

(No Model.)

C. McINTYRE.
CENTRIFUGAL PUMP.

No. 569,655.

Patented Oct. 20, 1896.

FIG. 1.

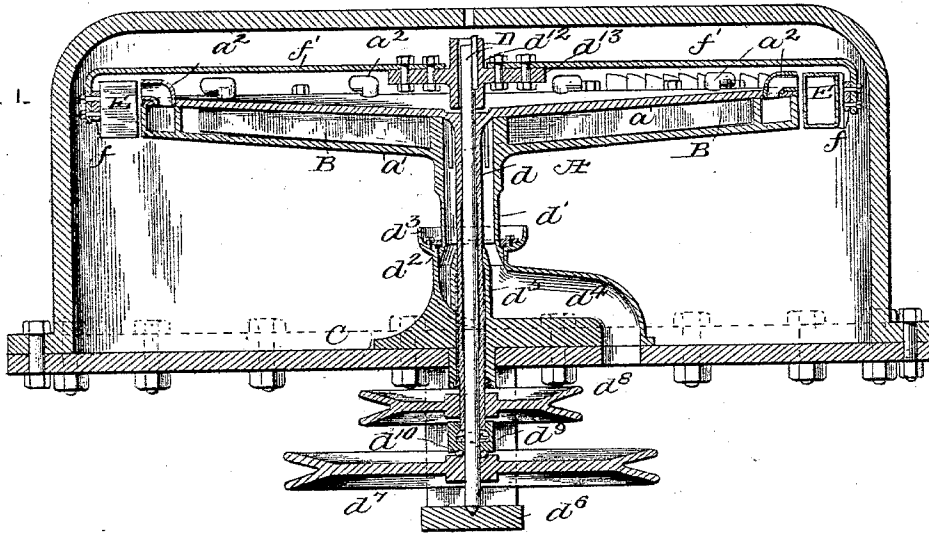
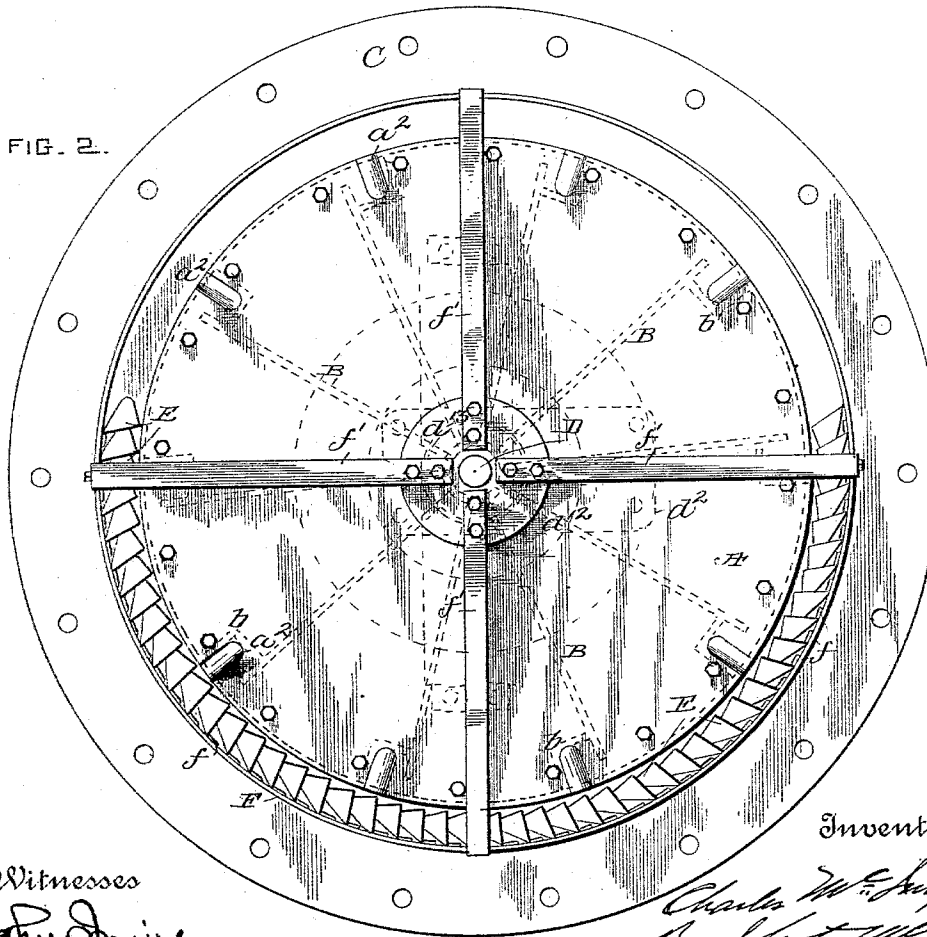


FIG. 2.



Witnesses

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CENTRIFUGAL PUMP.

SPECIFICATION forming part of Letters Patent No. 569,655, dated October 20, 1896.

Application filed November 24, 1894. Serial No. 529,843. (No model.)

To all whom it may concern:

Be it known that I, CHARLES MCINTYRE, of Fort Benton, in the county of Choteau and State of Montana, have invented certain new and useful Improvements in Centrifugal Pumps; 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.

This invention contemplates certain new and useful improvements in centrifugal pumps, having reference more particularly to the specific form known as "force-pumps."

The object of the invention is to provide simple and highly efficient means for effecting the discharge of the water at the periphery of a wheel in such manner that the force of the discharged water will be fully utilized and aid in revolving said wheel.

A further object is to provide simple and efficient means for directing the flow of discharged water from the periphery of the wheel.

To these ends the invention consists, primarily, of a hollow wheel provided with a series of divergent guides for directing the passage of the water toward the outlets at the periphery of said wheel.

The invention further consists of a hollow wheel provided with a series of divergent guide-plates having outer angular ends adjacent to the discharge-openings in the top of said wheel, and series of nozzles or elbows extending from said discharge-openings.

The invention further consists of a hollow wheel having angular discharge nozzles or elbows and a series of divergent guide-plates located in said wheel and extending to said nozzles, and a circular series of buckets surrounding said wheel on a line with said nozzles, said buckets being supported by arms connected to the hub or center of said wheel.

The invention also comprises the details of construction, combination, and arrangement of parts, substantially as hereinafter fully set forth, and particularly pointed out in the claims.

In the accompanying drawings, Figure 1 is a vertical sectional view illustrating my improvements. Fig. 2 is a plan view thereof with the top of the air-tight casing or cylinder broken away and some of the buckets omitted.

Referring to the drawings, A designates a wheel which is made hollow and inclines upwardly from its center to its periphery. This wheel is composed of parallel top and bottom plates or disks a and a' , connected together at their outer edges. In the top plate a are formed at periodical distances apart holes or openings in which fit the inner ends of nozzles or elbows a^2 , which are bent or curved so that their outer ends are on a line with the wheel's periphery. Within this wheel are arranged guide-plates B, which diverge from the hub or center of the wheel to near the periphery thereof, the end of each plate being on one side of each of the outlet-openings, and from each of these plates, from a point near the end thereof, projects a right-angular branch plate b , which extends beyond and incloses one side of the outlet-opening, the end of said branch plate extending to the periphery of the wheel. These guide-plates, together with their right-angular branches, direct the flow of the water in the hollow wheel to the outlet-openings thereof, whereby the same will be discharged through the nozzles or elbows.

The wheel A is provided with a central cylindrical sleeve d and an outer shorter depending extension d' , which fits in a casing d^2 , beneath the bell-mouth d^3 thereof, said casing being attached to the bottom of an inclosing air-tight cylinder C and provided with a tubular portion d^4 , through which the water is drawn. The sleeve d fits snug in a central stationary tubular bearing d^5 , extending upwardly in casing d^2 , and in this sleeve d fits a shaft D, which extends up beyond wheel A, its lower end being projected beneath the cylinder C and resting upon a base d^6 . Upon this shaft is a sheave-wheel d^7 , while upon the lower projecting portion of sleeve d is a second sheave-wheel d^8 , and beneath the latter is a box d^9 , which rests upon ball-bearings d^{10} , fitted in a groove of wheel d^7 . Upon the upper end of shaft D is keyed a hub or sleeve d^{12} , having a central horizontal flange d^{13} .

E E are a series of buckets, each of which is of approximately V shape in plan view, with one side longer than the other, and said longer side is provided with a plate or extension f , which is made fast to the inner side of a ring F, which is supported by lateral arms f' , secured at their inner ends to the

horizontal flange d^{13} of hub or sleeve d^{12} . These buckets are held on a line with the periphery of wheel A in such manner that the water discharged from the nozzles or elbows will strike with full force into the buckets. The openings of the latter being at the broad ends and the contact of the water being against the inclined sides of said buckets, as soon as the water has spent its force against said inclined sides it will fall out through the broad openings. The force of the water discharged by wheel A is thus utilized to aid in revolving said wheel. The primary power for revolving the latter is applied to the sheave-wheel d^8 . This form of centrifugal pump has many advantages over the form shown in my pending application for Letters Patent, filed March 18, 1892, Serial No. 466,688, and especially in that the wheel is made hollow and provided with guide-plates for directing the water to the outlet nozzles or elbows. By this means the water is discharged with greater force than through hollow arms and the full force of the discharged water is received by the buckets and by them imparted to the wheel, thus aiding in revolving the latter and rendering less primary power necessary.

The water discharged by wheel A can be stored in cylinder C, and under air-pressure therein can be forced therefrom and further utilized.

The advantages of my invention are apparent to those skilled in the art to which it appertains, and it will be specially observed that by the form of the wheel described the full centrifugal force of the water is obtained, and by reason of the nozzles or elbows the water is discharged with great force against the buckets, which are in close juxtaposition thereto, and hence the force of the discharged water is utilized in aiding in turning the hollow wheel.

I claim as my invention—

1. In a centrifugal pump, a hollow rotary wheel having discharge-openings adjacent to its periphery, nozzles or elbows fitted in said openings, and divergent guide-plates within said wheel extending from the center to near the periphery thereof and having angular branches inclosing said discharge-openings, substantially as set forth.

2. In a centrifugal pump, a hollow rotary wheel composed of upper and lower plates or disks connected together at their edges, said upper plate having openings therein, nozzles or elbows fitted in said openings and having their outer ends on a line with the periphery of the wheel, and the series of guide-plates located within the wheel and extended from the center to near the periphery thereof on one side of each of said openings and having each a right-angular branch extending over the other side of such opening, substantially as set forth.

3. In a centrifugal pump, a rotary wheel having its inlet at its center and its discharge

on a line with its periphery, said wheel being inclined upward from its center outward and made hollow and provided with a series of radial guides diverging from the center to its points of discharge for directing the flow of the water, said guides being provided with outer angular branches, substantially as set forth.

4. The combination of the hollow rotary wheel having a central inlet-opening, a depending cylindrical extension, discharge nozzles or elbows, radial guide-plates located in said wheel and extending from its center to said discharge nozzles or elbows, the casing in which said cylindrical extension fits, having a central sleeve, and the shaft fitted in said sleeve and supporting said wheel, substantially as set forth.

5. In a centrifugal pump, a hollow rotary wheel having a lower cylindrical extension and a depending supporting-sleeve within said extension, discharge-nozzles secured in the top of said wheel adjacent the periphery thereof, a casing in which the cylindrical extension of said wheel fits, a rotary shaft extended through said central sleeve, the series of buckets surrounding said wheel, the ring carrying the same supported by said shaft, and the arms connected to said ring and also to said shaft, substantially as set forth.

6. In a centrifugal pump, a hollow rotary wheel having a lower cylindrical extension and a depending supporting-sleeve within said extension, discharge-nozzles secured in the top of said wheel adjacent the periphery thereof, a casing having a sleeve therein in which said central sleeve fits, a rotary shaft extended through said central sleeve, a bearing-box for the lower end of said central sleeve, the circular series of buckets surrounding said wheel, a ring carrying the same, a hub keyed on said shaft, and arms connected to said hub and said ring, substantially as set forth.

7. In a centrifugal pump, a hollow rotary wheel having a lower cylindrical extension and a depending supporting-sleeve within said extension, discharge-nozzles secured in the top of said wheel adjacent the periphery thereof, a casing in which the cylindrical extension of said wheel fits, a rotary shaft extended through said central sleeve, the circular series of buckets each of which is of approximately V shape open at their wide ends and having extensions on one side, the ring carrying the same supported by said shaft, and the arms connected to said ring and also to said shaft, substantially as set forth.

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

CHARLES MCINTYRE.

Witnesses:

HUGH CONWAY WALKER,
JAMES MACDONALD.