

June 29, 1965

E. SCHWACHULA

3,191,345

SPACER FOR BUILDING CONSTRUCTION

Filed Feb. 8, 1961

2 Sheets-Sheet 1

FIG. 1

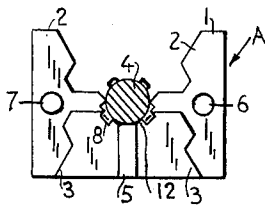


FIG. 2

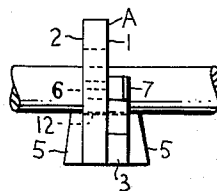


FIG. 3

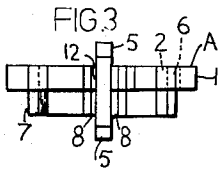


FIG. 4

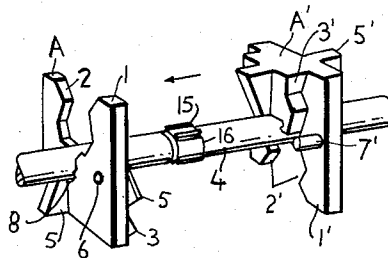


FIG. 5

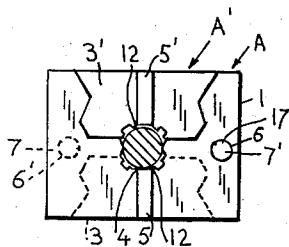
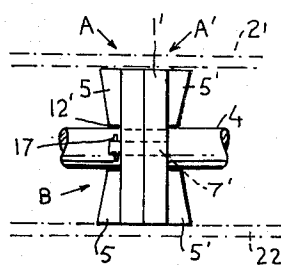


FIG. 6



ERNST SCHWACHULA
INVENTOR.

BY

Karl F. Bor

AGENT

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E. SCHWACHULA

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FIG. 7

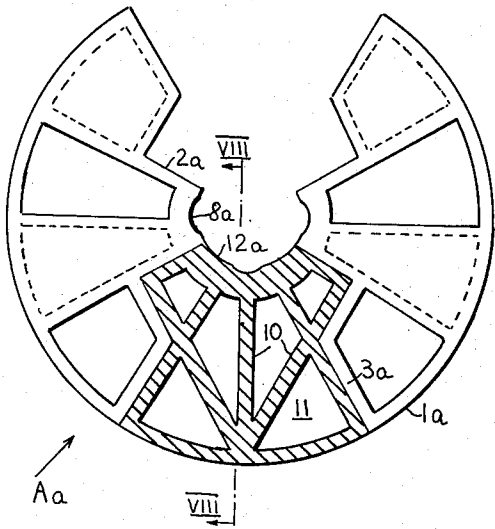


FIG. 8

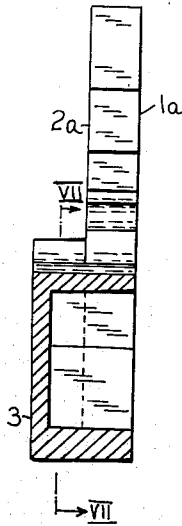
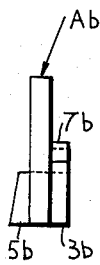


FIG. 10

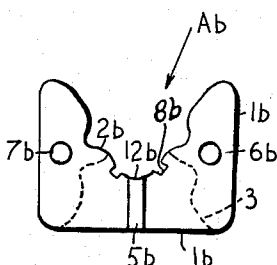


FIG. 9

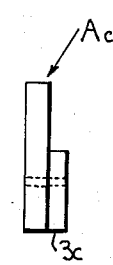


FIG. 12

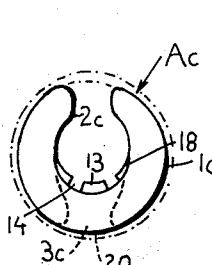


FIG. 11

ERNST SCHWACHULA
INVENTOR.

BY

Karl F. Bon
AGENT

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3,191,345

SPACER FOR BUILDING CONSTRUCTION

Ernst Schwachula, Essen (Ruhr), Germany, assignor to
Firma Ingeborg Schwachula, K.G., Essen (Ruhr), Germany, a corporation of Germany

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Sch 27,409

2 Claims. (Cl. 50—519)

The present invention relates to spacers for use in building construction, more particularly to spacers employed in reinforced-concrete structures, and to their assembly.

Spacers as widely used by the construction industry serve for holding reinforcing bars at required distances, for supporting these bars, for supplementing their stiffening action, and for bracing walls, ceilings, roof coverings and the like.

An object of the present invention is to provide an improved spacer of such configuration as to facilitate their connection to reinforcing bars or other structural elements.

A further object of the present invention is to provide spacers of a shape making it possible to use them either singly or in combinations of two spacers forming a unit with improved supporting and holding properties.

A still further object of the present invention is to provide a spacer of such shape as to assure an optimum stress distribution in order to achieve a high degree of strength and stability.

The above and other objects are realized in accordance with my invention by the provision of a spacer essentially composed of a male and a female supporting member rigidly juxtaposed to form a bed for a tension cable, reinforcing bar or similar elongated structural element. The male member, preferably plate-shaped and lying in a transverse plane of the element supported thereby, has an upwardly open cutout whose bottom forms part of a trough accommodating this element; the female member, preferably also plate-shaped, has an upper edge portion registering with (or at least tangent to) the bottom of the cutout and, beyond the edge portion, an outline mirror-symmetrical to that of the cutout whereby, upon juxtaposition of the two relatively inverted spacers of identical shape, the male member of each will be receivable in the cutout of the other so as to lock the supported element therebetween.

The male member may be formed as an integral extension of the female member, and the composite body constituted thereby may be provided on opposite sides of its transverse plane of symmetry with mating coupling formations (e.g. a pin and a corresponding bore) whereby the two juxtaposed spacers of a locking unit can be rigidly interconnected.

Advantageously, the bottom of the cutout and an adjacent notch in the upper edge of the male member are aligned to form a trough adapted to engage the supported element on three sides; the trough may be ribbed and fluted, for example, to receive mating projections (e.g., peripheral ribs) on the supported element whereby the latter is also held against rotation.

A further feature of the invention resides in the provision of one or more legs on the lower part of the spacer to spread its base and, at the same time, to extend the bed of the trough in axial direction of the supported element, each leg for this purpose preferably being in the shape of a fin transverse to the plane of the composite body and having an upper edge level with the bottom of the trough.

The invention will be better understood from the fol-

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lowing detailed description, reference being made to the accompanying drawing which illustrates various practical embodiments of the invention and in which:

FIGS. 1, 2 and 3 are respectively front, side and top views of a spacer according to the invention, the first two views showing the combination of the spacer with a reinforcing bar;

FIG. 4 is a perspective view of an assembly of two spacers as shown in FIGS. 1-3 together with a reinforcing bar supported thereby;

FIGS. 5 and 6 are respectively a front and a side view of the assembly of FIG. 4 but with the spacers thereof shown in mutual engagement;

FIGS. 7 and 8 are front and side views of a modified spacer according to the invention;

FIGS. 9, 10, 11 and 12 are front and side views of two further spacer embodiments.

As shown in FIGS. 1-6, a spacer A comprises an either firm or elastic plate 1 of rectangular outline with an upwardly open cutout or recess 2 whose bottom is recessed to form part of a trough 12 accommodating a reinforcing bar 4. The flanks of cutout 2 which partly diverge in a downward direction, are serrated and spaced apart by a distance substantially greater than the width of trough 12 at its mouth. The lower edge of cutout 2, on both sides of trough 12, lies above the horizontal plane of symmetry of plate 1 which also bisects the bar 4, the trough-forming recess of that edge thus extending below this plane. An opening 6 on one side accommodates a complementary pin 7 insertable in the other opening 6 located at the opposite side of the female member or plate 1 and at equal distances from the bar 4. An auxiliary support 3, complementary in shape to the cutout 2 and positioned mirror-symmetrically thereto, forms the male member of the spacer and is integral with the plate 1 or otherwise rigidly joined (e.g. cemented) thereto so as to help carry the bar 4; member 3 is for this purpose centrally indented at its upper edge to provide a continuation of trough 12. Legs 5 located on opposite faces of stepped body 1, 3, forming fins projecting in the direction of the axis of bar 4, enlarge the base area of this body, thereby increasing its stability, and have upper edges level with the bottom of trough 12 to extend the bed supporting the bar 4. The trough 12 is provided with grooves 8 to engage projections 15 on, for example, a collar 16 screwed onto bar 4 as illustrated in FIG. 4.

The juxtaposition of two identical spacers according to the above description so as to form a spacing block of improved holding and carrying capacities is illustrated in FIGS. 4-6. The two spacers A and A' are shown located on a common reinforcing bar 4 and offset in relation to each other by 180°. In FIG. 4 the spacers A and A' are shown separated by a certain distance from each other. By shifting spacer A' in the direction of arrow 9 (FIG. 4) the male extensions 3, 3' enter the cutouts 2' and 2, respectively, to form the combined spacing block B as shown in FIGS. 5 and 6. The pins 7, 7' on members 1, 1' mate with the openings 6', 6 of the opposite spacer. Thus, the two spacers A, A' positively interlock and hold the bar 4 between them. Additional safeguards against undesired discharge of spacers A and A' may be provided by means of suitable detents, such as cotter pins 17 inserted into the projecting extremities of pins 7, 7' as illustrated in FIGS. 5 and 6.

A spacer Aa of nearly circular outline is shown in FIGS. 7 and 8. A plate 1a, with an upwardly open cutout or recess 2a, forms the female member of the spacer and together with its extension 3a defines a trough 12a for a reinforcing bar or the like not shown in these figures. Grooves 8a are again formed in the surface of the trough 12a for engagement with mating projections, if

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any, on the reinforcing bar. The body 1a, 3a, which may be made of molded plastic resin or cast metal, consists of webs 10 and is provided with voids 11 to save weight and material. The support 3a is again complementary to cutout 2a.

The spacer Ab shown in FIGS. 9 and 10 is formed by a rectangular plate 1b, with rounded corners and a mouth-like cutout or recess 2b with undulating or serrated flanks forming the female member, and a complementary male member 3b adjacent one side of plate 1b. The structure of member Ab is analogous to that of member A (FIGS. 1-6) in that its body is supported by two legs 3b, 5b, the leg 3b being laterally enlarged beyond the outline of the other leg 5b, on opposite sides of the latter, to fit into the recess 2b of an identical member bonded by mating serrated edges. The fin 5b at the other side of plate body 1b increases the rigidity of the spacer and the area of its base while terminating at the top in a horizontal ledge extending the bed formed by trough 12b; the latter again is shown to be fluted at 8b for the purpose described.

Another embodiment of a spacer according to the present invention is illustrated in FIGS. 11 and 12. The spacer Ac comprises a plate 1c of circular configuration provided with a cutout 2c with arcuate flanks; the bottom part of this cutout is approximately tangent at 18 to the concave upper edge of male member 3c which is provided with teeth 13, separated by gaps 14, whereby a trough is formed to support a reinforcing bar not shown in these figures.

The several types of spacers shown in the drawing all share the feature that their male members readily fit into the cutouts of the female members of identical spacers so that they can be combined into pairs generally similar to unit B in FIGS. 5 and 6. Spacers Ac, for example, may be used as stiffeners and carriers for a central rod or cable inside a sleeve 20, as indicated in dot-dash lines in FIG. 11, such sleeve serving as a mold for a concrete column of circular cross-section. The other spacers may be similarly utilized in the manufacture of concrete beams of square or rectangular configuration, or for the pouring of slabs between falsework constituted, for example, by sheets 21, 22 as indicated in dot-dash lines in FIG. 6.

My invention is, of course, not limited to the specific embodiments described and illustrated but may be realized in various modifications without departing from the spirit and scope of the appended claims. It should be observed, however, that in any case the cutout of the

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female member must extend over more than half the length of that member (as measured from the mouth of the cutout to the opposite side) in order that the cutouts of interlocking spacers may overlap to form a channel for the passage of the structural element and to be engaged thereby.

I claim:

1. A spacer for maintaining a reinforcing element in spaced relation to a base, said spacer comprising two substantially identical members interfittingly interlocked in mutually inverted relationship, each member comprising a substantially flat body portion having an element-receiving seat at the geometrical center thereof, each member further including a recess extending from a first edge of said body portion to said seat and communicating therewith, each recess being defined by serrated bounding edges, and oppositely extending integral legs on each of said body portions, said legs extending from a second edge opposite said first edge to said seat, one of said legs on each member being laterally enlarged beyond the outline of the other leg on opposite sides thereof and having serrated edges shaped complementary to the serrated edges of said recess and interfitted therewith, the oppositely extending legs and said second edge on one of said body portions constituting a stabilizing base for said spacer.

2. A spacer as set forth in claim 1 wherein each member further includes an integral pin and an aperture, the respective pin and aperture on each member being positioned laterally of said seat and intermediate said first and second edges, the pin on each member being disposed in the aperture of the other member.

References Cited by the Examiner

UNITED STATES PATENTS

2,217,042	10/40	Bowman	24—126
2,613,900	10/52	Byrnie	50—514

FOREIGN PATENTS

688,989	3/53	Great Britain.
715,563	9/54	Great Britain.
972,409	8/50	France.
1,229,466	3/60	France.
719,985	4/42	Germany.
400,431	12/42	Italy.

HENRY C. SUTHERLAND, *Primary Examiner*.
JACOB L. NACKENOFF, *Examiner*.