(No Model.) 2 Sheets—Sheet 1.

E. BAZIN.

ROLLER VESSEL OR BOAT.

No. 507,099. Patented Oct. 24, 1893.

FIG. 1.

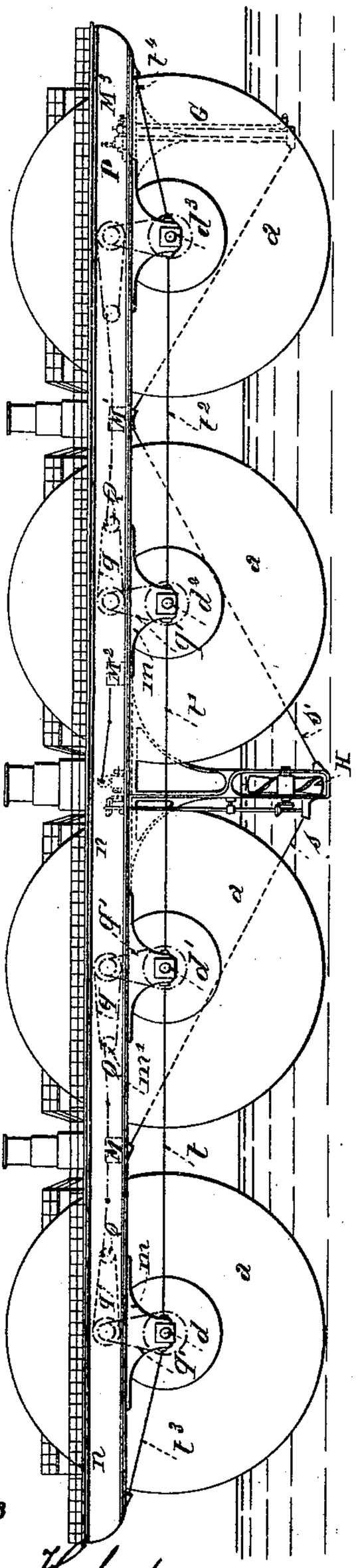
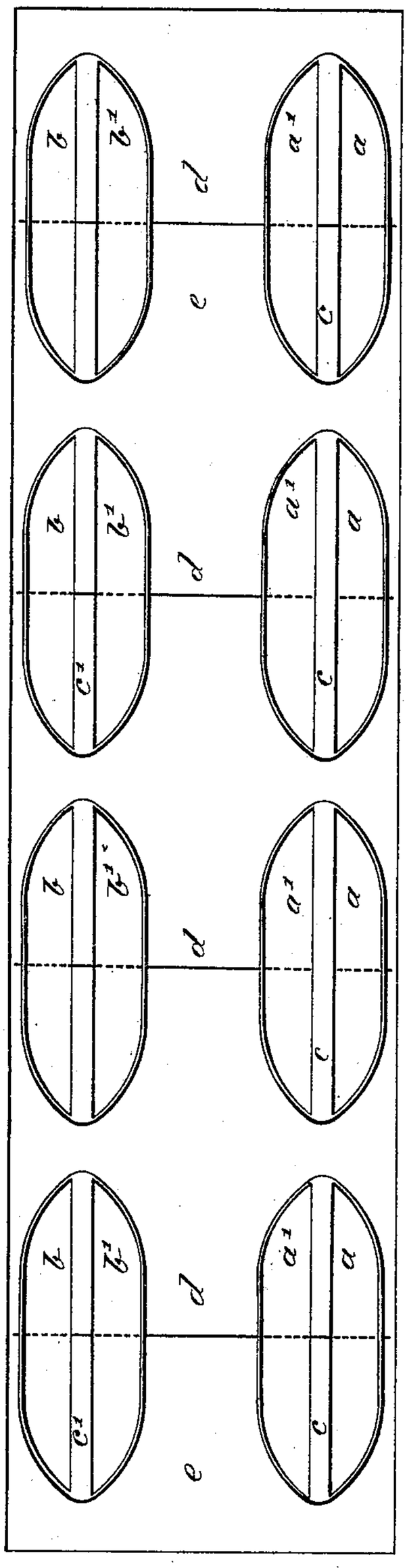


FIG. 2.



Witnesses
Alexandre Haubaut
Georges Laurent

Inventor
Ernest Bazin

(No Model.) 2 Sheets—Sheet 2.

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FIG. 5.

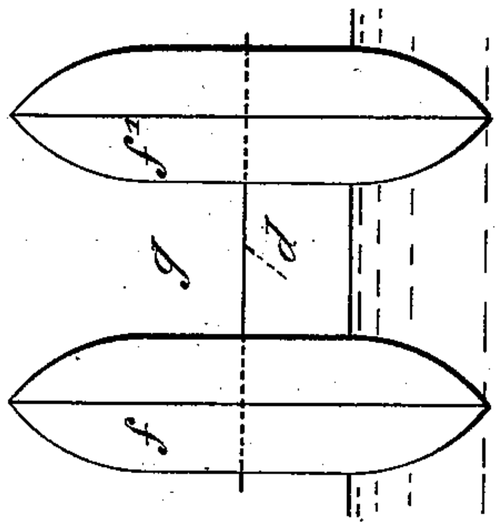


FIG. 3.

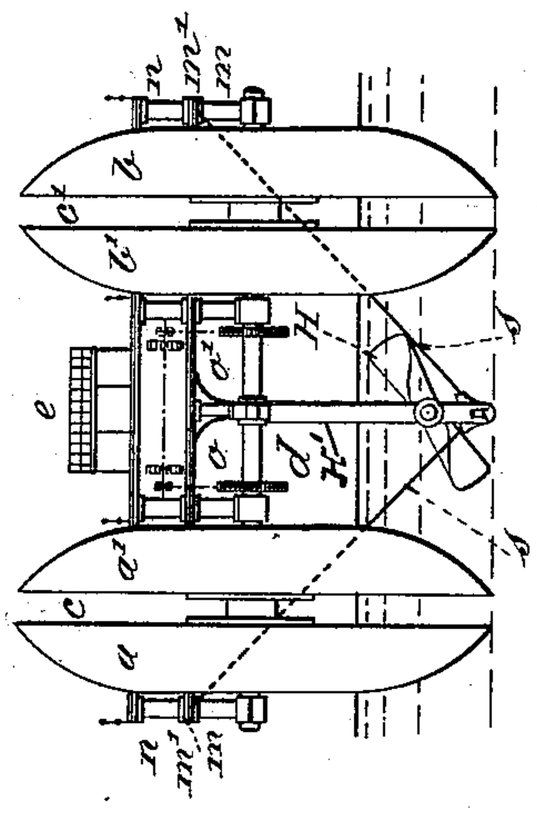


FIG. 4.

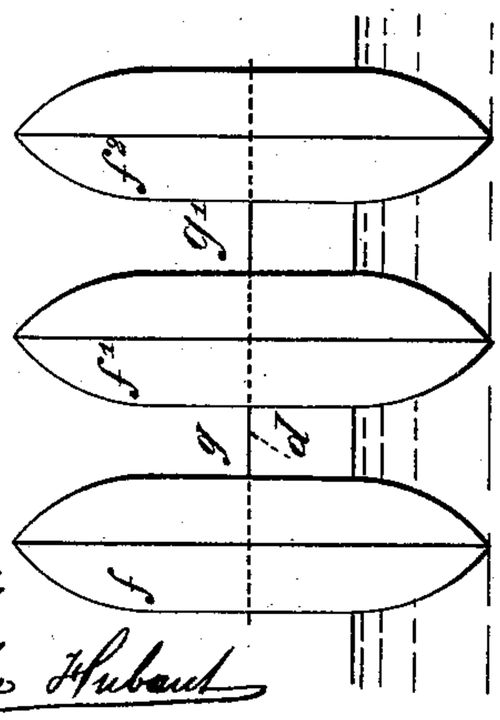


FIG. 6.

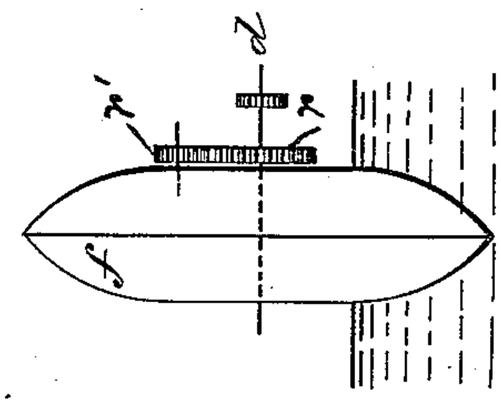
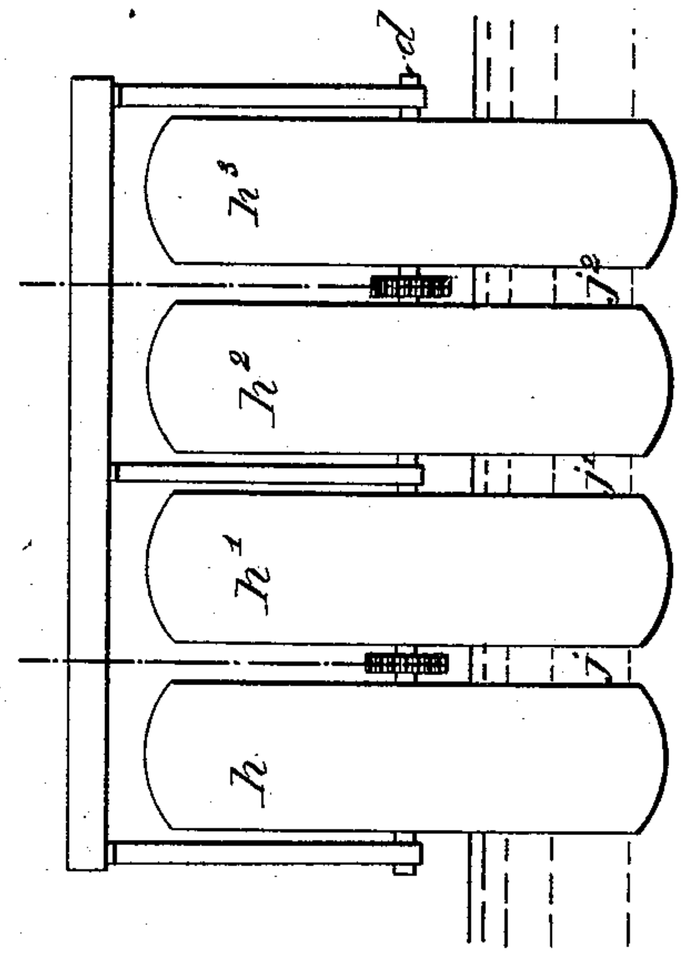


FIG. 7.



Witnesses.
Alexandre Hubaut
Georges Laurent.

Inventor.
Ernest Bazin.

UNITED STATES PATENT OFFICE.

ERNEST BAZIN, OF PARIS, FRANCE.

ROLLER VESSEL OR BOAT.

SPECIFICATION forming part of Letters Patent No. 507,099, dated October 24, 1893.

Application filed September 14, 1892. Serial No. 445,841. (No model.) Patented in France June 15, 1892, No. 222,367, and in England August 13, 1892, No. 14,661.

To all whom it may concern:

Be it known that I, ERNEST BAZIN, a citizen of the Republic of France, residing at Paris, France, have invented a new and useful Improvement in Roller Vessels or Boats, (for which I have obtained Letters Patent in France, dated June 15, 1892, No. 222,367, and in Great Britain, dated August 13, 1892, No. 14,661,) of which the following is a full, clear, and exact description.

The object of the present invention is to provide practical arrangements whereby the friction of rotatory multiple keels or rollers can be substituted for the friction of a hull with a single fixed keel, slipping or sliding in and through the water, thereby replacing sliding ships by what may be called roller ships.

Roller ships have heretofore failed for want of sufficient stability of the structure and because the rolling parts have been made to act as the propellers; these latter being provided with floats like paddle wheels which geared, as it were, with the water and neutralized the proper rolling effect of the rollers. In some cases rollers have been placed along the sides of the ship or in its interior but these arrangements have produced sliding and rolling effects combined, and the result is that no practical and useful effect has been obtained up to the present so far as I am aware.

The rollers should be free from all obstacles of sliding and propulsion; they should be of suitable and convenient form, as far as possible marine in character, and smooth on the surfaces which come in contact with the water in order to roll on the water like the wheel of a locomotive on a rail. They should have a special rotatory motion imparted to them corresponding with the thrust of the propellers but by distinct and independent motive power arranged to co-operate with the propelling power in order to produce a single progressive action. These rollers should further be arranged in such a manner that the whole structure is stable, and that the rolling motion of the ship does not neutralize or destroy the effects and advantages of the rollers.

The essential features of the present invention are the following:—first, securing the stability of the floating body by the use of rollers arranged in such a manner as to establish between them channels or bodies of water that offer resistance to the lateral rolling of the ship, and to the action of cross seas or swells; second, causing the rollers to rotate by means of independent motive power at a speed corresponding to the speed of the ship due to the thrust of the screws or other propelling organs.

In principle the rollers should be arranged somewhat like the wheels of a locomotive, keyed or otherwise secured on suitable driving shafts and performing the office of displacement wheels or circular movable keels. Their number transversely should be two at least but there may be three, four or more according to circumstances and lengthwise of the platform they may likewise vary in number according to the length of the ship and other conditions.

In the drawings hereto annexed Figure 1 is a longitudinal elevation of the preferable type of my roller ship. Fig. 2 is a plan view, and Fig. 3 is a transverse section of the same. Figs. 4, 5, 6 and 7 are views of modifications to be hereinafter described.

The type of vessel shown in Figs. 1, 2 and 3 comprises four split or divided rollers at each side, one behind the other, that is to say a vessel with eight divided rollers.

The form of the rollers I prefer for the high seas is that shown in Figs. 1 to 6, because it is the best suited for displacement and offers the least resistance to the sea.

Figs. 1, 2 and 3 show two double or divided rollers *a a' b b'* keyed on the same transverse shaft *d*, leaving two resistance or stability channels *c c'* and a third channel *e* formed by the space of water existing between the two double rollers, that is to say three resistance or stability channels *c c' e*.

Fig. 4 shows three rollers *f f' f²* on one shaft forming two channels only *g g'*. This arrangement gives very great stability by reason of the two spaces of water *g g'* and of the heavy weights being necessarily placed at each side of the central rollers *f'*, the other rollers *f f²* forming as it were equilibrium crutches. This type with twelve rollers namely three rollers secured on each of four shafts will have a sufficient displacement to carry a tolerably heavy load; the bolder but

cheaper type with eight double rollers shown in Figs. 1, 2 and 3 can be used for the special transport of passengers, and for the postal service for example; as a ship of war it would be useful as a reconnoitering vessel.

For river navigation the forms may be simpler, and the number of rollers may be varied but care should be taken that there are several intervals between them so as to form the necessary resistance or stability channels. Fig. 7 shows an arrangement and form of rollers h h' h^2 h^3 suitable for this purpose. With four rollers three resistance and equilibrium channels j j' j^2 are obtained.

The useful distance passed over by one revolution of a roller is about sixty per cent. of its circumference and I estimate that a roller of twenty-five meters diameter will pass over forty-five meters per revolution made in three seconds and thrust forward in any suitable or convenient way by its screw propeller, paddlewheel or other propelling device.

Figs. 1, 2 and 3 show the general construction. The vesssel proper is carried on the four shafts d d' d^2 d^3 of the rollers, which shafts may be equidistant or not. Brackets m at the bottom of which are arranged the bearings for the shafts of the rollers, carry beams m' and support them normally above the line of flotation. The sides n are constructed on the beams m' and determine the external shape of the ship in which suitable spaces are provided for the machinery, store rooms, cabins, &c. Along the channel e may be located horizontal bulkheads o o' intended to receive, direct and deaden the effect of the cross seas and thus protect effectively the bottom or the beams m' of the ship.

The shafts of the rollors are coupled together in pairs, each pair receiving rotatory motion from motive power engines M M'. Each of the shafts d d' d^2 d^3 receives motion from endless chains q q' the first q being actuated directly by the connecting rod of the engine which is coupled to a crank pin on the first chain wheel Q.

Fig. 6 shows that the roller may be turned by a large toothed wheel r driven directly by a toothed wheel r' on the driving shaft of the engine.

A separate engine M^2 is provided for turning the screw propeller H by gearing as clearly shown in Fig. 1 or by other arrangements if preferred.

Any suitable means may be used for steering my improved boat. However, I prefer to employ a jet fed with water by a pump P driven by an engine M^3. Lateral movement may be imparted to the jet nozzle by hand or by means of any suitable motor.

The shafts of the rollers are braced together by tension rods t t' t^2, and to the front and rear of the structure by other tension rods t^3 t^4, so as to obtain a structure all parts of which co-operate to strengthen and support one another.

The screw propeller H has its stern-post frame H' braced to the ship by tension rods s s, s' s' both longitudinally and transversely.

It will be understood that in the arrangement shown in Figs. 1, 2 and 3 three stability channels are formed. In that shown in Fig. 4 two such channels and in that shown in Fig. 5 one such channel, that is to say water spaces that prevent or diminish by their resistances the inclinations of roller vessels or boats, while an ordinary sliding ship's hull with a single keel rolls violently because it is not supported by any similar resistance.

If twelve plain and undivided rollers were arranged six at each side, the single channel or space of water between them would offer a smaller resistance to the action of cross seas than if they were disposed in four groups of three each, each group keyed on one shaft, or in six groups of two divided rollers each, that is to say with six divided rollers on each side producing multiple channels of resistance to the rolling of the ship. All these arrangements are to some extent equivalent to ships having several keels of considerable depth.

The agreement of the rotation of the rollers with their thrust is indispensable for the solution of the problem, as the rollers would not turn by the mere forward thrust of the propelling machinery, but by giving them an independent rotatory motion at a speed corresponding to that thrust their resistance is neutralized and their adhesion on the water is established somewhat as if on a fictitious hydraulic rail, on which they are ready to roll when thrust forward or backward. This independent rotation of the rollers should be arranged so as not to expend useless motive power; turning them too quickly would produce objectionable gyroscopic effects and an exaggerated adhesion which would retard forward progress instead of facilitating it. It is therefore necessary to arrange that the rotation of the rollers shall be in harmony with the thrust of the propellers in order to obtain the maximum of useful effect and speed in vessels of this kind.

The above described arrangements are also applicable to aquatic machines or velocipedes as well as to vessels or boats properly so called.

I claim—

1. In a boat the combination of buoyant circular rollers devoid of propelling projections, suitable means for rotating said rollers, and independent means, for propelling said boat, substantially as described.

2 In a boat the combination of circular buoyant rollers devoid of propelling projections, said rollers being adapted to be independently rotated at a speed corresponding to that due to the propelling machinery, and mechanism, for propelling said boat.

3. In a vessel a series of buoyant rollers devoid of propelling projections, arranged side by side, the spaces between said rollers forming resistance channels for securing stability

of the vessel in the water, substantially as described.

4. In a vessel having buoyant rollers and means of propulsion independent of the rollers, divided buoyant rollers each of which constitutes a double roller, the two halves of which are separated forming resistance channels for securing stability in the water, substantially as described.

5. In a vessel having buoyant rollers and means of propulsion independent of the rollers, divided rollers having channels between the sections thereof, placed side by side at a considerable distance apart, the space between said rollers and the space between the sections thereof forming resistance channels for securing stability in the water, substantially as described.

In witness whereof I have hereunto set my hand in presence of two witnesses.

ERNEST BAZIN.

Witnesses:

GEORGES LAURENTZ,

ALEXANDRE HUBANT.