Aug. 21, 1934. J. W. LOWELL 1,970,860

METHOD OF MOLDING A CONCRETE BLOCK EQUIPPED WITH A LIFTING STRAP

Original Filed June 22, 1932

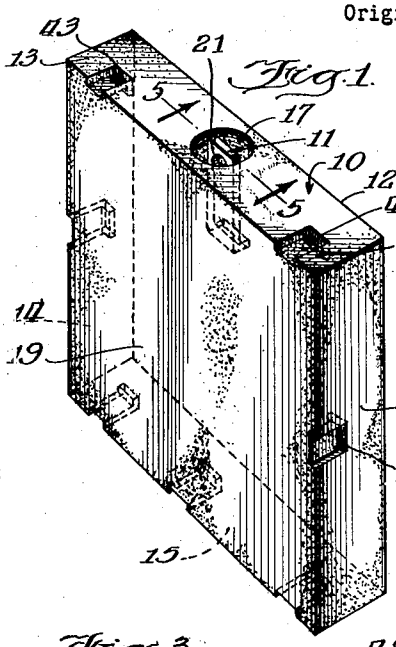


Fig. 1.

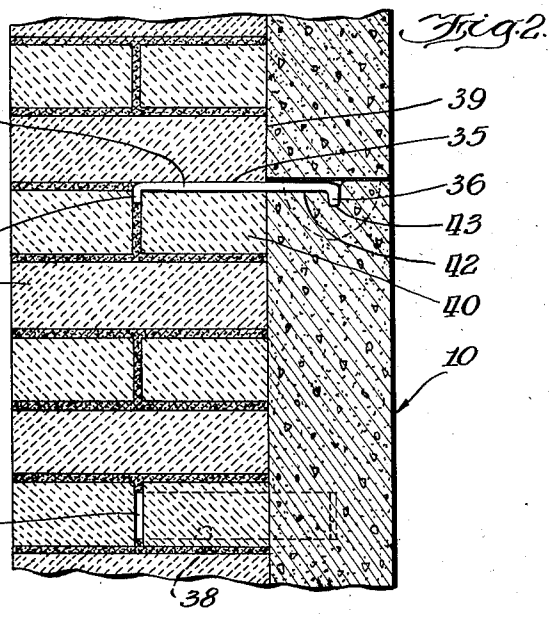


Fig. 2.

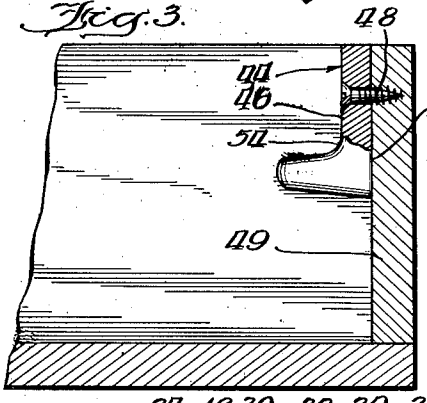


Fig. 3.

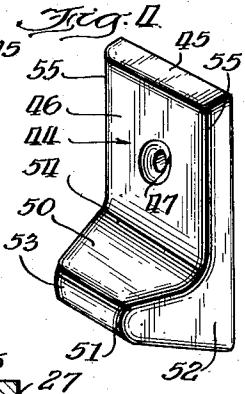


Fig. 4.

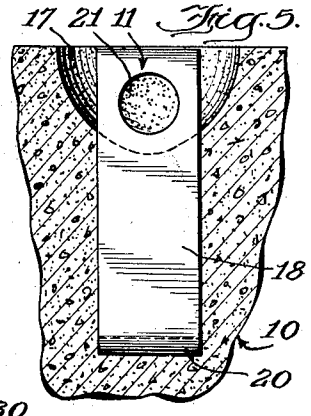


Fig. 5.

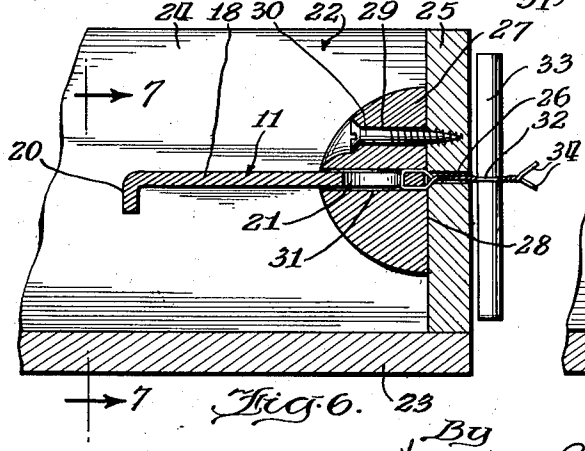


Fig. 6.

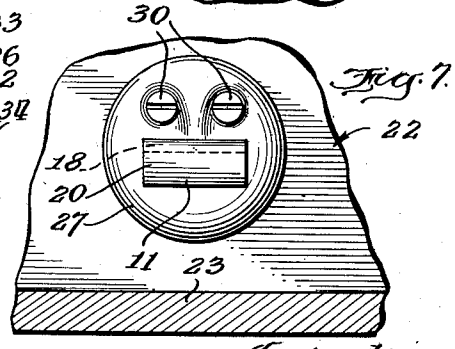


Fig. 7.

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METHOD OF MOLDING A CONCRETE BLOCK EQUIPPED WITH A LIFTING STRAP

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Original application June 22, 1932, Serial No. 618,589. Divided and this application April 17, 1933, Serial No. 666,477

1 Claim. (Cl. 25—155)

The present invention relates to concrete apparatus for building blocks and is particularly concerned with the provision of an improved building block having novel and improved characteristics with respect to the lifting of the block and the securement or anchoring of the block to a structure.

The present application is a division of my prior application, Ser. No. 618,589, filed June 22, 1932, for building blocks, and the present application relates particularly to the apparatus used for making concrete blocks, which was held to be divisible and classifiable in Class 25, Division 15, Concrete forms.

The building blocks of the prior art have been provided with various types of attaching devices for connection to lifting devices when the block is to be lifted, but the lifting devices of the prior art have been unsatisfactory on account of their crude and unworkmanlike appearance and on account of the unreliability of the devices of the prior art.

One of the objects of the present invention is the provision of an improved building block having a lifting ring which is adapted to be utilized for transporting the block from place to place and for placing the block in its proper position in a building structure.

Another object of the invention is the provision of an improved building block form adapted to be used for installing a lifting ring of the class described in building blocks.

Another object of the invention is the provision of an improved mode of anchoring building blocks in place in building structures and the provision of an improved building block having improved characteristics particularly adapting the block for the improved anchoring devices.

Anchoring devices have been utilized with the building blocks of the prior art, but it has been customary to use the lifting ring as a means for engaging with the anchoring devices of the prior art. When lifting rings are so employed and the block is not provided with particular formations for the anchoring devices, there is a tendency on the part of the workman to omit anchoring devices that should be used. The lifting ring having another function, its presence on the block does not necessarily indicate the necessity for an anchoring device.

One of the objects of the invention is the provision of an improved building block having formations peculiarly adapted to be used with anchoring devices so that the block may be provided with the proper number of formations, and the number of formations thereon will indicate the necessity for a predetermined number of building block anchors.

Another object of the invention is the provision of an improved building block having anchoring formations thereon, by means of which the anchoring devices are brought into engagement with the body of the building block rather than with a filling of mortar such as would be the case where the anchoring device is embedded in the mortar, the mortar engaging the block.

The material of which modern building blocks is made is capable of withstanding the pressure of many thousands of pounds per square inch, whereas the mortar itself may be of inferior quality, and is generally not of as good quality as the block. The direct engagement between the anchoring device and the parts of the block assures a stronger mode of anchoring than may be accomplished with any of the devices of the prior art.

Another object of the invention is the provision of an improved anchoring arrangement by means of which the anchors may be so disposed that the presence of anchors places no limitation upon the arrangement of the blocks, so that the blocks need not be spaced wide enough to receive the thickness of the anchor.

In the devices of the prior art, anchors had to be disposed in the joints between the blocks, and therefore the blocks often had to be placed farther apart than would be otherwise necessary or desirable. According to the present invention, the anchors are located in predetermined recesses extending backward from the blocks so that the blocks may lie directly upon each other and a minimum amount of mortar may be applied.

Another object of the invention is the provision of an improved form for constructing building blocks of the class described, having anchoring recesses complementary in shape to the improved anchors, whereby the anchors may be placed in direct engagement with the block in the building structure.

Other objects and advantages of the invention will be apparent from the following description and from the accompanying drawing, in which similar characters of reference indicate similar parts throughout the several views.

Referring to the single sheet of drawings accompanying this description,

Fig. 1 is a view in perspective of a building

block constructed according to the present invention;

Fig. 2 is a vertical sectional view taken through a brick wall faced with a building block and anchored according to the present invention;

Fig. 3 is a fragmentary sectional view of one end of a form, showing the structure of the form for providing the anchoring recesses in a block of the class described;

Fig. 4 is a view in perspective of the metal molding member which is attached to the form of Fig. 3 for forming the recesses in the block;

Fig. 5 is a fragmentary sectional view taken on the plane of the line 5—5 of Fig. 1, looking in the direction of the arrows, showing the structure of the anchoring ring in the block;

Fig. 6 is a vertical sectional view taken through the axis of the anchoring ring of Fig. 5 as it is disposed in the form prior to the pouring of the cementitious material in the form; and

Fig. 7 is a fragmentary sectional view taken on the plane of the line 7—7 of Fig. 6, showing the anchoring ring strip in elevation from the left end of Fig. 6 and also showing the shape of the ball which forms a socket about the anchoring ring.

Referring to Fig. 1, the building block, which is indicated in its entirety by the numeral 10, may be constructed of any type of building material. It is preferably constructed of cementitious material, comprising Portland cement, and fine and coarse aggregate of predetermined size, mixed with a minimum amount of water. The block is subjected to high frequency vibration in order to improve the characteristics of the product, increase its strength and density, fill the form more completely, and to provide a better finish.

The invention is of particular importance in connection with building blocks which simulate natural rock, by virtue of the use of a large amount of aggregate of the particular rock in question, and the present blocks may be employed as facing blocks and subjected to any desired type of finish, just like the natural rock. For instance, blocks to simulate granite or marble, may be provided with a polish like the natural rock.

The present building blocks can, of course, be molded in any suitable form, and they may be made of any shape. All of the standard structural building shapes may be made, and the simple rectangular shape of block shown in Fig. 1 is merely selected as a suitable example.

The blocks are preferably provided with one or more lifting rings 11, and a lifting ring is preferably suitably located with respect to the center of gravity so that when a lifting device is applied to the lifting ring 11 the block will not tilt, but will be held in the proper position for a placement of the block. Thus the lifting device 11 is preferably located in that surface of the block which is intended to be on top when the block is put in place.

The lifting device is also preferably located in one of the edges of the surfaces which are to be covered by other parts of the building structure when the block is in place, but in the case of capstones, lifting devices may be located on the top and facing side, and filled with mortar, if desired.

The building block 10 is provided with a face 12, which may be polished, if desired, and with the rectangular sides or edges 13—16. Midway between the ends of the upper edge 13 there is located a socket 17 of predetermined shape surrounding the lifting ring 11 and permitting access to the lifting ring.

The socket 17 preferably tapers in width from the edge 13 inward toward the base of the socket in order to permit the convenient removal of the form from the finished block, and I prefer to use a substantially hemispherical socket 17, as this shape of socket provides convenient access to the lifting ring, gives the block a convenient and workmanlike appearance, and leaves no sharp corners or points of weakness in the block.

The lifting ring 11 is preferably located in the middle of the socket 17 below the upper surface 13 of the edge so that the lifting ring 11 does not protrude at all from the building block 10. The lifting ring 11 preferably comprises a sheet metal member formed out of a strip of metal, the body 18 of which extends into the body of the building block parallel to the face 12 and back 19 of the block. The strip 18 must have sufficient embedment in the concrete block to prevent dislodgment therefrom, when the block is lifted through its means. This embedment or bond can be obtained with less embedment if the strip is bent, hooked or otherwise made irregular in shape. I have elected to bend the strip at its end. The strip 18 is provided with a laterally turned end 20 which serves as an anchoring formation for the strip 18 in the building block 10. At its outer end the strip 18 is provided with a transverse circular bore 21, which serves to receive lifting devices, such as hooks or the like, in the lifting or placing of the building block 10.

Referring to Figs. 5, 6 and 7, these are fragmentary views showing the structure of the lifting ring and the form utilized to install such a lifting ring. The form 22 in Figs. 6 and 7 may comprise any shape of form, but since the block which is located for an example is of the simple rectangular shape, the form 22 has a flat bottom 23 and flat sides 24, 25. The side 25 is that which forms the edge 13, and it is preferably provided with a bore 26 adapted to register with the location of the anchoring ring 11.

A ball shaped formation 27, preferably constructed of cast metal, such as cast iron, is utilized for forming the socket 17. The member 27 is hemispherical, being provided with a flat side 28 adapted to engage the side 25 of the form 22, and the ball is provided with one or more transverse apertures 29 for receiving wood screws 30 which secure the ball to the wooden form. Two wood screws 30 are preferably employed so that the ball shaped formation is suitably secured against rotation, and the ball is provided with a rectangular aperture 31 located on that diameter which is at right angles to the flat rear side 28 of the ball. The rectangular aperture 31 is of sufficient size to slidably receive that end of the anchor ring strip 11 which is to be located in the socket 17. Actually the aperture 31 is preferably a little larger so as to provide space for a tie wire 32.

The ball 27 is secured permanently to the side of the form 25 and removed with the form from the block 10, but the lifting ring 11 is intended to remain in the block, and therefore it is preferably detachably secured to the form.

One mode of securing the lifting ring to the form is to run a tie wire 32 through the aperture 21 of the lifting ring, the ends of the tie wire extending outward through the rectangular

aperture 31 and through the bore 26 in the side 25 of the form. The tie wire may be twisted together in the aperture 26 and looped about a pin 33, the ends 34 being again twisted together. By turning the pin 33 the lifting ring strip 18 may be drawn tightly into its socket 31 and suitably secured in the form. After the block has been cast and hardened sufficiently so that the form can be removed, the tie wire 32 is cut or untwisted, the pin 33 is removed, and then the side 25 of the form may be removed with the ball 27. The lifting ring 11 will slide out of the ball 27, leaving the lifting ring strip 18 suitably anchored in the block with its end located in the socket 17.

The present lifting rings may also be utilized as anchoring devices, if desired, and they will provide a better anchoring device than the devices of the prior art, on account of the regular formation of the lifting ring 11. I prefer, however, to utilize the lifting ring only for lifting and placing blocks and to provide the blocks with a predetermined number of formations, obviously indicating to the workmen where and how many of the anchoring devices are to be used.

The preferred form of anchoring device is indicated in its entirety by the numeral 35, and it comprises a strip of sheet metal of predetermined thickness and width so that the strip is preferably rectangular in section. The strip is also of predetermined length and it is provided with laterally turned formations 36, 37 at each end, the ends being directed at right angles to the body 38 so that the ends are adapted to directly engage the brick or other structural elements of the wall as well as the material of the building block.

Referring to Fig. 2, it will be noted that the anchoring strip 35 is located between successive courses of the brick wall below the brick 39 and above the brick 40. Its downwardly turned end 37 is located behind the brick 40 and in front of the brick 41, the other space between the bricks being filled with mortar. The other end 36 of the anchoring strip 35 extends forward in a groove or recess 42 slidably formed in the building block 10 to receive the strap 35. The downwardly turned end 36 is located in a deeper complementary recess 43, which is provided in the building block 10 at the end of the groove 42.

Although throughout the specification I show the facing blocks being anchored to brick walls, the facing may be in fact anchored similarly to other types of masonry such as tile, other concrete units or monolithic concrete and also the facing might also be anchored to steel members of the structure where they are conveniently close or to steel members provided or included in the structure for this purpose.

The shape of the groove 42 and socket 43 is preferably substantially complementary to the shape of the anchor strip 35, and therefore the anchor strip may be made of such thickness that the building blocks are very firmly anchored, and it is not necessary to make the anchoring strip thin so as to provide a thin joint between the facing blocks, nor is it necessary to space the facing blocks far enough to receive the strap. The present structure places no limitations upon the size of the anchoring device nor upon the amount of mortar which must be used between the facing blocks, as the building blocks are already molded to receive the anchoring strips.

It will thus be observed that the anchoring strip directly engages the bricks and the anchoring strip also directly engages the walls of the groove and socket provided for it in the building block, and a much stronger form of connection is thus provided than could be provided where it is necessary to fill in the space between the anchoring strip and the building block with mortar.

The anchoring strip is also thus adapted to accomplish its anchoring function immediately on the placing of the bricks and blocks, while the motor is soft. It will be evident that the devices of the prior art embedded in mortar could not hold while the mortar is soft.

The building block is anchored against forward movement or backward movement, upward movement or downward movement, if desired, and also anchored against lateral movement by the engagement of the walls of the groove 42 with the sides of the strip 35.

Where the building blocks are of relatively small size, I prefer to use only one anchor strap 35, preferably located midway between the ends of the block on one of its edges, and I prefer to select the top edge of the block for receiving the anchor strap.

The lower edge and side edges of the block are thus not anchored, but they are suitably secured in place by their engagement with the adjacent blocks and by mortar, and it is sufficient to provide an anchor strap at the top of each block where the blocks are relatively small. Anchor straps can also be placed more easily at the top of the block than at the bottom, and they are so located as to prevent tilting outward of the top of the block, which is to be expected more than any movement of the bottom of the block.

In appropriate cases, however, the anchoring strips may be located at the ends of the block or at the bottom, at the top and bottom, at both ends, excluding the top and bottom, or a greater number of anchoring strips may be used.

On occasions it is desirable to dowel the adjacent blocks together, the top of the block below to the bottom of the block above or adjacent blocks at their adjoining sides. By placing my anchored slots 43 in the proper locations of adjoining block surfaces, these slots will then be directly opposite each other. An anchor with a T shaped end then can be used to form both anchor and dowel.

Where a block is very long in a horizontal direction, it will be provided with a number of sockets symmetrically located on both sides of the lifting ring 11, as shown at the top of Fig. 1.

Anchor strips need only be provided in the vertical edges of the block where the block is quite wide in a vertical direction, and it should be understood that the block illustrated in Fig. 1 is merely to show all of the various locations for anchor strips which it may ever be desirable to employ. It would be a very large block indeed which would require all of the anchor straps shown in Fig. 1, but the structure shown in Fig. 1 is adapted to take care of all contingencies.

Referring to Fig. 4, this is a cast metal member 44, preferably made of cast iron, which may be utilized for molding the grooves and recesses 42, 43 in the block. The molding members 44 preferably have flat rear sides 45 for engaging the form. They are preferably provided with a flat strap-like body 46 having a countersunk aperture 47 for receiving the wood screw 48

which secures the molding member to the wall 49 of the form. At the lower end the molding member 44 is provided with a laterally projecting body 50, substantially complementary in shape to the end 36 of an anchoring strap 35.

The lug 50 on the molding member 44 preferably tapers in width from the outer end 51 to its base 52 and has all of its surfaces suitably curved. Thus the end 53 is substantially semi-cylindrical, and a partially cylindrical portion 54 is formed between the lug 50 and body 46.

The corners 55 of the body 46 are also rounded off so as to provide a finished groove 42 and recess 43, which has no sharp corners, but which is substantially complementary to the shape of the anchor strap.

The lug 50 is tapered so as to permit convenient removal of the molding member 44 within the wall 49 of the form after the block has been cast. The molds are provided with a suitable number of devices for supporting the lifting rings from the mold and for supporting the molding members 44 so as to provide the block with both the lifting rings and the anchoring recesses.

Since the block has an anchoring recess at every point where an anchor strap is to be placed, it is easy to see the omission of an anchor strap, and the workmen will naturally anchor the blocks as they were intended to be anchored by the manufacturer.

The blocks will be installed more securely and the work will be accomplished with greater certainty than in the devices of the prior art where the lifting ring was used to engage an anchoring device. The workmanlike appearance of the block is a source of satisfaction to the workmen and an incentive to a better grade of work in the installation of the facing blocks. The use of the present anchoring devices and lifting rings makes the building blocks more salable than the devices of the prior art.

It will thus be observed that I have invented an improved building block having improved characteristics with respect to the lifting devices and anchoring devices. The present building blocks are regarded as an important advance in the art over the devices of the prior art and have met with popular acceptance by the trade. The blocks may be transported and handled more effectively and safely, thereby reducing the possibility of accident, and tending to reduce the insurance rates involved, and the blocks may be anchored more securely and certainly than they could be anchored with the devices of the prior art. With my more positive anchoring the face of a wall or structure becomes a more solid and composite part of the entire structure through preventing dislodgment of the facing through movement of the structure due to settlement or vibration or the results of earth tremors, explosions, high winds and cyclones.

While I have illustrated a preferred embodiment of my invention, many modifications may be made without departing from the spirit of the invention, and I do not wish to be limited to the precise details of construction set forth, but desire to avail myself of all changes within the scope of the appended claim.

Having thus described my invention, what I claim is new and desire to secure by Letters Patent of the United States, is:

In the manufacture of a concrete block having a block lifting strap within the block in such position that the outer end of the strap will be disposed within a cavity formed in a face of the block, the method consisting of securing a tapered member on the inside of a form, placing the strap with one end extending inwardly from the tapered member and the other end protruding through the tapered member and abutting the form side, securing the strap in position by means of a wire fastened to the outer end of the strap passing through the form and tensioned from the exterior of the form to draw the outer end of the strap firmly against the inside of the form side, filling the mold with concrete and removing the wire and form.

JOHN W. LOWELL.