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King

(54) RETAINING WALL BLOCK AND MOLD

(76) Inventor: **Samuel L. King**, Loysville, PA (US)

Correspondence Address:
BUCHANAN INGERSOLL & ROONEY PC
P.O. BOX 1404
ALEXANDRIA, VA 22313-1404 (US)

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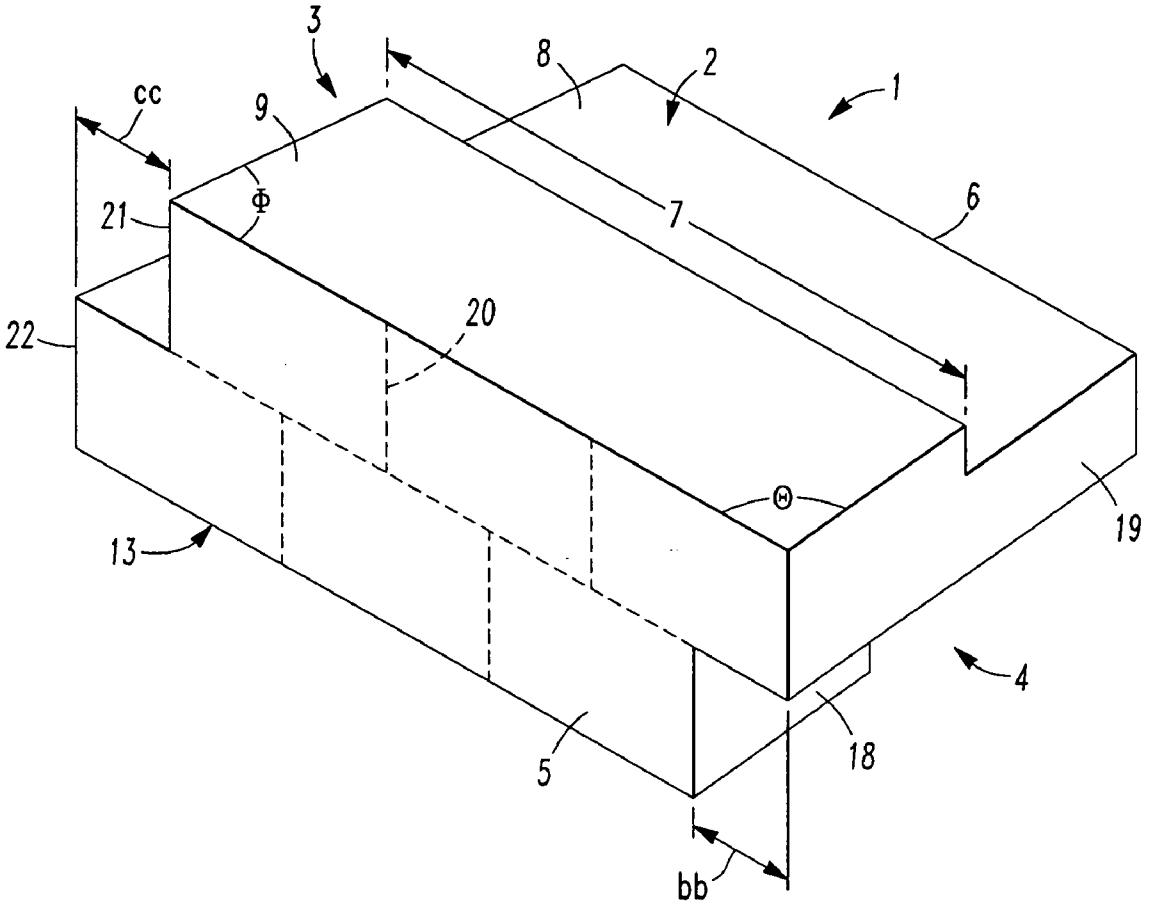
(57) **ABSTRACT**

A retaining wall block is disclosed that has a body. The body has a top, a bottom, a first end, a second end, a front side, and a rear side. The top has a first surface and a second surface adjacent the first surface. The first surface of the top is a first distance higher than the second surface of the top. The bottom has a first surface and a second surface. The second surface of the bottom is a second distance lower than the first surface of the bottom. The first and second distances are substantially similar. The first end has a top portion that extends a third distance beyond a bottom portion. The second end has a bottom portion that extends a fourth distance beyond a top portion. The third and fourth distances are substantially similar.



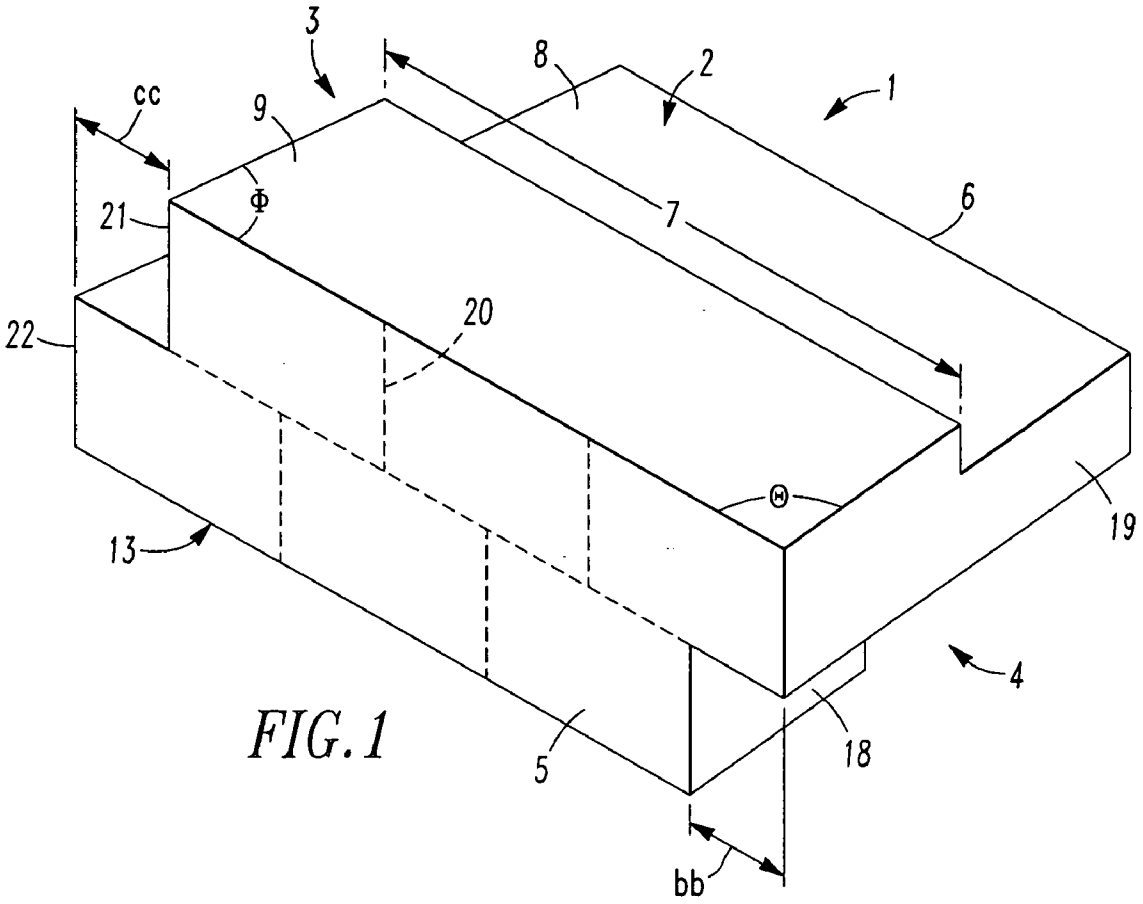


FIG. 1

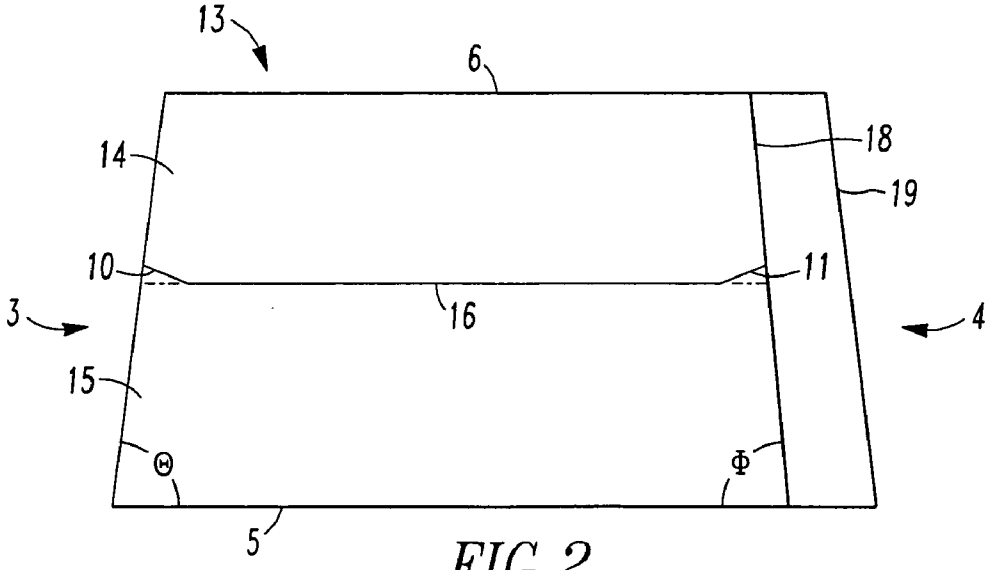


FIG. 2

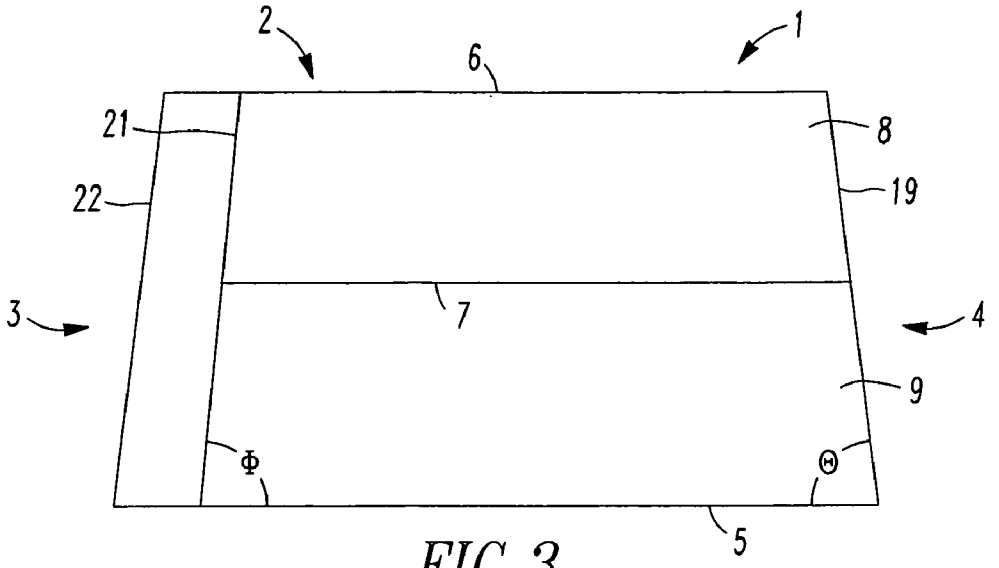


FIG. 3

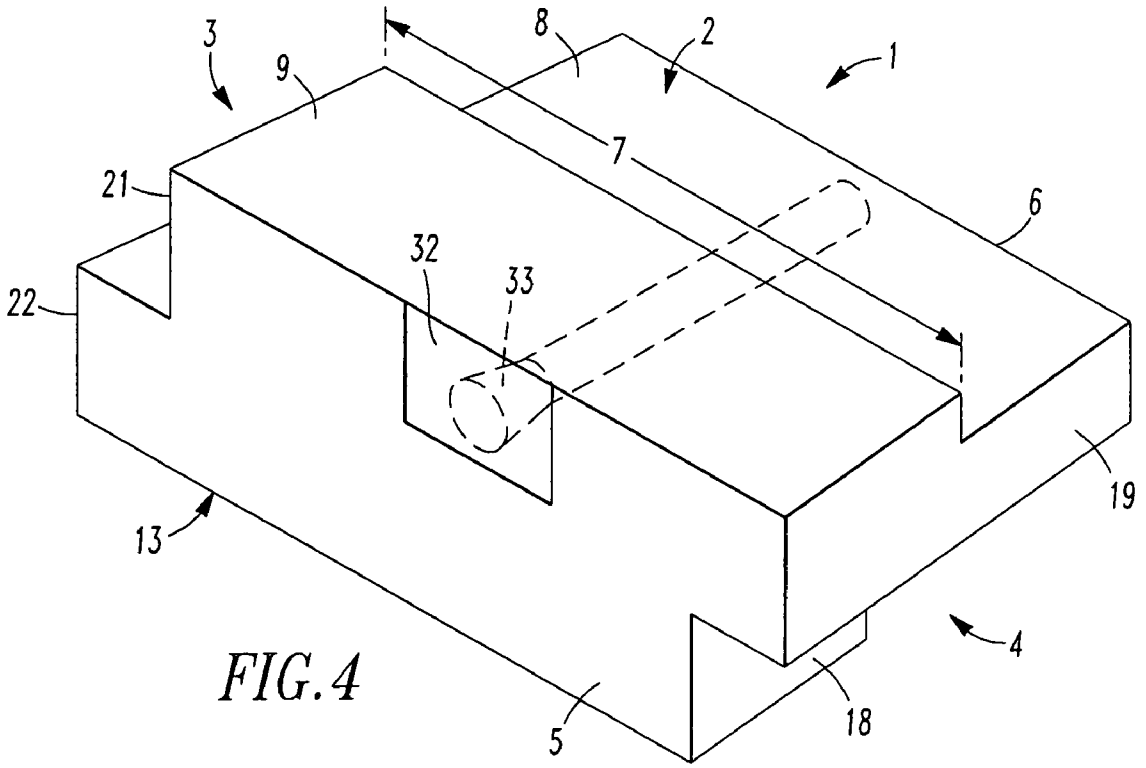


FIG. 4

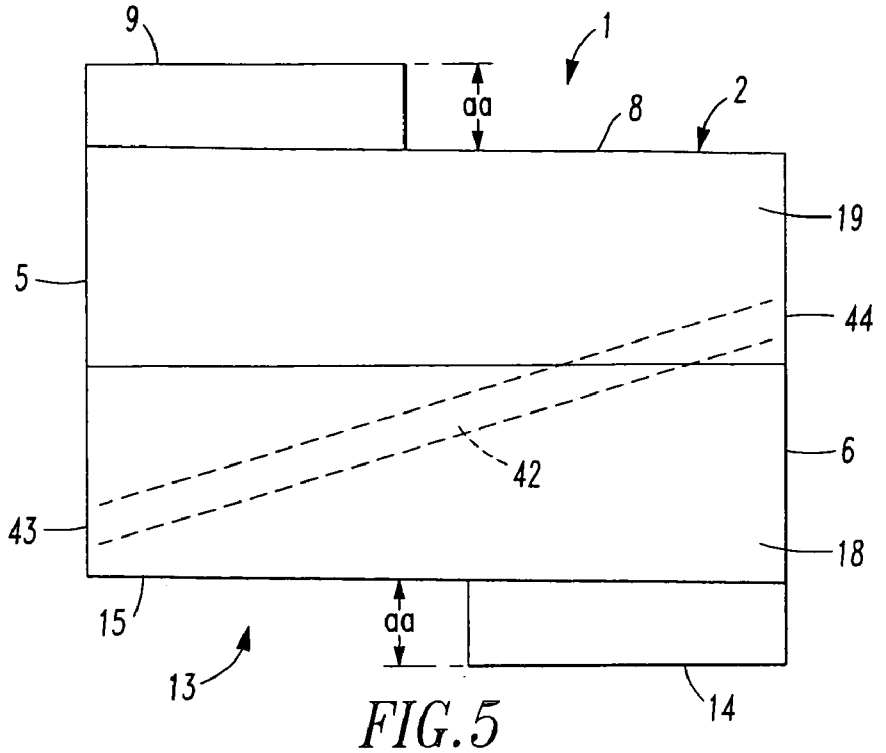

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FIG.5

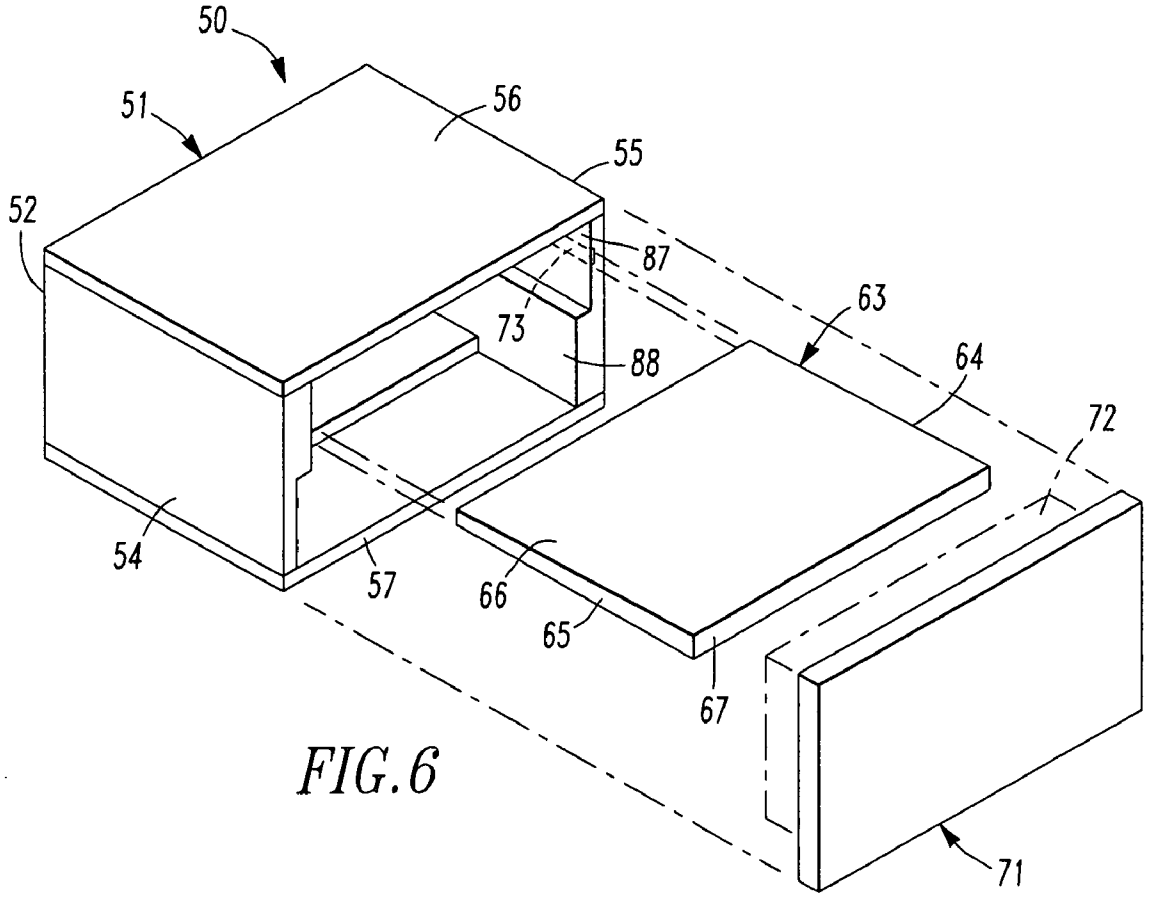
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FIG.6

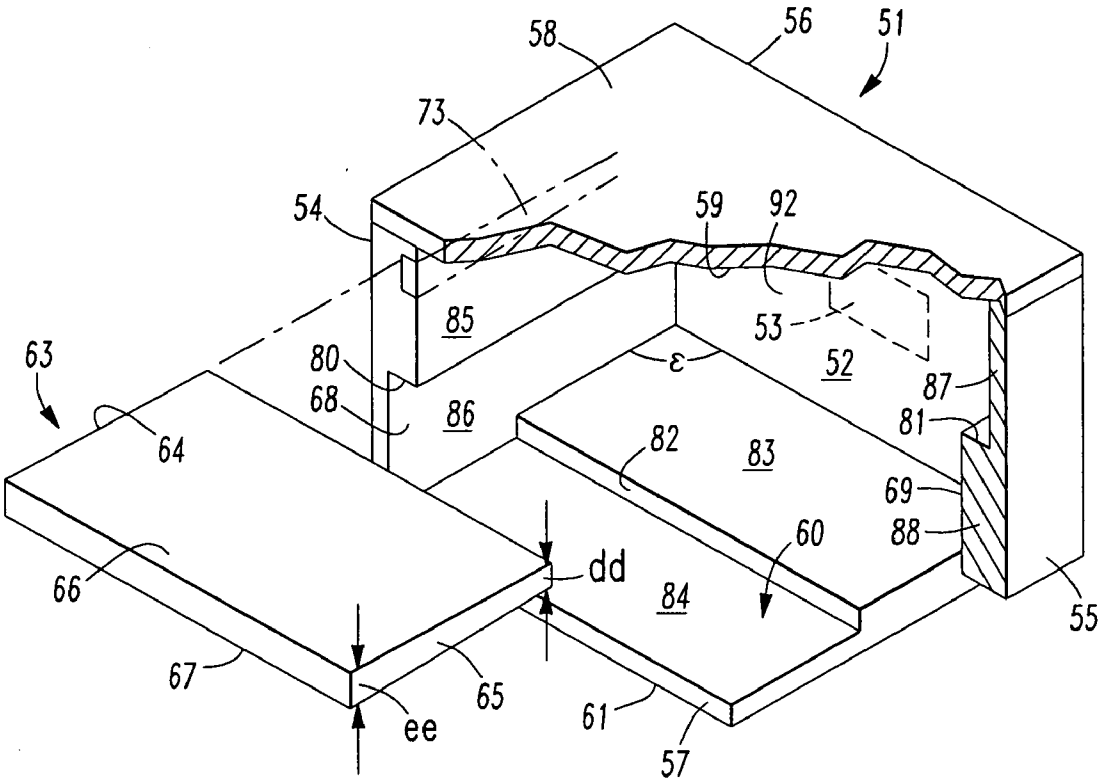
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FIG. 7

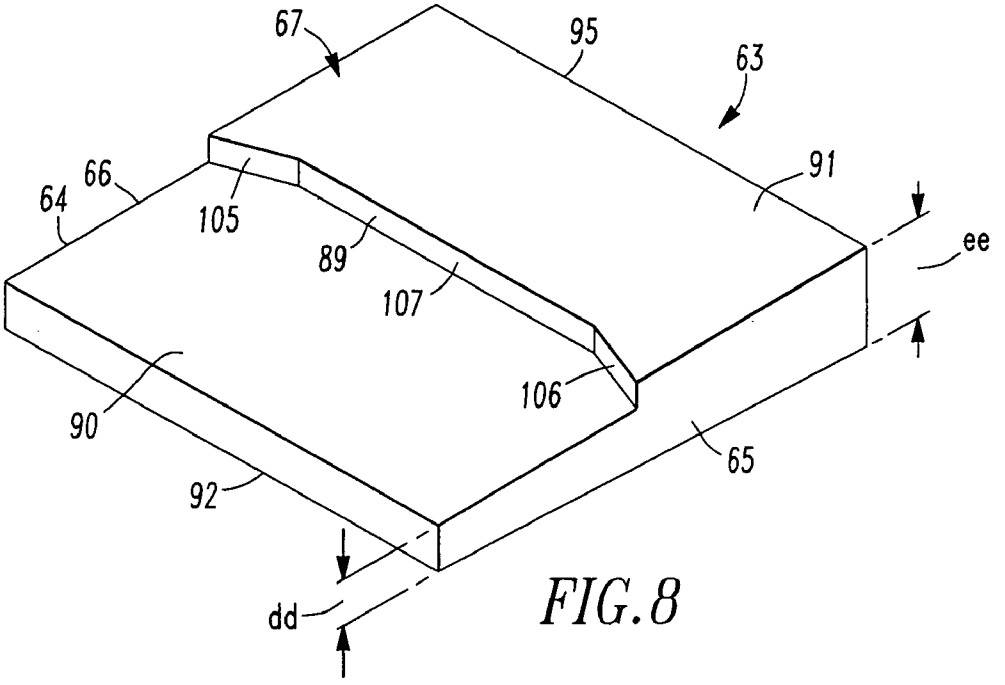
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FIG. 8

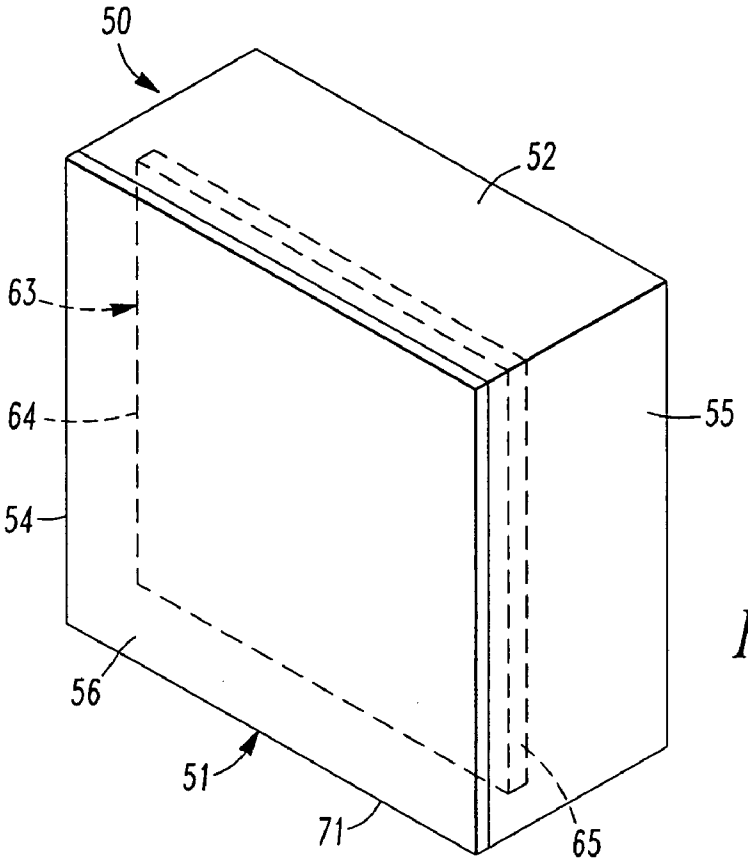

FIG. 9

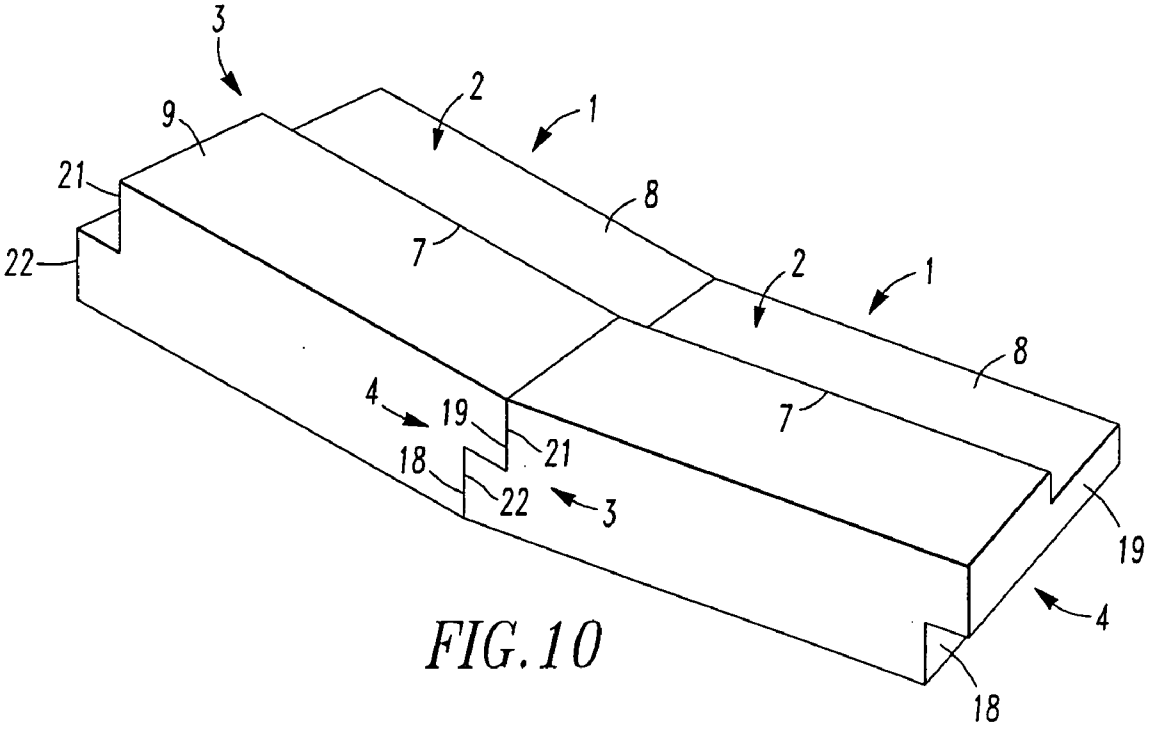

FIG. 10

RETAINING WALL BLOCK AND MOLD

FIELD OF INVENTION

[0001] The present invention relates to retaining wall blocks.

BACKGROUND OF THE INVENTION

[0002] Retaining wall blocks are used to form walls configured to retain soil, gravel, compost or other materials. Many retaining wall blocks are made of concrete and have rectangular or polygonal shaped bodies. Examples of such blocks are disclosed in U.S. Pat. Nos. Des. 363,787, Des. 306,489, and D513,805.

[0003] Often, a first course of retaining wall blocks is placed upon a base of sand or gravel and leveled. Once the base course of blocks is leveled, additional courses of blocks are laid upon the first course of blocks. Often, a top course of capstones is placed on the uppermost course of retaining wall blocks. When capstones are used, a concrete adhesive is typically applied to the bottom of the capstones to ensure the capstones stay connected to the uppermost course of blocks.

[0004] Retaining wall blocks in a wall often shift over time due to the pressure exerted on the wall by the retained mass of earth and changing weather conditions. As a result, retaining wall blocks can become separated from a wall or cause portions of the wall to collapse. In some cases, adhesives, such as cement, mortar or concrete adhesive, are used to keep the blocks connected to each other. The polygonal shape of the retaining wall block can also be configured to increase the friction applied by adjacent blocks in the wall to limit such shifting.

[0005] The costs and time associated with using concrete adhesive or mortar can increase the cost of retaining walls. Further, the use of adhesives can prevent an owner of the built wall from conveniently altering the design or configuration of the wall. For example, removal of the adhesive is a time consuming process. Moreover, blocks may be destroyed when the adhesive is being removed.

[0006] The polygonal shape of retaining wall blocks often fails to prevent blocks from moving. This is particularly true with respect to blocks residing in the upper courses of a wall because such blocks have less weight acting against them compared to the bottom courses of blocks.

[0007] Water that drains from the top of a mound of earth being retained by a retaining wall can accumulate along the wall. Such accumulated water can create an additional source of pressure that can be exerted against the wall until the water drains away or evaporates. As a result, it is often desirable to place drainage pipes adjacent to or below different blocks in a retaining wall.

[0008] Providing such pipes can cause sources of weakness within a wall and induce blocks within the wall to move. Further, creating the gaps sized to receive drainage pipes in a wall can be time consuming and require a builder to compensate for any structural instability caused by the gaps or pipes, which can take long periods of time and increase the cost of the retaining wall.

[0009] Often, a user with little or no experience builds a retaining wall. Such users may build the retaining wall without distributing the joints of the wall to increase the stability of the wall. For example, some builders make walls that have long joints extending from the bottom of the wall to the top of the wall. Many types of retaining wall blocks often fail to prevent a user from making walls with such joints. Typically, such wall configurations are chosen or implemented by a builder because the builder is unaware that a more stable configuration could be provided. This is particularly true for a builder, such as some homeowners, that has little or no previous experience building retaining walls.

[0010] Other methods used to alleviate the problems of retaining wall block slippage and instability are the use of interlocking recesses and projections. For example, U.S. Pat. No. 6,871,468 discloses a retaining wall block that has two spaced lugs that project from the top of the block and are sized to fit within recesses located on the bottom of such blocks. The recesses and lugs are sized and configured to define a setback dimension so that walls built with such blocks have courses that extend upwards and progressively behind the bottommost course of blocks.

[0011] Making blocks with projections sized to fit within a particularly sized recess in a block is difficult. Due to differences in manufacturing tolerances or other casting problems, the projections of some blocks fail to fit within the recesses of other blocks. As a result, a builder may be required to move blocks of previously laid courses to ensure that each block's projections can fit within an adjacent block's recesses. Moving previously laid block increases the time or costs associated with building a retaining wall.

[0012] Retaining wall blocks may also have channels that extend from the top of the block through the bottom of the block. U.S. Pat. No. 6,912,823 discloses such a type of block. The channels of the block disclosed in U.S. Pat. No. 6,912,823 are sized to receive pins or rebar. The blocks may also have horizontal grooves that extend from the left end of the block to the right end of the block. The grooves are sized to receive rebar and other horizontal reinforcing members or fastening devices. The rebar or other supports within the grooves or channels of such blocks are used to ensure the blocks retain their position so the wall retains its shape.

[0013] The use of such rebar or other mechanical fastening devices often involves increased costs to a homeowner or builder due to the extra material and labor required to lay such block and supports. Further, the grooves or channels are often not sufficiently sized to permit rebar or other fastening devices to reside within the apertures. Such problems can require blocks in lower, previously laid courses to be replaced.

[0014] Often, consumers choose to use blocks that have aesthetic front faces to build a retaining wall. Typically, consumers that choose to build a wall with such blocks prefer to have a wall built that appears to be an integral structure and provides an aesthetic effect consisting of the textured front face. Walls made from many concrete blocks that are currently available do not provide such a desired aesthetic effect because blocks in the wall are easily observed within the wall. For example, blocks similar to those disclosed in U.S. Pat. No. D513,805 are easily seen when incorporated into a wall due to the easily viewed joints such blocks create. Consequently, a user is usually able to readily appreciate each block in such a wall, which can limit the aesthetic effect the textured surface of each block is intended to provide.

[0015] There is a need for a retaining wall block that does not require the use of an adhesive to ensure a retaining wall keeps its initially constructed shape and size while allowing a user to readily move the location of a constructed wall or reuse the blocks of the wall to meet changing landscaping needs. Such a block is preferably configured to prevent a

casual builder from building a wall with long joints or other poor stability configurations while also making it difficult to recognize each individual block incorporated into the built wall or appreciate that the wall is made of numerous different concrete blocks. The block should also be designed to permit walls to be built in linear and curved arrangements and be easy to manufacture within a tolerance range so every retaining wall block can be easily positioned adjacent another similarly made block.

SUMMARY OF THE INVENTION

[0016] I provide a concrete retaining wall block that has a body with a top, a bottom, a first end, a second end, a front side and a rear side. The top has a first surface and a second surface adjacent the first surface. The first surface of the top is a first distance higher than the second surface of the top. The second surface of the bottom is a second distance lower than the first surface of the bottom. The first end of the body has a top portion that extends a third distance beyond the bottom portion of the first end. The second end has a bottom portion that extends a fourth distance beyond the top portion of the second end. The height of the top portion of the first end and the top portion of the second end are substantially the same. The height of the bottom portion of the first end and the bottom portion of the second end are substantially the same. The first and second distances are substantially the same and the third and fourth distances are substantially the same.

[0017] Preferably, the first and second distances are exactly the same and the third and fourth distances are exactly the same. As should be understood by those skilled in the art, such exact dimensions permit the blocks to be easily incorporated into a wall and may permit such a wall to appear to be a unitary structure.

[0018] The first distance and second distance is preferably 0.25 inches to 0.75 inches. Most preferably the first and second distances are 0.5 inches. The third distance and the fourth distance are preferably 0.75 inches to 1.25 inches. Most preferably, the third and fourth distances are 1.0 inches.

[0019] The front side may have a texture configured to simulate a plurality of ledge stones, a plurality of cobblestones or a plurality of bricks so the blocks may provide a wall with different aesthetic effects. The body is preferably formed by wet casting cement.

[0020] The first and second ends may both extend from the front side at an angle to the rear side such that the front side is longer than the rear side. The second surface of the bottom may also extend along the bottom such that the second surface has a first angled portion adjacent the first end and a second angled portion adjacent the second end. The angled portions preferably extend away from the front side of the body.

[0021] A light fixture housing may also be attached to the body such that the light fixture is integral with the body. In some embodiments, one or more lights may be connected to the housing so that the blocks can provide a source of light.

[0022] In other embodiments, a tube may be attached to the body so that the tube and body form a unitary structure. Such embodiments can permit walls having such blocks to drain water that may accumulate behind the wall by permitting the water to pass through the tube. In some embodiments, the tube may extend through the rear side of the body to the front side of the body at an angle so that the rear end of the tube is higher than the front end of the tube. When the tube passes through the block at such a downward angle, water or other liquids may more easily pass from the rear side of the block through the tube to the front side of the block.

[0023] In some embodiments, the surface of the top and surface of the bottom slope along similar grades and in the same direction. For example, the first and second surface of the top may slope from the back side to the front side and the first and second surfaces of the bottom slope may slope from the back side to the front side. The top and bottom surfaces should slope along substantially similar grades. Most preferably, the top and bottom surfaces slope along substantially identical grades. Blocks with such complementary slopes on the top and bottom surfaces of the block that slope in the same direction permit a builder to lay and level a first course of blocks and then lay additional courses that form a balanced structure including multiple courses of blocks.

[0024] I also provide a mold that can be used to make my concrete retaining wall blocks. My mold has a frame, a moveable insert and a removable cover. The mold is also adjustable from a molding position to an extraction position. The frame of the mold has an end, a first side, a second side, a third side and a fourth side. Each of the end, first side, second side, third side, and fourth side has an interior surface and an exterior surface. The first side, second side, third side and fourth side are attached to the end and extend from the end. The moveable insert is sized and configured to fit within the frame adjacent the interior surface of the first side when the mold is in the molding position.

[0025] The moveable insert has a first side and a second side. The first side of the insert is adjacent to and faces the interior surface of the first side of the frame when the mold is in the molding position. The second side of the insert faces the interior surface of the second side of the frame when the mold is placed in the molding position.

[0026] The interior surface of the third side of the frame extends away from the interior surface of the end of the frame at an angle. The interior surface of the third side of the frame has a first portion adjacent the first side of the frame and a second portion adjacent the second side of the frame. The first portion of the interior surface of the third side of the frame extends towards the fourth side of the frame more than the second portion of the interior surface of the third side of the frame such that a first lip is formed between the first and second portions of the interior surface of the third side of the frame. The interior surface of the fourth side of the frame also extends away from the interior surface of the end at an angle. The interior surface of the fourth side of the frame has a first portion adjacent the first side of the frame and a second portion adjacent the second side of the frame. The second portion of the interior surface of the fourth side of the frame extends towards the third side of the frame more than the first portion such that a first lip is formed between the first and second portions of the interior surface of the fourth side of the frame.

[0027] The interior surface of the second side of the frame has a first section and a second section. The first section of the interior surface of the second side of the frame is adjacent the end and extends further toward the first side of the frame than the second section such that a first lip is formed between the first and second sections of the interior surface of the second side of the frame.

[0028] The second side of the moveable insert also has a first surface and a second surface adjacent the first surface. The first and second surfaces of the second side of the insert define a first lip between the two surfaces. The first lip of the

insert extends from the first surface to the second surface such that the second surface extends further toward the second side of the frame than the first surface when the mold is in the molding position. The second surface of the insert is farther from the end of the frame than the first surface of the insert when the mold is in the molding position.

[0029] The cover is moveably or removably connected to the first side, second side, third side, and fourth side of the frame when the mold is in the molding position. The moveable cover is moved away from the first side, second side, third side, and fourth side of the frame when the mold is placed in the extraction position. The moveable insert is moved away from the first side of the frame and the end of the frame when the mold is placed in the extraction position such that the insert is at least partially extracted from within the frame when the mold is in the extraction position.

[0030] When in the molding position, the mold is configured to retain wet cement until the cement cures into concrete. In some embodiments, the mold may only be placed in the molding position after it has received the wet cement. For such embodiments, the insert may be within the mold prior to pouring the cement and the cover may be positioned to cover the frame and insert after the cement is poured into the frame to place the mold in the molding position. When in the molding position, the mold retains the wet cement to allow the cement to cure into concrete. Once the cement has cured into concrete within the mold, the mold is adjusted to an extraction position by moving the cover and insert to extract the cured concrete block from the mold.

[0031] In some embodiments, the moveable insert can have a first thickness that is narrower than its second thickness. The first thickness is located adjacent the end of the frame when the mold is in the molding position. The second thickness is located away from the first thickness such that the first thickness is closer to the end of the frame than the second thickness when the mold is in the molding position. The first and second widths of the insert can permit the insert to provide immediate relief to the cured concrete block when the mold is being adjusted to the extraction position and the moveable insert is being moved away from the end of the frame. Such immediate relief permits the concrete blocks to be easily extracted from the mold and minimizes the likelihood that a portion of the concrete block will break or otherwise be damaged upon the removal of the insert.

[0032] Preferably, the interior surface of the second side of the frame is sloped from adjacent the end of the frame to a location away from the end and the surface of the second side of the insert is configured to be sloped on a substantially similar grade as the interior surface of the second side of the frame when the mold is in the molding position. Most preferably, the grade of the slope of the interior surface of the second side of the frame and the slope of the surface of the second side of the insert are substantially identical when the mold is placed in the molding position.

[0033] The frame is preferably a unitary structure formed of plastic. However, the frame may also be made of wood or other materials. In some embodiments of the present invention, the interior surface of the third side of the frame extends away from the interior surface of the end at an angle of 45 to 112 degrees relative to the end of the frame and the interior surface of the fourth side of the frame extends away from the interior surface of the end of the frame at an angle of 45 to 112 degrees relative to the end. In other preferred embodiments of the present invention, the interior surface of the third side of the frame extends away from the interior surface of the end at an angle of 45 to 90 degrees relative to the end and the interior surface of the fourth side of the frame extends away from the interior surface of the end at an angle of 45 to 90 degrees relative to the end.

[0034] The first lip of the third side of the frame preferably extends 0.75 to 1.25 inches between the first portion and the second portion of the interior surface of the third side of the frame. Most preferably, the first lip of the third side of the frame extends 1.0 inches between the first portion and the second portion of the interior surface of the third side. Similarly, the first lip of the fourth side of the frame preferably extends 0.75 to 1.25 inches between the first portion and the second portion of the interior surface of the fourth side. Most preferably, the first lip of the fourth side extends 1.0 inches between the first portion and the second portion of the interior surface of the fourth side.

[0035] In some embodiments, the first lip of the second side of the frame extends 0.25 to 0.75 inches between the first and second sections of the interior surface of the second side and the first lip of the second side of the insert can extend 0.25 to 0.75 inches between the first and second surfaces of the second side of the insert. Most preferably, the first lip of the second side of the frame extends 0.5 inches between the first and second sections of the interior surface of the second side of the frame and the first lip of the second side of the insert extends 0.5 inches between the first and second surfaces of the second side of the insert.

[0036] It should be understood that the frame, cover, or insert can be made of various materials, including wood, plastics, metals, or any combination thereof.

[0037] In some embodiments, the interior surface of the third side of the frame can also define a groove sized to receive a third side of the moveable insert adjacent the first side of the frame and the interior surface of the fourth side of the frame can define a groove sized to receive a fourth side of the moveable insert adjacent the second side of the frame. Such grooves can help ensure that the moveable insert is properly positioned adjacent the first side of the frame when the mold is placed in the molding position and can help facilitate the insertion and removal of the insert.

[0038] At least one form may be attached to the cover or the interior surface of the end. Each form can be connected such that the form is removable from the interior surface of the end or the cover. In one embodiment, one form can be attached to the interior surface of the end and one form can be attached to the cover. The one or more forms can be configured to provide at least one textured surface that provides an appearance of a plurality of ledge stones, a plurality of bricks or a plurality of cobblestones.

[0039] In some embodiments, the first lip of the insert may have a first angled portion, a second, opposite angled portion and a middle portion. The first and second angled portions extend from the middle portion along an angle relative to the middle portion. Preferably, the first angled portion may extend along an angle of 3 to 15 degrees and the second angled portion may extend along an angle of 3 to 15 degrees. Most preferably, the first and second angled portions extend along an angle of 3 to 5 degrees relative to the middle portion of the first lip of the insert.

[0040] Other details, objects, and advantages of the invention will become apparent as the following description of

certain present preferred embodiments thereof and certain present preferred methods of practicing the same proceeds.

BRIEF DESCRIPTION OF THE DRAWINGS

[0041] In the accompanying drawings I have shown present preferred embodiments of the invention and have illustrated certain present preferred methods of practicing the same.

[0042] FIG. **1** is a perspective view of a first embodiment of the present invention.

[0043] FIG. **2** is a bottom view of the first embodiment.

[0044] FIG. **3** is a top view of the first embodiment.

[0045] FIG. **4** is a perspective view of a second embodiment of the present invention.

[0046] FIG. **5** is a side view of a third embodiment of the present invention.

[0047] FIG. **6** is an exploded view of a fourth embodiment of the present invention.

[0048] FIG. **7** is a fragmentary view of the fourth embodiment in an extraction position illustrating the insert and frame portions of the embodiment.

[0049] FIG. **8** is a perspective view of a first embodiment of the insert.

[0050] FIG. **9** is a perspective view of the fourth embodiment in a molding position.

[0051] FIG. **10** is a perspective view a first present preferred method of laying a course of retaining wall blocks.

DETAILED DESCRIPTION OF PRESENT PREFERRED EMBODIMENTS

[0052] A first embodiment of my retaining wall block **1** has a top **2**, a bottom **13**, a first end **4** and a second end **3**, a front side **5** and a second side **6**, as illustrated in FIGS. **1**, **2**, **3**, **4** and **5**. The block **1** is preferably formed from wet casting cement. The top **2** has a first surface **9** and an adjacent second surface **8**. The first and second surfaces **8**, **9** extend adjacent the entire first length **7** of the top, as may best be seen in FIG. **3**. As may best be appreciated in FIG. **5**, the first surface **9** is higher than the second surface **8**, extending a first distance aa above the second surface **8**. Distance aa is preferably 0.25 to 0.75 inches. Most preferably, distance aa is 0.5 inches.

[0053] The first end **4** of the block has a bottom portion **18** and a top portion **19**. The top portion **19** extends a first distance bb away from the bottom portion **18**. First end **4** extends from the front side **5** to the rear side **6** along an angle Θ. Angle Θ is preferably 45 to 112 degrees relative to the front side. Most preferably, angle Θ is 45 to 90 degrees relative to the front side.

[0054] The second end **3** has a top portion **21** and a bottom portion **22**. The bottom portion **22** extends a first distance cc away from the top portion **21**. The second end **3** extends from the front side **5** to the rear side **6** along an angle Φ. Angle Φ is preferably 45 to 112 degrees relative to the front side. Most preferably, angle Φ is 45 to 90 degrees relative to the front side.

[0055] Some embodiments have ends **3**, **4** that extend from the front side at similar angles. Other embodiments have ends that extend from the front side at different angles.

[0056] The angled ends **3**, **4** permit course of blocks **1** to be aligned in curved courses that can form very tight curved walls or slightly curved walls. Such walls may have courses of blocks aligned in a tight or compact arrangement that form walls that curve along the path of a curved road or walkway that is slightly curved or tightly curved.

[0057] Distances bb and cc are substantially the same so that courses of blocks may interlock when two blocks are positioned adjacent each other in a course of blocks. I prefer that distances bb and cc be 0.75 to 1.25 inches. Most preferably, distances bb and cc are 1.0 inch.

[0058] Similarly, the height of top portions **19** and **21** are preferably substantially the same and the height of bottom portions **18** and **22** are preferably substantially the same. It should be appreciated that the use of the phrase "substantially the same" in reference to the different portions' heights means that the heights compliment each other such that two blocks **1** can be positioned adjacent each other in the same course of blocks so that at least a portion of the top portion **19** of the first end of one block can lay upon at least a portion of the bottom portion **22** of the second side of the other block.

[0059] Referring to FIG. **2**, the bottom **13** of block **1** has a first surface **15** and a second surface **14**. Both surfaces **14** and **15** have a middle portion that extends along a length **16** of the bottom. The second surface **14** has a first angled portion **11** adjacent the first end **4** and a second angled portion **10** adjacent the second end **3** that extend away form the front side **5**. Angled portions **10**, **11** are preferably angled 3 to 15 degrees relative to the middle portion of the first and second surfaces **15**, **14**. Most preferably, angled portions **10**, **11** are angled 3 to 5 degrees relative to the middle portion of the first and second surfaces. The angled portions **10**, **111** permit the blocks to be easily interlocked along angled courses. For example, the bottom of one block may be aligned with the top of blocks on a lower course of blocks so that one of the angled portions **10** or **11** interlock with a portion of blocks in that lower course, while the middle portion interlocks with the top of a third block.

[0060] The second surface **14** is lower than the first surface **15** by substantially the same distance as distance aa, as may best be seen in FIG. **5**. It should be appreciated that by "substantially the same" in reference to the different heights of surfaces **14** and **15** means that the heights compliment each other such that one block **1** can be stacked on top of another block so that at least a portion of top surface **8** engages the bottom surface **14** and at least a portion of top surface **9** engages bottom surface **15**.

[0061] In some embodiments, the second surface **14** and first surface **15** may extend fully along length **16** such that there are no angled portions **10**, **11**, as illustrated by dotted lines in FIG. **2**.

[0062] To provide blocks that may be used to create walls having different aesthetic effects, the front side or rear side of each block may have a textured surface **20**, illustrated in dotted line in FIG. **1**. The textured surface can provide an appearance of a plurality of ledge stones, cobblestones or bricks that are stacked in adjacent courses. When blocks having such textured surfaces are used to form a wall, the wall may appear to be a unitary structure formed of numerous ledge stones, bricks, or cobblestones instead of a wall formed by various concrete blocks.

[0063] The angles Φ, Θ along which the ends **3**, **4** extend from the front side of the block to the rear side of the block define the polygonal shape of the block **1**. The angled ends **3**, **4** permit the blocks to be compactly stacked in curved or angled courses.

[0064] When embodiments of the blocks are stacked in courses to build a retaining wall, it should be appreciated that the offset surfaces **8**, **9** on the top and **14**, **15** of the bottom permit the blocks to be easily and securely stacked on top of

one another. For example, the second surface **8** of the top is sized and configured to receive the lowermost second surface **14** of the bottom. Similarly, the first surface of the top **9** is sized and configured to easily receive the first surface **15** of the bottom. The bottom and top surfaces interlock to keep the blocks secured to one another, which improves the stability of a wall constructed of my blocks. Further, the offsets are easy to manufacture within a definite tolerance range such that the problem of blocks not interlocking with other blocks is greatly minimized, if not eliminated.

[0065] Preferably, the surfaces **8**, **9** of the top and the surfaces **14**, **15** of the bottom are sloped. For example, surfaces **8**, **9** of the top may be sloped upwards from the rear of the block to the front of the block and the surfaces **14**, **15** may be sloped upward from the rear of the block to the front of the block. The grade of the sloped top and bottom surfaces should be substantially similar and, most preferably, are sloped along the exact same grade. Preferably, the grade of the slopes for the top and bottom surfaces is 1 to 3 degrees. Most preferably, the grade of the slopes for the top and bottom surfaces is 1 degree.

[0066] The sloped bottom and top surfaces permit blocks to be laid in courses that are balanced and more fully engaging adjacent courses. As those skilled in the art know, the first course of a retaining wall is typically leveled prior to laying additional courses. When using embodiments of my block that have sloped tops and bottoms, additional courses may be laid upon the leveled first course that form a level wall. Further, the sloped top and bottom surfaces can ensure more friction is applied to each block included within a wall to help prevent block movement, which may provide a wall with a much higher level of stability than walls composed of conventional blocks.

[0067] Also, the offsets defined by the top and bottom portions of ends **3** and **4** permit any builder to construct a retaining wall with a series of distributed joints. Each of my blocks requires a user to align a course with the first end **4** of one block in abutment with the second end **3** of an adjacent block, as shown in FIG. **10**. The top portion **19** of the first block is supported by the bottom portion **22** of the second block. Similarly, the bottom portion **18** of the first block abuts the bottom portion **22** of the second block. Every joint in a wall built with blocks **1** is supported by at least one adjacent block. Consequently, a user cannot build a wall with long, unstable joints using blocks **1**.

[0068] It is often useful to have light fixtures adjacent a retaining wall to provide light during evening hours so others are made aware of the location of a retaining wall. This is particularly true when retaining walls are positioned adjacent driveways or walkways that people or vehicles travel along so that a driver or person can avoid coming into contact with such walls. As shown in FIG. **4**, one embodiment of my retaining wall block has a light fixture housing **32** attached to the block **1** so that the housing **32** is integral with the block **1** by molding the concrete of the block around the perimeter of at least a portion of the housing **32**. In some embodiments, a light **33**, which is illustrated in dotted lines, may also be provided within the housing **32**.

[0069] In another embodiment, a tube **42** can be attached to the block **1** so the tube **42** is integral with the block **1**, as shown by dotted lines in FIG. **4**. The tube is made integral with the block by molding the concrete of the block around at least a portion of the circumference of the tube. The tube **42** has a front end **43** adjacent the front side **5** of the block and a rear end **44** located adjacent the rear side **6** of the block. I prefer that the tube be positioned to extend through the block on a downward angle such that the rear end **44** of the tube is higher than the front end **43** of the tube.

[0070] Because the tube **42** and block **1** form a unitary structure, a retaining wall can easily and quickly be built without having to construct a wall with gaps sized to receive drainage pipes or preplan the particular location of the gaps or pipes. Walls built with such blocks may also provide a wall having greater stability than one made of conventional blocks because the pipes do not require any gaps within the wall.

[0071] I also provide molds that can be used to form embodiments of my block. One embodiment 50 of my mold is shown in FIGS. **6**, **7** and **9**. Mold **50** has a frame **51**, a moveable insert **63** and a cover **71**. The mold can be adjusted from a molding position to an extraction position. When in the molding position, the insert is within the frame and the cover is connected to the sides of the frame. When the mold is in the extraction position, the cover is moved away from the frame and the insert is at least partially removed from the frame. In some embodiments, the cover and insert may be completely removed from the frame when the mold is placed in the extraction position.

[0072] The frame **51** may be most easily viewed in FIG. **7**. The frame **51** has an end **52**, a first side **56**, a second side **57**, a third side **54**, and a fourth side **55**. The first side **56**, second side **57**, third side **54**, and fourth side **55**, are attached to the end **52** and extend from the end **52**. The first side **56** has an interior surface **59** and an exterior surface **58**. The second side **57** has an interior surface **60** and an exterior surface **61**. The third side **54** has an interior surface **68** and an exterior surface. The fourth side **55** has an interior surface **69** and an exterior surface. The end has an interior surface **92** and an exterior surface. In some embodiments, the end may have an opening **53** illustrated in dotted line in FIG. **7**. The opening may permit cement to be poured into the mold when the mold is in a molding position.

[0073] Preferably, the frame is a unitary structure formed of plastic. Of course, other embodiments of the frame may have each side **54**, **55**, **56** and **57** attached to end **52** by adhesives, screws, nails, brackets, or fastening devices.

[0074] It should be understood that end **52** may be a top or bottom of the frame in some embodiments of my mold. In embodiments of my mold that use a square frame, end **52** may be considered a side or face of the frame.

[0075] The interior surface **68** of the third side extends away from the interior surface of the end on an angle ϵ. The interior surface **69** of the fourth side also extends away from the interior surface **92** of the end on an angle. In some embodiments, the angle at which the interior surfaces **68**, **69** of the third and fourth sides extend may be substantially the same. In other embodiments, the angles may be different. Preferably, the interior surface **68** of the third side extends away from the end **52** at an angle of 45 to 112 degrees and the interior surface **69** of the fourth side extends away from the end at angle of 45 to 112 degrees. In other preferred embodiments of my mold, the interior surface **68** of the third side extends away from the end **52** at an angle of 45 to 90 degrees and the interior surface **69** of the fourth side extends away from the end at angle of 45 to 90 degrees.

[0076] The interior surface **68** of the third side has a first portion **85** adjacent the first side **56** of the frame and a second portion **86** adjacent the second side **57** of the frame. The first portion **85** extends further toward the fourth side **55** than the

second portion **86** such that a lip **80** is defined between the first and second portions **85**, **86**. The interior surface **69** of the fourth side similarly has a first portion **87** adjacent the first side **56** and a second portion **88** adjacent the second side **57**. The second portion **88** extends further toward the third side **54** than the first portion **87** such that a lip **81** is defined between portions **87** and **88**.

[0077] Lips **80** and **81** may be substantially similar in length, width and height. Similarly, first portions **85**, **87** can have substantially similar lengths and widths and second portions **86** and **88** can have substantially similar lengths and widths. Preferably, lip **81** extends 0.75 to 1.25 inches between portions **87** and **88** and lip **80** extends 0.75 to 1.25 inches between portions **85** and **86**. Most preferably, lips **80** and **81** both extend 1.0 inches.

[0078] The second side **57** has an interior surface **60** that has a first section **83** and a second section **84**. The first section is adjacent the end **52** and extends further toward the first side than the second section such that a lip **82** is defined between sections **83** and **84**. Lip **82** preferably extends 0.25 to 0.75 inches between sections **83** and **84**. Most preferably, lip **82** extends 0.5 inches between sections **83** and **84**.

[0079] Insert **63** has a first side **66**, a second side **67**, a third side **64** and a fourth side **65**. The insert can be positioned within the frame, as shown in FIG. **9** and indicated in FIGS. **6** and **7**. The insert can also be moved away from the frame so that at least a portion of the insert extends away from the frame. The second side **67** has a first surface **90** and a second surface **91**. The second surface is located above the first surface **90** such that the first and second surfaces **90**, **91** define a lip **89**. Lip **89** preferably extends 0.25 to 0.75 inches between surfaces **90** and **91**. Most preferably, lip **89** extends 0.5 inches between surfaces **90** and **91**.

[0080] The lip **89** has a first angled portion **105**, a second angled portion **106** and a middle portion **107** between the first and second angled portions **105**, **106**. Preferably, angled portions **105** and **106** extend from the middle portion **107** on an angle of 3 to 15 degrees relative to the middle portion **107**. Most preferably, the angled portion **105** extends along an angle of 3 to 5 degrees and angled portion **106** extends along an angle of 3 to 5 degrees relative to the middle portion **107**. The angled portions **105**, **106** are configured to extend towards the end **52** when the mold is in the molding position. It should be appreciated that the angled portions **105** and **106** may define a bottom surface for a concrete block that can be easily laid in angled courses. When the insert **63** is in the molding position, angled portion **105** extends toward side **55** of the frame and angled portion **106** extends toward side **54** of the frame.

[0081] Of course, in some embodiments, the first surface **90** may be configured to have a solely linear interface with second surface **91** such that lip **89** does not have any angled portions as indicated by dotted line in FIG. **8**.

[0082] The cover **71** is moveable so that it can be separated from or at least moved away from the frame when the mold is placed in the extraction position. In some embodiments, the cover **71** can be attached to a form **72** that is configured to provide the concrete block with a textured surface, such as textured surface **20** shown in dotted line in FIG. **1**.

[0083] In one embodiment of my mold, a second form could be attached to the end **52** of the frame so that two different surfaces of a concrete block, such as front and rear sides of block **1**, can have a textured surface. In other embodiments, the interior surface **92** of the end **52** can be sized and configured to provide such a textured surface.

[0084] The moveable insert **63** is positioned within the frame when the mold is placed in a molding position, as shown in FIG. **9** and is moved at least partially out of the frame when the mold is placed in an extraction position to remove the concrete block cured within the mold. When the insert **63** is placed within the frame **51** to place the frame in the molding position, the second side **67** of the insert faces toward the second side **57** of the frame and the first side **66** of the insert faces the interior surface **59** of the first side **56** of the frame. The second surface **91** extends further toward the second side **57** than the first surface **90**.

[0085] Once the insert has been inserted into the frame **51**, the cover **71** is connected to the frame adjacent the third side, fourth side, first side and second sides of the frame to place the mold **1** in its molding position, as shown in FIG. **9**. The cover **71** may have a form **72** that faces the interior surface **92** of the end when the mold is placed in the molding position.

[0086] Moving the insert away from the frame can be difficult after the cement has cured into concrete because the concrete is bonded to the second side **67** of the insert. As a result, friction generally makes removing the insert extremely difficult. In some cases, the concrete block can become damaged when the insert is moved after the cement has cured.

[0087] To make removal of the insert easier and to help reduce the likelihood that a block may become damaged upon the removal of the insert, I prefer to use an insert with at least two different thicknesses dd and ee. The first thickness dd of the insert is located adjacent the first surface **90** of the insert. The second thickness ee is located adjacent the second surface **91** of the insert. The first thickness dd is narrower, or thinner, than the second thickness ee.

[0088] When the insert is positioned within the frame **51**, the portion of the insert having the first thickness dd is located closer to the end **52** of the frame than the portion with the second thickness ee. Because the first thickness dd is thinner than thickness ee, the insert immediately separates from a concrete block cured within the frame **51** when the insert is moved away from the end **52** of the frame. This immediate separation is caused because the narrower portion moves into alignment with parts of the frame configured to receive a thicker portion of the insert. As a result, space between the concrete block and the insert is created, which greatly reduces the friction against the sides and ends of the frame induced by the cured concrete. The creation of space between the cured concrete and the insert permits the insert to be easily slid out of the frame. In some cases, the cured concrete will slide out of the frame as the insert is moved out of the frame. Preferably, the thickness of the insert progressively thickens from a narrow thickness dd adjacent end **92** of the first surface **90** to thicker thickness ee adjacent end **95** of second surface **91**.

[0089] Without the use of an insert with such different thicknesses, removal of the insert or block from the frame can be extremely difficult and even require hammering the frame or other forces to be acted on the frame to remove the cured block. This is particularly true for blocks formed from wet concrete. Such forces can damage the block cured within such a frame.

[0090] When the mold is placed in an extraction position, the cover is moved away from the frame so that the cured concrete block formed in the mold can be extracted from the frame. The insert **63** is at least partially removed from the frame **51** to separate the cured concrete block from the frame.

The space created by movement of the insert permits the concrete block to be extracted from the frame **51**.

[0091] In some embodiments, the interior surface **68** of the third side of the frame and the interior surface **69** of the fourth side of the frame can have grooves **73** sized and configured to receive the third and fourth sides **64**, **65** of insert **63**. The grooves **73** are located adjacent the first side **56** of the frame so that the insert is easily positioned within the frame when the mold **50** is placed in the molding position.

[0092] The interior surface **60** of the second side **57** of the frame can be sloped such that sections **83** and **84** are not level. Similarly, the second side **67** of the insert **63** may have a sloped surface such that surfaces **90** and **91** are not level. Preferably, the surface of the second side **67** of the insert **63** is sloped on a grade so that the slope of the second side of the insert **67** is substantially similar to the grade of the interior surface **60** when the mold is in the molding position. Most preferably, the grade of the surface of the second side of the insert **67** is exactly the same to the grade of the interior surface **60**. The direction of the slope of the surface of the second side **67** of the insert should be configured so that the direction of the slope along the surface of the second side **67** of the insert is the same to that of the interior surface **60** of the second side **57** of the frame. For example, the interior surface **60** may slope in an upward direction extending away from end **52** of the frame and the surface of the second side **67** of the insert can be configured to slope in an upward direction extending away from end **52** when the mold is in the molding position. Preferably the grade of the slopes for the interior surface **60** and surface of the second side **67** of the insert is 1 to 10 degrees. Most preferably, the slopes for the interior surface **60** and surface of the second side **67** of the insert is 1 to 3 degrees.

[0093] It should be noted that the sloping of the surface of the second side **67** of the insert can be obtained without always providing an insert with different thicknesses dd and ee. For example, the first side of the insert may be configured to slope along a grade that compliments the slope of the second side such that the insert has a substantially uniform thickness.

[0094] It should be appreciated that the frame, cover, or insert may be composed of wood, plastics, ceramics, metals, composites, or any combination thereof.

[0095] While I have shown and described certain present preferred embodiments of my retaining wall block and retaining wall block mold and have illustrated certain present preferred methods of making and using the same, it is to be distinctly understood that the invention is not limited thereto but may be otherwise variously embodied and practiced within the scope of the following claims.

I claim:

1. A concrete block for retaining walls comprising:

a body having a top, a bottom, a first end, a second end, a front side and a rear side,

the top having a first surface and a second surface adjacent the first surface, the first surface of the top being a first distance higher than the second surface of the top;

the bottom having a first surface and a second surface, the first surface of the bottom being adjacent the second surface of the bottom, the second surface of the bottom being a second distance lower than the first surface of the bottom;

the first distance and the second distance being substantially similar distances,

the first end of the body having a top portion and a bottom portion, the top portion of the first end extending a third distance beyond the bottom portion of the first end;

the second end of the body having a top portion and a bottom portion, the bottom portion of the second end extending a fourth distance beyond the top portion of the second end;

the third and fourth distances being substantially similar distances, the top portion of the first end and the top portion of the second end having substantially similar heights and the bottom portion of the first end and the bottom portion of the second end having substantially similar heights.

2. The concrete block of claim **1** wherein the front side has a texture configured to simulate one of a plurality of ledge stones, a plurality of cobblestones, and a plurality of bricks.

3. The concrete block of claim **1** wherein the concrete block is formed by wet casting cement.

4. The concrete block of claim **1** wherein the front side has a length and the rear side has a length, the first end and second end both being angled as each end extends from the front side to the rear side such that the length of the front side is longer than the length of the rear side.

5. The concrete block of claim **1** wherein the second surface of the bottom has a first angled portion adjacent the first end and a second angled portion adjacent the second end.

6. The concrete block of claim **1** further comprising a light fixture housing attached to the body such that the light fixture housing is integral with the body.

7. The concrete block of claim **1** further comprising at least one tube attached to the body such that the at least one tube is integral with the body, the at least one tube extending from the rear side to the front side of the block.

8. The concrete block of claim **7**, wherein the at least one tube has a front end adjacent the front side of the body and a rear end adjacent the rear end of the body, the at least one tube extending on a downward angle such that the rear end is located above the front end.

9. The concrete block of claim **1** wherein the first distance is 0.25 inches to 0.75 inches and the second distance is 0.25 to 0.75 inches

10. The concrete block of claim **1** wherein the third distance is 0.75 inches to 1.25 inches and the fourth distance is 0.75 inches to 1.25 inches.

11. The concrete block of claim **1** wherein the top surface of the body is sloped from the rear side of the body to the front side of the body about a first grade and the bottom surface of the body is sloped from the back side of the body to the front side of the body about a substantially similar second grade.

12. The concrete block of claim **11** wherein the first grade is 1 to 3 degrees and the second grade is 1 to 3 degrees.

13. A mold for a concrete block comprising a frame, a moveable insert, and a movable cover, the mold being adjustable from a molding position to an extraction position;

the frame having an end, a first side, a second side, a third side and a fourth side, the first side, second side, third side and fourth side attached to the end and extending from the end, the end having an interior surface and an exterior surface, the first side having an interior surface and an exterior surface, the second side having an interior surface and an exterior surface, the third side having an interior surface and an exterior surface and the fourth side having an interior surface and an exterior surface;

the moveable insert sized and configured to fit within the frame adjacent the interior surface of the first side when the mold is in the molding position, the moveable insert having a first side and a second side, the first side of the insert facing the interior surface of the first side of the frame when the mold is in the molding position and the second side of the insert facing the interior surface of the second side of the frame when the mold is in the molding position;

the interior surface of the third side of the frame extending away from the end at an angle, the interior surface of the third side of the frame having a first portion adjacent the first side of the frame and a second portion adjacent the second side of the frame, the first portion of the interior surface of the third side of the frame extending towards the fourth side of the frame more than the second portion such that a first lip is formed between the first and second portions of the interior surface of the third side of the frame;

the interior surface of the fourth side of the frame extending away from the interior surface of the end at an angle, the interior surface of the fourth side of the frame having a first portion adjacent the first side of the frame and a second portion adjacent the second side of the frame, the second portion of the fourth side of the frame extending towards the third side of the frame more than the first portion of the fourth side of the frame such that a first lip is formed between the first and second portions of the interior surface of the fourth side of the frame;

the first portion of the interior surface of the third side of the frame and the second portion of the interior surface of the fourth side of the frame having substantially similar lengths and widths, the second portion of the interior surface of the third side of the frame and the first portion of the interior surface of the fourth side of the frame having substantially similar lengths and widths, the first lip of the third side of the frame and the first lip of the fourth side of the frame having substantially similar lengths and widths;

the interior surface of the second side of the frame having a first section and a second section, the first section of the interior surface of the second side of the frame being adjacent the end and extending further toward the first side of the frame than the second section of the interior surface of the second side of the frame such that a first lip is formed between the first and second sections of the interior surface of the second side of the frame;

the second side of the insert having a first surface and a second surface, the first and second surfaces of the second side of the insert defining a first lip between the first and second surfaces, the first lip of the insert extending from the first surface of the second side of the insert to the second surface of the second side of the insert such that the second surface extends further toward the second side of the frame than the first surface when mold is in the molding position, the first surface of the insert being located on the second side of the insert such that the first surface of the insert is closer to the end than the second surface of the insert when the mold is in the molding position;

the moveable cover being moveably or removably connected to the first side, second side, third side and fourth side when the mold is in the molding position; and

wherein the moveable cover is moved away from the first side, second side, third side and fourth side of the frame when the mold is placed in the extraction position and the moveable insert is moved away from the end of the frame when the mold is placed in the extraction position.

14. The mold of claim **13** wherein the frame is a unitary structure.

15. The mold of claim **13** further comprising at least one form attached to one of the cover and the interior surface of the end.

16. The mold of claim **15** wherein each form is removably connected to at least one of the cover or interior surface of the end when the mold is in the molding position.

17. The mold of claim **15** wherein the at least one form is configured to provide a textured surface that provides an appearance of one of a plurality of ledge stones, a plurality of bricks, and a plurality of cobblestones.

18. The mold of claim **13** wherein the interior surface of the third side is angled at 45 to 112 degrees relative to the interior surface of the end of the frame and the fourth side is angled at 45 to 112 degrees relative to the interior surface of the end of the frame.

19. The mold of claim **13** wherein the first lip of the third side extends 0.75 to 1.25 inches between the first portion and the second portion of the interior surface of the third side and the first lip of the fourth side extends 0.75 to 1.25 inches between the first portion and the second portion of the interior surface of the fourth side.

20. The mold of claim **13** wherein the first lip of the second side of the frame extends 0.25 to 0.75 inches between the first section and the second section of the interior surface of the second side and the first lip of the second side of the insert extends 0.25 to 0.75 inches between the first surface and the second surface of the second side of the insert.

21. The mold of claim **13** wherein at least one of the frame, insert and cover is comprised of at least one material selected from the group consisting of plastics, metals, and wood.

22. The mold of claim **13** wherein the moveable insert is further comprised of a third side and a fourth side and the interior surface of the third side of the frame is further comprised of a groove sized and configured to receive the third side of the moveable insert adjacent the first side of the frame and the interior surface of the fourth side of the frame is further comprised of a groove sized and configured to receive the fourth side of the moveable insert adjacent the first side of the frame.

23. The mold of claim **13** wherein the insert is further comprised of a first thickness and a second thickness, the first thickness of the insert being narrower than the second thickness, the first thickness being located adjacent the first surface of the second side of the insert and the second thickness being located away from the first thickness such that the first thickness is closer to the end of the frame than the second thickness when the mold is in the molding position.

24. The mold of claim **13** wherein the first lip of the insert has a first angled portion, a second angled portion and a middle portion between the first and second angled portions, the first angled portion extending from the middle portion of the first surface of the insert toward the third side of the frame and the second angled portion extending from the middle portion of the first surface of the insert toward the fourth side of the frame when the mold is in the molding position.

25. The mold of claim **23** wherein the first angled portion of the first lip of the insert extends along an angle of 3 to 15

degrees relative to the middle portion of the first lip of the insert and the second angled portion of the first lip of the insert extends along an angle of 3 to 15 degrees relative to the middle portion of the first lip of the insert.

26. The mold of claim **13** wherein the interior surface of the second side of the frame is sloped in a direction away from the end of the frame along a first grade and the first and second surfaces of the second side of the insert are sloped in a direction that is away from the end of the frame when the mold is in the molding position, the slope of the first and second surfaces of the second side of the insert being sloped along a second grade that is substantially similar to the first grade.

27. The mold of claim **26** wherein the first grade is 1 to 3 degrees and the second grade is 1 to 3 degrees.

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