S. S JACKMAN.

GRAIN-BINDER.

No. 169,360. Patented Nov. 2, 1875.

Fig 1.

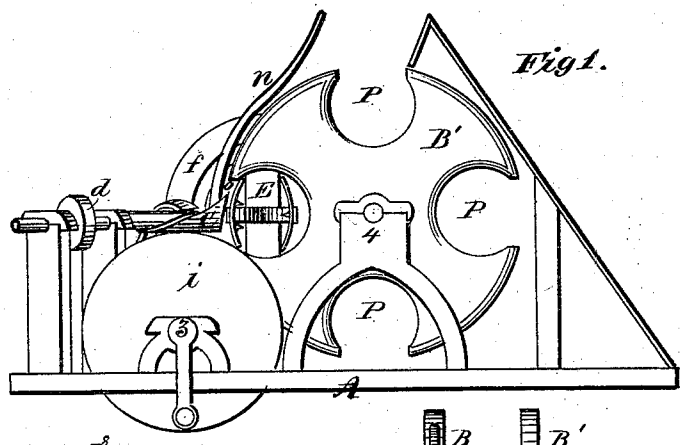


Fig 5.

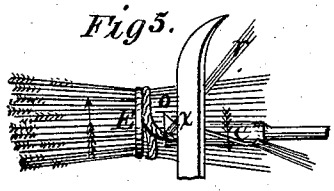


Fig 4.

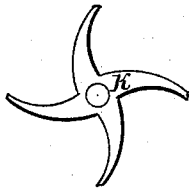


Fig 2.

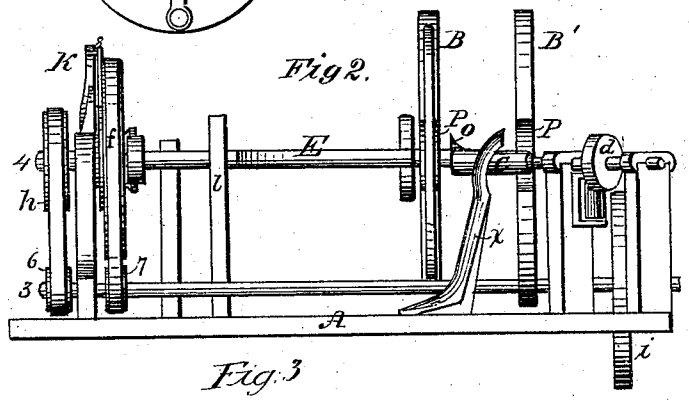
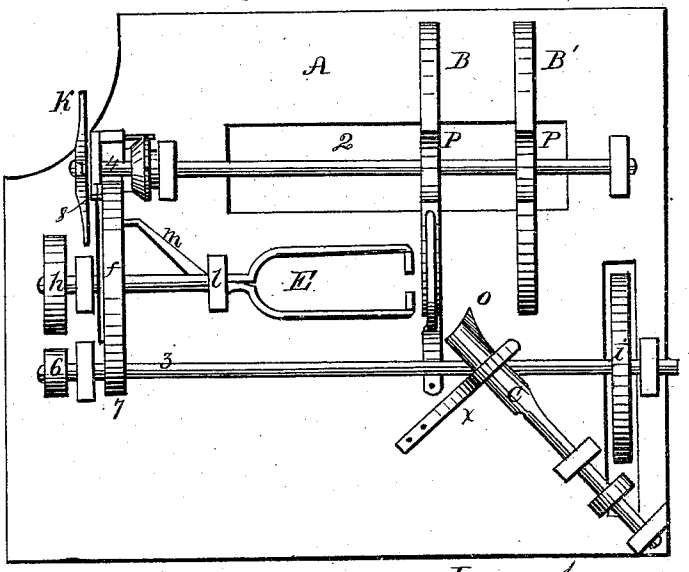
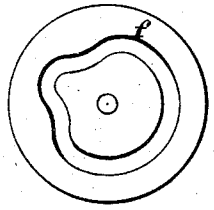
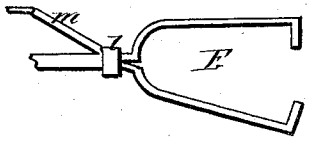


Fig 3







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UNITED STATES PATENT OFFICE.

SOLON S. JACKMAN, OF JANESVILLE, WISCONSIN.

IMPROVEMENT IN GRAIN-BINDERS.

Specification forming part of Letters Patent No. **169,360**, dated November 2, 1875; application filed December 26, 1873.

To all whom it may concern:

Be it known that I, SOLON S. JACKMAN, of Janesville, in the county of Rock and State of Wisconsin, have invented an Improved Mode of Binding Grain and similar productions, to be attached to a harvester, of which the following is a specification:

My invention consists in binding sheaves of grain by means of a band formed around the exterior from the straw or fibers of the same, the band not having been separately made, but being formed during the operation from and remaining a part of the sheaf, and as such not liable to be slipped or removed toward either extremity of the same, which binding is accomplished by means of causing the sheaf to be firmly grasped near the point where it is intended to form the band, and rotated on its own axis, while at the same time small portions of the straws or fibers of the same are successively detached from one end of the sheaf and twisted or plaited together, and wound around the sheaf, forming a complete and strong band for the same.

To enable others skilled in the art to make and use my invention, I will proceed to describe the same, reference being had to the annexed drawings making a part of this specification, in which—

Figure 1 is an end view, Fig. 2 a front view, Fig. 3 a vertical or top view, Fig. 4 detached portions, and Fig. 5 a sheaf in process of being bound.

The same letters and figures indicate the same parts in each figure.

The grain from the platform of the harvester is to be carried by means of a revolving apron, or otherwise, up the inclined plane D, as shown at Fig. 1, and deposited in the recess P in the wheels or disks B′ and B′.

When a quantity sufficient to form a sheaf has been deposited the projecting pin 8, Figs. 2 and 3, attached to the loose pulley or wheel *f*, coming in contact with a concave arm of *k*, carries it downward by turning the shaft 4 one-fourth part of a revolution. E is a clamp or tongs, one arm of which, *m*, is made to move outward and inward by means of the groove in the wheel *f*, in which it runs, being made eccentric in one-fourth part of the circle, as shown at Fig. 4, having an inclosed joint, *l*, which is made a bearing to support the tongs in their operation. The wheels *f* and *h* are attached to the shaft of the tongs, which is made to revolve by means of *h*, which is one-half the size of *f*. The driving wheels or pulleys 6 and 7 being equal, the tongs must revolve twice while the loose wheel revolves once. They are to be so adjusted that the arm *m* of the tongs shall pass through the eccentric while B′ and B′ are moved one-quarter of a revolution, thus opening, as at Fig. 4, allowing one sheaf to pass out and another to take its place, when they immediately close upon it, as at Fig. 3. The band is formed by means of the twister C, which is a cylinder having a central longitudinal cavity, of diameter sufficient to contain the band, from which is a radial spiral slot, as shown in Fig. 1. At the end of the twister one side is provided with a pointed projecting lip, O, and is rotated in the opposite direction from the driving-wheel *i* by means of crossing the belt or using an intermediate pinion.

When the grain comes into the tongs, as before described, it also comes in contact with the twister, which disengages a few straws from one end of the sheaf, as is more plainly understood by reference to Fig. 5. These straws, in being carried forward by the twister, come in contact with the standard X, and pass into the spiral slot, where one or more projecting pins compel them to twist around each other. The relative speed of E and C is such that the surface of the sheaf will move three inches, more or less, at each revolution of C, so that an additional portion of fiber is added to the band at every, say, three inches, and the rotation of the sheaf pulls three inches of the band from the twister, which is thus firmly wound around the exterior of the sheaf, as in Fig. 5. In the rotation of B the loose grain deposited in the upper recess P comes in contact with the stationary concave *n*, Fig. 1, which presses it into P, so that as the band is twisted toward B and *n* it is wound around against the side of B, and when the sheaf has made one revolution the second coil tends to press upon the first coil, especially at the place of commencement, thus preventing a tendency to untwist. When the band has extended one and one-half times around the sheaf the arm of the

tongs *m* enters the eccentric, the tongs open, and the twist-pin S, by turning B and B′ one-quarter of a revolution, carries down the sheaf to the opening 2 in the bed-plate A, when it falls to the ground, and another sheaf has come in contact with the twister, to be dealt with in like manner.

The twister C should be placed at an angle with the line of the shaft of the tongs E, which angle may be optional, but I prefer forty to forty-five degrees as the range.

The power from the machinery of the harvester may be communicated to the driving-shaft 3 in any manner to suit the circumstances, provided that the speed is such as to accomplish the binding of the sheaves as nearly as possible in the time required by the harvester to cut the same.

The twister C may be operated by means of a crossed belt with a guide-pulley; or by cog-wheels with an intermediate pinion, and the fast wheel *h* and the loose wheel *f* by means of chain-belts of square links, with projections to prevent the possibility of slipping.

The band being attached to the sheaf at short intervals, as described, is not liable to become untwisted, but simply preventing the straws from untwisting after the last joining to the sheaf is all the fastening that is necessary. This may be accomplished by so placing the twister *c* as to operate on the under surface of the sheaf while the standard X, being made shorter, is so inclined that when the sheaf, after being bound, in passing downward, will be divided, a portion of the straw being carried to the left of the twister, thus leaving the end of the band in the opening between the two portions of the sheaf.

I do not claim the binding of sheaves by means of a band formed of straw, nor of a band formed from the straw of the same. I make no claim to the mode in which the sheaf is brought into the recess or pocket for binding; nor to the use of a revolving apron, for I am aware that these are not new; but

I claim as my invention—

1. The herein-described process of binding grain by clamping the gavel and rotating it against the twister, which separates a portion of the butts from the gavel at intervals, and twisting the same around the bundle to a point past the beginning, and securing the end in a cleft.

2. In a grain-binder, the combination of the rotating clamping-tongs with the rotating twister C, having its lateral spiral slot for the purpose of forming a band around and attached to grain-bundles, substantially as described.

3. Twister C, standard X, clamp or tongs E, grooved wheel or eccentric *f*, in combination, substantially as and for the purposes hereinbefore set forth.

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