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S. S. YOUNGHUSBAND.

SLIDE VALVE GEAR FOR STEAM ENGINES.

APPLICATION FILED FEB. 25, 1903.

NO MODEL.

FIG. 2.

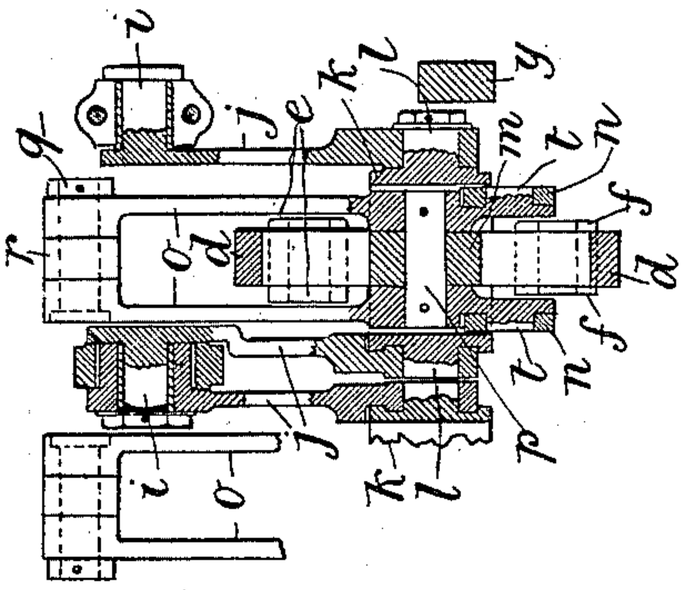
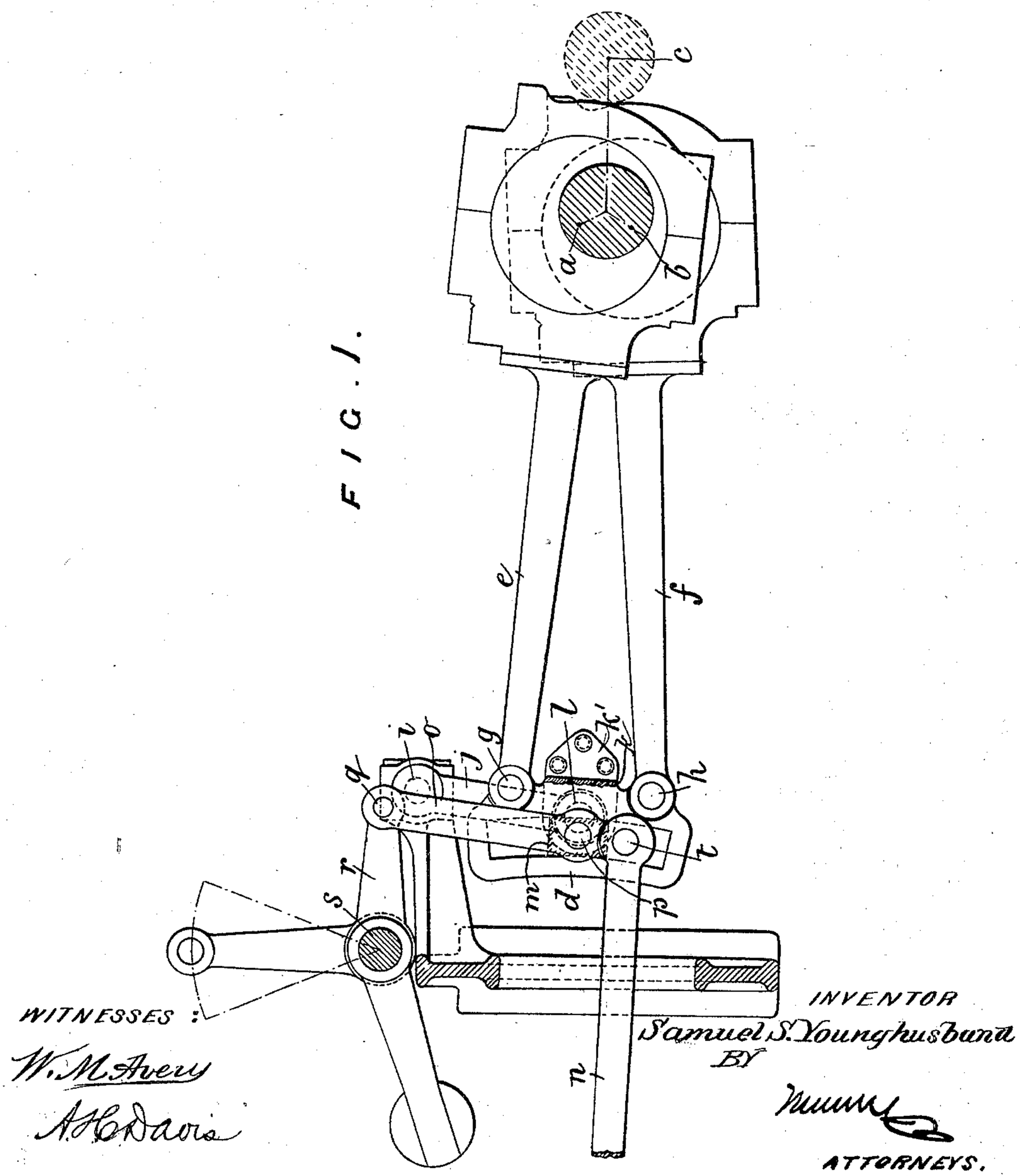


FIG. 1.



WITNESSES :

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SLIDE-VALVE GEAR FOR STEAM-ENGINES.

SPECIFICATION forming part of Letters Patent No. 724,987, dated April 7, 1903.

Application filed February 25, 1903. Serial No. 145,092. (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 swinging 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 part sectional 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 mid-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 brackets *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 of the expansion and reversing link slot at a point midway between the eccentric-rod joints *g h*. The brackets *k* are fixed to the opposite faces of a lug *k'*, projecting in the direction of the crank-shaft from the middle of the back member of the link *d* and in the plane of the link, the brackets being so formed as to overhang the link-slot and being offset a sufficient distance from the respective faces of the link *d* to allow of the die-block pin *p*, the valve-operating lever *o*, and the valve-rod *n* passing clear of the brackets *k* and carrier-links *j*. In Fig. 1 the bracket *k* on the near side is broken away in section in order to show the lug *k'*. 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 brackets *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 lug projecting in the direction of the crank-shaft from midway of the length of the link and in the plane thereof; a pair of brackets fixed to the said lug at opposite faces thereof and projecting transversely of the link-slot at a sufficient distance from the opposite faces of the link to give passage to the die-block pin, the valve-operating lever pivoted to the die-block pin, and the valve-rod jointed to said lever; and a pair of axially-alined gudgeons, carried by and projecting from the brackets 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.

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Witnesses:
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