United States Patent

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[54] LOCKING DEVICE FOR A DISC HARROW WING SECTION

5 Claims, 7 Drawing Figs.

[52] U.S. Cl. 172/456, 172/568, 280/411
[51] Int. Cl. A01b 65/02
[50] Field of Search 172/310–311, 452, 456, 568, 582; 280/411; 16/145

[56] References Cited

UNITED STATES PATENTS

3,506,073	4/1970	Walberg	172/568
2,299,584	10/1942	Low	16/145
2,972,385	2/1961	Walberg	172/568
3,118,507	1/1964	Oehler et al.	172/568
3,362,484	1/1968	Walberg	172/568
1,308,938	7/1919	Donovan	280/411

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ABSTRACT: A locking device for use with a folding frame implement having one or more extension gang sections pivotally connected on a main gang section functions to automatically engage and hold the extension gang section in a rigid locked relation with the main gang section upon the extension gang section being moved to the extended horizontal position. The locking device has a latch member which is pivotally mounted on the extension gang section adjacent its pivotal connection with the main gang section and which is adapted to engage a pin member extending from the main gang section whenever the extension gang section is moved to the extended position. The latch member has a curved guide surface for directing the pin towards its cam lock slot. A spring member urges the latch member against the pin to cause the pin to ride along the guide surface and into the cam lock slot as the extension gang section is swung into the horizontal extended position.

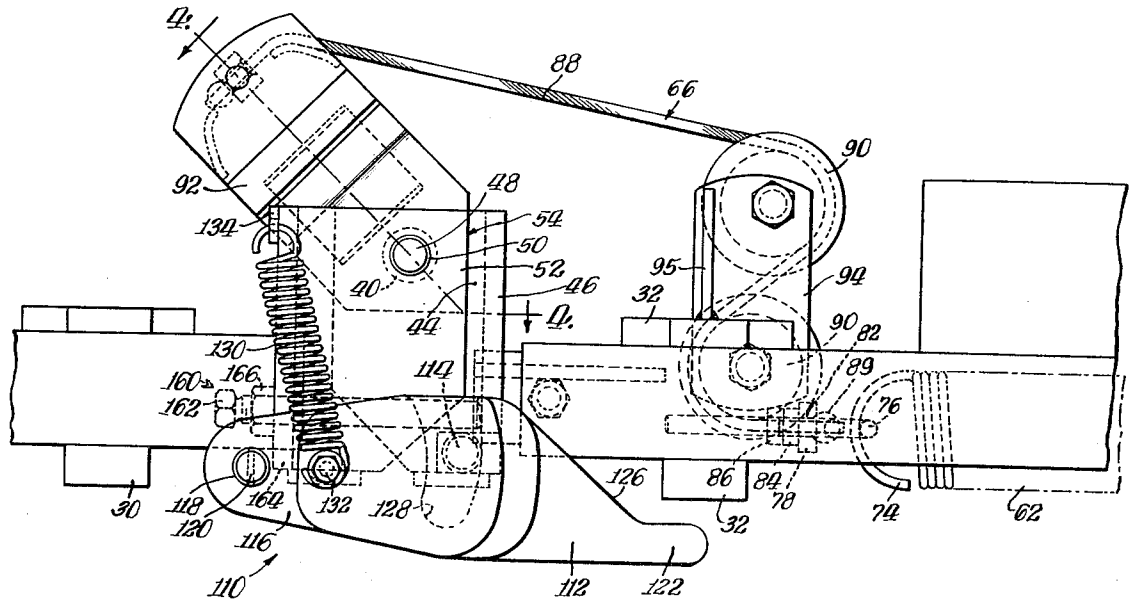

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Fig. 2.

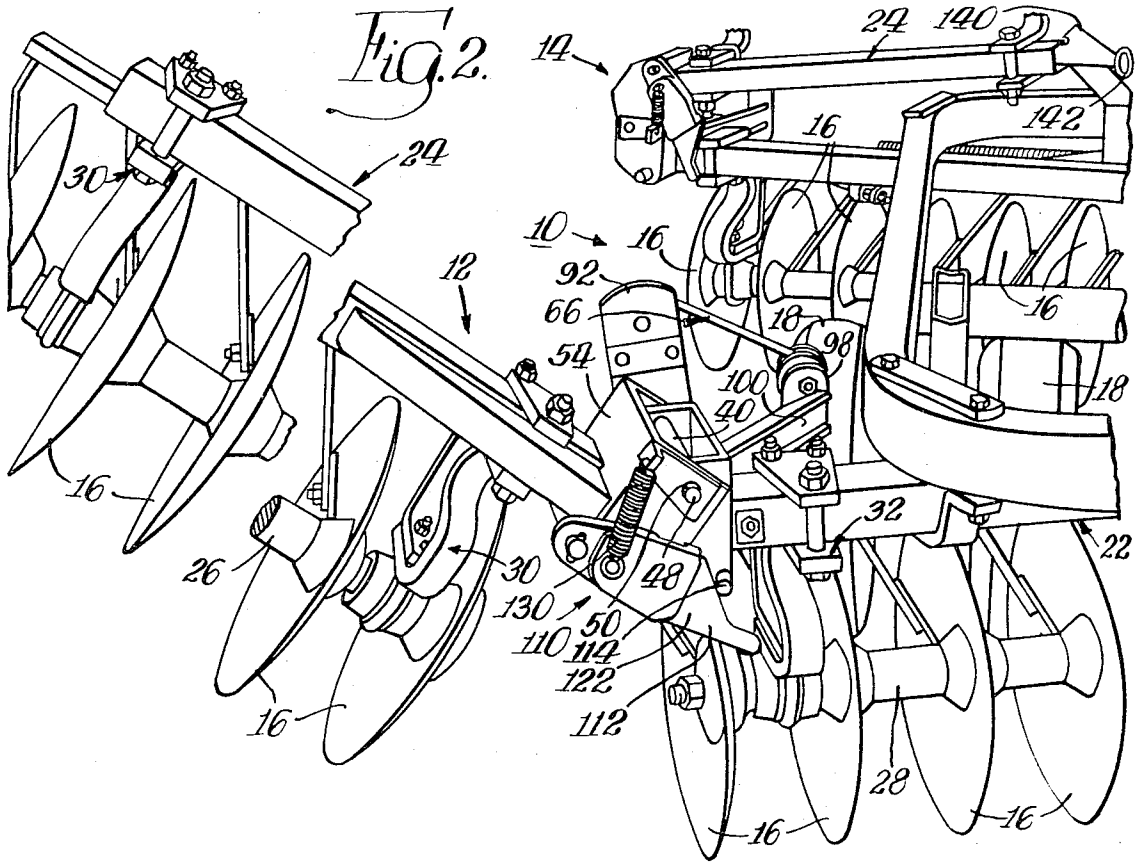

Fig. 1.

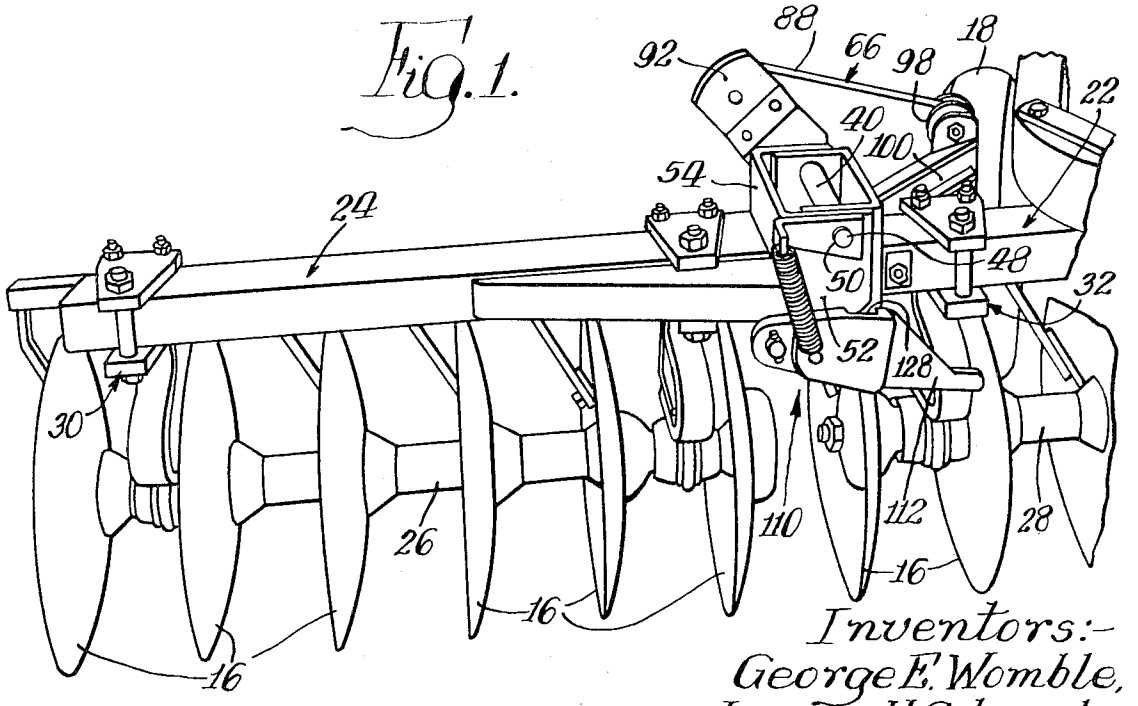

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FIG. 3.

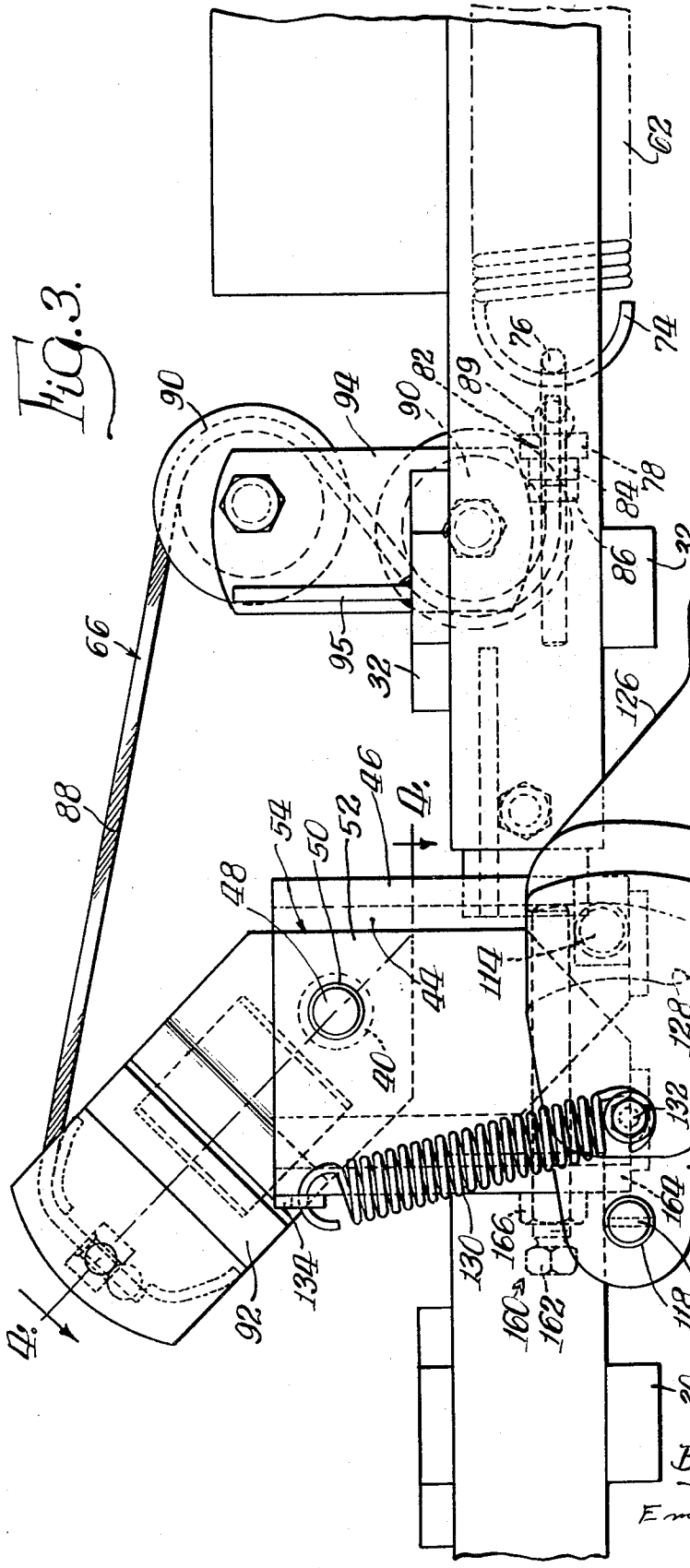
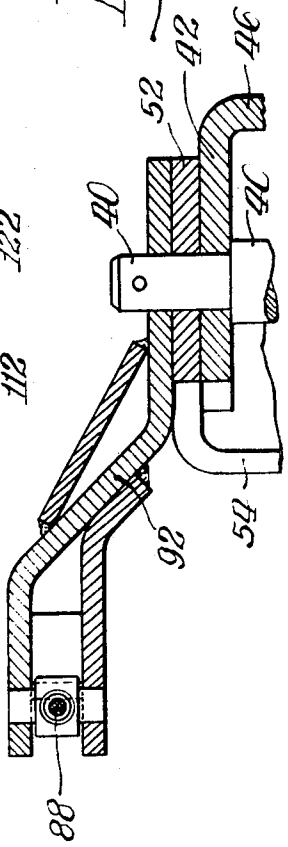


FIG. 4.



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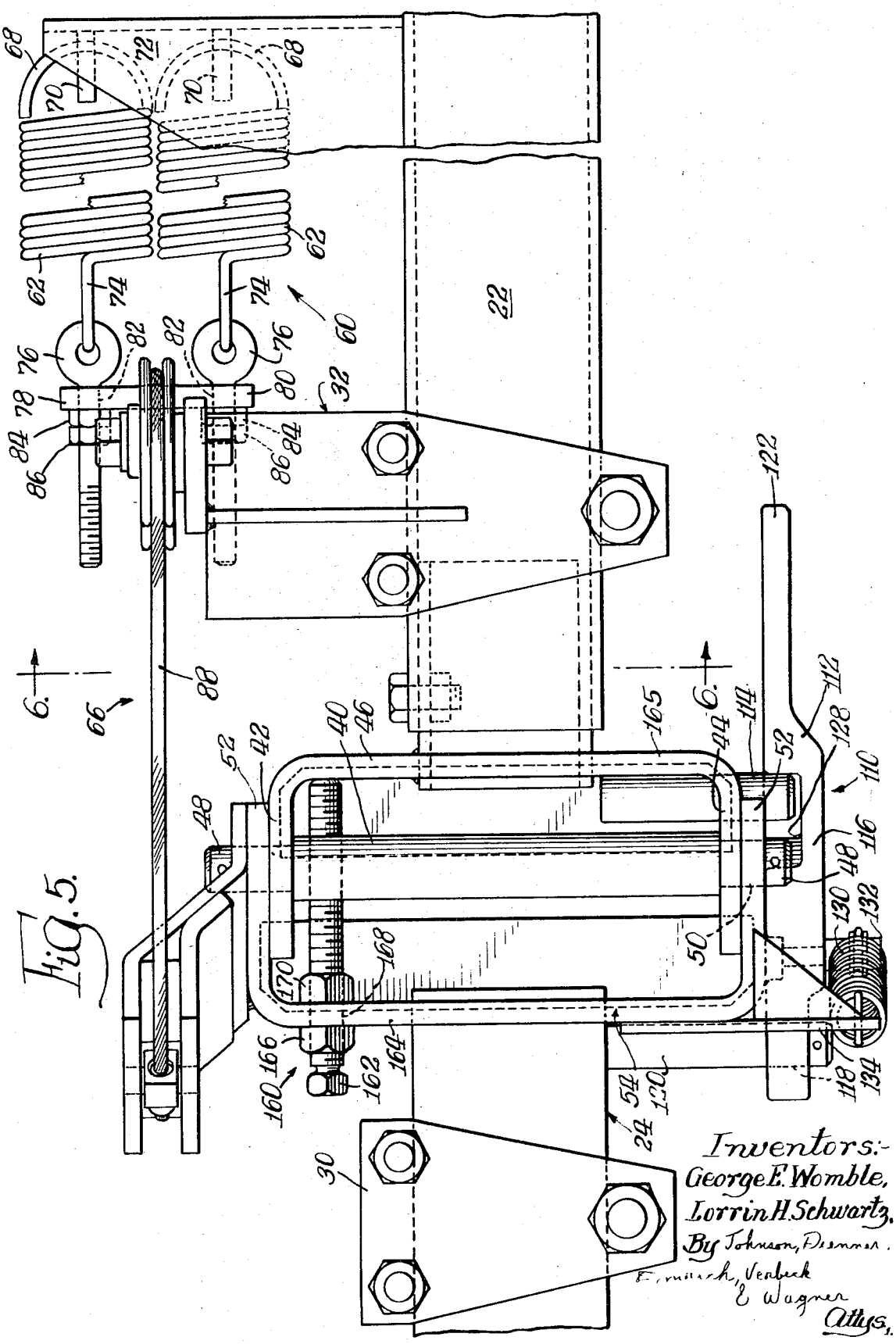

FIG. 5.

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Fig. 7.

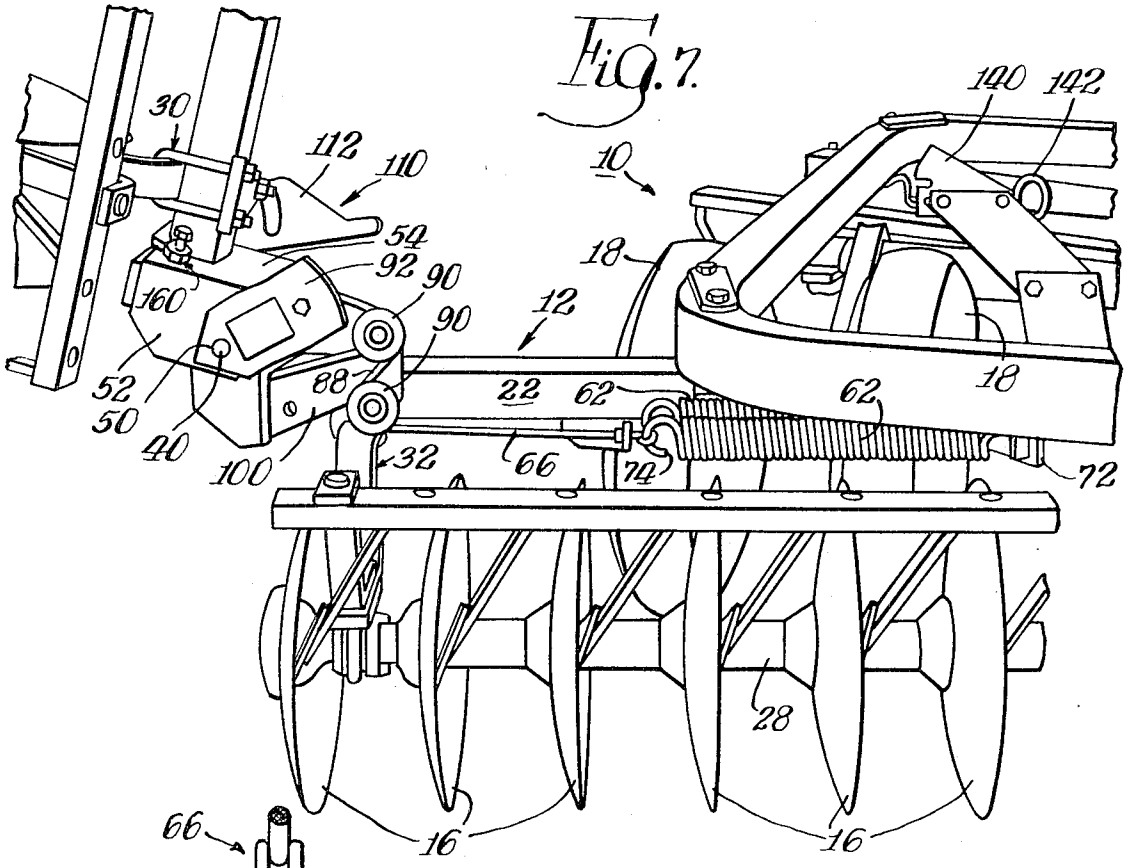
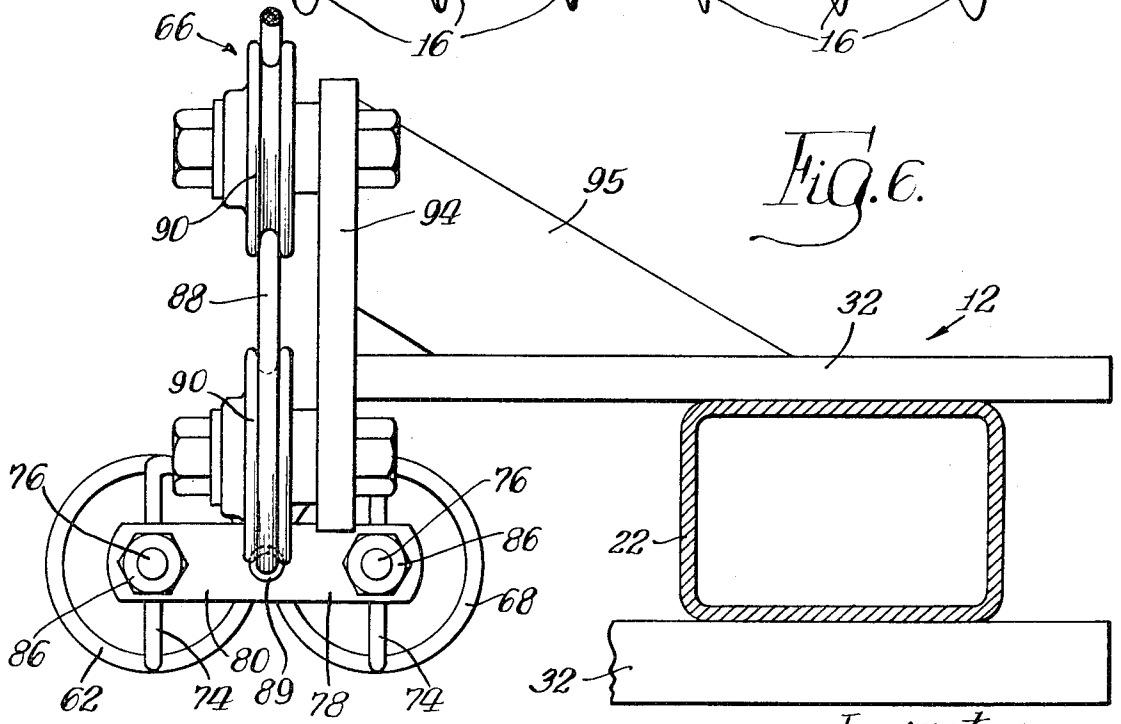


Fig. 6.



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LOCKING DEVICE FOR A DISC HARROW WING SECTION

BACKGROUND OF THE INVENTION

This invention relates to agricultural implements and more particularly to implements employing a folding frame construction such as disc harrows or the like.

The incorporation of a folding frame construction in an agricultural implement is well known and widely accepted. The main advantage of a folding frame construction is that it permits the implement to be transported through narrow gates and along narrow passageways.

One of the main considerations in the design of a folding frame implement is to provide a means for locking the extension gang in a rigid working position relative to the main gang section. It is of course desirable if the locking means is both simple to operate and dependable in performance.

This invention is directed to an improved lock device for holding the extension gang section in a rigid locked engagement relative to the main gang section. Furthermore, the lock device of this invention is automatically actuated upon the extension gang section being swung to the extended horizontal position.

Another important feature of this invention is an adjustable means to selectively vary the extended position of the extension gang section relative to the main gang section in order that the discs on the extension gang section penetrate into the ground a sufficient distance for proper discing.

As will become apparent from reading the description, this invention has many advantages over the prior art. It is inexpensive to manufacture but very dependable in performance. It can be readily installed on any foldable frame implement without the necessity of redesigning the foldable frame construction. It is easy to operate and is automatically actuated by movement of the extension frame section to the horizontal extended position.

DESCRIPTION OF DRAWINGS

For a better understanding of this invention, reference may be had to the accompanying drawings, in which:

FIG. 1 is a partial showing of a disc harrow implement, showing an extension gang section in its extended horizontal position;

FIG. 2 is a partial showing of a disc harrow implement showing the front foldable frame having its extended gang section in a neutral balanced position and showing the back foldable frame with the extended gang section in its folded position;

FIG. 3 is an enlarged partial view of FIG. 1 illustrating in detail the locking device of this invention;

FIG. 4 is a sectional view taken along the line 4—4 of FIG. 3;

FIG. 5 is an enlarged partial top plan view of the FIG. 1 illustration;

FIG. 6 is a sectional view taken along the line 6—6 of FIG. 5; and

FIG. 7 is a rear view of the FIG. 1 illustration, with the extension gang section shown in a position between its two neutral balanced positions.

DESCRIPTION OF PREFERRED EMBODIMENT

There is shown in FIGS. 1 and 2, a disc harrow 10 having a front foldable frame 12 and a rear foldable frame 14. Implements, such as harrow discs 16, are carried by the front and rear foldable frames 12 and 14. Narrow discs 16 are raised and lowered relative to the ground by transport wheels 18.

Since the front and rear foldable frames 12 and 14 are identical in construction and are locked in the same manner by the device of this invention, only the front frame 12 will be described. Front foldable frame 12 comprises a main gang section 22 and an extension gang section 24. The plurality of ground-working discs 16 are mounted at spaced-apart positions along extension gang section shaft or arbor 26 and main gang section shaft or arbor 28. Arbors 26 and 28 are mounted

for rotation with respect to extension and main gang sections 22 and 24 by bearing means supported from bracket assemblies 30 and 32, respectively, as is well known in the art. For a description of the particular clamping assemblies 30 and 32 illustrated in the drawings, reference may be made to copending application of George E. Womble, Ser. No. 7,614, filed Apr. 15, 1970, and which is assigned to the same assignee as this invention.

The extension gang section 24 is pivotally connected to the main gang section 22 by means of a pivot pin 40. Pivot pin 40 extends between the arm portions 42 and 44 of a U-shaped member 46 that is secured to the end of the main gang section 22 and its reduced-diameter opposite end portions 48 extend through openings 50 provided in the arm portions 52 of U-shaped member 54, which is likewise secured to the end of extension gang section 24.

The front foldable frame 12 is also provided with a lift assist assembly 60 which serves to counterbalance the weight of the extension gang section 24 and thus assist the movement of the extension gang section 24 between its folded position and its extended position. The lift assist assembly 60 utilizes a pair of counterbalanced springs 62 having their one end 68 fixed to the main gang section 22 and their other end 74 interconnected to strap 92 on U-shaped member 54 of extension gang section 24 by means of a pulley arrangement 66. The fixed ends 68 of the pair of springs 62 are hooked through a pair of eye-hook fasteners 70 which form an integral part of a mounting bracket 72 supported from and below the main gang section 22. The other ends 74 of the pair of springs 62 are hooked through a pair of eyebolts 76 carried by a mounting plate 78. The mounting bracket 78 comprises an elongated rectangular-shaped plate 80 having a pair of apertures 82 formed at its opposite ends having a pair of nuts 84 secured to the plate 80 in direct alignment with the apertures 82. A pair of locknuts 86 are used to lock the eyebolts 76 in place once their proper position has been set relative to the plate 80 for providing the proper counterbalancing force. The length of chain 88 is fastened at one end 89 to the middle of the rectangular plate 80.

From the mounting bracket 78 the length of chain 88 extends horizontally towards the extension gang section 24. At a point adjacent the end of the main gang section 22, chain 88 trains about a pair of vertically aligned pulley wheels 90, and from there across to the top of strap 92 secured to the U-shaped member 54.

Referring to FIGS. 3 through 6, it is noted that the pair of pulley wheels is mounted on a vertically oriented plate 94 which is secured from the rear of clamping device 32 and held vertically by angle brace 95 (FIG. 6). A slightly modified way of mounting the pulley wheels 90 is illustrated in FIGS. 1, 2 and 7, where they are rotatably supported on a vertical plate 98 secured on the end of a transverse horizontal channel member 100 whose other end is secured, as by welding, to the main gang section 22.

The foregoing description of the disc harrow 10 forms no part of this invention and has been described for purposes of better understanding this invention.

The locking device 110 incorporates the principles of this invention and comprises two main cooperating parts: a latch member 112 pivotally mounted to the extension gang section 24 and a pin member 114 extending perpendicular from the U-shaped member 46 of main gang section 22. The latch member 112 is formed as a one-piece elongated body 116 having a circular opening 118 at one end provided for pivotally mounting the latch member 112 on pivot pin 120 extending from the end of extension gang section 24 along the bight portion 164 of U-shaped member 54. A handle portion 122 is provided at the opposite end to its pivotal connection and from handle portion 122, a guide surface 126 extends in a transverse direction to the length of elongated body 16 and is adapted to be engaged by the pin member 114 for guiding the same towards a cam lock slot 128 formed generally crosswise to the length of the body portion 116 at its approximate

midlength. As is illustrated in FIG. 3, the cam lock slot 128 has a slightly curved configuration and a width slightly larger than the diameter of the pin member 114.

To urge the latch member 112 against the pin member 114 as the extension gang section 24 is being lowered to its extended position, a spring 130 is stretched between a stud 132 on the main body 116 and an apertured ear 134 extending horizontally from the top of bight portion 164 of the U-shaped member 54.

To selectively vary the extended position of the extension gang section 24 relative to the main gang section 22 such that its discs 16 will penetrate into the ground a sufficient distance, a level adjustment device 160 (FIG. 5) is provided comprising a setscrew 162 threadedly mounted through the bight portion 164 of U-shaped member 34 and adapted to engage the bight portion 165 of U-shaped member 46 upon the extension gang section 24 being swung to its extended horizontal position. To permit the adjustment of setscrew 162, a threaded nut 166 is secured to the bight portion 164 of U-shaped member 54 directly in alignment with opening 168, and locknut 170 is tightened once the selected position is determined.

A description of the operation of locking device 110 will now be given in conjunction with its use on the disc harrow 10, starting with the extension gang section 24 in the transport position (as illustrated by the rear foldable frame 14 in FIG. 2). The extension gang section 24 is held in the folded position by a transport latch 140 comprising a spring-biased latch of the type generally known in the prior art. When the handle 142 of the transport latch 140 is pulled away from the extension gang section 24, the gang section 24 is released and it swings to a neutral or balanced position under the influence of counterbalancing springs 52. This neutral position is at an approximate 30° to 40° angle relative to the horizontal. The extension gang section 24 is then swung about pivot pin 40 towards the ground and after it passes over the vertical, it will fall under the weight of gravity until it reaches its second neutral point (as illustrated in FIG. 2) which is approximately 30° to 40° above the ground level.

As can be seen from FIG. 2, the latch pin 114 has ridden partly up the guide surface 126 when the extension gang section 24 reaches this second neutral position. As the extension gang section 24 is swung from this neutral position towards the ground, the latch pin 114 continues to ride along the guide surface 126 towards the cam lock slot 128. Upon the extension gang section reaching an approximate parallel level with the main gang section 22, the latch pin 114 falls into the top of the cam lock slot 128, and the spring 130 rotates the latch member 112 in an upward direction about pivot pin 118 to thereby lock the latch pin 114 into engagement with the latch member 112. Thus it can be seen that the locking device 110 is automatically actuated upon the movement of the extension gang section 24 being moved to its extended horizontal position.

To unlatch the locking device 112, the handle portion 112 is swung in a clockwise direction (as viewed in FIG. 3) until the pin 114 is brought out of the cam lock slot 128. The handle portion is continued to be turned through another approximate 120° angle, where the latch member 112 is moved to an overcentered rest position relative to the spring 130 to prevent the accidental relatching of the latch pin 114. The extension gang section 24 is then lifted to its transport position.

We claim:

1. A locking device for a folding gang implement having an extension gang section pivotally connected on a main gang section for swinging movement between folded and extended positions comprising a latch member pivotally mounted to one of said main gang and extension gang sections adjacent their pivotal connection, a pin member secured to the other of said main gang and extension gang sections and extending into the path of said latch member as said extension gang is moved towards said extended position, where said latch member includes an elongated body having a guide surface facing towards and adapted to be engaged by said pin member and a cam lock slot extending from said guide surface crosswise to its length for receiving and holding said pin member upon said extension gang member reaching said extended position, spring means for urging said latch member to pivot towards said pin member, and an adjustable means for selectively varying said extended position of said extension gang section relative to said main gang section.

2. In a folding gang implement having an extension gang section pivotally connected on a main gang section, the combination comprising a first U-shaped member having its bight portion secured to one end of said main gang section with its pair of arms extending outwardly, a second U-shaped member having its bight portion secured to one end of said extension gang section with its pair of arms extending outwardly, a pivot pin extending between said pair of arms of said first and second U-shaped members for pivotally interconnecting the same, a latch member pivotally mounted to said extension gang section adjacent said second U-shaped member and extending beyond said first U-shaped member, a pin member extending from said first U-shaped member into the path of said latch member as said extension gang is moved towards said extended position, where said latch member includes an elongated body having a guide surface facing towards and adapted to be engaged by said pin member and a cam lock slot extending from said guide surface crosswise to its length for receiving and holding said pin member upon said extension gang member reaching said extended position, spring means for urging said latch member to pivot towards said pin member, and an adjustable means for selectively varying said extended position of said extension gang section relative to said main gang section.

3. The combination of claim 2, wherein said adjustable means comprises a setscrew threadedly mounted through the bight portion of one of said first and second U-shaped members and extending towards the bight portion of the other of said first and second U-shaped members, whereby said setscrew is turned to selectively vary said extended position of said extension gang section relative to said main gang section.

4. A locking device for a folding gang implement having an extension gang section pivotally connected on a main gang section for swinging movement between folded and extended positions comprising a latch member pivotally mounted to one of said main gang and extension gang sections adjacent their pivotal connection, a pin member secured to the other of said main gang and extension gang sections and extending into the path of said latch member as said extension gang is moved towards said extended position, said latch member comprises an elongated body pivotally connected adjacent one of its ends to said one of said gang sections, said elongated body including a handle portion formed at the other of its ends, a guide surface formed along the lateral edge facing said pin member inwardly from said other end for engaging said pin member, and a cam lock slot formed intermediate its ends in a crosswise direction and extending from said guide surface in an arc curving about said pivotal connection, and spring means for urging said elongated body to swing towards said pin member, whereby said pin member enters said slot upon said extension gang section reaching said extended position and said elongated body pivots under the urging of said spring means to lock said pin member in place.

5. In a folding gang implement having an extension gang section pivotally connected on a main gang section, the combination comprising a first U-shaped member having its bight portion secured to one end of said main gang section with its pair of arms extending outwardly, a second U-shaped member having its bight portion secured to one end of said extension gang section with its pair of arms extending outwardly, a pivot pin extending between said pair of arms of said first and second U-shaped members for pivotally interconnecting the same, a latch member pivotally mounted to said extension gang section adjacent said second U-shaped member and extending beyond said first U-shaped member, a pin member extending from said first U-shaped member into the path of said

latch member as said extension gang is moved towards said extended position, said latch member comprises an elongated body pivotally connected adjacent one of its ends to said one of said gang sections, said elongated body including a handle portion formed at the other of its ends, a guide surface formed along the lateral edges facing said pin member inwardly from said other end for engaging said pin member, and a cam lock slot formed intermediate its ends in a crosswise direction and extending from said guide surface in an arc curving about said pivotal connection, and spring means for urging said elongated body to swing towards said pin member, whereby said pin member enters said slot upon said extension gang section reaching said extended position and said elongated body pivots under the urging of said spring means to lock said pin member in place.

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