Oct. 7, 1952 N. F. ANDREWS 2,612,988

CHAIN-TIGHTENING MEANS WITH RATCHET LOCK

Filed Jan. 14, 1950

FIG. 1

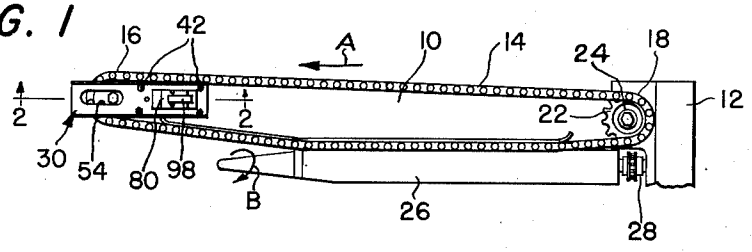


FIG. 2

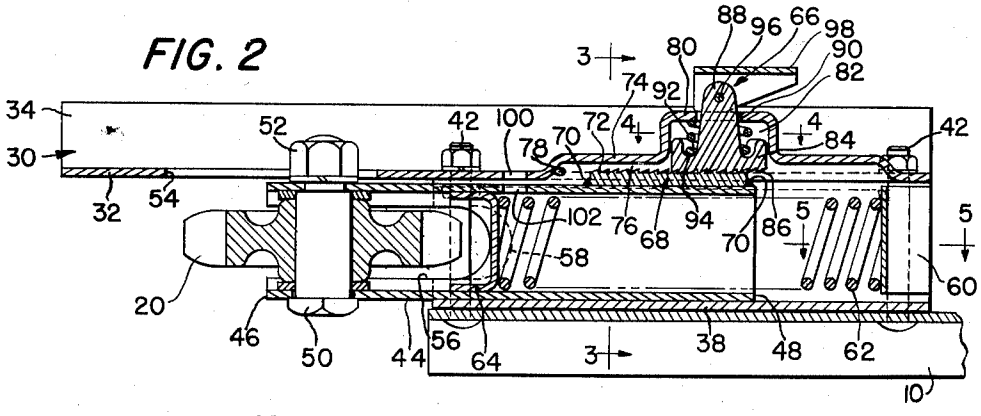


FIG. 3

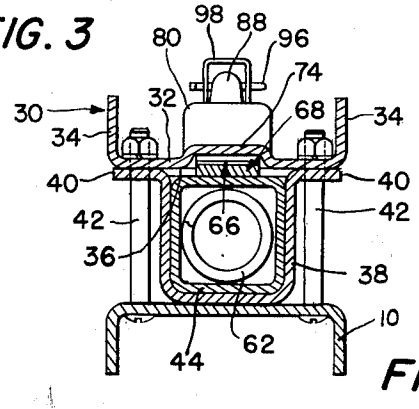


FIG. 4

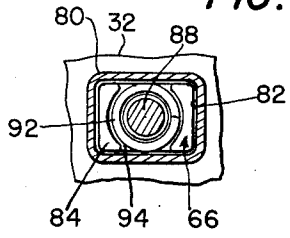
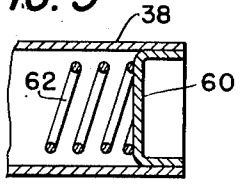


FIG. 5



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CHAIN-TIGHTENING MEANS WITH RATCHET LOCK

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13 Claims. (Cl. 198—208)

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This invention relates to a chain-tightening means and more particularly to such means embodying biasing means for normally urging a pair of relatively movable parts in chain-tightening direction and having a pair of ratcheting lock members for preventing retrograde movement of the parts.

The invention is designed primarily for use in a corn harvester or the like having a gathering unit including a support on which is mounted one or more endless chains utilized for the purpose of gathering crops such as standing corn stalks. In a machine of this type, the gathering chains operate in planes inclining upwardly and rearwardly as respects the direction of travel of the machine and ordinarily include paddles or lugs for engaging the stalks and moving them rearwardly into a stalk-receiving throat or passage. It is conventional to provide adjustments for these chains so that the tension thereon may be maintained uniform. However, in such conventional constructions uniformity of tension is achieved only at the expense of constant attention to the adjustment. It is known in some instances to provide spring-loaded means to maintain tension at all times on the chain. However, this means is yieldable under stress and a portion of the chain may become sufficiently loose as to cause the chain to be thrown from its carrying sprocket. According to the present invention, these disadvantages are eliminated by providing a chain tightener that is spring-loaded in a chain-tightening direction and which has cooperative lock members provided respectively with interengageable portions constructed to permit one-way-overrunning movement of a movable member relative to a fixed member and to prevent retrograde or opposite relative movement of the members.

A further object of the invention is to provide an improved chain tightener that is simple and inexpensive in construction and one that is efficient and has long life in operation. A still further object is to provide means for selectively disengaging the lock members so that inward or retrograde movement of the chain-carrying members may be had when desired. It is another object of the invention to provide a chain tightener having a carrier including a tubular guide within which is carried a tubular slide, and to provide a compression spring within the guide and slide and acting between the two so as to accomplish the purposes set forth above, the arrangement of the guide and slide being such that the spring is at all times completely enclosed.

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Specifically, it is another object to provide the lock members within the tubular construction in such manner that they are likewise enclosed. Thus the functional parts of the chain tightener to as great an extent as possible are protected against the entrance of dirt and other foreign matter, which is important in the application of the invention to a harvester of the type referred to, since the chain tightener is normally located close to the ground and is thereby in a position in which it is subjected to extremely dirty and trashy conditions.

The foregoing and other important objects and desirable features inherent in and encompassed by the invention will become apparent as a preferred embodiment of the invention is completely disclosed in the following detailed description and accompanying sheet of drawings in which

Figure 1 is a fragmentary plan view of a portion of the gathering unit of a corn harvester having a gathering chain carried in part by the improved chain tightener;

Figure 2 is an enlarged longitudinal sectional view taken substantially along the line 2—2 of Figure 1;

Figure 3 is a transverse sectional view taken on the line 3—3 of Figure 2;

Figure 4 is a transverse fragmentary sectional view taken on the line 4—4 of Figure 2; and

Figure 5 is a fragmentary sectional view taken on the line 5—5 of Figure 2.

That portion of the corn harvester illustrated in Figure 1 is a forward portion embodying a crop-gathering unit including a longitudinally extending support 10 connected in any appropriate manner at its rear end to harvester structure including a gear casing 12. An elongated endless gathering chain 14 has opposite or front and rear end loops 16 and 18 trained respectively about rotatable means in the form of sprockets 20 and 22 carried respectively at front and rear portions of the support 10. The sprocket 22 is carried by a vertical driven shaft 24 which extends from the gear case 12.

The chain operates in the direction of the arrow A in Figure 1 so that the inner longitudinal flight thereof passes over or adjacent a longitudinally extending snapping roll 26. This roll is rotatable in the direction of the arrow B in Figure 1 and is driven by a second shaft 28 projecting forwardly from the gear casing 12. In the conventional corn harvester of the picker type there are a pair of snapping rolls arranged side by side to provide a longitudinal stalk-receiving passage

into which stalks are urged by a plurality of gathering chains similar to the chain 14. Since these details of harvester construction are generally conventional and well known, only such portion thereof has been illustrated in Figure 1 as is necessary to serve as orientation for the disclosure of the present invention. A typical corn harvester construction of the type referred to may be found in U. S. Patent No. Reissue 23,083.

The chain tightener embodied in the present invention provides means for maintaining a uniform tension on the chain 14 through the use of biasing means to urge the sprocket 20 constantly forwardly. As will be hereinafter brought out in greater detail, the chain tightener includes means for preventing retrograde movement of the sprocket 20 so that, normally, the chain will not become loose or slack through wear or temporary overloading.

The chain tightener comprises essentially a carrier designated generally by the numeral 30 which is preferably in the form of an elongated plate structure 32 having opposite upturned flanges 34. The plate has a relatively flat bottom or underside 36 beneath which is disposed a second carrier part 38 of U shape in cross section and having lengthwise attaching flanges 40 that are secured to the underside of the plate 32 as by means of a plurality of bolt and nut assemblies 42 which assemblies are here shown as representative of means for affixing the carrier parts to the support 10. As best shown in Figures 2 and 3, the relationship of the parts comprising the plate 32 and U-shaped part 38 constitutes an elongated tubular guide within which is carried means providing an elongated slide 44.

This slide is likewise preferably tubular and has front and rear end portions 46 and 48, the latter being slidably carried in the tubular guide. The front end projects forwardly beyond the front end of the tubular guide and carries means for supporting the chain 14. In this instance, the means comprises a vertical spindle or bearing member 50 for journaling the sprocket 20. The upper end of the spindle 50 is threaded to receive a nut 52, and the plate 32 is formed with an elongated slot 54 to allow longitudinal movement of the nut 52 as the slide moves in the guide. Opposite side wall portions of the tubular structure of the slide 44 are slotted or cut out as at 56 to accommodate the sprocket 20. Opposite side walls of the tubular structure providing the guide part 38 are cut out as at 58 (dotted lines in Figure 2) for the same purpose.

The forward end of the guide 38 is open so that the slide 44 may project therethrough. The rear end of the guide 38 is provided with closure means constituting an abutment 60 (Figures 2 and 5) for receiving one end of biasing means in the form of an elongated compression spring 62. The other end of the spring 62 seats against a second abutment 64 rigidly carried within the slide 44 just rearwardly of the sprocket 20. The spring 62 operates normally to urge the slide forwardly so that tension is always maintained on the chain 14.

A further feature of the invention resides in the means for permitting forward extension of the slide 44 while operating to prevent retrograde or rearward movement of the slide. For this purpose, the guide and slide respectively carry lock members 66 and 68. The lock member 68 is preferably in the form of a rectangular plate rigidly secured as by welding at 70 to the top wall of the slide 44. The upper surface of the plate 68 is transversely notched or serrated, as at 72.

For the purpose of accommodating the plate 68, the rear portion of the plate 32 is depressed or deformed upwardly, as at 74, to provide a longitudinal space 76 within which the plate 68 may move as the plate is carried back and forth by the slide 44. The forward part of the deformation 74 includes a wall portion 78 which, in cooperation with the forward or leading portion of the plate 68, provides stop means for limiting forward travel of the guide 38.

The deformation at 74 is continued upwardly into a hat section at 80 which provides a chamber 82 within which is housed a portion of the lock member 66. As best shown in Figures 2 and 4, this member comprises a lower portion 84 presenting a substantially rectangular area which is serrated at 86 for cooperation with the serrations 72 on the plate 68. The member 66 further includes an upstanding portion 88 which projects upwardly and outwardly through an opening 90 in the top wall of the hat section 80. Yieldable means in the form of a light compression spring 92 seats at one end against the under surface of the top wall of the hat section 80 and at its other end in a substantially annular groove or pocket 94 in the member 66, and operates normally to urge the lock member 66 into engagement with the lock member 68. The serrated portions of the two members are cooperative to establish interengageable, one-way-overrunning portions arranged to provide for movement of the slide outwardly under action of the compression spring 62 and for locking upon attempted inward or retrograde movement of the slide relative to the guide.

A further feature of the invention resides in means including a movable element selectively operative to disable the lock member 66 so that it is prevented from engaging the lock member 68. As best seen in Figures 2 and 3, the vertical portion 88 of the member 66 that projects outwardly through the opening 90 in the top wall of the hat section 80 has a transverse pin 96 on which is pivotally carried a release or cam element 98. When the element is in the position shown in Figure 2, the spring 92 is capable of urging the member 66 into engagement with the member 68. However, when the element 98 is moved in a counterclockwise direction about the pin 96, the member 66 will be withdrawn upwardly and out of engagement with the member 68. When the members 66 and 68 are disengaged, the slide 44 may be moved inwardly of the guide 38 against the action of the spring 62, as when it is desired to remove the chain 14.

A further feature of the invention resides in the provision of cooperative portions on the guide and slide which are positioned for alinement when the slide is moved a predetermined extent into the guide. For this purpose, the plate 32 has an intermediate portion thereof provided with an opening or aperture 100 and the top wall of the tubular slide structure 44 is provided with a similar hole or aperture 102. During normal operation of the chain tightener, alinement or misalinement of the openings 100 and 102 is unimportant. However, when it is desired to remove the chain 14 or to make other repairs in the gathering unit requiring relaxation of the chain 14, the lock members 66 and 68 may be disabled by means of the element 98, whereupon the slide 44 may be moved manually inwardly

against the spring 62 until the opening 102 becomes alined with the opening 100. A punch or other suitable tool or implement may then be inserted through the gap established by the alined openings 100 and 102 to temporarily retain the slide against outward movement. This tool is, of course, to be removed before the chain tightener can function normally.

Various features of the invention not specifically enumerated above will undoubtedly occur to those versed in the art, as likewise will numerous modifications and alterations in the preferred embodiment disclosed, all of which may be achieved without departing from the spirit and scope of the invention as defined in the appended claims.

What is claimed is:

1. For a crop harvester having gathering mechanism including a support, an endless crop-moving chain disposed in elongated looped form over the support and having opposite end loops, and rotatable means mounted on the support and carrying one end loop of the chain, the improvement residing in adjustable mechanism for mounting on the support to carry the other looped end of the chain in spaced relation to the rotatable means, comprising: a carrier having means for affixation to the support at a portion of the support spaced lengthwise of the chain from the rotatable means, said carrier including a tubular guide extending lengthwise as respects the chain and having an open end remote from the rotatable means, and including means closing its opposite end; a slide means carried by the guide for movement lengthwise thereof and having an inner end portion within the guide and further having an outer end portion projecting lengthwise outwardly of the open end of the guide; biasing means within the guide and acting between the inner end portion of the slide and the end-closing means of the guide to urge the slide outwardly of the guide; means on the projecting end portion of the slide for the carrying of the other looped end of the chain; a first lock member fixed to the inner end portion of the slide; means providing a chamber on the guide opening to the interior of the guide in the zone of the first lock member; a second lock member movably carried by the chamber means for engagement with the first lock member; means within the chamber means normally urging the second lock member into engagement with the first lock member, said lock members having cooperative interengageable, one-way-overrunning portions arranged to provide for movement of the slide outwardly under action of the aforesaid biasing means and for locking of the members upon attempted inward movement of the slide; and limit means cooperative between the guide and slide and separate from the chain for limiting outward movement of the guide.

2. The invention defined in claim 1, further characterized in that: the chamber means carries a movable element engageable with the second lock member and selectively operative to disable the second lock member, as respects its function of engaging the first lock member, so that the slide may be moved inwardly against said biasing means.

3. The invention defined in claim 2, further characterized in that: the slide and carrier respectively have portions normally misalined but positioned for alinement when the slide is moved a predetermined extent into the guide, said portions being constructed and arranged and cooperative with each other to provide a gap to receive a tool or the like for holding the slide against action of said biasing means.

4. The invention defined in claim 1, further characterized in that: the limit means includes a portion on the guide and a cooperative portion on the first lock member.

5. The invention defined in claim 4, further characterized in that: the limit portion on the guide includes a wall of the chamber means spaced to provide for limited free movement of the first lock member as it moves with the slide during outward travel of said slide, said wall having a part directed into the path of the first lock member to be engaged by said first lock member stop portion.

6. The invention defined in claim 1, further characterized in that: the first lock member is carried on a top portion of the slide; the tubular guide includes a top wall having a portion thereof deformed upwardly to provide a space of such shape and length as to house and permit lengthwise movement of the first lock member as said first lock member moves with the slide.

7. The invention defined in claim 6, further characterized in that: said portion of the guide top wall is further deformed upwardly to provide at least part of said chamber means within which the second lock member is disposed.

8. The invention defined in claim 7, further characterized in that: the carrier has a first part provided with a relatively flat underside, and a second elongated part U-shaped in cross-section and positioned under and secured to said first part to provide said tubular guide; said underside of the first part constituting said top wall having the deformed portion.

9. The invention defined in claim 1, further characterized in that: the carrier includes a first part having a generally flat, relatively long underside, and further includes a second elongated part U-shaped in cross-section and positioned under the first part to provide said tubular guide.

10. The invention defined in claim 9, further characterized in that: the biasing means is a relatively long compression spring; and the inner end portion is tubular and of such length as to house a substantial portion of the length of said spring to prevent exposure of said spring during maximum outward movement of the slide.

11. For a crop harvester having gathering mechanism including a support, an endless crop-moving chain disposed in elongated looped form over the support and having opposite end loops, and rotatable means mounted on the support and carrying one end loop of the chain, the improvement residing in adjustable mechanism for mounting on the support to carry the other looped end of the chain in spaced relation to the rotatable means, comprising: a carrier having means for affixation to the support at a portion of the support spaced lengthwise of the chain from the rotatable means, said carrier including a hollow guide having an open end and including abutment means at its opposite end; a slide means carried by the guide for movement through the open end of the guide and toward and away from the abutment means of the guide said slide means having an inner end portion within the guide and further having an outer end portion projecting outwardly of the open end of the guide; biasing means within the guide and acting between the inner end portion of the slide and the abutment means of the

guide to urge the slide outwardly of the guide; means on the projecting end portion of the slide for the carrying of the other looped end of the chain; a first lock member fixed to the inner end portion of the slide; means providing a chamber on the guide opening to the interior of the guide in the zone of the first lock member; a second lock member movably carried by the chamber means for engagement with the first lock member; and means within the chamber means normally urging the second lock member into engagement with the first lock member, said lock members having cooperative interengagable, one-way-overrunning portions arranged to provide for movement of the slide outwardly under action of the aforesaid biasing means and for locking of the members upon attempted inward movement of the slide.

12. The invention defined in claim 11, further characterized in that: the chamber means carries a movable element engageable with the second lock member and selectively operative to disable the second lock member, as respects its function of engaging the first lock member, so that the slide may be moved inwardly against said biasing means.

13. The invention defined in claim 12, further characterized in that: the slide and carrier respectively have portions normally misalined but positioned for alinement when the slide is moved a predetermined extent into the guide, said portions being constructed and arranged and cooperative with each other to provide a gap to receive a tool or the like for holding the slide against action of said biasing means.

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