

No. 897,904.

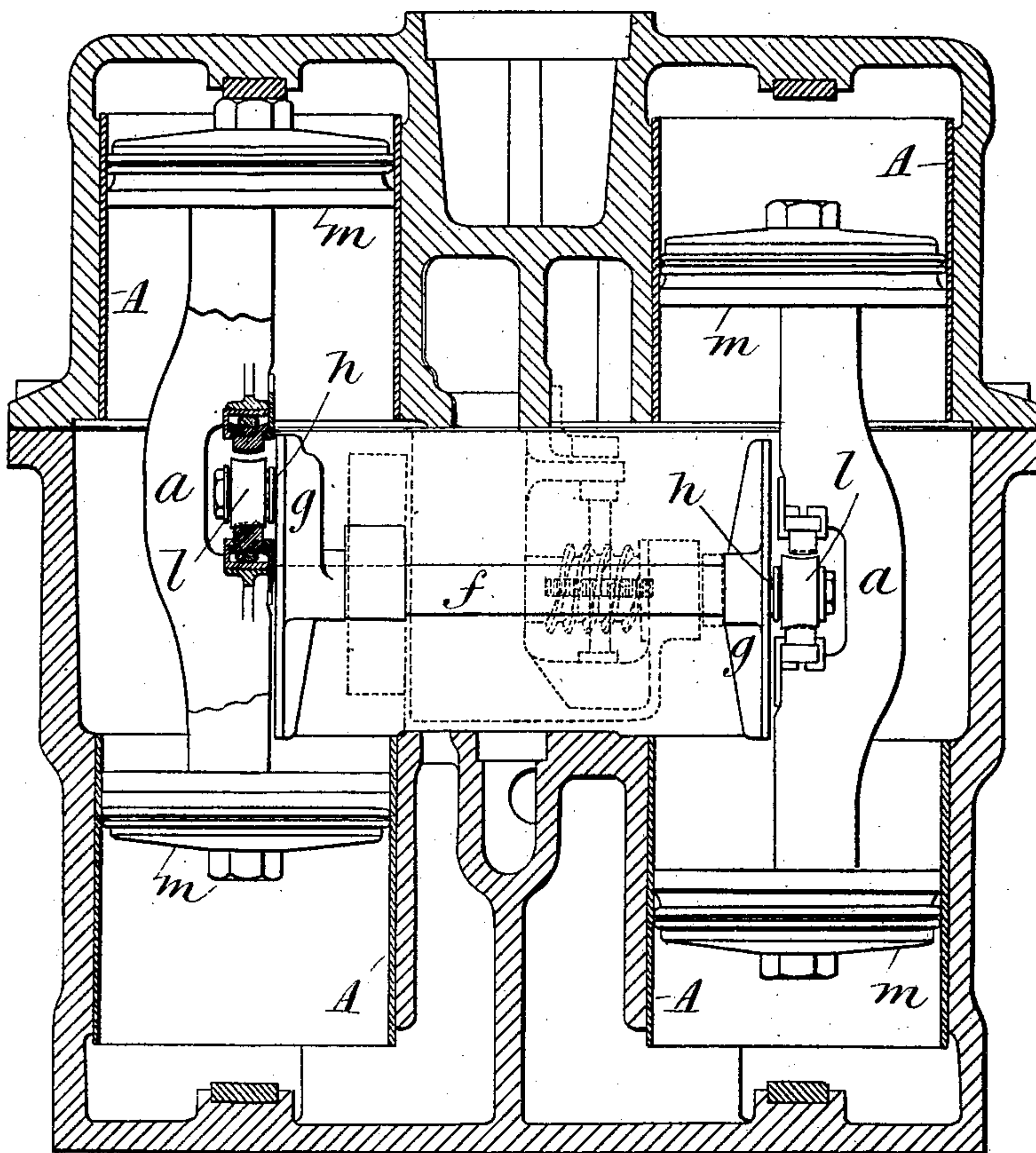
PATENTED SEPT. 8, 1908.

W. G. KENT.
LIQUID METER.

APPLICATION FILED JULY 23, 1907.

4 SHEETS—SHEET 1.

Fig. 1.



Witnesses.

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4 SHEETS—SHEET 2

Fig. 2.

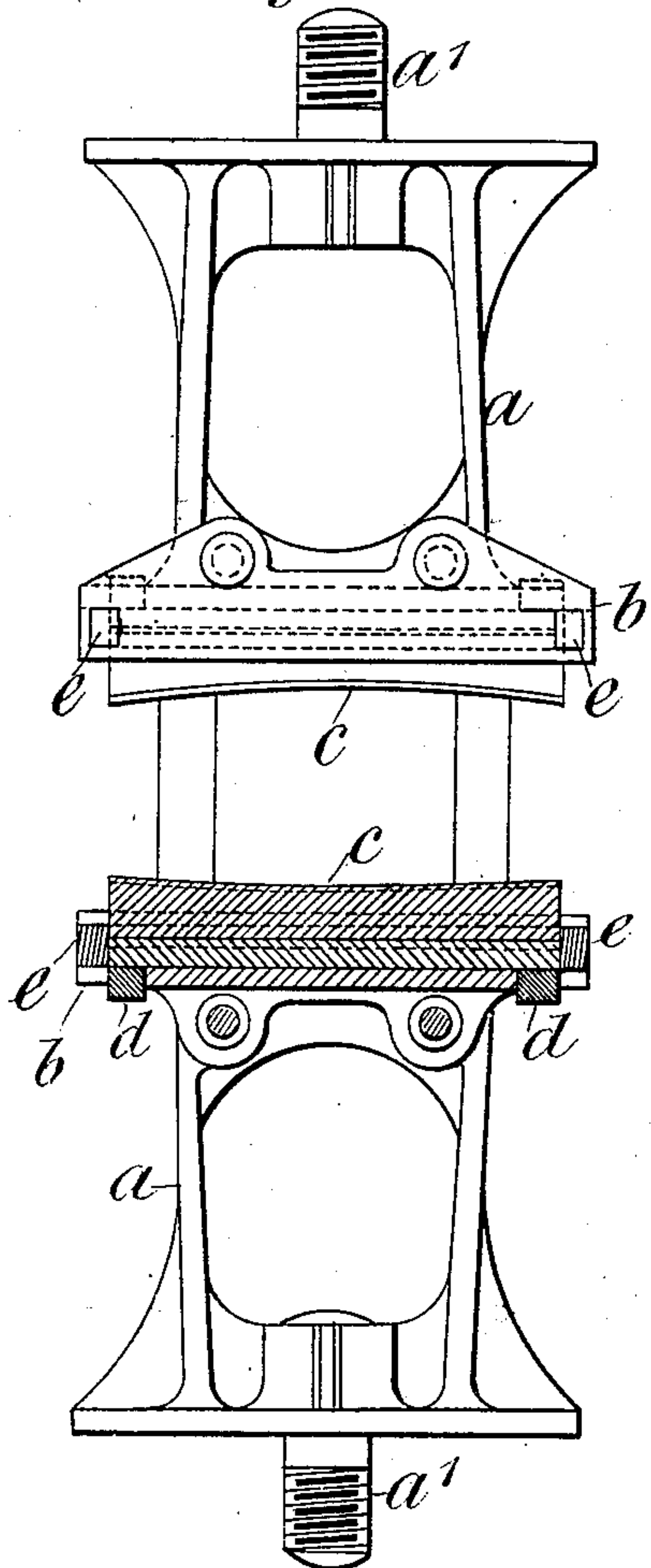


Fig. 3.

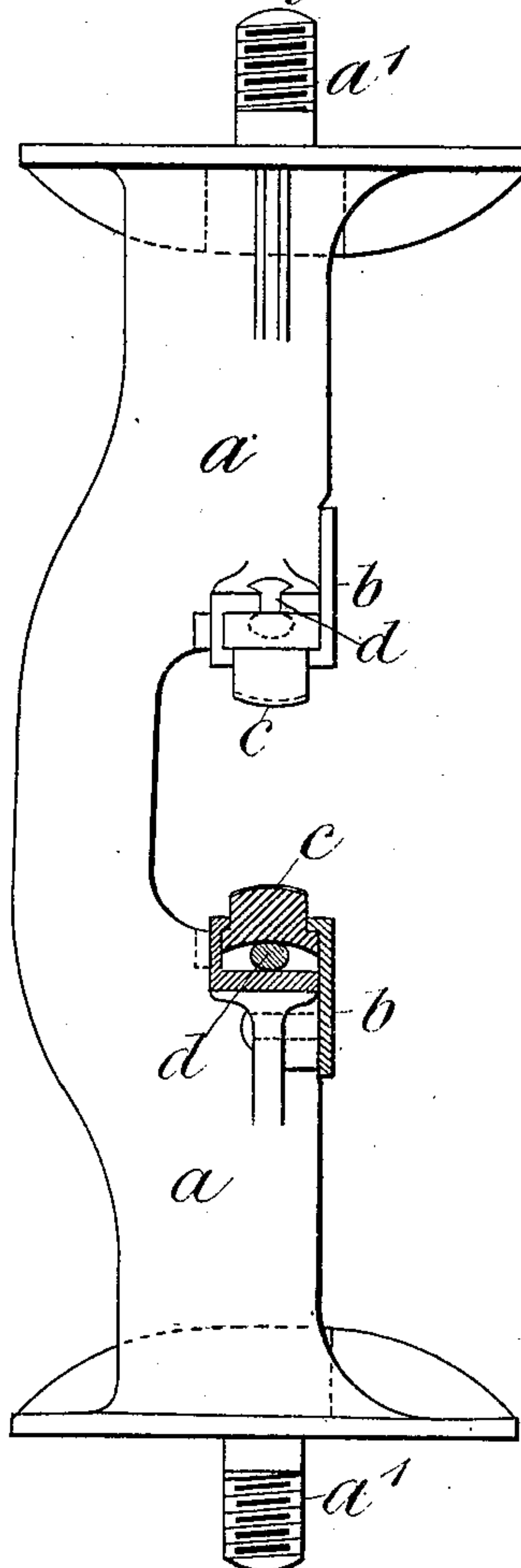


Fig. 4.

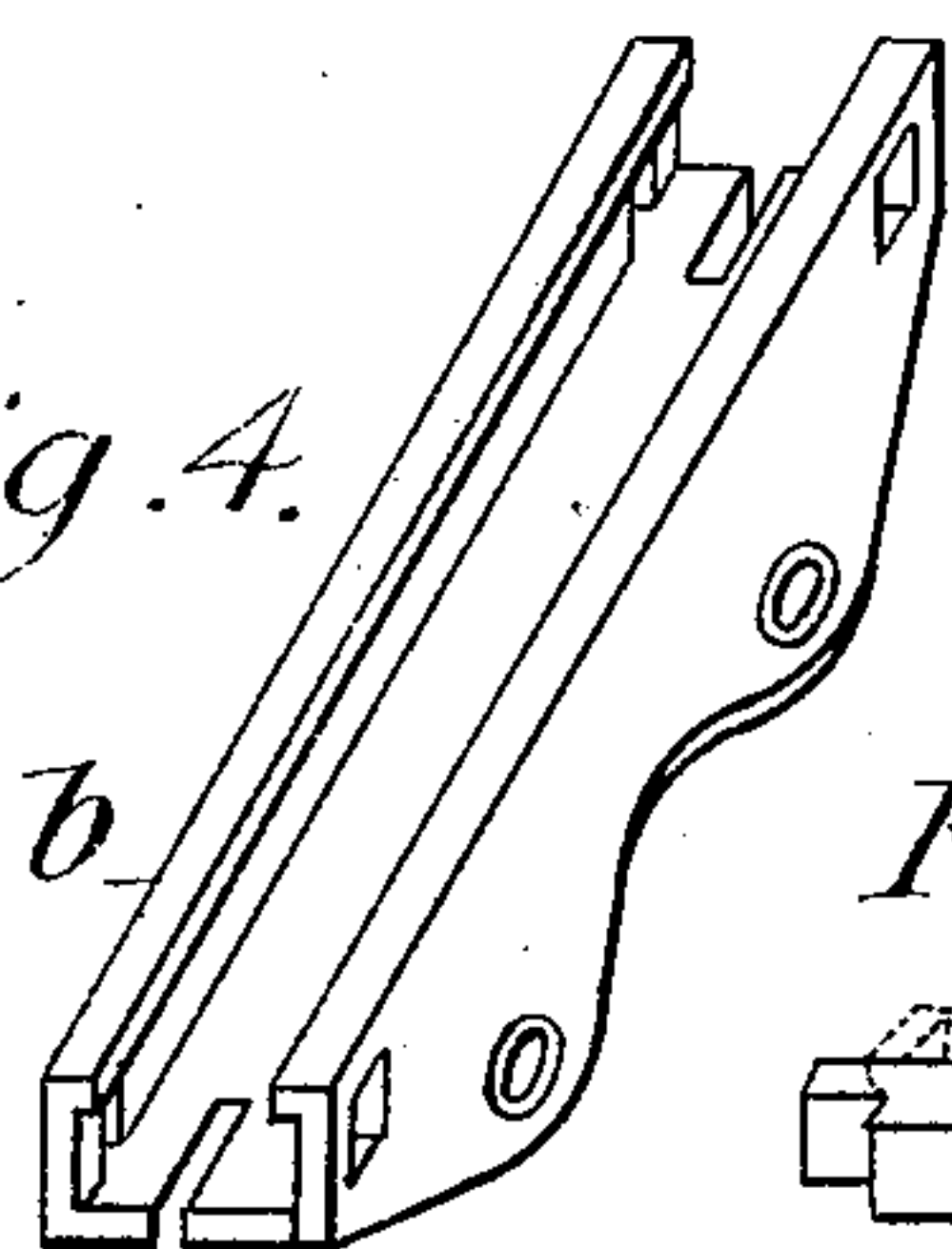
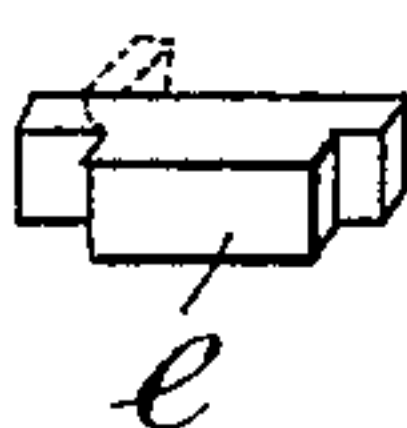


Fig. 5.



Witnesses.

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4 SHEETS—SHEET 3.

Fig. 6.

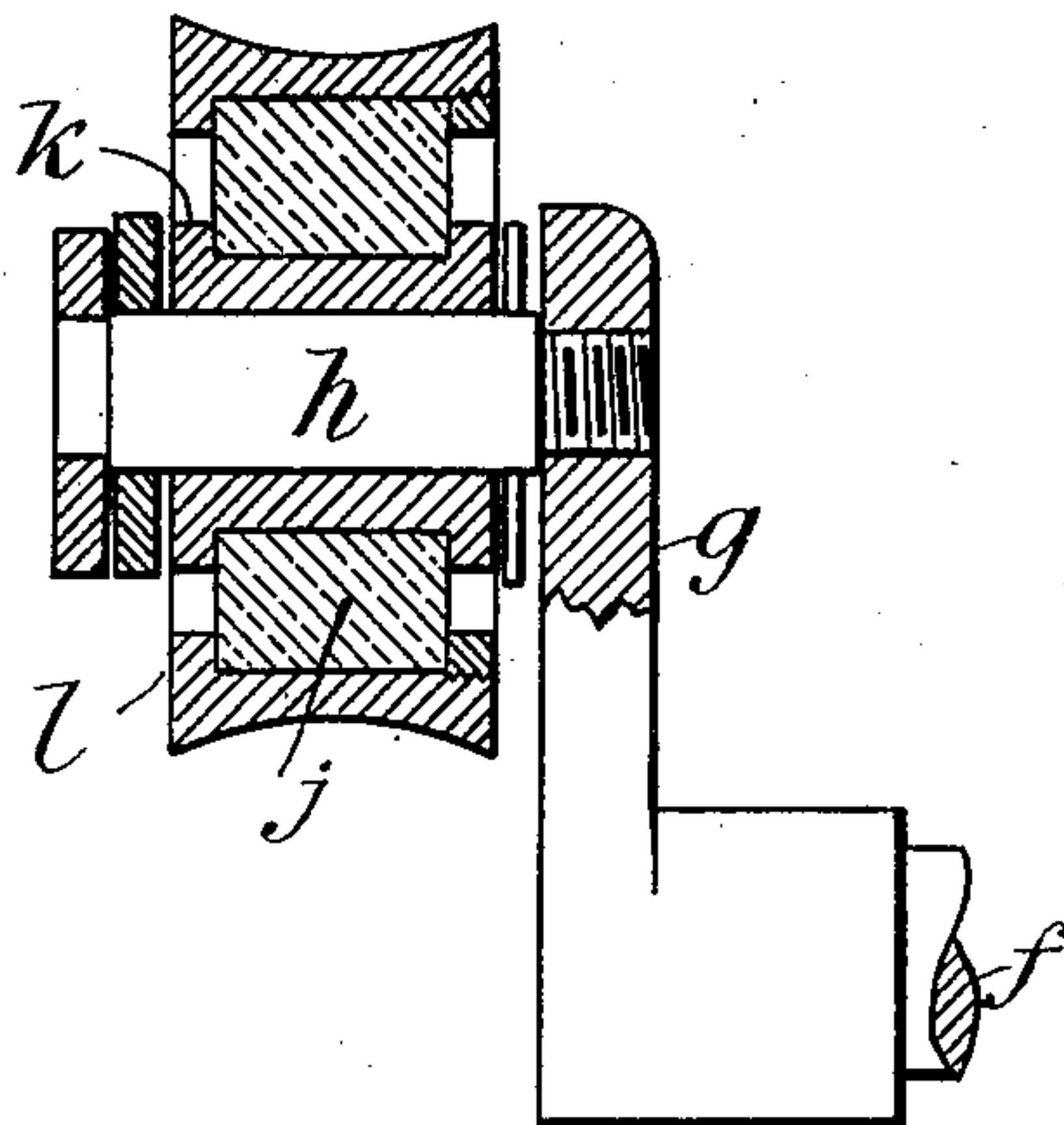


Fig. 7.

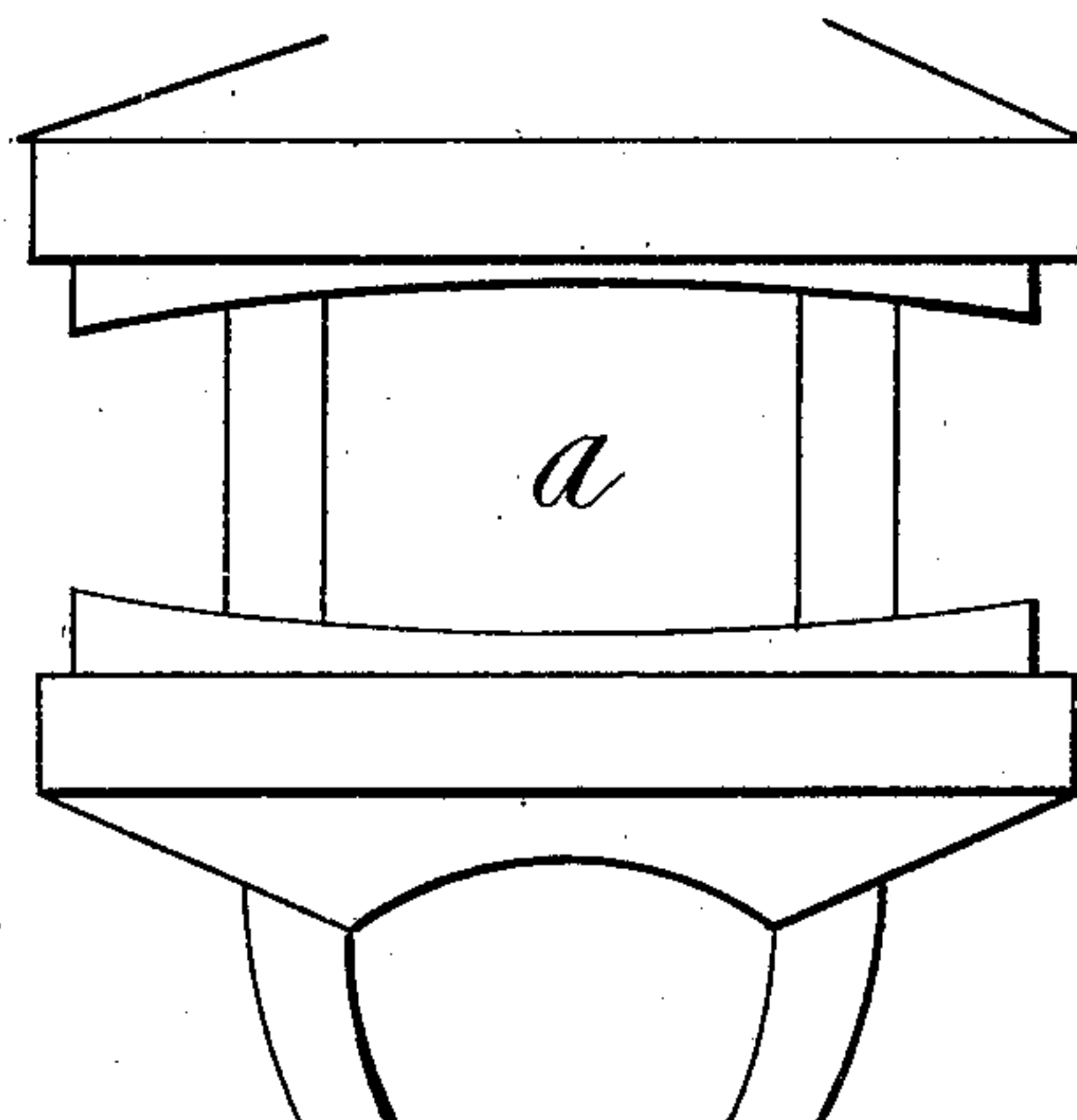


Fig. 8.

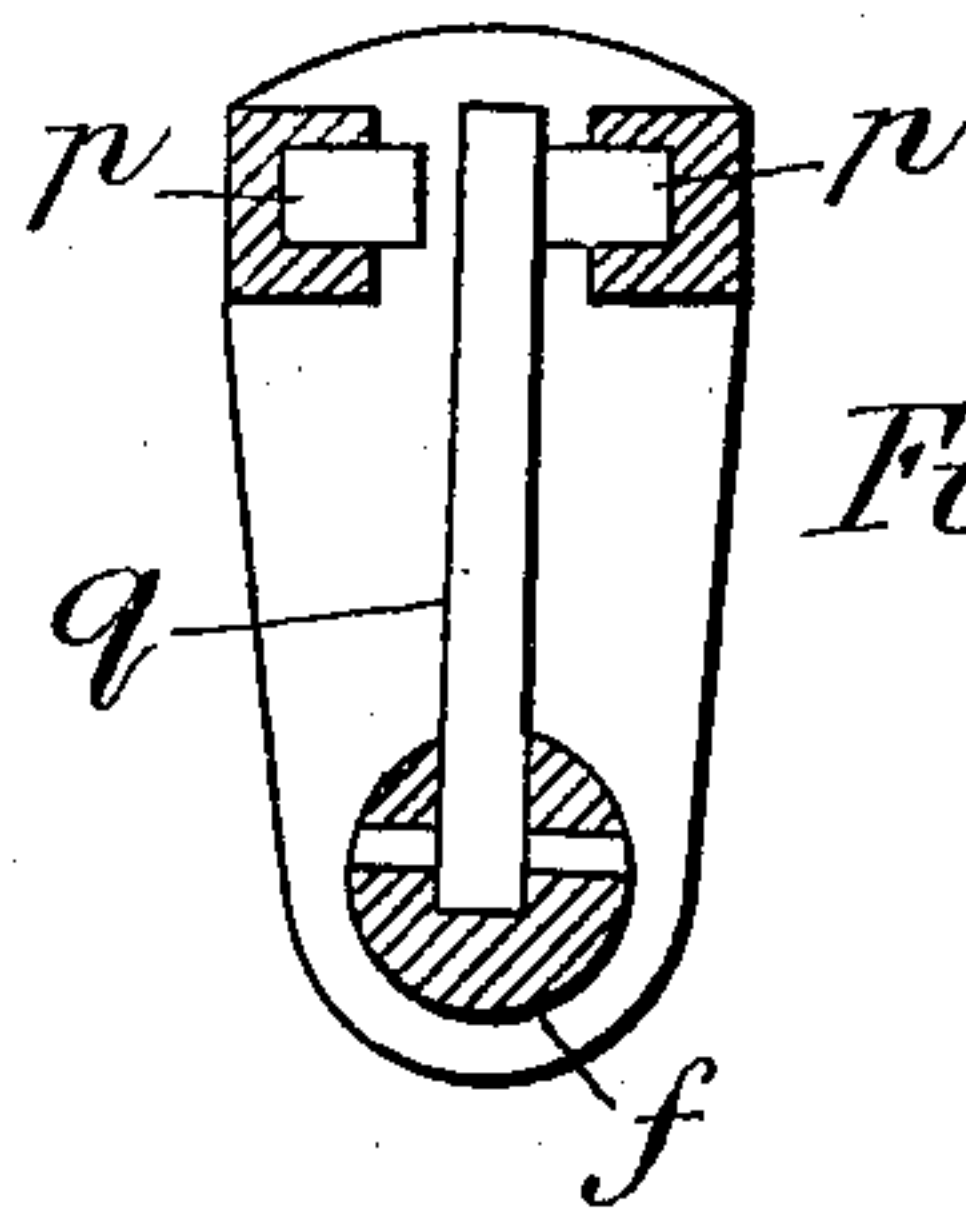
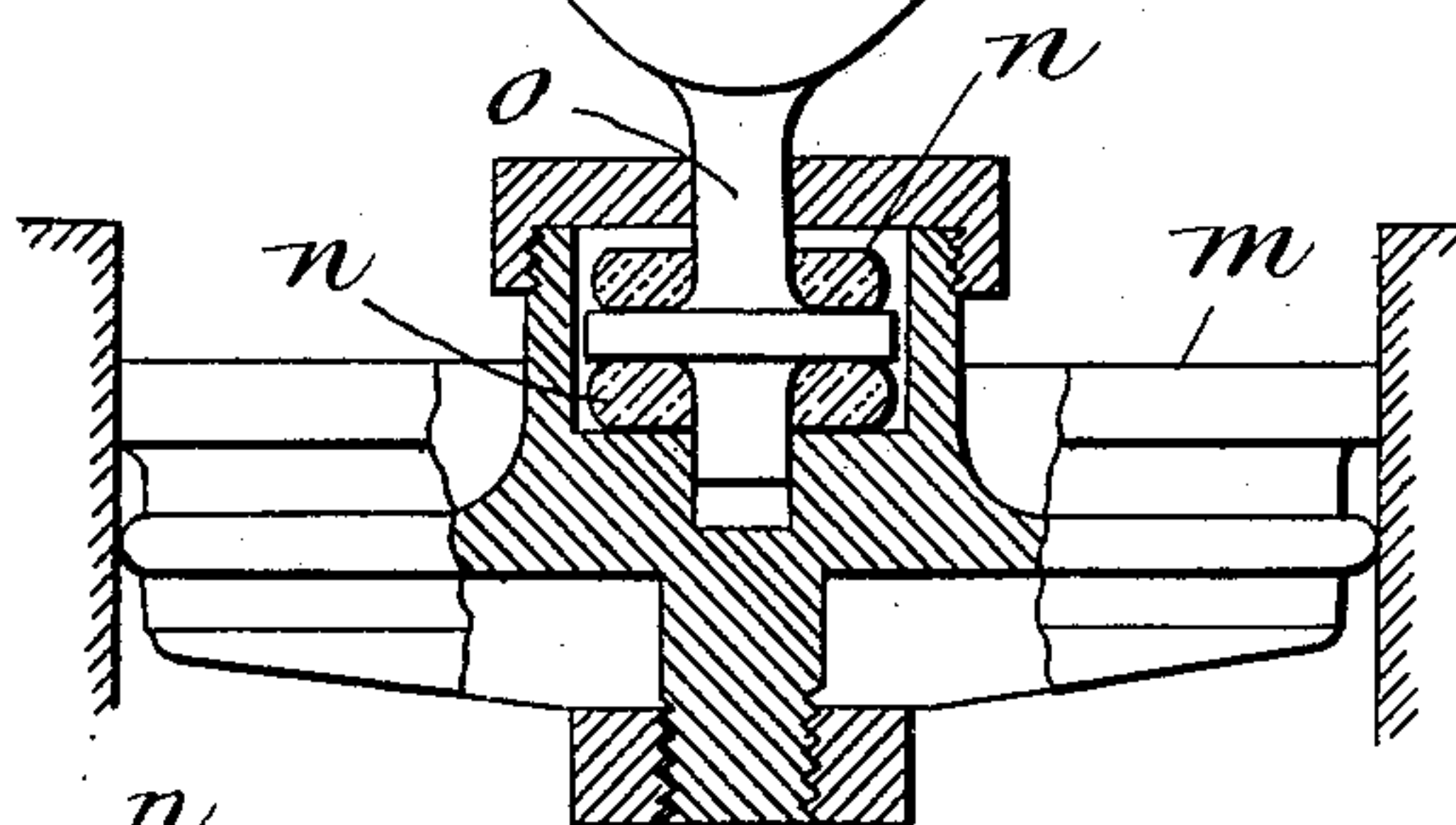
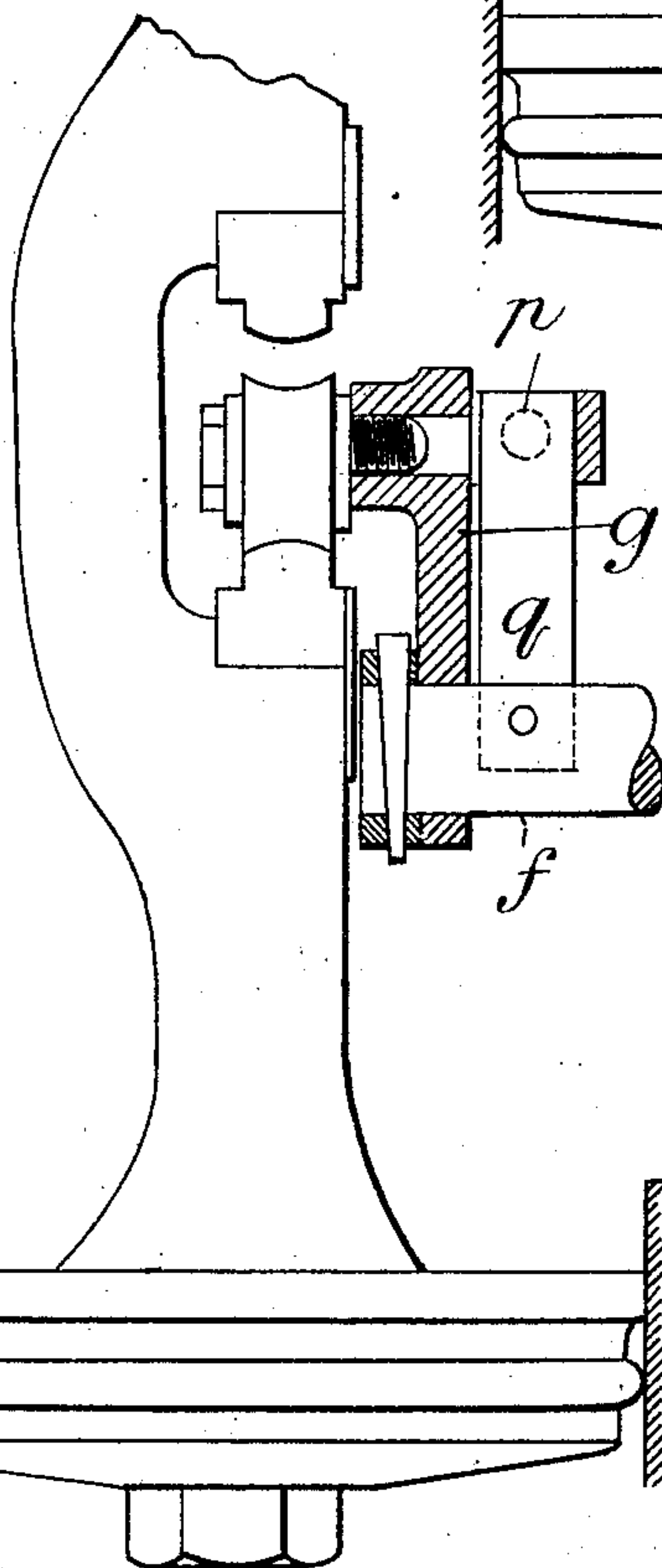


Fig. 9.

Witnesses.
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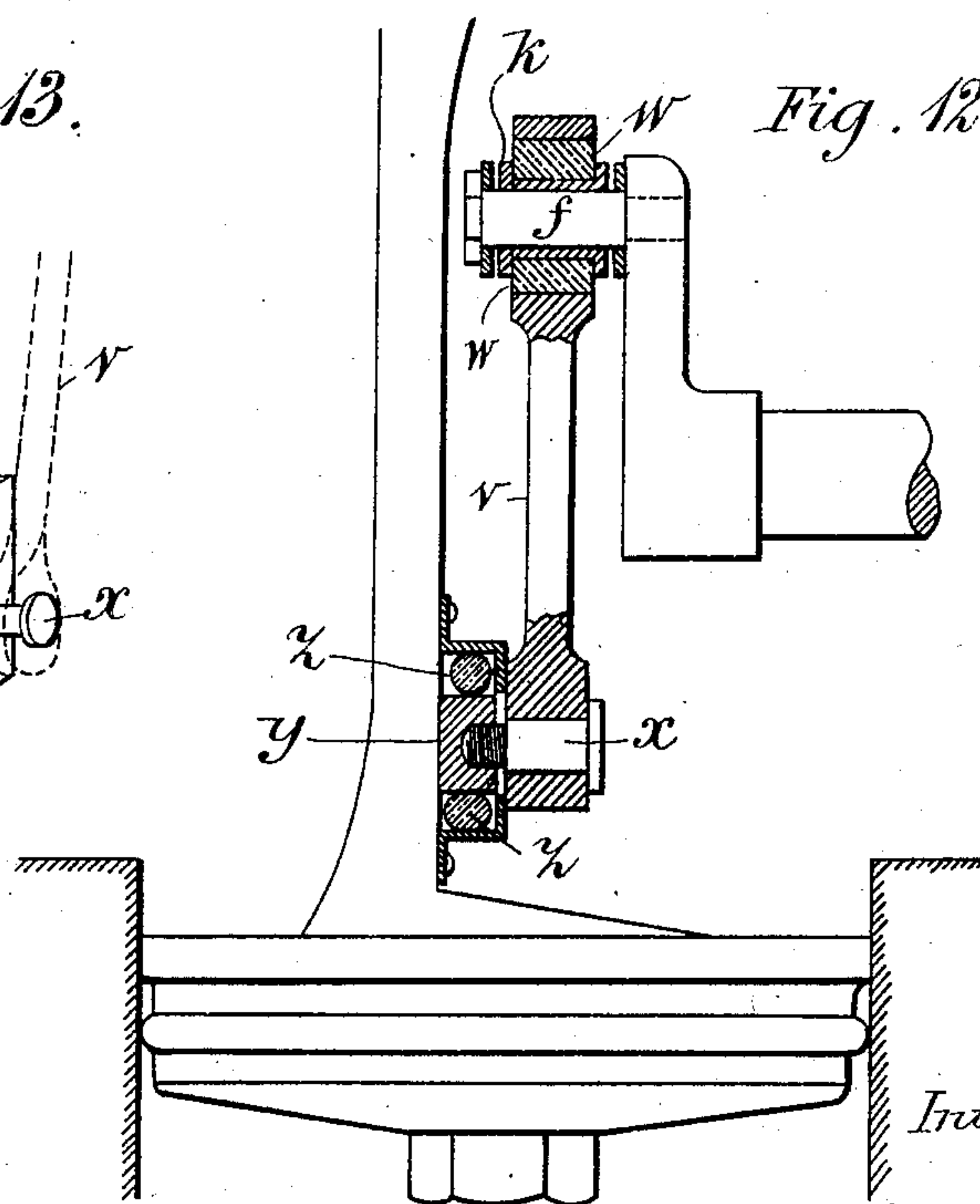
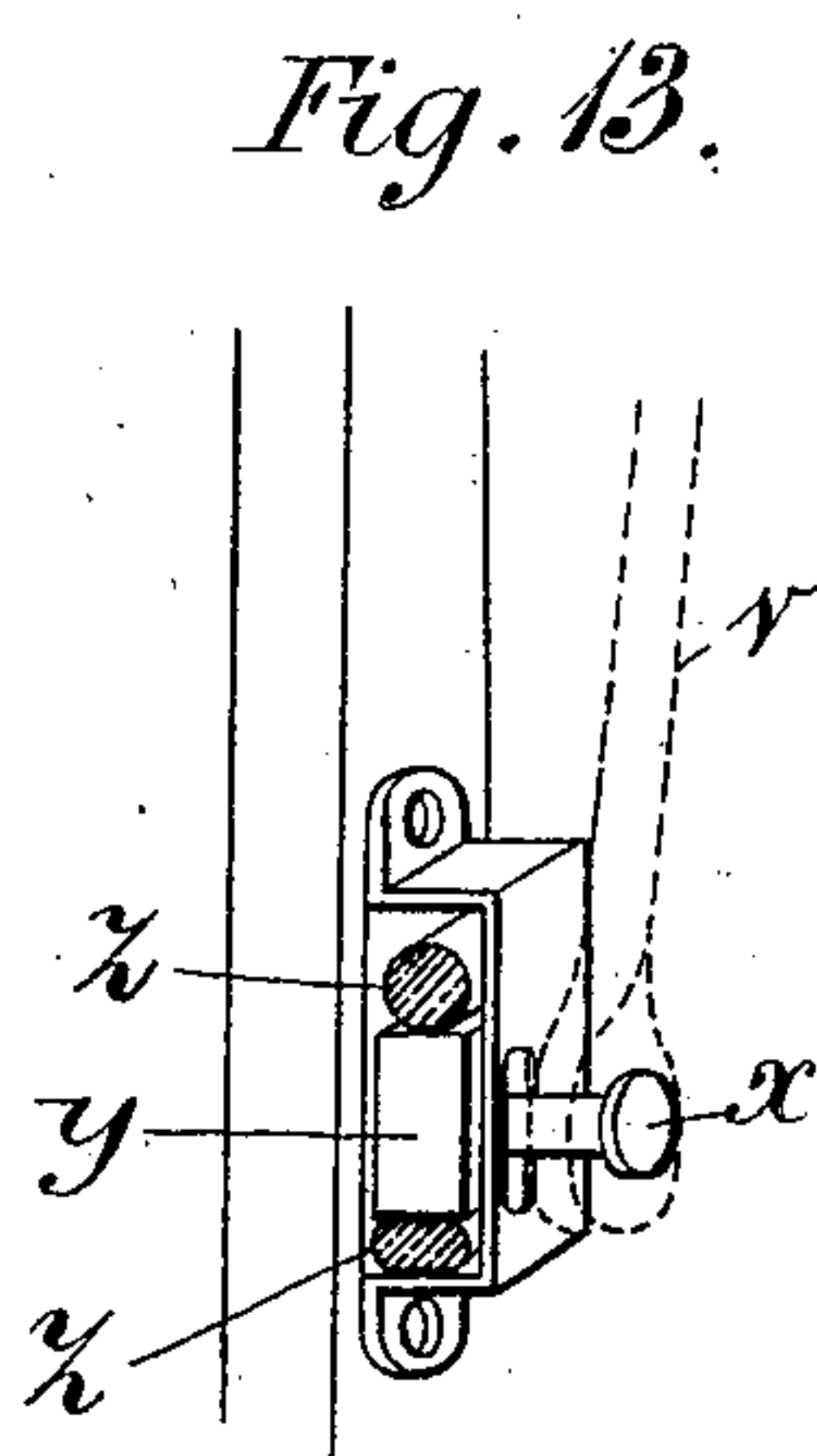
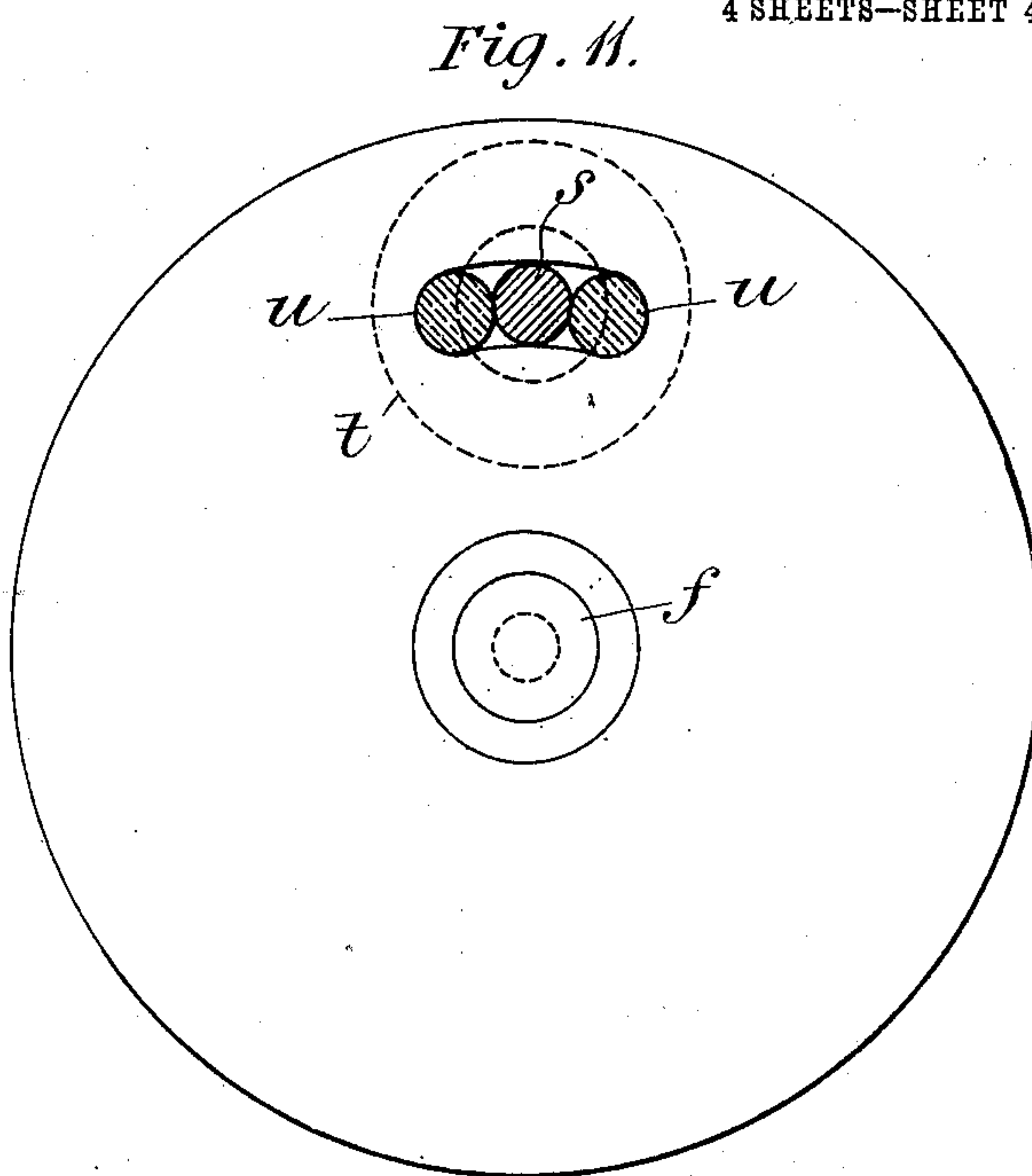
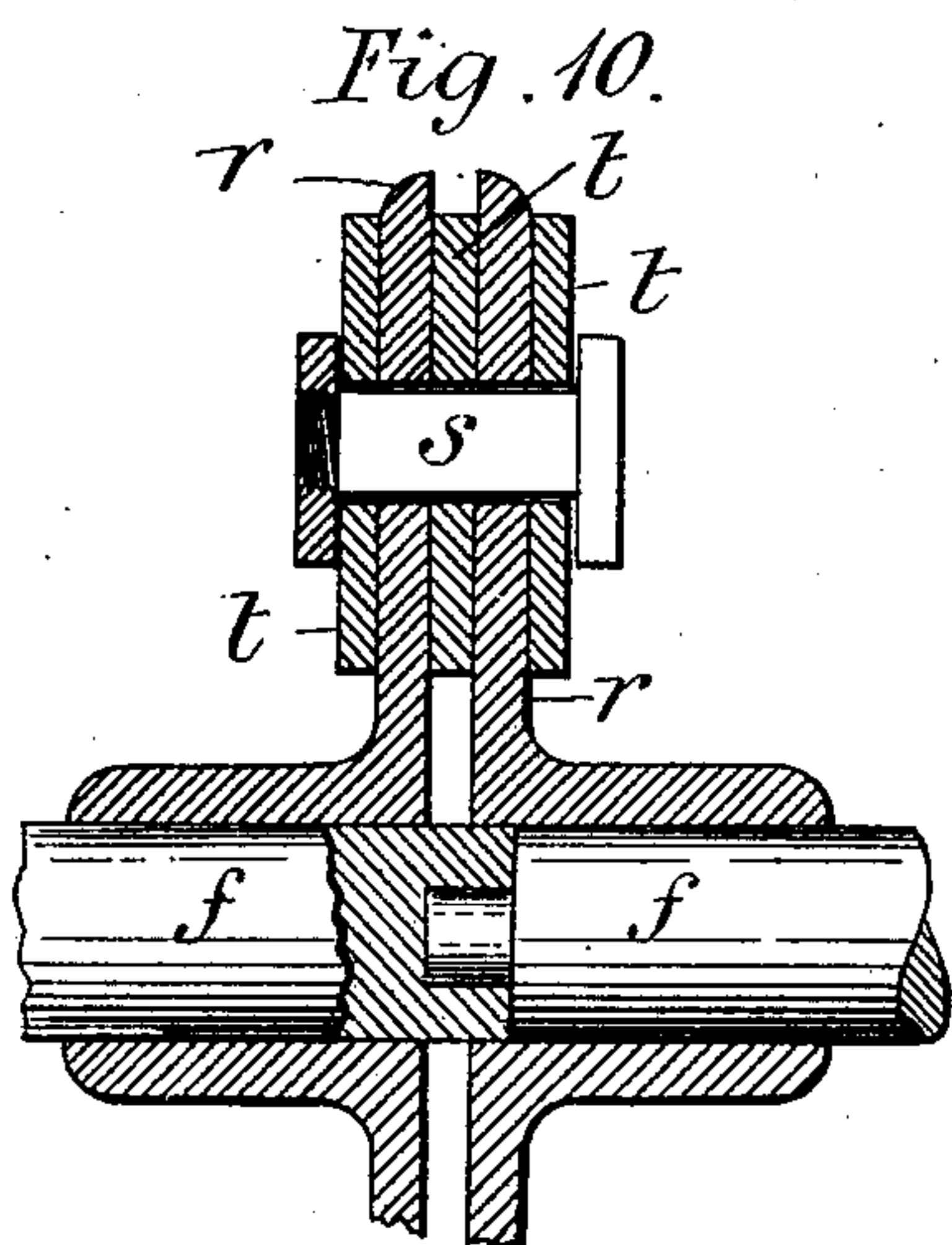
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W. G. KENT.
LIQUID METER.

APPLICATION FILED JULY 23, 1907.

4 SHEETS—SHEET 4.



Witnesses.

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UNITED STATES PATENT OFFICE.

WALTER GEORGE KENT, OF LONDON, ENGLAND.

LIQUID-METER.

No. 897,904.

Specification of Letters Patent.

Patented Sept. 8, 1908.

Application filed July 23, 1907. Serial No. 385,201.

To all whom it may concern:

Be it known that I, WALTER GEORGE KENT, engineer, a subject of the King of Great Britain, residing at 199 High Holborn, London, England, have invented new and useful Improvements in Liquid-Meters, of which the following is a specification.

This invention relates to what are known as "piston" meters, that is to say, meters in which the liquid is measured in two or more cylinders having in them reciprocating pistons which drive the actuating and counting mechanism. In such meters the pistons usually carry frames having in them slots to receive the crank pins or rollers upon them. As is well known it is desirable that the pistons should be allowed to remain at rest more or less at the ends of their strokes while the inlet valves are closing and the outlet valves are opening and the slots are generally so far as is permissible in consideration of the lost motion thereby caused made wider at their middle to allow of this. In place of or in addition to this arrangement according to this invention a yielding or elastic face is provided to the slot of the piston frame in which the crank pin roller works or the pistons in the two cylinders are similarly elastically connected by the crank mechanism. The first mentioned arrangement is preferably carried out in the following manner: The frame to receive the bearing piece is made in the form of a rectangular tube made in two parts screwed together. One side of this tube is slotted so that the bearing piece can protrude through it. The ends of the opposite side are notched to receive the ends of an india rubber cord which runs along the tube beneath the bearing piece. The ends of the tube are closed by blocks provided with lugs which pass through holes in the sides of the tube and are secured by bending or riveting.

Figure 1 is a section of a "piston" meter modified in accordance with this invention. Figs. 2 and 3 are elevations (partly in section) of one of the frames connecting a pair of the pistons and Figs. 4 and 5 show details of the same. Fig. 6; Fig. 7; Figs. 8 and 9; Figs. 10 and 11, and Figs. 12 and 13, respectively show modifications.

In Fig. 1, *m* are four pistons working in cylinders *A*, the pistons being connected together in pairs by frames *a*.

f is the crank shaft which operates the valves and counting mechanism.

g are cranks fixed to the crank shaft *f* and *h* are the crank pins carrying rollers *l* working in slots in the frames *a*.

As the construction and method of working of "piston" meters is well understood no further general description is necessary.

Figs. 2 to 13 show the details of the present invention.

In Figs. 2 and 3 *a* is the frame which is fixed to the two pistons in the ordinary manner by screws *a'*.

b are tubes (shown in perspective at Fig. 4) receiving the bearing pieces *c* (preferably of vulcanite) which form the sides of the slots.

d are indiarubber cords and *e* (Fig. 5) are blocks forming the ends of the tubes.

The tubes *b* are preferably made in two parts as shown at Fig. 3, and the end blocks *e* are secured in place by upsetting one end and bending the other end round, as shown by dotted lines in Fig. 5.

In place of the elastic connection between the pistons of the two cylinders being in the sides of the slot, an elastic roller on the crank pin may be employed as shown at Fig. 6 where *f* is the crank shaft, *g* the crank, *h* the crank pin, and *j* an indiarubber ring interposed between the bush *k* and the roller *l*. Or the slotted frame *a* may be elastically connected to the pistons as shown at Fig. 7 where *m* is one of the pistons and *n* are indiarubber rings on the stem *o* connecting the frame *a* to the piston. Or the crank may be made elastic as shown at Figs. 8 and 9 where the crank *g* is loose on the crank shaft *f* and carries two indiarubber buffers *p p* which are acted on by a second crank or tongue *q* keyed to the shaft *f*. Or the crank shaft itself may be made elastic as shown at Figs. 10 and 11 where the crank shaft *f* is made in two parts each having keyed to it disks *r* which are elastically connected together by bolts *s* which pass through tangential slots in the disks *r* and washers *t* and have on each side of them an indiarubber cord *u*. Or in cases where the slot in the frame *a* is replaced by a connecting rod this rod may be elastically connected to the piston or crank or bolt as shown at Figs 12 and 13 where *v* is the connecting rod at one end of which an indiarubber cushion *w* is interposed between it and the bush *k* on the crank pin *f* while the other end is pivoted to a

pin x fixed to the block y which is free to move in guides between the india rubber cushions z .

What I claim is:—

- 5 1. In a piston meter, the combination of a pair of cylinders, pistons in the cylinders, a crank shaft, means for connecting the cranks of said shaft to the pistons including a yielding element which allows the pistons to remain at rest at the ends of their strokes while the inlet valves are closing and the outlet valves are opening whereby the breaking of the mechanism is avoided, substantially as set forth.
- 10 2. In a piston meter, the combination of a pair of cylinders, pistons in the cylinders, a pair of slotted frames fixed respectively to the pistons, yieldably mounted bearing pieces at the sides of the slots, and a crank shaft carrying crank pins working between the bearing pieces, the organization being such that the breaking of the crank, crank pins and piston frames owing to the checking of the piston which is in mid career at the moment the other piston is started from rest is avoided.
- 15 3. In a piston meter, the combination of two pairs of cylinders, two pairs of pistons in the cylinders, a crank shaft, means for connecting the cranks of said shafts to the two pistons of each pair including a yielding element which allows the pistons to remain at rest at the ends of their strokes while the inlet valves are closing and the outlet valves are opening and which prevents the breaking of the crank, crank pins and piston frames from the checking of the piston which is in mid career at the moment the other piston is started from rest.
- 20 35

4. In a piston meter, the combination of 40 two pairs of cylinders, two pairs of pistons in the cylinders, two slotted frames connecting respectively the two pistons of each pair, yieldably mounted bearing pieces at the sides of the slots and a crank shaft carrying crank 45 pins working between the bearing pieces, the organization being such as to allow the pistons to remain at rest at the ends of their strokes while the inlet valves are closing and the outlet valves are opening and to prevent 50 breakage of the parts resulting from the checking of the piston which is in mid career at the moment the other piston is started from rest.

5. In a "piston" meter, the combination of a 55 pair of cylinders, pistons in the cylinders, a pair of slotted frames fixed respectively to the pistons, slotted tubes fixed to the sides of the slots, bearing pieces protruding from the slots in the tubes, elastic cushions in the 60 tubes against which the bearing pieces rest, and a crank shaft carrying crank pins working between the bearing pieces.

6. In a "piston" meter, the combination of 65 two pairs of cylinders, two pairs of pistons in the cylinders, two slotted frames connecting respectively the two pistons of each pair, slotted tubes fixed to the sides of the slots, bearing pieces protruding from the slots in the tubes, elastic cushions in the tubes 70 against which the bearing pieces rest, and a crank shaft carrying crank pins working between the bearing pieces.

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Witnesses:

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