Aug. 2, 1966 R. P. HAWKINS 3,263,956

CONCRETE ACCESSORY

Filed Sept. 14, 1964

FIG-1

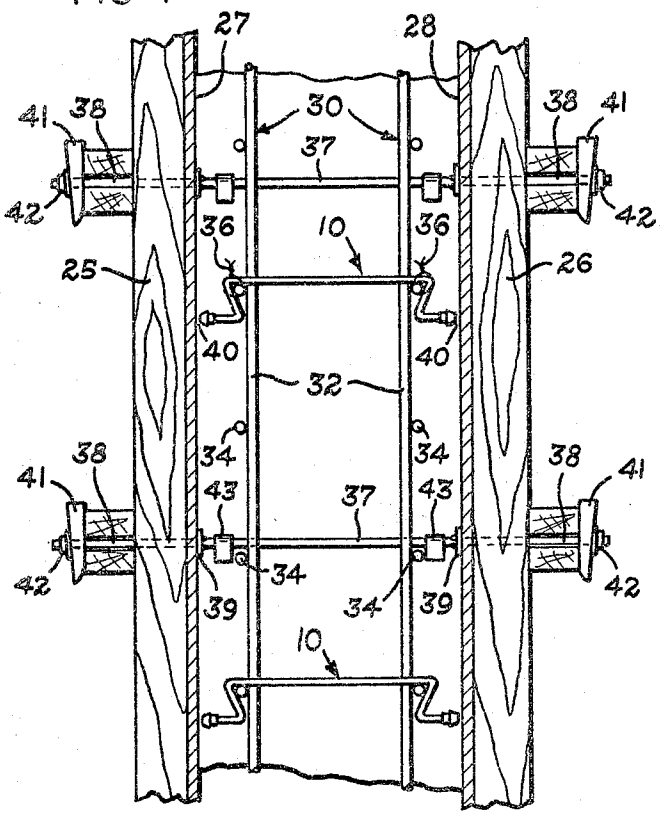


FIG-3

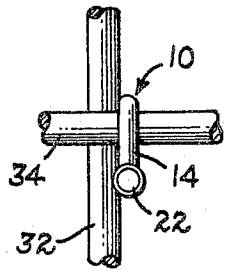
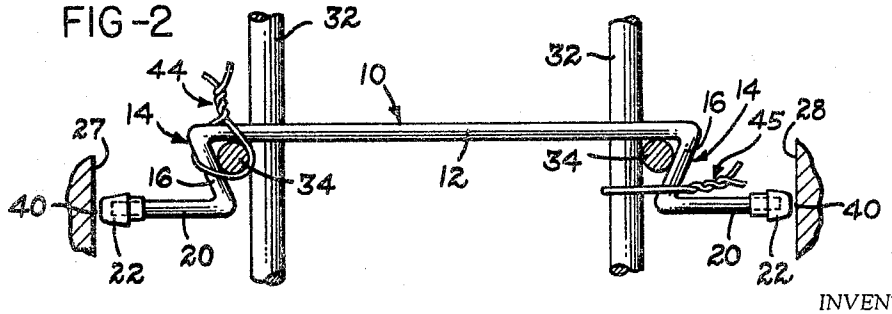


FIG-2



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This application relates to a spacer for concrete reinforcement, and more particularly to a spacer for rigidly positioning a pair of reinforcing mats of heavy rods in a spaced relationship within the forms for a vertical concrete wall.

In order to provide a vertical concrete wall with high compression and shear strength, it is common to provide the wall with steel reinforcing members of some type. However, when exceptionally high strength is required, it has been found desirable to position two parallel layers of reinforcing mats of heavy steel rods so that a single layer is spaced within the wall close to each side. The present invention is directed to a spacing device which interconnects the reinforcing mats and retains the mats in a parallel spaced relationship with each other and with the inner surfaces of the form walls while the concrete wall is poured.

Accordingly, it is a primary object of the present invention to provide a novel inexpensive spacer for layers of reinforcing members for a vertical concrete wall and which spacer is adapted to be quickly and easily installed between the reinforcing members.

As another object, the present invention provides a novel spacer for two reinforcing mats for a vertical concrete wall and which spacer is provided with a configuration which is adapted to retain the reinforcing mats in a parallel spaced relationship with each other and with the inner surfaces of the form walls during the time the concrete for the wall is being poured from above and is setting.

Still another object of the present invention is to provide a spacer for positioning a pair of reinforcing mats within the forms for a vertical concrete wall and which spacer includes a generally Z-shaped end configuration that is easily formed from steel rod material so that the spacer is especially adapted for economical manufacturing.

As another object, the present invention provides a spacer for a pair of reinforcing mats for a vertical concrete wall wherein the spacer is constructed from a single piece of heavy gauge wire and is provided with a Z-shaped configuration on each end which serves both to retain the reinforcing mats in the desired parallel positions and also is self-locking so as to hold the spacer in its installed position as concrete is poured into the forms between and around the reinforcing mats.

Other objects and advantages will be apparent from the following description, the accompanying drawing and the appended claims.

In the drawing:

FIG. 1 is a sectional elevational view of the forms and reinforcing mats for a concrete wall showing the generally horizontal positioning of the spacers according to the invention in relation to the pair of vertically arranged reinforcing mats which are spaced near the inner surfaces of the forms;

FIG. 2 is an enlarged detail view of one of the spacers according to the invention showing the mounting of the spacer and how it can be fastened when necessary in order to locate and retain the pair of reinforcing mats properly before pouring of the wall; and

FIG. 3 is an end view of the spacer according to the invention showing the position of the spacer in relation to the junction of the vertical and horizontal rod members which comprise a typical reinforcing mat.

Referring to the drawing, which illustrates a preferred embodiment of the present invention, the spacer **10** as shown from the side in FIGS. 1 and 2 is formed preferably from heavy gauge steel wire and includes a straight central portion **12** which extends into a Z-shaped configuration **14** on each end orientated in substantially the same plane and providing the spacer with a generally overall dovetail configuration. As shown, the Z-shaped end portion of the spacer is formed by an intermediate leg **16** which extends from the straight central portion **12** to define an acute angle therewith. To complete the Z-shaped end configuration, the spacer is formed again on a complementary acute angle to define the legs **20** on the end of the spacer which are substantially co-linear with each other in addition to being parallel with the central portion **12**. Mounted on each end of the end legs **20** is a plastic cap **22** adapted to cover the ends of the wire and prevent the ends from rusting by preventing exposure to air and moisture when either end is positioned at or near the surface of the wall.

A spacer **10** is installed after one of the form walls **25** or **26**, having inner surfaces **27** and **28** respectively, is erected and the pair of reinforcing mats **30** are positioned in the general location where they are desired. Commonly, the reinforcing mats **30** comprise a series of parallel vertical steel rod members **32** which are attached by wiring or other suitable connecting means to a series of parallel horizontal steel rod members **34** to define a coarse steel mesh. After the reinforcing mats **30** are positioned in place, a number of spacers **10** are slipped down over a pair of corresponding horizontal rod members **34** and adjacent the vertical rod members **32** as shown in FIG. 3.

The spacers **10** are placed randomly as desired throughout the pair of reinforcing mats so that the straight central portion **12** of each spacer is positioned substantially normal to the inner flat surfaces **27** and **28** of the forms **25** and **26**. Some of the spacers **10** are tied to the reinforcing members by a light gauge wire **36** as shown in FIG. 1 so that the horizontal rod members **34** will be held firmly within the acute angle formed between the straight central portion **12** and the intermediate leg **16**. The wire **36** prevents the reinforcing mats **30** from moving toward each other during the time period before which the concrete wall is poured. It is not necessary, however, to wire each end of each spacer to the reinforcing mats **30** since the normal outward force on the reinforcing mats **30** during pouring, as a result of the bulk of concrete being poured between the mats **30**, tends to hold the spacers **10** down tightly against the horizontal rod members **34** whereby the reinforcing mats **30** are hooked and prevented from separating and the spacers are self-locked in the position shown.

After the reinforcing mats **30** and spacers **10** are placed in position, a series of form ties **37** are inserted between the mats **30** and include end portions **38** which extend through corresponding holes in the form walls. The spreader buttons **39** are secured to the form ties **37** in a spaced apart relationship for engaging the inner surfaces **27** and **28** of the form walls to space them apart precisely according to the desired thickness of the final concrete wall. When the spacers **10** and ties **37** are installed, the other form wall, either **25** or **26**, is erected and is spaced from the opposite form wall according to the predetermined spacing of the spreader buttons **39**, which preferably is a distance slightly greater than the overall length of the spacers **10** including the plastic caps **22**. It is preferred that the gap **40** defined between each end of the spacers **10** and the adjacent form wall be approximately ⅛ inch, which permits the spacers to float within the forms and the concrete to flow into the gap **40** and prevents the plastic cap **22** from extending to a position flush with the

side of the wall. After both forms **25** and **26** are positioned the slotted wedges **41** are inserted adjacent each headed end **42** of the ties **37** to clamp the forms tightly against the spreader buttons **39**. A pair of clevis **43** comprising a folded strap of steel are crimped over flats formed on the ties **37** to prevent the ties from turning after the concrete has set, and the end portions **38** are then manually broken off at the flats after removal of the forms **25** and **26**.

While some of the spacers **10** may be tied to the reinforcing mats any number of wiring arrangements, two different arrangements **44** and **45** are shown in FIG. 2. The wiring arrangement **45** is particularly desirable since it not only prevents the spacers **10** from sliding horizontally along a horizontal rod member **34** but also prevents the spacers **10** from moving upwardly along the vertical rod **32**.

In view of the fact that the spacers **10** remain in the concrete wall as lateral reinforcement and are not reusable, it is particularly important that the spacers be simple in construction in order to be inexpensive to manufacture. This is one important advantage provided by the spacer according to the invention. On one automatic machine tool equipped with simple dies, the Z-shaped configuration **14** can be quickly formed in heavy gauge steel wire, and the same dies can be used to trim the spacer to the desired length so that the spacer is formed with minimum cost. Furthermore, since the plastic caps can be inexpensively formed and can be easily assembled simultaneously on both end legs **20**, this feature adds substantially little cost. It is also an incidental advantage that the spacer formed in accordance with the invention may be packaged with several hundred in one box without any problem of the spacers inter-locking between one another. Thus, the spacers can be easily removed individually from the container.

While the form of apparatus herein described constitutes a preferred embodiment of the invention, it is to be understood that the invention is not limited to this precise form of apparatus, and that changes may be made therein without departing from the scope of the invention which is defined in the appended claims.

What is claimed is:

1. In combination with a pair of forms having inner surfaces positioned in predetermined parallel spaced relation to define a concrete wall having a corresponding predetermined thickness, and a pair of reinforcing means positioned between said surfaces for reinforcing the wall, an improved spacer for positioning said reinforcing means in

predetermined spaced relation with each other and with said inner surfaces, comprising a central portion having a length establishing the predetermined spacing of said reinforcing means, an intermediate leg portion extending from each end of said central portion and defining a hook for engaging and retaining one of said reinforcing means, an end leg portion extending outwardly from each said intermediate leg portion, and said end leg portions defining an overall length of said spacer no greater than said spaced relation of said inner form surfaces.

2. The combination of claim **1** wherein said spacer includes a straight central portion, and said end leg portions extend colinear with each other and substantially parallel to said central portion.

3. The combination of claim **2** wherein each said intermediate leg portion forms an acute angle with said central portion to define a Z-shaped end configuration.

4. The combination of claim **1** including wire means for tying said intermediate leg portions to said reinforcing means.

5. The combination of a spacer for locating reinforcing members between the inner surfaces of the forms for a concrete wall and a form tie for accurately spacing the forms in a spaced apart relationship, comprising a tie having spreader means for engaging firmly the inner surfaces of the forms, a spacer having a generally straight central portion adapted to extend directly between the reinforcing members, an intermediate leg portion extending from each end of said central portion and forming an acute angle therewith defining a hook for engaging and retaining the adjacent reinforcing member, an end leg portion extending from each of said intermediate leg portions and formed substantially colinear with each other and substantially parallel to the central portion, and said end leg portions defining an overall length of the spacer which is no greater than the spaced apart distance between said spreader means.

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