United States Patent

Cooper et al.

[15] **3,669,193**

[45] **June 13, 1972**

[54] GANG BOLT LOCKING ARRANGEMENT

[72] Inventors: **Hugh Cooper,** Rochelle; **Dale S. Whitehouse; George E. Womble,** both of Kewanee, all of Ill.

[73] Assignee: **Kewanee Machinery & Conveyor Co.,** Kewanee, Ill.

[22] Filed: **Dec. 9, 1970**

[21] Appl. No.: **96,549**

[52] **U.S. Cl.**.....**172/570,** 172/601, 172/604, 172/711, 287/20

[51] **Int. Cl.**.....**A01b 21/08,** A01b 23/06

[58] **Field of Search**.....172/604, 599, 600, 601, 570, 172/574, 548, 570, 711

[56] **References Cited**

UNITED STATES PATENTS

1,266,328	5/1918	Schulte	172/599
2,556,492	6/1951	Dockery et al.	172/599
2,773,343	12/1956	Oppel	172/570 X
3,370,653	2/1968	Hixon	172/599
3,576,216	4/1971	Tanke	172/604

Primary Examiner—Robert E. Pulfrey
Assistant Examiner—Stephen C. Pellegrino
Attorney—Johnson, Dienner, Emrich, Verbeck & Wagner

[57] **ABSTRACT**

Clamping means for a piece of farm machinery, more specifically a disc harrow. The clamping means assures the proper tightening and positioning of one or more discs which are concavo-convex in shape upon a shaft. The clamping means includes a reaction member such as an anchor nut for the threaded end of the gang bolt or tie-rod which reaction member or anchor nut has a series of threaded holes through it and carries tightening screws or bolts and a clamping plate which has a central opening embracing the shaft but not connected to the shaft said plate being spring-like in character and engageable by the tightening screws whereby the plate is adapted to be forced by its outer surface, or at least the margin thereof against the surface of the disc which is adjacent to it whereby the gang bolt is placed under proper tension and the disc, or discs, and spacers between discs are adequately pressed together under spring tension.

8 Claims, 5 Drawing Figures

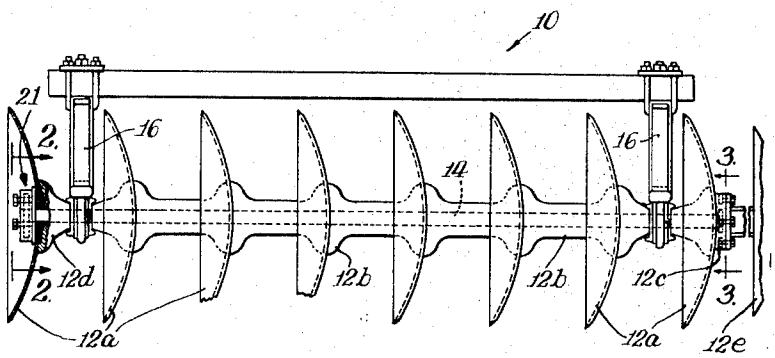


Fig. 1.

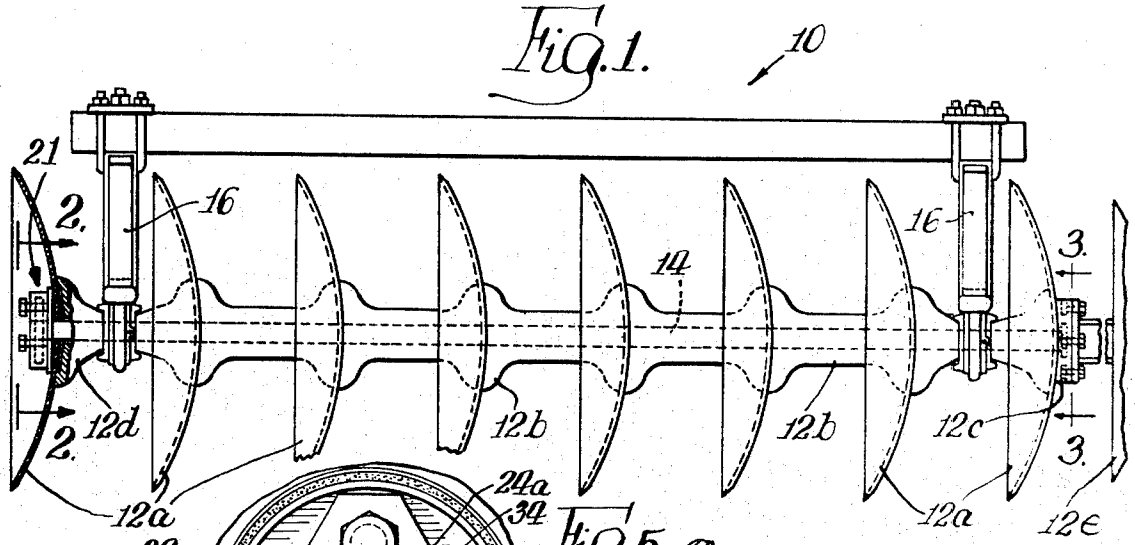


Fig. 5.

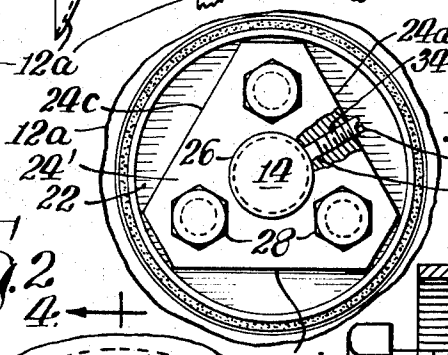


Fig. 2.

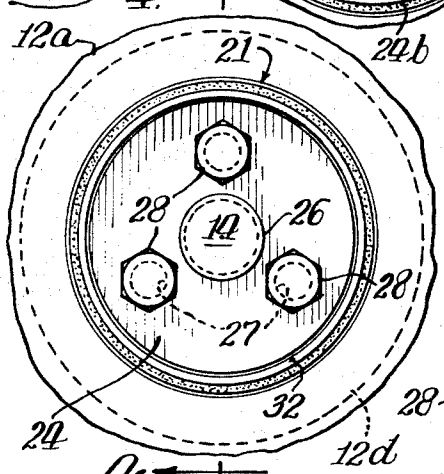


Fig. 3.

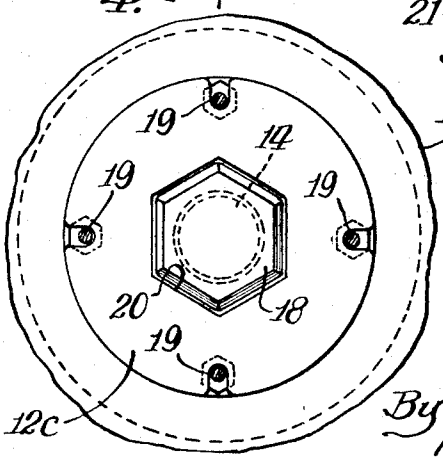
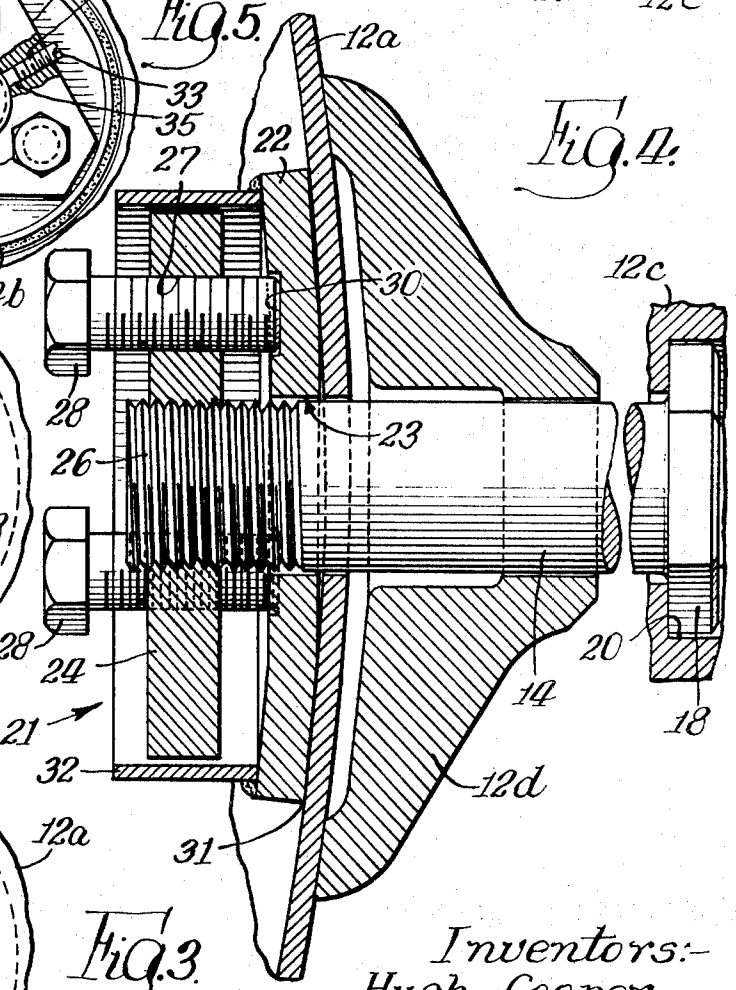


Fig. 4.



Inventors:-
Hugh Cooper,
Dale S. Whitehouse
George E. Womble,

By Johnson, Dienner, Emrich, Verkuil & Wagner
Attys.

GANG BOLT LOCKING ARRANGEMENT

BACKGROUND OF THE INVENTION

Gang discs have become increasingly large and heavy. The gang bolt, or tie-rod which goes through the centers of the spacers and discs has become very large and heavy and it is difficult for both dealers and users to properly fasten an anchor nut on it. It is important to the proper functioning of a disc harrow that the discs and disc spacers be tightened sufficiently and held in the correct position.

It is therefore an object of this invention to assure the proper tightening and positioning of the discs of the disc harrow.

It is a further object to provide a structure which can be properly tightened by a dealer or user with the usual tools he has on hand.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a reduced size fragmentary drawing showing a gang of discs of a disc harrow and an adjacent frame member of the disc harrow;

FIG. 2 is on a scale larger than FIG. 1 and is taken approximately on the line 2—2 of FIG. 1, a number of the parts being shown in elevation;

FIG. 3 is on a larger scale than FIG. 1 and is a view taken approximately on the line 3—3 of FIG. 1;

FIG. 4 is on a scale larger than FIGS. 2 and 3 and is a sectional view taken approximately on the line 4—4 of FIG. 2; and

FIG. 5 is an end elevation, similar to FIG. 2, of a modified form of the anchor nut.

DESCRIPTION OF THE PREFERRED EMBODIMENT

In FIG. 1 there is shown generally by the reference numeral 10 a frame member of a piece of farm machinery, more particularly a disc harrow. A gang or set of discs 12*a* and spools or spacers 12*b* are supported from the frame 10 on a gang bolt, or tie-rod, or shaft 14 by bearing brackets 16. The shaft 14 may be of differing lengths depending upon the number of discs and spacers to be accomodated. The shaft 14, or gang bolt, passes through central apertures in the spacers and discs in a known manner.

The tie rod, or gang bolt, or shaft, 14 has a non-circular head 18 which is adapted to seat in a matching socket 20 in a slotted bumper 12*c* (see FIGS. 1 and 4.)

An additional disc 12*e* may be secured to the slotted bumper 12*c* by a series of bolts such as bolts 19 of FIG. 3.

Preferably the discs are concavo-convex and, as shown in FIG. 4, the convex side of the outermost disc 12*a* is in engagement with a bearing spacer 12*d* which provides an abutment which holds the disc against movement axially on the shaft 14 in the direction of said abutment.

Clamping means indicated generally by the reference numeral 21 holds one or more discs and their spools in the proper position and under proper compression. The clamping means includes a clamping or pressure plate 22 which is spring-like in character. It has a central opening which embraces the shaft 14 but is not attached to said shaft. The clamping or spring pressure plate 22 engages the outermost disc 12*a*. A reaction member in the form of the anchor means 24 which is internally threaded engages the threaded end 26 of the shaft 14. The anchor means or reaction means 24 is attached to the shaft 14 by threading in the illustrative embodiment. Since the actual tightening pressure is exerted by the screws 28 the attachment of the anchor means or reaction means 24 to the shaft 14 may be made otherwise as by pinning or other non-rotatable coupling and thereby avoid the tendency for the connection between the anchor or reaction means and the shaft to loose in use.

The anchor means or nut 24 has a series of threaded holes 27 disposed substantially symmetrically about its center with the axes of the holes being substantially parallel with the axis of the shaft and being disposed radially between the shaft and the outer periphery of said anchor nut 24 substantially equidistant. Tightening screws or bolts 28 are threaded in said threaded holes 27, said tightening screws having their inner ends, or free ends, disposed to exert pressure upon said clamping plate 22 at points disposed symmetrically about the opening 23 in said plate 22. The clamping plate preferably has indentations or recesses 30 which are alignable with the free ends of the tightening screws 28 which indentations are adapted to receive the free ends of the tightening screws. Said tightening screws are adapted to force the outer margin, or the entire outer surface of the clamping plate 22 against the concave surface of the disc 12*a* under spring tension. As shown by FIG. 4 the tightening of the tightening screws 28 will first cause the outermost corner 31 of the clamping plate 22 to engage the concave surface of the disc 12*a*.

If desired, a dirt shield 32 may be carried adjacent the outer margin of the clamping plate 22 so that it surrounds the anchor nut 24.

In use, the various discs 12*a* and spacers 12*b*, 12*c* and 12*d* are disposed over the shaft 14 in the usual manner. Then the clamping plate 22 is slipped over the threaded end 26 of shaft 14, after which the anchor nut 24 is threaded on the end of the shaft 14. Then the tightening screws 28 of the anchor nut 24 are tightened down and this is preferably done progressively either clockwise or counter-clockwise to force the outermost corner and at least the margin of the clamping plate 22 against the concave surface of the disc 12*a*. The locking nut 24 is preferably truncated in a triangular shape 24′ having three flat sides 24*a*, 24*b* and 24*c*. A setscrew 33 is disposed in a threaded bore 34 in one of the sides and a soft brass plug 35 is interposed between the setscrew and the threads on the end of the shaft to lock the nut or anchor means to the shaft, see FIG. 5.

What is claimed is:

1. Clamping means for holding a disc upon a supporting shaft which shaft provides an abutment on one side of the disc, a disc on said shaft with said one side toward said abutment whereby said disc is held against movement axially of said shaft in the direction of said abutment, a clamping plate having a central opening embracing said shaft and having its periphery symmetrical about said opening for engaging the opposite surface of said disc about said shaft, a reaction member secured on the end of said shaft, said reaction member having a series of threaded holes disposed substantially symmetrically about its center with the axes of said holes being substantially parallel with the axis of the shaft and being disposed radially between the shaft and the outer periphery of said reaction member and being substantially equidistant, tightening screws threaded in said holes said screws having their inner ends disposed to exert pressure upon said clamping plate at points disposed symmetrically about the opening in said plate and being adapted to be tightened progressively to force the outer margin of the clamping plate against said opposite surface of the disc under spring tension.

2. The clamping means of claim 1 wherein the disc is concavo-convex and said one side of the disc is a convex side and wherein the opposite surface of the disc is the concave surface.

3. The clamping means of claim 1 wherein the clamping plate has a plurality of indentations each alignable with the threaded holes in said anchor nut and adapted to receive the free end of a tightening screw.

4. The clamping means of claim 1 wherein the clamping plate has a shield adjacent its outer margin which surrounds the reaction member.

5. The clamping means of claim 1 wherein the reaction member is an anchor nut and the free end of the shaft is threaded to receive the nut.

6. The clamping means of claim 5 wherein the anchor nut has a threaded bore leading to the free end of the shaft and is adapted to carry a setscrew and a soft metal plug, the plug being movable by the setscrew.

7. In combination a supporting shaft (14), a concavo-convex disc (12*a*) having a central opening through which the

shaft extends, means (12*d*) connected to the shaft and providing an annular shoulder for exerting pressure against the convex side of the disc (12*a*), anchor means (24) releasably mounted upon the shaft on the concave side of the disc, an annular spring pressure plate (22) having a central opening (23) receiving the shaft (14) said pressure plate (22) being disposed between the anchor means (24) and the concave side of the disc (12*a*) and having its outer rim (31) engaging said concave side of the disc (12*a*) and a series of tightening screws (28) with their axes in parallel and being symmetrically disposed about the axes of said shaft (14) and lying at a radius from the axis of the shaft (14) substantially less than the radius of the outer peripheral edge (31) of the pressure plate (22) said tightening screws (28) being threaded through the anchor means (24) and being adapted to spring the central part of the pressure plate (22) towards the disc (12*a*) and press the outer circular margins of the pressure plate against the disc (12*a*).

8. The combination of claim 7 with means (35) interacting between the anchor means (24) and the shaft (14) to prevent displacement of the anchor means (24) relative to the shaft (14).

* * * * *