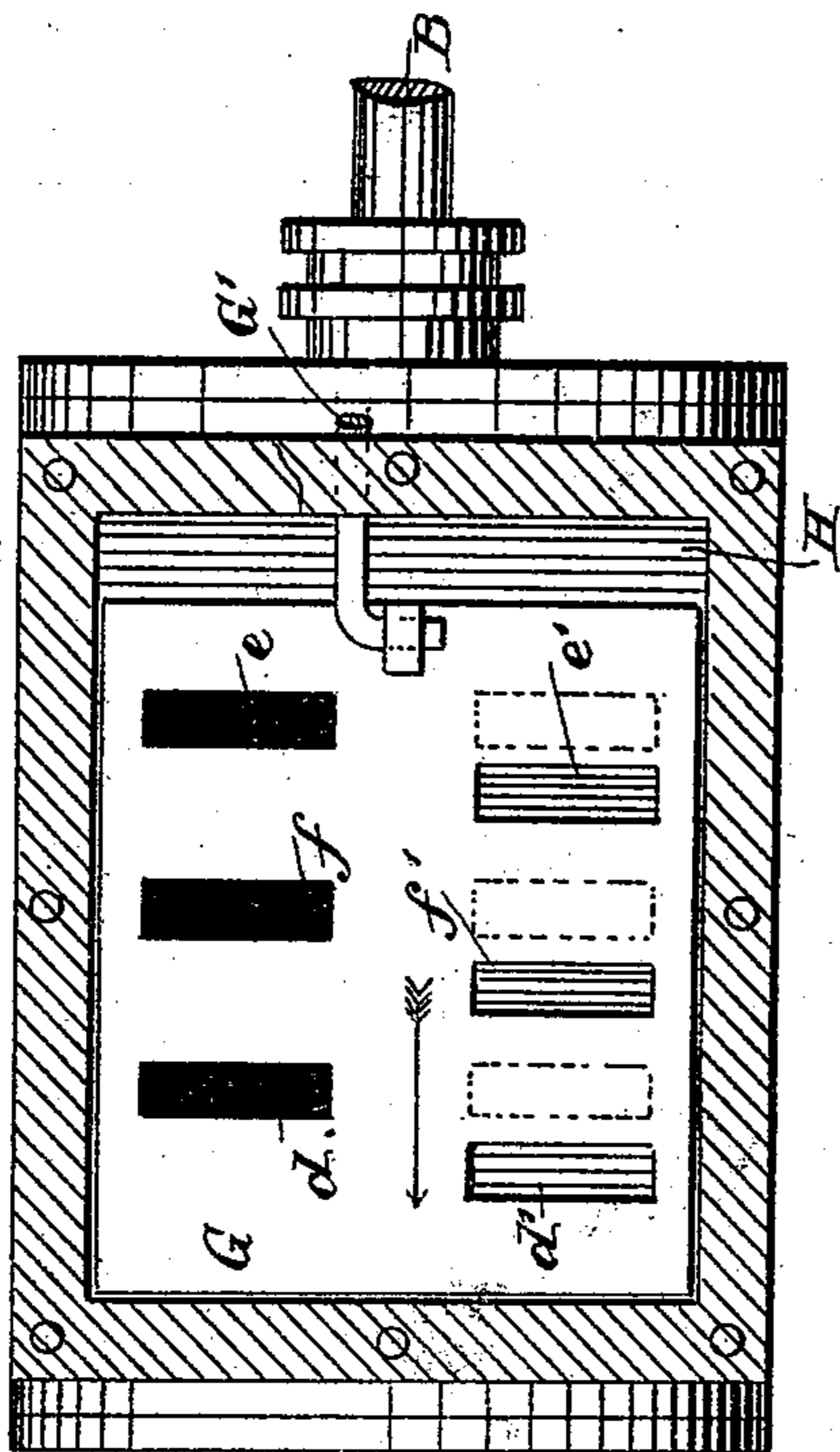


Fig: 6.

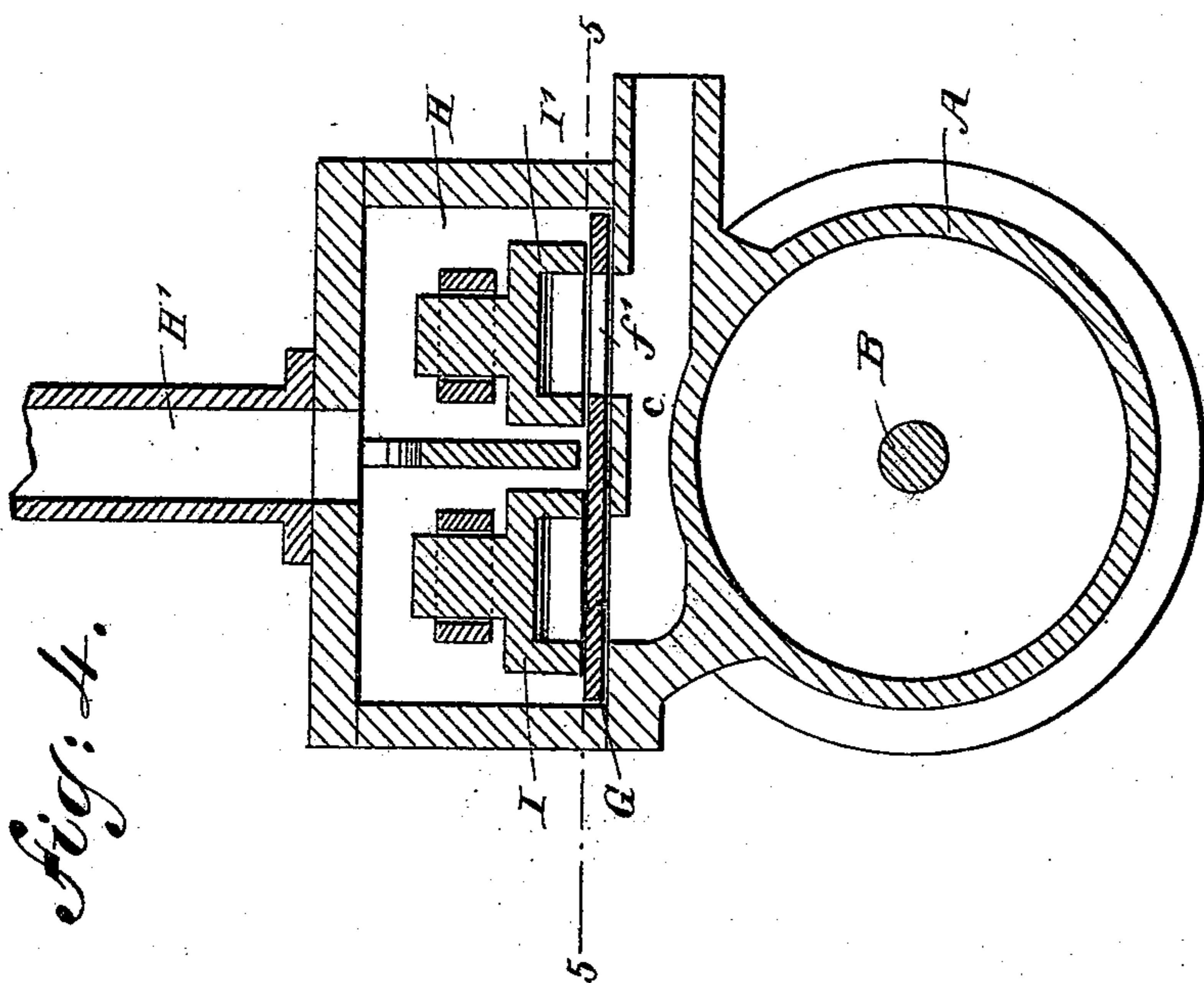
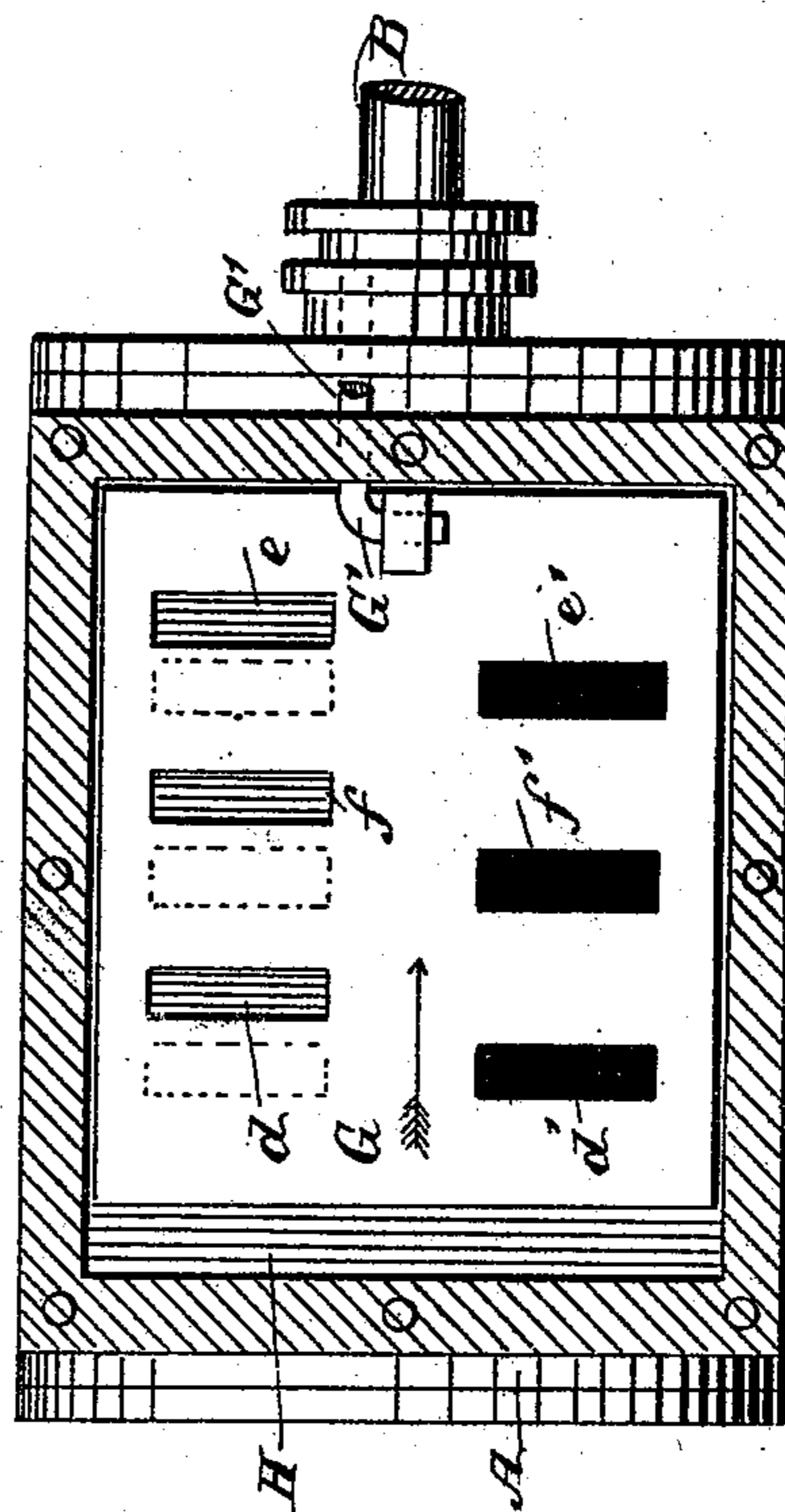


Fig: 4.

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# UNITED STATES PATENT OFFICE.

THOMAS FRANKLIN WHITTINGTON AND WILLIAM ALFRED FISHERING, OF  
XENIA, OHIO.

## REVERSING-GEAR FOR ENGINES.

SPECIFICATION forming part of Letters Patent No. 500,935, dated July 4, 1893.

Application filed March 29, 1893. Serial No. 468,160. (No model.)

*To all whom it may concern:*

Be it known that we, THOMAS FRANKLIN WHITTINGTON and WILLIAM ALFRED FISHERING, of Xenia, in the county of Greene and State of Ohio, have invented a new and Improved Reversing-Gear for Engines, of which the following is a full, clear and exact description.

The object of the invention is to provide a new and improved reversing gear for engines, which is simple and durable in construction, very effective in operation, and arranged to permit of conveniently reversing the engine without the use of the link motion.

The invention consists of certain parts and details and combinations of the same, as will be fully described hereinafter, and then pointed out in the claims.

Reference is to be had to the accompanying drawings forming a part of this specification, in which similar letters of reference indicate corresponding parts in all the figures.

Figure 1 is a plan view of the improvement with the steam chest cover removed and the device applied to a locomotive engine. Fig. 2 is a sectional side elevation of the same on the line 2—2 of Fig. 1. Fig. 3 is a transverse section of the same on the line 3—3 of Fig. 2. Fig. 4 is an enlarged transverse section of the same on the line 4—4 of Fig. 1. Fig. 5 is a sectional plan view of the steam chest and cylinder on the line 5—5 of Fig. 4; and Fig. 6 is a similar view of the same with the movable valve seat in a different position.

In the cylinder A operates the usual piston connected by a piston rod B with the cross-head C, connected by a pitman D with the wristpin E, held on the drive wheel F, in case the device is applied on a locomotive, it being understood that for ordinary engines the pitman D is connected with the usual crank arm attached to the main driving shaft.

In the cylinder A are arranged the usual inlet ports *a* and *b*, and the exhaust port *c* adapted to register with sets of ports *d*, *d'*, *e*, *e'*, *f*, *f'*, respectively, formed in a movable valve seat G, held adjustably in the steam chest H, arranged on the cylinder A in the usual manner and provided with the steam inlet pipe H' connected with a suitable source of steam supply. When the valve seat G is

in the position illustrated in Fig. 5, then the ports *d*, *e* and *f* register with the ports *a*, *b* and *c* of the cylinder, while the other ports *d'*, *f'* and *e'* are disconnected from the said cylinder ports. When the valve seat G is shifted to the position shown in Fig. 6, then the ports *d*, *e*, and *f* are cut off from the cylinder ports *a*, *b*, *c*, while the other ports *d'*, *e'*, *f'* are in register with the cylinder ports *a*, *b*, *c*.

In order to shift the valve seat G, we provide the same with a stem G' extending through one end of the steam chest H to the outside thereof, the outer end being pivotally connected with a lever G<sup>2</sup> fulcrumed on a bracket G<sup>3</sup> secured to the steam chest, as is plainly illustrated in the drawings. The free end of the lever G<sup>2</sup> is adapted to be actuated by the operator in case the device is applied to an ordinary steam engine, but if the improvement is applied on a locomotive engine, then the free end of the said lever G<sup>2</sup> is connected by a rod G<sup>4</sup> with the cab of the locomotive, so that the valve seat G is under the control of the engineer.

On the movable valve seat G are arranged to slide the valves I and I' respectively, over the respective sets of ports *d*, *e*, *f*, and *d'*, *e'*, *f'*. The slide valves I and I' are provided with valve stems J and J' respectively, extending through suitable stuffing boxes in one end of the steam chest H to the outside thereof, the outer ends of the valve stems being pivotally connected with arms K and K' respectively, of which the former is secured on a shaft K<sup>2</sup> journaled in suitable bearings held on the frame of the engine. The other crank arm K' is secured on a sleeve K<sup>3</sup> mounted loosely on the said shaft K<sup>2</sup>, as is plainly illustrated in Fig. 3.

On the shaft K<sup>2</sup> and on the sleeve K<sup>3</sup> are secured the arms L and L' respectively, pivotally connected by links N and N' respectively with the ends of an arm O secured at its middle on a shaft P mounted to rock in suitable bearings forming part of the main frame of the engine. On the shaft P is secured an arm Q pivotally connected with a sleeve R fitted to slide on a rod S secured longitudinally on the pitman D, so that the swinging motion of the latter imparts a swinging motion to the arm Q, thus giving a rocking mo-

tion to the shaft P, whereby the arm O is caused to swing and imparts, by the links N and N', a rocking motion to the shaft K<sup>2</sup> and sleeve K<sup>3</sup>, so that their arms K and K' impart  
 5 a longitudinal sliding motion to the valve stems J and J' in opposite directions, thus moving the valves I and I' simultaneously, but in opposite directions, over their respective sets of ports *d, e, f* and *d', e', f'*. Now, it will  
 10 be seen that when the movable valve seat G is in the position shown in Fig. 5, the valve I, in moving over the ports *d, e, f*, permits entrance of the motive agent to the ends of the steam cylinder A, in the usual manner, and at the  
 15 same time the exhaust takes place in the regular way. At the same time the other valve I' moves over its ports *d', e', f'*, but as the latter are disconnected from the cylinder ports the said valve is inactive as far as the admis-  
 20 sion to and exhaust of steam from the cylinder is concerned. When, however, the movable valve seat G is shifted to the position shown in Fig. 6, then the valve I travels over the ports *d, e, f*, cut off from the cylinder  
 25 ports, and is thus rendered inactive as far as the admission of steam to and exhaust from the cylinder is concerned, while the other valve I' becomes the active one, in that it travels over the ports *d', e', f'*, now in register  
 30 with the cylinder ports, thereby regulating the admission to and exhaust from the cylinder A.

It will be seen that the movable valve seat G can readily be changed whenever it is de-  
 35 sired to reverse the engine, as the said seat is under the full control of the engineer in charge. By this arrangement the complicated link motion usually employed for reversing the engine is entirely dispensed with.

40 It will be seen that by giving but a half stroke to the movable valve seat G the two sets of ports in the seat can be disconnected from the cylinder ports, so as to enable the engineer to shut off steam from the cylinder  
 45 in case of accident to the throttle or other parts of the locomotive. By drawing the valve seat half way, the engineer is enabled to stop the locomotive in a short distance, as the entire supply of steam is cut off from the

cylinder and a suction is created in one end 50 thereof, thus retarding pressure in the other end and reducing the liability of blowing the cylinder head off.

Having thus fully described our invention, we claim as new and desire to secure by Let- 55 ters Patent—

1. In a reversing gear for engines, the combination of a rock shaft having an arm, and a sleeve pivotally connected with the said arm and fitted to slide on a guideway on the engine pitman, substantially as shown and de- 60 scribed.

2. In a reversing gear for engines, the combination with the steam chest, two valves therein, and the engine pitman, of a shaft provided with a crank arm at each end, a sleeve 65 mounted loosely on the said shaft and provided with arms, one valve stem being connected with one crank arm of the shaft and the other valve stem with one of the arms of the sleeve, a rock shaft provided with arms, 70 one of the said arms having a sliding connection with the engine pitman, and links connecting the other arm of the rock shaft with an arm of the first named shaft, and an arm of the sleeve thereof, substantially as described. 75

3. In a reversing gear, the combination with a steam chest, a movable valve seat therein and provided with two sets of ports, two valves in the steam chest and the engine pitman provided with a longitudinal rod, of a 80 shaft provided with an arm at each end, a sleeve mounted loosely on the shaft and provided with two arms, the valve stems being connected with one of the arms of the said shaft and sleeve, a rock shaft provided with an arm 85 secured at its middle to said shaft, links connecting the ends of the said arms with one of the arms of the first named shaft and the sleeve thereon, and an arm on the end of the rock shaft and provided with a sleeve sliding 90 upon the rod of the engine pitman, substantially as herein shown and described.

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