





# UNITED STATES PATENT OFFICE.

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## IMPROVEMENT IN MACHINES FOR BINDING GRAIN IN BUNDLES.

*Specification forming part of Letters Patent No. 24,400, dated June 14, 1859.*

*To all whom it may concern:*

Be it known that I, JAMES D. OSBORN, of Constantine, in the county of St. Josephs and State of Michigan, have invented a new and useful Improvement in Binding or Tying Up Grain in Bundles, to be used in connection with a reaping-machine; and I do hereby declare the following to be a full, clear, and exact description of the construction and operation of the same, reference being had to the accompanying drawings, making a part of this specification, in which—

Figure 1 represents, in perspective, the binding-box or table, the bottom and portions of the sides of which are represented as cut away or removed to better show the mechanism otherwise concealed by these parts. Figs. 2, 3, and 4, represent detached portions, which will be specially referred to.

Similar letters of reference, where used, in all cases refer to like parts of the machine.

My binding apparatus is operated automatically, though the cord is placed partially by an operator or attendant who rides on the machine.

The nature of my invention consists mainly in the peculiar kind of knot or interlocking of the cord which forms the tie, said knot or tie being made partially by the attendant, but mainly by the machinery itself.

To enable others skilled in the art to make and use my invention, I will proceed to describe the same with reference to the drawings.

A is a binding-box, connected in any suitable manner to a reaping-machine, into which box the grain to be bound up is brought, either by a conveying belt or apron, or by a rake operated by hand.

The tying apparatus may be worked from any of the moving power of the reaping-machine, through shafts and gearing that will rotate the wheel B on its journals, said wheel accomplishing the entire automatic motions that gather and hold the bundle and tie the knot. On the wheel B there is formed a portion or segment of a bevel-gear, C, which takes into and operates a segment-wheel, D, on the shaft E, giving the shaft E a partial rotation, then holding it still for another period, and then releasing it entirely, so that a stout

spring, *a*, which is wound up by its rotation, may return it to its first position again. On the rim of the wheel B there is a cam-ledge, *b*, which comes in contact with an arm, *c*, on a shaft, F, which lies behind and parallel with the shaft E, and gives to said shaft F a partial rotation, and holding it in its rotated position so long as the arm *c* rides on said ledge *b*. The turning of this shaft F winds up a stout spring, *d*, and when the arm *c* reaches the end of the ledge, this coiled or wound-up spring immediately returns the shaft to its first position. The partial rotation, cessation, or rest and return of these two shafts E F, both of which are actuated by the wheel B, perform or effect the whole automatic process. There is a curved arm, G, on the shaft E, and another, though larger, one, H, on the shaft F, both of which arms have the same movement and rest that their shafts have, being fast on them.

Figs. 2, 3 represent portions of the tying devices, which will be more fully referred to in describing the whole process of gathering and tying up the bundle.

Fig. 4 represents the form of the knot before it is drawn, as also its form after it is drawn up tight.

The attendant has a stand or position in the binding-box, from whence he may readily reach the tying devices.

The operation is as follows: The attendant takes the end of the binding-cord and passes it around the end of the curved arm G, as shown, and then passes the end of the cord under a hinged knife, *e*, on said arm. This turn or half-turn of the cord around the end of the arm G I shall call, for the sake of illustrating the form of the knot, "loop No. 1." Now, suppose the cord thus united to G, and that this arm is thrown back by the rotation of its shaft, it draws back with it the cord, which may unwind from a reel placed in any suitable position. The other arm, H, having also been thrown back a little in advance of the one G, just before the arm G arrives at its extremity of rearward motion, the operator forms another half-turn or half-loop in the cord, and passes it around a stem, *f*, that projects just above the plate *g*, and if the arm G has not reached the extent of its rearward



motion it is immaterial, inasmuch as the turn or half-turn around the stem *f* will run or slip so as to give plenty of cord out. This turn around the stem I shall call "loop No. 2." So much having been done, the cord will lie in the bottom of the binding-box, as shown in Fig. 1, and is now ready to receive the grain that is to be bound, and which falls upon said cord. The shaft *F* by this time is released, and its arm *H* flies over upon the grain, pressing and holding it down, and immediately following it comes the arm *G* with the cord, its extreme point striking upon the top of the stem *f*. Now, this stem *f* is set upon a coiled spring, *h*, Figs. 2, 3, and recedes before the blow of the arm *G*, the point of said arm following it down through the plate *g*, and thus loop No. 1 is passed through loop No. 2, which latter lies upon the plate *g*, the stem *f* having left it. To the stem *f*, underneath the table *g*, there is attached an arm *i*, said arm being connected to a looper-arm, *k*, by a link, *l*, so that, as the stem *f* is forced down by the arm *G*, it will cause the point *m* of the looper-arm (through a notch or slot in which the binding-cord is caught) to carry its loop (which I shall call "No. 3") through loop No. 1, which had just previously passed through loop No. 2, these three loops, thus passed through each other, forming, when drawn up by the expansion of the grain when released, the knot. In Fig. 4 this will be clearly seen, where loop No. 1 has passed through loop No. 2, and loop No. 3 is passed through No. 1 below No. 2, which, when drawn up, makes an effective and secure knot.

When the point of the arm *G* passes through the plate *g*, the curved heel of the knife *e* strikes against said plate, bringing its cutting-edge down upon the cord and cuts off that end of it, and there is also another knife, *n*, underneath the plate *g*, against which the looper-arm *k* brings the cord, and thus cuts off that end. The bundle with the cord around it and its ends tied, and cut away from the main cord, is now ready to be removed, and the moment the two arms *G* *H* rise, which held the bundle clamped between themselves and the bottom of the binding-box, the grain expands and tightens up the knot. The bundle or bundles are then thrown upon a spring-bottom, or arms *o*, until the attendant desires to drop them upon the ground, when he simply presses upon them with his foot, the spring

gives way, and they fall upon the ground, the spring returning to be ready for another charge. Of course this binding or tying mechanism can be so connected by a clutch, or otherwise, as that it may be thrown out of gear, to await the accumulation of enough grain to form the bundle, or for any other purpose. The only important duty that the attendant must perform is to put the turn or loops around the arm *G* and the stem *f*, which is quickly done, and it is immaterial which of the two has the loop first put upon it, as the cord will pay out to the rising of the arm.

There is a guide, *r*, underneath the plate *g*, through an eye in which the cord passes before it passes up through said plate. This guide keeps the cord immediately in the path of the looper-arm *k*, so that it is certain to catch it. To insure the looper-arm *k* carrying its loop through loop No. 1, guides *s* are arranged underneath the plate *g*, between which it must pass, and the loop No. 1 stands right across the path of that of No. 3, so that it cannot fail. After the bundle is tied up and released, the end of the cord lies on top of the plate *g*, and the operator can draw it through sufficiently far—make a loop and pass it around *f*—then loop the end of the cord around *G*, and the apparatus is ready for another similar operation.

Of course many modifications of the devices may be effected to accomplish the same end which I effect, viz: A binding-knot composed of three loops passed through each other and drawn up tight.

I am the first to use this knot for the purpose and to make it by machinery, and shall therefore claim such a knot when made by machinery and used for tying up grain in bundles.

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

A binding-knot composed of three loops passed through each other, when said passing of the loops through each other is effected by machinery driven or moved from any of the moving parts of a harvesting-machine, and whether accomplished by the means herein stated or by their substantial equivalents.

JAMES D. OSBORN.

Witnesses:

THOS. H. UPPERMAN;  
E. COHEN.