(No Model.) 3 Sheets—Sheet 1.

R. BROWN.

GRAIN BINDER.

No. 317,292. Patented May 5, 1885.

Fig. 1.

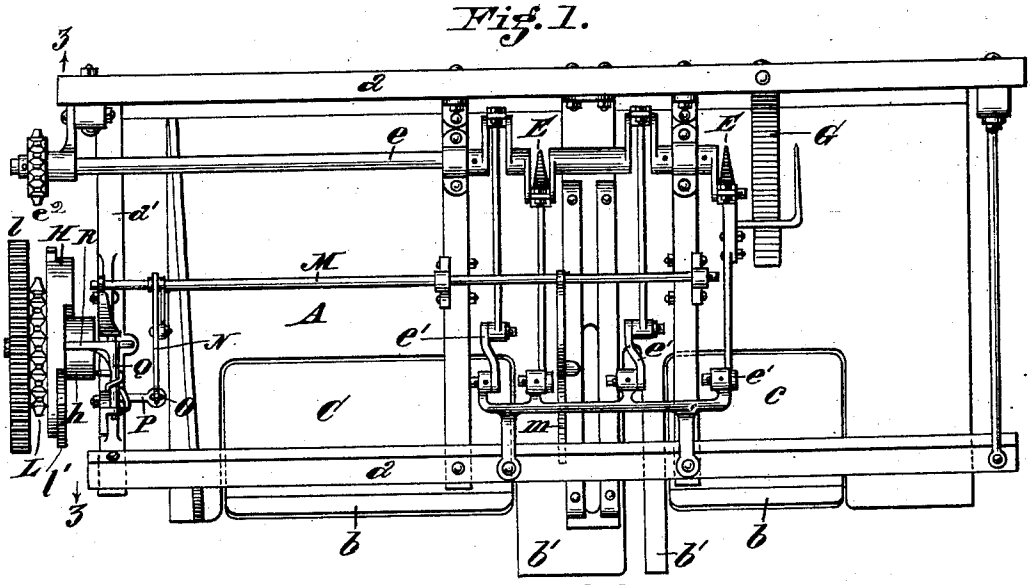


Fig. 2.

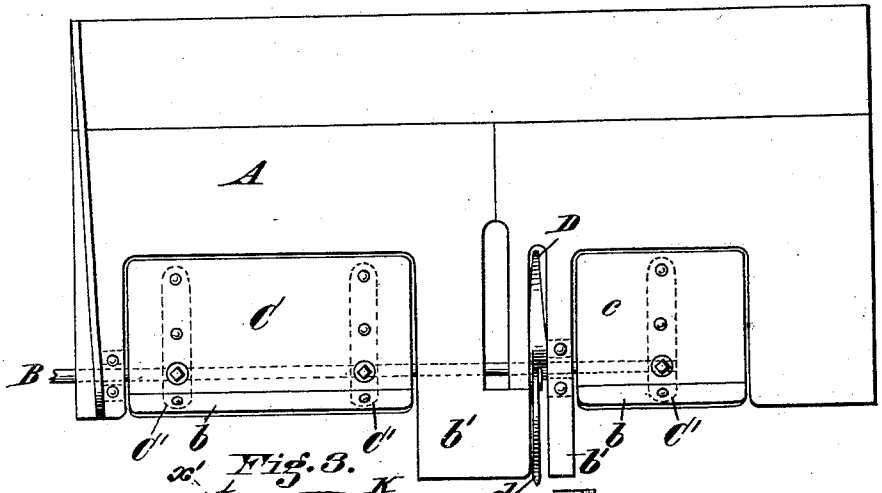


Fig. 3.

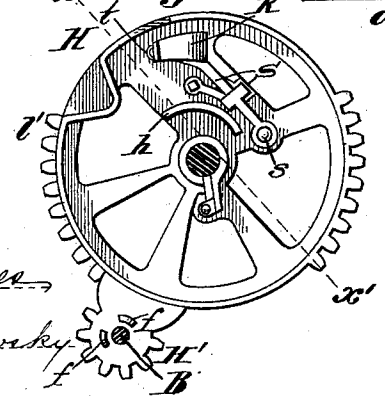
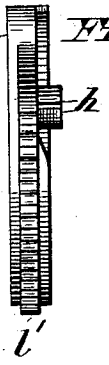


Fig. 4.



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Fig. 5.

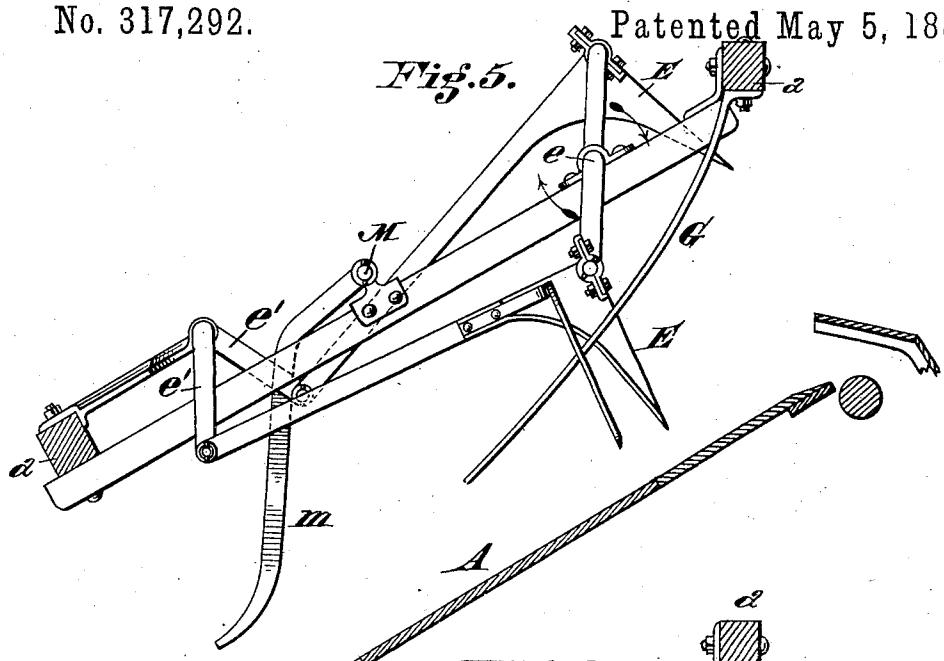
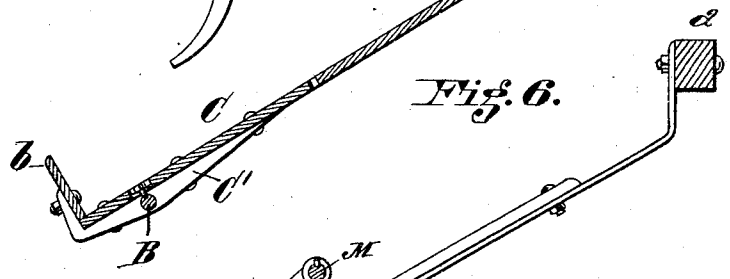


Fig. 6.



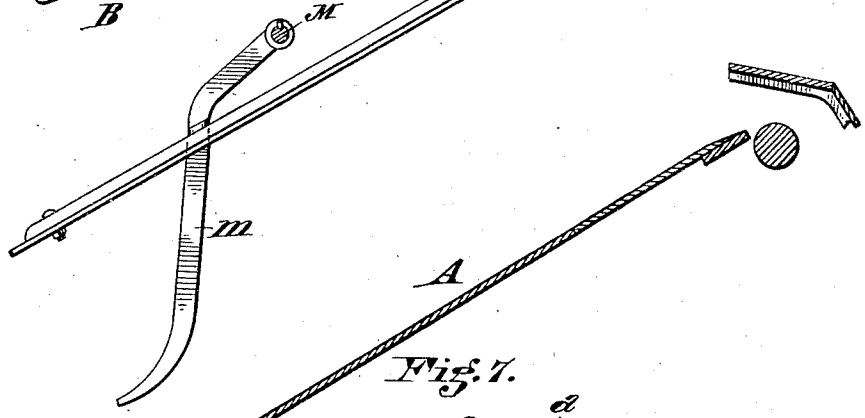
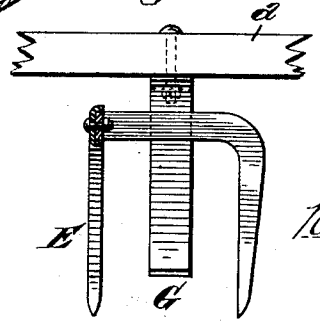


Fig. 7.



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GRAIN BINDER.

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Fig. 8.

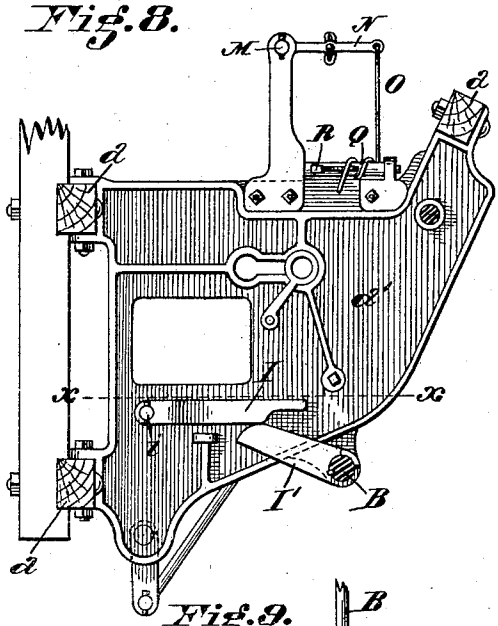


Fig. 10.

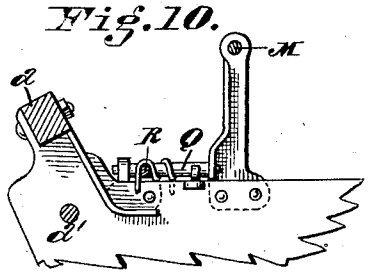


Fig. 11.

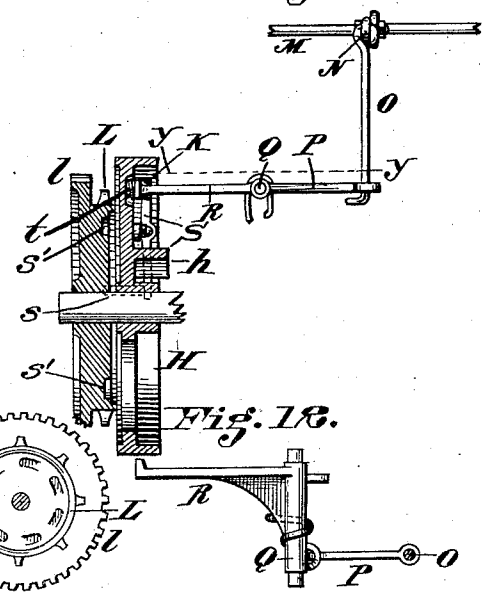


Fig. 9.

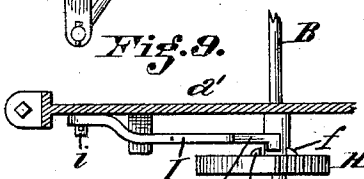


Fig. 17.



Fig. 18.

Fig. 13.

Fig. 14.

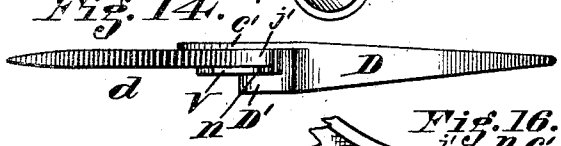


Fig. 15.

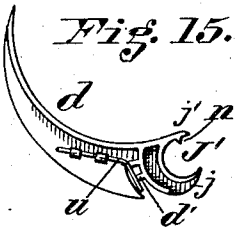
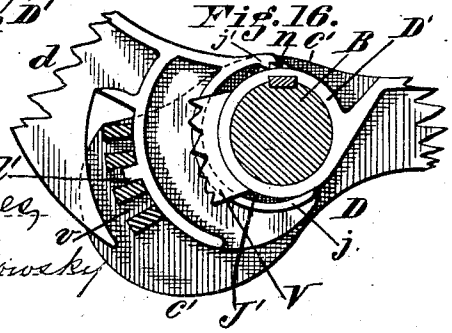


Fig. 16.



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UNITED STATES PATENT OFFICE.

ROBERT BROWN, OF SPRINGFIELD, OHIO.

GRAIN-BINDER.

SPECIFICATION forming part of Letters Patent No. 317,292, dated May 5, 1885.

Application filed January 11, 1884. (No model.)

To all whom it may concern:

Be it known that I, ROBERT BROWN, a citizen of the United States, and a resident of Springfield, in the county of Clark and State of Ohio, have invented certain new and useful Improvements in Grain-Binders, of which the following is a specification.

This invention relates to grain-binders; and it consists in certain improvements upon the machine shown and described in Letters Patent No. 266,087, granted me October 17, 1882.

The object of this invention is to retain the same general features of the binding mechanism therein described, with improvements therein for securing a better operation of the binding mechanism.

Another feature of my invention is the employment of revolving sections of the binding-table, so as to deliver the bundle in a better manner, the details of which will be fully set forth in the description of the accompanying drawings, in which—

Figure 1 is a plan view of the binder-table, tripping and driving mechanism with the knot-tying devices removed. Fig. 2 is a plan view of the binder-table with the tripping and packing mechanism removed. Fig. 3 is a side view of the combined cam and gear wheel. Fig. 4 is an edge view of the same. Fig. 5 is a sectional elevation of the packing-fingers, tripping device, and binder-table. Fig. 6 is a sectional elevation of the tripping-finger and support in position above the table. Fig. 7 is a detail view of parts of the packers. Fig. 8 is a section on line *z z*, Fig. 1. Fig. 9 is a section on line *x x*, Fig. 8. Fig. 10 is a broken inside elevation of the frame and tripping devices shown in Fig. 8. Fig. 11 is a detail, partly in section, of the tripping mechanism and the combined cam and gear wheel, being taken on the line *x' x'* of Fig. 3. Fig. 12 is a plan view of the tripping crank-arm on line *y y*, Fig. 11; Fig. 13, a perspective view of the combined compressor and ejector fingers. Fig. 14 is a top plan view of the same. Fig. 15 is a side elevation of the compressor. Fig. 16 is an enlarged view, partly in section, of the compressor and ejector fingers, their ends being broken off, showing the means for uniting the compressor and ejector fingers. Fig. 17 is a side elevation of the driving-gear.

A represents the binder-table, which is suitably supported in the usual manner.

a a represent beams upon which the binding mechanism is mounted.

B represents the ejector and compressor shaft, upon which is mounted the compressor and ejector fingers, as shown in my said Patent No. 266,087, October 17, 1882.

C *c* represent revolving sections or leaves of the binder-table, which are provided with eyes or journal-holes, formed in strengthening-ribs C', which are secured to the under side of the revolving sections or leaves, and through which eyes passes the ejector and compressor shaft B, to which they are keyed.

b represents angle-pieces, forming part of revolving sections or leaves C *c*.

d D represent the ejector and compressor fingers, which are also keyed to said shaft. These fingers are made adjustable, as will be hereinafter described. When the ejector and compressor shaft B is revolved to eject a bundle, the sections or leaves C *c* revolve with the ejector-finger and assist in delivering the bundle, and this is an important feature of my invention, as it makes a positive delivery of the bundle.

b' b' represent stationary portions of the binder-table under the knotting mechanism, between the revolving sections or leaves C *c*.

E E represent the packers, which are driven by the crank-shaft *e;* and *e' e'* represent links at the heel end of the packers for securing the proper motion of the same, as stated in my said former patent.

G represents a guard secured to the beam *a*, to hold the grain down on the table.

The mechanism here shown is designed to be used in connection with the knotting mechanism shown in my said former patent.

Instead of employing the tripping devices as there shown I operate them in the following manner: H represents the combined cam and gear wheel for driving the binding mechanism, and is provided upon its inner face with a cam, *h*, which comes in contact with an arm, I, pivoted to a stud, *i*, on the end of the binder-frame *a'*, and presses it down on the crank-arm I', which is keyed upon the ejector and compressor shaft B, so as to give a slight reverse or inward motion to the sections C *c*

of the binder-table to compress the grain, and to slacken the cord around the bundle while the knot is being tied. In order to limit the inward movement of the revolving sections or leaves, I provide lugs *f* on the inner face of the stop-motion pinion H′, the teeth of which engage with the segmental teeth *l′* on the combined cam and gear wheel H. The stop-motion pinion is on the shaft of the compressor and ejector arms, as described in my former patent. The arm I′ will be caught by the lugs directly after the backward motion is imparted and arrest it. This engagement is but momentary and only during the act of tying the knot.

K represents an inclined lug, formed upon the end of trigger S, which is pivoted to the face of combined cam and gear wheel H, as shown in Figs. 3 and 11, to operate the spring-clutch, which connects the combined cam and gear wheel H with the continuously-operated drive-wheel *l*, the latter being a gear-wheel meshing with a pinion driven by an independent driving-shaft.

s represents a clutch-pin pivoted to lever S, projecting through an opening in the combined cam and gear wheel H, and engaging with recesses *s′* formed on the inner face of the sprocket-wheel L, which is rigidly connected to the drive-wheel *l′*.

t represents a spring secured to the inner face of the combined cam and gear wheel H, pressing against the free end of the trigger S, so as to hold the clutch-pin *s* normally in engagement with continuously-operated drive-wheel *l*. The sprocket-wheel L is provided with sprocket-teeth for driving the packer-shaft *e*, a sprocket-wheel, e^2, being also on said shaft.

M represents a tripping-shaft journaled to the frame above the binder-table; *m*, an arm keyed to said shaft, projecting downward over the table, as shown in Fig. 5, against which arm the grain is forced by the packers.

N represents a crank-arm keyed upon the rock-shaft M; O, a rod or link connecting-arm N with the arm P, which is secured to the crank-shaft Q.

R represents a crank-arm projecting from the opposite end of crank-shaft Q, which is journaled upon the frame *a′* in such relation to lug K on the lever S as to bring the free end of arm R into engagement with the outer face of the lever S when the parts are in their normal position or stationary, pressing the free end of lever S and its spring *t* inward, and holding the pins *s* out of engagement with the recesses *s′* on the face of the sprocket-wheel L, which is rigidly connected to the continuously-operated drive-wheel *l′*.

When a sufficient amount of grain has been forced against the finger *m*, it lifts said finger, rocks the shaft M, and lifts the arm N and the link O. The link O in turn operates the arm P, which rocks the crank-shaft Q, and moves the arm R over the face of the inclined lug K, releasing the lever-trigger S, which, by means of its spring, shoots the clutch-pin *s* inward into engagement with the recesses *s′* upon the sprocket-wheel L, and brings into action the combined cam and gear wheel H, which revolves and operates the knotting mechanism, and binds a bundle upon one complete revolution of the combined cam and gear wheel H, and brings the arm R back into engagement with the lever S, and withdraws the clutch-bolt *s* out of engagement with the sprocket-wheel L, thereby throwing the binding mechanism out of gear during the period of collecting grain for the next bundle. The arm *m* falls back to its normal position as soon as the tripping is effected. This act of tying the knot and ejecting the bundle is done very quickly.

D *d* represent the combined ejector and compresser finger, made in two parts, so as to be readily detachable and adjustable, the part *d* being adjusted circumferentially upon the hub D′ for securing the device to the shaft B by a feather.

c′ represents a flange or guard projecting radially up from the hub D′.

V represents a bracket or lug projecting up from near the center of hub D′. *v* represents a series of openings or slots pierced through the ledge of the part V. The metal forming the spaces between these openings is securely joined to the flange *c′*, the parts D, hub D′, flanges V *c′*, and teeth or openings *v* all being cast in one piece. These flanges V and *c′* are sufficiently far apart to form an opening sufficiently large to receive the projecting hook *j* of finger *d*.

J′ represents a semicircular recess in the end of finger *d*, which encircles hub D′, as shown in Figs. 13 and 16, there being a sufficient space between the parts J′ and the hub D′ to allow the teat or lug *d′* to pass under the ledge or teeth *v*, and to engage therewith by a lateral movement of the part *d*, as shown in Fig. 16. The object of these several spaces between the teeth or spaces *v* is to allow the lug *d′* to be changed from one space to the other, so as to adjust the finger *d* readily on the shaft B and to the finger D.

u represents a spring attached to finger *d*, with its forward end bent to form an arm which presses against the ends of teeth *v*, so as to hold the finger *d* in the position shown in Fig. 16.

When it is desired to remove the finger *d*, it is pressed down so that the groove J′ bears against the hub D′, releasing the lug *d′* from engagement with the teeth or openings *v*, when the finger *d* may be moved readily from the hub D′ for removal or adjustment.

n represents lugs and serrations on the hub D′ and point *j′* to prevent any casual displacement of the parts. These, however, may be omitted if the spring *u* be sufficiently rigid, and the fit of lug *d′* in the openings *v* be sufficiently close.

This mode of constructing the parts D and *d* allows the two to be readily separated and

adjusted without the use of nuts and bolts or set-screws, which is of material advantage in the setting of the compressor and ejector fingers to suit the different kinds of grain to be bound.

Having thus described my invention, what I claim is—

1. The combination of the stationary binding-table, having one or more movable flat sections or leaves forming part of the flat table-surface, with the revolving compressor and ejector shaft B, having the movable sections or leaves secured thereto so as to revolve with said shaft, substantially as herein set forth.

2. In combination with the shaft B and one or more movable sections or leaves of the binder-table revolving therewith, the arms I I′ and flange *h*, arranged to give an inward movement to the shaft B and movable sections of the table to compress the bundle for tying, substantially as described.

3. In a grain-binder, the combination of the tripping-finger *m*, shaft M, cranks and links N O P Q R, spring tripping-bolt S, continuously-operating drive-wheel *l*, and sprocket-wheel provided with recesses *s′*, substantially as specified.

4. In a grain-binder, the combination of the revolving shaft B, and the movable sections or leaves C *c*, and the ejector-finger D, secured upon said shaft and revolving therewith, with the stationary binder-table having openings in which the movable sections or leaves operate, substantially as herein set forth.

5. In a grain-binder, the binder-table composed of the stationary portions *a*, and movable sections C *c*, and the stationary portions *b′*, arranged between the sections C *c*, substantially as specified.

6. The combination of the compressor and ejector shaft B, having the arm I′ and stop-motion pinion H′, provided with lugs *f*, and the pivoted arm I, mounted upon the binder-frame, with the combined cam and gear wheel having segmental teeth *l′*, substantially as set forth.

In testimony whereof I have hereunto set my hand.

ROBERT BROWN.

Witnesses:
JNO. E. JONES,
A. GLUCHOWSKY.