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D. M. DE CANIO

2,782,484

LINER CLAMP FOR PANEL FORMS

Filed Dec. 29, 1952

2 Sheets-Sheet 1

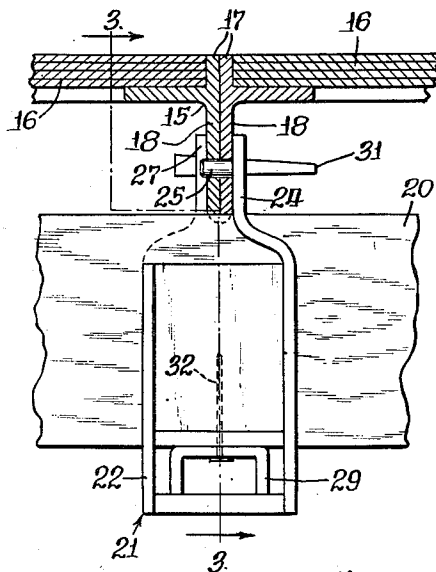
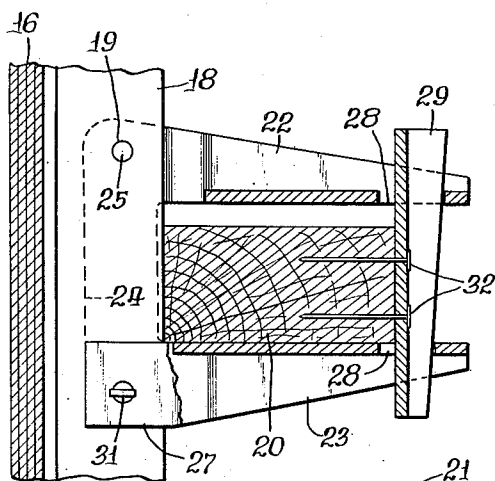
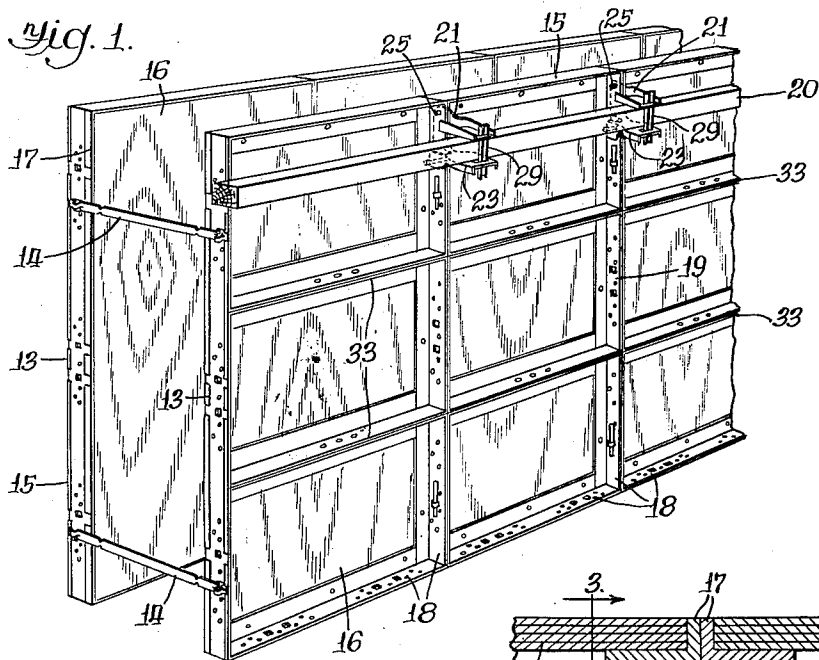


Fig. 3.

Fig. 2.

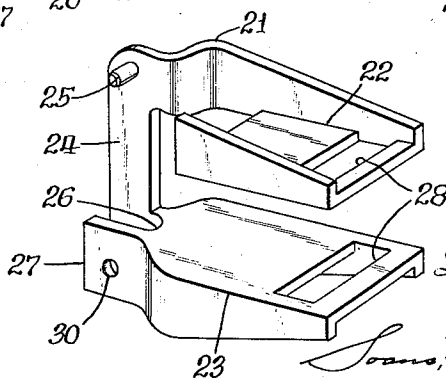


Fig. 4.

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2 Sheets-Sheet 2

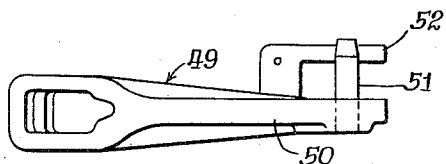
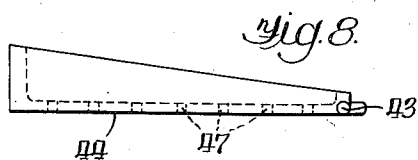
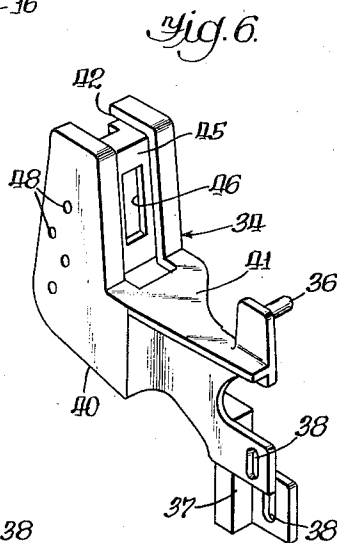
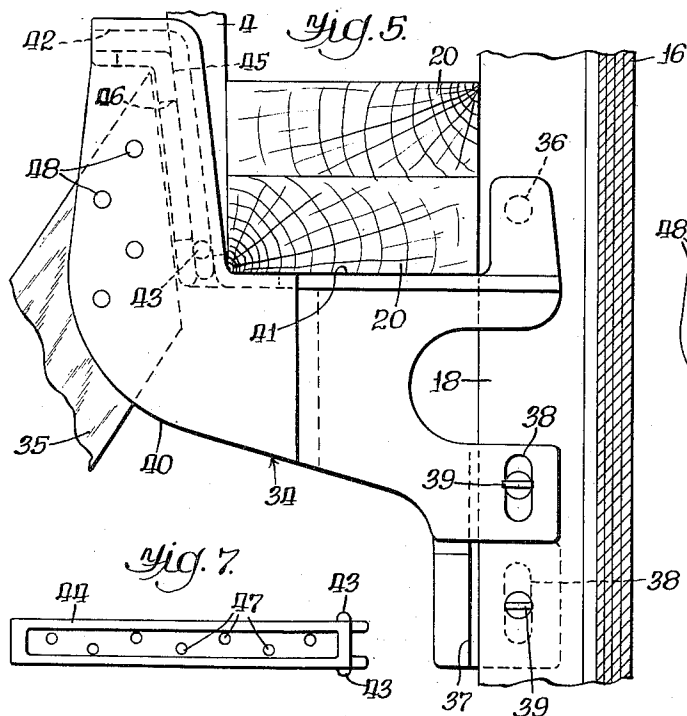


Fig. 10.

Fig. 11.

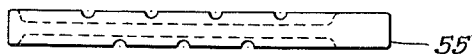


Fig. 12.

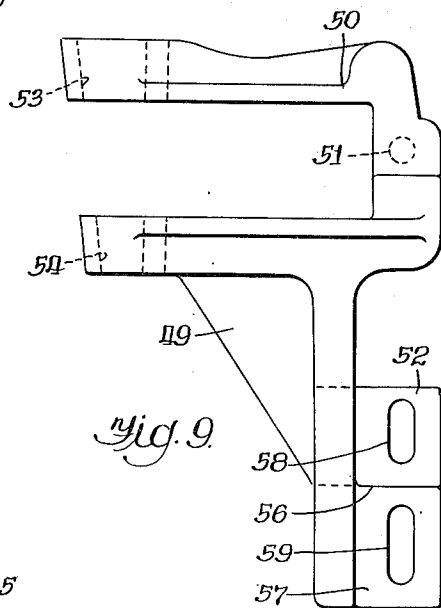
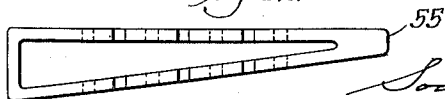


Fig. 9.

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2,782,484

LINER CLAMP FOR PANEL FORMS

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4 Claims. (Cl. 25—131)

This invention relates generally to forms used in the construction of concrete walls and the like, and is more particularly concerned with the well known type of panel forms wherein the panel facing is held by a rectangular metal frame, as shown in the Anderson Patent No. 1,970,547, dated August 21, 1934.

The framed panels are united in edge abutting relation in the Anderson construction referred to, with the panel facings presenting a plane inner surface for retaining the concrete to be poured. The exposed side of the form includes the flange portions of the several frames, which project outwardly from the panel facings, with the adjoining flanges being joined by a temporary clamping means.

In the usual construction, the wall to be formed is of considerable length and, consequently, the panel forms must be further stiffened against the lateral thrust of the wet concrete by heavy horizontal stringers or liners that extend across the outer sides of the panels, as illustrated in the above mentioned Anderson patent. Similarly, vertical stringers are used to maintain vertical alignment of the panels when the assembled panel forms are of considerable height.

The principal objects of the present invention are to provide an improved form of clamp for securing the liners to the panel forms; to provide an improved liner clamp that may also serve to secure adjacent form panels in edge-abutting relation; to provide a liner clamp which simultaneously secures the abutting edges of adjacent panels together and affords a fixed support for a liner; to provide a liner clamp having improved means for pressing the form engaging edge of the liner firmly against the form irrespective of small variations in the thickness of the liner; and to provide a liner clamp having the aforementioned characteristics, which is relatively inexpensive to manufacture and which is easily manipulated by an individual not skilled in the art.

The accompanying drawings illustrate various embodiments of the present invention, wherein:

Figure 1 is a perspective view of a panel type wall form, including several separable panels held in place by liners which are secured to the form by the improved liner clamps.

Figure 2 is an enlarged, fragmentary plan view of the structure in Figure 1, illustrating the attachment of the clamp and liner, the panel frame being shown in section.

Figure 3 is a vertical sectional view taken along the line 3—3 in Figure 2.

Figure 4 is a perspective view of the clamp shown in the preceding figures, the wedge portion being omitted.

Figure 5 is a side elevation of a modified form of clamp, showing also part of a panel form, a pair of overlapping liners, and a diagonal brace.

Figure 6 is a perspective view of the clamp shown in Figure 5, reduced in scale.

Figure 7 is a side elevation of the wedge shown in Figure 5.

Figure 8 is another side elevation of the wedge shown in Figure 7.

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Figure 9 is a side elevation of another modified form of liner clamp.

Figure 10 is a top plan view of the liner clamp shown in Figure 9.

Figure 11 is a side elevation of a wedge adapted for use with the clamp shown in Figure 9.

Figure 12 is another side elevation of the wedge shown in Figure 11.

In the construction illustrated, the improved liner clamp is used in conjunction with a wall form comprising two series of panels 13, with the opposite facing panel series being united in properly spaced relation to each other by means of form ties 14 of the same construction as those shown in said Anderson Patent No. 1,970,547. The panels 13 are preferably all identical in construction, size, and shape, so as to obviate the necessity of sorting and to facilitate handling and storage.

In the form shown, the panels are rectangular and each panel comprises an angle iron frame 15 to which is suitably fastened a facing 16, preferably of plywood, in flush relation with the edges presented by a flange portion 17 of the metal frame 15 (Figure 2). The outer side of each of the panels 13 presents additional flange portions 18 which project outwardly from the facing 16 and which have transverse openings 19 therethrough adapted for alignment with similar openings in the adjacent panels. As shown in the drawing, the flange portions 17 and 18 completely surround the edges of the facing 16.

The utilization of the form panels 13 in connection with the construction of a wall of any appreciable length or height, or both, obviously requires the use of some means for bracing the panels in addition to the form ties and the means for fastening the adjacent panels together. Accordingly, liners or stringers 20 are, in such instances, positioned in fixed relation to the outside of a series of panels to maintain their aligned relationship. These liners are held in position by a series of clamps which are attached to the panel forms.

Heretofore, the liner clamps were generally of such a nature as to require the time and labor of several persons to fix the relatively long liners in position on the wall forms. Furthermore, the commonly used types of liner clamps are effective only as a support for the liners, although some do attach to the adjoining flange portions of the panels. The illustrated liner clamps are effective both as a means for securing the liner against the wall form to align the several panels thereof and, also, as a means for fixedly uniting the abutting edges of adjacent panels.

In the form shown in Figures 1, 2, 3, and 4, the improved liner clamp 21 comprises a generally U-shaped bracket of the shape shown in Figure 4, having relatively wide channel-shaped bearing arms 22 and 23 disposed in spaced-apart, parallel relation to each other, and a flat bight portion 24. Adjacent one end of the bight portion 24, there is suitably formed a transversely extending pin or stud 25 adapted to fit the openings 19 in the flange portions 18 of the panels 13. The opposite end of the bight portion 24 includes a yoke 26, preferably formed by an inner end extension 27 of the adjacent arm 23 disposed in parallel relation to the plane of the bight 24. The yoke or U-shaped clamping element 26 is adapted to receive therebetween, in frictional engagement therewith, a pair of abutting flange portions 18 of the panel form.

The outer end portions of the arms 22 and 23 include a pair of aligned openings 28 for the insertion of a wedge 29 or the like therethrough. In this respect, it will be noted in Fig. 3 that the openings 28 and the wedge 29 are arranged so that the inclined surface of the wedge is disposed along the side of the wedge opposite the straight edge which engages the liner 20. Further, the

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innermost edges of the openings 28 are in a plane normal to the liner-supporting surface of the arm 23. Consequently, the wedge 29 maintains engagement along the entire depth or thickness of the liner 20 as the wedge moves through the openings 28 and forces the liner against the panel flanges to provide and maintain a firm engagement therebetween. Also, the yoke 26 includes a pair of transverse, aligned openings 30 for the insertion of a pin 31.

In view of the foregoing, it will be apparent that the clamp 21 is positionable on the panel form, in supported relation thereto, by inserting the pin 25 through a pair of the aligned openings 19 in a pair of abutting flanges 18 of the form. The clamp is then rotated about the axis of the pin 25 until the yoke 26 frictionally engages a portion of the abutting flanges 18 and the openings 30 are aligned with similar openings 19 through the flanges, whereupon the pin 31 is inserted to secure the clamp in place.

Having positioned two or more of the clamps in aligned relation along the form, one of the liners 20 is then placed between the spaced-apart arm portions of the several clamps and fixed in place therein by insertion of one of the wedges 29 in each of the clamps. If desired, the wedge 29 may be provided with apertures to receive nails 32 for anchoring the wedges to the liners 20. It will also be noted from the drawings (Figure 2), that the relative disposition of the various portions of the liner clamp is such that, when it is in place on the wall form, the entire intermediate bight portion 24 is within the projecting edge of the flange 18 and, consequently, the wooden liner 20 is disposed with its inner edge bearing against the flange edges to maintain lateral alignment of the several panels.

Although shown as adapted for receiving a single liner, the clamp can obviously be formed with a greater spacing between the arm portions 22 and 23 so as to accommodate two or more liners, if desired. It will also be apparent that the liner clamp may be used for securing vertically disposed liners in position by simply placing the pin 25 in one of the openings provided in the horizontal flanges and locking the clamp in place with the pin 30 through another of the flange openings. This may be done by utilizing one of the transverse panel braces 33 or by placing the clamp on a pair of abutting horizontal flange portions 18 formed by placing one panel on top of another in vertically extending relation thereto.

A modified form of clamp 34 is illustrated in Figures 5 and 6. The clamp is adapted to receive either a single liner or a pair of overlapping liners, and a diagonal brace member 35. The liner clamp 34, which employs the principles of the clamp shown in Figure 4, is provided with a pin 36 and an aligned clamping yoke 37 which function in a manner similar to that discussed with respect to the parts 25 and 26 of the previously described clamp 21. The yoke 37 has openings 38 for receiving pins 39 to lock the clamp to the panel.

More particularly, the clamp 34 comprises a generally L-shaped bracket having means along one side, including the pin 36 and the yoke 37, for securing it in clamping relation to an abutting pair of the projecting flange portions 18 of the panel forms. The portion of the bracket which projects outwardly from the wall form is bifurcated near its outer end to present a generally vertically extending channel-like part 40. The intermediate portion of the bracket includes a generally horizontal shelf 41 which provides a support for one or more transversely arranged liners 20.

The portion 40 of the clamp 34 is formed to provide a pair of inwardly facing guideways 42 along the top and inner side thereof, which terminate at their lower ends adjacent the horizontal shelf 41. These guideways provide a downwardly inclined track for a pair of laterally projecting pins 43 on the tapered end of a wedge 44 (Figures 7 and 8). With the liners 20 in position, as shown in Figure 5, the tapered end of the wedge 44 is positioned

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with the pins 43 inserted in the upper open end of the guideways 42. The wedge is then moved in the direction of the wall panel and down the inclined surface 45 of the bracket portion 40 until the wooden liners are firmly wedged against the edges of the projecting panel flanges 18. An opening 46 is provided in the inclined surface 45 of the bracket in order that nails or the like may be driven through one or more of a series of openings 47 in the wedge and into the liners.

As indicated previously, the inclined wall 45 forms with the two sides of the part 40 a channel-like section on the bracket for receiving the upper end of the diagonal brace member 35. The lower portion of this diagonal brace may be suitably secured to a stake or the like which is driven into the ground. The upper portion of the member 35 is suitably cut to be received by the bracket part 40 in end-abutting relation to the outer face of the inclined wall 45. A series of holes 48 are formed in the bracket part 36 to receive nails or the like for securing the brace 35 to the clamp. Bracing of this type is generally desired in instances where the wall form is of sufficient height to require additional lateral support for the wet concrete.

Another modified form of clamp 49 is illustrated in Figures 9 and 10. The clamp 49 includes a U-shaped portion 50 adapted to receive a liner, a pin 51 for insertion into one of the openings 19 in a pair of the abutting flanges 18, and a clamping yoke 52 for frictionally engaging abutting flanges 18 of the wall panel form. The outer ends of the U-shaped portion 50 include a pair of aligned tapered openings 53 and 54 for receiving a wedge 55 (Figures 11 and 12) to firmly press the inner edge of the liner against the projecting flanges of the wall form.

The clamping yoke 52 includes a pair of laterally spaced-apart arms 56 and 57, which function in a manner similar to that described with respect to the part 26 of the clamp 21 in Figure 4. The arms of the yoke 52 are provided with slotted openings 58 and 59 for alignment with the openings 19 in the panel flanges, whereby a pair of pins or other suitable fastening means may be inserted therethrough. Consequently, as in the previously described clamps 21 and 34, the clamp 49 is adapted not only to secure a liner in position along the backs of adjacent panel forms but, also, to secure adjacent panels in edge abutting relation to each other.

It is evident from the foregoing that, in the present invention, there is provided an improved liner clamp which serves not only to hold the liners in firm engagement with the back of the wall form, but also provide an easily manipulated fastening means for securing adjacent form panels in edge abutting relation to one another. Furthermore, the clamps are self-supporting when positioned on the wall forms and, as a result, one man may install the liners in position by first placing the desired number of clamps on the form.

Although shown and described in connection with specific embodiments thereof, it is obvious that other modifications may be made without departing from the principles of this invention. For example, the clamps may be made to accommodate any desired size of liner and, also, the clamp in Figures 4 and 9 may be made to accommodate two or more overlapping liners, if desired, by enlarging the liner receiving opening.

I claim:

1. A liner clamp for use with a concrete form including a plurality of panel forms each having a frame with laterally extending flange portions, the panel forms being arranged in edge-engaging relation to one another and having aligned openings along the extending flange portions thereof, said clamp comprising a generally U-shaped bracket with the bight portion thereof having a laterally projecting pin disposed for insertion in a pair of the aligned openings through adjoining panel flanges to pivotally support the clamp, a clamping element disposed on said bracket to embrace the adjoining panel

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flanges which receive said pin at a position spaced from said pin, said U-shaped bracket being adapted to embrace a liner between the leg portions of said bracket which extend outwardly from the panel forms, said pin, clamping element and the inner edge of the bight portion of said clamp being disposed relative to one another so that when said liner clamp is positioned on adjoining panel flanges said inner edge of the bight portion of said U-shaped bracket extends inwardly of the outer edges of the adjoining flanges, said U-shaped bracket including means defining a pair of aligned openings through the outer ends of said leg portions, and means movably positionable through the aligned openings in said leg portions, whereby a liner embraced by said U-shaped bracket may be wedged against the edges of the liner clamp supporting flanges by said movably positionable means.

2. A liner clamp in accordance with claim 1, wherein said movably positionable means comprises an elongated, tapered member having a plurality of transverse fastener-receiving openings therethrough, whereby a liner engaged by said elongated, tapered member may be secured thereto.

3. A liner clamp in accordance with claim 1, wherein said clamping element includes a transverse opening therethrough which is disposed for alignment with another pair of aligned openings in said adjoining panel flanges.

4. A liner clamp for use with a concrete form including a plurality of panel forms each having a frame with laterally extending flange portions, the panel forms being arranged in edge-engaging relation to one another and having aligned openings along the extending flange portions thereof, said liner clamp comprising a U-shaped bracket with the bight portion thereof including a laterally projecting pin and a generally U-shaped clamping element spaced from said pin, whereby said liner clamp may be supported on the panel forms by inserting said pin in

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a pair of the aligned openings through adjoining panel flanges and by pivoting the bracket about the axis of said pin to place said U-shaped clamping element in engagement with opposite sides of the panel flanges, said U-shaped bracket being thereby positioned with the legs of said bracket extending outwardly from the panel forms, said U-shaped clamping element being disposed on said bracket so that the bight portion thereof is disposed outwardly of the bight portion of said U-shaped bracket when the liner clamp is supported by adjoining panel flanges, whereby a liner disposed between the legs of said U-shaped bracket may firmly abut the edges of the liner clamp-supporting flanges, said U-shaped bracket including a pair of openings through the outer end portions of the legs of said bracket in generally aligned relation, the edges of said openings which are disposed closest to the bight portion of said U-shaped bracket being in a first plane which is normal to the direction of extension of said bracket legs and the opposite edges of said openings being disposed in a second plane which is inclined with respect to said first plane, and wedge shaped means movably positionable through the openings in said bracket so as to afford a wedging action against a liner disposed between the legs of the bracket.

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