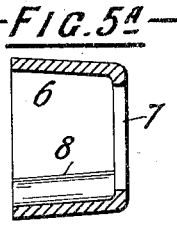
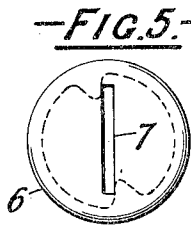
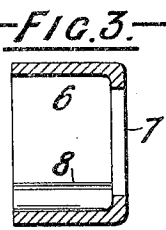
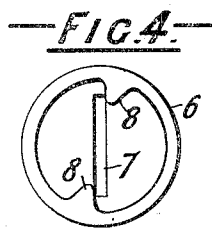
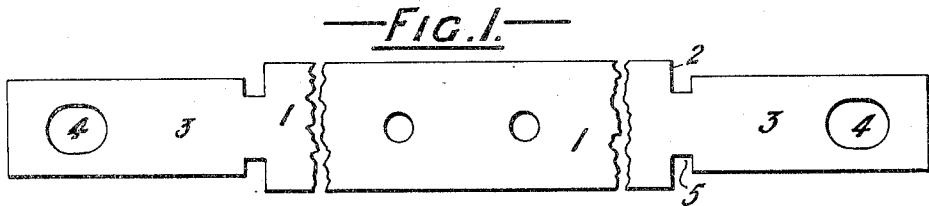


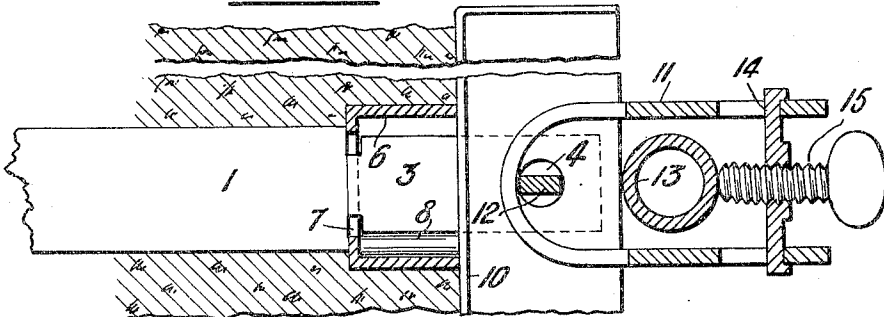
Aug. 24, 1926.

1,597,424

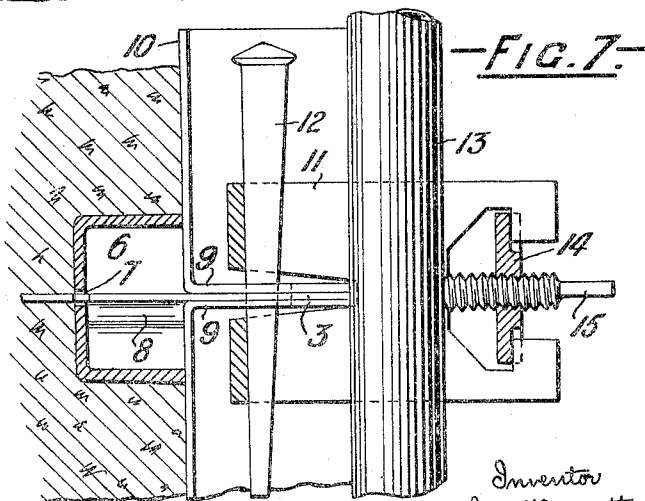
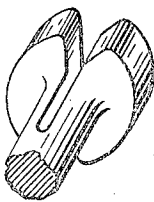
J. H. BENNETTS
DEVICE FOR SPACING, STRUTTING, AND CLAMPING IN POSITION SHUTTERING FORMS
FOR THE CONSTRUCTION OF CONCRETE STRUCTURES
Filed April 13, 1926



—FIG. 6.—



—FIG. 8.—



Inventor
James Henry Bennetts
By *[Signature]*
his Attorneys

UNITED STATES PATENT OFFICE.

JAMES HENRY BENNETTS, OF FINCHLEY, LONDON, ENGLAND, ASSIGNOR TO SCAFFOLDING (GREAT BRITAIN) LIMITED, OF LONDON, ENGLAND.

DEVICE FOR SPACING, STRUTTING, AND CLAMPING IN POSITION SHUTTERING FORMS FOR THE CONSTRUCTION OF CONCRETE STRUCTURES.

Application filed April 13, 1926, Serial No. 101,838, and in Great Britain May 20, 1925.

The present invention refers to devices for spacing, shuttering and clamping steel or other shuttering plates equidistant during assembly, as well as providing a simple attachment for clamping and fixing the plates to some auxiliary support during the operation of filling in the moulds so formed with liquid or semi-liquid concrete aggregates and the like.

According to the present invention, a plurality of sheet metal strips are each shouldered adjacent the ends, conveniently by reducing the width of the strip for a distance from each end; each end of the strip is slid through a slot in the otherwise closed end of a cylindrical or frusto-conical alignment thimble which then bears against the shoulder of the strip, the ends of the latter extending through the thimbles. The projecting ends of the strip pass between the flanges of opposite shuttering plates and means are provided for securing and holding the opposite shuttering plates to the ends of the strip and in contact with the said thimbles during the formation of the concrete structure, whereby the correct alignment of the shuttering plates is ensured.

After the setting of the concrete structure and the removal of the shuttering plates, a suitable tool is applied to the thimbles, which latter are formed so as to be engaged thereby, and the thimbles are forcibly turned whereby the ends of the strip are sheared off and the latter with the thimbles removed from the concrete structure. The holes left by the removal of the thimbles can then be closed with cement, and thus no portion of the metal tie is left exposed on the surface of the structure, an important and distinguishing advantage as compared with metal wire ties which are cut off flush with the face of the concrete structure, the exposed ends of which ties are liable to rust and disfigure the surface of the structure.

The thimbles are preferably each constructed cylindrical or frusto-conical externally, open at the outer end and slotted at the otherwise closed inner end to permit of the passage of the reduced end of the spindle therethrough. The interior of the

thimble has teeth or projections which can be engaged by a suitable tubular tool, by which the thimble can be turned to shear off the ends of the strip.

The ends of the strip projecting beyond the thimbles are formed with holes, said projecting ends pass adjacent outwardly-turned flanges of opposite shuttering plates, and wedges or keys, such for instance as cut nails, are passed through holes in said flanges and through the holes in the ends of the strip to retain the interior faces of the shuttering plates in contact with the thimbles and in proper alignment.

In order further to support the shuttering plates during the filling in of the liquid or semi-liquid concrete aggregates and the like, the present invention further consists in utilizing a U-shaped clamp, such as is described in the specification of The Tubular Scaffolding Company Limited's Patent No. 1,445,410. Such a clamp, to adapt it to this invention, is slotted for a distance at its rounded end in a plane at right angles to such rounded end, and it is applied to extend astride the adjacent flanges of two shuttering plates; the wedge or key is passed through the clamp, the shuttering plate flanges and the end of the strip. A length of tube is placed within the clamp, and the thrust plate and screw is then fitted as described in the aforesaid patent specification to press the tube against the flanges of the shuttering plate. Such a tube may extend through a plurality of such clamps and thereby the shuttering plates can be effectively supported, and kept in true alignment.

The invention will be further described with reference to the examples of construction shown on the accompanying drawings, whereon Figure 1 is an elevation, and Figure 2 a plan view of a shouldered sheet metal strip.

Figure 3 is a vertical section, Figure 4 an elevation of the outer and Figure 5 an elevation of the inner end of a cylindrical thimble, and Figure 5^A is a vertical section of a thimble of frusto-conical shape.

Figure 6 is a sectional elevation, and Figure 7 a sectional plan view showing an as-

sembly of the parts constituting the present invention where the clamp and the supporting tube are employed.

Figure 8 is a view showing a suitable tool for turning the thimbles to shear off the ends of the strip.

Figures 1 and 2 show the strip 1 of sheet metal reduced in width for a distance at each end to form shoulders 2, the reduced ends 3 being formed with holes 4. Preferably the reduced ends 3 of the strip adjacent the shoulders are notched at 5 as shown.

Each thimble 6, as shown at Figures 3, 4 and 5, is cylindrical externally, open at its outer end, Figure 4, and having a closed inner end, Figure 5, through which a slot 7 is formed to permit the thimble to be threaded onto the end 3 of a strip 1 so that it bears up against the shoulder 2. At Figure 5^A an example is shown of a similar thimble of frusto-conical shape. Teeth 8 are formed in the interior of the thimble, see Figure 4, by which the thimble can be engaged by such a tool as is shown at Figure 8, which latter will be readily understood from the drawing.

The assembly of the parts will be readily understood by an inspection of Figures 6 and 7, which show one end of a strip engaging the shuttering plates at one side of the structure. The thimble 6 has been threaded over the end 3 of the strip 1 and bears against the shoulders of the strip. The end of the strip 1 passes between the adjacent out-turned flanges 9 of two shuttering plates such as 10.

The clamp 11 is then applied, so that the flanges 9 of the plates 10 pass into the slot which has been formed in the bent end of the clamp and a wedge, which may conveniently be an ordinary cut nail 12, is passed through coinciding holes in the flanges 9 of the plates 10 and through the hole 4 in the end of the strip 1.

The tube 13 is then placed within the leaves of the clamp, and extends for a desired length, passing for instance through several clamps applied to the flanges of the various shuttering plates. The thrust plate 14 and screw 15 is then applied as is described in the aforesaid patent specification, and the clamping effected whereby the entire structure is properly spaced, strutted, clamped, and held in alignment.

When the concrete has been filled in between the shuttering plates and has become set, the clamps are released, the tube 13 and wedges 12 and the shuttering plates removed, leaving the thimbles 6 in the concrete structure with the ends of the strips projecting. The tool, Figure 8, is then applied to the thimble, which is thereby forcibly revolved, so shearing off the end 3 of the strip adjacent the shoulder 2. The thimble having during this operation been loos-

ened, it can be easily removed with the end 3 of the strip, and the hole in the concrete structure can then be closed by cement.

What I claim as my invention and desire to secure by Letters Patent is:—

1. In spacing shuttering plates in the formation of concrete structures; the combination with outwardly flanged shuttering plates arranged in series at a distance apart and opposite each other with the flange of one plate of a series adjacent the flange of the next plate; of a plurality of sheet metal strips each reduced in width adjacent its ends equally on opposite sides of its centre line to produce two shoulders at each end, alignment thimbles each cylindrical in section at right angles to its axis and having a through slot in the direction of its axis to permit said thimble to pass on to said reduced end of said strip and contact with said shoulders, said reduced ends of said strip projecting beyond said thimbles and between said adjacent flanges of opposite series of said shuttering plates to permit said shuttering plates to contact with said thimbles to distance said shuttering plates apart, means for detachably securing said flanges of said shuttering plates to the ends of said strips and in contact with said thimbles during the formation of the concrete structure, and means for forcibly turning said thimbles about their axes to shear off the reduced ends of said strips adjacent said shoulders and to remove said thimbles after the setting of the concrete structure and the removal of said shuttering plates.

2. In spacing shuttering plates in the formation of concrete structures; the combination with outwardly flanged shuttering plates arranged in series at a distance apart and opposite each other with the flange of one plate of a series adjacent the flange of the next plate; of a plurality of sheet metal strips each reduced in width adjacent its ends equally on opposite sides of its centre line to produce two shoulders at each end, alignment thimbles each of frusto-conical shape closed at its smaller end and having a slot through said closed end to permit said thimble to pass on to said reduced end of said strip and contact with said shoulders, said reduced ends of said strip projecting beyond said thimbles and between said adjacent flanges of opposite series of said shuttering plates to permit said shuttering plates to contact with said thimbles to distance said shuttering plates apart, means for detachably securing said flanges of said shuttering plates to the ends of said strips and in contact with said thimbles during the formation of the concrete structure, and means for forcibly turning said thimbles about their axes to shear off the reduced ends of said strips adjacent said shoulders and to remove said thimbles after the setting of the con-

crete structure and the removal of said shuttering plates.

3. In spacing shuttering plates in the formation of concrete structures; the combination with outwardly flanged shuttering plates arranged in series at a distance apart and opposite each other with the flange of one plate of a series adjacent the flange of the next plate; of a plurality of sheet metal strips each reduced in width adjacent its ends equally on opposite sides of its centre line to produce two shoulders at each end, alignment thimbles each cylindrical in section at right angles to its axis and having a through slot in the direction of its axis to permit said thimble to pass on to said reduced end of said strip and contact with said shoulders, said reduced ends of said strip projecting beyond said thimbles and between said adjacent flanges of opposite series of said shuttering plates to permit said shuttering plates to contact with said thimbles to distance said shuttering plates apart, each said sheet metal strip having a hole adjacent each end and said flanges of said shuttering plates having corresponding holes, wedges to pass through said corresponding holes in said strips and in said flanges to detachably secure said flanges of said shuttering plates to the ends of said strips and in contact with said thimbles during the formation of the concrete structure, and means for forcibly turning said thimbles about their axes to shear off the reduced ends of said strips adjacent said shoulders and to remove said thimbles after the setting of the concrete structure and the removal of said shuttering plates.

4. In spacing shuttering plates in the formation of concrete structures; the combination with outwardly flanged shuttering plates arranged in series at a distance apart and opposite each other with the flange of one plate of a series adjacent the flange of the next plate; of a plurality of sheet metal strips each reduced in width adjacent its ends equally on opposite sides of its centre line to produce two shoulders at each end, alignment thimbles each cylindrical in section at right angles to its axis, closed at one end and open at the other end and having a slot through said closed end to permit said thimble to pass on to said reduced ends of said strip and contact with said shoulders, said reduced ends of said strip projecting beyond said thimbles and between said adjacent flanges of opposite series of said

shuttering plates to permit said shuttering plates to contact with said thimbles to distance said shuttering plates apart, means for detachably securing said flanges of said shuttering plates to the ends of said strips and in contact with said thimbles during the formation of the concrete structure, and means for forcibly turning said thimbles about their axes to shear off the reduced ends of said strips adjacent said shoulders and to remove said thimbles after the setting of the concrete structure and the removal of said shuttering plates.

5. In spacing shuttering plates in the formation of concrete structures; the combination with outwardly flanged shuttering plates arranged in series at a distance apart and opposite each other with the flange of one plate of a series adjacent the flange of the next plate; of a plurality of sheet metal strips each reduced in width adjacent its ends equally on opposite sides of its centre line to produce two shoulders at each end, alignment thimbles each cylindrical in section at right angles to its axis and having a through slot in the direction of its axis to permit said thimble to pass on to said reduced end of said strip and contact with said shoulders, said reduced ends of said strip projecting beyond said thimbles and between said adjacent flanges of opposite series of said shuttering plates to permit said shuttering plates to contact with said thimbles to distance said shuttering plates apart, each said sheet metal strip having a hole adjacent each end and said flanges of said shuttering plates having corresponding holes, a U-shaped clamp having a transverse slot in its rounded end to pass astride the adjacent shuttering plates, wedges to pass through said U-shaped clamp and through said corresponding holes in said strip and said flanges to detachably secure said flanges in the ends of said strips and in contact with said thimbles, a length of tube located within said clamp and means associated with said clamp for pressing said tube against the edges of said flanges of said shuttering plates to bring same into alignment, and means after removal of said shuttering plates for forcibly turning said thimbles about their axes to shear off the reduced ends of said strips adjacent said shoulders and to remove said thimbles.

In witness whereof I have hereunto set my hand.

JAMES HENRY BENNETTS.