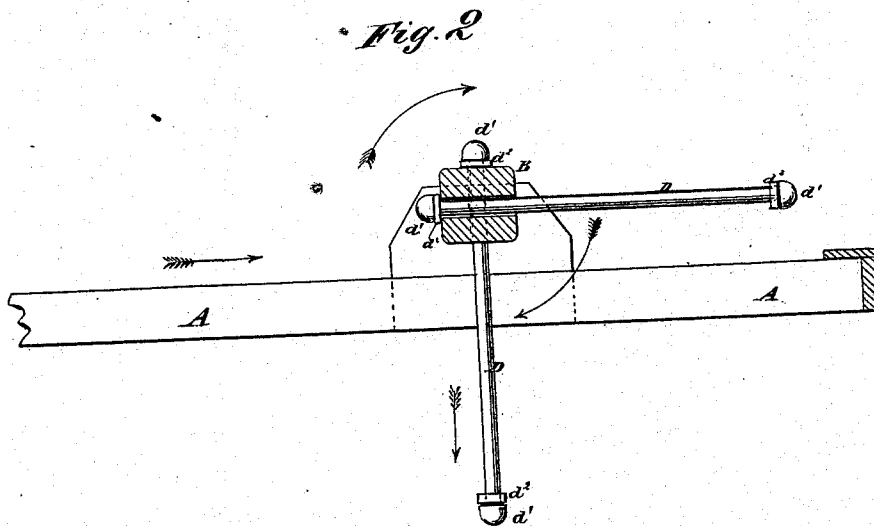
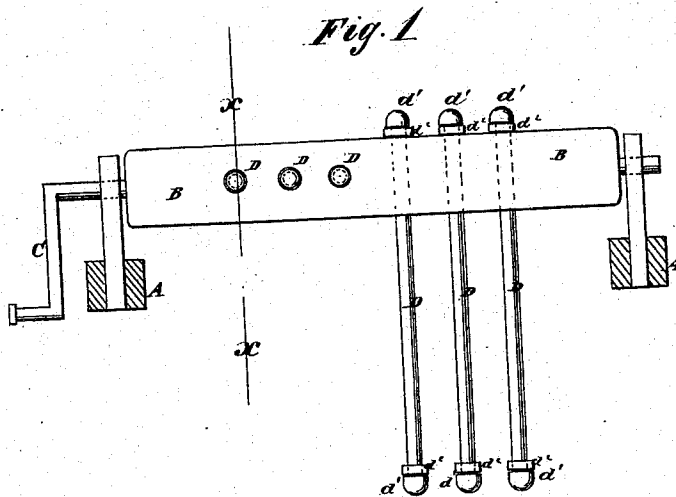


J. T. MARTIN.
Ice-Breaking Attachment for Vessels.
 Patented June 22, 1875.
 No. 164,746.



WITNESSES:
A. W. Almqvist
A. J. Terry

INVENTOR:
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BY *mmu*
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UNITED STATES PATENT OFFICE.

JOSEPH T. MARTIN, OF NEW YORK, N. Y.

IMPROVEMENT IN ICE-BREAKING ATTACHMENTS FOR VESSELS.

Specification forming part of Letters Patent No. 164,746, dated June 22, 1875; application filed May 8, 1875.

To all whom it may concern:

Be it known that I, JOSEPH T. MARTIN, of the city, county, and State of New York, have invented a new and useful Improvement in Ice-Breakers, of which the following is a specification:

Figure 1 is a front view of my device, the supporting-frame being shown in section; and Fig. 2 is a detail cross-section of the same, taken through the line *xx*, Fig. 1.

Similar letters of reference indicate corresponding parts.

The object of this invention is to furnish an improved device for breaking up the ice in rivers and harbors in front of a vessel to keep the water open, or to enable the vessel to pass along, which shall be simple in construction, conveniently applied, and effective in operation.

The invention consists in the combination, with the revolving shaft, of the transverse sliding shafts, provided with heads and cushions placed at right angles with each other and with the said revolving shaft, as herein-after fully described.

A represents a frame-work framed into or firmly secured to the bow of a boat, and in bearings attached to which revolves a shaft, B, placed transversely with the length of the boat. To the shaft B is attached a crank, C, to which power is applied to revolve the said shaft, either from the engine that propels the vessel or from a separate engine, as may be desired or convenient. D are shafts or rods, which pass through the transverse holes in the shaft B, and have heads *d*¹, of any desired form, attached to the ends, and which, as the shaft B revolves, slide longitudinally through

said holes, so as to strike the ice and break it into pieces in front of the boat as the boat advances.

The sliding shafts D pass through the revolving shaft B at right angles with each other, as shown in Figs. 1 and 2, and may be arranged in groups of three, more or less, as shown in Fig. 1, or they may alternate with each other.

By this construction, as the shaft B revolves slowly, the shafts D will slide longitudinally through the holes in the said shaft B, and strike the ice with the heads *d*¹ formed upon their ends, so as to break the ice in pieces in front of the vessel, each shaft D sliding twice at each revolution of the shaft B.

The shafts D should have rubber blocks or other cushions *d*² placed upon them to receive the jar should the ice not be firm enough to check their momentum, or should they slide through their holes without coming in contact with anything.

The shaft B must be revolved slowly, so as not to engender sufficient centrifugal force to keep the shafts D from sliding.

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

The combination, with the revolving shaft B, of the transverse sliding shafts D, provided with heads *d*¹ and cushions *d*², placed at right angles with each other and with the shaft B, substantially as herein shown and described, and for the purpose set forth.

JOSEPH T. MARTIN.

Witnesses:

JAMES T. GRAHAM,
T. B. MOSHER.