July 6, 1943. J. C. MUSHET 2,323,723

SPACER FOR PULL TIES

Filed Nov. 21, 1941

Fig. 1.

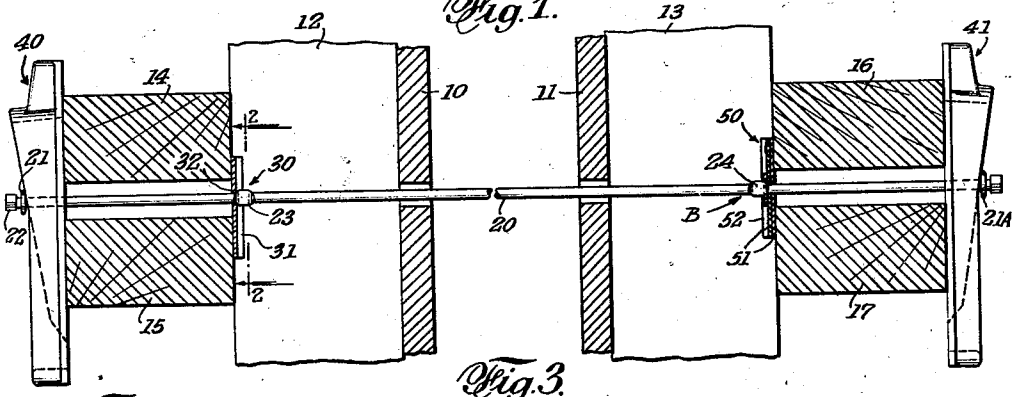


Fig. 2.

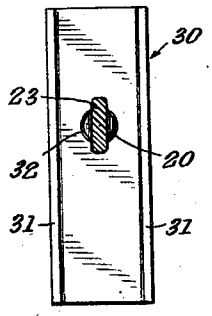


Fig. 3.

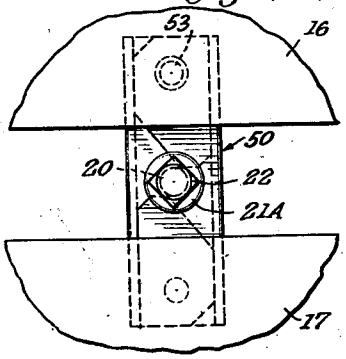


Fig. 7.

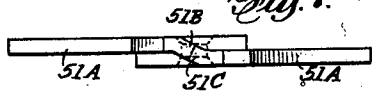


Fig. 6.

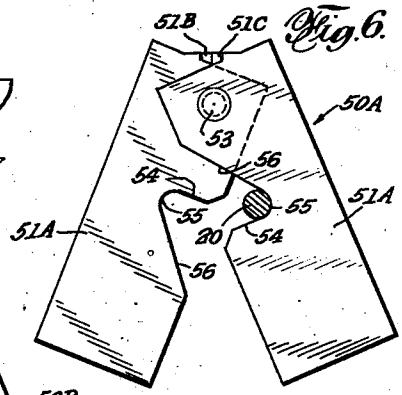


Fig. 4.

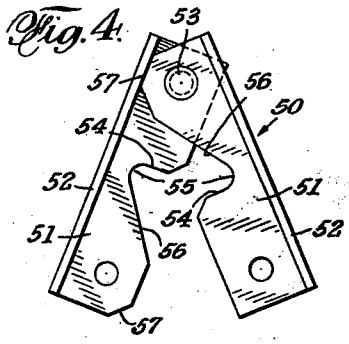


Fig. 8.

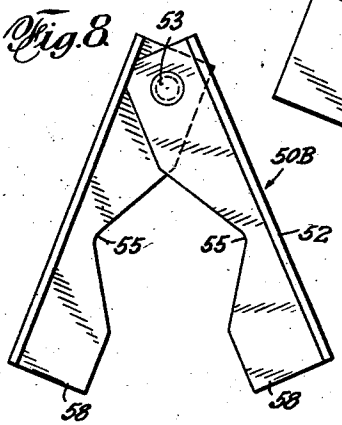
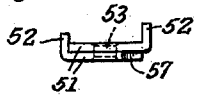


Fig. 5.



INVENTOR
JAMES C. MUSHET
BY Marshall & Hawley
ATTORNEYS

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SPACER FOR PULL TIES

James C. Mushet, Roselle Park, N. J., assignor, by mesne assignments, to Ralph E. Ogden, New York, N. Y.

Application November 21, 1941, Serial No. 419,859

6 Claims. (Cl. 85—51)

This invention relates to improvements in spacers for pull ties, and its object is to provide a simple device which can be placed on a tie rod between the walers of a form for receiving concrete and a stop on the tie rod. In concrete work of the "architectural" type, in which the exposed surfaces are as smooth and free from markings as possible, the tie rods are pulled out after the concrete is set and the holes from which they are removed should be as small as possible. For this reason the tie rod stops are placed outside of the parts of the form against which the concrete is poured and the particular object of my invention is to provide a spacer which will embrace the tie rod and abut the form tie stop and the inner surfaces of the walers which are parts of the form.

In the following specification I will describe some embodiments of my invention and will point out its novel features in appended claims.

In the drawing,

Fig. 1 is a transverse elevation of a form, a tie rod, a spacer which embodies the invention and tightening wedges, the parts of the form being shown in section;

Fig. 2 is a sectional end elevation of the spacer shown at the left hand part of Fig. 1. The section in this figure is taken on the line 2—2 of Fig. 1;

Fig. 3 is an end elevation of a pair of walers and the spacer shown at the right hand end of Fig. 1, illustrating its position relative to the walers;

Fig. 4 is an end elevation of a spacer which embodies my invention, with its parts spread apart;

Fig. 5 is a plan view of the spacer shown in Fig. 4;

Figs. 6 and 7 are an end elevation and a plan view of a spacer of modified form which also embodies the invention; and

Fig. 8 is an end elavation of a spacer of a further modified form.

The form for architectural concrete work is built up of side walls 10, 11, spaced vertical stringers 12, 13 and spaced longitudinal walers 14, 15 and 16, 17. The parts 10, 12, 14 and 15 are fastened together and so are the parts 11, 13, 16 and 17. These groups of parts are held together in spaced relation by tie rods, such as that shown at 20. The tie rods pass through holes in the walls 10 and 11 and between the stringers and walers. Near their ends are integral heads 21 and 21A of a larger diameter than the rods themselves and they sometimes terminate in flat-sided ends 22 which have a larger transverse dimension than the diameter of the rods and a smaller transverse dimension than the diameter of the heads. At predetermined parts of the rod it is stamped to form flattened outstanding webs 23 and 24 which form stops for the spacers. The distance between the outer ends of these stops is important as it determines the distance between the form walls 10 and 11 and consequently the thickness of the concrete which is poured between them.

A spacer 30 is shown in the left hand part of Fig. 1 and in Fig. 2 which comprises a flat metallic plate with upstanding side flanges 31. In it is a hole 32 through which the tie rod passes freely. This plate is narrower than the space between the walers 14 and 15 and longer than this space. The hole through which the rod passes is transversely in the center of the plate and considerably above its longitudinal center. This spacer is placed on the tie rod before its head 21 is formed. As soon as the spacer 30 reaches the walers 14 and 15 it may be held in a horizontal position and pushed in between them and up to the stop 23. After it has cleared the walers 14 and 15 it will assume the vertical position in which it is shown in Fig. 2, because one of its ends is longer and heavier than the other. A wedge 40 driven in between the head 21 and the outside of the walers 14 and 15 produces a tension on the tie rod between the head 22 and the spacer 30 and secures the rod to the parts of the form at the left hand part of Fig. 1. The other end of the tie rod projects through the parts of the form at the right hand part of Fig. 1.

A spacer 50 (Figs. 4 and 5) is placed on the other end of the tie rod. This comprises two like members 51, 51, each of which is in the form of a flat plate having an upstanding flange 52 along one of its edges. These plates are reversely positioned and pivoted together near one end, as at 53. An edge of each of these plates is cut back on lines 54 in the manner shown in Fig. 4 to form parts 55 which extend inwardly so that they will clear the rod when the members are closed. Oblique edges 56 extend from these parts 55 to an edge of each member. One corner 57 of each plate is cut off. This beveled corner of one of the members will abut against the flange 52 of the other member to limit the degree to which the members may be swung apart. When the members are swung apart, as shown in Fig. 4, the device may be placed over a tie rod 20 and then closed, as shown in Fig. 3,

so that the rod will be embraced by the parts 55 and adjacent parts of the members.

This device may be inserted directly between the stop 24 and the inside of walers 16 and 17 and its members are of sufficient length to span the space between the walers.

The spacer 50A shown in Figs. 6 and 7 comprises two flat plates 51A reversely positioned and pivoted together at 53. One edge of each of these members is cut back in the manner previously described. Parts 51B and 51C at the pivoted ends of these plates are offset, as shown in Fig. 7, to abut and limit the degree to which the members may be swung apart.

By making the parts of the members which extend from the parts 55 to their unpivoted ends longer than the parts which extend from the parts 55 to their pivoted ends, one end of the device will be heavier than the other so that it will tend to assume a vertical position automatically. A similar result may be attained by making the distance from the parts 55 of the spacer farther from the pivot than they are from the free ends 58 as they are shown in the spacer 50B, Fig. 8.

A spacer in open condition is placed between the tie rod stop 24 and inside the walers 16 and 17 and closed. The beveled edges 56 will guide the rod into seated position. Then a wedge 41 is driven in between the tie rod head 21A and the outside of the walers 16 and 17. This secures the rod to the parts of the form at the right hand part of Fig. 1 and holds the walls 10 and 11 at the desired distance apart.

After the concrete has set, the tie rod is severed back of the stop 24 at some such point as that indicated by the arrow B and the rod pulled out to the left.

The part of the tie rod which is embedded in the concrete has no projection or enlargements so that its removal leaves only a hole of minimum diameter.

Several other structural modifications than those shown and described may be made within the spirit and scope of this invention and I intend no limitations other than those imposed by the appended claims.

What I claim is:

1. A spacer adapted to engage an enlarged head on a tie rod passing between the walers of a concrete form, said spacer comprising a pair of members pivoted together near one of their ends, said members being in the form of flat plates longer than the space between the walers and having straight parallel edges and having an edge of each cut back beyond its longitudinal center to clear the rod, an oblique edge from the cut back portion of at least one of the members to an edge thereof, and means for limiting the relative opening movement of the members about their pivotal connection.

2. A spacer adapted to engage an enlarged head on a tie rod passing between the walers of a concrete form, said spacer comprising a pair of members pivoted together near one of their ends, said members being in the form of flat plates longer than the space between the walers and having straight parallel edges, each having a continuous upstanding flange along the length of one of its edges and with its other edge cut back beyond its longitudinal center to clear the rod.

3. A spacer adapted to engage an enlarged head on a tie rod passing between the walers of a concrete form, said spacer comprising a pair of members pivoted together near one of their ends, said members being in the form of flat plates longer than the space between the walers and having straight parallel edges, and one of said members having a beveled corner adapted to abut against the flange of the other member to limit the opening movement of the members.

4. A spacer adapted to engage an enlarged head on a tie rod passing between the walers of a concrete form, said spacer comprising a pair of members pivoted together near one of their ends, said members being in the form of flat plates longer than the space between the walers and having straight parallel edges, each having a continuous upstanding flange along the length of one of its edges and with its other edge cut back beyond its longitudinal center and at one side of its transverse center to clear the rod.

5. A spacer adapted to engage an enlarged head on a tie rod passing between the walers of a concrete form, said spacer comprising a pair of members pivoted together near one of their ends, said members being in the form of flat plates longer than the space between the walers and having straight parallel edges, and a continuous upstanding flange along the length of one of its edges and having its other edge cut back beyond its longitudinal center to clear the rod, one end of said spacers being heavier than the other, one of said members having a beveled corner adapted to abut against the flange of the other member to limit the relative opening movement of the members.

6. A spacer adapted to engage an enlarged head on a tie rod passing between the walers of a concrete form, said spacer comprising a pair of members pivoted together near one of their ends, said members being in the form of flat plates longer than the space between the walers and having straight parallel edges, and a continuous upstanding flange along the length of one of its sides and having its other edge cut back beyond its longtiudinal center to clear the rod, the distance from the cut back portions of said plates to one end of the spacer being longer than the distance from said cut back portions to the other end of the spacer, one of said members having a beveled corner adapted to abut against the flange of the other member to limit the relative opening movement of the members.

JAMES C. MUSHET.