Nov. 25, 1958 R. D. THOMAS 2,861,602

COLLAPSIBLE MANDREL FOR MANUFACTURING REINFORCING CAGES

Filed Dec. 21, 1956 3 Sheets-Sheet 1

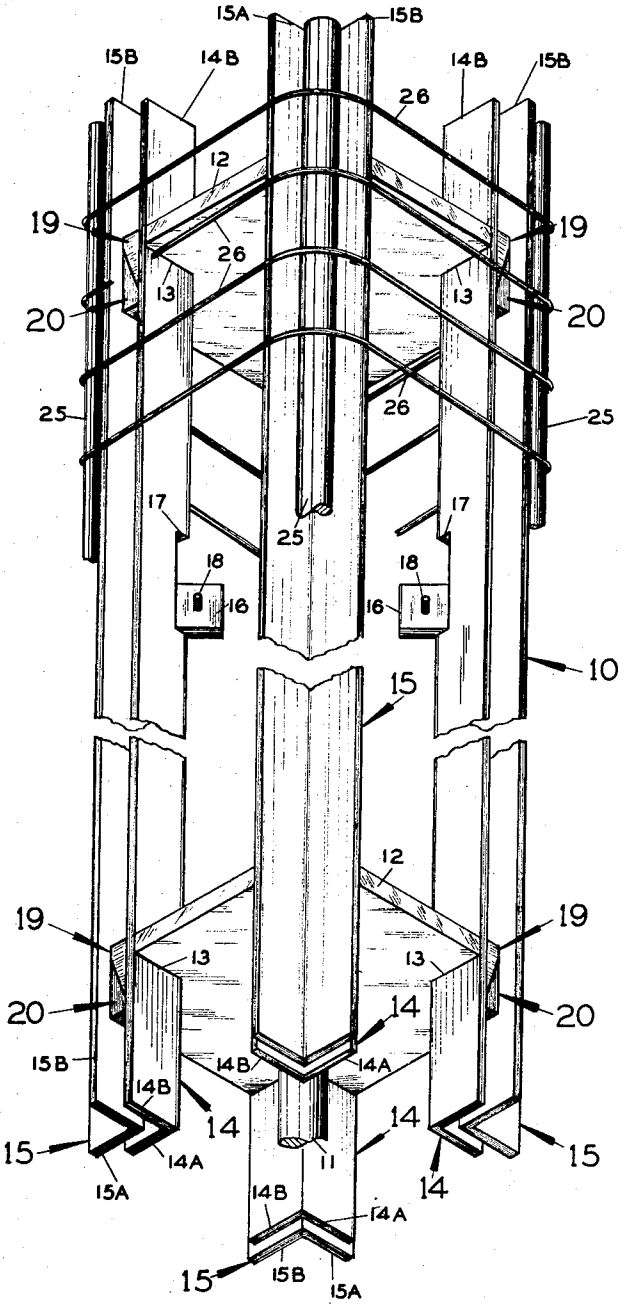


FIG. 1

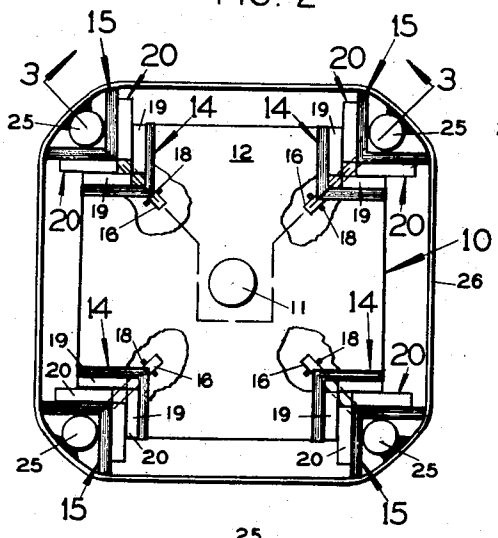
INVENTOR.
RALPH D. THOMAS
BY
Salvatore G. Militana
ATTORNEY

Nov. 25, 1958 R. D. THOMAS 2,861,602

COLLAPSIBLE MANDREL FOR MANUFACTURING REINFORCING CAGES

Filed Dec. 21, 1956 3 Sheets-Sheet 2

FIG. 2



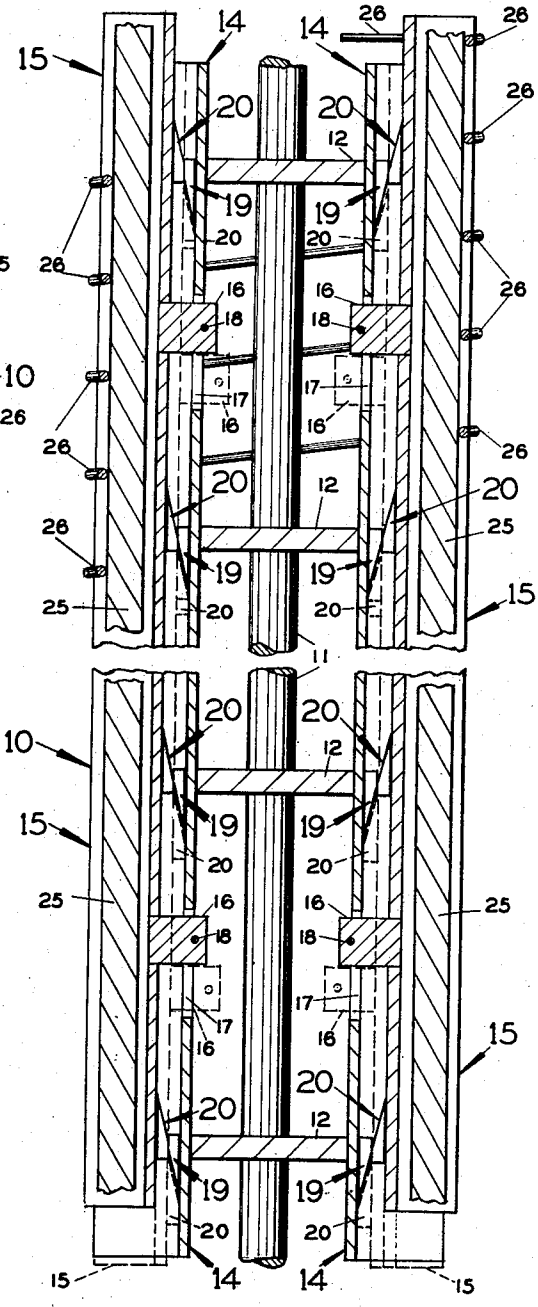


FIG. 3

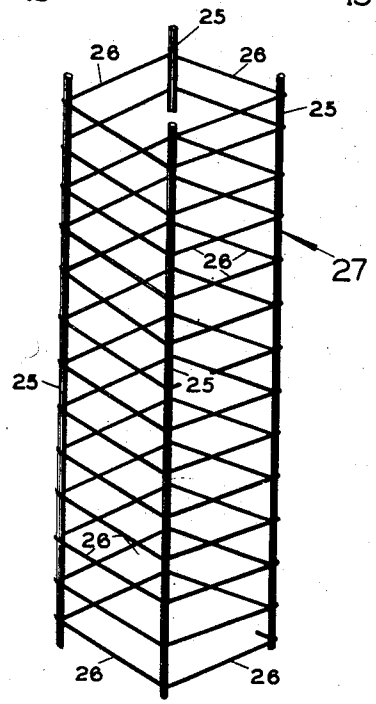


FIG. 5

INVENTOR.
RALPH D. THOMAS
BY
Salvatore G. Militana
ATTORNEY

Nov. 25, 1958 R. D. THOMAS 2,861,602

COLLAPSIBLE MANDREL FOR MANUFACTURING REINFORCING CAGES

Filed Dec. 21, 1956 3 Sheets-Sheet 3

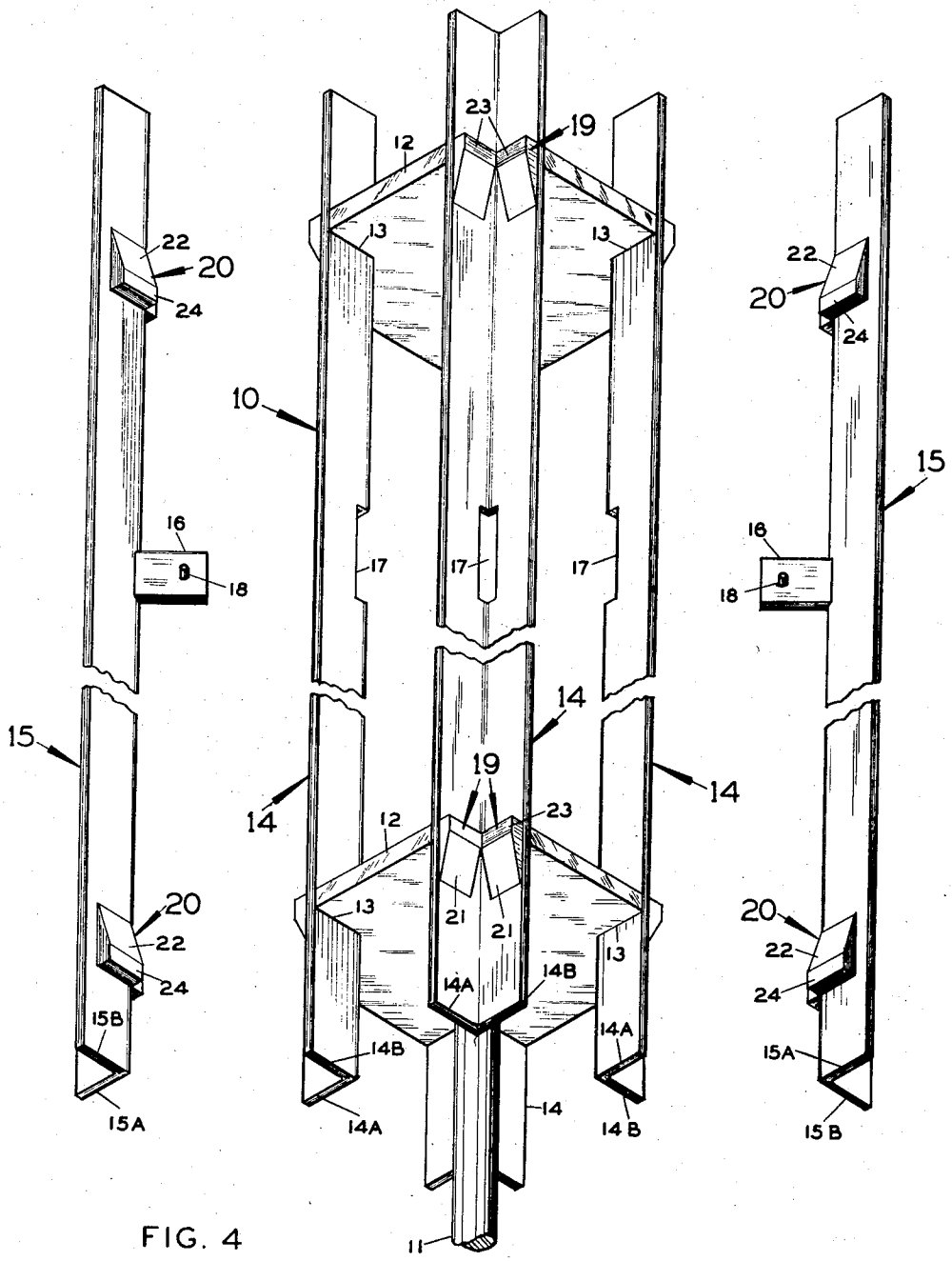


FIG. 4

INVENTOR.
RALPH D. THOMAS
BY
Salvatore G. Militana
ATTORNEY

United States Patent Office

2,861,602

Patented Nov. 25, 1958

2,861,602

COLLAPSIBLE MANDREL FOR MANUFACTURING REINFORCING CAGES

Ralph D. Thomas, Miami, Fla., assignor to Anna M. Sedges, Miami Beach, Fla.

Application December 21, 1956, Serial No. 629,970

1 Claim. (Cl. 140—92.2)

This invention relates to mandrels generally and is more particularly directed to collapsible mandrels utilized in the manufacture of reinforcing cages to be placed in poured concrete piling, columns and the like.

A principal object of the present invention is to provide a collapsible mandrel for the production of reinforcing cages which readily release the cage from the mandrel along their four sides after being formed and welded to permit the removal of the reinforcing cage from the mandrel with ease.

A further object of the present invention is the provision of a collapsible mandrel for manufacturing reinforcing cages described as above which permits the production of cages of any desired length, weight or size.

A still further object of the present invention is to provide a collapsible mandrel characterized as above having any number of sides so as to produce reinforcing cages of any desired polygonal cross section.

A still further object of the present invention is to provide a collapsible mandrel consisting of a plurality of inner and outer nesting angle bars mounted on a rotatable shaft for producing reinforcing steel cages which when formed thereon is released for removal by shifting the outer nesting angle bars in the direction of the inner nesting bars.

With these and other objects in view, the invention will be best understood from a consideration of the following detailed description taken in connection with the accompanying drawings forming a part of this specification, with the understanding, however, that the invention is not confined to any strict conformity with the showing of the drawings but may be changed or modified so long as such changes or modifications mark no material departure from the salient features of the invention as expressed in the appended claim.

In the drawings:

Figure 1 is a perspective view of a collapsible mandrel embodying my invention with a reinforcing cage shown in part and in position as manufactured thereon with the mandrel in its contracted condition for removal of the cage.

Figure 2 is a top plan view thereof with the mandrel shown in its expanded condition.

Figure 3 is a cross sectional view taken along the line 3—3 of Figure 2, with the mandrel in its contracted position shown by dotted lines.

Figure 4 is an exploded view thereof with the reinforcing cage not shown.

Figure 5 is a perspective view of a completed reinforcing cage as seen when removed from the mandrel.

Referring to the drawings wherein like numerals are used to designate similar parts throughout the several views, the numeral **10** refers generally to my collapsible mandrel consisting of a main shaft **11** whose ends are mounted on supports (not shown) and provided with power operated drive mechanism (also not shown) for rotating the mandrel **10** in the manufacture of reinforcing cages as is explained in greater detail hereinafter. Mounted

on the shaft **11** is a plurality of support members or plates **12** equally spaced therealong and welded or otherwise secured to the shaft **11** at their mid-portions so as to become integral therewith. The outer periphery of the support plates **12** is provided with recesses **13** to receive therein angle bars or irons **14**. There is shown, by way of illustration, four such angle bars **14** mounted in parallel relation with each other and with the rotatable shaft **11**. However any desired number of such angle bars **14** may be utilized depending upon the desired cross-sectional configuration of the reinforcing cages that is to be produced thereon. For example, if only three angle bars **14** are used, the reinforcing cage that is to be produced will be triangular in cross section, if five angle bars **14** are used then the cage will have five sides, if six angle bars **14** are used, then the cage will be hexagonal in cross section, etc.

Each of the angle bars **14** is provided with leg portions **14A** and **14B** set at approximately right angle to each other. In nesting relation with each of the angle bars **14** there is positioned a similar angle bar **15** lying along the full length of the angle bars **14** having leg portions **15A** and **15B** lying in parallel relation with the leg portions **14A** and **14B** of the angle bars **14**. The sliding movements of the outer angle bars **15** with relation to the inner angle bars **14** are limited by virtue of a plurality of stop members **16** welded or otherwise secured to the outer edge portions of the outer angle bars **15** and extending inwardly through slots **17** formed in the inner angle bars **14**. The length of the slots **17** determines the length of travel of the outer angle bars **15** on the inner angle bars **14**. A pin **18** which is mounted at the free end of each of the stop members **16** prevents the nesting angle bars **14** and **15** from becoming inadvertently separated. Means are provided for collapsing and expanding the outer angle bars **15** comprising a plurality of wedges **19** mounted on each of the leg portions **14A** and **14B** of the inner angle bars **14** and a plurality of similarly positioned wedges **20** on the leg portions **15A** and **15B** of the outer angle bars **15**. The wedges **19** and **20** are in opposed contact relationship with their respective inclined surfaces **21** and **22** facing in a direction toward each other as best shown by Figure 3 and their elevated surfaces **23** and **24** mounted adjacent the inclined surfaces **21** and **22** respectively.

With the construction as described above, when the mandrel **10** is in its contracted or collapsed position, the outer angle bars **15** are at the position in which they are closest to the inner angle bars **14** as shown by Figure 1 and by the dotted lines in Figure 3. In this position the inclined surfaces **21** and **22** of the wedges **19** and **20** respectively are in contact relation with each other. Also, the stop members **16** will be in abutting relation with one end of the slots **17**, namely the lower end of the slots **17** as viewed in Figure 1. When the outer angle bars **15** are slid along the inner angle bars **14** to their other extreme position wherein the stop members **16** abut against the other end of the slots **17**, the wedges **20** will slide on the wedges **19** until the elevated surface **24** of the wedge **15** has come to rest upon the elevated surface **23** of the wedge **19** during this sliding movement, the outer angle bars **15** have moved outwardly in a direction away from the main shaft **11**, a distance equal to the thickness of the wedges **19** and **20**. That distance may be noted in Figure 3 which shows the distended position of the angle bars **15** in solid lines and their contracted positions by dotted lines.

In the normal operation of the mandrel **10**, the angle bars **15** are slid along the inner angle bars **14** to their distended or expanded position with the stop members **16** abutting against the upper end of the slots **17** and the elevated surfaces **23** and **24** of the wedges **19** and **20** respectively in contact relationship with each other. The angle

bars **15** are now in the position at which they are the farthest away from the shaft **11**. A reinforcing steel bar **25** is placed in each of the angle bars **15** and a binding wire **26** is wound about the mandrel **10** in spiral loops as shown by Figures 1 and 2. In practise, the shaft **11** is geared to a source of power which slowly revolves the mandrel as the binding wire **26** is payed out onto the outer periphery of the mandrel **10**. At each position that the binding wire **26** contacts the reinforcing steel rods **25**, they are welded or otherwise secured together. When a cage **27** as shown by Figure 5 is formed along the full length of the reinforcing steel rods **25**, the rotating movement of the mandrel **10** is stopped. Now, the angle bars **15** are made to slide along the angle bars **14** to their contracted or collapsed position with the inclined surfaces **21** and **22** of the wedges **19** and **20** respectively in contact relation. As a practical matter, by pulling on the completed cage **27**, the angle bars **15** are made to slide (downwardly as viewed in Figure 3) until the cage becomes released from the angle bars **15** when the latter while sliding along the angle bars **14** move in the direction of the shaft **11** on all four sides thereof. The cage **27** is continued to be pulled from the mandrel **10** until it is freed therefrom. The operation is again repeated by placing reinforcing rods **25** in the angle bars **15** which had been placed in their distended position, and the binding wire **26** would thereabout to form another cage **27**.

Having now disclosed my invention and realizing that, in view of my disclosure many other modifications in details and construction or design will readily occur to those skilled in the art, I do not choose to limit myself except as in the appended claim.

What I claim as new is:

A mandrel for fabricating reinforcing steel cages comprising a rotatable shaft, support members mounted on

said shaft and extending radially of said shaft, a plurality of inner elongated bars mounted on said support members, said inner elongated bars being substantially parallel to said shaft and symmetrically disposed about said shaft, each of said bars having a slot, a plurality of further elongated bars, each of said further elongated bars having troughs for receiving longitudinally disposed reinforcing rods and being positioned in spaced parallel relation with one of said inner bars, a stop member mounted on each of said further elongated bars and extending through said slots for limiting the sliding movement of said further elongated bars with relation to said inner elongated bars, a locking member mounted on each of said stop members for preventing said stop members from leaving said slots, a plurality of pair of wedges mounted on said inner and further elongated bars in opposed relation, said wedges each having an inclined surface and an elevated surface whereby when said elevated surfaces of said opposed wedges are in contact relation said further elongated bars are a greater distance from said inner bars than when said inclined surfaces of said opposed wedges are placed in contact relationship.

References Cited in the file of this patent

UNITED STATES PATENTS

211,247	McVoy	Jan. 7, 1879
459,265	Barton	Sept. 8, 1891
1,260,786	Manz	Mar. 26, 1918
1,334,704	Kubasta	Mar. 23, 1920
1,589,456	Beghetti	June 22, 1926
2,151,034	Kauppert	Mar. 21, 1939
2,564,482	Kentis	Aug. 14, 1951