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**METHOD FOR SECURING LAMINATED INORGANIC
FIBER BLOCKS TO A FURNACE WALL**

5 FIELD OF THE INVENTION

The present invention relates to an improvement of a method for securing laminated inorganic fiber blocks to a wall and/or ceiling portion of an industrial furnace such as an incandescence furnace, a heating furnace, a heat treatment furnace, etc.

10 DESCRIPTION OF THE PRIOR ART

Heretofore various execution methods have been proposed for securing blocks consisting of laminated blankets of inorganic fiber excellent in heat resistance such as ceramic fiber, alumina fiber, silica fiber, etc. to an inner surface of a wall of an industrial furnace.

For example, in JP-B-60-53270, an execution method is proposed wherein anchor metal sockets are attached by welding to a shell made of iron constituting the furnace wall; the anchor metal sockets are inserted into mounting holes formed in supporting metal pieces incorporated in the laminated fiber blocks; a bolt is inserted into each of guide pipes disposed in the laminated fiber blocks so as to be connected with the mounting holes formed in the supporting metal pieces; and the laminated fiber blocks are held on the furnace wall by screwing the bolt on each of the sockets by means of a tool through each of the mounting holes formed in the supporting metal pieces so as to tighten the former on the latter.

However the above execution method has a problem that work for positioning the laminated fiber blocks so that the mounting holes formed in the supporting metal pieces incorporated in the laminated fiber blocks are fitted to the sockets and centering work for screwing the bolt on each of the sockets are difficult, because the laminated fiber blocks



stand in the way to see them and thus it is difficult to see position of the socket.

In order to solve the above problem, in JP-B-62-48154, an execution method has been proposed, wherein a guide rod is connected detachably with each of the anchor sockets attached to the shell made of iron constituting the furnace wall; the guide rod is inserted into each of the mounting holes formed in the supporting metal pieces incorporated in the laminated inorganic fiber blocks and hollow portions connected therewith, the laminated fiber blocks being advanced along the guide rod so that the mounting holes formed in the supporting metal pieces are engaged with the sockets; then a mounting nut is set on the guide rod and advanced along the guide rod; the supporting metal pieces are attached to the sockets by screwing the mounting nut on each of the sockets; thereafter the guide rod is dismantled and the hollow portions are filled with inorganic fiber filling material.

By this execution method work for positioning the laminated fiber blocks so that the mounting holes formed in the supporting metal pieces incorporated in the laminated fiber blocks are fitted to the sockets and centering work for screwing the bolt on each of the sockets are facilitated. However laboriousness of the execution method is not yet solved.

SUMMARY OF THE INVENTION

The main object of the present invention is to provide an execution method capable of securing laminated inorganic fiber blocks to a wall of an industrial furnace by extremely simple work.

An execution method for securing laminated inorganic fiber blocks, in each of which a number of inorganic fiber blankets are held in a multi-layered structure by means of a supporting metal piece, to a furnace wall, according to a first invention of the present application is characterized



in that the laminated inorganic fiber blocks are held on the furnace wall by engaging members disposed at tips of supporting metal pieces in the laminated inorganic fiber blocks so as to extend in an arm shape either in a lamination direction of the blankets or in a surface direction of the blankets with hook portions or ring portions disposed at tips of anchors attached to a shell made of iron constituting the furnace wall.

An execution method for securing laminated inorganic fiber blocks, in each of which a number of inorganic fiber blankets are held in a multi-layered structure by means of a supporting metal piece, to a furnace wall, according to a second invention of the present application is characterized in that the blocks of laminated inorganic fiber are held on the furnace wall by engaging each of engaging members disposed at tips of supporting metal pieces in the laminated inorganic fiber blocks so as to extend in an arm shape in two directions, which are a lamination direction of the blankets and a surface direction of the blankets, respectively, with hook portions or ring portions disposed at tips of anchors attached to a shell made of iron constituting the furnace wall, depending on the direction of the laminated inorganic fiber blocks which are to be arranged.

By the execution methods for securing the laminated inorganic fiber blocks to the furnace wall according to the present inventions the laminated inorganic fiber blocks can be held on the furnace wall by extremely such simple work, that the engaging members extending in an arm shape formed at tips of the supporting metal pieces in the laminated inorganic fiber blocks are engaged upward or horizontally with the hook portions or the ring portions disposed at tips of the anchors attached to the shell made of iron constituting the furnace wall.

The execution methods for securing the laminated inorganic fiber blocks according to the present inventions



can be applied not only to securing the laminated inorganic fiber blocks to the furnace wall but also to securing the laminated inorganic fiber blocks to the furnace ceiling.

BRIEF DESCRIPTION OF THE DRAWINGS

5 Fig. 1 is a perspective view of a laminated inorganic fiber block used for executing the methods according to the present inventions, partially cut-off;

Fig. 2 is a cross-sectional view of a part of a furnace wall; and

10 Fig. 3 is a cross-sectional view of a part where laminated inorganic fiber blocks are secured to the furnace wall.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Hereinafter execution methods for securing laminated inorganic fiber blocks to a furnace wall according to the present inventions will be explained concretely by using several embodiments.

15 In Fig. 1, A represents a laminated inorganic fiber block used for realizing one of the present inventions, in which a number of blankets a made of heat resistant inorganic fiber such as ceramic fiber, alumina fiber, silica fiber, etc. are held by a supporting metal piece B, in a state where they are laminated and compressed.

20 The supporting metal piece B comprises a spit portion 1 passing through the blankets a to support them and a strut 2 protruding from the central portion thereof to the proximity of the surface of the blankets a, engaging members 3 and 4 extending in an arm shape in two directions, which are a lamination direction of the blankets and a surface direction of the blankets, respectively, being fixed to the tip of the strut 2. Tip portions of the engaging members 3 and 4 form guiding portions 3a and 4a slightly bent for a purpose described later.

25 The laminated inorganic fiber block A consisting of a number of blankets a, through which the spit portion passes,



is held in a state where it is compressed uniformly by binding strongly the whole thereof by means of a tape (not shown in the figure) made of paper or plastics, applying a backplate having a rectangular shape opened on one side (□-
5 shaped) made of e.g. corrugated card board, plastic plate, etc. (not shown in the figure) thereto.

On the other hand, Fig. 2 shows a cross-sectional view of a part of a furnace wall. An anchor 6 having a hook portion 6a at the tip thereof is previously attached by
10 welding, etc. to a predetermined location on the shell made of iron 5 constituting the furnace wall and back-up material 7 consisting of heat resistant inorganic fiber blankets is also mounted thereon.

Fig. 3 is a cross-sectional view of a part where
15 laminated inorganic fiber block A constructed as described above are secured to the furnace wall.

In order to secure the laminated inorganic fiber blocks to the furnace wall, similarly to a prior art, execution method, the laminated inorganic fiber blocks A are
20 so located that the lamination surface of the blankets is directed perpendicularly to the shell made of iron 5 of the furnace wall and that the lamination surfaces of the blankets of two blocks A adjacent to each other are perpendicular to each other.

Since the laminated inorganic fiber blocks A used for the execution described above are so constructed that the engaging members 3 and 4 extending in an arm shape in two directions, which are a lamination direction of the blankets and a surface direction of the blankets, respectively, are
25 disposed at the tip of the block supporting metal piece, even if the blocks adjacent to each other are directed differently, the laminated inorganic fiber blocks A can be attached to the shell made of iron by engaging either one of the engaging
30 members 3 and 4 with the hook 6a at the tip of the anchor 6
35 on the shell made of iron, corresponding to the direction of



the block which is to be secured. The engaging members can be easily engaged with hook portions, using the guiding portions 3a and 4a by bending slightly the tip portions of the engaging members 3 and 4.

5 When the tape is cut and the backplate is removed after having completed fixing of the laminated inorganic fiber blocks by the execution described above, gaps between different blocks adjacent to each other are completely filled up by resiliency of the fiber blankets compressed up to that
10 time so that lining by blocks having no gaps is formed. In this case, if the tape and the backplate are inflammable, they may be left, because they can be burnt to be eliminated by high temperature at driving the furnace.

 Although a supporting metal piece 1 having engaging
15 members 3 and 4 extending in two directions is used for the laminated inorganic fiber blocks above mentioned, it is also possible that both laminated inorganic fiber blocks, each of which has only one engaging member extending in the lamination direction of the blankets, and laminated inorganic fiber
20 blocks, each of which has only one engaging member extending in the surface direction of the blankets, are prepared and the execution is carried out by using alternately the two kinds of the laminated inorganic fiber blocks corresponding to the direction of the blocks to be secured so that the
25 lamination directions of the blocks adjacent to each other are perpendicular to each other, as described previously.

 As explained above, by the execution methods for securing laminated inorganic fiber blocks to a furnace wall according to the present inventions, since the laminated
30 inorganic fiber blocks can be held on the furnace wall by extremely such simple work, that the engaging members extending in an arm shape formed at tips of the supporting metal pieces in the laminated inorganic fiber blocks are engaged upward or horizontally with the hook portions or the
35 ring portions disposed at tips of the anchors attached to the



shell made of iron constituting the furnace wall, the laminated inorganic fiber blocks can be secured to the furnace wall in a short time without any special tool.

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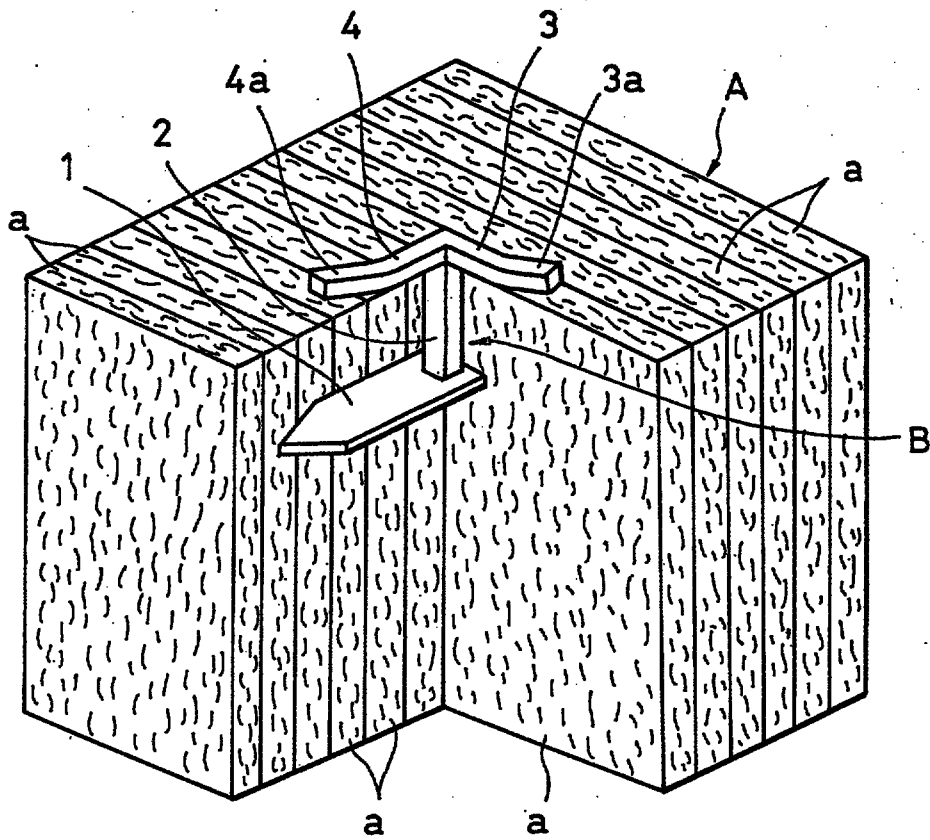
WHAT IS CLAIMED IS:

1. An execution method for securing laminated inorganic fiber blocks, in each of which a number of inorganic fiber blankets are held in a multi-layered structure by means of a supporting metal piece, to a furnace wall, said method being characterized in that said laminated inorganic fiber blocks are held on said furnace wall by engaging members disposed at tips of supporting metal pieces in said laminated inorganic fiber blocks so as to extend in an arm shape either in a lamination direction of said blankets or in a surface direction of said blankets with hook portions or ring portions disposed at tips of anchors attached to a shell made of iron constituting said furnace wall.

2. An execution method for securing laminated inorganic fiber blocks, in each of which a number of inorganic fiber blankets are held in a multi-layered structure by means of a supporting metal piece, to a furnace wall, said method being characterized in that said laminated inorganic fiber blocks are held on said furnace wall by engaging each of engaging members disposed at tips of supporting metal pieces in the laminated inorganic fiber blocks so as to extend in an arm shape in two directions, which are a lamination direction of said blankets and a surface direction of said blankets, respectively, with hook portions or ring portions disposed at tips of anchors attached to a shell made of iron constituting said furnace wall, depending on the direction of said blocks of laminated inorganic fiber which are to be arranged.



FIG. 1



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FIG. 2

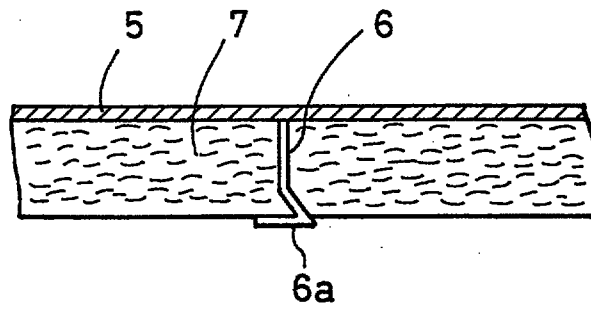
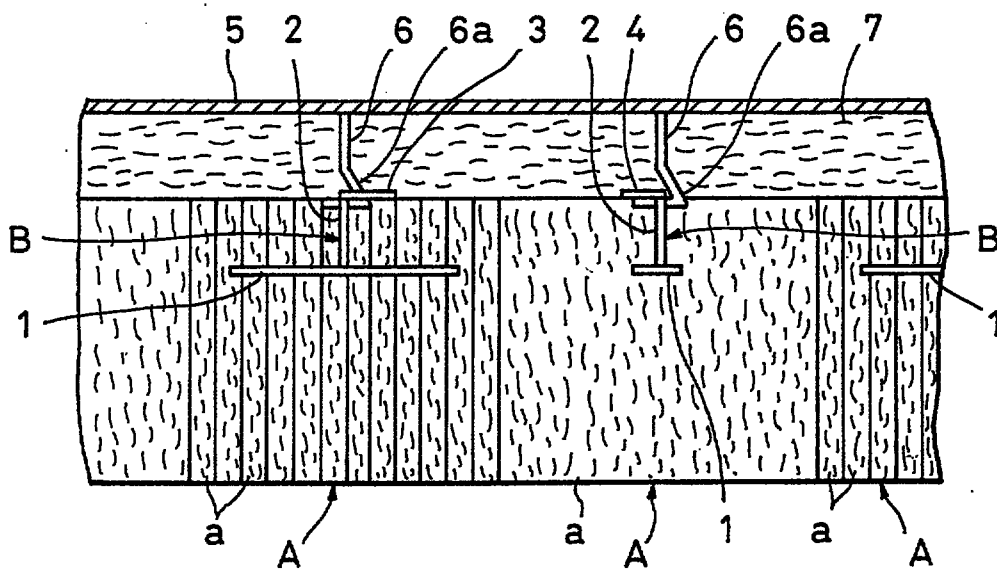


FIG. 3



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METHOD FOR SECURING LAMINATED INORGANIC FIBER BLOCKS TO A FURNACE WALL

ABSTRACT OF THE DISCLOSURE

Execution methods for securing laminated inorganic fiber blocks to a furnace wall are provided wherein it is possible to secure the laminated inorganic fiber blocks, in each of which a number of inorganic fiber blankets are held in a multi-layered structure by means of a supporting metal piece, to the furnace wall in a short time. By one of the laminated inorganic fiber blocks are held on the furnace wall by engaging each of engaging members disposed at tips of supporting metal pieces in the laminated inorganic fiber blocks so as to extend in an arm shape in two directions, which are a lamination direction of the blankets and a surface direction of the blankets, respectively, with hook portions disposed at tips of anchors attached to a shell made of iron constituting the furnace wall, depending on the direction of the laminated inorganic fiber blocks which are to be arranged.

For the execution, since it is sufficient to engage each of the engaging members on the block side with a hook portion disposed at an tip of an anchor on the furnace wall side, no special tool is necessary and work therefor is extremely simple.

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METHOD FOR SECURING LAMINATED INORGANIC
FIBER BLOCKS TO A FURNACE WALL

5 FIELD OF THE INVENTION

The present invention relates to an improvement of a method for securing laminated inorganic fiber blocks to a wall and/or ceiling portion of an industrial furnace such as an incandescence furnace, a heating furnace, a heat treatment
10 furnace, etc.

DESCRIPTION OF THE PRIOR ART

Heretofore various execution methods have been proposed for securing blocks consisting of laminated blankets of inorganic fiber excellent in heat resistance such as
15 ceramic fiber, alumina fiber, silica fiber, etc. to an inner surface of a wall of an industrial furnace.

For example, in JP-B-60-53270, an execution method is proposed wherein anchor metal sockets are attached by welding to a shell made of iron constituting the furnace wall; the
20 anchor metal sockets are inserted into mounting holes formed in supporting metal pieces incorporated in the laminated fiber blocks; a bolt is inserted into each of guide pipes disposed in the laminated fiber blocks so as to be connected with the mounting holes formed in the supporting metal
25 pieces; and the laminated fiber blocks are held on the furnace wall by screwing the bolt on each of the sockets by means of a tool through each of the mounting holes formed in the supporting metal pieces so as to tighten the former on the latter.

30 However the above execution method has a problem that work for positioning the laminated fiber blocks so that the mounting holes formed in the supporting metal pieces incorporated in the laminated fiber blocks are fitted to the sockets and centering work for screwing the bolt on each of
35 the sockets are difficult, because the laminated fiber blocks

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stand in the way to see them and thus it is difficult to see position of the socket.

In order to solve the above problem, in JP-B-62-48154, an execution method has been proposed, wherein a guide
5 rod is connected detachably with each of the anchor sockets attached to the shell made of iron constituting the furnace wall; the guide rod is inserted into each of the mounting
10 holes formed in the supporting metal pieces incorporated in the laminated inorganic fiber blocks and hollow portions connected therewith, the laminated fiber blocks being
advanced along the guide rod so that the mounting holes formed in the supporting metal pieces are engaged with the
sockets; then a mounting nut is set on the guide rod and
15 advanced along the guide rod; the supporting metal pieces are attached to the sockets by screwing the mounting nut on each
of the sockets; thereafter the guide rod is dismounted and the hollow portions are filled with inorganic fiber filling
material.

By this execution method work for positioning the
20 laminated fiber blocks so that the mounting holes formed in the supporting metal pieces incorporated in the laminated fiber blocks are fitted to the sockets and centering work for
screwing the bolt on each of the sockets are facilitated. However laboriousness of the execution method is not yet
25 solved.

SUMMARY OF THE INVENTION

The main object of the present invention is to
provide an execution method capable of securing laminated
inorganic fiber blocks to a wall of an industrial furnace by
30 extremely simple work.

An execution method for securing laminated inorganic
fiber blocks, in each of which a number of inorganic fiber
blankets are held in a multi-layered structure by means of a
supporting metal piece, to a furnace wall, according to a
35 first invention of the present application is characterized

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in that the laminated inorganic fiber blocks are held on the furnace wall by engaging members disposed at tips of supporting metal pieces in the laminated inorganic fiber blocks so as to extend in an arm shape either in a lamination direction of the blankets or in a surface direction of the blankets with hook portions or ring portions disposed at tips of anchors attached to a shell made of iron constituting the furnace wall.

An execution method for securing laminated inorganic fiber blocks, in each of which a number of inorganic fiber blankets are held in a multi-layered structure by means of a supporting metal piece, to a furnace wall, according to a second invention of the present application is characterized in that the blocks of laminated inorganic fiber are held on the furnace wall by engaging each of engaging members disposed at tips of supporting metal pieces in the laminated inorganic fiber blocks so as to extend in an arm shape in two directions, which are a lamination direction of the blankets and a surface direction of the blankets, respectively, with hook portions or ring portions disposed at tips of anchors attached to a shell made of iron constituting the furnace wall, depending on the direction of the laminated inorganic fiber blocks which are to be arranged.

By the execution methods for securing the laminated inorganic fiber blocks to the furnace wall according to the present inventions the laminated inorganic fiber blocks can be held on the furnace wall by extremely such simple work, that the engaging members extending in an arm shape formed at tips of the supporting metal pieces in the laminated inorganic fiber blocks are engaged upward or horizontally with the hook portions or the ring portions disposed at tips of the anchors attached to the shell made of iron constituting the furnace wall.

The execution methods for securing the laminated inorganic fiber blocks according to the present inventions

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can be applied not only to securing the laminated inorganic fiber blocks to the furnace wall but also to securing the laminated inorganic fiber blocks to the furnace ceiling.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is a perspective view of a laminated inorganic fiber block used for executing the methods according to the present inventions, partially cut-off;

Fig. 2 is a cross-sectional view of a part of a furnace wall; and

Fig. 3 is a cross-sectional view of a part where laminated inorganic fiber blocks are secured to the furnace wall.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Hereinafter execution methods for securing laminated inorganic fiber blocks to a furnace wall according to the present inventions will be explained concretely by using several embodiments.

In Fig. 1, A represents a laminated inorganic fiber block used for realizing one of the present inventions, in which a number of blankets a made of heat resistant inorganic fiber such as ceramic fiber, alumina fiber, silica fiber, etc. are held by a supporting metal piece B, in a state where they are laminated and compressed.

The supporting metal piece B comprises a spit portion 1 passing through the blankets a to support them and a strut 2 protruding from the central portion thereof to the proximity of the surface of the blankets a, engaging members 3 and 4 extending in an arm shape in two directions, which are a lamination direction of the blankets and a surface direction of the blankets, respectively, being fixed to the tip of the strut 2. Tip portions of the engaging members 3 and 4 form guiding portions 3a and 4a slightly bent for a purpose described later.

The laminated inorganic fiber block A consisting of a number of blankets a, through which the spit portion passes,

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is held in a state where it is compressed uniformly by binding strongly the whole thereof by means of a tape (not shown in the figure) made of paper or plastics, applying a backplate having a rectangular shape opened on one side (□-
5 shaped) made of e.g. corrugated card board, plastic plate, etc. (not shown in the figure) thereto.

On the other hand, Fig. 2 shows a cross-sectional view of a part of a furnace wall. An anchor 6 having a hook portion 6a at the tip thereof is previously attached by
10 welding, etc. to a predetermined location on the shell made of iron 5 constituting the furnace wall and back-up material 7 consisting of heat resistant inorganic fiber blankets is also mounted thereon.

Fig. 3 is a cross-sectional view of a part where
15 laminated inorganic fiber block A constructed as described above are secured to the furnace wall.

In order to secure the laminated inorganic fiber blocks to the furnace wall, similarly to a prior art execution method, the laminated inorganic fiber blocks A are
20 so located that the lamination surface of the blankets is directed perpendicularly to the shell made of iron 5 of the furnace wall and that the lamination surfaces of the blankets of two blocks A adjacent to each other are perpendicular to each other.

Since the laminated inorganic fiber blocks A used for
25 the execution described above are so constructed that the engaging members 3 and 4 extending in an arm shape in two directions, which are a lamination direction of the blankets and a surface direction of the blankets, respectively, are
30 disposed at the tip of the block supporting metal piece, even if the blocks adjacent to each other are directed differently, the laminated inorganic fiber blocks A can be attached to the shell made of iron by engaging either one of the engaging members 3 and 4 with the hook 6a at the tip of the anchor 6
35 on the shell made of iron, corresponding to the direction of

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the block which is to be secured. The engaging members can be easily engaged with hook portions, using the guiding portions 3a and 4a by bending slightly the tip portions of the engaging members 3 and 4.

5 When the tape is cut and the backplate is removed after having completed fixing of the laminated inorganic fiber blocks by the execution described above, gaps between different blocks adjacent to each other are completely filled up by resiliency of the fiber blankets compressed up to that
10 time so that lining by blocks having no gaps is formed. In this case, if the tape and the backplate are inflammable, they may be left, because they can be burnt to be eliminated by high temperature at driving the furnace.

 Although a supporting metal piece 1 having engaging
15 members 3 and 4 extending in two directions is used for the laminated inorganic fiber blocks above mentioned, it is also possible that both laminated inorganic fiber blocks, each of which has only one engaging member extending in the lamination direction of the blankets, and laminated inorganic fiber
20 blocks, each of which has only one engaging member extending in the surface direction of the blankets, are prepared and the execution is carried out by using alternately the two kinds of the laminated inorganic fiber blocks corresponding to the direction of the blocks to be secured so that the
25 lamination directions of the blocks adjacent to each other are perpendicular to each other, as described previously.

 As explained above, by the execution methods for securing laminated inorganic fiber blocks to a furnace wall according to the present inventions, since the laminated
30 inorganic fiber blocks can be held on the furnace wall by extremely such simple work, that the engaging members extending in an arm shape formed at tips of the supporting metal pieces in the laminated inorganic fiber blocks are engaged upward or horizontally with the hook portions or the
35 ring portions disposed at tips of the anchors attached to the

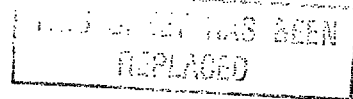
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shell made of iron constituting the furnace wall, the laminated inorganic fiber blocks can be secured to the furnace wall in a short time without any special tool.

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WHAT IS CLAIMED IS:

1. An execution method for securing laminated inorganic fiber blocks, in each of which a number of inorganic fiber blankets are held in a multi-layered structure by means of a supporting metal piece, to a furnace wall, said method being characterized in that said laminated inorganic fiber blocks are held on said furnace wall by engaging members disposed at tips of supporting metal pieces in said laminated inorganic fiber blocks so as to extend in an arm shape either in a lamination direction of said blankets or in a surface direction of said blankets with hook portions or ring portions disposed at tips of anchors attached to a shell made of iron constituting said furnace wall.

2. An execution method for securing laminated inorganic fiber blocks, in each of which a number of inorganic fiber blankets are held in a multi-layered structure by means of a supporting metal piece, to a furnace wall, said method being characterized in that said laminated inorganic fiber blocks are held on said furnace wall by engaging each of engaging members disposed at tips of supporting metal pieces in the laminated inorganic fiber blocks so as to extend in an arm shape in two directions, which are a lamination direction of said blankets and a surface direction of said blankets, respectively, with hook portions or ring portions disposed at tips of anchors attached to a shell made of iron constituting said furnace wall, depending on the direction of said blocks of laminated inorganic fiber which are to be arranged.



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Method for Securing Laminated Inorganic
Fiber Blocks to a Furnace Wall

ABSTRACT OF THE DISCLOSURE

Execution methods for securing laminated inorganic fiber blocks to a furnace wall are provided wherein it is possible to secure the laminated inorganic fiber blocks, in each of which a number of inorganic fiber blankets are held in a multi-layered structure by means of a supporting metal piece, to the furnace wall in a short time. By one of the laminated inorganic fiber blocks are held on the furnace wall by engaging each of engaging members disposed at tips of supporting metal pieces in the laminated inorganic fiber blocks so as to extend in an arm shape in two directions, which are a lamination direction of the blankets and a surface direction of the blankets, respectively, with hook portions disposed at tips of anchors attached to a shell made of iron constituting the furnace wall, depending on the direction of the laminated inorganic fiber blocks which are to be arranged.

For the execution, since it is sufficient to engage each of the engaging members on the block side with a hook portion disposed at an tip of an anchor on the furnace wall side, no special tool is necessary and work therefor is extremely simple.

Figure 1

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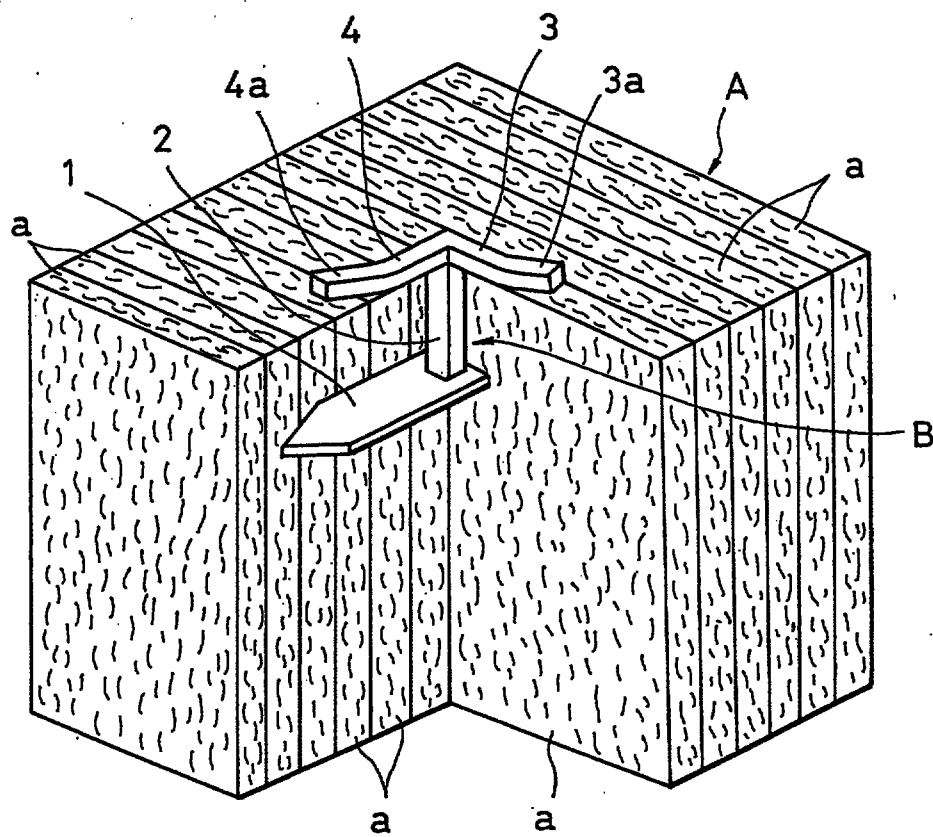
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FIG. 1



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FIG. 2

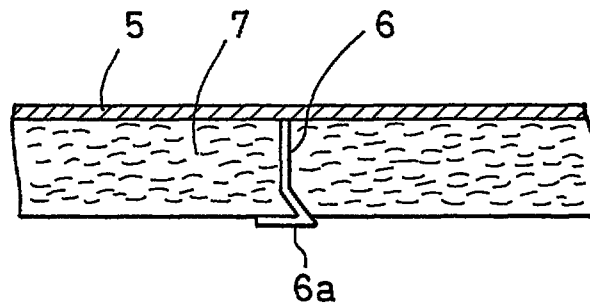
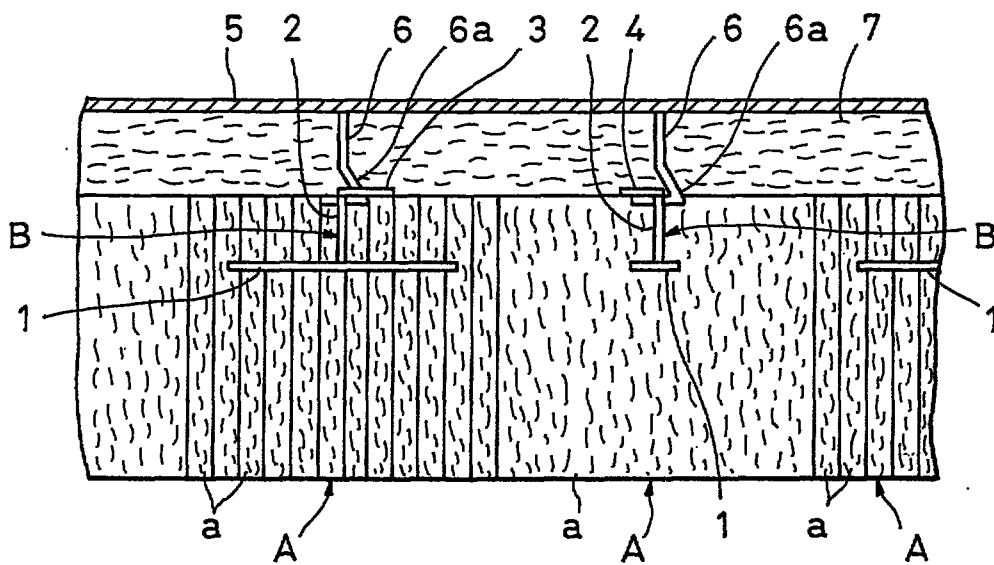


FIG. 3



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CLAIMS:

1. An execution method for securing laminated inorganic fiber blocks, in each of which a number of inorganic fiber blankets are held in a multi-layered structure by means of a supporting metal piece, to a furnace wall, said method being characterized in that said laminated inorganic fiber blocks are held on said furnace wall by engaging each of engaging members disposed at tips of supporting metal pieces in the laminated inorganic fiber blocks so as to extend in an L shape in two directions, which are a lamination direction of said blankets and a direction parallel to the surface of said blankets, respectively, with hook portions or ring portions disposed at tips of anchors attached to a shell made of iron constituting said furnace wall, depending on the direction of said blocks of laminated inorganic fiber which are to be arranged.

