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(54) Bridge construction

(57) A bridge construction comprising a plurality of adjacent substantially rectangular solid blocks (1) extending to form longitudinal lines of blocks, these longitudinal lines of blocks being assembled adjacent one another to form transverse lines of blocks. Each block (1) is tapered in its end faces in a direction from its upper face to its lower face and rods (4) extend under tension through each longitudinal line of blocks and act to compress the blocks in each longitudinal line together. The tapering in the blocks acts to cause each longitudinal line of blocks to form an upwardly extending arcuate curve from end to end of the longitudinal line.

Adjacent longitudinal lines of blocks are held together by rods 7 under tension that extend through the blocks transversely of the longitudinal lines. Hand rails (8) can be mounted on uprights (9) on each side of the bridge. The blocks (1) can be made from a hardwood.

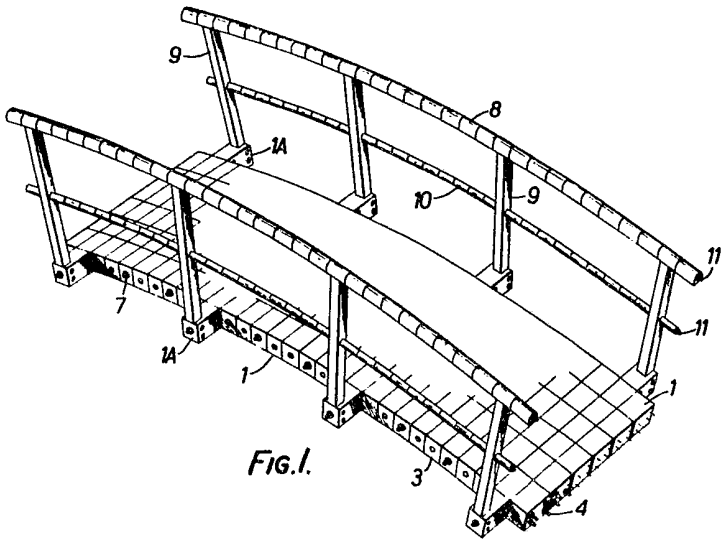


FIG. 1.

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The drawing(s) originally filed was/were informal and the print here reproduced is taken from a later filed formal copy.

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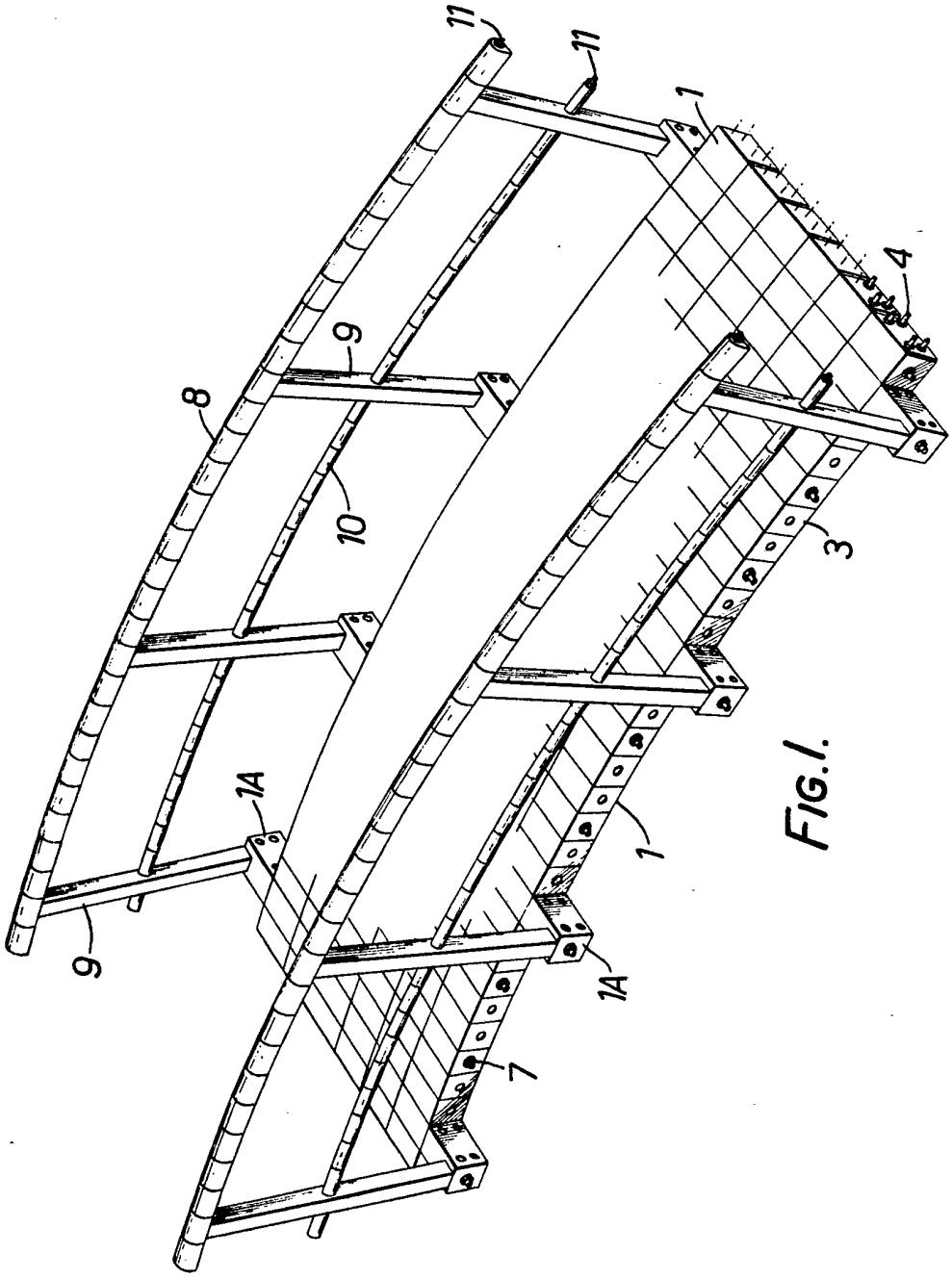


FIG. 1.

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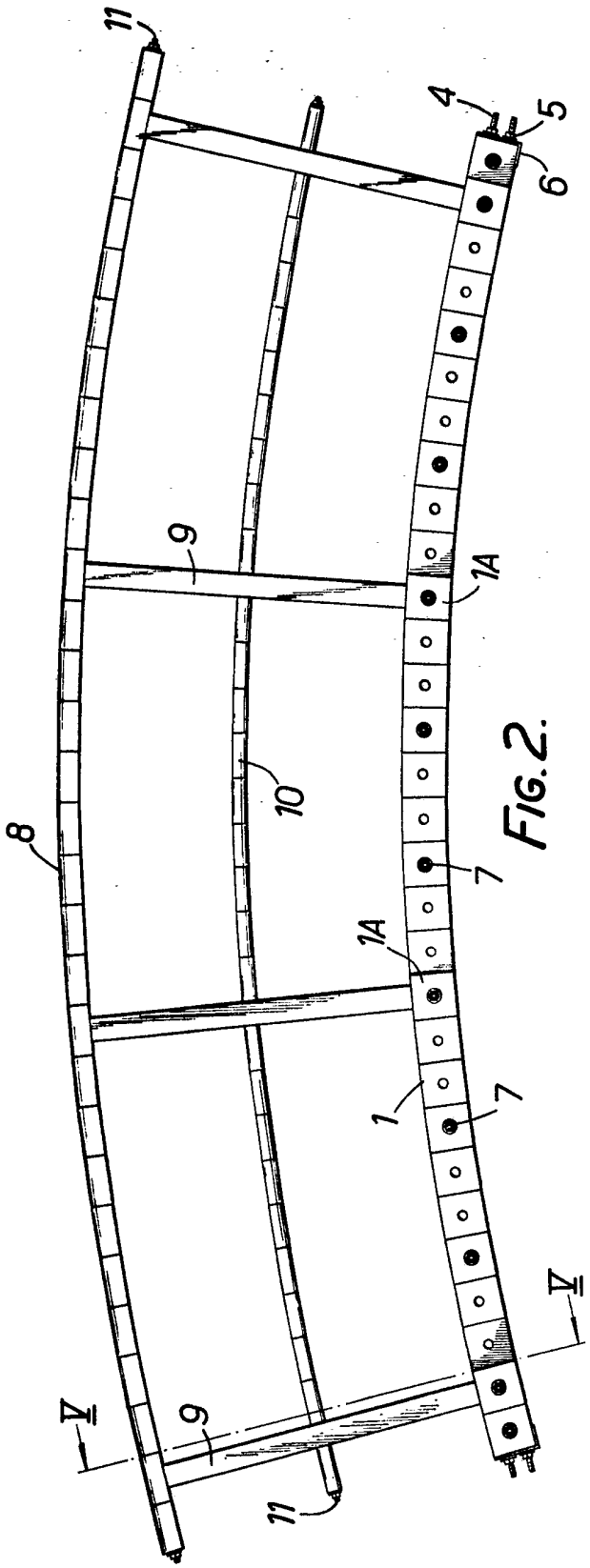


FIG. 2.

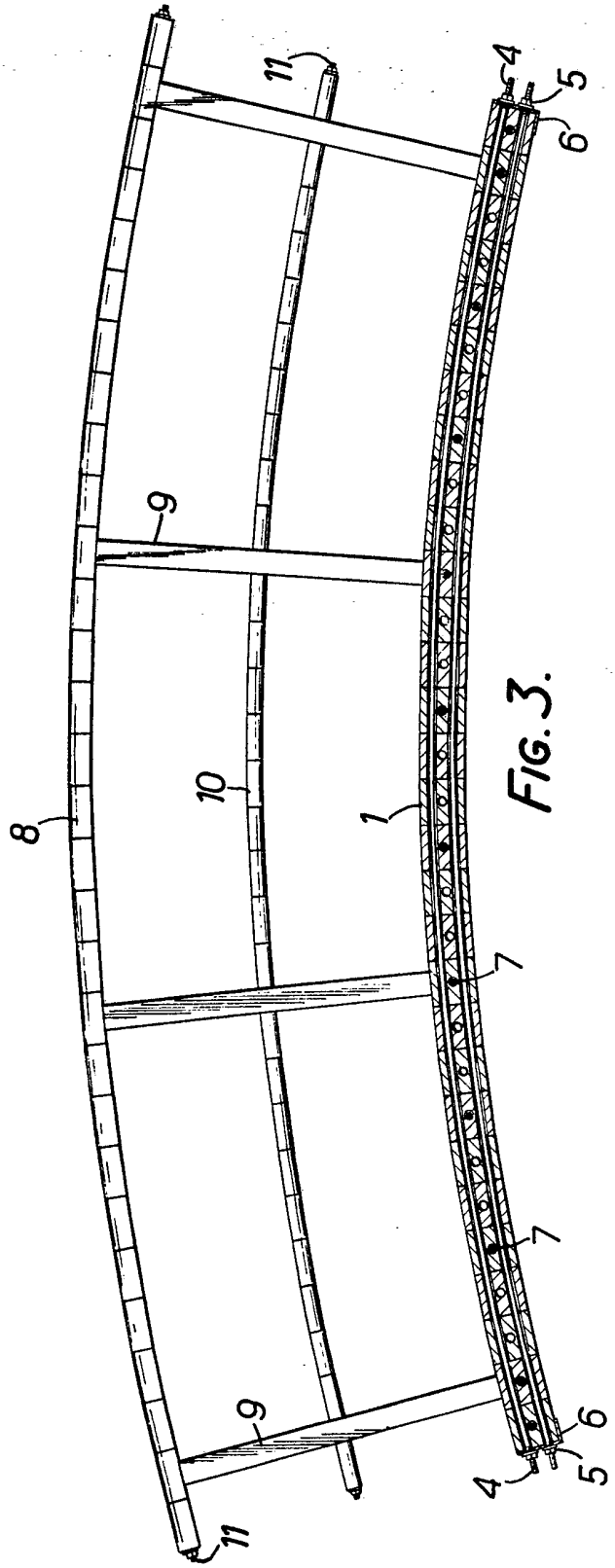


FIG. 3.

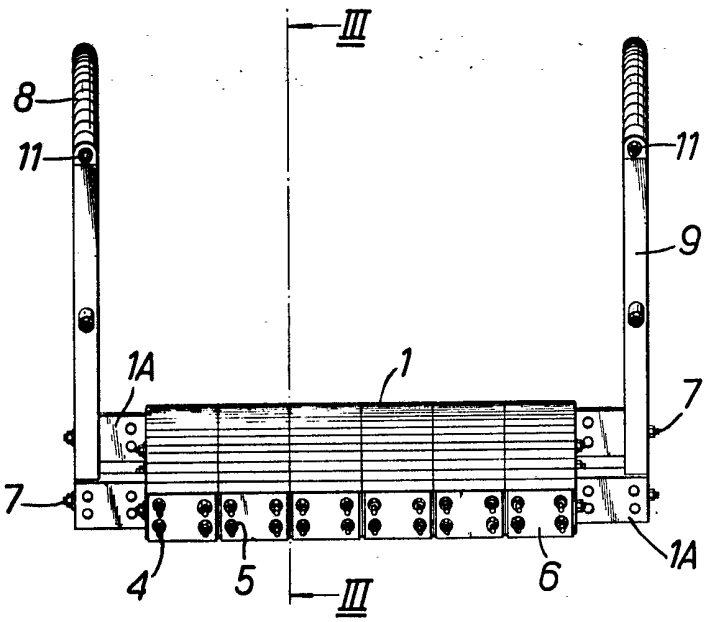


FIG.4.

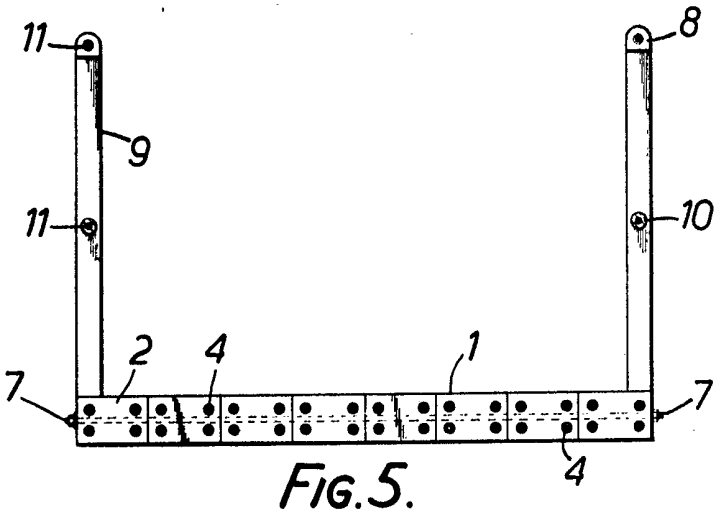


FIG.5.

SPECIFICATION

Bridge construction

According to a first aspect of the present invention, there is provided a bridge construction comprising a plurality of adjacent substantially rectangular solid blocks extending to form longitudinal lines of blocks, these longitudinal lines of blocks being assembled adjacent one another to form transverse lines of blocks, each block being tapered in its end faces in a direction from its upper face to its lower face, there being a rod under tension extending through each longitudinal line of blocks from end to end of the line and acting to compress the blocks in each longitudinal line together, and the tapering in the blocks acting to cause each longitudinal line of blocks to form an upwardly extending arcuate curve from end to end of the longitudinal line.

According to a second aspect of the present invention, there is provided a method of building a bridge, comprising assembling a plurality of adjacent substantially rectangular solid blocks adjacent one another to form longitudinal lines of blocks, each block being tapered in its end faces in a direction from its upper face to its lower face, assembling these longitudinal lines of blocks adjacent one another to form transverse lines of blocks, inserting a rod through each longitudinal line of blocks from end to end of the line, and tensioning each rod to compress the blocks in each longitudinal line together, the taper of each block acting to cause each longitudinal line of blocks to form an upwardly extending arcuate curve from end to end of the longitudinal line.

More than one tensioned rod may extend through each longitudinal line of blocks and, preferably, there are four such rods extending through each longitudinal line.

The blocks may be fashioned from a hardwood and the rods may be formed from mild bright steel.

The ends of each rod extend beyond the ends of the longitudinal lines of blocks and may be screw-threaded to receive tightening nuts by which means the rods are tensioned. A plate may be provided at each end of each longitudinal line of blocks against which the tightening nuts bear.

Adjacent longitudinal lines of blocks may be held together by rods extending through a plurality of the transverse lines of blocks; these rods may be tensioned in a similar way to the rods extending through the longitudinal lines of blocks.

Uprights may be provided at intervals on one or both sides of the bridge, the uprights being interconnected on each side, respectively, by a rail composed of a plurality of longitudinally-extending members joined together under compression by a rod passing through them from end to end under tension.

For a better understanding of the invention and to show how the same may be carried into effect, reference will now be made, by way of example, to the accompaying drawings, in which:-

Figure 1 is a diagrammatic perspective view of a bridge construction according to the invention,

Figure 2 is a side view of the bridge construction shown in Fig. 1,

Figure 3 is a sectional side view, taken on the line III-III in Fig. 4,

Figure 4 is an end view of the bridge construction, and

Figure 5 is a sectional view taken on the line V-V in Fig. 2.

The drawings show an assembled bridge construction, the major part of which being made-up of a plurality of identical wooden blocks 1, each block 1 having four holes extending between its end faces 2 and one hole extending between its side faces 3. Four steel rods 4 extend through each longitudinal line of blocks 1 from end to end of the longitudinal line, these rods 4 being threaded at their outer ends and extending beyond the ends of the longitudinal lines of blocks and being tensioned by tightening nuts 5 screwed on the rods 4. The outer ends of each longitudinal line of blocks are each provided with a plate 6 against which the nuts 5 bear in order to spread the load over the whole face of the end block. In the example shown, each plate 6 is bent to form a flange extending underneath the end block of each longitudinal line. In a modified form (not shown), the plates 6 could be of T-form in section so that, as well as having a part extending underneath the end block, a free flange is provided which can dig in ground adjacent to the bridge.

The wood used for each block is preferably a Malaysian Keruing wood, but can also be, for example, of Canadian Hemlock.

In constructing the bridge, once a set of rods 4 have been passed through a longitudinal line of blocks 1, adjacent longitudinal lines of blocks can be placed together so that the blocks then form transverse lines of blocks. They are held adjacent to one another by means of transversely-extending rods 7 passing through a plurality of the transverse lines of blocks from end to end of those lines, the rods 7 being similarly tensioned by means of nuts 8 at both ends of the transverse lines.

Once the bridge has been assembled to its required dimensions, i.e., once sufficient blocks have been assembled together to form the required length and width of the bridge, the rods 4 are tensioned. Before tensioning, the bridge construction will lie flat and a plurality of such bridges can be stacked in this condition before transportation to the construction sites. Thus, it will be apparent that the bridges can be tensioned on site.

The act of tensioning the rods 4 compresses

the blocks 1 in the longitudinal sense and, because each block is tapered, the bridge assumes an upwardly extending arcuate curve from end to end as shown.

Because the timber is likely to give after the first tensioning of the rods 4, the tensioning on the rods 4 can be repeated after a week or so.

Preferably the timber blocks are given a 2° taper from top to bottom and the longitudinal rods 4 can be of 10 mm diameter. The transverse rods need only be of about 8 mm diameter.

If the bridge construction is intended to carry vehicular traffic, then it is preferable that a rod 7 pass through substantially all of the transverse lines of blocks rather than just every other two as shown.

Whether or not the bridge is intended to carry vehicular traffic, hand rails 8 or the like may be provided. Each hand rail is supported by a plurality of uprights 9 which are mounted in additional blocks 1A mounted beyond the outermost longitudinal lines of blocks. Guard rails 10 are also provided. The hand rails 8 and the guard rails 10 are formed of cylindrical blocks with tapered end faces, each with a hole extending axially therethrough, these rails being tensioned by rods 11 extending through them and tensioned in the same way as the rods 4.

The rods 4 are preferably all of the same diameter. This has the advantage that minimum horizontal thrust occurs at the abutment of the blocks and the completed bridge can be moved to an alternative site after tensioning has occurred without the need for dismantling. As a result of the upper tensioning rods being of the same diameter as the lower tensioning rods, if the bridge is lifted by a sling or forklift under the centre of the span of the bridge, the tension and compression areas of the blocks will be reversed, but remain dimensionally the same.

It will be appreciated that, in order to preserve the timber of the bridge and to retreat it after a period of time, it is possible to inject a wood preservative into any vacant holes in the lines of blocks.

In order to aid construction and launching of the bridge, parts of the bridge can be mounted on a wheeled chassis so that the bridge can be easily transported into position, the wheeled chassis thereafter being removed.

CLAIMS

1. A bridge construction comprising a plurality of adjacent substantially rectangular solid blocks extending to form longitudinal lines of blocks, these longitudinal lines of blocks being assembled adjacent one another to form transverse lines of blocks, each block being tapered in its end faces in a direction from its upper face to its lower face, there being a rod under tension extending through each longitudinal line of blocks from end to end of the line and acting to compress the blocks in each longitudinal line together, and the tapering in the blocks acting to cause each longitudinal line of blocks to form an upwardly extending arcuate curve from end to end of the longitudinal line.

2. A bridge construction as claimed in claim 1, wherein there are four of said tensioned rods extending through each said longitudinal line of blocks.

3. A bridge construction as claimed in claim 1 or 2, wherein the blocks have been fashioned from a hardwood.

4. A bridge construction as claimed in claim 1, 2 or 3, wherein the rods are of mild bright steel.

5. A bridge construction as claimed in any one of the preceding claims, wherein the ends of each rod extend beyond the ends of the longitudinal lines of blocks and are screw-threaded and receive tightening nuts, by which means the rods are tensioned.

6. A bridge construction as claimed in claim 5, wherein a plate is provided at each end of each longitudinal line of blocks, against which plate the tightening nuts bear.

7. A bridge construction as claimed in any one of the preceding claims, wherein adjacent longitudinal lines of blocks are held together by further rods under tension extending through a plurality of the tranverse lines of blocks.

8. A bridge construction as claimed in any one of the preceding claims, wherein uprights are provided at interval on one or both sides of the bridge, the uprights being interconnected on a respective side of the bridge by a rail composed of a plurality of longitudinally-extending members joined together under compression by a rod passing through them from end to end under tension.

9. A bridge construction as claimed in claim 8, wherein a guard rail interconnects said uprights on a respective side of the bridge, said guard rail being positioned beneath the firstmentioned rail.

10. A bridge construction as claimed in any one of the preceding claims, wherein said blocks each have a 2° taper from top to bottom.

11. A bridge construction as claimed in any one of the preceding claims, wherein each rod extending through the longitudinal lines of blocks is of 10 mm diameter.

12. A bridge construction, substantially as hereinbefore described with reference to the accompanying drawings.

13. A method of building a bridge, comprising assembling a plurality of adjacent substantially rectangular solid blocks adjacent one another to form longitudinal lines of blocks, each block being tapered in its end faces in a direction from its upper face to its lower face, assembling these longitudinal lines of blocks

adjacent one another to form transverse lines of blocks, inserting a rod through each longitudinal line of blocks from end to end of the line, and tensioning each rod to compress the blocks in each longitudinal line together, the taper of each block acting to cause each longitudinal line of blocks to form an upwardly extending arcuate curve from end to end of the longitudinal line.

14. A method as claimed in claim 13, wherein parts of the bridge are mounted on a wheel chassis to enable the bridge to be transported into position, the wheeled chassis thereafter being removed.

15. A method of building a bridge, substantially as hereinbefore described with reference to the accompanying drawings.

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