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Dykmans

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[54] **MEANS AND TECHNIQUES USEFUL IN WIRE GRIPPING DEVICES**

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[52] **U.S. Cl.** **226/183,** 226/184, 226/196

[51] **Int. Cl.** **B65h 17/22**

[58] **Field of Search** ... 226/172, 184, 186, 189, 196, 226/198, 187; 198/179; 226/183; 254/175.5

[56] **References Cited**

UNITED STATES PATENTS

1,438,674	12/1922	Trumm	226/183
3,441,189	4/1969	Erb et al.	226/189
3,510,041	5/1970	Dykmans	226/172

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[57] **ABSTRACT**

A rotatable cable or wire gripping device has a peripheral V-shaped grooved portion within which a series of pairs of gripping jaws is disposed. Each pair of jaws has its own spring means acting independently to wedge a cable between a pair of jaws. A sprocket wheel connected to the gripping device rotates the same. The cable is wrapped around the practical maximum periphery of the gripping device with a series of loosely mounted rollers retained in corresponding V-shaped grooved portions pressing the cable. These rollers are resiliently urged against the cable by their engagement with rollers of a conventional type conveyor belt generally encircling the device and having one of its ends anchored and the other one of its ends resiliently supported and adjustable to in turn adjust the force on the rollers and hence the cable gripping action.

7 Claims, 5 Drawing Figures

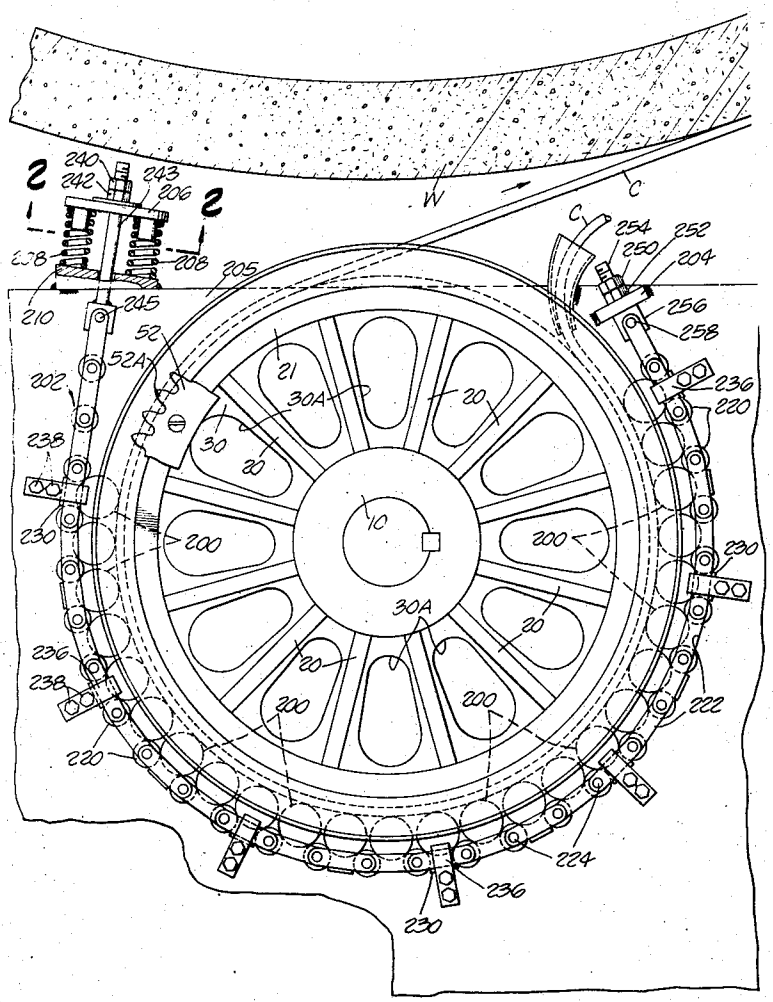


FIG. 1.

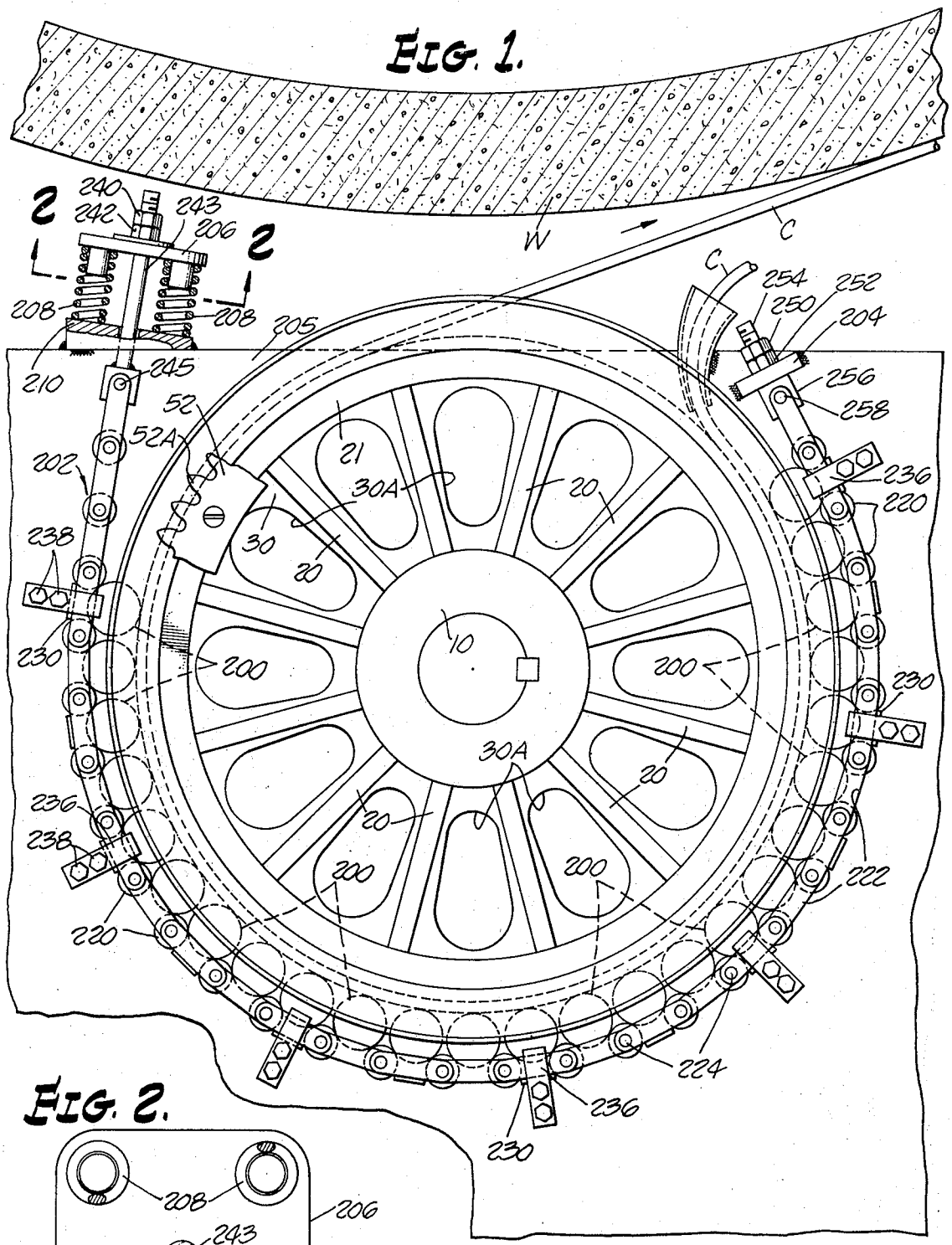
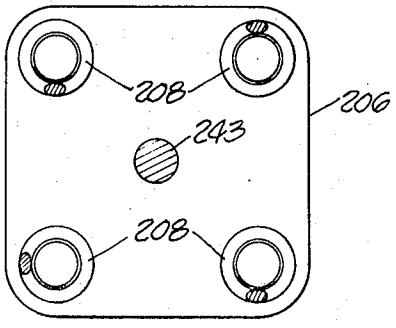


FIG. 2.



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FIG. 3.

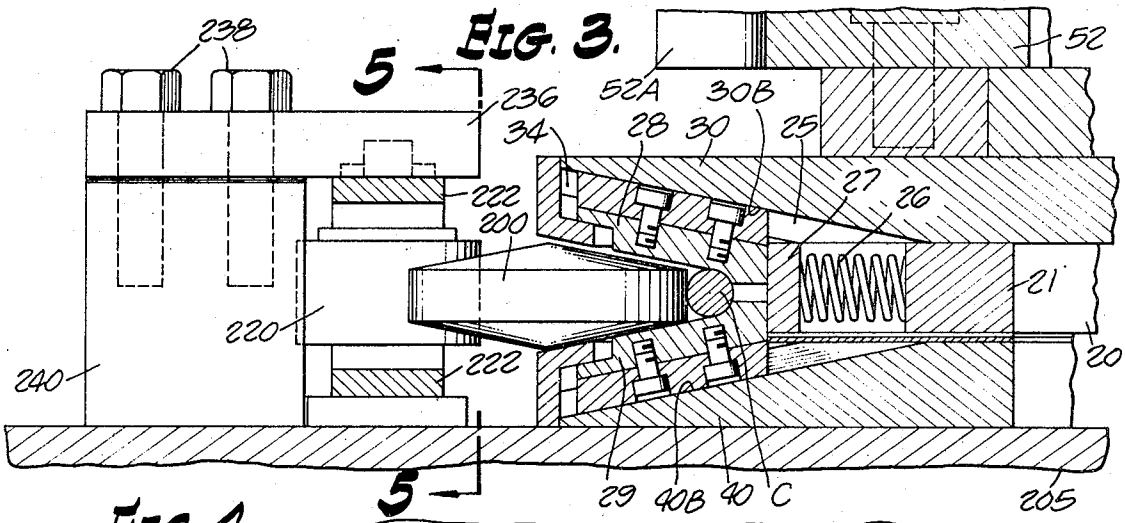
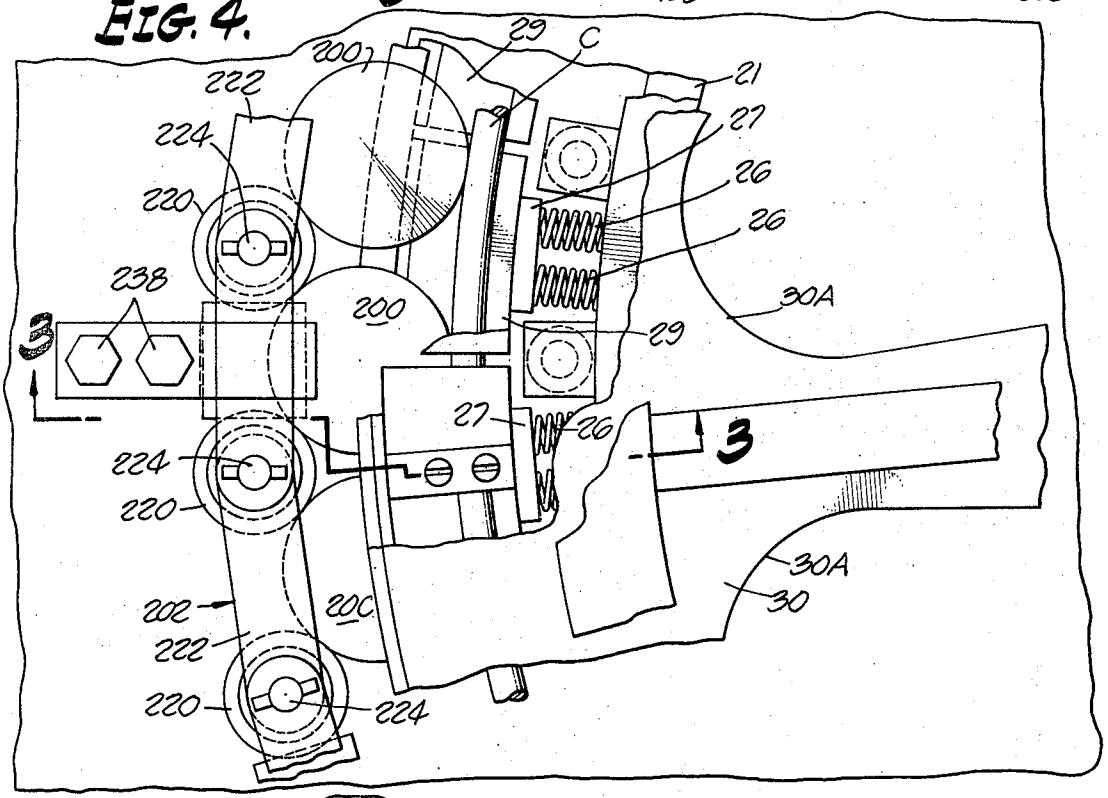


FIG. 4.



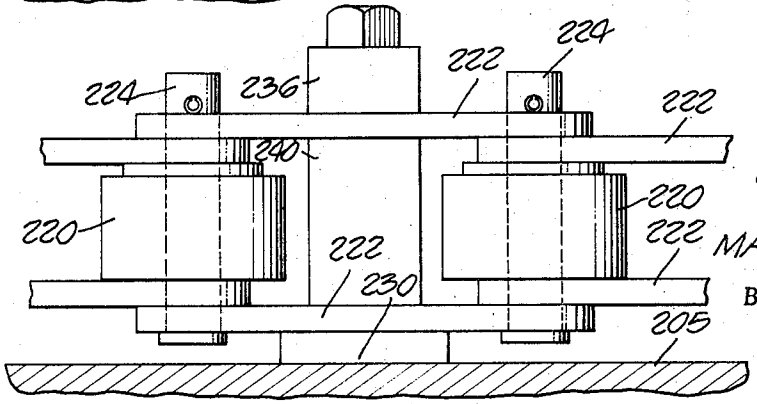


FIG. 5.

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MEANS AND TECHNIQUES USEFUL IN WIRE GRIPPING DEVICES

The present invention relates to improved means and techniques for gripping and tensioning cable, wire, strand and the like and is particularly useful in wire wrapping of circular concrete structures in the process of prestressing the same, although it will be appreciated that the same may be used in other applications such as, for example, in the laying of cable.

A specific object of the present invention is to provide improvements in the form of a gripping device described in my U.S. Pat. No. 3,510,041, issued May 5, 1970.

Another specific object of the present invention is to provide an improved gripping device in which a wire gripping wheel mounts a plurality of spring urged jaws and loosely mounted rollers are within such jaws and are pressed against a cable by a belt-type structure having rollers engaging the previously mounted rollers, such belt-type structure being under adjustable tension to resiliently press the rollers into engagement with the cable between such jaws.

The features of the present invention which are believed to be novel are set forth with particularity in the appended claims. This invention itself, both as to its organization and manner of operation, together with further objects and advantages thereof, may be best understood by reference to the following description taken in connection with the accompanying drawings in which:

FIG. 1 is generally a view in elevation, partly in section of apparatus embodying features of the present invention.

FIG. 2 is a view taken along line 2—2 of FIG. 1.

FIG. 3 is a section taken along line 3—3 of FIG. 4.

FIG. 4 illustrates some of the structure shown in FIG. 1 in enlarged form and also with some of the structure broken away.

FIG. 5 is a view taken along line 5—5 of FIG. 3.

The gripping device is illustrated in the form of a wheel. The wheel is constructed as described in more detail in my aforementioned U.S. Pat. No. 3,510,041. Added to such wheel is a series of loosely mounted rollers **200**, and these rollers contact adjacent rollers of a modified, conventional conveyor belt structure **202**, one end of this conveyor belt structure **202** being anchored at **204**, and the other one of its ends being resiliently anchored at plate **206** so that the conveyor belt structure **202** is under tension and causes the rollers **200** to be resiliently pressed against the cable C between the individual jaw pairs **28, 29**. For purposes of reference, corresponding parts in this application and the aforementioned U.S. Pat. No. 3,510,041 are designated by the same reference numerals, and the parts added thereto are referenced with reference numerals greater than 200.

The gripping device is in the form of a rotatable wheel having a central hub portion **10** to which is joined radially extending spokes **20** and a member **30** in the form of a disk which has a series of apertured portions **30A** for weight reduction purposes.

The spokes **20** terminate at a ring **21** which may be welded thereto as described in my U.S. Pat. No. 3,510,041 such ring **21** is formed with series of peripheral pockets **25** within each of which is disposed a pair of compression springs **26** and a small slidable pressure plate **27**. Each of such springs **26** has one of its ends bearing against a ring **21** and the other one of its ends bearing against the pressure plate.

Each pair of such compression springs urges a pair of cable gripping jaws **28, 29** radially outwardly against the force developed in wrapping the cable C around this gripping device.

Each pair of jaws **28, 29** is slidably mounted for independent movement within a generally V-shaped peripheral grooved portion **34** which in general is defined by tapered faces **30B** and **40B** respectively on disc **30** and a ring **40**.

This cable gripping assembly includes also a sprocket ring **52** for rotating the same by its engagement of its teeth **52A** with a driven sprocket chain (not shown).

The cable C is gripped and is rotated in the clockwise sense in FIG. 1 by such sprocket chain (not shown) engaging the sprocket wheel **52**. The cable C contacts individual pairs **28, 29** with a pressure being applied to the cable C so as to assure a good gripping action between such jaws **28, 29**.

For these purposes, the cable C is wrapped around the major peripheral portion of the gripping device and a series of loosely mounted rollers **200** are resiliently pressed into engagement with cable C by a spring urged conveyor belt type chain **202**, the chain **202** having one of its ends anchored at a stationary abutment **204** on plate **205** and the other one of its ends secured to a plate **206** to compress four compression springs **208** between plates **206** and a stationary spring seat **210** on plate **205**.

The loosely mounted rollers **200**, illustrated as being **25** in number, are of generally tapered shape as seen in FIG. 3 and are somewhat smaller than the V-shaped cable slot so as to be freely movable therein and at all times contacting cable C.

It will be seen that the rotational axis of each of the rollers **200** is within the confines of the V-shaped cable slot and that each is as shown in FIG. 4 contacted by adjacent rollers **220** of the conventional conveyor-type belt in which as seen in FIG. 5, adjacent rollers **220** thereof are interconnected by pairs of links **222** and conveyor belt pins **224**.

Guide means are provided with limited movement of this chain **202**, and such guide means are illustrated as being in general seven in number and consist essentially in bearing blocks **230** secured on plate **205** and contacting corresponding chain link **222**, the other adjacent chain link **222** as seen in FIGS. 3 and 5 being contactable by a bar **236**, the bar **236** being secured by a pair of bolts **238** to a post **240** secured on mounting plate **205**.

The force with which the cable C is pressed within the cable corresponding jaws **28, 29** may be adjusted by adjusting the tension present in the belt **202**, and this is accomplished by loosening the lock nut **240** and turning the adjusting nut **242** on the threaded shaft **243** having one of its ends connected by chain **245** to chain **202**. A similar adjustment, mainly for alignment purposes, is obtainable at the abutment **204**, and this is accomplished by loosening the lock nut **250** and adjusting the adjustment nut **252** on the threaded end of a shaft **254** which is an extension of a bar **256** to which the other end of chain **202** is connected by chain **258**. In obtaining such initial alignment, shims may be interposed between the bar **256** and the stationary abutment **204**. From the foregoing, it will be appreciated that the

gripping action may be increased or decreased by adjustment of the tension of cable **202.** This gripping action is maintained when and as the gripping wheel is rotated in the clockwise direction during those times while simultaneously a carriage (not shown) carrying the supporting plate **205** on which the gripping wheel rotates is moved around a concrete wall W of a tank. Usually the linear speed of such carriage carrying the mounting plate **205** and gripping wheel is somewhat greater than the peripheral speed of the gripping wheel to achieve a stressing or tensioning of the cable C when and as it is being laid on the outer surface of the wall W. Higher cable tensions and the use of larger diameter cable is now permitted because there is no possible slippage in the cable gripping wheel.

For these purposes, it will be noted that the force exerted on the rollers **200** by the roller chain **202** is greater than that force exerted by the springs **26** so that the springs **26** are compressed further as a result of spring urged roller chain **202.**

While the arrangement previously described is preferred, in some instances the loose rollers **200** may be eliminated in which case the rollers **220** are sufficiently large and so shaped as to enter between the wire gripping jaws **28, 29** and contact the wire directly.

Also in either case, the rollers **220** instead of being rotatably supported on a single supporting chain may be individually spring mounted, each in its separate housing.

While the particular embodiments of the present invention have been shown and described, it will be obvious to those skilled in the art that changes and modifications may be made without departing from the invention in its broader aspects and, therefore, the aim in the appended claims is to cover all such changes and modifications as fall within the true spirit and scope of this invention.

I claim:

1. A wire gripping device of the character described including a circular frame having two internal oppositely disposed walls each sloping towards the center of said circular frame and both defining generally a V-shaped peripheral groove for receiving and gripping wire; a plurality of pairs of gripping jaws within and extending around said peripheral groove; each jaw of each pair of jaws being slidably mounted on a corresponding one of said walls; each pair of said jaws having two oppositely disposed faces each sloping towards the center of said circular frame and both defining generally a V-shaped peripheral jaw slot; jaw retention means on said frame; individual resilient operated means for each of said pair of jaws acting between said frame and said jaws and urging the same in a direction extending radially outwardly of said frame against said retention means; support means; means rotatably supporting said circular frame on said support means; and a plurality of roller means extending into said V-shaped groove, and resilient means acting on said roller means and pressing the same into engagement with wire in said groove.

2. A device as set forth in claim **1** including an elongated flexible chain like structure partially encircling said circular frame and having one of its ends secured to said support means; a plurality of spaced rollers each rotatably supported on said chain like structure; and a plurality of rollers extending into said V-shaped peripheral groove for contacting cable therein and contacted by the first rollers; and resilient tensioning means connecting the other end of said chain like structure to said support means.

3. A device as set forth in claim **1** including an elongated flexible chain like structure partially encircling said circular frame and having one of its ends secured to said support means; and a plurality of rollers on said chain like structure and extending into said groove and contacting wire in said groove.

4. A device as set forth in claim **1** in which roller means includes a plurality of rollers each resiliently urged into contact with wire in said groove.

5. In cable gripping apparatus, a circular structure; a support means; means rotatably supporting said circular structure on said support means; means near the peripheral portion of said structure defining a circular V-shaped grooved portion adapted to receive a cable to be gripped thereby; a flexible chain like structure partially encircling said circular structure and having one end thereof secured to said support means; a plurality of spaced rollers rotatably supported on said chain like structure; rollers extending into said grooved portion for contacting said cable therein and contacting the first-mentioned rollers; and means resiliently supporting the other end of said chain like structure on said support means.

6. Apparatus as set forth in claim **5** in which said rollers extending into said grooved portion are tapered rollers held in said grooved portion solely by their contact with the rollers on said chain like structure and the wall portions defining said V-shaped grooved portion.

7. In wire cable gripping apparatus, a circular structure; a support means; means rotatably supporting said circular structure on said support means; means near the peripheral portion of said structure defining a circular V-shaped grooved portion adapted to receive wire to be gripped thereby; articulated means partially encircling said circular structure; a plurality of spaced rollers rotatably supported on said articulated means and extending into said grooved portion; and resilient means acting on said articulated means and said rollers for pressing the same into contact with wire in said grooved portion; said articulated means being a roller chain like structure and said rollers extending into said grooved portion being tapered rollers held in said grooved portion solely by their contact with rollers on said chain like structure and wall portions defining said V-shaped grooved portion.

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