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SNAGGER FOR CONTINUOUS WIRE TAKE-UP

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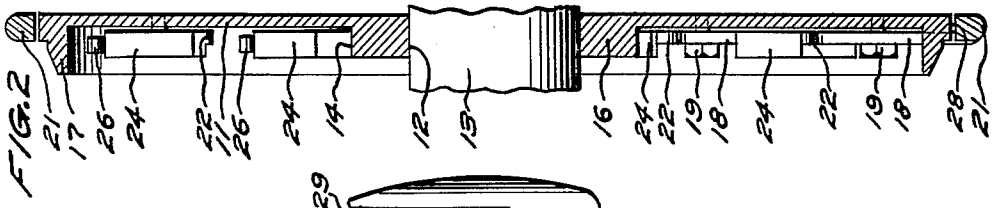


FIG. 2

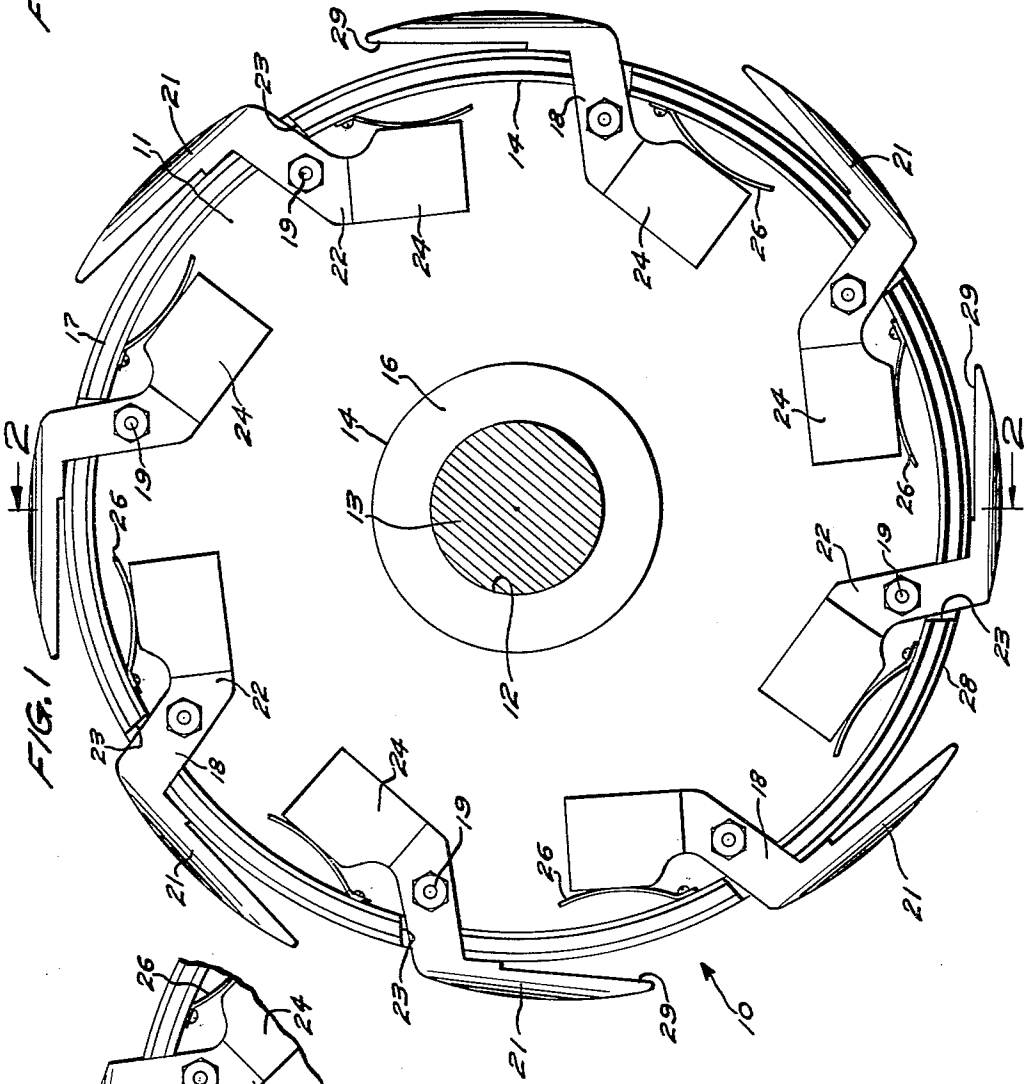


FIG. 1

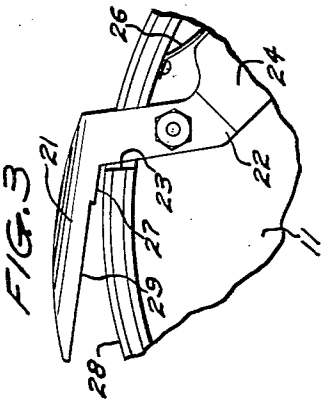


FIG. 3

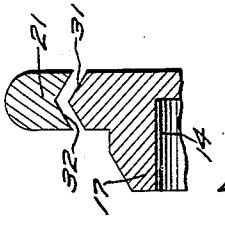


FIG. 4

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SNAGGER FOR CONTINUOUS WIRE TAKE-UP

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This invention relates to a snagger for continuous wire take-up operations, or more particularly to a snagger plate having radially disposed teeth which automatically close upon rotation of the plate and automatically open when the plate ceases to rotate.

In the continuous winding of wire or other strand material, the wire must be shifted from a full take-up reel to an empty take-up reel without halting the take-up operation. This is generally accomplished by separately rotating a pair of take-up reels in close proximity to one another and guiding the wire from the full reel to the empty reel. Mounted to each reel, and rotated therewith, is generally a snagger plate having gripping means, or teeth, disposed along the periphery thereof which are used to grip the wire as it leaves the full reel and enters the empty reel. The gripping of the wire at each reel is necessary, in that, the wire between the reels is severed in order to remove the full reel while the empty reel is being wound, and the wire must therefore be tightly gripped at each reel to prevent the wire from unwinding from the full reel and to maintain a pulling force on the wire to be wound on the empty reel. A more complete disclosure of a continuous wire take-up operation may be found in the two co-pending applications of N. H. Swanson, Serial No. 768,756, filed October 21, 1858 for "Self Cleaning Snagger Plate" and Serial No. 768,600, filed October 21, 1958 for "Self Cleaning Snagger Plate." It is desirable, therefore, to provide a snagger plate with peripherally disposed teeth which are in a gripping position while the snagger plate is rotating and in an open position when the plate and associated reel has stopped rotating so that the ends of wire are easily accessible.

It is therefore an object of the invention to provide a new and improved snagger for continuous wire take-up.

Another object of the invention is to provide a snagger plate having peripherally disposed gripping means which automatically close upon rotation of the plate and automatically open when the plate ceases to rotate.

A further object of the invention is to provide a snagger plate with pivotally mounted gripping means having a weight distribution such that the teeth automatically move to a gripping position when the plate is rotated.

A still further object of the invention is to provide a sinagger plate with pivotally mounted teeth having a weight distribution which causes the teeth to move to a closed position upon rotation of the plate and having a means for urging the teeth to an open position.

With these and other objects in view, the present invention contemplates a snagger plate connectible to a shaft for rotation with a take-up reel. The plate is provided with gripping means, or teeth, pivotally mounted to the periphery thereof, such that the leading portion of each tooth projects beyond the periphery of the plate and the trailing portion of each tooth is positioned within the peripheral rim of the plate. Mounted on the snagger plates and associated with each tooth, is a spring urging means which bears against the trailing portion of each tooth to urge the tooth in an open or non-gripping position. The trailing position of each tooth is formed with an excess mass to provide a weight on the trailing portion whereby centrifugal forces act upon the weight when the plate is rotating to move the weighted trailing portion of each tooth radially outward, such that the spring urging means is overcome and the teeth are moved to a closed or gripping position.

Other objects, advantages and novel aspects of the invention will become apparent upon consideration of the following detailed description, in conjunction with the accompanying drawings wherein:

Fig. 1 is a front elevation view of a snagger plate embodying the principles of the instant invention;

Fig. 2 is a sectional view taken along line 2—2 of Fig. 1;

Fig. 3 is a fragmentary view of the leading portion of a tooth mounted on the snagger plate; and

Fig. 4 is an enlarged fragmentary view, in full section, disclosing an alternative structural configuration of the strand gripping surfaces on the snagger plate.

Attention is now directed to Fig. 1, wherein is shown a snagger plate 10 comprising of a circular plate 11 having a central aperture 12 for mounting the plate on a shaft 13. The plate 11 is formed with a groove 14 concentric with the aperture which provides a hub portion 16 around the aperture 12 and a flange 17 extending around the periphery of the plate 11.

A plurality of gripping means, or teeth, 18 are pivotally mounted near the peripheral flange 17 of the plate 11 by means of bolts 19. Each tooth 18 comprises a leading portion 21 which extends in the direction of rotation of the plate 11 and a trailing portion 22 which extends in a direction opposite to the direction of rotation of the plate 11. The leading portion of each tooth extends through an oversized slot 23 formed in the peripheral flange 17, which allows a limited amount of movement for the tooth between a gripping and non-gripping position. The trailing portion 22 of each tooth 18 is formed with, or has mounted thereto, a weight 24 which is urged towards the center of the plate by means of a spring 26 mounted on the inner surface of the peripheral flange 17.

As may be seen from Fig. 3, when the plate 11 is not rotating, the springs 26 force the trailing portions 22 of the teeth 18 inwardly, thereby forcing the teeth against the rear surface of the slots 23 such that an inner surface 29 of the leading portion 21 of each tooth is separated or spaced from an outer peripheral surface 28 of the flange 17. When the plate 11 begins to rotate, however, centrifugal forces act upon the excess weight 24 on the rear portion 22 of each tooth to move the rear portion away from the center of the plate 11 against the force of the spring 26 thereby pivoting the teeth into a gripping position as shown in Fig. 1. In the gripping or closed position, the teeth are forced against the forward surface of the slots 23 in the flange 17 such that the inner surface 29 of each tooth is forced into engagement with the outer peripheral surface 28 of the flange 17.

The inner surface 29 of each tooth is provided with a raised portion 27 which is engageable with peripheral surface 28 to maintain the inner surface 29 spaced from the surface 28. It may therefore be understood, that when the plate 11 is rotating and the teeth 18 are in a gripping position, a wire passing over the flange 17 of the plate 11 will be snagged or gripped between the leading portion 21 of a tooth 18 and the flange 17. The smallest distance between the inner surface 29 and the outer peripheral surface 28 is constructed to be slightly less than the diameter of the wire to be snagged, thereby gripping the wire tightly against the tooth 18 and flange 17. When the plate 11 ceases to rotate, the centrifugal forces acting upon the weights 24 become smaller until

the forces are overcome by the forces exerted on the weights 24 by the springs 26. At this time, the springs 26 will force the teeth 18 to an open or non-gripping position as shown in Fig. 3 whereby the wire is automatically released. It may be understood, therefore, that the snagger plate 10 possesses self-cleaning characteristics, in that, after the wire is snagged and the plate 11 ceases to rotate, the teeth automatically release the wire to permit easy removal of the wire from the snagger plate 10.

In order to enhance the gripping of the wire, the leading portion 21 of each tooth 18 may be provided with various alternative structural configurations other than the one shown in Figs. 1, 2 and 3. For example, as shown in Fig. 4, the outer peripheral surface 28 of the plate 11 may be provided with a V-shaped ridge 31 and the inner surface of the leading portion 21 of each tooth 18 formed with a V-shaped slot or groove 32 for complementing the ridge to crimp or bend a strand snagged therebetween. Also, the various gripping surfaces may be serrated or crenelated to form surfaces that bite into the strand for positive retention of the strand between the surfaces.

It is to be understood that the above-described arrangements are simply illustrative of the application of the principles of this invention. Numerous other arrangements may be readily devised by those skilled in the art which will embody the principles of the invention and fall within the spirit and scope thereof.

What is claimed is:

1. A snagger plate for continuous strand take-up, which comprises a rotatable plate, strand gripping means movably mounted near the peripheral edge of said plate and having an arcuately movable leading portion engageable with the peripheral edge, means rendered effective by the rotation of said plate for causing the leading portion to move arcuately inwardly and engage the peripheral edge, and means rendered effective by a cessation of rotating movement of the plate for disengaging the leading portion and the peripheral edge.

2. A snagger plate for strand take-up, which comprises a plate rotatable in a predetermined direction, strand gripping means pivotally mounted on said plate, a first portion of said gripping means extending in a first direction, a second portion of said gripping means extending in a second direction, said second portion of said gripping means being rendered effective upon rotation of said plate to cause said first portion of said gripping means to pivot inwardly until said first portion of said gripping means engages a strand.

3. A snagger plate for continuous strand take-up, which comprises a plate rotatable in a predetermined direction and having a ridge formed on the outer peripheral surface thereof, strand gripping means pivotally mounted near the peripheral edge of said plate and having a leading portion extending in the direction of rotation of the plate, said leading portion positioned beyond the peripheral edge of the plate and having a groove formed in the inner surface thereof complementing the ridge, means rendered effective by the rotation of the plate for moving the leading portion towards the plate to force the groove over said ridge, and means rendered effective by a cessation of rotating of the plate for moving the leading portion from the plate.

4. A snagger plate for continuous strand take-up, which comprises a plate rotatable in a predetermined direction, pivotally mounted gripping means positioned near the peripheral edge of said plate and having a leading portion extending in the direction of rotation of said plate, said leading portion projecting beyond the peripheral edge of the plate and engageable therewith, a trailing portion on said gripping means extending in a direction opposite to the direction of rotation of said plate and positioned within the peripheral boundaries of the plate, weighted means mounted on the trailing portion for causing the leading portion to engage the peripheral edge upon rotation of the plate, and spring means mounted on the plate in engagement with the trailing portion for urging the leading portion from the peripheral edge.

5. A snagger plate for continuous strand take-up, which comprises a plate rotatable in a predetermined direction and having a V-shaped ridge formed on the outer peripheral surface thereof, pivotally mounted gripping means positioned near the peripheral edge of said plate and having a leading portion extending in the direction of rotation of said plate, said leading portion projecting beyond the peripheral edge of the plate and having a V-shaped groove formed in the inner surface thereof complementing the ridge, a trailing portion on said gripping means extending in a direction opposite to the direction of rotation of said plate and positioned within the peripheral boundaries of the plate, weight means mounted on the trailing portion for moving the leading portion towards the peripheral ridge on the plate to force the groove over said ridge upon rotation of the plate, and spring means mounted on the plate in engagement with the trailing portion for urging the leading portion from the peripheral ridge.

6. A snagger plate for continuous wire take-up, which comprises a circular plate having a central aperture for mounting the plate to a rotatable shaft for rotation in a predetermined direction, said plate having a concentric groove therein forming a hub around the aperture and a peripheral flange, said peripheral flange having spaced slots therein, a plurality of teeth pivotally mounted within said groove, each tooth having a leading portion extending through one of said slots and beyond the periphery of the plate and a trailing portion within the boundaries of the peripheral flange, each said leading portion extending in the direction of rotation of the plate and engageable with the peripheral flange, each said trailing portion extending in a direction opposite to the direction of rotation of said plate, a weight mounted on the trailing portion of each tooth whereby centrifugal forces act upon the weight to cause the leading portion of each tooth to engage the peripheral flange when the plate is rotated, and spring means mounted on said plate for urging the leading portion of each tooth to disengage from the peripheral flange.

7. A snagger plate for continuous strand take-up, which comprises a plate rotatable in a predetermined direction, strand gripping means pivotally mounted adjacent the peripheral edge of said plate and having an arcuately movable leading portion extending in the direction of rotation of the plate, said leading portion being positioned beyond the peripheral edge of the plate, means rendered effective by rotation of the plate for pivoting said strand gripping means so as to move the leading portion of said strand gripping means arcuately inwardly towards the plate until said leading portion engages a strand, and means rendered effective by cessation of rotation of the plate for moving the leading portion away from the plate.

8. A snagger plate for continuous strand take-up, which comprises a plate rotatable in a predetermined direction, pivotally mounted gripping means positioned near the peripheral edge of said plate and having a leading portion extending in the direction of rotation of said plate, said leading portion projecting beyond the peripheral edge of the plate and engageable therewith, a trailing portion on said gripping means extending in a direction opposite to the direction of rotation of said plate and positioned within the peripheral boundaries of the plate and having sufficient mass to cause the leading portion to engage the peripheral edge upon rotation of the plate, and spring means mounted on the plate in engagement with the trailing portion for urging the leading portion away from the peripheral edge.

9. A snagger plate for continuous strand take-up,

which comprises a plate rotatable in a predetermined direction, pivotally mounted gripping means positioned near the peripheral edge of said plate and having a leading portion extending in the direction of rotation of said plate, said leading portion projecting beyond the peripheral edge of the plate, a trailing portion on said gripping means extending in a direction opposite to the direction of rotation of said plate and positioned within the peripheral boundaries of the plate, weight means mounted on the trailing portion for moving the leading portion towards the peripheral edge of the plate upon rotation of said plate, and spring means mounted on the plate in engagement with the trailing portion for urging the leading portion away from peripheral edge.

10. A snagger plate for continuous wire take-up, which comprises a circular plate having a central aperture for mounting the plate to a rotatable shaft for rotation in a predetermined direction, said plate having a concentric groove therein forming a hub around the aperture and a peripheral flange, said peripheral flange

having spaced slots therein, a plurality of teeth pivotally mounted within said groove, each tooth having a leading portion extending through one of said slots and beyond the periphery of the plate, and a trailing portion within the boundaries of the peripheral flange, said leading portion extending in the direction of rotation of the plate and engageable with the peripheral flange, said trailing portion extending in a direction opposite to the direction of rotation of said plate and having sufficient mass that centrifugal forces act upon the mass causing the leading portion of each tooth to engage the peripheral flange when the plate is rotated, and spring means mounted on said plate for urging the leading portion of each tooth to disengage from the peripheral flange.

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