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LINTEL AND OTHER STRUCTURE OF REINFORCED BRICKWORK

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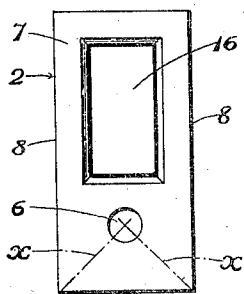


Fig. 1.

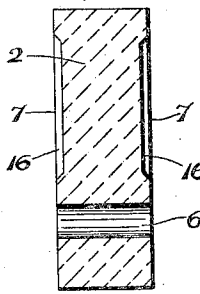


Fig. 2.

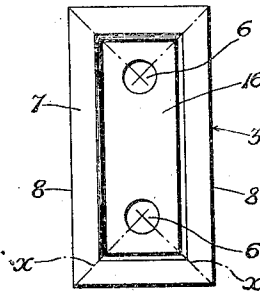


Fig. 3.

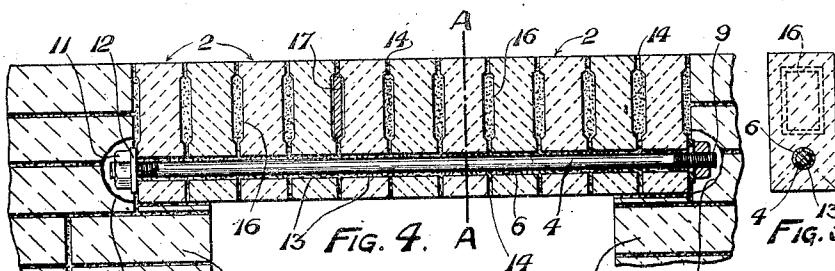


Fig. 4.

Fig. 5.

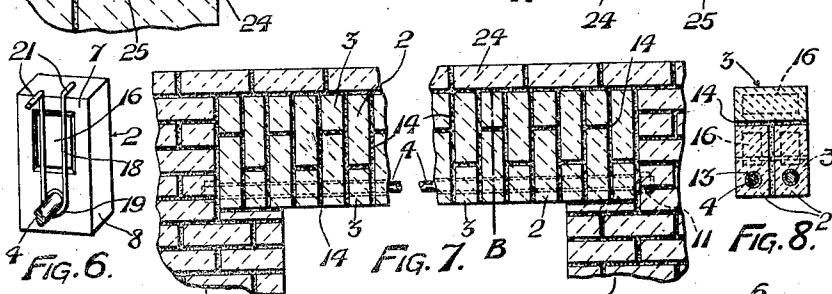


Fig. 6.

Fig. 7.

Fig. 8.

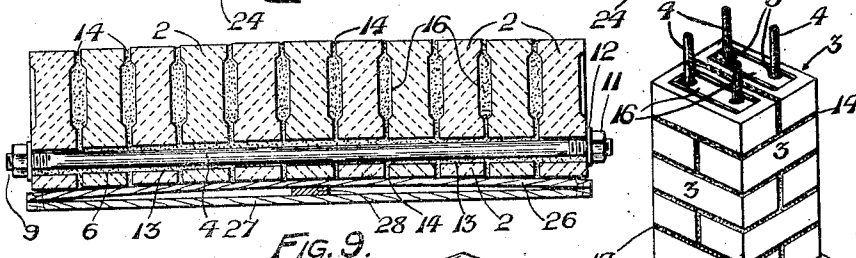


Fig. 9.

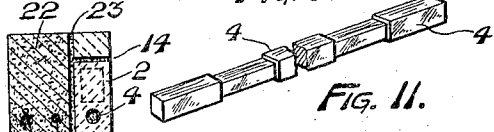


Fig. 10.

Fig. 11.

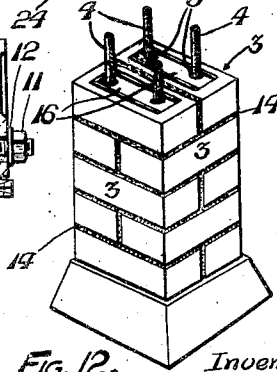


Fig. 12.

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LINTEL AND OTHER STRUCTURE OF REENFORCED BRICKWORK.

Application filed October 11, 1922. Serial No. 593,848.

To all whom it may concern:

Be it known that I, CLIFFORD LANE CUMMINGS, a subject of the King of Great Britain and Ireland, and a resident of the city of St. Kilda, a suburb of the city of Melbourne, in the county of Bourke, State of Victoria, Commonwealth of Australia, whose post-office address is St. Leonards, Church Square, in the said city of St. Kilda, have invented certain Improvements Relating to Lintels and Other Structures of Reenforced Brickwork, to which the following is a specification.

This invention relates to reenforced brick structures and is more particularly concerned in the provision of a pre-constructed composite lintel or beam composed of a series of special bricks cemented together and effectively reenforced by a longitudinal metal rod or rods which pass through and are embedded in the structure.

It will be hereinafter evident however that the invention is not limited to the construction of such lintels or beams as the special bricks employed therein may also be advantageously utilized in the construction of reenforced brick columns, piers, walls and various other structures, the special bricks having in themselves certain novel features which render them adaptable for various purposes such as indicated.

A lintel or beam constructed in accordance with the invention has proved of great strength under test and is relatively inexpensive and of becoming appearance. It may, moreover, be readily applied by merely placing the beam into position for support at its ends. The invention thus has the advantage over the present method of assembling the bricks of a lintel during the erection of a building, that the usual angle iron supports for placing under the soffit or lower face of the lintel, and the labor and difficulty involved in the laying of the bricks in this manner is eliminated. Moreover, by elimination of exposed metal parts such as the aforesaid angle iron supports, the fire resisting properties of the lintel are greatly enhanced.

In addition the improved lintel has considerably greater resistance to bending than the ordinary brick lintel in which the angle iron section of the exposed support is not

well adapted to resist bending and is liable to deflect under the load thus producing a downwardly curved or convex soffit which is unsightly and objectionable. Other disadvantages of the usual method of forming brick lintels are that the reaction of the load does not act vertically over the centroid of the angle iron section so that the wall face has a tendency to bulge outwardly, and one leg or member of the angle iron is visible on the soffit and requires frequent painting.

The invention also has the advantage over the pre-cast concrete lintels at present in use, that no moulds or forms are necessary in its construction and in addition the improved lintel is stronger and has the appearance of laid bricks which is superior and in most cases desirable. Furthermore, it is usually necessary to set a concrete lintel some little distance back from the wall face thus necessitating the rendering or covering of the lintel face to bring it into alignment with the face of the wall.

Referring to the drawings which form part of this specification:—

Figure 1 is a side view of one type of brick employed in accordance with the invention.

Figure 2 is a cross section of Figure 1.

Figure 3 is a side view of another type of brick in accordance with the invention.

Figure 4 is a longitudinal section of a lintel or beam constructed in accordance with the invention and placed in position for support on the wall of a building.

Figure 5 is a cross section of Figure 4 taken on line A—A thereof.

Figure 6 is a perspective view of a brick in accordance with the invention and a reenforcing stirrup applied thereto.

Figure 7 is a sectional view showing a modified construction of a beam or lintel in accordance with the invention placed in position in the wall of a building, the plane of section being taken in front of the reenforcing rods and pockets or recesses hereinafter described.

Figure 8 is a cross section of the lintel seen in Figure 7 taken on the line B thereof.

Figure 9 is a longitudinal section of a lintel having an arched under face or soffit

and showing a convenient means of supporting the bricks during assemblage to provide such arched formation.

Figure 10 is a cross section showing a lintel in accordance with the invention combined with a reinforced concrete lintel.

Figure 11 is a perspective view of portion of a modified reinforcing rod.

Figure 12 is a perspective view of portion of a reinforced brick column constructed in accordance with the invention.

A lintel or beam constructed in accordance with the invention comprises a series of bricks indicated at 2 and 3 arranged face to face in aligned layers which make up the length of the structure. Each of these layers may comprise only a single brick as in Figures 4 and 5 or a series of bricks some of which may be arranged in upright position or on end whilst others are arranged with their length extending transversely of the lintel as in Figures 7 and 8.

For instance as shown in Figures 7 and 8 each said layer may comprise two or more bricks 2 arranged on end or with their length extending vertically whilst one or more bricks 3 are laid on edge or with their length extending transversely, these transversely laid bricks being arranged alternately above and below the vertically disposed bricks in the case of alternate layers.

The latter method of construction, embodying a series of bricks in each layer, is more particularly intended for use wherein the lintel is to span a comparatively wide opening, the additional depth provided by the superimposed courses of bricks, imparting a greater resisting moment to the lintel. For ordinary window or like openings of comparatively narrow width however, a single vertically disposed brick may constitute each layer as in Figure 5.

In combination with the foregoing one or more longitudinal metal reinforcing rods or bars 4 extend from end to end of the lintel through longitudinally coinciding holes 6 formed transversely through the bricks during moulding of the latter and opening on the major or wider opposite side faces 7 thereof. The reinforcing rod or rods 4 extend through the lower part of the lintel as shown so that the latter is thus effectively reinforced adjacent the soffit where the beam is in tension when under load and the stress is greatest.

Where each layer of the lintel comprises a series of the bricks as aforesaid a plurality of transversely spaced parallel reinforcing rods 4 may be employed as in Figures 7 and 8, one of said rods extending through each longitudinally aligned series of holes 6 so that the beam is additionally reinforced in accordance with its extended width.

The holes 6 to accommodate the reinforcing rods are located at the intersection of

two imaginary diagonal lines (x) struck at an angle of 45° from the corners to the longitudinal centre line of the brick face 7. By this arrangement the holes 6 are positioned equi-distant from the minor or narrower side faces 8 and the adjacent end face of the brick and the holes of both the upright and transversely disposed bricks thus coincide at the lower part of the beam when assembled. In this respect, the vertically disposed or upright bricks 2 require only a single hole disposed near the lower end of the brick whereas the transversely disposed bricks 3 at the bottom of the lintel are provided with a hole near each end to accommodate the transversely spaced reinforcing rods.

Each of the reinforcing rods is preferably threaded at its extremities 9 where it is provided with nuts 11 and washers 12. These nuts and washers are adapted to press against opposite ends of the lintel so that the rod is in tension when under load and the whole structure is effectively tied and reinforced.

In assembling the bricks liquid cement or grouting is introduced as at 13 into the holes around each tie rod so as to hold the latter securely in position and increase the strength and stability of the structure. For this purpose the holes 6 are of slightly larger diameter than the tie rod as shown.

The bricks are also cemented together with cement, mortar or neat cement (as the case may be according to the carrying strength required) this material being placed between their adjoining or meeting faces as at 14. In this respect the opposite side faces 7 of the bricks are provided with recesses or pockets 16 to accommodate portion of the cementitious jointing material 14 so that by reason of the jointing material passing into said recesses on the faces of the bricks it acts as a key to effectively resist vertical shear stress on the lintel.

If desired key pieces 17 of metal, concrete or other suitable material and corresponding substantially in shape to the pockets 16 may be introduced therein and embedded in the jointing material 14 as seen in Figure 4.

As an additional means of binding or reinforcing the structure wire stirrups 18 may be inserted between the bricks as in Figure 6. These reinforcing stirrups comprise a pair of legs united by a return bend 19 which passes under the rod 4 and offset ends 21 which project in opposite directions on the upper ends of the adjacent bricks, the stirrups being embedded in the jointing material 14 between the bricks.

The invention may if desired be employed in conjunction with a concrete lintel as in Figure 10 by arranging the improved lintel in front of the concrete member 22 so as to form a brick face. The brick and con-

crete elements are cemented together as at 23 when laid and reinforced by the longitudinal tie rods 4 which may extend through both the brick and concrete members. By this arrangement the concrete rear portion of the lintel may take the greater part of the superimposed wall and floor load whilst the brick portion provides an artistic and efficient facing to the combination.

In constructing the lintel the grouting or jointing material 13, 14 is introduced into the holes 6 and between the bricks as the latter are assembled on the reinforcing rod or rods the bricks being rested on a board or other suitable support during assemblage. When said jointing material has set the nuts 11 are tightened against the opposite ends of the lintel as aforesaid and the article is ready for use.

In use it is merely necessary to rest the ends of the lintel on the suitable supporting part of the wall structure 24 as in Figures 4 and 7 the nuts 11 being accommodated if necessary by suitable cavities 25 formed in the wall.

An objection to existing lintels having a straight soffit is that owing to an optical illusion the soffit or under face of the lintel appears to be deflected or in other words to sag at the middle. The present invention may be readily adapted to overcome this objection by making the holes 6 through the bricks of sufficiently large diameter to permit of a certain amount of play or clearance around the reinforcing rod or rods so that in assembling the bricks they may be arranged in stepped formation or progressively higher towards the center of the lintel with the result that the soffit is of slightly arched or concave form as in Figure 9.

A convenient means of assembling the bricks in the above manner comprises an arched or convex support which may consist of a curved wooden batten 26 nailed or otherwise fastened at each end to a suitable base piece 27 and passing at its center over a distance piece 28 inserted between the base and curved member. By assembling the bricks upon this arched support the curvature of the latter may be imparted to the soffit of the lintel owing to the play between the longitudinal tie rod or rods and the sides of the holes 6. During assemblage of the bricks in the above manner the cementitious jointing material is introduced between the recessed side faces of the bricks and into the holes around the reinforcing rods. When this cementitious material has set the end nuts are tightened up on the tie rod or rods as before mentioned and the article is complete and ready for use.

Instead of employing a cylindrical reinforcing rod with threaded ends and nuts

as aforesaid, a rectangular or other suitable reinforcing rod or bar as seen in Figure 11 may be employed. This reinforcing bar is preferably of indented or recessed construction as shown to provide a firm anchorage in the jointing material without the aid of the nuts 11.

As will be evident from Figure 12 the invention is not limited to the construction of lintels or beams but may be applied with advantage to the construction of reinforced brick columns, piers, walls and the like. In this example portion of a column is shown constructed from a series of the bricks illustrated in Figure 3 these bricks being laid at right angles to each other in the case of successive tiers so that the holes 6 coincide near each corner of the column to receive the reinforcing rods 4. The erection of walls and other structures in a similar manner will be obvious and it will be appreciated that the particular positioning of the holes 6 and the provision of the pockets 16 renders the bricks advantageously applicable to all such structures.

Having now described my invention what I claim as new and desire to secure by Letters Patent is:—

1. Improvements relating to lintels and other structures of reinforced brickwork, consisting in a brick having a transverse hole extending therethrough and opening on opposite sides thereof to accommodate a reinforcing rod, said hole having its center located at a point equidistant from the other two side faces and one end of the brick for the purpose specified.

2. Improvements relating to lintels and other structures of reinforced brickwork, consisting in a rectangular brick of elongated form and having two major opposite sides and two minor opposite sides, a transverse hole extending through said brick adjacent one or both ends thereof, said hole or holes opening on said major sides and having the center thereof located at the intersection of two imaginary diagonal lines of forty-five degrees struck from the adjacent corners of the brick towards the longitudinal center line thereof substantially as described.

3. A brick having in combination a transverse hole extending therethrough and opening on opposite side faces thereof to accommodate a reinforcing rod, said hole having its center located at a point equidistant from the other two side faces and one end of the brick, and pockets formed in the first named side faces thereof for the purpose set forth.

4. An elongated rectangular brick having a transverse hole formed therethrough adjacent each end and opening on opposite sides of the brick to accommodate reinforcing rods, said hole having its center located

at a point equi-distant from the other two side faces and the adjacent end of the brick and pockets formed in the first-named opposite sides thereof substantially as and for the purpose specified.

5 A pre-constructed brick lintel or beam comprising a series of juxtaposed bricks having coinciding transverse holes formed therethrough adjacent the lower face of soffit of the structure certain of said bricks being arranged vertically and others transversely of the structure, the transversely disposed bricks having holes adjacent each end to coincide with corresponding holes near the lower ends of the vertically disposed bricks and parallel reinforcing rods extending through said coinciding holes from end to end of the structure.

20 6. A reenforced brick structure comprising in combination a series of juxtaposed bricks having coinciding holes formed therethrough, a reinforcing rod extending through said coinciding holes, a cementitious jointing material interposed between the adjoining faces of said bricks and a reinforcing stirrup of wire embedded in said jointing material between the bricks, said stirrup comprising a pair of legs having a return bend which embraces said reinforcing rod substantially as described.

30 7. A reenforced brick structure comprising in combination a series of juxtaposed bricks having coinciding holes extending therethrough and opening on opposite side faces thereof, a reinforcing rod extending through said coinciding holes, pockets formed in said opposite side faces of the bricks, a cementitious jointing material between the

bricks and accommodated in said pockets and key pieces inserted in said pockets and embedded in said jointing material.

8. A pre-constructed lintel or beam comprising a series of juxtaposed bricks having coinciding transverse holes formed therethrough adjacent the lower face or soffit of the structure, a reinforcing rod extending through said coinciding holes from end to end of the structure said holes being of larger diameter than said rod and the bricks being arranged in stepped formation or progressively higher from the ends towards the center of the structure whereby the holes are partially de-aligned and the soffit of the structure is arched for the purpose set forth.

9. A reenforced brick structure comprising in combination a series of juxtaposed bricks having holes extending transversely therethrough and opening on opposite sides thereof, said holes having their centers located equi-distant from the other sides and one end of the respective bricks whereby the holes of bricks laid at right angles to each other coincide, pockets formed in the first-named opposite sides of the bricks, a reinforcing rod extending through said coinciding holes from end to end of the structure said rod being of lesser diameter than the holes and cementitious jointing material inserted in said pockets between the bricks and in said holes around the reinforcing rod.

In testimony whereof I affix my signature.
C. L. CUMMINGS.

Witness:

VICTOR J. KELSON.