

Sept. 16, 1952

E. O. HENDRICKSON

2,610,460

PADDLE WHEEL REINFORCEMENT MEANS

Filed Aug. 23, 1949

Fig. 1.

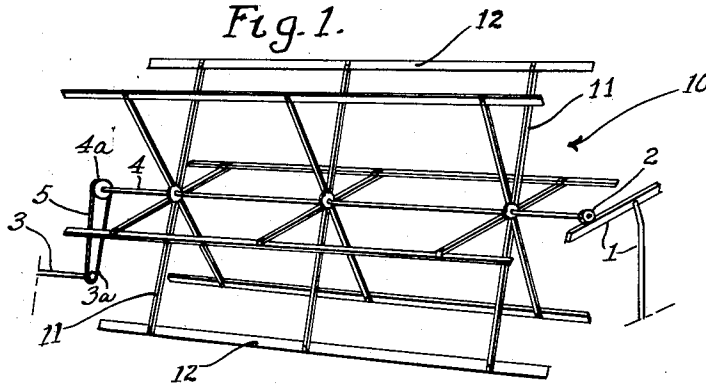


Fig. 2.

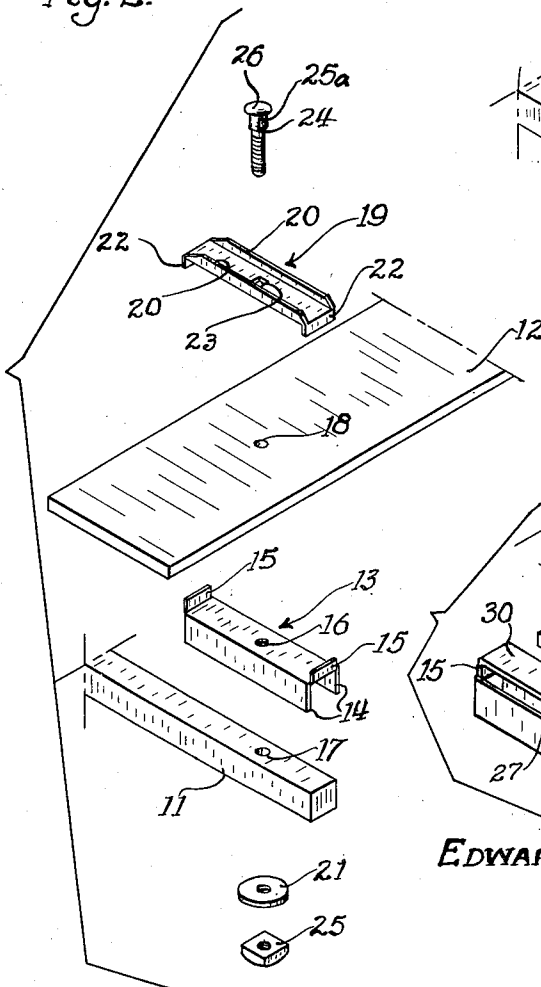


Fig. 3.

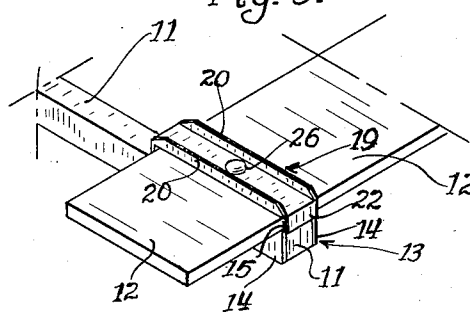


Fig. 4.

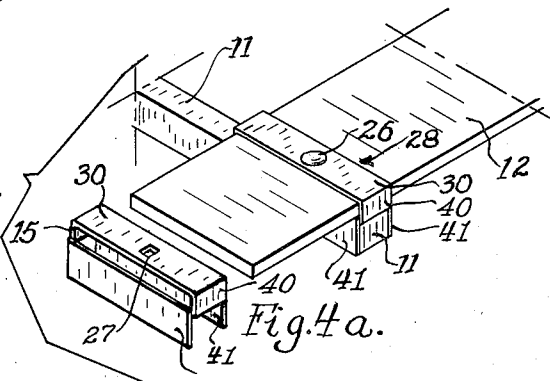


Fig. 4a.

EDWARD O. HENDRICKSON, INVENTOR.

BY *Alvin Q. E. Mitchell*
Atty.

UNITED STATES PATENT OFFICE

2,610,460

PADDLE WHEEL REINFORCEMENT MEANS

Edward O. Hendrickson, Grenville, S. Dak.

Application August 23, 1949, Serial No. 111,823

5 Claims. (Cl. 56-220)

1

2

This invention relates to paddle wheels.

In the use of paddle wheels heretofore, such as in the type of paddle wheel here illustrated, being one used with a small grain harvester, binder or combine, in the farm machinery art, it has become frequently necessary to replace the paddle or slat bars thereof. Those bars, as well as the radial spokes of the wheel, are made of wood, and are secured together with a common square lugged button headed carriage bolt. That bolt has been seated through the slat, with its square portion held only by a square hole formed for it in the wood slat, with the natural result of inability to remove the bolt, when necessary to replace the slat, upon the nut becoming rusted on the bolt and the square wood seat for the bolt becoming worn or rotten from weather action on the wood, the button head of the bolt being the only part exposed, there being no way of holding the button end of the bolt to remove the nut from the other end.

Heretofore, also, there has been no way known in the art to prevent the slats of the wheel from splitting, warping and becoming loose on the spoke arms, and the spoke arms from splitting, with the result that the entire wheel assembly, at its periphery, becomes weakened and loose, and the wheel racks transversely of its periphery, becomes inoperative from split slats and arms and requires frequent disassembly and replacement of slats and arms thereof, resulting in many lost man hours.

To overcome those defects of construction, it is a principal object of this invention to provide a novel paddle wheel reinforcement means, used in connection with the bolt, for reinforcing both the slat and the arm when bolted together, to prevent breaking thereof.

Another principal object of my invention is to provide such a reinforcement means as will securely hold the slat and the arm of the wheel together, as one rigid unit against any side movement or racking of the wheel.

Another object of my invention is the provision of such a reinforcement means for cooperation with the conventional button headed square lugged carriage bolt.

Another object of my invention is the provision of a novel washer having two channels therein, each at right angles to the other, with a channel on each side of the washer, adapted to substantially enclose the paddle wheel arm in one channel and the slat in the other channel.

Other and further objects will be apparent to those skilled in the art from the following de-

tailed description, reference being had to the accompanying drawing, in which drawing:

Figure 1 is a partial perspective of a paddle wheel of the type used on grain combines;

Figure 2 is a composite exploded perspective view of the various parts used to connect the slat and arm of a paddle wheel;

Figure 3 is a composite assembled view, in perspective, of the parts shown in Figure 2; and

Figure 4 is a partial, assembled, perspective view of a modified form of my novel reinforcement means or washer, being of unitary construction; with perspective view, Figure 4a, being of that washer alone.

Throughout the various views, in the following description, I have used like characters of reference to designate like or similar parts. Referring now to the drawings:

The reference numeral 10 designates a paddle wheel of the type used with harvesters and combines, in the farm machinery art, having a plurality of spokes or arms radiating therefrom, designated as 11, to the outer ends of aligned ones of which are secured slats 12. Instead of just sinking a button headed, square lugged bolt, of the carriage bolt type, into the slat, with the button on the slat side, which is an inferior and temporary method of securing the slats 12 to their respective arms 11, for reasons previously explained, I provide a novel reinforcement means of securing the slats to their arms.

The frame of a grain harvester is diagrammatically illustrated in Figure 1, by reference numeral 1. The paddle wheel 10 has its hub-shaft 4 axis suitably journaled in bearing members 2 secured to the frame, there being one of said bearings at each end of the horizontal shaft 4 though only one is shown. Drive shaft 3, diagrammatically shown, operated by the source of power operating the harvester, and journaled in bearings on the frame structure, in the conventional manner, has a chain drive sprocket wheel 3a secured rigidly thereto. A driven chain sprocket wheel 4a is keyed to the end of the hub-shaft 4 adjacent the drive sprocket 3a, so as to be adapted to receive a drive loop chain 5 in meshed relationship over the sprocket wheels 3a and 4a, for causing revolution of the paddle wheel 10 upon operation of drive shaft 3. Paddle wheel 10 comprises radially aligned sets of spoke arms 11, each of the arms being rigidly secured to the main hub shaft 4 by a conventional hub structure, so that revolution of 4 causes the arms 11 to revolve with it, and at the outer extremity of the aligned arms a slat member 12 is bolted to those arms, as illus-

3

trated. It is apparent, in this modification illustrated, that the paddle wheel 10 revolves in its entirety on its horizontal axis 4. My novel reinforcement means is applied at the juncture of each of the arms 11 with its slat member 12.

That reinforcement means of mine, illustrated in Figures 2 and 3, comprises a novel pair of complementary channel members or washers, 13 and 19. The channel washer 13 is of a length the same as the width of the slat 12, and has downturned arms 14 spaced so as to provide a channel for snugly receiving the end of the arm 11 therebetween. Centrally of the washer 13 is a hole 16 positioned to receive the bolt 24, which bolt also extends down through the hole 17 in the arm 11. At each end of the washer 13, there are a pair of upturned wings 15, which wings are of a height slightly less than the thickness of the slat 12, and the distance between wings 15 is formed so as to provide a channel for snugly receiving the slat 12 therebetween. The channel washer 19 is also of a length the same as the width of the slat 12, and has downturned wings 22 spaced so as to provide a channel therebetween those wings 22 for snugly receiving the slat 12 therebetween, when assembled as illustrated in Figure 3. A square opening, designed to receive the square lug body portion 25a of the bolt 24, is provided centrally of the washer 19 in alignment with the opening 18 for the bolt in the slat 12. Slat 12, made of wood, usually warp after they have been used a while, and to assure that washer 19 holds the slat from warping I provide upturned bridge truss type reinforcement arms 20, integral with the base of that washer, which prevents the slat 12 from so warping by constantly extending the pressure from the bolt button head 26, after assembly, through the entire surface or width of the slat by means of those arms 20. During assembly, as illustrated in Figure 2, a washer 21 is inserted over the screw end of the bolt and a nut 25 is screwed then onto the bolt, after the parts shown in exploded view Figure 2, have been placed together in the order shown for assembly. As that bolt is tightened, wings 22, of washer 19, telescope with wings 15, of washer 13, each of those wings being slightly shorter than the thickness of the slat 12. At the beginning of assembly, one of these wings at each side of the slat 12 is slightly bent in or out with relation to the slat, by a suitable tool, such as a pair of pliers, to permit that wing to telescopically pass the wing of the other washer on that side as the members are drawn together by a tightening of the bolt nut, thus effecting a complete and snug encasement of the slat by the washers 13 and 19. Lower wings 14, of washer 13, act with relationship to that washer, after assembly, as bridge arms for preventing any flexing of that washer as it rests against that side of the slat opposite from washer 19.

It will thus be seen that my novel reinforcement means, comprising a pair of right angularly opposed channel washers, not only acts to reinforce the respective slat and arm held together therein, when the bolt assembly is secured in place, as illustrated in Figure 3, but also acts to securely and rigidly hold one of those members with relation to the other one from twisting or moving on that bolt, thus preventing any racking of the outer paddle wheel peripheral assembly. The latter is important, as heretofore the arms and slats of a paddle wheel have had to be replaced many times during the life of a machine, due to the racking and twisting and split-

4

ting of the arms and slats caused by the loose bolt connection therebetween. With my novel reinforcement means, one set of arms and slats will last the life of the machine, barring unforeseen mishaps. The snug telescopic relationship between the wings 22 and 15, after assembly is important to accomplish that rigidity between the arms 11 and slats 12. It is to be understood, that, instead of having the distance between the wings, 15 and 22, of each washer, respectively, identical, the one set can have a slightly larger distance, for ease of assembly.

In Figure 4, I illustrate a modification of my invention, in the form of a unitary washer 28 instead of two washers. Figure 4a clearly illustrates this washer as having three main surfaces: namely, the upper surface strap 30, which rests on top of the slat, side wings 40 which rest against each side of the slat 12, and extending downwardly, as illustrated, are a pair of parallel wings 41, spaced apart sufficient to allow the arm 11 to snugly fit between those wings. A square hole 27 for the square lugged bolt body is provided in the strap 30. This unitary washer is made of less material than the pair of washers previously explained and illustrated in Figures 2 and 3, and accomplishes the same purpose. The wings 41 are welded onto the lower edges of wings 40, as illustrated, being spaced with the upper edges of 41 parallel with strap 30 and with those edges spaced a distance from 30 equivalent to the thickness of slat 12. Thus it will be seen, relative to the modification of my reinforcement means illustrated in Figures 4 and 4a, that this washer also has two right angularly opposed channels. One of those channels is the one for the arm 11 between the wings 41, and relative to which it is to be noted that the arm rests upwardly against the under edges of wings 40; and the other of those channels is the one wherein the slat 12 is inserted, namely between strap 30, wings 40 and the upper edges of the other wings 41. The latter channel is a loop channel and effects reinforcement of the slat therein as a result. The wings 41 act as reinforcement or strengthening arms for preventing a bending of that loop and thus the slat is held against warping.

It is to be noted, in both modifications of my invention heretofore described, that the square opening provided for seating the square lugged carriage bolt therein, in each instance, assures that the nut 25 may be removed at any time, despite a rusting between it and the bolt, at any time, as those square bolt body seats in the washer hold the body of the bolt from turning at all times, should it be desired to remove the bolt nut, for disassembly for any reason.

I preferably make my washers or washer of galvanized thick gauge metal or light alloy metal.

It is to be understood, that while I have shown and described my invention with relation to its use in the farm machinery paddle wheel art, that it is adaptable and usable in any art wherein a paddle wheel is used, and I am not to be limited by the preferred embodiment of my invention here shown and described.

Having thus shown and described detailed modifications of my invention, it is to be understood that many changes and modifications may be made therein without deviating from the spirit and scope of my invention, and it is to be therefore distinctly understood that I wish to be found only by the appended claims.

What I claim and desire to secure by Letters Patent is:

5

1. The combination with a paddle wheel having a spoke arm, an axially aligned paddle-slat overlapping the arm, and a square-lugged button-headed bolt securing the one to the other, of reinforcing and joining means associated with said bolt comprising a U-shaped washer adapted to receive and hold the slat between the arms of the U, said washer being positioned between the bolt head and the slat and having a square hole adapted to snugly receive the square-lugged portion of the bolt therein, and the washer having upturned bridge reinforcing arms on the opposite side thereof from the U-shaped arms, said bridge arms being adapted to reinforce the washer, and in turn reinforce the slat held thereby, for transmitting bolt head pressure throughout the entire washer surface to the slat.

2. The combination with a paddle wheel having a spoke arm, an axially aligned slat, and a square-lugged button-headed bolt securing the arm to the slat, of reinforcement means comprising a pair of channel washers, one of said washers having two upturned wings adapted for snugly receiving the slat between said wings and also having downturned wings for snugly receiving the arm therebetween at a right angle to the slat and being positioned between the arm and the slat, the other of said washers being also adapted to snugly receive and hold the slat between the sides of its channel and being positioned between the bolt head and the slat, said second washer having a square hole adapted to snugly receive and hold the square-lugged portion of the bolt therein, and said second washer having upturned reinforcing bridge arms on the opposite side thereof from its channel sides for reinforcing the said washer as it is pressed against the slat by the bolt head.

3. The paddle wheel combination as claimed in claim 2, and characterized further by the definition of the upturned wings of the first washer being adapted to telescope with the sides of the second washer channel for snugly holding the slat between said two washers and between said wings and sides against movement when the bolt draws the arm and slat together.

4. In combination, a pair of complementary washers, adapted for association with a bolt, a nut therefore, and two members designed to be securely held together by the bolt and nut at right angles to each other and in overlapping relationship to each other, each washer having a channel portion for receiving one of said members therein, one of said washers being adapted to be positioned between said members and the

6

other of said washers being positioned on the other side of a member from said first washer, each of said washers having a pair of bridge arms adapted to extend perpendicular to and transversely of said member positioned between said two washers, and also each of said washers having a pair of wings adapted for snug telescopic encasement of the sides of said member positioned between said two washers.

5. A reinforcement and holding means for a paddle wheel having spoke arms extending radially from the axle thereof and axially aligned paddle slats bolted on the arms, comprising a pair of complementary channel washers in association with said bolt, the channel of each washer being adapted to substantially enclosed the adjacent portion of a slat near one end of the bolt, said washers and an arm and its slat each having a hole therethrough for receiving the bolt, one of said washers being adapted upon a seating of the bolt through said holes to reinforce said slat and also to hold the slat onto its arm, and the other of the washers being adapted thereupon to reinforce said arm and to hold it with relation to its slat, each washer having a pair of reinforcing bridge arms on its side thereof opposite from the channel side and which arms constitute means for so reinforcing said slat by transmitting bolt securement tension to the slat throughout each entire washer surface adjacent said channel, the sides of each channel of each washer being adapted to telescope together and around the said slat, said means for reinforcing and telescoping sides comprising said means for holding.

EDWARD O. HENDRICKSON.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
79,009	Rundell	June 16, 1868
381,137	Hodges	Apr. 17, 1888
381,308	Whiteley et al.	Apr. 17, 1888
408,750	Rockwell et al.	Aug. 13, 1889
909,055	Bowers	Jan. 5, 1909
2,255,270	Pimm	Sept. 9, 1941
2,283,943	Myer	May 26, 1942
2,345,847	Wink	Apr. 4, 1944

FOREIGN PATENTS

Number	Country	Date
29,403	Great Britain	Dec. 24, 1906