United States Patent

Holt

[15] **3,693,931**

[45] **Sept. 26, 1972**

[54] **APPARATUS FOR CONSTRUCTING CONCRETE FORMS**

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[22] Filed: **April 30, 1969**

[21] Appl. No.: **824,359**

Related U.S. Application Data

[63] Continuation-in-part of Ser. No. 683,558, Nov. 16, 1967, abandoned.

[52] **U.S. Cl.** .....**249/219 W,** 249/46

[51] **Int. Cl.** **E04g 17/08**

[58] **Field of Search** .249/219, 219 W, 213, 214, 190, 249/40, 46, 191, 216, 217; 25/131 CW

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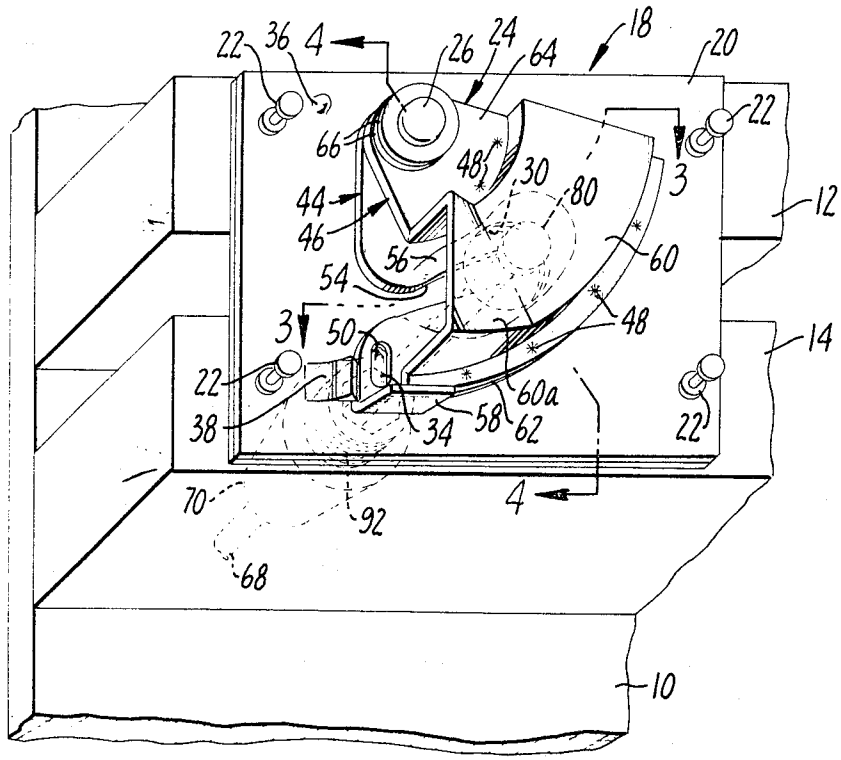
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[57] **ABSTRACT**

An apparatus for constructing a concrete form comprised of a pair of form panels arranged in opposed spaced relationship and secured against movement relative to each other by tie rods extending therebetween. The apparatus comprises conical grouting cores secured to the panels independently of the rods to slidably receive the rods and permit their extension through the panels from the outer side of one of the panels, and waler brackets mounted on each of the panels for selective gripping engagement with the ends of the rods to prevent movement of the panels toward and away from each other. The brackets are provided with hinged jaw-like elements which are movable to effect selective engagement and disengagement of the brackets with the rods. When disengaged, these elements permit free slidable movement of the rods relative to the brackets. The method is directed to the construction of a concrete form by a "-feed through system" wherein tie rods are fed through a pair of opposed panels and grouting cores secured thereto from the outer side of one of the panels. In the method, once the rods are fed through the panels, they are secured against axial movement relative thereto to maintain the panels in opposed spaced relationship.

In an alternative embodiment, the apparatus is concerned with an arrangement wherein bushing inserts are secured to the panels in place of the conical grouting cores and cores or other sealing elements carried by the tie rods are cooperable with these inserts.

3 Claims, 10 Drawing Figures



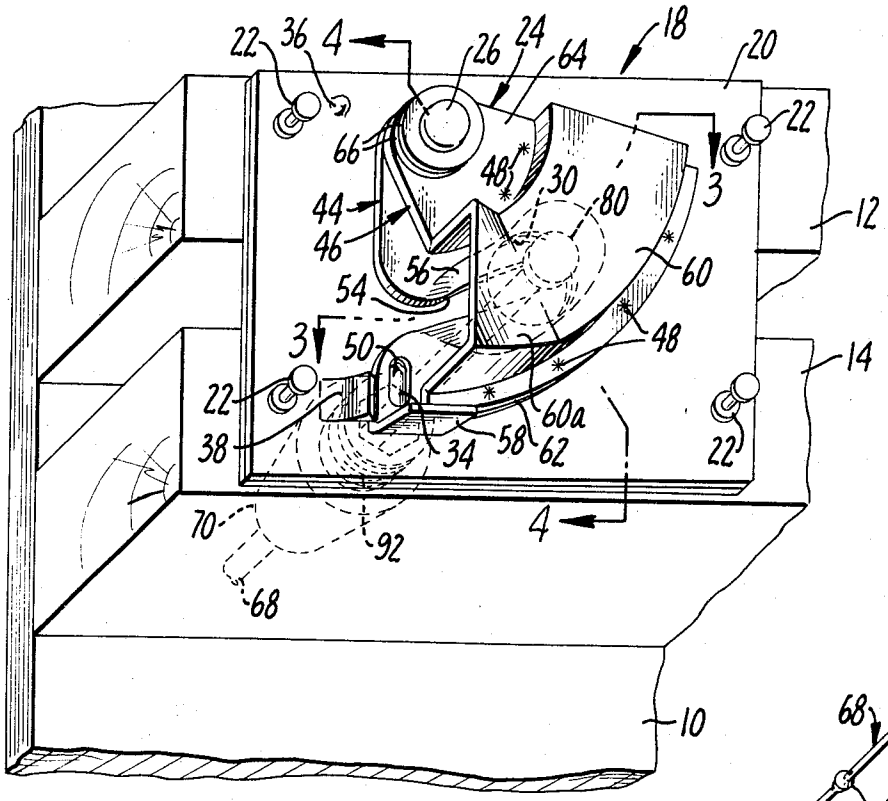


FIG. 1.

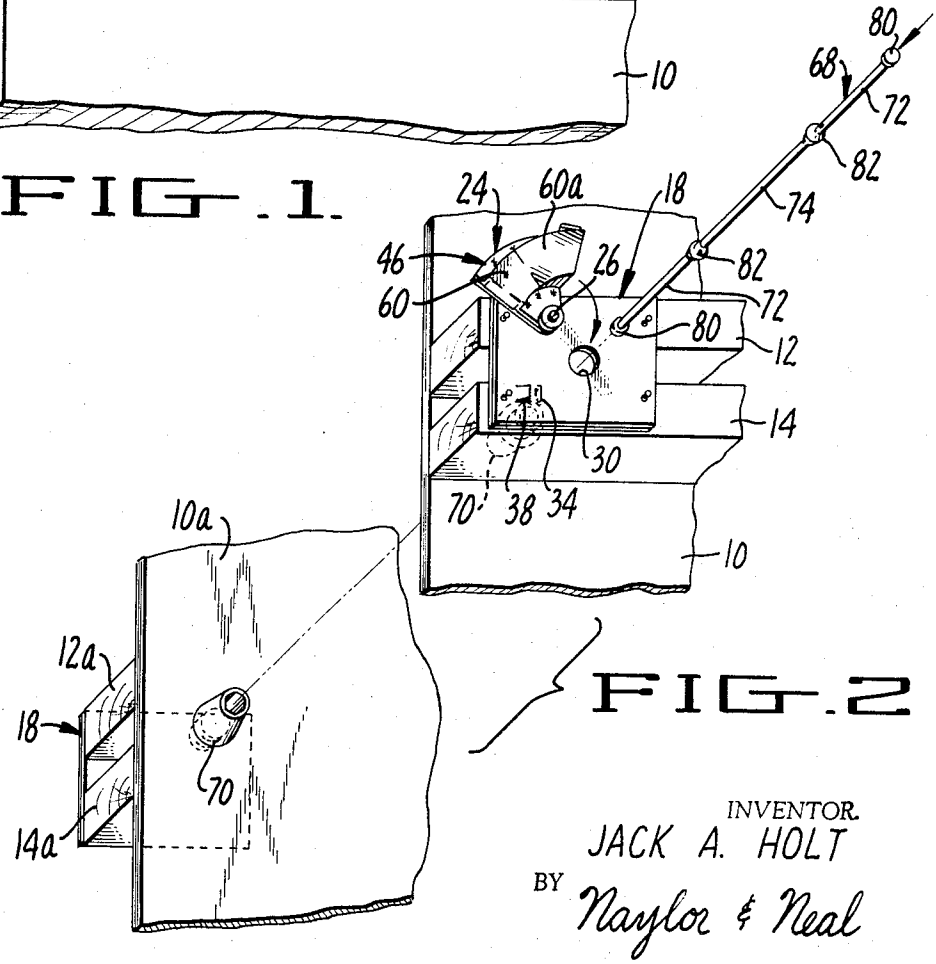


FIG. 2.

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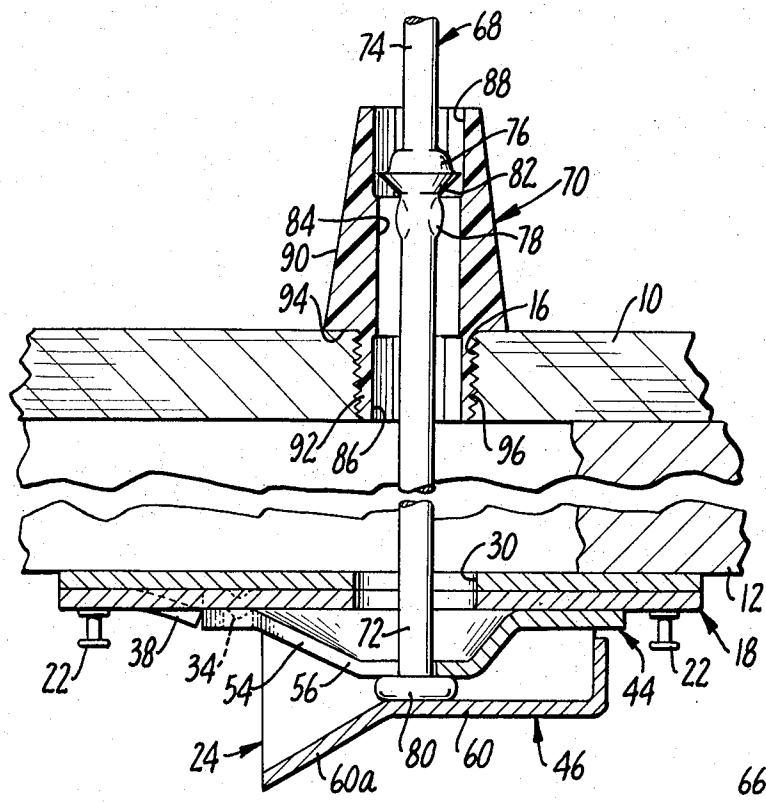


FIG. 3.

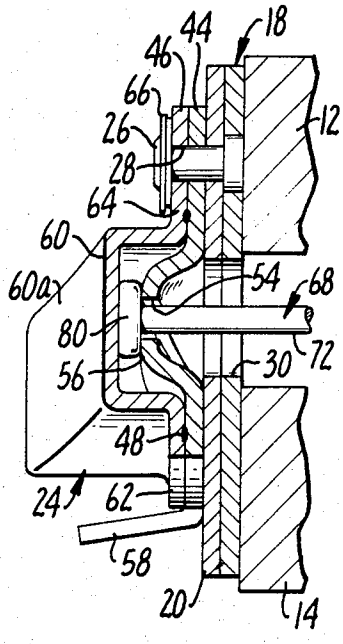


FIG. 4.

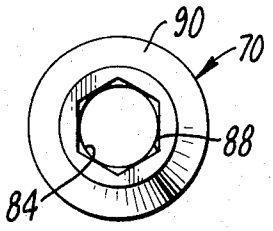


FIG. 6.

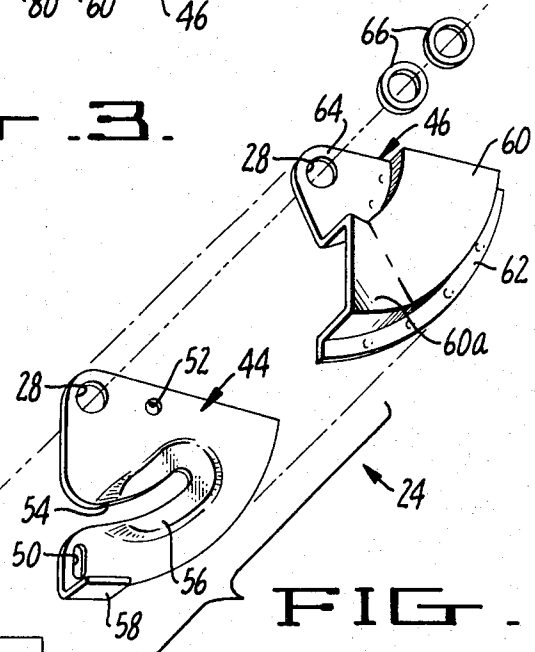
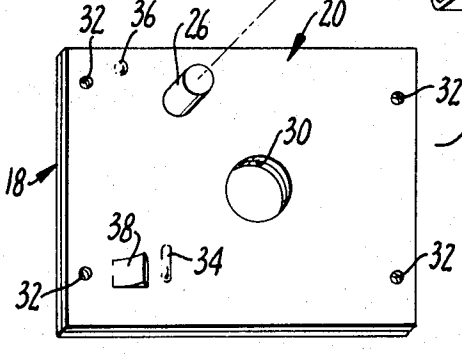


FIG. 5.



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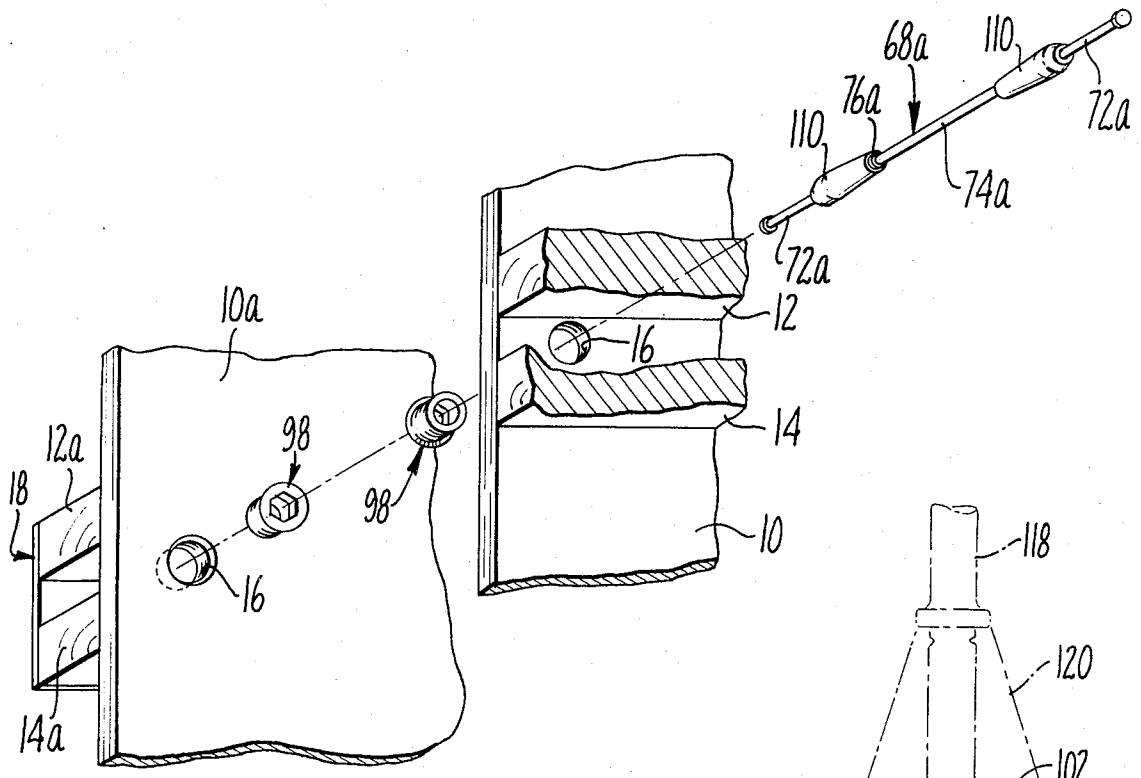


FIG. 7.

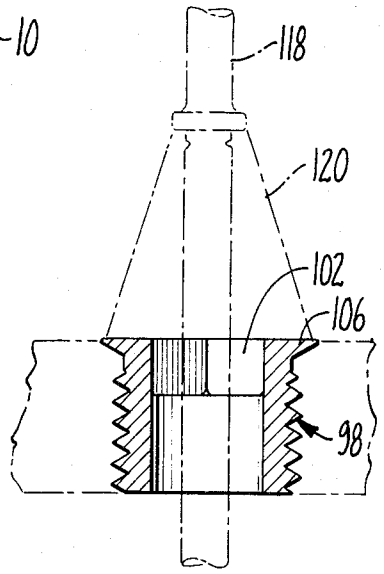


FIG. 9.

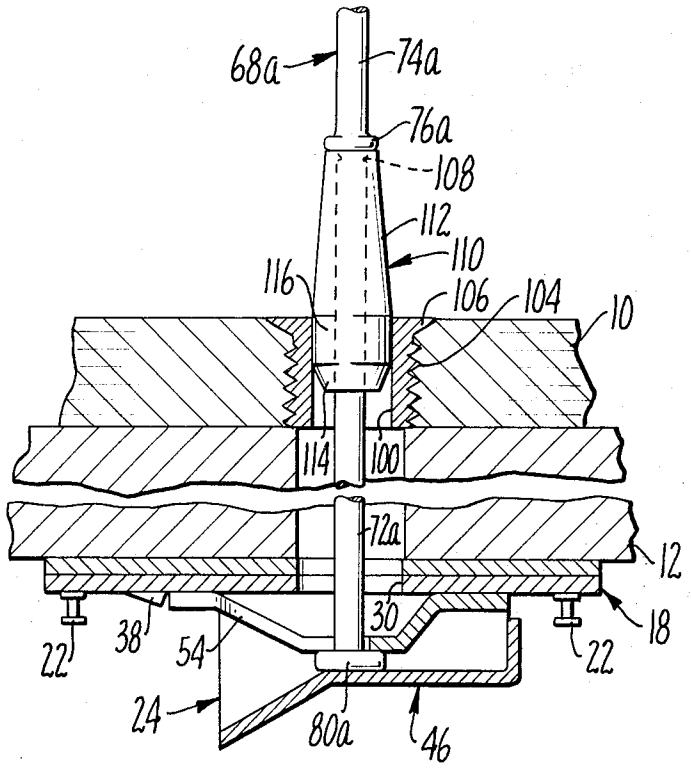


FIG. 8.

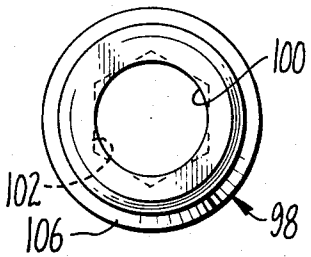


FIG. 10.

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APPARATUS FOR CONSTRUCTING CONCRETE FORMS

This application is a continuation-in-part of my copending application Ser. NO. 683,558, filed Nov. 16, 1967, now abandoned.

The present invention relates to the art of constructing concrete forms and, more particularly, is directed to the construction of such forms from panels arranged in opposed spaced relationship and secured against movement relative to each other by tie rods.

In the prior art, various arrangements have been provided to construct concrete forms from panels held in opposed space relationship by tie rods extending therebetween. The most conventional of these arrangements simply provide for the mounting of the rods to the inner side of one of the panels and then for the assembly of the other panel over the rods. With arrangements of this type, spacers are mounted on the rods for abutting engagement with the inner surfaces of the panels and waler brackets are employed to force the panels against the spacers. Such arrangements have the disadvantage that the panels must, in effect, be assembled around the rods. This disadvantage is particularly acute when large difficult to handle "gang form" assemblies are employed.

To avoid the disadvantages inherent with prior art arrangements of the foregoing type, efforts have also been made to provide arrangements wherein tie rods may be fed through opposed panels from the outer side of one of the panels and then secured in place. While these efforts have net with some success, the arrangements employed therein also possess certain inherent disadvantages. One of the disadvantages is that the tie rods used in the arrangements must be formed with looped or notched ends, rather than the more conventional hot-upset ends. Another disadvantage of these arrangements is that they have been incapable of effectively providing sealing and grouting cores around the rods employed therein. Such cores are necessary to prevent leakage of fluid concrete around the rods and permit architectural finishing after the panels are removed.

In summary, the present invention may be said to reside in a concrete form construction and method of fabricating the same. The construction comprises, as its basic elements, a pair of form panels disposed in opposed face-to-face relationship and having transversely aligned apertures extending therethrough. The apertures in at least one of the panels have tubular grouting cores sealingly secured thereto and extending laterally toward the other of the panels. These cores slidably receive tie rods which extend between the panels and through the aligned apertures therein. Waler brackets mounted on the respective panels permit the rods to be inserted from a position to one side of one of the panels and, upon placement of the rods, are selectively operable to maintain the rods against axial movement relative to the panels.

In its more specific aspects, the invention is concerned with the specific construction of the grouting cores and the waler brackets. The cores are adapted to be secured to the panels independently of the rods and, together with cooperating sealing structure provided on the rods, to seal the openings in the panels to the flow of fluid concrete. Each waler bracket comprises a base member adapted to be fixed to the panel on which it is mounted and selectively operable gripping structure associated with the member to apply tension imparting force to a rod while restricting its axial movement in either direction.

An alternative embodiment of the invention employs bushing inserts secured to the panels in place of the tubular grouting cores and cores or other sealing elements carried by the tie rods for cooperation with the inserts.

It is, accordingly, a principal object of the present invention to provide a concrete form construction and method of fabricating the same wherein tie rods may be passed through opposed panels from a position disposed to one side of one of the panels.

With respect to the latter object, it is another object of the invention to provide waler brackets which facilitate positioning of the tie rods in this manner.

Still another object of the invention is to provide architectural grouting cores which may be securely mounted to form panels and permit the substantially unrestricted axial movement of tie rods therethrough.

Yet another object of the invention is to provide a bushing insert adapted to be secured within the tie rod opening of a form panel to seal and protect the edges of the opening and act as a guide and bearing element for a grouting core or other sealing element carried by a tie rod extended through the opening.

These and other objects and the specifics of the invention will become more apparent when viewed in light of the accompanying drawings, wherein:

FIG. 1 is a perspective view illustrating the waler bracket and the panel secured grouting core of the invention attached to a concrete form panel having walers extending transversely thereacross, with the walers and form panel illustrated in partial section;

FIG. 2 is an exploded perspective view illustrating an entire concrete form construction employing form panels and hardware of the type shown in FIG. 1, with the form panels and walers incorporated therein illustrated in partial section;

FIGS. 3 and 4 are sectional views taken on the planes designed by lines 3—3 and 4—4, respectively, of FIG. 1;

FIG. 5 is an exploded perspective view illustrating the components of the waler bracket;

FIG. 6 is a top plan view of the panel secured grouting core;

FIG. 7 is an exploded perspective view illustrating a concrete form construction incorporating the bushing inserts of the invention and a feed through tie rod carrying grouting cores cooperable with the inserts, with parts of the walers and form panels broken away and shown in section;

FIG. 8 is a plan sectional view, with parts thereof broken away, illustrating one side of the form illustrated in FIG. 7 with the tie rod in position and engaged by the waler bracket of the invention;

FIG. 9 is a longitudinal sectional view taken through the bushing insert with a form panel and a non-feed through type tie rod and grouting core shown in phantom; and,

FIG. 10 is an end view of the bushing insert as viewed from the bottom of FIG. 9.

THE FIGURE 1 TO 6 CONSTRUCTION

Referring now to FIG. 1, a form panel is therein designated by the numeral **10** and is shown as having walers **12** and **14** fixed thereto to either side of an aperture **16** (see FIG. 3) extending therethrough. This overall arrangement provides for bracing of the panel and the extension of tie rods therethrough. While only one aperture and the walers cooperating therewith are illustrated, it is to be understood that the panel **10** would be provided with a plurality of such apertures between the walers **12** and **14** and that other similarly provided walers would be fixed to the panel where necessary.

The walers **12** and **14** have a waler bracket, designated in its entirety by the numeral **18**, mounted thereon. The bracket **18** comprises a base member **20** fixedly secured in over lying relationship to the walers by nails **22** and a tie rod gripping jaw **24** pivotally mounted on the base member for selective slidable movement thereover. Pivotal mounting of the jaw is provided by post **26** secured to the member **20** and extending through an opening **28** (see FIG. **4**) provided therefor in the jaw.

In the embodiment illustrated, the base member **20** is fabricated of a pair of sheet metal plates fixedly welded together and having a central aperture **30** extending therethrough. When the bracket is mounted, the aperture **30** is positioned in alignment with the aperture **16**. In addition to the aperture **30**, the base member **20** is provided with apertures **32** for receipt of the nails **22**, a pair of outstanding detent protrusions **34** and **36**, and an outstanding stop protrusion **38**. The protrusions **34** and **36** are releasably engageable with the jaw **24** to selectively retain it in the positions illustrated in FIGS. **1** and **2**, respectively. The protrusion **38** is positioned to abut with the jaw when it is engaged with the protrusion **34**.

The detailed construction of the jaw **24** may best be seen from FIG. **5**. There it can be seen that the jaw is comprised of a detent member or slide **44** disposed for slidable engagement over the outer surface of the member **20** and a retention member **46** fixed over the detent member. In the preferred embodiment, these members are fabricated of sheet metal and fixedly secured together by spot welds **48** therebetween. Aligned apertures through the members define, together, the opening **28**. In addition to these apertures, the member **44** is provided with apertures **50** and **52** and an arcuate slot **54** opening through one edge thereof and extending thereacross in concentric relationship to the opening **28**. The slot **54** is aligned with the aperture **30** for passage thereover and around a tie rod extending therethrough. The apertures **50** and **52** are disposed in alignment with the protrusions **34** and **36**, respectively, for passage thereover and releasable engagement therewith. The latter engagement provides for the aforedescribed retention of the jaw in the alternative positions illustrated in FIGS. **1** and **2**.

The base member **20** and detent member **44** cooperate in much the same manner as a conventional waler bracket in that they provide for the engagement of a tie rod end and the application of tension imparting force thereto. To facilitate this operation, the member **44** is provided with an inclined ramp portion **56** around the slot **54** and an upstanding ear **58**. The ramp portion **56** diverges outwardly relative to the base member adjacent the open end of the slot **54** and terminates in a length substantially parallel to the base member at the closed end of the slot. The ear **58** is simply intended as a striking abutment to provide for the convenient driving of the detent member with the hammer.

The retention member or plate **46**, in effect, simply boxes in the ramp portion **56** to limit endwise movement of a tie rod through the slot **54**. Thus, through the combined operation of the detent member **44** and retention member **46** the bracket **18** is capable locking a tie rod against axial movement relative thereto. The member **46** comprises a box portion **60** of channel-shaped cross-section having leg portions disposed, respectively, to either side of the slot **54** and a bight portion disposed above and in spaced relationship to the portion **56**. Peripheral portions **62** and **64** extend from the leg portions of the box portion and are secured directly to the member **44** by the spot welds **48**. The box portion **60** is of generally arcuate open ended configuration and flared out at **60*a*** to facilitate the passage of a tie rod therebeneath. The opening **28** extends through the portion **64**; and a riveted over end on the post **26**, together with washers **66** around the post, provides enlarged terminal end means which bears against the member **46** to maintain the jaw against lateral movement realtive to the base member **20**.

The outer surface of the detent member or slide **44** and the inner surface of the retention member or plate **46** define a central area therebetween of a width closely approximating the thickness of the head of a tie rod to be used therewith **80** and a divergent mouth to one side of said area to facilitate entry of the head of a tie rod between said surfaces (see FIG. **3**). Thus, upon movement of the detent member around the head of a rod to the position shown in FIG. **3** the head is captured and axially positioned relative to the bracket.

The manner in which a tie rod is engaged by the waler bracket **18** and the construction of the tie rod and the grouting core cooperating therewith may be seen from FIG. **3**. In this figure, the tie rod and grouting core are designated, respectively, by the numerals **68** and **70**. While only one end length of the tie rod **68** is illustrated in FIG. **3**, it is to be under stood that both end lengths of the rod are similarly constructed for extension through a form panel and engagement by a waler bracket.

The rod **68** is of the "snap-tie" type in that its end lengths are designed to be broken away by the application of torque thereto. The end lengths and the intermediate length of the rods are designated by the numerals **72** and **74**, respectively. These lengths are integrally formed and provided with a deformed enlarged collar-like portion **76** therebetween. It is at the juncture of this collar portion and the length **74** that the end lengths are designed to break away. The rod is also provided with crimped portions **78** in the lengths **72** adjacent the portions **76** and enlarged terminal end portions **80** of the "hot-upset" type at the distal ends of the lengths **72**. Washers **82** are concentrically received around the rod and held against axial movement thereover by abutment with the portions **76** and **78**. Each of these washers is designed to fit closely within

the grouting core cooperating therewith to seal the core to the flow of fluid concrete therethrough, while permitting slidable movement of the rod within the core.

The core **70** is of integral tubular configuration and defines a passage **84** extending axially therethrough. The internal end lengths of the passage **84**, designated by the numerals **86** and **88**, are of hexagonal configuration for turning engagement by an Allen wrench. The body of the core is comprised of a truncated conical portion **90** and a cylindrical dowel-like portion **92**. The portion **90** diverges towards the portion **92** and terminates in a planar base surface **94** forming a juncture therewith. The portion **92** is formed with self-threading external screw threads **96** for engagement with the aperture **16**. When assembled as shown in FIG. **3**, the portion **92** is threaded into engagement with the aperture **16** so as to tighten the base surface into sealed engagement with the panel **10**.

It is here noted that the rods **68** and the washers **82** mounted thereon are dimensioned to pass, in their entirety, through the aperture **30** in the base member of the waler bracket and the passage **84** in the grouting core. Thus, the rods **68** may be inserted into the position shown in FIG. **3** from either side of the panel **10**. The cross sections of the lengths **72** and head **80** are such that, once the rod is positioned, the jaw **24** may be swung to a position wherein the slot **54** slidably receives the lengths **72** with the portion **56** beneath and in abutting engagement with the undersurface of the head **80**. The depth of the head **80** is such that, when the undersurface thereof is engaged with the outermost length of the ramp portion **56**, the outer surface thereof is in proximate abutting engagement with the underside of the box portion **60**. This overall interrelationship may be seen from FIG. **3**. It should be appreciated that the distance between the ramp portion **56** and box portion **60** is sufficient to permit the head **80** to pass freely to the position shown in FIG. **3**.

THE FIGURE 1 TO 6 METHOD

The method of employing the structure of FIGS. **1** to **6** for the construction of a concrete form may best be seen from FIG. **2**. In this figure, two form panels are shown in the process of being assembled in spaced opposed face-to-face relationship. The forward panel in this figure and the components mounted thereon are those of FIG. **1**. The rearward panel, designated by the numeral **10***a* is a mirror image of the panel **10**. The walers on the latter panel are designated by the numerals **12***a* and **14***a*, respectively. The panel **10***a* and the walers **12***a* and **14***a* are provided with hardware identical to that on the panel **10** and the walers **12** and **14**. This hardware, to the extent that it is illustrated, is designated by numerals corresponding to those used in the foregoing discussion.

To construct a form by the method illustrated in FIG. **2**, the following steps sequentially carried out:

1. The panels **10** and **10**a are disposed in stacked face-to-face relationship and aligned apertures **16** are drilled therethrough.
2. The walers and the waler brackets are secured to the respective panels.
3. The grouting cores **70** are securely screwed into the apertures.
4. The panels are disposed in opposed face-to-face relationship, as illustrated in FIG. **2**, with the apertures in alignment.
5. The rod is passed through the panels from one side of one of the panels (see the arrow line in FIG. **2**).
6. The ends of the rods are engaged by the gripping jaws on the respective waler brackets to secure the rods against axial movement relative to the panels and maintain the panels in opposed spaced relationship. While the FIG. **2** illustration and the foregoing description are directed to the positioning of only one tie rod, it is to be understood that in actual practice a plurality of rods would be similarly placed between the opposed form panels.

Once a concrete form is thus constructed, concrete is poured between the panels and allowed to set. After the concrete has set, the panels may be readily removed by releasing the gripping jaws of the waler brackets from the tie rods and pulling the panels away from the formed concrete. During the latter operation, the grouting cores are pulled from the form concrete with the panels and, thus, clean grouting pockets are provided. After removal of the panels, the end lengths of the tie rods may be readily broken away by the application of torque thereto. It should be understood that, if desired, the end lengths may be broken away before actual removal of the form panels.

The removed panels may be readily reused by simply repeating the steps of disposing the panels in opposed face-to-face relationship with the apertures therein aligned and passing and securing a tie rod or rods between the panels. In this operation, the tie rods are the only elements which need be renewed. The panels, walers, waler brackets and grouting cores are all reused, since they remain secured together when the panels are removed from a previous pour of set concrete. In addition to facilitating their reuse, the secure mounting of the grouting cores has the advantage that it functions to prevent the leakage of fluid concrete between the cores and the panels.

FIGURE 7 TO 10 CONSTRUCTION

The form panels, walers, waler brackets and the parts thereof shown in these figures correspond identically to those of FIGS. **1** to **6** and, accordingly, are designated by like numerals. The primary differences between the FIG. **1** to **6** construction and the construction of FIGS. **7** to **10** reside in the employment of bushing inserts in the tie rod apertures of the form panels rather than the panel secured grouting cores, and the provision of a modified tie rod construction.

Referring now specifically to FIGS. **7** to **10**, each bushing insert is designated therein in its entirety by the numeral **98**. While two inserts are shown in FIG. **7**, it should be understood that they are identical in construction. One insert is provided for each of the apertures **16** in the panels **10** and **10***a*.

The insert **98**, only one of which will be described in detail, is of tubular construction and defines a passage **100** extending longitudinally therethrough. The passage **100** terminates at one end in a hexagonal socket **102** designed for the receipt of an Allen wrench. Externally, the insert is provided with screw threads **104** designed for self-threading receipt in the tie rod aperture of a form panel. At one end, these threads ter-

minate in a flare collar **106**. The collar defines a flat end surface at one end of the insert and is of generally frusto-conical cross section. Through the latter provision, the collar is adapted to be drawn into the tie rod aperture of a form panel to a position wherein the flat end surface is flush with the interior surface of the panel. Such a disposition is shown in FIGS. **8** and **9**. Ideally, the length of the bushing insert is substantially equal to the thickness of the form panel in which it is used.

The preferred tie rod for use with the bushing inserts **98** is shown in FIGS. **7** and **8** and designated in its entirety by the numeral **68***a*. This rod is similar to the aforedescribed rod **68** in that it is of the "snap-tie" type. The end lengths of the rod are each designated by the numeral **72***a* and the length intermediate the end lengths is designated by the numeral **74***a*. Between each of the end lengths and the intermediate length a deformed enlarged collar-like portion **76***a* is provided. Each end length of the tie rod **68***a* is notched, as designated **108**, adjacent the collar **76***a* to which it is joined to provide a break away point. As with conventional "snap-tie" tie rods, the rod breaks at these points responsive to the application of torque to its ends. The terminal end portions of the rod **68***a*, designated **80***a*, are "hot-upset" similarly to the ends of the aforedescribed rod **68**.

Grouting cores, designated **110**, employed with the tie rod **68***a* are concentrically received on and carried by the end lengths **72***a*. These cores are snugly received on the rod in abutting engagement with the collars **76***a*. Each core is comprised of generally frusto-conical end portions **112** and **114** and an intermediate cylindrical portion **116**. The portions **116** are proportioned for close slidable receipt within the passage **110** of the bushing inserts **98**.

THE FIGURE 7 AND 8 METHOD

The method of employing the structure of FIGS. **7** and **8** for the construction of a concrete form is sequentially carried out to the following steps:

1. The panels **10** and **10***a* are disposed in stacked facing relationship and apertures **16** are drilled therethrough.
2. The walers and waler brackets are secured to the respective panels.
3. The brushing inserts **98** are securely into the apertures to the condition illustrated in FIG. **8**.
4. The panels are disposed in opposed face-to-face relationship, as illustrated in FIG. **7**, with the apertures in alignment. 5. The rod **74***a* is passed through the panels from one side of one of the panels.
6. The ends of the rods are engaged by the gripping jaws on the respective waler brackets to secure the rods against axial movement relative to the panels and maintain the panels in opposed spaced relationship with the cylindrical sections **116** of the grouting cores **110** received in the bushing inserts **98**. The latter condition can be seen from FIG. **8**. It should be understood that the rod **68** and the cores **110** are so proportioned that the cores are positioned as shown in FIG. **8** when the terminal end portions **80***a* are fully gripped by the waler brackets. Ideally, this disposes the grouting core so that the line of demarcation between the end portion **112** and the cylindrical portion **116** is substantially coincident with the flat end surface on the flared collar **106**.

In use, once a concrete form is thus constructed, concrete is poured between the panels and allowed to set. After the concrete has set, the panels may be readily removed by releasing the gripping jaws of the waler brackets from the tie rods and pulling the panels from the formed concrete. After removal of the panels, the end lengths of the tie rods are snapped and removed, together with the grouting cores **110**. Thus, clean grouting pockets are provided in the surfaces of the formed concrete. It should be understood that, if desired, the end lengths and grouting cores may be broken away before removal of the form panels.

The removed panels may be readily reused by simply repeating the steps of disposing the panels in opposed face-to-face relationship with the apertures therein aligned and passing and securing the tie rods between the panels. In this operation, the tie rods and the grouting cores carried thereby are the only elements which need to be renewed. The panels, walers, waler brackets and bushing inserts are all reused, since they remain secured when the panels are removed from a previous pour of concrete.

ALTERNATIVE USE OF THE FIGURE 7 TO 10 CONSTRUCTION

The phantom line representation of FIG. **9** illustrates the manner in which the bushing insert **98** may be used with a conventional "snap-tie" type tie rod. With this type of rod, the form panels are assembled around the tie rod and the feed through system is not employed. The employment of the bushing insert in this environment functions to seal and protect the edges of the tie rod opening in the form panel and provide a smooth bearing surface for the grouting core carried by the tie rod. The tie rod and grouting core in FIG. **9** are designated, respectively, by the numerals **118** and **120**.

Where a grouting pocket is not desired, the bushing insert **98** may be used in a manner similar to that shown in FIG. **9**, but with a washer type tie rod. In such an environment, the washer would take the place of the grouting core **120** and be carried by the tie rod for abutting sealing engagement with the flat end surface of the collar **106**.

CONCLUSION

From the foregoing description, it is believed apparent that the present invention enables the attainment of the objects initially set forth herein. This is believed especially evident from the characteristics of the invention which provide for the feeding of tie rods through opposed panels from a position to one side of one of the panels and for the reuse of all of the forming components, with the exception of the "snap-tie" rods and the elements carried thereby. The manner in which the reusable components remain secured to the panels at all times is particularly advantageous from a labor saving standpoint in gang form assemblies.

I claim:

1. A waler bracket for use in combination with a tie rod adapted to pass freely through an opening provided therefor in a form panel and having an enlarged ter-

minal end at at least one end thereof, said bracket being adapted to grip the terminal end of the rod to lock the rod against axial movement relative to the bracket in either direction and comprising:

A. a base member having an opening therein for the passage of a tie rod therethrough;

B. a post secured to and extending from the base member in spaced relationship to the opening therein;

C. means adapted to fix the base member in overlying relationship to a waler secured to a form panel;

D. a slide overlying the base member, said slide having:

1. an opening therein received around the post whereby the slide is mounted for pivotal movement about the post and slidable movement over the base member;

2. an arcuate slot extending therethrough in concentric relationship to the post for movement over the opening in the base member and around a rod extending through said opening; and,

3. an outer surface defining edge portions to either side of said slot engageable with the underside of the enlarged terminal end of a rod extending through said slot:

E. a retention plate of channel-shaped cross-section fixedly secured to the slide and extending over said slot, said plate having an opening therein received around the post and an inner surface spaced from the outer surface of the slide by a distance sufficient to permit the head of a rod to pass between the outer surface of the slide and said inner surface and wherein:

1. at least one area between the outer surface of the slide and the inner surface of the plate is of a width closely approximating the thickness of the terminal end of a tie rod used with the bracket whereby movement of the slide to a position wherein the head of a rod is received within said area functions to capture said head and axially position said rod relative to the bracket;

2 the outer surface of the slide and inner surface of the retention plate define an open divergent mouth to one side of said one ares, said mouth having a width appreciably greater than the thickness of the terminal end of a tie rod to be used with the bracket to facilitate entry of the head of a tie rod extending through the slot beneath the retention plate and guidance of said head to said one area responsive to predetermined slidable movement of the slide relative to the base member;

F. terminal end means on the post disposed to bear against the retention plate to secure the plate against the slide and, in turn, secure the slide against the base member.

2. A waler bracket according to claim **1** further comprising mutually engageable stop means on the base member and slide, said means being adapted to assume an abutting engaged condition upon locating of said one area in alignment with the opening in the base member responsive to pivotal movement of the slide about the post in one direction and to assume disengaged condition responsive to pivotal movement of the slide about the post in an opposite direction.

3. A waler bracket according to claim **1**, wherein:

A. the retention plate comprises an arcuate channel disposed in concentric relationship to the post said channel having:

1. first and second leg portions disposed, respectively, to either side of the slot and spaced apart sufficiently to permit the head of a rod extending through the slot to pass therebetween; and,

2. a bight portion secured between said leg portions and disposed over the slot in spaced relationship to the outer surface of the slide;

B. the inner surface of the retention plate is formed on the bight portion.

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