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CONCRETE-WALL BOXING.

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To all whom it may concern:

Be it known that I, ARTHUR EDWARD HOLMES, subject of the King of Great Britain, residing at Wai-iti Road, Timaru, Dominion of New Zealand, have invented new and useful Improvements in or Relating to Concrete-Wall Boxing, of which the following is a specification.

This invention relates to the boxing used in the erection of the concrete walls of buildings of all kinds, when such walls are erected by being moulded, in situ, course by course, to the height required.

The boxing designed and forming the subject of the invention is adapted for use in the formation of solid walls or cavity walls, as may be desired, and is constructed to form the mould on the two sides of such wall.

The invention covers a special arrangement of planks or sheets to form each side of the mould by the arrangement and connection of which two planks or sheets are connected together by such means as to be adapted to be disposed, edge on, one vertically above the other, and to be transposed in position one upon the other, in continuous sequence as each course of the wall is moulded, so as to form the mould for the next course. It also covers a special construction of means whereby the mould members on the one side of the wall may be stayed by cross ties with those on the other side in order thus to prevent the mould from spreading.

The invention is illustrated in the accompanying drawings, in which:—

Figure 1 is an end elevation of the boxing forming one side of the mould.

Figure 2 is an outside elevation of one end thereof.

Figure 3 is a plan of one of the stay bars used in the assembly of the boxing.

Figure 4 is an end elevation of the boxing as assembled for use in the construction of a wall.

Figures 5 and 6 are detail views that will be hereinafter fully described.

In carrying out the invention the wall mould is formed of similar construction on each side and is made of any approved length so that by the end to end arrangement of sections similarly made, any desired length of wall may be constructed in the well known systems.

In this invention each mould section, for each side of the mould, is made up of two wooden planks, or metal sheets, A—A' of approved and equal length and width. These two planks are arranged edge on one above the other, and to the outer surface of each, at each extremity, a length B of angle iron is fastened so that it extends vertically up the plank and has one web projecting out at right angles from the plank's surface. The angle irons on one plank are disposed to extend uniformly with those on the other, and if required, as where the planks are long, similar bars may be disposed at other points in the lengths of the planks.

Combined with each pair of angle iron bars thus provided is a metal linking bar C that fits against their outwardly projecting webs and is arranged to overlap both bars to the middles of their lengths. This link is then attached at its ends to the respective angle irons by means of the pivot pins D that pass through the link ends and then through slots B' formed to extend longitudinally for a distance in each angle iron. This allows for an amount of independent up and down movement of each plank in relation to the other, limited in extent by the length of these slots and for a purpose to be hereinafter described.

The linking of the two planks together by means of these pivotal links will thus permit of one being swung out from beneath the other in the manner shewn by the dotted lines in Figure 1, and then raised and swung in to occupy a similar position on the top of the previously upper plank. The planks may thus be transposed in position and worked to higher elevations by the repeated movement of the lower plank to the higher position.

For holding the two planks rigidly in the same plane, the link C is provided with a pin K projecting from its surface into the space between the two angle iron bars, and each bar is formed on its projecting web with a half round recess b in its top edge into which the said pin will drop when the one plank has been turned from the lower to the upper position. The provision of the slots B' allow for this engagement of the recess with the pin.

The web of each angle iron length that engages the surface of the plank is formed at its upper end with a tongue E projecting

longitudinally upwards beyond the top edge of the plank and at its lower end with the tongue J projecting longitudinally downwards below the bottom edge of the plank.

5 This latter tongue is however bent outwards from the plane of the web so that its bottom extremity extends in a plane outside of and parallel with the tongue E.

For use in conjunction with the mould members thus constructed, stay bars F (Figure 3) are provided. These are made of thin metal strips and of a length corresponding with the thickness of the wall to be built. Each bar near each end is formed with two slots G and G' disposed transversely across it and at distances apart corresponding to the distance between the vertical planes of the tongues E and J of the angle iron B. The slots are also made of sizes such as to be capable of receiving such tongues.

In use, as shewn in Figure 4, the mould members are disposed on opposite sides of a wall foundation course and are arranged so that they are supported upon the ends of a stay bar F moulded into such course so that its ends project. The bottom plank of each side then rests on such bar and is held from moving away from the foundation by the engagement of the tongue J in the outer slot G' of the stay bar on that side. The top edges of the lower planks on both sides are then stayed together by means of a second and similar stay bar F interposed between the planks (which may be done by reason of the provision by which the upper plank may be moved upwards from the lower) so that the slots G at the ends thereof pass down over the tongues E on the respective sides. The upper planks are then dropped so that the tongues J will pass into the respective slots G' in the stay bar. A third stay bar F is then disposed in a similar manner across between the upper ends of the top planks. Consequently a mould is thus provided the sides of which are held rigidly upright and prevented from spreading or collapsing inwards.

Concrete material is then poured into the mould to about the level of the upper planks and when sufficiently set, the lower plank on each side is freed and raised to above the previously upper plank to form the mould for the next course, and so on repeatedly. This is effected by first freeing the tongue J of the lower plank from the slot in the bottom stay bar, by bending the end of the bar down in the manner indicated by the dotted lines. The plank's support will thus be removed so that it will drop down and outwards to the limits allowed by the slots B', freeing also the upper tongue E from the second stay bar. The plank may thus be swung upwards on the links C to above the other plank and dropped into position there-

on by causing its tongues J to drop into the slots G' in the second stay bar and the pin K on each link bar to engage the recess b in the angle iron beneath. The upper ends of the raised planks are then stayed by a further cross stay F, a further course moulded and the whole operations repeated.

When each plank is moved from the lower to the upper position, the stay bar F previously supporting it is drawn from the wall.

When it is inconvenient to adopt the practice of bending down the stay bar ends to free the tongues J, such tongues may be made and secured to the angle iron bars in the manner shewn in Figures 5 and 6 in order that they may be moved vertically up and down independently of such bars. In this form each tongue is formed so that its upper end overlaps the surface of the angle iron web. It is then attached to such surface by means of the rivets j passing through a slot J' formed in the tongue and made to allow of sufficient movement to permit of the tongue being knocked up to free the stay bar and then moved down again to enable it to engage the upper stay bar when the plank to which it is attached is lifted.

The stay bars may be used to support a cavity forming core of any approved construction, such core being lifted course by course in a well known way in correspondence with the raising of the mould course by course.

I claim:—

1. Boxing for the moulding of concrete walls formed, for each side of the mould, of two planks adapted to be disposed, edge on, vertically one above the other, each having bars of angle iron secured to extend vertically on its outside face at approved points in its length and extending continuously with similarly positioned bars on the other plank, and a link bar made to overlap each pair of angle iron bars of the two planks, and pivoted at its ends to the respective bars by means of pivot pins passing through the end and through slots formed longitudinally in the respective angle iron bars, and so disposed as to permit of one plank swinging in a transverse direction upon the other, substantially as specified.

2. In boxing for the moulding of concrete walls constructed as described in claim 1, constructing each angle iron bar with a tongue projecting longitudinally upwards from its upper end, and with a tongue projecting longitudinally downward from its lower end and bent to extend in a plane parallel with the bar and with the upwardly extending tongue, substantially as and for the purposes specified.

3. Boxing for the moulding of concrete walls constructed as described in the preceding claims combined with transversely

extending stay bars adapted to extend between the upper and lower edges of the corresponding planks on both sides of the mould and formed near each end with a pair of slots, adapted to receive the tongues
5 on the said angle iron bars and disposed a distance apart in the length of the stay bar

equivalent to the distance between the planes of the upper and lower tongues on each angle iron bar, substantially as specified. 10

In testimony whereof, I affix my signature.

ARTHUR EDWARD HOLMES.