

No. 830,890.

PATENTED SEPT. 11, 1906.

J. EBERHARDT & H. WEGHORST.

STEAM TURBINE ENGINE.

APPLICATION FILED FEB. 29, 1904.

2 SHEETS—SHEET 1.

Fig. 1.

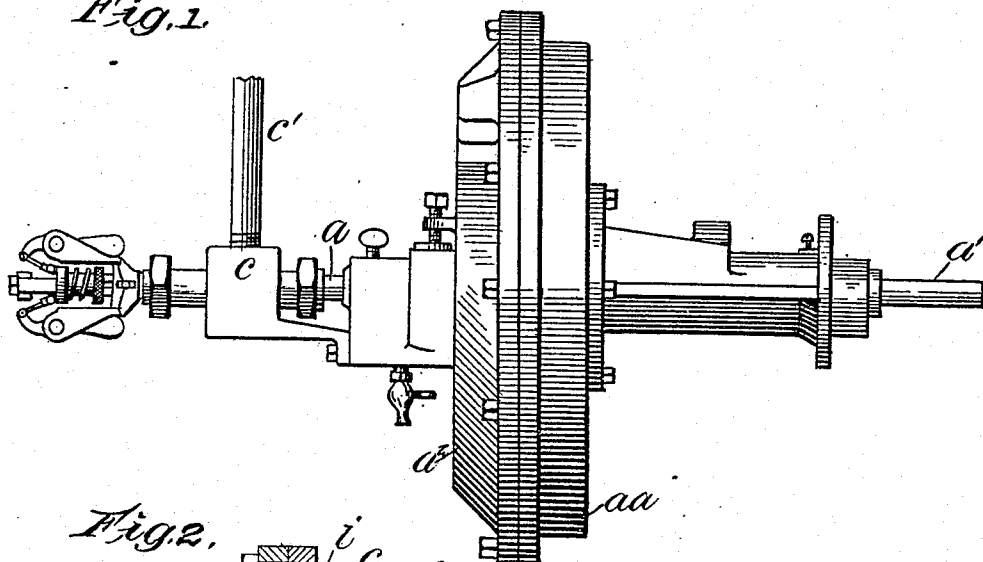


Fig. 2.

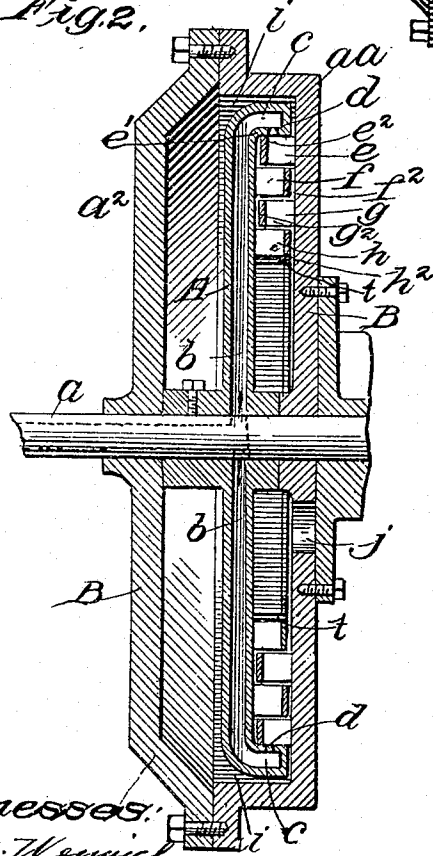
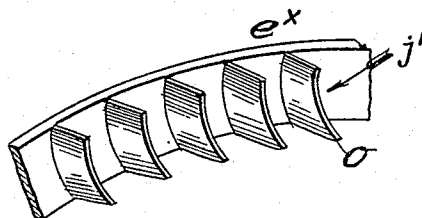


Fig. 3.



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2 SHEETS--SHEET 2.

Fig. 4.

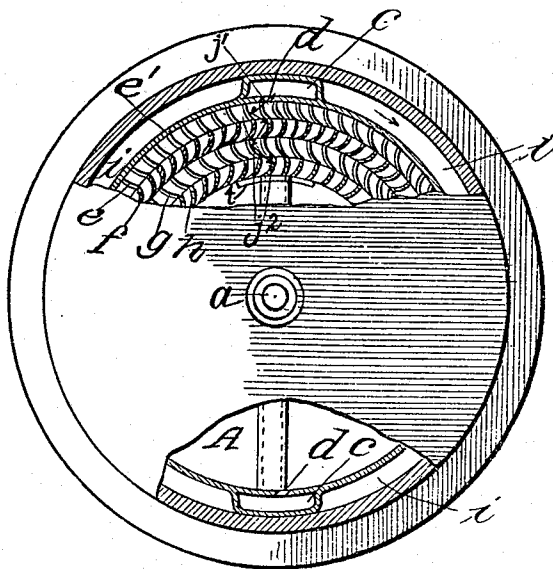


Fig. 5.

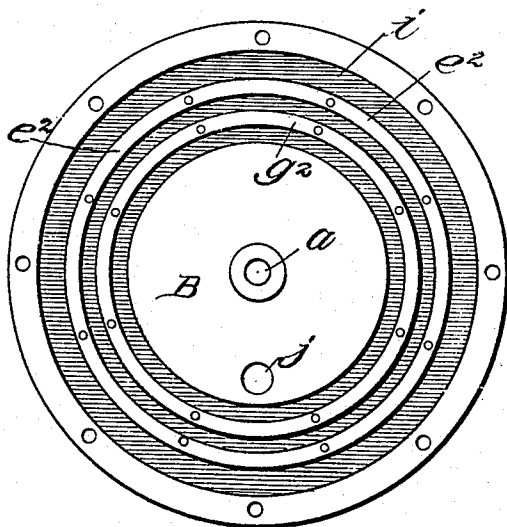
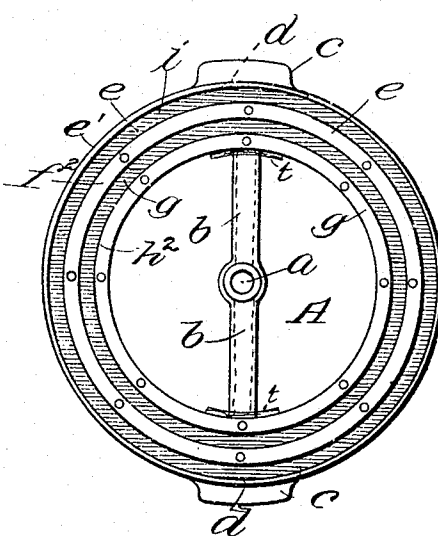


Fig. 6.



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UNITED STATES PATENT OFFICE.

JOHN EBERHARDT AND HERMAN WEGHORST, OF CHICAGO, ILLINOIS.

STEAM TURBINE-ENGINE.

No. 830,890.

Specification of Letters Patent.

Patented Sept. 11, 1906.

Application filed February 29, 1904. Serial No. 195,812.

To all whom it may concern:

Be it known that we, JOHN EBERHARDT and HERMAN WEGHORST, citizens of the United States, residing at Chicago, Illinois, have invented new and useful Improvements in Steam Turbine-Engines, of which the following is a specification, reference being had to the accompanying drawings, forming a part hereof, and in which—

10 Figure 1 shows our new steam-engine in elevation. Fig. 2 shows a central longitudinal section through the engine. Fig. 3 shows in perspective a fragment of a circle of bucket-capping with buckets thereto, the buckets
15 being cut free from the elements A or B. Fig. 4 shows the inner or rotating end of our engine with fragments of the cover broken away and the caps of the buckets removed at one of said places and the other or lower
20 places without buckets, showing the steam-chamber and passages to it. Fig. 5 shows the fixed or static part B of our engine open as seen from the entrance end. Fig. 6 shows the active part A, which fits into and works
25 in said static part.

Like reference-letters denote like parts throughout.

The object of our invention is to produce a turbine-engine in which the wheel A, or active
30 element, discharges moving jets of steam at its periphery toward the axis of the engine upon fixed buckets, so as to cause said jet or jets to move away from the fixed buckets *e*,
35 which constitute the first or outer circle of buckets of the part or element B, and, further, to deflect the steam from said fixed bucket upon a moving circle of buckets forming
40 a part of the disk A, which contains said jets, which in turn deflects the steam-jet upon a circle of fixed buckets, from which the steam is again deflected on a circle of buckets forming a part of the moving element of
45 our device, as before, and so on indefinitely as long as the steam so worked can produce added force to our said active element or sets
50 of circles of rotating buckets. To attain said desirable ends, we construct our said new turbine steam-engine in substantially the following manner, namely: We make a circular box
55 of two separable parts a^1 and a^2 , the latter being but a cover bolted to the former. A steam-pipe *a* enters at the center of said box from one side and continues out of the other side of said box as a solid shaft a' , and from the end of the said tubular shaft or steam-pipe are openings forming parts of openings *b*

in opposite arms, which terminate in a steam-chamber *c* at the ends of said arms, from which there is an opening *d* at an angle directed toward the center of fixed and concave buckets, as at *o*, Fig. 3, in which the
60 arrow indicates the direction of said opening and jet from it. The inner side of said steam-chamber forms a part of a vertical flange e' , continued on around at the outer edge of a
65 rotatable disk A, which forms the active element of our engine. Said flange extends to the opposite fixed or static element B of our engine as closely as permissible to allow it to
70 still move over it freely, and it also moves as closely to the edges of the circle of fixed buckets *e*, which form an integral part of said static element B. Said flange confines the steam from the annular channel *i*, required
75 for the steam-chests *c*. The buckets *e* are an integral part of the static part B, and they are united or cast to a ring e^2 , of which the general construction for rings e^2 f^2 g^2 h^2 is shown more clearly at e^x , Fig. 3, and within
80 said ring of fixed buckets is another ring of buckets *f*, which form an integral part of the active or rotating element A, which are under an annular cap f^2 , and within said ring of buckets is another ring of buckets *g* under the
85 annular cover g^2 , forming an integral part of the part B, and within said ring is another ring of buckets *h* under the annular cover h^2 , which form an integral part of the rotating
90 element A. Said rings of buckets pass between each other telescopically and fit as nearly steam-tight within their places as possible to work the parts freely.

In operation the steam issues from the inclined holes (ports) *d* and impinges on the stationary buckets *e*, and thereby the steam-chest is forced to move and so engage the said
95 steam-jet with another bucket in *e*, and so on. At the same time the said jet is deflected from said fixed buckets *e* against the next ring of buckets *f*, which move integrally with
100 *c*, and then the said jet is again reflected from said moving buckets upon the fixed buckets *g*, and from them said jet is again reflected against the moving buckets *h* of the
105 last and inner ring of buckets, after which its force is so far spent as to be of little or no farther value as a driving force.

The buckets are concave and are pitched at such distances and angles as will best facilitate the action of the steam-jet from one
110 circle of buckets onto the other, substantially as shown in Fig. 4.

The rings $e^2 f^2 g^2 h^2$ capping the buckets strengthen them and, with the other parts around them, inclose the steam, so as to force it to act from bucket to bucket.

5 A short wall t within the ring of buckets h closes the jet at its end j^2 . Said jet is shown at the port d as j' , which ends at j^2 . Said wall t prevents the too early exhaustion from the inner ring of buckets.

10 What we claim is—

1. The combination with telescoped rings of buckets alternately stationary and rotating and an axial steam-entrance with radial branches, of steam-chests moving exterior to
15 a fixed ring of buckets and steam-orifices from said chests for jets on said fixed buckets, buckets actuated by jets deflected from said fixed buckets and exhausted toward the axis.

2. The combination with telescoped rings
20 of buckets whereof, alternately, one set is fixed and the other rotates, radially, within it, and a steam-chest exterior to said outer ring, of a tubular axle and tubular arms therefrom to said steam-chests and steam-
25 orifices from said chests directed for jets from said chests impinging, alternately, on fixed and moving buckets.

3. The combination with a fixed and a rotary element on a combined steam-pipe and
30 axle, of rings of buckets alternately fixed on one and then the other of said elements, steam-chests exterior to the outer of said rings, steam-tubes to them from said axle and ports for jets onto said outer ring of fixed
35 buckets.

4. The combination with a rotary steam-pipe and disk, on said pipe, provided with branches from said pipe and steam-chests on

said branches, jet-orifices in said chests and rings of buckets on said disks radially within
40 said jets, of a fixed disk provided with rings of buckets telescoped with the buckets of said rotary disk and provided with an exhaust-port.

5. The combination with concentric rings
45 of alternately-fixed and moving rings of buckets, of a steam-pipe, axial to said rings—branches therefrom and moving steam-chests on said branches and ports to said
50 chest.

6. The combination with concentric rings
50 of alternately fixed and moving rings of buckets, a steam-supply pipe axial to said rings, branch pipes and steam-chest radial to said axial-pipe ports to said chests exterior
55 to said rings of buckets, of a wall to the inner edges of the inner circle of buckets.

7. The combination with concentric rings of alternately static and dynamic rings of
50 buckets, of an axial steam-pipe extending, as an integral element, on each side of said rings of buckets, and branches from said pipe with ported steam-chests.

8. The combination with a rotary steam-pipe and disk on said pipe provided with
55 ported steam-chests connected to said pipe, of a static disk provided with rings of buckets concentric with dynamic rings of buckets, steam-chests and ports, and exhaust-port, the former at the greater and the latter at
70 the least radial distance.

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