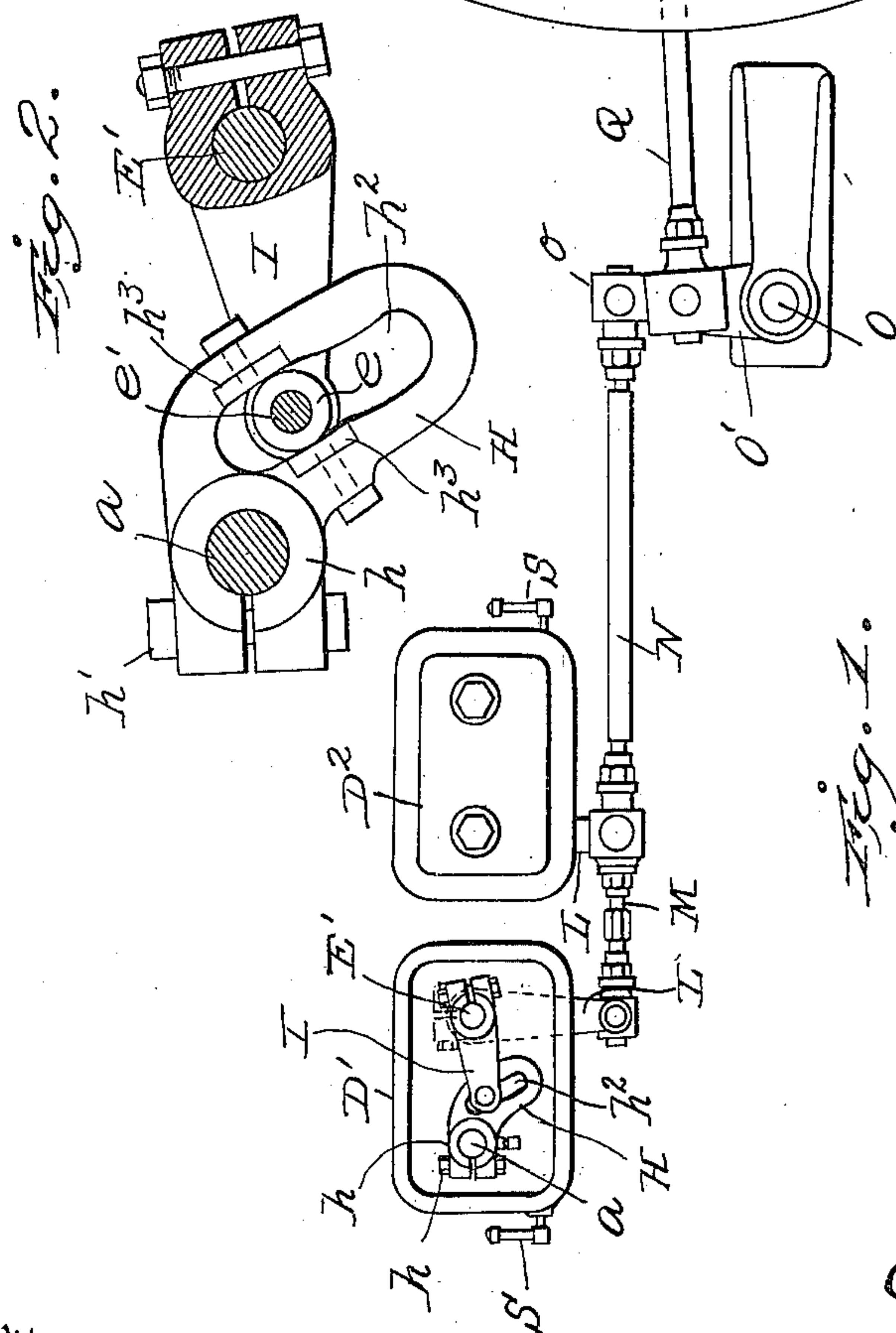
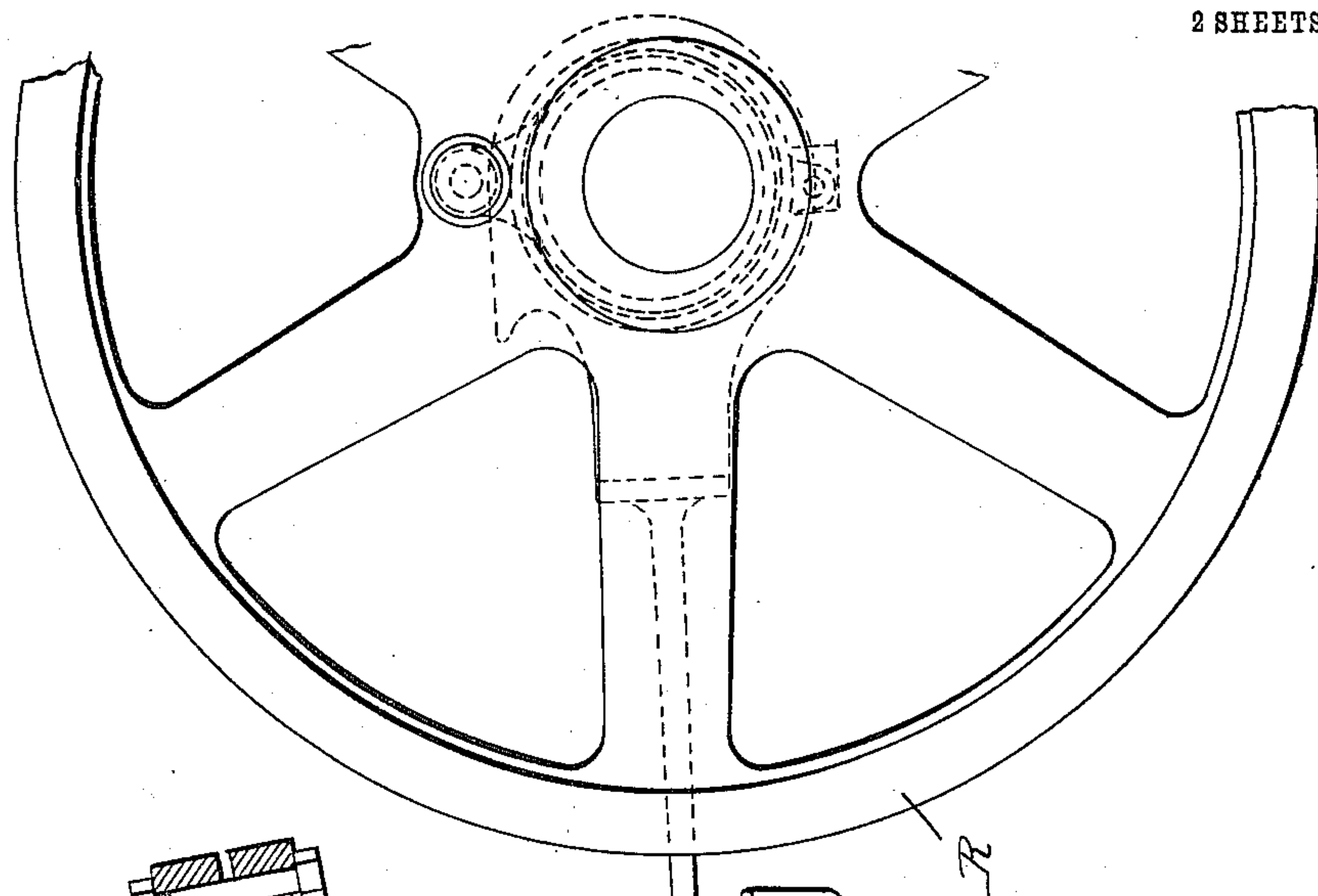


964,194.

Patented July 12, 1910.

2 SHEETS--SHEET 1.



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2 SHEETS—SHEET 2.

Fig. 4.

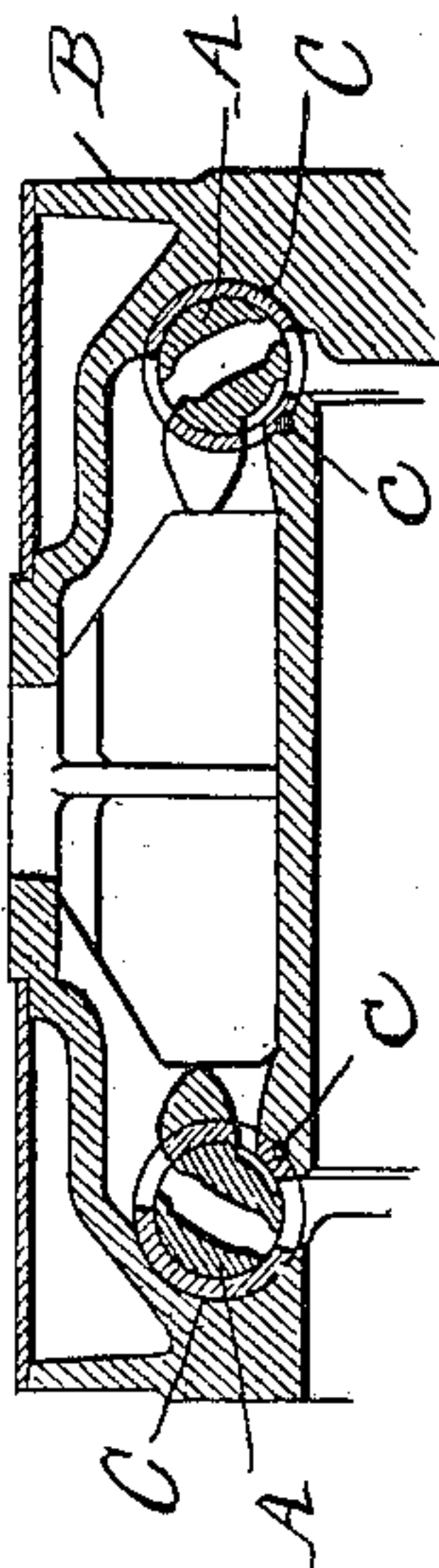
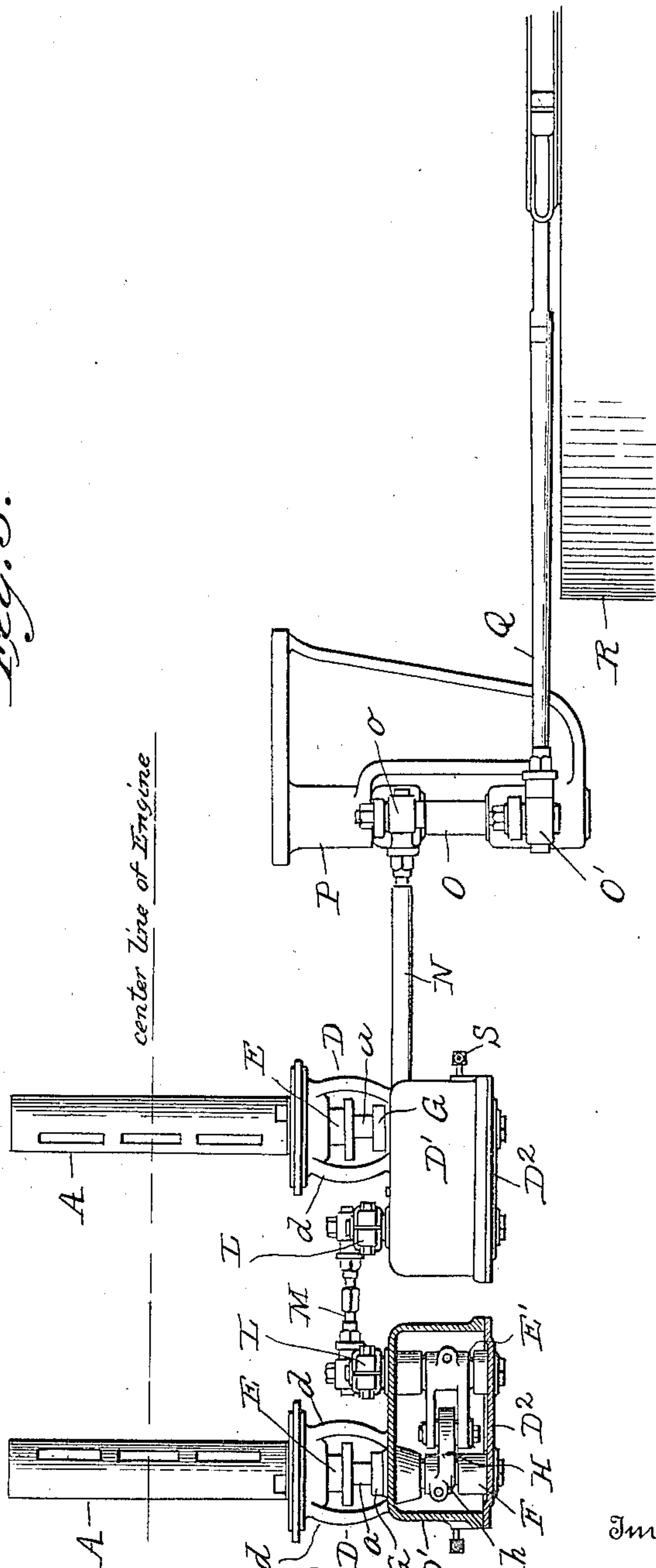


Fig. 3.



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VALVE MECHANISM FOR CORLISS ENGINES.

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To all whom it may concern:

Be it known that I, BENJAMIN T. ALLEN, a citizen of the United States, residing at Harrisburg, in the county of Dauphin and State of Pennsylvania, have invented a certain new and useful Improvement in Valve Mechanism for Corliss Engines; and I do hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming a part of this specification, and to the letters of reference marked thereon.

This invention relates to that type of steam engine valve mechanism embodying separate valves at opposite ends of the cylinder and is especially designed for use in four valve Corliss engines having double ported oscillatory valves, the objects of the invention being to provide a simple and highly efficient operating mechanism where-with the proper dwell of a valve at one end of the cylinder while the other valve is opening and closing may be secured, the operating parts most subject to wear may work in oil and at the same time the valve stem glands and connections are left accessible for ready inspection, repair and adjustment.

In the accompanying drawings—Figure 1 is a diagrammatic elevation of a valve operating mechanism embodying the present invention; Fig. 2 is a detail sectional elevation of a portion of the mechanism on an enlarged scale; Fig. 3 is a top plan of the parts shown in Fig. 1; and Fig. 4 is a section taken in a plane transverse to the valves and showing the valve bushings.

Similar letters of reference in the several figures denote the same parts.

In said drawings, A, A indicate cylindrical oscillatory valves preferably located in a valve chest B (Fig. 4) and surrounded by removable chilled iron bushings C, the latter being held in place by rods or keys *c* located in the narrow wall between ports whereby they form packings to prevent steam leakage.

In line with each of the valves and secured to the chest in any ordinary or preferred manner are valve brackets D. They may conveniently form the closures for the outer ends of the valve chambers and are provided with glands E for the valve stems *a*. Arms or walls *d* of the brackets extend

outwardly and support casings D' there being sufficient space between the arms to permit access to the gland for adjusting the latter. Each casing is provided with a cover D² and forms an oil tight chamber for certain parts of the valve operating mechanism to be presently described.

Bearings are provided in the casing for the valve stem *a* and for a rock shaft E', the outer bearings being preferably formed in or by brasses F which also cover the ends of the stem and shaft respectively.

A thrust collar G on the valve stem takes any outward thrust of the valve and is readily accessible through the openings between the arms of the bracket.

Mounted on the valve stem between the bearings in the casing is a cam arm H preferably having a split hub *h* clamped to the stem by a bolt or screw *h'*, and a cam slot *h*² which is properly shaped to give the desired differential movement to the valve. A crank arm I clamped to the rock shaft E' is provided with a pin or a hardened roller *e* working in the cam slot *h*², the preferred arrangement embodying a bifurcated crank arm embracing the cam arm and a cross-pin *e'* on which the roller is journaled.

To resist wear and provide a means whereby such wear as does occur may be compensated for, adjustable wear blocks *h*³ are inserted in the walls of the slot *h*², it usually being sufficient to provide such blocks only at the inner end of the slot where wear is most liable to occur and where any looseness would have the greatest influence on the valve movements owing to the proximity of the roller to the axis of the valve.

As illustrated in the drawings—the operating mechanism for the two valves are usually arranged in reverse positions with relation to each other or with the rock shafts in proximity. The rock shafts are connected for simultaneous movement through the medium of crank arms L on their inwardly projecting ends and an adjustable link M, the adjustability of the latter being secured by the ordinary expedient of right and left screw threads.

An adjustable reach rod N extends from one of the crank arms to an arm *o* on an intermediate rocker shaft O journaled in a bracket P secured to the engine frame.

The shaft O has a second arm O' to which the end of an eccentric rod Q is jointed and the eccentric for operating the rod is controlled by well-known shaft governor mechanism preferably of the centrally balanced inertia type mounted on or within the fly-wheel R.

The oil tight casings for the valve arm and operating arm therefor are preferably provided with gage glasses S and it will be understood that in operation said casings or chambers contain sufficient oil to keep the ports thoroughly covered with the lubricant.

In the preferred construction the valve brackets and body of the oil tight casings or chambers are cast integral whereby by securing the brackets in position the casings and bearings for the shafts of the valve operating mechanism are all properly positioned and held in fixed relation to each other. The working parts do not project beyond the casings and access to all the working parts may be had by simply removing the covers of the casings and this may be done without disturbing the adjustment of or changing the connections in any way.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent of the United States is—

1. In a valve mechanism for Corliss engines, the combination with the oscillatory valves and valve stems, valve brackets having openings therein around the stems and oil containing casings carried by the brackets on the outer sides of the openings and having bearings therein for the valve stems and bearings for rocker shafts parallel with the valve stems, of cam arms secured to the valve stems within the casings, rocker shafts, arms on said rocker shafts cooperating with the cam arms and means for oscillating said rocker shafts in unison.

2. In a valve mechanism for Corliss engines, the combination with the oscillatory valve and stem projecting in alinement therewith, the bracket surrounding said stem and having a transverse opening to give access to said stem, an oil containing casing carried by the bracket and having

bearings therein for the valve stem and rocker shaft, of a rocker shaft journaled in the casing, an arm on said rocker shaft, a cam arm on the valve stem within the casing and having a cam slot for cooperation with the rocker arm, an operating arm on the rocker shaft and means for operating said arm.

3. In a valve mechanism for Corliss engines, the combination with a valve bracket having a base for attachment to the engine, arms extending outwardly from said base to form a valve gland space, and an oil chamber carried by said arms and having bearings therein for the valve stem and a rock shaft, of a valve stem and a rock shaft journaled in said bearings, operating connections between the stem and shaft, and means for operating the shaft.

4. In a valve mechanism for Corliss engines, the combination with the oscillatory cylindrical valves having stems projecting in line therewith, and arms clamped on said stems and having cam slots therein, of rock shafts journaled in bearings parallel with the valve stems, bifurcated arms on the rock shafts embracing the cam arms, rollers carried thereby and cooperating with the cam slots, operating arms on the rock shafts, an adjustable connection between said operating arms, and means for operating the rock shafts.

5. In a valve mechanism of the character described, the combination with the oscillatory valves having stems projecting in alinement therewith, the brackets surrounding the stems and oil containing casings carried by said brackets and having bearings therein for the valve stems and rock shafts, of rock shafts journaled in said casings and projecting on the inner sides of the casings parallel with the stems, operating connections between the shafts and stems within the casings, arms on the inwardly projecting ends of the shafts and an adjustable connection between said arms.

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