

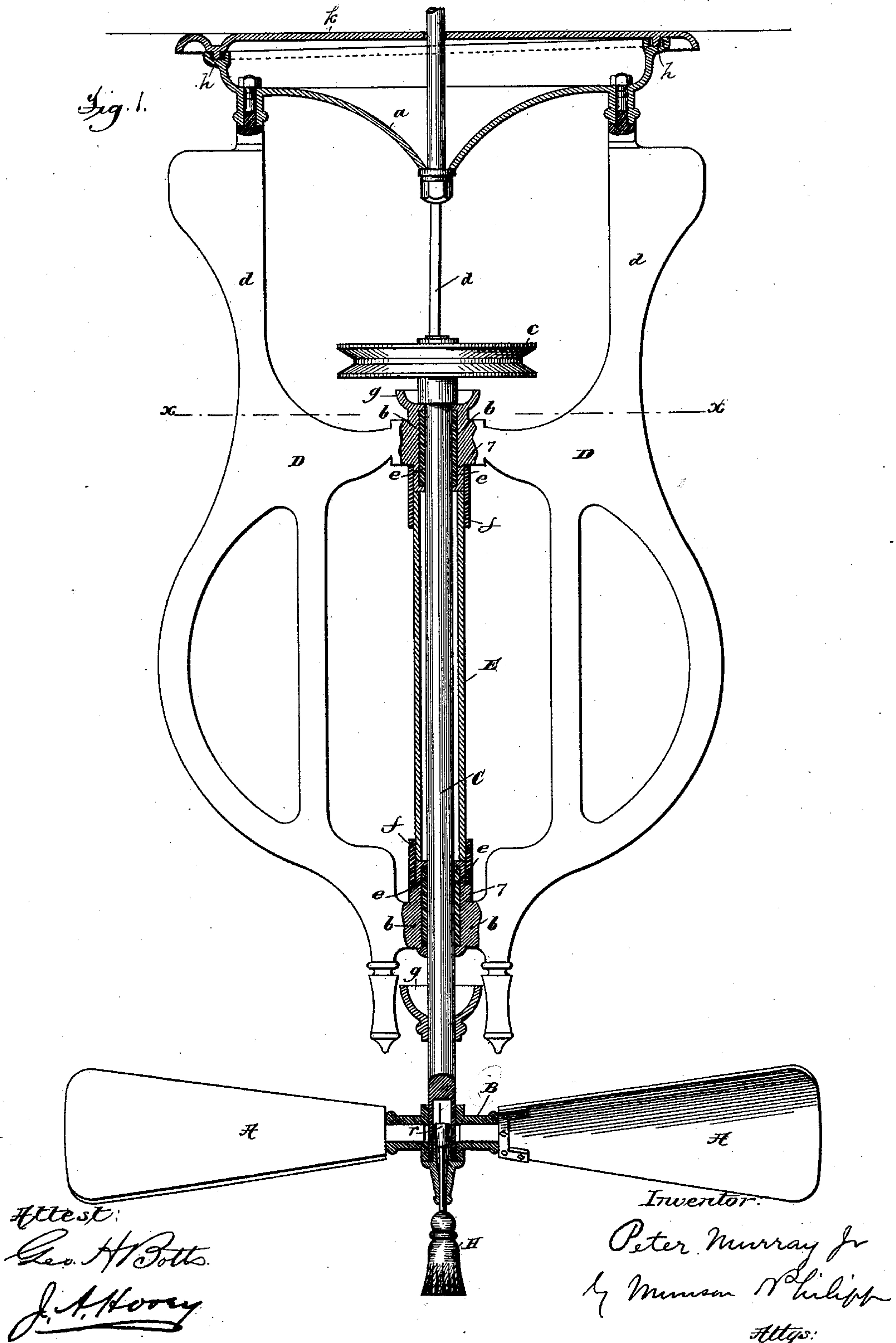
(No Model.)

4 Sheets—Sheet 1.

P. MURRAY, Jr.
FAN.

No. 428,779.

Patented May 27, 1890.



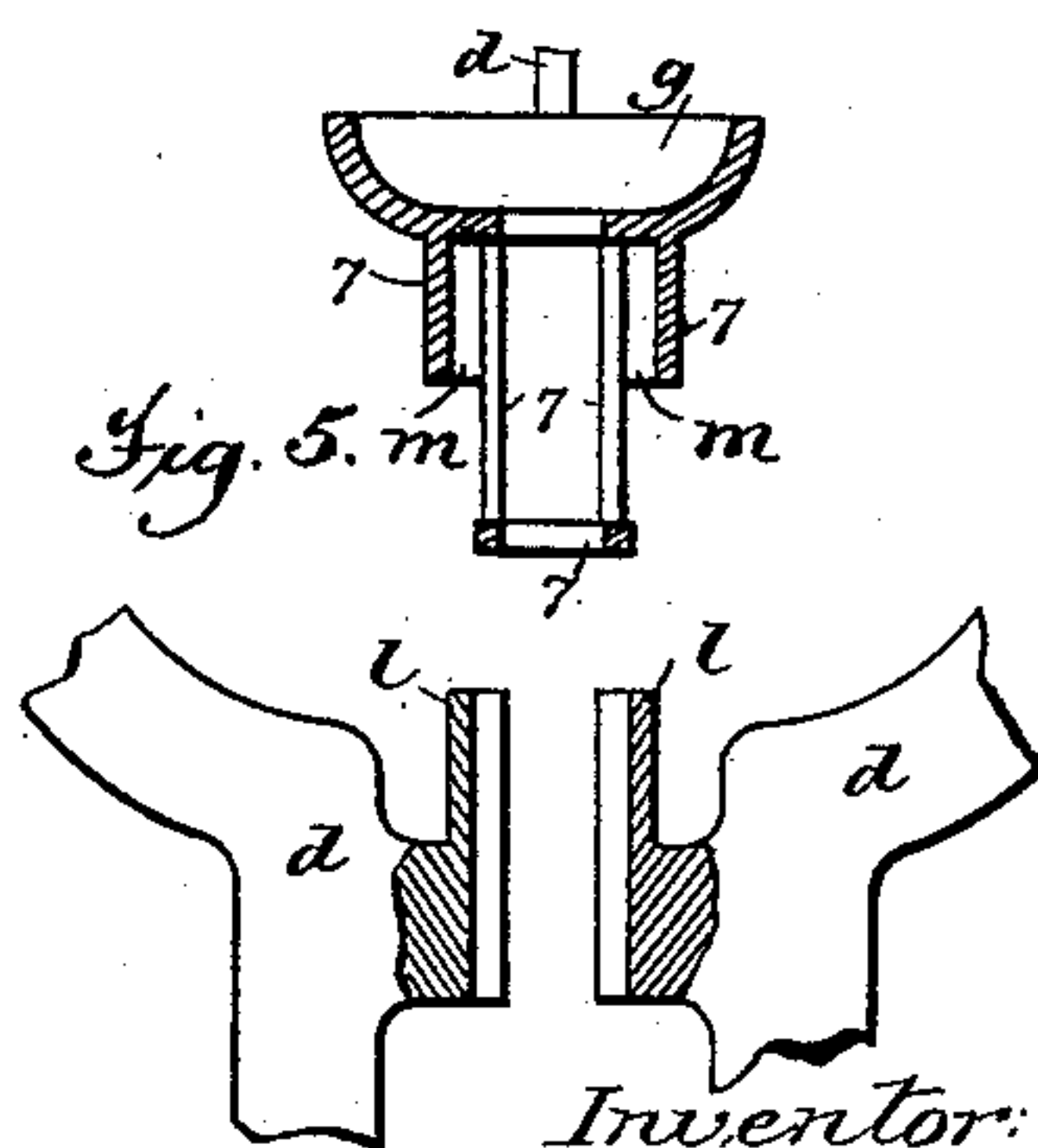
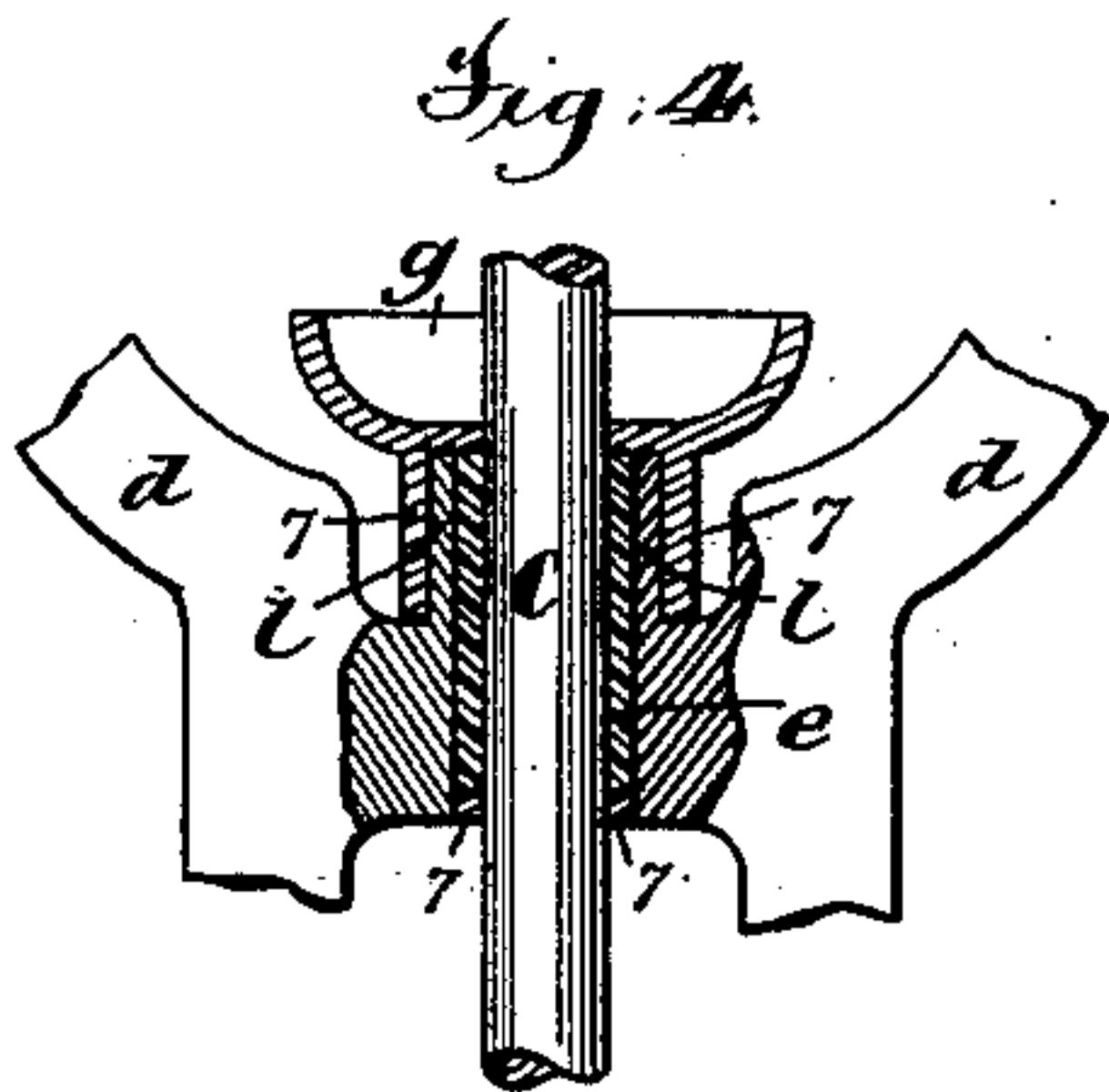
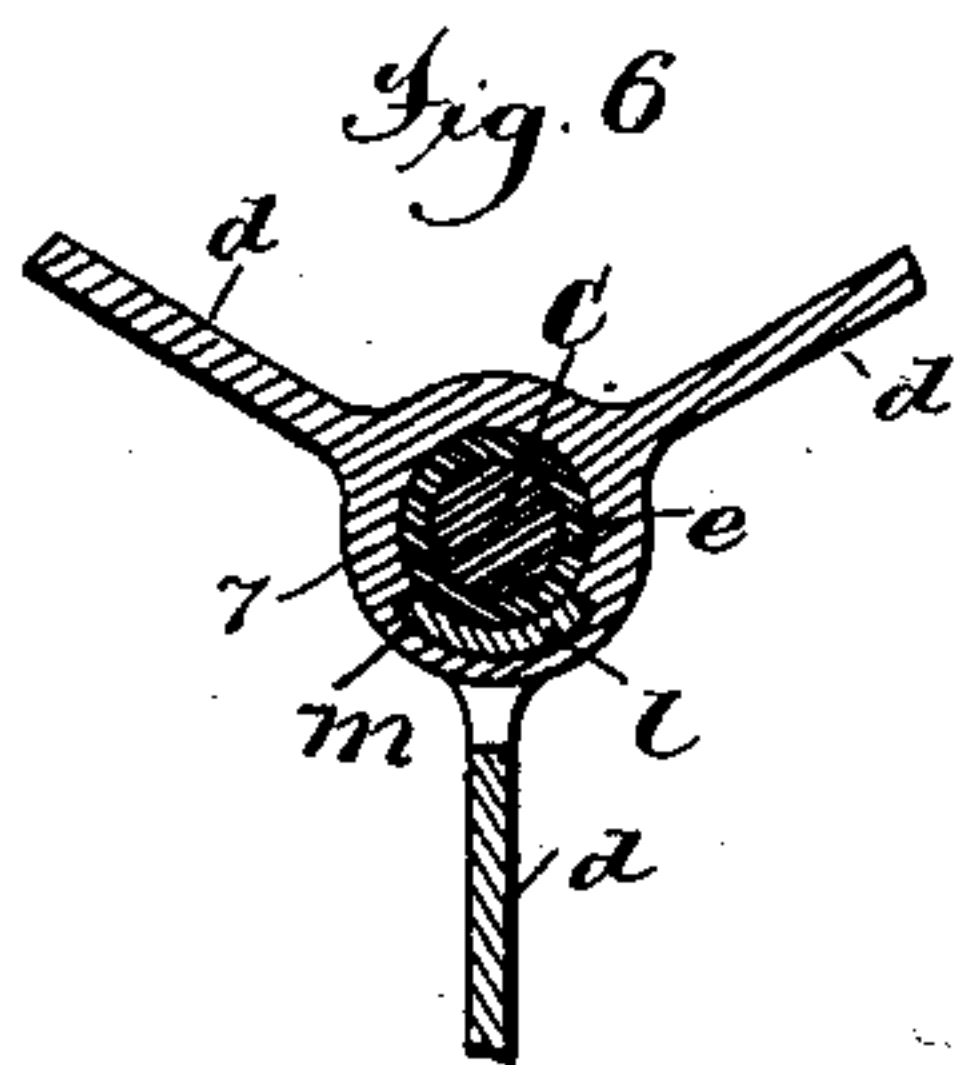
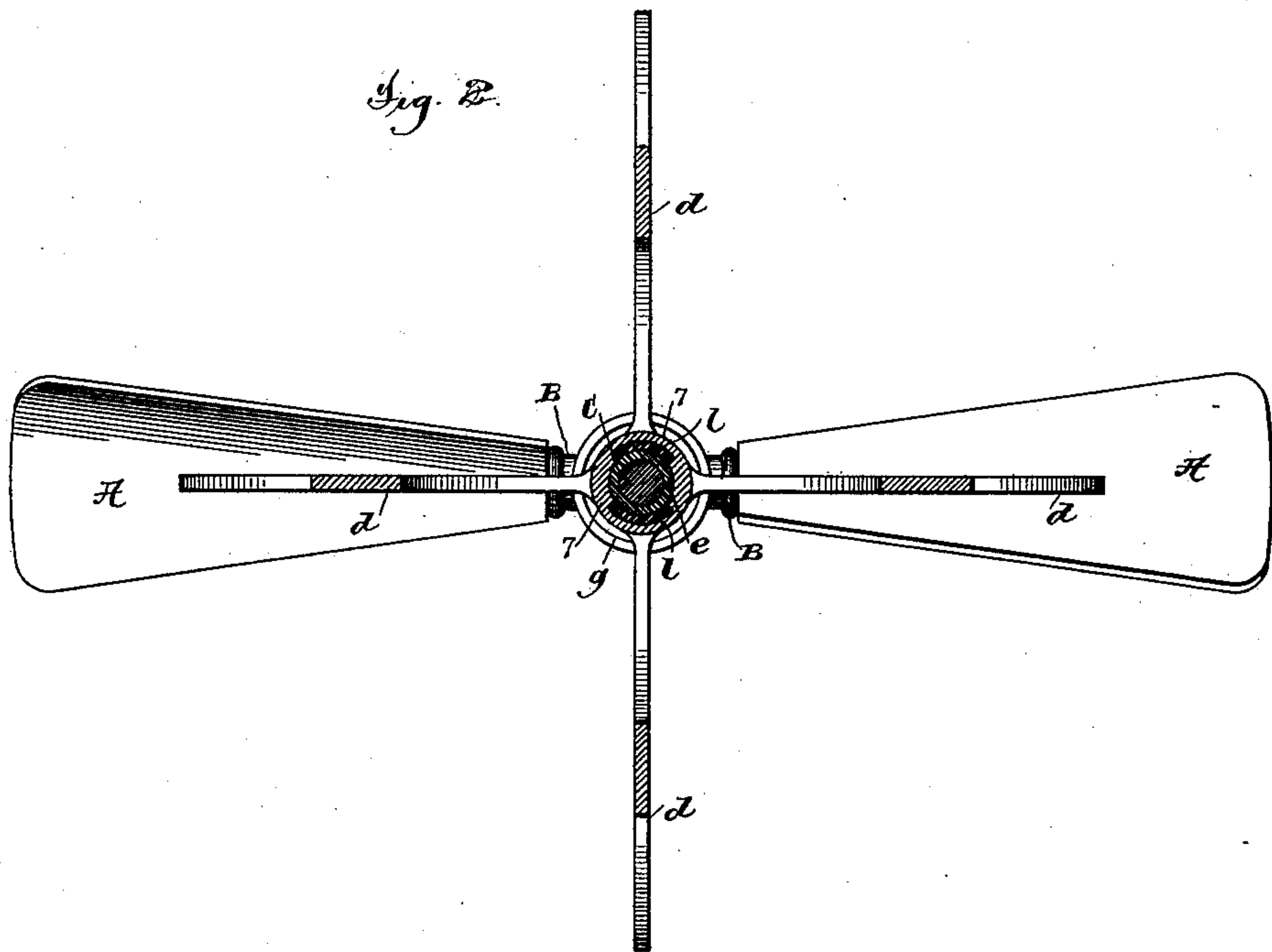
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Attest:
Geo. H. Batts
J. A. Hoovey

Inventor:
Peter Murray Jr.
by Munson Phillips

Atty:

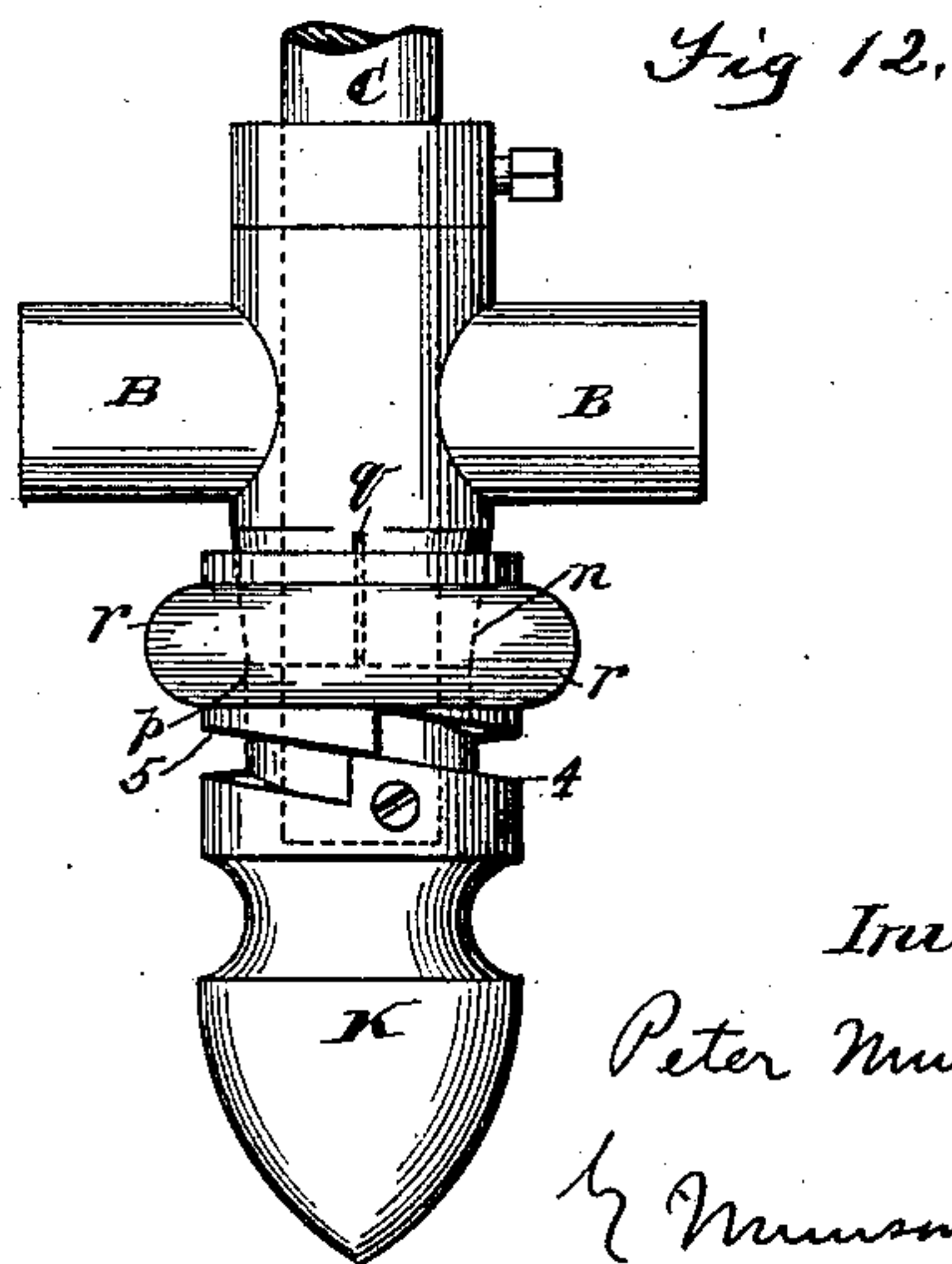
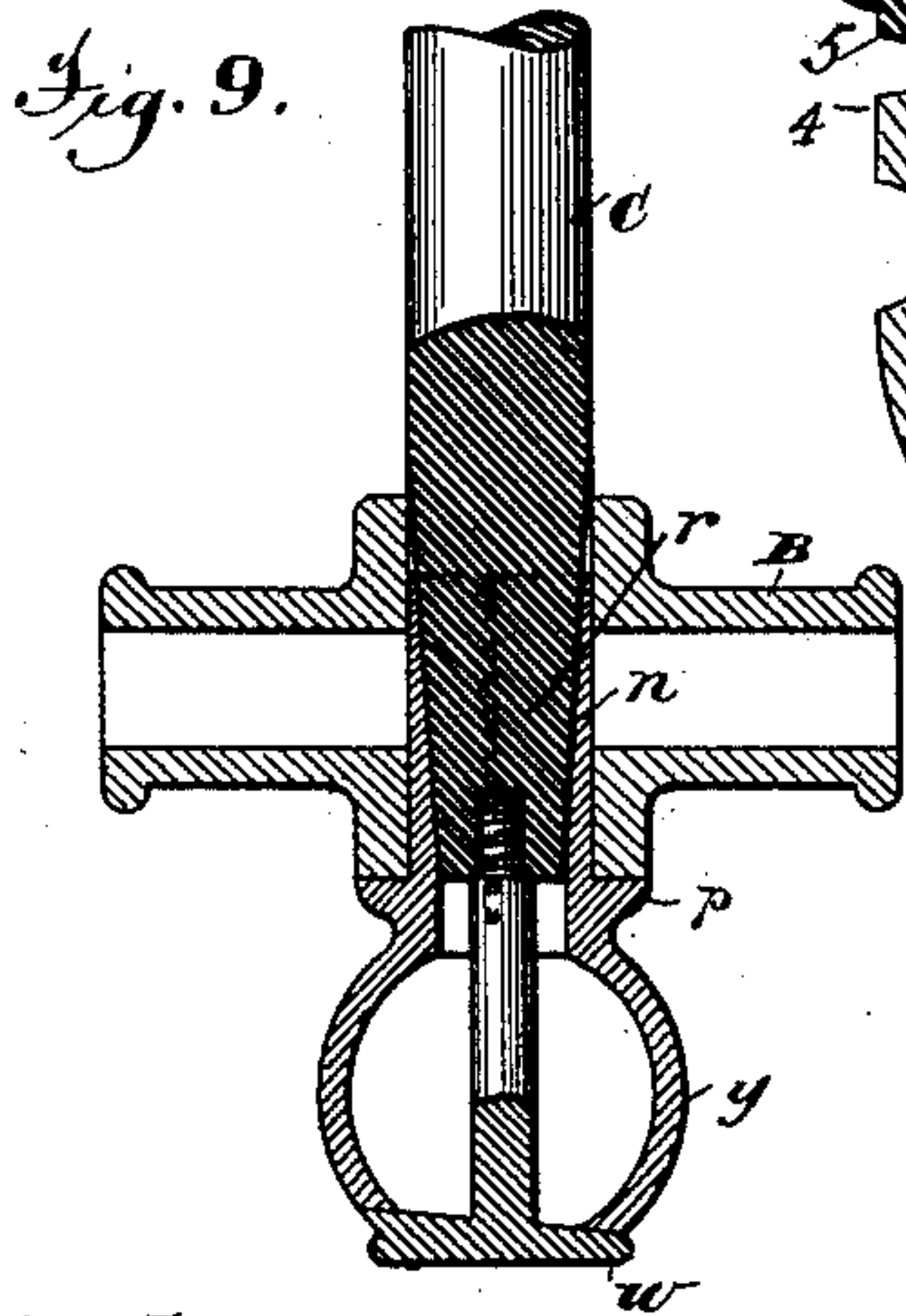
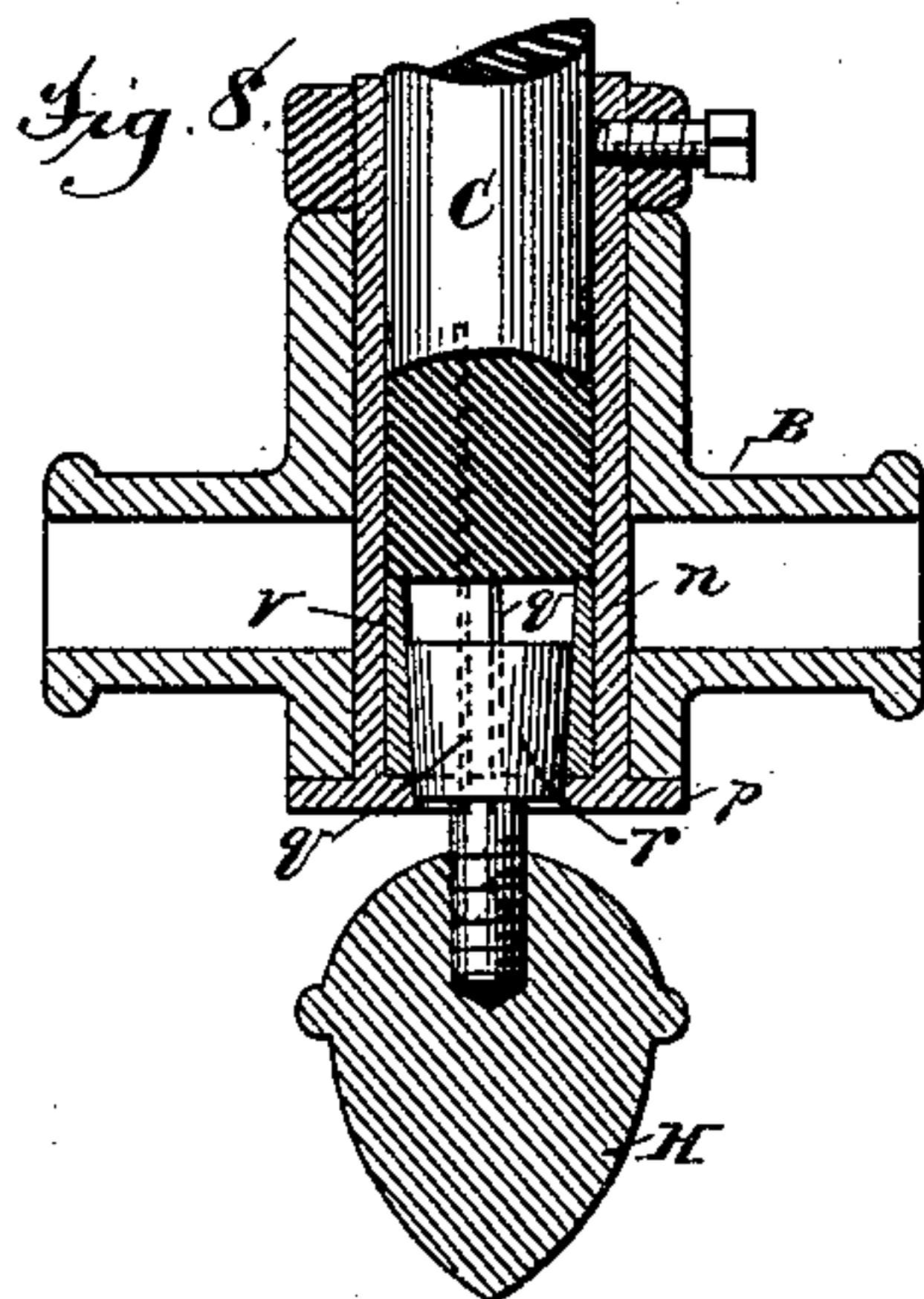
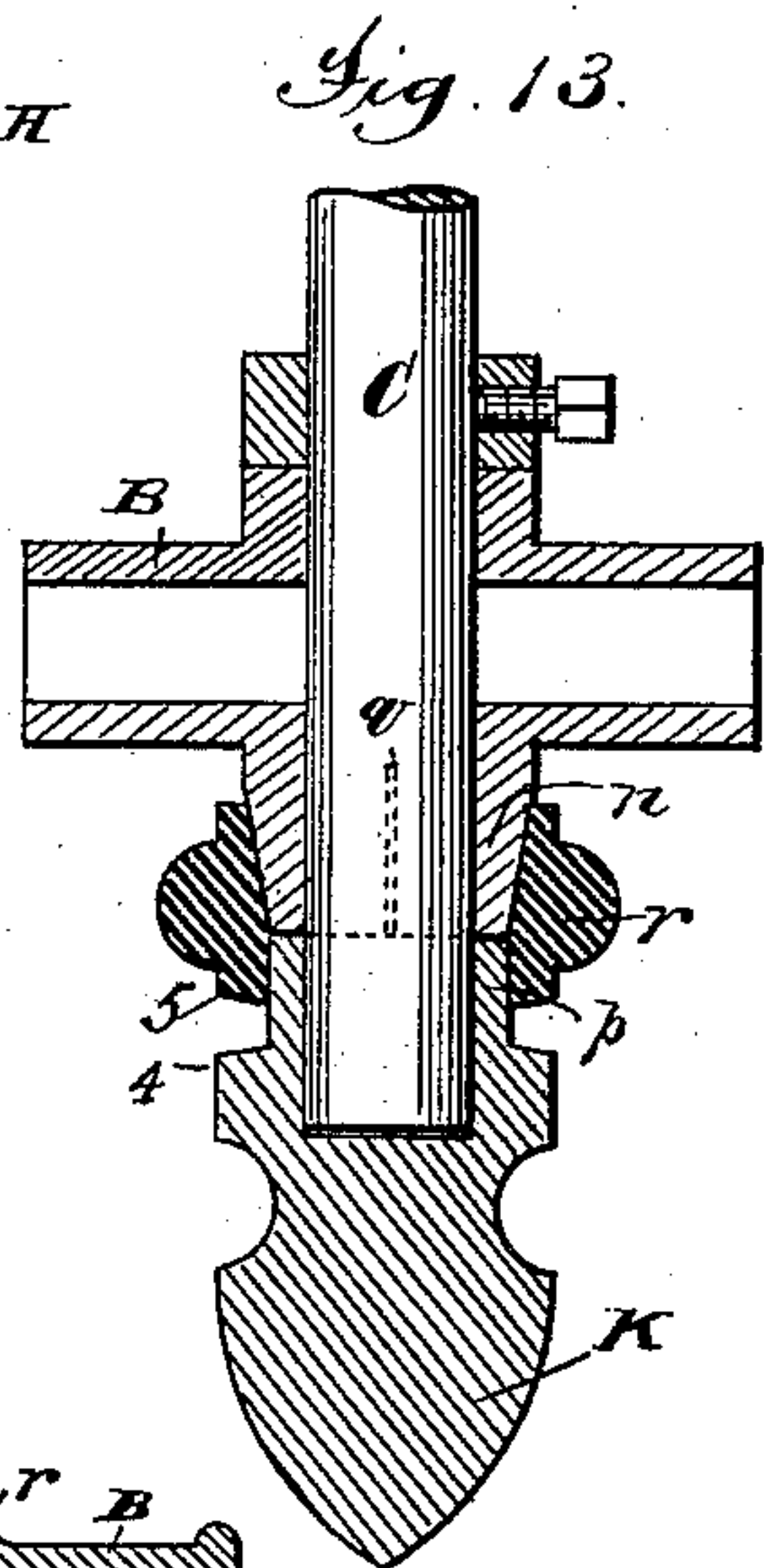
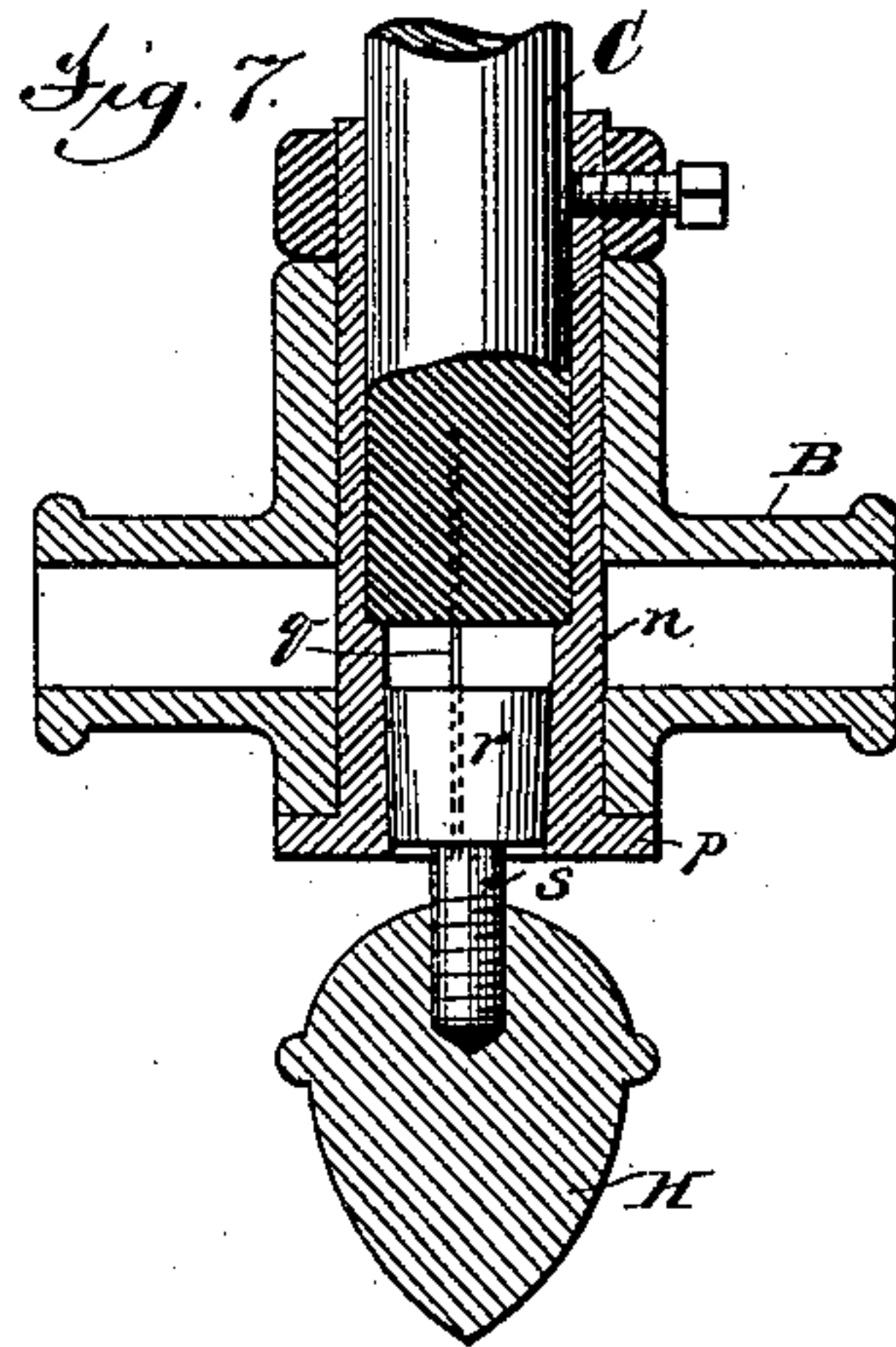
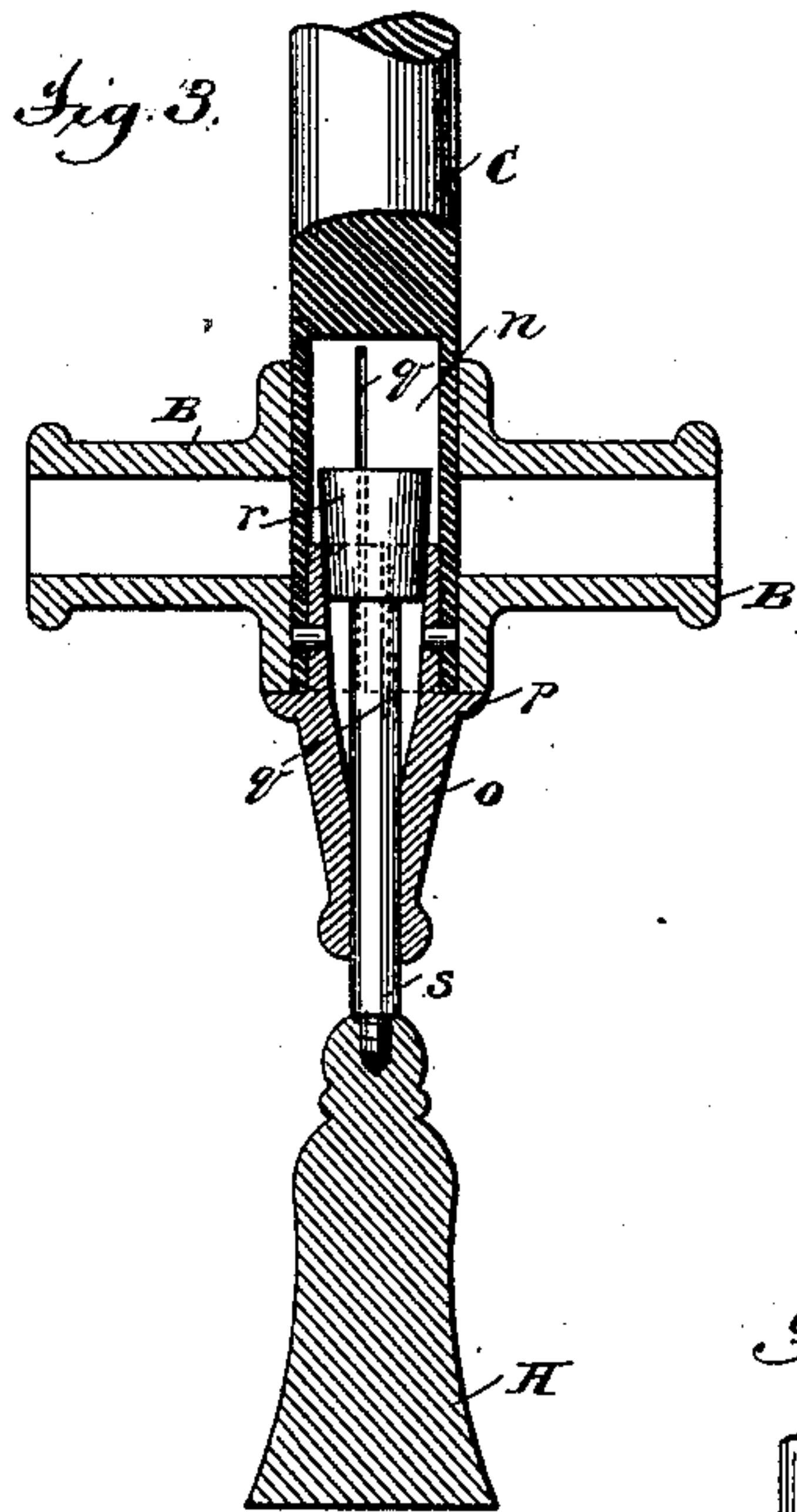
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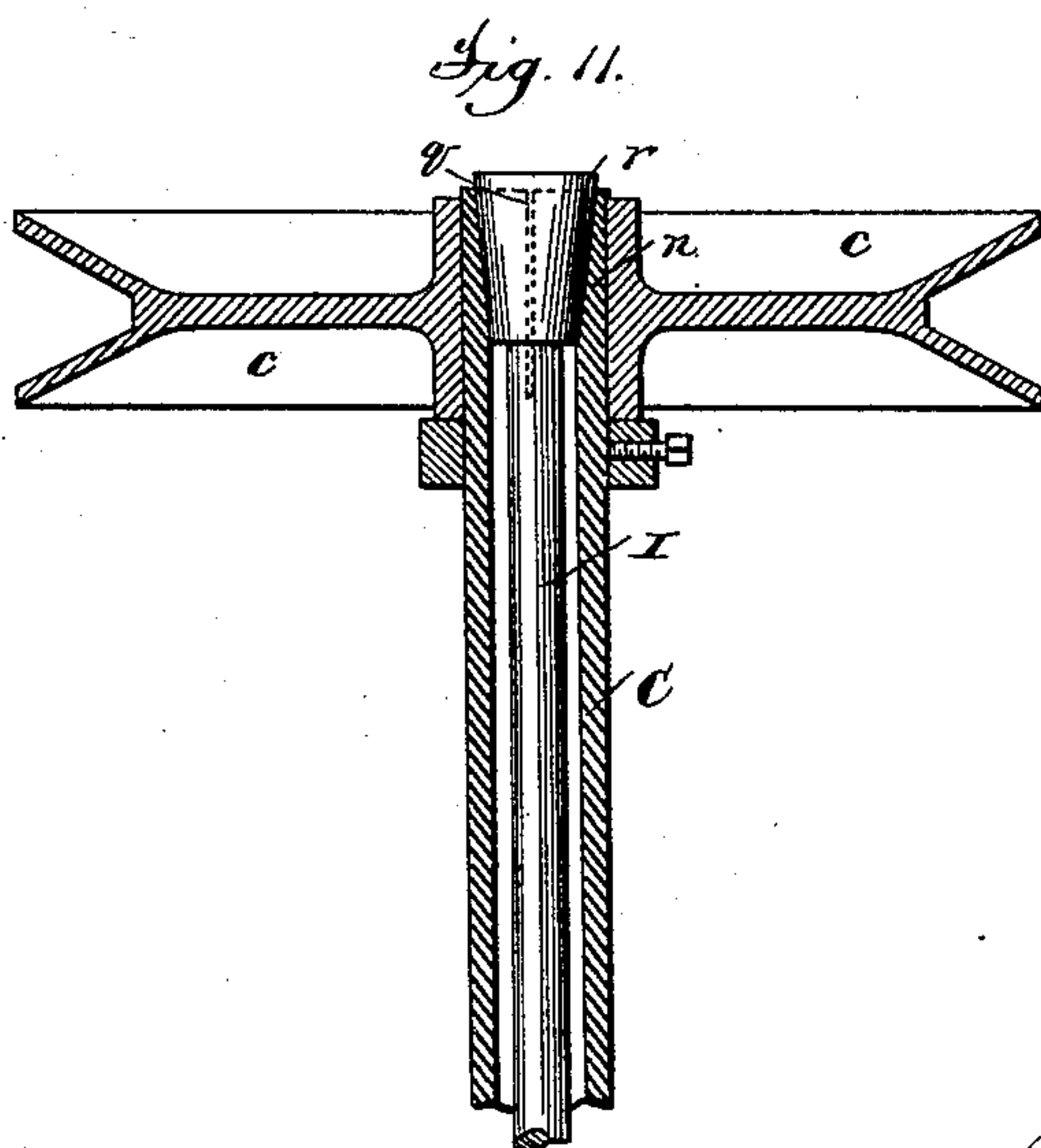
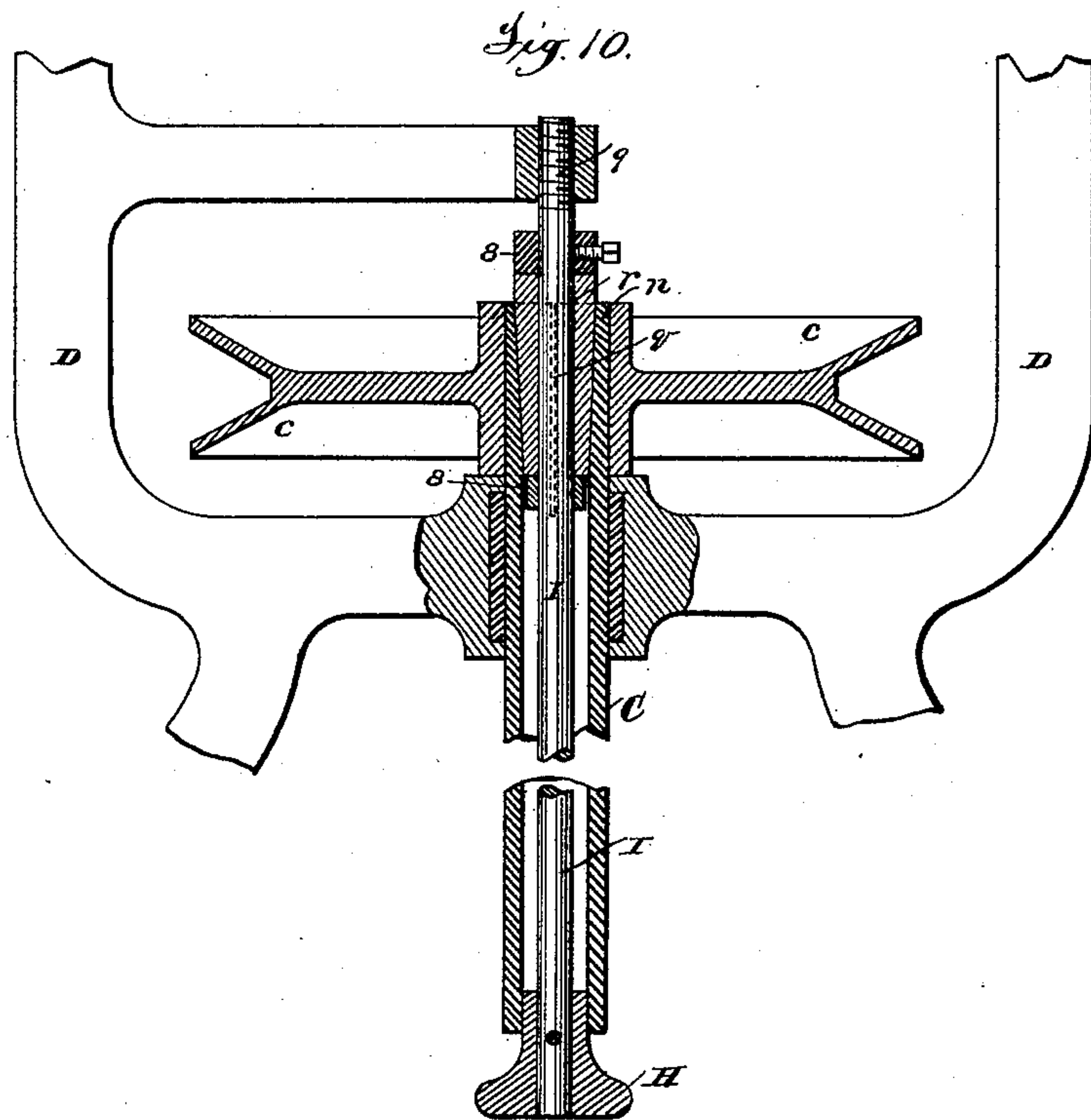
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Patented May 27, 1890.



Attest:

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Atty's:

UNITED STATES PATENT OFFICE.

PETER MURRAY, JR., OF NEWARK, NEW JERSEY, ASSIGNOR TO THE NEW JERSEY VENTILATING AND POWER COMPANY, OF SAME PLACE.

FAN.

SPECIFICATION forming part of Letters Patent No. 428,779, dated May 27, 1890.

Application filed March 28, 1887. Renewed October 3, 1889. Serial No. 325,891. (No model.)

To all whom it may concern:

Be it known that I, PETER MURRAY, Jr., a citizen of the United States, residing at Newark, county of Essex, and State of New Jersey, have invented certain new and useful Improvements in Fans, fully described and represented in the following specification and the accompanying drawings, forming a part of the same.

10 This invention relates, generally, to that class of power-fans which are used for cooling and ventilating restaurants and other places. The invention relates particularly, however, to improvements in the means for supporting and driving the fans and for putting them into and out of operation as required. Where these fans are employed for cooling and ventilating a room, and particularly where the room is large, so that a number of the fans are required, it is frequently desirable to stop or start one or more of the fans without stopping or starting the others. It is therefore desirable that each fan should be provided with means by which its movements can be controlled independently of the others. One feature of the present invention relates especially to means for effecting this result. Other features of the invention relate more particularly to the means for supporting the fans and the connections for operating them.

As a full understanding of the invention can only be given by an illustration and a detailed description of the construction and operation of the devices embodying the same, all further preliminary description will be omitted and a full description of the invention given, reference being had to the accompanying drawings, in which—

40 Figure 1 is a sectional elevation of a fan and its support or hanger embodying the improvements constituting the present invention. Fig. 2 is a horizontal section of the same, taken on the line *xx* of Fig. 1. Fig. 3 is an enlarged view of a part of Fig. 1, showing particularly the means for stopping and starting the fan. Figs. 4 and 5 are detail views illustrating the construction of the hanger or support, which will be hereinafter explained. Fig. 6 is a view similar to Fig. 2,

illustrating a modification, which will be explained. Figs. 7 to 13 illustrate modifications in the stopping and starting devices, which will also be hereinafter referred to and explained.

Referring now particularly to Figs. 1 and 2, it is to be understood that the fan proper is of the ordinary or substantially the ordinary form, consisting of two or more horizontally-arranged blades *A*, which project radially from a hub *B*, in which they are supported in such manner that they can readily be adjusted to different angles of inclination. The hub *B* is mounted to turn freely upon the lower end of a vertical shaft *C*, which is supported in a suitable frame or hanger *D*, depending from the ceiling of the room. The shaft *C* is provided at its upper end with a grooved or other pulley *c*, around which the belt for driving the fan passes.

As shown in Figs. 1 and 2, the hanger *D* is composed of four arms *d*, which are arranged with relation to each other, as best shown in Fig. 2, and are secured at their upper ends to a cap-piece *a* of any suitable form, preferably circular. The four arms *d* composing the hanger will preferably be cast in three pieces, two of the arms in one piece and the other two separately. The arms *d* are so formed that when placed together they provide bearings *b* for the shaft *C*, which bearings will be provided with any suitable form of journal-boxes *e*.

The arms *d* are held together, so as to keep the bearings *b* in position around the shaft *C*, as follows: The two arms which are cast together are connected by ring-like portions 7, which form the upper and lower portions of the bearings *b*. The bearings *b* are provided with recesses *m*, (see Figs. 2, 4, and 5,) and the two arms *d*, which are cast separately, are provided with lugs *l*, which enter these recesses, and thus complete the bearings *b* and hold the four arms together. The upper bearing *b* is provided with an oil-cup *g*, into which oil can be introduced for properly lubricating the bearings of the shaft, and the shaft is provided below the lower bearing with a similar cup *g*, in which any oil passing through the lower bearing will accumu-

late and be prevented from dripping from the lower end of the shaft. Between the bearings *b* the shaft *C* is inclosed in a tube *E*, which is held in place by thimbles *f*, and
 5 which prevents the shaft, along which the oil will be conducted from one bearing to the other, from being exposed.

In placing the hangers for fans of this class in position it is of course necessary that the
 10 hangers should be so secured to the ceiling that the shaft *C* will be vertical, as otherwise the fan would not run easily and evenly. This is ordinarily a work of considerable difficulty, as it usually or at least frequently
 15 happens that the ceiling upon which the hangers are to be secured is not perfectly smooth and level. Heretofore when this happened it was necessary to place wedges or
 20 blocks between the cap-piece *a* and the ceiling, so as to hold the former away from the ceiling at one or more points, and thus make it level and the shaft *C* vertical. To obviate
 25 this difficulty and to make the work of putting up the fans less difficult and troublesome, and also to do away with the unsightly
 30 wedges or blocks heretofore used, the cap-piece *a* is made thicker upon one side than upon the other, as shown in Fig. 1, so that the plane of its upper edge will not be horizontal when the shaft *C* is plumb. The upper
 35 edge of the cap-piece *a* is provided with a circular groove *h*, which receives a correspondingly-shaped rib formed on the under side of a supplemental cap-piece *k*, which is
 40 also made thicker upon one side than upon the other, as also shown in Fig. 1.

The cap-piece *a* and the supplemental cap-piece *k* are so proportioned that when the thickest portion of one and the thinnest portion of
 40 the other are brought together, as in Fig. 1, the shaft *C* will be exactly vertical to the plane of the top of the supplemental cap-piece. From this construction it results that by adjusting the supplemental cap-piece to different
 45 positions the hanger *D* can be made to accommodate itself to almost any inequality or condition of the ceiling, so as to bring the shaft *C* to a vertical position.

The hanger *D*, instead of being composed
 50 of four of the arms *d*, as in Figs. 1 and 2, may consist of a greater or less number. In many cases three will be the preferred number. When the hanger consists of three of these
 55 arms, it will preferably be cast in two pieces, two of the arms in one piece and the third in another piece, as illustrated in Fig. 6. In this case the arms will be held together, the same as in the case of the four arms.

Referring now to Figs. 1 and 3, it is to be
 60 understood that the hub *B* is mounted so as to turn freely upon the shaft *C*, so that the shaft can be driven without necessarily imparting any motion to the hub and the fan-blades. The lower end of the shaft *C*, which
 65 forms the journal for the hub *B*, is bored out for a distance equal or about equal to the

length of the hub, so that the portion of the shaft which forms the journal *n* is only a thin shell. Into the hollow journal thus formed
 70 there is fitted a hollow plug *o*, which is secured to the shaft, and has a shoulder *p*, which forms a support for the hub *B* to prevent it from falling from the shaft. The opening in
 75 the plug *o* is made conical, and both the journal *n* and the upper end of the plug *o* are split, as shown at *q*, so that they can readily be expanded. Fitted into the conical opening in
 80 the upper end of the plug *o* is a conical plug *r*, having a stem *s*, which passes through an opening in the plug *o*, and is provided with a suitable knob or handle *II*, by which it can be conveniently grasped.

The operation of the apparatus thus organized is as follows: The belt being upon the
 85 pulley *c*, so as to set the shaft *C* in motion, it is only necessary, in order to start the fan, to grasp the handle *II* and pull downward, so as to force the plug *r* into the conical opening
 90 in the plug *o*. This will at once expand the plug *o* and the journal *n*, so as to force and hold the latter against the hub *B* with sufficient pressure to clutch the hub and start the fan. To stop the fan the operation is simply
 95 reversed. As soon as the plug *r* is moved upward in the conical opening of the plug *o* the plug *o* and the journal *n* will contract, so as to release the hub *B*. As soon as the hub is thus released the friction between the end
 100 of the hub and the shoulder *p* will not be sufficient to move the fan against the resistance of the air, and the fan will consequently be arrested, and the shaft *C* will continue to revolve idly until the hub *B* is again clutched to it.

The construction shown in Fig. 7 differs but
 105 very slightly from that which has just been described. In this case the shaft *C*, instead of being bored out at its lower end, as in Figs. 1 and 3, is provided with a split sleeve which extends below the end of the shaft and
 110 forms the expansible journal *n* for the hub *B*. This sleeve *n* is fast to the shaft *C*, and the opening at its lower end is made conical to afford a seat for the conical plug *r*. The operation of the apparatus when thus constructed is the same as already described.

The construction shown in Fig. 8 is the same as that shown in Fig. 7, except that the
 120 opening in the lower end of the sleeve *n*, instead of being conical, is straight, and the sleeve is provided with a conical ring *v*, which serves as a seat for the conical plug *r*. The ring *v* is made in two or more pieces, as indicated, so that it will readily spread and contract with the journal *n* as the plug is moved
 125 upward and downward.

In the construction shown in Fig. 9 the shaft *C* is made tapering at its lower end to
 130 form the plug *r*, and the expansible journal *n* is arranged to be moved onto and off the plug to effect the clutching and unclutching of the hub. For this purpose the shaft is pro-

vided at its lower end with a flat head *w*, the upper face of which is made to form an incline, as shown, and between this head and the hub B there is interposed a loose tubular sleeve *y*, the lower end of which forms a corresponding incline, and the upper end of which has a shoulder *p* to support the hub and a conical tubular extension *n*, which surrounds the tapered end of the shaft, and being split at *q* forms the expansible journal for the hub B. When the apparatus is thus organized and it is desired to put the fan in motion, it is only necessary to grasp and hold the sleeve *y*. The motion of the shaft C will then cause the incline upon the lower edge of the sleeve to ride up the corresponding incline upon the upper face of the head *w*, thereby raising the hub B and journal *n* upward on the tapered end *r* of the shaft C, and causing the journal *n* to spread and the hub to be clutched to the shaft. To stop the fan the sleeve *y* will be grasped and held until the incline upon the sleeve has been carried down the incline of the head *w*, when the sleeve will immediately drop, thus allowing the hub B to be unclutched from the shaft C, so as to stop the fan.

As thus far described, the starting and stopping of the fan have in all cases been effected by expanding and contracting the sleeve *n*, forming the journal upon which the hub B of the fan is supported. The same result may, however, be accomplished by forming the sleeve *n* upon or connecting it to the hub B and causing it to be contracted around the shaft C or the journal to clutch the hub and start the fan, and vice versa. A construction of this character is shown in Figs. 12 and 13, Fig. 12 being a side view of the apparatus and Fig. 13 a vertical section. In this case the lower end of the shaft C is solid and straight, and is provided with a knob K, which forms the shoulder *p* for the hub B to rest upon. The split sleeve *n* is formed upon the lower side of the hub B and is tapered upon its outside, as shown. The knob K is provided with a shoulder, upon which is formed a spiral cam 4, and surrounding the upper end of the knob and the tapered sleeve *n* is a conical collar *r*, upon the lower edge of which is formed a spiral cam 5, corresponding to the cam 4. With the apparatus thus organized it is only necessary, in order to start the fan, to grasp the collar *r* and hold it so as to cause the cam 5 to ride up on the cam 4. This will raise the collar onto the tapered sleeve *n* and contract it around the shaft C, so as to clutch the sleeve and the knob B to the shaft. To stop the fan the operation is the same. The collar will be grasped and held until the abrupt portion of the cam 5 falls off the abrupt portion of the cam 4. The collar will then drop and allow the sleeve to expand and release the knob.

In all the constructions which have been thus far described the starting and stopping

of the fan have been effected by clutching and unclutching the hub of the fan to and from the shaft, the shaft being continuously revolved. It is manifest, however, that the same result can be accomplished by clutching and unclutching the pulley *c* to and from the shaft, and in some cases this will be preferable, as by that means the shaft will be at rest when the fan is not in motion. This clutching and unclutching of the pulley *c* can be effected in a variety of ways, the same as or similar to those described for effecting the clutching or unclutching of the hub B. Two of the several ways in which this can be effected are illustrated in Figs. 10 and 11. In the construction shown in Fig. 10 the shaft C, instead of being solid, is tubular in form, and is provided with a rod I, which extends the entire length of the shaft, terminating at its lower end in a suitable knob or handle H. The upper end of the shaft C, which passes through the hub of the pulley *c* and forms the journal *n* for the pulley, is made conical, and the rod I is provided with a conical sleeve, forming a plug *r*, which is loose upon the rod, and is held in position between collars 8 and fits into the conical portion of the shaft. The upper end of the rod I is screw-threaded and works in a nut 9, formed in an arm extending from the hanger D. When the apparatus is thus organized, it is only necessary, in order to start the fan, to grasp the handle H and turn the rod I in the nut 9, so as to move the rod, and with it the plug *r*, downward. This will force the plug into the conical journal *n*, which is split, as indicated at *q*, thereby expanding the journal and clutching the pulley *c* to it, so as to set the shaft in motion. To stop the fan the operation is simply reversed.

The construction shown in Fig. 11 is the same as that just described, except that the sleeve or plug *r* is fast to or formed on the rod I, and the rod is moved upward and downward to clutch and unclutch the pulley *c* by pulling and pushing upon the handle H, instead of by turning the handle.

Many other modifications might readily be made in the particular devices for effecting the starting and stopping of the fan without departing from the principle of the invention; but those described are deemed sufficient to fully illustrate the principle and operation of the invention.

What I claim is—

1. In a hanger for fans, &c., the combination, with the arms *d*, rigidly secured to the stationary cap-piece *a*, which is made thicker at one side than at the other, of the supplemental cap-piece *k*, also made thicker at one side than at the other and adapted to be adjusted to different positions upon the cap-piece *a*, said cap-piece and supplemental cap-piece being provided with a circular rib *h* and a corresponding groove, substantially as described.

2. The combination, with the pulley *c*, shaft

C, and hub B of the fan, of the expansible sleeve *n* and plug or collar *r*, whereby the pulley, shaft, and hub can be clutched and unclutched to start and stop the fan, substantially as described.

5 3. The combination, with the shaft C, of the hub B, arranged to turn freely upon the expansible journal *n*, and the plug *r*, arranged to expand said journal to clutch the hub to

the shaft, and vice versa, substantially as described.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

PETER MURRAY, JR.

Witnesses:

J. A. HOVEY,

J. J. KENNEDY.