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(54) **COKE OVEN WALL BRICKWORK STRUCTURE**

BACKSTEINSTRUKTUR FÜR EINE KOKSOFENWAND

STRUCTURE EN BRIQUETAGE POUR PAROI DE FOUR À COKE

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Description

FIELD OF THE INVENTION

[0001] This invention relates to a coke oven wall brickwork structure, particularly to the part of the brickwork structure of a chamber coke oven including the stretcher brick walls partitioning the coking chambers and combustion chambers and the binder brick walls partitioning adjacent combustion chamber flues.

DESCRIPTION OF THE RELATED ART

[0002] The coking chambers and combustion chambers of the chamber coke oven are arranged alternately. The partitions separating the coking chambers and combustion chambers and the partitions separating the combustion chamber flues from each other are all formed as brickwork structures. As shown in FIG. 9(a), the coking chambers 1 and the series of combustion chamber flues 3 are separated by partitions 4 called stretcher brick walls, and the combustion chamber flues 3 are separated from each other by partitions 5 called binder brick walls. As shown in FIG. 9(b), the stretcher brick walls 4 can be further divided into portions where the combustion chamber flues 3 and the coking chambers 1 face one another (hereinafter sometimes called "flue facing regions 6") and portions within regions 8 on extensions of the binder walls (hereinafter sometimes called "intersecting regions 7").

[0003] The walls of a coke oven are required to have adequate strength against thermal strain induced by uneven heating during construction, surface temperature differences during operation and the like, and various pressures such as coal expansion pressure during coking and lateral pressure during coke extrusion. They are also required to have an adequate margin of safety against buckling. Moreover, since coking in a coke oven relies on indirect heating through a single wall, air-tightness is essential not only between the combustion chamber flues and coking chambers but also between adjacent combustion chamber flues. Therefore, the individual bricks forming the coke furnace walls must have shapes that are strong against thermal deformation and external forces. In addition, they must ensure air-tightness and good thermal conductivity when assembled.

[0004] FIGs. 10(a), 10(b), 10(c), 10(d) and 10(e) show a typical oven wall brickwork structure. The structure uses three kinds of bricks: hammer brick 41 centered on an intersecting region 7 and extending across part of a stretcher brick wall 4 and part of a binder brick wall 5, stretcher brick 42 located in a stretcher brick wall 4, and binder brick 43 located in a binder brick wall 5. In the stretcher brick wall facing the coking chamber, the hammer bricks 41 are arranged one every other binder brick wall. As shown in FIG. 10(b), the hammer bricks 41 are staggered in the vertically stacked courses.

[0005] The mating faces 44 between bricks are called joints. As shown in FIGs. 10(c) and 10(d), each joint 44 includes a tongue in groove joint 45 that helps to increase the strength and improve the sealing property of the brickwork structure. In the example shown in FIG. 10(b), owing to the staggering of the hammer bricks 41 in the vertically stacked courses, the arrangement of the vertical joints is not continuous but offset every tier. The ordinary practice is to lay the bricks so that their coarse joints are continuous in the horizontal direction.

[0006] At the parts of the stretcher brick walls 4 located at the flue facing regions 6 in the oven wall brickwork shown in FIGs. 10(a), 10(b), 10(c), 10(d) and 10(e), joints are present in two vertical rows per flue. The vertical joints are not continuous. Instead, joints and stretcher bricks are arranged alternately in the vertical direction. When the coke oven wall brickwork structure sustains damage, cracks 51 occur in the stretcher bricks located between the joints of the facing regions, and joint gaps 52 form in the joints of the flue facing regions in contact with the cracks. Owing to the continuity of the brick cracks and the joint gaps, it frequently happens that, as shown in FIG. 10(e), vertical through-cracks 53 form in the oven height direction of the stretcher brick walls. When a coking chamber wall in which a vertical through-crack 53 has occurred comes under a vertical load, it may not be able to withstand the load and the cracked bricks in the stretcher brick wall may cave in.

[0007] Japanese Patent Publication (A) No. 2005-307003 ('003) teaches utilization of an angular U-shaped brick that faces the coking chamber and sandwiches the combustion chamber flue to structurally integrate a pair of binder brick walls and a stretcher brick wall in the oven longitudinal direction. In each of the stretcher brick walls, the U-shaped brick is disposed at every other combustion chamber flue, neighboring U-shaped bricks are connected to a rectangular solid brick to form the stretcher brick wall of the oven. As a result, the stretcher brick wall has no joints, so that thermal cracks caused by joint gaps can be avoided. Further, since the binder brick walls and the stretcher brick walls are structurally integrated, the arrangement also exhibits an effect of offering extremely high rigidity with respect to side wall and locally concentrated load.

SUMMARY OF THE INVENTION

[0008] The brickwork structure of '003 uses angularly U-shaped bricks to structurally unite the pair of binder brick walls and the stretcher brick wall and has a drawback in that the U-shaped brick is heavy. For easier handling during oven

construction, it is generally required to keep the unit brick weight to 25 kg or less. The weight of the U-shaped brick taught by '003 can be held to within 25 kg by reducing the brick height to around 2/3 the ordinary size. However, use of bricks that are 2/3 the usual height would rather increase bricklaying labor because it would require the number of brick courses in the coking chamber height direction to be increased 1.5 times. Moreover, the thinner brick profile would also cause other problems. For example, the bricks would be more susceptible to deformation during handling at the time of brickmaking and firing. The resulting impossibility of realizing a right-angled brick structure would make oven building difficult.

[0009] The object of the present invention is to provide an oven wall brickwork structure for a chamber type coke oven including stretcher brick walls partitioning coking chambers and combustion chambers, and binder brick walls partitioning adjacent combustion chamber flues, which oven wall brickwork structure does not experience cave-in owing to vertical through-cracks in the stretcher brick wall and is easy to build.

[0010] The gist of the invention is as set out below.

(1) A coke oven wall brickwork structure including bricks of a stretcher wall 4 that is a wall partitioning a coking chamber 1 and a combustion chamber 2 and bricks of a binder wall 5 that is a wall portioning combustion chamber flues 3 from each other, comprising

a stretcher A brick 11 that is an L-shaped brick integrally combining part of the stretcher wall 4 and part of the binder wall 5; and

a stretcher B brick 12 that is a brick forming part of the stretcher wall 4;

wherein an L-shaped corner of the stretcher A brick 11 is formed at a location thereof corresponding to the stretcher wall with a shoulder 14 capable of receiving the stretcher B brick 12, a stretcher wall portion end of the stretcher A brick 11 on the opposite side from the shoulder constitutes a stretcher end 15 and mating of the stretcher ends 15 of two stretcher A bricks 11 with each other forms a stretcher wall separating a first combustion chamber flue 3a and a coking chamber 1, a stretcher B brick 12 received at its opposite ends by the shoulders 14 of two stretcher A bricks 11 disposed with their shoulders 14 facing each other forms a stretcher wall separating a second combustion chamber flue 3b and the coking chamber 1, and the first combustion chamber flue 3a and second combustion chamber flue 3b are arranged alternately.

(2) A coke oven wall brickwork structure according to (1), wherein the binder wall 5 is formed by two stretcher A bricks 11 and a binder brick 13 disposed between the two stretcher A bricks 11.

(3) A coke oven wall brickwork structure according to (1) or (2), wherein the brickwork structure at the stretcher brick wall 4 separating the combustion chamber flue 3 and the coking chamber 1 is formed by alternately overlaying a structure formed of stretcher A bricks 11 in contact with one another and a structure formed of a stretcher B brick 12.

(4) A coke oven wall brickwork structure according to any of (1) to (3), wherein the distance between binder walls of a combustion chamber flue 3 is defined as L_0 and a joint 16 between the stretcher ends 15 of the stretcher A bricks is within $\pm 0.05 L_0$ from the center of the flue 3, and wherein the following relationships are satisfied:

$$3P / \sigma_b \leq H \times W^2 / L \leq 13000 \quad <1>$$

$$3P / \sigma_b \leq H \times B^2 / (L + B / 2) \leq 13000 \quad <2>,$$

where W is the thickness of the stretcher region of the stretcher A brick 11, H is the height of the stretcher A brick 11, B is the distance from the shoulder 14 of the stretcher A brick 11 to the surface of the binder wall on the opposite side from the shoulder 14 (binder surface S), and L is the stretcher length defined as the distance from the binder surface S to the stretcher end 15,

provided that P is the concentrated load acting on the joint between the stretcher ends of stretcher A bricks and has a value of 2,000 kg to 5,000 kg, and σ_b is the allowable bending stress of the stretcher A brick.

(5) A coke oven wall brickwork structure according to any of (1) to (4), wherein the length L_0 of the combustion chamber flue 3 between binder walls is 200 to 500 mm, the thickness W of the stretcher region of the stretcher A brick is 90 to 130 mm, the height H of the stretcher A brick is 100 to 150 mm, and the distance B from the shoulder of the stretcher A brick to the binder wall surface on the opposite side from the shoulder (binder surface s) is 100 to 250 mm.

(6) A coke oven wall brickwork structure according to any of (1) to (5), wherein a corner region 18 where the stretcher region of the stretcher A brick 11 facing the combustion chamber flue 3 and the binder brick wall 5 meet has a curved region.

(7) A coke oven wall brickwork structure according to any of (1) to (6), wherein one or both of the binder region of the stretcher A brick 11 and the binder brick 13 has a through-hole 19 for forming a duct in the binder wall.

BRIEF DESCRIPTION OF THE DRAWINGS

[0011]

FIG. 1(a) is a plan view showing a brickwork structure according to the invention.
 FIG. 1(b) is a plan view of a brick that is a component of an invention brickwork structure.
 FIG. 1(c) is a plan view of a brick that is a component of an invention brickwork structure.
 FIG. 1(d) is a plan view of a brick that is a component of an invention brickwork structure.
 FIG. 1(e) is a side view showing a brickwork structure according to the invention.
 FIG. 2 is a plan view showing a brickwork structure according to the invention.
 FIG. 3(a) is a plan view showing a brickwork structure according to the invention.
 FIG. 3(b) is a plan view showing a brickwork structure according to the invention.
 FIG. 3(c) is a side view showing a brickwork structure according to the invention.
 FIG. 4 is a plan view showing a brickwork structure according to the invention.
 FIG. 5 is a perspective cross-sectional view showing a brickwork structure according to the invention.
 FIG. 6 is a lateral cross-sectional view showing a brickwork structure according to the invention.
 FIG. 7(a) is a plan view showing a brick according to the invention.
 FIG. 7(b) is a plan view showing a brick according to the invention.
 FIG. 8 is a lateral cross-sectional view showing a brickwork structure according to the invention.
 FIG. 9(a) is a diagram used to explain the individual parts of the brickwork.
 FIG. 9(b) is a diagram used to explain the individual parts of the brickwork.
 FIG. 10(a) is a plan view showing a conventional brickwork structure.
 FIG. 10(b) is a side view showing a conventional brickwork structure.
 FIG. 10(c) is a plan view of bricks of a conventional brickwork structure.
 FIG. 10(d) is a cross-sectional view in the direction of arrow D-D in FIG. 10(c).
 FIG. 10(e) is a side view showing a conventional brickwork structure.

DETAILED DESCRIPTION OF THE INVENTION

[0012] Referring to FIGs. 9(a) and 9(b), in this invention, the partitioning walls separating the coking chambers 1 and series of combustion chambers 2 are called "stretcher brick walls 4" and the partitioning walls separating the combustion chamber flues 3 from each other are called "binder brick walls 5." The stretcher brick walls 4 can be further divided into portions where the flues 3 and the coking chambers 1 face one another (flue facing regions 6) and portions within regions 8 on extensions of the binder walls (intersecting regions 7).

[0013] As shown in FIG. 1, the coke oven wall brickwork structure according to the present invention requires stretcher A bricks 11 and stretcher B bricks 12. As shown in FIG. 1(b), the stretcher A brick 11 is an L-shaped brick integrating part of the stretcher wall 4 and part of the binder brick wall 5. The stretcher A brick 11 includes an intersecting region 7, and further includes part of the stretcher wall in contact with one side of the intersecting region 7, and part of the binder wall in contact with the intersecting region 7. The L-shaped corner of the stretcher A brick 11 has, at the part thereof corresponding to the stretcher wall (corresponding to the intersecting region 7), a shoulder 14 for receiving a stretcher B brick 12. The stretcher wall portion end of the stretcher A brick 11 on the opposite side from the shoulder is hereinafter sometimes called the "stretcher end 15." The stretcher B brick 12 is a brick that forms part of the stretcher wall. As shown in FIG. 1(c), its shape is substantially that of a rectangular solid (rectangular parallelepiped).

[0014] For convenience of explanation, the description will initially be made on the presumption that first combustion chamber flues 3a and second combustion chamber flues 3b are arranged as shown in FIG. 1(a). The first combustion chamber flues 3a and second combustion chamber flues 3b are alternately disposed in the series of combustion chambers arranged in parallel with the coking chambers. The stretcher wall separating the first combustion chamber flue 3a from the coking chamber 1 is formed by the stretcher ends 15 of two stretcher A bricks (11a, 11b) in contact with each other. On the other hand, the stretcher wall separating the second combustion chamber flue 3b from the coking chamber 1 is formed between opposing shoulders 14 of two stretcher A bricks (11a, 11c) by a stretcher B brick 12 whose opposite ends are received by the shoulders 14 of the two stretcher A bricks (11a, 11c).

[0015] As shown in FIG. 1(b), the shoulder 14 of the stretcher A brick 11 is formed in the intersecting region 7. As a

result, the mating faces (joint 17) between the shoulder 14 of the stretcher A brick 11 and the end of the stretcher B brick 12 are situated in the intersecting region 7, i.e., in the stretcher wall within a region 8 on an extension of the binder wall.

[0016] The series of combustion chambers are formed on both side with stretcher walls in contact the coking chambers. And both sides form brickwork structures composed of stretcher A bricks and stretcher B bricks in the foregoing manner.

In the present invention, the binder brick wall 5 can be formed as shown in FIG. 2 by joining the binder wall ends of the stretcher A bricks 11 but it is also possible, as shown in FIGs. 1(a), 1(b), 1(c), 1(d) and 1(e) to interpose a separate binder brick 13 between the stretcher A bricks 11 on opposites sides. Provision of the separate binder brick 13 is preferable because it enables weight reduction of the individual stretcher A bricks. In this case, the binder wall is formed by two stretcher A bricks and a binder brick interposed between the two stretcher A bricks.

When next course of bricks is laid on the previously laid course, it is assumed that, as shown in FIGs. 3(a), 3(b) and 3(c), the first combustion chamber flues 3a and second combustion chamber flues 3b are interchanged relative to the foregoing presumption. Specifically, a combustion chamber flue formed as a first combustion chamber flue 3a in the first course (FIG. 3(a)) by joining the stretcher ends of stretcher A bricks is in the second course (FIG. 3(b)) formed as a second combustion chamber flue 3b by installing a stretcher B brick. In other words, in laying the bricks of the stretcher wall, the brickwork structure separating the flues and the coking chambers is formed, as shown in FIG. 3(c), by laying the bricks so that structures formed by contacting stretcher A bricks 11 with each other and structures formed by stretcher B bricks 12 alternate. The joints are therefore prevented from running continuously in the vertical direction.

As regards the stretcher walls on opposite sides of the combustion chamber flues during the laying of a given course, it is possible, as shown in FIG. 4, to lay bricks on one side assuming a combustion chamber flue to be combustion chamber flue 3a and on the other side to lay bricks assuming the same combustion chamber flue to be a second combustion chamber flue 3b.

As shown in FIG. 5, in the brickwork structure according to the present invention, each L-shaped stretcher A brick 11 is connected at its stretcher end 15 to the adjacent stretcher A brick 11 and is also assembled into the associated binder brick wall 5. As a result, a load P acting perpendicularly to the stretcher end 15 from the coking chamber side can be borne solely by a single course of bricks without relying on the rigidity of an adjacent course or courses. Stretcher B bricks 12 of the adjacent courses make contact with joint region between the stretcher ends 15. Since the stretcher ends of the L-shaped stretcher A bricks 11 are joined together, a pressing load acting on the joint 16 between the stretcher ends produces a force in the direction of closing the joint 16. Therefore, no force is applied in the direction of producing a crack in the stretcher B bricks 12 of the adjacent courses. As a result, brick cracking does not readily occur in the stretcher B bricks 12 adjacent to joint 16 between the stretcher ends. Even if a crack should occur in one of the adjacent stretcher B bricks 12 and progress through the joint bonding the stretcher ends of the stretcher A bricks (the joint 16) to grow into a vertical through-crack, the fact that the stretcher A bricks possess self-supporting rigidity ensures that the brickwork does not cave into the combustion chamber flue.

Moreover, as mentioned above, when a perpendicular load P acts on the stretcher ends 15 from the coking chamber side, a force is produced that acts in the direction of closing the joint 16 between the stretcher ends, so that no gap forms in the stretcher end joint. Thus, any vertical through-crack that might form is countered by a force acting in the direction of preventing crack enlargement. A crack resisting property is thus established.

The vertical joints formed in the stretcher wall include not only the joints 16 between the stretcher ends 15 of the stretcher A bricks 11 but also the joints where the ends of the stretcher B bricks 12 and the shoulders 14 of the stretcher A bricks 11 meet (the joints 17). These latter joints are located in the intersecting regions 7, i.e., within regions 8 on extensions of the binder walls (FIGs. 1(a), 1(b), 1(c), 1(d) and 1(e)). The so-arranged joints are characterized in being resistant to formation of vertical through-cracks.

Thus, as will be understood from the foregoing explanation, in the oven wall brickwork structure according to the present invention, even if a vertical through-crack should form in a joint between the stretcher ends of stretcher A bricks 11 (a joint 16) (formed in a flue facing region 6), the crack cannot easily grow, so that the oven wall is safe from cave-in. Moreover, the probability of a vertical through-crack forming in the joint between a stretcher A brick 11 and a stretcher B brick 12 (joint 17) (formed in a intersecting region 7) is low from the start. The coke oven wall brickwork structure according to the invention can therefore prevent cave-in of bricks cracked as a result of vertical through-cracking.

The dimensions of the stretcher wall formed where two stretcher A bricks 11 join at their stretcher ends will be explained with reference to FIG. 6. The stretcher wall length La of the stretcher A brick 11a (distance from binder wall surface on the opposite side from the shoulder (binder surface S) to the outer extremity of stretcher end) can be the same as or different from the stretcher wall length Lb of the stretcher A brick 11b. When the stretcher wall lengths La and Lb are the same, the joint 16 between the stretcher ends is located at the stretcher wall center C. When La and Lb are different, the joint is located apart from the center C.

To say that the joint 16 between the stretcher ends is located apart from the center C means that the stretcher wall length La is small and the stretcher wall length Lb is large, but when one or the other of the stretcher wall lengths is too long, the strength of the stretcher regions of the stretcher A bricks 11 declines.

In the present invention, where the length of the combustion chamber flue between the binder walls is defined

as L_0 , it is preferable from the viewpoint of maintaining adequate strength of the stretcher A bricks for the joint between the stretcher ends of the stretcher A bricks to be within $\pm 0.05 L_0$ from the center C.

[0026] Further, as shown in FIG. 5, the thickness of the stretcher region of the stretcher A brick 11 is defined as W (mm), the height of the stretcher A brick 11 as H (mm), the distance from the shoulder 14 of the stretcher A brick 11 to the surface of the binder wall on the opposite side from the shoulder (binder surface S) as B (mm), and the distance from the binder surface S to the stretcher end as stretcher length L. In the present invention, it is desirable to satisfy:

$$3P / \sigma_b \leq H \times W^2 / L \leq 13000 \quad <1>$$

$$3P / \sigma_b \leq H \times B^2 / (L + B / 2) \leq 13000 \quad <2>$$

[0027] The form of the middle terms of the formulas can be derived from the theoretical equation for the bending moment of the narrowest width region in the vicinity of the stretcher A brick.

[0028] P (kg) is the concentrated load acting on the joint between the stretcher ends of two stretcher A bricks and σ_b (kg/mm²) is the allowable bending stress of the stretcher A brick. 2,000 kg is adopted as the concentrated load P. The brick can be further improved in strength by increasing P to the range of greater than 2,000 kg to 5,000 kg. Ordinary silica bricks have a σ_b of around 0.6 to 1.0 kg/mm².

[0029] When the concentrated load is applied to the stretcher end, the maximum tensile stress acts on the stretcher A brick in the vicinity of the stretcher root and the shoulder root. If the dimensions and shape of the stretcher A brick satisfy the left side of the Formulas <1> and <2>, the maximum tensile stress under the concentrated load can be kept within the allowable stress, occurrence of through-cracking can be inhibited, and the strength and rigidity of the stretcher A brick with respect to bending stress can be ensured. Moreover, by striking a good balance among the values of H, W and B, a well-balanced structure that minimizes brick unit weight can be established. Increasing brick height H while maintaining low weight makes it possible to reduce the number of courses, thereby improving brickwork constructability. In addition, brick processing (making) performance can be improved (no thermal deformation of thickness and height) to inhibit through-cracking (ensure required thickness), thereby enhancing safety through gas-leakage prevention and the like. It also becomes possible to establish the flue cross-sectional area needed for good heat transfer efficiency, and to improve brickwork constructability (reduce number of courses).

[0030] The reason for making the right sides of Formulas <1> and <2> equal to or less than 13,000 (mm²) is to avoid excessive rigidity reduction, occurrence of stress, and shape-related production problems by making brick width, depth and height as close to equal as possible

[0031] In this invention, if the length L_0 of the flue between the binder walls of the combustion chamber is too small, combustion performance is degraded owing to insufficient space within the combustion chamber. If it is too large, the length of the stretcher wall increases to reduce stretcher brick rigidity, which in turn reduces the rigidity of the oven wall. These problems do not arise if the inter-binder wall length L_0 is in the range of 200 to 500 mm. If the thickness W of the stretcher region of the stretcher A brick is too small, the rigidity of the stretcher brick declines to lower the rigidity of the oven wall. If it is too large, heat transfer from the combustion chamber diminishes to lower coke oven efficiency. These problems do not arise if the thickness W of the stretcher region is in the range of 90 to 130 mm. If the height H of the stretcher A brick is too small, the number of brick courses in the coking chamber height direction must be increased, which increases the amount of bricklaying work. In addition, the thinner brick is more susceptible to deformation during handling at the time of brickmaking and firing. The resulting impossibility of realizing a right-angled brick structure is liable to make oven building difficult. If the height H is too large, brick handling is impeded by the increase in brick unit weight. These problems do not arise if the height H is in the range of 100 to 150 mm. If the distance B from the shoulder of the stretcher A brick to the binder wall surface on the opposite side from the shoulder (binder surface s) is too small, the rigidity of the stretcher brick against rotation declines. If it is too large, heat transfer from the combustion chamber diminishes to lower coke oven efficiency. These problems do not arise if the distance B is in the range of 100 to 250 mm.

[0032] The stretcher A brick of the invention is substantially L-shaped and includes a stretcher region facing the combustion chamber flue and a corner region that contacts the binder wall (FIG. 7(a)). In this invention, as shown in FIG. 7(b), the corner region 18 preferably has a curved region. The presence of the curved region mitigates stress concentration and increases rigidity against bending. The radius of curvature of the curved region is desirably equal to or greater than about 1/3 to 1/2 the thickness W of the stretcher brick (about 50 mm).

[0033] The binder walls are sometimes equipped with ducts for passing air for multi-stage combustion conducted as an NO_x countermeasure. In this invention, as shown in FIG. 8, it is possible to provide through-holes 19 in the binder regions of the stretcher A bricks 11 or in the binder bricks 13 or in both and to form the binder wall ducts of the through-

holes 19. This is preferable because the through-holes are can be used without modification as the ducts for multi-stage combustion.

INDUSTRIAL APPLICABILITY

[0034] The coke oven wall brickwork structure according to this invention uses stretcher A bricks to form joints in the stretcher brick wall. The stretcher A brick is formed to have an L-shape that straddles the stretcher wall and the binder wall, whereby it can withstand stress acting perpendicular to the stretcher brick wall. Even if a vertical through-crack should form along the stretcher wall joints, the bricks do not cave into the flue. Owing to the fact that even the largest of the stretcher A bricks 11 merely occupies a portion of the stretcher wall and a portion of the binder wall, brick unit weight can be reduce relative to that according to Japanese Patent Publication (A) No. 2005-307003, so that the workload during construction can be kept low without need to reduce brick height.

Claims

1. A coke oven wall brickwork structure including bricks of a stretcher wall that is a wall partitioning a coking chamber and a combustion chamber and bricks of a binder wall that is a wall portioning combustion chamber flues from each other, comprising
 - a stretcher A brick that is an L-shaped brick integrally combining part of the stretcher wall and part of the binder wall; and
 - a stretcher B brick that is a brick forming part of the stretcher wall;
 wherein an L-shaped corner of the stretcher A brick is formed at a location thereof corresponding to the stretcher wall with a shoulder capable of receiving the stretcher B brick, a stretcher wall portion end of the stretcher A brick on the opposite side from the shoulder constitutes a stretcher end and mating of the stretcher ends of two stretcher A bricks with each other forms a stretcher wall separating a first combustion chamber flue and a coking chamber, a stretcher B brick received at its opposite ends by the shoulders of two stretcher A bricks disposed with their shoulders facing each other forms a stretcher wall separating a second combustion chamber flue and the coking chamber, and the first combustion chamber flue and second combustion chamber flue are arranged alternately.
2. A coke oven wall brickwork structure according to claim 1, wherein the binder wall is formed by two stretcher A bricks and a binder brick disposed between the two stretcher A bricks.
3. A coke oven wall brickwork structure according to claim 1 or 2, wherein the brickwork structure at the stretcher brick wall separating the combustion chamber flue and the coking chamber is formed by alternately overlaying a structure formed of stretcher A bricks in contact with one another and a structure formed of a stretcher B brick.
4. A coke oven wall brickwork structure according to any of claims 1 to 3, wherein the distance between binder walls of a combustion chamber flue is defined as L_0 and a joint between the stretcher ends of the stretcher A bricks is within $\pm 0.05 L_0$ from the center of the flue, and wherein the following relationships are satisfied:

$$3P / \sigma_b \leq H \times W^2 / L \leq 13000 \quad <1>$$

$$3P / \sigma_b \leq H \times B^2 / (L + B / 2) \leq 13000 \quad <2>,$$

where W is the thickness of the stretcher region of the stretcher A brick, H is the height of the stretcher A brick, B is the distance from the shoulder of the stretcher A brick to the surface of the binder wall on the opposite side from the shoulder (binder surface S), and L is the stretcher length defined as the distance from the binder surface S to the stretcher end,

provided that P is the concentrated load acting on the joint between the stretcher ends of stretcher A bricks and has a value of 2,000 kg to 5,000 kg, and σ_b is the allowable bending stress of the stretcher A brick.

5. A coke oven wall brickwork structure according to any of claims 1 to 4, wherein the length L_0 of the combustion

chamber flue between binder walls is 200 to 500 mm, the thickness W of the stretcher region of the stretcher A brick is 90 to 130 mm, the height H of the stretcher A brick is 100 to 150 mm, and the distance B from the shoulder of the stretcher A brick to the binder wall surface on the opposite side from the shoulder (binder surface s) is 100 to 250 mm.

6. A coke oven wall brickwork structure according to any of claims 1 to 5, wherein a corner region where the stretcher region of the stretcher A brick facing the combustion chamber flue and the binder brick wall meet has a curved region.
7. A coke oven wall brickwork structure according to any of claims 1 to 6, wherein one or both of the binder region of the stretcher A brick and the binder brick has a through-hole for forming a duct in the binder wall.

Patentansprüche

1. Ziegelmauerwerkstruktur einer Koksofenwand, die Ziegel einer Läuferwand, die eine Wand ist, die eine Kokskammer und eine Brennkammer trennt, und Ziegel einer Binderwand umfasst, die eine Wand ist, die Brennkammer-Rauchabzugskanäle voneinander trennt, die aufweist einen Läuferziegel A, der ein L-förmiger Ziegel ist, der integral einen Teil der Läuferwand und einen Teil der Binderwand kombiniert; und einen Läuferziegel B, der ein Ziegel ist, der einen Teil der Läuferwand bildet; wobei eine L-förmige Ecke des Läuferziegels A an einer Stelle davon, die der Läuferwand entspricht, mit einer Schulter ausgebildet ist, die zur Aufnahme des Läuferziegels B imstande ist, ein Läuferwandabschnittsende des Läuferziegels A auf der von der Schulter gegenüberliegenden Seite ein Läuferende bildet und ein Ineinandergreifen der Läuferenden von zwei Läuferziegeln A miteinander eine Läuferwand bildet, die einen ersten Brennkammer-Rauchabzugskanal und eine Kokskammer trennt, ein Läuferziegel B, der an seinen gegenüberliegenden Enden durch die Schultern von zwei Läuferziegeln A aufgenommen ist, die so angeordnet sind, dass ihre Schultern zueinander weisen, eine Läuferwand bildet, die einen zweiten Brennkammer-Rauchabzugskanal und die Kokskammer trennt, und der erste Brennkammer-Rauchabzugskanal und der zweite Brennkammer-Rauchabzugskanal abwechselnd angeordnet sind.
2. Ziegelmauerwerkstruktur einer Koksofenwand nach Anspruch 1, wobei die Binderwand durch zwei Läuferziegel A und einen Binderziegel gebildet wird, der zwischen den beiden Läuferziegeln A angeordnet ist.
3. Ziegelmauerwerkstruktur einer Koksofenwand nach Anspruch 1 oder 2, wobei die Ziegelmauerwerkstruktur an der Läuferziegelwand, die den Brennkammer-Rauchabzugskanal und die Kokskammer trennt, durch abwechselndes Übereinanderlegen einer Struktur, die aus Läuferziegeln ausgebildet ist, die miteinander in Kontakt stehen, und einer Struktur gebildet wird, die aus einem Läuferziegel B gebildet wird.
4. Ziegelmauerwerkstruktur einer Koksofenwand nach einem der Ansprüche 1 bis 3, wobei der Abstand zwischen Binderwänden eines Brennkammer-Rauchabzugskanals als L_0 definiert ist und eine Verbindungsstelle zwischen den Läuferenden der Läuferziegel A innerhalb $\pm 0,05 L_0$ von der Mitte des Rauchabzugskanals liegt, und wobei die folgenden Beziehungen erfüllt werden:

$$3P / \sigma b \leq H \times W^2 / L \leq 13000 \quad <1>$$

$$3P / \sigma b \leq H \times B^2 / (L + B / 2) \leq 13000 \quad <2>,$$

wobei W die Dicke des Läuferbereichs des Läuferziegels A ist, H die Höhe des Läuferziegels A ist, B der Abstand von der Schulter des Läuferziegels A zur Oberfläche der Binderwand auf der von der Schulter (Binderoberfläche S) gegenüberliegenden Seite ist, und L die Läuferlänge ist, die als der Abstand von der Binderoberfläche S zum Läuferende definiert ist,

unter der Voraussetzung, dass P die Punktlast ist, die auf die Verbindungsstelle zwischen den Läuferenden der Läuferziegel A wirkt, und einen Wert von 2000 kg bis 5000 kg aufweist, und σb die zulässige Biegespannung des Läuferziegels A ist.

5. Ziegelmauerwerkstruktur einer Koksofenwand nach einem der Ansprüche 1 bis 4, wobei die Länge L_0 des Brennkammer-Rauchabzugskanals zwischen Binderwänden 200 bis 500 mm beträgt, die Dicke W des Läuferbereichs des Läuferziegels A 90 bis 130 mm beträgt, die Höhe H des Läuferziegels A 100 bis 150 mm beträgt und der Abstand B von der Schulter des Läuferziegels A zur Binderwandoberfläche auf der von der Schulter (Binderoberfläche S) gegenüberliegenden Seite 100 bis 250 mm beträgt.
6. Ziegelmauerwerkstruktur einer Koksofenwand nach einem der Ansprüche 1 bis 5, wobei ein Eckbereich, wo sich der Läuferbereich des Läuferziegels A, der zum Brennkammer-Rauchabzugskanal weist, und die Binderziegelwand treffen, einen gekrümmten Bereich aufweist.
7. Ziegelmauerwerkstruktur einer Koksofenwand nach einem der Ansprüche 1 bis 6, wobei der Binderbereich des Läuferziegels A und/oder der Binderziegel ein Durchgangsloch zum Bilden eines Kanals in der Binderwand aufweisen.

Revendications

1. Structure en briquetage pour paroi de four à coke, comportant des briques d'une paroi en panneresses, laquelle est une paroi séparant une chambre de carbonisation d'une chambre de combustion, et des briques d'une paroi de liaison, laquelle est une paroi séparant des carreaux de chambre de combustion l'un de l'autre, comprenant une panneresse A, laquelle est une brique en forme de L intégrant une partie de la paroi en panneresses et une partie de la paroi de liaison ; et une panneresse B, laquelle est une brique faisant partie de la paroi en panneresses ; où un coin en L de la panneresse A est formé à un emplacement de celle-ci correspondant à la paroi en panneresses, avec un épaulement permettant le logement de la panneresse B, une extrémité de partie de paroi en panneresses de la panneresse A sur le côté opposé à l'épaulement constitue une extrémité de panneresse et l'aboutement des extrémités de deux panneresses A forme une paroi en panneresses séparant un premier carneau de chambre de combustion et une chambre de carbonisation, une panneresse B logée par ses extrémités opposées dans les épaulements de deux panneresses A disposées avec leurs épaulements en vis-à-vis forme une paroi en panneresses séparant un deuxième carneau de chambre de combustion et la chambre de carbonisation, et le premier carneau de chambre de combustion et le deuxième carneau de chambre de combustion sont disposés en alternance.
2. Structure en briquetage pour paroi de four à coke selon la revendication 1, où la paroi de liaison est formée par deux panneresses A et une brique de liaison disposée entre les deux panneresses A.
3. Structure en briquetage pour paroi de four à coke selon la revendication 1 ou la revendication 2, où la structure en briquetage sur la paroi en panneresses séparant le carneau de chambre de combustion et la chambre de carbonisation est formée par superposition alternée d'une structure constituée de panneresses A en contact l'une avec l'autre, et d'une structure formée d'une panneresse B.
4. Structure en briquetage pour paroi de four à coke selon l'une des revendications 1 à 3, où la distance entre les parois de liaison d'un carneau de chambre de combustion est définie par L_0 , et un joint entre les extrémités des panneresses A est de $\pm 0,05 L_0$ depuis le centre du carneau, et où il est satisfait aux relations suivantes :

$$3P / \sigma b \leq H \times W^2 / L \leq 13000 \quad <1>$$

$$3P / \sigma b \leq H \times B^2 / (L + B / 2) \leq 13000 \quad <2>, \quad$$

où W est l'épaisseur de la zone panneresse de la panneresse A, H est la hauteur de la panneresse A, B la distance de l'épaulement de la panneresse A à la surface de la paroi de liaison sur le côté opposé à l'épaulement (surface de liaison S), et L la longueur de panneresse définie comme distance de la surface de liaison S à l'extrémité de panneresse, étant supposé que P est la charge concentrée qui s'exerce sur le joint entre les extrémités des panneresses A et

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a une valeur comprise entre 2.000 kg et 5.000 kg, et que σ_b est la contrainte de flexion admissible pour la panneresse A.

- 5 **5.** Structure en briquetage pour paroi de four à coke selon l'une des revendications 1 à 4, où la longueur L_0 du carneau de chambre de combustion entre les parois de liaison est comprise entre 200 et 500 mm, l'épaisseur W de la zone panneresse de la panneresse A est comprise entre 90 et 130 mm, la hauteur H de la panneresse A est comprise entre 100 et 150 mm, et la distance B de l'épaulement de la panneresse A à la surface de paroi de liaison sur le côté opposé à l'épaulement (surface de liaison S) est comprise entre 100 et 250 mm.
- 10 **6.** Structure en briquetage pour paroi de four à coke selon l'une des revendications 1 à 5, où une zone de coin où se rejoignent la zone panneresse de la panneresse A vis-à-vis du carneau de chambre de combustion et la paroi de briques de liaison présente une partie incurvée.
- 15 **7.** Structure en briquetage pour paroi de four à coke selon l'une des revendications 1 à 6, où la zone de liaison de la panneresse A et/ou la brique de liaison présentent un trou traversant pour former un conduit dans la paroi de liaison.

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Fig.1(a)

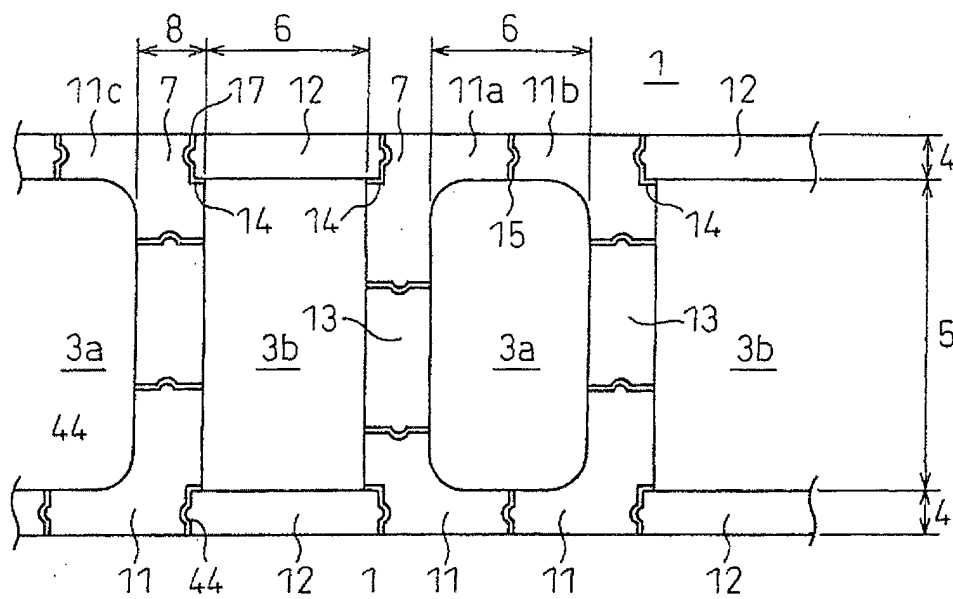


Fig. 1(b)

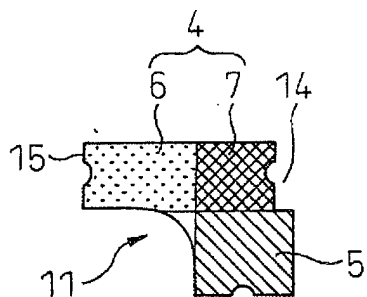


Fig. 1(c)

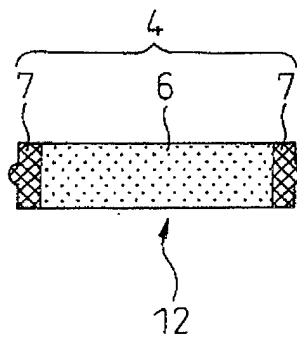


Fig. 1(d)

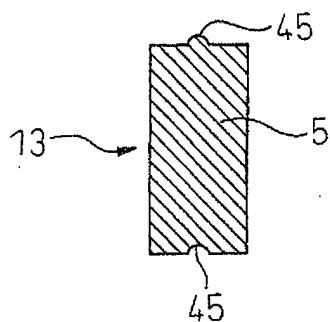


Fig. 1 (e)

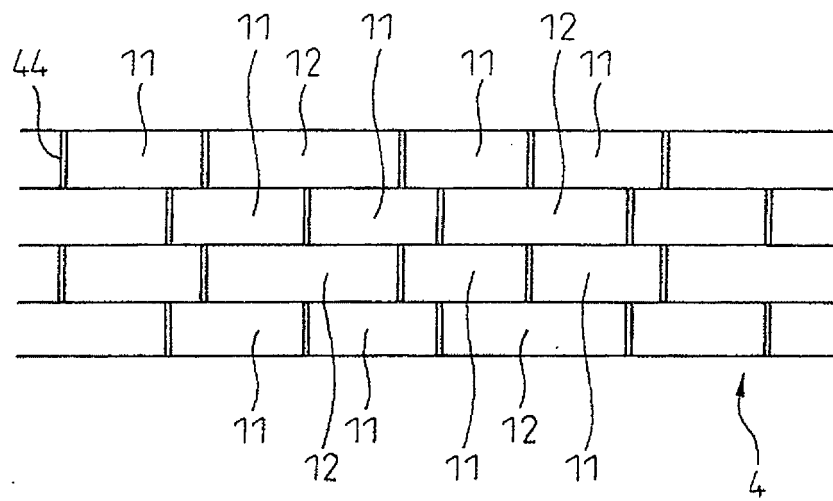


Fig. 2

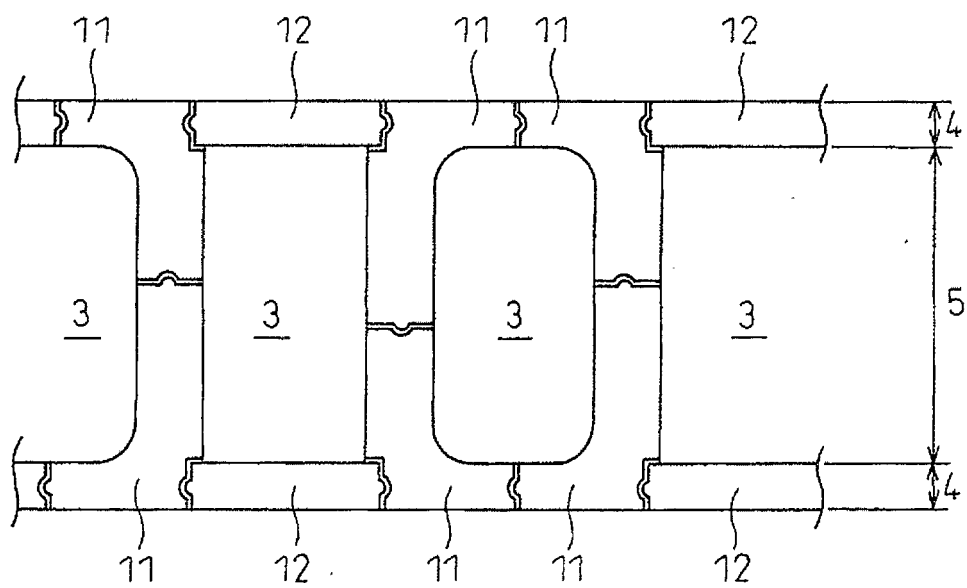


Fig.3(a)

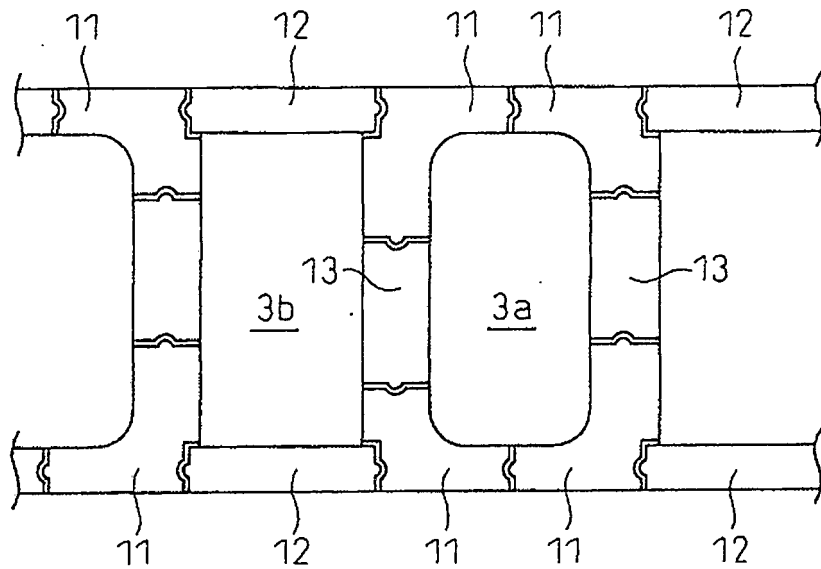


Fig.3(b)

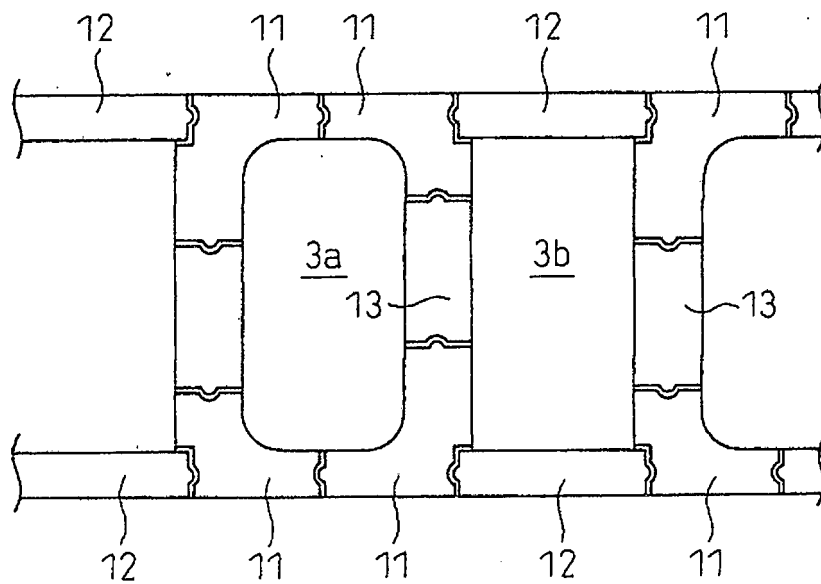


Fig.3(c)

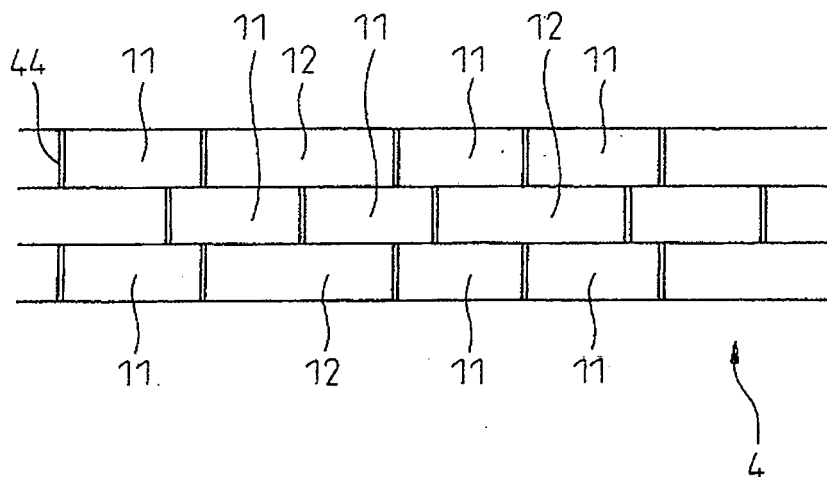


Fig.4

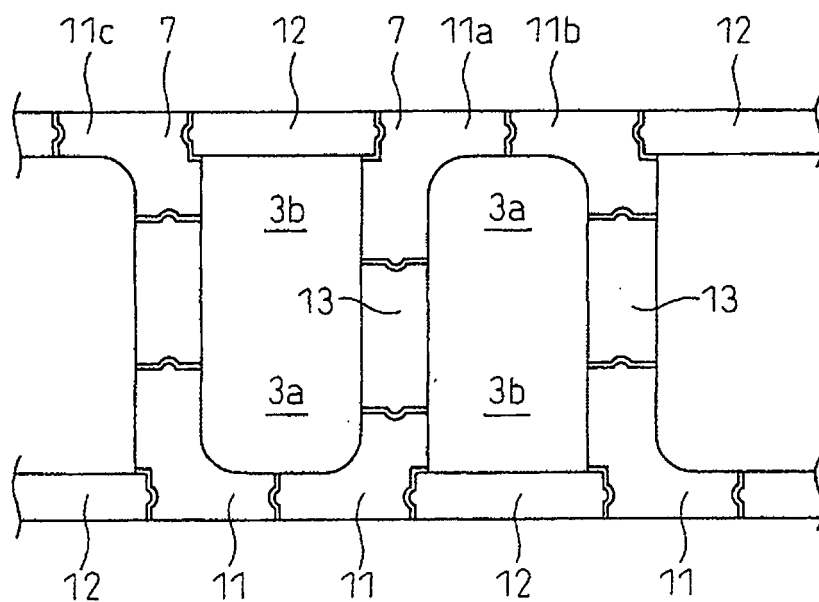


Fig.5

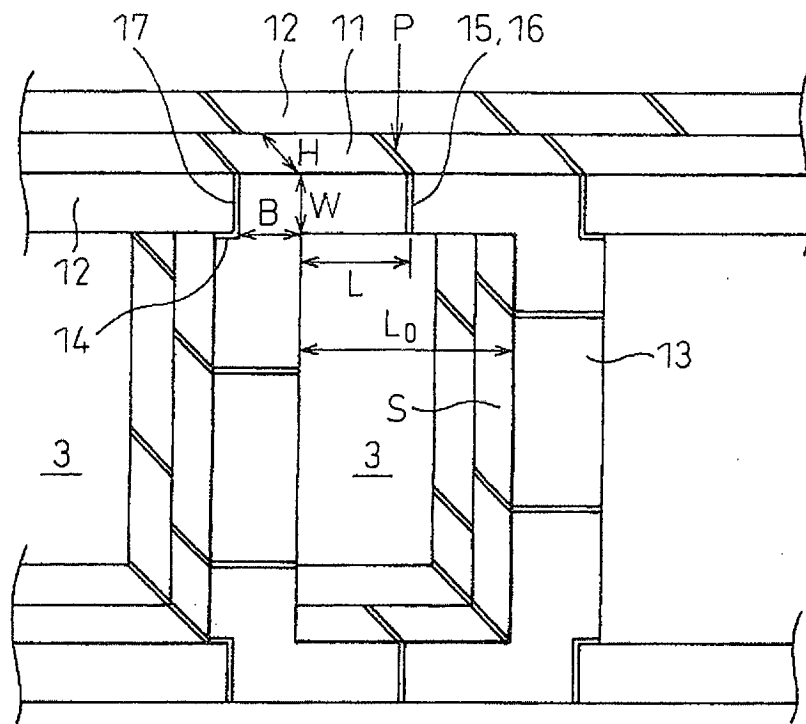


Fig.6

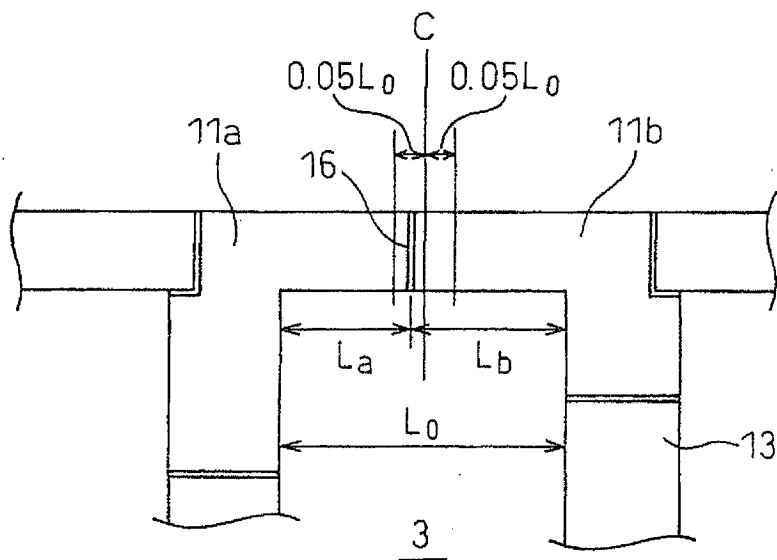


Fig. 7(a)

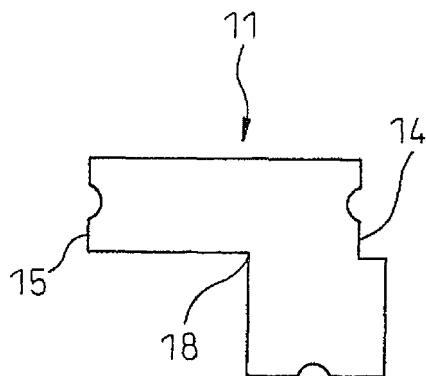


Fig. 7(b)

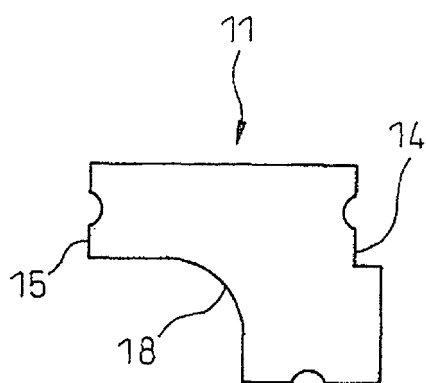


Fig. 8

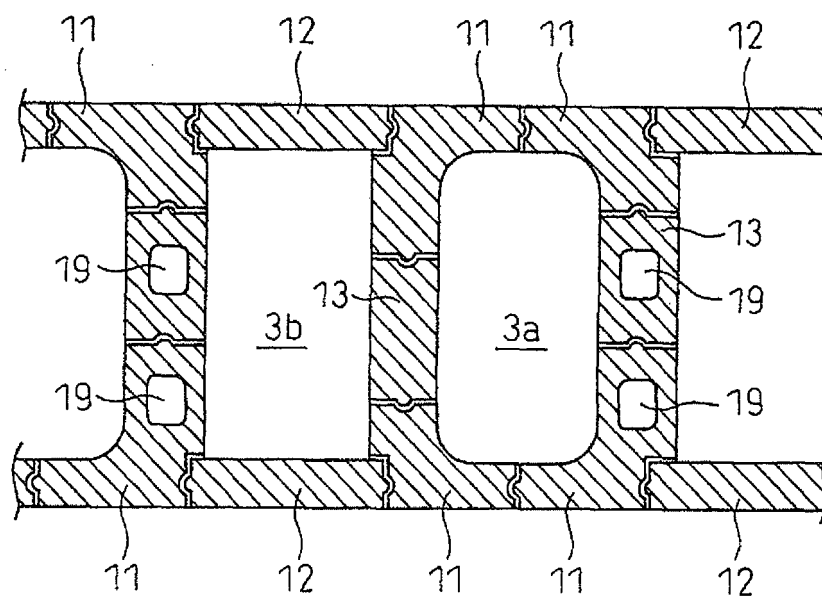


Fig.9(a)

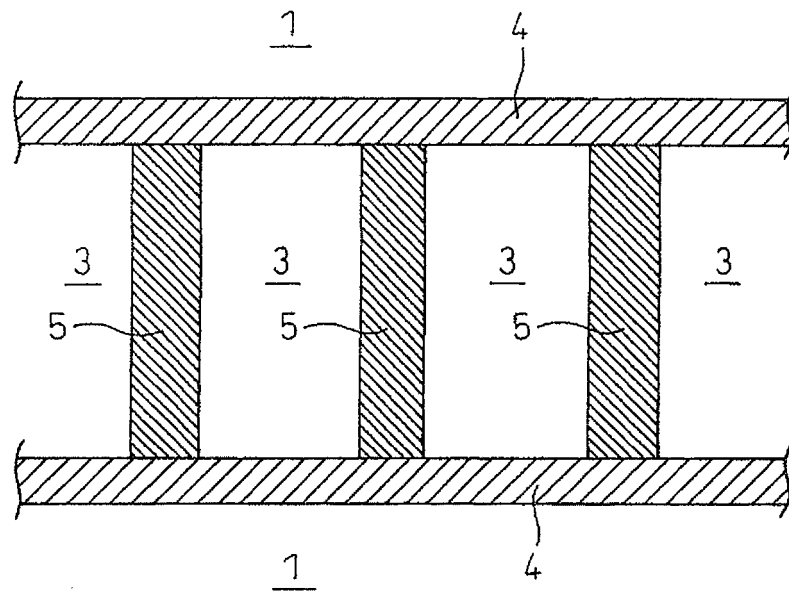


Fig.9(b)

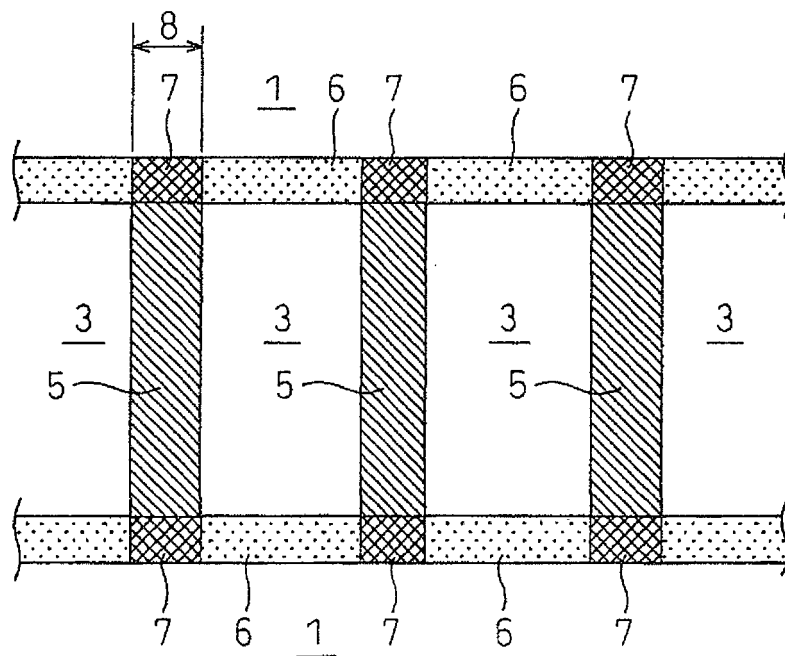


Fig.10(a)

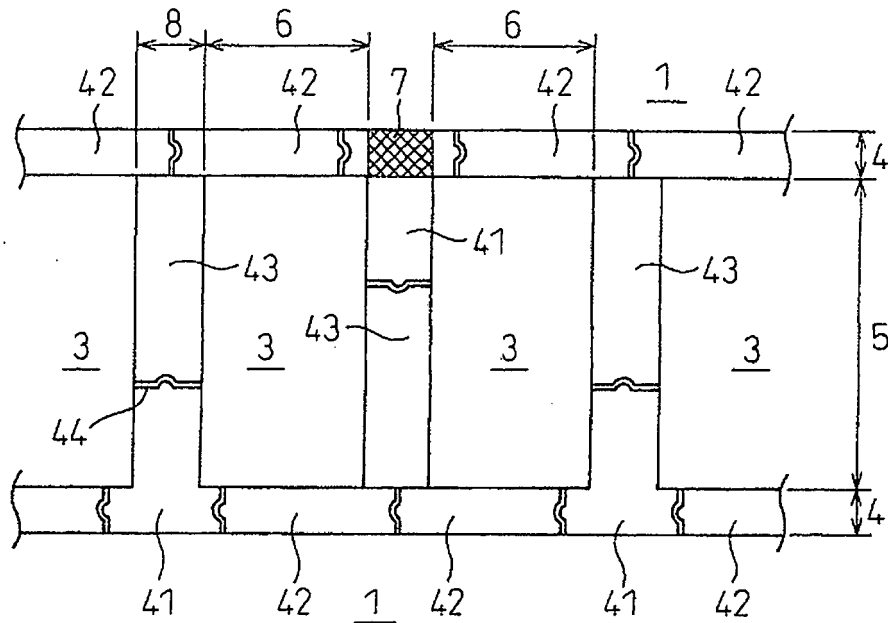
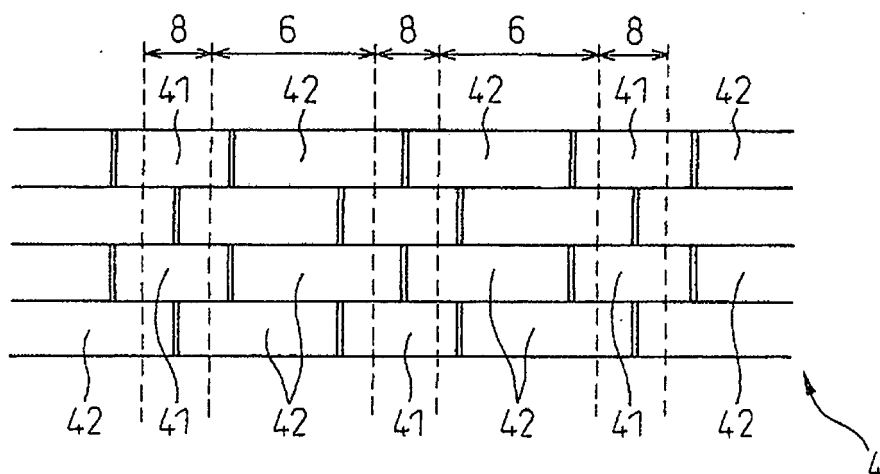


Fig.10(b)



REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

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