3 Sheets. Sheet 1.

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No. 913. Patented Sept. 12, 1838.

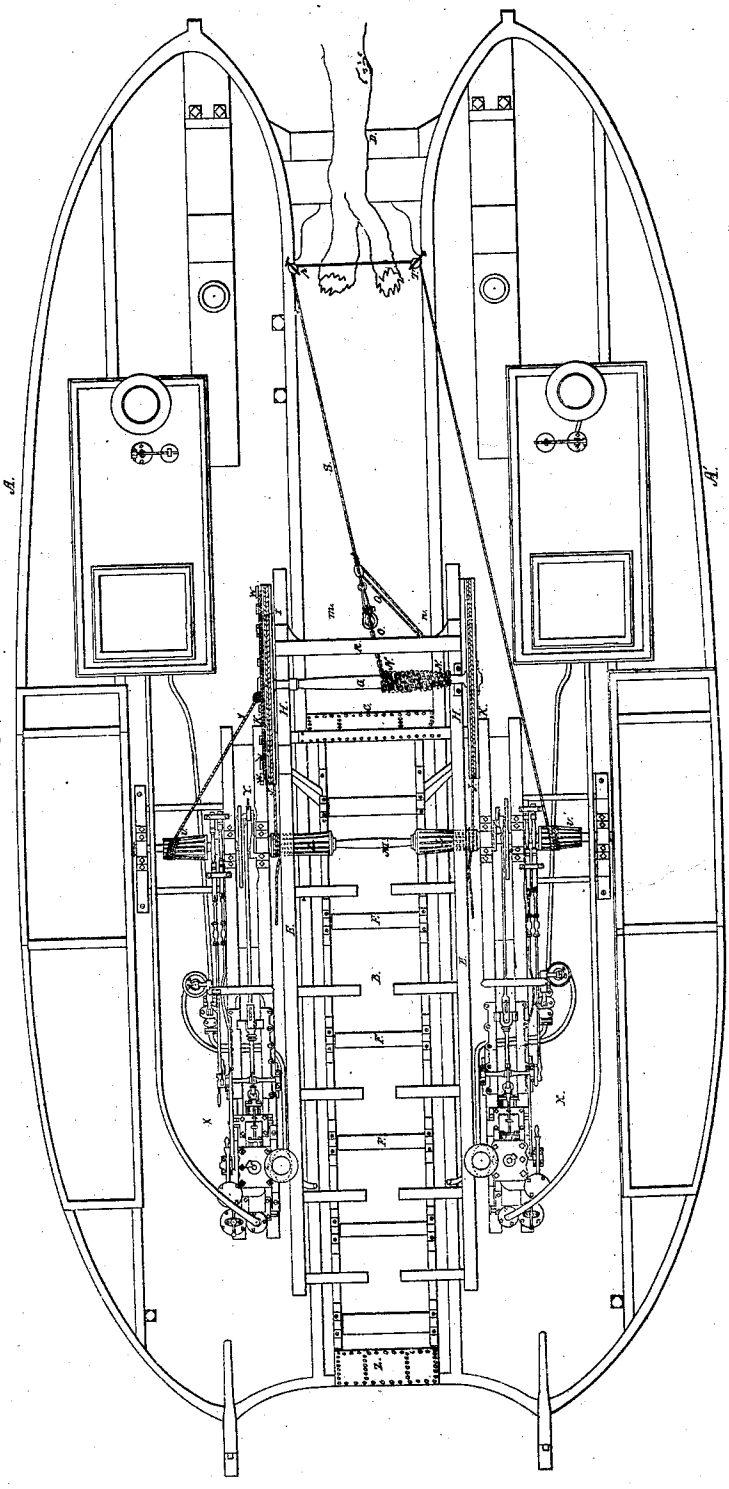

Fig. 1.

3 Sheets. Sheet 2.

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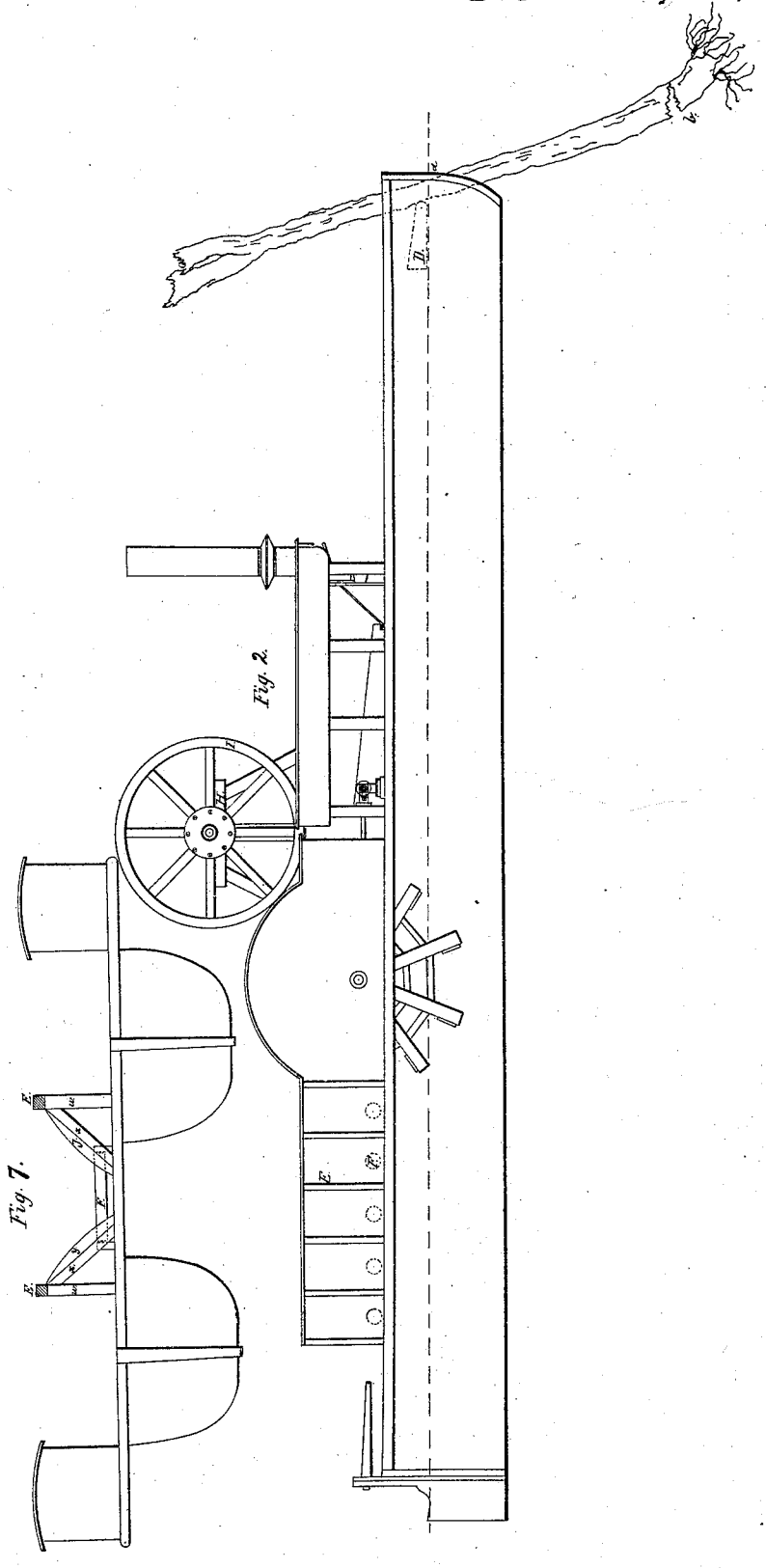

Fig. 2.

Fig. 7.

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Fig. 3.

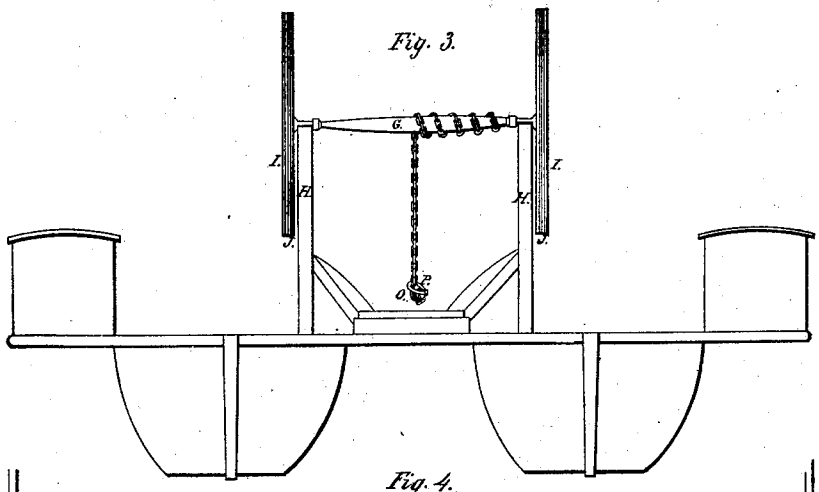

Fig. 4.

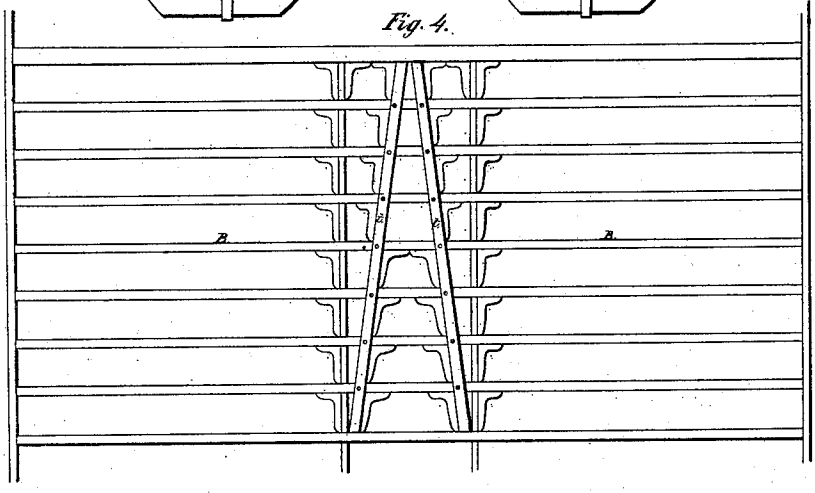

Fig. 6.

Fig. 5.

UNITED STATES PATENT OFFICE.

HENRY M. SHREVE, OF ST. LOUIS, MISSOURI.

IMPROVED MACHINE FOR REMOVING SNAGS AND SAWYERS FROM THE BEDS OF RIVERS.

Specification forming part of Letters Patent No. **913**, dated September 12, 1838.

To all whom it may concern:

Be it known that I, HENRY M. SHREVE, of the city and county of St. Louis, and State of Missouri, have invented a new and useful Machine for Removing Trees, Roots, Logs, &c., (called Snags and Sawyers,) from the Beds and Channels of Rivers, which may be called the "Archimedes" or "Steam Snag Boat," described as follows, reference being had to the annexed drawings of the same, making part of this specification.

It is no doubt well known that great difficulties have existed in the navigation of the Mississippi river and other rivers of the West, arising from numerous snags, sawyers, and other impediments found in the tracks of steam and flat boats throughout the whole length of the former river, and so numerous were those obstructions that no pilot could bear in mind their location. To perform a great public good in removing these obstructions from our rivers, the subscriber has invented and constructed a very simple machine that will accomplish this most desirable object with the greatest dispatch and at the least expense, and has at length succeeded beyond the most sanguine expectation. The machine is beautifully simple and most powerful in its operation and produces the effect intended in the most admirable manner.

It consists of a double or twin boat A, Figures 1, 2, and 3, connected by two tiers of beams, the upper tier running from the midships or centers of the boats to the stern of the same, decked over on the tops of the upper beams. The lower tier running from midships toward the stern, about half the distance of the upper tier, and sealed, sheathed, or planked under said lower tier of beams, and secured by diagonal timbers *t*, Fig. 4, running on the top of the lower tier of beams, framed onto each beam and secured by a bolt passing through the beam. The front or forward ends of the two sets of beams are connected by a strong bulk-head C, Fig. 1, fixed in an inclined position and sheathed with sheet-iron about one-fourth of an inch thick, the lower side of the bulk-head being thirty inches forward of the upper side, forming an inclined plain by which the end of a snag is conducted on deck by the impetus of the boat when the snag comes in contact with said bulk-head. There is also a large beam D, Figs. 1, 2, and 6, passed through the sides of the two hulls near their bows, running quite through the hulls of the boat to their outside frames. This beam is made of square timber fitted and bolted together to form a mass of timber nine feet fore and aft and two and a half feet thick, rounded on the front side to a semicircle, or nearly so, and sheathed with sheet-iron about one-fourth of an inch thick. There is a fore and aft framing of timber E, Figs. 1, 2, and 7, running from the middle of the boats to the stern, raised seven feet above the deck and supported by perpendicular stanchions *w*, Fig. 7, and diagonal braces, which also support cradle-pieces *y* to conduct the snags down onto rollers F as they are drawn on deck, the rollers being placed in a line near the deck from the forward end of the middle deck to the stern.

The main windlass *b*, Figs. 1, 2, 3, and 5, of the machine is placed about two feet forward of the bulk-head C at the middle of the boats, resting on a diagonal framing H, Figs. 1, 2, and 3, called "gallows-frames," twenty feet above the water, more or less, as may be found convenient. The main windlass consists of a cast-iron shaft G, sixteen inches diameter in the center and ten inches at the ends and journals. On each end of the windlass there is a wheel I, Figs. 1, 2, 3, and 5, eighteen feet diameter, with a score, groove, or recess on the periphery of the rim of six inches wide and four deep, in and round which a five-and-one-half-inch line J, Figs. 1, 3, and 5, is passed, and leads down through blocks and sheaves to the windlasses L L, Fig. 1, on the coupling-shaft M of the engine, which windlasses are four feet long and sixteen inches diameter. By these lines thus working on the windlasses a perpetual and prodigious lever-power is obtained. From the main windlass *b* there is a chain N suspended, made of malleable iron two inches thick, with links as short as they can be made and at the same time allow them to work clear of each other. One end of this chain (which is sixty-five feet long, or of any other suitable length or size) is fastened on the windlass *b* and wound around the same to any extent required. The other end of the chain hangs in a loop O, Figs. 1, 3, and 5, or running noose, down to the surface of the water, or below it if required. In that end of the chain there is a shackle or large ring P,

Figs. 3 and 5, made of iron, three inches diameter, or so large as to let the chain reeve through it freely, by which the running noose on the chain is made. To the shackle there is attached a tackle Q, which leads to a cross-beam R of the gallows-frame above, by which the running noose in the end of the chain is controlled. A leading block and sheave are attached to the shackle, through which a line S is passed, one end of which is fastened to the bows of the larboard-boat A. The other end passes through a leading-block T on the bows of the starboard-boat A′ and leads aft to the windlass U′ on the main shaft of the engine. By that line the chain is drawn out and passed down on the snag to any distance required. There is also a line V passing around chocks W on the arms of the larboard purchase-wheel and leading down to the windlass U on the larboard main shaft of the engine. The use of this line is to reverse the motion of the purchase-wheels for the purpose of lowering the chain down to renew the purchase on the snag at pleasure.

The whole of the machine is worked by the power of a double steam-engine X X, coupled by the permanent shaft M, extending from the crank Y of one engine to the crank of the other.

The operation of the machine is as follows: When snags or trees are found so firmly fixed in the bottom or bed of the river as to be liable to break before the roots give way, they are removed by running against them with the twin boat, so as to strike the snag with the large beam D in front, which in nearly every case breaks the snag off below the bottom of the river as far as the diameter of the tree. When the snag is not so firmly fixed as to break, the beam runs under it and turns it over in a position contrary to that in which it was first found, and so far as to allow the boat to pass entirely over it, by which means the tree is so loosened from the mud or sand in which it is embedded as to be taken up by the main windlass *b* in the manner before described, and laid horizontally on the rollers F on the after-deck, where the root is cut off with a cross-cut or other saw, by hand or the steam-power, and the root deposited in the bends of the river, where the water is from fifteen to twenty feet deeper than it is over the bars. Consequently the root sinks many feet below the draft of water that any boat can carry over the bars. The trunk of the tree is cut into several lengths of from twenty to thirty feet and thrown overboard, where they are carried down by the stream and are caught for fire-wood or pass off to the sea. The entire operation of removing a snag requires on an average about forty-five minutes, or sixteen snags per day, with a machine that this applicant has recently been experimenting with on the Mississippi river. A greater number, however, may be removed in a day.

For a further illustration of this invention reference may be had to the annexed drawings.

Figure 1 is a top view. Fig. 2 is a side view. Fig. 3 is an end view. Fig. 4 is a plan of the lower tier of beams B, showing the diagonal braces *t*. Fig. 6 is a cross-section of the snag-beam; Fig. 5, a section showing the manner of drawing up a snag or tree; Fig. 7, a cross-section of the framing E or cradle with the rollers F, on which the snag or tree is laid after being hauled up.

The boat being put in motion by the full power of the engines—say of one hundred and twenty horse-power or more—is directed in such a manner as to receive the end of the snag on top of the snag-beam D, Fig. 2, when by the great momentum of the whole moving mass, together with the continued action of the engine, the snag is either broken off at *d* or *b*, Fig. 2, or is loosened from its bed and thrown in the position *c*, Fig. 2, represented by dotted lines, in which case it becomes necessary to raise it on deck, to accomplish which it is brought under the snag-beam and between the two boats in the space *m n o p*, Fig. 1, when the chain N from the windlass *b*, Fig. 1, is passed around it. The windlass, as before stated, is worked by the fall or rope J, passing through a leading-block to a barrel L, of sixteen inches diameter, fixed on the coupling-shaft M of the engine, as before stated. When the log or tree is raised so as to meet the shaft of the windlass, it is secured for a moment to a bolster by a chain on deck. When the windlass is over-hauled by the down-haul V, which is also worked by a barrel U on the main shaft, at the same time the chain as it slacks is hauled out in the position represented in Fig. 5 by a line S, attached to a ring *o*, passing forward to a leading-block *p* and then back to a barrel U, Fig. 1, on the main shaft of the engine. As the log or snag rises and becomes counterpoised it falls back on the rollers F, Fig. 1, between the strong timber frames E on each side of the rollers, which thus form a cradle and secure other parts of the boats from injury. When in this position, the root is cut off and the trunk cut up and launched into the river by means of tackle-purchase, the root falls through the space *m n o p*, and the trunk is launched over the inclined plane Z at the stern. The falls of both these purchases are led to the main shaft of the engine.

The power of this simple piece of mechanism is such as to raise the largest and most firmly planted snag in the river. A snag of sixteen hundred cubic feet of timber, (after separating the root,) weighing not less than sixty tons, has been raised by the experimenting machine referred to. The machine, however, is capable of raising a weight of more than two hundred tons, and the part that is the most liable to give way is the chain. The machine has raised a tree one hundred and

sixty feet in length and three and one-half feet in diameter, and several that were planted twenty feet in the bed of the river have been raised.

The invention claimed and desired to be secured by Letters Patent consists in the manner in which I have combined and connected the mechanical power of the windlass and the pulleys so as to operate with the momentum given to a twin steamboat and with the continuous action of the paddle-wheels, so as to break off, uproot, and raise snags and sawyers, as above set forth.

I, however, particularly claim as new—

1. The application of the forward or snag beam D for the purpose or raising or breaking the snag or sawyer preparatory to its being lifted on board the boat by the apparatus constructed for that purpose.

2. The manner of connecting together the two boats by means of the upper and lower tier of beams, diagonal braces, bulk-head, and forward beam D.

HENRY M. SHREVE.

Witnesses:
WM. P. ELLIOT,
JOHN F. HUNT.