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(54) **REBAR, BEAM AND MESH HIGHCHAIR**

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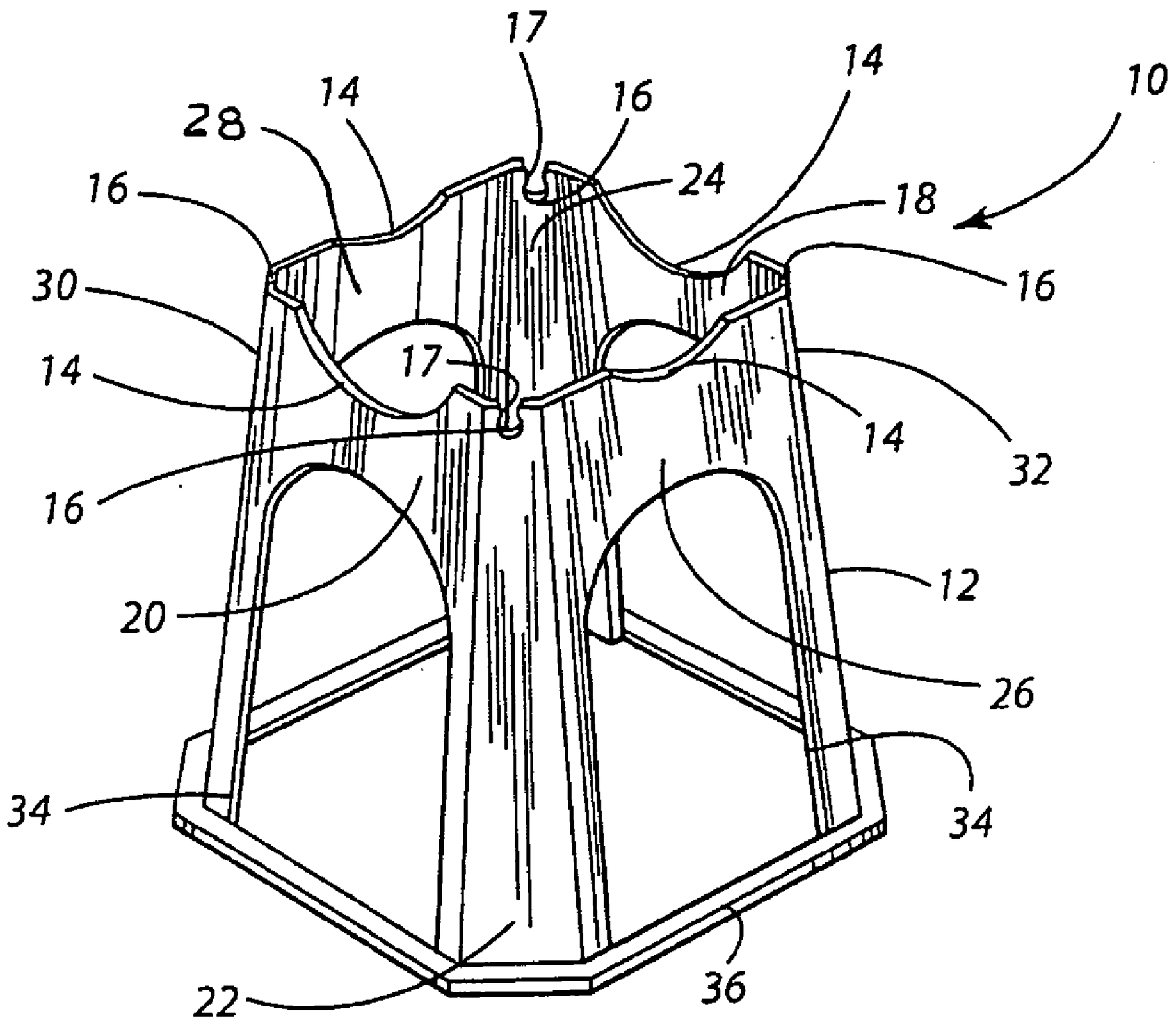
(57) **ABSTRACT**

An apparatus for supporting a reinforcing element during the pouring of concrete includes a body having both a reinforcing bar bearing indentation and a concrete mesh bearing notch.



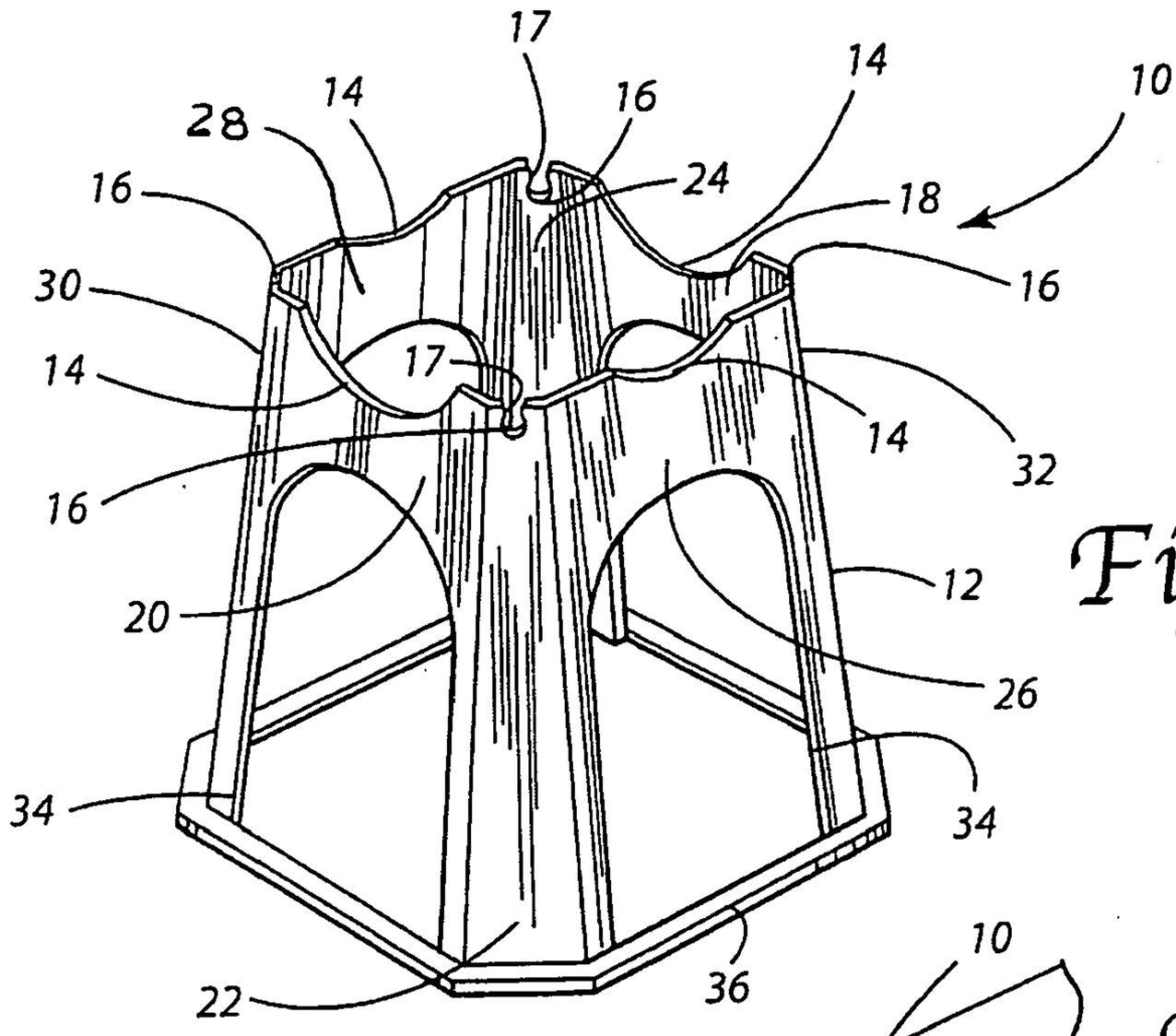

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Fig. 1

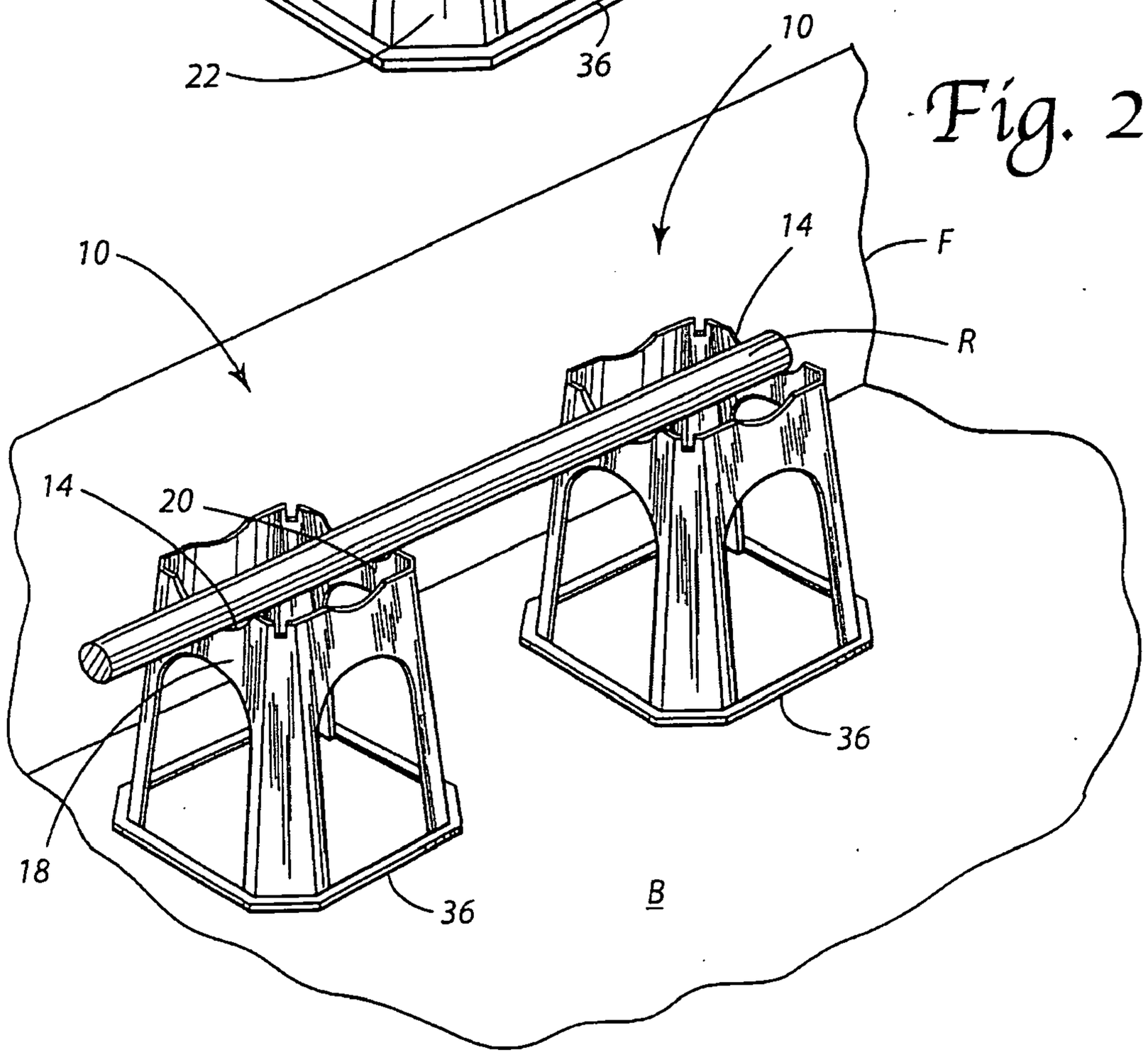
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Fig. 2

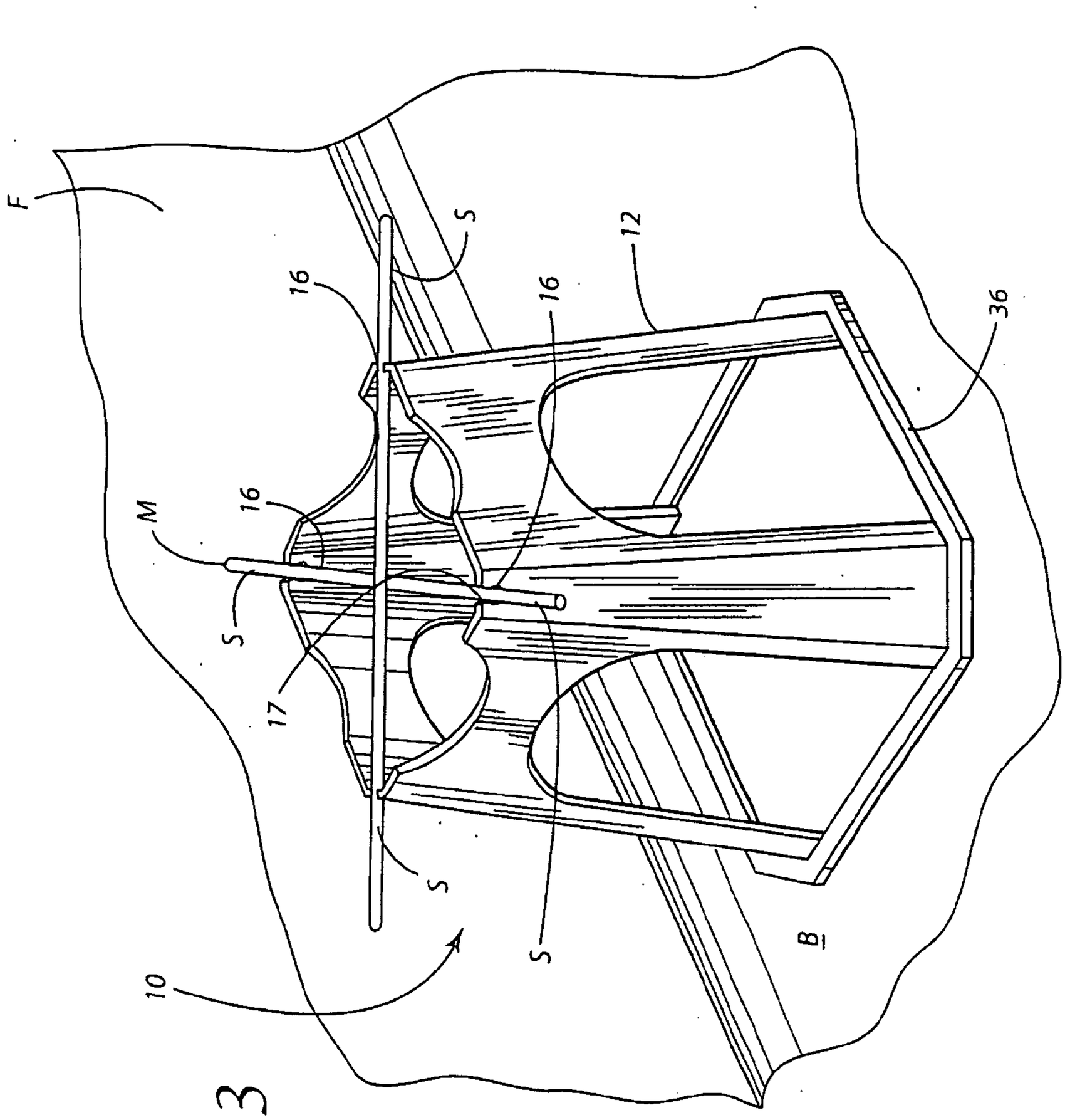

Fig. 3

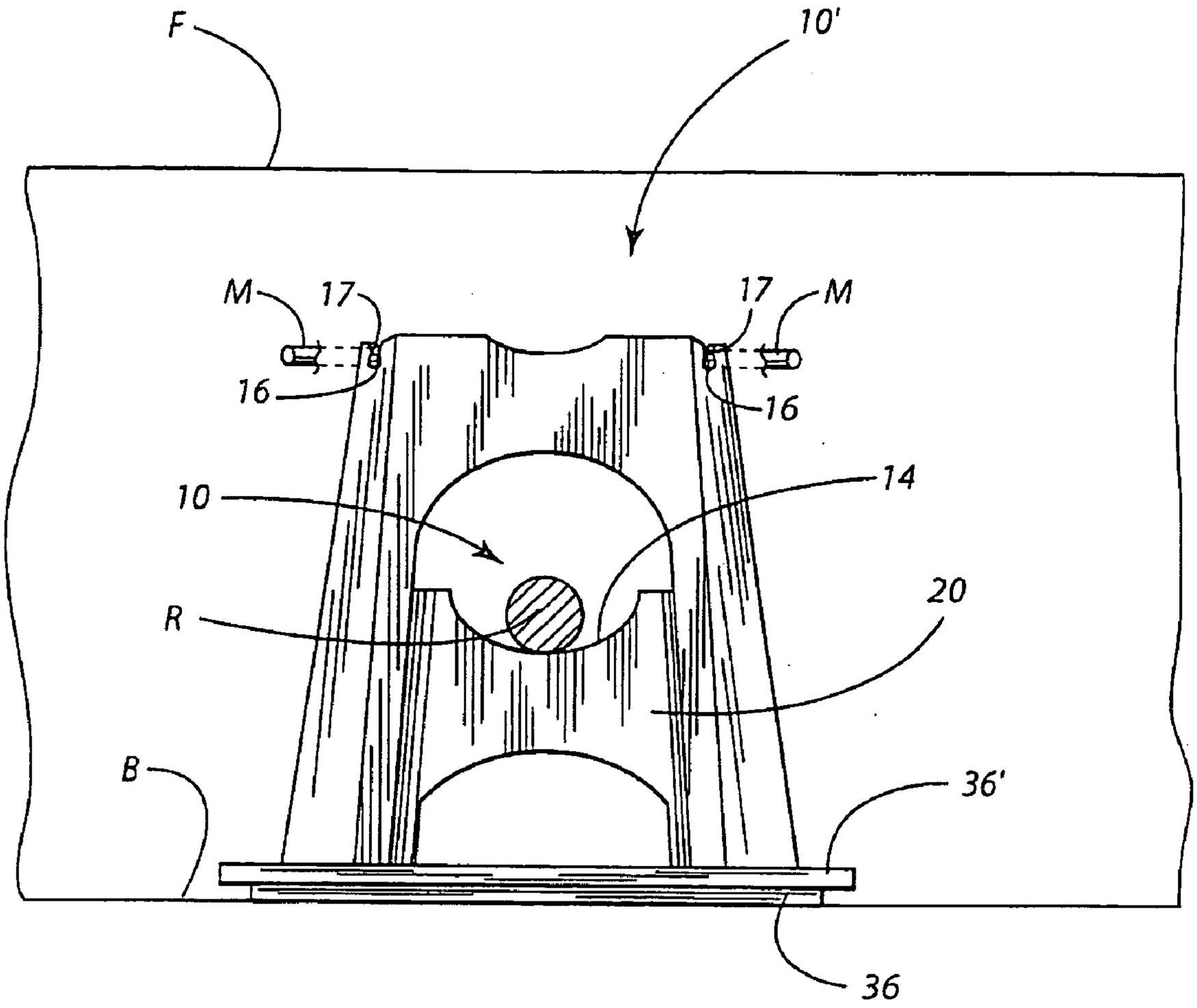

Fig. 4

REBAR, BEAM AND MESH HIGHCHAIR

[0001] This application is a continuation of U.S. patent application Ser. No. 11/333,424 filed on 17 Jan. 2006 which claims the benefit of U.S. Provisional Patent Application Ser. No. 60/644,694 filed on Jan. 18, 2005.

TECHNICAL FIELD

[0002] The present invention relates generally to devices utilized in the construction field and more particularly to an apparatus or highchair for supporting a reinforcing element in freshly poured concrete.

BACKGROUND OF THE INVENTION

[0003] Reinforced concrete construction is well known in the art. Applications include but are not limited to sidewalks, floors, roadways, walls of buildings and the like. One method of concrete reinforcement involves the utilization of metal bars or rods known as rebar. Another involves the use of concrete mesh typically made from metal wire.

[0004] Specifically, the reinforcing element is positioned in the concrete in one or more layers between the upper and lower surfaces. In order to achieve this end an apparatus or device, commonly known as a spacer, bolster or chair is utilized to hold the reinforcement element in the desired position between the upper and lower surfaces of the concrete to be poured. More specifically, the workers prepare the lower surface of the form structure. The spacers, chairs or bolsters are then positioned on the prepared surface for supporting the reinforcement element in a plane generally parallel to the prepared surface but vertically spaced from that surface. The reinforcement element is then positioned on the spacer, bolster or chair. The concrete is then poured into the form so as to fully surround the reinforcement element.

[0005] The present invention relates to a new and improved apparatus for supporting a reinforcement element in freshly poured concrete.

SUMMARY OF THE INVENTION

[0006] In accordance with the purposes of the present invention as described herein, an apparatus is provided for supporting a reinforcing element in freshly poured concrete. That apparatus comprises a body including a reinforcing bar bearing indentation and a concrete mesh bearing notch. The concrete mesh bearing notch includes three concrete mesh engaging edges. The concrete mesh bearing notch has a width of between about ⅜ to about 5/16 inch and a depth of between about ⅜ to about 5/16 inch. Further the concrete mesh bearing notch has a narrow neck.

[0007] The reinforcing bar bearing indentation has a radius of curvature of between about 150 and about 195 inches. In addition the body includes eight sides. The body also includes an annular base connecting the eight sides. Further, in accordance with one possible embodiment of the present invention the body includes multiple reinforcing bar bearing indentations and multiple concrete mesh bearing notches.

[0008] In the alternative the body may be described as including a first sidewall, a second sidewall, a third sidewall and a fourth sidewall. The first sidewall and second sidewall are opposed and both the first and second sidewalls include one reinforcing bar bearing indentation. The third sidewall and fourth sidewall are opposed and both the third and fourth sidewalls include one concrete mesh bearing notch. Still further the body may be described as including a fifth sidewall, a sixth sidewall, a seventh sidewall and an eighth sidewall. The fifth and sixth sidewalls are opposed and each includes one reinforcing bar bearing indentation. The seventh and eighth sidewalls are also opposed and each includes one concrete mesh bearing notch.

[0009] Still further describing the invention the reinforcing bar bearing indentations in the first and second sidewalls are aligned along a first line and the reinforcing bar bearing indentations in the fifth and sixth sidewalls are also aligned along a second line. The first and second lines are substantially perpendicular to one another.

[0010] Still further the concrete mesh bearing notches in the third and fourth sidewalls are aligned along a third line and the concrete mesh notches in the seventh and eighth sidewalls are aligned along a fourth line. The third and fourth lines are substantially perpendicular to one another. Each reinforcing bar bearing indentation has a radius of curvature of between about 150 and about 195 inches. Each concrete mesh bearing notch has a width of between about ⅜ and about 5/16 inch and a depth of between about ⅜ and about 5/16 inch. Further each concrete mesh bearing notch includes an edge for positively engaging and holding the concrete mesh. Further the body includes an annular base engaging the first, second, third, fourth, fifth, sixth, seventh and eighth sidewalls.

[0011] In the following description there is shown and described a preferred embodiment of this invention, simply by way of illustration of one of the modes best suited to carry out the invention. As it will be realized, the invention is capable of other different embodiments and its several details are capable of modification in various, obvious aspects all without departing from the invention. Accordingly, the drawings and descriptions will be regarded as illustrative in nature and not as restrictive.

BRIEF DESCRIPTION OF THE DRAWING

[0012] The accompanying drawing incorporated in and forming a part of this specification, illustrates several aspects of the present invention, and together with the description serves to explain certain principles of the invention. In the drawing:

[0013] FIG. **1** is a perspective view of the apparatus of the present invention;

[0014] FIG. **2** is a perspective view illustrating how multiple high chairs of the type illustrated in FIG. **1** are utilized to support rebar in a concrete form;

[0015] FIG. **3** is a perspective view illustrating how the apparatus of FIG. **1** may be used to support concrete mesh in a form; and

[0016] FIG. **4** is a detailed side elevational view illustrating how the highchairs may be "stacked" to support rebar and mesh in a concrete form.

[0017] Reference will now be made in detail to the present preferred embodiment of the invention, an example of which is illustrated in the accompanying drawing.

DETAILED DESCRIPTION OF THE INVENTION

[0018] Reference is now made to FIG. **1** illustrating the apparatus or highchair **10** of the present invention. The apparatus includes a body **12** constructed of a non-biodegradable material. The non-biodegradable material is impervious to water and is preferably both shatter resistant and sag resistant

within a temperature range between 220° and −40° F. Examples of such material include ABS plastic, polycarbonates, polybutyleneterephthalates, polyphenylene oxides and any mixtures thereof. Advantageously, utilization of any of these resins allows the simple and relatively inexpensive injection molding of the apparatus **10** of the present invention in one strong, lightweight piece.

[0019] The body **10** includes at least one reinforcing bar bearing indentation **14** and at least one concrete mesh bearing notch **16**. Each reinforcing bar bearing indentation **14** is specifically sized and shaped to receive a reinforcing bar such as steel rebar which may be utilized in various diameters typically of one-half inch or more to reinforce concrete. In the illustrated embodiment the reinforcing bar bearing indentation **14** has a radius of curvature of between about 150 and about 195 inches. Thus, the indentation **14** is deepest in the middle so that the rebar, which is round in cross section, tends to rest in the middle of each indentation over the center of the apparatus **10**. In this way the rebar is held in position on the apparatus **10** with the weight over the center of the apparatus so as to avoid tipping of the apparatus.

[0020] Each concrete mesh bearing notch **16** is sized and shaped to positively engage and hold a concrete mesh reinforcing element. More specifically, each notch **16** has a width and depth of between about ⅜ inch and about 5/16 inch. As illustrated, the notch **16** may be provided with a relatively wide width at the bottom and a partially closed, narrower width or neck **17** at the top. As a consequence, the notch **16** has a tendency to positively engage and hold concrete mesh in a manner described in greater detail below.

[0021] More specifically describing the invention, the body **12** may include eight walls. The first wall **18** is opposed by the second wall **20**. The third wall **22** is opposed by the fourth wall **24**. The fifth wall **26** is opposed by the sixth wall **28**. Finally, the seventh wall **30** is opposed by the eighth wall **32**. Each of the opposing first and second walls **18**, **20** includes a reinforcing bar bearing indentation **14**. Similarly, each of the opposing fifth and sixth walls **26**, **28** includes a reinforcing bar bearing indentation **14**. The indentations **14** in the first and second walls **18**, **20** are aligned on a first plane while the indentations in the fifth and sixth walls **26**, **28** are aligned on a second plane. The first and second planes are substantially perpendicular to one another.

[0022] In the illustrated embodiment, the indentations **14** in the first and second walls **18**, **20** are deeper and have a smaller radius of curvature than the indentations **14** in the fifth and sixth walls **26**, **28**. In either case, however, it should be appreciated that indentations **14** are provided in the opposing walls in order to allow the apparatus **10** to support a long piece of rebar extending past each opposing wall.

[0023] As should also be appreciated, each opposing third and fourth wall **22**, **24** includes a concrete mesh bearing notch **16**. Similarly, each opposing seventh and eighth wall **30**, **32** also include a concrete mesh bearing notch **16**. The notches **16** in the third and fourth walls **22**, **24** are aligned on a third plane while the notches **16** in the seventh and eighth walls **30**, **32** are aligned on a fourth plane. The third and fourth planes are substantially perpendicular to one another.

[0024] As further illustrated, an annular base **36** interconnects all of the walls **18**, **20**, **22**, **24**, **26**, **28**, **30** and **32** in order to provide additional rigidity and strength to the apparatus **10** and to provide a more stable base to hold the apparatus **10** in an upright position in the concrete form.

[0025] As further illustrated, each of the primary or wider walls **18**, **20**, **26** and **28** that include the indentations **14** also include cutout openings **34**. These openings serve multiple functions. First, they reduce the cost of manufacture by reducing the material needed to produce each apparatus **10**. Additionally, they allow apparatus or chairs **10** of different sizes to be stacked in a form to hold reinforcing elements at different heights during a concrete pour in a manner that will be described in greater detail below.

[0026] Still further it should also be appreciated that the body **12** tapers outwardly from the top to the bottom. This allows a number of the highchairs **10** to be nested together for high density shipping in a smaller container.

[0027] Use of the apparatus **10** of the present invention will now be described with reference to FIGS. **2-5**. As illustrated in FIG. **2**, the apparatus **10** is placed at the bottom B or on the floor of the form F. Advantageously, the base **36** provides a wide stance relative to the tapered top of the apparatus **10** so as to resist tipping. A length of steel reinforcing bar R is supported on the apparatus **10** with the bar resting in the bottom of the indentations **14** in the opposing first and second walls **18**, **20**. As should be appreciated, any number of highchairs **10** may be spaced at desired intervals to support a length of reinforcing bar R in the form F prior to the pouring of concrete.

[0028] As illustrated in FIG. **3**, the apparatus **10** is equally adapted for supporting concrete mesh M. More specifically, the apparatus **10** is positioned with the annular base **36** engaging the bottom B of the form F. The concrete mesh M is then placed on the apparatus **10** so that the individual wire strands S are received in at least one and more typically each of the four notches **16**. As should be appreciated, the notches **16** are each sized so that the edges of the notches **16** positively engage and hold one of the strands S at three points along the bottom and sides of the notch. Further, note how the narrow neck **17** of each notch **16** closes over the strand S to positively engage and hold the strand in position. Once again, one uses as many of the highchairs **10** as necessary to support the concrete mesh M at spaced locations so that the mesh is held at the desired height in the form F prior to the pouring of concrete.

[0029] Reference is now made to FIG. **4** illustrating how highchairs **10** of the present invention may be made of varying heights and utilized together to hold reinforcing elements in different planes at different vertical heights in a form F. As illustrated, a first relatively short apparatus or highchair **10** is positioned on the bottom B of the form F. A second, taller apparatus or highchair **10'** is also positioned with a base **36'** engaging the bottom B of the form F. If desired, the second highchair **10'** may be positioned nesting over the shorter highchair **10** as illustrated. Alternatively, they may be provided at completely different positions in the form F.

[0030] In the illustration, reinforcing bar R is supported on the shorter apparatus or highchair **10** while concrete mesh M is supported at a higher vertical height in a separate plane by the taller apparatus or highchair **10'**. Of course, it should be appreciated that the highchairs **10**, **10'** could both be used to support concrete mesh M or reinforcing bar R if desired. Alternatively, additional layers of reinforcing elements could be provided in still more planes vertically spaced from one another by utilizing apparatus or highchairs of the present invention of additional, other heights.

[0031] The embodiment was chosen and described to provide the best illustration of the principles of the invention and

its practical application to thereby enable one of ordinary skill in the art to utilize the invention in various embodiments and with various modifications as are suited to the particular use contemplated. All such modifications and variations are within the scope of the invention as determined by the appended claims when interpreted in accordance with the breadth to which they are fairly, legally and equitably entitled. The drawings and preferred embodiment do not and are not intended to limit the ordinary meaning of the claims and their fair and broad interpretation in any way.

What is claimed:

1. An apparatus for supporting a reinforcing element in freshly poured concrete, comprising:

a body including a reinforcing bar bearing indentation and a concrete mesh bearing notch.

2. The apparatus of claim **1**, wherein said concrete mesh bearing notch includes three concrete mesh engaging edges.

3. The apparatus of claim **1**, wherein said concrete mesh bearing notch has a width of between about ⅜ to about 5/16 inch and a depth of between about ⅜ to about 5/16 inch.

4. The apparatus of claim **3**, wherein said concrete mesh bearing notch has a narrow neck.

5. The apparatus of claim **1**, wherein said reinforcing bar bearing indentation has a radius of curvature of between about 150 and about 195 inches.

6. An apparatus for supporting a reinforcing element in freshly poured concrete, comprising:

a body including eight side walls forming four sets of opposing sidewalls connected together by an annular base.

7. The apparatus of claim **6**, including reinforcing bar bearing indentations and concrete mesh bearing notches in alternating sets of said four sets of opposing sidewalls.

8. The apparatus of claim **1**, wherein said body includes multiple reinforcing bar bearing indentations and multiple concrete mesh bearing notches.

9. The apparatus of claim **8**, wherein said body includes a first sidewall, a second sidewall, a third sidewall and a fourth sidewall.

10. The apparatus of claim **9**, wherein said first sidewall and said second sidewall are opposed and both said first sidewall and said second sidewall include one reinforcing bar bearing indentation.

11. The apparatus of claim **10**, wherein said third sidewall and said fourth sidewall are opposed and both said third sidewall and said fourth sidewall include one concrete mesh bearing notch.

12. The apparatus of claim **11**, wherein said body further includes a fifth sidewall, a sixth sidewall, a seventh sidewall and an eighth sidewall.

13. The apparatus of claim **12**, wherein said fifth sidewall and said sixth sidewall are opposed and both said fifth sidewall and said sixth sidewall include one reinforcing bar bearing indentation.

14. The apparatus of claim **13**, wherein said seventh sidewall and said eighth sidewall are opposed and both said seventh sidewall and said eighth sidewall include one concrete mesh bearing notch.

15. The apparatus of claim **14**, wherein said reinforcing bar bearing indentations in said first sidewall and said second sidewall are aligned along a first line and said reinforcing bar bearing indentations in said fifth sidewall and said sixth sidewall are aligned along a second line wherein said first line and said second line are substantially perpendicular to one another.

16. The apparatus of claim **15**, wherein said concrete mesh bearing notches in said third sidewall and said fourth sidewall are aligned along a third line and said concrete mesh bearing notches in said seventh sidewall and said eighth sidewall are aligned along a fourth line wherein said third line and said fourth line are substantially perpendicular to one another.

17. The apparatus of claim **16**, wherein each said reinforcing bar bearing indentation has a radius of curvature of between about 150 and about 195 inches.

18. The apparatus of claim **17**, wherein each said concrete mesh bearing notch has a width of between about ⅜ and about 5/16 inch and a depth of between about ⅜ and about 5/16 inch.

19. The apparatus of claim **16**, wherein each said concrete mesh bearing notch includes an edge for positively engaging and holding concrete mesh.

20. The apparatus of claim **16**, wherein said body further includes an annular base engaging said first, second, third, fourth, fifth, sixth, seventh and eighth sidewalls.

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