4 Sheets—Sheet 1.

A. S. HOYT.

Grain-Binder.

No. 201,346. Patented March 19, 1878.

Fig. 1.

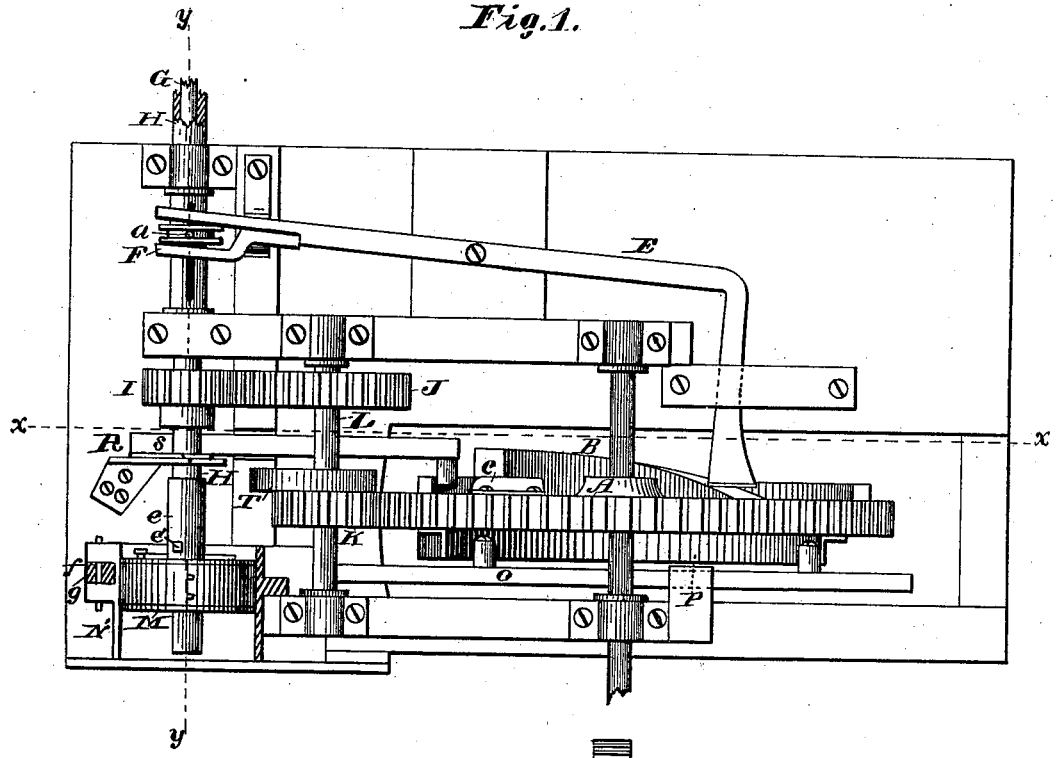
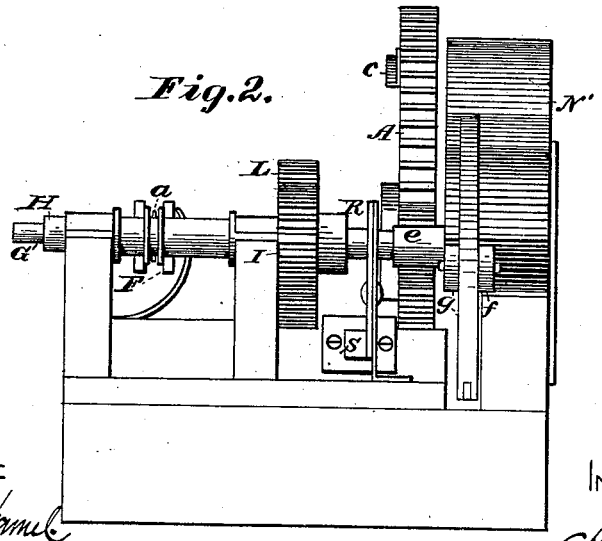


Fig. 2.



WITNESSES:

Jas. F. Duthamel

H. B. Brown

INVENTOR:

Albert S. Hoyt

PER

A. C. Fraser

ATTORNEY

4 Sheets—Sheet 2.

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Fig. 3.

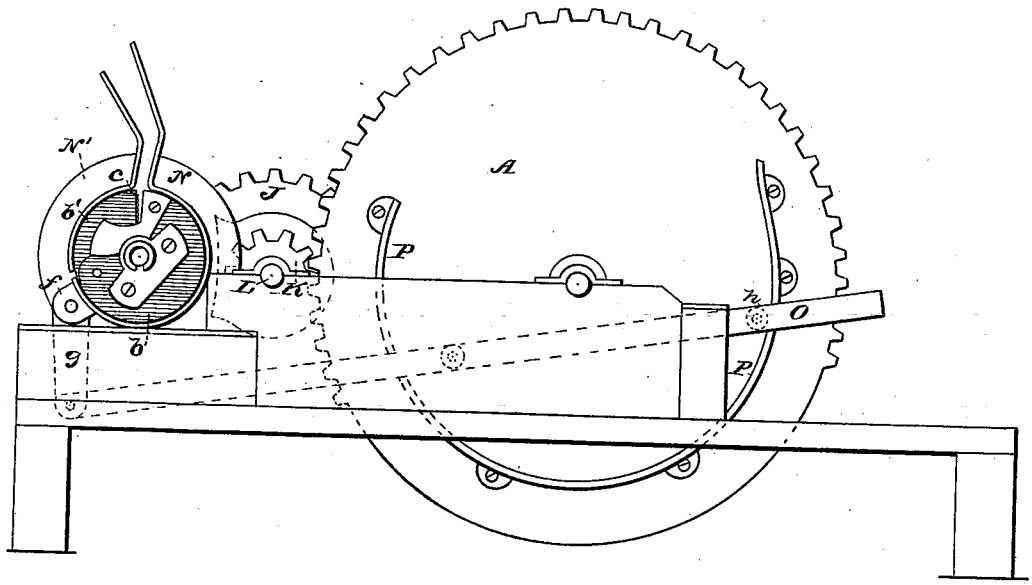
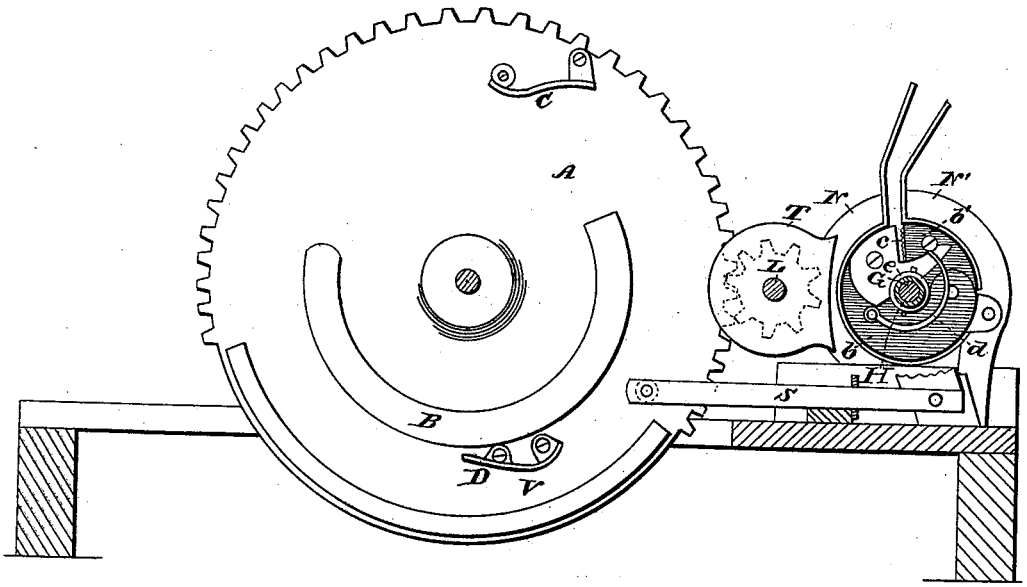


Fig. 4.



WITNESSES

Jas. F. Duhamel

W. B. Brown

INVENTOR

Albert S. Hoyt.

Per N. C. Abbott.

Attorney.

4 Sheets—Sheet 3.

A. S. HOYT.
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Fig. 5.

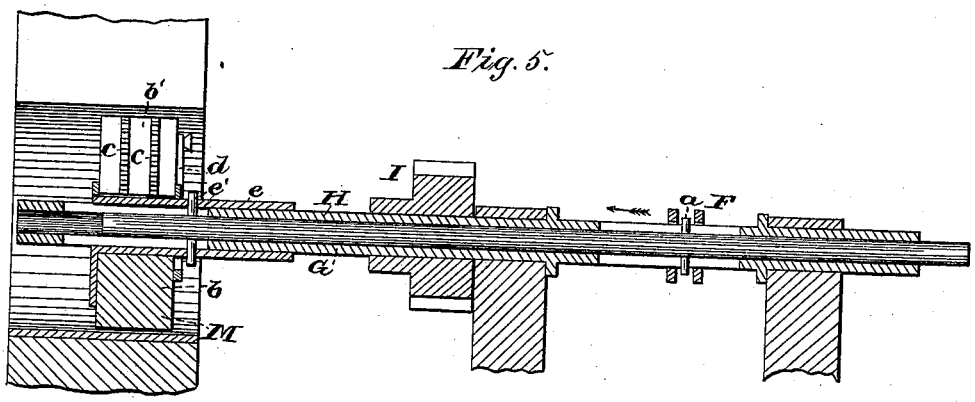
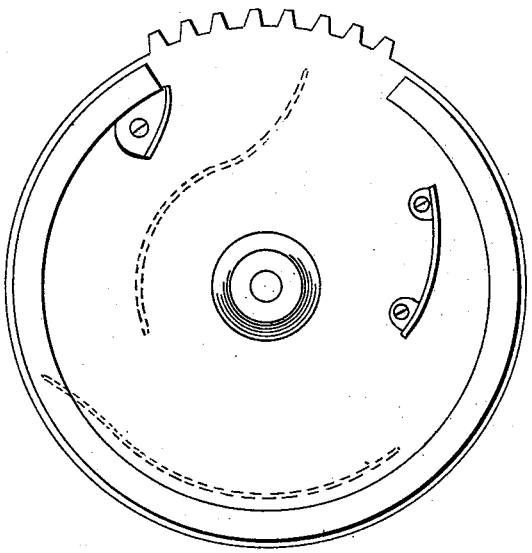


Fig. 6.



Witnesses:
Jas. F. DuHamel
W. B. Brown

Inventor.
Albert S. Hoyt.
per N. C. Abbot
Attorney.

4 Sheets—Sheet 4.

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Fig. 7.

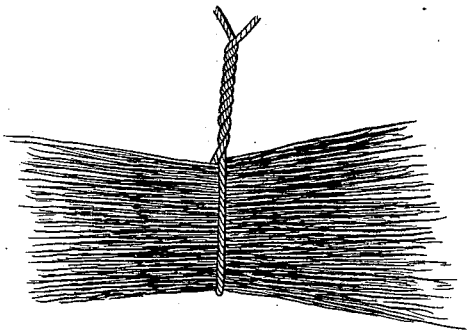

Fig. 8.

Witnesses:
Jas. F. Duhamel
W. B. Brown

Inventor.
Albert S. Hoyt.
Per N. C. Abbot.
Attorney.

UNITED STATES PATENT OFFICE.

ALBERT S. HOYT, OF WINONA, MINNESOTA.

IMPROVEMENT IN GRAIN-BINDERS.

Specification forming part of Letters Patent No. **201,346**, dated March 19, 1878; application filed May 31, 1877.

To all whom it may concern:

Be it known that I, ALBERT S. HOYT, of Winona, in the county of Winona and State of Minnesota, have invented certain new and useful Improvements in Grain-Binders; and I do hereby declare that the following is a full, clear, and exact description thereof, which will enable others skilled in the art to which it appertains to make and use the same.

This invention is in the nature of a mechanism for securing the cord or wire used to bind gavels of grain.

The invention consists in cord or wire nippers or holding-jaws, operated so as to twist together the ends of the cord or wire after said cord or wire has been passed around the gavel, and so as to impart to such twisted portion a kink, whereby the cord or wire is securely fastened around the gavel.

In the drawings, Figure 1 is a top-plan view of my apparatus; Fig. 2, a front end view of the same; Fig. 3, a side elevation; Fig. 4, a longitudinal sectional elevation on line *x x*, Fig. 1; Fig. 5, a transverse section on line *y y*, Fig. 1; Fig. 6, a side elevation, showing the necessary modification of the driving-wheel to adapt the mechanism for tying wire; Fig. 7, an elevation of a gavel with the cord twisted but not kinked; and Fig. 8 shows the cord as kinked, so as to secure it around the gavel.

In a mechanism where the cord is not tied in a knot, to secure it around a gavel, it is necessary that the cord should be of a glutinous character, so that when its ends are brought side by side and twisted together they shall adhere to one another; but this alone is not sufficient to unite such ends so firmly as to resist the strain upon them from the gavel. I therefore, after twisting the ends of such glutinous or sticky cord, kink them or press them down upon the gavel, and, being separated from the body of the cord, the twist and the downward pressure will serve to cause such ends to double up or be kinked, and thereby the cord will be firmly secured around the gavel. This is fully illustrated in Figs. 7 and 8. Such cord may be prepared with pitch or other sticky or glutinous substance.

The mechanism herein shown for binding gavels of grain consists of a driving-wheel, A, suitably connected with the driving-power of the harvester to which the binder is attached, part of whose periphery is provided with cogs, more or less in number, according as cord or wire is to be used. This wheel has upon one face an incline or cam-like projection, B, semicircular in form, and serving to operate an elbow-lever, E, which is provided at its outer end with a fork, F.

G is a shaft placed within a hollow shaft, H, and rotating with said shaft H, but having an independent longitudinal sliding movement within said shaft imparted to it by means of the vibration of the lever E, the lever's fork F engaging with a pin, *a*, projecting from said shaft G through a slot in shaft H, and thus forming the connection between shaft G and lever E.

On the shaft H is a pinion, I, which meshes with a gear, J, on a counter-shaft, L, and there is also upon this counter-shaft a pinion, K, which meshes with the large wheel A. By this system of gearing motion is transmitted from the wheel A to the shaft H, or vice versa, according to the location of the power.

Over the shaft H, at one end, is placed a sleeve, *e*, and this sleeve is connected with the shaft G by a pin, *e'*, passing through a slot in the shaft H, whereby said sleeve rotates with the shaft H and has a longitudinal movement with the shaft G.

Fixed upon this sleeve *e* are nippers M, consisting of a fixed jaw, *b*, and a movable jaw, *b'*. The jaw *b'* is provided with a spring, *d*, the power of which is exerted to draw said jaw from the jaw *b*.

The face of the jaw *b'* is armed with teeth *c*, or is otherwise made rough or frictional, so as to readily and securely hold cord or wire placed between it and the jaw *b*.

The nippers are inclosed by a separable or partible tubular casing, N, one member, N', of which is hinged at *f*, and has a tail-piece, *g*. The tail-piece *g* of the part N' is connected with a rod, O, which is provided with friction-rollers *h*, that engage with a projecting rim or

cam, P, on the wheel A, whereby said rod receives an intermittent reciprocating movement.

R is a pair of shears for severing the cord or wire. One of the blades of these shears is movable, and is actuated by a rod, S, that is intermittingly operated by contact with projections C D on the wheel A.

T is a stop on the shaft L, operating, in connection with the rim U on wheel A, to stop the revolution of the gearing when the gear A has run out of pinion K.

My improved binder being constructed substantially as above described, its operation is as follows: The wheel A is caused to revolve until its teeth mesh with pinion K; but just prior to the meshing of wheel A and pinion K the projection D on the wheel A will strike against the rod S, and so move it as to cause the shears to cut or close. At the same time the cam P will operate the rod *o*, pressing it forward, and thereby closing the movable member N′ of the partible casing, which causes the jaws of the nippers to come together—that is to say, the movement of the movable member N′ of the casing is imparted to the moving jaw *b* of the nippers, and as said jaw is closed it grasps and firmly holds the end of the cords after they have been passed around the gavel.

The rotation of the wheel A causes its cam or incline B to so act upon the lever E as that said lever moves the shaft G horizontally in the direction of the arrow, Fig. 5, while at the same time the gearing revolves the shaft H. The nippers receive the rotary movement of the gearing, and by the horizontal movement of the shaft G they are moved correspondingly through the casing. This combined horizontal and rotary motion of the nippers serves to twist the ends of the cord together the length of the travel of the nippers, in order to secure the cord around the gavel.

When the wheel A has completed about a half-revolution relatively to the number of its cogs, the projection C will actuate the rod S, so as to open the shears, and thus have them in readiness to sever the cord at the proper time.

When the cogs of wheel A shall just have run out of pinion K, the lever E will have been freed from the incline B and the rod O will have been freed from the rim P. A spring, W, will then act upon the lever E to force its forked end outward, whereby the shaft G will be retracted, carrying with it the nippers M, and the mechanism will then be ready for the next gavel.

It will be understood that the cord is passed around the gavel, and then severed, and then grasped in the nippers, and as they are made to travel in the direction of the arrow in Fig. 5, the cord is twisted; and when the nippers have traveled the length of their casing the nippers continue to revolve without advancing, and the cord is thereby kinked, and is finally released by the opening of the movable jaw, and twisted up close to the gavel.

The freeing of the rod O from the rim P serves to release the member N′ of the casing, and the spring *d* is at liberty to act upon the jaw *b′* of the nippers and force it away from jaw *b*, thereby releasing the cord.

As soon as the teeth of the wheel A are freed from the pinion K the face *t* of the stop T comes in contact with the face of the flange or rim U on the wheel A, and said stop being keyed to the counter-shaft L, the motion of the machine is stopped, with the exception of the wheel A, which continues to revolve, so as to be ready to begin the next movement.

The wheel A may be removed when it is desired to tie or bind with iron, and the wheel shown in Fig. 6 be substituted therefor, the difference between the two lying in the number of cogs and the corresponding and necessary location and arrangement of the rim, cams, and projections.

By removing the pivot of the lever E, the machinery may be used in binding with wire instead of cord, and without kinking the wire. In this case the wheel A may be used instead of that shown in Fig. 6.

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

1. In a grain-binder, a twisting mechanism, in combination with mechanism for imparting a gradual forward movement to the twister, substantially as shown and described, all arranged and operating to produce a kink in the tying material after the same has been twisted.

2. A grain-binder having a twister to which is imparted a rotary motion, a gradual horizontal movement in one direction, and a sudden horizontal return movement, substantially as and for the purpose specified.

3. A band for grain-gavels, consisting of a waxed, sticky, or glutinous cord, with its ends twisted and kinked, substantially as shown and described.

4. The combination of the movable member N′, the spring-jaw *b′*, the rod O, the rim P, and the wheel A, substantially as and for purpose set forth.

5. The partial gear-wheel A, in combination with the revolving twister M, having a gradual horizontal forward movement and a sudden return movement, all arranged and operating substantially as described, and for the purpose set forth.

6. A twisting device having a rotary motion and a gradual horizontal movement in one direction, in combination with a partial gear-wheel, A, provided with cam B, whereby said twisting device is given a sudden horizontal retracting movement, substantially as described.

7. A sliding and rotating shaft, G, a slotted revolving shaft, H, and twisting-nippers M,

combined and operating substantially as described.

8. A sliding and rotating shaft, G, slotted revolving shaft H, nippers M, spring-lever E, and an incline or cam, B, combined and operating substantially as described.

In testimony that I claim the foregoing as my own I affix my signature in presence of two witnesses.

ALBERT S. HOYT.

Witnesses:
GEO. P. WILSON,
JACOB STORY,
C. H. MYERS.