June 19, 1923. 1,459,510

D. KOEHLER

FLUID TURBINE

Filed July 30, 1921 2 Sheets-Sheet 1

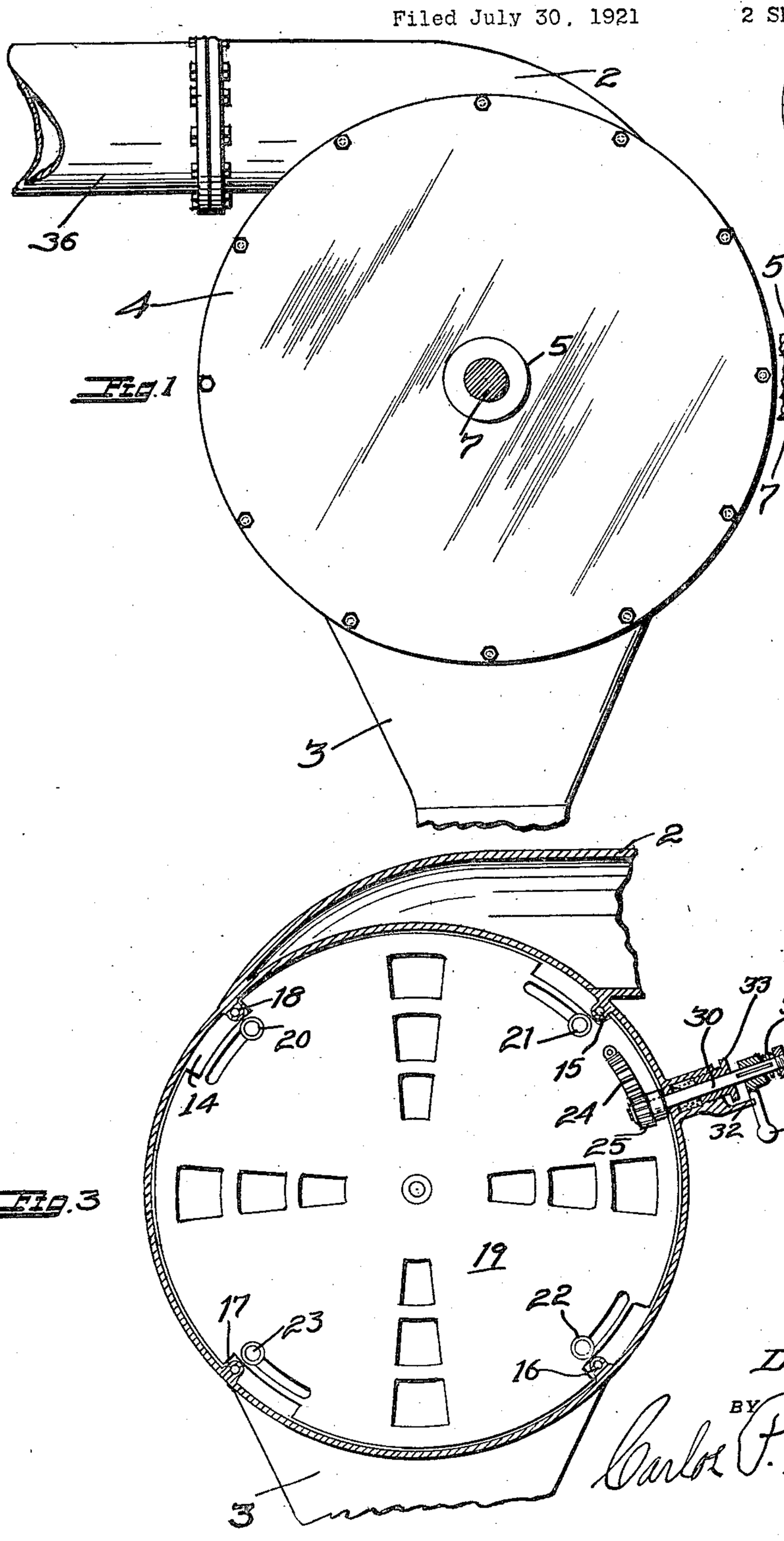

Fig. 1

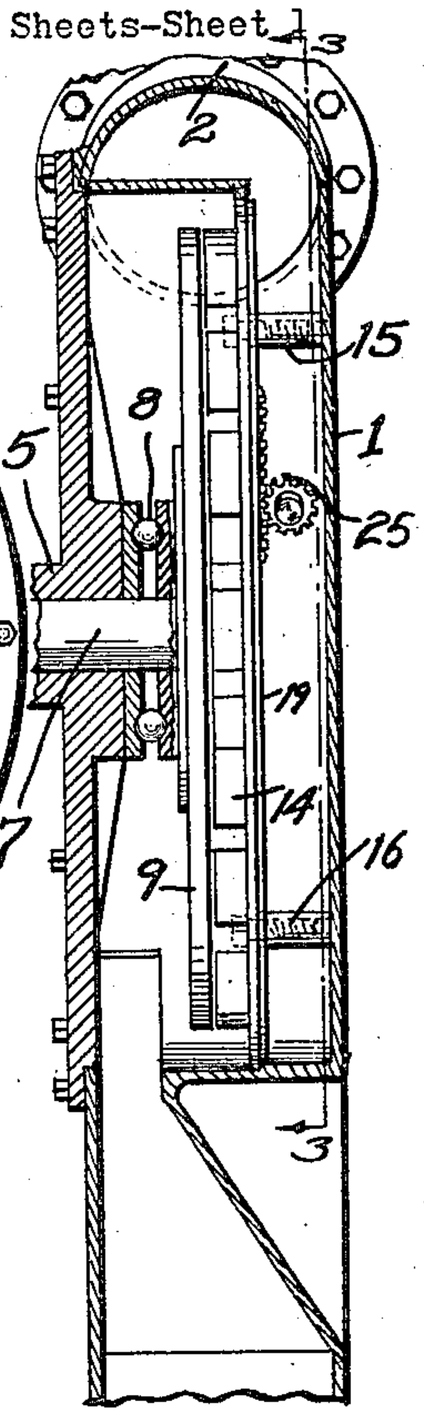

Fig 2

Fig. 3

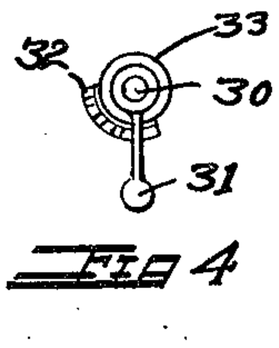

Fig 4

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Fig. 5.

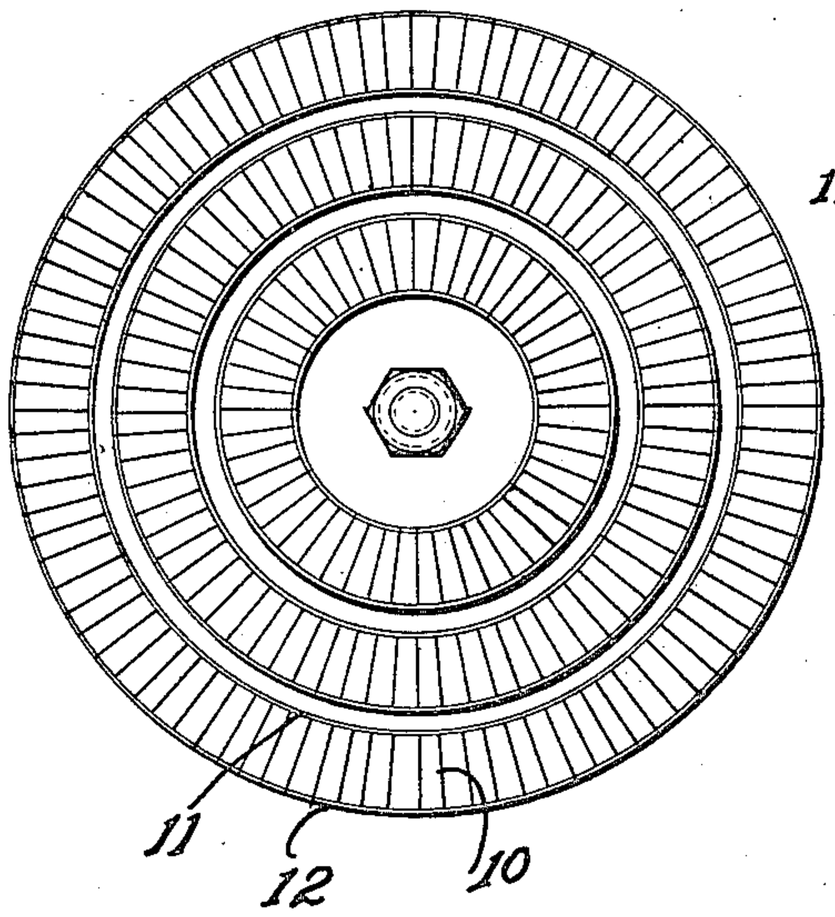
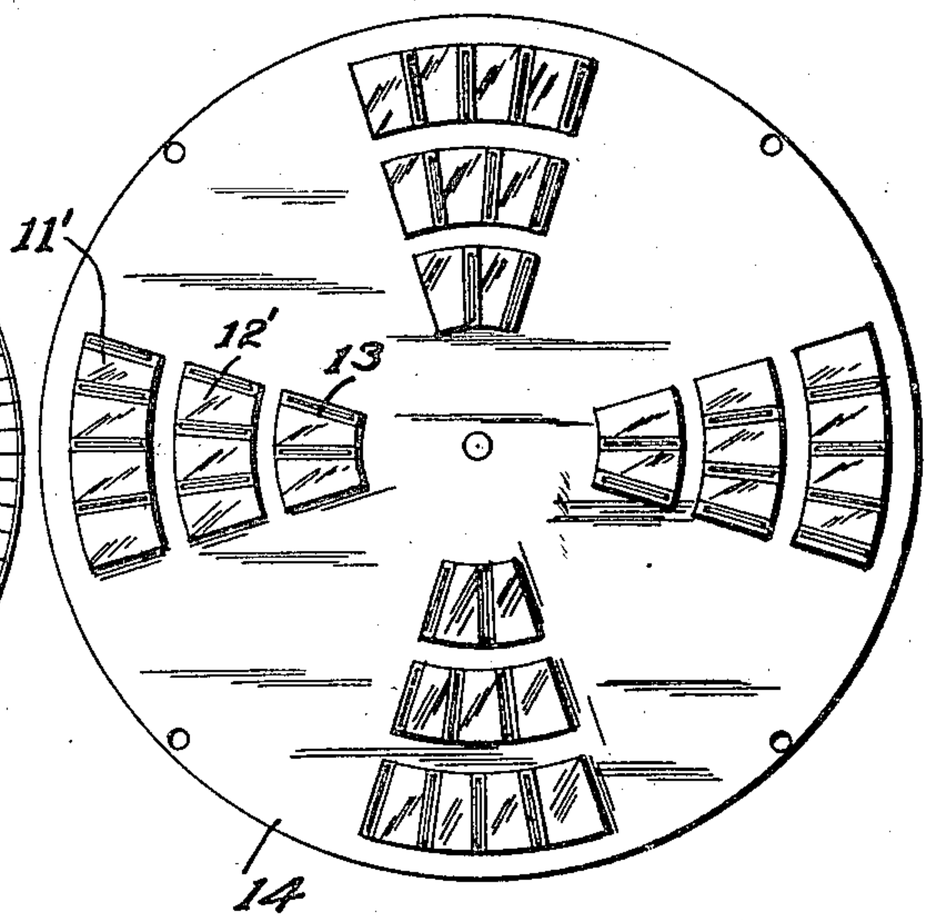


Fig. 6.



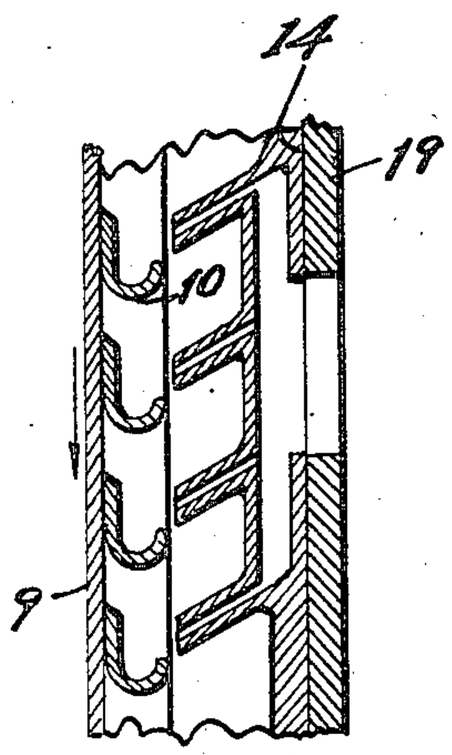


Fig. 7.

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UNITED STATES PATENT OFFICE.

DELL KOEHLER, OF SAN FRANCISCO, CALIFORNIA.

FLUID TURBINE.

Application filed July 30, 1921. Serial No. 488,500.

To all whom it may concern:

Be it known that I, DELL KOEHLER, a citizen of the United States, residing at San Francisco, in the county of San Francisco, State of California, have invented a new and useful Fluid Turbine, of which the following is a specification, in such full and clear terms as will enable those skilled in the art to construct and use the same.

This invention relates to a fluid turbine and its object is to produce a turbine which is capable of being very nicely regulated and which will be of an extremely simple construction.

Another object of the invention is to produce a turbine which is capable of developing power from fluid passed through the same at very low pressures.

Another object of the invention is to produce a turbine which is capable of developing the maximum power at different steam pressures, the reduction of steam to the nozzles being so arranged that no reduction in size in the nozzles is made although a smaller amount of steam is delivered therefrom when less power is required.

Other objects of the invention will appear as the description proceeds.

An embodiment of the invention is shown in the accompanying drawings in which the same reference numeral is applied to the same portion throughout, but I am aware that there may be modifications thereof.

Fig. 1 is a side elevation of the complete turbine.

Fig. 2 is a vertical sectional view of the complete turbine.

Fig. 3 is a sectional view of the apparatus in plan at right angles to the turbine wheel.

Fig. 4 is a plan view of the mechanism for turning the regulating plate.

Fig. 5 is a side elevation of the turbine wheel.

Fig. 6 is a side elevation of the turbine nozzle plate, and

Fig. 7 is a sectional view of the turbine nozzles and a portion of the turbine wheel.

The turbine comprises a cylindrical casing 1 having an inlet pipe 2 and an outlet pipe 3 connected therewith. This casing is covered with a flat plate 4 which is bolted to the casing and which has a bearing 5 for the shaft 7 and a thrust bearing 8 to prevent the thrust from the jets from issuing from the nozzles from moving the turbine wheel 9 away from the nozzles.

The turbine wheel 9 consists of a flat plate to which a plurality of curved buckets 10 are suitably connected. These buckets may be made in any way and have raised rims 11 and 12 at their ends, said raised rims being circular and extending entirely around the rim disk 9. The buckets are placed in three rows concentric with each other, and there are three concentric rows of nozzles 11′, 12′, 13 carried by a plate 14 which is secured within the casing 1.

Suitable spacers 15 to 18 space it away from the back of the casing a sufficient amount to permit the fluid to have proper access to all of the nozzles. The nozzles are placed in sets and they receive the fluid through an opening in their supporting plate 14. Adjacent the supporting plate 14 is the regulating plate 19. This plate is a flat plate bearing against the plate 14 and having openings to correspond with the openings in the plate 14. This plate is held against the plate 14 by means of suitable bolts 20 to 23 carried by the plate 14 and extending through slots in the plate 19.

In order to adjust the quantity of fluid passing to the nozzles, the plate 19 has a flat segment rack 24 thereon which is in mesh with a small pinion 25 carried by a shaft 30. This shaft has an operating handle 31 thereon which may be rotated to engage notches in a fixture 32 connected to the casing and which enables the operator to increase or diminish the quantity of fluid permitted to pass through the nozzles. The shaft 30 extends through a packing gland 33 and the arm 31 is held in engagement with the notches in the fixture 32 by means of a spiral spring 34.

In operation steam or other gas is fed to the apparatus through the pipes 36 to and into the casing in back of the plate 19 and the quantity of steam is regulated by regulating the position of the plate 19. As the fluid passes through the nozzles it impinges upon the buckets 10 and drives them forward. Since the nozzles do not occupy the entire space of the plate 14 there is

ample clearance for the escape of the fluid radially thereof, after which it passes over the edge of the rotating wheel and out through the pipe 3 to any suitable place of exhaust.

It will be understood by those skilled in the art that while steam has been mentioned for the operation of this engine that any fluid under pressure may be used to operate it.

What I claim is as follows, but various modifications may be made in the construction shown in the drawings and above particularly described form, within the purview of my invention.

1. In a fluid turbine, the combination of a casing having inlet and outlet pipes, a partition therein, a plurality of nozzles carried thereby in concentric series several nozzles of each series leading to separate fluid supply chambers, a runner adjacent the nozzles, and means to gradually increase or reduce the fluid supply to each of the separate nozzle chambers whereby the number of nozzles used remains constant regardless of the amount of fluid supplied to the nozzle chambers.

2. In a fluid turbine, the combination of a casing having inlet and outlet pipes, a partition therein, a plurality of nozzles carried thereby in concentric series all the nozzles at a given distance from the center terminating in a single plane, several of the nozzles being connected with several separate fluid supply chambers, a revoluble disk to regulate the fluid supply to all the nozzle chambers, and means to rotate said disk to regulate the speed and power of the engine.

In testimony whereof I have hereunto set my hand this 16th day of July A. D. 1921.

DELL KOEHLER.