No. 724,988. PATENTED APR. 7, 1903.

S. S. YOUNGHUSBAND.

SLIDE VALVE GEAR FOR STEAM ENGINES.

APPLICATION FILED FEB. 25, 1903.

NO MODEL.

FIG. 2.

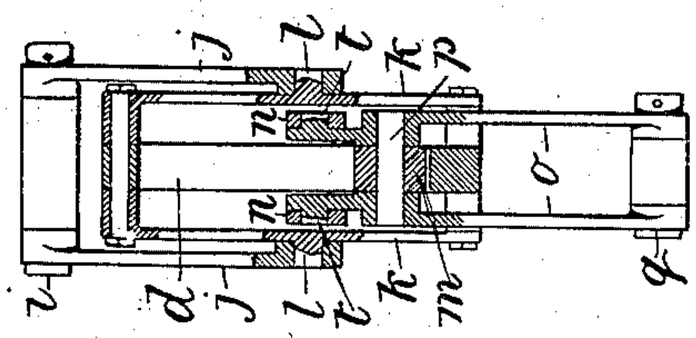
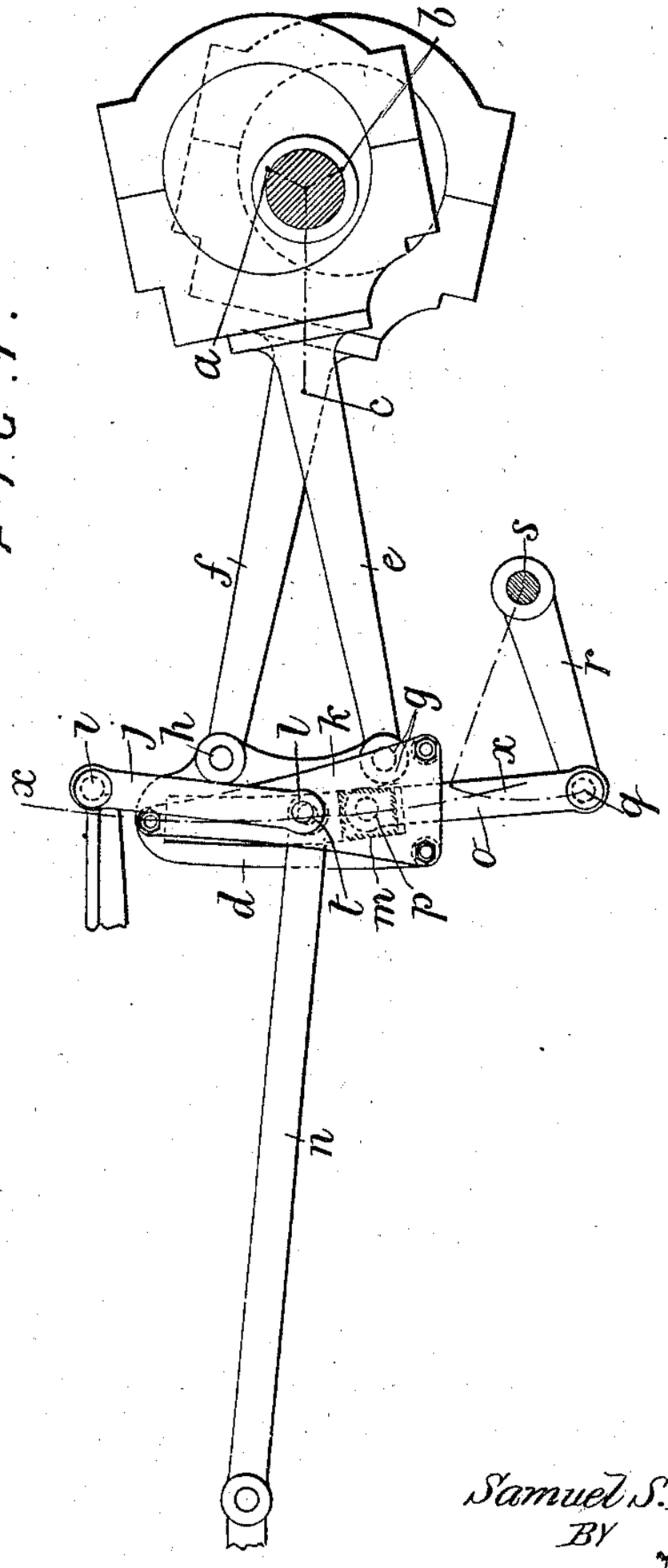


FIG. 1.



WITNESSES :

W. M. Avery

A. H. Davis

INVENTOR

Samuel S. Younghusband

BY

Munn & Co

ATTORNEYS.

UNITED STATES PATENT OFFICE.

SAMUEL SMITH YOUNGHUSBAND, OF DARLINGTON, ENGLAND, ASSIGNOR TO GILBERT CHARLES WARD, SR., OF NEWCASTLE, ENGLAND.

SLIDE-VALVE GEAR FOR STEAM-ENGINES.

SPECIFICATION forming part of Letters Patent No. 724,988, dated April 7, 1903.

Application filed February 25, 1903. Serial No. 145,093. (No model.)

To all whom it may concern:

Be it known that I, SAMUEL SMITH YOUNGHUSBAND, engineer, a subject of the King of Great Britain, residing at Granville Terrace, Woodlands Road, Darlington, in the county of Durham, England, have invented certain new and useful Improvements in Slide-Valve Gear for Steam-Engines, of which the following is a specification.

My invention relates to slide-valve reversing and expansion gear of the kind wherein motion is transmitted from the expansion and reversing link to the slide-valve through an intermediate lever, which is pivoted to the die-block of the link and connected by its shorter arm or arms to the valve-rod, while its other and longer arm is pivoted to an arm or arms on the weigh-shaft, the expansion and reversing link vibrating as a whole about a fixed axis, to which it is connected by a pair of swing carrier-links, and the reversal of the engine being effected by moving the die-block along the slot of the link. This type of valve-gear, while specially designed to secure durability, cheapness, and compactness, gives a fixed amount of lead with all degrees of linking up, a quick port-opening for the admission of steam, a quick opening at the commencement of exhaust, and a much larger steam-port opening and more sudden cut-off than usual for all degrees of linking up, thus enabling the engine to be always readily started.

The invention is illustrated, by way of example, in the accompanying drawings, wherein—

Figures 1 and 2 are a side elevation and a sectional end elevation showing the general arrangement of the improved gear as applied to a locomotive having inside cylinders and valve-chests, the gear being in full forward position.

In the drawings, a b are the centers of the forward and backward eccentrics, respectively, and c the crank-center. The expansion and reversing link d is coupled to the forward and backward eccentric-rods e f by the pivotal joints g h, formed in or upon lugs situated at the back of the link toward the ends thereof. The link d is supported by being attached to the fixed axis i by means of a pair of swing carrier-links j, which are pivotally connected at l to gudgeons carried by a pair of plates k, attached to the link d, the pair of centers l being in axial alinement and so placed as to intersect (either actually or approximately, as shown) the center line x x of the expansion and reversing link slot at a point midway between the eccentric-rod joints g h.

The plates k are fixed to the opposite faces of the link d, preferably at three points, as shown, and extend over the link-slot from end to end thereof, the plates being offset a sufficient distance from the respective faces of the link to allow of the die-block pin p, the valve-operating lever o, and the valve-rod n passing clear of the plates k and carrier-links j.

The die-block m is fitted to slide in the slot of the link d and is coupled to the valve-rod n by means of a lever o, formed of duplex members, which work one at either side of the link d, between the latter and the plates k. The lever o is pivoted, by means of the pin p, to the die-block center and is fulcrumed at q to an arm or arms r on the weigh-shaft s, the lever o being continued beyond the die-block center p and pivoted at t to the valve-rod n, which is thus caused to reciprocate through a greater distance than if it were coupled direct to the die-block.

The expansion and reversing link d may be curved in the direction shown or in the opposite direction or may be made straight, according to the position of the weigh-shaft, as will be readily understood by any one versed in the art of designing link-motions. It is also to be observed that by suitably proportioning the length of the valve-rod n, the weigh-shaft arm r, and the valve-operating lever o the constancy of the lead given by this gear to the slide-valve in all positions of the die-block may be maintained, whatever the direction or degree of curvature given to the expansion and reversing link.

I claim—

In engine slide-valve gear of the kind described, the combination of a slotted expansion and reversing link having eyes situated toward the opposite ends of the link-slot for the pivotal attachment of the eccentric-rods;

a die-block fitted to slide in the link-slot and carrying a laterally-projecting pin for the pivotal connection of the valve-operating lever; a pair of plates fixed to and offset from the opposite faces of the link and extending over the link-slot from end to end, the positions of the points of attachment of the plates to the link, and the distance of the plates from the respective faces of the link being such as to afford passage to the die-block pin, the valve-operating lever pivoted thereto, and the valve-rod jointed to said lever; and a pair of axially-alined gudgeons carried by and projecting from the plates approximately in intersection with the middle point of the longitudinal center line of the link-slot, for the attachment of a pair of swing carrier-links, as described.

SAMUEL SMITH YOUNGHUSBAND.

Witnesses:

ARTHUR J. TAYLOR,

W. H. GOLDING.