

CONCRETE SPACER FORMING APPARATUS

Background and Field of the Invention

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This invention relates to apparatus for forming concrete spacers.

Reinforced concrete comprises essentially two components, the first being a concrete structure which withstands compression and the second being a
10 network of reinforcing bars which gives the structure tensile rigidity.

Since the reinforcing bars are formed from steel which is susceptible to corrosion and to fire damage, it is essential that the reinforcing bars are enclosed by a coat of concrete. In order to ensure that the reinforcing bars are
15 properly placed with the required degree of concrete cover, concrete spacers are used during concrete casting. The spacers are disposed between formwork, in which the concrete is cast, and the reinforcing bars to ensure that the bars are spaced from the formwork to a required degree. The spacer is formed from fine aggregate concrete or cement mortar so that it can connect
20 properly to the concrete when cast.

Such concrete spacers are manufactured in numerous shapes and sizes, optionally with a wire tie, so that the spacer may be attached directly to the reinforcing bars and such spacers are manufactured and delivered to a building

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site in accordance with requirements. The disadvantages of such spacers, however, are that, firstly, as a manufactured component, they are relatively expensive and it is necessary for orders to be placed in advance independent upon the estimated need for the spacers. For a large building project, it can be
5 time consuming to work out what kind and shape of spacers are required and how many. Furthermore, as concrete spacers tend to come in standard packages of a predetermined number, there will inevitably be some degree of wastage on any building contract.

- 10 It is an object of the invention to provide a means for forming a concrete spacer which alleviates at least one disadvantage of the prior art and/or provides the general public with a useful choice.

Summary of the Invention

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According to the invention there is provided concrete spacer forming apparatus comprising a portable structure defining a plurality of concrete spacer moulds. The structure may be formed from any suitable material, for example steel or aluminium or from plastics material, for example by injection moulding.

- 20 Preferably, the structure is in the form of a grille or tray having at least one carrying handle.

In the described embodiment of the invention, a tray-like portable structure is provided which may be used by a building contractor to make concrete spacers.

- 25 Since the structure is portable, it may be transported to a building site and

spacers made on site in accordance with actual demand. Thus, for the building contractor, a means for forming the spacers is provided which allows the contractor to make the spacers himself thus reducing costs and in accordance with actual rather than projected demand. In its simplest form, the structure is formed using as a lattice of flat steel bars that is sufficiently simple to be made,
5 if necessary, on site with only limited cutting and welding tools.

Brief Description of the Drawings

10 An embodiment of the invention will now be described by way of example, with reference to the accompanying drawings in which:

Figure 1 is a three dimensional view of a first embodiment of a concrete spacer forming apparatus of the invention with Figure 1a showing a concrete spacer,
15 on an enlarged scale; and

Figure 2 is a cut away view showing part of the structure of the embodiment of Fig. 1 in more detail.

20 Figure 3 is a three dimensional view of a second embodiment of the invention.

With reference to figures 1 and 2, a first embodiment of a concrete spacer forming apparatus of the invention for forming a plurality of concrete spacers 5 having a tie wire 7 as illustrated in Figure 1a is shown which comprises a
25 portable structure formed from a lattice work of flat bars connected to each

other by welding to form a plurality of concrete spacer moulds between the intersections of the flat bars.

The perimeter of the structure is formed from four bars 10, 12, 14, 16 which are
 5 welded together. In the enclosed space, a plurality of interconnected bars 18, 20 form a lattice defining moulds 30. Each of the bars 18, 20 has a plurality of slots 22, 24 formed to half the width of the bar at intervals A, B corresponding to the dimensions of each mould 30. The bars 18 slot into bars 20 and vice versa as shown. The thus formed lattice is then placed within the perimeter bars and
 10 the whole assembly is spot-welded together. At each side, a handle 26 is provided. This is preferably formed from round bar, preferably rebar (since such is commonly and cheaply available) bent or stamped to shape and welded in place.

15 The structure is then finished by being painted or hot-dip galvanised.

In use, a smooth and flat surface is selected and a layer of PVC sheet is preferably spread on the surface, the apparatus being placed on the sheet. A fine aggregated concrete or cement mortar is then prepared and placed in the
 20 moulds of the structure to fill them. The top surface is then smoothed using a trowel.

While the cement is still wet, a looped tie wire 7 may be inserted into the concrete of each spacer 5 so as to be held by the spacer once set.

The apparatus is carefully removed from the surface leaving the spacers in place, before the spacers 5 are completely set. The structure is then washed and oiled for subsequent use.

- 5 Using this technique, any size of rectangular concrete spacer may be made, with the height of the concrete spacer being determined by the height of the flat bars forming the structure and the points of intersection of the lattice determining the shape of the spacer. Although a single size of spacer may be made using the structure of Figs. 1 and 2, different sizes and/or shapes of
10 spacers may be made with the single structure by the suitable selection of the points of intersection of the lattice.

- A second embodiment of the invention is shown in Fig. 3 and comprises a structure 40 forming moulds 42 in a similar manner to the structure of Fig. 1 but
15 this time formed from injection moulded plastics materials. Handles are provided at each end of structure 40 by a length of cord 44 threaded and secured between opposed openings 46 in the ends of the structure 40. Although the structure 40 as shown forms similar concrete spacers to the embodiment of Figs. 1 and 2, such an injection moulded structure is particularly
20 advantageous if it is desired to form spacers having more complicated shapes, for example having curved sides or more complicated polygonal shapes.

- Whilst the apparatus has been shown formed from steel bar or plastics material, this is not to be construed as limitative. For example, the apparatus may be
25 formed from other suitable materials such as aluminium.

Furthermore, although it is preferred that the apparatus is sufficiently portable as to be handled by a single user, this is not to be construed as limitative and a larger structure may be provided suitable for use by a team or by using light
5 lifting machinery.



CLAIMS

1. Concrete spacer forming apparatus comprising a portable structure defining a plurality of concrete spacer moulds.
- 5 2. Apparatus as claimed in claim 1 wherein the structure comprises a grille.
3. Apparatus as claimed in claim 2 wherein the grille is formed from a lattice of flat bars.
- 10 4. Apparatus as claimed in any one of claims 1 to 3 further comprising at least one handle.
5. Apparatus as claimed in any one of the preceding claim wherein the
- 15 structure is formed from metal.
6. Apparatus as claimed in claim 1 or claim 2 wherein the structure is formed from plastics material.
- 20 7. Apparatus as claimed in any one of the preceding claims wherein the moulds are such as to form a polygonal spacer.
8. Apparatus as claimed in claim 7 wherein the moulds are such as to form a rectangular spacer.



9. Apparatus as claimed in any one of the preceding claims wherein the moulds are of different sizes and/or shapes.