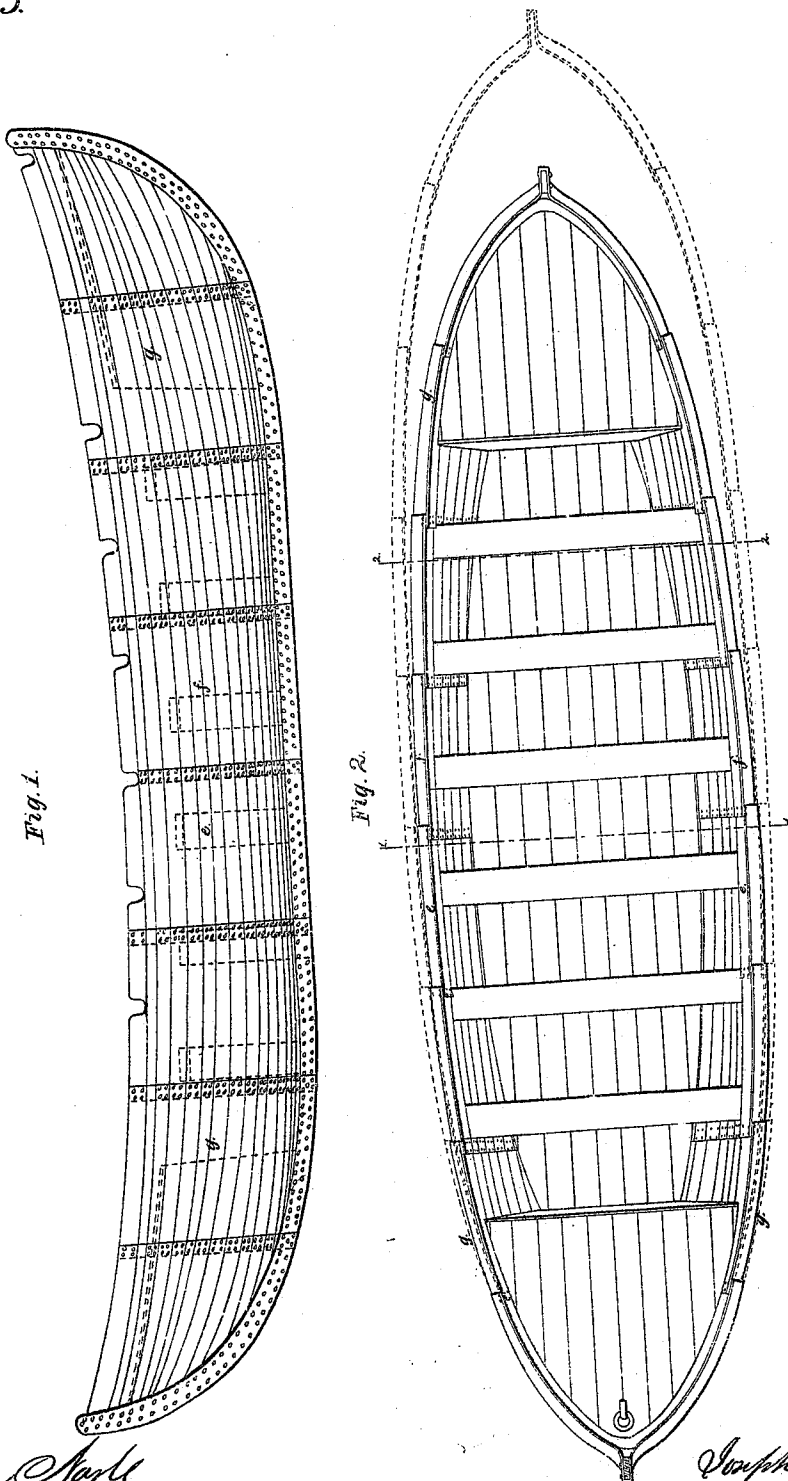


Sheet 1. 2 Sheets.

J. Francis.
Life Boat.

Nº 19,693.

Patented Mar. 23, 1858.



Witnesses.

By *making*

Henry Clarke

Inventor.

Joseph Francis

Sheet 2 of 2 Sheets.

J. Francis.
Life Boat.

Nº 19,693.

Patented Mar. 23, 1858.

Fig. 4.

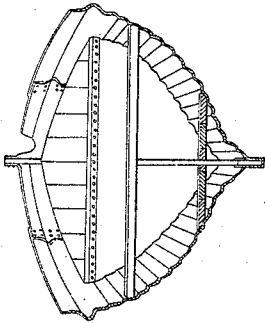


Fig. 3.

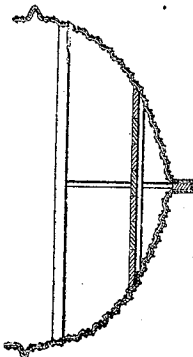


Fig. 7.

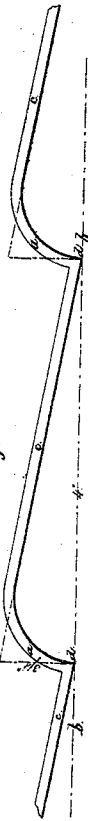


Fig. 6.

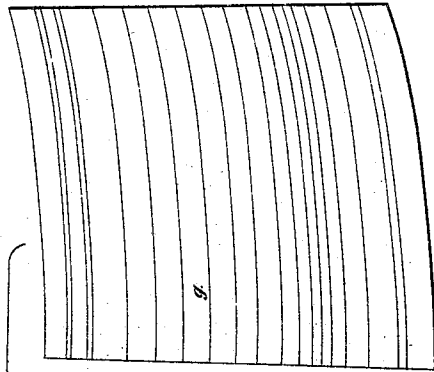
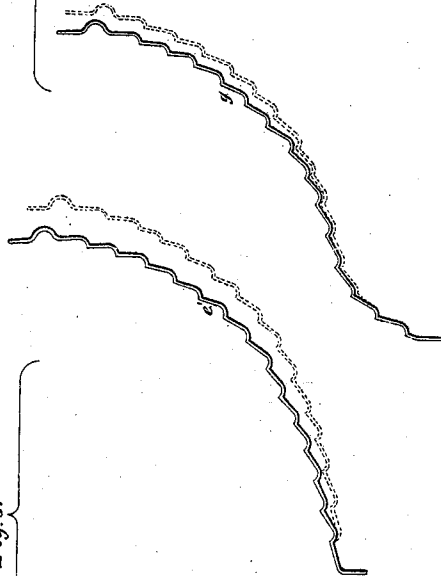
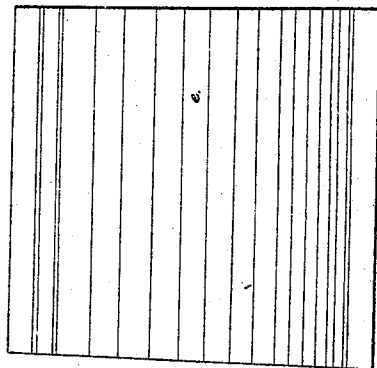


Fig. 5.



Witnesses.

By *Henry Clarke*

Inventor.

Joseph Francis

UNITED STATES PATENT OFFICE.

JOSEPH FRANCIS, OF NEW YORK, N. Y.

METALLIC BOAT.

Specification of Letters Patent No. 19,693, dated March 23, 1858.

To all whom it may concern:

Be it known that I, JOSEPH FRANCIS, of the city, county, and State of New York, now temporarily residing in the city of London, have invented, made, and applied to use certain new and useful Improvements in Metallic Boats; and I do hereby declare that the following is a full, clear, and exact description of the nature and operation of the said invention, reference being had to the annexed drawing, making part of this specification, wherein—

Figure 1, is a side elevation of one of my said metallic boats. Fig. 2, is a plan of the same showing the manner in which I make different sizes of boats from sheets struck up by one pair of dies. Fig. 3, a cross section at the line 1, 1, and Fig. 4, is a cross section at the line 2, 2, showing also the air chambers in the bow of the boat. The other figures are separately referred to, and similar marks of reference denote corresponding parts.

In Letters Patent granted to me March 25th 1845 the use of a pair of dies the size and shape of the boat to be produced is specified, said dies having semi-circular ribs on the surface of one, taking similar grooves in the surface of the other, so as to corrugate the metal and take the same up in such a manner as to prevent wrinkling. In this case a separate set of dies was required for each size of boat, causing the manufacture to be costly and attended with many inconveniences.

The nature of my said invention consists in a peculiar corrugation composed of a series of plain surfaces united by a curved or quarter circle corrugation in such a manner that the metallic boats formed therewith are very strong and rigid, and are adapted to the most severe service, even such as getting among surfs, rocks, &c., and at the same time the shape of the corrugation is such that thicker metal can be formed into shape by the dies without injury thereto, and with a less expenditure of power, than where a half round corrugation is used. I also make the lines of corrugation near the center of the boat parallel or nearly so, by which means I am enabled to make boats of various kinds and sizes from the same pair of dies, by striking up in such dies, center sheets, which being introduced between the end sections will lengthen the boat, and the width can be increased by bending or strain-

ing the several sheets out to the desired point before they are riveted together.

The dies which I make use of, are to be suitably formed, and actuated by hydraulic pressure or other competent power, but forming no part of this invention do not require further description.

The boat, it will be seen, is composed of plates or sheets of corrugated metal of different forms, examples of which are given in the detached views Figs. 5 and 6, the said sheets being pressed at the different parts of the dies, transversely of the same, so that the joints of the sheets come crosswise of the boat and nearly parallel to each other.

The form of corrugation will be best seen by reference to the diagram Fig. 7, which represents an edge view of a portion of a plate in full size. The shape of the corrugation may be described as a quarter circle *a*, struck from a center, located on the plane *b*, *b*, and continued in a straight line *c*, (or a slight curvature may be substituted) to the point *d*, on the plane *b*. The distance apart of the points *d*, or in other words the breadth of corrugation may vary, but I have found by experiments that corrugations about four inches broad (the proportion given in the drawing) will answer best.

At those parts where the shape of the boat is such that the plates require more or less corrugation to prevent buckling, the depth of corrugation, and the distance from one corrugation to the next, is to be varied; I have however found that from five eighths to three quarters of an inch for the depth of corrugation will answer best.

I would remark that in order to impart great rigidity to thin sheets of metal by corrugating the same, it is desirable to approach, in the sectional form of the corrugation, as near to a right angle as the metal will permit without fracture. This I have attained in the corrugation which I employ, and while obtaining the required rigidity, I am enabled to adapt the plates to different forms and dimensions of boats, as next described.

The plates prepared as before specified are connected together and to the keel by rivets as shown in the several views of the boat, the edges being lapped about two and a half inches over the adjoining plates and riveted to form the joints, whereby a stiff shell is formed requiring no braces or angle irons to keep it in shape; and the boat is to

be finished with air chambers, seats, rowlocks, &c., in any usual manner.

We will suppose that the dies, (in which the various sheets of which the boat is composed are pressed,) are of the size for the boat shown in the drawing, say for a boat 24 feet long; each sheet of metal will be about three feet wide and the sheets *e* and *f*, near the center are pressed with corrugations similar to those shown in Fig. 5, which are nearly parallel to each other. If therefore either or both sheets (*e*, and *f*,) be left out in setting the boat together, the length of the boat will be decreased about three or six feet; and if three or four of these parallel corrugated sheets be used instead of two, the boat will be proportionately increased in length, see dotted lines Fig. 2.

By bending the sheets to a greater or less angle with the keel of the boat as shown by dotted lines in Figs. 5 and 6, the breadth of the boat can be increased or decreased at pleasure; this however must be done before riveting the joints together. If, then, a medium size of boat be chosen as a model for the corrugating and shaping dies, a great variety of boats may be built from plates or sheets of metal prepared by such dies; and said boats can be of various lengths and widths, and differently proportioned, so as

to suit the purpose for which they are intended; and at the same time the cost of manufacture will be very greatly reduced.

Having thus described the nature of my said invention and shown the manner of carrying the same into effect, I wish it to be understood that what I claim as my invention and desire to secure by Letters Patent is—

1. Preparing sheets or plates of metal for forming boats with corrugations composed of a series of flat or nearly flat surfaces united by a curved or nearly quarter circle corrugation substantially as, and for the purposes specified.

2. I also claim the manner herein specified of varying the size and proportions of corrugated metallic boats made from sheets pressed in one size of die; by forming the corrugations near the center parallel or nearly so, and increasing or decreasing the number of central plates, formed with such corrugations, substantially as and for the purposes specified.

In witness whereof I have hereunto set my signature this sixteenth day of September 1857.

JOSEPH FRANCIS.

Witnesses:

H. J. WILDING,
HENRY NASH.