



## UNITED STATES PATENT OFFICE.

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## FORM FOR CONCRETE CONSTRUCTION.

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*To all whom it may concern:*

Be it known that we, CARL NELSON and JOHN L. MONTEN, former subjects of the King of Sweden, who have declared our intentions of becoming citizens of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Forms for Concrete Construction, of which the following is a full, clear, concise, and exact description, reference being had to the accompanying drawings, forming a part of this specification.

Our invention relates to improvements in forms for concrete construction designed for use especially in the formation of caps for chimneys or pillars, wall copings, belt courses on building structures, windowsills, water tables for building foundations and like structures.

One object of our invention is the production of a form of this character which may be readily and quickly erected for use and as readily and easily removed after setting of the concrete for further or subsequent use.

A further object is the provision of a form of this character which will be of an adjustable nature permitting of ready and expeditious adjustment to meet various conditions and requirements, and which will be firm and rigid after application or assembly so as to insure the production of a concrete structure which will be of accurate design and finished appearance.

A still further object is the production of a form for concrete construction which will be of durable and economical construction and highly efficient in use.

Other objects will appear hereinafter.

With these objects in view the invention consists in the combinations and arrangements of parts hereinafter described and claimed.

The invention will be best understood by reference to the accompanying drawings wherein like numerals refer to corresponding parts.

In the drawings—

Fig. 1 is a central section through a chimney structure showing a form applied thereto which embodies our invention, said section being taken on substantially line 1—1 of Fig. 2;

Fig. 2 is a top plan view of the structure seen in Fig. 1;

Fig. 3 is an enlarged fragmentary detail

of the means employed for locking together adjacent angularly disposed units of the form;

Fig. 4 is a section taken on substantially line 4—4 of Fig. 3;

Fig. 5 is a vertical section through a windowsill showing the employment of our form in connection therewith;

Fig. 6 is a top plan view of the corner portion of a wall coping showing the use of our form in connection therewith;

Fig. 7 is an enlarged top plan view of a portion of the construction shown in Fig. 6;

Fig. 8 is a section taken on substantially line 8—8 of Fig. 7; and

Fig. 9 is a section taken on line 9—9 of Fig. 8.

The form of construction illustrated in Figs. 1 to 4 inclusive comprises a plurality of form units 10, preferably of sheet metal. Said units are angularly disposed with relation to each other, one end 10' of each unit abutting against the adjacent side of the opposite end 10'' of the adjoining unit, said end 10' being formed to conform with the contour of the surface against which the same abuts.

Each unit is in the form of an angle bar with also an upper horizontal outwardly projecting flange 11 and a lower downwardly projecting perpendicular flange 12. At the end 10' of each unit, the two vertical and horizontal portions and the flange 11 extend to abut the adjacent side of the end 10'' of the adjoining unit, but the flange 12 is cut off at the corner of the chimney so as to avoid interference with the flange 12 of the end 10''.

Secured by screws 13 to the flange 11 of each unit adjacent the end 10' thereof is a plate 14, the outer end of which projects beyond the adjacent end of the unit and has pivotally or hingedly connected therewith as at 15 a clamping member 16. The member 16 adjacent the secured end thereof is formed with an offset or shoulder 17 which is adapted to cooperate with the adjacent end portion of the plate 14 to clampingly engage the flange 11 of the adjoining unit as clearly seen at the right hand side of Fig. 1. The free end portion of the clamping member 16 is provided with an elongated slot 18 as seen in Fig. 4.

Provided at the underside of each unit at the end 10' thereof is a plate 19 rigidly secured thereto by screws or other suitable

fastening devices 20. The heads of said screws, as seen in Fig. 3, are countersunk so as to prevent the same becoming embedded in the concrete during the employment of the form.

The plate 19 terminates a short distance back from the end of the unit and is bent downwardly forming a depending portion 21, as clearly seen in Figs. 1 and 3.

Pivottally or hingedly connected at 22 to the lower end of the portion 21 is a clamping member 23. The arrangement is such that the secured end of the clamping member 23 is adapted to cooperate with the stationary portion 21 for clampingly engaging the flange 12 of the adjacent form unit, as clearly seen in Figs. 1 and 3.

The free end of the member 23 is reduced in thickness and is adapted to project through the slot 18 in the clamping member 16 as clearly seen in Fig. 4.

Carried at the free end of clamping member 16 is a locking member or latch 24 pivottally secured thereto at 25. Formed in one edge of the member 23 is a notch 26 adapted, when the clamping members 16 and 23 are in operative position, as seen in Fig. 3, to be engaged by the adjacent end of latch 24 whereby said clamping members will be positively locked in operative position, that is, in clamping relation with the adjoining form unit. One side of the latch 24 is bevelled or formed with a cam surface 27 which is adapted to engage with the notch 26, provision being thus made to compensate for wear and to insure forcing of the clamping members into certain clamping engagement.

The interlocking of the members 16 and 23 is such that the same may be readily unlocked and disengaged by moving the latch 24 to operative position and then swinging the member 16 outwardly and the member 23 downwardly. In locking said clamping members together, the reverse procedure is of course resorted to. With this arrangement it will be seen that the form units may be readily and expeditiously assembled, adjusted to the position desired and locked together and as readily unlocked, disconnected and removed after the setting of the concrete. The engagement of the clamping members with the adjoining unit is such that the latter will be not only positively locked to the unit carrying said clamping members, but will be reinforced and braced so as to prevent distortion or bending of the same.

Each of the form units is provided at the lower edge thereof, that is, at the juncture of the body of the unit with the flange 12, with an inwardly projecting finger or lug 28 which is adapted to rest upon the upper edge or surface of the structure in connection with which the form is used. Of course

any number of fingers or lugs 28 may be provided upon each unit.

In the use of the form for providing a concrete cap on a chimney, as seen in Figs. 1 and 2, the form units are first adjusted as desired so that the flanges 12 will engage against the outer surface of the chimney A and the members 28 upon the upper surface of the chimney. After the units have been adjusted to this position, the same are locked together by manipulation of the locking members 16 and 23 and the latches 25. A chimney is ordinarily provided with a lining B which projects above the brick or masonry formed portion thereof, the concrete being poured into the space between the form units and said lining B.

After the concrete has set, the form units may be unlocked, as before described, and the form units removed for further use. By forming the projections 28 very thin and tapering, as seen, the same will be held but very lightly by the concrete and may be readily loosened by exerting slight outward pressure or pull upon the form units, as will be readily understood.

A form of this type may, of course, be used in the provision of caps on pillars and the like since a pillar would be the same as a chimney except that the pillar is solid.

Where the form is used on structures of any material length, form units of considerable length or of sectional construction must be used, in which case bracing means or additional supporting devices must be employed at points intermediate the ends of the structure. Where the form is used for the purpose of providing a concrete coping on a building wall, as seen in Fig. 6, at the inner corners of the wall permanent corner members 29 will be provided. Form units 10''' of the same cross section as the units 10 and 29 will be used the same being arranged end to end in registration with said units 10 and 29, as clearly seen in Figs. 6 and 7.

In this case brace members will be employed. Each of these comprises an elongated bar 30 on the opposite ends of which clamping members 31 are mounted, the members 31 being provided with elongated slots 32 to accommodate said bar. Slidably mounted upon the members 31 are clamping jaws 33 with which cooperate set screws 34 for locking said jaws in positions of adjustment, as will be readily understood.

In order to prevent the inner ends of screws 34 from entering the slots 32 in the members 31, substantially U-shaped plates 35 are loosely mounted upon the jaws 33 against which the inner ends of said screws contact. The members 35 are of a width greater than that of the slots 32 so that in the tightening of the screws 34 said members 35 will engage against the adjacent sides of the members 31.

Cooperating with the members 31 for locking the same in positions of adjustment upon the bar 30 are set screws 36. Between the bar 30 and the jaws 33 are interposed plates 37, the latter being slotted so as to slide freely on the members 31. In use, the upper flanges 11 of the form units will be interposed between the plates 37 and the jaws 33 so that upon tightening of the screws 36 said flanges will be securely clamped between said plates and jaws, as clearly seen in Fig. 8.

The plates 37 are interposed between said flanges and the bar 30 in order that the area of contact at the upper sides of said flanges will be extended laterally, it being apparent that without the use of such a plate, the area of engagement with the upper sides of plates would be only the width of the bar 30. By interposing the plate 37 such width is increased to that of the width of said plates, as clearly seen in Fig. 9. This is of importance especially where the bracing devices are employed at the joints between the form units, the increased area of engagement between the bracing devices and the ends of the units insuring a firm securing of the latter. To compensate for the thickness of the flanges 11, the rearward ends of the jaws 33 are provided at their upper sides with a lug or step 38, as clearly seen in Fig. 8.

In the lower ends of the members 31 are provided engaging screws 39 carrying swivelled end pieces 40 which are adapted to engage with the form unit flanges 12, as clearly seen in Fig. 8.

Bracing devices of the construction set forth may be used at any suitable point along the form units in order to brace or reinforce the same.

The construction of said devices is such as will permit of ready application of the same and ready removal thereof after the concrete has set. The same are adjustable to various widths of structure and to forms of various heights, the latter adjustment being effected through manipulation of the set screws 36. In Figs. 6, 7 and 8 where the device is shown in connection with a wall coping, the wall is shown at D and the coping at E.

Where it is impossible or becomes inconvenient to use clamping devices 31 at both ends of the bar 30 as, for instance, where the form is used in connection with windowsills, as shown at F in Fig. 5, a bar 30' may be used in which a vertical slot 41 will be provided at one end. In this slot a spur or anchoring arm 42 may be employed adjustably secured therein by a set screw 43.

While we have illustrated and described the preferred forms of construction for carrying our invention into effect, these are capable of variation and modification without departing from the spirit of the invention. We therefore do not wish to be limited to the

precise details of construction set forth but desire to avail ourselves of such variations and modifications as come within the scope of the appended claims.

Having thus described our invention, what we claim as new and desire to secure by Letters Patent is:

1. A form for concrete construction comprising two units angularly disposed with relation to each other, one end of one unit abutting against the adjacent side of the other unit whereby the latter may be adjusted in a direction transversely with respect to the first mentioned unit; means on said end of said first mentioned unit for connecting the latter with the other unit, said means comprising a pair of clamping members each having one end pivotally mounted, the opposite ends of said members being free to embrace the adjoining unit and to interlock with each other; and means cooperating with said members for locking the same in operative position.

2. A form for concrete construction comprising two units angularly disposed with relation to each other, one end of one unit abutting against the adjacent side of the other unit whereby the latter may be adjusted in a direction transversely with respect to the first mentioned unit; means on said end of said first mentioned unit for connecting the latter with the other unit, said means comprising a pair of clamping members each having one end pivotally mounted, the opposite ends of said members being free to embrace the adjoining unit and to interlock with each other; and a locking element carried by one of said members and adapted to engage the other to lock said members in operative position.

3. A form for concrete construction comprising two units angularly disposed with relation to each other, one end of one unit abutting against the adjacent side of the other unit whereby the latter may be adjusted in a direction transversely with respect to the first mentioned unit; means on said end of said first mentioned unit for connecting the latter with the other unit, said means comprising a pair of clamping members each having one end pivotally mounted, the opposite ends of said members being free to embrace the adjoining unit and to interlock with each other; and a locking element carried by one of said members and adapted to engage the other to lock said members in operative position; and a cam surface on said locking element for forcing said clamping members into close engagement with the unit engaged.

4. A form for concrete construction comprising two units angularly disposed with relation to each other, one end of one unit abutting against the adjacent side of the other unit whereby the latter may be ad-

justed in a direction transversely with respect to the first mentioned unit; means on said end of said first mentioned unit for connecting the latter with the other unit, 5 said means comprising a pair of clamping members each having one end pivotally mounted, the opposite ends of said members being free to embrace the adjoining unit and to interlock with each other; and a 10 locking element carried by one of said members and adapted to engage a notch in the other to lock said members in operative position.

5. A form for concrete construction comprising two units angularly disposed with relation to each other, one end of one unit abutting against the adjoining side of the other unit whereby the latter may be adjusted in a direction transversely with respect to the first mentioned unit; means on 20 said end of said first mentioned unit for connecting the latter with the other unit, said means comprising clamping members pivotally secured to the upper and lower 25 edges of said first mentioned unit and adapted to swing toward the center of the unit to embrace said second mentioned unit; and means engaging the free ends of said clamping members to lock the same in operative position. 30

6. A form for concrete construction comprising two units angularly disposed with relation to each other, one end of one unit abutting against the adjoining side of the 35 other unit whereby the latter may be adjusted in a direction transversely with respect to the first mentioned unit; means on said end of said first mentioned unit for connecting the latter with the other unit, 40 said means comprising clamping members pivotally secured to the upper and lower edges of said first mentioned unit and adapted to swing toward the center of the unit to embrace said second mentioned unit; 45 stationary surfaces for cooperation with the secured end portions of said clamping members to clampingly engage the upper and lower edge portions of said second mentioned unit; and means engaging the free 50 ends of said clamping members to lock the same in operative position.

7. A form for concrete construction comprising a form unit; means for securing said unit in position, said means comprising a 55 bar; a block adjustably mounted on said bar; and means on said block for engaging the upper and lower ends of said unit in clamping relation, said means accommodat-

ing itself to irregularities in the contour of the unit. 60

8. A form for concrete construction comprising a form unit; means for securing said unit in position, said means comprising a bar; a block adjustably mounted on said bar; a jaw adjustably mounted on said block and between which and said bar the upper edge portion of the unit is adapted to engage; means for locking said block and jaw in positions of adjustment; and adjustable means at the lower end of said block for engaging the lower edge portion of the unit to hold the same in position, the adjustment of said means being independent of the adjustment of said jaw in order to compensate for irregularities in the contour of this lower edge portion of the unit. 75

9. A form for concrete construction or the like comprising angularly disposed form units, one of said units abutting the side of the other unit and having means on one of its ends for locking said units together, said means comprising two pivotally mounted embracing members adapted to engage and be locked together at their free ends by a cam member carried on one of these 85 members after they are swung about said other unit in embracing relation.

10. A form for concrete construction or the like comprising angularly disposed form units, means for locking the adjoining units together, said means comprising a latch hingedly mounted on one of said units to swing about one edge of the other unit and a cooperating arm also hingedly mounted thereon for swinging about the opposite edge of this other unit in order to engage said latch and thereby lock said units together. 95

11. A form for concrete construction or the like comprising angularly disposed form units, and a pair of members on one unit adapted to swing about the other unit and interlock with each other at their free ends. 100

12. A form for concrete construction or the like comprising angularly disposed form units, and a pair of members on one unit adapted to swing about the other unit and interlock with each other at their free ends, said members being formed of two or more sections hingedly connected to each other in order that these members may accommodate 110 themselves to the contour of said other unit.

In witness whereof, we have hereunto subscribed our names.

CARL NELSON.  
JOHN L. MONTEN.