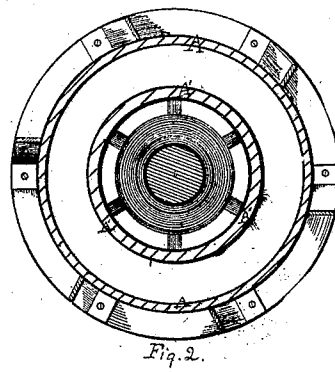
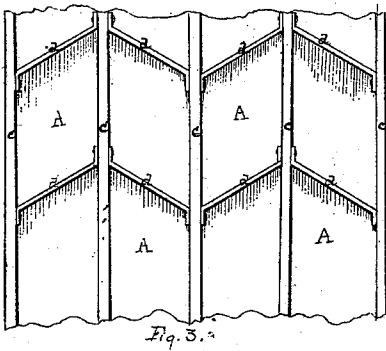
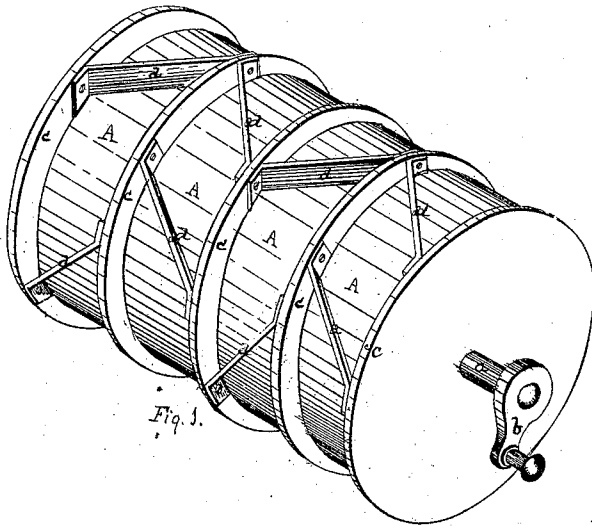


J. REES.
PADDLE WHEEL.

No. 106,620.

Patented Aug. 23, 1870.



Witnesses
R. C. Gresham
Thos. B. Keck

Inventor

United States Patent Office.

JAMES REES, OF PITTSBURG, PENNSYLVANIA.

Letters Patent No. 106,620, dated August 23, 1870.

IMPROVEMENT IN PADDLE-WHEELS.

The Schedule referred to in these Letters Patent and making part of the same

To all whom it may concern:

Be it known that I, JAMES REES, of the city of Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Steamboat Driving-Wheels; and I do hereby declare the following to be a full, clear, and exact description thereof, reference being had to the accompanying drawing making a part of this specification, in which—

Figure 1 is a perspective view of my improved wheel;

Figure 2 is a vertical section thereof, as formed by a plane passing through the wheel at right angles to its axle; and

Figure 3 is a plan view of a section of its outer face.

Like letters of reference indicate like parts in each.

My invention relates to the construction of a driving-wheel for steam-boats and other like water-craft, in which the buckets are arranged on the outside of a close barrel or cylinder, angularly to the axis of the wheel, between flanges which project from and extend around the periphery of the wheel, each in a plane at right angles to its axis.

To enable others skilled in the art to make and use my improvement, I will proceed to describe its construction and mode of operation, and how it is distinguishable from other steam-boat driving-wheels.

The wheel as shown is fitted up as designed for use on a stern-wheel boat, though with such changes as are well known in the art, it may equally as well be used as a side wheel.

The main shaft *a* and crank *b* are of the usual or any known construction.

From this shaft *a* any suitable frame-work extends out to and supports the outer barrel or cylinder *A* and the other operative parts of the wheel. This outer barrel is made of wood, such as flooring-boards, planks, &c., or of boiler-plate iron, so as to form a still or cylinder practically water-tight. The ends of the wheel may be closed entirely from outer shell to shaft in the same way, as in fig. 1, or a second cylinder, *A'*, fig. 2, may be made inside the first, and at a distance from the outer shell about equal or a little greater than equal to the depth in the water at which the wheel is designed to operate, and only the space between the two at their ends be closed, if so preferred. Other things being equal, the latter construction will give the stronger wheel.

Extending around the periphery of the wheel is a series of outwardly-projecting flanges, *c*, say from four inches in depth upward according to the size of the wheel and the amount of power required, and arranged from one to three feet apart, more or less, though, in these respects, I do not limit myself to any particular dimensions.

If the wheel is made of wood, these flanges may

consist of heavy substantial ribs, sawed or cut out in any of the ways known in ship or boat-building, and they may be attached to the outer shell, or the shell built onto them, as may be preferred.

If the outer shell is made of boiler-plate, it may be made first as boilers, tanks, &c., are made, and the angle or T-iron riveted on to form the flanges, or the flanges may be first made wholly or in segments, of angle or T-iron, and the sheets of the shell riveted thereto.

Extending from one flange *c* to another *c*, over the face of the wheel angularly with the shaft *a*, and at any desired distance from each other, I attach a series of buckets *d*.

The inner edges of these buckets rest closely on the shell *A*, and the outer edges are about flush with the outside of the flanges *c*.

The angular arrangement of the buckets is that which I prefer.

By this construction of driving-wheel, that is, with close shell, flanges, and buckets angularly arranged, I am enabled to avoid all "back-lash," which, in the use of the ordinary open wheel, occasions a great loss of power, as well as a serious and useless strain on the machinery.

I also confine the water while the wheel is in operation as closely as it can be confined. The close barrel prevents its escaping over the top of the bucket, while its tendency to flow off along the inclined face of the bucket is checked by the flange opposite. Hence, the water can escape only by flowing under the lower or open face of the bucket, and even here, its tendency to escape is less than with the ordinary open wheel.

Under the bottom of a close wheel, made as described, not only is the water more closely confined, as above set forth, but also all the pressure of the water around and above it is more effective in preventing its escape.

The effect is the same as if the density of the water were increased at the point of operation; I thus save practically from twenty to thirty per cent. of the power, or, in other words, can get a correspondingly increased result in the propulsion of the boat with the same expenditure of power. Also, the wheel is equally efficacious in backing as in going ahead.

The object of making the wheel tight is to obviate the danger arising from logs, snags, cakes of ice, &c., getting into the wheel, and also to lessen liability to injury from freezing.

The barrel *A* should be, if not water-tight, at least so close as not to permit the inflow of any considerable amount of water, since thus the confining power of the buckets and flanges would be seriously lessened. Also, a considerable part of the weight of the wheel

is sustained by the water under it. Hence the weight of the wheel will tend less to weigh down the stern of the boat, and so increase its draught.

Hence, what I claim as my invention, and desire to secure by Letters Patent, is—

1. In combination with an outer shell, A, an inner shell, A', the distance between the shells being about equal to the depth in the water at which the wheel is designed to operate, the annular space between the shells being closed at the ends, substantially as described.

2. In combination with an outer close shell A, a series of flanges, c, two or more in number, with interposed buckets d, arranged angularly to the axis of the wheel, substantially set forth.

In testimony whereof, I, the said JAMES REES, have hereunto set my hand.

JAMES REES.

Witnesses:

A. S. NICHOLSON,
G. H. CHRISTY.