

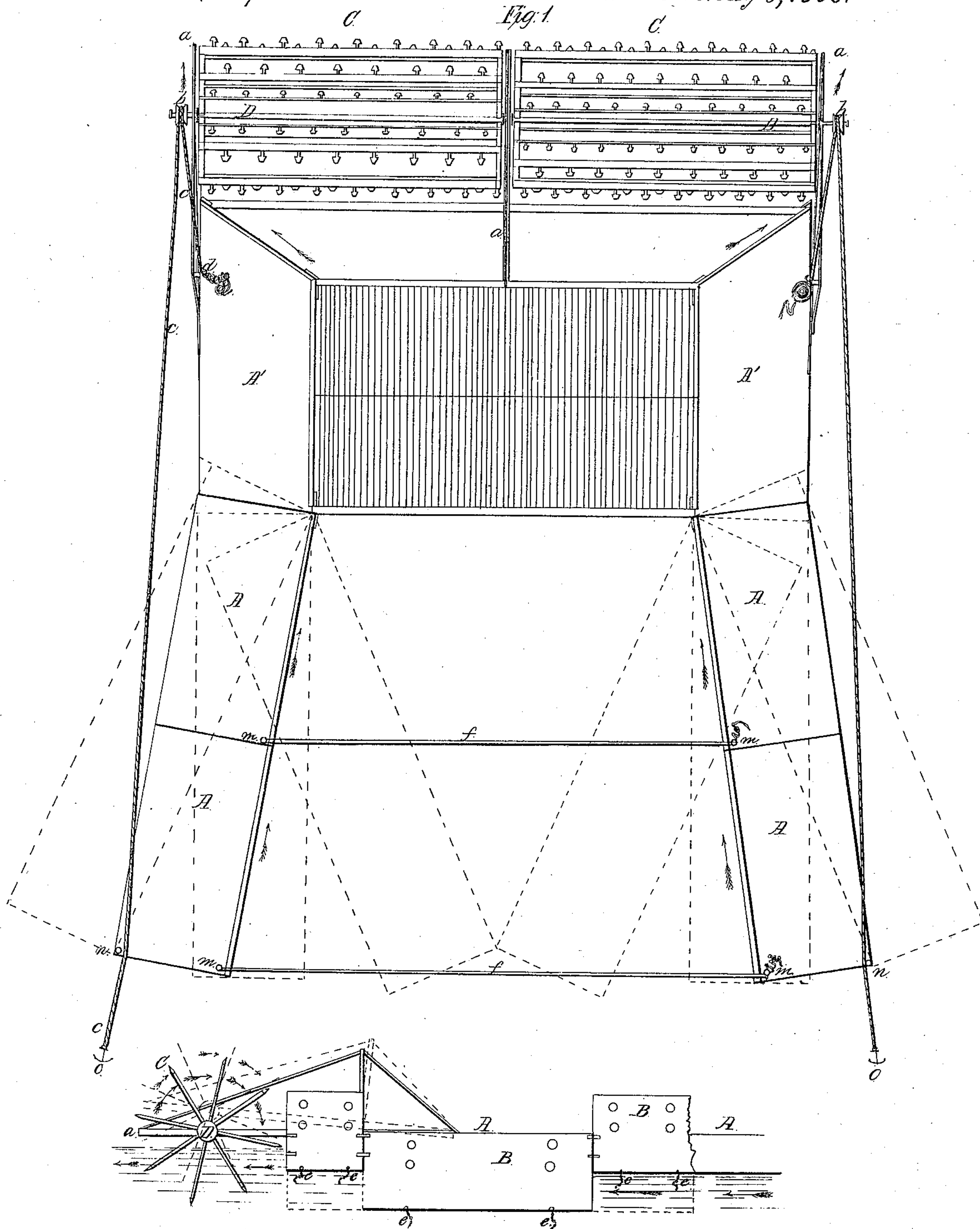
E. Bell.

Dredging Machine.

N^o 54,489.

Patented May 8, 1866.

Fig. 1.



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UNITED STATES PATENT OFFICE.

EDWIN BELL, OF ST. PAUL, MINNESOTA.

IMPROVED METHOD OF REMOVING SAND-BARS FROM RIVERS.

Specification forming part of Letters Patent No. 54,489, dated May 8, 1866.

To all whom it may concern:

Be it known that I, EDWIN BELL, of St. Paul, in the county of Ramsey and State of Minnesota, have invented certain new and useful Improvements in a Plan and Apparatus for Removing Sand-Bars, &c., from River Channels; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, making part of this specification, and to the letters of reference marked thereon, like letters indicating like parts wherever they occur.

To enable others skilled in the art to construct and use the invention, I will proceed to describe it.

The nature of my invention consists in a novel method of removing sand-bars and similar obstructions and deepening the channels of rivers and streams by means of an apparatus consisting of a series of floating guides for turning the current onto the bar or obstruction, and in using therewith, if desired, one or more wheels, to be propelled either by the current or by other power, for the purpose of digging, stirring, or cutting up the sand or other obstruction in the stream.

Figure 1 represents a plan view, and Fig. 2 a side view, of the apparatus which I propose to use.

It is well known that the Mississippi and many other of our Western rivers and streams have sand-bars formed in their channels by the floods and currents, and that the navigation thereof is seriously retarded and in many cases entirely obstructed thereby, much to the detriment and inconvenience of the public. Many plans have been devised and many dredges invented for the purpose of removing these obstructions, but hitherto without success. The greatest difficulty in removing these sand-bars arises from the fact that the sand is so fine, yielding, and loose that it cannot be readily removed by the ordinary dredging or excavating machines, and that when thus dug out the hole or cavity is immediately filled again by the mass of sand swept in by the current.

I propose to remove these sand-bars or cut channels through them by means of the current itself. To do this two results must be accomplished—first, to turn or direct the current of the stream on or across the bar; and, second, as an auxiliary, to loosen or stir up

the sand, so that it may be removed by the current, and thus form a channel.

To accomplish the first object I provide two series of flat boats or barges, as represented by A in the drawings, and connect them so as to form two lines of any required length, as shown in Fig. 1. The two lower boats of the series A' are rigidly secured opposite each other at such a distance apart as it is desired to form the channel. If desired, the space between these two boats A' may be floored over, as shown, to afford a ready passage for the men employed from one to the other side of the apparatus. The remaining boats of the series are lashed or otherwise connected behind the boats A', so that they can be swung outward or inward, as shown by the red lines, the guy-lines *f* serving to hold them in any required position.

In front of the two forward boats, A', are mounted two paddle-wheels, C, similar to those used on stern-wheel steamers, and to the paddles are secured shovels or prongs for digging or loosening up the sand. These wheels C are mounted in an adjustable frame of any suitable construction, so that they can be raised or lowered, as may be required, as indicated by the red lines in Fig. 2. On the outer end of the shafts D of these wheels C is mounted a drum or pulley, *b*, which is attached rigidly to the shaft and turns with the wheel.

A cable, *c*, is provided, and has an anchor, O, secured to one end, as shown in Fig. 1. The anchor being dropped where desired, the cable is passed over the end of the rear boat, which is provided with a post, *n*, or other suitable means for holding the cable in place thereon, and from thence the cable *c* extends forward and is wound once or more around the drum *b*, from whence it is passed back to the boat A', where it is passed around a post, *d*, or windlass of any proper construction, by which it may be controlled and paid out as desired by the attendants in charge.

It will thus be seen that as the wheels C are made to revolve by the current operating on the paddles the cable *c* will be gradually unwound, and the boats thus permitted to drop gradually down the stream, their movements being controlled by the speed with which the cable *c* is paid out by the attendants. When desired, as it sometimes may be, the cables

may be detached from the wheels C and attached directly to the paying-out devices, in which case the wheels will continue to revolve independently of the movement of the boats.

In order to control the current to a greater depth than merely that of the boats A, a series of lee-boards, B, are secured to the inner sides of the boats, and arranged to slide up and down, as shown in Fig. 2, suitable levers or other devices being provided for that purpose. By depressing these lee-boards until they strike the sand it is obvious that they will thus form a barrier on each side and cause the water to flow down between the two lines of boats; and as these are wider apart at their upper ends than at their lower or front ends, it will be readily seen that the channel for the passage of the water will be thereby narrowed and the velocity of the current correspondingly increased as it passes between the boats A', thereby sweeping away the fine loose sand as it passes, especially where loosened and stirred up by the wheels C.

As it is necessary that the channel formed should be of sufficient width to permit the boats A' to pass, their front ends are inclined outward, as shown in Fig. 1, and the wheels C made of such a length as to reach to the outside of said boats A'. By these means the water, as it passes from between the boats A', is deflected or turned outward at the edges, thereby cutting or sweeping away the sand in front of the boats and forming a channel of sufficient width to permit them to pass.

In cases where the current is weak, or the sand or other obstruction is too hard to be loosened by the wheels operated by the current, I propose to use steam or other power for the purpose of operating the wheels; and, if desired, it is obvious that such power may be used to propel the apparatus by means of the wheels.

It will of course be understood that many minor details and devices well known to boatmen will be used in connection with the apparatus, and that this description is intended to illustrate the general plan of operating, the details being varied according to circumstances.

The operation is as follows: The dredge is located at the upper side of the bar that is to be removed, with the wheels next to the bar, and at the point where it is proposed to start the channel. The anchors being dropped, the upper or rear boats will swing asunder as the cable is drawn tight, their distance apart being regulated by the guy-ropes *f*. The lee-boards B are then depressed, thereby confining the current more or less to the space between the two lines of boats, and directing it

with force against the wheels C, which revolve and dig and stir up the sand, which is then swept away by the current of water.

As it is obvious that the pressure of the water against the lee-boards would tend to tip the boats, especially when depressed to a considerable extent, I provide for this by extending guy rods or lines *e* from the boat on one side across to the bottom of the lee-boards on the opposite side, whereby they are firmly braced or tied and held in an upright position. For the purpose of assisting in keeping them upright, and also to settle the boats in the water, they may be loaded with stone or other suitable material, the weight being placed on the side of the boat opposite from that to which the lee-boards are attached.

The dredge may be guided to the right or left, as desired, by paying out on one or the other of the cables more or less, and thereby swinging it to the right or left. When desired to move it in narrow or crooked channels the boats may be detached and moved separately.

The cable *c* may be of any required length, and when once at work it will seldom be necessary to raise the anchors until the bar is cut through or removed.

By these means I am enabled to remove the sand-bars, or cut channels through them means of the power generated by the cur' by of the stream itself, and thus, in a very simple and cheap manner, remove the great obstruction to the navigation of our Western rivers. A few of these dredges kept in operation will serve to remove the bars as fast as they form, and thus keep the channel constantly open for the passage of boats.

Having thus fully described my invention, what I claim is—

1. The removal of sand-bars and similar obstructions, in the manner and by the means substantially as set forth.
2. The wheels C, having the shovels or prongs attached to the paddles, when arranged to operate, in combination with the boats or barges A, as shown and described.
3. A series of boats or barges provided with the lee-boards B, and arranged to form a channel for the passage of the water, for the purpose of controlling or directing the current, as and for the purpose set forth.
4. In combination with the boats, arranged as set forth, the wheels C and the cables *c*, arranged and operating as described, for the purpose of controlling the movements of the boats, as herein set forth.

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Witnesses:

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