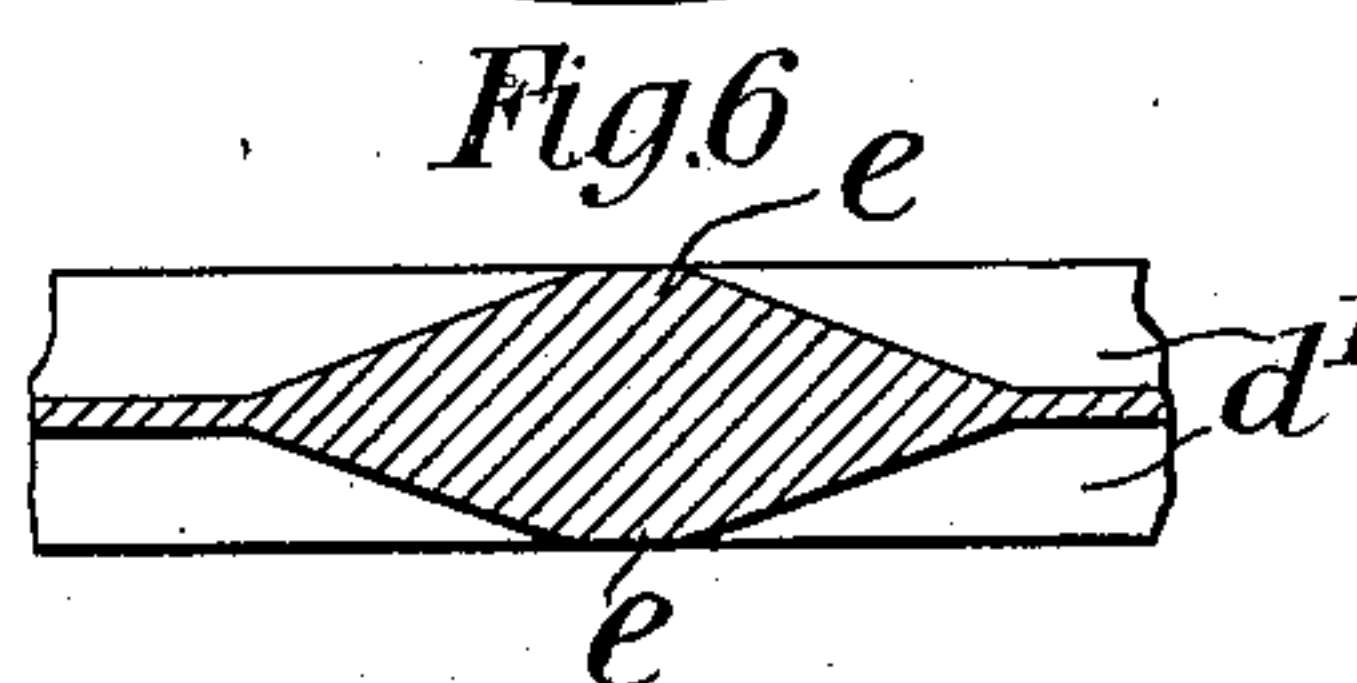
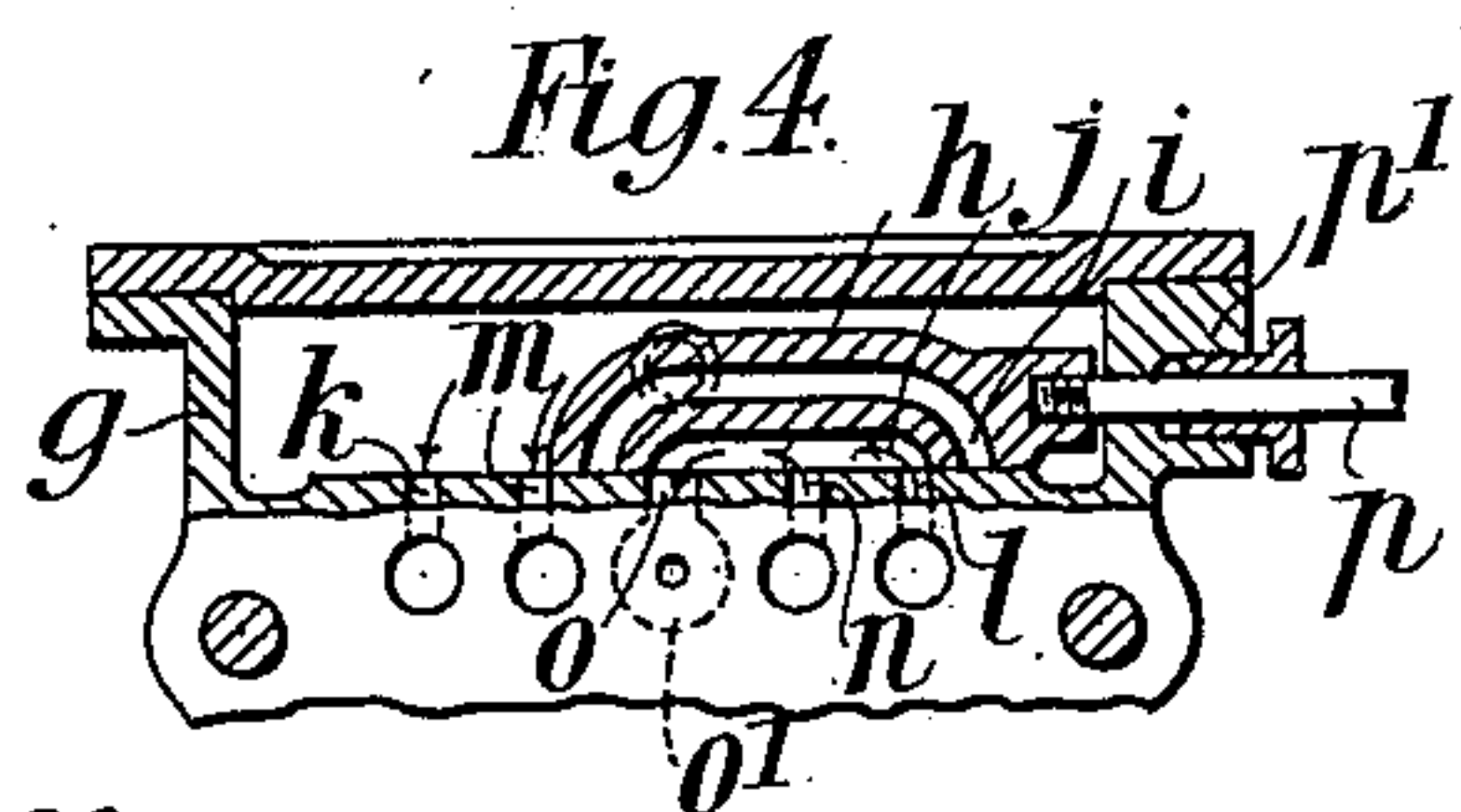
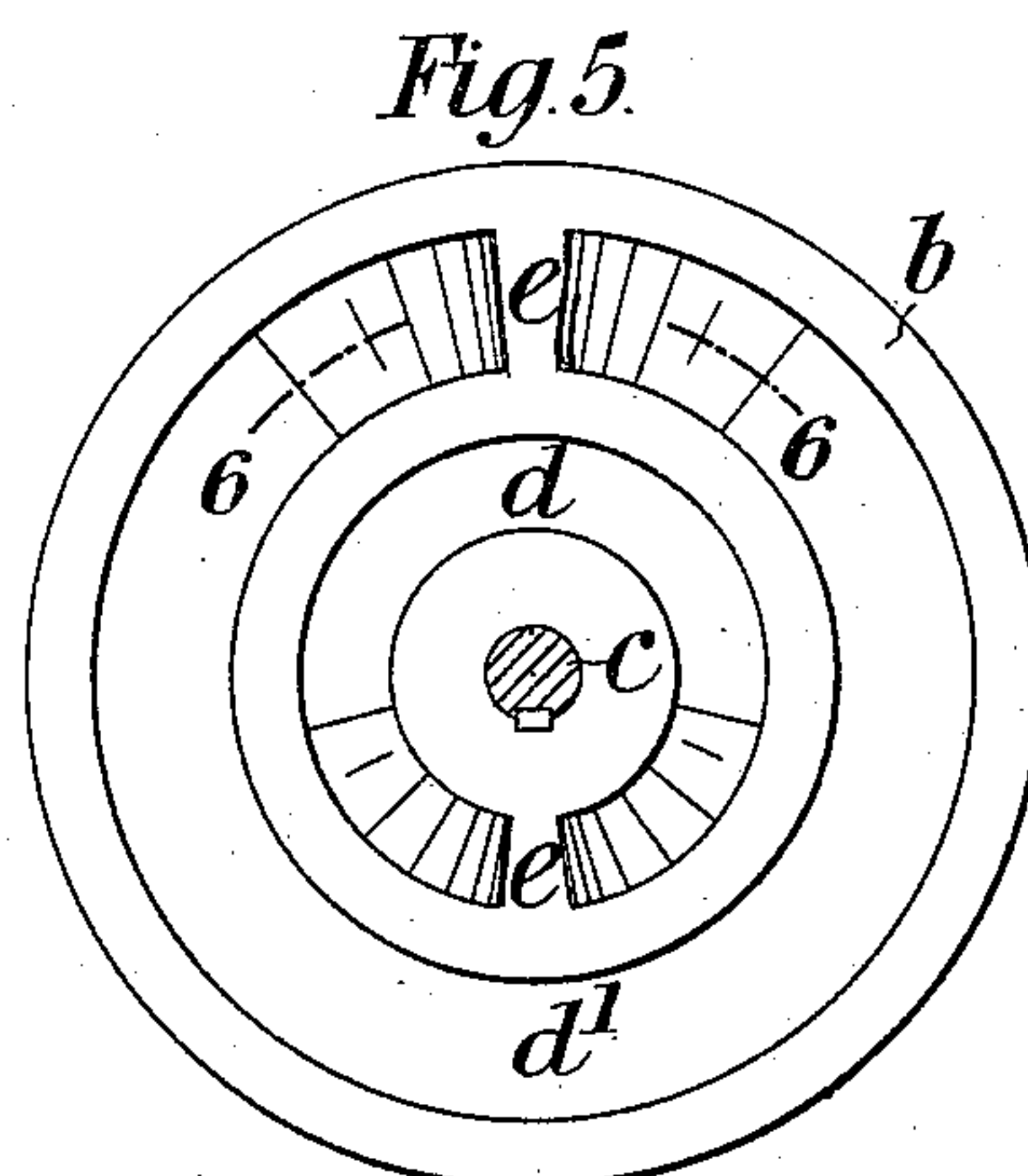
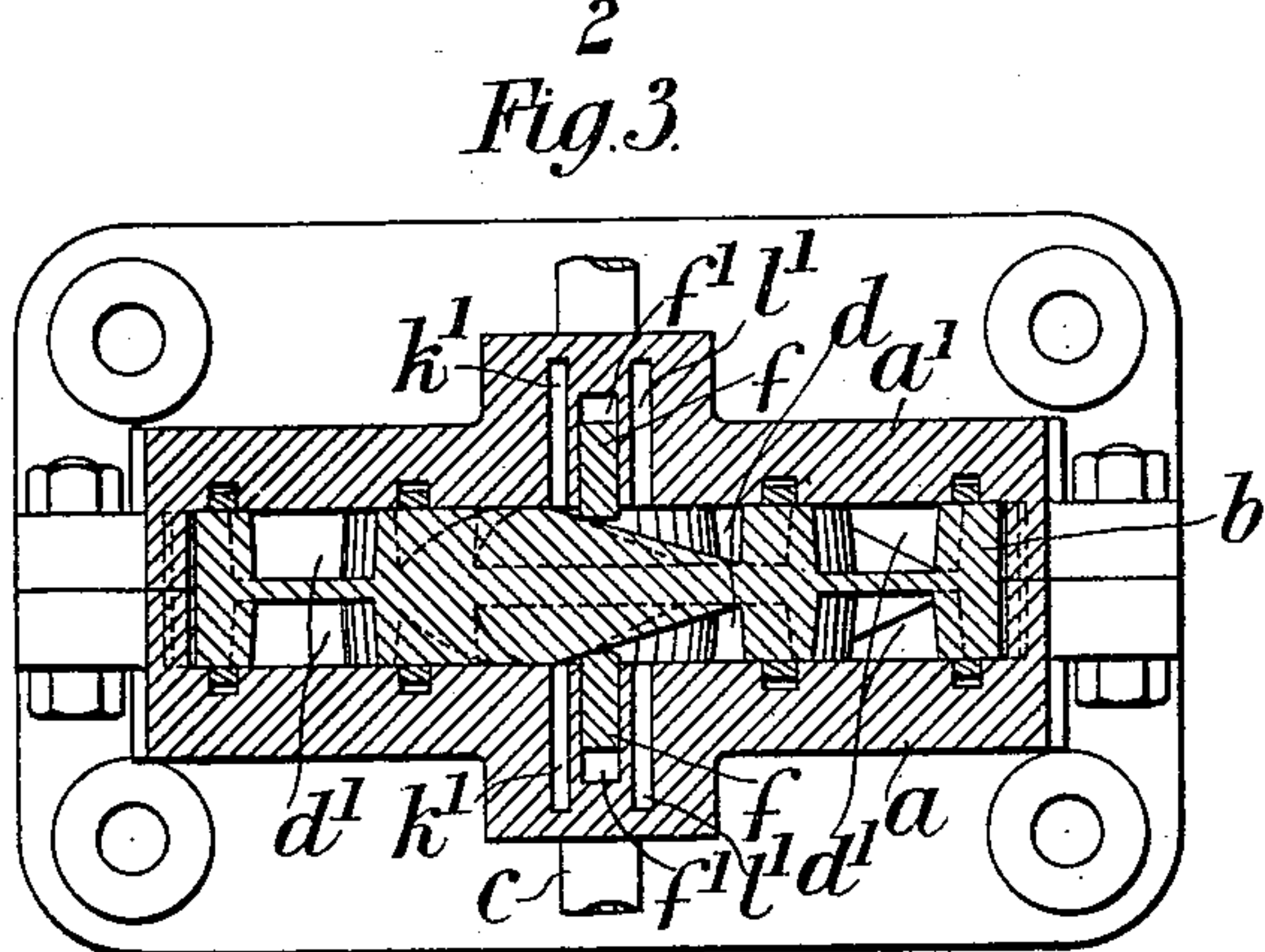
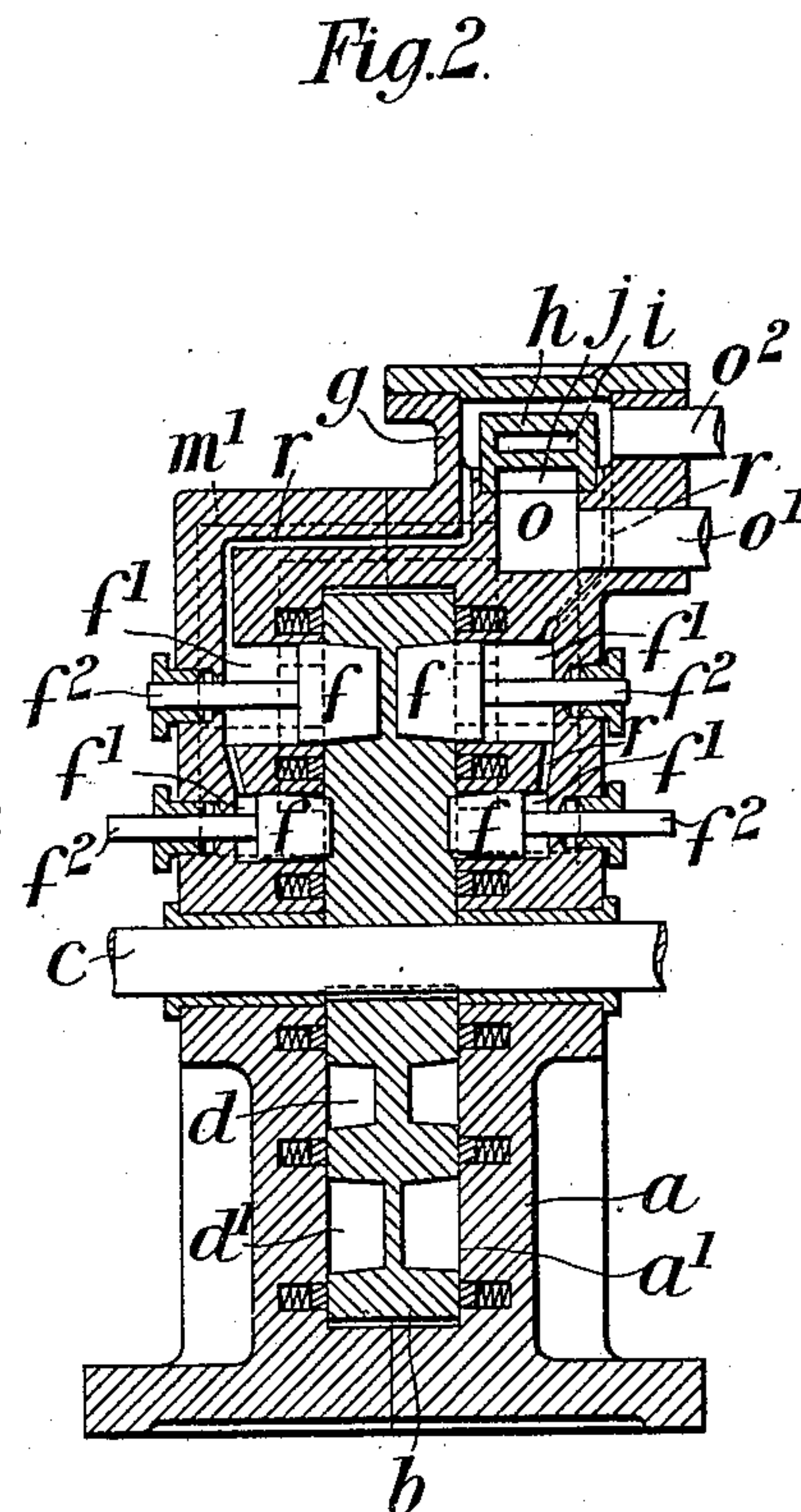
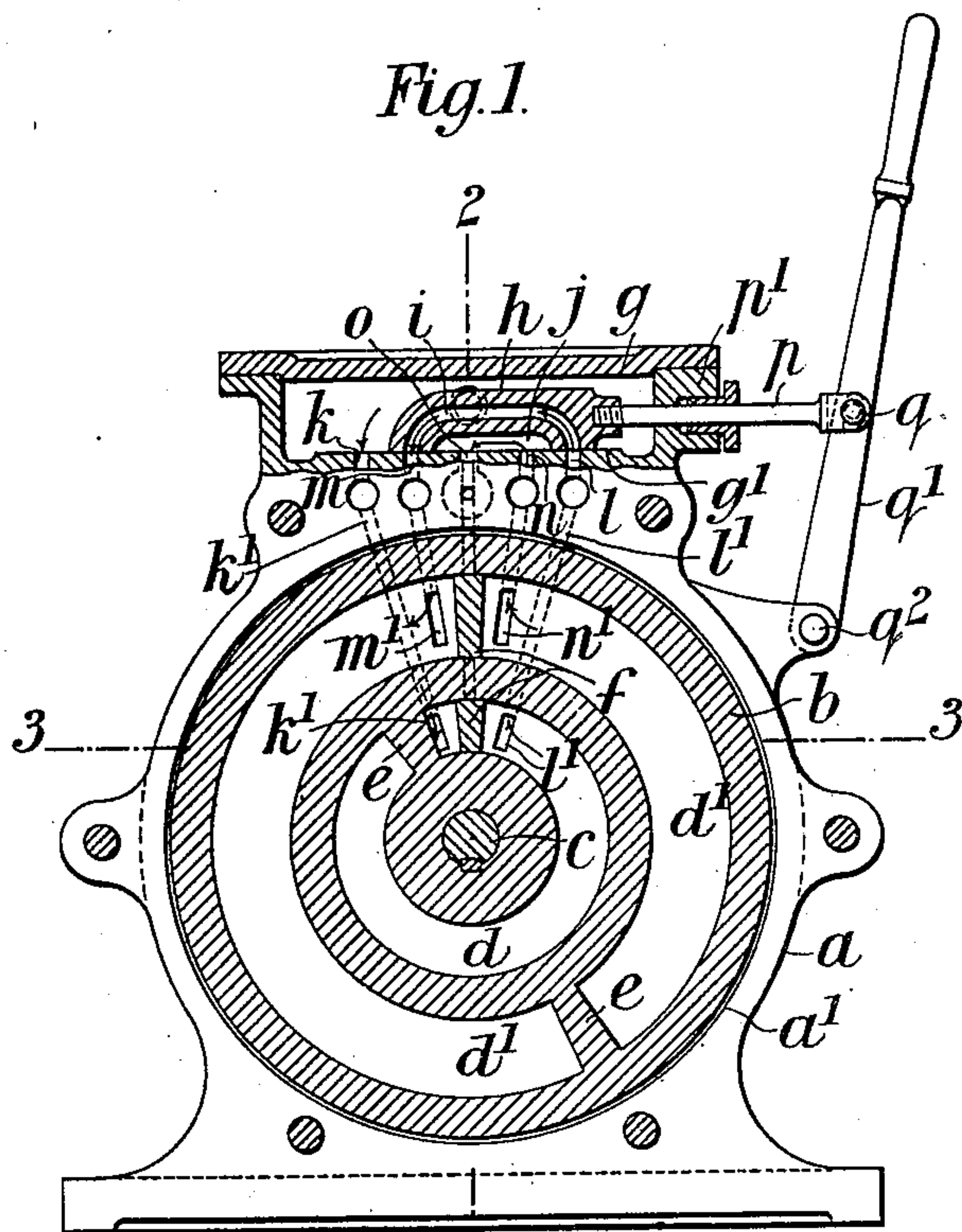


**C. TUCKFIELD.**

## DISTRIBUTING VALVE FOR STEAM ENGINES.

(Application filed Nov. 15, 1901.)

(No Model.)



*Witnesses.*

C. J. Redfern

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*Inventor.*

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# UNITED STATES PATENT OFFICE.

CHARLES TUCKFIELD, OF EAST MOLESEY, ENGLAND, ASSIGNOR OF TWO-THIRDS TO DYSON WESTON, OF LONDON, ENGLAND.

## DISTRIBUTING-VALVE FOR STEAM-ENGINES.

SPECIFICATION forming part of Letters Patent No. 706,131, dated August 5, 1902.

Application filed November 15, 1901. Serial No. 82,390. (No model.)

*To all whom it may concern:*

Be it known that I, CHARLES TUCKFIELD, a subject of the King of Great Britain, residing at 12 Palace Crescent, East Molesey, county of Surrey, England, have invented new and useful Improvements in Distributing-Valves for Steam-Engines, of which the following is a specification.

This invention relates to improvements in distributing-valves for steam-engines, and more particularly to those of the rotary type, the object being to provide means whereby an engine can be arranged to work as an ordinary high-pressure engine or as a compound engine and can also be reversed.

According to the invention I make use of a valve-chest having a face upon which there rests a valve provided with a number of passages which by adjusting the position of the valve upon the face can be brought to register with a system of ports opening into the valve-chest and the steam-spaces of the engine in such a manner that the said engine can be caused to act as a high-pressure engine, high-pressure steam being admitted to all the steam-spaces, or as a compound engine, the steam exhausting from one set of steam-spaces to another. By further adjusting the position of the valve the direction of rotation of the engine-shaft can be controlled.

To fully explain the invention, I will describe it by reference to the accompanying drawings, in which the distributing-valve is shown applied to a compound rotary motor of the kind described in my application of even date herewith.

In the said drawings, Figure 1 is a sectional elevation of the motor and distributing-valve. Fig. 2 is a section on the line 2 2, Fig. 1. Fig. 3 is a section on the line 3 3, Fig. 1. Fig. 4 is a sectional elevation of the distributing-valve, showing it in a different position from that illustrated in Fig. 1. Fig. 5 is an elevation of the piston-disk; and Fig. 6 is a developed section on the line 6 6, Fig. 5.

The motor comprises the casing *a*, having a circular recess *a'*, in which is located the disk *b*. This disk is keyed upon the shaft *c*, rotatably mounted in the casing *a*, and is formed upon each of its lateral faces with annular grooves *d d' d'*. These grooves are, how-

ever, not continuous, but are stopped at one point, as shown at *e e*, Figs. 1 and 5. In connection with each groove *d d'* there is arranged a sliding abutment *f*, located in a recess *f'* in the casing and having a stem *f<sup>2</sup>*, which passes through a stuffing-box in the said casing. These sliding abutments are shaped to fit the grooves *d d'* and are held therein by the pressure of steam behind them.

*g* is the valve-casing, having the face *g'*, and *h* is the valve, which is located in the casing *g* and is supported upon the said face *g'*. This valve *h* is provided with a passage *i*, extending through its whole length and opening at each end at its under side, and also with a recess *j* upon its under side. This passage and the recess are adapted to be brought into coincidence with a number of ports *k l m n* in the valve-face *g'*. The ports *k* and *l* have branches *k'* and *l'*, which extend to the two grooves *d d'* in the disk *b*, and the ports *m* and *n* have branches *m' n'*, which extend to the two grooves *d'* in the said disk. Furthermore, the valve-face *g'* has an opening *o* in communication with the exhaust *o'*.

*o<sup>2</sup>* is the steam-inlet to the casing *g*.

With this arrangement when the valve *h* is in the position shown in Fig. 1 steam passes from the chest *g*, through the ports *k* and *k'*, to the two grooves *d* between the stops *e e* and the abutments *f f*, thereby rotating the disk. As soon as the stops *e e* have passed the ports *l' l'* the steam escapes from the grooves *d* and flows through the said passages *l'*, the port *l*, the valve-passage *i*, port *m*, passages *m'* into the grooves *d'*, after flowing through which and actuating the disk *b* it escapes through the passages *n' n'* into the port *n* and thence into the valve-recess *j* and through the port *o* into the exhaust *o'*. In this position of the valve, therefore, the engine operates as a compound engine. In the position of the valve *h* (shown in Fig. 4) the steam from the valve-chest *g* passes through the ports *k* and *m* and the passages *k' m'* directly to all the disk-grooves, from which it escapes after doing its work through the passages *l' n'* and ports *l n* to the valve-recess *j* and exhaust *o o'*. It will be clear that by moving the valve to the same positions on the other side of the median plane of the engine



the same results are obtained, except that the disk rotates in the opposite direction.

The position of the valve can advantageously be controlled by the rod *p*, which passes through a stuffing-box *p'* on the valve-casing *g* and is pivoted at *q* to a lever *q'*, fulcrumed at *q<sup>2</sup>* to the casing *a*. The steam to keep the abutments in the grooves *d d'* is supplied from the valve-chest *g* through the passages *r r*.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is—

1. In a steam-engine having more than one steam-cylinder or steam-space, a valve-casing having steam ports and passages communicating with each end of the said cylinders or steam-spaces and a slide-valve movable to different positions having passages therein, whereby two positions of the slide-valve will make cylinders or steam-spaces high-pressure engines in opposite directions and two other positions will make the cylinders or steam-spaces a compound engine in opposite directions, substantially as described.

2. The combination with a motor provided with a plurality of cylinders or steam-spaces, of a valve-chest provided with a main inlet and an exhaust-outlet, and with separate inlet and exhaust ports communicating with

each of said cylinders or steam-spaces, a sliding valve in said chest, provided with a passage for connecting the exhaust-ports for one cylinder or steam-space with the inlet-ports of another cylinder or steam-space and a separate passage, for connecting the exhaust-port of the last cylinder or steam-space with the main exhaust, whereby two positions will make the cylinders or steam-spaces high-pressure engines moving in opposite directions and two other positions will make said cylinders or steam-spaces a compound engine moving in opposite directions, substantially as described.

3. The combination with a motor provided with a plurality of cylinders or steam-spaces, of a valve-chest provided with a main inlet and an exhaust-outlet, and with separate inlet and exhaust ports communicating with each of said cylinders or steam-spaces, a sliding valve in said chest provided with separate passages for independently connecting certain ports of the valve-casing whereby the motor may be adjusted as a high-pressure or compound motor, and reversed, in either adjustment, and means for moving said valve, substantially as described.

CHARLES TUCKFIELD.

Witnesses:

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A. ALBUTT.