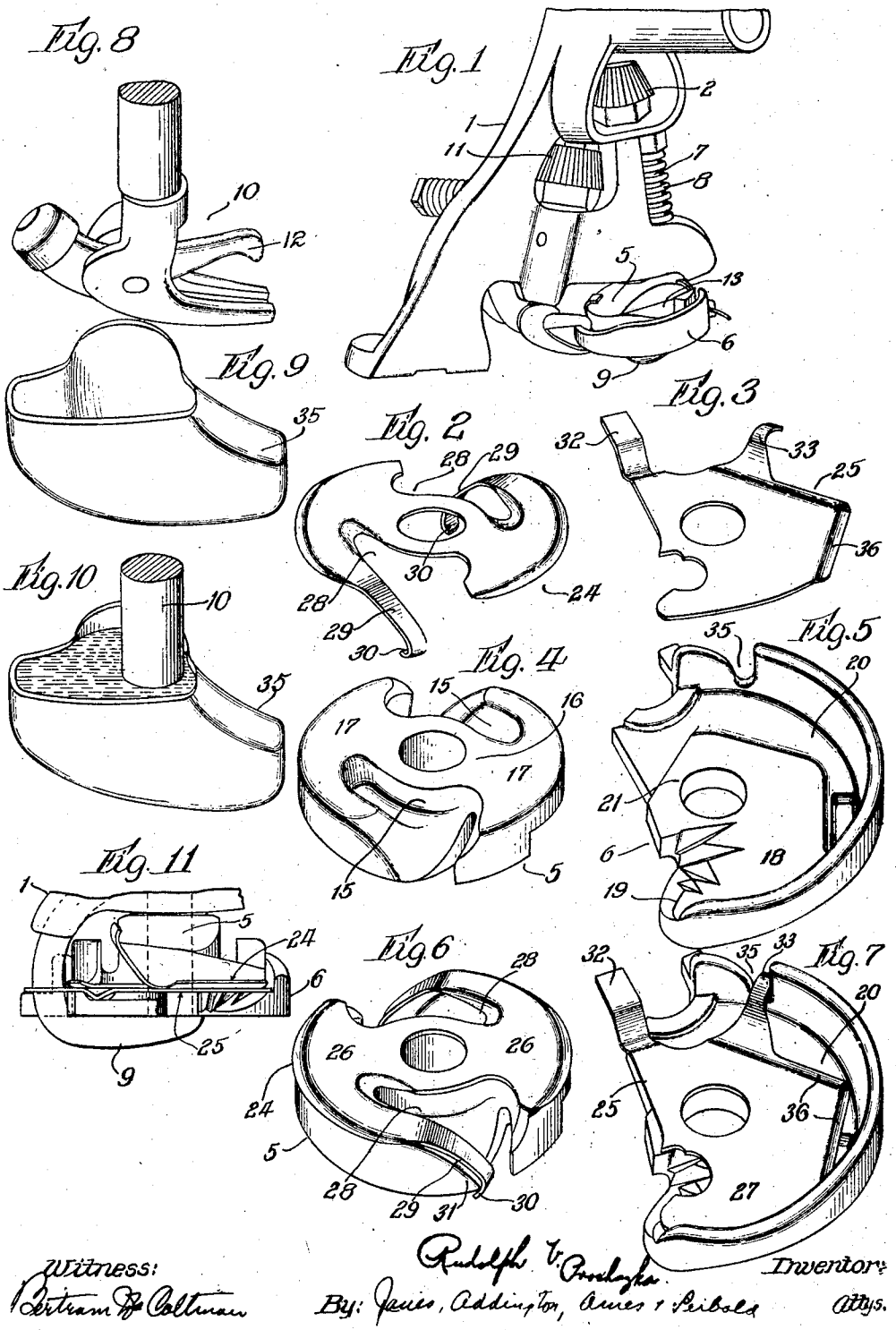
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R. V. PROCHAZKA

KNOTTER DEVICE

Filed April 18, 1923



Witness:
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UNITED STATES PATENT OFFICE.

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KNOTTER DEVICE.

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To all whom it may concern:

Be it known that I, RUDOLPH V. PROCHAZKA, a citizen of the United States, residing at 2106 South 56th Ave., Cicero, in the county of Cook and State of Illinois, have invented new and useful Improvements in Knotter Devices, of which the following is a full, clear, concise, and exact description, reference being had to the accompanying drawing, forming a part of this specification.

My invention relates to grain binders and more particularly to knotters for tying the bundles of grain prior to their discharge from the grain binders.

In the construction of knotting devices, it is common practice, at the present time, to provide a pair of members adjacent the knotter hook, one a twine holder and the other a cover which applies pressure against the holder, for gripping twine and holding the end thereof as the twine is fed to the knotter hook by an oscillating needle. These members have relative movement, the twine holder rotating while the cover is held stationary. The cover applies a pressure against the twine holder in order to hold the end of the twine therebetween during each cyclic movement of the knotter. The pressure is applied by a spring through an arm, which holds the cover stationary. It is, therefore, apparent that considerable wear upon the twine holder and cover will result, this wear being confined to the engaging surfaces of these members, due to this pressure and relative movement. The efficient functioning of the knotter will therefore be eventually destroyed.

It is well known that the knotter is a vital, as well as an important part, of a grain binder. If there is the slightest defect in the construction of the knotter, or if the engaging surfaces of the twine holder and cover are worn, the end of the twine will not be held and released at the proper time. The end of the twine will, therefore, not pass through the loop of the knot, which is formed by the knotter hook or bill. The result is that the bundles of grain will be discharged from the machine, untied.

To remedy this difficulty, it has heretofore been necessary to replace these worn members with new parts. Removal of the members is a difficult matter and requires considerable care to prevent the breaking of the knotter frame, which is of cast iron. A missing blow of the hammer or other tool used to remove the twine holder shaft will destroy the knotter frame. If, as stated, the cast iron knotter frame is broken, the entire knotter device must be renewed.

An object of my invention is to obviate the above disadvantages, and includes the provision of an improved means to compensate for the wearing of the engaging surfaces of the twine holder and cover.

More specifically this means comprises a pair of wearing plates adapted to cooperate with the engaging surfaces so that the relative rotation and pressure between the twine holder and the cover will not result in wear on these engaging surfaces.

A further object of my invention resides in the production of an improved form of these wearing plates. Inasmuch as there is considerable friction between the engaging surfaces, due to the pressure of the cover spring, it is essential that each wearing plate follows the member with which it cooperates, in order that the twine held therebetween will be received and discharged properly. To accomplish this purpose, the wearing plates have been shaped to correspond to the configuration of the engaging surfaces. In addition to this, certain provisions have been made whereby the wearing plates are positively gripped and thereby made to cooperate with each member in its relative movement.

As a further object of my invention, I contemplate providing a cover which is to be placed over the knotter hook or bill. As is well known to those skilled in the art, it is essential that the knotter hook or bill maintains its high surface finish, in order that the twine may freely move thereover when the knot is removed from the knotter hook or bill at the end of the knit-forming operation. It has been found that this high surface finish is easily lost during the storage periods of the binder. Consequently, by providing a cover for the knotter hook, and if desired, immersing the same in a lubricant within the cover, this highly finished surface of the knotter hook may be retained during the life of the binder.

Further objects and advantages of my invention will appear from the following

specification and drawings wherein I have illustrated a preferred embodiment thereof.

In the drawings—

Figure 1 is a perspective view of a knotter mechanism, including the knotter frame;

Fig. 2 is a similar view of the wearing plate provided for the twine holder;

Fig. 3 is also a similar view of the wearing plate provided for the cover;

Fig. 4 is a perspective view of the twine holder;

Fig. 5 is a similar view of the cover;

Fig. 6 illustrates the manner in which one of the wearing plates engages the twine holder;

Fig. 7 similarly illustrates the manner in which the other wearing plate engages the cover;

Fig. 8 is a detail view of the knotter hook or bill;

Fig. 9 is a perspective view of the cover therefor;

Fig. 10 illustrates the manner in which the cover lies over the knotter hook when the grain binder is not in use; and,

Fig. 11 is a side elevational view of the twine holder, cover and wearing plates in their assembled relation.

The operation of knotter devices is well known to those skilled in the art. I, therefore, do not consider it conducive to a clear understanding of my invention to explain in detail the operation of the knotter device shown herein, but consider it merely necessary to explain the purpose of the various parts thereof, in order for one to comprehend clearly the function of the wearing plates and the cover which encloses over the knotter hook, while the binder is not in use.

The knotter is suitably supported above the binder deck (not shown) on a cast iron frame 1. This frame 1 may be carried in any desired manner, but preferably in a manner permitting a pinion 2 on the twine holder shaft to mesh with a driving gear on the binder. At the end of the twine holder shaft, a twine holder member 5 is mounted, and is adapted to be driven by the pinion 2. A cover member 6 is adapted to close over the under side of twine holder 5, and be held thereagainst under pressure by a coil spring 7 on a shaft 8. Shaft 8 is provided with a lower end projection 9, which holds cover 6 stationary and in engagement with the twine holder 5.

A knotter hook or bill 10 is mounted for rotation adjacent to the twine holder 5 and cover 6. Frame 1 similarly supports this knotter hook, and carries a driving pinion 11, so that the latter may mesh with another gear upon the binder, whereby the knotter hook will be suitably rotated to form a double loop of twine around one end thereof. After this double loop of twine is formed, an arm (not shown) moves forwardly and pushes the grain toward the discharge end of the machine. This operation causes the twine, thus twice looped about the knotter hook to be pulled therefrom, while the hook 12 at this moment is closed with one end of the twine gripped thereby, so that this end of twine will be pulled through the double loop. Thus the knot is formed.

On the next bundling and knotting operation, an oscillating needle (not shown) moves forwardly to lay the twine over the knotter hook, and also in a groove 13 on the top face of the twine holder 5. A one hundred and eighty degree rotation of the twine holder 5 will cause a portion of the twine to be caught between the twine holder 5 and cover 6 whereupon the twine will be cut. One end of the twine is then left in the holder 5 while the other end is freed to permit the discharging of the bundle of grain as soon as the knot has been completed.

It is to be here noted that the end of the twine caught between the twine holder 5 and the cover 6 partially lies in one of the grooves 15 on the under side or engaging surface 16 of the twine holder. A portion of the twine is gripped by one of the surfaces designated 17, just back of the groove 15 on the twine holder 5, and the surface designated 18 on the engaging surface 21 of the cover 6. The pressure applied by the coil spring 7, between these two members causes the surfaces 17 and 18 to grip the twine firmly until the following groove 15, or rather the end of the surface 17, advances past the point 19 on the cover 6. The twine is then freed to complete the formation of the knot on the knotter hook or bill 10. The groove 20 in the cover 6 allows the twine to fill the entire groove 15 before the twine is gripped by the surfaces 17 and 18.

Thus it is apparent that the surfaces 17 and 18 and grooves 15 and 20 perform an important part in the formation of the knot by the knotter hook or bill 10. If these surfaces are permitted to wear, the depth of the grooves 15 will be accordingly decreased. Hence the twine will not be permitted to fill these grooves 15 before being gripped by the twine holder 5 and cover 6.

As before stated, my invention contemplates providing wearing plates 24 and 25, the former for cooperating with the engaging surfaces 16 and the latter for cooperating with the engaging surface 21.

It will be noted in Figs. 2, 4 and 6 that the wearing plate 24 is made so as to conform substantially to the configuration of engaging surface 16. Likewise, the wearing plate 25 is made to conform substantially to the configuration of engaging sur-

face 21. Thus the passage of the twine between the twine holder 5 and the cover 6 is not in any way interfered with, nor is the rotation of the twine holder hindered.

Instead of being gripped between the surfaces 17 and 18 on the twine holder 5 and the cover 6, respectively, the twine is gripped between the surfaces 26 and 27 on the wearing plates 24 and 25. The wearing plate 24 is cut away at 28 in order to clear the grooves 15. Adjacent to these cut away portions, the margin of the plate 24 is formed into downwardly turned flanges 29. The ends of these flanges are bent into angularly formed lips 30, which grip portions 31 on the twine holder 5, so that the wearing plate 24 will be made to follow the twine holder in its movement, in the direction of the arrow shown in Fig. 6.

The wearing plate 25 is provided with projecting arms 32 and 33, the arm 33 being adapted to lie in a notch 35 in cover 6 to prevent relative movement between itself and the cover. Along one side of the wearing plate 25, a turned down edge 36 is provided for preventing the wearing plate from interfering with the functioning of the groove 20, inasmuch as the edge holds the plate in place over the wearing or engaging surface 21 and prevents the plate from slipping over and covering the groove.

Thus it is seen that both of the wearing plates 24 and 25 are held upon their respective engaging surfaces. The pressure between these engaging surfaces and the rotation of the twine holder 5 and the wearing plate 24 can not, in any possible way, displace the wearing plates. Hence the engaging surfaces 16 and 21 are properly protected against wear.

By inserting a pointed edged instrument between the cover 6 and the twine holder 5 for temporarily separating them, the wearing plates may be easily inserted. Hence, it will be seen that it is not necessary to disassociate the entire knotting device in order to mount these wearing plates.

If the knotter is first used without the wearing plates, their insertion at a later time, say after the engaging surfaces 16 and 21 have been worn, will obtain the advantages of a new knotter.

Likewise, if the wearing plates 24 and 25 are used when the knotter is new, they may be removed after worn. The engaging surfaces 16 and 21 having not been put into direct wearing engagement with each other before this time, the knotter will function the same as when new.

For reasons well known to those skilled in the art, the surfaces of the knotter hook or bill 10 must be kept in a highly polished condition. The twine is permitted to slide easily off the knotter hook 10 after the knot has been formed. As pointed out, it has been my experience that the knotter hook will, in time tend to rust, especially during the seasons of the year when binders are not used. To preserve this highly polished finish, I contemplate as part of my present invention the mounting of a cap or cover 35 over the knotter hook 10. The cover 35 is preferably filled with a grease or lubricant, and is pushed upwardly over the knotter hook, so that the latter will be entirely immersed in the lubricant. It is to be noted that the cover 35 is shaped so as to fit closely over the knotted hook. I consider this shape particularly novel in that it holds the cover 35 in place.

It will be observed that the wearing plates 24 and 25 have been designed so as to fit upon the engaging surfaces 16 and 21. I am aware that many types of knotters are in use, and that the relation of the twine holder 5 and cover 6, together with their respective engaging surfaces vary according to the different type of knotters. Practically every different make or type of binder is provided with a different type of knotter. I, therefore, wish it to be understood that my invention contemplates the provision of wearing plates which may be adapted to any type of knotter.

Without further elaboration, the foregoing will so fully explain the gist of my invention, that others may, by applying current knowledge, readily adopt the same for use under varying conditions of service, without eliminating certain features, which may properly be said to constitute the essential items of novelty involved, which items are intended to be defined and secured to me by the following claims.

I claim:

1. In combination, a knotter hook, a pair of relatively movable members for gripping the end of twine as the twine is fed to said knotter hook, and means adapted to be interposed between said relatively movable members for preventing the wearing thereof.

2. In combination, a pair of relatively movable members, means for applying a pressure to one of said members whereby twine may be gripped between said members, and wearing elements adapted to be inserted between said members to prevent the wearing thereof.

3. In combination, a pair of relatively movable members provided with engaging surfaces between which twine is adapted to be held, and means adapted to be inserted between said engaging surfaces for preventing the wearing thereof.

4. In combination, a pair of relatively movable members provided with engaging surfaces between which twine is adapted to be held, said surfaces being provided with grooves in which the twine is adapted to lie when held, and wearing plates having a con-

figuration similar to that of said surfaces for cooperating therewith and for preventing the wearing thereof.

5. In combination, a pair of relatively movable members provided with engaging surfaces thereon, said surfaces having grooves therein, said grooves serving to confine twine between said members and permit its removal and the replacement of new twine during each cyclic movement of one of the members, and means between said surfaces for preventing the wearing thereof as the result of said movement.

6. In combination, a pair of relatively movable members provided with engaging surfaces thereon, said surfaces having grooves therein for receiving and gripping twine between said movable members, plates adapted for insertion between said surfaces for cooperation with said members in their relative movement, and means permitting each plate to follow its cooperating member in the movement thereof.

7. In combination, a pair of relatively movable members between which twine is adapted to be gripped, and wearing plates cooperating with each of said members and following the same in its relative movement with the other member.

In witness whereof, I have hereunto subscribed my name.

RUDOLPH V. PROCHAZKA.