No. 684,045. Patented Oct. 8, 1901.

F. H. COOK.

IMPACT WATER WHEEL.

(Application filed Oct. 20, 1900.

(No Model.)

2 Sheets—Sheet 1.

Fig. 1.

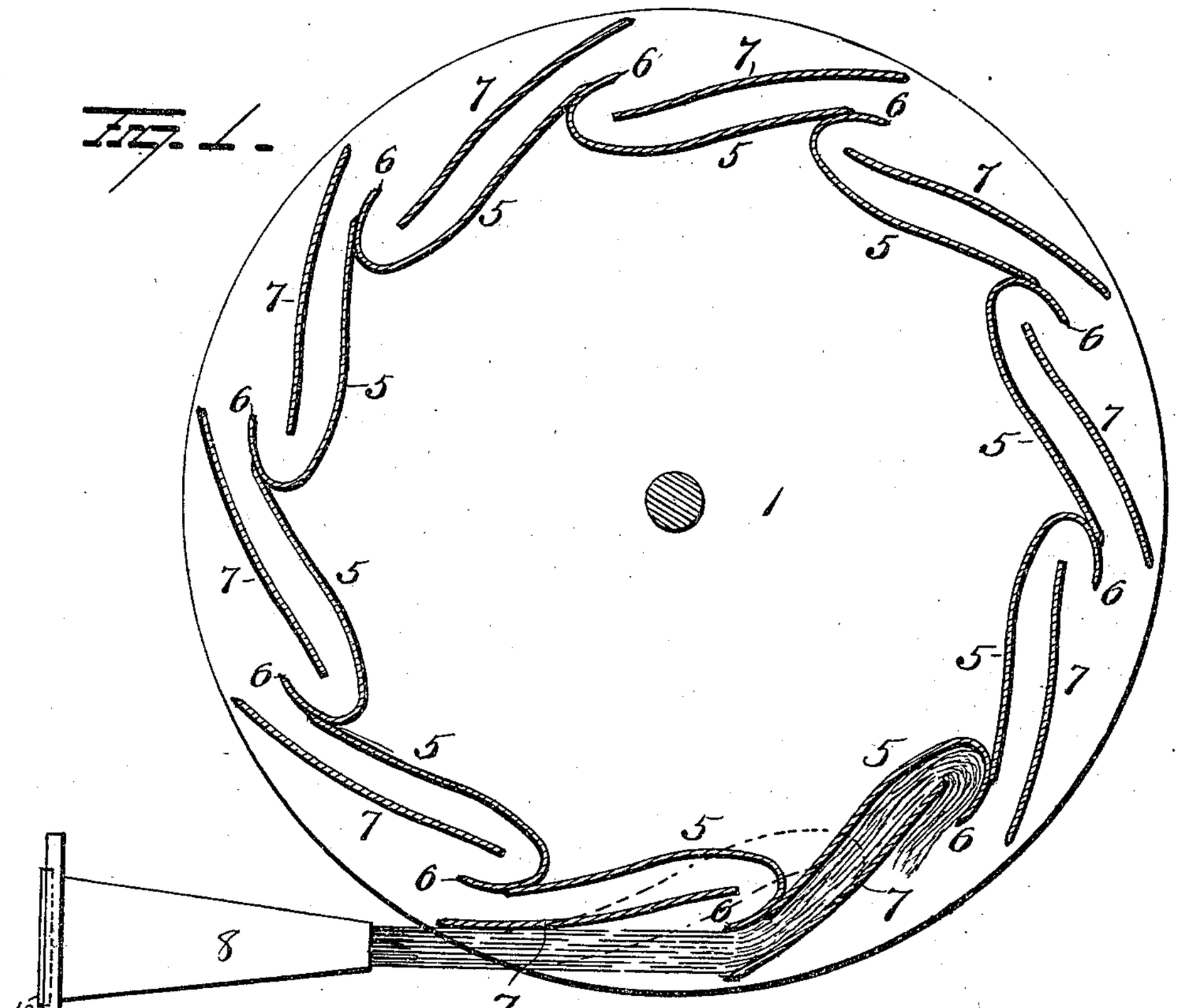

Fig. 2.

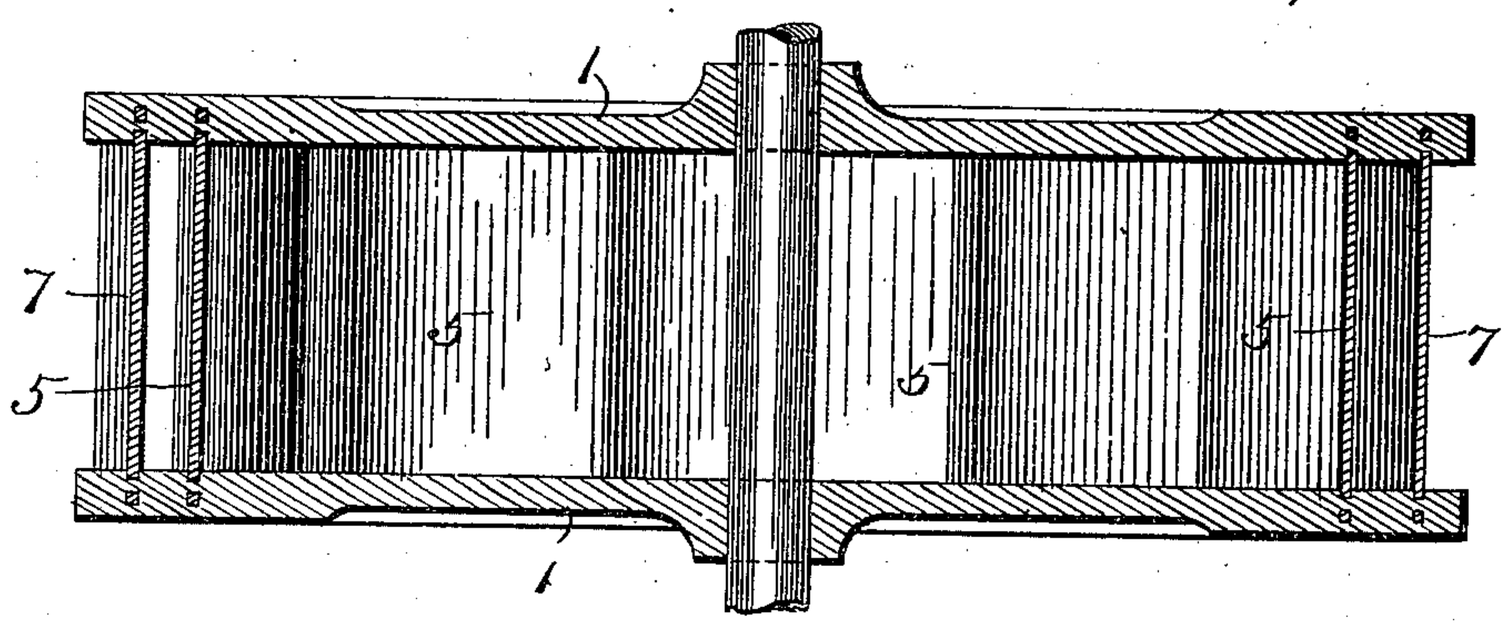

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FIG. 3.

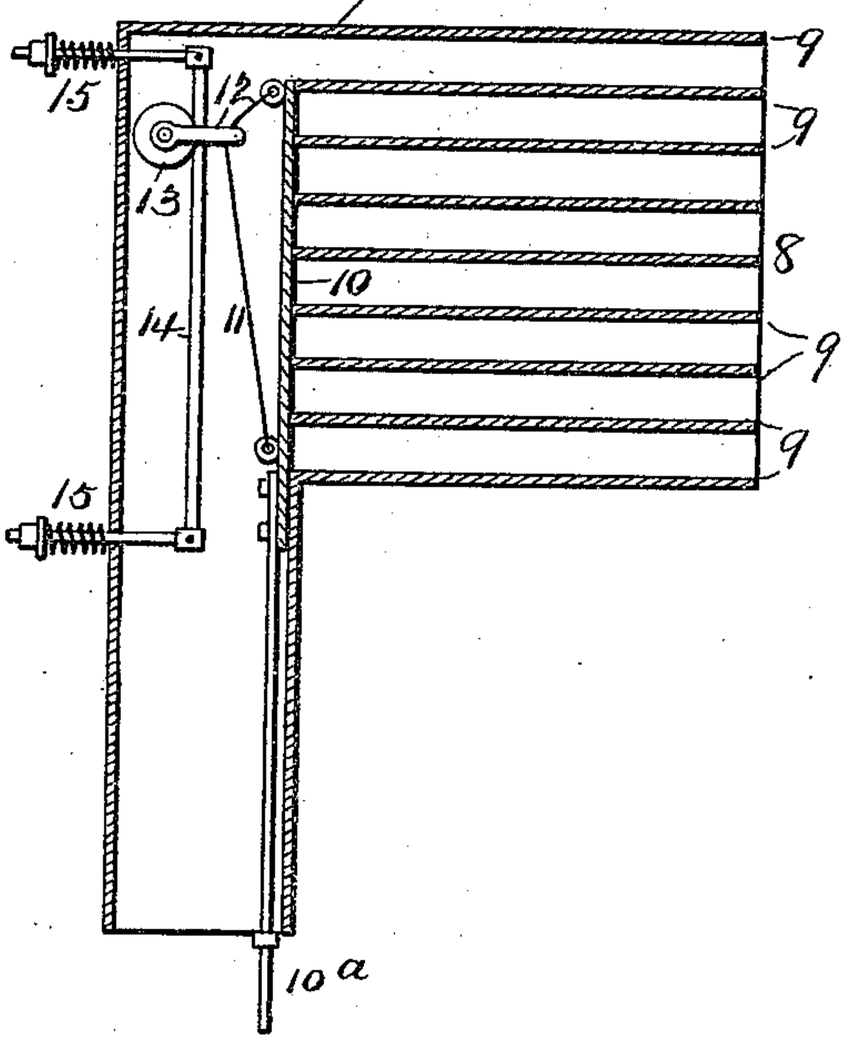


FIG. 4.

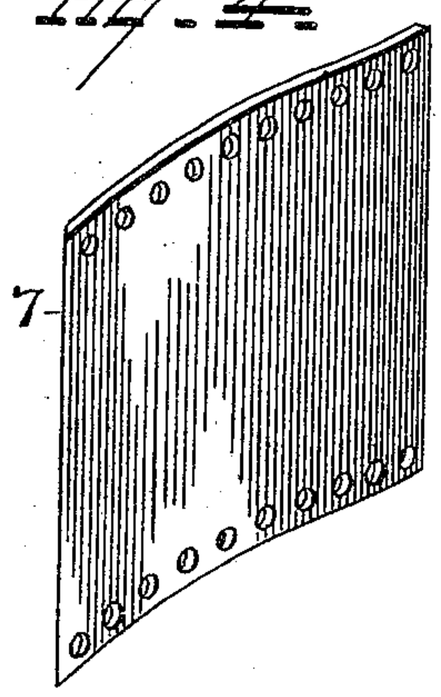
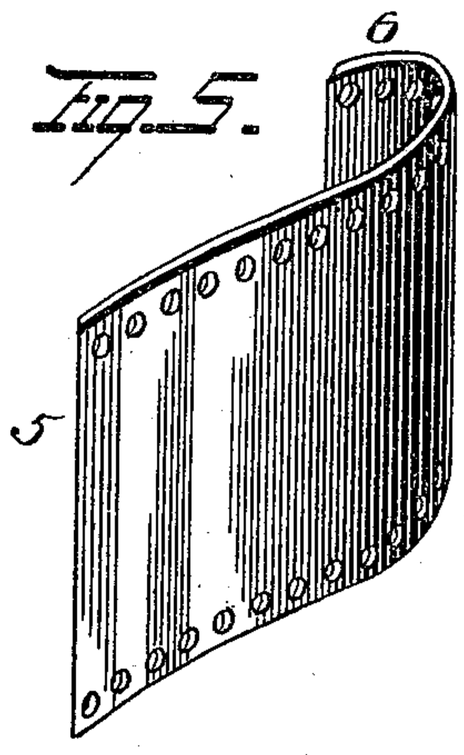


FIG. 5.



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UNITED STATES PATENT OFFICE.

FRANCIS H. COOK, OF MEAD, WASHINGTON.

IMPACT WATER-WHEEL.

SPECIFICATION forming part of Letters Patent No. 684,045, dated October 8, 1901.

Application filed October 20, 1900. Serial No. 33,708. (No model.)

To all whom it may concern:

Be it known that I, FRANCIS H. COOK, a resident of Mead, in the county of Spokane and State of Washington, have invented certain new and useful Improvements in Impact Water-Wheels; 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 an improved motor, and more particularly to an improved wheel adapted to be operated by water, steam, compressed air, and the like, the object of the invention being to provide a wheel which will be extremely simple in construction and which will utilize every particle of force of its driving fluid.

A further object is to provide a wheel which will have its buckets cast integral therewith and provided with integral means for preventing the spent fluid from interfering with the force of the power-giving stream.

A further object is to provide an improved nozzle for regulating the size and power of the stream discharged against the wheel.

With these objects in view the invention consists in certain novel features of construction and combinations and arrangements of parts, as will be more fully hereinafter described, and pointed out in the claims.

In the accompanying drawings, Figure 1 is a view illustrating my improvements. Fig. 2 is a view in section of the wheel, and Figs. 3, 4, and 5 are views of details of construction.

1 1 represent two circular disks provided centrally with alined holes in which a shaft is made integral when the disks are cast. Between the disks 1 and arranged in circular formation is a series of fixed buckets 5. Each bucket comprises a plate having a sharp edge at one end. The inner end of said plate is curved outward and rearward, as shown at 6, and at its curved portion it abuts against the outer end of the next adjacent bucket, and guide-plates 7 are disposed approximately parallel with the main portion of buckets 5 and project into the curved ends of said buckets, the outer ends of the guide-plates 7 extending almost to the periphery of the disks 1 and considerably beyond the outer ends of the buckets.

In constructing my improved wheel the buckets 5 and guide-plates 7 are provided at their edges with perforations and placed in the molds for disks 1 and held therein by removable plugs, and when the molten metal is poured into the molds it will fill the perforations in the buckets and guides and form the wheel into one integral casting, thus dispensing with the use of bolts, rivets, &c., which are a source of great annoyance in all wheels of this character heretofore known.

In operation my improved wheel is mounted preferably so as to receive the stream at its lower edge, although the stream might be forced against the side or top, as desired. When water is used as a motive power, I provide a nozzle 8, having a series of partitions 9 therein, forming a series of outlet-chambers, and a gate or valve 10 is mounted to slide in said nozzle 8 to open or close any number of compartments or chambers in the nozzle, thus regulating the size and force of the stream supplied to the wheel. A suitable rod or stem 10^a is provided on said valve for operating it, and a wire or cable 11 is connected at its respective ends to the valve and held between its ends in an arm 12 on a roller 13, which latter is mounted on a track 14, provided with springs 15 to hold the track and roller thereon away from the nozzle, thus exerting a spring-pressure on valve 10 to overcome the water-pressure thereon and permit the ready operation of the valve.

The operation of my improvements is as follows: The stream of water will first strike the outer end of one guide-plate 7 and be deflected thereby into the curved forward end of bucket 5 to drive the wheel around, and the spent water will be deflected by the curved end of bucket 5 in front of guide-plate 7, thus carrying it out of the way of the fresh supply, and hence not interfering with the latter, and it will be seen that the power of the stream is twice utilized, as it will when it first strikes guide-plates 7 give power to the wheel and again when it strikes the forward curved ends of the buckets 5, where the flow of water is completely reversed.

While I have shown and described my im-

provements in connection with a stream of water as the motive power, it is evident that steam or compressed air or the like might be used with equal effectiveness, and hence I do not wish to be limited to the use of water.

Various slight changes might be resorted to in the general form and arrangement of the several parts described without departing from the spirit and scope of my invention, and hence I do not limit myself to the precise details set forth, but consider myself at liberty to make such slight changes and alterations as fairly fall within the spirit and scope of my invention.

Having fully described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. A wheel employing fluid motive power, comprising a series of fixed buckets and a support therefor, each of said buckets made U-shaped at one end and having its inner wall extending a considerable distance beyond the free end of the outer wall and a plate spaced from and approximately parallel with the long wall of said bucket and forming an elongated channel open at one end and communicating at its other end with the U-shaped portion of the bucket.

2. In a motor, the combination with parallel disks or heads, of a series of fixed buckets between said disks or heads, each bucket made U-shaped at one end and having its inner wall extending a considerable distance beyond the free end of the outer wall and a plate disposed approximately parallel with the long inner wall of the bucket and terminating within the space between the two walls forming the U-shaped portion of the bucket, the long inner wall of the bucket and the guide-plate forming an elongated channel for the passage of motive fluid.

3. In a motor, the combination with parallel disks or heads, of an annular series of buckets fixed between said disks or heads, each bucket made U-shaped at one end and having its inner wall extending a considerable distance beyond the outer wall and terminating against the outer face of the outer wall of the adjacent bucket and coöperating therewith to form one wall of an elongated channel, and a guide-plate disposed approximately parallel with the long wall of the bucket and terminating at one end in the space between the walls of the bucket and constituting the other wall of said elongated channel.

4. A wheel for employing fluid motive power made in a single casting and comprising a supporting-frame, buckets integral with said frame and each having a U-shaped portion at one end, and plates also integral with said frame and spaced from and approximately parallel with said buckets to form elongated channels or waterways, the forward ends of said plates projecting into the U-shaped portions of the buckets.

5. In a motor, a single casting comprising parallel disks, a shaft extending through the center of the disks and made integral therewith, buckets between the disks and integral therewith each bucket having a U-shaped end and guide-plates integral with the disks and projecting into the U-shaped portion of the buckets and spaced from the walls of said buckets.

6. In a motor, the combination of a wheel having an annular series of buckets, a nozzle disposed to discharge fluid into said buckets, said nozzle having a series of outlet-passages, a slide-valve for said outlet-passages, a spring-actuated bar parallel to said valve, a roller to travel on said bar, and a flexible device connected with the valve and with said roller.

In testimony whereof I have signed this specification in the presence of two subscribing witnesses.

FRANCIS H. COOK.

Witnesses:
R. L. WEBSTER,
L. C. COOK.