AMENDED SPECIFICATION

Reprinted as amended in accordance with the Decision of the Superintending Examiner acting for the Comptroller-General, dated the twentythird day of November 1953, under Section 29 of the Patents Act, 1949.

PATENT SPECIFICATION



Inventor: ALFRED SUTCLIFFE

682,870

Date of filing Complete Specification: Aug. 28, 1950.

Application Date: Oct. 4, 1949. *No. 25444/49.*

Complete Specification Published: Nov. 19, 1952.

Index at acceptance:—**Class 20(ii)**, C4a.

COMPLETE SPECIFICATION

Improvements in or relating to Shuttering for use in Building Concrete Structures

We, RAPID METAL DEVELOPMENTS LIMITED, a Registered British Company, of 209, Walsall Road, Perry Barr, Birmingham 22B, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention has reference to shuttering or formwork to be used in building concrete and like structures such as walls and pillars, and it relates to shuttering of the kind consisting of panel units adapted to be assembled vertically in superposed relationship so as to provide spaced walls to be filled with concrete or the like, upon the setting of which the shuttering can be dismantled.

Some kinds of shuttering require expensive and intricate equipment to be erected at the site for holding the shuttering in position and this has the disadvantage that with large scale building of concrete structures a heavy financial outlay is required and the installation of the equipment calls for technique on the part of erectors in the erection of special upright clamping members connected by screw operated clamping mechanism. When a concrete structure has been completed and the shuttering dismantled and laid aside, there is a danger of the screw operated mechanism associated with such clamping members being damaged as they are thrown down and piled on the site while the screw mechanism may be temporarily rendered inoperative after a period of non use due to cement and dirt collecting on it. The main object of the present invention is to provide simple and inexpensive shuttering which can be readily erected and dismantled by unskilled labour and which when erected, is rigid and secure without provision of internal uprights or walings as found to be necessary hitherto and, moreover, without special upright clamping members connected by screw operated mechanism. There exists a pressing need for inexpensive steel shuttering which can be erected and dismantled readily by unskilled personnel having regard to the shortage of labour and the demand for the speedy erection of buildings, sewers, dams, walls and like structures.

According to the present invention, metal shuttering for use in building a concrete or like structure, comprises rectangular panel units each having on one of its sides a right angular, or approximately right angular, boundary flange formed with regularly spaced slots, the panels mating flange to flange with the slots in register and forming on the other side a plain shuttering wall, and screw operated clamps having hooked jaws engaging registering slots and adapted, on tightening a floating abutment on the clamp screw, against the edges of the flanges of the panels, to interconnect and press the mating flanges into abutting relationship.

The most satisfactory results are obtained by arranging for the hooked jaws to exert a pressure in opposite directions on the abutting faces of the flanges; for this purpose, the jaws are provided with tapered or converging throats.

No specific claim is made herein to the construction of the screw operated clamps, since this construction forms the subject of our application for Letters Patent No. 3065/51 (Serial No. 682,916).

[*Price* 2/8]

As the panel units are erected and secured together they are fastened to scaffolding arranged outside the shuttering by similar screw operated clamps of which the screw abutments tighten against members of the scaffolding.

A method of erecting shuttering according to the present invention as above defined, consists in mating panel units flange to flange with the slots in register, inserting the jaws of the clamps into the registering slots in the flanges and in tightening the floating abutments on the screws against the edges of the mating flanges so as to interconnect and press the jaws into engagement with ends of the slots and clamp the flanges together in abutting relationship. This method further consists, according to the invention, in fastening the shuttering to outside scaffolding by engaging the jaws of screw operated clamps in registering slots and then tightening the said abutments on the screws against elements of the scaffolding.

Satisfactory embodiments of shuttering according to the present invention, and of clamps employed therewith, are illustrated by way of example on the accompanying drawings:—

Fig. 1 is a perspective view of shuttering erected according to the invention.

Fig. 2 is a perspective view drawn to a larger scale of a clamp for connecting the flanged, slotted panels together.

Fig. 3 is a perspective view showing the clamp (Fig. 2) clamping abutting flanges of adjoining panels.

Fig. 4 is a perspective fragment of a panel.

Fig. 5 is a side elevation of a clamp for tying the panels to scaffolding.

Fig. 6 is a plan of Fig. 5.

Fig. 7 is an end view of Fig. 6.

Fig. 8 is a perspective view showing the clamp (Figs. 5—7) tying panels to a vertical tube of scaffolding.

Referring to Fig. 1, a tubular, steel scaffolding comprises uprights and longitudinals 2 rigidly connected together and erected on the site it is intended to build a concrete wall with the use of metal shuttering. This is a simple form of scaffolding commonly employed but a scaffolding wholly or partly of I section members can be employed. The shuttering consists of several rectangular sheet steel panels 1 each having on one of its sides a boundary flange 3 set at a right angle to the plane of the panel. Each flange 3 is provided with several slots 4 spaced at uniform distances so that the slots 4 of any flange 3 can be brought into register with those of another panel when shuttering is built up into the form of a temporary wall of which one side of a wall is shown in Fig. 1. This is simply done by arranging the panels 1 longitudinally and vertically in a common plane with their slotted flanges 3 in abutting and registering relationship and as the process of erection continues the flanges 3 are clamped together and tied to the scaffolding 2. For building a concrete wall, the panels 1 will be erected in laterally spaced relationship so as to form a rectangular well which is filled with concrete. The tying of the shuttering to the scaffolding is effected by means of channel section clamps 4a having hooked jaws 5 on the flanges 6 and a central clamping screw 7 engaging a nut 8 in the reinforced web 9. These hooked jaws 5 have throats constructed with opposite inclined planes 10. One end of the screw 7 is provided with a hole 11 to receive a rod for use in tightening and releasing and the other end with a facetted floating abutment 12 having inclined faces leading to a seating 12a and having horns 13 engaging the inner faces of the flanges 6 so as to prevent the abutment turning; alternatively, these horns could engage edges of the flanges 6. These clamps 4a are of uniform design for clamping the flanged panels together in alignment and for tying them to the scaffolding 2. As the panels 1 are placed with their slotted flanges 3, 4 in abutting relationship, they are connected by the hooked jaws 5 of the clamps 4a simply by inserting the hooked jaws 5 in the slots 4 and tightening the screw 7 with its abutment 12 exerting clamping stress against the adjacent edges 14 of the abutting flanges 3, the inclined or converging throats 10 and the inclined faces on the abutment 12 operating with a wedging action against ends of the mating slots 4 so as to press the abutting faces of the flanges 3 in opposite directions into physical contact into the seating 12a and simultaneously rigidly align the panels. As is more easily seen from Fig. 4, an end of each slot 4 is tapered at 15 correspondingly to the throats 10 of the hooked jaws 5 for aiding the clamping action in pressing the flanges together. The clamps 4a coacting with the scaffolding 2 and flanges 3 are of uniform design but the scaffolding clamps are of greater channel depth than those clamps operating on the edges 14 of the flanges 3; the clamping screws 7 of these uniform clamps 4a clamp the abutting flanges together and simultaneously tie the panels 1 to the scaffolding 2.

The clamp 4a and its abutment screw being a unit provides an important advantage in the rapid assembly and dismantling of shuttering since the absence of loose parts saves erector's time and enables unskilled labour quickly to learn and carry out simple erection instructions.

Referring to Fig. 8, it illustrates on a large scale a simple arrangement of clamping together slotted flanges 3, lying in a horizontal plane and for tying the panels to a vertical member of the scaffolding 2 and identical clamps are employed and operate in the same manner where the slotted flanges 3, lie in a

vertical plane and are tied to a horizontal member of the scaffolding 2 as seen at Fig. 1.

What we claim is:—

1. Metal shuttering for use in building a concrete or like structure, comprising rectangular panel units each having on one of its sides a right angular, or approximately right angular, boundary flange formed with regularly spaced slots, the panels mating flange to flange with the slots in register and forming on the other side a plain shuttering wall, and screw operated clamps having hooked jaws engaging registering slots and adapted, on tightening a floating abutment of the clamp screw against the edges of the flanges of the panels, to interconnect and press the mating flanges into abutting relationship.

2. Metal shuttering according to Claim 1, wherein the hooked jaws have throats with opposite inclined panes which exert a pressure in opposite directions on the abutting faces of the flanges.

3. Metal shuttering according to Claims 1 or 2 fastened to scaffolding, outside the shuttering, by other similar screw operated clamps of which the floating abutments tighten against members of the scaffolding.

4. The method of erecting shuttering as claimed in Claim 1, which consists in mating panel units flange to flange with the slots in register, inserting the jaws of the clamps into the registering slots in the flanges and in tightening the screws with their abutments against the edges of the mating flanges so as to interconnect and press the jaws into engagement with ends of the slots and clamp the flanges together in abutting relationship.

5. Method according to Claim 4, which consists in fastening the shuttering to outside scaffolding by engaging the jaws of other similar screw operated clamps in registering slots and in tightening the abutments against elements of the scaffolding.

6. Metal shuttering according to Claim 2, wherein the slots have converging ends to co-act with the throats of the jaws.

7. Metal shuttering constructed and arranged substantially as described and as shown by Figs. 1, 3 and 8 of the accompanying drawings.

8. The method of erecting metal shuttering and tying it to scaffolding substantially as described and with reference to and as illustrated by the accompanying drawings.

Dated this 4th day of July, 1950.

For the Applicants:
GEORGE FUERY & CO.,
Chartered Patent Agents,
Newhall Chambers, 8, Newhall Street,
Birmingham 3.

PROVISIONAL SPECIFICATION

Improvements in or relating to Shuttering for use in Building Concrete Structures

We, RAPID METAL DEVELOPMENTS LIMITED, a Registered British Company, of 209, Walsall Road, Perry Barr, Birmingham 22B, do hereby declare the nature of this invention to be as follows:—

This invention has reference to shuttering for use in building concrete structures and is particularly concerned with shuttering comprehending a plurality of sheet metal panels adapted to be assembled into a temporary cavity wall to be filled with concrete upon the setting of which the shuttering can be dismantled.

The present invention has for its object the provision of clamping devices for the flanges and scaffolding having in view greater strength and security and rapid erection and dismantling of shuttering together with the possibility of reducing the number of clamping devices employed throughout a given shuttering structure.

According to the present invention, screw operated clamps are provided for fastening the panels together, these clamps being provided with jaws for engagement with mating slots and the screws being adapted to co-act with the panels and/or with the scaffolding so as to press the flanges into abutting relationship and/or tie the panels to the scaffolding.

Preferably, the jaws terminate in hooks the throats of which are tapered for engagement with the ends of the mating slots; under the screw clamping action the said hooks exert pressure in opposite directions on the faces of adjoining flanges so that the flanges are securely pressed into physical contact and maintained in alignment.

Conveniently, the slots are correspondingly tapered at one end thus to match the tapered throats of the hooked jaws and to induce a wedging action between the jaws and slots.

In an embodiment of the invention, the limbs of a robust channel-section member are notched near the ends thus to form hooked jaws, the throat of each hook being tapered in opposite directions for co-acting with corresponding tapered ends in mating slots of the flanges of the panels.

A clamping screw engages a screw box in a reinforced web of the channel member and the inner end of the screw is provided with a floating abutment adapted to co-act either with the terminal edges of the flanges of adjoining panels or with a scaffold waling.

vertical plane and are tied to a horizontal member of the scaffolding 2 as seen at Fig. 1.

What we claim is:—

1. Metal shuttering for use in building a concrete or like structure, comprising rectangular panel units each having on one of its sides a right angular, or approximately right angular, boundary flange formed with regularly spaced slots, the panels mating flange to flange with the slots in register and forming on the other side a plain shuttering wall, and screw operated clamps having hooked jaws engaging registering slots and adapted, on tightening a floating abutment of the clamp screw against the edges of the flanges of the panels, to interconnect and press the mating flanges into abutting relationship.

2. Metal shuttering according to Claim 1, wherein the hooked jaws have throats with opposite inclined panes which exert a pressure in opposite directions on the abutting faces of the flanges.

3. Metal shuttering according to Claims 1 or 2 fastened to scaffolding, outside the shuttering, by other similar screw operated clamps of which the floating abutments tighten against members of the scaffolding.

4. The method of erecting shuttering as claimed in Claim 1, which consists in mating panel units flange to flange with the slots in register, inserting the jaws of the clamps into the registering slots in the flanges and in tightening the screws with their abutments against the edges of the mating flanges so as to interconnect and press the jaws into engagement with ends of the slots and clamp the flanges together in abutting relationship.

5. Method according to Claim 4, which consists in fastening the shuttering to outside scaffolding by engaging the jaws of other similar screw operated clamps in registering slots and in tightening the abutments against elements of the scaffolding.

6. Metal shuttering according to Claim 2, wherein the slots have converging ends to co-act with the throats of the jaws.

7. Metal shuttering constructed and arranged substantially as described and as shown by Figs. 1, 3 and 8 of the accompanying drawings.

8. The method of erecting metal shuttering and tying it to scaffolding substantially as described and with reference to and as illustrated by the accompanying drawings.

Dated this 4th day of July, 1950.

For the Applicants:
GEORGE FUERY & CO.,
Chartered Patent Agents,
Newhall Chambers, 8, Newhall Street,
Birmingham 3.

PROVISIONAL SPECIFICATION

Improvements in or relating to Shuttering for use in Building Concrete Structures

We, RAPID METAL DEVELOPMENTS LIMITED, a Registered British Company, of 209, Walsall Road, Perry Barr, Birmingham 22B, do hereby declare the nature of this invention to be as follows:—

This invention has reference to shuttering for use in building concrete structures and is particularly concerned with shuttering comprehending a plurality of sheet metal panels adapted to be assembled into a temporary cavity wall to be filled with concrete upon the setting of which the shuttering can be dismantled.

The present invention has for its object the provision of clamping devices for the flanges and scaffolding having in view greater strength and security and rapid erection and dismantling of shuttering together with the possibility of reducing the number of clamping devices employed throughout a given shuttering structure.

According to the present invention, screw operated clamps are provided for fastening the panels together, these clamps being provided with jaws for engagement with mating slots and the screws being adapted to co-act with the panels and/or with the scaffolding so as to press the flanges into abutting relationship and/or tie the panels to the scaffolding.

Preferably, the jaws terminate in hooks the throats of which are tapered for engagement with the ends of the mating slots; under the screw clamping action the said hooks exert pressure in opposite directions on the faces of adjoining flanges so that the flanges are securely pressed into physical contact and maintained in alignment.

Conveniently, the slots are correspondingly tapered at one end thus to match the tapered throats of the hooked jaws and to induce a wedging action between the jaws and slots.

In an embodiment of the invention, the limbs of a robust channel-section member are notched near the ends thus to form hooked jaws, the throat of each hook being tapered in opposite directions for co-acting with corresponding tapered ends in mating slots of the flanges of the panels.

A clamping screw engages a screw box in a reinforced web of the channel member and the inner end of the screw is provided with a floating abutment adapted to co-act either with the terminal edges of the flanges of adjoining panels or with a scaffold waling.

* C L M S *

vertical plane and are tied to a horizontal member of the scaffolding 2 as seen at Fig. 1.

What we claim is:—

1. Metal shuttering for use in building a concrete or like structure, comprising rectangular panel units each having on one of its sides a right angular, or approximately right angular, boundary flange formed with regularly spaced slots, the panels mating flange to flange with the slots in register and forming on the other side a plain shuttering wall, and screw operated clamps having hooked jaws engaging registering slots and adapted, on tightening a floating abutment of the clamp screw against the edges of the flanges of the panels, to interconnect and press the mating flanges into abutting relationship.

2. Metal shuttering according to Claim 1, wherein the hooked jaws have throats with opposite inclined panes which exert a pressure in opposite directions on the abutting faces of the flanges.

3. Metal shuttering according to Claims 1 or 2 fastened to scaffolding, outside the shuttering, by other similar screw operated clamps of which the floating abutments tighten against members of the scaffolding.

4. The method of erecting shuttering as claimed in Claim 1, which consists in mating panel units flange to flange with the slots in register, inserting the jaws of the clamps into the registering slots in the flanges and in tightening the screws with their abutments against the edges of the mating flanges so as to interconnect and press the jaws into engagement with ends of the slots and clamp the flanges together in abutting relationship.

5. Method according to Claim 4, which consists in fastening the shuttering to outside scaffolding by engaging the jaws of other similar screw operated clamps in registering slots and in tightening the abutments against elements of the scaffolding.

6. Metal shuttering according to Claim 2, wherein the slots have converging ends to co-act with the throats of the jaws.

7. Metal shuttering constructed and arranged substantially as described and as shown by Figs. 1, 3 and 8 of the accompanying drawings.

8. The method of erecting metal shuttering and tying it to scaffolding substantially as described and with reference to and as illustrated by the accompanying drawings.

Dated this 4th day of July, 1950.

For the Applicants:
GEORGE FUERY & CO.,
Chartered Patent Agents,
Newhall Chambers, 8, Newhall Street,
Birmingham 3.

PROVISIONAL SPECIFICATION

Improvements in or relating to Shuttering for use in Building Concrete Structures

We, RAPID METAL DEVELOPMENTS LIMITED, a Registered British Company, of 209, Walsall Road, Perry Barr, Birmingham 22B, do hereby declare the nature of this invention to be as follows:—

This invention has reference to shuttering for use in building concrete structures and is particularly concerned with shuttering comprehending a plurality of sheet metal panels adapted to be assembled into a temporary cavity wall to be filled with concrete upon the setting of which the shuttering can be dismantled.

The present invention has for its object the provision of clamping devices for the flanges and scaffolding having in view greater strength and security and rapid erection and dismantling of shuttering together with the possibility of reducing the number of clamping devices employed throughout a given shuttering structure.

According to the present invention, screw operated clamps are provided for fastening the panels together, these clamps being provided with jaws for engagement with mating slots and the screws being adapted to co-act with the panels and/or with the scaffolding so as to press the flanges into abutting relationship and/or tie the panels to the scaffolding.

Preferably, the jaws terminate in hooks the throats of which are tapered for engagement with the ends of the mating slots; under the screw clamping action the said hooks exert pressure in opposite directions on the faces of adjoining flanges so that the flanges are securely pressed into physical contact and maintained in alignment.

Conveniently, the slots are correspondingly tapered at one end thus to match the tapered throats of the hooked jaws and to induce a wedging action between the jaws and slots.

In an embodiment of the invention, the limbs of a robust channel-section member are notched near the ends thus to form hooked jaws, the throat of each hook being tapered in opposite directions for co-acting with corresponding tapered ends in mating slots of the flanges of the panels.

A clamping screw engages a screw box in a reinforced web of the channel member and the inner end of the screw is provided with a floating abutment adapted to co-act either with the terminal edges of the flanges of adjoining panels or with a scaffold waling.

This floating abutment, which desirably is facetted, carries lugs which lie adjacent the inner faces of the limbs or the longitudinal edges thereof and form stops for resisting rotation of the nose when the screw is traversed and under clamping stress.

These channel section clamps are of uniform design so that they are applicable for clamping the panels together and for tieing them to the scaffolding for which purpose they need to vary only in the depth of channel. As the clamp and its screw is a unit, it is an important advantage in the rapid assembly and dismantling of shuttering, since there are no loose parts and the only tool required may be a tommy bar or key for inserting into a hole in the operative end of the screw for tightening and loosening it.

When the flanged panels are in the course of erection, it is but a simple matter to engage the hook ended and wedge acting clamps with the mating slots and tighten the screws against the terminal edges of the flanges or against the periphery of the scaffolding members, as the case may be. It is most convenient to employ the same design of clamps for fastening the panels together and for tying the panels to the scaffolding but where a clamp is employed for the one purpose another form of fastening could be used for the other.

Dated this 3rd day of October, 1949.

For the Applicants:
GEORGE FUERY & CO.,
Chartered Patent Agents,
Newhall Chambers, 8, Newhall Street,
Birmingham 3.

Leamington Spa: Printed for Her Majesty's Stationery Office, by the Courier Press.—1954.
Published at The Patent Office, 25, Southampton Buildings, London, W.C.2, from which copies may be obtained.