(No Model.)

J. F. STEWARD.

GRAIN BINDER.

No. 266,732. Patented Oct. 31, 1882.

Fig. 1.

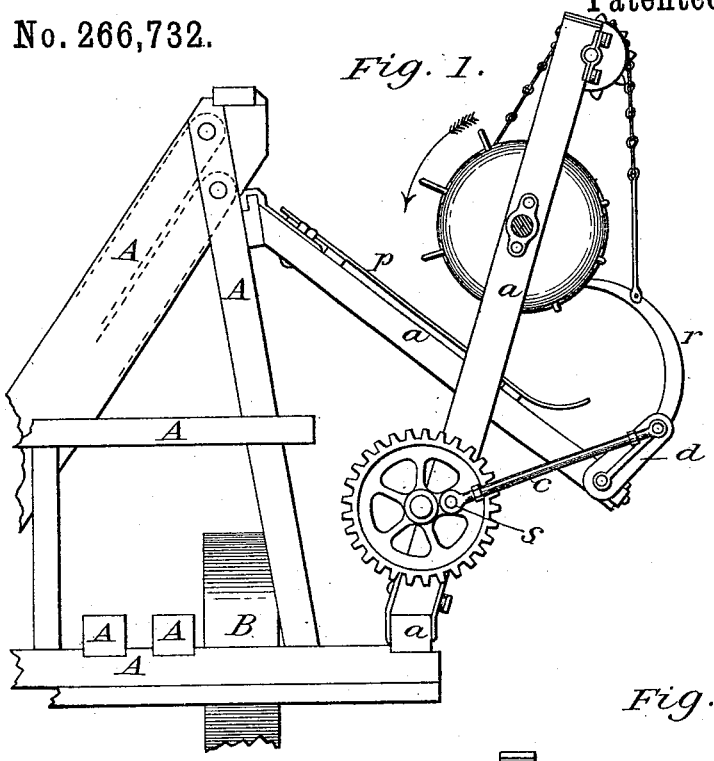


Fig. 5.

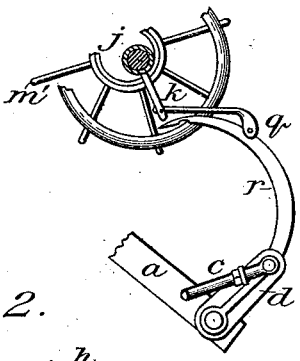


Fig. 2.

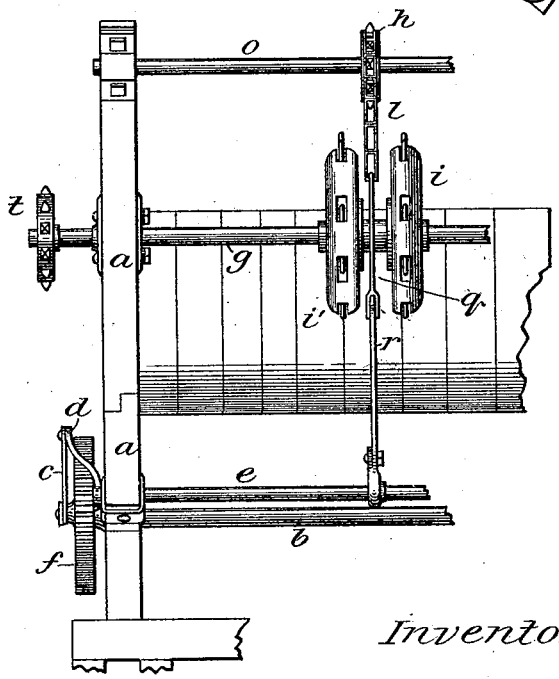


Fig. 3.

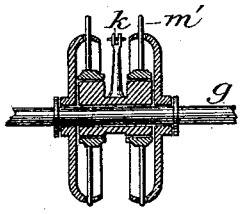
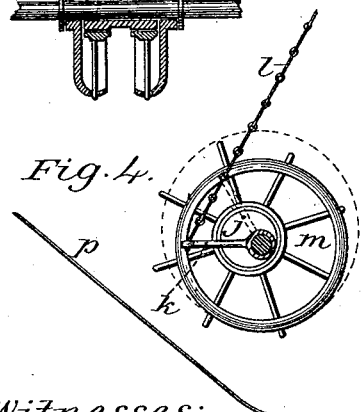


Fig. 4.



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UNITED STATES PATENT OFFICE.

JOHN F. STEWARD, OF CHICAGO, ILLINOIS.

GRAIN-BINDER.

SPECIFICATION forming part of Letters Patent No. 266,732, dated October 31, 1882.

Application filed March 6, 1882. (No model.)

To all whom it may concern:

Be it known that I, JOHN F. STEWARD, of the city of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Grain-Binders, of which the following is a full specification, reference being had to the accompanying drawings, in which—

Figure 1 is an end view of the binder-frame connected with the harvester-frame, and shows also the packers and needle. Fig. 2 is a partial side view. Figs. 3 and 4 are details. Fig. 5 shows a modified form of the means for connecting the needle with the packers.

The object of my invention is to produce packing mechanism that may be continuous in its movement and yet intermittent in its operation on the grain submitted to its action; and its nature consists in mounting a packing device to act upon the grain, and be so controlled by the binding devices that when they are in operation the position of the packers shall be so varied by being connected with the needle or other vibrating part of the binder that they shall not engage the grain during the operation of binding.

In the drawings, A designates both the harvester and elevator frames, and B the drive-wheel. These are introduced only to show the position of the binder-frame with its operating parts located in relation to them.

a is the frame-work of the binder; *b*, the main shaft of the binder mechanism; *e*, the needle-shaft.

c is a pitman connecting the crank or arm *d* of the needle-shaft with the wrist-pin *s* on the main driving-gear *f*.

g is the packer-shaft.

h is a sprocket-wheel over which the chain *l* moves.

i i' are the wheels, secured to the shaft *g* for driving the packers and stripping their teeth, the eccentricity of the axis of the packer to that of the wheels causing the teeth of the former to withdraw into the rim of the latter, and they form also a revolving breast against which the grain falls, and between which and the dishing the grain passes or is forced by the packer-teeth.

j is an eccentric mounted loosely and vibrating on the shaft *g*. This eccentric is provided with the arm *k* for vibrating it.

l is a chain connecting the arm *k* with the needle *r*.

m is a ring loosely surrounding the eccentric *j*, and into which are inserted the arms *m'*.

Fig. 4 shows one wheel cut away so as to expose more clearly all the parts, and it will be seen by reference to this figure how the packers are arranged radially around the ring.

o is a shaft supporting the sheave *h*.

p is the deck which forms part of the receptacle.

q is a link forming part of the connection between the lever *k* and the needle *r*.

s is a wrist-pin on the wheel *f*.

I show my packer arranged to operate on a binder the form of which is similar to that shown in the patent issued to me May 29, 1877, and numbered 191,264. The shaft *g* crosses the machine above the deck and needle. It is constructed as follows: The wheels *i* are made of suitable size, and keyed to the shaft and revolve with it. The motive power for this shaft is derived from the harvester-gearing by means of a chain thrown over the sprocket-wheel *t*, that shall give it a continuous rotation. The wheels *i i'* are shown in section in Fig. 3. Their faces are made round, so as to present no sharp corners that will break the straws or cut them. The faces are provided with a series of slots equal in number to the packers *m'*.

Surrounding the shaft and vibrating on it is the eccentric *j*. The rings *m* revolve on this as a bearing. The eccentricity of *j* and the length of the packers are so proportioned that on the side of extreme eccentricity of *j* they will protrude from the rim or face of *i*, and on the opposite side be so far withdrawn as to be within the circumference of the wheel. The greatest amount of protrusion of the packers will be in the direction of the extreme radius of *j*, and if *j* be vibrated on its axis the direction or side of the wheel of the extreme protrusion will follow it. Fig. 4 shows the preferable position of the eccentric on its axis of vibration when packing is taking place. The lever *k* is shown in dotted line in the position to which it is moved to render the packers inoperative. The dotted circle shows the path described by the ends of the packers when thrown out of their operating positions.

As long as the parts are in the positions shown by the full lines in Fig. 4, and the pack-

ers are revolved, the grain will be carried through the throat formed by the deck and wheels. This feed must be checked while the gavel is being bound. Especially is this the case if a reciprocating or any other needle is used that will obstruct the throat. To check the feed the lever *k* is raised to the position shown in dotted line in Fig. 4, or higher, if necessary. The packers then traversing, as shown by the dotted circle, will be withdrawn before passing so far as to force the grain through the throat. The wheels *i i'*, revolving, as they do, the ring *m* on the eccentric, will have a tendency to carry the eccentric in the same direction, and as the needle rises and slackens the chain *q* the eccentric will be permitted to fall to its first position and the packers move on this axis to position for work. It will be seen, then, that I have packers controlled by a vibrating support, which renders them alternately operative and inoperative, yet continuous in their movement. The needle *r* is connected by the link *q* and chain *l*, or, preferably, by the link alone, as seen in Fig. 5, to the lever *k*. In the last case the eccentric support of the packers is given a positive vibration; yet I have found in practice that the first form works well. The band-uniting devices will be located in this case below the decking, and may be a tyer or twister, as desired. The wheel *f* will be geared to any part of the harvester suitably located, and clutching mechanism provided to render its motions controllable. Any number of packers may be used; but I consider two series sufficient.

The operation of my invention is as follows: A chain is thrown over the sprocket-wheel *t* from a constantly-running wheel of the harvester that will rotate the wheels *i i'*, in the direction indicated by the arrow in Fig. 1. The grain delivered by the elevator will be carried downward and packed against the band outdrawn by the needle. When sufficient grain has accumulated for a bundle the binding mechanism is put in motion by the attendant. The packers will then be rendered inoperative, as described, and the gavel accumulate above. After the bundle has been bound and the needle retracted the packing-teeth will again be permitted to begin operation anew. I have shown the deck as forming one side of the binding-receptacle or throat for the passage of the grain to be bound. The wheels *i i'* form the upper side of the throat. I wish to distinguish this invention from a class of packers which consist of revolving disks with pivoted teeth, which, by means of periodically-interposed cams, are thrown into and out of packing action. As far as I know, these are not positively carried entirely out of contact with the grain, whereas mine, by being carried entirely out of contact with the grain, are rendered absolutely inactive on the same.

What I claim is—

1. The combination of the binding mechanism with the continuously-moving packers and means connecting the packers with the needle or other vibrating part of the binder mechanism, whereby the packers are carried out of contact with the grain during the descent of the needle, substantially as described.

2. The combination of the continuously-moving packers with their vibrating support, for the purpose specified, substantially as described.

3. The combination of the continuously-moving packers and their vibrating support with means for producing a vibration of said support, substantially as described.

4. The combination, with the needle, of the continuously-moving packers and means connecting the packers and needle, whereby the said packers are given alternate positions of action and inaction upon the grain, substantially as described.

5. The combination of the wheels, the packers, and the vibrating eccentrics, substantially as described.

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