

Wells & Douglass,

Water Wheel,

N^o 23,207.

Patented Mar. 8, 1859.

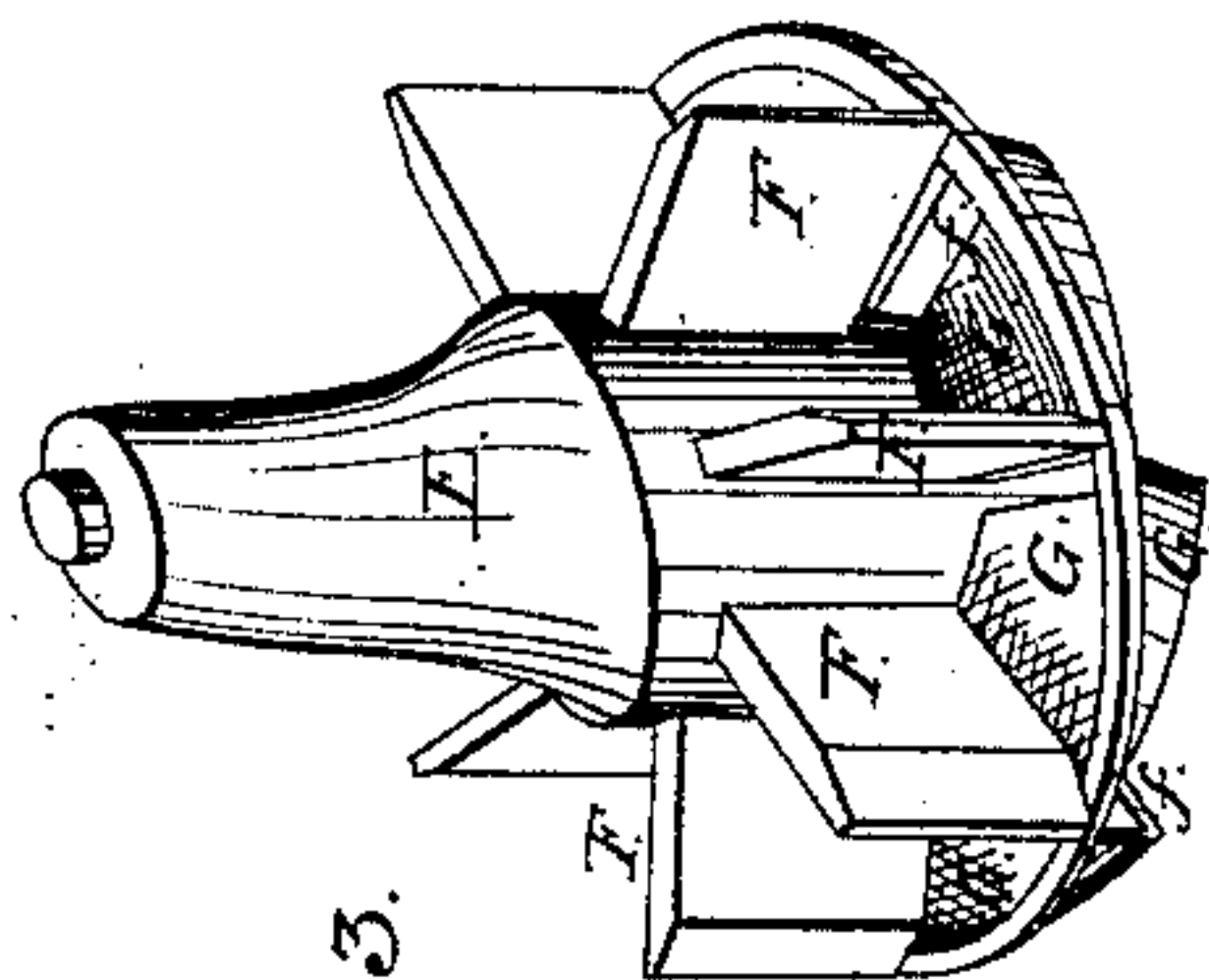


Fig. 3.

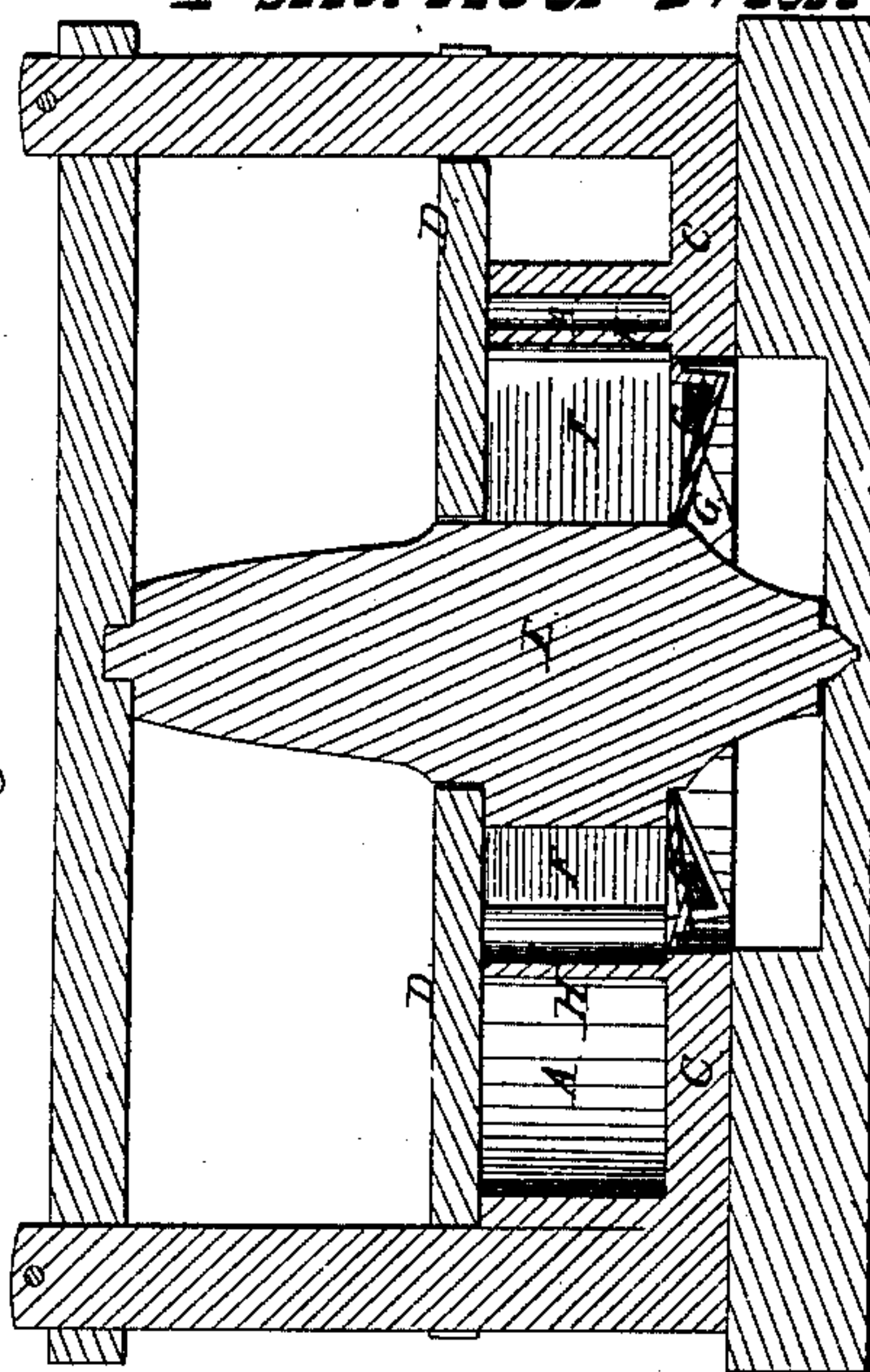


Fig. 2.

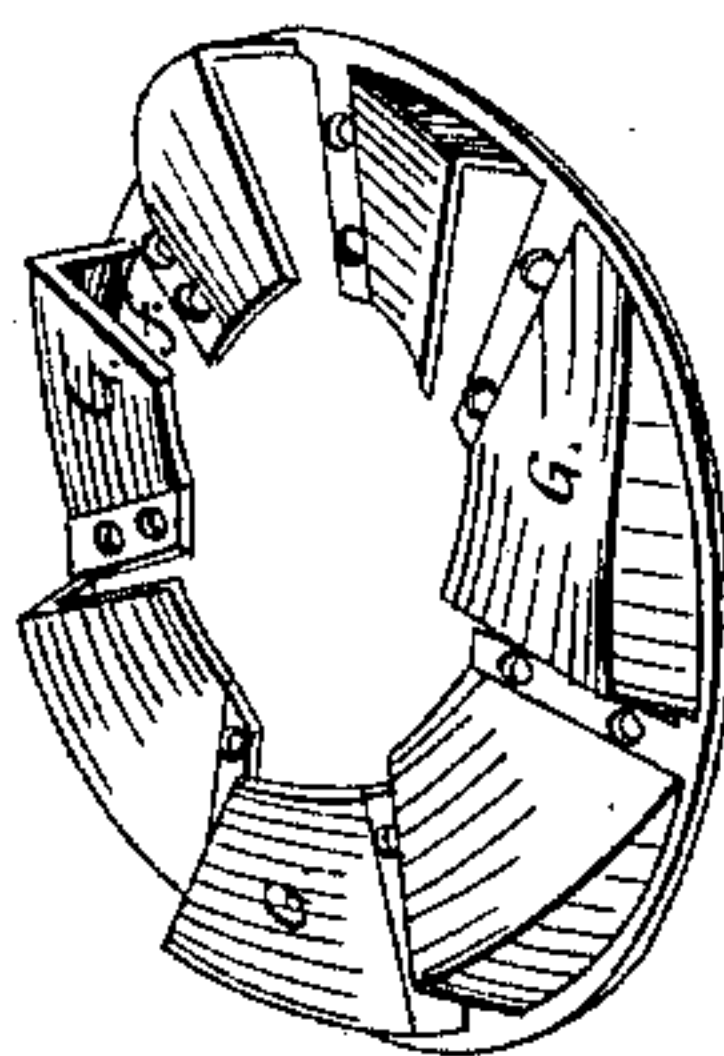


Fig. 4.

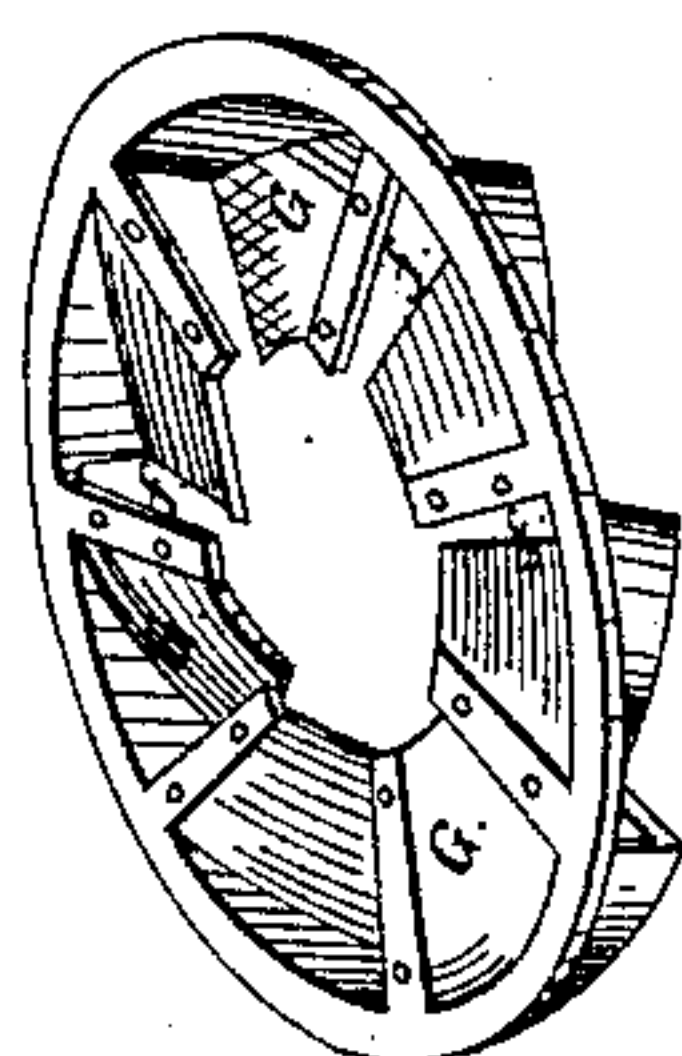
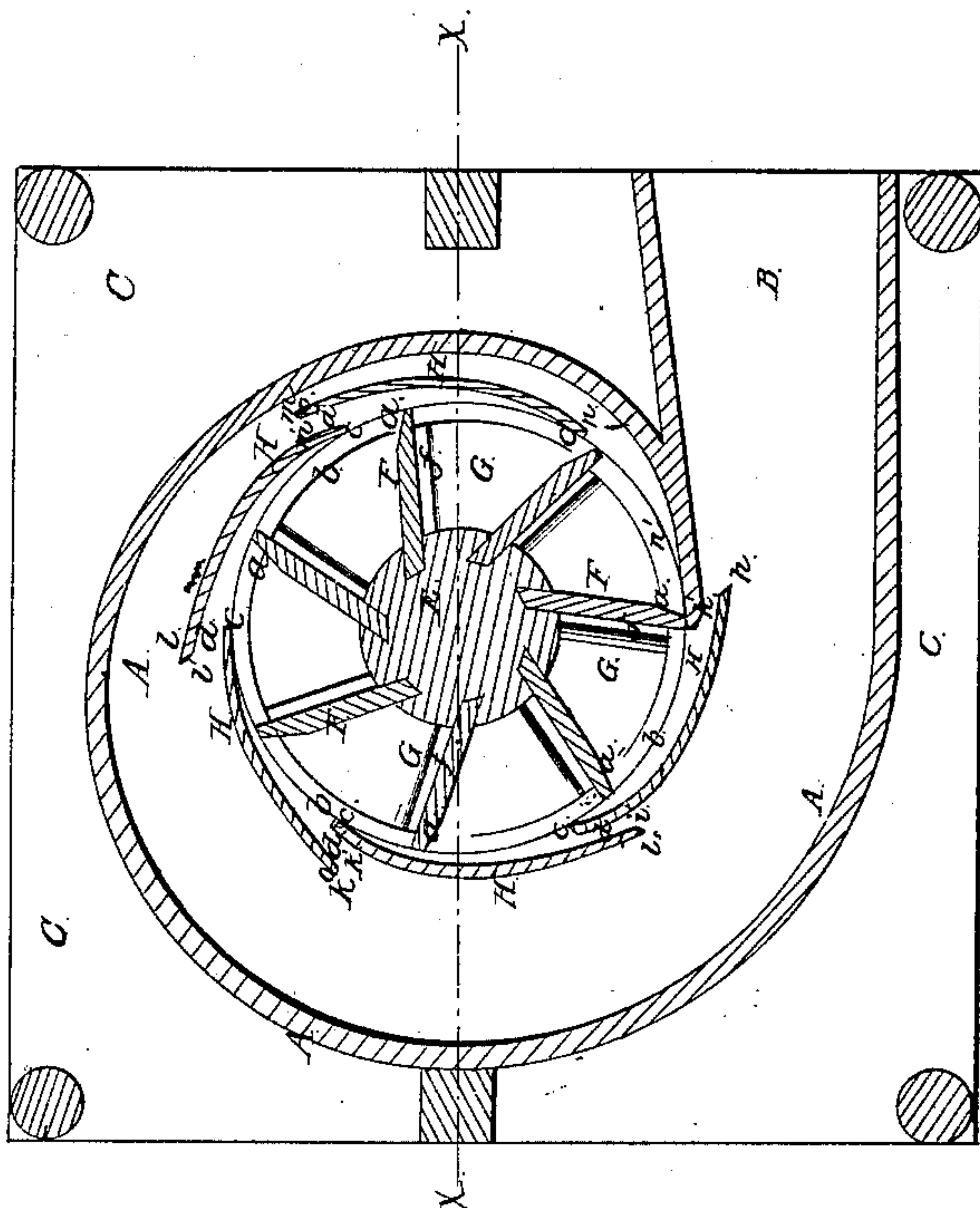


Fig. 1.



UNITED STATES PATENT OFFICE.

CHARLES WELLS AND WILLIAM DOUGLASS, OF MONROETON, PENNSYLVANIA.

IMPROVEMENT IN WATER-WHEELS.

Specification forming part of Letters Patent No. 23,207, dated March 8, 1859.

To all whom it may concern:

Be it known that we, CHARLES WELLS, of Monroeton, county of Bradford, in the State of Pennsylvania, and WILLIAM DOUGLASS, of county and State aforesaid, have invented a new and useful Improvement in Water-Wheels; and we do hereby declare that the following is a full and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon.

The nature of our invention consists in the peculiar construction of the buckets and arrangement therewith of a series of scrolls, as will be hereinafter fully described.

To enable those skilled to make and use our improvement, we will proceed to describe its construction and operation.

In the accompanying drawings, Figure 1 represents a horizontal section of our improved water-wheel. Fig. 2 represents a vertical section on the line $x x$, Fig. 1. Fig. 3 represents a perspective view of the wheel and its shaft, and Fig. 4 represents detail perspective views of the lower buckets.

Similar letters denote the same parts in different views.

A represents the curb or case into which the head of water is admitted through the chute B.

C is the base of the case, and D is the cover which comes down close onto the top of the curb A.

E is the shaft of the wheel; F, the vertical vanes or buckets, and G the lower or reacting buckets.

H are a series of scrolls or plates which are arranged in arcs of circles around the wheel, as clearly illustrated at Fig. 1, and which are in height equal to the curb A.

As our improvement relates to the wheel and parts operating in direct connection therewith, we shall omit a description of the external arrangements.

The vertical buckets F, it will be seen, lie in planes radiating from the shaft E, and have their active surfaces slightly beveled off at the outward extremity, as shown at a . The scrolls H are arranged in arcs of circles concentric to the circle in which the periphery of the wheel lies, one extremity c of the curve in which said scroll lies being in contact with the circle $b b b$, (in which the wheel lies,) and said curve diverging toward the opposite end

from said circle, so as to leave a space between itself and the circle $b b b$ sufficient for the end of the next scroll to run in and leave a passage d for the entrance of the water. The lower buckets G are inclined downward from the bottom of one vertical bucket to some distance below the bottom of the next vertical bucket, so as to form an outlet for the water at f , and said lower bucket G also has its bottom inclined from the shaft E downward toward the periphery of the wheel, so that their lowest point is immediately below the extremity of the under edge of the vertical bucket H. This peculiarity of form in the lower bucket is intended to cause the water to react on it, causing the wheel to revolve by its (the water's) weight as it descends the inclined bottom of said bucket, running backward, and at the same time toward the periphery of the wheel when it discharges. The opening or discharge space of each lower bucket G is intended to be about double the capacity of each entrance-space d ; but since there is one more bucket G than spaces d the total exit capacity is a little more than double the entrance. This ratio we have adopted for an eight-foot head and would be varied under other circumstances.

The operation of our improved wheel is as follows, viz: The head of water being let on through the chute B flows round in the case or between the curb A and the scrolls H, and is divided in numerous jets, which are projected, respectively, through the different passages formed by the scrolls, the first division of the stream being made at the point h , where a jet is cut off and passes through the opening h' . The next is made at i , a second jet passing in through i' , the third at k , passing in at k' , the fourth at l , passing in at l' , the fifth at m , passing in through m' , and the sixth at n , passing through at n' between the extremity of the scroll H and the inner surface of the curb A. It will be observed that by this arrangement of the scrolls H in the case the head of water is at each successive step in its advance divided, so that before it reaches its final exit it has been cut up into a series of jets, and that this result is accomplished in such a manner as to avoid any loss of power by the conflicting of different currents, existence of obstructions, or friction, creative-surfaces or angles. The end of each scroll where the water is cut is chamfered off, as at o . As each jet or head passes

in through its respective passage or entrance between the scrolls H, it strikes the vertical bucket F, upon which it acts directly, and after spending its momentum upon said vertical bucket the body of water descends into the lower bucket G, upon which a reaction is produced by the weight of the column of water, which acts on the double inclination of said lower bucket in an increasing proportion until it discharges itself at the bottom of the periphery of the wheel. It will be observed that by the construction of the wheel as described the greatest possible effect is produced by a given head of water, since the column first spends its momentum on the vertical buckets and then operates reactingly by its inertia or weight on the lower buckets. It will also be seen that by the arrangement of the scrolls H in arcs of circles as described the column is effectually divided, so as to produce the best possible effect in the wheel without producing any conflict between the different currents which act independently upon the buckets of the wheel.

We are aware that water-wheels have been constructed with several chutes to admit the water at several different points on the wheel,

but do not consider such devices at all similar to ours, since in them the currents conflict and the power is lost.

We are also aware that wheels have been made with vertical and horizontal buckets, but do not consider such wheels similar to ours, since the buckets do not enhance the peculiarities formed in ours, on which we depend for a portion of the advantage derived in our improvement.

Having described the construction and operation of our improved water-wheel, what we claim, and desire to secure by Letters Patent, is—

The combination of the scrolls H, vertical buckets F, and lower buckets G, the whole constructed and arranged as described, for the purpose set forth.

In testimony whereof we have hereunto set our hands and seals this 9th day of August, 1858.

CHARLES WELLS. [L. S.]
WILLIAM DOUGLASS. [L. S.]

Witnesses:

THEO. W. SHEPPARD,
JOSEPH HOMET.