

No. 859,035.

PATENTED JULY 2, 1907.

C. H. ATKINS.
STEAM JOINT.

APPLICATION FILED NOV. 2, 1906.

2 SHEETS—SHEET 1.

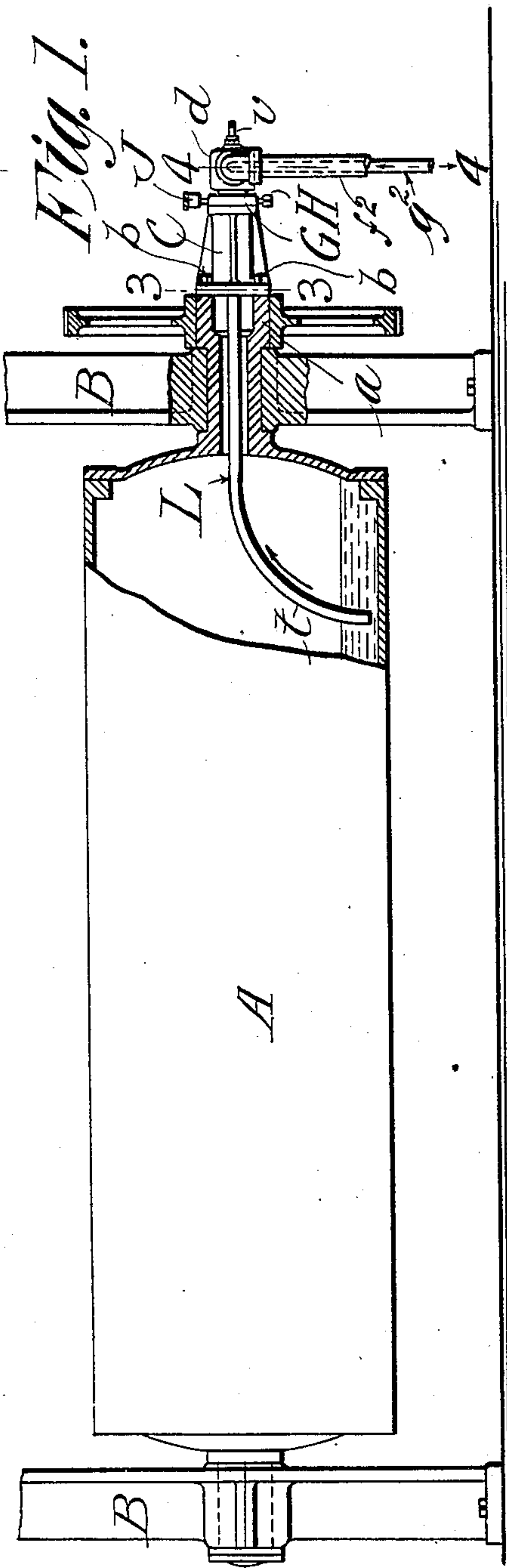


Fig. 1.

Fig. 2.

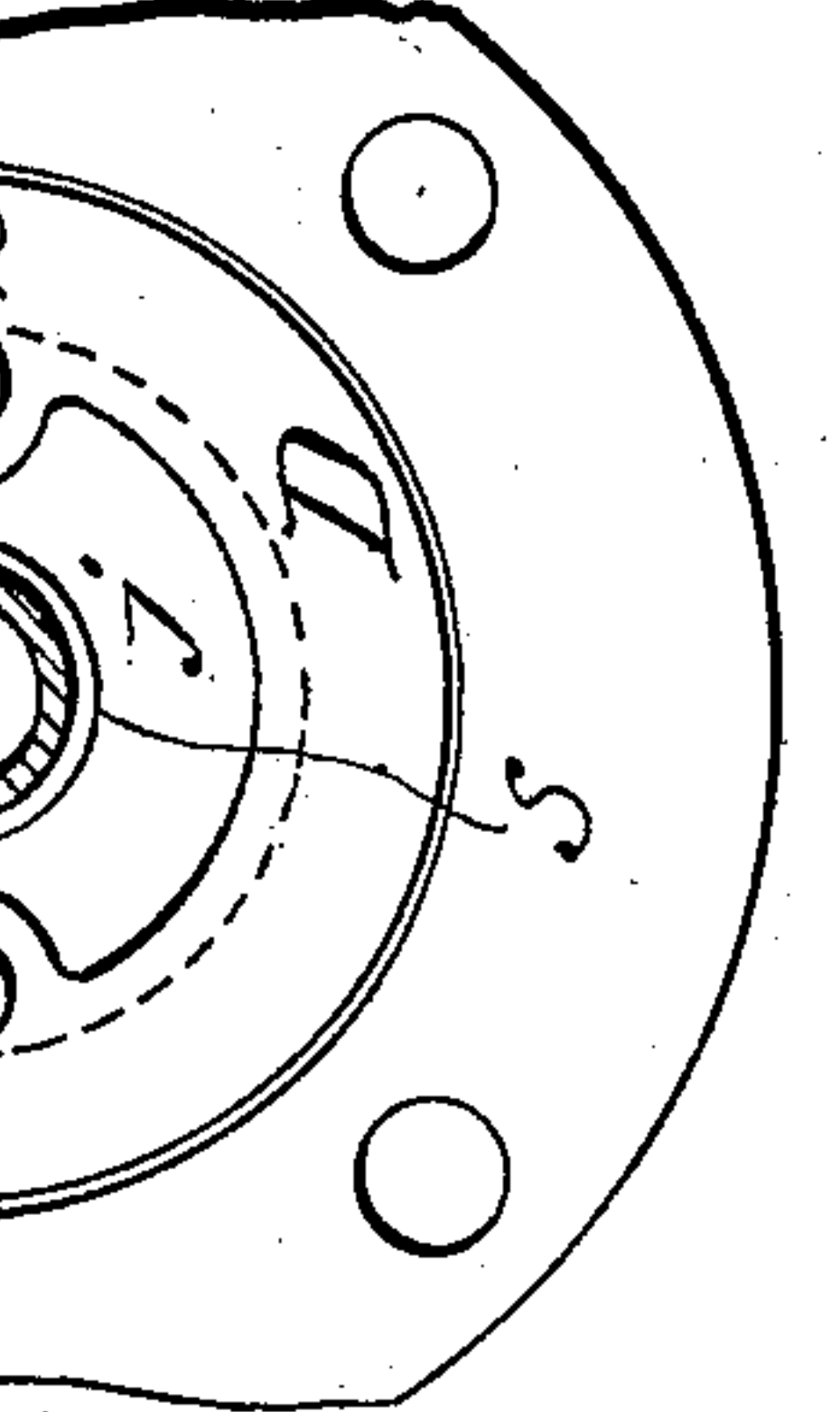
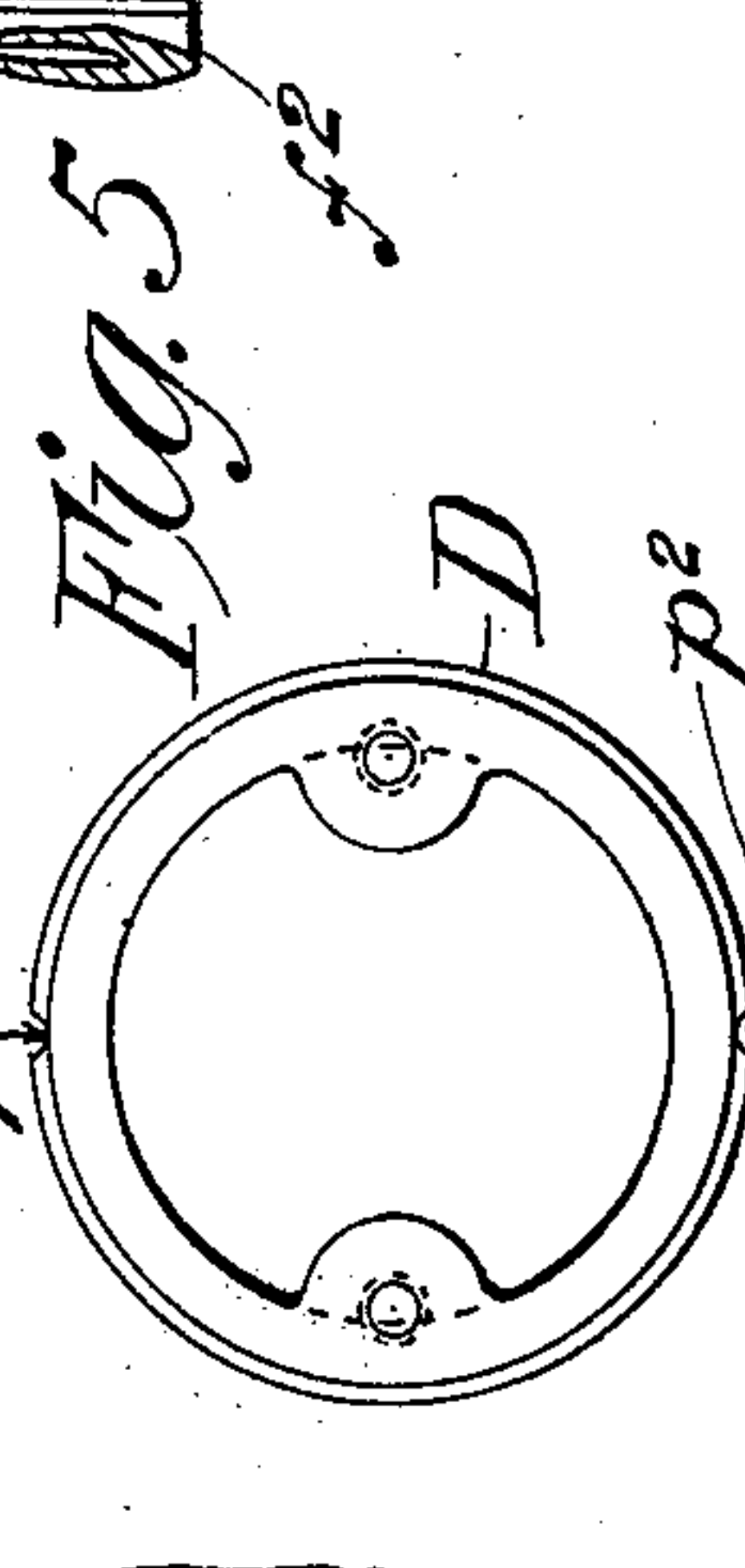
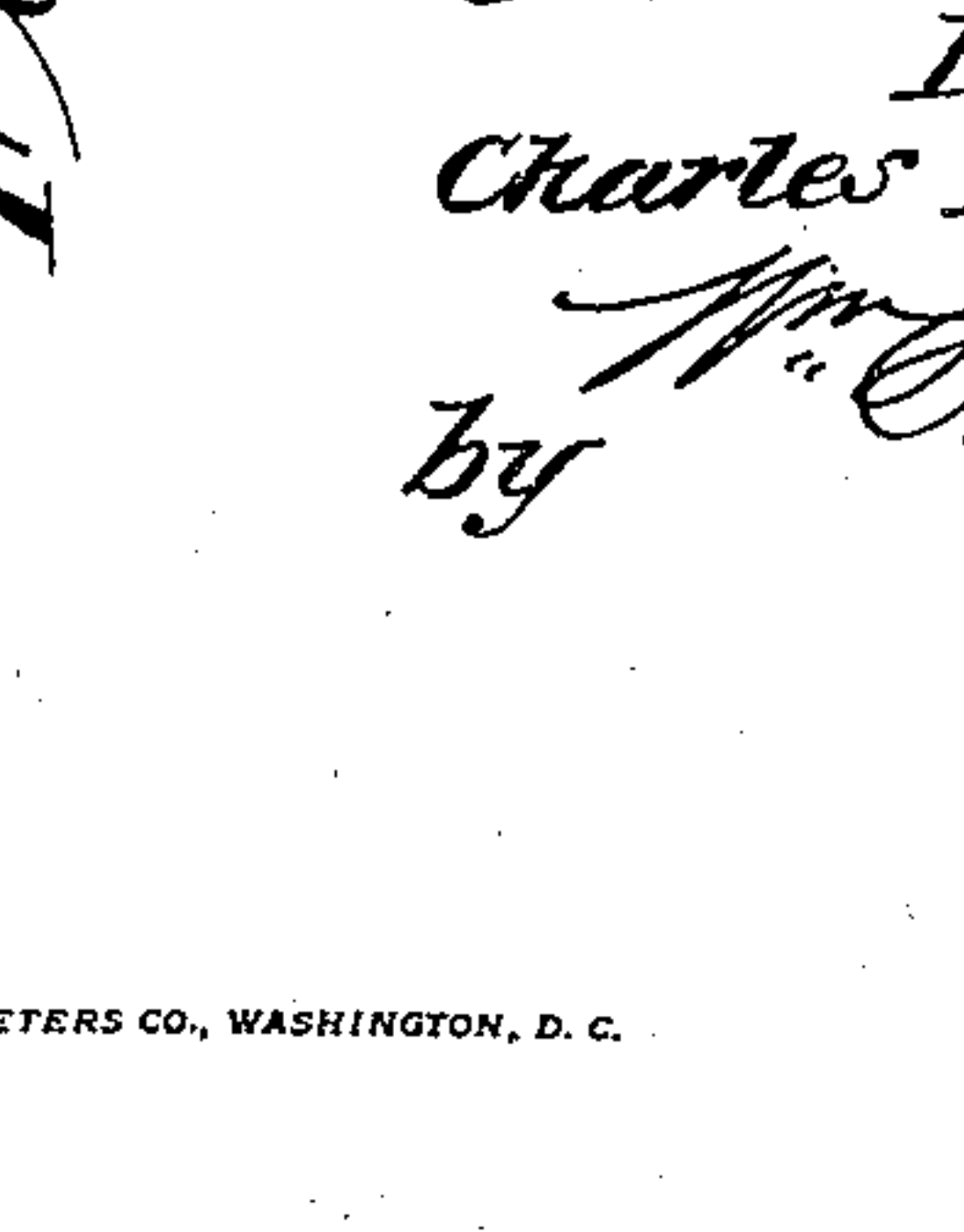
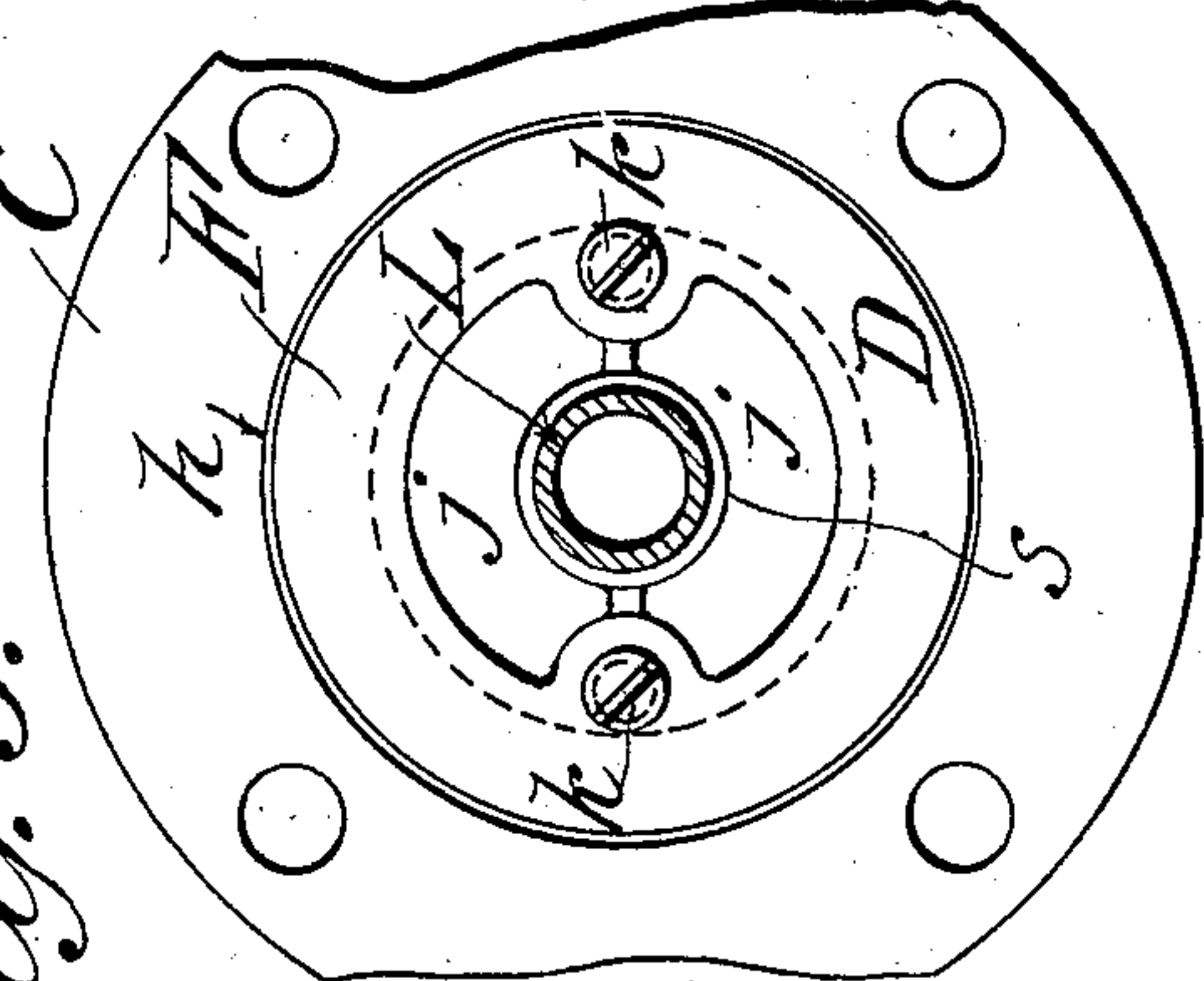
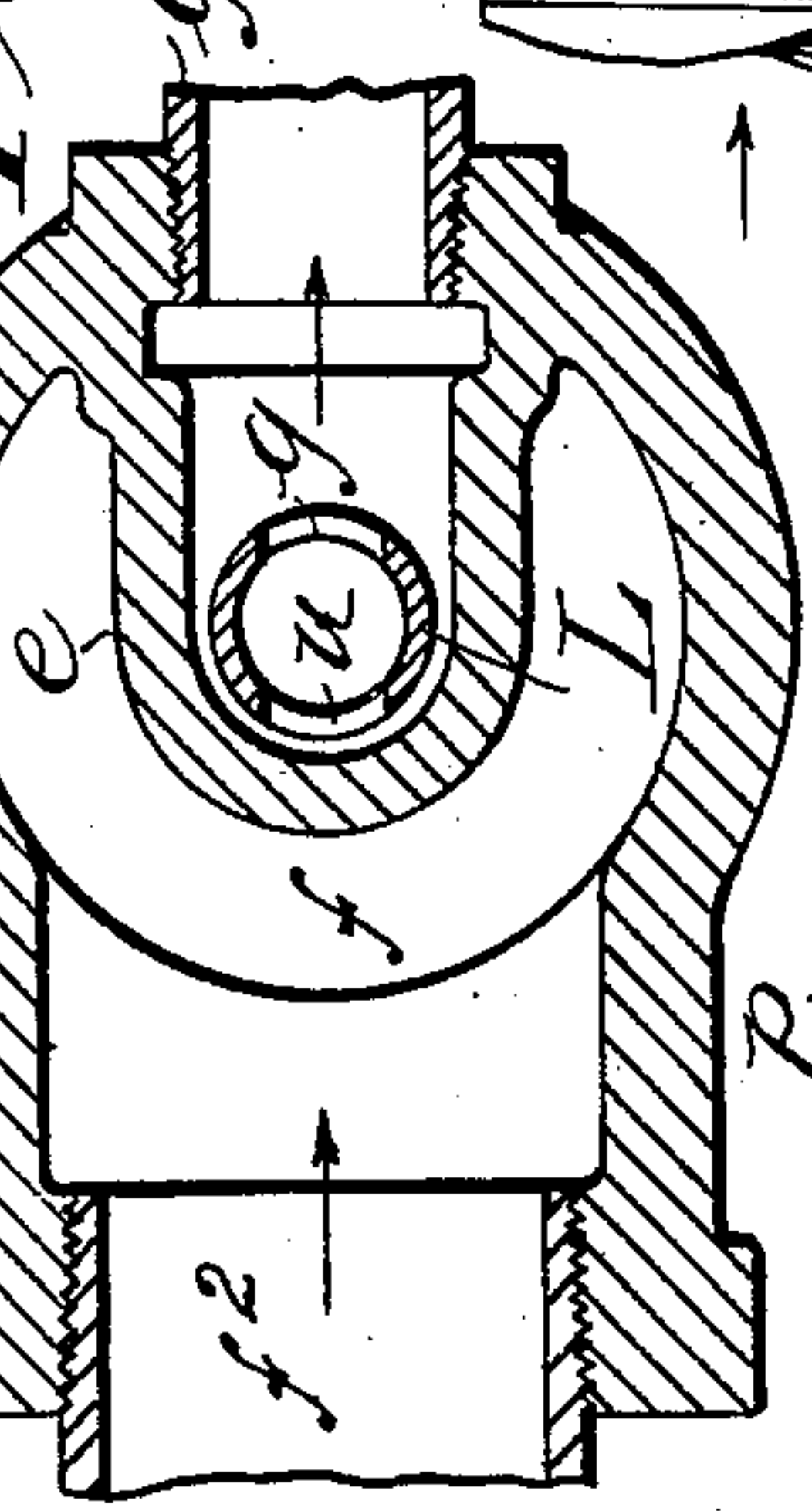
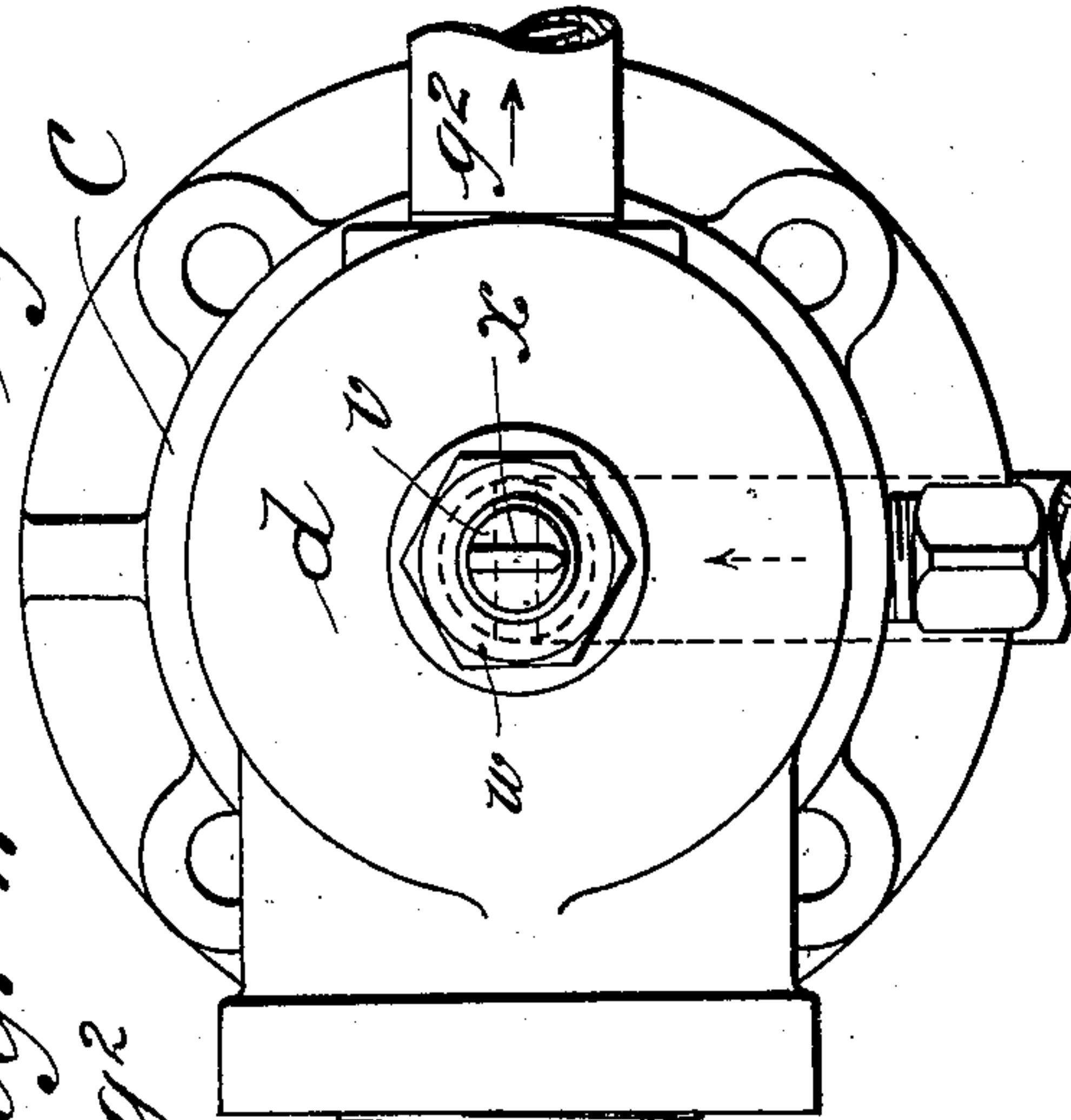
Fig. 3.

Fig. 4.

Fig. 5.

Fig. 6.

Fig. 7.



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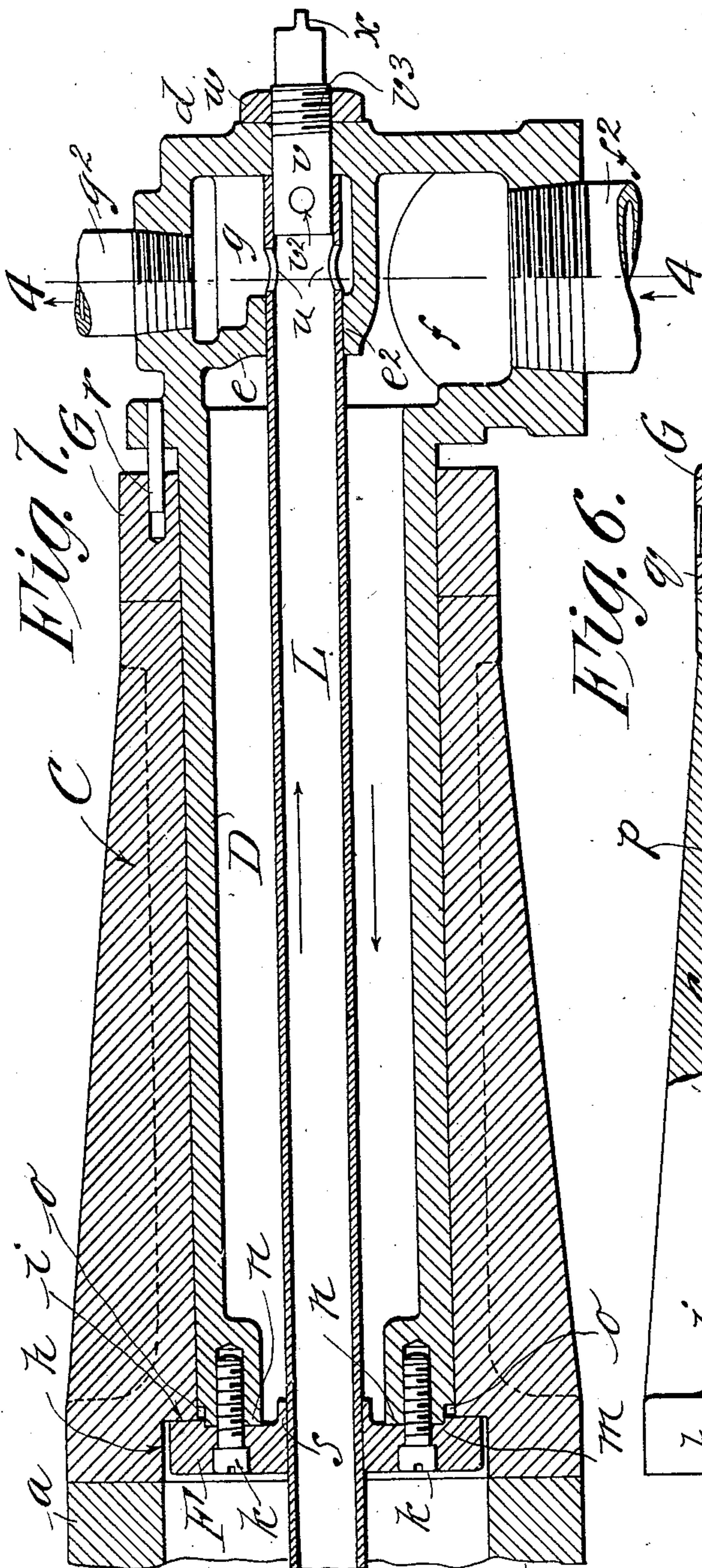
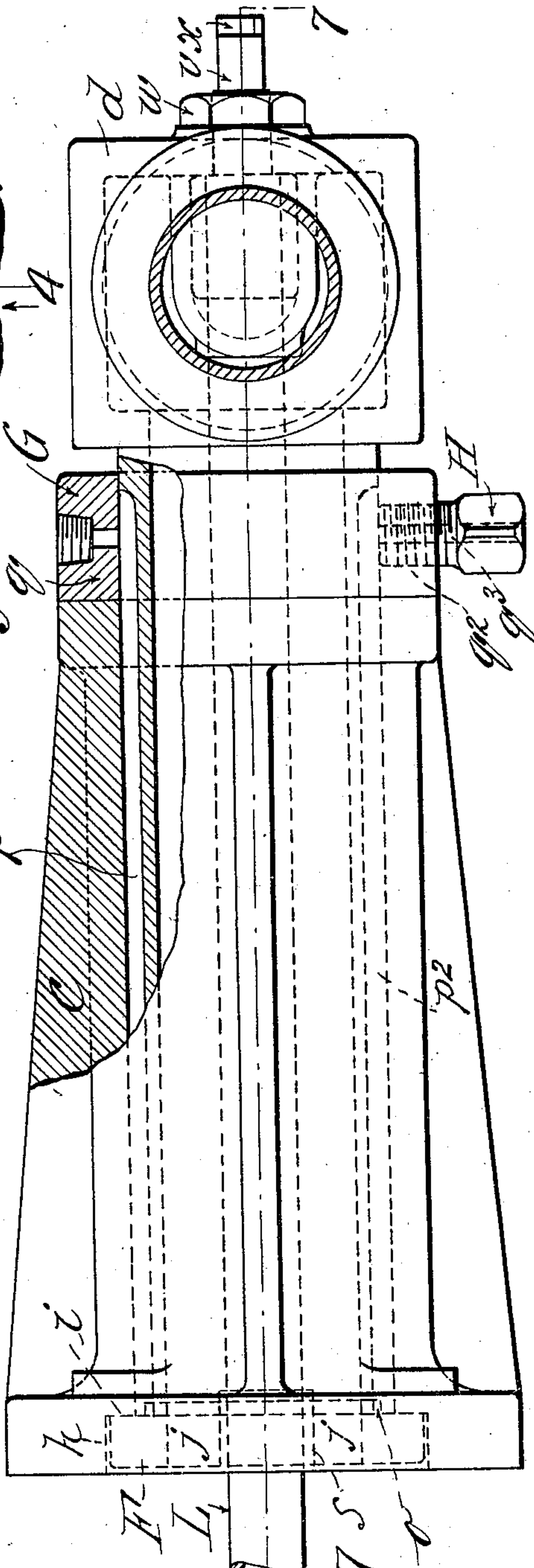


Fig. 6.



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UNITED STATES PATENT OFFICE.

CHARLES HENRY ATKINS, OF SPRINGFIELD, MASSACHUSETTS.

STEAM-JOINT.

No. 859,035.

Specification of Letters Patent.

Patented July 2, 1907.

Application filed November 2, 1906. Serial No. 341,742.

To all whom it may concern:

Be it known that I, CHARLES HENRY ATKINS, a citizen of the United States of America, and a resident of Springfield, in the county of Hampden and State of Massachusetts, have invented certain new and useful Improvements in Steam-Joints, of which the following is a full, clear, and exact description.

This invention relates to improved means for making a satisfactory steam tight joint between a conduit made as a unitary hub-like tubular extension or journal of a rotary steam receptacle (such as the drier drum of a paper machine, or a rotary pulp-stock digester, or a rotary drying can used in a calico mill) and a non rotatable steam supplying conduit axially alined and communicating with and inclosed by a portion of the said tubular hub like journal extension, without the employment of a stuffing box or boxes, and all so that in cases of leakage in the joint after protracted use the parts including the joint plate, and the seat therefor may be easily disassembled and be re-ground.

The invention further relates to constructions or formations in the jointed parts which enable a lubrication of such parts, and also serve as an indicator whether or not the joint is steam tight.

The invention further relates to the provision, in a novel manner, in conjunction with the tubular hub-like extension of the steam receptacle and the non rotatable axially alined steam-supplying conduit jointed thereto, of a pipe for extracting water and air harmfully accumulating in the steam drum or receptacle; and, furthermore, to the provision, as an appurtenance of said pipe, of externally visible means for ascertaining merely by a glance whether or not the bent end of said pipe within the steam receptacle is properly downturned so as to have its open end near the bottom of the receptacle, and operable to readily rectify any displacement of the pipe as occasion therefor may require.

The invention consists in the combinations or arrangements of parts, and in the constructions of, or provisions for, certain of the parts, all substantially as hereinafter fully described, and as definitely set forth in the claims.

The present improvements are illustrated in the accompanying drawings, in which,—Figure 1 is a front view of a steam drier-drum, such as plurally employed on paper machines, a portion thereof being shown in section on the axial plane, indicating the location of the steam joint, and showing the air and water exhausting pipe combined therein. Fig. 2 is an end view, on a larger scale, of the parts seen at the right hand portion of Fig. 1. Fig. 3 is in part a cross section and in part a face view as seen looking to the

rightward beyond the plane indicated by line 3—3, 55 Fig. 1. Fig. 4 is a cross sectional view, on a larger scale, taken at the plane indicated by the line 4 on Fig. 1, and also by the line 4—4 on Fig. 7. Fig. 5 is a view of the left hand end of the non-rotatable steam supplying conduit section hereinafter referred to. 60 Fig. 6 is a side view on a larger scale of the portions shown in Fig. 1 to the rightward of the section line 3—3. Fig. 7 is a horizontal longitudinal sectional view of the parts shown in Fig. 6, taken on the line 7—7.

Similar characters of reference indicate corresponding parts in all of the views. 65

In the drawings,—A represents a rotary steam receptacle which as exemplified in Fig. 1 is of the form employed for a drier drum of a paper machine, the same being shown supported axially horizontally in journal bearings therefor of a portion of the machine frame B. The steam receptacle or drum has essentially at one end thereof an axial hub-like endwise open tubular extension *a* preferably made integrally with the end head of the drum. 75

C represents a sleeve like part endwise adjoined and by bolts *b b* secured to the hub like portion *a* of the drum and constituting a joint element rotatable as one with the drum and its said part *a*.

D represents a non rotatable steam conduit or section, 80 being for a greater portion of the length thereof fitted within the sleeve like section C, and having outwardly beyond the end of such sleeve like part a coupling head *d* constructed with a dividing wall *e* therewithin whereby are formed the steam inlet chamber *f* and an air and 85 water outlet chamber *g*, to the former of which chambers a steam supply pipe *f*² leads while from the latter chamber *g* leads an air and water exhausting pipe *g*². The tubular non rotatable steam conduit D has its end farthest from the coupling head located just forward of 90 the plane of the joint between the parts *a* and the sleeve section C which is affixed thereto. The said sleeve section has at its end in proximity to the end of the tubular steam section D a depression *h* at one boundary of which a seat shoulder *i* is produced. 95

F represents a joint-plate of circular form as shown, facewise, in Fig. 3, and is made with an intermediate aperture or apertures *j*. This joint plate *f* is preferably slightly thinner than the depth of the depression *h*, has its disposition in such depression, and has an overlapping bearing on the truly ground seat shoulder *i* and 105 the end of the tubular steam section D; and by the screws *k k* the said joint plate is tightly secured on the end of the tubular section D. And, as shown in Fig. 7, the forward face of the joint plate has a depression or 100 rabbet *m* in which the diametrically reduced end portion of the section D is seated with a close fit circumferentially as well as by end contact.

It will be perceived in Fig. 7 that by reason of the left hand end portion of the section D being diametrically reduced or necked down from its seated end a slight distance forwardly beyond the plane of the seat shoulder *i*, a small annular space or chamber *o* is produced adjoining the seam at the contacting surfaces of the joint plate and seat shoulder and the periphery of the tubular section D and internal bore through the sleeve like section or extension C of the hollow drum hub. The section D has grooves *p*, *p*², extending along its external surface longitudinally and connecting into the aforementioned annular chamber *o*. These grooves forwardly extend somewhat beyond the outer end of the sleeve section C and their outer ends are inclosed or covered by a collar G fitted on the section D and abutted against the end of the sleeve section C. This collar G has opposite radial openings *q* and *q*² in line with said grooves and having communication therewith. In one of these openings or passages *q*² is provided a set screw H having an axial hole *q*³ from end to end thereof,—the set screw serving to confine the collar against endwise and rotational displacement while the hole there-through affords a contracted outlet or way through which steam, if any, leaking through the joint when the same, after protracted use, may have become defective, may be perceived and taken as a warning of the necessity for regrinding the seat shoulder *i*, the joint-plate F, or both thereof. An oil cup or lubricator J connects into the upper opening *q* in the collar for giving a regulated supply of oil into the upper groove *p* whereby it may lubricate the cylindrical bearing parts of the sections D and C, and also by running to the annular chamber *o* it becomes distributed to thoroughly lubricate the last mentioned bearing surfaces and also the forward face of the joint plate in revolving contact on which is the seat shoulder *i*. The aforementioned collar G is additionally held against rotational displacement by the stud and socket engagement indicated at *r* provided between the collar and coupling head.

L represents a non rotative air and water exhausting pipe, located and extending centrally through the non rotatable steam conduit or section D and through the tubular hub *a* of the drum, being intermediately closely fitted in and supported by the ring like concentric part *s* of the joint plate which to this end is made as in the form of a spider frame, as is to be perceived on again referring to Fig. 3; and the said pipe L has a downwardly directed inner extremity *t* which properly terminates within, and near the bottom of the drum. The forward or outer end portion of the said non rotative tube L is connected, supported and arranged relatively to the coupling head, as clearly shown in Fig. 7: that is, its forward extremity is fitted through a round hole *e*² therefor in the wall or partition *e*, the end of this tube proper is set closely against the vertical internal wall surface of the chamber *g* and the said tube has one or more holes *u* whereby communication is had between the tube passage and the chamber *g* from which the suction pipe *g*² leads. The tube has an end closing part which in the present instance is constituted by a stud or cylindrical plug *v* passed through the outer vertical wall of the coupling head, telescoped for a suitable distance into the end portion of the tube L and connected therewith by the pin *v*². The said stud *v* is visible and accessible externally of the coupling head, and

is provided with a screw threaded portion *v*³ receiving engagement thereon of a locking nut *w* to be turned up to hard contact against the outer surface of the coupling head, holding the tube against liability, under ordinary conditions, of rotating. The said cylindrical plug or stud is made with a tell-tale feature, formed or arranged to correspond with the deflection radially of the tube extremity *t*; and the same, as shown at *x*, consists of a diametrical ribbon the end of the plug having a V-shape at its lower end,—the plug and tube being so connected at the radial lines of the tube extremity *p* and the rib *x* coincide, the V end of the rib pointing in the direction of the downturning of the tube extremity. It will be perceived that the said tube L is supported through the joint-plate F and in the coupling head *d* which are non rotative parts, whereby little liability obtains for the turning of the tube, but inasmuch as it is highly important that the tubes be maintained in the driers, as represented in Fig. 1, the tell-tale feature above particularly described and explained is an important and valuable provision in, or appurtenant to, the steam joint. It is, of course, manifest that in cases where the tube L becomes rotationally displaced the same will be immediately perceived by the machine tender and may be, by him, readily rectified.

I claim:—

1. The combination with a tubular conduit made as a hub-like extension of a rotary steam receptacle, and a tubular non-rotatable steam conduit section axially aligned with, and endwise adjacent, the rotatable tubular conduit, and having, outwardly thereof, means for connection therewith of a steam supplying pipe, of a sleeve like part fitted about the said non-rotatable tubular conduit in endwise proximity to, and connected to rotate in unison with the said tubular conduit and having in said endwise proximate end a seat-shoulder-including depression, and an intermediately apertured joint-plate, facewise bearing against said seat-shoulder in the depression at the end of said sleeve like part, and detachably fastened to the adjacent end portion of the said non-rotatable tubular steam conduit section.
2. The combination with a rotary steam receptacle having a tubular conduit made as a hub-like extension thereof, and a tubular non-rotatable section axially aligned with, and endwise adjacent, the rotatable conduit, and having, outwardly therefrom, means for connection therewith, of a steam supplying pipe, of a sleeve like part fitted about the said non rotatable tubular conduit in endwise proximity to, and connected to rotate in unison with the said conduit extension and having in said endwise proximate end a depression, with a seat shoulder therein, and an intermediately apertured plate, facewise bearing against said seat-shoulder in the depression at the end of said sleeve like part having a depression in the face thereof, in which the end of the said non rotatable tubular section has a seating fit, and screws engaged through the said plate and threading into the end portion of said non rotatable section.
3. In combination, a rotary steam receptacle having an axial hub-like endwise open tubular extension and a non-rotatable tubular section axially aligned with and endwise adjacent the rotatable hub-like extension provided with a steam supplying connection, a sleeve like part fitted about said non-rotatable section and endwise connected to, and for rotation in unison with, the said hub-like extension, and having in its end a circular depression with a seat shoulder therein concentrically outside of the adjacent end of the non-rotatable section, an intermediately apertured plate located in said depression and facewise bearing against the seat therein and against the end of the non-rotatable section and secured to the latter, and said non rotatable section having a groove longitudinally extending along its external surface, connecting with the seam at

the contacting surfaces of the plate against the seat shoulder in the sleeve like part and end of the non-rotatable section, and having a radial way in communication with the said groove and leading to the exterior of the appliance.

4. In combination, a rotary steam receptacle having an axial hub-like endwise open tubular extension and a non-rotatable tubular section axially alined with and endwise adjacent the rotatable hub-like extension provided with a steam supplying connection, a sleeve like part fitted about said non-rotatable section and endwise connected to, and for rotation in unison with, the said hub-like extension, and having in its end a circular depression with a seat shoulder therein concentrically outside of the adjacent end of the non-rotatable section, an intermediately apertured plate located in said depression and facewise bearing against the seat therein and against the end of the non-rotatable section and secured to the latter, and said non rotatable section having grooves longitudinally extending along its external surface, at different portions thereof, and connecting with an annular space which is constituted between the non rotatable section and the rotatable sleeve-section forwardly adjacent the joint plate, and a collar, fast on the non rotatable section next to the outer end of the sleeve like part, having radial passages connecting with said grooves.

5. In combination, a rotary steam receptacle having an axial hub-like endwise open tubular extension and a non-rotatable tubular section axially alined with and endwise adjacent the rotatable hub-like extension provided with a steam supplying connection, a sleeve like part fitted about said non-rotatable section and endwise connected to, and for rotation in unison with, the said hub-like extension, and having in its end a circular depression with a seat shoulder therein concentrically outside of the adjacent end of the non-rotatable section, an intermediately apertured plate located in said depression and facewise bearing against the seat therein and against the end of the non-rotatable section and secured to the latter, and said non rotatable section having grooves longitudinally extending along its external surface at different portions thereof, and connecting with an annular space which is constituted between the non rotatable section and the rotatable sleeve-section forwardly adjacent the joint plate, a collar, fast on the non rotatable section next to the outer end of the sleeve like part, having radial passages connecting with said grooves, an oil supplying device connected with one of said radial passages, and a longitudinally bored set screw, engaged in the other of said passages, and binding the collar on the non rotatable section.

6. The combination with an axially horizontal drum having a tubular hub-like extension, and a tubular non-rotatable section axially alined with, and endwise adjacent, said extension, and having a steam supplying pipe connected therewith, of a sleeve like part fitted about the said non rotatable tubular conduit in endwise proximity to, and connected to rotate in unison with the said drum extension and having in its end a seat shoulder forming depression, a joint plate located in said depression and facewise bearing against said seat-shoulder and also facewise bearing against and secured to the end of said non-rotatable section, and intermediately apertured, and having a ring-like support concentrically in its intermediate aperture, and a non-rotative air and water exhausting pipe, extending centrally through the non rotatable section, through the hub-like drum extension,—being closely fitted in, and supported by, said ring like concentric part of the apertured joint plate,—and having a downwardly directed inner extremity terminating within and near the bottom of the drum.

7. The combination with an axially horizontal rotary steam drum having a tubular hub-like extension, and a non-rotatable steam conduit section having a portion thereof fitted within the said hub-like extension and having outwardly beyond said extension a coupling head constructed with a dividing wall therewithin constituting a steam inlet chamber and an air and water outlet chamber, of a tube having the outer end portion thereof located within and in communication with said air and water outlet chamber and extended centrally through the conduit section and drum extension, and having a downwardly

turned extremity terminating within and near the bottom of the drum, and a stud fitted through the coupling head and fastened to the outer, chamber-inclosed, end of said tube, said stud having its outer portion accessible and visible externally of the coupling head.

8. The combination with an axially horizontal rotary steam drum having a tubular hub-like extension, and a non-rotatable steam conduit section having a portion thereof fitted within the said hub-like extension and having outwardly beyond said extension a coupling head constructed with a dividing wall therewithin constituting a steam inlet chamber and an air and water outlet chamber, of a tube having the outer end portion thereof located within said air and water outlet chamber having a hole connecting the tube passage with said chamber, having its outer end positioned against the internal surface of a wall of such chamber, and said tube being extended centrally through the conduit section and drum extension, and having a downwardly turned extremity terminating within and near the bottom of the drum, a stud fitted through the coupling head, fitted and fastened in the outer end portion of said tube, having an externally located portion screw threaded and a nut screw engaging on the stud and to be set against the outer side of the coupling head.

9. The combination with an axially horizontal rotary steam drum having a tubular hub-like extension, and a non-rotatable steam conduit section having a portion thereof fitted within the said hub-like extension and having outwardly beyond said extension a coupling head constructed with a dividing wall therewithin constituting a steam inlet chamber and an air and water outlet chamber, of a tube having the outer end portion thereof located within and in communication with said air and water outlet chamber and extended centrally through the conduit section and drum extension, and having a downwardly turned extremity terminating within and near the bottom of the drum, and a stud fitted through the coupling head and fastened to the outer, chamber-inclosed, end of said tube, said stud having its outer portion accessible and visible externally of the coupling head, and having a feature to serve as a tell-tale whereby may be determined whether or not the downturned extremity of the tube within the drum is in its properly depending position.

10. The combination with an axially horizontal rotary steam drum having a tubular hub-like extension, and a non-rotatable steam conduit section having a portion thereof fitted within the said hub-like extension and having outwardly beyond said extension a coupling head constructed with a dividing wall therewithin constituting a steam inlet chamber and an air and water outlet chamber, of a tube having a portion thereof near its outer end located within and in communication with said air and water outlet chamber having a tube end-closing portion thereof extended through the wall of the coupling head and externally visible and accessible thereat, and said tube being oppositely extended through the conduit section and drum extension, and constructed with a downwardly turned extremity terminating within and near the bottom of the drum.

11. The combination with an axially horizontal rotary steam drum having a tubular hub-like extension, a non-rotatable steam conduit section having a portion thereof fitted within and to constitute a partial journal for the said hub-like extension and having outwardly beyond said extension a coupling head constructed with a dividing wall therewithin constituting a steam inlet chamber, and an air and water outlet chamber, and a circular spider shaped joint plate supported by the end of the non rotatable conduit section, and preventing steam entrance between the surface of said section and the portion of the internal surface of the hub-like extension in encircling bearing thereabout, of a tube having the outer end portion thereof located within and in communication with said air and water outlet chamber and extended centrally through the conduit section and drum extension,—deriving intermediately a support in the spider shaped joint plate,—and having a downwardly turned extremity terminating within and near the bottom of the drum, a stud fitted through the coupling head and fastened to the outer, chamber-inclosed, end of said tube, said stud having its outer portion accessible and visible externally of the coupling head.

12. The combination with a rotary steam receptacle provided with a tubular hub-like extension comprising an outwardly located portion having the bore therethrough of reduced diameter, whereby an annular seat shoulder is
5 provided facing towards the receptacle, a non rotative tubular steam supplying section about which said outwardly located portion of the hub like extension closely fits, having an end thereof located adjacent and concentrically relatively to said shoulder and provided with an

outwardly extending circular flange like part having face- 10
wise contact against said annular seat shoulder.

Signed by me at Springfield, Mass., in presence of two
subscribing witnesses.

CHARLES HENRY ATKINS.

Witnesses:

WM. S. BELLOWS,
G. R. DRISCOLL.