

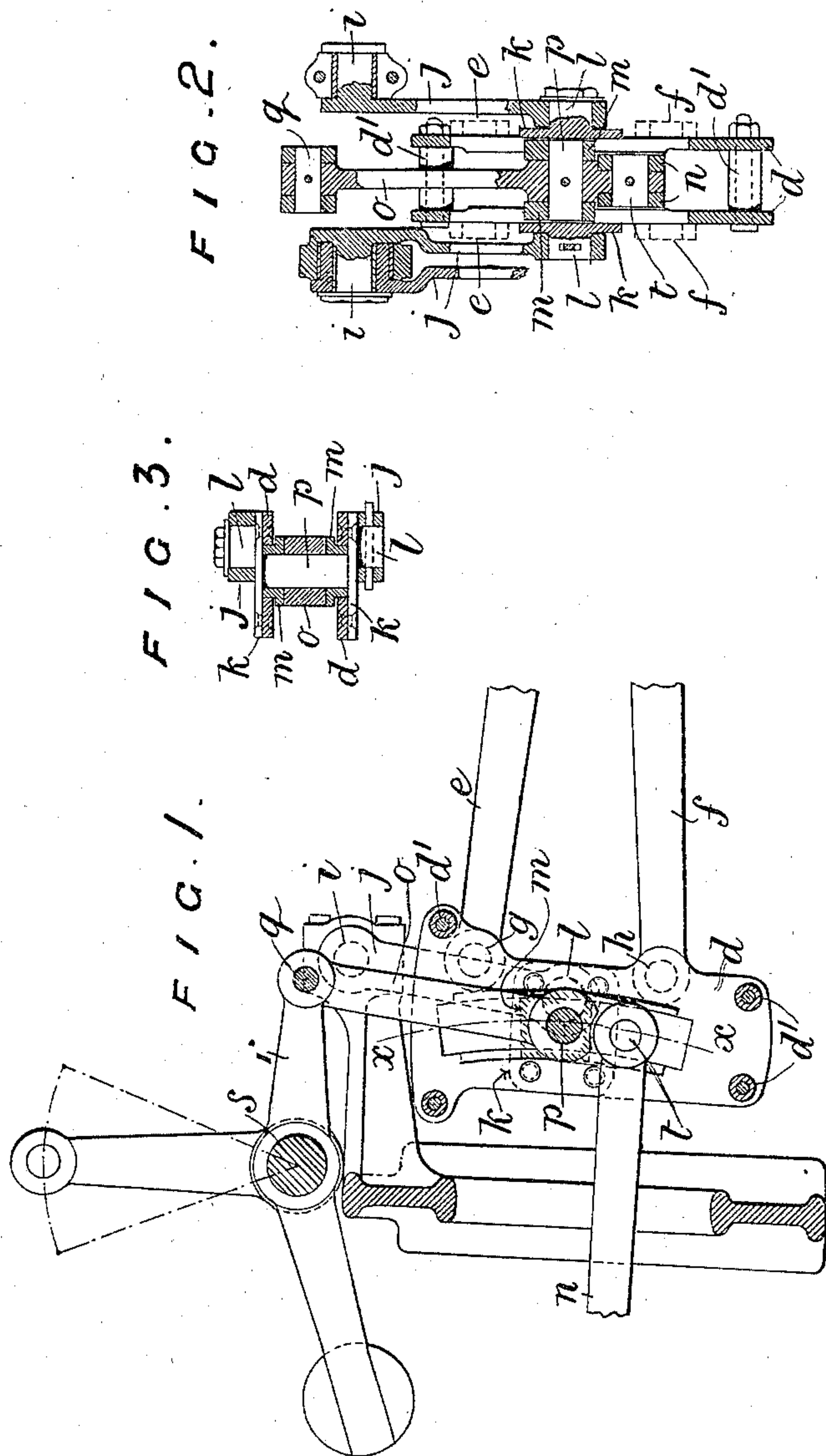
No. 724,989.

PATENTED APR. 7, 1903.

S. S. YOUNGHUSBAND.
SLIDE VALVE GEAR FOR STEAM ENGINES.

APPLICATION FILED FEB. 25, 1903.

NO MODEL.



WITNESSES :

W. M. Avery
A. H. Davis

INVENTOR
Samuel S. Younghusband
BY *Mumford*
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. 724,989, dated April 7, 1903.

Application filed February 25, 1903. Serial No. 145,094. (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; and Fig. 3 is a detail sectional view 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.

The expansion and reversing link d is duplex, being formed of two parallel slotted bars held apart by distance-pieces and bolts or rivets, as at d' . The link d is coupled to the forward and backward eccentric-rods $e f$ by the pivotal joints or gudgeons $g h$, formed upon lugs situated at the back of each of the duplex link members and toward the ends thereof. The link is supported by being at-

tached to the fixed axis i by means of a pair of swing carrier-links j , which are pivotally connected at l to axially-alined gudgeons carried by a pair of brackets k , fixed to the outside of the duplex link d , the gudgeons l being situated midway between the eccentric-rod centers $g h$ and being in approximately axial intersection with the longitudinal center line $x x$ of the link d .

The die-block m is duplex and consists of a pair of members adapted to slide in the slots of the respective link members d , the two die-block members $m m$ being connected by a cross-pin or gudgeon p , which forms the pivotal connection of the lever o , through which the oscillations of the die-block are transmitted to the valve-rod n . The lever o is fulcrumed at q to an arm or arms r on the weigh-shaft s . It is continued beyond the cross-pin p of the die-block and is pivoted at its extremity 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 duplex expansion and reversing link formed of a pair of parallel plates held apart by distance-pieces and having slots for the die-block in registration with one another; a duplex die-block whereof the members are fitted to slide in the slots of the respective link members; a pin connecting and journaled in bearings in, the die-block members; a valve-operating lever pivoted about the axis of the said pin to work between the link members and pivotally con-

nected at the one end to the slide-valve rod and at the other end to an arm on the weigh-shaft; bracket-plates fixed to the outer faces of the link members and straddling the slots
5 thereof; and a pair of alined gudgeons carried by, and projecting from, said bracket-plates in approximately axial 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 F. TAYLOR,
W. H. GOLDING.