

W. L. SILVEY.

STEAM ENGINE.

(Application filed May 31, 1901.)

(No Model.)

2 Sheets—Sheet 1.

Fig. 2.

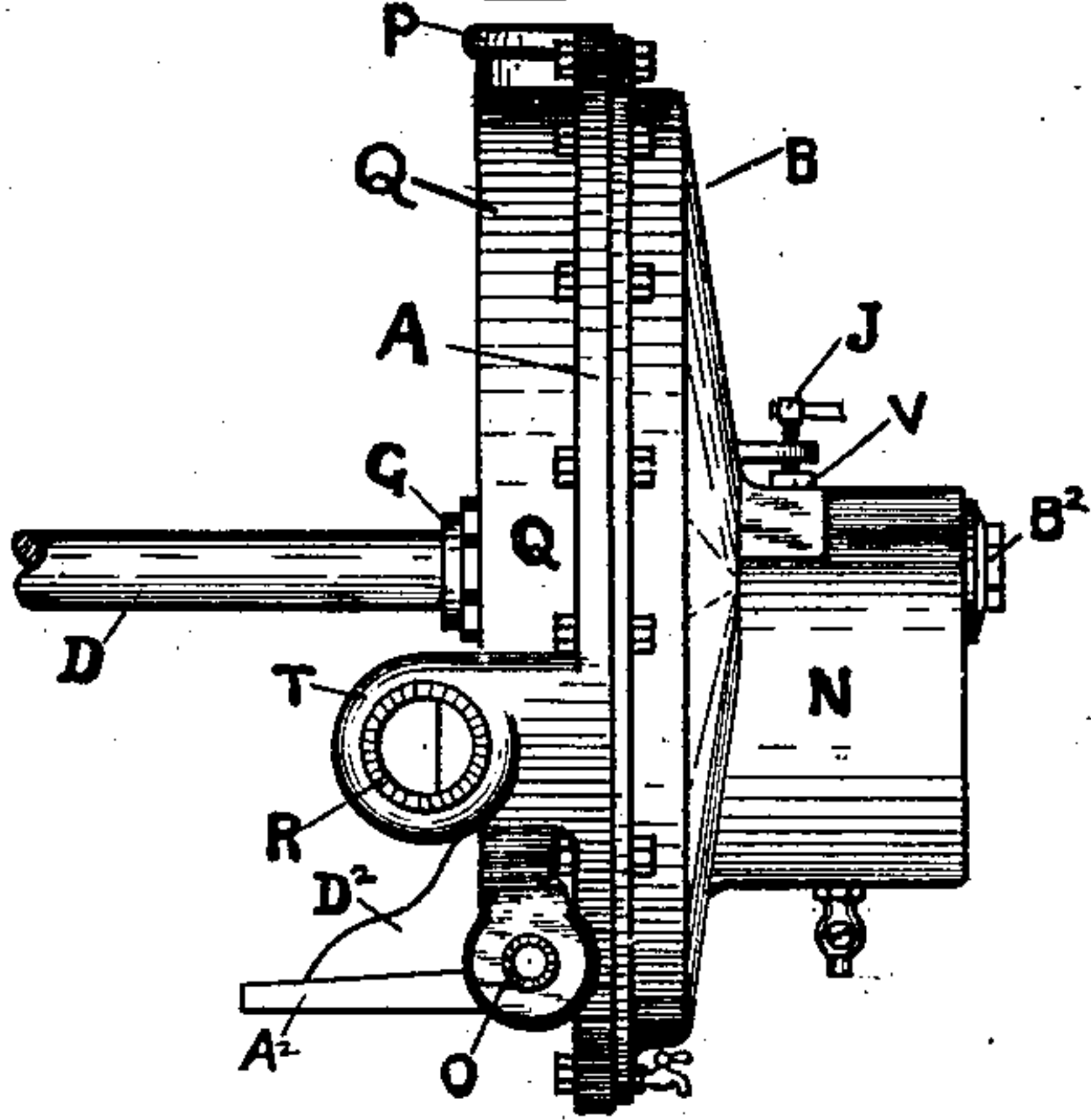


Fig. 4.

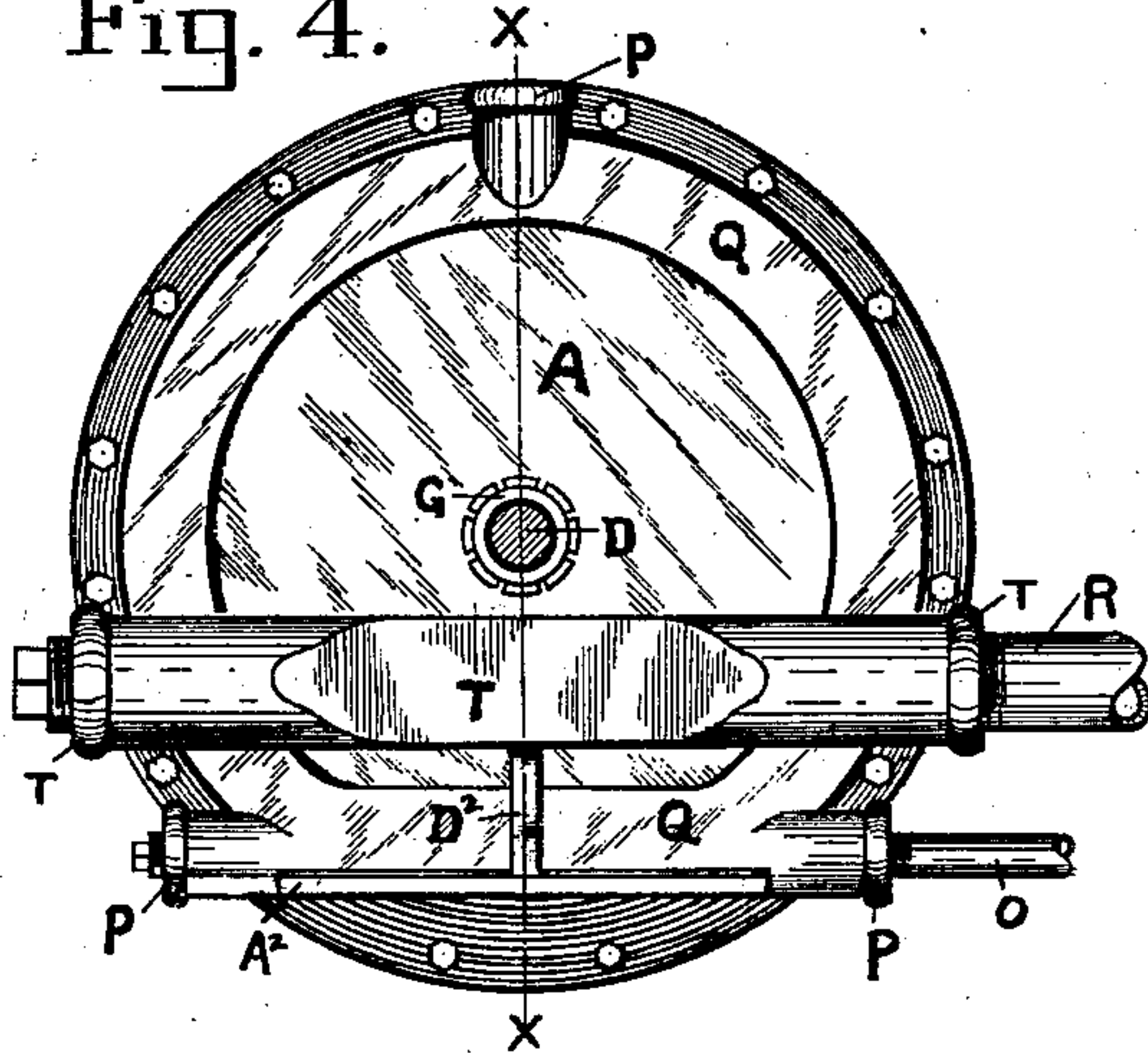


Fig. 12.

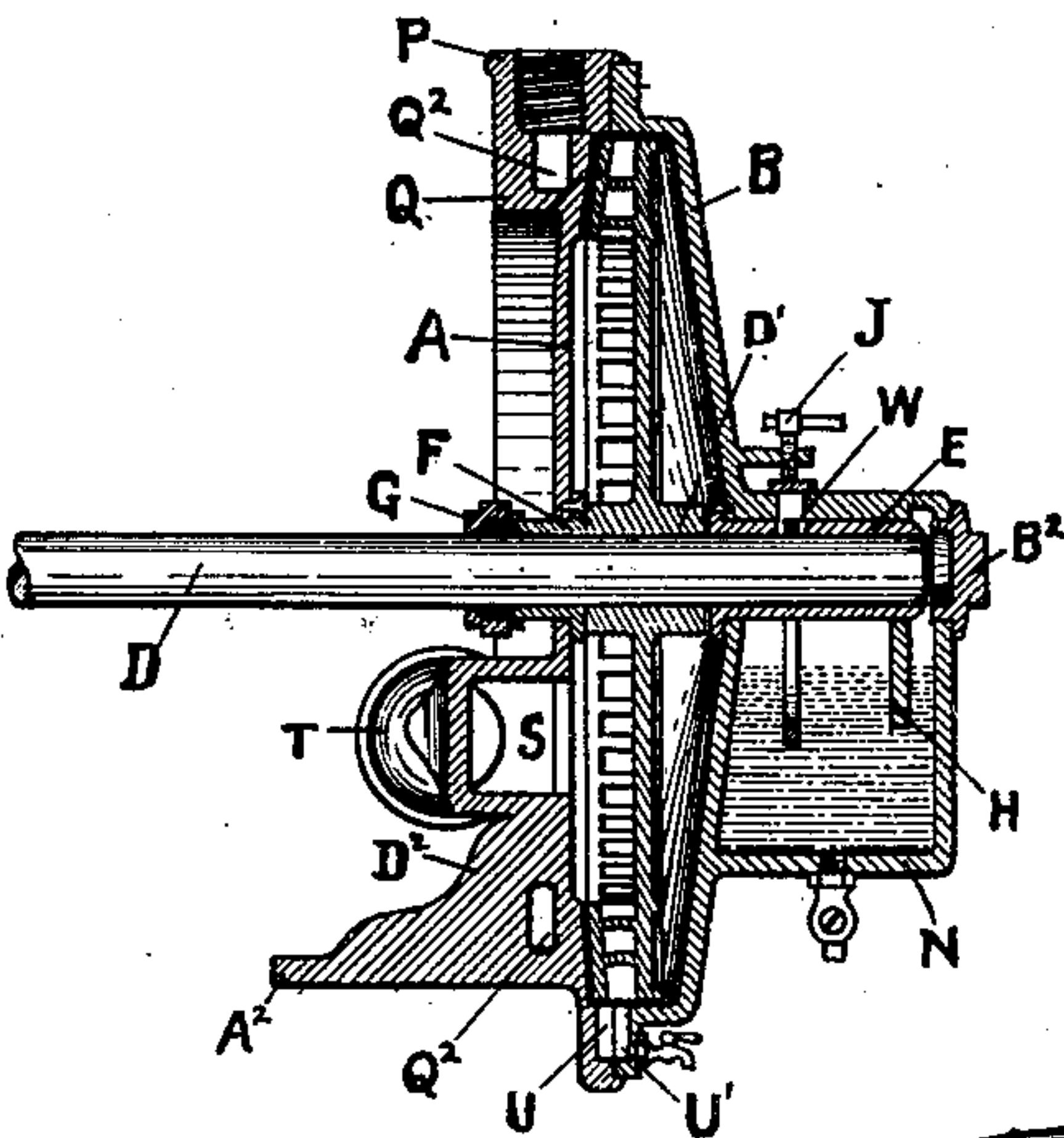


Fig. 1.

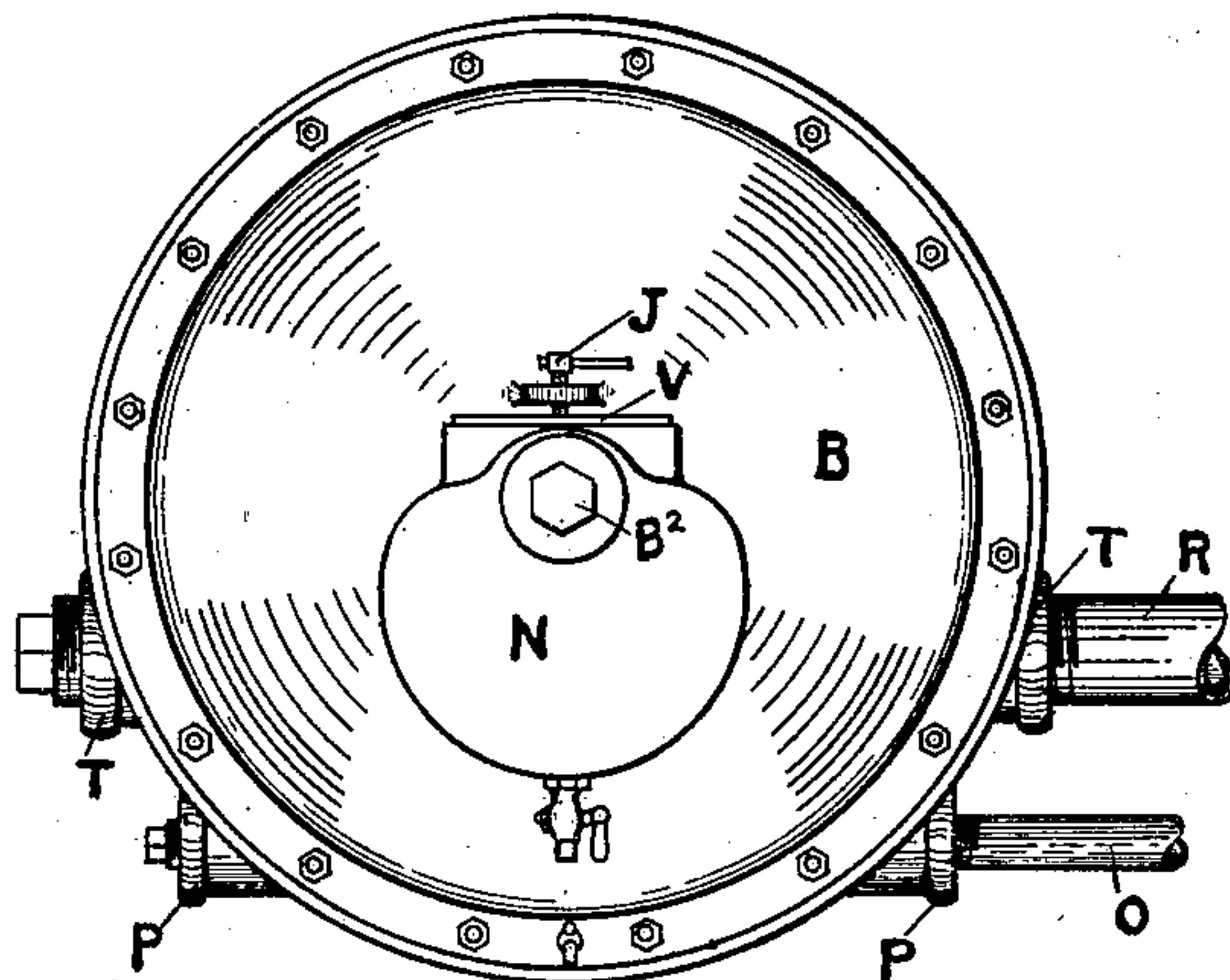
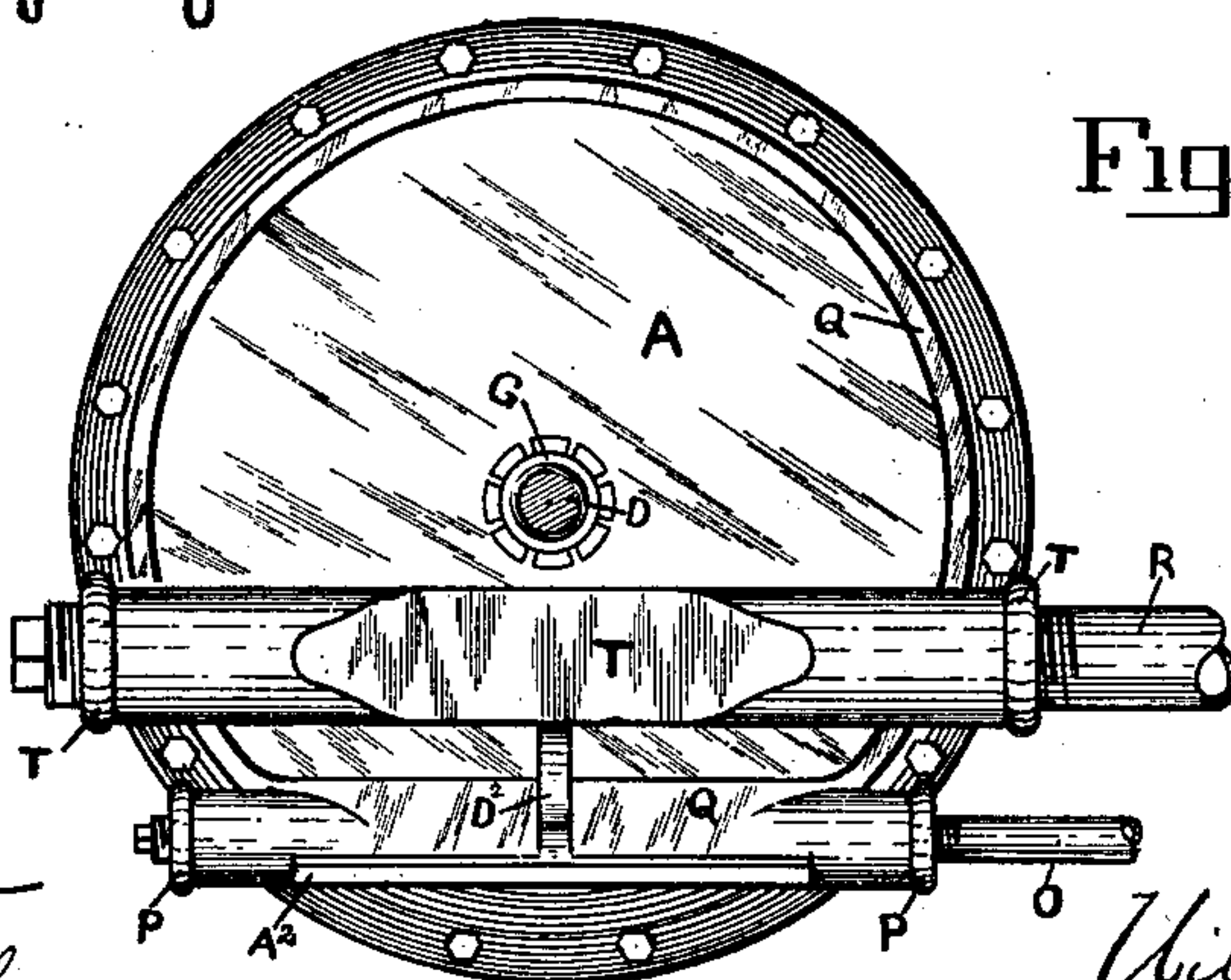


Fig. 13.



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Fig. 5.

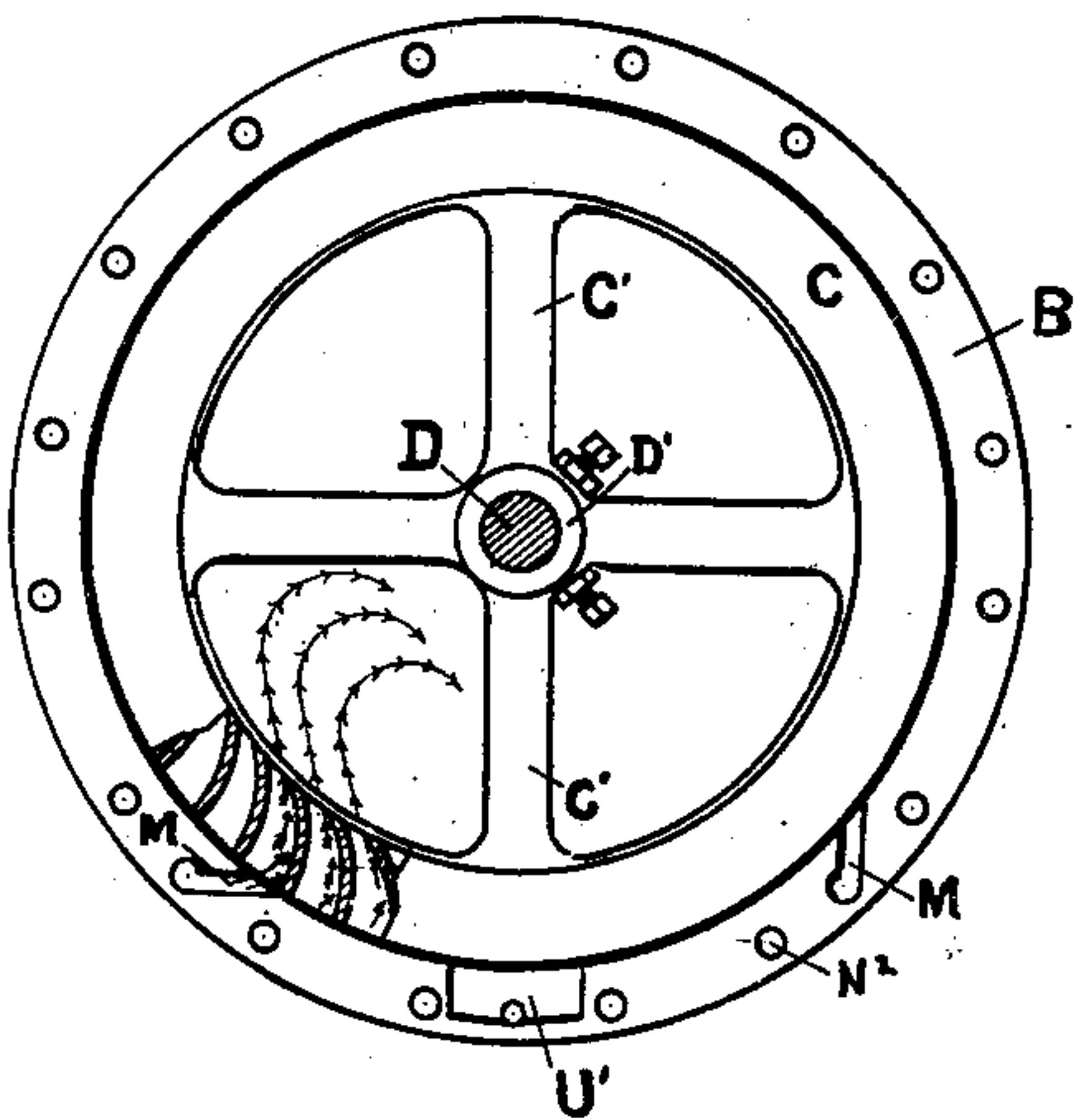


Fig. 6.

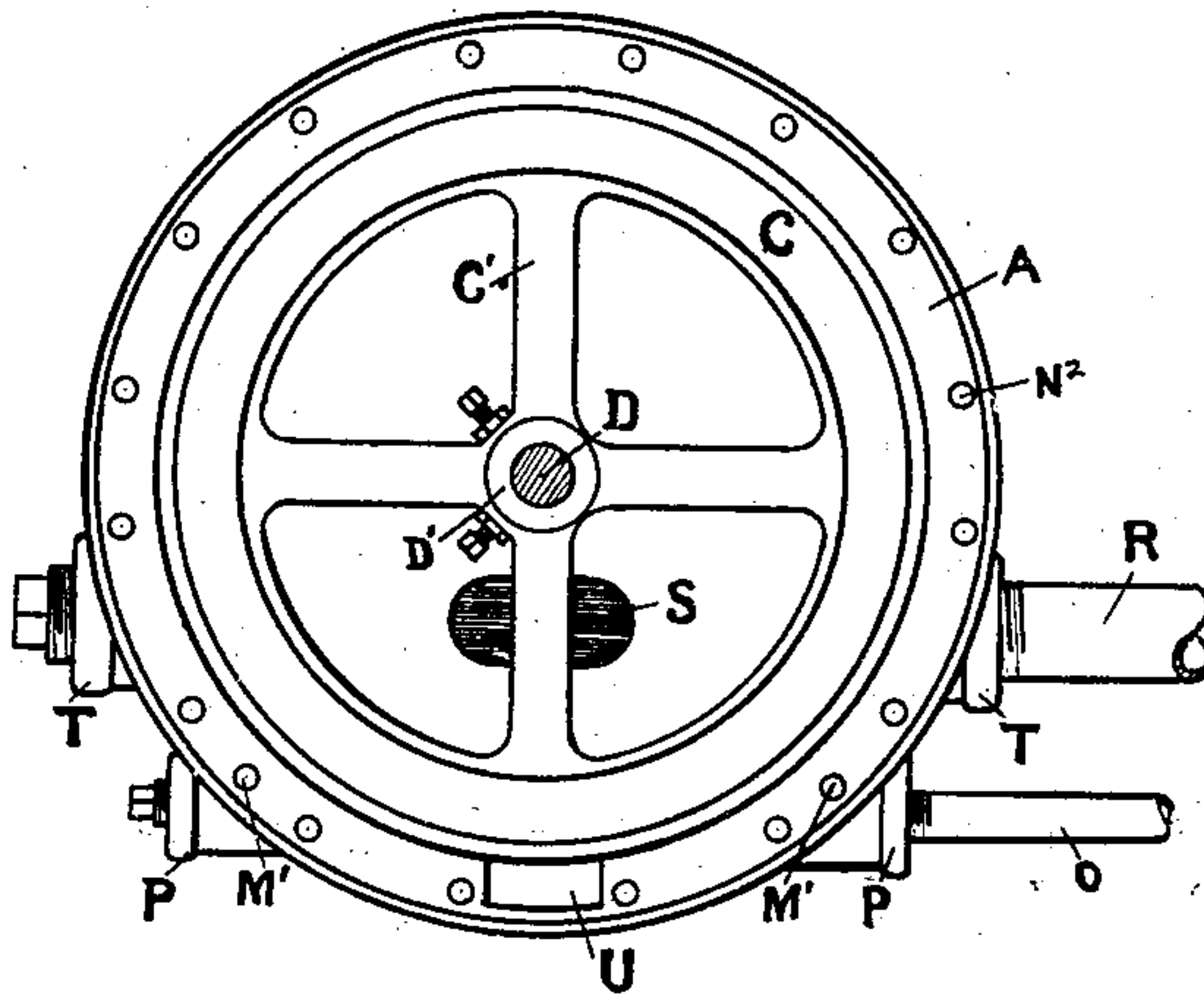


Fig. 7.

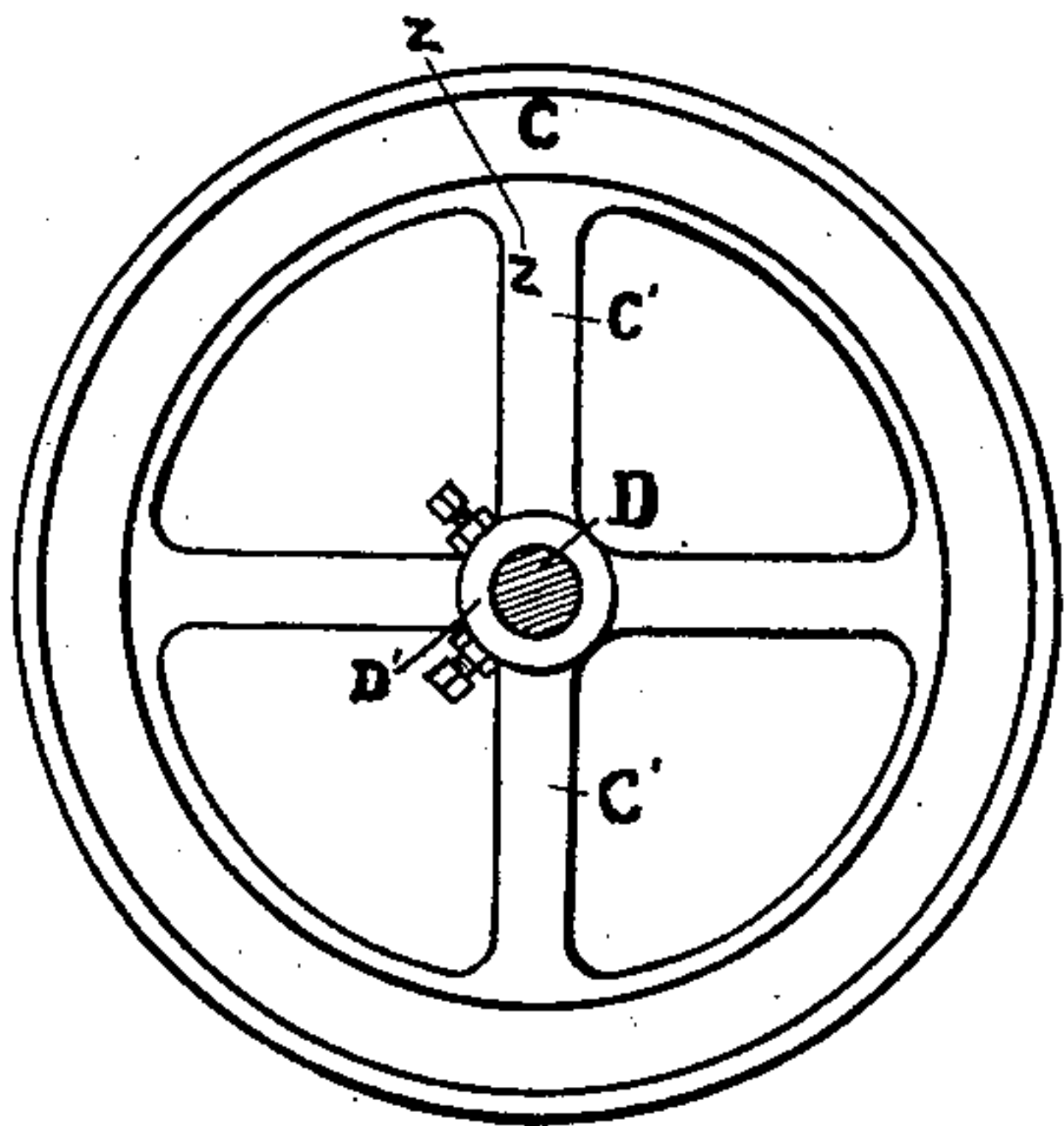


Fig. 8.

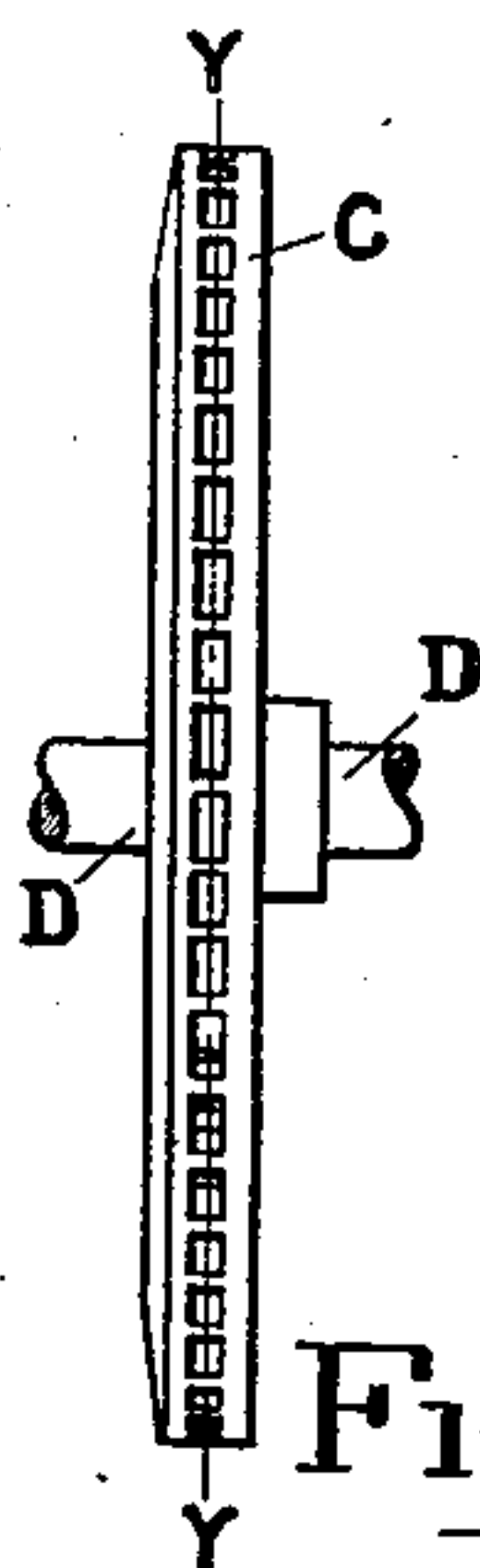


Fig. 9.

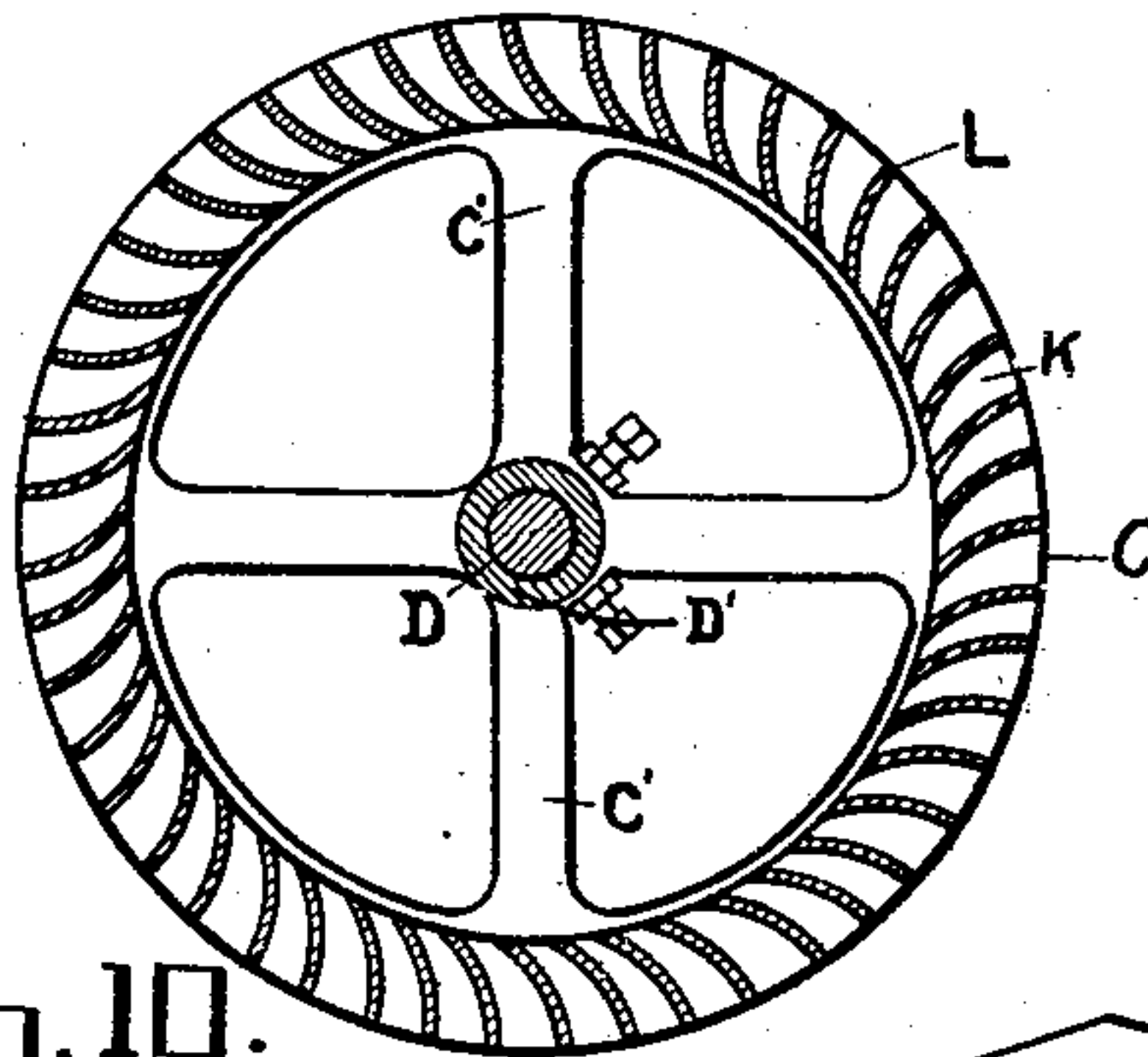


Fig. 10.

Fig. 11.

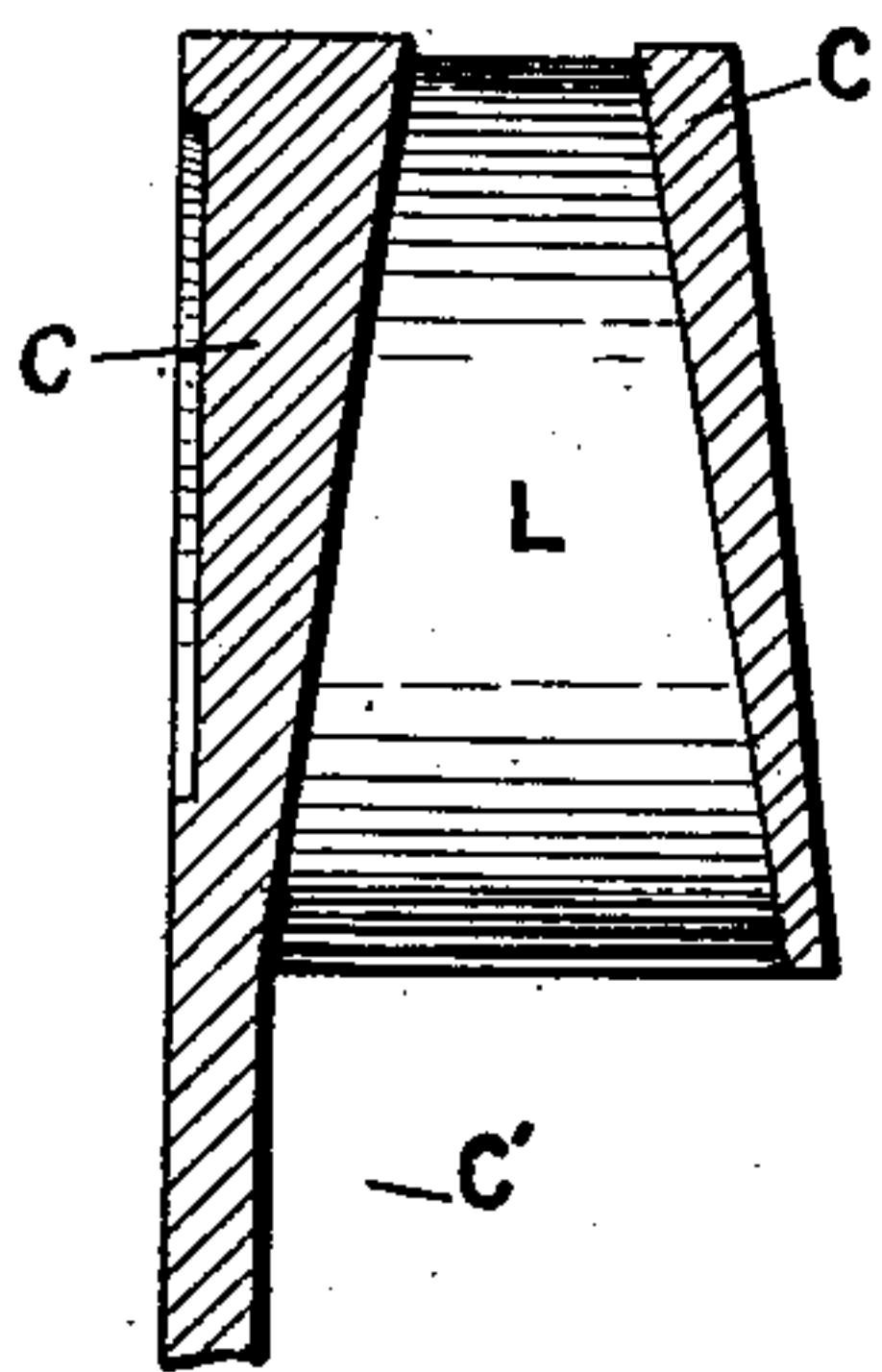
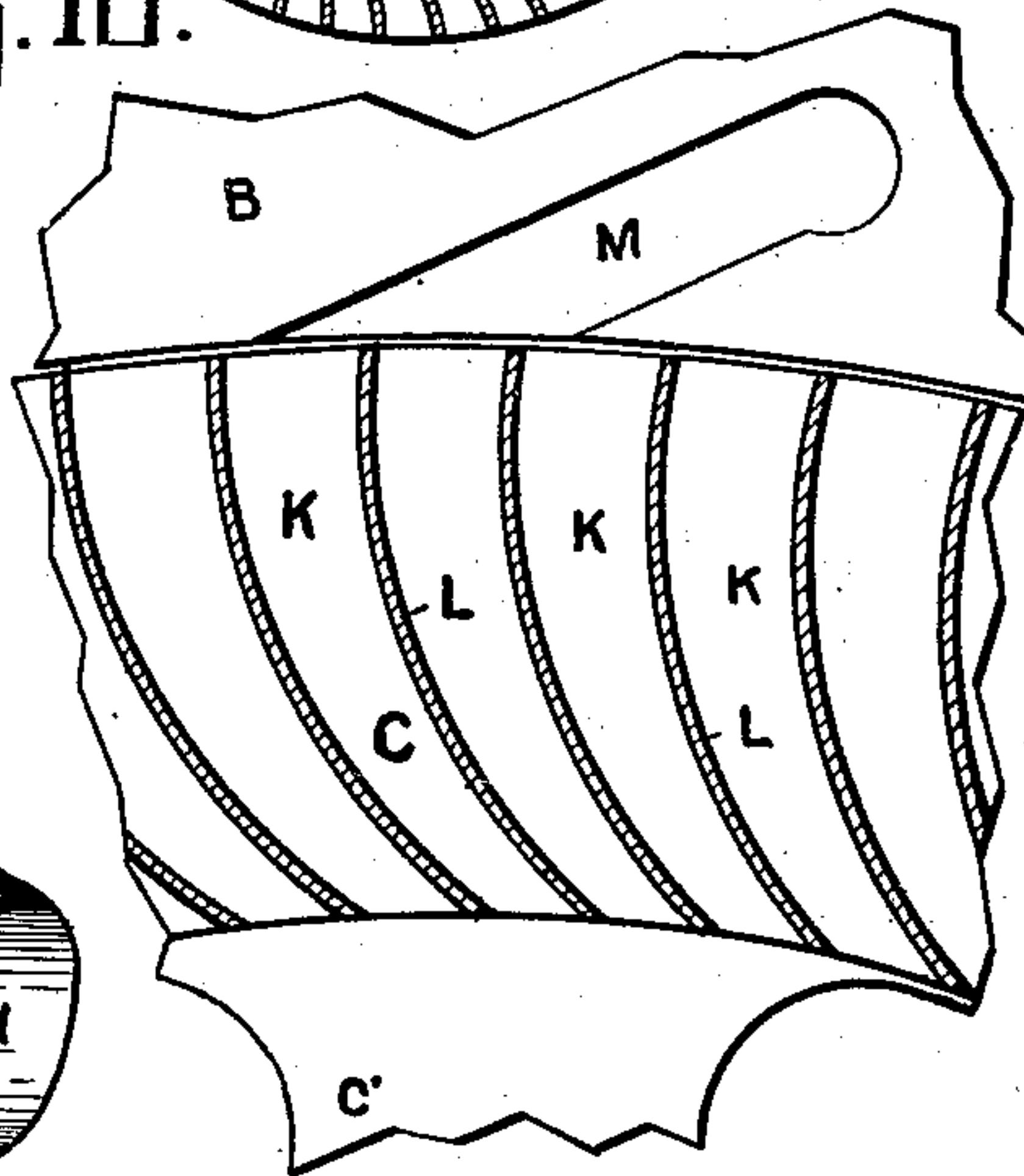
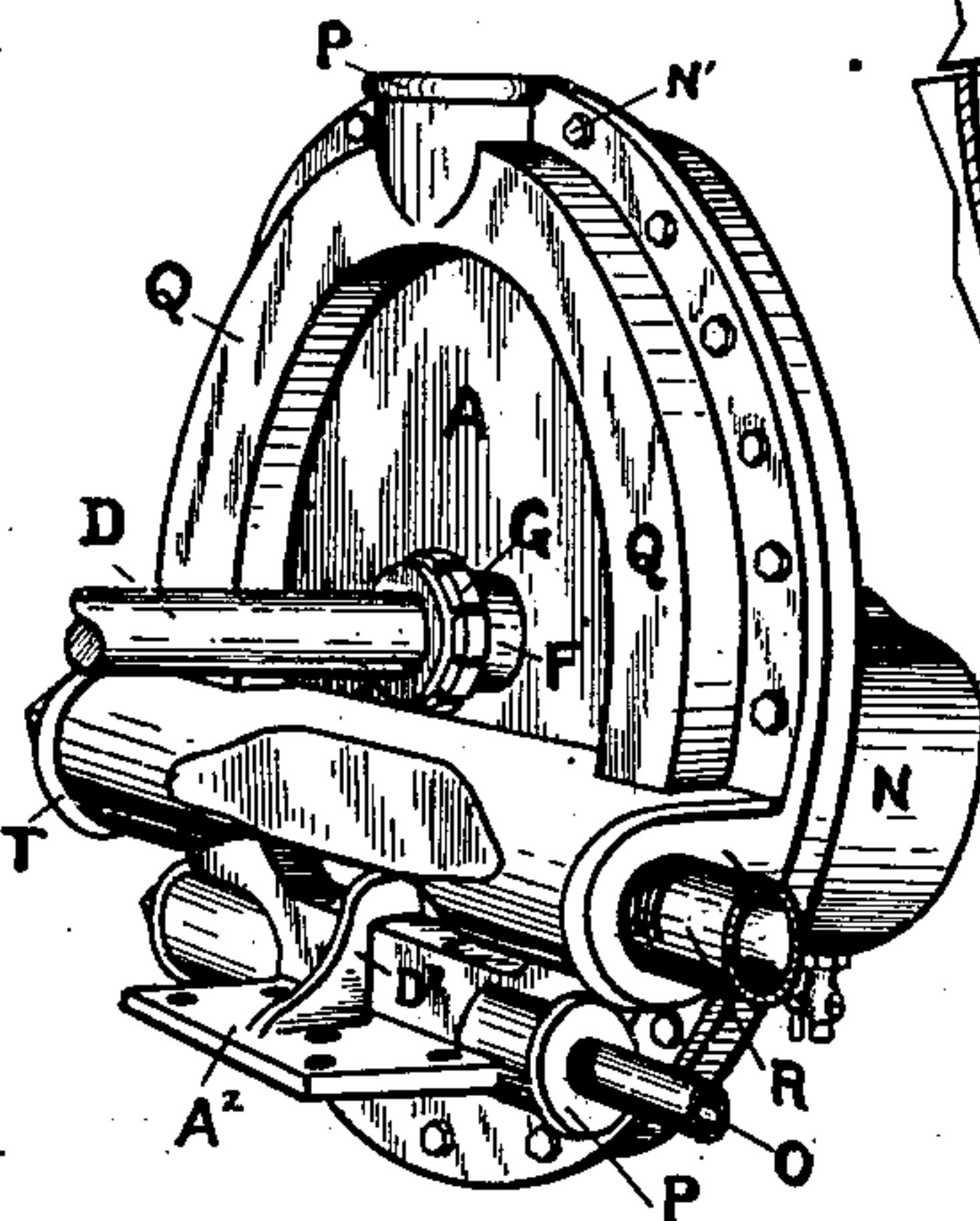


Fig. 3.



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UNITED STATES PATENT OFFICE.

WILLIAM L. SILVEY, OF DAYTON, OHIO.

STEAM-ENGINE.

SPECIFICATION forming part of Letters Patent No. 713,248, dated November 11, 1902.

Application filed May 31, 1901. Serial No. 62,549. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM L. SILVEY, a citizen of the United States, and a resident of Dayton, in the county of Montgomery and State of Ohio, have invented certain new and useful Improvements in Steam-Engines, of which the following is a specification.

My invention relates more particularly to that class of steam-engines which I term the "disk" class, in which a wheel mounted on a shaft is caused to revolve by the impact of steam against a series of curved buckets located successively around the circumference of the wheel; and it is the object of the present invention to construct a device which will be reliable, simple, and light, of low cost to construct, and economical to operate, economy being attained by using the impact of the steam against the buckets as they are successively interposed in the path of the steam and at the same time to use the steam expansively as far as possible with a disk engine.

Referring to the accompanying drawings, which are made a part hereof, in which similar letters of reference refer to similar parts throughout, Figure 1 is a front end view of a complete engine. Fig. 2 is a side view of a complete engine. Fig. 3 is a three-quarters side elevation of a complete engine looking from the back. Fig. 4 is a rear view of a complete engine. Fig. 5 is an interior view of the front cover B with the bucket-wheel C in position, the shaft D broken off, and a part of the rim of the wheel broken away and shown in section, with arrowed lines showing the path of the steam after leaving the steam-ports M. Fig. 6 is an interior view of the engine with the cover B removed. Fig. 7 is a front view of the bucket-wheel complete. Fig. 8 is an edge view of the bucket-wheel. Fig. 9 is a sectional view of the bucket-wheel along the line Y Y in Fig. 8. Fig. 10 is an enlarged and broken section of the bucket-wheel as shown in Fig. 9, showing the relation of the rotary buckets K to the steam-entering port M. Fig. 11 is a cross-section of Fig. 7 along the line Z Z. Fig. 12 represents a vertical cross-section of Fig. 4 along the line X X; and Fig. 13 shows a modified rear view of Fig. 4, showing the rib Q reduced in size, with the steam-supply opening P at the top omitted.

The main frame A consists of a dish-shaped

casting, the cavity being made to conform somewhat and register to the shape of a bucket-wheel C, together with its hub and spokes C'. On the back part of the main frame A is a rib Q, which serves a double purpose to stiffen the plate and convey steam to the various ports, from which it escapes to the bucket-wheel. The steam enters at one of the steam-openings P, then passes through the channel Q² in the rib Q to opening M' around the face of the frame. The face of the frame is finished smooth, and against this turned face a cover B is bolted, as fully illustrated in Figs. 1, 2, 3. The cover B is further held in position by a lip around the outer edge. This serves to center the main part A and the cover B with relation to each other, so that the shaft D will be in perfect alinement. The shaft D is carried principally by the bearing-sleeve E in the front head B. The other end of the shaft passes through a second sleeve F, on the outer edge of which is a stuffing-box or gland G, filled with packing, the purpose of which is to prevent steam from escaping along the shaft instead of passing out through the exhaust-port S and the exhaust-pipe T. Steam is prevented from escaping through the center hole in the cover B by means of the plug B². The shaft is kept thoroughly oiled by a ring oiler W, which dips into and revolves in an oil-chamber N, filled with oil. The hole through which the oil-ring W is inserted is covered with a plate V, which is held in place and the joint made steam-tight by means of a screw J.

An examination of Figs. 6, 7, 10, 12 shows that the bucket-wheel C is mounted on a hub D' and suitable spider C'. This wheel is turned on its face and periphery and made to run quite close to the inside cavity of the main casting A and the cover B. The purpose of this is to prevent any considerable escape of steam around the face of the wheel, it being the purpose to direct all or nearly all the steam which issues from the steam duct or nozzle M through the buckets in the bucket-wheel, as illustrated in the arrowed lines in the section of Fig. 5. By referring to Figs. 8, 9, 10, and 11 it will be seen that the bucket-wheel C is of peculiar construction, the buckets enlarging toward the center of the

wheel. This is accomplished in order, to a certain extent, to work the steam expansively and to allow greater space for the steam as it expands. By viewing the bucket-wheel along the dotted line Y Y of Fig. 8, of which Fig. 9 is a sectional view and Fig. 10 an enlargement, it will be seen that the buckets L are curved, so as to pocket the steam, causing it to flow against the concave side of the bucket, which gives the wheel a forward movement. It has been found desirable in practice to arrange the nozzle at an angle to the buckets about as shown in Fig. 10. The port-openings K are wider at the periphery of the wheel than they are at the inner end, as shown in Fig. 10; but this contraction is compensated for by making the opening longer at the inner end than at the periphery, as shown in Fig. 11, the face of the rear side of the bucket-wheel being set at an angle to allow for this enlargement, as shown, and it will be also observed that the buckets L and their attached cover or rim overhang, so that free exit will be given to the steam without coming in contact with any of the spokes C' of the wheel. The placing of the bucket-ducts on a curve and contracting them in the direction of rotation as they converge to the center and expand them in the direction of the shaft will be made a special feature of my claims. The ports M, I prefer to make integral with the cover, they being made to register with the holes M' in the base. Steam escapes from steam-supply pipe O into the channel Q², thence by opening M' through the nozzle or port M into the buckets K of the wheel and by impact pushes against the concave side of the bucket L, as shown in Fig. 5, and thence escapes through an opening S, near the center of the shaft, and thence by exhaust-pipes T R to the air. It is obvious that there will be a certain amount of condensation, which is provided for by a pocket U U', into which the water collects instead of being carried around with the wheel and obstructing the passages or creating undue friction. This water is allowed to escape through a small pipe. (Shown in the cover B of Fig. 5.) It is to be understood that the surface between the main casting and the cover B is made smooth, so that steam will not escape except through the proper channels, the two parts being thoroughly clamped together by means of numerous bolts. (Shown in Figs. 1, 2, 3, 4, and 13.)

The machine is supported and bolted in position by means of a suitable bracket A², which in turn is stiffened by means of a rib D². The main bearing-sleeve E is supported on one end by the body of the cover B and at the other end by means of a suitable division-piece H, the sleeve being prevented from turning by a screw passing through the flanged head of the sleeve. The rear sleeve F is supported

on the main casting A and is prevented from displacement longitudinally and rotatively by means of a screw.

Having described the features of my invention, what I claim as new, and wish to secure by Letters Patent in the United States, is—

1. In a steam-engine, the combination of the main casting A having a dish-shaped cavity therein, a cover having a cavity therein, the cover fitted and bolted to the main casting, and a bucket-wheel having an overhanging rim, curved channels in the rim enlarged lengthwise the casting from the outside inlet inwardly to the channel-exit, and enlarged circumferentially the casting from said exit to the inlet, steam-nozzles for supplying steam to the channels at their inlet, and an exhaust-channel near the shaft, as set forth.

2. In a steam-engine, the combination of an outer casting with a central shaft mounted and journaled therein, the shaft carrying a bucket-wheel, the wheel consisting of a hub, a rim and a support for the rim, the rim overhanging one side of the support and provided with curved channels enlarged lengthwise the casting from the outside inlet inwardly to the channel-exit, and enlarged circumferentially the casting from said exit to the inlet, steam-nozzles for supplying steam to the channels at their inlet, and an exhaust-channel near the shaft, as set forth.

3. In a steam-engine, a rotative member mounted on a shaft, the rotative member having a single circumferential series of approximately wedge-shaped curved channels or buckets in its outer periphery, said channels having each at its inner exit end its greatest dimension lengthwise said rotative member, said greatest dimension being arranged approximately parallel with the shaft, and each channel having at its inlet end the largest dimension in the direction of the circumference of said member, and an exhaust-port adjacent the shaft.

4. In a steam-engine, the combination of an outer casing, steam-supply and steam-exhaust pipes located in the outer casing, a shaft extending through and journaled in bearings in the casing, and a rotative member carried by the shaft inside the outer casing, the rotative member having a series of steam passages or buckets in its periphery, the buckets extending through the rim of the rotative member, and the bucket-channels each enlarged lengthwise the said member from the outside inlet inwardly to the channel-exit, and enlarged circumferentially the said member from said exit to the inlet, as set forth.

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

WILLIAM L. SILVEY.

Witnesses:

ED L. SPENCER,
C. U. RAYMOND.