Oct. 16, 1928.

1,687,976

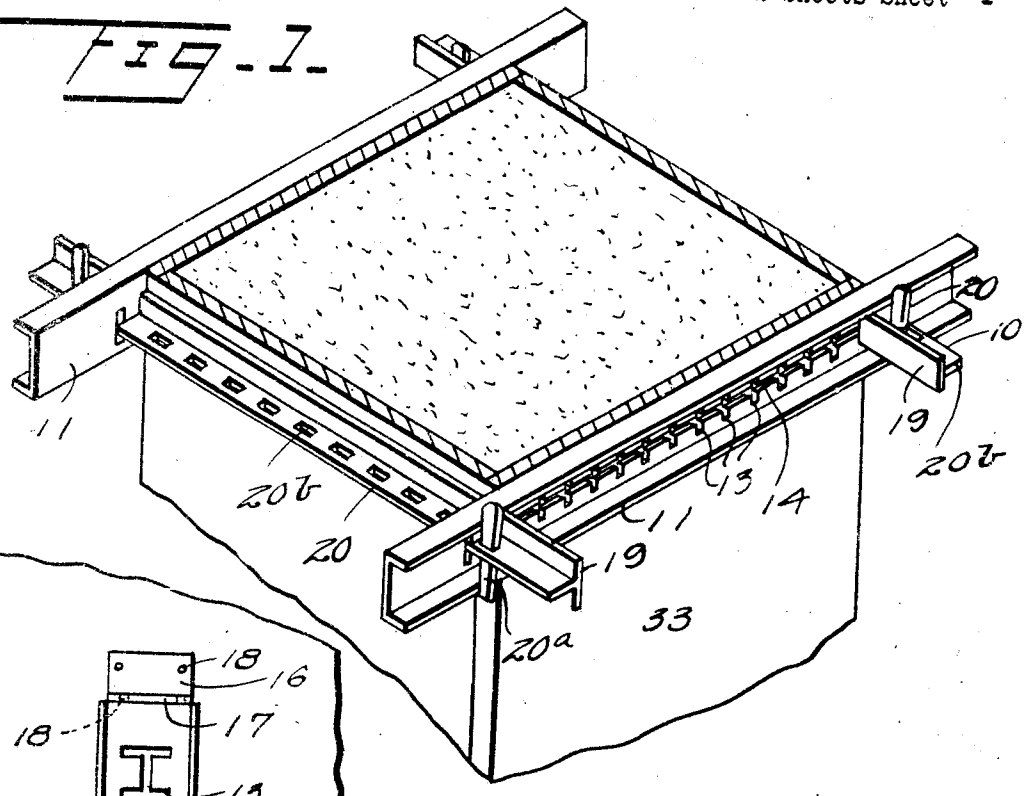
H. FORD

CONCRETE FORM CLAMP

Filed Jan. 21, 1928

2 Sheets-Sheet 1

Fig. 1.



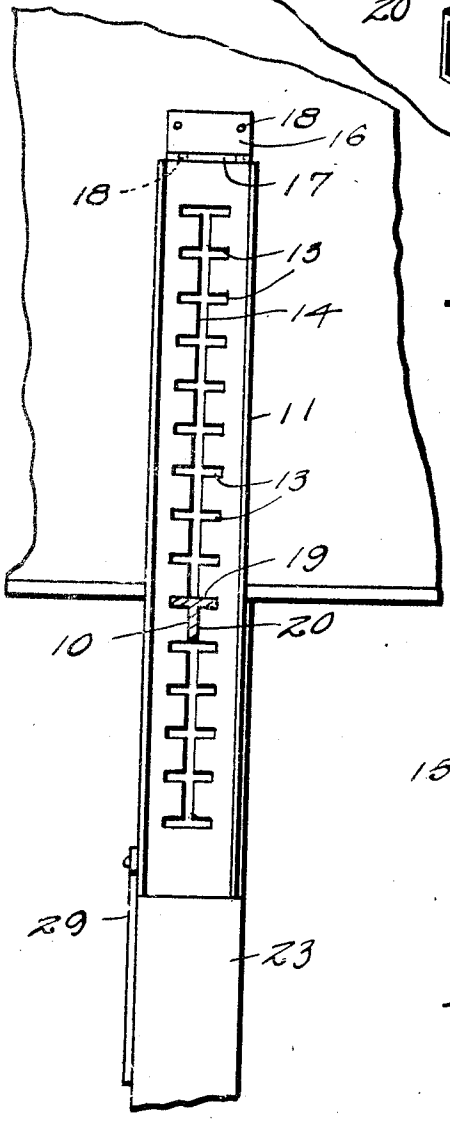
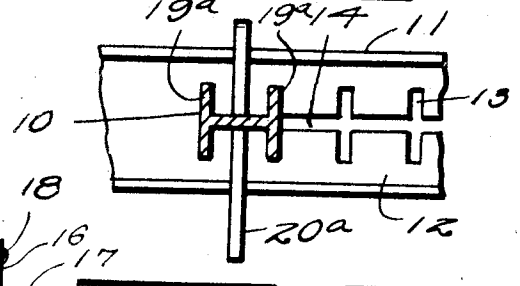


Fig. 2.

Fig. 7.



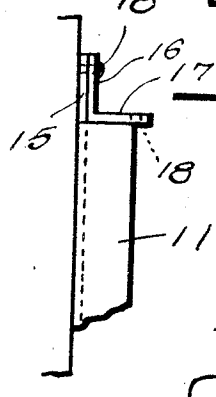


Fig. 6.

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Oct. 16, 1928.

1,687,976

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CONCRETE FORM CLAMP

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FIG. 3.

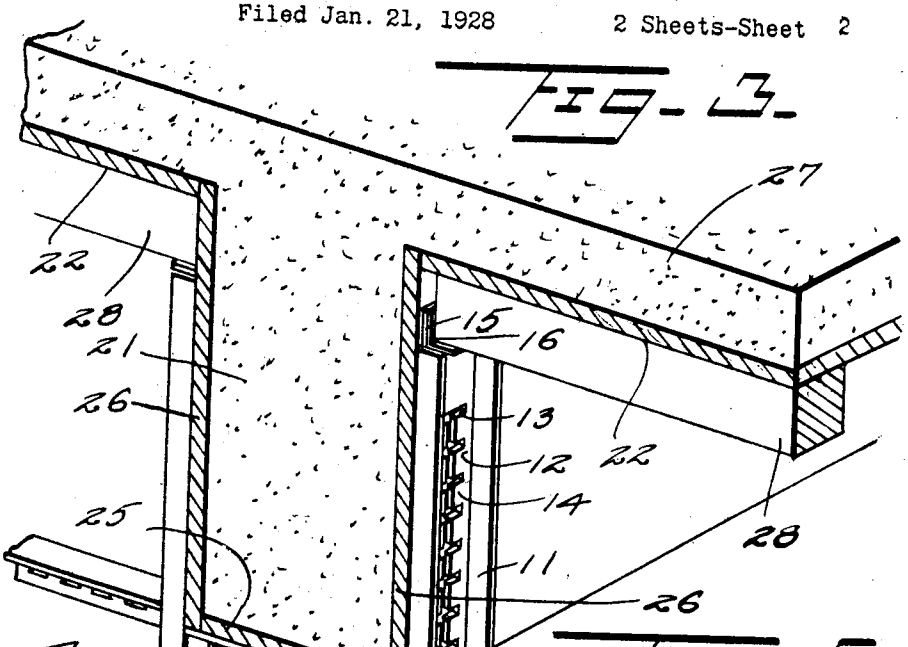


FIG. 4.

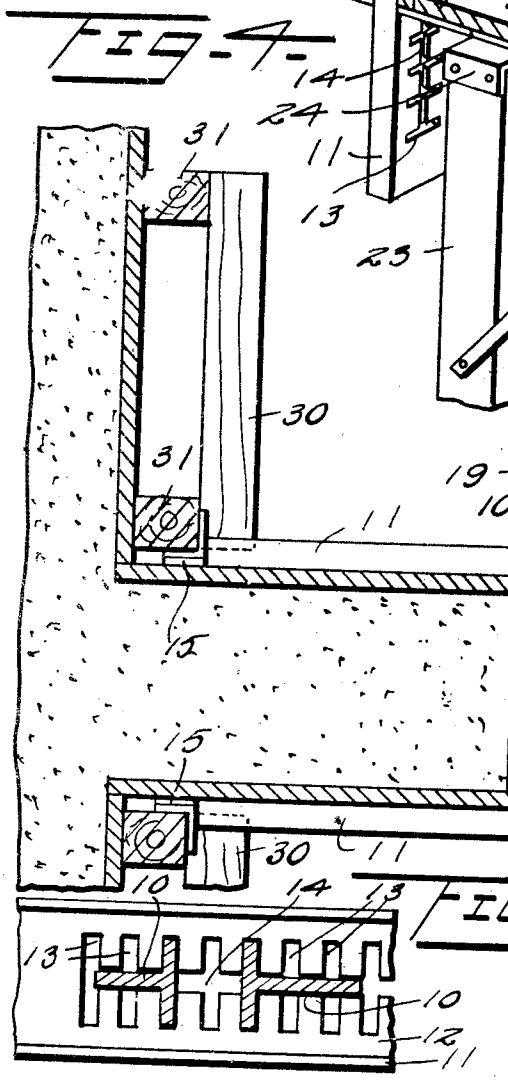


FIG. 5.

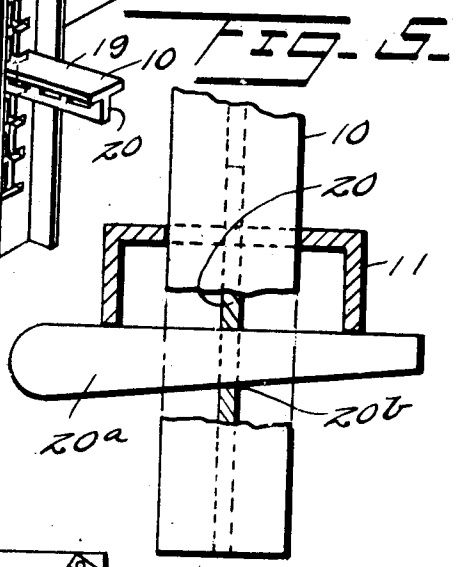


FIG. 8.

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Patented Oct. 16, 1928. 1,687,976

UNITED STATES PATENT OFFICE.

HORACE FORD, OF BALTIMORE, MARYLAND, ASSIGNOR OF ONE-HALF TO CHARLES L. STOCKHAUSEN, OF BALTIMORE, MARYLAND.

CONCRETE-FORM CLAMP.

Application filed January 21, 1928. Serial No. 248,475.

This invention relates to concrete form clamps and more particularly to a clamping structure capable of use in the formation of beams, columns and pilasters.

An important object of the invention is to produce a device of this character which is readily adaptable to use with elements of this character of different sizes, and in which certain elements of the clamp are readily interchangeable to permit adaptation of the clamp to use in situations where the pressures and stresses which must be resisted vary considerably.

A further and more specific object of the invention is to provide a clamp for beam molds of concrete structure in which all but the actual supporting element of the clamp may be readily removed after the beam has set sufficiently. In this connection, it is pointed out that such beams in concrete structures are integrally formed with the ceiling or floor slab. Engineering practice demands that due to the thickness of the beam and the correspondingly slower curing thereof, the beam structure be supported after the supports for the ceiling or floor slab may have been removed.

The invention further contemplates supporting the mold frame of the floor slabs from the beam mold clamp in such manner that the floor slab form may be removed at any time without disturbing the beam clamp and certain elements of the beam clamp which are unnecessary to support the beam after setting may be removed for similar use at another place in the structure which is being erected.

These and other objects I attain by the construction shown in the accompanying drawings, wherein for the purpose of illustration is shown a preferred embodiment of my invention and wherein:—

Figure 1 is a perspective view showing a clamp constructed in accordance with my invention applied to a column mold;

Figure 2 is a side elevation showing the same applied to a beam mold;

Figure 3 is a perspective showing the application of the clamp to the beam mold and the manner of supporting the adjacent ceiling slab molds;

Figure 4 is a horizontal sectional view showing the application to a pilaster mold and the adjacent wall mold sections;

Figure 5 is a detail sectional view showing the manner of securing the side sections against outward movement;

Figure 6 is a detail side elevation of the upper end of the side clamp element as employed with beam and pilaster molds;

Figure 7 is a detail sectional view illustrating the use of a slightly modified end member;

Figure 8 is a similar view illustrating the adaptability of the side members to the reception of end members having webs of different depths and illustrating the reversibility of the end members in the side members.

Referring now more particularly to the drawings, the clamp comprises elements 10 and 11 which, for the purpose of convenience, may be termed end and side members. The side members comprise channel iron beams which are provided in the web 12 thereof with a plurality of uniformly longitudinally spaced transversely extending slots 13 connected to one another by a centrally disposed longitudinally extending slot 14. At one end, the beam has its flanges cut-away to permit projection of the web, as indicated at 15, and to this projecting portion of the web is riveted, welded or otherwise secured one flange 16 of an angle iron, the other flange 17 of which projects outwardly between the flanges of the beam and has its inner surface coplanar with or arranged outwardly of the ends of the flanges. Both flanges 16 and 17 of the angle iron are perforated, as indicated at 18, the perforations of the flange 16 extending through the web 12 of the channel iron beam. These openings permit the passage of securing elements to engage in the mold elements associated therewith.

The end members 10 may comprise either T-beams, as disclosed in Figure 1, or H-beams as disclosed in Figure 7. These beams may be arranged with their flanges 19 in the slots 13 and their webs 20 in the slot 14 of the side members The beams may be adjusted to engage their flanges in any of the slots 13 and where the T-beam is employed, the web may be of any suitable depth, dependent upon the load which must be supported. Where H-beams are employed, the webs 20 must, of course, be of such length to permit the flanges 19ª to be engaged in slots 13.

In the drawings, three applications of the clamping structure just described have been illustrated. In Figure 3, the clamp is shown as employed to support a beam mold 21 and the adjacent ends of the slab form 22. In this use, two side members 11 and a single end member 10 are employed. The end member 10 is seated upon the upper end of a prop 23, this prop being provided at its upper end with a chair 24 receiving the web of the T-beam. Where, as illustrated in Figure 7, an H-beam is employed, the lower flange of the H-beam may seat directly upon the upper end of the prop without the use of a chair. The base 25 and lower ends of the side members 26 of the beam mold are then placed upon this beam and side members 11 engaged with the beam with the angle iron seats thereof upwardly disposed and the flanges thereof outwardly disposed, care being taken in the application of the side members that sufficient space is left, between the upper surfaces of the flanges 17 and the proposed bottom of the slab 27 which is to be formed, to accommodate the form and permit a beam 28 thereof to seat upon the flange 17. The side members 11 are moved over until the side members 26 are firmly engaged against the bottom element 25 of the beam mold, at which time wedges 20^a are passed through openings 20^b formed in the web 20 of the end member 10 and driven home to maintain the elements of the mold in proper relation to one another. Securing elements may be entered through the openings 18 of the flange 16 of the angle iron seat to engage the side members 26 of the beam mold 21.

The lower ends of the side members are preferably provided with means for attaching thereto links 29, the lower ends of which are secured to the prop 23, so that oscillation of the side member is prevented. The beam 28 is then seated upon the flange 17 and may be secured thereto by small nails inserted through the openings 18.

With the structure erected as above described, when the setting of the floor slab has been completed, the beam 28 may be knocked from its support, permitting the slab form to be removed. The side members 11 may then be removed without in any way disturbing the end member 10, which actually supports the beam. With the side members removed, the side member 26 of the beam form may be removed, so that curing of the beam may proceed more rapidly. Where the clamp is used in connection with the mold of a pilaster, the mold elements employed are identical with those employed in the construction of a beam and are engaged with the mold elements of the pilaster and wall molds similarly. With this construction and in this use of the clamp, the channels of the side members afford seats in which the ends of the walers 30 of the wall mold may be engaged. Of course, in a construction of this character, the beams 31 of the wall mold extend vertically and accordingly engage upon the seats intermediate their ends instead of with an end, as in the case of the beams 28. Where employed as a column mold, two side and two end members are used, the side members engaging two opposed faces of the column mold 33, while the end members engage the remaining faces. The wedges 20^a are employed for holding the structure in assembled relation.

It is pointed out that strains which the elements of the clamp must withstand will vary considerably under different conditions and, therefore, adjustability as to the strain which may be withstood by the end members must be available. It is always desirable that the clamp elements have the least possible weight. The side members, due to their double flanges, are sufficiently stiff to withstand practically any load to which they may be subjected, but the single web of the end members would, under certain conditions, prove unsatisfactory, were it not possible to substitute these end members with other end members, the webs of which have a greater depth and are accordingly capable of withstanding a greater load. Attention is directed to the fact that these webs are, to a certain extent, weakened by the openings formed therein and the end members could not, therefore, have the resistance of an unperforated beam having the same characteristics. Under some circumstances, it may be desirable to omit the extension of the web of the side members to produce the angle iron seat attachment and the attachment itself as, for example, when the devices are intended primarily for use as column molds. Attention is further directed to the fact that due to the arrangement of the slots 13 and 14, the end members may be reversely positioned in the slots, thus permitting use of the elements either in the formation of column beams or pilasters. Furthermore, the construction permits use of a single type of side member in connection with beams or pilasters of a considerably varied depth.

Since the construction hereinbefore set forth is capable of a certain range of change and modification without materially departing from the spirit of the invention, I do not limit myself to such specific structure except as hereinafter claimed.

I claim:—

1. A concrete form clamp including side and end members for engagement with sides and at least one end of a concrete form, the end members being of a cross section including a web and a perpendicularly related flange, the side members comprising bars each having a plurality of longitudinally spaced transversely extending slots for the selective passage of the flange of an as-

sociated end member and a longitudinally extending slot communicating with all of said transverse slots and adapted for the reception of the web of the end member.

2. A concrete form clamp including side and end members for engagement with sides and at least one end of a concrete form, the end members being of a cross section including a web and a perpendicularly related flange, the flange being connected to the web at its center, the side members comprising bars each having a plurality of longitudinally spaced transversely extending slots for the selective passage of the flange of an associated end member and a longitudinally extending slot communicating centrally with all of said transverse slots and adapted for the reception of the web of the end member.

3. A concrete form clamp including side and end members for engagement with sides and at least one end of a concrete form, the end members being of a cross section including a web and a perpendicularly related flange, the side members comprising bars each having a plurality of longitudinally spaced transversely extending slots for the selective passage of the flange of an associated end member and a longitudinally extending slot communicating with all of said transverse slots and adapted for the reception of the web of the end member, the end member having means associated therewith adapted to engage one face of an associated side member to limit movement of the side member in one direction thereon.

4. A concrete form clamp including side and end members for engagement with sides and at least one end of a concrete form, the end members being of a cross section including a web and a perpendicularly related flange, the side members comprising bars each having a plurality of longitudinally spaced transversely extending slots for the selective passage of the flange of an associated end member and a longitudinally extending slot communicating with all of said transverse slots and adapted for the reception of the web of the end member, the web of the end member having openings and wedges selectively engageable in said openings and adapted to engage one face of an associated side member to limit movement thereof in one direction upon the end member.

5. A concrete form clamp including side and end members for engagement with sides and at least one end of a concrete form, the end members being of a cross section including a web and a perpendicularly related flange, the side member comprising bars each having a plurality of longitudinally spaced transversely extending slots for the selective passage of the flange of an associated end member and a longitudinally extending slot communicating with all of said transverse slots and adapted for the reception of the web of the end member, an angle iron seat secured to one end of each side member, said seats each having a flange thereof extending transversely of the associated side member and projecting outwardly therefrom.

6. A concrete form clamp including side and end members for engagement with sides and at least one end of a concrete form, the end members being of a cross section including a web and a perpendicularly related flange, the side members comprising bars each having a plurality of longitudinally spaced transversely extending slots for the selective passage of the flange of an associated end member, a longitudinally extending slot comunicating with all of said transverse slots and adapted for the reception of the web of the end member, and means at corresponding ends of the side members affording transversely extending seats projecting outwardly from the side member.

7. A concrete form clamp including an end member whose cross-sectional area includes a T formation and side members in the form of bars provided with longitudinal spaced transversely extending slots for the passage of the head of the T and a longitudinally extending slot communicating with all of said transversely extending slots for the passage of the web of the T.

8. A concrete form clamp including an end member H-shaped in cross section and side members, the side members having longitudinally spaced transversely extending slots for the passage of the flanges of the H and a longitudinally extending slot connecting pairs of adjacent transverse slots for the reception of the web of the H.

9. A concrete form clasp including an end member H-shaped in cross section and side members, the side members having longitudinally spaced transversely extending slots for the passage of the flanges of the H, and a longitudinally extending slot connecting pairs of adjacent transverse slots for the reception of the web of the H, the longitudinal slots of each side member being continuous and communicating with all of said transverse slots.

10. A concrete form clamp including an end member whose cross-sectional area includes a T formation and side members in the form of channel bars whose webs are each provided with longitudinally spaced transversely extending slots for the passage of the head of the T, a longitudinally extending slot communicating with all of said transversely extending slots for the passage of the web of the T, the webs of said channel bars being continued beyond the flanges thereof and angle iron seats secured to the continuations of the webs and each having

an angle thereof projecting outwardly from the web at the same side thereof as the flanges.

11. A concrete form clamp including an end member H-shaped in cross section and channel iron side members, the webs of the channel iron side members having longitudinally spaced transversely extending slots for the passage of the flanges of the H, a longitudinally extending slot connecting pairs of adjacent transverse slots for the reception of the web of the H, the longitudinal slots of each side member being continuous and communicating with all of said transverse slots, the webs of said channel bars being continued beyond the flanges thereof and angle iron seats secured to the continuations of the webs and each having an angle thereof projecting outwardly from the web at the same side thereof as the flanges.

12. A concrete form clamp including an end member whose cross sectional area includes an L-formation and side members in the form of bars provided with longitudinally spaced transversely extending slots for the passage of one arm of the L and a longitudinally extending slot communicating with all of said transversely extending slots for the passage of the other arm of the L.

13. A concrete form clamp including an end member having a web and a flange, the web and flange being angularly related and side members comprising bars having a single longitudinal slot for the reception of the web and a plurality of transverse slots adapted to interchangeably receive the flange and each communicating with the longitudinal slot.

14. A concrete form clamp including an end member whose cross sectional area includes an L-formation and side members in the form of bars provided with longitudinally spaced transversely extending slots for the passage of one arm of the L, and a longitudinally extending slot communicating with all of said transversely extending slots for the passage of the other arm of the L, said side members having each secured thereto at one end thereof an angle iron seat one flange of which projects outwardly from the side member.

In testimony whereof I affix my signature.

HORACE FORD.