

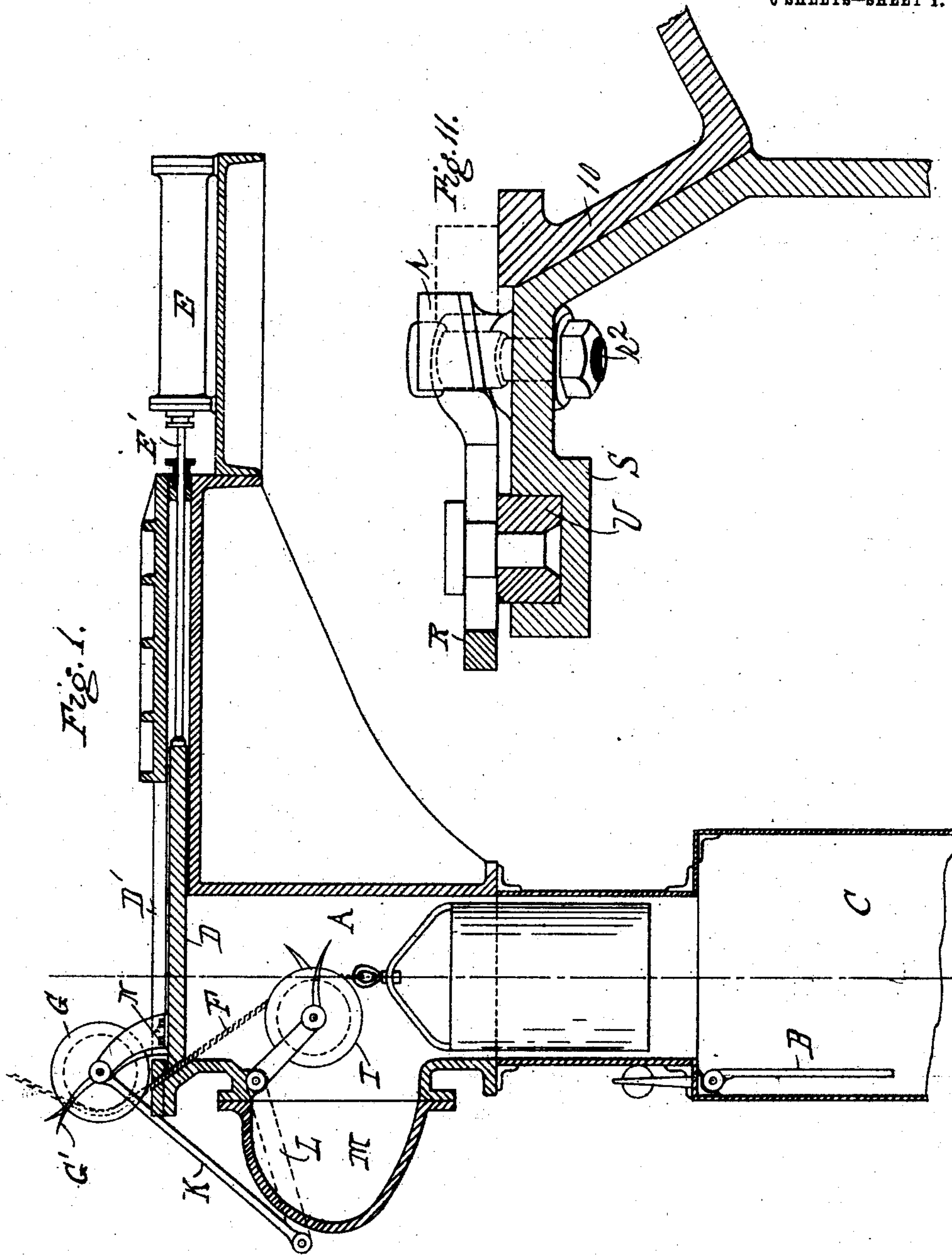
H. JAPP.
AIR LOCK.

APPLICATION FILED SEPT. 4, 1908.

908,866.

Patented Jan. 5, 1909.

6 SHEETS—SHEET 1.



WITNESSES
Muller Abbe
L. H. Grote

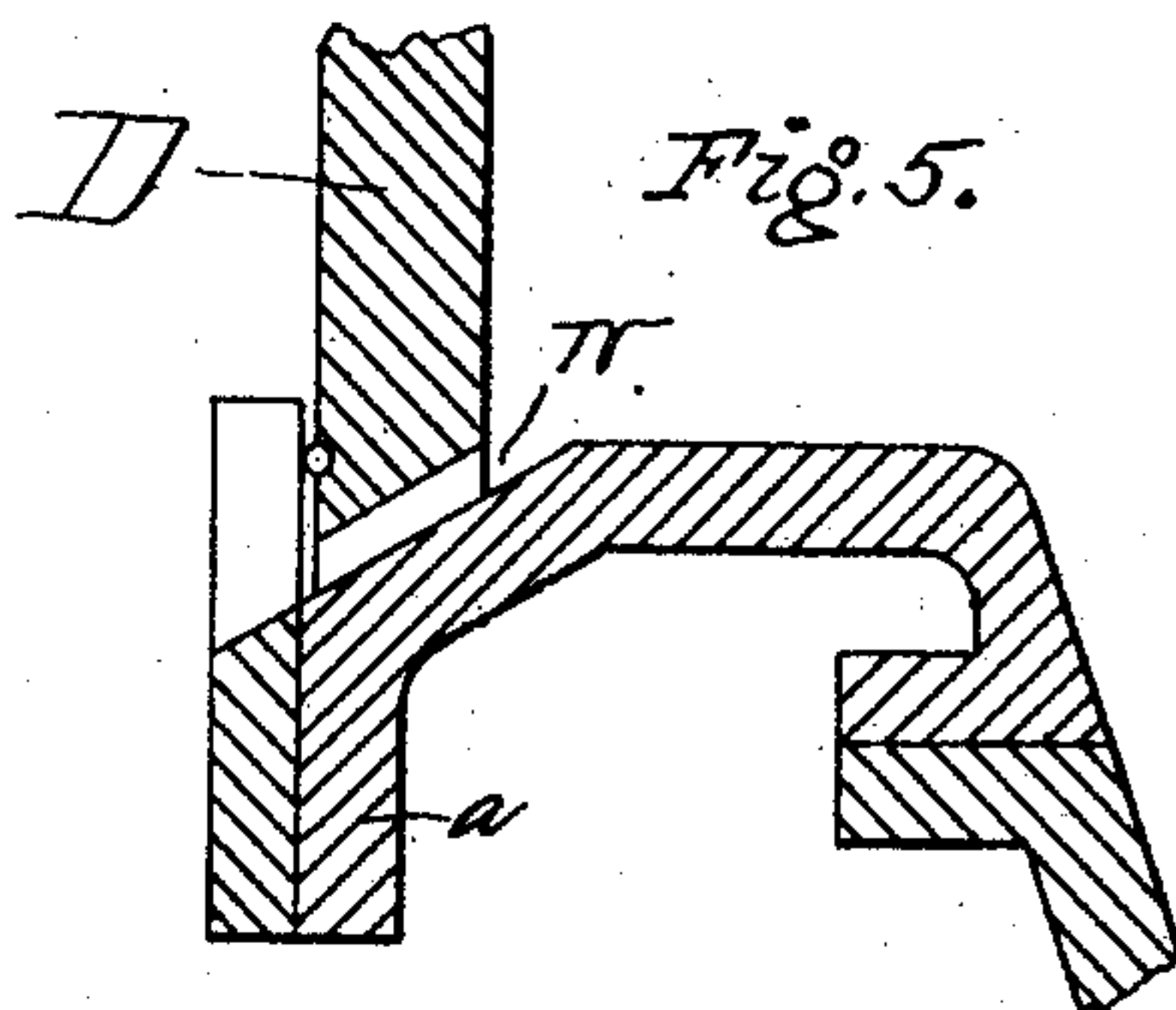
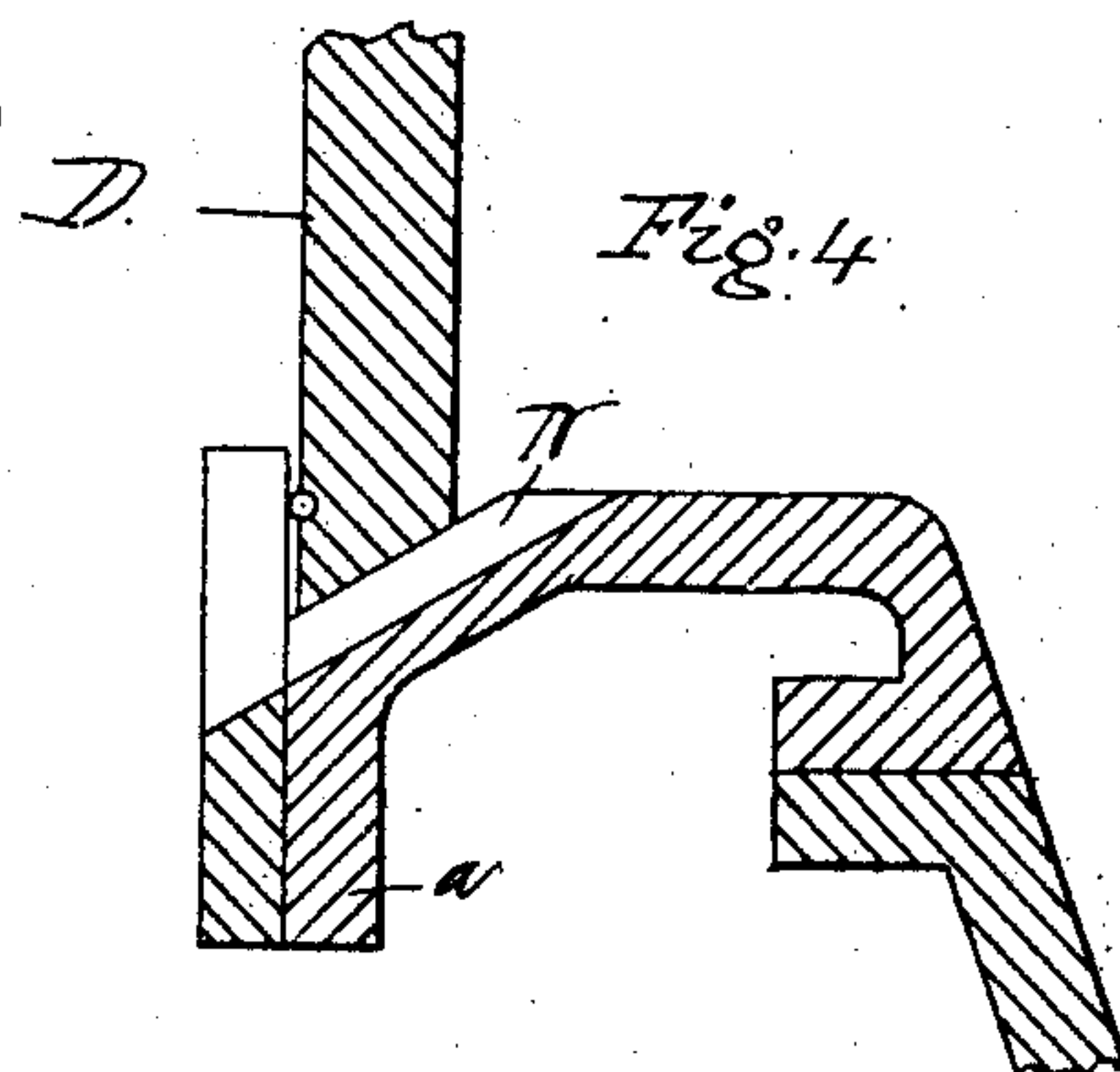
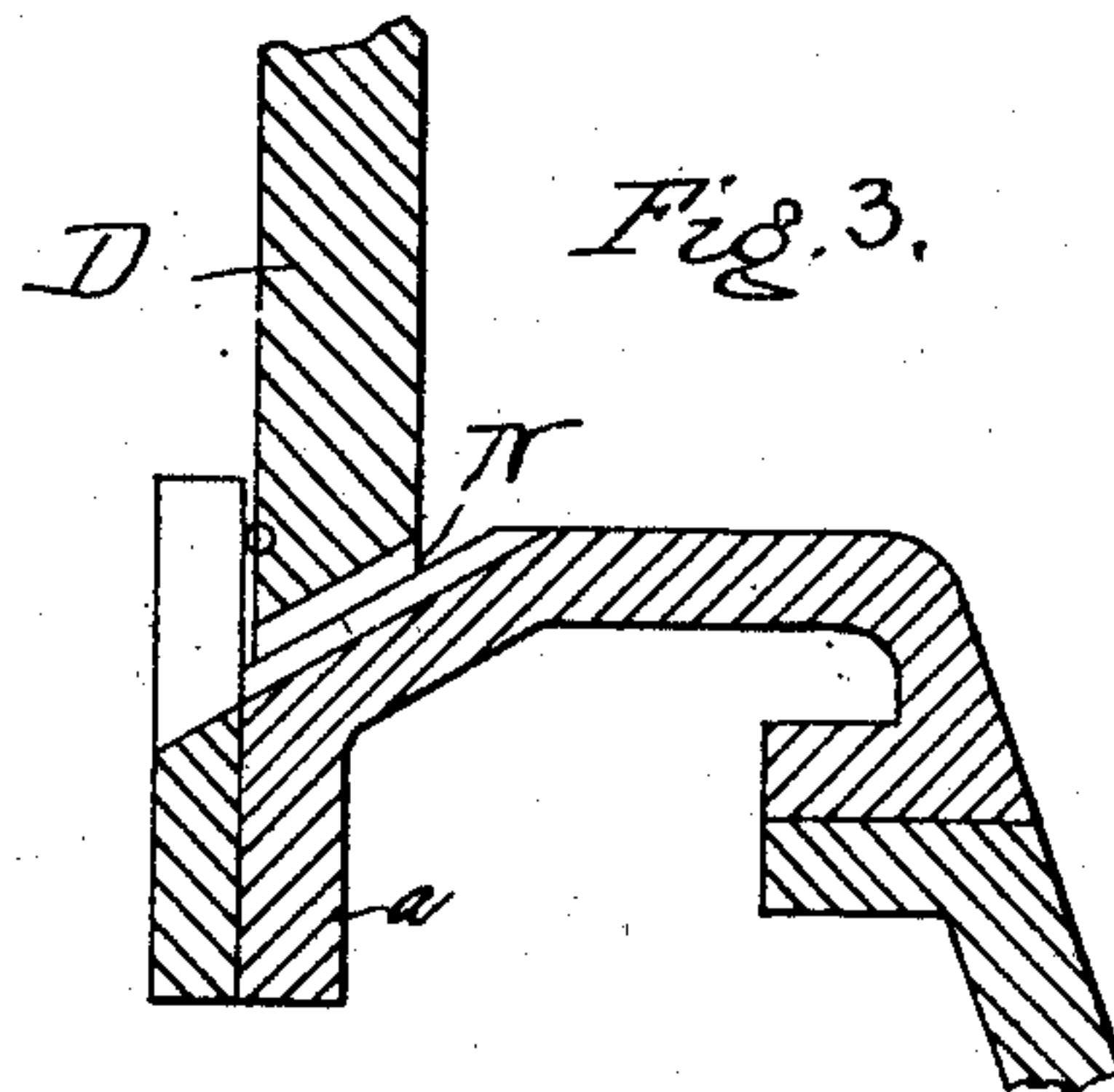
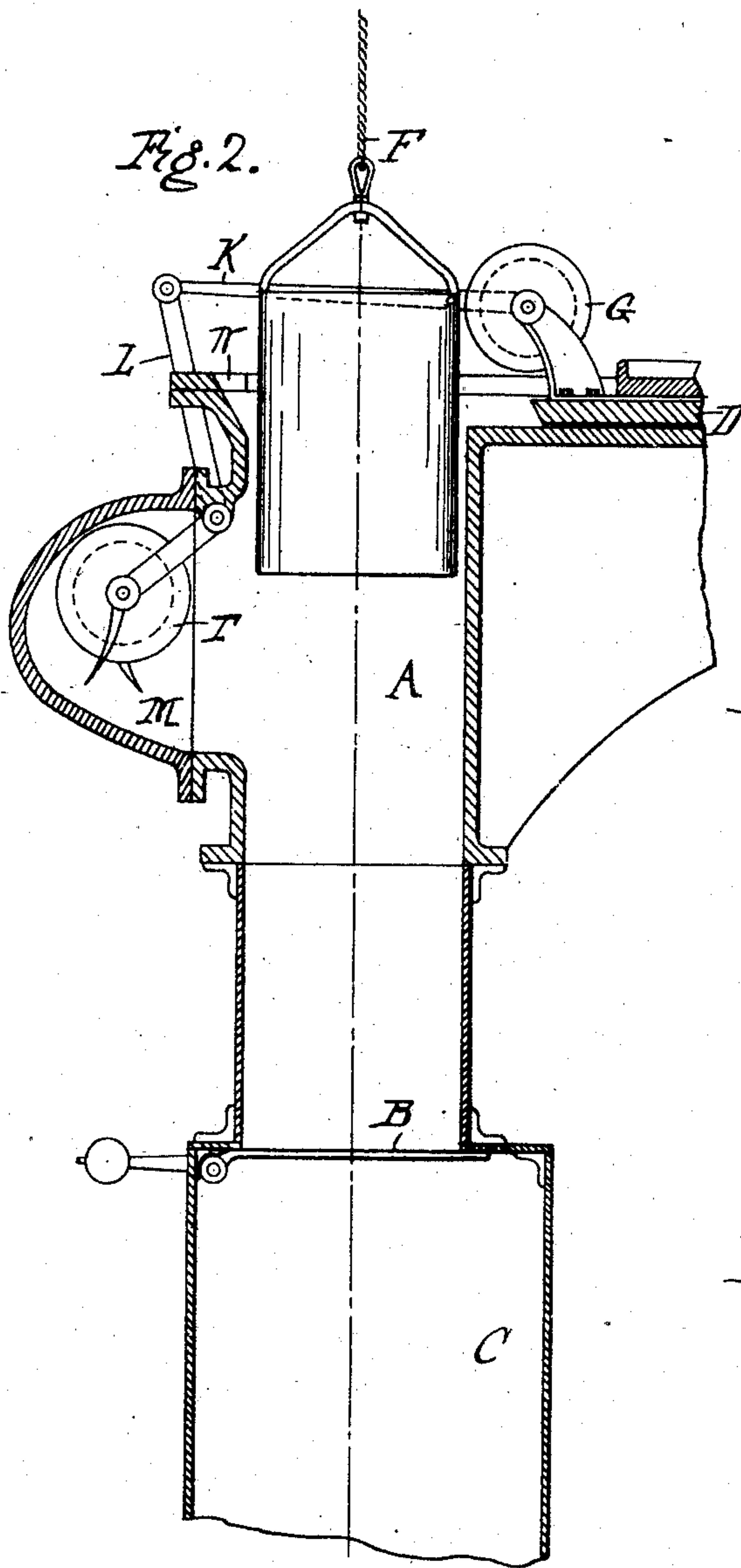
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6 SHEETS—SHEET 2.



WITNESSES

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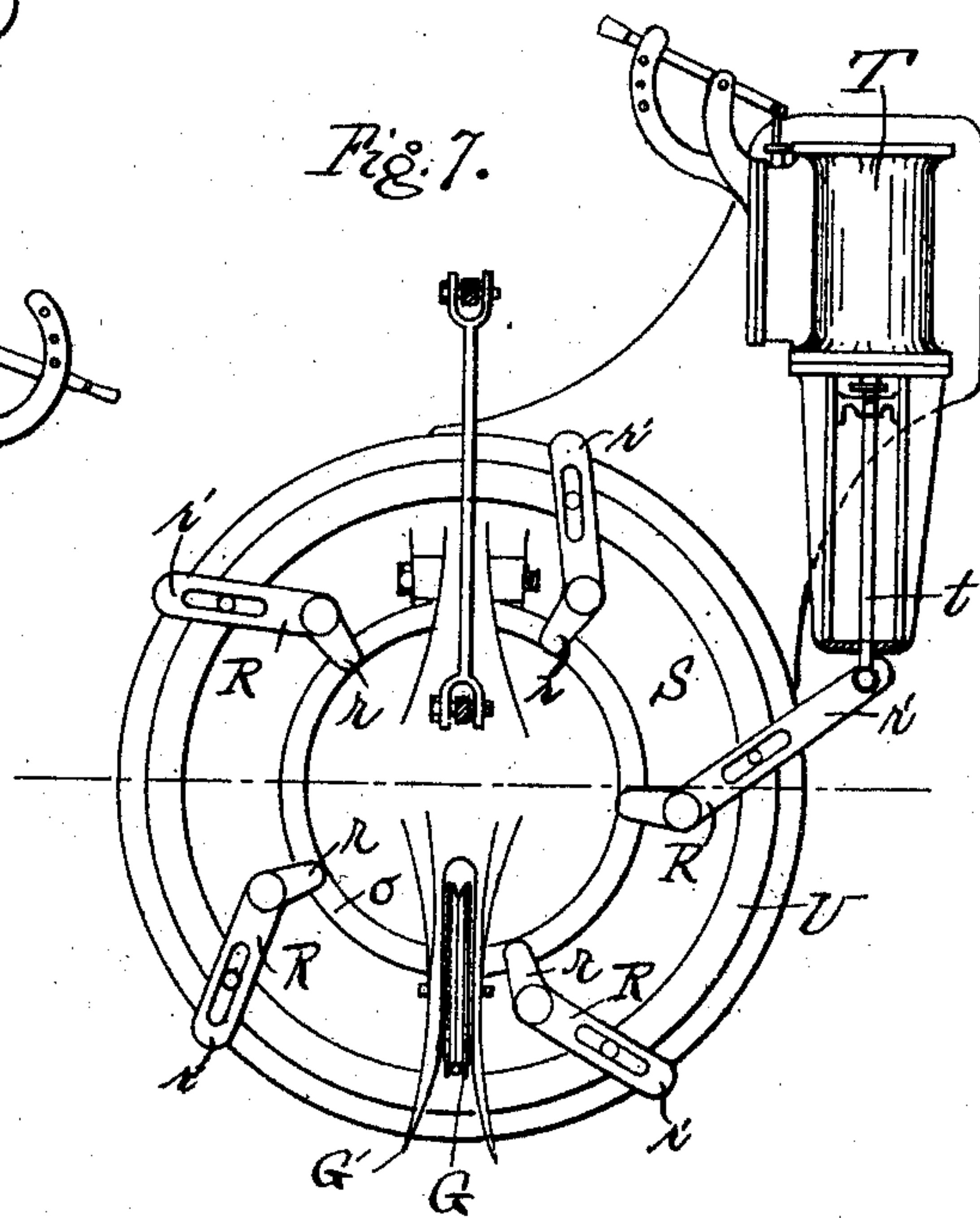
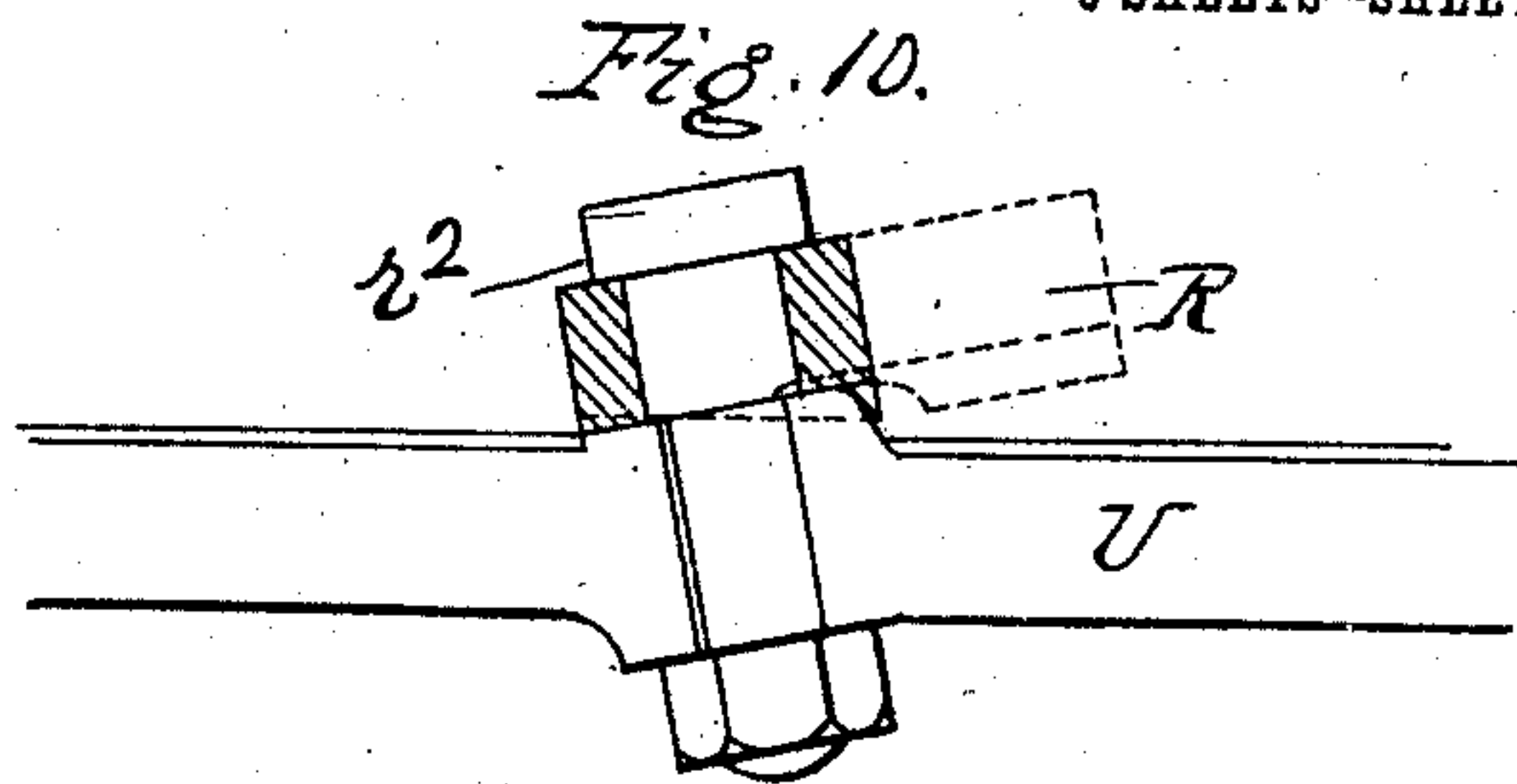
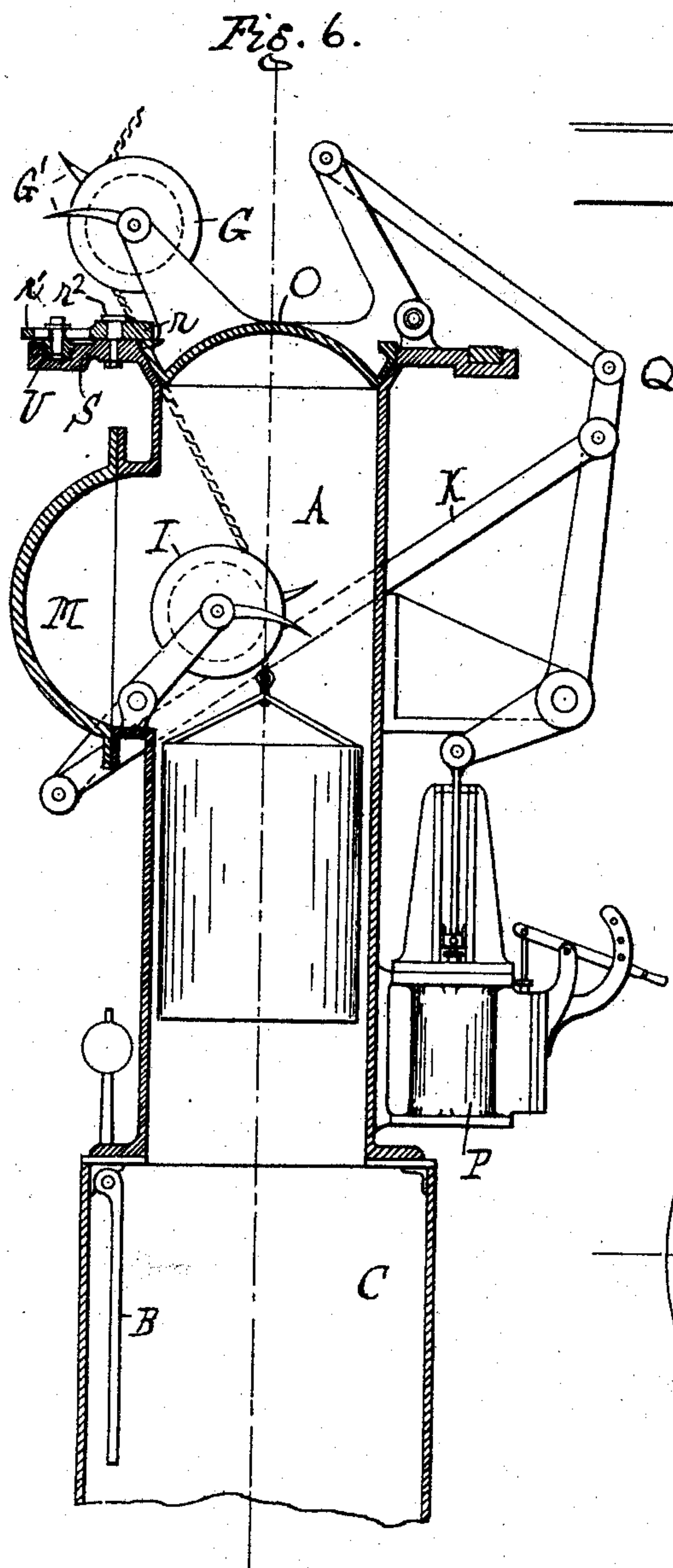
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6 SHEETS—SHEET 3.



WITNESSES

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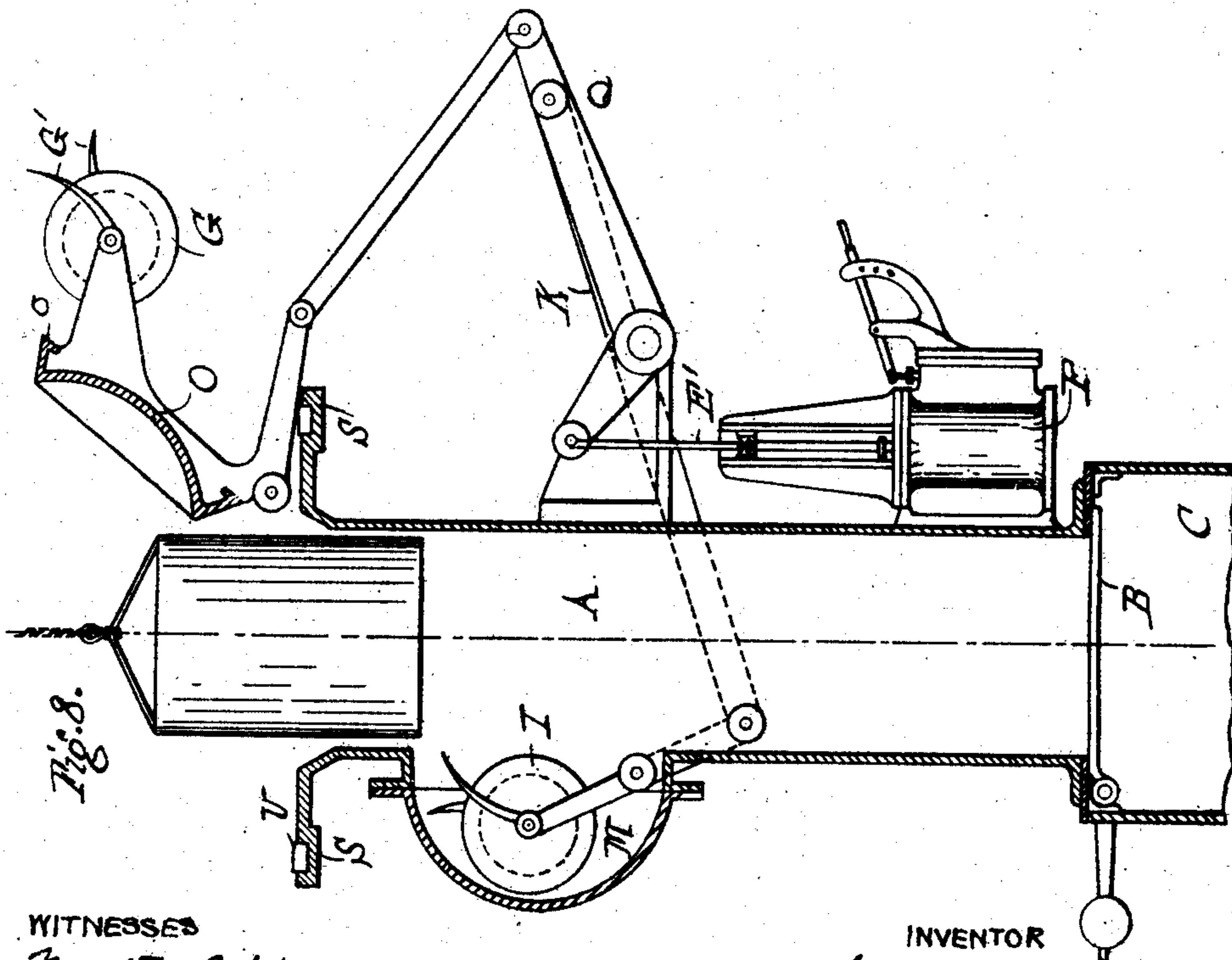
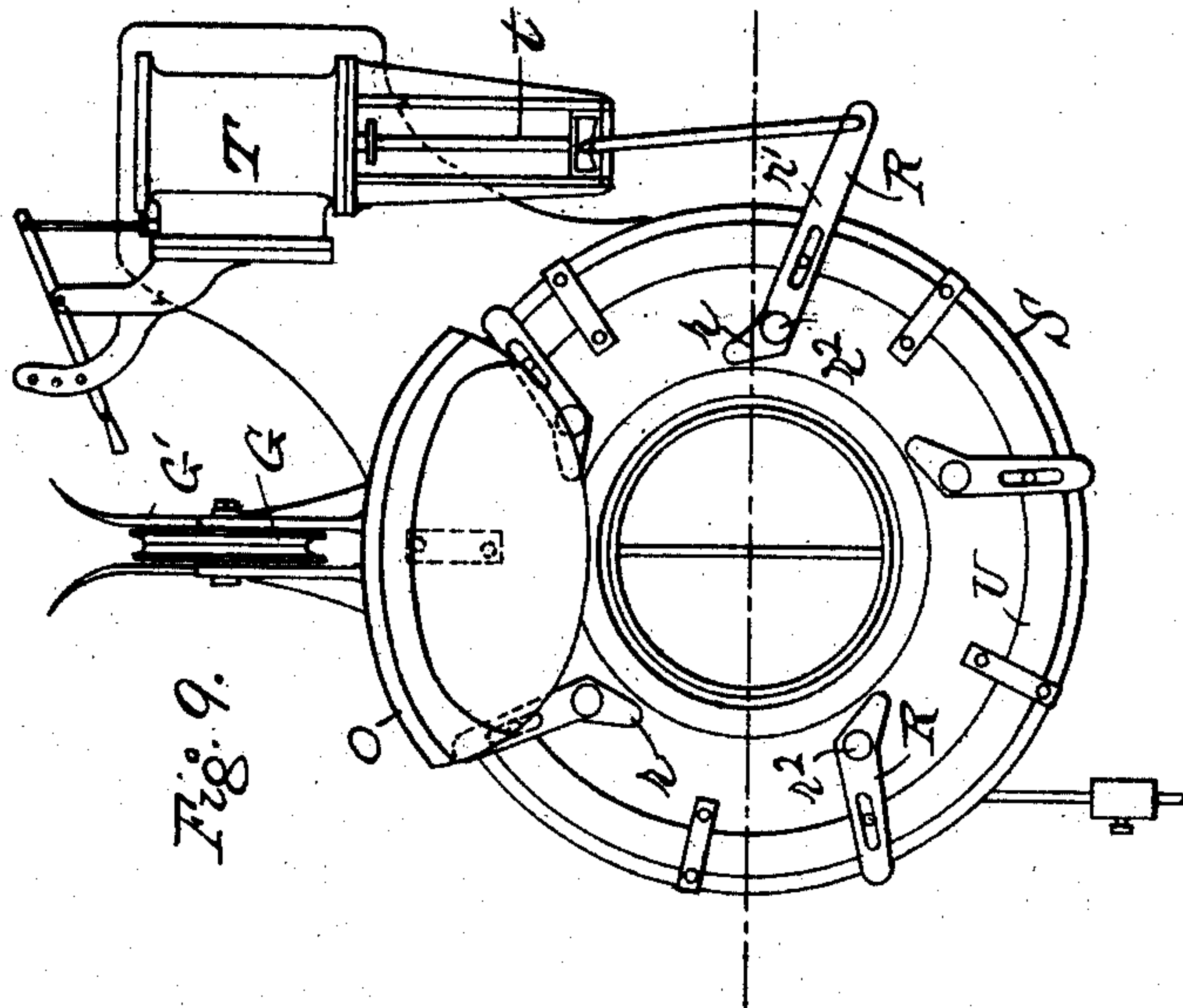
H. JAPP.
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908,866

Patented Jan. 5, 1909.

6 SHEETS—SHEET 4.



WITNESSES

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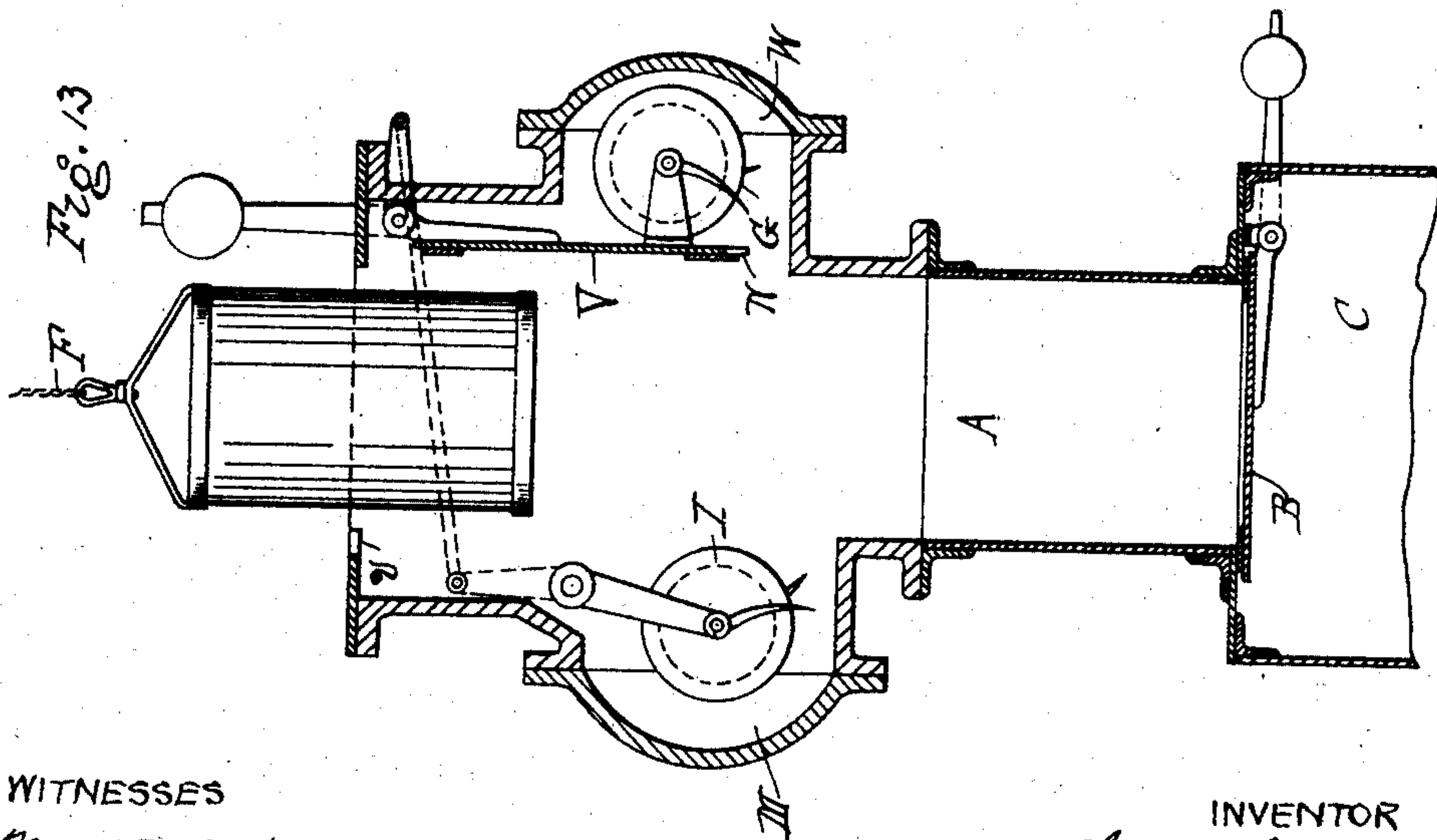
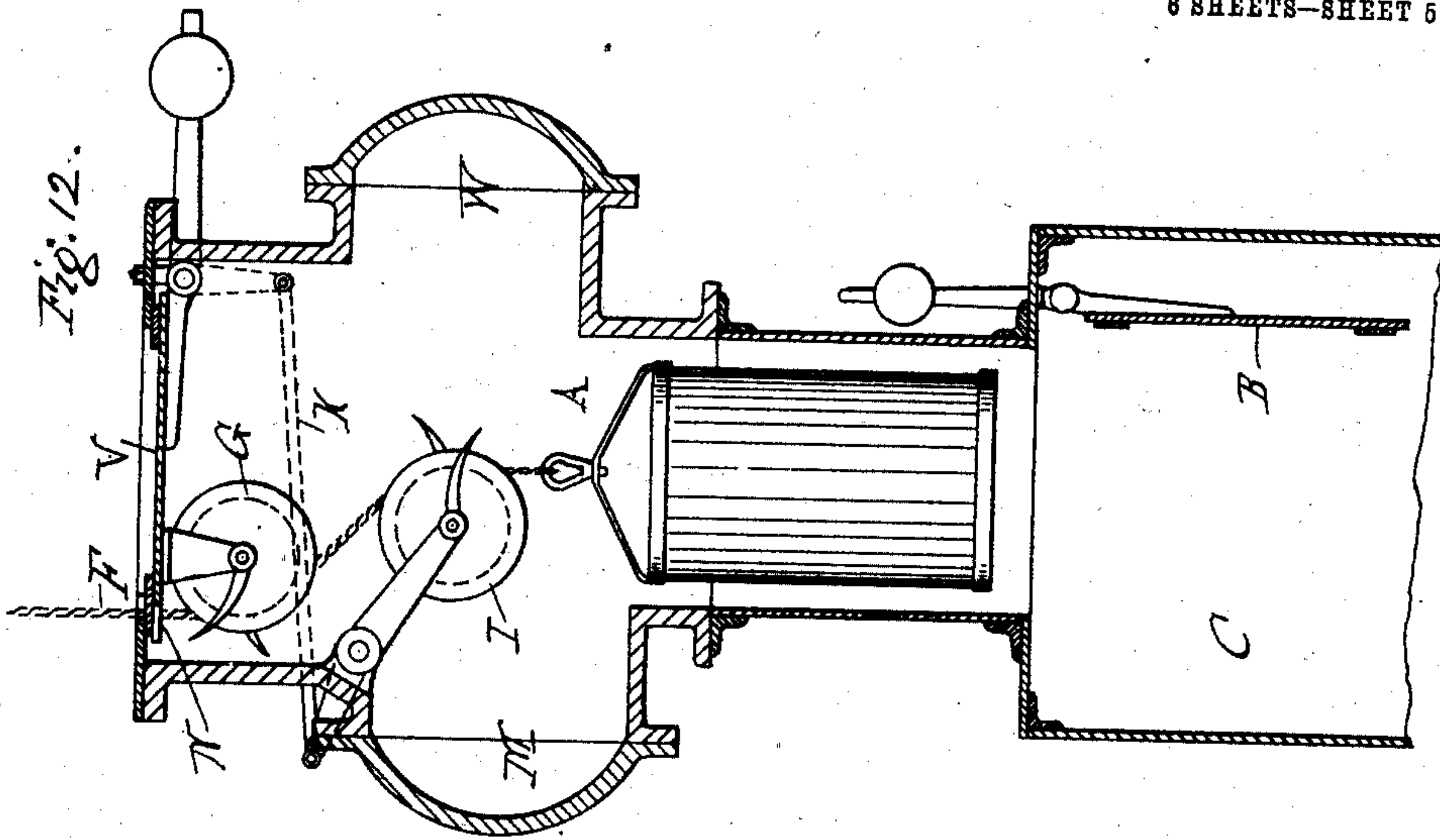
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6 SHEETS—SHEET 5.



WITNESSES

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APPLICATION FILED SEPT. 4, 1908.

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6 SHEETS—SHEET 6.

Fig. 15.

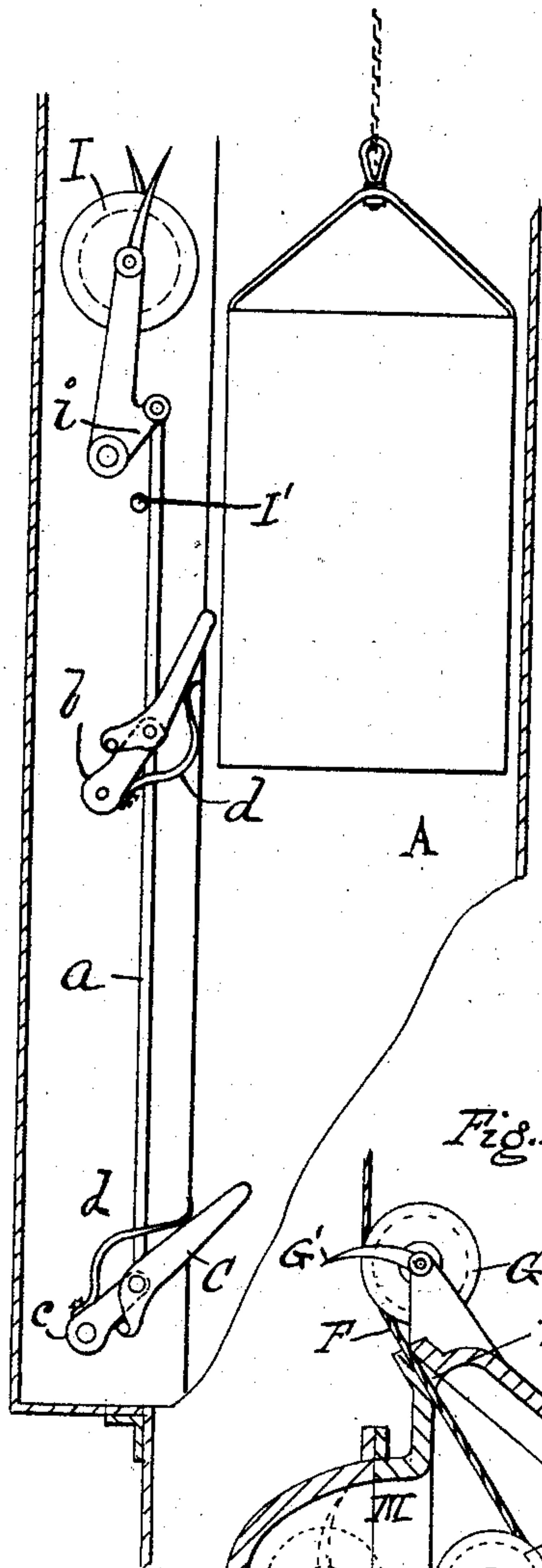


Fig. 14.

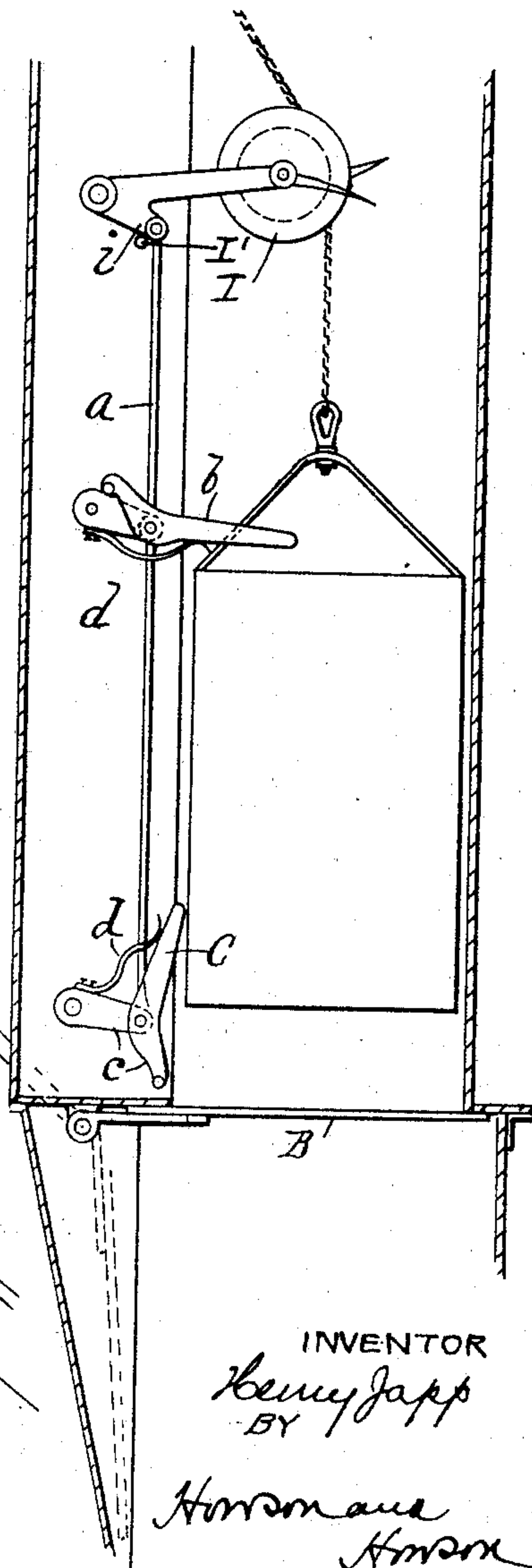
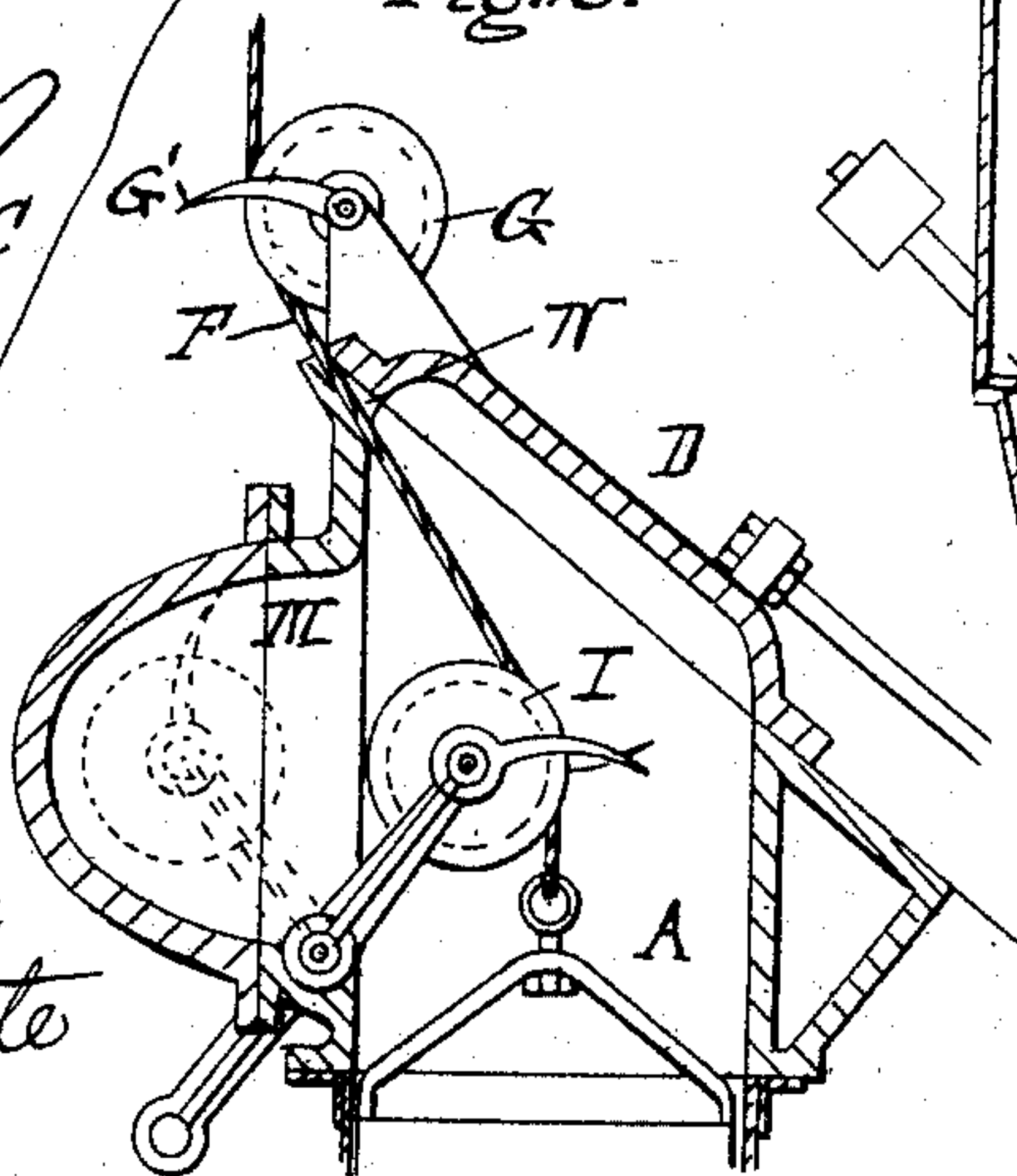


Fig. 16.



WITNESSES

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UNITED STATES PATENT OFFICE.

HENRY JAPP, OF NEW YORK, N. Y., ASSIGNOR TO S. PEARSON AND SON, INC., OF LONG ISLAND CITY, NEW YORK, A CORPORATION OF NEW YORK.

AIR-LOCK.

No. 908,866.

Specification of Letters Patent.

Patented Jan. 5, 1909.

Application filed September 4, 1908. Serial No. 451,680.

To all whom it may concern:

Be it known that I, HENRY JAPP, a subject of the King of Great Britain and Ireland, and a resident of the borough of Manhattan, in the city, county, and State of New York, have invented certain new and useful Improvements in Air-Locks, of which the following is a specification.

My invention relates to air locks, particularly for caissons, the object of my invention being to provide simple means for accomplishing the "straight through" hoist for buckets in caisson work under compressed air.

In the accompanying drawings Figure 1 is a vertical section of a lock to which my invention is applied; Fig. 2 is a similar view with the bucket raised; Figs. 3, 4 and 5 are broken sections on larger scale, showing details; Fig. 6 is a vertical section of a lock to which my invention is applied in modified form; Fig. 7 is a plan of the same; Figs. 8 and 9 are similar views showing the bucket raised; Figs. 10 and 11 are broken sections on larger scale, showing details of construction; Figs. 12 and 13 are vertical sections of a lock showing another modification with the bucket in different positions; Figs. 14 and 15 are similar views of another modification; and Fig. 16 is a broken section of another modification.

In the devices heretofore used to secure a "through hoist" for the material bucket from the loading point in the caisson through the air lock to the air, the valve arrangements for the lock have contemplated the use of an upper or outlet valve either in two parts with an opening for the hoisting rope to pass through at the junction of the two parts or in the form of a pot lid cover through which the rope passes and which is lifted along with the bucket. These constructions are attended with certain disadvantages of construction and operation which are obviated in my device, the latter being both simpler in construction and less expensive in operation than the devices heretofore used.

In the broadest aspect my invention comprises an air lock provided with an upper or outlet valve adapted to engage the hoisting rope and deflect it from the perpendicular when the valve is closed, so that the rope is guided between the valve and the casing of the air lock.

In the accompanying drawings I have shown several convenient ways of accom-

plishing this. The air lock A opens at its lower end through a valve B into the caisson C, while the upper part is closed by the valve D. These valves B and D may be of any suitable form and operated by any suitable means.

In Fig. 1 I have shown the upper valve as a slide valve operated pneumatically from the cylinder E through the piston rod E'. The valve is guided in suitable ways D' which hold the same to its seat. To engage the hoisting rope F and deflect the same, without injury, to the side of the lock when the valve is closed, a grooved pulley G, with guide horns G' is mounted on the outer face of the valve so that as the latter is moved forward to close the port, the rope F is engaged by the pulley. A second pulley I within the air lock, over which the hoisting rope passes, is provided to guide the bucket into the lock as it is hoisted from the caisson. Any suitable means may be utilized to move this pulley out of the way when the bucket is to be lifted from the air lock. For instance, this may be automatically accomplished by means of a link K secured at one end to the valve D and at the other end to a bell crank lever L pivoted to the casing and carrying the pulley I. As the valve D is opened, (Fig. 2), the link actuates the lever and the pulley is swung back into the recess M in the side of the lock where it is out of the way of the bucket. When the valve is again closed the pulley I is by the same means swung out and engages the hoisting rope. The latter is simultaneously engaged by the pulley G and deflected as shown.

It will be noticed that the runway N for the rope follows the angle to which the rope is deflected by the pulleys and the rope thus passes between the valve and lock casing practically without friction. The runway may be formed wholly in the valve D, (Fig. 5), or wholly in the casing a of the lock, (Fig. 4), but preferably, (Fig. 3), it is formed half in one and half in the other. A split metallic bush to take up undue wear may be provided, but this is unnecessary for the successful operation of the device.

In Fig. 6 a hinged upper valve O is shown operated by the cylinder P through a system of levers Q, and provided as before with a pulley G. The link K for the inner pulley I instead of being connected to the valve O is pivoted to one of the levers Q and serves as

before to swing the pulley I back into the recess M when the upper valve is opened. In order to hold the valve O to its seat in this construction, I pivot bell crank levers R on the casing flange S, the shorter arm r being adapted to swing over the flange o on the upper face of the valve O by the movement of the longer slotted arm r^1 . The latter is actuated from the cylinder, T, the piston rod t of which is pivoted to one of the slotted arms r^1 , and the latter communicates its motion to the other levers through a ring U mounted loosely in a run way in the flange S and provided with pins engaging the slots in the longer lever arms. When the valve is closed, (Fig. 7), the ring U is rotated in one direction, swinging the short arms r over the valve flange. When the valve is to be opened, (Fig. 9), the ring is rotated in the other direction, swinging the arms r out of engagement with the flange and thus freeing the valve. A wedge action for the arms r may be secured by angling the pins r^2 on which the levers R swivel, (Fig. 10), or by inclining the contact face of the arm, (Fig. 11).

Perhaps the simplest and most efficient arrangement is shown in Figs. 12 and 13 where the upper valve V is hinged on the inner face of the casing and is pressed against its seat v by the pressure within the lock. In this case the pulley G is mounted on the lower face of the valve and swings into a recess W on the opposite side of the casing from that which accommodates the pulley I. Both upper and lower valves are in these figures shown as hand operated.

Instead of the usual link connection between the upper valve or its operating mechanism and the lower pulley I, the latter may be moved into and out of position by trip mechanism actuated by the hoisting bucket itself. Thus in Figs. 14 and 15 a rod a carrying trip levers b and c is secured to a lug i upon the pulley arm. The end of each trip lever is movable in one direction against the action of a light spring d sufficient to return the trip to position. As the bucket is lifted, (Fig. 14), it passes the lower trip C without affecting the rod, since the end of the trip is merely pressed back against its spring. Reaching the upper and oppositely faced trip b , the latter, being rigid, lifts the rod a and pushes the pulley I back out of the way of the bucket. This action is of course reversed when the bucket is lowered, passing the upper trip without affecting the rod a , while pulling the pulley down when the lower trip is reached. The resultant force of the pulley on the rope vertically and on the incline tends to keep the pulley down against the stop I' in its horizontal position.

As shown in Fig. 16, the same general principles may be applied to a lock having the upper valve inclined. The incline of the rope within the lock may be made less sharp

by this arrangement, but otherwise it is not as desirable as the horizontal valve illustrated in the other views. Various modifications of the arrangement and parts may be devised without departing from my invention and I do not limit myself to the construction as shown.

I claim as my invention—

1. An air lock for caissons and the like, having a lower valve and an upper valve and means for deflecting a hoisting rope to a passage therefor between the upper valve and the lock casing, substantially as described.

2. An air lock for caissons and the like, having a lower valve and an upper valve and means in connection with the latter for deflecting the hoisting rope to a passage therefor between the upper valve and the lock casing, substantially as described.

3. An air lock for caissons and the like, having a lower valve and an upper valve and a pulley carried by the latter for deflecting a hoisting rope to a passage therefor between the upper valve and the lock casing, substantially as described.

4. An air lock for caissons and the like, having a lower valve and an upper valve and means for deflecting a hoisting rope to a passage therefor between the upper valve and the lock casing, in combination with means to guide said rope perpendicularly into said lock past said lower valve.

5. An air lock for caissons and the like, having a lower valve and an upper valve and means for deflecting a hoisting rope to a passage therefor between the upper valve and the lock casing in combination with a pulley to guide said rope perpendicularly into said lock past said lower valve.

6. An air lock for caissons and the like, having a lower valve and an upper valve and means for deflecting a hoisting rope to a passage therefor between the upper valve and the lock casing, in combination with a pulley to guide said rope perpendicularly into said lock past said lower valve, and means to shift said pulley out of the way of a bucket on said hoisting rope.

7. An air lock for caissons and the like, having registering entry and exit ports, valves therefor, means for guiding a hoisting bucket into the air lock and means for deflecting the hoisting rope so that the same passes from the side of the lock when the upper valve is closed.

8. An air lock for caissons and the like, having a lower valve and an upper valve and means for deflecting the hoisting rope on the closing of the upper valve so that it passes from the lock at a point out of alignment with the portion of the rope below the lock, substantially as and for the purposes described.

9. An air lock for caissons and the like, having a lower valve and an upper valve and

means for deflecting the hoisting rope on the closing of the upper valve and a pulley for guiding the hoisting bucket into the lock, in combination with means in connection with
5 the upper valve mechanism for moving said pulley out of the way of the bucket when the latter is to be hoisted from the lock.

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses.

HENRY JAPP.

Witnesses:

H. D. FORBES,
L. I. SEIP.