(No Model.)

D. R. SYMONDS.

GRAIN BINDER.

No. 264,909. Patented Sept. 26, 1882.

Fig. 1.

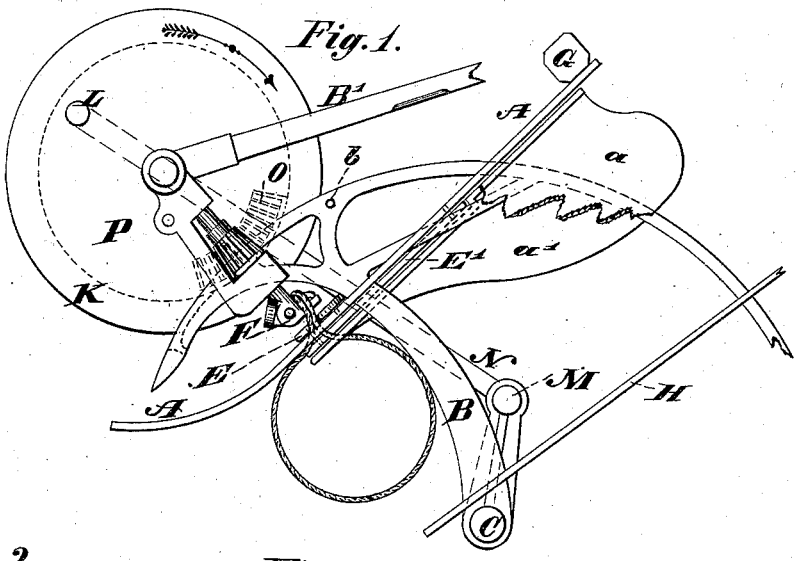


Fig. 2.

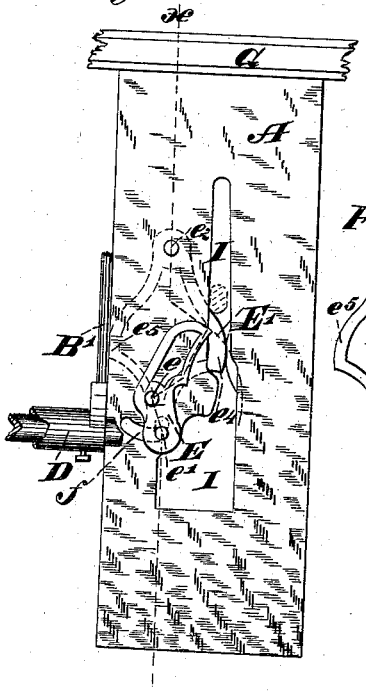
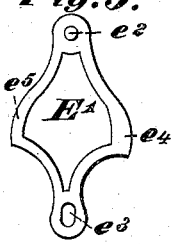


Fig. 3

Fig. 5.



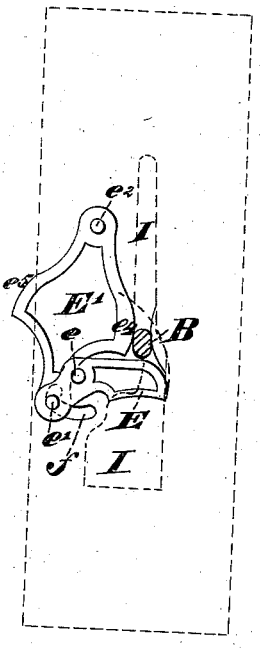
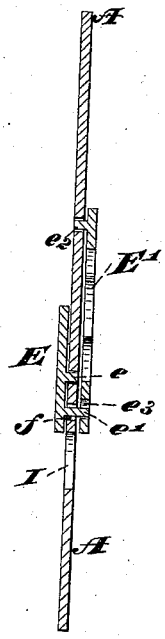


Fig. 4.



Witnesses:

P. F. Steward
John B. Kaspar

Inventor:

Daniel R. Symonds

UNITED STATES PATENT OFFICE.

DANIEL R. SYMONDS, OF CHICAGO, ILLINOIS, ASSIGNOR TO WILLIAM DEERING, OF SAME PLACE.

GRAIN-BINDER.

SPECIFICATION forming part of Letters Patent No. 264,909, dated September 26, 1882.

Application filed May 2, 1882. (No model.)

To all whom it may concern:

Be it known that I, DANIEL R. SYMONDS, 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 description, reference being had to the accompanying drawings.

The object of my invention is to produce a device to engage the twine or other band material as it is brought by the forward thrust of the needle to encircle the gavel, and to carry it to a definite position in relation to the tying-mechanism, and there retain it until after the tyer has operated. I am aware that many devices have been used for this purpose; but the greater number of them have been given movement by means of gearing, cams, or their equivalents independent of the needle and definitely timed independent of the needle, and hence no allowance could be made for the spring of the needle and the shafts, which in practice vary the position of the needle often to the extent of an inch at its point, and in case of excessive stress in compressing the bundle sometimes more. This yielding of the parts is not a constant quantity, and hence no allowance can be made for it. If the tucker be so timed when driven by means independent of the needle as to strike close to the latter and catch the twine drawn along it when the parts are not acting on a large gavel, and then made to act on a large gavel, the needle will be held back by the pressure of the grain and the tucker be actuated too early, or before the twine is brought within its reach. I arrange the tucker and its actuating mechanism to be operated by the needle itself, and hence these two parts must always move in time relatively. The use of my device is not limited to any particular form of binder, but is here shown as attached to the proper parts of one now most extensively used.

In the drawings, Figure 1 is a front end view of the binder, showing the needle, tying devices, breast-plate, and its cheeks, and the decking beneath them to form a throat for the passage of the grain. This arrangement is shown in several patents and fully described in the patent issued to John F. Appleby, February 18, 1879, No. 212,420, and hence I will only describe such parts as constitute my invention. Fig. 2 is a view of the breast-plate or shield between the tying mechanism and the grain, on which is mounted my improved tucker. The parts are shown in position of rest awaiting the approach of the needle in its downward movement and as viewed from above. Fig. 3 is a view from the same direction, but with the parts in the position to which they are moved by the needle. Fig. 4 is an enlarged sectional edge view of the parts exposed by cutting Fig. 2 along the irregular dotted line *x x*, so as to show the pivots connecting the working parts. Fig. 5 is a view of the lever for moving the tucker.

A is the breast-plate, to which are secured the cheek-pieces *a a'*. Between these the needle passes in its movements. The purpose of these pieces is but to give contour to the throat through which the grain passes to the receptacle. The shape given is considered best to permit the needle to penetrate the grain and to allow the gavel thus cut off to be carried forward. The cheek-piece *a* is shown cut away to expose the one opposing it and the needle between them.

The needle B is of the usual form used in the machines of this style.

B' is the "discharge-arm" for carrying the completed sheaf forcibly out of the binding-receptacle, and also to serve as one of the means for operating the tucker. It is secured to the shaft D, which makes one revolution to each operation of the binding mechanism.

E is the tucker, pivoted to the breast-plate at *e*. This pivot is so located in the breast-plate and in the tucker E that when thrown forward, as shown in Figs. 1 and 3, the twine will be held in certain and proper relation to the tyer F.

E' is a lever, made wide and pivoted to the breast-plate at e^2. On this pivot it is at liberty to swing. Its sides are provided with the curved edge e^4 and e^5. This lever is of such width that when the edge e^5 shall coincide with the breast-plate, as shown in Fig. 2, its edge e^4 shall extend nearly across the slot I; or, if in the position shown in Fig. 3, its edge e^5 shall extend beyond the outer edge of the breast-

plate. This lever is provided at its lower end with the slot e^3.

The tucker E is provided with a stud, e', which extends through the curved slot f in the breast-plate and enters the slot e^3 in the lever E′.

F is the tyer. The form here shown is that most in use; but any other may be substituted for it.

G is a part of the frame of the binder and forms a support for the top of the breast-plate.

H is the decking or bottom of the chute. It forms one limit of the throat for the passage of the grain to the receptacle.

K is the main gear of the binder; but it performs no office in connection with my devices only to give the tyer rotation as well as to give other parts their movements in the usual manner. By means of the wrist L and the connection N the wheel oscillates the arm M and gives vibration to the shaft C and needle B.

P is the outline of the segmental gear for operating the tyer.

The wheel K in practice is connected with the harvester-gearing, and the wheel P and tyer F given movement therefrom. The dotted lines at O show the position of the segments for rotation of the tyer. The needle B is secured to the shaft C, and situated in such relation to the breast-plate that its point shall oscillate through the slot I, and the discharge-arm is secured to the shaft D in such relation to the breast-plate as to pass very close to the edge of the same.

The movement of the needle is so timed in relation to that of the tyer as to carry the twine to the proper position as nearly as it is enabled to before the beginning of the rotation of the tyer. The discharge-arm is so timed in its movements that it shall not engage with the bundle until after the needle has well begun its return or backward movement after carrying the twine around the bundle. The shafts C and D are of such length that while the wheel K, connection N, and crank M, or any of the frame-work, will permit the full length of grain to pass them, the needle and tyer near their other ends will be located near the middle of the passing grain.

The operation of my invention is as follows: The binder is carried through its movements, in the usual manner with this class of machines, in the direction indicated by the arrow in Fig. 1. The tucker being at rest in the position shown in Fig. 2, with the edge e^4 well across the slot I, the needle advances, carrying the twine around the gavel that is supposed to be in the receptacle, and passes forward to the position shown in Fig. 1. Before quite reaching the limit of its advanced position the bar of the needle comes in contact with the edge e^4, and, acting as a cam, moves the lever out of its path. On account of the width of the needle-bar where it comes in contact with the edge e^4, (see at B, Fig. 3,) after the lever is carried well over, it is retained in such position by the surfaces dwelling in contact while the needle is making its slow movements in passing to its extreme forward throw. The tucker E, being pivoted at e to the breast-plate, and at e' below its axis of vibration to the lever E′, will be moved by the said lever across the slot and forward, its point just escaping contact with the needle, but engaging the twine extending from the eye upward across the interior arc of the needle's curvature. The twine thus engaged will be carried forward and held by the tucker while the whole width of the needle is passing to and fro in contact with the edge e^4. As the needle is retracted the tucker will be free to rise. When the needle has withdrawn so that the lever E′ is free to swing the discharge-arm B′ comes in contact with the edge e^5, which, being in its way, is forced aside and into the position shown in Fig. 2, ready for the next operation.

It will be seen that the lever is swung positively in each direction, and that when once forward upon the twine the tucker remains approximately still until forced backward.

I have shown the tucker as separated from the lever by the breast-plate; but they may be located both on the same side.

What I claim is—

1. The pivoted oscillating lever with the pivoted tucker connected directly to the free end thereof, in combination with the needle, the whole operating substantially as described.

2. The combination of the discharge-arm B′ and the pivoted lever E′ with the tucker E, pivoted to the breast-plate and connected to the lever, as shown, for giving the latter a positive backward movement, substantially as described.

3. The combination, with the needle B and discharge-arm B′, of the pivoted vibrating lever E′ and the pivoted tucker E, connected to the lever E′, substantially as described.

DANIEL R. SYMONDS.

Witnesses:
W. J. LUKENS,
J. F. STEWARD.