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RUNNER RING

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FIG. 1.

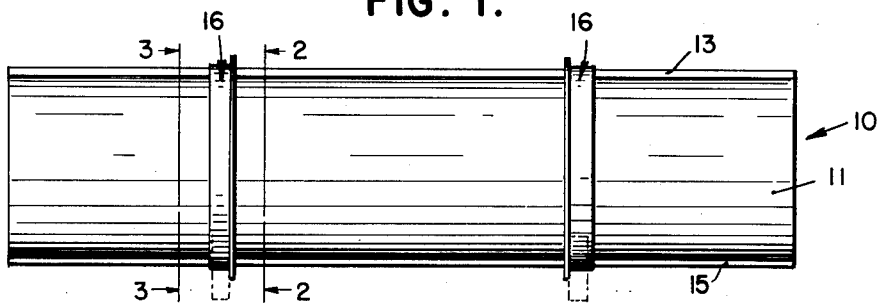

FIG. 2.

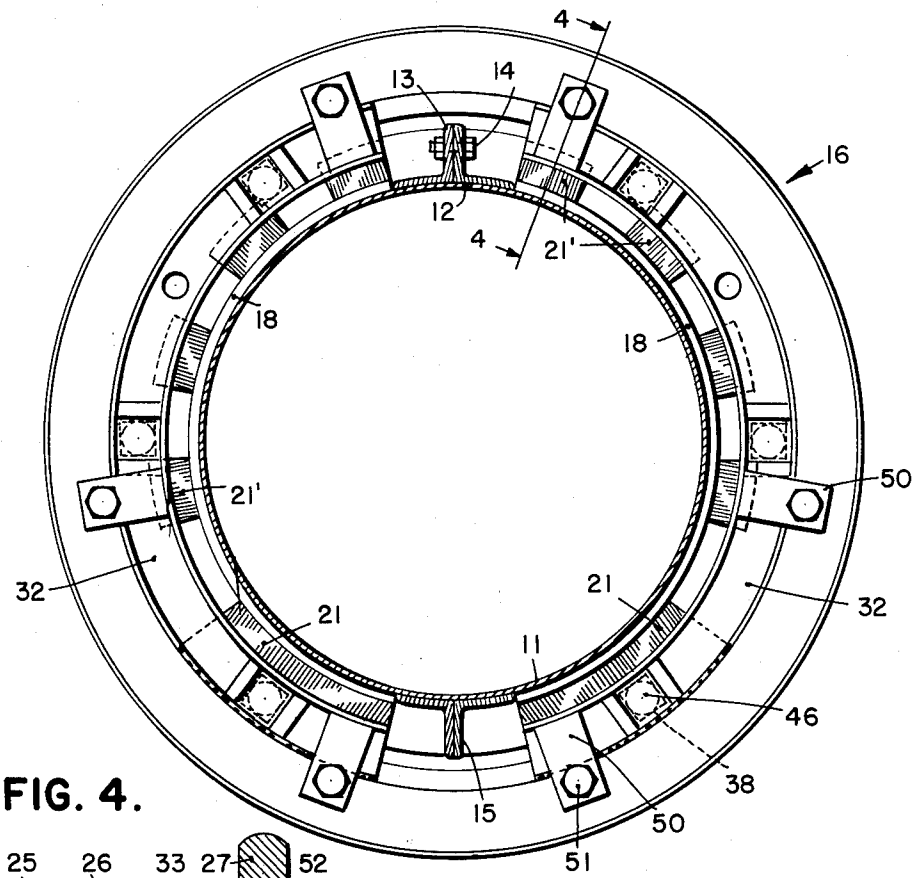

FIG. 4.

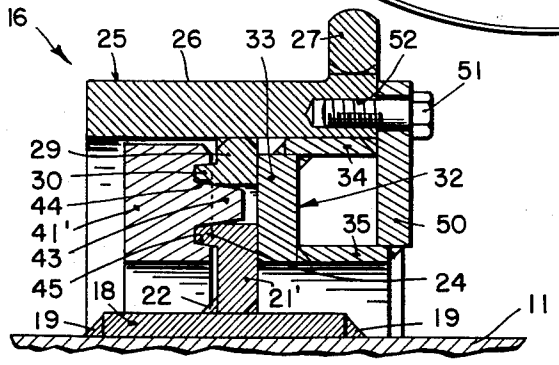

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FIG. 3.

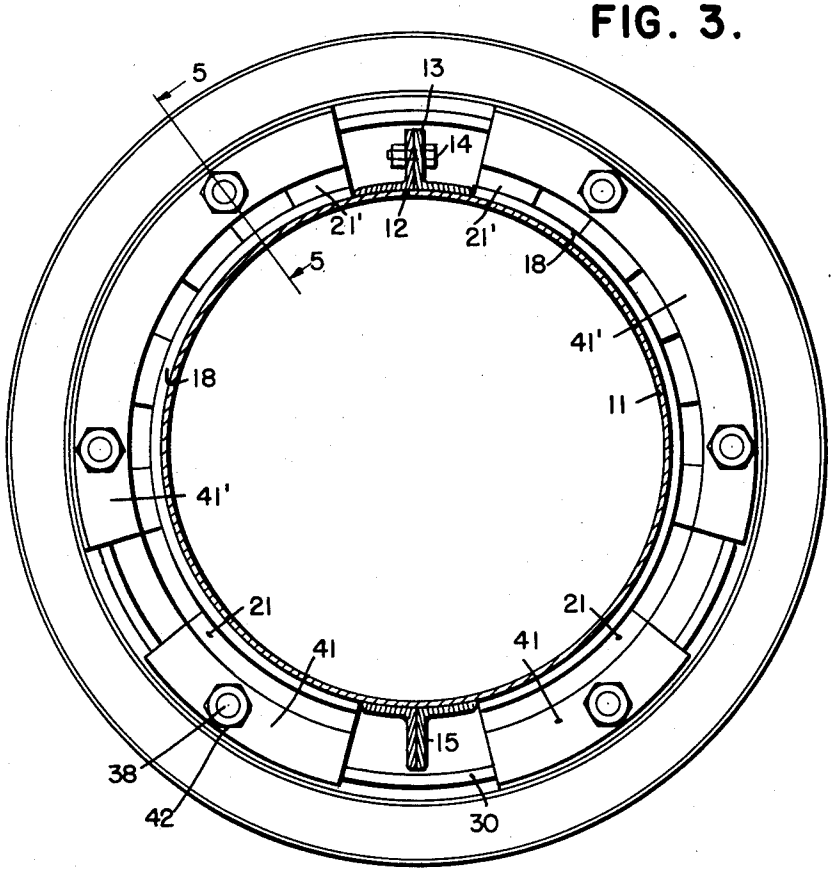

FIG. 5.

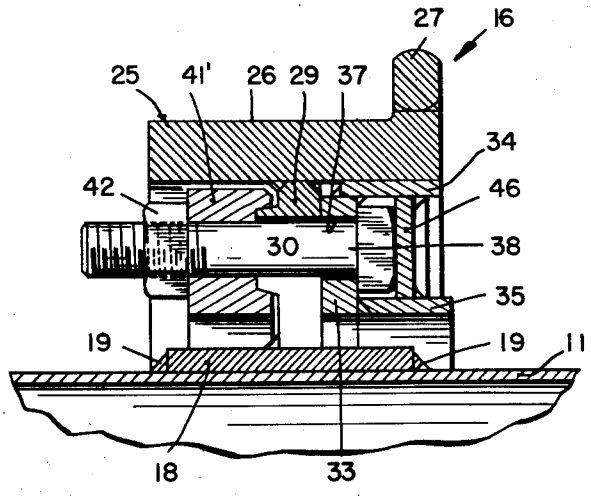

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FIG. 6.

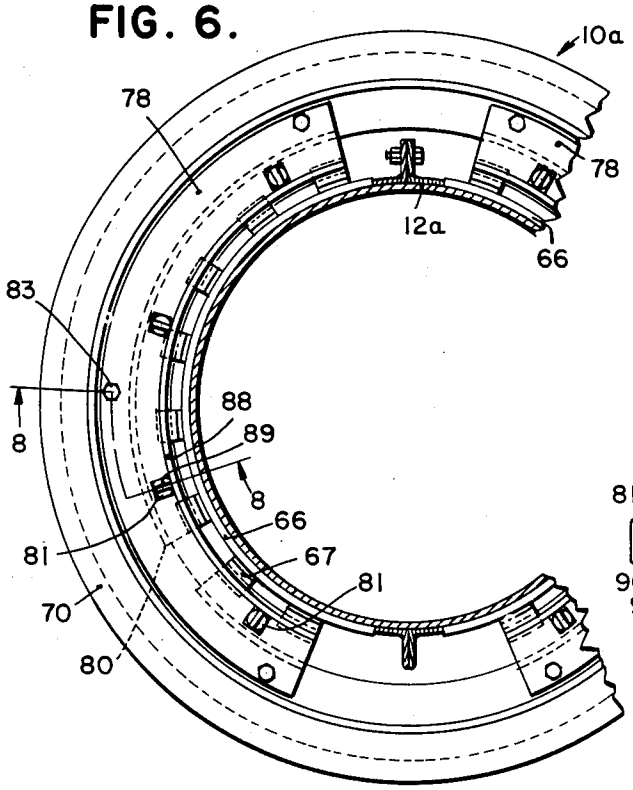

FIG. 8.

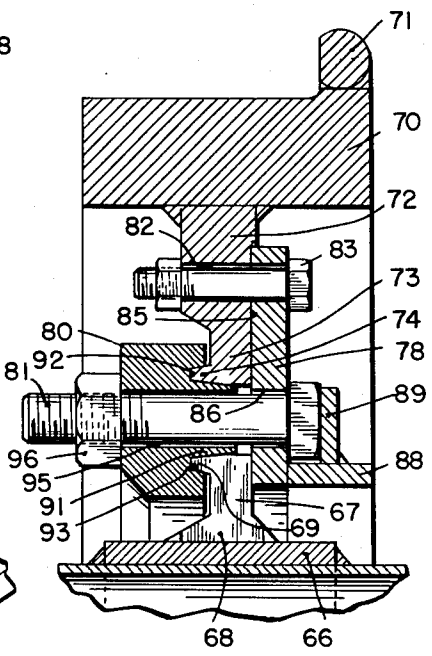

FIG. 7.

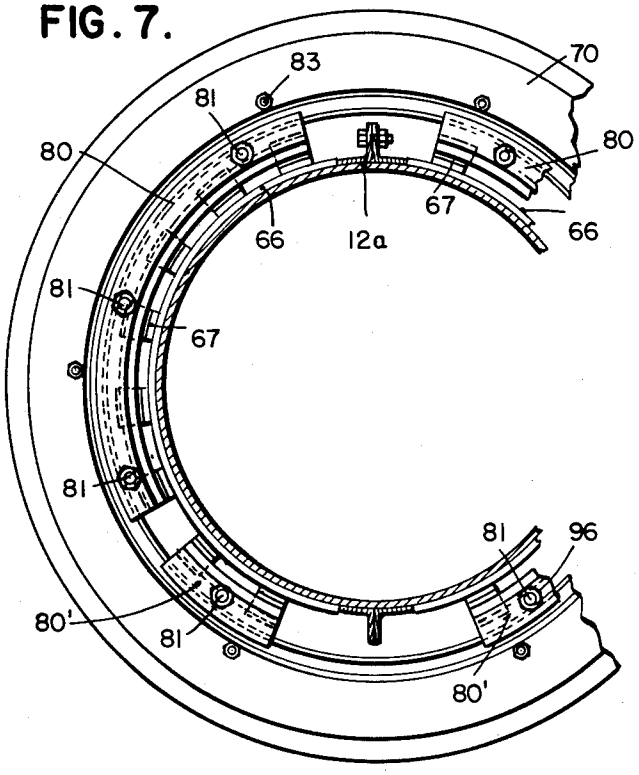

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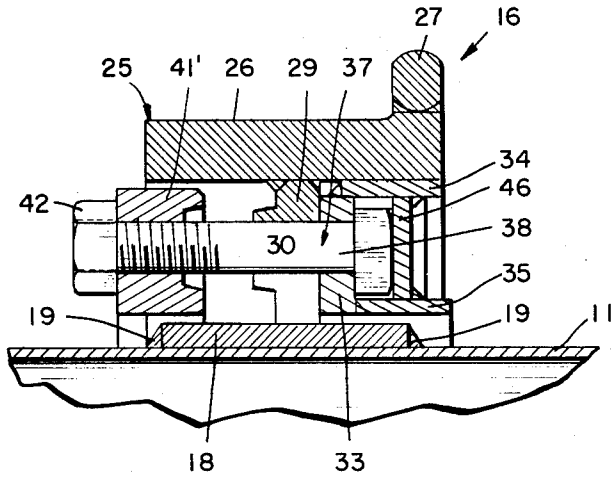
FIG. 5A.



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United States Patent Office 2,754,563 Patented July 17, 1956

2,754,563

RUNNER RING

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Application November 8, 1951, Serial No. 255,441

12 Claims. (Cl. 25—126)

This invention has to do generally with the making of centrifugally spun concrete pipe and particularly with the molds for such pipe.

In the manufacture of centrifugally spun concrete pipe, the mold is supported upon two or more pairs of trunnions or rollers, one or more of the rollers being driven to impart rotation to the mold. Usually the mold is provided with runner rings each of which may be likened to a circular track around the periphery of the mold, and these rest on the trunnions or rollers.

The molds are longitudinally split from end to end at one or more places in order to permit removal of the completed pipe from the mold. In view of this the runner rings must either permit of the expansion of the mold while on the mold or must be removable for this purpose. It has been customary to use runner rings which are detachably mounted upon the mold and secured by bolts. These are not entirely satisfactory because they come loose in the operation of spinning the mold with consequent jarring and damage to both the pipe mold and the runner rings. Some attempts have been made to provide a runner ring which is permanently attached to the pipe mold and provides space within itself for the expansion of the mold when the same is opened to remove the completed pipe. This latter type of runner ring construction, so far as I am aware, has not proved rugged enough to successfully withstand the abuse it must take. As a result this type often vibrates so badly as to cause cracking of the mold or the runner ring itself.

An object of this invention is to provide a novel runner ring construction which overcomes the above-noted disadvantages of presently used or known types of runner ring assemblies and which has certain advantageous features thereover.

A particular object is to provide a runner ring assembly which is essentially simple in construction, which is easy to assemble upon the pipe mold, and which, when assembled, provides a rigid structure concentric with the pipe mold and presenting a smooth circular track or runner ring to run upon the trunnions or mold-supporting rollers.

Another object is to provide a runner ring assembly embodying parts which are rigidly attached to the pipe mold and other parts which are detachably secured thereto which may be partially disassembled to permit of the expansion of the pipe mold for the purpose of removing the formed pipe. Another object in this connection is the provision of such a runner ring assembly wherein the outer or runner ring track portion can be readily removed for refacing.

Another object is to provide a durable construction in a runner ring assembly.

These and other objects will be apparent from the drawings and the following description:

Referring to the drawings, Fig. 1 is a side elevational view of a pipe mold having two runner ring assemblies thereon embodying the invention;

Fig. 2 is a cross section on line 2—2 of Fig. 1 but on an enlarged scale;

Fig. 3 is a cross section on line 3—3 of Fig. 1 on the same scale as Fig. 2;

Fig. 4 is a sectional view on line 4—4 of Fig. 2 but on a larger scale;

Fig. 5 is a section on line 5—5 of Fig. 2 on the same scale as Fig. 4.

Fig. 6 is a partial sectional view similar to Fig. 2 illustrating a modified form of the invention;

Fig. 7 is a partial sectional view similar to Fig. 3 showing the opposite side of the apparatus of Fig. 6; and

Fig. 8 is a section on line 8—8 of Fig. 6.

More particularly describing the invention, numeral 10 generally indicates a pipe mold having a shell 11 which is longitudinally split at 12 from end to end so that it can be partially opened or expanded to facilitate removal of a pipe formed therein. In the region of the split 12 the shell is provided with the flanges 13 which are normally bolted together, as by bolts 14. Diametrically opposite the flanges 13 is a double flange 15 which is provided for the purpose of counter-balancing the flanges 13.

On the mold shell 11 I show a pair of runner ring assemblies, generally indicated by numeral 16. As previously indicated, each of these assemblies is designed to run upon a pair of steel rollers or trunnions for the purpose of supporting and spinning the mold in a manner well known in the art. Referring particularly to Figs. 2 to 5, the construction of these runner ring assemblies will now be described.

Wherever a runner ring is to be mounted, the pipe mold shell 11 is provided with a pair of arcuate base plates 18 which extend around the periphery of the shell between the flanges 13 and 15, being welded thereto as by welds 19. Rigidly mounted on the base plates are a plurality of anchor lugs 21 and 21'. Two anchor lugs 21 which are relatively long are provided one on each side of the flange 15. Spaced circumferentially from the lugs 21 are two groups of shorter lugs 21'. Each group extends from one of the flanges 13 to a point about 90° circumferentially of the mold. The anchor lugs 21 and 21' are preferably welded at 22 to the base plates and each is provided with an axially projecting tapered flange 24.

I also provide what will be termed a runner ring 25 which presents an outer peripheral surface 26 for engagement with the rollers or trunnions and a flange 27 for retaining the runner ring on the trunnions. The runner ring is provided with a radially inwardly extending mounting ring 29 having an axially projecting flange 30 which is similar in cross-section to the flanges 24 on members 21—21'.

On one side I provide a pair of back-up bars, generally indicated by numeral 32. These bars include a main section 33 to which are rigidly secured an outer axially projecting flange 34 and an inner axially projecting flange 35 as by welds as shown. The bars are apertured as at 37 to receive bolts 38 which, in conjunction with tie bars 41 and 41' and nuts 42 are used for securing the runner ring to the anchor lug.

I prefer to provide two relatively short tie bars 41 which are co-extensive in length with the anchor lugs 21 and to provide two tie bars 41' which are co-extensive in length with each group of anchor lugs 21'. One bolt is provided for each tie bar 41 and two bolts for each tie bar 41'.

The tie bars are formed on their inner sides to provide a central tongue 43 and a pair of recesses or grooves, indicated by 44 and 45, are on each side of the tongue. The recesses receive the flanged portions 24 and 30 of the anchor lugs 21—21' and ring 29, respectively, the tongue 43 fitting between these parts. The parts are

tapered somewhat as shown to facilitate seating and rigid assembly thereof.

I prefer to lock the bolts in the back-up bar and for this purpose I provide bolt-head covering plates **46** and bolt-head side plates **47** on the back-up bar, these being welded in place as shown.

The back-up bars are also provided with a plurality of radially extending tabs **50** which are welded to the flanges **34** and **35** of the bars. These tabs are apertured to receive bolts **51** which are received in threaded bores **52** in the runner ring **25**.

In the operation of the runner ring assembly the individual runner rings are assembled on the pipe mold with the pipe secured along the flange **13**. After a pipe has been spun the pipe shell may be expanded without removing the runner ring assemblies from the shell merely by loosening the nuts upon the bolts **38** extending through the tie bars **41'**. This permits sufficient expansion of the pipe shell radially within the runner rings through about 220° of the circumference of the pipe shell to permit easy removal of the formed pipe from the mold. In Fig. 5A I show the parts in expanded position. It will be noted that nut **42** has been backed off sufficiently to permit the tie bar **41'** to be moved to the left sufficiently to withdraw the tongue portion **43** thereof from between the lug **21'** and the mounting ring **29** thereby permitting expansion radially of the lug **21'** and the mold shell within the mounting ring **29**.

Referring now to Figs. 6–8, I show a modified or alternate form of the invention. Numeral **10*a*** generally indicates a pipe mold split at **12*a*** and similar to mold **10** previously shown and described. The runner ring construction includes a pair of base plates **66** of arcuate form which are welded to the periphery of the mold shell as shown. A plurality of mounting lugs **67** of limited length are mounted on the plates **66** as by welding. These are preferably of substantially the same size and are approximately evenly circumferentially spaced. Each mounting lug has a base portion **68** and an axially projecting flange portion **69**. When the mounting lugs are installed and after being welded in place they may be machined to insure their providing surfaces in the region of the flange **69** and on their outer ends which are concentric with the mold shell.

I provide a runner ring **70** which has an external flange **71**. This ring also is provided with an internal or radially inwardly projecting mounting ring **72** which terminates in an end portion **73** of lesser width and an axially projecting flange **74**, similar in cross-sectional shape to the flanges **69** on the mounting lugs.

The runner ring **70** is detachably secured to the mold by means of a pair of back-up bars **78**, a plurality of tie bars **80—80'**, and bolts **81**.

More particularly describing these parts, the back-up bars **78** are each provided with three or more apertures **82** for receiving bolts **83** by means of which the bars are attached to the mounting ring **72** of the runner ring, the ring **72** being provided with a flat surface **85** against which the back-up bars seat. The back-up bars are also provided with four apertures **86** for receiving the aforementioned bolts **81**. If desired, the back-up bars may be provided with a shelf **88** and plate **89** for each bolt head.

On the opposite side of the assembly I provide four of the tie bars **80—80'**. In the region of the split in the mold shell, and extending circumferentially therefrom a little over 90 degrees I position the two long tie bars **80** and beyond these two short bars **80'**. The long tie bars are coextensive in length with the first six mounting lugs and the two shorter tie bars are coextensive with the two mounting lugs on each side farthest from the split in the shell. These tie bars are formed to provide a central tongue **91** which is received between mounting ring **72** of member **70** and the outer portion of the mounting lugs **67**. The tie bars are also provided

with arcuate recesses **92** and **93** to receive the flanged portions **74** and **69**, respectively, of the parts **72** and **67**. The tie bars are also apertured at **95** to receive the bolts **81**. When nuts **96** are tightened on the bolts, the assembly is made secure.

In the assembly of the parts, the back-up bar **78** is secured to the mounting ring **72** of member **70** and these assembled parts are then positioned against the mounting lugs after which the tie bars can be placed in position and secured by bolts **81** and nuts **96**.

After a pipe has been spun in the mold and it is desired to remove the same from the shell it is possible to expand the shell within the runner rings by loosening the bolts **81** extending through tie bars **80** and since these bolts are located between the mounting lugs, the latter may move radially outwardly therebetween. With both constructions disclosed, it is an easy matter to remove the runner ring for resurfacing when necessary.

Although I have shown and described two preferred forms of the invention, I contemplate that various changes and modifications can be made therein without departing from the scope of the invention and I intend to cover such changes and modifications as come within the fair scope of the claims appearing hereinafter.

I claim:

1. In a pipe mold, a longitudinally split cylindrical shell, a plurality of anchor lugs arranged circumferentially of the shell on the periphery thereof, an endless runner ring around said shell adjacent said lugs and spaced radially of the shell, said runner ring being spaced radially outward of said anchor lugs, and means detachably securing said runner ring to said lugs, said last-mentioned means radially overlapping said lugs and said runner ring and being adjustable to permit expansion of said shell within said runner ring.

2. In a pipe mold, a longitudinally split cylindrical shell, a plurality of anchor lugs arranged circumferentially of the shell on the periphery thereof, an endless runner ring around said shell adjacent said lugs and spaced radially of the shell, a mounting ring on said runner ring projecting radially inwardly toward said mounting lugs, back-up bar means overlapping said lugs and said mounting ring on one side thereof, tie bar means overlapping said lugs and said mounting ring on the other side thereof, and bolt means securing said back-up bar and said tie bar.

3. A construction as defined in claim 2 in which said tie bar means and said mounting ring and anchor lugs are formed to provide arcuate interengaging means for prevential radial displacement of said runner ring relative to said anchor lugs.

4. A construction as defined in claim 2 in which said anchor lugs and said mounting ring are provided with axially projecting flange portions and said tie bar means is provided with concentric recesses for receiving the flange portions respectively of the anchor lugs and mounting ring.

5. A construction as defined in claim 2 in which said anchor lugs and said mounting ring are provided with axially projecting flange portions and said tie bar means is provided with concentric recesses for receiving the flange portions respectively of the anchor lugs and mounting ring, and in which said tie bar means is provided with an axially projecting tongue receivable between said mounting ring and said anchor lugs.

6. A construction as defined in claim 2 in which there are a plurality of tie bars.

7. A construction as defined in claim 2 in which there are two back-up bars and a plurality of tie bars.

8. In a pipe mold, a longitudinally split cylindrical shell, a plurality of anchor lugs arranged circumferentially of the shell on the periphery thereof, an endless runner ring around said shell encircling said lugs, a mounting ring on said runner ring projecting radially inwardly toward said mounting lugs, back-up bar means overlapping said lugs and said mounting ring on one side

thereof, tie bar means overlapping said lugs and said mounting ring on the other side thereof, and bolt means securing said back-up and said tie bar, said bolt means being positioned at circumferentially spaced points in regions between said mounting lugs for a substantial proportion of the circumference of the mold on each side of the split thereof.

9. In a pipe mold, a longitudinally split cylindrical shell, a plurality of anchor lugs arranged circumferentially of the shell on the periphery thereof, an endless runner ring around said shell encircling said lugs, a mounting ring on said runner ring projecting radially inwardly toward said mounting lugs, back-up bar means overlapping said lugs and said mounting ring on one side thereof, tie bar means overlapping said lugs and said mounting ring on the other side thereof, bolt means securing said back-up bar and said tie bar, means radially extending circumferentially spaced tabs on said back-up bar, and bolts through said tabs threadedly secured in said runner ring.

10. In a pipe mold, a longitudinally split cylindrical shell, a plurality of anchor lugs arranged circumferentially of the shell on the periphery thereof, an endless runner ring around said shell encircling said lugs, a mounting ring on said runner ring projecting radially inwardly toward said anchor lugs, back-up bar means overlapping said lugs and said mounting ring on one side thereof, tie bar means overlapping said lugs and said mounting ring on the other side thereof, bolt means securing said back-up bar and said tie bar, and bolts securing said back-up bar to said mounting ring.

11. In a pipe mold, a longitudinally split cylindrical shell, a plurality of anchor lugs fixed to said shell and spaced circumferentially thereof, an endless runner ring around said shell, a mounting ring on said runner ring projecting radially inwardly toward said lugs, a pair of back-up bars on one side of said mounting ring and said lugs and overlapping the mounting ring and lugs, a plurality of tie bars on the other side of said mounting ring and said lugs and overlapping said mounting ring and lugs, and bolt means securing said tie bars to said back-up bars, said bolt means being located at points spaced circumferentially of the mold and between said mounting lugs for a substantial distance circumferentially of the mold on each side of the split therein.

12. A construction as defined in claim 11 in which means are provided detachably securing said back-up bar to said mounting ring.

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