Nov. 25, 1930. C. E. HUDGIN 1,782,897

FORM CLAMP

Filed May 31, 1929 2 Sheets-Sheet 1

Fig. 1

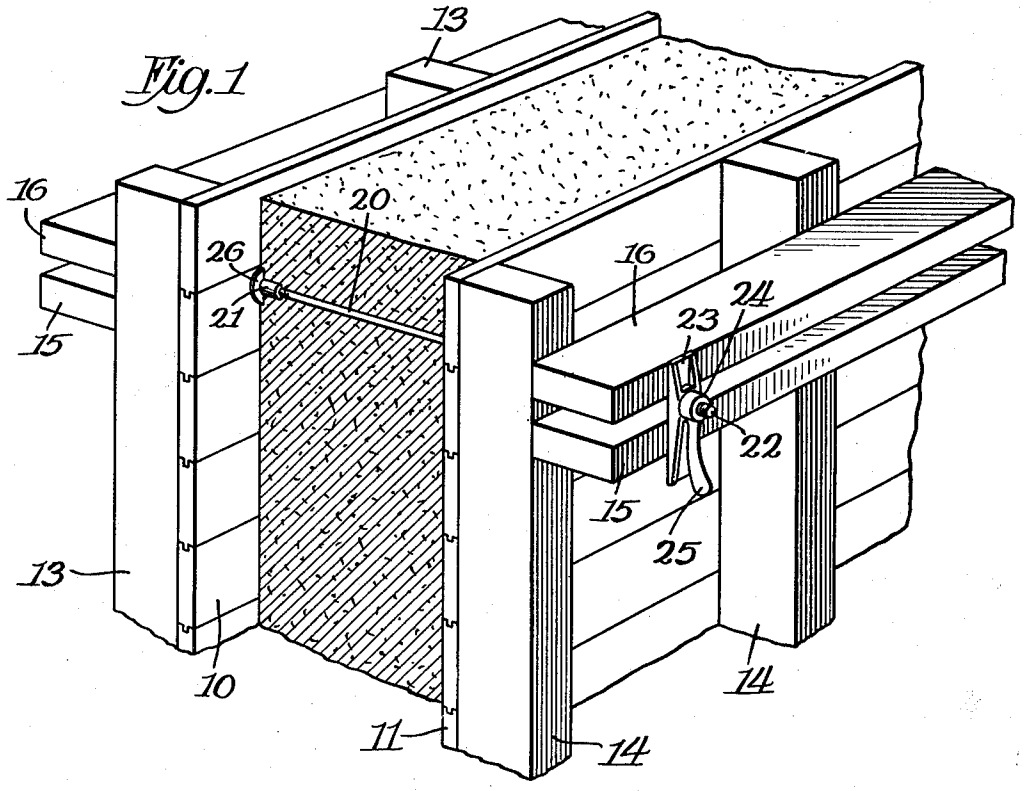
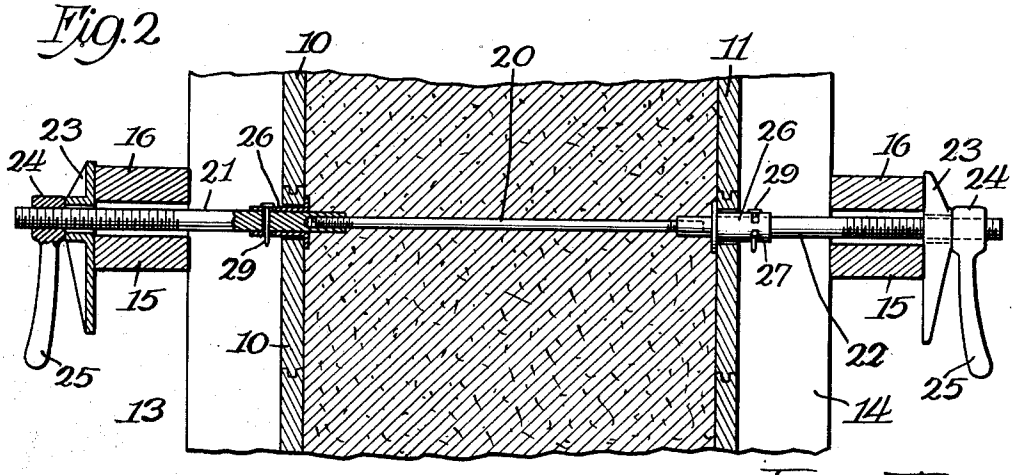


Fig. 2



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Fig. 3

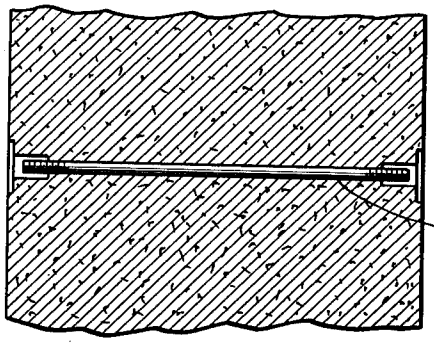
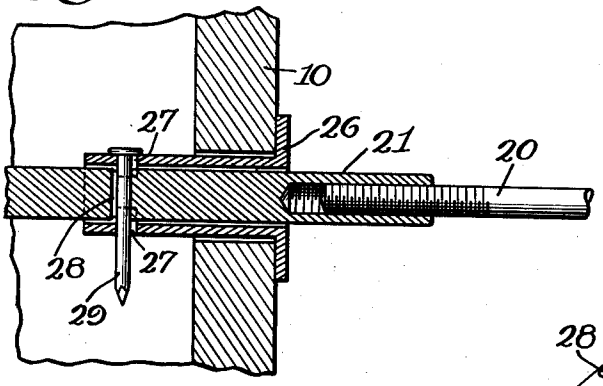
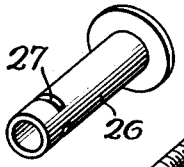


Fig. 4





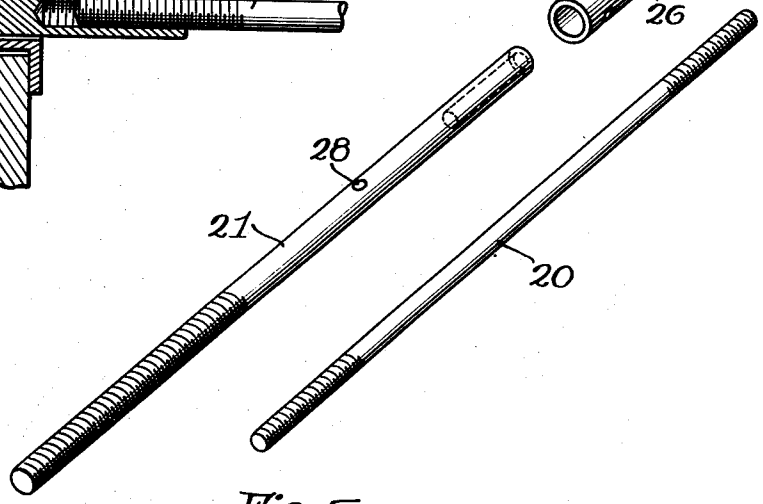
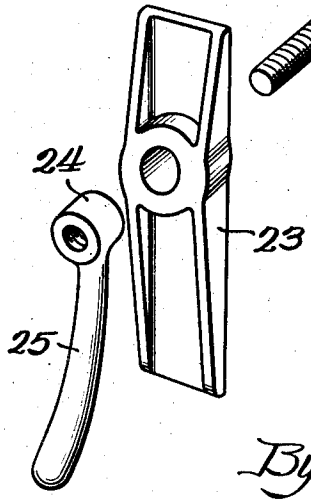


Fig. 5



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UNITED STATES PATENT OFFICE

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FORM CLAMP

Application filed May 31, 1929. Serial No. 367,421.

This invention relates to a form clamp used for holding the walls of concrete forms in spaced relation.

Concrete walls are usually made by pouring concrete between forms comprising side walls held together in spaced relation by spacers and clamping devices. After the concrete has hardened the clamps are released and the forms removed. It is not only desirable to have forms that may be quickly assembled but it is also important to have forms that may be equally as quickly knocked down and left in such shape that they can be used again. A desirable feature is to be able to assemble these forms from the outside because the walls are sometimes too narrow to permit a worker to get between them conveniently. It is also necessary that the side walls be spaced accurately, that means be provided for spacing the forms at different distances apart to provide for different thicknesses of wall, that the clamps be readily removable, and that when they are removed the wall is left without any projections sticking out of it and without any holes which would weaken or damage it or leave it so it is not water-proof. An important factor is cost, not only the cost of the clamp itself but the cost of the devices associated with it and the cost of assembly, it being well known that immense pressure is continually brought to bear in this age to reduce building costs.

The present invention has been devised with the object in view of overcoming the above difficulties by the provision of a simple, inexpensive form clamp that will permit easy assembly of concrete forms from the outside, that will enable the forms to be held rigidly in spaced relation, that will enable easy disassembly of the forms, and that will leave the forms free for use again and the wall undamaged.

Accordingly, the general object of the invention is to provide an improved form clamp for concrete walls.

Other objects and advantages of the invention will appear from the specification and drawings.

An embodiment of the invention is shown in the accompanying drawings in which;

Figure 1 is a partial perspective and section of a concrete wall with the forms applied thereto;

Fig. 2 is a partial section through the wall of Fig. 1 illustrating the form clamps in cross-section and elevation to illustrate its parts in more detail;

Fig. 3 is a partial section of a concrete wall showing its condition when the forms have been taken away;

Fig. 4 is a partial section illustrating how the ends of the form clamps cooperate with the walls of the form;

Fig. 5 is a separated perspective of portions of the form clamp.

The wall forms with which the clamp is to be used may be varied to suit the requirements but generally speaking they are of the type illustrated in Fig. 1. These forms comprise side walls 10 and 11 built of boards held together by vertical members 13 and 14, respectively. The length and height of these side walls can be varied, a contractor usually having a supply of various sizes so that the side walls of different sizes are available on quick notice. Instead of bearing directly against the side walls the form clamps bear against horizontal cross-members or whalers 15 and 16 which abut the vertical members 13 and 14. In the construction shown these whalers are assembled in pairs and the portions of the form clamps extend between them.

The form clamp includes a center tie rod 20 which spaces the form walls apart. This tie rod remains in the concrete wall after the forms have been removed as illustrated in Fig. 3. It may vary in length depending upon the thickness of walls desired.

Screw-threaded onto each end of the tie rod 20 are end rods 21 and 22 which are preferably of larger diameter than the center tie rod. These end rods extend outwardly between the whalers 15 and 16 and clamping devices are screw-threaded onto their outer ends. These clamping devices include bearing plates 23 of such length that they may engage the two whalers through which the end rods project and abutting against these

plates are nuts 24 having handles 25 by means of which they may be turned readily.

It will be readily apparent that, in order to rigidly hold the walls in spaced relation, they must be prevented from moving inwardly. One of the chief difficulties heretofore encountered has been the provision of a simple, inexpensive device for holding the walls in spaced relation which device would permit the worker to assemble the forms from the outside and which would permit ready removal of the forms without leaving large openings in the wall by virtue of the spacing device. This difficulty has been overcome in the present form clamp by a novel construction which will now be explained.

Loosely fitting on the end rods 21 and 22 are flanged sleeves 26. These sleeves are preferably mounted in openings in the side walls of the form before the form clamps are inserted. The sleeves are mounted with their flanges abutting the inner sides of the side wall and they fit snugly in the openings in the side wall so that they will not drop out easily while the forms are being moved. The shanks of the sleeves extend out beyond the outer sides of the side walls as illustrated clearly in Figs. 2 and 4. When the form clamps are put in place they extend through the sleeve as illustrated in Fig. 2. The sleeves are provided with openings or slots 27 as shown in Figs. 4 and 5 which may be brought into register with holes or openings 28 in the end rods to permit the insertion of a fastening device 29 such as a nail or the like. When one of the nails is dropped in place its sleeve is prevented from moving longitudinally relative to its end rod. A limited amount of rotative movement of the rods relative to the sleeves is permitted owing to the length of the slots 27.

It will be apparent that, when the parts are assembled as illustrated in Fig. 2, a tightening, say the left-hand nut 24, will cause pressure to be exerted on the corresponding plate 23 which will be transmitted through the whalers 15 and 16 to the vertical members 13 of the side wall 10. The side wall is moved inwardly until it engages the flange of the sleeve 26 whereupon its movement will be arrested and further tightening of the nut 24 simply clamps the parts together in rigid position. The same action takes place at both sides. The side walls are thus held rigidly in spaced relation.

The forms are assembled by first placing one of the side walls in vertical position and bracing it and then inserting the sleeves 26 in it. The sleeves 26 are then put in the second side wall, preferably before it is raised. After the second wall is raised, the form clamp rods are placed in position as follows. First, one of the end rods is screwed into the tie rod 21, the rods being proportioned so that the correct length for spacing the walls is secured by screwing the end rod into the rod 21 as far as it will go. One of the end rods having been screwed onto the tie rod, the two rods are inserted through the sleeves in the two side walls from the outside of one of the side walls. The second end rod is then screwed onto the rod after which the whalers are put in place and one of the plates 23 is slipped over the end rod and a clamp nut 24—25 is screwed onto it. As the clamp nut 24—25 is tightened, the side wall on the side where it is being tightened, is moved inwardly and this movement is continued until the opening in the sleeve 26 coincides with the opening in the end rod. When this occurs a nail or similar device is inserted into the registered openings. It will be recalled that these openings are on the outside of the wall so that the nail can be easily slipped in place. When this occurs further tightening of the clamp nut 24—25 clamps the side wall to the whalers, and the wall is held rigidly to the whalers and the form clamp.

A clamp nut 24—25 is then screwed onto the opposite end rod, the whalers for the other side having been put in place; and the other side wall is moved in until the openings in the sleeve 26 of that wall coincides with the opening in the end rod. A nail is dropped in place and the wall clamped to the whalers. It will be understood that the above operations are repeated for each form clamp.

In this manner, the walls are held tightly and firmly in spaced relation and the assembly is accomplished by men working on the outside of the walls. The walls are held together in such a manner that they will withstand heavy pressure such as may be exerted on them by wet concrete poured between them.

After the concrete between the side walls has hardened the clamp nuts 24—25 are loosened, the whalers removed, and the nails taken out of the openings in which they were placed. The end rods can then be unscrewed from the tie rods leaving the side walls free to be removed. The tie rods are left in the concrete as shown in Fig. 3, the holes in the sides of the walls being subsequently filled with concrete which gets a good anchorage in the threaded ends of the tie rods which project into the holes.

It is to be understood that the structure shown is for purposes of illustration and that variations may be made in it without departing from the spirit and scope of the invention as defined by the claims.

I claim:

1. A form clamp for holding wall forms in spaced relation, comprising a center tie rod, end rods removably secured to said center rod, flanged sleeves loosely fitting over said end rods, the flanges of said sleeves being adapted to engage the inner sides of said wall forms, means for readily fastening

said sleeves to said end rods on the outside of said wall forms to prevent movement of the sleeves longitudinally of the rods, and adjustable clamping devices on the outer ends of said end rods.

2. A form clamp for holding wall forms in spaced relation comprising a center tie rod, end rods removably secured to said tie rod, flanged sleeves loosely mountable on said end rods, said flanged sleeves being adapted to project through the wall forms with the flanges engaging the inner sides of said forms, fastening devices for readily fastening said sleeves to said end rods on the outside of said wall forms to thereby prevent movement of the sleeves longitudinally of the end rods, and clamping devices mounted on the outer ends of said end rods for bearing against portions of said wall forms.

3. A form clamp for holding wall forms in spaced relation comprising a center tie rod, end rods screw-threaded onto the ends of said tie rod, flanged sleeves loosely mountable on said end rods, said sleeves being adapted to extend through openings in the wall forms with the flanges engaging the inner sides of said forms, openings in said sleeves and said end rods which may be brought into registration outside of said wall forms for the ready reception of a fastening device to prevent longitudinal movement of the sleeves relative to the end rods, and clamping devices mounted on the outer ends of the end rods.

4. A form clamp for holding in spaced relation forms having side walls provided with vertical members and horizontal whalers, comprising a center tie rod, and rods removably secured to said tie rod and adapted to extend outside the side walls and between the whalers, flanged sleeves mounted loosely on said end rods with the flanges abutting the inner sides of the side walls, fastening devices for fastening the sleeves to the end rods on the outside of the side walls to prevent longitudinal movement of the sleeves relative to the end rods, and clamping devices on the outer ends of the end rods for bearing against the whalers.

In testimony whereof, I have subscribed my name,

CHARLES E. HUDGIN.