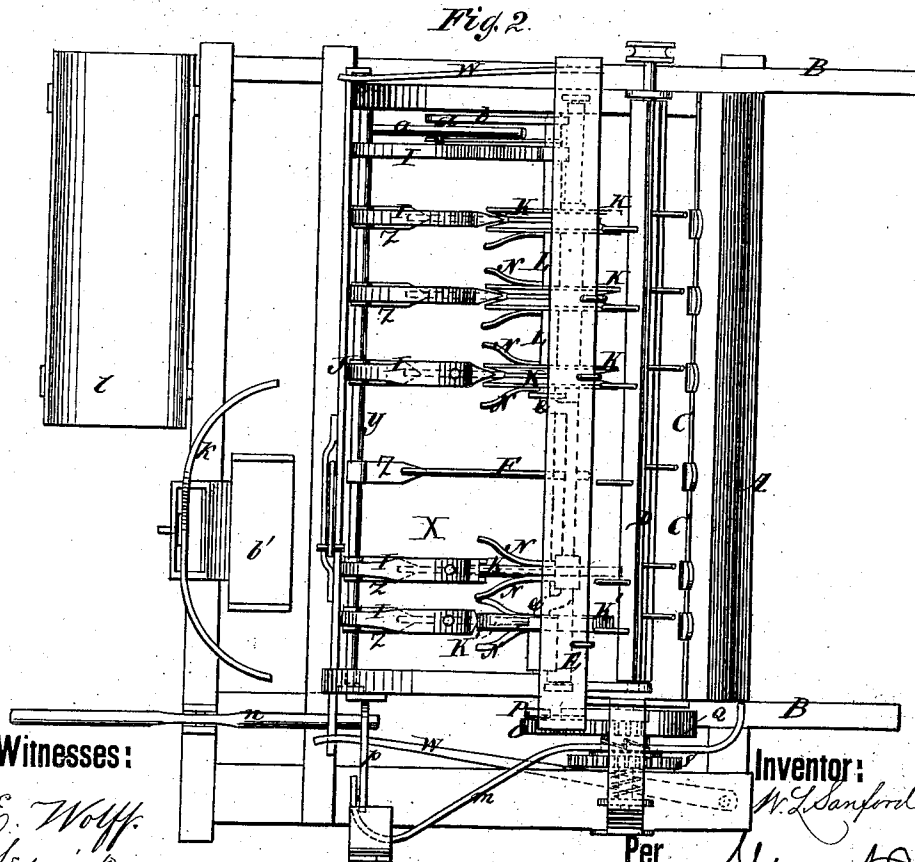
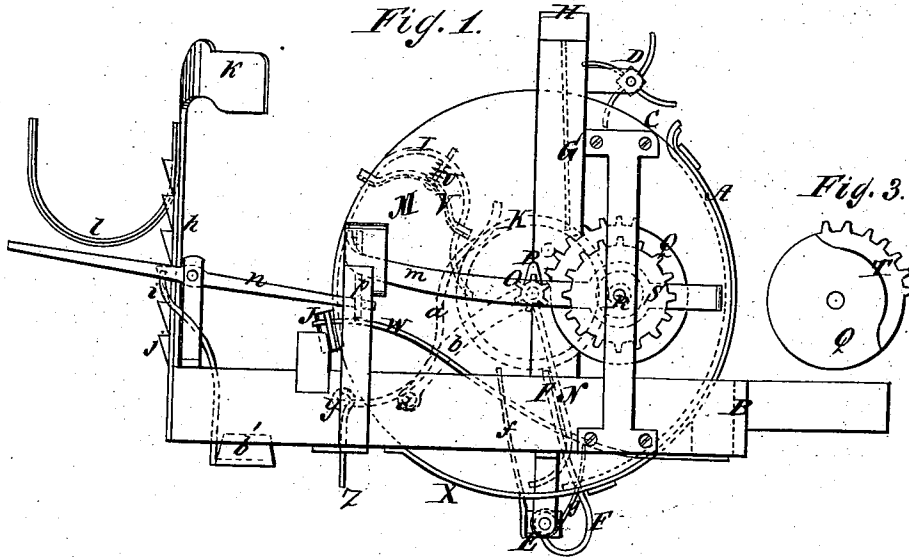


W. L. SANFORD.

Binder's Attachments for Harvesters.

No. 142,870.

Patented September 16, 1873.



Attorneys.

UNITED STATES PATENT OFFICE

WASHINGTON L. SANFORD, OF ASHTON, ILLINOIS.

IMPROVEMENT IN BINDERS' ATTACHMENTS FOR HARVESTERS.

Specification forming part of Letters Patent No. 142,870, dated September 16, 1873; application filed May 31, 1873.

To all whom it may concern:

Be it known that I, WASHINGTON L. SANFORD, of Ashton, in the county of Lee and State of Illinois, have invented a new and Improved Binding Attachment to Reapers, of which the following is a specification:

My invention relates to certain improvements in binders for harvesters, as hereinafter described, and specifically indicated in the claims.

Figure 1 is a side elevation of my improved binding attachment. Fig. 2 is a plan view, and Fig. 3 is a detail view of one of the wheels of the operating-gear.

Similar letters of reference indicate corresponding parts.

A represents a hollow cylinder, or it may be an open-frame, long enough to receive the longest grain, and large enough for receiving sufficient loose grain for a gavel in one part, and having another part in which to compress it. It is attached by a suitable supporting-frame, B, to the side of a reaper, in such manner that the endless elevator thereof will deliver the grain into the opening C, near the top, where there is a shaft, D, provided with curved teeth, to adapt it to clear the grain from the elevator, and press it downward and compact it in the receiver.

It will be seen that to thus operate the rotation must be in a direction to bring the bow or curve of the wire teeth forward, so that they shall come first in contact with the grain.

At the bottom of the cylinder is a shaft, E, with teeth or arms F projecting upward nearly to the center, to retain the falling grain in the side where it falls until a quantity sufficient for a gavel is obtained. There are also fingers or rods G projecting downward from the top cross-bar H, to guide the grain as it falls from the elevator to the side, where it accumulates for the gavel. I represents the stationary compressing-arms. They are attached at one end to the bar J, and curve upward therefrom, as shown in Fig. 1, and then downward to the guard-wheels K on the shaft L in the axis of the cylinder, with which they are arranged, either by the ends entering the grooved face of the wheels, or by the latter working in the grooved ends of the arms, so as to guide the grain into the

space M under the curves of these arms, for compressing it to be bound. The movable compressing-arms N are mounted on the shaft L. This shaft has a pinion, O, and a wedge-shaped cam, P, on one end, and in connection with this pinion and cam is a wheel, Q, having a sufficient number of cogs on its periphery to turn the pinion a little more than a revolution, and the rest of it is plain, which said wheel is on a shaft, R, whereon is a wheel, S, which is supposed to be kept continuously in motion by a machine-chain worked by a driving-wheel on the reaper, and which is arranged to clutch with wheel Q or not, as required. The wheel Q has a portion of its thickness removed along the toothed part, and a little beyond, as indicated at T, so that the cam which is arranged alongside of the pinion can turn without obstruction by the wheel Q, while the teeth of the latter are in gear with the pinion.

While the gavel is accumulating, the compressing-arms N are holding the one being bound, and after releasing it they are swung upward to the left, over to the right, downward onto the grain, and then up again to the left until arrested by the pressure of the grain brought up by them under the arms I, and the toothed part of the wheel Q escapes from the pinion, when they come to a rest, and are held by the smooth face of the wheel acting on the cam P. The extent of the compression of the gavel is regulated by springs U and auxiliary compressing-arms V, fixed on the arms I. It is also further regulated by the bar J, to which the stationary arms are attached, being arranged to rise to some extent under the control of springs W. The arms or plates V have another important function, in that they act to cast the bound gavel down and out of the cylinder speedily, which is especially necessary when the gavels are light, in order that the rake may the sooner revolve and save time for the binding. The bar J is also arranged so that, in case a gavel does not discharge, and another is forced into the binding-space, it will, after rising to a certain height, lift the lever W, and automatically throw the wheel Q out of gear, and thus prevent breaking the machine.

When the arms N push the grain up into the

stationary compressing-arms, the arms F on shaft E are swung down, first by the wrist *d* acting on the arm *f* to start them, and then by the pressure of the grain on them, so as to partly bridge over the escape-passage X between shaft E and rod Y, through which the bound bundles are discharged. The arm *f* for first starting the arms F is employed to make it easier for the teeth N. The other portion of the bridge is formed by the short arm Z projecting from rod Y. These are brought up against the ends of arms F by the lever *a* on said rod, and the arm *b* on shaft L, the latter having a wrist-pin, *d*, which comes under lever *a* and raises it sufficiently in advance of the grain to prepare the bridge by which it may pass up to the compressing-arms. When the bundle is thus compressed in the space M the band is put round it and fastened by the attendant who stands on the platform *b'*. The shaft L is cranked at *e*, in such manner as to provide space for the attendant to pass his arm between it and the bundle for passing the band around the latter. When the arms N have arrived at the limit of the movement in compressing the bundle, they have passed beyond the ends of arms F and freed them, so that they are forced back immediately by the spring-arm *f* to the position for retaining the grain falling from the elevator. A spring, *g*, prevents them from being thrown too far back. The arms Z are also released before the arms N stop when compressing the gavel by the escape of the wrist-pin *d* from the lever *a*, so that they fall back, and thus the space X for the escape of the bundle is opened to let it fall to the ground when bound. The bundle is released from the arms N when in the rotation of the wheel Q the front portion of recess T comes to the cam P and releases it from the face of the wheel, so that it is free to turn. The weight of the arms N and the bundle then turns them back to the position represented in Fig. 1, and the bundle escapes. At the same time lever *a* falls on the wrist-pin *d*, and by its weight holds the teeth against the grain so they cannot swing, as they otherwise might by the jarring of the machine. The platform *b'* is made vertically adjustable on the standard *h* by the hanger *i* and notches *j*, to adjust it to suit the height of the operator. A back-rest, *k*, is arranged on the top of the standard *h*, to which the operator can secure himself by a strap to guard against being thrown off by the jolting of the machine. *l* is a trough for carrying the bands with which the bundles are bound. The clutch is shifted by the levers *m* and link *p*. The disk K and stationary compressing-arm I

at one side of the place where the binder passes the band around the bundle are attached to their respective supports, so that they can be shifted on them to vary the width of the space. Bands or hoops K' may be used instead of these disks for keeping the grain from the shaft L as it is carried up into the compressing-space. If the grain is in sufficient quantity to obtain enough for a gavel during one revolution of wheel Q it will be kept continuously going and not thrown out of gear, and the gavel will be bound while the smooth part of the said wheel is passing the pinion; but in case it is light said wheel can be thrown out until enough has accumulated.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

1. The arrangement of compressing-arms I and bar J with the shipping-lever *n*, for automatically throwing the rotating compressing-arms out of gear, substantially as specified.
2. The shaft D, having curved arms, and arranged in the upper open portion of the cylinder, in combination with the rods G, for the purpose of packing the grain, as set forth.
3. The retaining-arms F, combined with the receptacle A and the movable compressing-arms N, substantially as specified.
4. The combination of retaining-arms F and arms Z with the receptacle and the compressing-arms, in the manner described, for conveying the grain over the discharging-space.
5. The wheel Q, pinion O, and cam P, constructed and arranged in the manner described, for operating the movable compressing-arms, holding them during the binding of the bundles, and finally discharging said bundles.
6. The stationary arm I and the disk K at the space for presenting the bands, arranged adjustably on their supports for varying the space, substantially as specified.
7. The support J of the stationary compressing-arms, arranged to yield to the action of the movable compressing-arms and controlled by springs, substantially as specified.
8. The arm *a*, relatively arranged with the wrist-pin *d* to hold teeth N against the grain and prevent them from vibrating, substantially as specified.
9. The binder's stand, arranged adjustably on the guard-standard *h*, as specified.

WASHINGTON L. SANFORD.

Witnesses:

W. E. PADDOCK,
A. E. KING.