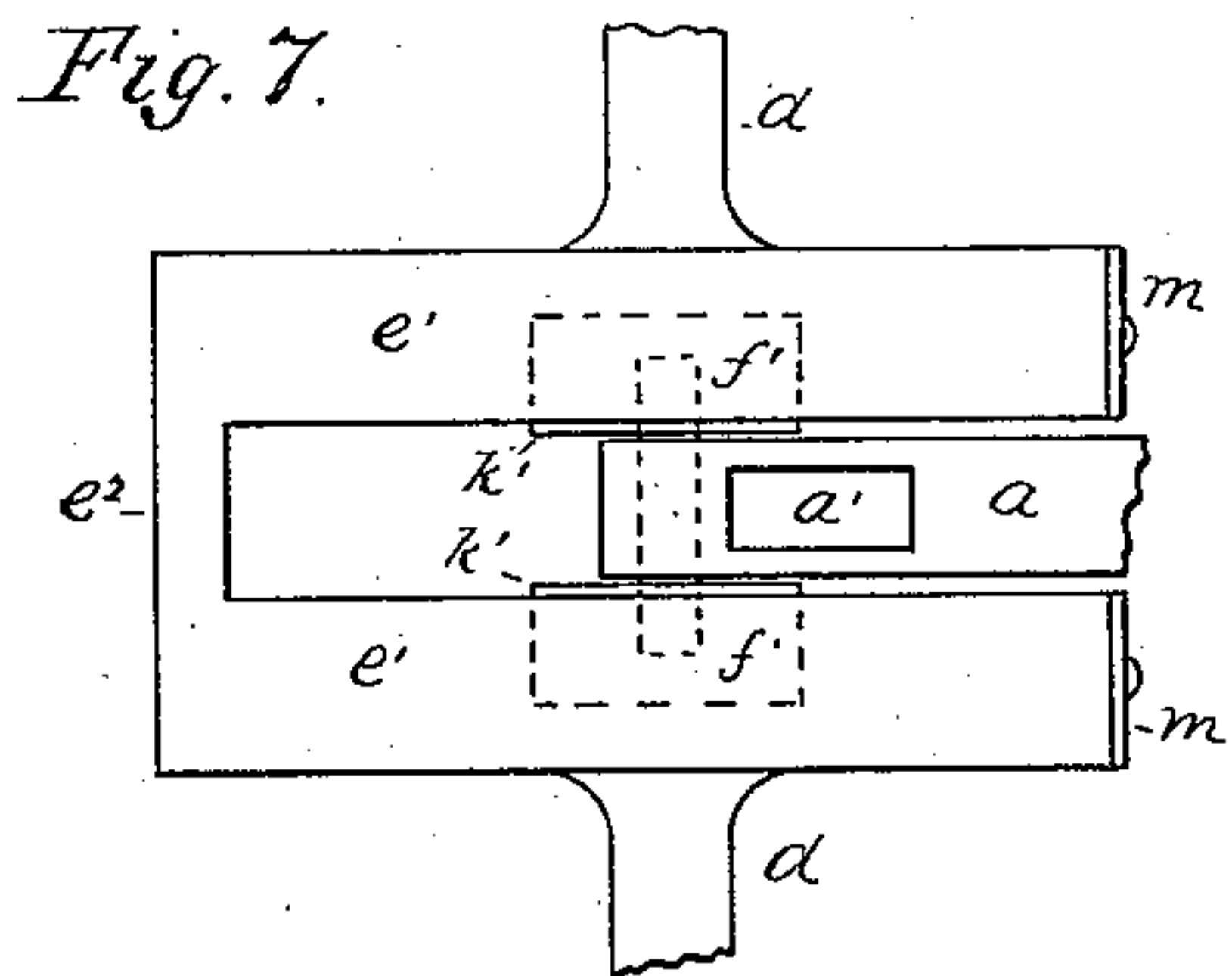
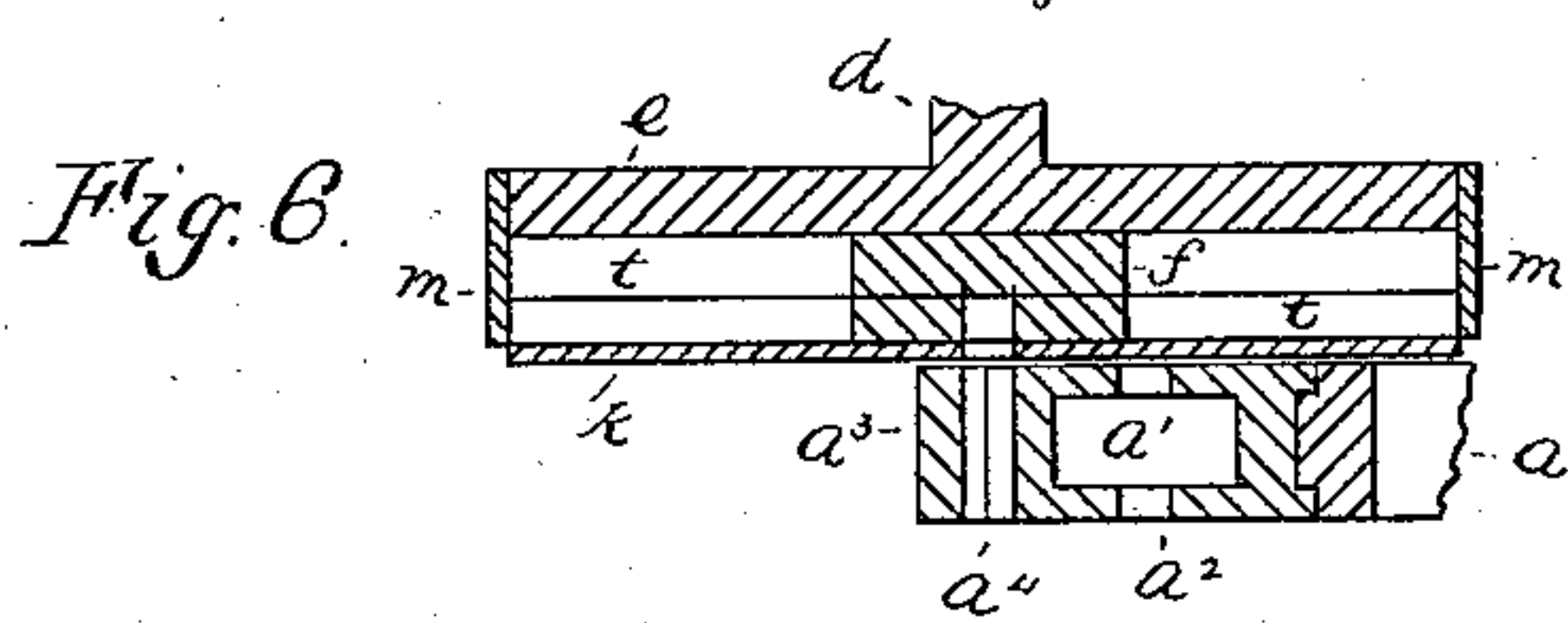
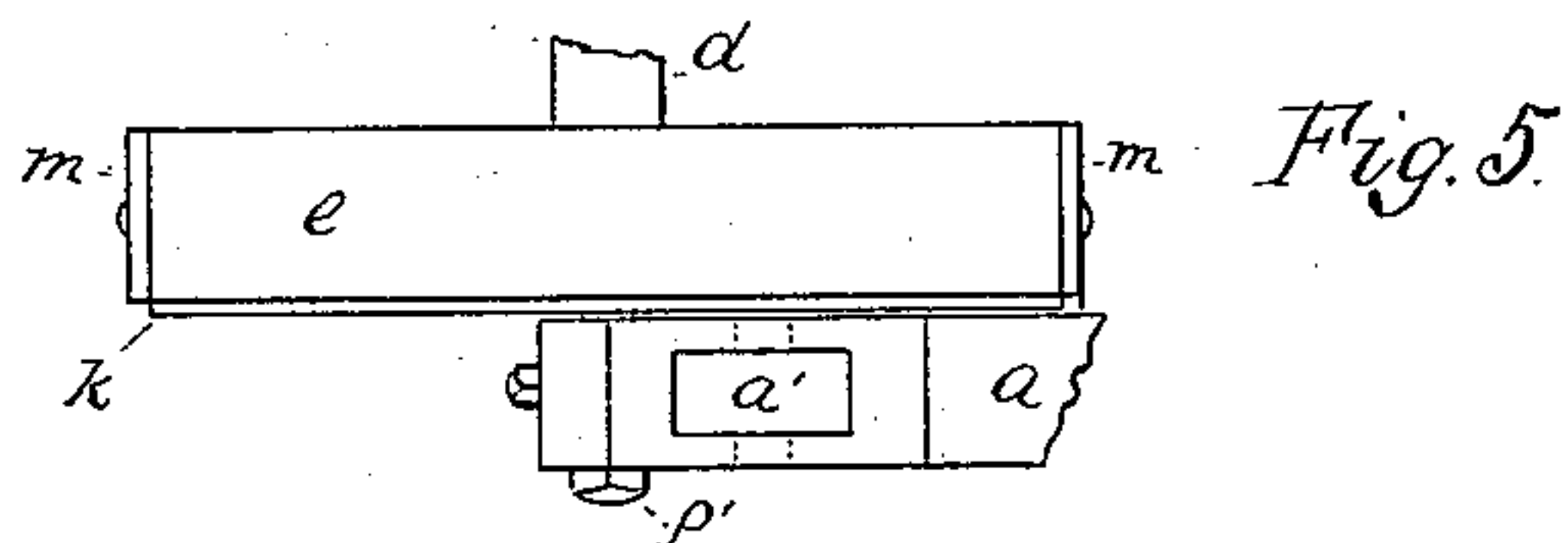
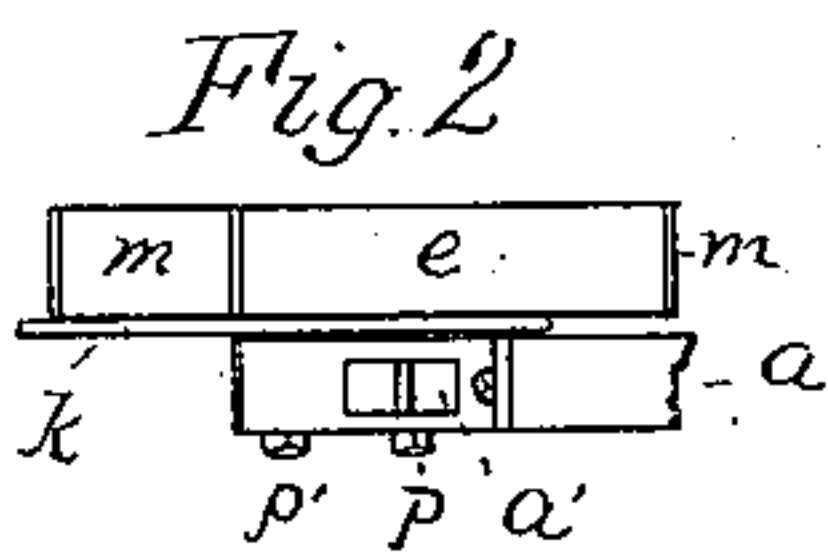
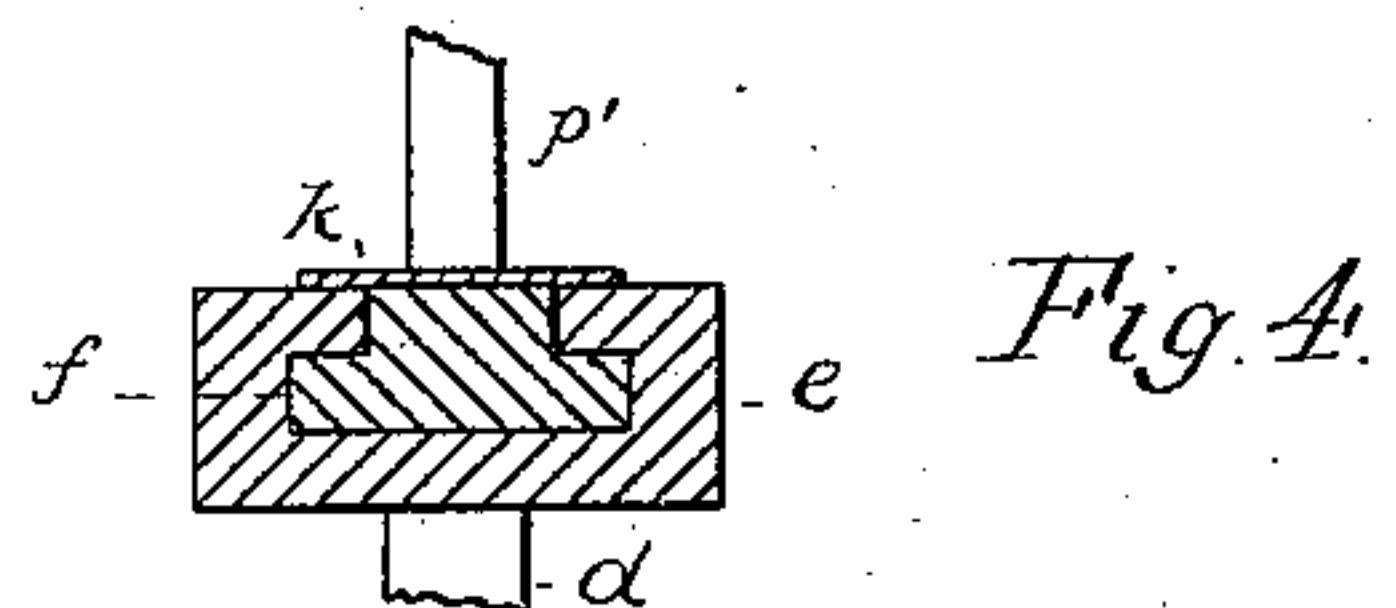
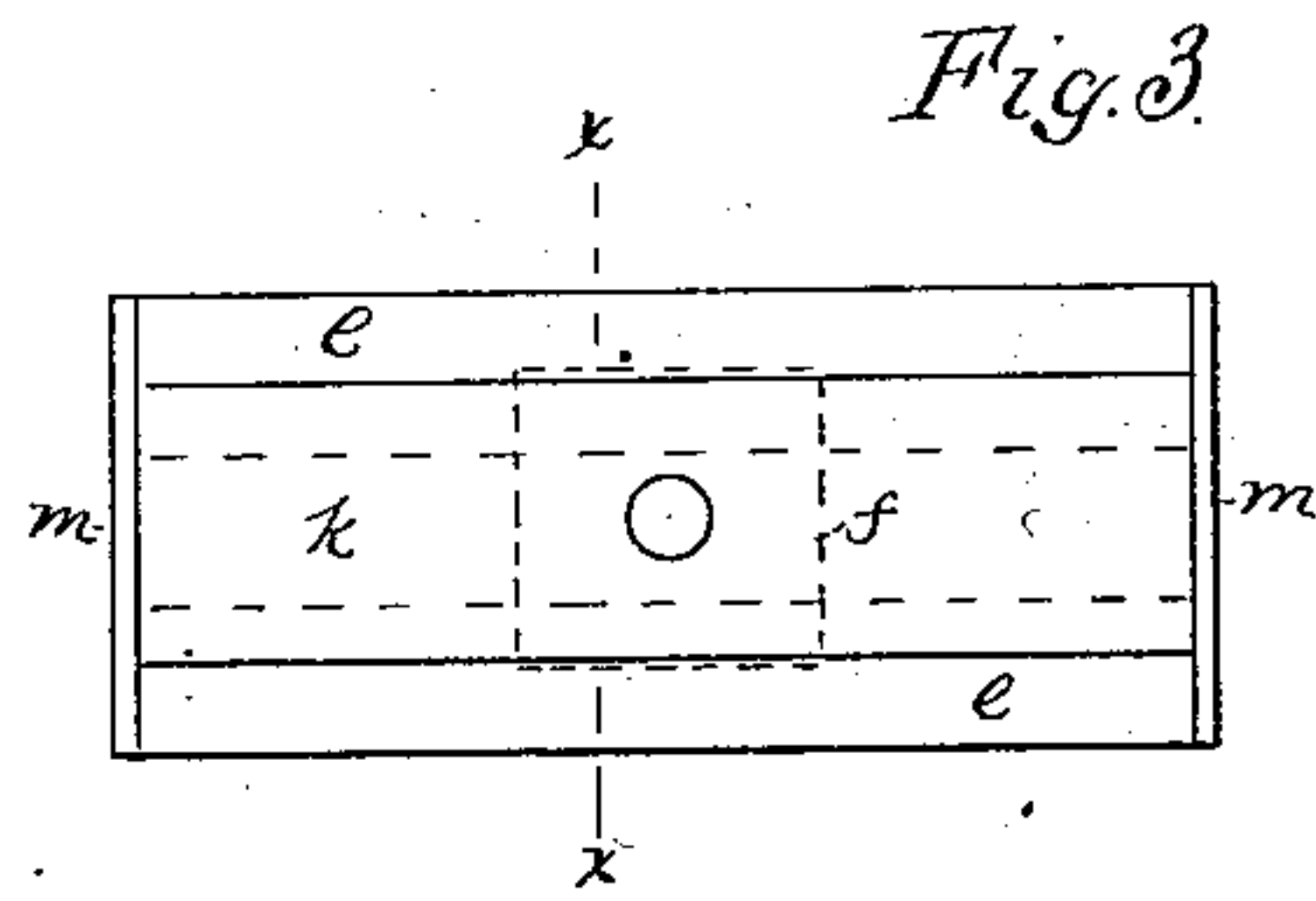
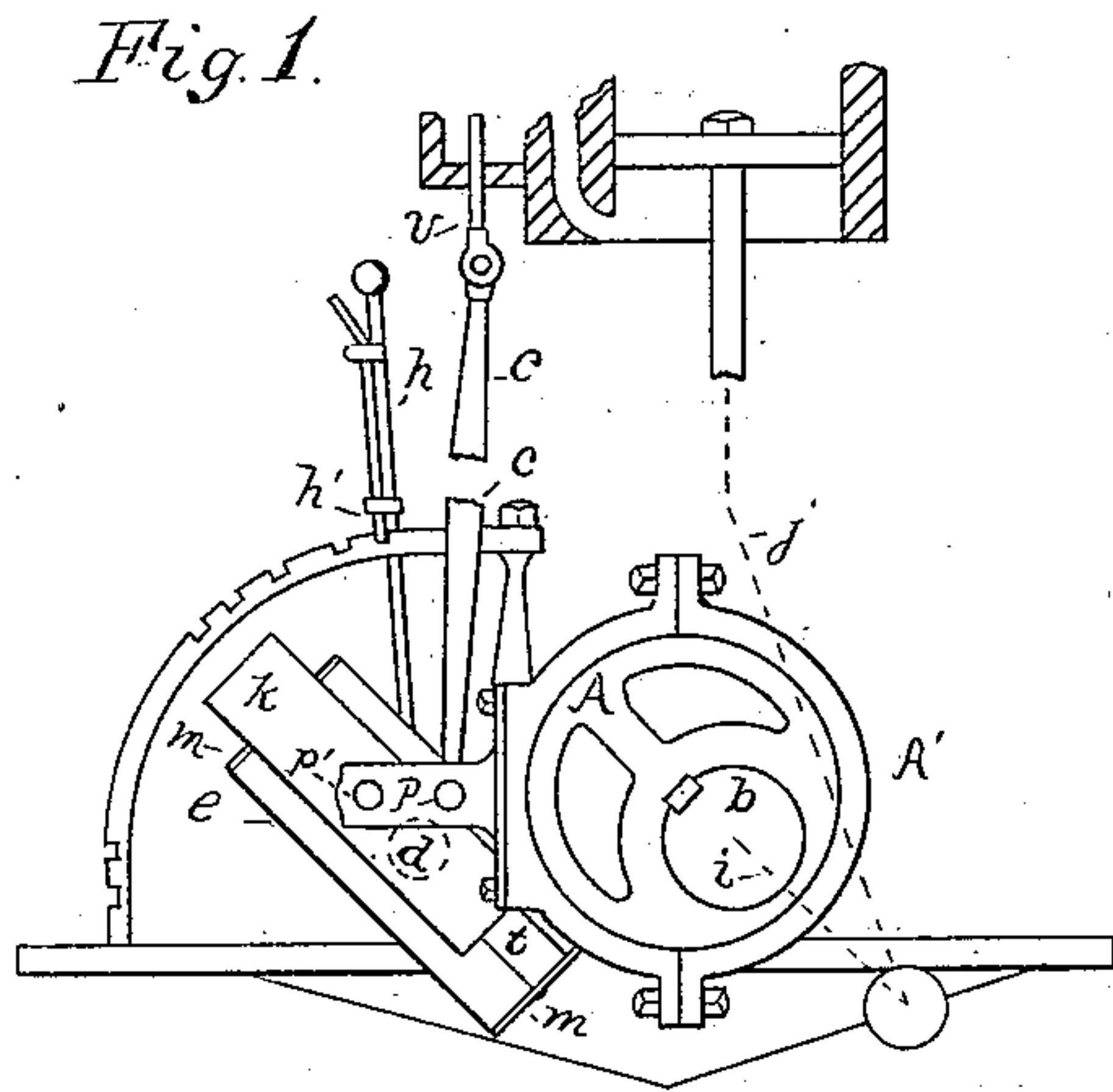


(No Model.)

J. GRIME.
VALVE GEAR FOR ENGINES.

No. 330,782.

Patented Nov. 17, 1885.



Witnesses:

C. J. Rockwood
H. H. Gnae

Inventor:

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By P. H. Gunkel
Attorney.

UNITED STATES PATENT OFFICE.

JOHN GRIME, OF MINNEAPOLIS, MINNESOTA, ASSIGNOR OF ONE-HALF TO
GEORGE H. EASTMAN, OF SAME PLACE.

VALVE-GEAR FOR ENGINES.

SPECIFICATION forming part of Letters Patent No. 330,782, dated November 17, 1885.

Application filed August 15, 1885. Serial No. 174,472. (No model.)

To all whom it may concern:

Be it known that I, JOHN GRIME, a citizen of the United States, residing at Minneapolis, in the county of Hennepin and State of Minnesota, have invented certain new and useful Improvements in Valve-Gears for Engines, of which the following is a specification.

My invention relates to the valve-gear for engines in which the valves are operated with one eccentric; and it is the object of the invention to improve the construction and arrangement of the slide-block and guide and eccentric; and the invention is specially designed as an improvement upon the invention disclosed in Letters Patent No. 307,128, granted to Louis C. Lugmayr and myself October 28, 1884.

The improvements are illustrated in the accompanying drawings, in which Figure 1 is a side elevation of an upright engine provided with the improvements. Figs. 2, 3, 4, 5, and 6 are details of the slide-block, guide, and eccentric arm; and Fig. 7 is a modification in which a pair of slide-blocks and guides are used with one eccentric.

A is the eccentric on a shaft, *b*, and has an arm, *a*, extending from the strap A'. The crank on the shaft *b* and the rod connecting the crank with the cross-head are respectively indicated by the dotted lines *i* and *j* in Fig. 1.

c is a rod connecting the eccentric arm *a* with the valve-stem *v*. The eccentric arm has a vertical slot, *a'*, in which the end of the rod *c* is pivoted by a pin, *p*, through a hole, *a*², and the slot has sufficient length to allow the necessary oscillation of the rod *c*. In the end of the arm *a* is a semicircular groove, and a cap, *a*³, having a corresponding groove, is fastened on the end of the arm, thus forming a hole, *a*⁴, for pivoting the arm *a* to the slide-block.

d is a rock-shaft to which is attached a hand-lever, *h*. The lever is moved along a notched segmental guide, and a catch, *h'*, on the lever holds it in the notch to which it is turned.

e is a guide carried on the end of the rock-shaft *d*; and *f* is the slide-block, operating in the opening of the guide *e*. The block is piv-

oted to the eccentric arm *a* by a pin, *p'*, passed through the hole *a*⁴. The guide *e*, as shown in the drawings, is a rectangular piece of metal having an opening in its face with lateral recesses, forming an elongated chamber, *t*, of T-shape in cross-section, for the block *f* to slide in. Caps *m* are fastened on the ends of the guide block, covering the openings, to prevent the escape of oil and to exclude dirt. The block *f* is a solid piece conforming in width to the chamber *t* and adapted to slide in it.

k is a thin metal plate of any suitable length and a little wider than the opening in the face of the guide, and is secured on the block *f*, so as to be carried by the block and slide on the surface of the guide. In the drawings the plate *k* is shown of the same length as the guide, and serves to a great extent to exclude dirt from the chamber and to work off from the face of the guide the exuded oil and dirt. This plate being thin, the eccentric arm may be pivoted close to the block and guide, and the rod *c* being connected within the arm instead of at one side, the lateral strain and tendency of the parts to twist are obviated.

By means of the lever *h* the rock-shaft *d* can be turned, so as to carry either end of the guide above or below the axis of the rock-shaft or to place the guide in a horizontal plane with it. The extent of the valve movement depends upon the inclination of the guide *e*, the shortest valve movement being when the guide is in line with the eccentric arm, and the longest movement when the guide is turned to either of its extreme positions. The eccentric arm *a* being moved in and out by the rotation of the shaft *b* reciprocates the block *f* in its guide *e*, and reciprocates also the rod *c* for sliding the valves, and the inclination of the guide *e*, thus regulates the extent of the reciprocations of the rod *c*, and controls the valve movement.

In Fig. 7 is shown a modified construction in which a guide, *e'*, and slide-block *f'* are used at each side of the eccentric arm *a*. The outer ends of the guides are connected by a cross-piece, *e*², otherwise the guides and blocks are the same as those above described. The

sliding plate *k* is necessarily made shorter because of the cross-piece *e*². This form of construction may be used to advantage in large engines.

5 What I claim, and desire to secure by Letters Patent, is—

1. The combination in a valve-gear, with an eccentric and rock-shaft, of a guide having a slide-channel widened interiorly and extending to the ends of said guide, removable covers for the ends of said channel, a slide-block in said channel, and a sliding plate on said guide, carried by said slide-block, substantially as set forth.

2. In a valve-gear, the combination of the following elements: a rock-shaft, a guide carried thereon having the channel *t*, the caps *m*, the slide-block *f*, the sliding plate *k*, and the eccentric arm *a*, pivoted to said slide block and plate, and having the slot *a'* and the cap *a*³, substantially as set forth. 15 20

JOHN GRIME.

Witnesses:

H. H. BRACE,
P. H. GUNCKEL.