(12) **United States Patent**
Scarbrough

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(54) **PROPELLING STEAM BOATS, & OTHER VESELS**

(76) Inventor: **William Scarbrough**

William Scarbrough Savannah Georgia

Sellers Patent

The schedule referred to in these Letters Patent and making part of the same containing a description in the words of the said William Scarbrough himself of his improvement in the construction and Propulsion of Steam or other Boats.

To all whom these presents shall come. Be it known that I William Scarbrough of the City of Savannah in Chatham County State of Georgia have invented new and useful improvements in the Construction and Propulsion of Steam or other Boats & that the following is a full and exact description thereof.

The accelerated Progress of the Vessels or Boats as above set forth is to be carried at firstly by the diminution of resistance in the water navigated; & secondly by the increase of the travel of the Vessels or other mode of propulsion through the water. The diminution of resistance is to be effected by the greatest possible reduction of the immersion or draft of water of the Vessels or Boats & by the formation of their Models as to keep them whilst in motion skimming as nearly as possible upon the surface. Therefore the bottoms of these Vessels Boats & the main point of bearing should be as nearly as possible flat, without more than nine or ten degrees rise: the greatest breadth should be considerably abaft the centre perhaps most advantageously within one third of the whole length from the stern post. From this point the rise should commence tapering aft: and from a point forward should commence tapering to the bows in both cases gradually in rounding lines so as to obtain the greatest possible buoyancy or bearing. With the double object of facilitating the steering of the Vessel or Boat and keeping the same as much as possible upon the surface so as to cause the displaced water to return & spring from the superincumbent pressure to raise as high as possible on the forward part of the propelling water wheel and afterwards under the counter to form part the bottom of the Vessel or boat forward should from 15 to 20 feet more or less according to the size of the Vessel or Boat abaft the stem or cutwater begin gradually to rise or curve up from the straight line of the after part so as to attain the height of from 2 to 3 or even more feet, where a perpendicular line would

fall from said Stern or Cut Water. The Shaft of the paddle wheels should be placed as right over the abaft end of the greatest breadth of the Vessel or Boat whereby the displaced water will more readily escape & by a slight yet horizontal inclination of the buckets of the paddle wheels from a direct right angle from the keel of the boat will not only carry the displacing water under the Stern to counteract the power of the rudder but will tend to lighten the pressure of the head water on the said Buckets and the wave of the displaced water in the act of regaining its level must as a matter of Course urge the Boat or Vessel forwards. Secondly in regard to the increase & the travelling of the water wheel or other mode of propulsion as the steam or other Engine of any considerable length of stroke could keep in advantageous motion wheels of any great diameter with the length of buckets or paddles now generally in use where any considerable resistance was opposed at more than 25 to 30 revolutions in a minute, increased velocity could only be given to piston Engines by the power of gearing the effect of which would be a material encroachment on the power of the Engine and attended with considerable loss of power.

The object is then to find a ready power to overcome the difficulties or disadvantages in proportion to the reduction of the diameter of the wheel so will be the diminution of the travel of the periphery thus an reduction of a diameter that would give but a little over 16 yards without the reduction of the 25 feet diameter would produce a little more than 31 yards; hence the fleet Boats plying on the Hudson Delaware or Chesapeak the diameters of the paddle wheels have been enlarged to the extent the capacity of the Boat and the powers of the Engines would admit; and we have, as the evidence that Mr Brown could only transcend their velocity principally by the augmented diameter of his paddle wheels; he could not have done it on his experimental raft of 75 feet in length. The difficulties & disadvantages which have been suggested in regard to gearing upon the Engine to obtain increased velocity of motion and the enlargement of the diameter of the paddle wheels to augment the travel may however safely and easily be surmounted by shortening the length of the buckets or paddles in a proportionate degree For example if we place on a wheel 16 feet in diameter arms 8 feet apart in a straight line near the periphery Buckets 6 feet in

lengths and 2 feet in width the 16 Multiplied into each other would exhibit a superficies of 192 feet Square. On a 24 feet wheel with arms at the same distance apart if Buckets only four feet in length were placed they would be 24 in Number which Multiplied as above would give a superficies of 160 Square feet. Thus although the reduction in the length of the Bucket has caused a 33⅓ p Cent or ⅓ of the whole superficies of immersion in the revolution it returns only 25 p Cent which thus is a clear saving of 8⅓ p C or ⅓ of the power of the Wheel in hard water. This saving is not one tithe of many other advantages we may readily believe when we perceive them generally in the large boat of this Country the whole length of the Buckets or paddles have been divided into two or more parts. We have thus seen that by the formation of the wheel so as to diminish the resistance of the water & by shortening the paddles or Buckets the work or labour of the Engine has been so much reduced that much of the risk of breakage in the event of getting wheels by wheels Round or Stones has been superseded. The consequent increase of velocity will not by any means be attended with the proportional correspondent loss or diminution of power which the general rule might seem to intimate for when the impulse or momentum has been once given the augmented Speed of the Boat or Vessel will more than Compensate the Engine for it first expence of power.

As stability or solidity of the construction may be gained is of primary importance for the correct working of machinery Especially in the case of gearing it is further proposed as the means of attaining it that the paddle wheel bearers or any part of the boat or vessel between or beyond them where the immersion is great shall be sustained or suspended from the inside of the boat or vessel by the use of projecting knees or else resting directly under the beams or on Strong pieces thereunder connecting two or more of them and against the ceiling or sides of the boat or vessel but permanently affixed to the same so that the Rebbet or Rebbets working in the manner of a Key Stone or Key Stones & the arch the pressure near the gunnels or on the upper part of the Boat or Vessel will be transferred to the Rebbet or Rebbets and they in return if necessary will find a reciprocating & adequate abutment from the capability of pressure at the other side or on the end of the arch there. But Exclusively of this it is considered that in this

rollers or Pulleys of the largest diameter which can be used, would be advantageously employed in Steadying the the propelling Shafts & partially relieving the friction in their journals

What I Claim as my own invention and not previously known in the above described Method of Constructing & propelling Steam or other Boats is the peculiar formation of the Model of the Boat or Vessel as above described and specified in Combination with the increased Velocity of the propelling Wheels to obtain by said Combination & more rapid production of the Boat or Vessel as also the application of the inverted curved friction Rollers or Pulleys as above set forth. It is to be observed that I Claim no originality to any of the parts Separately

Washington City D.C. of Columbia March 1836

Wm Cartwright

Witnesses
B. L. Russell
C. S. Stetson

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