

March 31, 1931.

M. LIPTAK

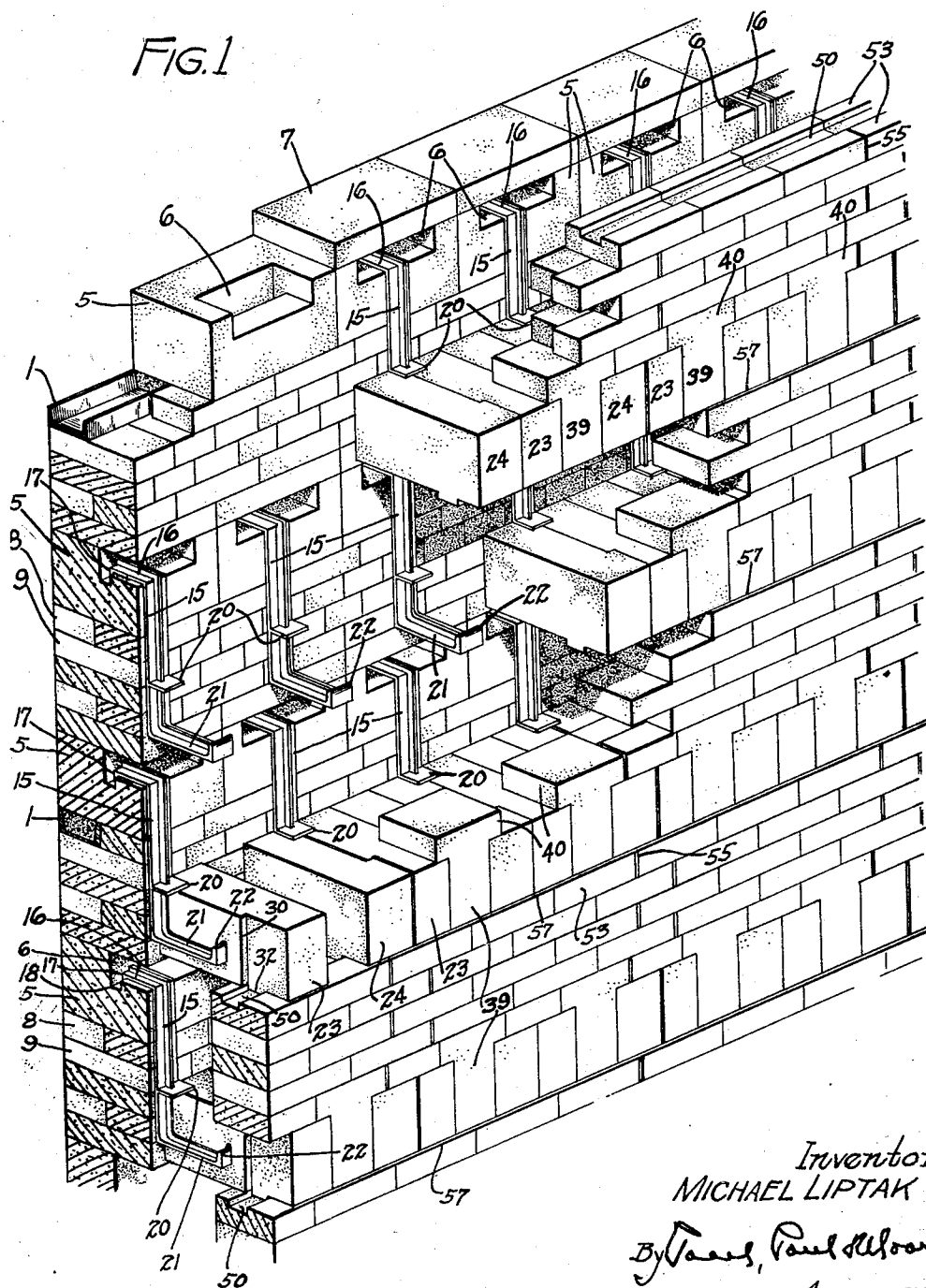
1,798,331

FIRE WALL

Filed Nov. 1, 1928

3 Sheets-Sheet 1

FIG. 1



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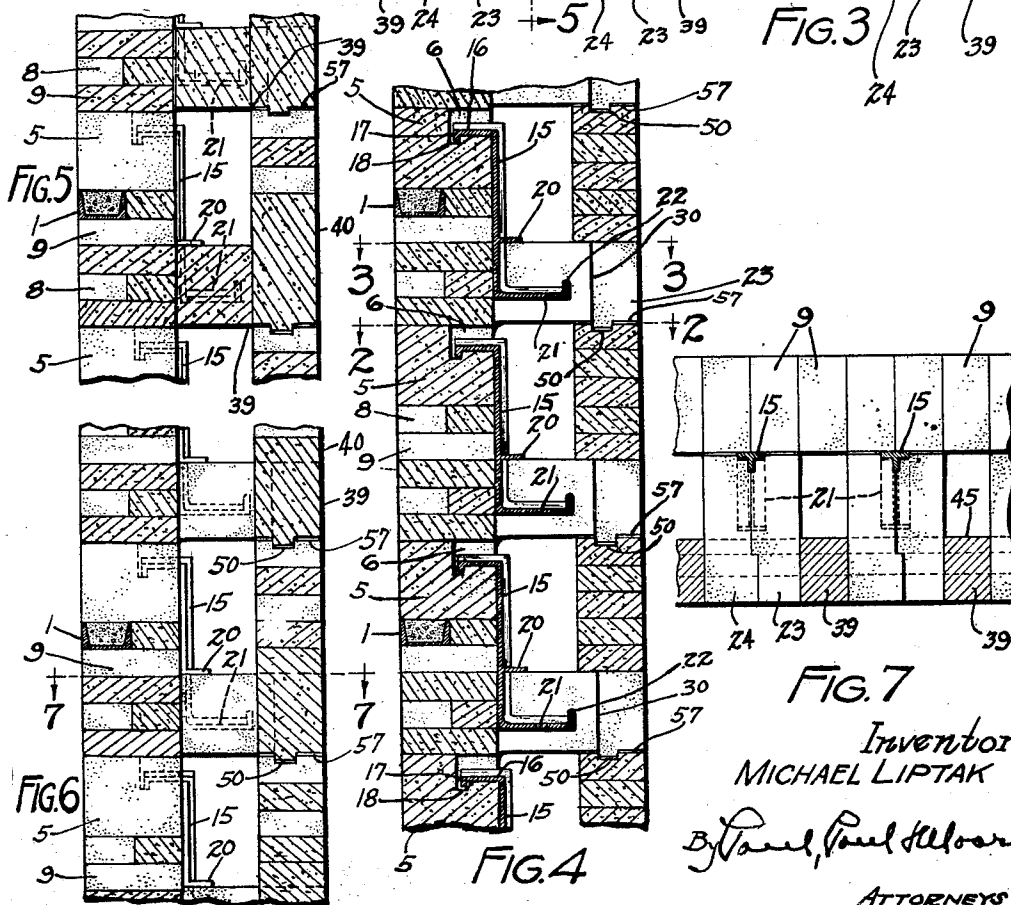
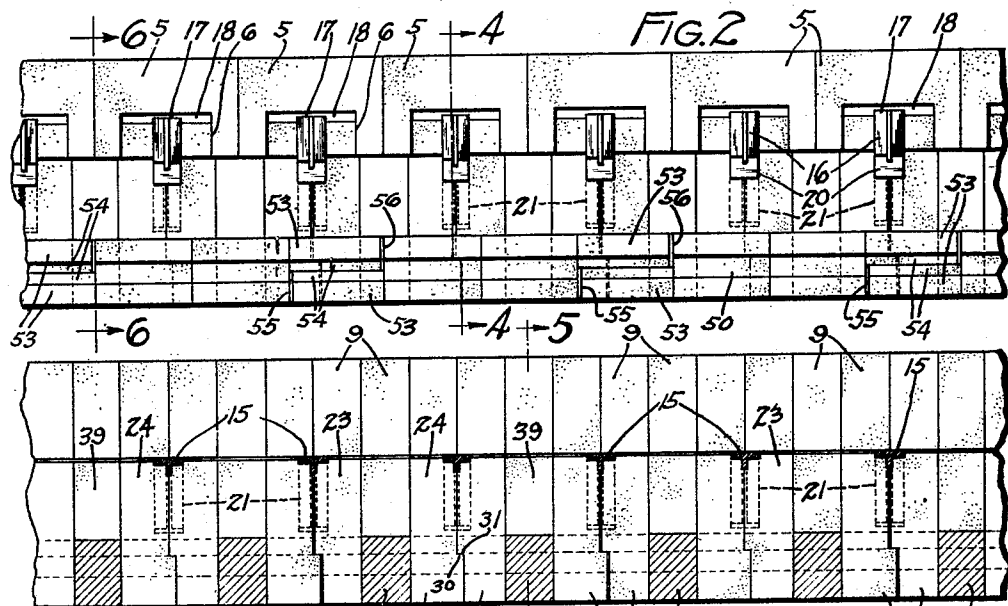
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FIRE WALL

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March 31, 1931.

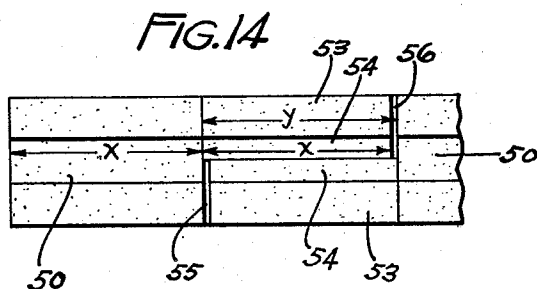
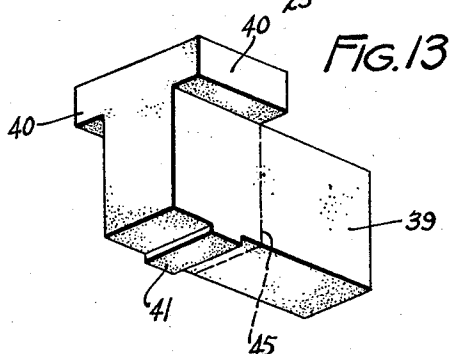
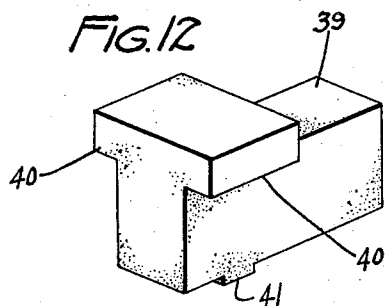
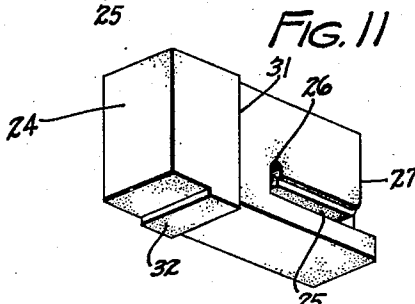
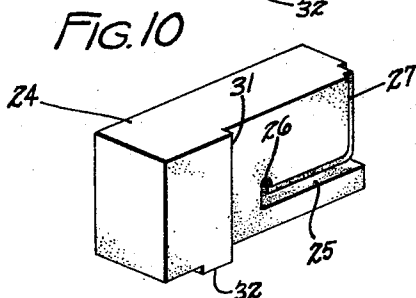
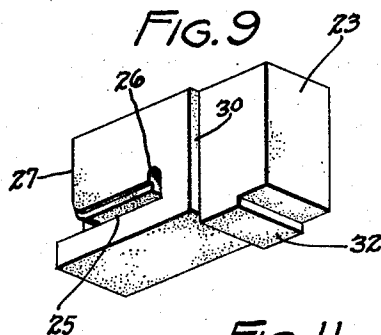
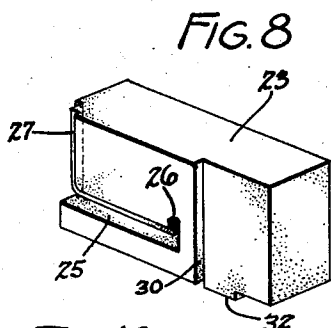
M. LIPTAK

1,798,331

FIRE WALL

Filed Nov. 1, 1928

3 Sheets-Sheet 3



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UNITED STATES PATENT OFFICE

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FIRE WALL

Application filed November 1, 1928. Serial No. 316,512.

This invention relates to improvements in fire walls, both of the solid and hollow type, having a replaceable facing portion called the replaceable wall. A very important object of the invention is to provide a wall in which headers of refractory material are supported by and enclose and protect metal elements which are anchored in the permanent wall section, whereby the metal elements are protected from excessive heat. Other objects are to provide a metal hanger supporting structure for refractory header elements which support a replaceable wall, and to have these hangers supported by refractory blocks which form part of the permanent wall; to so connect the refractory elements with the metal supporting elements that they may be removed therefrom in horizontal directions transversely of the headers; to provide a construction whereby each header is not only supported by a metal element but is reinforced by said element and in which the reinforcement extends longitudinally with said header substantially entirely across the inter-wall space, thus providing means whereby two adjacently disposed headers each supported by a common metal element are capable of movement toward and away from each other in a direction transverse to the wall and headers without exposing the metal support directly to the flame, or in other words, providing a horizontal expansion joint which allows the proper movement but limits longitudinal movements with reference to the supports.

Important features of the invention are the use of metal hangers; the enclosing of the metal hangers with refractory material; the enclosing of the metal hangers with refractory material as header elements to protect the iron element from the heat; enclosing of the metal elements by header elements which interlockingly engage with the hangers in a manner to only permit disengagement therefrom in a horizontal direction transversely to the headers; the method of connecting blocks of the refractory material as headers, in pairs, to permit transverse but not longitudinal movements; to arrange the header elements in pairs respective members of which

engage the hanger elements from opposite sides; the employment of key bricks to secure the pairs of hanger protecting header elements against disengagement and therefore to provide a structure in which certain of the header elements can be removed and replaced without dismantling any substantial portion of the replaceable wall or facing; to so form the hanger protecting header elements that they cooperate when in operative position to prevent entry of heat between them, and to the metal hangers; and to provide locking cooperation between certain courses of the filler bricks and the headers to reduce bulging action of these filler bricks as part of the replaceable wall in a direction away from the permanent wall. The features of the invention not only include the details of construction but the broader aspects of each feature, irrespective of the constructional details.

Another important feature of the invention relates to the provision of horizontal expansion joints for that portion of the replaceable wall which is supported between and by the header elements.

Another feature of the invention which is coincident with that feature which prevents entry of heat in a direction longitudinally of the header elements to the enclosed hanger, includes the arrangement whereby horizontal expansion longitudinally of the wall is provided between each pair of headers, so that they are free for limited movement in direction of disengagement, but wherein the degree of this movement is not sufficient to permit disengagement of the elements from their hanger.

Features and advantages of the invention will be set forth in the description of the drawings forming a part of this application, and in said drawings:

Figure 1 is a perspective view, with portions of the elements of the wall removed to more clearly illustrate the construction;

Figure 2 is a plan view substantially on line 2—2 of Figure 4;

Figure 3 is a plan section substantially on line 3—3 of Figure 4;

Figure 4 is a vertical section substantially on line 4—4 of Figure 2;

Figure 5 is a vertical section substantially on line 5—5 of Figure 3;

Figure 6 is a view of the modification in which the horizontal inter-wall spaces or channels are made to intercommunicate by vertical passage and is a section which generally corresponds to line 6—6 of Figure 2;

Figure 7 is a plan section on line 7—7 of Figure 6;

Figures 8 and 9 are perspective views showing the construction of the right hand headers;

Figures 10 and 11 are perspective views of the left hand headers;

Figures 12 and 13 show perspective views of the key blocks; and

Figure 14 is a plan, showing how the "soaps" are laid to provide for longitudinal expansion.

The permanent wall section is generally built substantially in the following manner: A metal base structure is first provided which includes the channel elements 1. This construction has been found extremely efficient and is disclosed in my patent, Number 1,665,556. Although these elements have been shown, it will be understood that they are not absolutely necessary to the successful use of the present invention. Upon the elements 1 are arranged blocks 5 which may be designated either as socket blocks or as hanger supporting and locking elements. These blocks are of refractory material and each is provided with a recess or socket in its upper side. This socket is best shown in Figure 1 and is generally designated 6. It will be seen that courses of blocks 5 are also used at points intermediate of the irons 1, and these, of course, are supported by and form the part of the wall which lies between and is supported by the elements 1. Each block 5 is capped by a slab brick 7 which closes the recess 6 and forms a pocket. Upon the slab 7 are then laid, for example, alternate stretcher and header courses, these courses being respectively designated 8 and 9. As shown in the drawing a second course of hanger-supporting socket blocks 5 is laid upon the uppermost stretcher course of bricks, and upon these are laid another course of slabs 7. Between this slab and the next element 1 are laid stretcher and header courses substantially in the manner before described.

An important feature of the invention is the use of the blocks 5 as refractory elements for supporting metal hangers. These hangers are generally designated 15 and each in this instance has a horizontal portion 16, a downturned portion 17 as a stop, the elements 16—17 forming a kind of hook. Each block 5 in addition to the recess 6 is provided with a downwardly extending groove or pocket 18 into which the element 17 projects. This construction provides means for secur-

ing the hanger against movement transverse-ly of the wall, but permits compensatory movements lengthwise thereof. Referring to Figure 4, the element 15 has a vertical portion which flatly engages the inner face of the permanent wall. Projecting horizon-70 tally from this vertical portion is a lug 20, and below this is a foot 21 having an upturned end 22. The length of this foot is substan-75 tially equal to the width or depth of the inter-wall space so that the refractory head-ers, later to be described, are reinforced and supported by the metal element across the inter-wall space.

Another feature of the invention is the 80 manner of enclosing and protecting these re-inforcing portions 21 by refractory material, and having the header-forming refractory material removably engaged in a manner to be either assembled or dis-assembled by horizon-85 tal movements in a direction longitudinally of the wall. Referring first to Figures 8, 9, 10 and 11, in which the header elements are il-lustrated in detail, the header elements are made in "rights and lefts" and each is formed 90 so that it may be connected with the hanger element by movements from opposite sides of the hanger toward the hanger. To this end, the element shown in Figure 9 is pro-95 vided with a horizontal groove 25 for receiv-ing portion 21 of the hanger, and with an up-ward vertical extension 26 for receiving ex-tension 22 of the hanger, thus forming a stop to limit longitudinal motion of the header upon the extension 21. There is also pro-100 vided upwardly extending grooves or corner notches 27 at that face which abuts the inner surface of the permanent wall, see Figure 3, to fit the cross-sectionally T-shaped vertical portion of the hanger. The general contour 105 of the walls of the grooves 25, 26 and 27 is such as to fit the corresponding contours of the horizontal and vertical portions of the metal hangers. While the details of the groove and hanger shapes are claimed and are 110 features of the invention there is no intention to be limited to these particular shapes. It is sufficient that respective blocks can be moved from opposite sides toward one an-115 other and toward the hanger to lockingly en-gage the hanger in a manner to limit vertical movements as well as horizontal movements in a direction lengthwise of the headers. Each header of the pair is provided with a 120 shoulder, one designated 30, cooperating with the shoulder 31 of the opposite header, see Figures 8, 9 and 10, 11. Each header is also provided on its bottom with a shoulder shown at 32, which, in this instance, is formed by a portion which projects downwardly from the 125 under surface of the header. The provision of shoulders 30—31 and their cooperation are features of the invention. The object is to provide a locked expansion joint which, al-though it may open as a result of expansion 130

will yet protect the horizontal portion 21 of the hanger, as well as the vertical portion. In hollow wall constructions, inter-wall space is, of course, provided.

Pairs of header elements 23—24 are arranged as well shown in Figures 3 and 4 in horizontal superposed courses, the pairs being spaced from one another, and the spaces being closed by key blocks presently to be described.

The key block is illustrated in Figures 12 and 13. Each is of substantially the same length as the header blocks 23 and 24 but each has means for supporting it as a key block against downward movement in a manner to provide an expanding joint. The block is provided at the top with lateral projections 40, which makes the outer face of the block generally T-shaped in configuration. Each block is also provided with a projection 41 corresponding to the projections 32 of the header blocks, and for a similar purpose. The blocks are placed as best shown in Figure 1 and it will be seen that when blocks 23, 24 and 39 are positioned, separated horizontally disposed wall inter-spaces are provided. However, under some conditions it is desirable to connect these horizontal wall inter-spaces by vertical passages to provide inter-communication between all wall spaces. In this instance, the rear portions of the blocks 39 are removed along dotted line 45, see Figure 13, so that only that portion of the block having the elements 40 and 41 is used and this is placed substantially as shown in Figures 6 and 7 of the drawing. This construction is also a feature of the invention. All that is necessary to convert a brick 49 is for the workmen to crack off what may be termed the inner portion of each brick 39. As shown in Figure 1, the whole key block has been used.

Another feature of the invention is the construction of those portions of the replaceable wall which lie between and are supported by the outer ends of the headers 23 and 24. These bricks in the present instance are laid as stretchers, and also in the present instance are one brick deep. The main feature of the connection of this portion of the wall includes the use of projections 32 and 41 respectively of the headers 23—24 and 39.

It is desirable to provide expansion joints in the replaceable portion which is exposed to the most intense heat, and yet positively prevent such movements of the bricks as would permit them to be disconnected. Another object and feature is to provide for this expansion and yet prevent hot gases from passing inwardly. For these general purposes, certain bricks of the uppermost course of each inter-header bricks of the replaceable wall are grooved longitudinally as at 50, see Figures 1 and 2. When the bricks are laid, these grooves 50 are aligned and form a continuous groove longitudinally of

the wall. Within these grooves, the elements 32—42 project as best shown in Figures 4 and 5. The arrangement is, therefore, such that expansion is provided for in all directions both longitudinally and transversely of the wall, and yet the elements are secured so that expansion cannot be sufficient to disconnect any portion of the replaceable wall.

Another feature of the invention is the introduction of bricks which are called "soaps". These bricks are indicated at 53 and each is corner notched as at 54, the notches cooperating to form a groove which is continuous with the groove 50, see Figure 2. Another feature of the invention is the arrangement of the bricks 53 so that expansion spaces 55—56 are provided at regular intervals along the wall, in this case, for every two grooved bricks of the top stretcher course. The length of all bricks is the same but in building up the wall one end of one of the bricks 54 is abutted with an adjacent groove brick, for example, the inner brick of the two, and the opposite end of the outer brick is abutted with the wall of the brick in the other side. The arrangement is clearly shown in Figures 2 and 14. With this arrangement combined with the arrangement of the header elements 23 and 24, all elements of the wall are capable of sufficient expansion, but none can become detached as the result of this expansion. At the same time any expansion pressure of gas which would tend to bulge the wall is relieved, while at the same time the entrance of flame, to melt or deform the metal supports is prevented.

The projections 40 of the blocks 39, in this instance, lie above the top face of the block and the height or thickness of this projection is substantially equal to that of the stretcher course bricks which are arranged between and supported by the headers. By an inspection of Figure 1, the arrangement of the upper key portions of blocks 39 in relation to the bricks and as part of the upper course can be observed.

The header key elements 39 when removed allow the headers 23—24 to be removed from the hangers and thus means is provided whereby any portion of the wall can be replaced without disturbing any substantial portion, the elements of which do not need to be repaired or replaced. The element 40 of the key blocks 39 as before mentioned prevents downward movement of the keys and also allows for horizontal expansion.

It is also a feature of the invention in some instances, to make the projections 32—41 of such height and the grooves 50 of such depth that expansion joints 57 will be provided, see Figures 1 and 4.

I claim as my invention:

1. A permanent wall having superposed rows of hangers the members of which are spaced lengthwise of the wall, header ele-

ments supported by the hangers, and bricks supported on the header elements to form with said header elements a complete replaceable wall.

5 2. A permanent wall having superposed rows of hangers the members of which are spaced lengthwise of the wall, pairs of header elements supported by each hanger, and bricks supported on the header elements to form with said header elements a complete
10 replaceable wall.

3. A permanent wall having superposed rows of hangers the members of which are spaced lengthwise of the wall, pairs of header elements supported by the hangers and protectingly enclosing a portion thereof, and bricks supported on the header elements to form with said header elements a complete
15 replaceable wall.

4. A permanent wall having a plurality of rows of hangers at different levels the elements of each row being spaced in a direction longitudinally of the wall, a pair of header elements secured to each hanger in a manner to be disengaged by a movement
20 lengthwise of the wall, key blocks arranged to limit disengaging movements of headers, the headers and key blocks of each row being abuttingly engaged, and bricks filling the space between the rows of headers to form a wall.
25

5. A permanent wall having a plurality of rows of hangers at different levels the elements of each row being spaced in a direction longitudinally of the wall, header elements secured to the hangers in a manner to be disengaged by a movement lengthwise of the wall, key blocks supported by said headers and arranged between them to normally prevent disengagement, the headers and key blocks of each row being abuttingly engaged, and bricks filling the space between the rows of headers to form with said headers and key blocks a replaceable wall.
30

6. A permanent wall composed of bricks including courses, some of the elements of which have recesses arranged at one side of the wall, hangers one for each recess detachably secured therein, each hanger having an outwardly projecting portion, pairs of header elements supported by and protectingly enclosing said portion and having means detachably engaged therewith in a manner to be disengageable therefrom by motion in direction lengthwise of the wall, key blocks arranged to limit the disengaging movements of opposed members of adjacent pairs of headers, bricks filling the space between and supported by the headers and key blocks, to complete the replaceable wall.
35

7. A permanent wall composed of bricks some of which have recesses arranged at one side of the wall, hangers one for each recess detachably secured therein, each hanger having an outwardly projecting portion, header
40

elements supported by and protectingly enclosing portions and having means detachably engaged with the projecting portion in a manner to be disengageable therefrom by motion in direction lengthwise of the wall, key blocks arranged to limit the disengaging movements of opposed members of adjacent pairs of headers, bricks filling the space between and supported by the headers and key blocks to complete the replaceable wall.
70

8. A permanent wall having superposed rows of hangers the members of which are spaced in a direction lengthwise of the wall, header elements secured to and protectingly enclosing portions of the hangers, said hangers having means securing them to the hangers in a manner to be detachable only by a movement lengthwise of the wall, key blocks arranged to limit disengaging movements of the headers, said headers and key blocks being abuttingly arranged, and courses of bricks laid between and supported by the headers and key blocks to form a replaceable wall, certain courses of said bricks and said hangers and key blocks having means which interlock to prevent movement of the bricks in a direction transversely of the wall.
75

9. A permanent wall having rows of hangers the members of which are spaced lengthwise of the wall, a pair of header elements supported by each hanger one at each opposite side and having means securing them in a manner to be detached by movement in direction lengthwise of the wall, key blocks arranged between these releasable header elements to normally prevent detachment, said key blocks having means cooperative with the headers in a manner to be supported thereby and to permit removal of said key blocks in a direction transversely of the wall, and bricks filling the space between the headers and key blocks to complete a replaceable wall.
80

In testimony whereof, I have hereunto set my hand this 26th day of October, 1928.
110

MICHAEL LIPTAK.