

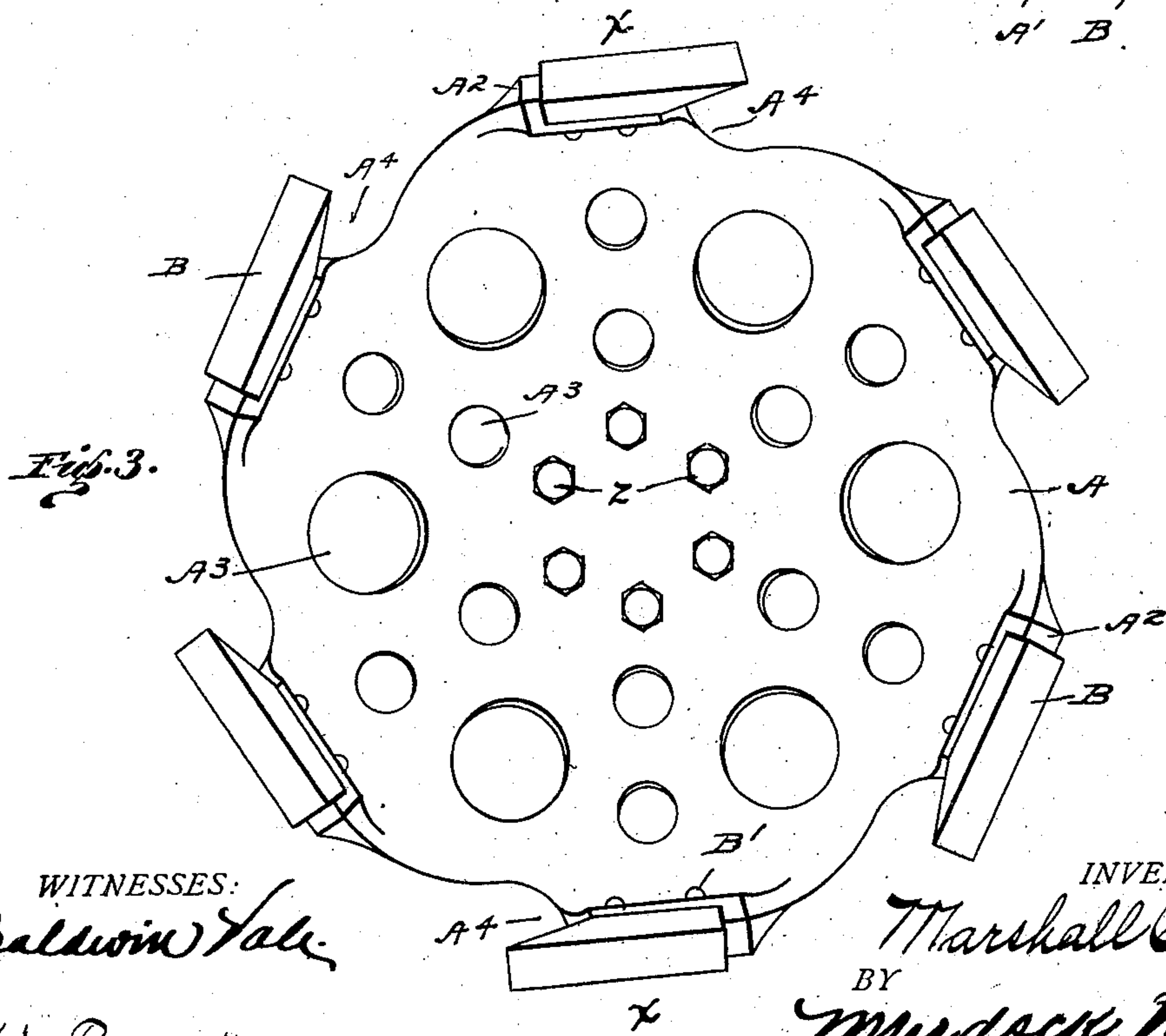
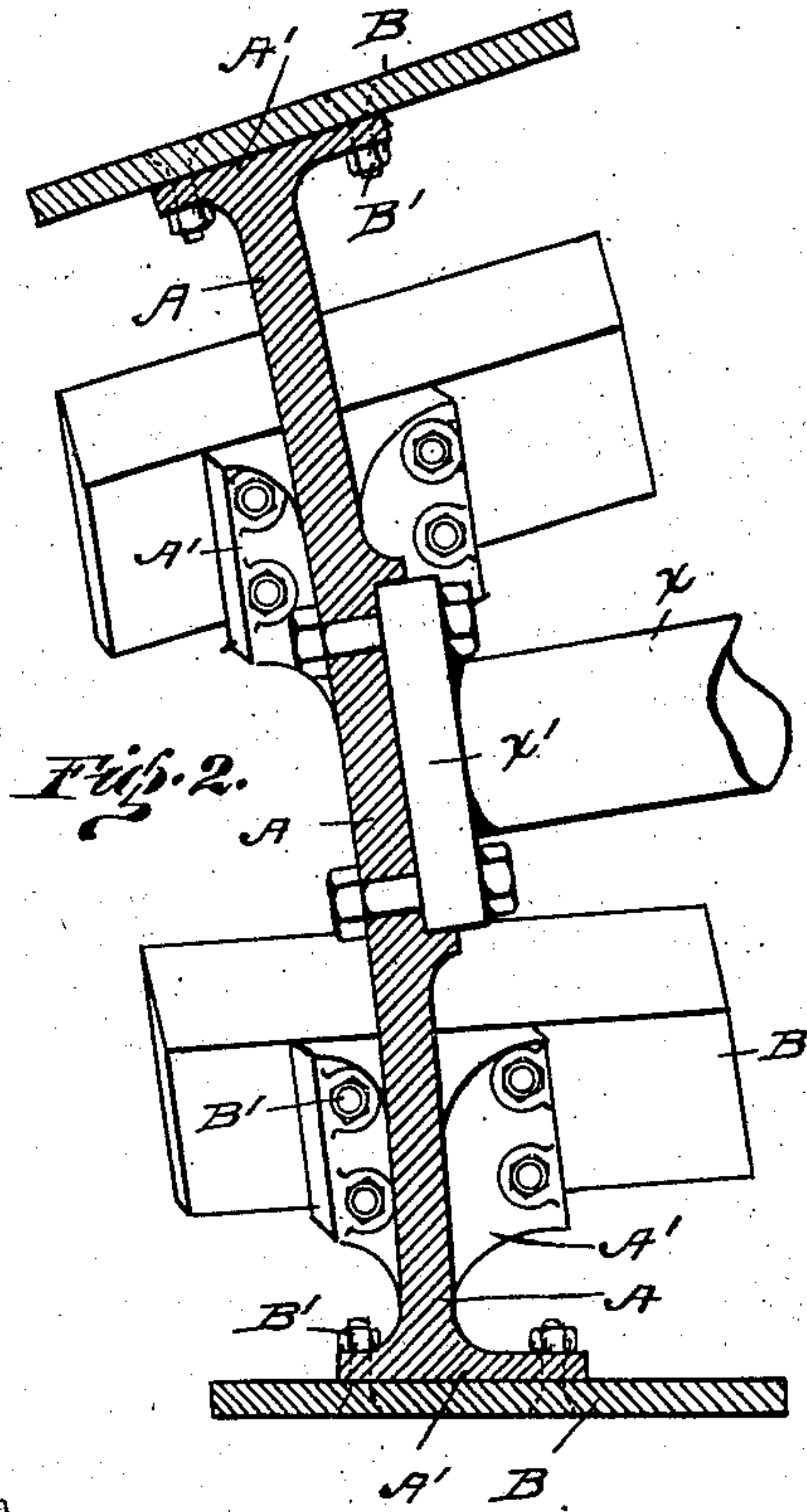
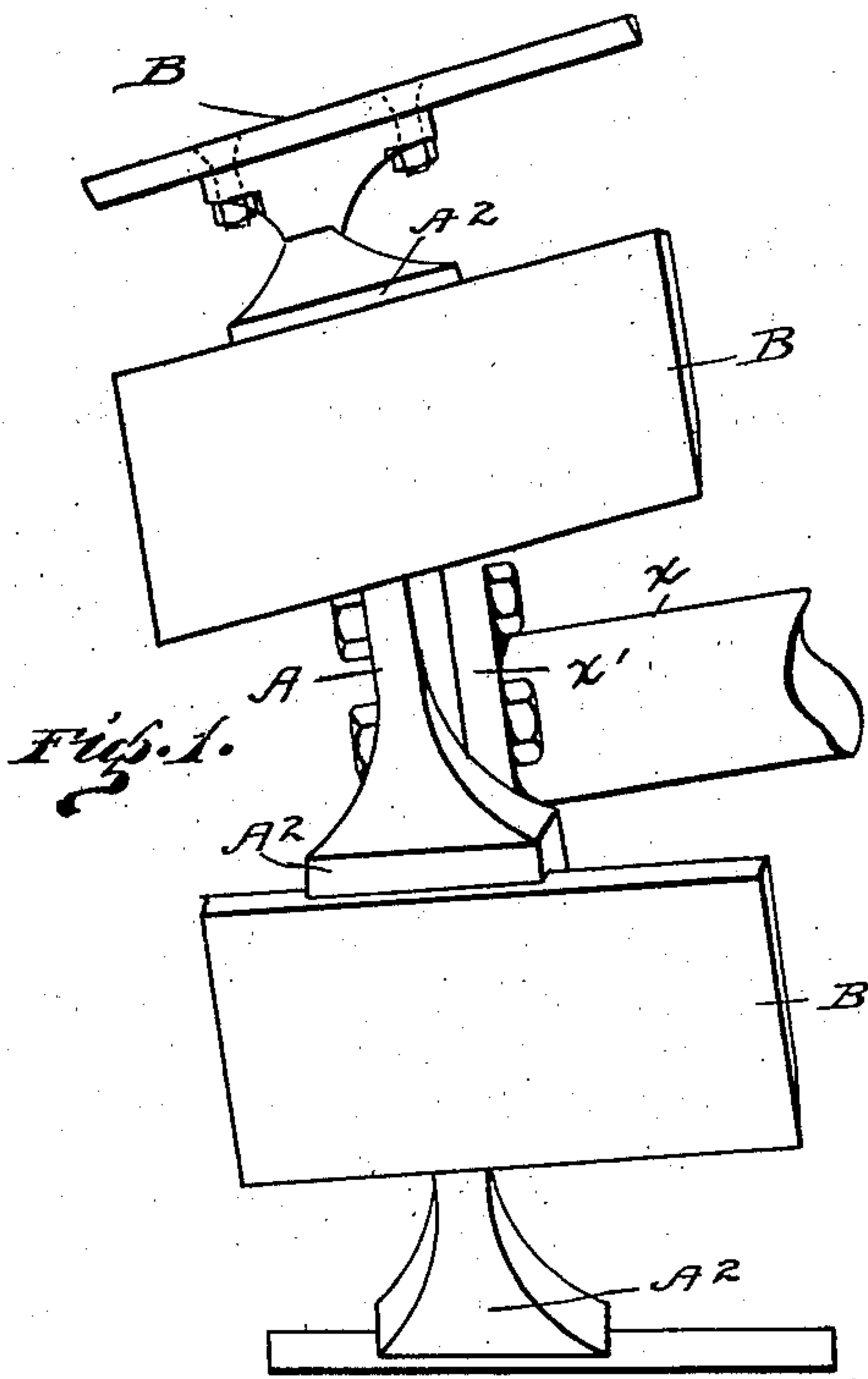
No. 744,703.

PATENTED NOV. 17, 1903.

M. C. HARRIS.  
CUTTER HEAD FOR SUCTION DREDGES.

APPLICATION FILED MAR. 30, 1903.

NO MODEL.



WITNESSES:

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## UNITED STATES PATENT OFFICE.

MARSHALL C. HARRIS, OF SAN FRANCISCO, CALIFORNIA.

## CUTTER-HEAD FOR SUCTION-DREDGERS.

SPECIFICATION forming part of Letters Patent No. 744,703, dated November 17, 1903.

Application filed March 30, 1903. Serial No. 150,295. (No model.)

*To all whom it may concern:*

Be it known that I, MARSHALL C. HARRIS, a citizen of the United States, residing at 1010 Fillmore street, in the city of San Francisco, county of San Francisco, and State of California, have invented certain new and useful Improvements in Cutter-Heads for Suction-Dredgers; and I do hereby declare the following to be a full, clear, and exact description of the said invention, such as will enable others skilled in the art to which it most nearly appertains to make, use, and practice the same.

This invention relates to improvements in hydraulic suction-dredgers, and particularly to the cutter-heads thereof; and it consists of the novel construction and arrangement of the parts.

Heretofore the cutter-knives have been mounted upon a skeleton framework or upon arms radiating from a hub fixed upon the driving-shaft and various modifications of these structures, all of which are subject to breakage, disalignment, and buckling. In obviating these disadvantages, which is the object of this invention, the construction consists, broadly, of a perforated disk of cast-steel slightly concave, dished on its face, and having seats for the knives formed upon its periphery, the plane of said seats being slightly tangential and converging forward toward the axis of the disk, the disk having an axial seat, into which the flanged head of the driving-shaft is fixed by bolts.

In the drawings, Figure 1 is a side elevation of a cutter-head constructed in accordance with this invention and set at the mean operative angle. Fig. 2 is a vertical cross-section of the same, taken on the line X X, Fig. 3. Fig. 3 is a front elevation of the same, taken on the axial center.

In detail the construction consists of the cast-steel disk A, having integrally formed on its periphery the seats A', in which the knives B are securely seated by the bolts B', countersunk in the knives and extending through the seat overhanging each side of the disk. The back or heel of the knife, seated in the angle of the plane of the seat and the back A<sup>2</sup>, transmits the strain of cutting along the periphery of the disk, and thence to the axis. By this construction the backs A<sup>2</sup> take the

strain off the bolts B', distribute the cutting strain throughout the entire cutter-head, in this manner bracing the operating-knives and holding them rigidly to their work.

The plane of the seats A' is set slightly tangential to give clearance to the heel of the knife and converges forward toward the axis to leave an approximately level floor after the cut. This plane of convergence is determined by the length of the driving-shaft and the depth to which the cutter is lowered, the median angle being given to the cutter-knives. To reduce internal strains in casting the disk, it is given the perforations A<sup>3</sup>. The dirt disturbed in front of the cutter-head escapes backward to the suction-pipe through the throats A<sup>4</sup> in front of the knives and also through the perforations A<sup>3</sup>.

The convex plane of the disk and the convergence of the knives give to the cutter-head the strength of an arc in withstanding the thrust of the barge from which it operates when disturbed by swells or other disturbance of the surface upon which it floats.

The method of attaching the disk to the shaft *x* by means of bolts *z* through the rim of the flange-head *x'* greatly facilitates the removal of the head. Where the cutter-head is attached in the usual way—that is, by extending the shaft through a hub—after submergence the two are apt to set with rust, making the removal of the head very tedious.

Having thus described this invention, what is claimed, and desired to be secured by Letters Patent, is—

1. A cutter-head consisting of a dished perforated disk having knife-seats integrally formed on its periphery, the plane of said seats being tangential to and converging toward the axis of the disk; and suitable knives fixed within said seats; and an axial seat on said disk to engage the flanged head on the driving-shaft.

2. A cutter-head consisting of a dished perforated disk, having knife-seats on its periphery, the plane of said seats being tangential to, and converging toward the axis of the disk; suitable knives fixed within said seats; and means for attaching said disk to a driving-shaft.

3. A cutter-head consisting of a perforated disk having angular knife-seats on its periph-

ery, suitable knives fixed within said seats; and means for fixing said disk on a driving-shaft.

4. A cutter-head for hydraulic dredgers of  
5 a disk having suitable knives on its periphery, and an axial seat into which the flanged head of the driving-shaft is adapted to be bolted.

5. A cutter-head consisting of a rotatable,

dished disk having knives affixed to its periphery.

In testimony whereof I have hereunto set my hand this 24th day of February, 1903.

MARSHALL C. HARRIS.

Witnesses:

BALDWIN VALE,  
V. BERKA.