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(54) Insulation sheaths.

(57) The invention provides an insulation sheath for a pipe, particularly for use in a furnace and has the object of providing ease of installation.

The sheath is formed in two layers, (4, 6) the first layer (4), to contact the pipe (2) being a plurality of separate longitudinally-abutting segments (4C) and the second layer (6) also being a plurality of separate longitudinally-abutting segments (6C) fitting over a major portion of the circumference of first layer (4), the segments (6C) of the second layer overlying the joints between the segments (4C) of the first layer.

The segments (4C) of the first layer are preferably in longitudinally-divided halves (4A, 4B).

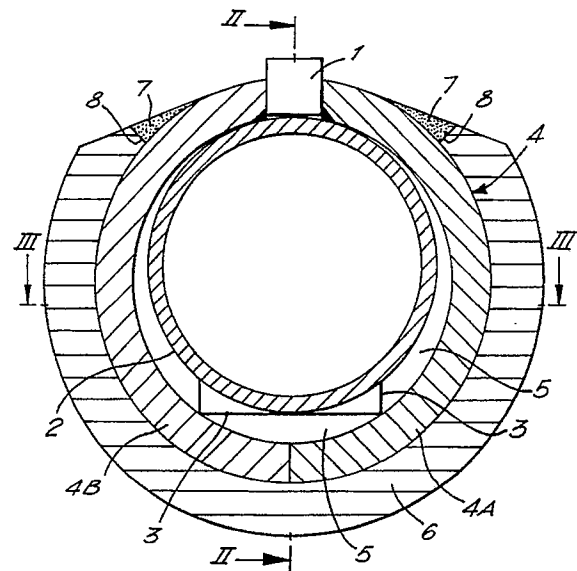


FIG.1.

INSULATION SHEATHS

This invention relates to insulation sheaths and particularly to sheaths suitable for the insulation of tubes, pipes or the like in furnaces.

It is well known that furnaces such as pusher furnaces, walking beam furnaces and the like require water-cooled supports. Such supports, which may be in the form of hollow tubes or pipes, require insulation to protect them from the heat and also to reduce the otherwise high heat losses that would be incurred by the cooling effect on the material being treated in the furnace.

The insulation is normally provided in the form of one or more layers of sheathing of suitably insulating material which form a jacket or jackets around the tube or pipe to be protected.

The present invention aims to provide an improved form of insulating sheathing that gives excellent insulation properties while being designed to provide ease of installation even in the confined regions of the aforesaid types of furnaces.

Accordingly, the invention provides an insulation sheath for a pipe, the sheath comprising two layers, the first layer to be in contact with the pipe and being a plurality of separate longitudinal segments abutting adjacent similar segments along the length of the pipe and the second layer being a plurality of separate longitudinal segments fitting snugly over the first layer over a major portion of the circumference of the first layer, the segments of the second layer overlying the joints between the segments of the first layer.

The invention is particularly applicable for use in pusher furnaces in which the pipe to be insulated is welded or otherwise attached along its length to a rail or rider of the furnace. Normally the rail or rider will sit on top of the pipe, to which it is attached. It will be appreciated, therefore, that the insulating sheath cannot (and must not) completely encompass the pipe but its ends can abut either side of the rail or rider. It will also be appreciated that the presence of this rail, which together with the pipe may extend for many metres, makes it very difficult to fit layers of refractory sheathing around the pipe.

In one embodiment of the present invention, therefore, the first layer extends around the entire circumference of the pipe except for the portion where the pipe is in contact with the furnace rail and the second layer extends around and contacts the first layer over the majority of the circumference of the first layer. The second layer is preferably of substantially 'C'-shape transverse section.

The present invention enables each segment of the first layer to be applied around the pipe in two

longitudinally-divided parts, which can be temporarily held in position. The corresponding one-piece outer, i.e. second, layer segment can then be slid into place over the inner, i.e. first layer, segments or the inner ones slid inside the outer one to hold the inner segment halves in their desired location. By appropriate choice of the dimensions of the C-shaped segment relative to the pipe diameter and the exterior dimensions of the inner layer segment, the outer layer can readily accommodate and closely contact the inner layer, whereas the opening in the 'C' is too small to allow it to be readily separated from the inner as it would be necessary to prise open the arms of the 'C'.

It is not necessary that the first layer be in contact with the pipe for the majority of its circumference. In fact, it can be advantageous to leave an air gap between the pipe and first layer over a major portion of the circumference and, indeed, it may only be necessary for contact to occur in the immediate vicinity of the furnace rail. The air gap so provided gives useful further insulating properties to the sheath.

In order to stabilise the location of the first layer with respect to the pipe in those circumstances where an air gap is to be provided between them, the pipe may have projections attached to its surface against which the first layer will rest.

The second layer may be longitudinally co-extensive with the first layer so that a double layer of insulation extends for the full length of the insulated pipe. However, this may not always be essential and, in another embodiment of the invention, the second layer is in the form of a plurality of segments spaced longitudinally from each other, each segment extending over and covering a joint between a pair of adjacent segments of the first layer.

The layers of the insulation may be made of any suitable material that is adequately refractory for the conditions in the furnace location and, of course, that provides the required degree of insulation. Thus, in a preferred embodiment, the first and second layers are both made of bonded ceramic fibre, e.g. aluminosilicate fibres bonded with colloidal silica and/or colloidal alumina.

The invention is illustrated by way of example only in the accompanying drawings in which:

Figure 1 is a transverse cross-section through a pipe attached to a rail of a pusher furnace which has been insulated in accordance with one embodiment of the invention;

Figure 2 is a longitudinal section along line II-II of Figure 1; and

Figure 3 is a section along line III - III of Figure 1.
(It will be noted that Figures 1, 2 and 3 are not to scale.)

In Figure 1, a furnace rail 1 has attached to its underside a pipe 2 to carry coolant, normally water. At the lower portion of its circumference pipe 2 has fins 3 attached to it. An inner (first) insulation layer 4 is in two halves 4A, 4B that encircle the pipe and abut against the sides of rail 1. 4A and 4B abut each other at a position diametrically across the pipe 2 from rail 1 but only contact the pipe at its circumference immediately adjacent the rail. 4A and 4B also contact fins 3, which latter thereby act as spacers to provide an air gap 5 between layer 4 and the pipe.

The two halves 4A and 4B of layer 1 are held in position by C-shaped outer (second) insulating layer 6, which closely contacts layer 4 except for a minor portion of the latter's circumference immediately to each side of rail 1.

A fillet 7 of refractory cement may be used to protect the otherwise unsealed joint between the end 8 of each arm of the C-shaped layer 6 and the inner layer 4. This fillet has the advantage of preventing dust and other particulate matter, e.g. iron-based, from entering between the two layers, whereby physical separation and harmful chemical reaction are prevented.

In Figure 2 can be seen the plurality of inner layer segments 4C and their overlying outer layer segments 6C running along the length of the pipe 2 beneath rail 1. It will be noted that the abutting joint between each adjacent pair of segments 4C is covered by an overlying segment 6C.

In Figure 3, the ends of each outer layer segment 6C are shaped to have a tongue 9 and groove 10 configuration, whereby adjacent segments interlock to provide an effective insulation sheath. The outer layer segments 11 at each end of the span of pipe being insulated are cut or otherwise formed to the appropriate length and stainless steel needles 12 are pushed longitudinally through these end segments to extend into the next adjacent segment to clamp the assembly together, thereby providing a satisfactorily-sheathed pipe.

Claims

1. An insulation sheath for a pipe, the sheath comprising two layers characterised in that the first layer (4) to be in contact with the pipe (2) is in the form of a plurality of separate longitudinal segments (4C) abutting adjacent similar segments along the length of the pipe and the second layer (6) is in the form of a plurality of

separate longitudinal segments (6C) fitting over the first layer (4) over a major portion of the circumference of the first layer, the segments (6C) of the second layer overlying the joints between the segments (4C) of the first layer.

2. An insulation sheath according to Claim 1, characterised in that the first layer (4) is formed to extend around the entire circumference of the pipe (2) except for the portion of the pipe that is attached to a furnace rail or rider (1).
3. An insulation sheath according to Claim 1 or 2, characterised in that the second layer (6) is of substantially C-shape transverse cross-section.
4. An insulation sheath according to Claim 1, 2 or 3, characterised in that the segments (4C) of the first layer (4) are in two longitudinally-divided halves (4A, 4B).
5. An insulation sheath according to Claim 4, characterised in that the two longitudinally-divided halves (4A, 4B) are designed to encircle a pipe (2), which is attached to a furnace rail (1), and to abut each other at a position diametrically across pipe (2) from rail (1), with their other ends abutting against rail (1).
6. An insulation sheath according to Claim 4 or 5, characterised in that the two longitudinal halves (4A, 4B) of the segments (4C) of the first layer can be fitted by being temporarily held in position around pipe (2) until a one-piece segment (6C) of the second layer is slid into place over the inner segments (4A, 4B).
7. An insulation sheath according to any one of the preceding claims, characterised in that the first layer (4) is shaped to leave an air gap (5) between the pipe (2) and layer (4) over a major portion of the circumference of pipe (2).
8. An insulation sheath according to Claim 7, characterised in that the layer (4) rests against projections (3) attached to the surface of pipe (2).
9. An insulation sheath according to any one of the preceding claims, characterised in that the segments (6C) of the second layer (6) are spaced longitudinally from each other.
10. An insulation sheath according to any one of Claims 1 to 8, characterised in that the ends of adjacent segments (6C) interlock by means of a tongue and groove configuration (9, 10).

- 11.** An insulation sheath according to any one of the preceding claims, characterised in that the first layer (4) and the second layer (6) are both made of bonded ceramic fibre.

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- 12.** An insulation sheath according to Claim 11, characterised in that the bonded ceramic fibre is of aluminosilicate fibres bonded with colloidal silica and/or colloidal alumina.

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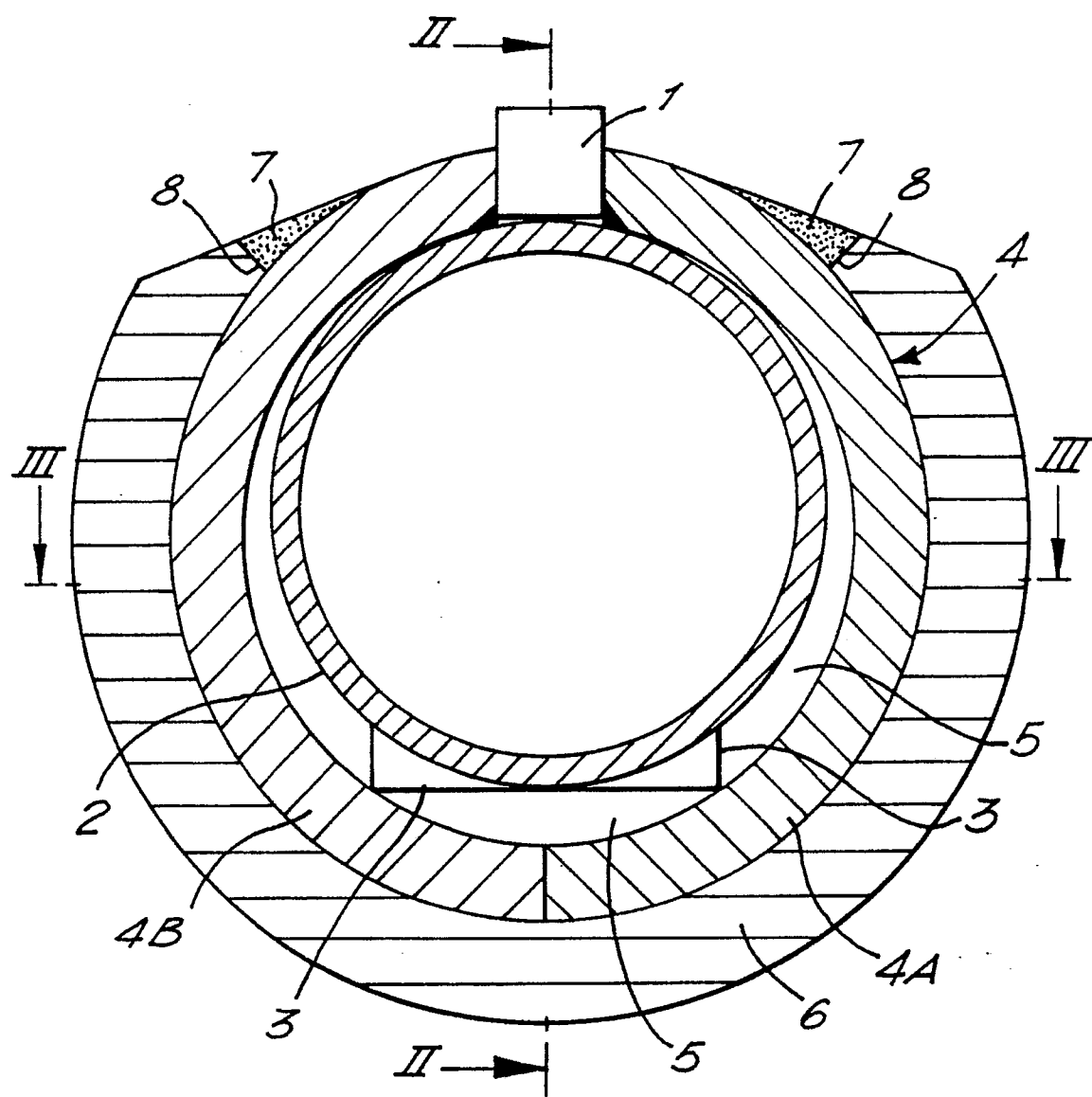
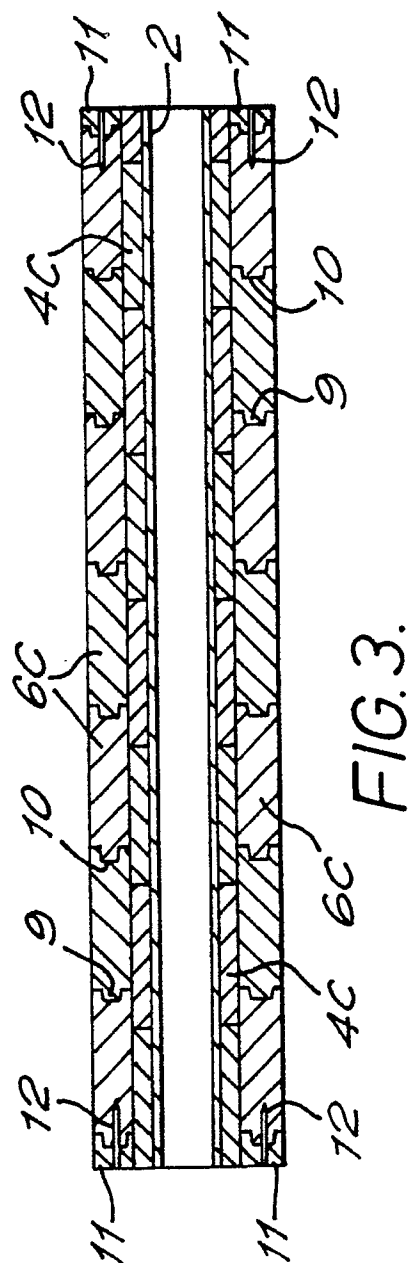
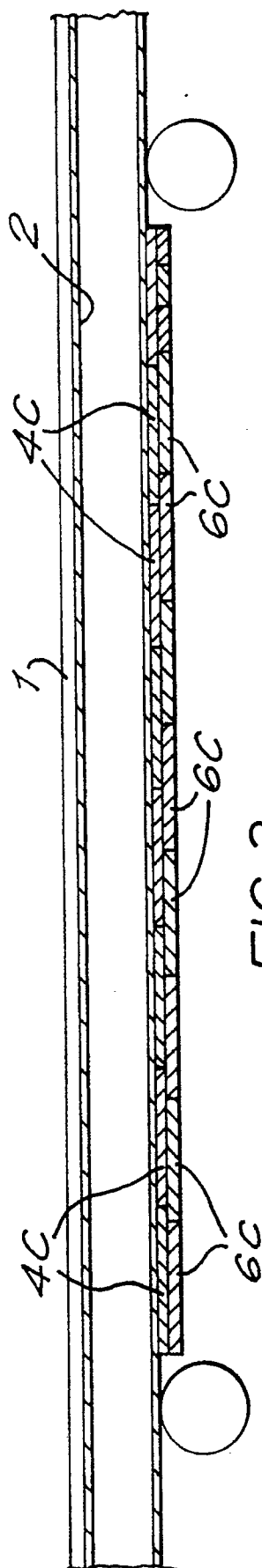


FIG. 1.





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EUROPEAN SEARCH REPORT

Application Number

EP 90 31 2775

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.5)
A	GB-A-7 968 48 (STEIN & ATKINSON) - - -		F 27 D 3/02
A	WO-A-8 101 451 (F. CAMPBELL) - - -		
A	US-A-2 436 452 (W.E. SCHMIDT) - - - - -		
The present search report has been drawn up for all claims			TECHNICAL FIELDS SEARCHED (Int. Cl.5) F 27 D F 27 B
Place of search The Hague		Date of completion of search 20 December 90	Examiner COULOMB J.C.
CATEGORY OF CITED DOCUMENTS X: particularly relevant if taken alone Y: particularly relevant if combined with another document of the same category A: technological background O: non-written disclosure P: intermediate document T: theory or principle underlying the invention E: earlier patent document, but published on, or after the filing date D: document cited in the application L: document cited for other reasons ----- &: member of the same patent family, corresponding document			