Oct. 10, 1939. J. W. ADAMS 2,175,948

BOILER INSULATION

Filed April 13, 1937 2 Sheets-Sheet 1

Fig. 1.

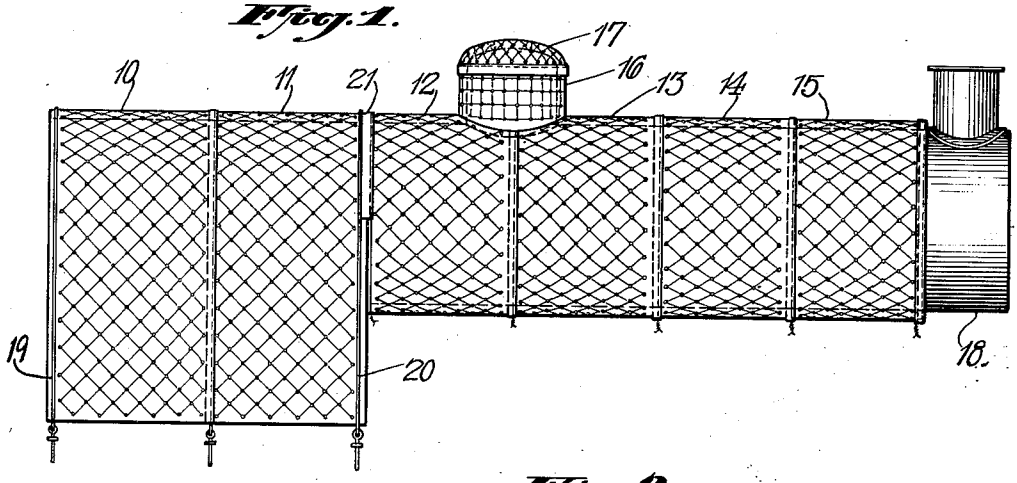

Fig. 2.

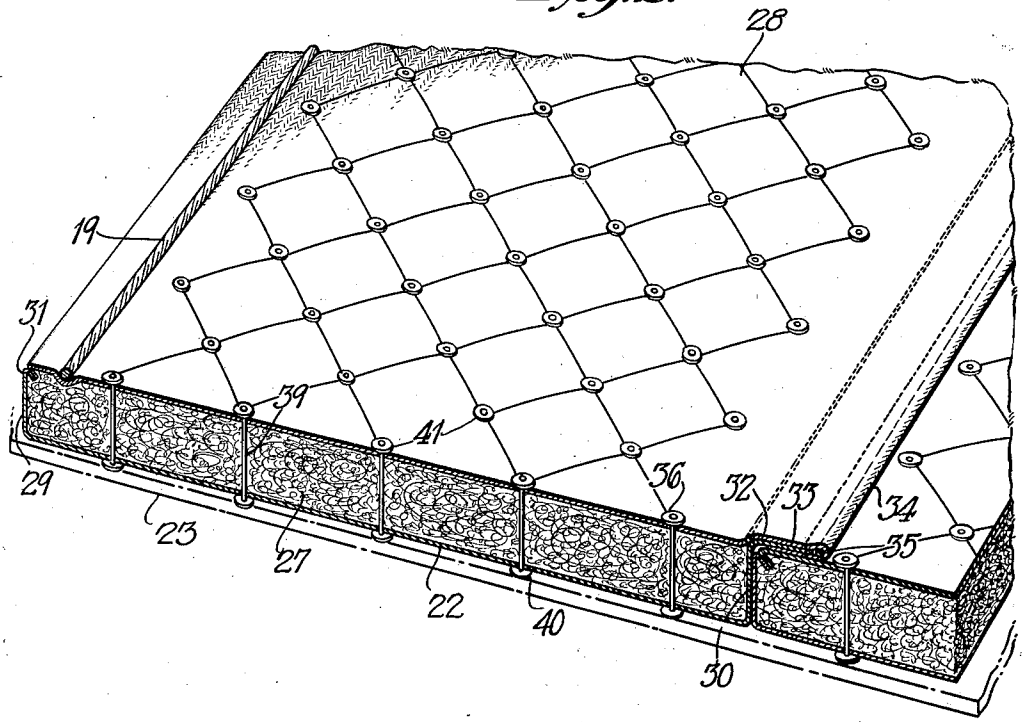

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Fig. 5.

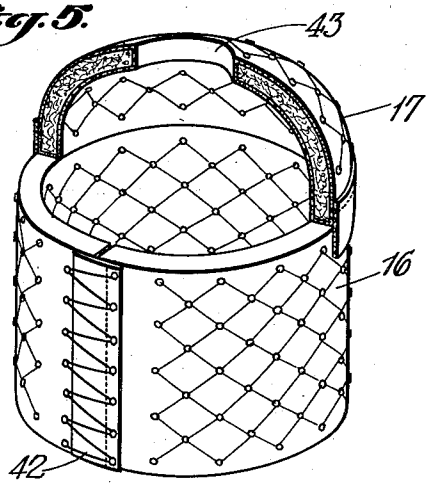


Fig. 4.

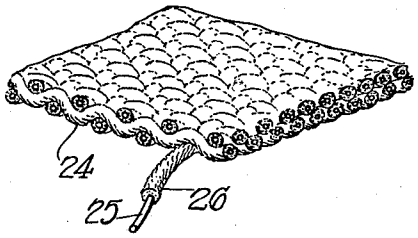
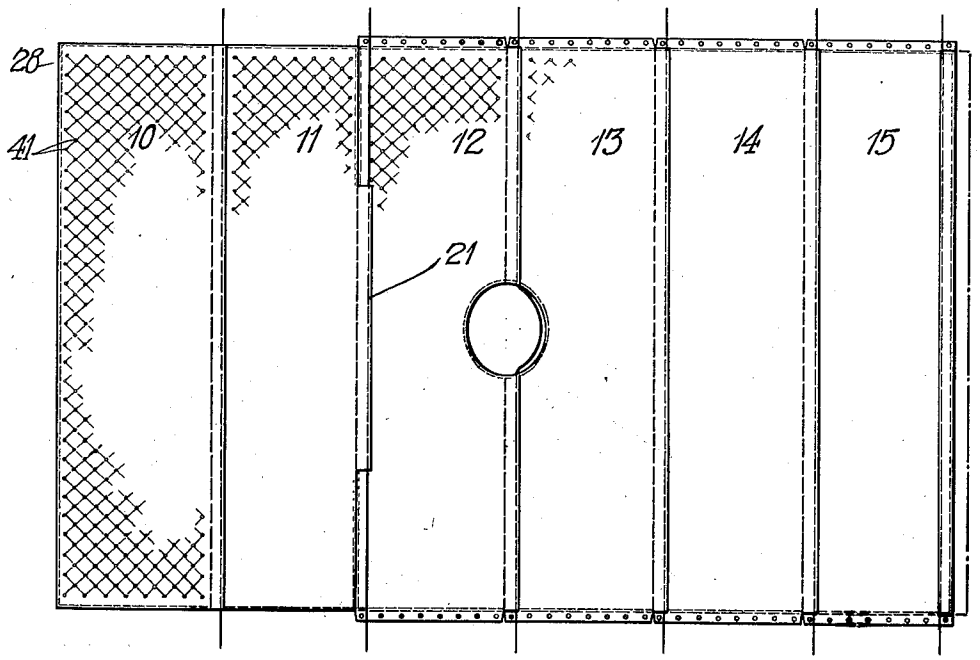


Fig. 3.



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UNITED STATES PATENT OFFICE

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BOILER INSULATION

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Application April 13, 1937, Serial No. 136,678

2 Claims. (Cl. 154—44)

My invention relates to a removable insulation for boilers used in the production of petroleum, and particularly to fire tube boilers used in drilling wells.

Boilers used to supply power for the drilling of oil wells must be moved frequently, generally being used for short periods of time, for example, one to four months, in one location while the well is being drilled, and then being moved to a new location when another well is to be drilled. This frequent moving the boilers makes it impractical to provide them with a permanent insulation, as such an insulation would be injured or destroyed by the rough handling to which these boilers are subjected in moving from one location or lease to another. It has heretofore been customary, therefore, not to provide the boilers with heat insulation, but to leave them exposed freely to the atmosphere, with a consequent loss of heat due to conduction and convection.

These heat losses are avoided, or greatly reduced, by my invention which provides a removable jacket for insulating the boilers after they have been placed in position, and which may be removed when moving from one location to another.

The various features of my invention are illustrated by way of example in the accompanying drawings, in which:

Fig. 1 is a side elevation of a boiler having an enclosing layer or blanket of heat insulating material embodying a preferred form of my invention.

Fig. 2 is a cross section of a part of a heat insulating blanket showing its method of construction and its manner of assembly on the boiler.

Fig. 3 is a development of the insulating blanket showing it in a flattened or spread position.

Fig. 4 is a perspective view of part of an element of the heat insulating blanket.

Fig. 5 is a detail perspective view, partly in section, of a blanket element for the steam dome of the boiler.

In my invention I provide a number of flexible blankets, each of which is made of an inner heat resistant sheet or fabric, an outer sheet or fabric which need not be heat resistant but may be of canvas or similar fabric resistant to the atmosphere, and an intermediate layer of fibrous heat insulating material such as mineral wool or glass wool. The two sheets or fabrics are tied together at spaced intervals by threads or cords of low heat conductivity which pass through the fibrous material and thus hold it in position uniformly throughout the area of the blanket. These threads or cords are preferably of such low heat conductivity that the heat of the boiler will be dissipated before it reaches the outer sheet, thus avoiding the presence of hot spots. The covering for a boiler may be made by assembling a number of such blanket sections side by side. Tying cords or cables encircling the assembled blankets may serve to hold them firmly in position on the boiler. The cables passing over the fire box part of the boiler may be attached to anchors in the ground to hold them firmly in position. The inner sheet or fabric may be of any suitable heat resisting material, preferably of woven threads of fine wire covered with asbestos or with asbestos threads reinforced with wire. The threads or cords passing from the inner to the outer sheet through the fibrous material may be of similar material.

Referring more particularly to the accompanying drawings, the heat insulating covering is shown as made up of a series of six blankets 10 and 11 covering the fire box part of the boiler, the blankets 12, 13, 14 and 15 covering the tubular part, and a dome assembly consisting of a vertical, cylindrical blanket 16 and a cover 17. The smoke box end of the boiler 18, which does not need insulation, may project beyond the insulating covering. Cables 19 and 20 pass over the fire box blankets 10 and 11 and anchor to the ground, serving to hold these blankets in position. The blankets 12, 13, 14 and 15 are held in position by encircling cables, the ends of each section surrounding the tubular portion of the boiler being laced together. The successive blanket sections may be held together edge to edge by the overlapping section 21 of each adjacent flap portion in which a tying cable is secured.

Each blanket consists of an inner fabric or sheet 22 which may rest against or be supported on the wall 23 of the boiler, as shown in Fig. 2. This sheet or fabric is preferably resistant to the heat or temperatures at the surface of the boiler. A fabric suitable for this purpose is one consisting of threads 24, as shown in Fig. 4, each of which is made of a central reinforcing wire or wires 25 and enclosing envelope 26 of asbestos or other flexible heat resisting material. Any suitable fibrous material may be used for these threads provided it does not deteriorate at the temperature prevailing on the surface of the

boiler which may be between 400° F. and 500° F., and is sufficiently flexible to permit handling.

A layer 27 of fibrous insulating material, such as glass or mineral wool, is held in place between the inner sheet or fabric 22 and an outer sheet of fabric 28 which may be of canvas or other fabric sufficiently strong and resistant to atmospheric conditions. Preferably, it is moistureproof or waterproof to prevent penetration of water into the fibrous insulating material 27.

The edges of the blankets are closed by an outward extension of the inner sheet 22, as at 29 and 30, respectively. One of these joinings, as at 31, may be made with an inner seam, thus forming a smooth edge. The other is preferably formed by extending the inner sheet, as at 33, to overlie the outer sheet of the next adjacent blanket and be covered by the outer sheet 28 to form a flap overlying the next blanket. These two extensions of the sheets 22 and 28 may be stitched to a firm seam. The outer sheet may be extended still further and looped underneath to form a loop 34 through which a tying cord 35 may extend. In this way a smooth, continuous outer surface free from direct seams to the boiler is provided.

Strings or cords 39 are provided at spaced intervals in the blanket to extend through the layer of fibrous material 27 from the inner to the outer sheet, being anchored in the respective sheets by discs or buttons 40 and 41, respectively. A diagonal form of stitching is shown in Fig. 2. These cords are of sufficiently low heat conductivity to dissipate heat transmitted to them from the boiler wall 23 before it reaches the outer sheet or fabric 28. Cords of asbestos wrapped about or reinforced with small diameter wires of suitable material, such as copper, are suitable for this purpose. For example, an asbestos thread having a thickness of about $\frac{3}{64}$ of an inch and reinforced by one or two copper wires of about .006 of an inch in diameter provides a sufficiently strong and bulky cord to unite the inner and outer sheets and prevents displacement of the fibrous material. While the copper itself has a high specific heat conductivity, its diameter is so small relative to the size of the cord that the total conductivity is negligible.

The covering elements 16 and 17 for the dome of the boiler are similar to that described above. The element 16 may consist of a blanket of dimensions to completely encircle the side walls of the dome and be laced together as at 42, and to either rest on or be laced to the blankets 12 and 13 encircling the tubular part of the boiler as shown in Fig. 1 The cover 17 may be a separate blanket having an opening 43 for the steam pipe and may rest on the top of the dome, its weight being sufficient to hold it in position.

When a boiler is to be moved from one location to another, the tying cords 19 and 20 and 35 may be loosened and the various blankets unwrapped and spread out, as in Fig. 3. Preferably, they are removed individually as this decreases the weight to be lifted at one time. These blankets may then be transported without danger of being torn by the necessity of lifting the relatively much greater weight of the boiler itself. When the boiler is again set up in a new location, the blankets may be assembled and tied into position.

Through the above invention the heat losses on a boiler are greatly reduced. For example, the temperature on a typical 350 pound pressure boiler at the surface of the boiler was found to be about 436° F., whereas the temperature on the outer surface of the blanket placed on the boiler was only about 88° F., other conditions being the same. On a quiet, dry day, the saving in fuel may be 10% or greater, and in wet or snowy weather, may be considerably greater. The blankets may be made of any suitable size to be easily handled. For example, a blanket having a thickness of two inches and using fibrous material of a density of 10 pounds to the square yard, may be made in four foot widths for a three foot boiler, and will each weigh about 175 pounds so that they may be easily lifted by two men.

It will be understood that the specific construction of certain of the elements may be varied as, for example, any suitable heat resisting material, such as a wire screen, might be employed for the inner sheet 22, although the asbestos cover for the wire is advantageous. The outer material may be of canvas or duck. Weather and flameproof canvas is preferable, but cheaper fabrics may be employed provided they are of sufficient strength.

What I claim is:

1. A heat insulating blanket for boilers consisting of a plurality of sections, each said section being adapted to be disposed in covering relation upon a determined portion of the outer surface of the boiler in juxtaposition to an adjacent section, the said sections each comprising a heat resistant inner fabric, a weather resistant outer fabric with a filling of heat resistant fibrous material therebetween retained in position between the facing fabrics by a plurality of cords comprised of material of low heat conductivity passing therethrough and through the two said facing fabrics, the inner said fabric extending outwardly beyond the edges of the outer fabric a sufficient distance to permit the same to be joined to the outer fabric along its edges, each section along one edge being provided with a flap member extending over the adjacent section, said flap member forming a loop to receive a tying cord, a tying cord running through the said flap members to secure the said sections in position on the said boiler, and means to secure together the abutting edges of the said sections enclosing cylindrical portions of the boiler.

2. In a heat insulating blanket for boilers, a plurality of sections, each said section being adapted to be disposed in covering relation upon a determined portion of the outer surface of the boiler in juxtaposition to an adjacent section, each said section being comprised of inner and outer facing fabrics with a filling of heat resistant fibrous material therebetween held in position between said fabrics by a plurality of cord members comprised of material of low heat conductivity passing therethrough and through the two said facing fabrics, the inner said fabric being comprised of heat resistant material and being of a size greater than that of the outer said fabric to permit the same to extend outwardly to join the outer edges of said outer fabric, the outer said fabric being comprised of weather resistant material, and a loop extension along one elge, of said section overlying the edge of an adjacently disposed section to receive a tying cord for securing the section and the overlaid portion of the adjacent section in position on a boiler.

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