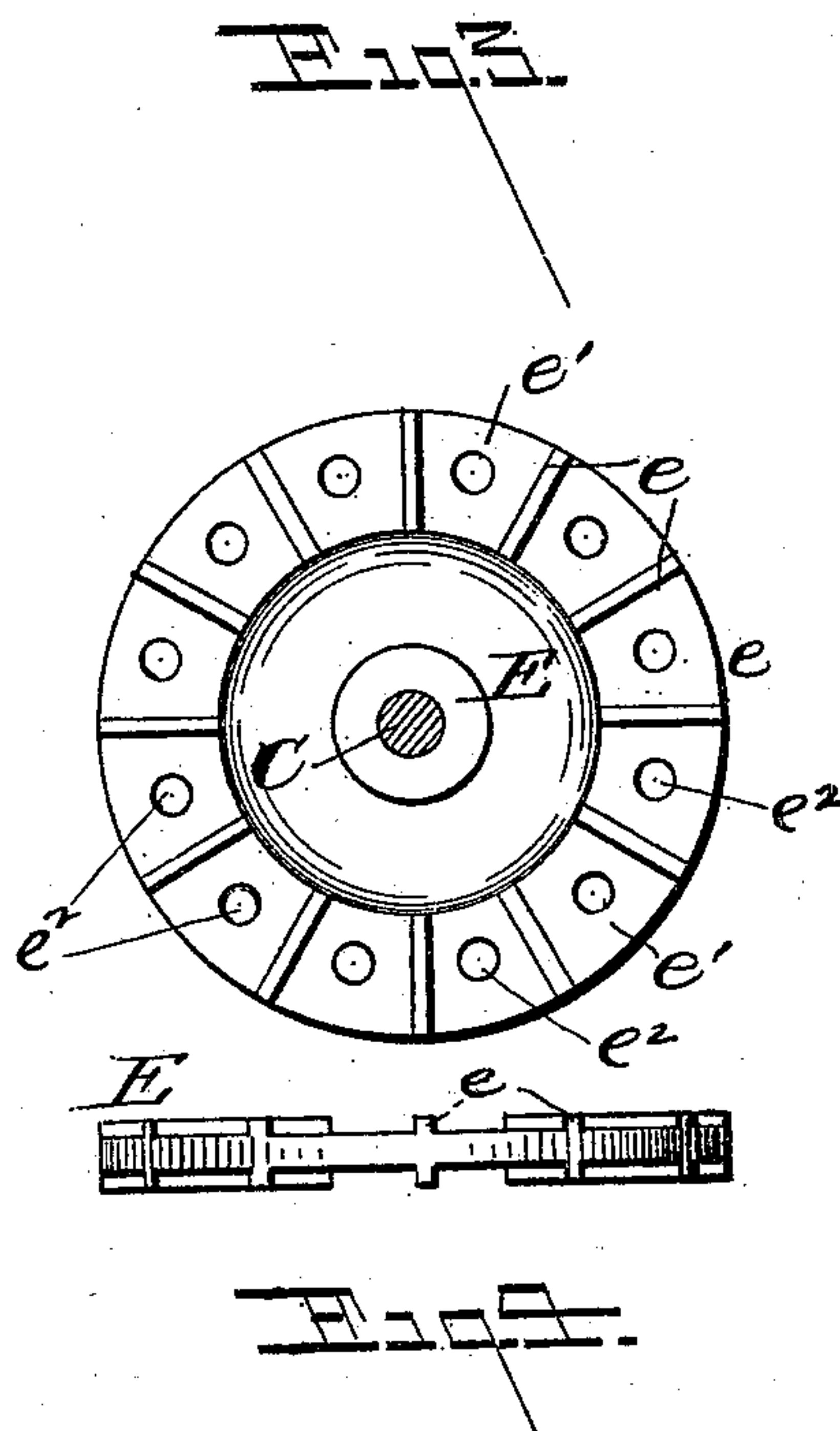
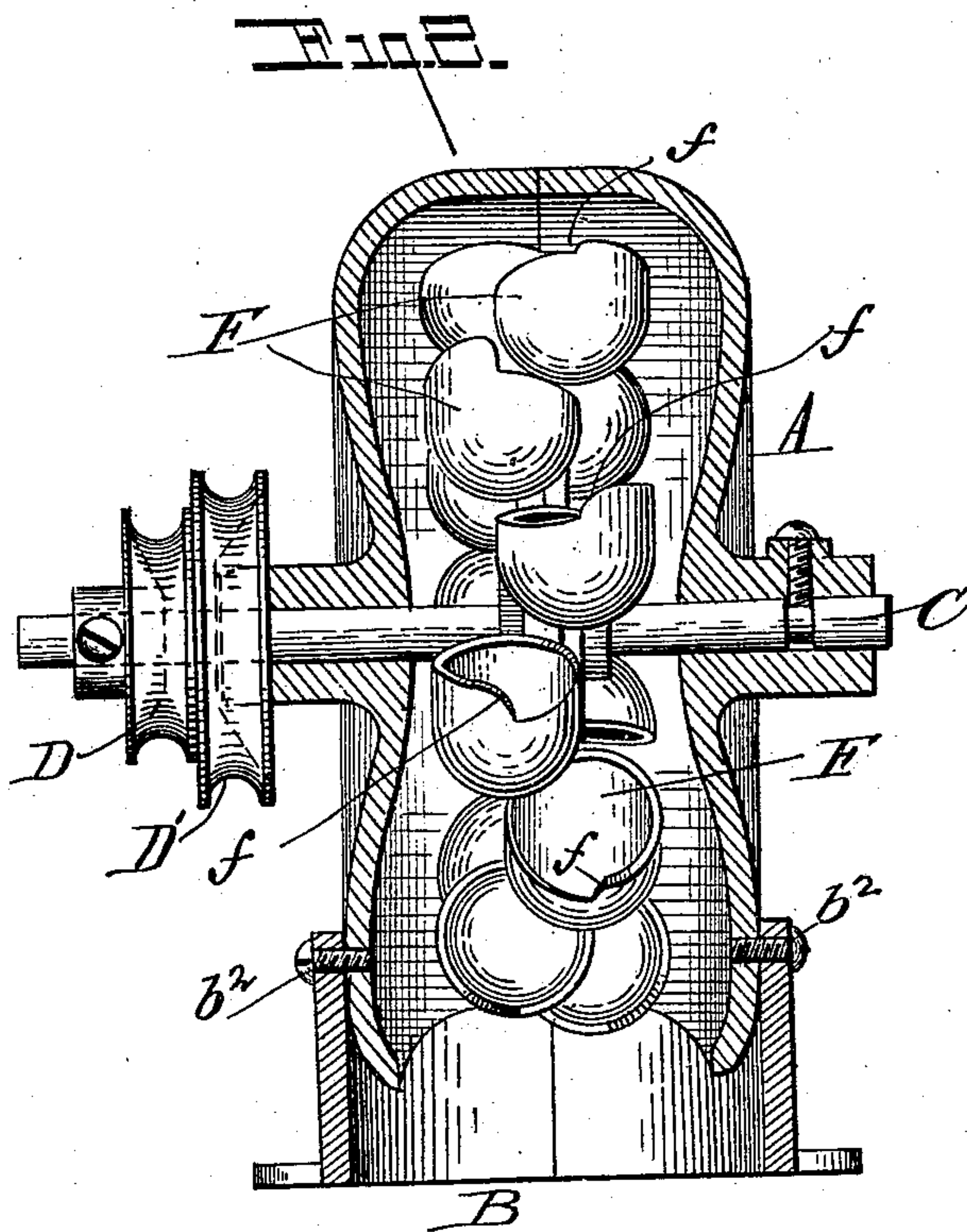
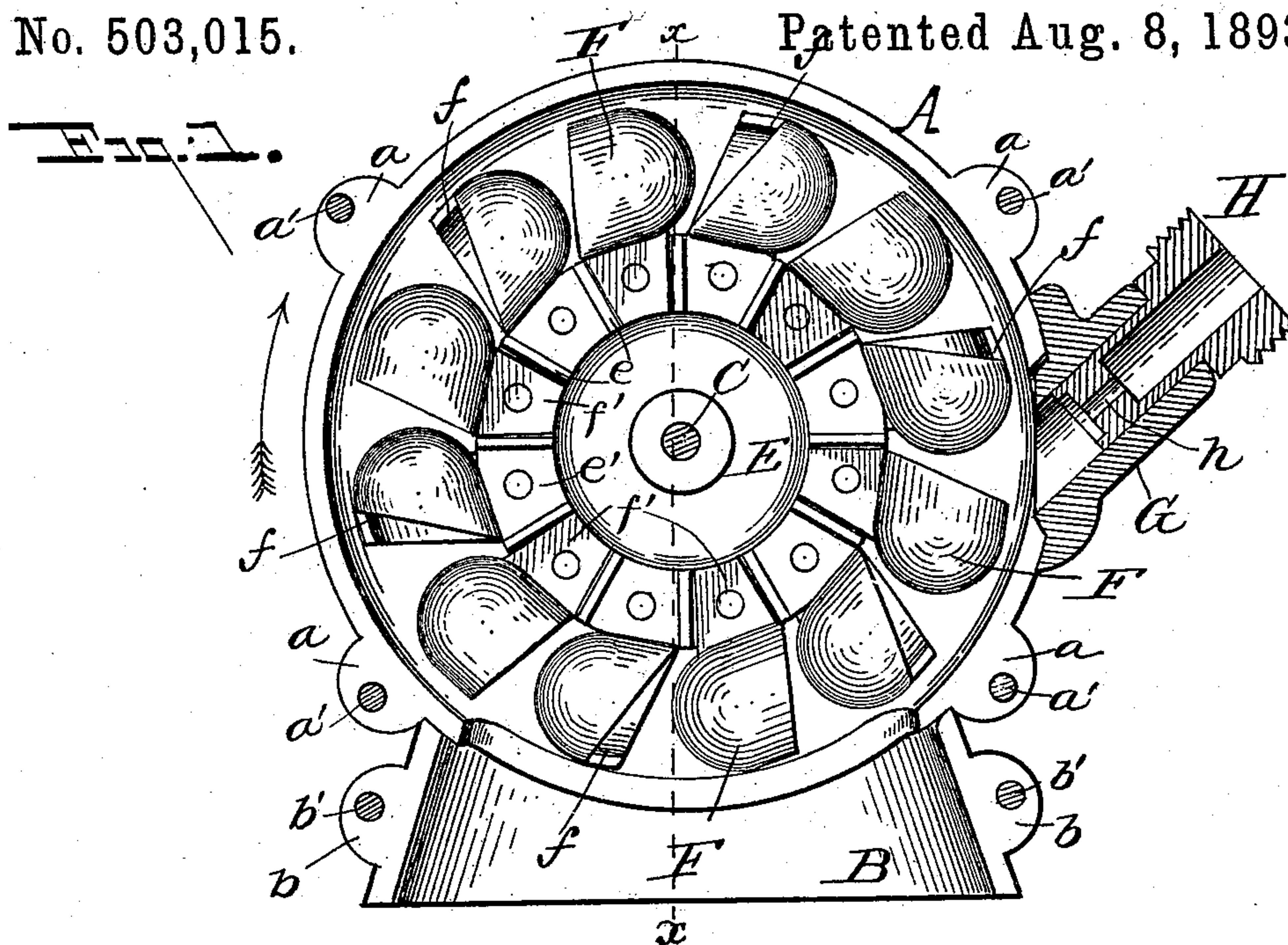


(No Model.)

O. F. TEED.  
HYDRAULIC MOTOR.

No. 503,015.

Patented Aug. 8, 1893.



WITNESSES  
J. L. Ormand  
John A. Wilson.

INVENTOR  
Oliver F. Teed,  
by Whitman & Milkins  
Attorneys.



# UNITED STATES PATENT OFFICE.

OLIVER F. TEED, OF COVINGTON, KENTUCKY, ASSIGNOR OF ONE-HALF TO  
W. H. GLORE, OF SAME PLACE.

## HYDRAULIC MOTOR.

SPECIFICATION forming part of Letters Patent No. 503,015, dated August 8, 1893.

Application filed May 17, 1893. Serial No. 474,588. (No model.)

*To all whom it may concern:*

Be it known that I, OLIVER F. TEED, a citizen of the United States, residing at Covington, in the county of Kenton and State of Kentucky, have invented certain new and useful Improvements in Hydraulic Motors; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to improvements in rotary hydraulic motors, and it consists in certain novel features hereinafter described and claimed.

Reference is had to the accompanying drawings, in which the same parts are indicated by the same letters throughout the several views.

Figure 1 represents a side elevation of one of the detachable halves in which the inclosing case is preferably made, and represents the rotary wheel in elevation, and the supply pipe, shaft, and tie-bolts in section. Fig. 2 represents a vertical section through the case, along the line  $x x$  of Fig. 1, the rotary wheel and buckets being shown in elevation. Fig. 3 represents a side elevation of the ribbed hub on which the various buckets are mounted, and Fig. 4 represents an end view of the ribbed hub shown in Fig. 3.

The case A is preferably made in two halves, each of which is cut away at the bottom, as shown, and provided with a plurality of lugs  $a$ , through which the tie-bolts  $a'$  are secured. This case A is mounted upon a bed plate or pedestal B which is made hollow as shown, and is preferably made in two pieces which are held together by bolts  $b'$  passing through the lugs  $b$ . The case A is secured on the pedestal B by bolts  $b^2$ .

C represents the shaft on which the hub E, carrying the buckets F, and the pulleys D and D' are mounted.

The hub E is provided with a plurality of ribs  $e$  separating it into sectors  $e'$ , provided with bolt holes  $e^2$ , and the buckets F are provided with shanks  $f'$  adapted to fit between these ribs, and to be held in position by bolts passing through the holes  $e^2$ . These ribs  $e$  are placed on either side of the hub E,

and the buckets are attached alternately, the one to one side, and the next to the other side of the said hub, as is shown in Fig. 2.

The buckets F, are preferably made in the form of cylinders, with hollow hemispherical ends, the cylinders being cut off helicoidally, and leaving a shoulder  $f$  as shown in Fig. 1.

G represents the bouching of the delivery pipe H, which latter may be provided with a nozzle or reduced aperture  $h$  for the purpose of limiting the water to a small stream, and increasing the pressure and consequent velocity under which it is delivered.

The operation of the device is as follows: The water is turned on through the pipe H, and entering through the nozzle  $h$ , strikes the interior of the cup-shaped buckets, causing them to revolve in the direction indicated by the arrow in Fig. 1. Motion is transmitted by either one or both of the pulleys D or D'.

By having the case A and bed plate B formed of two separable parts, easy access to the interior of the motor is obtained. And by having the buckets F provided with shanks  $f'$  adapted to be held in the sectors  $e'$  between the ribs  $e$  of the hub, the said buckets are not only held securely while in position, but each bucket may be readily detached from the hub, and a new one may be put on in its place with equal facility.

By having the cups or buckets in the form of cylinders with hemispherical ends, the full effect of the impetus of the water for turning the wheel is obtained, while any backward spattering of the water which strikes the buckets under a high pressure is deflected by the curved ends of the succeeding buckets. This backward spattering is also rendered less objectionable by placing the buckets alternately on either side of the hub in two parallel groups, in which case, the splashing from one bucket is not likely to seriously retard the bucket which is directly behind it, that bucket being the second, and not the first attached to the hub in rear thereof.

By cutting away the open face of the bucket helicoidally, and leaving a shoulder  $f$  with an adjacent groove, as it were, in practically the circle of greatest diameter passing through each group of buckets, the bucket is made to



empty itself rapidly when in the lowest position, and the suction of the water as the bucket begins to ascend on the opposite side, is reduced to a minimum. By this peculiar  
5 construction of bucket, I have found that great economy in motive power is obtained.

Having thus described my invention, what I claim, and desire to secure by Letters Patent of the United States, is—

10 1. In a rotary hydraulic motor, the combination with a suitable case open at the bottom, and a delivery pipe connected thereto at one side thereof, in the direction of a chord of the circle described by the rotary wheel; of a shaft  
15 mounted in said case, a hub mounted on said shaft and cup-shaped buckets having shanks attached to said hub alternately on opposite sides thereof, and cut away helicoidally along their forward edges, substantially as and for  
20 the purposes described.

2. In a rotary hydraulic motor, the combination with a suitable case open at the bottom, and a delivery pipe connected thereto at one side thereof, in the direction of a chord of the circle described by the rotary wheel, of a shaft 25 mounted in said case, a hub mounted on said shaft, cylindrical buckets with hemispherical ends attached to said hub alternately on opposite sides thereof, and cut away helicoidally leaving a shoulder and an angular mouth or 30 outlet adjacent thereto in approximately the circles of maximum diameter of the two parallel groups of buckets, substantially as and for the purposes described.

In testimony whereof I affix my signature in 35 presence of two witnesses.

OLIVER F. TEED.

Witnesses:

WILLIAM H. GLORE,  
H. A. PIGGER.