ADJUSTABLE CONCRETE FORM SPACER AND CLAMP

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Fig. 1.

Fig. 2.

Fig. 3.

Fig. 4.

Fig. 5.

Fig. 6.

Fig. 7.

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My invention relates to improvements in adjustable concrete form spacer and clamp and it more especially consists of the features pointed out in the annexed claims. The purpose of my invention is to provide a form clamp that is quickly applied, rapidly adjusted, into alignment with other clamps; and that may be rapidly removed after the concrete is set. The clamp is very simple to make. It is not expensive to manufacture and the parts are not easily injured or broken, in consequence it supplies an ever present need. I illustrate in the accompanying drawings such instances of adaptation as will show the broad underlying features without limiting myself to the specific details shown thereon and described herein.

A conventional type of concrete form is shown on the drawings. It has the usual board sides, 1, secured to the studding 2. At points where it is desired to hold the sides in spaced apart relation, liners or waler 3, are nailed to a pair of adjacent position studding. Holes are bored through the boards on one side in alignment with similar holes bored in the boards on the other side.

A rod 4 projects on each side of the form for a convenient distance. At the left hand end on the drawings, it is threaded at 13. At this point a washer 12, having a large diameter flange is adjusted on the rod by a nut. The flange may abut against a pair of liners 3, or their equivalent. At the other end of the rod 4, a clutch or tension member 14 is positioned. It also has a large diameter flange which abuts a pair of liners 3. It has a slot 15 in which a clutch lever 16, is pivoted at 17 between cheeks 24. The lever has a curved eccentric portion 16 provided with teeth which engage the rod 4.

At the other end of the rod 4 a square or hexagon ended sleeve 11 passes loosely over the rod. The threads of the sleeve engage the threads on the inside of the cone 7 which threads may end at 9. This cone also loosely receives one end of the spacing tube 5 which may be of metal. The other end of this tube is seated in a recess 18 of the cone 6. Before the concrete is poured the sides 1 are brought into alignment by means of the adjusting screw or sleeve 11 and the washer 12. There the whole structure adjacent each rod 4 is clamped firmly by the teeth 16 of the clamping lever 18. This pulls the rod 4 endwise and the washer 12 against the liners 3. The sleeve 11 abuts the tube 5 at 9 so as to move the far side of the form outward or inward as needed thus shifting the cone 7 and the cone 6 at the same time. When the cone side is first aligned then the other side is brought against the cone 7 by the washer 12, after which both sides 1 are drawn tightly against both cones by means of the clamp or tension lever 18 acting on the rod 4.

After the concrete has set sufficiently to remove the form the clamp 18 is instantly released. This frees the rod 4 which is then pulled out of the tube 5 by the washer 12. The cones 6 and 7 have slots 16 formed in their large ends into which a flat ended screw driver may be placed to loosen and remove them from the concrete after which the pipe 5 is pushed out and the recesses formed.
by the cones and the hole formed by the pipe are filled with cement. The cone 5 may be threaded at a short distance from its large end so that, if necessary, in case it should stick in the concrete, a sleeve 11 or a similarly threaded rod may be used to remove the cone. The sleeve 11 may also serve a similar purpose for the sleeve 7.

In order that the clamping member 14 may be speedily placed on the rod 4 and as speedily removed, the lever 10 is normally held by means of a light spring 22 acting against an extension 21 so that the teeth 16 are practically out of engagement with the rod 4. The lever 10 is pushed in the direction of the arrow in Fig. 3 to bring the teeth 16 into engagement with the rod 4 to hold all the parts under tension. Sufficient clearance is provided between the extension 21 and the member 14 to permit the teeth 16 to come into engagement with the rod. The spring 22 only needs to move the light lever a very slight amount.

All of the parts can be used over and over and the only changes which need to be made for different thicknesses of walls, abutments etc, is to cut the tubes 5 and the rods 4 to the required length. In standard thickness of concrete the tubes 5 are all duplicates of each other and the rods may also be in duplicate, though it is immaterial if longer rods are used than the given width of the form may require.

In Figures 8-15, inclusive, I show modified means for aligning concrete forms in which the arrangement shown at the right-hand end of Fig. 1 is used in connection with a wedge for rapid tightening of the part against the form. This does away with the threaded end 13 of the rod 4 shown in Fig. 1 and it also may supplant the use of the engaging bolt with the rod 4 shown in the same figure. Modified cones 25 have openings throughout for the rod 4. These cones after being in position on a rod 4, are held in close contact with the form 1 by suitable nails 28 driven into the form. After the concrete has set, the nails will remain in the form as it is removed. The nails pass through shallow notches 28 which are made at a reverse angle to that of the cones. This arrangement holds the cones against the form so that cement will not run between the form and the cones. In order that the opening left by the cones shall have no ridges formed therein, to prevent the cement filling separating cones 25 have spiral grooves 27 formed therein which leave their impress in the concrete. Through the use of slots 10 the cones, as heretofore stated, are easily turned and removed from the concrete.

The modified clamping means shown in Figs. 8-15, inclusive, include a barrel 35 which has an enlarged conical end 30, that abuts the waters. An internal bore 36 in the barrel and an inclined slot 44 in the end of the sleeve 31 are formed. In the bore 36 a tube 39 may slide. This tube carries the same holding device 18 as is shown in Figs. 1 and 3. In order that the tube 38 will not accidentally drop out of the barrel 35, pins 39 enter side-slots 37 of the barrel. The standing ears 24 as well as the boss for set screw 42 shown on Fig. 5 have endwise movement in the slot 41 with the tube 38 in the bore of the barrel 35. The wedge 31 is slotted at 33. It has an extra slope 32 so as to give it a quick start when it is placed in the slot 45 of the enlarged end 30 of the barrel 35. The slot 33 permits the wedge 31 to pass over the rod 4. In order that the wedges 31 may not become lost, cotter pins 34 or any other equivalent spans the bottom end of the slot 33. When set screws 42 are used instead of the dogs 18, a modified sleeve 60 cooperates therewith. In order to give a very slight bend to the rods 4 the opening for the rod 4 in the tube 30 is slightly enlarged beneath the rod so that when the dogs 18 or the set screws 42 are used a very slight bend will be produced in rods 4, thus assisting in additionally holding the clamping rod against endwise displacement.

To dismantle a form it is only necessary to trip the dogs 18 to disengage the teeth 16, and drive the wedges 31 loose when the rods 4 will be instantly free to be pulled out as soon as the clamping means are slid off from its ends. In assembling the clamp, the one side of the form is "lined up", and holes are made for the rods. On this end of a rod a clamp is secured, another clamp is put on the other end of the rod, the dogs are set and the wedge is driven home. The extent of the take-up is varied by the distance the sleeve 38 projects into the path of the wedge 31.

What I claim is:

1. In form spacers, a pair of forms, a distanc ing tube, a cone at each end of the tube said cones having openings to receive the tube, a rod within the tube which extends beyond the forms, a threaded sleeve adapted to pass onto the rod and engage threads on same at the same time engage one end of the tube while the other end of the tube engages a shoulder in the other cone, a washer adapted to engage the outside of one side of the form while threaded on that end of the rod, a removable clamping washer on the other end of the rod adapted to engage the outside of the other side of the form, and means on such washer for pulling the rod endwise and simultaneously clamping it against further movement.

2. A device of the class described for aligning concrete forms, comprising a distanc ing tube, a one-piece clamping rod projecting beyond the tube and the form, a pair of cones loosely engaging the ends of the tube, a form external of each cone, means on the rod for adjusting one cone in respect of its cooperating form, and means on the rod for rigidly securing the cone and form to each other.

3. In concrete form devices, a pair of forms, means for adjusting the forms to a predetermined position apart and means for aligning the forms to a given standard, such means comprising a rod which projects from the forms, a spacing tube on the rod, a pair of cones on the tube and the rod, means for adjusting one cone by a sleeve loose on the rod and threaded in the cone, means for forcing one form against said cone, and means on the other end of the rod for forcing the forms toward each other and simultaneously holding them against separation.

4. A concrete form spacer and adjuster comprising a pair of forms, a tube for limiting the distance the forms may be taken apart, a one-piece rod passing through the tube and projecting away from the forms, limiting members such as cones on the tube positioned against the inside of the forms, and means for separately adjusting one cone, the end of the tube within the cone and its adjacent forms away from the other form to thereby align the forms.

5. A concrete form spacer and adjuster comprising a pair of cones, a tube the ends of which terminate in the cones, a form abutting the large end of each cone, a sleeve threaded into one cone and engaging one end or portion of the tube the other end of the tube resting against a shoulder in the other
cone, and a rod passing through the tube and the sleeve, and means on the rod for clamping the form against the cones whereby the distance between the large ends of the cones and the position of the tube may be changed.

6. A concrete form spacer and adjuster comprising a flanged portion having a hub projection therefrom and an opening therethrough, a rod in the opening, an upstanding cam member pivoted in a slot of the hub adapted to engage the rod, and a spring between the hub and a side extension of the cam member for automatically holding the cam portion of the lever in engagement with the rod.

7. A concrete form spacer and adjuster comprising a flanged portion for engaging a form, a hub projection therefrom having a large slotted opening therein, a removable rod passing through the hub and the flange, a collar within such opening, said rod passing through the collar, means on the latter for engaging the rod to secure the collar and rod parts to each other, and a slotted wedge passing through the flange portion and simultaneously engaging the flange and the collar while at the same time straddling the rod.

8. A concrete form spacer and adjuster comprising a flanged clamping member having an enlarged opening and a transverse slot there-through, a rod passing through the flange and extending beyond the clamping member, a collar in the large opening of the clamping member, means on the collar for attaching and detaching it to the rod, oppositely positioned radial pins on the collar entering said slots in said clamping member for maintaining the collar in adjustable alignment and from separation from the clamping member, and a slotted wedge between the flange and the collar.

9. In concrete form spacers, a concrete form, a rod passing entirely through the form, separate clamping means at each end of the rod abutting the outside of the form, said clamping means comprising a sleeve on the rod, a tube on the sleeve, said tube having an enlarged end for engagement with the form, clamping means between the sleeve and the rod, wedge shaped means between the sleeve and the tube, and means for retaining the sleeve and the tube in adjustable assembled relation whereby after the sleeve is clamped to the rod and the wedge is moved endwise between the sleeve and the tube the large end of the tube will be forced against the form at one end of the rod independently of the clamping means at the other end of the rod.

10. In form spacers, a pair of forms, a distancing tube, a one piece rod inside of the tube projecting from the outside faces of the form, a pair of cones loosely engaging the tube, means for adjusting one of the cones on the tube which surrounds the rod, and means for firmly holding the forms in adjustable engagement with the cones.

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