

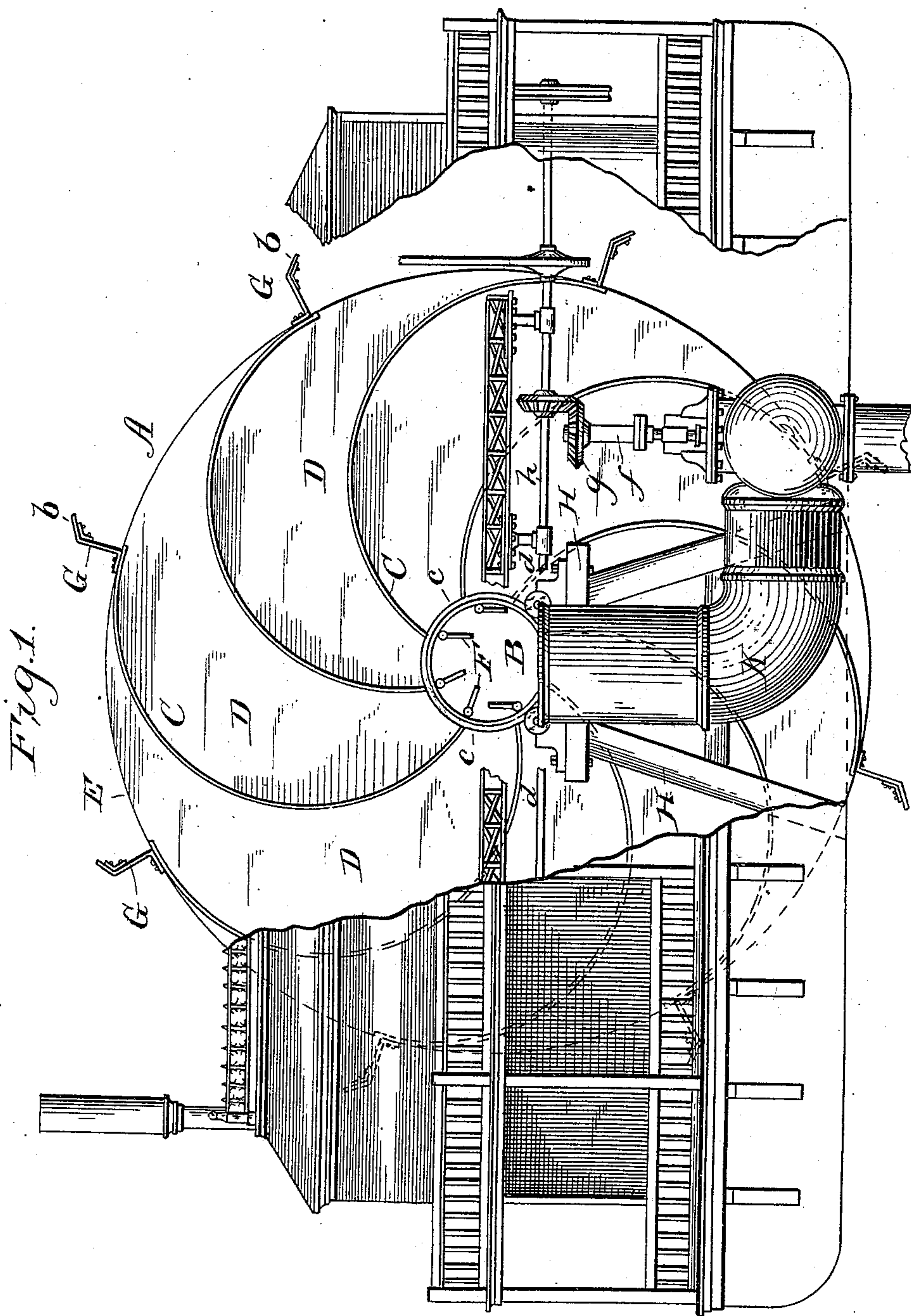
(No Model.)

2 Sheets—Sheet 1.

H. C. GARDNER.
CURRENT WHEEL.

No. 485,624.

Patented Nov. 8. 1892.



WITNESSES

W. E. Bowen
J. F. Beale.

INVENTOR

Henry C. Gardner,
by W. A. Redmond, Attorney

(No Model.)

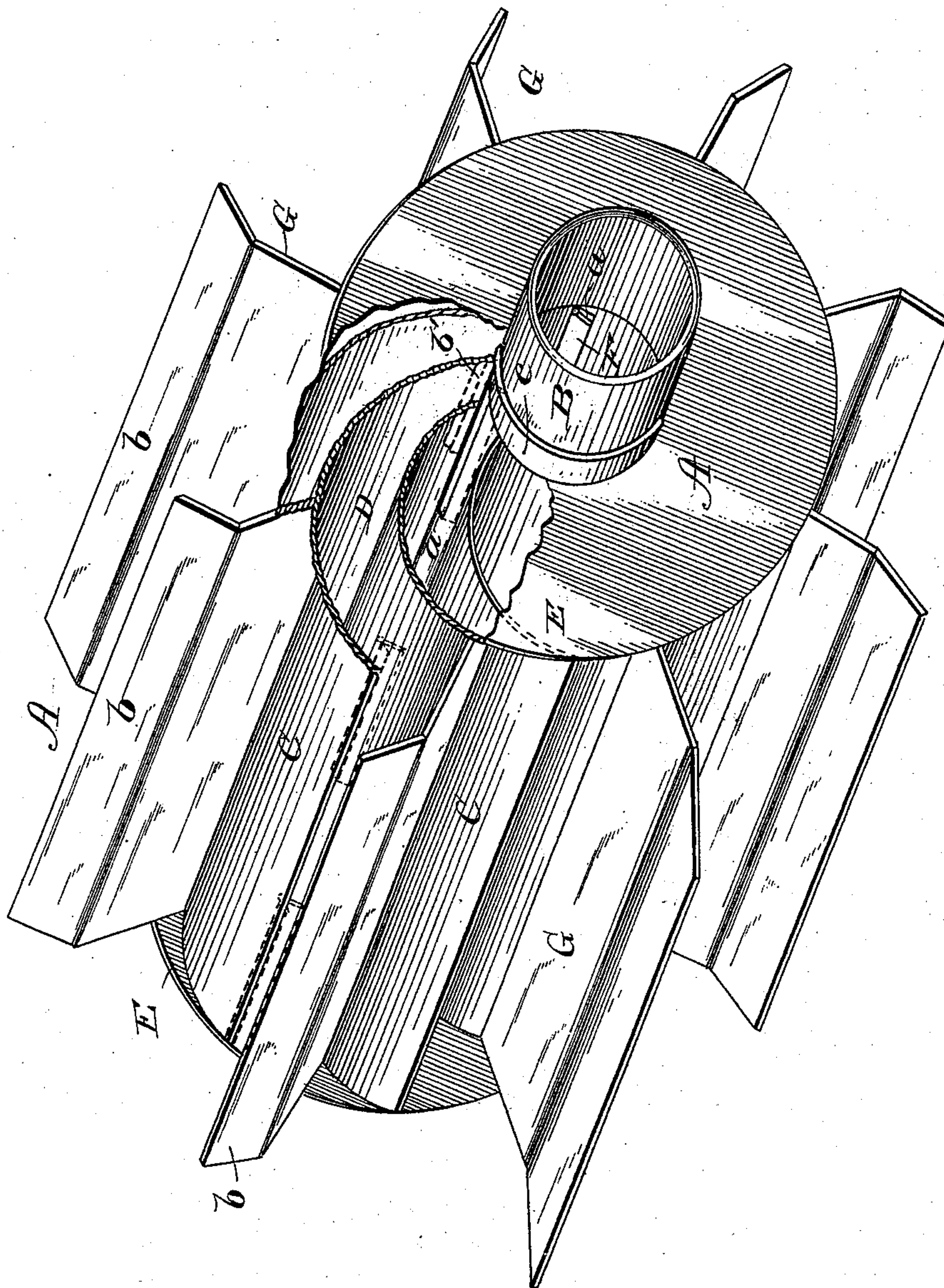
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Fig. 2.



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UNITED STATES PATENT OFFICE.

HENRY C. GARDNER, OF NASHVILLE, TENNESSEE.

CURRENT-WHEEL.

SPECIFICATION forming part of Letters Patent No. 485,624, dated November 8, 1892.

Application filed October 14, 1891. Serial No. 408,673. (No model.)

To all whom it may concern:

Be it known that I, HENRY C. GARDNER, a citizen of the United States, residing at Nashville, in the county of Davidson and State of Tennessee, have invented certain new and useful Improvements in Current-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.

This invention relates generally to water-powers, and particularly to an apparatus for utilizing the waters of a stream or river without damming the same, and by the force of the current of such stream raising water from the stream to a height sufficient to drive any desired water-motor; and it has for its object to provide a wheel of great capacity, of simple and durable construction, and to regulate the discharge of water therefrom automatically; and it consists of the parts and combinations of parts hereinafter described and claimed.

In the accompanying drawings, forming a part of this specification, Figure 1 is a side elevation of a barge, partly broken away, showing my invention thereon; and Fig. 2, a perspective view of my improved wheel.

Similar letters refer to similar parts in both views.

In carrying out my invention I preferably provide two barges, which are secured together alongside each other at a suitable distance apart, and centrally between said barges I mount or journal my improved scoop-wheel A. This wheel consists of a central cylindrical tubular axle B, from which radiate in curved lines the partitions C, which are arranged at equal distances apart, the convex side of one partition and the concave side of the adjacent partition forming between them the scoops or chambers D, the end walls of which are formed by disks E, fitting about the axle and closely against the ends of said partitions in order to form water-tight joints. Centrally between each pair of partitions at the point where they join the axle, I form the peripheral openings or elongated slots *a* in said axle, the number of which being a matter of convenience or as found desirable or necessary.

F represents flap or gravity valves pivot-

ally attached to the edges of the slots *a* on the interior of the axle, and adapted as said axle is rotated to alternately cover and uncover the slots, each slot being once closed or covered and once uncovered or unclosed at each revolution of the axle, said valves opening on the upward movement of the wheel and closing on the downward movement of the same, thus preventing the escape of the water into the compartments on the lower side of the wheel during its revolutions and causing the same to flow out at the end of the axle or shaft.

On the outer or convex sides of the partitions, at a point near their edges, I attach, in any suitable manner, the floats or paddles G, said paddles being preferably formed with a rearwardly-extending angular portion *b*, thus adapting said paddles to enter the water with the least resistance and to afford greater surface for the water to act upon when the paddles have once entered the water. The axle is of greater length than the partitions and has formed or secured thereon adjacent the outer sides of the disks at each end a flange *c*, the purpose of which will be hereinafter described. The wheel described may be built of wood or metal, as desired, wood being preferred, owing to its greater lightness of weight. When arranged in position on a stream or water-course, as hereinafter described, so that the ends or edges of the partitions will extend into the water for a depth of about six inches, according to the diameter of the wheel, (when at their greatest depth therein and with their convex sides upstream) it will be seen that the water will be scooped up into the chambers by the force of the stream, which, acting upon the paddles, propel the same and cause the wheel to rotate, thus raising at each revolution a given quantity of water and discharging the same through the slots *a* into the tubular axle, from whence it is conducted, through either end, to operate any motor desired, to furnish the power for operating machinery of any kind.

It may be found in practice that the forming of one long or numerous small slots or openings in the axle for each of the buckets will materially weaken the same and I have therefore designed to reduce the number of the slots in the axle by forming the axle solid

between every alternate bucket and forming in the partition, near or at its junction with the axle, a slot *b'*, as indicated in dotted lines, Fig. 2, whereby the quantity of water raised in such alternate buckets will empty into the adjacent bucket and be discharged therefrom through the discharge-openings formed in the axle for such bucket; also, if found desirable, I purpose hinging the paddles or floats to the partitions directly and against the direction of the current, gaining thereby a leverage equal to their weight to assist in carrying up the wheel when said paddles fall forward onto the wheel during its revolution and straightening out before or as they enter the stream; also, the paddles may be jointed—that is, the angular portion may be hinged to the main portion of the paddle if a stop or catch be arranged on the same to limit the distance it may open.

In Fig. 1 I show my improved wheel, with one end disk removed, arranged in position for operation between two barges, of which only a portion of one barge, in side elevation, is shown. As here arranged the barges are supposed to be anchored in the current of the stream and the wheel supported on the frame *H*, secured to and projecting upwardly from the bottom of the barge through the medium of friction-wheels *d*, said wheels being arranged so as to have their bearing directly on the axle at a point outside of and adjacent the flange *c*, whereby endwise or longitudinal movement of the axle and wheel is prevented.

K represents a vertical tube of supply of a diameter sufficient to receive the discharge of water from the tubular axle, arranged at the end or both ends, if desired, of the axle and being bent horizontally at its lower portion, and leads into a box or casing surrounding a turbine wheel of any desired or well-known construction, the vertical shaft *f* of which carries at its upper end a bevel-wheel *g*, meshing with a similar wheel arranged on a line-shaft *h*, which is supported from the ceiling or flooring of the upper deck of the barge, as clearly shown. From pulleys on this shaft the power may be transmitted to any machinery it is desired to operate, either on board the barge or on the banks of the stream, by belts. It is also my purpose to apply my improved wheel, if I desire so to do, to the forward part or bow of a barge or scow or other vessels which are towed or pushed through the water in order to scoop out or remove from the path of the barge or scow a certain quantity of water and discharge the same at each end of the wheel, thereby lessening the resistance to and rais-

ing the forward end of the vessel partly out of the water.

While I have described my wheel as arranged between two barges or other floating platforms, I do not desire to be restricted to such arrangement, as it is evident I may place the same on a single barge either above an auxiliary bottom open at both ends for the passage of the water therethrough or arrange the same to extend through an opening formed in the bottom of the barge; nor do I desire to be restricted to a floating or movable platform, as it is evident the framework and platform may be permanently secured in the stream, if desired, although when used on streams subject to the ebb and flow of the tide it is better to have the same capable of rising and falling therewith.

In case of repairs, or it is desired for any purpose to stop the rotation of the wheel, I provide a sliding or hinged valve or door adapted to be let down at either side of the wheel—that is, in front or in rear of the same—to a distance the depth at which the wheel extends into the water, and thereby stopping or checking the current immediately in front or in rear of the wheel and stopping the revolution of the latter.

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

1. A current-wheel divided into a series of compartments, a hollow axle or shaft communicating with said compartments, and automatic valves to alternately open and close communication during the operation of the said wheel, substantially as described.

2. A scoop-wheel divided into a series of compartments adapted to discharge into the axle of the wheel, automatic flap-valves for preventing the return of the water to said compartments, and paddles through which the wheel is propelled, substantially as described.

3. A current-wheel comprising a hollow cylindrical axle or shaft formed with peripheral openings, curved partitions radiating from said axle or shaft, disks forming the ends of said wheel, and valves acting automatically to open and close each of said peripheral openings once during each revolution of the wheel, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

HENRY C. GARDNER.

Witnesses:

J. F. BEALE,
W. E. BOWEN.