No. 746,373. PATENTED DEC. 8, 1903.

G. B. PETSCHE.

AIR PUMP ACTUATING DEVICE FOR STEAM ENGINES.

APPLICATION FILED APR. 17, 1903.

NO MODEL. 2 SHEETS—SHEET 1.

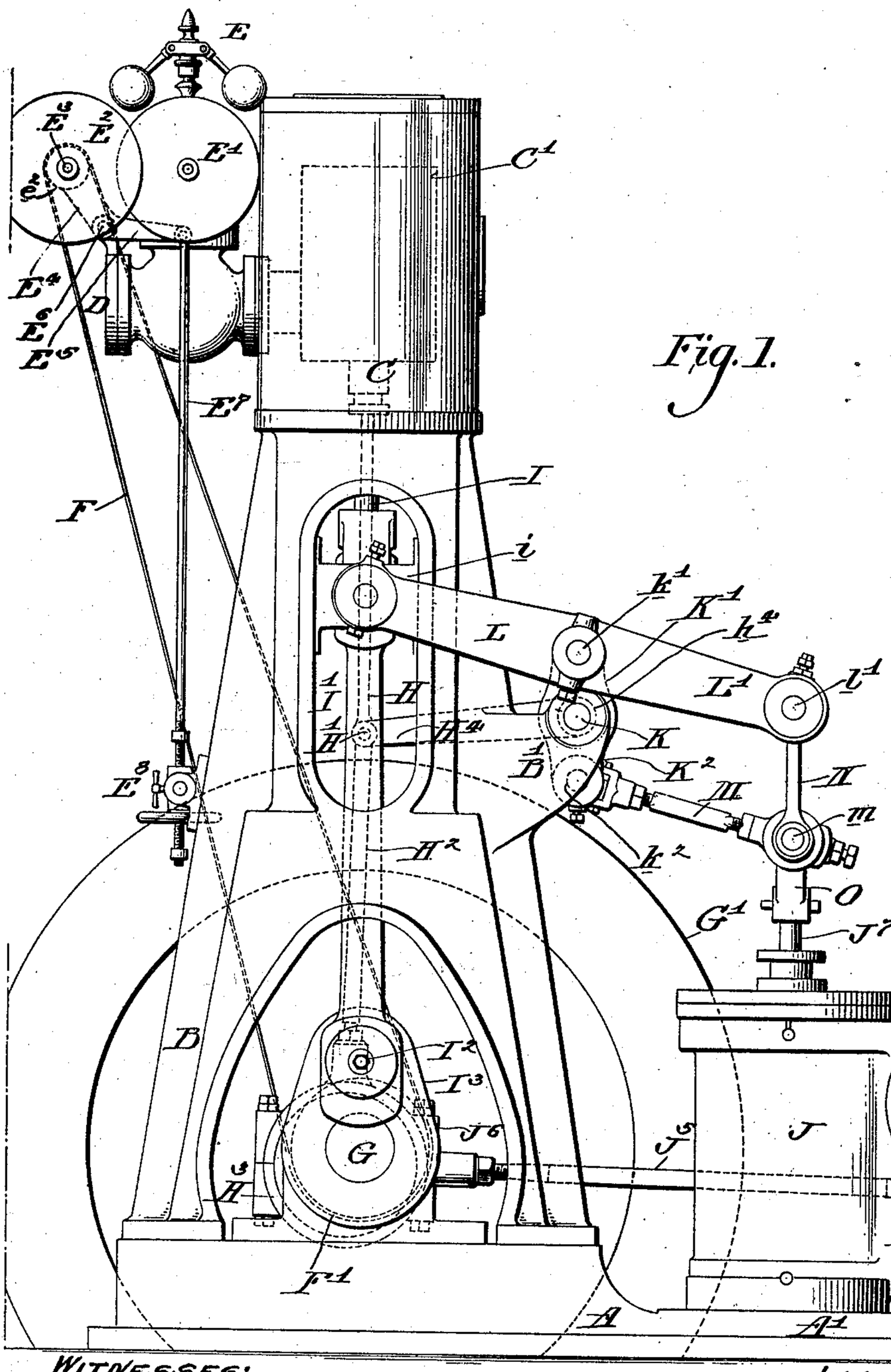

Fig. 1.

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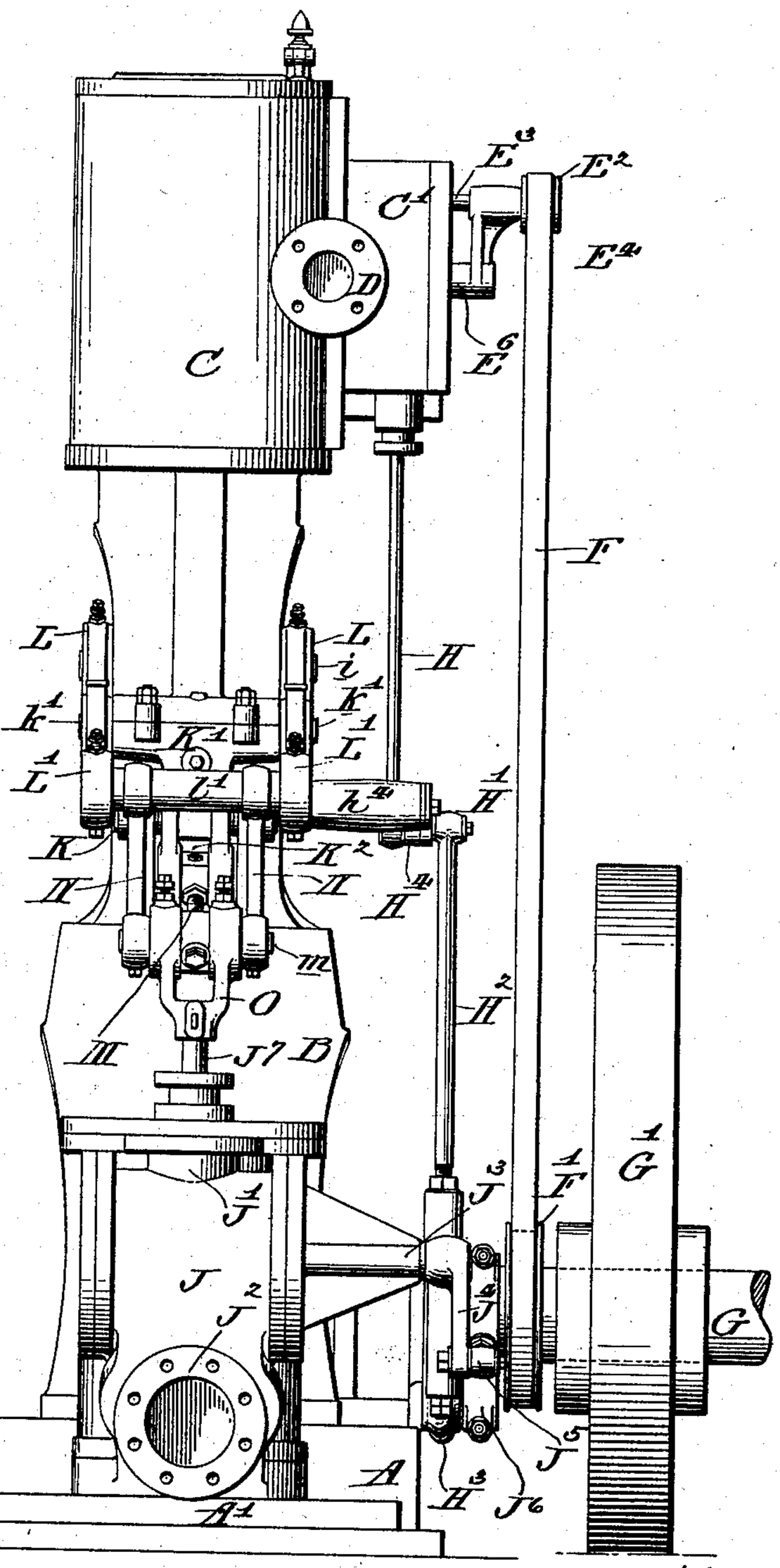
NO MODEL. 2 SHEETS—SHEET 2.

Fig. 2.



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UNITED STATES PATENT OFFICE.

GUSTAV BERNHARD PETSCHE, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR TO THE SOUTHWARK FOUNDRY & MACHINE COMPANY, OF PHILADELPHIA, PENNSYLVANIA, A CORPORATION OF PENNSYLVANIA.

AIR-PUMP-ACTUATING DEVICE FOR STEAM-ENGINES.

SPECIFICATION forming part of Letters Patent No. 746,373, dated December 8, 1903.

Application filed April 17, 1903. Serial No. 153,042. (No model.)

To all whom it may concern:

Be it known that I, GUSTAV BERNHARD PETSCHE, a subject of the Emperor of Germany, residing in the city and county of Philadelphia, in the State of Pennsylvania, have invented a certain new and useful Improvement in Air-Pump-Actuating Devices for Steam-Engines, of which the following is a true and exact description, reference being had to the accompanying drawings, which form a part thereof.

My invention relates to devices for actuating air-pumps connected with steam-engines; and it consists of a parallel-motion construction whereby the piston of an air-pump of any diameter can be actuated and whereby the use of guide-bearings other than those incident to the ordinary construction of the steam-engine is made unnecessary.

The nature of my improvements will be best understood as described in connection with the drawings, in which they are illustrated, and in which—

Figure 1 is a side elevation of an engine equipped with my improvement, and Fig. 2 a front elevation thereof.

A indicates the base of the engine, having an extension, (indicated at A′,) upon which the air-pump cylinder can be placed, said extension-platform being of such dimensions as to permit of its receiving and supporting cylinders of differing diameter.

B B indicate the housings and supports for the engine-cylinders and are formed with lateral extensions (indicated at B′) for purposes to be explained.

C indicates the engine-cylinder; C′, the valve-box; D, the steam-conduit leading to the valve-box and embodying, as shown, a governing-valve.

E indicates the weights of the governor; E′, a friction-disk connected with the governor-spindle by mechanism, (not shown,) said governor-disk being actuated by contact with a second friction-disk (indicated at E^2) and secured on the spindle E^3, which is supported on the arm E^4 of a bell-crank lever pivoted at E^6 and having its other arm E^5 connected for adjustment with a spindle E^7, E^8 indicating a regulating-screw.

e^2 is a belt-wheel on the spindle E^3, which is connected by a belt F with a pulley F′ on the shaft G of the engine.

H is the valve-spindle, pivoted at H′ to a swinging link H^4, pivoted at K, and also to a link H^2, connected with an eccentric on the shaft G, which is indicated at H^3.

I is the piston-rod of the steam-engine, which is pivotally connected with the cross-head *i*, to which is also pivotally connected the connecting-rod I′, the other end of which is connected with the crank-pin I^2 and crank-arm I^3, secured on shaft G.

J indicates the air-pump cylinder; J′, the admission-conduit leading thereto; J^2, the exhaust-conduit.

J^3 is a valve-spindle connected with the valve (not shown) in the conduit J′ and actuated through a lever-arm J^4 and connecting-rod J^5 by an eccentric J^6 on the shaft.

J^7 is the piston-rod of the air-pump cylinder.

K is a pivot secured on the brackets B′ B′ and supporting the fulcrum-lever, having arms K′ and K^2 supporting pivot-pins *k*′ and k^2.

L is a beam pivoted on the pivot-pin *k*′ and also pivotally connected at the end of its arm L with the cross-head *i*, the arm L′ of the beam supporting the pivot, (indicated at *l*′.)

M is a connecting-link pivoted to the fulcrum-lever at k^2 and equal in effective length to the length of the beam-arm L′. The outer end of the link M is pivoted at *m* to the link N, the effective length of which is equal to the effective length of the fulcrum-lever. Also pivoted at *m* is a head O, which is secured to and in effect forms a part of the piston-rod J^7.

It will be at once obvious that the motion communicated from the cross-head *i* to the pivot *m* is a parallel motion and that the essential constructive feature of the device by which the parallelism is obtained lies in the feature that the pivotal connection of the beam L with the cross-head, the pivot K of the fulcrum-lever, and the pivot *m* lie in a straight line. As long as this feature of construction is retained the proportionate length of the links and lever-arm making up the device can be considerably changed, it being necessary that the effective length of the link N should be equal to the effective length of

the fulcrum-lever and that the effective length of the connecting-link M should be equal to the distance between the pivots k' and l'.

Having now described my invention, what I claim as new, and desire to secure by Letters Patent, is—

In a combination with a steam-engine having a sliding cross-head, a fulcrum-lever K' K^2 pivoted on the frame of the engine, a beam L L' pivoted to one arm of the fulcrum-lever and connected at one end to the cross-head, a link N pivoted to the other end of the beam and of effective length equal to that of the fulcrum-lever, a connecting-rod M pivoted to the arm K^2 of the fulcrum-lever, and to the link N, the effective length of said rod being equal to the effective length of the arm L' of the beam, an air-pump and a pump-piston connected to link and rod N M.

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Witnesses:
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