(No Model.)

G. C. PYLE.

STEAM TURBINE.

No. 552,396. Patented Dec. 31, 1895.

Fig. 1.

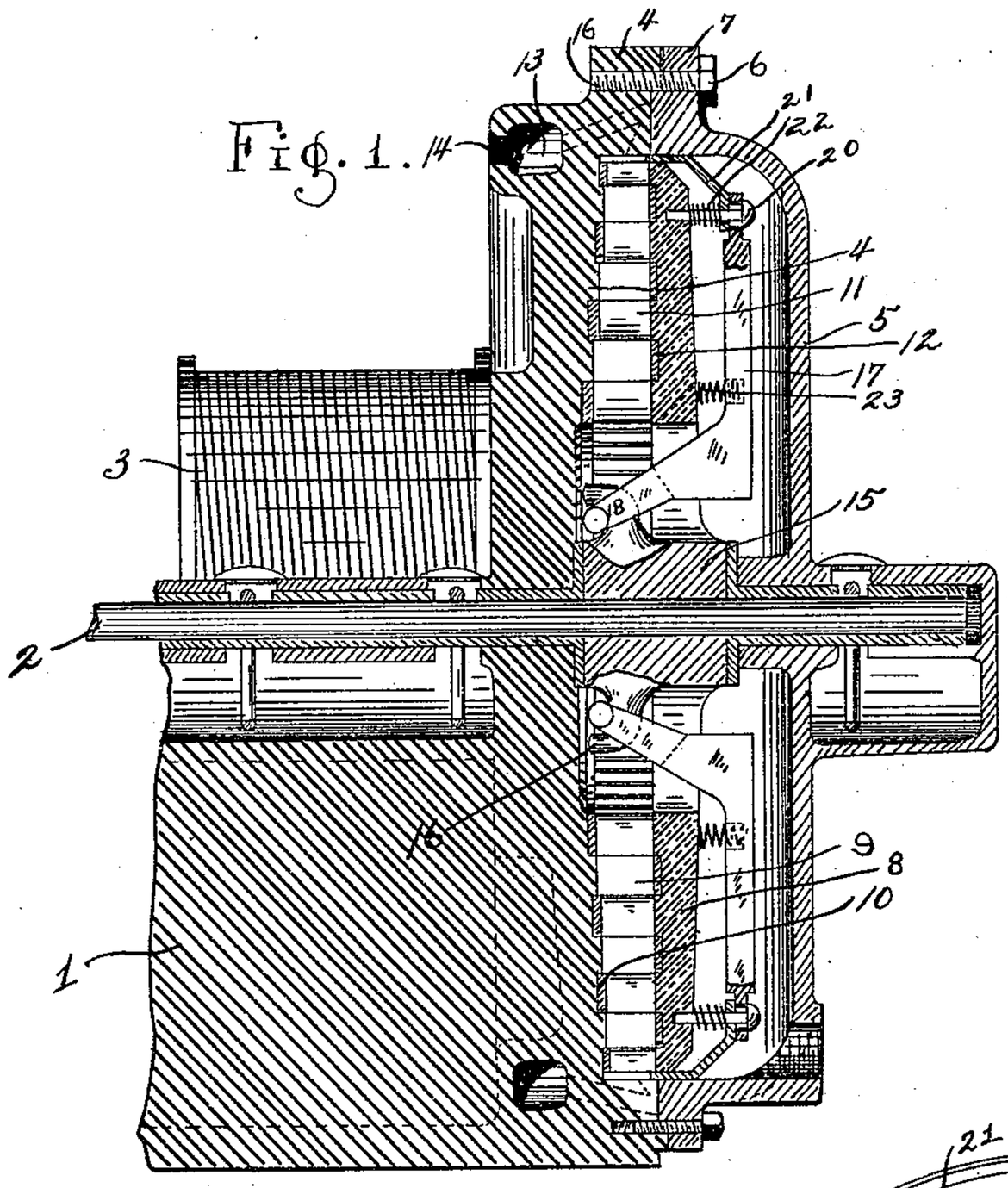


Fig. 2.

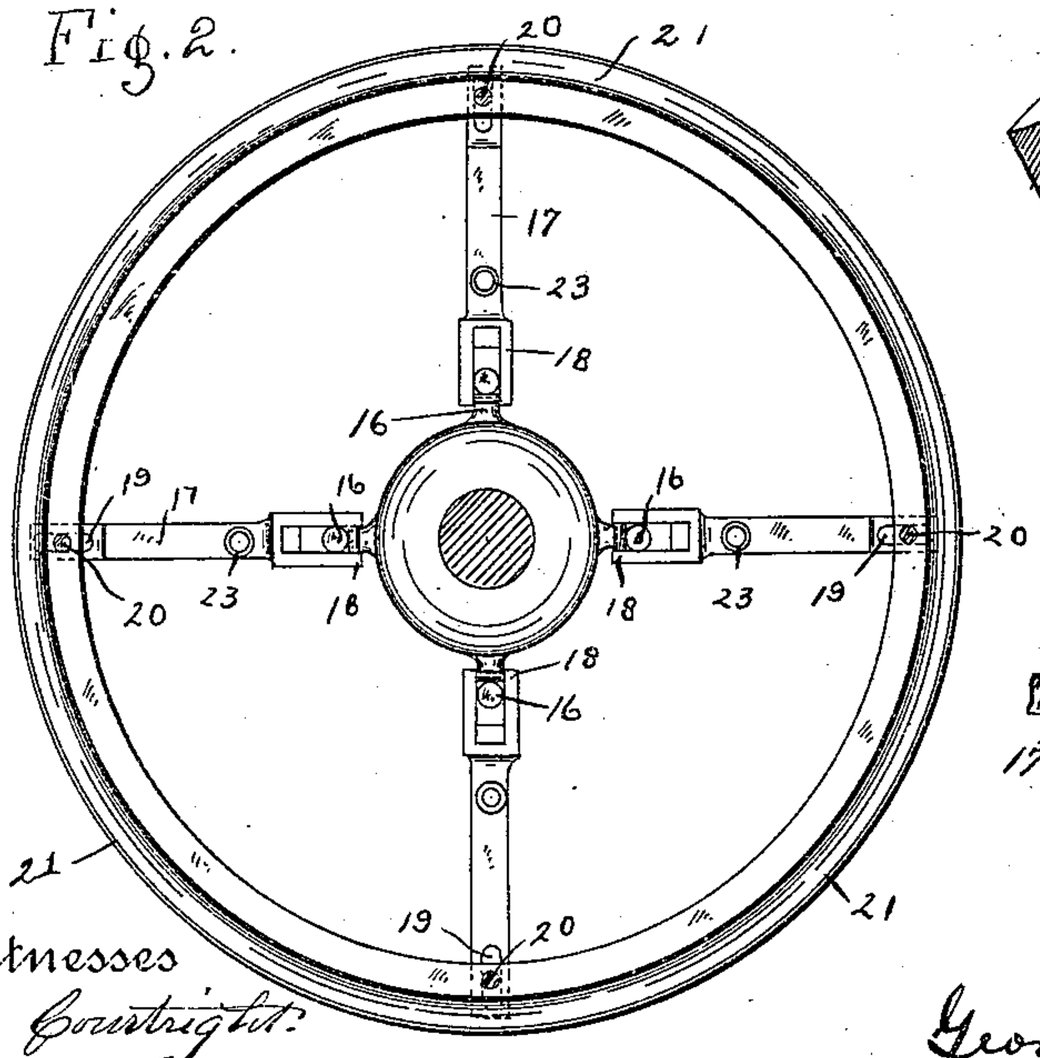
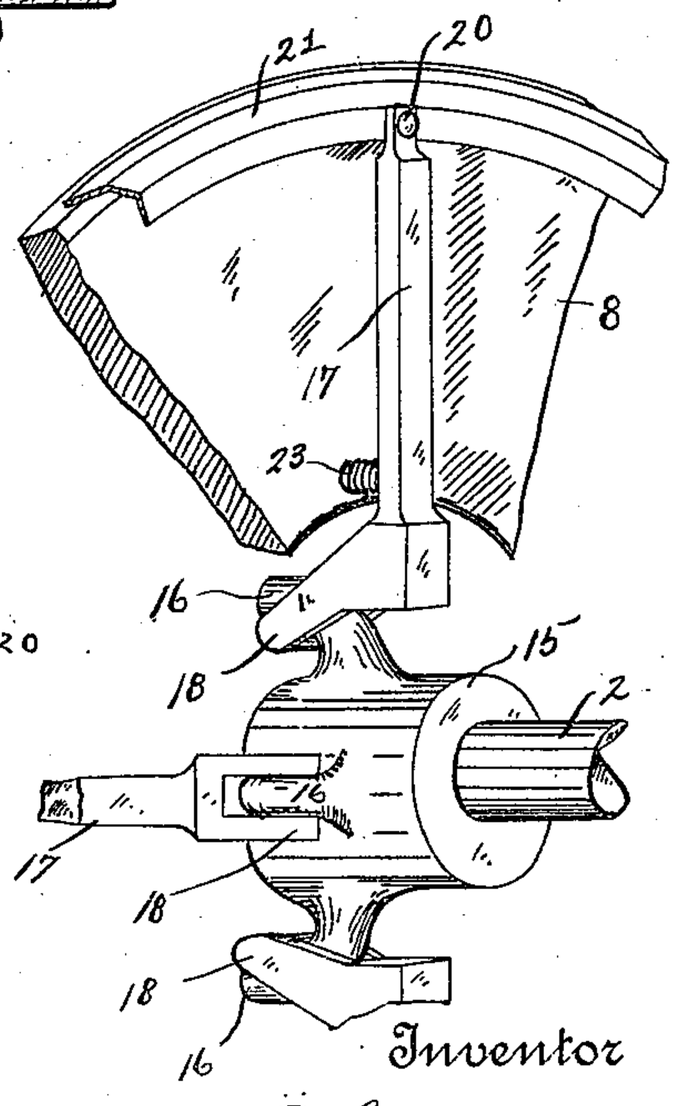


Fig. 3.



Witnesses
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UNITED STATES PATENT OFFICE.

GEORGE C. PYLE, OF INDIANAPOLIS, INDIANA, ASSIGNOR OF ONE-HALF TO FRANK H. EWERS, OF SAME PLACE.

STEAM-TURBINE.

SPECIFICATION forming part of Letters Patent No. 552,396, dated December 31, 1895.

Application filed April 11, 1895. Serial No. 545,408. (No model.)

To all whom it may concern:

Be it known that I, GEORGE C. PYLE, of Indianapolis, county of Marion, and State of Indiana, have invented a certain new and useful Steam-Turbine; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, in which like figures refer to like parts.

My invention relates to a governor mechanism for steam-turbines and similar engines. It is in the nature of a centrifugal governor and will be fully understood from the accompanying drawings and the description following.

Figure 1 is a central vertical section of a steam-turbine with a part of its base, shaft, &c., broken away. Fig. 2 is a plan view of the governor by itself. Fig. 3 is a detail view of a portion of the device.

The steam-turbine herein shown I have used in connection with electric headlight mechanism, and hence it is here shown with the base 1, shaft 2, and dynamo 3. The turbine proper consists of a suitable casing consisting of two parts. Herein I show one part, 4, integral with the base 1 and the other part, 5, secured to the part 4 by bolts 6 extending through the flanges 7. This flange-joint should be air-tight. Within the casing a wheel 8 is mounted upon the shaft 2 and provided with laterally-extending buckets 9 with their ends connected by a ring 10. These buckets are arranged in concentric series being enlarged from the circumference to the center of the wheel, as shown. Extending between the buckets are stationary deflectors 11, formed integral with the part 4 of the casing, and each series of the deflectors is likewise provided with a ring 12. I provide an annular steam-chamber 13, having a suitable inlet 14, (shown in dotted lines in Fig. 1,) whereby the steam is admitted to the outer series of buckets on the wheel.

The chief features of the steam-turbine herein shown and described are the same as those to be found in my application for a patent for a steam-turbine, filed October 1, 1894, Serial No. 524,615. Other forms of steam-turbine may be used in connection with the governor which I shall now describe.

Upon the hub 15 of the wheel 8 I provide the hooks 16, each having a free end and all turned in the same direction. 17 is a bar extending parallel with the wheel excepting at its lower end where it is provided with a bracket 18 adapted to catch over the hook 16. As herein shown, this bracket is formed by channeling out the lower end of the bar 17. The outer end of the bar 17 is provided with an enlarged hole or slot 19, through which passes a screw-bolt 20 that is fastened in the wheel 8. Thus the outer end of the bar 17 is free to move toward or from the wheel.

Between the periphery of the wheel and the casing there is a small annular space for the admission of steam to the outer series of buckets. Into this space I fit an annular shut-off plate 21 so constructed that when it is pushed in toward the wheel it will completely fill the space referred to and shut off the steam from the wheel, but when it is pushed away from the wheel it will not interfere with the admission of steam thereto. This shut-off plate is secured loosely to the bolt 20 and is held back by the spring 22, which may be a coil-spring around the bolt, as herein shown or be a flat spring elsewhere located, tending to press the plate backward. Thus both the plate 21 and the outer end of the bar 17 are capable of moving toward and from the wheel. Toward the other end of the bar 17 I mount another spring 23 whose functions are to keep the inner end of the bar 17 from becoming disengaged from the hooks 16 when the wheel is stationary and also to keep the free end of such bar 17 pressed backward.

When the wheel 8 is rotated rapidly the tendency of the free end of the bar 17 will be to move inward toward the wheel by reason of the pivotal point or hook 16 being locked inward. The outer end of the bars 17 will seek the plane of rotation of the inner end and therefore will press the shut-off plate 21 inward toward the wheel. The more rapid the rotation the farther inward this plate will be pushed, and the farther inward it is pushed the more it will tend to cut off the supply of steam and in this manner check the too-rapid rotation of the wheel. The sensitiveness of the governor is regulated by the springs, for if the springs are made stiffer much more rapid rotation will be permitted, and vice versa. If the steam-inlet does not

extend all around the periphery of the wheel, the plate 21 may be sectional or segmental, so formed always as to shut off the steam when the arms 17 push it in.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. In a steam turbine, a governor mechanism comprising a shut-off plate which when moved opens or closes the steam port, and a bar pivoted at one end to an immovable part of the mechanism that rotates with the wheel and extended at an angle to the plane of rotation of its pivotal point with its other end connected with the shut-off plate whereby the plate is moved toward and from the plane of the pivotal point, of the bar by the latter's rotation, substantially as set forth.

2. In a steam turbine, the combination with the wheel, of a governor mechanism comprising a shut-off plate adapted when moved to close or open the steam port, and a bar pivoted at its inner end to the wheel and extending at an angle to the plane of rotation of its inner end, and a bolt secured to the wheel and extending loosely through the plate and outer end of the bar, substantially as shown and described.

3. The combination with a steam turbine provided with a casing having suitable steam ports, and a wheel so mounted therein as to leave an annular space between it and the portion of the casing through which the steam ports enter, of a governor mechanism comprising an annular plate adapted to move into and out of such annular space, and bars pivoted at their inner ends to the wheel and extending at an angle to the plane of rotation of their inner ends, with their outer ends so connected to such annular plate as to move it.

4. In a steam turbine, the combination of a wheel provided near its center with a suitable hook, of a shut-off plate adapted to open or close the steam port, and a bar whose inner end is provided with a bracket adapted to catch over the hook on the wheel and extending at an angle to the plane of rotation of such hook and with its outer end so connected to the shut-off plate as to move it, and a spring adapted to hold such bar normally away from the wheel, substantially as shown and described.

5. In a steam turbine provided with a casing having suitable steam ports, and a wheel so mounted therein as to leave an annular space between it and the portion of the casing through which the steam ports enter, a governor mechanism comprising an annular plate adapted to move into or out of such space, bars pivoted at their inner ends to the wheel and extending at an angle to the plane of rotation of such inner ends, and bolts secured to the wheel and passing loosely through the shut-off plate and the outer ends of such bars, and a spring adapted to hold the shut-off plate normally out of such annular space.

6. In a steam turbine provided with a casing having an annular steam port therein, and a wheel so mounted therein as to leave an annular space between it and the portion of the casing through which the steam ports enter and having hooks near its center, a governor mechanism comprising the annular shut-off plate 21 adapted to move into or out of such annular space, the bars 17 provided with brackets at their inner ends adapted to catch over the hooks and extending at an angle to the plane of rotation of such hooks, the springs 23 adapted to keep such bars normally away from the wheel, the bolt 20 secured to the wheel and extending loosely through the shut-off plate and the outer ends of the bar 17, and the spring 22 adapted to hold the shut-off plate normally out of such annular space.

In witness whereof I have hereunto set my hand this 25th day of February, 1895.

GEORGE C. PYLE.

Witnesses:
G. C. CONNER,
L. A. MONROE.