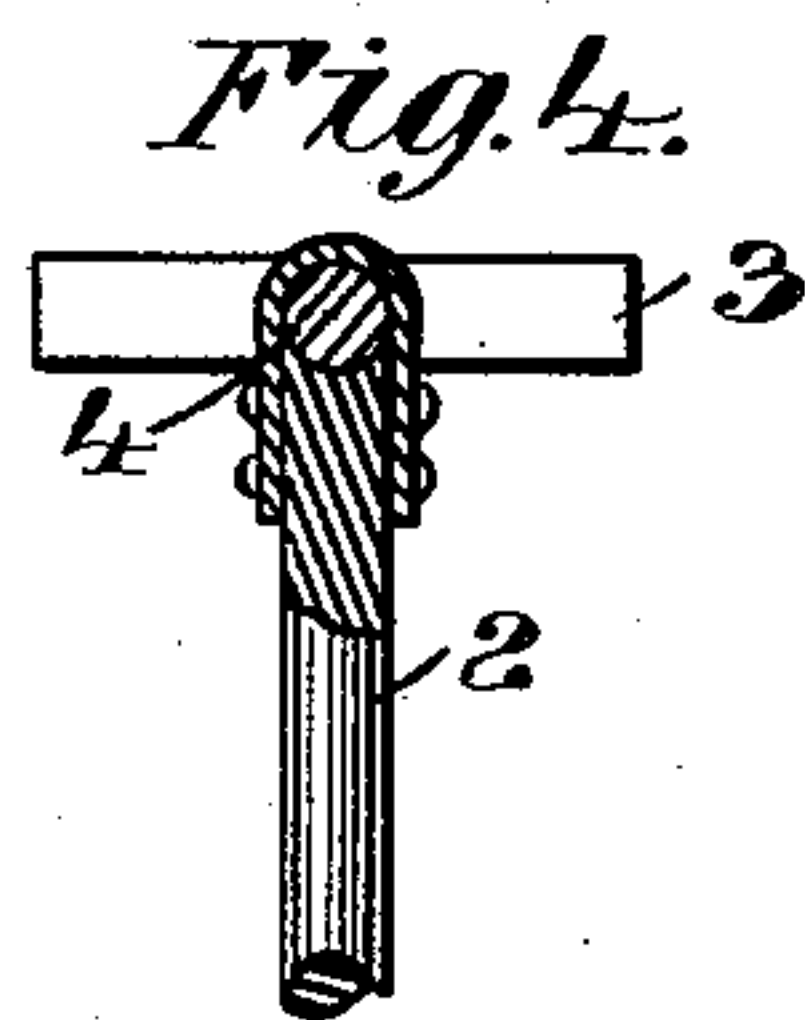
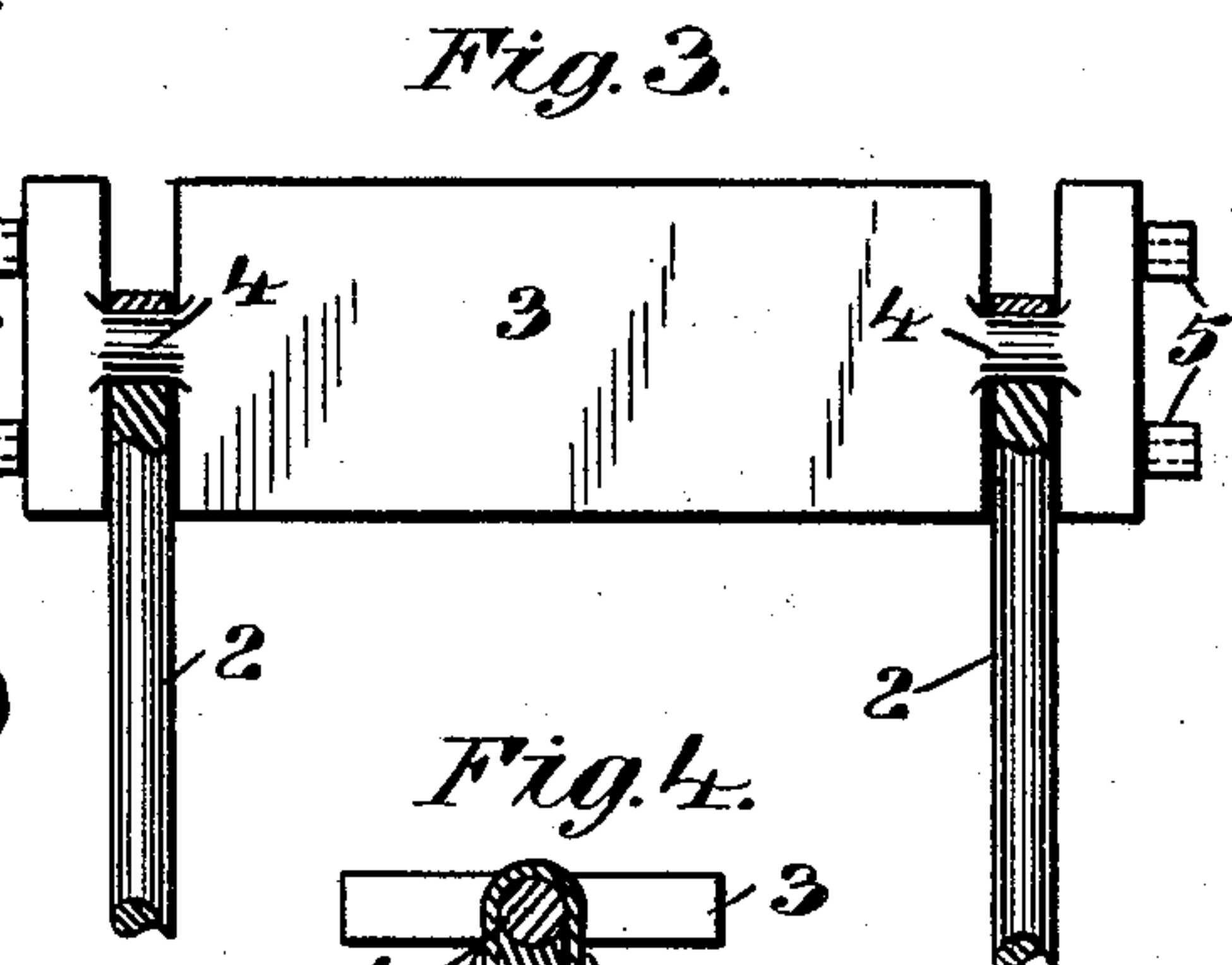
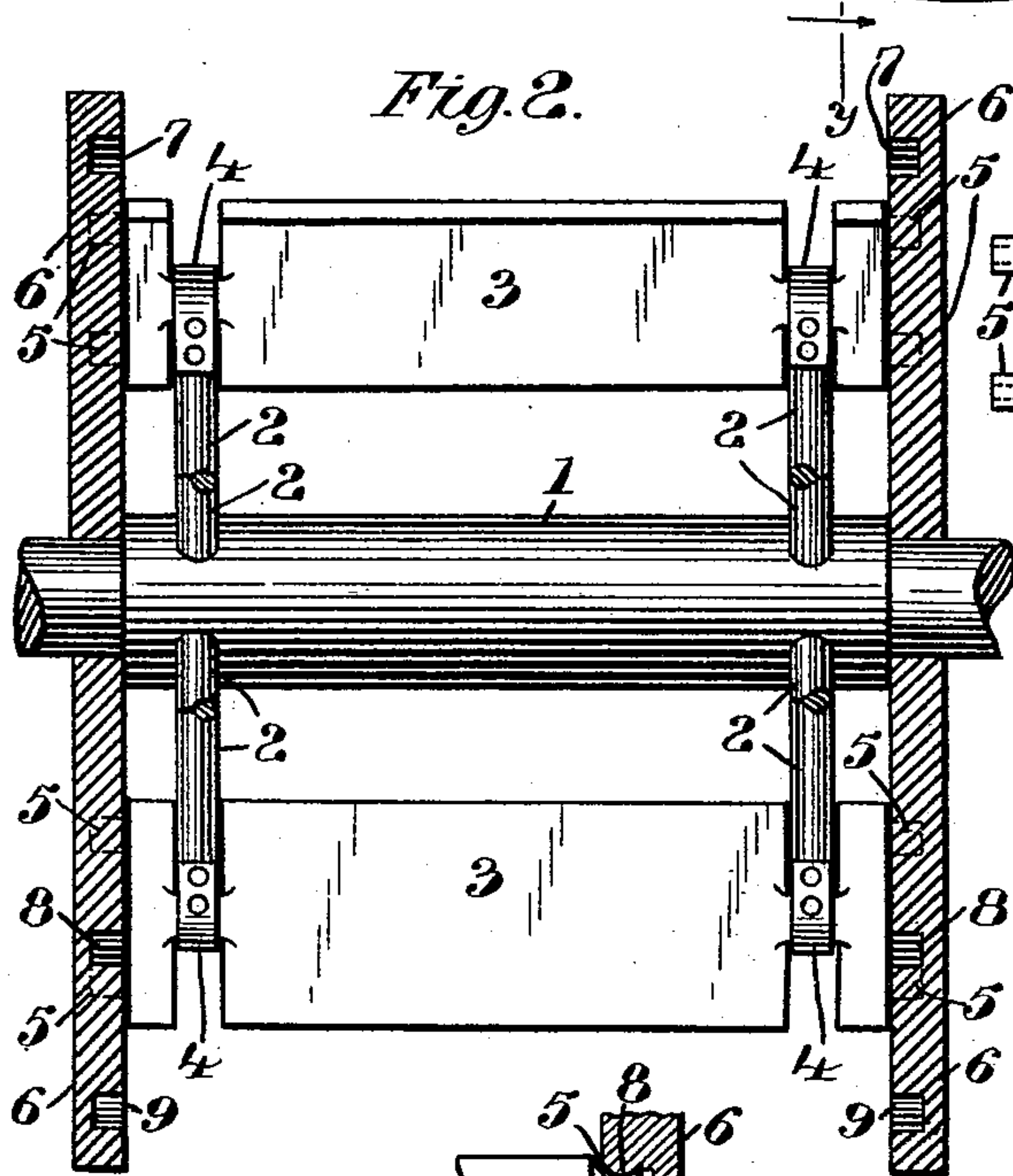
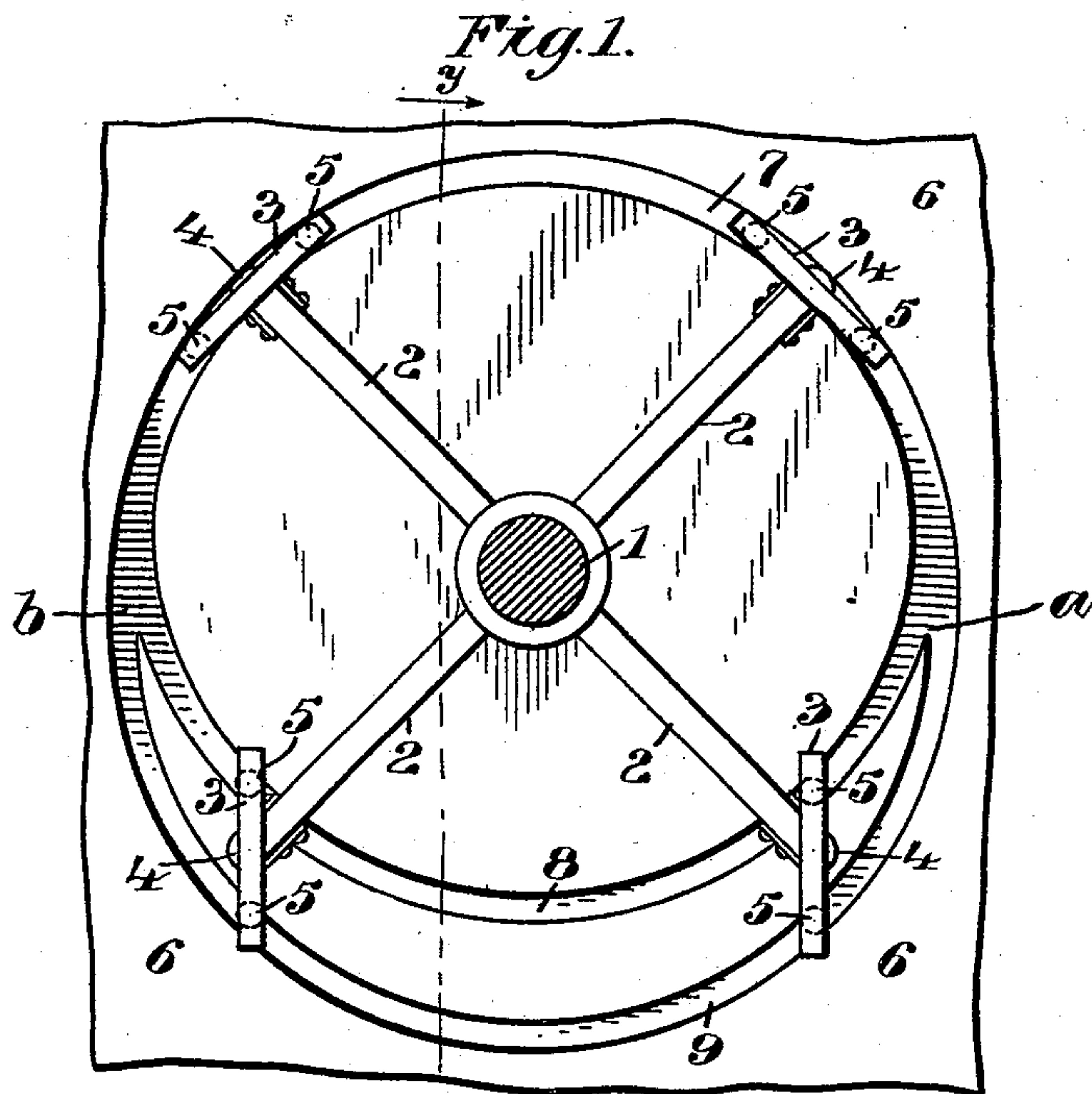


(No Model.)

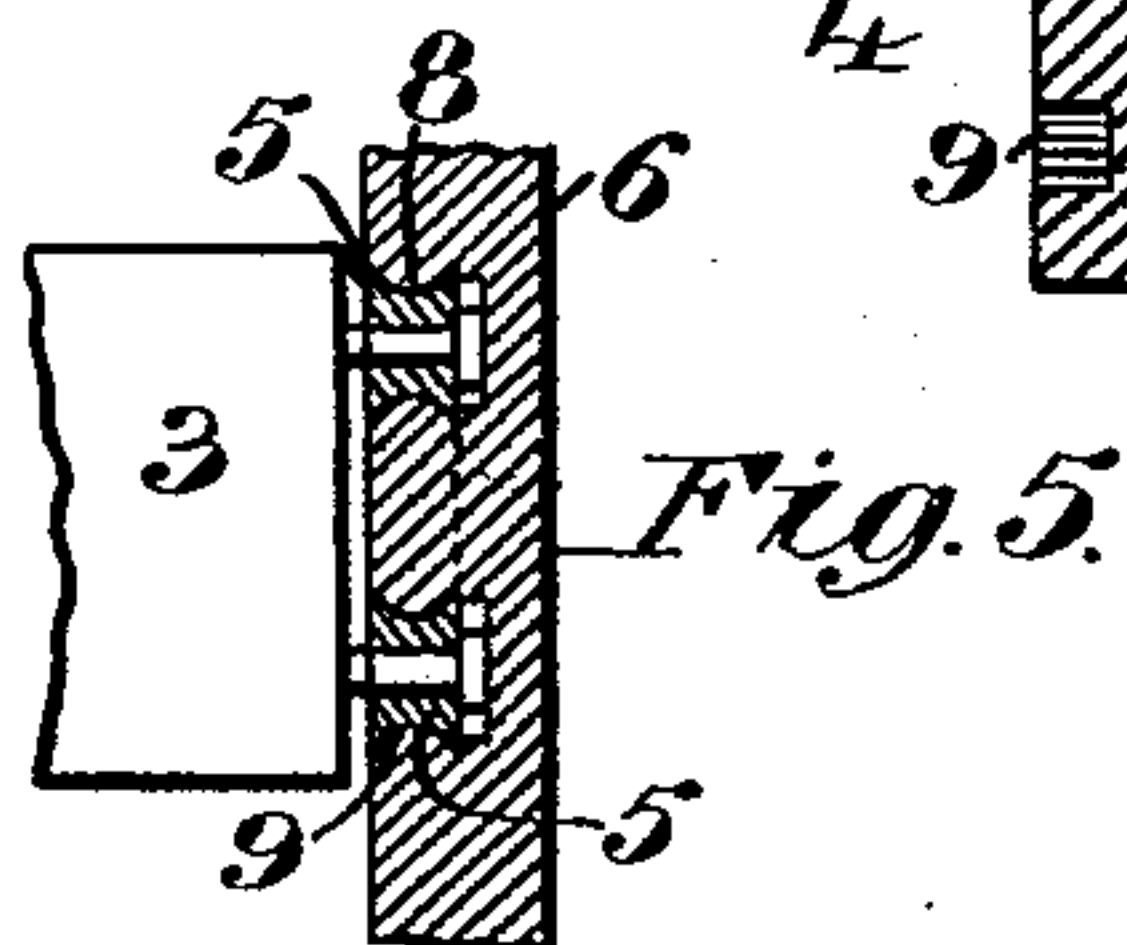
C. E. KEITH.
PADDLE WHEEL.

No. 454,652.

Patented June 23, 1891.



Witnesses
Wm. J. Danner
A. J. Tanner.



Inventor
Charles E. Keith
by his attorney
J. H. Hubbard.

UNITED STATES PATENT OFFICE.

CHARLES E. KEITH, OF BRIDGEPORT, CONNECTICUT.

PADDLE-WHEEL.

SPECIFICATION forming part of Letters Patent No. 454,652, dated June 23, 1891.

Application filed August 11, 1890. Serial No. 361,695. (No model.)

To all whom it may concern:

Be it known that I, CHARLES E. KEITH, a citizen of the United States, residing at Bridgeport, in the county of Fairfield and State of Connecticut, have invented certain new and useful Improvements in Paddle-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 to certain novel and useful improvements in paddle-wheels, and has for its object to furnish a device of this description which shall while passing through the water carry its blades at right angles to the surface of the latter, which shall feather its blades while passing through the air, in which the blades shall be completely rotative for the purpose of accomplishing their proper movements; and with these ends in view my invention consists in the construction and combination of elements hereinafter explained, and then recited in the claims.

In order that those skilled in the art to which my invention appertains may fully understand its construction and operation, I will describe the same in detail, reference being had to the accompanying drawings, which form a part of this specification, and in which—

Figure 1 is a section through the shaft of the wheel, showing the latter and the guide-plate in elevation. Fig. 2 is a section at the line *y y* of Fig. 1. Fig. 3 is a detail plan view of one of the buckets; Fig. 4, a detail section through one of the bucket-bearings; Fig. 5, a detail section showing a preferred construction of guide-rollers and a corresponding conformation of the grooves in which said rollers run.

Like numerals denote the same parts in all the figures.

1 represents the shaft from which project radial spokes 2.

3 are the buckets, each of which is provided with a cylindric journal 4 near each of its ends. These journals have a bearing upon the ends of the spokes 2 in such manner that the bucket is completely rotatable for the purposes presently explained. Upon each of its ends the bucket carries friction-rollers 5.

6 represents a guide-plate. There will, preferably, be one of these at each end of the wheel, but the device will operate with one only. The shaft 1 is journaled in said plates. Cut in the face of this plate is a guide-groove, which consists of an upper part 7, which is a simple semicircle struck from the shaft center, and two lower grooves 8 9, each of which is struck from a center, but neither of which is struck from the center of the shaft. The groove 8 is struck from a center which is one-half the distance between the rollers above the center of the shaft, and the groove 9 is struck from a center the same distance below it. The purpose of this is to make said grooves 8 and 9 bear such relation to each other that in passing through the lower half of its sweep each bucket will be held by them in a vertical plane throughout.

The operation of my invention is as follows: Throughout the upper half of its sweep the two rollers of each bucket run in the groove 7, one following the other, so that the edge only of the bucket is presented to the air. When the bucket arrives at *a*, its forward roll passes outside the point between the grooves 8 9, and this so tilts the bucket on its axis, by reason of the longer radius of 9, that the rear roll enters the groove 8. After the rolls have separated, one passing into the groove 8 and the other into the groove 9, the relation of said grooves is such that the bucket passes through the water in a plane vertical to the surface of the latter. The position of the buckets just after entering the water and just before leaving it is shown at Fig. 1. After the bucket is lifted past the point *b* it travels edgewise in the single groove, as heretofore explained. It will be observed that each bucket turns over on its own axis at each revolution. Hence the necessity for the form of journal-bearing shown. Furthermore, if the bucket be not completely rotative a switch of the form shown could not be employed.

I claim—

1. The combination, with the wheel, the buckets rotatable thereon and provided with projecting rolls or studs, of the guide-plate having a groove adapted to engage the bucket-rolls, whose upper half is single and is concentric with the wheel-shaft, said groove di-

vided at or near its horizontal center into two grooves, each the arc of a true circle having the same radius as the upper half of said groove, but one struck from a point 5 higher than the shaft center and the other from a point lower than the shaft center.

2. In a paddle-wheel, the combination, with the shaft, the spokes and the buckets having guide-rolls, substantially as described, of a 10 guide-plate having a continuous guide-groove therein adapted to hold and operate said rolls, the upper half of said groove being single,

and the lower portion of said groove divided into two grooves, having between them a crescent-shaped portion of the plate, the latter adapted to act as a switch, substantially 15 as described.

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

CHARLES E. KEITH.

Witnesses:

SHERMAN HARTWELL HUBBARD,
M. C. HINCHCLIFFE.