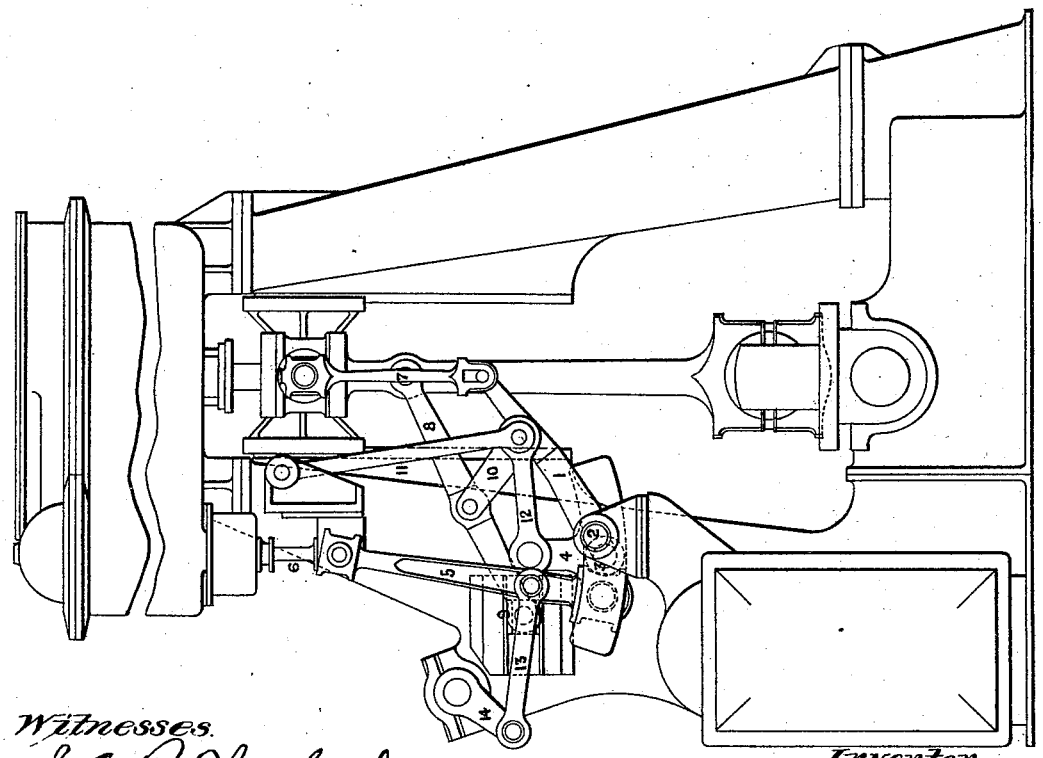
(No Model.)

A. D. BRYCE-DOUGLAS.

LINK MOTION FOR ENGINES.

No. 345,617. Patented July 13, 1886.



Witnesses.
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UNITED STATES PATENT OFFICE.

ARCHIBALD DOUGLAS BRYCE-DOUGLAS, OF SEAFIELD, ARDROSSAN, COUNTY OF AYR, SCOTLAND.

LINK-MOTION FOR ENGINES.

SPECIFICATION forming part of Letters Patent No. 345,617, dated July 13, 1886.

Application filed September 8, 1885. Serial No. 176,516. (No model.) Patented in England May 28, 1885, No. 6,506; in Germany July 18, 1885, No. 34,501; in Austria-Hungary October 19, 1885, No. 26,663 and No. 54,993; in France November 4, 1885, No. 172,063, and in Belgium November 5, 1885, No. 70,744.

To all whom it may concern:

Be it known that I, ARCHIBALD DOUGLAS BRYCE-DOUGLAS, a subject of the Queen of Great Britain, residing at Seafield, Ardrossan, in the county of Ayr, Scotland, have invented a new and useful Link-Motion for Working the Slides or Valves of Steam and other Fluid Pressure Engines, (for which I have obtained patents in Great Britain, dated May 28, 1885, No. 6,506; in Germany, dated July 18, 1885, No. 34,501; in France, dated November 4, 1885, No. 172,063; in Belgium, dated November 5, 1885, No. 70,744, and in Austria-Hungary, dated October 19, 1885, No. 26,663 and No. 54,993,) of which the following is a specification.

My invention relates to the arrangement of levers and links for working the slides or valves of steam or other fluid pressure engines, to stop, start, reverse, or to vary expansion. The motion for this purpose is derived from that of the piston-rod, combined with a movement obtained from the connecting-rod.

The levers and links which I employ may be variously arranged to suit the particular forms and conditions of the engines to which they are applied.

The accompanying drawing shows an arrangement suitable for a steam-engine having the cylinder situated at the top of the framing, with the piston-rod passing through the cylinder bottom and connected to the crank below.

1 is the beam pivoted on fixed center 2, and connected at one end to piston-rod head by a link, while at the other end it carries the curved link 4 on a pin, 3; 8, lever pivoted at 7 to the connecting-rod of the engine and sliding with its other end in a guide, 9; 10, link pivoted to lever 8, and connected by link 12 to arm of curved link 4; 11, radius-rod supporting-links 10 and 12; 5, connecting-rod to slide rod 6; 13 14, gear for shifting rod 5 in curved link.

I provide a beam, 1, (which may be that for working the air-pump,) mounted on a stationary fulcrum, 2, and connected at one end by a link to the piston-rod cross-head, so as to oscillate in time with the piston. On a pin, 3, on the beam 1, I mount a curved link, 4, to which is fitted a sliding block, linked by a rod, 5, to the slide or valve-rod 6. To a pin, 7, on the connecting-rod, I joint one end of a lever, 8, the other end being jointed to a pin on a sliding block, 9, which moves in a curved or straight guide. I connect a pin on the lever 8 by a link, 10, to a pin joining the end of the radius-rod 11, (which is pivoted on a stationary fulcrum,) and of a link, 12, jointed to the upper arm of the curved link 4, which thus receives a motion corresponding nearly with that of the link usually worked by two eccentrics. The rod 5 is linked by a rod, 13, to an arm, 14, by moving which the block at the lower end of the rod 5 can be slid along the curved link 4, and thus the slide or valve rod 6 can be made to receive movements corresponding with those obtained by the use of ordinary double eccentrics, and link-motion to suit either direction of the engine's motion, and various degrees of cut-off and expansion. The up-and-down motion imparted to curved link 4 by beam 1, combined with the rocking motion imparted to it by lever 8 and links 10 11 12, results in a compound motion similar to that of an ordinary link-motion.

Having thus described the nature of my invention, and in what manner the same is to be performed, I claim—

In combination with the lever 1, oscillating on a fixed fulcrum in time with the piston, and the curved link 4, mounted on the lever, and fitted with a sliding block connected to the valve-rod, the lever 8, and the links 10, 11, and 12, communicating rocking movement from the connecting-rod to the link 4, substantially as described.

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, this 24th day of August, A. D. 1885.

A. D. BRYCE-DOUGLAS.

Witnesses:
JAMES SYME,
ANDREW LAING.