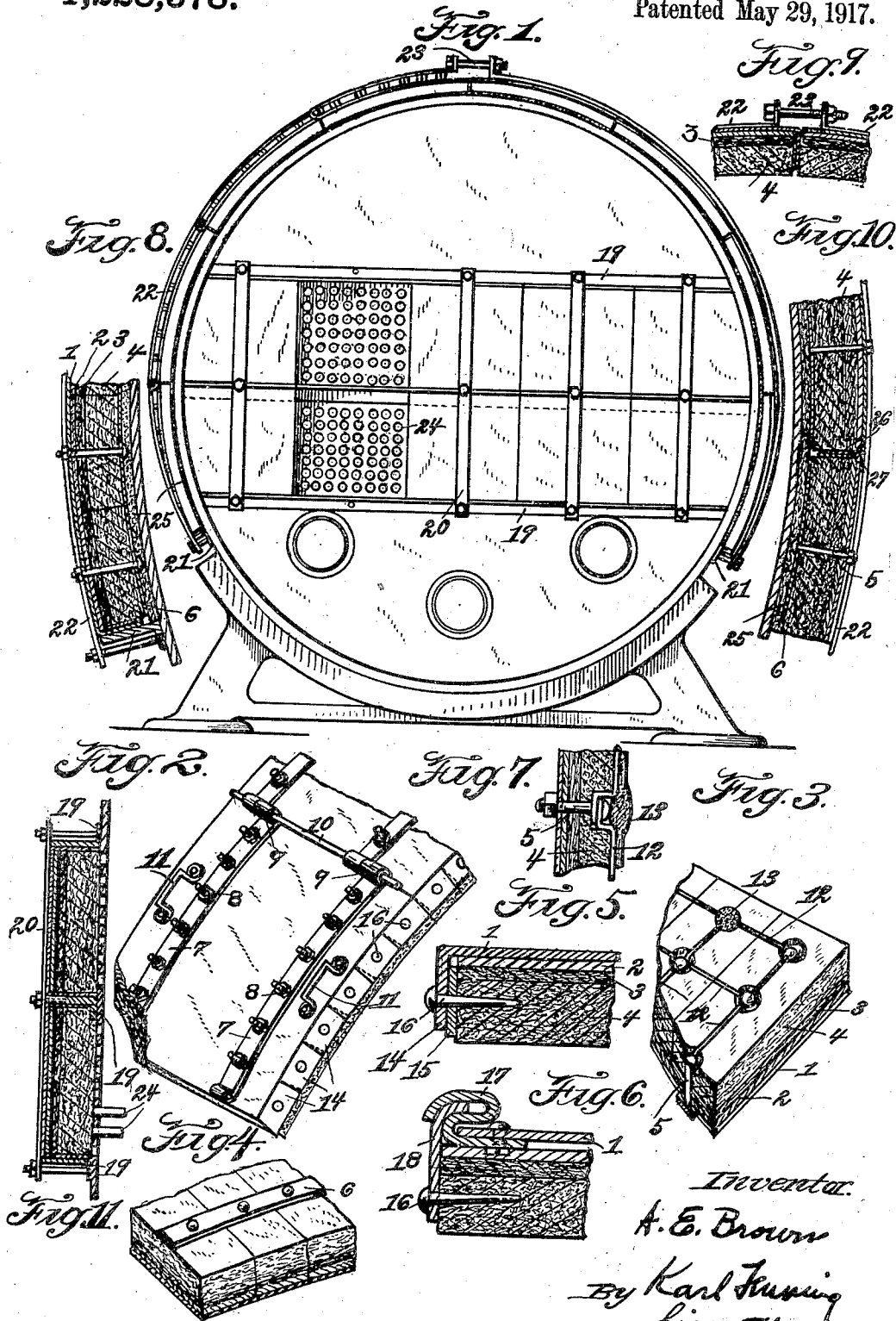


1,228,378.

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Inventor.

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By Karl Hanning
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UNITED STATES PATENT OFFICE.

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INSULATION.

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To all whom it may concern:

Be it known that I, ABRAM E. BROWN, a citizen of the United States, residing at Cleveland, Ohio, have invented certain new and useful Improvements in Insulation, of which the following is a specification.

My invention relates particularly to insulation such as is used in coverings on steam boilers, and although not confined to such use, I will describe an application of it on marine boilers of the type commonly known as Scotch type of boilers.

In general my invention includes the use of a plurality of separate self-contained insulation units which may be formed to correspond, in a general way, to the contour of the particular part of the boiler surface to which they are to be applied. The various units when assembled on a boiler are held in place in such a way that access may be obtained to the protected surface by entirely removing one or more of the self-contained sections of insulation. In one form of my invention, in which the sections may be hinged together, one or more of the self-contained units may be swung out on such hinge or joint to thus expose the portion of the boiler surface to which access is desirable. This is particularly desirable at the particular part of the boiler shell which is provided with the usual hollow stay bolts. It is desirable that this part of the boiler be effectively insulated when the boiler is in use, while it is essential that this part of the boiler be readily accessible for the repairs which may be needed or for the periodic inspection by the proper officials.

In the accompanying drawings, Figure 1 is an end view of a boiler fitted with my insulation, a part of which has been removed to disclose the hollow stay bolts in the boiler end. Fig. 2 is a perspective, partly broken away, of parts of two sections of the insulation formed on a curve to correspond with the contour of the boiler. Fig. 3 is a perspective of a fragment of another form of insulation unit. Fig. 4 is a perspective of a fragment of an insulation unit showing another construction, and Figs. 5, 6, 7, 8, 9, 10, and 11 are sectional views of details.

I provide a metallic base or casing 1 for each section of insulation next to which is placed a layer of asbestos board 2 upon which is a layer of carded fiber 3, upon which is placed a preferably thicker layer

or block of insulating material 4. I prefer to use a block of magnesia and will describe my invention as using magnesia while contemplating the use of any other suitable insulating material. In one form of device bolts 5 are passed through metal strips 6 laid across a plurality of magnesia blocks. The bolts extend through the magnesia fiber, asbestos board and metal backing and reinforcing strips 7 where they engage nuts 8 by which the whole is held together. The strips 7 may be continued and rolled up at their ends as shown at 9 in Fig. 2. A rod 10 may be passed through the rolled ends 9 of adjoining sections of insulation, so that either section may turn on the joint as a hinge. This construction is indicated at the left of Fig. 1 and as shown in Fig. 2, handles 11 may be provided on each section. The reinforcing strips 7 may be omitted and the binding straps 6 may be omitted. The latter may be replaced as shown in Fig. 3 by wires 12 which engage the heads of the bolts 5 which are counter-sunk in each magnesia block 4. Depressions (see Fig. 7) may be provided in the magnesia blocks for the passage of the wires 12 and the bolt head and wire covered with insulating plaster or cement 13 thus presenting a surface of insulating material entirely free from metallic parts.

Where the insulation is to be applied to a suitable part of the boiler such as its head the insulation section may be plain and flat as shown for instance, in Fig. 11. Where the insulation is to be applied to a curved portion of the boiler shell the sections may be suitably curved as shown in Fig. 2.

As shown in Fig. 2 the ends of the metal backing 1 may be cut so that when the portions 14 are bent over at the ends of the block of magnesia they may overlap one another and in order to reinforce this end construction a strip 15, suitably cut on a curve may be placed across the ends of the magnesia blocks to underlie the portions 14. Nails 16 may be driven through the portions 14 and the reinforcing strip 15 into the magnesia blocks. Of course the reinforcing 15 may be omitted. An optional construction is shown in Fig. 6 in which the metal backing 1 does not extend beyond the ends of the magnesia block but there is riveted to it an S-shaped strip 17 in which is clamped a suitably formed strip 18 which extends

across the ends of the magnesia blocks to which it may be attached by the nails 16. It will be noted that neither the end cover 14—15 nor the end cover 18 extends to the face of the magnesia block so that when the insulating unit is put in place this metallic portion will not come in contact with the insulated surface, but this is not essential.

As shown in Fig. 11 angle irons 19 are suitably placed on the boiler forming supports to receive the insulating units which are put directly in contact with the boiler surface and are held in place by the removable strap 20 extending between the angle irons to which they are fastened.

On the curved side of the boiler may be placed angle irons 21 forming supports on which may be seated insulating units and from which may extend retaining straps 22 passing over a series of insulating units. The retaining straps 22 may be joined at any suitable place on the boiler circumference by a bolt 23 of suitable construction in such a way that when the bolt 23 is released or removed one or more of the straps 22 may be removed so leaving free one or more of the insulated sections.

Where the insulation is not placed over the hollow stay bolts such as are indicated at 24 in Fig. 1 a layer of insulating cement 25 may be interposed between the face of the insulating unit and the boiler surface and although not essential this may be particularly desirable when the construction illustrated in Fig. 4 is used where a strap of metal extends across the face of the magnesia blocks.

Instead of having the insulating units engage each other by the hinge mechanism illustrated in Fig. 2 and at the left of Fig. 1, the construction shown in Fig. 10 and at the right of Fig. 1 may be used. In this construction one end of the metal backing 1 may be turned down to protect the insulating block as indicated at 26 in Fig. 10 while the other end of the metal backing may be extended as at 27 so as to overlap the metal backing 1 of the adjoining unit. This construction may be particularly useful in situations where water is likely to reach the insulated boiler surface as the joint between the insulating units is thus protected by the shingle-like overlap of the adjacent edges of the individual units.

I claim as my invention:

1. An insulating unit comprising layers of insulating material, a metal backing for the insulating material, means to hold the various elements together; an adjacent insulating unit therebelow having a metal

backing, and means on the first backing to engage the second backing.

2. Layers of insulating material, a metal backing for the insulating material, means to hold the various elements together, an adjacent insulating unit therebelow having a metal backing, and a portion of the first backing overlapping the second backing.

3. A boiler, supports on the boiler, independent metal casings supported by the supports and holding the insulation against the boiler, and removable means resting against the casings and holding the casings in place.

4. A boiler or the like, supports on the boiler, cement on the boiler, a plurality of sections of insulation resting on the supports and in the cement, bands running around the boiler from the supports and holding in place the sections of insulation, and means for connecting the bands.

5. A boiler or the like, supports on the boiler, cement on the boiler, a plurality of sections of insulation resting on the supports and in the cement, and bands running around the boiler from the supports and holding in place the sections of insulation.

6. A boiler or the like, supports on the boiler, cement on the boiler, a plurality of metal casings each holding insulation resting on the supports and in the cement, bands running around the boiler from the supports and holding in place the sections of insulation, and means for connecting the bands.

7. A boiler, supports on the boiler, independent metal casings holding insulation on the supports, and removable bands surrounding the casings and holding the casings in place.

8. A boiler, supports on the boiler, metal casings on the supports, removable bands surrounding the casings and holding the casings against the boiler, layers of insulation in the casings, and means for holding the layers in the casings.

9. A boiler insulation comprising cement adjacent the boiler, magnesia blocks on the cement, fibrous material on the magnesia, asbestos board on the fibrous material, a metal sheathing, and means to hold the magnesia, fibrous material and asbestos in the sheathing.

10. A boiler insulation comprising a plurality of layers of insulating material, a metal backing for the insulating material, and means to hold the layers of material on the backing so as to leave one surface of the insulating material exposed.

ABRAM E. BROWN.