E. F. KENNELLY.

CONCRETE SHIP HULL.

APPLICATION FILED FEB. 13, 1918.

1,267,668.

Patented May 28, 1918.

2 SHEETS—SHEET 1.

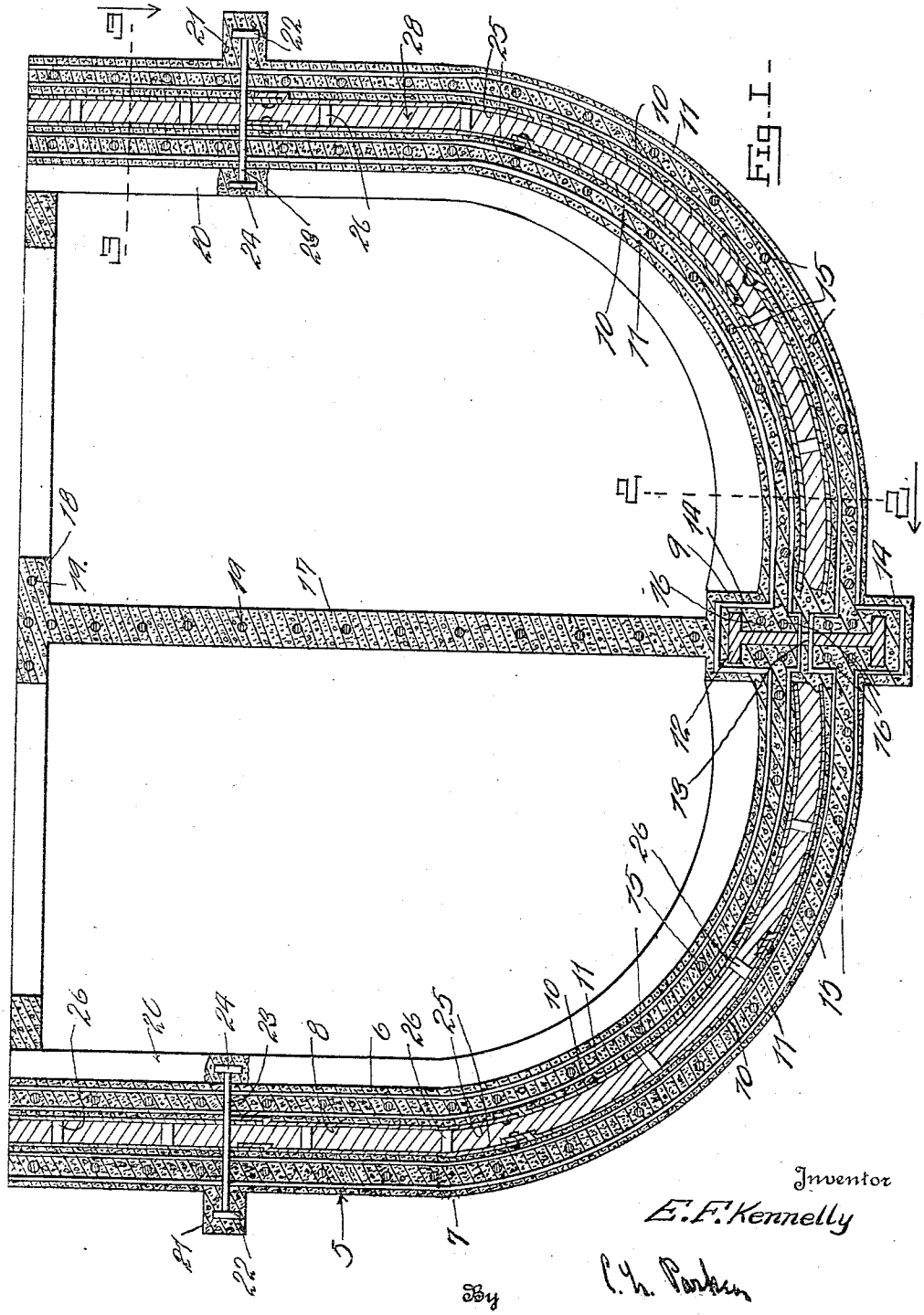


Fig. 1.

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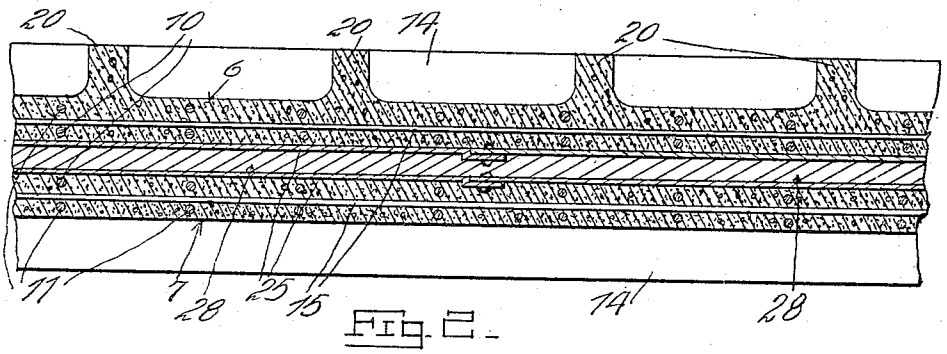


Fig. 2.

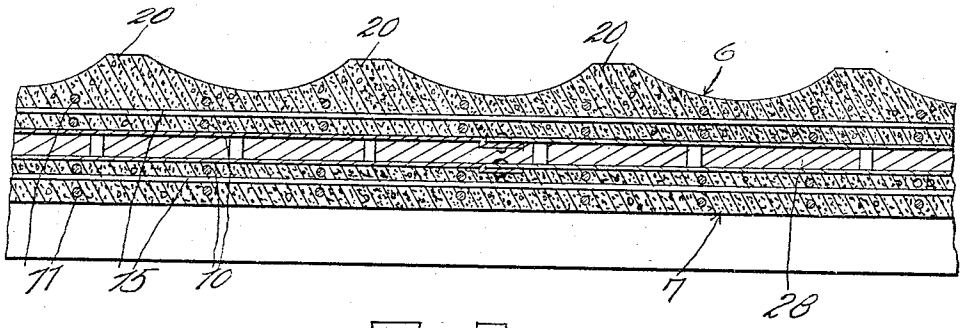


Fig. 3.

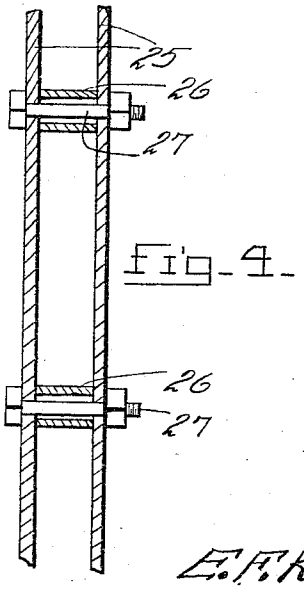


Fig. 4.

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UNITED STATES PATENT OFFICE.

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CONCRETE SHIP-HULL.

1,267,668. Specification of Letters Patent. **Patented May 28, 1918.**

Application filed February 13, 1918. Serial No. 216,914.

To all whom it may concern:

Be it known that I, EDWARD F. KENNELLY, a citizen of the United States, residing at Boston, in the county of Suffolk and State of Massachusetts, have invented certain new and useful Improvements in Concrete Ship-Hulls, of which the following is a specification.

My invention relates to improvements in concrete ship-hulls.

An important object of the invention is to provide means whereby a concrete ship-hull may be constructed so that it will possess the desired degree of elasticity, strength, and durability.

A further object of the invention is to provide a concrete ship-hull of the above mentioned character, which is adapted to be constructed by the employment of molds, which may be readily removed after the hull has hardened.

Other objects and advantages of the invention will be apparent during the course of the following description.

In the accompanying drawing, forming a part of this specification, and in which like numerals are employed to designate like parts throughout the same,

Figure 1 is a transverse vertical section through the hull of a ship embodying my invention,

Fig. 2 is a vertical section taken on line 2—2 of Fig. 1,

Fig. 3 is a horizontal section taken on line 3—3 of Fig. 1, and,

Fig. 4 is an enlarged detail section through one of the spacing elements or sleeves, together with associated elements.

In the drawing, wherein for the purpose of illustration is shown a preferred embodiment of my invention, the numeral 5 designates a ship-hull as a whole which is formed of concrete, preferably having a waterproofing material incorporated therewith. This ship-hull comprises inner and outer walls or shells 6 and 7, which are spaced to provide a chamber 8 therebetween, for a purpose to be described. The inner and outer shells 6 and 7 extend downwardly for connection with a keel 9, as shown. The inner and outer shells are reinforced by metallic rods 10 and 11, extending transversely thereof. The keel 9 is reinforced by an I-beam 12, having an opening 13, for receiving therethrough portions of the rods 10. The rods 11 are bent into U-shaped portions 14, which are embedded within the keel, and pass about the upper and lower edges of the I-beam 12. The inner and outer shells 6 and 7 are further reinforced by metallic longitudinal rods 15, and longitudinal metallic rods 16, are also preferably embedded in the keel.

The numeral 17 designates a longitudinal wall or partition, connected with the keel 12, and extending upwardly for connection with a top wall or deck 18, as shown. This wall and deck are preferably reinforced by longitudinal metallic rods 19, as shown.

The inner shell or wall 6 is reinforced by transverse ribs 20, and these ribs preferably taper toward their upper ends, with their lower ends attached to the keel, as shown.

The numeral 21 designates a horizontal rib, formed upon the outer surface of the outer shell 6, near and spaced from the top thereof. This outer rib receives, at spaced points, preferably in transverse alinement with the transverse ribs 20, a plurality of anchor plates 22, having connection with transverse rods 23, secured to anchor plates 24, which are embedded in the ribs 20. It is thus apparent that the upper portions of the outer and inner shells are thus securely anchored together.

The inner faces of the outer and inner shells 6 and 7 are completely covered by two sets of metallic plates 25, and the plates in each set are secured together by bolts or rivets, as may be found desirable. The two sets of plates 25 are retained in the proper spaced relation, by spacing elements or tubes 26, arranged therebetween, and adapted for the reception of bolts 27, which pass through said plates 25. In constructing the inner and outer shells 6 and 7, the two sets of plates 25 are thereby retained in the proper shape and position, while the concrete is being fed or poured between these sets of plates and outer and inner molds, the two sets of plates serving as mold elements. These two sets of plates provide the space 8.

The space 8 is filled with an elastic and waterproofing composition 28. This composition comprises asphalt, combined with preferably one-fourth part by weight of a glue compound. This glue compound comprises glue, a solvent of the glue, such as al-

cohol and water, to which may be advantageously added boiled linseed oil and resin. The glue compound preferably comprises the following ingredients, combined in the following proportions:

Glue	40 parts by weight.
Alcohol	18 parts by weight.
Water	48 parts by weight.
Boiled linseed oil	10 parts by weight.
Resin	1 part by weight.

The ingredients constituting the glue compound are mixed together in a receptacle and boiled for about two and one-half to three hours, to obtain a homogeneous mass having more or less the consistency of molasses.

The asphalt is first heated until it is converted into a liquid state, having more or less the consistency of molasses, at which time the heated glue compound, having more or less the consistency of molasses, is thoroughly mixed therewith, for producing a homogeneous mass, which may be readily poured. When this mass is poured into the space 8 it is allowed to cool therein and produces a filler which is relatively hard and resilient, besides being waterproof.

It is to be understood that the form of my invention herewith shown and described is to be taken as a preferred example of the same, and that various changes in the shape, size, and arrangement of parts may be resorted to without departing from the spirit of my invention or the scope of the subjoined claims.

Having thus described my invention, I claim:

1. A concrete ship-hull of the character described, comprising inner and outer spaced shells to afford a chamber therebetween, and an elastic composition serving as a filler for the chamber.

2. A concrete ship-hull of the character described, comprising inner and outer spaced shells to afford a chamber therebetween, and a filler for the chamber comprising an elastic waterproof composition.

3. A concrete ship-hull of the character described, comprising inner and outer spaced shells affording a chamber therebetween, and a filler for the chamber, comprising asphalt, and a compound containing glue.

4. A concrete ship-hull of the character described, comprising inner and outer spaced shells affording a chamber therebetween, and a filler for the chamber, comprising asphalt and a glue compound including glue, a solvent for the glue, linseed oil and resin.

5. A concrete ship-hull of the character described, comprising inner and outer spaced concrete shells affording a chamber therebetween, and a filler for the chamber, comprising asphalt and a glue compound, including glue, a solvent for the glue, and boiled linseed oil.

6. A concrete ship-hull of the character described, comprising inner and outer spaced shells to afford a chamber therebetween, two sets of metallic plates arranged upon the inner sides of the spaced shells and arranged in spaced relation, spacing elements serving to connect the two sets of metallic plates, and a filler arranged between the two sets of metallic plates.

In testimony whereof I affix my signature.

EDWARD F. KENNELLY.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."