2 Sheets—Sheet 1.

# C. L. TRAVIS.

## Grain Binding Machine.

No. 238,750. **Patented March 8, 1881.**

*Fig. 1.*

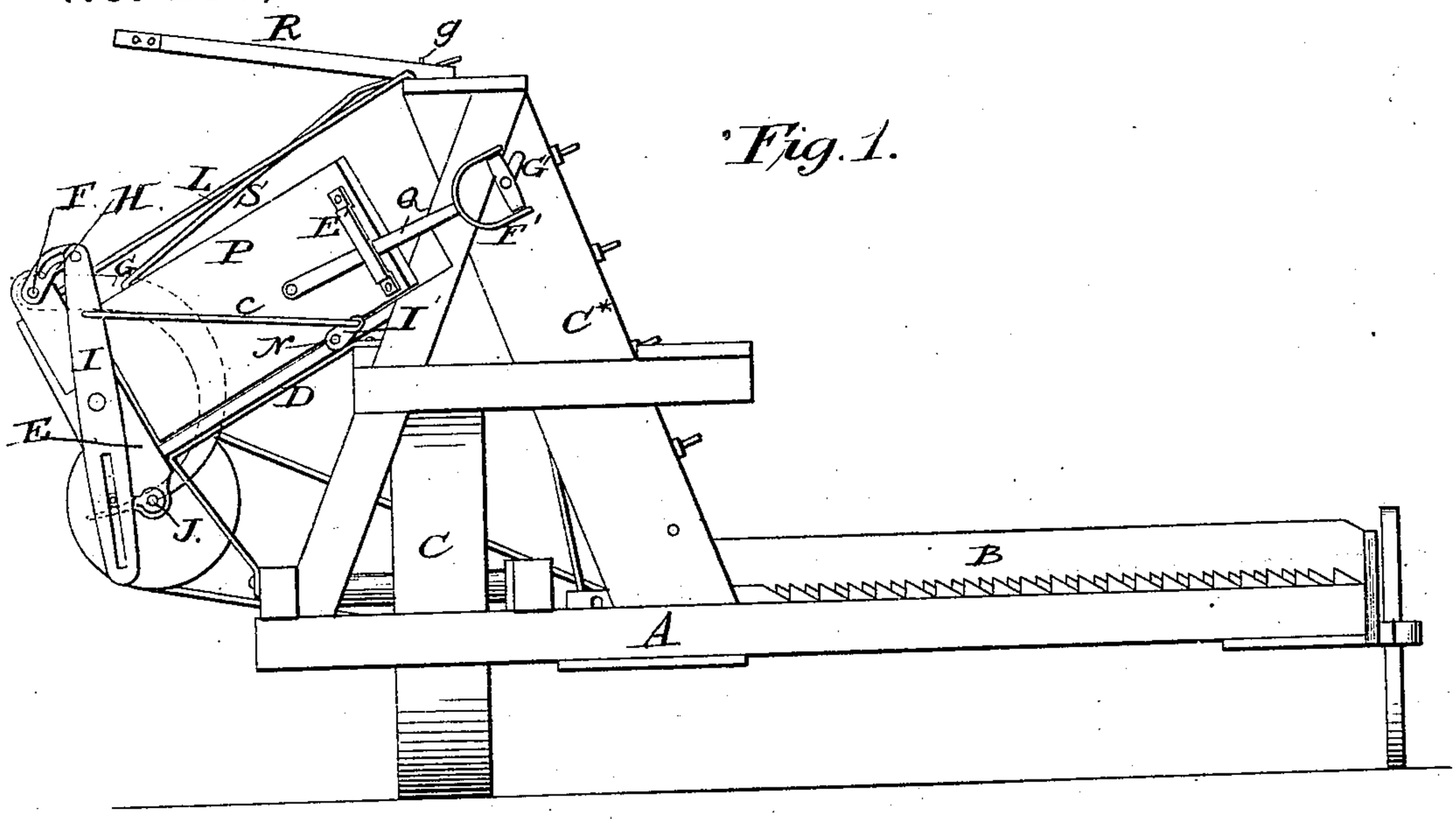
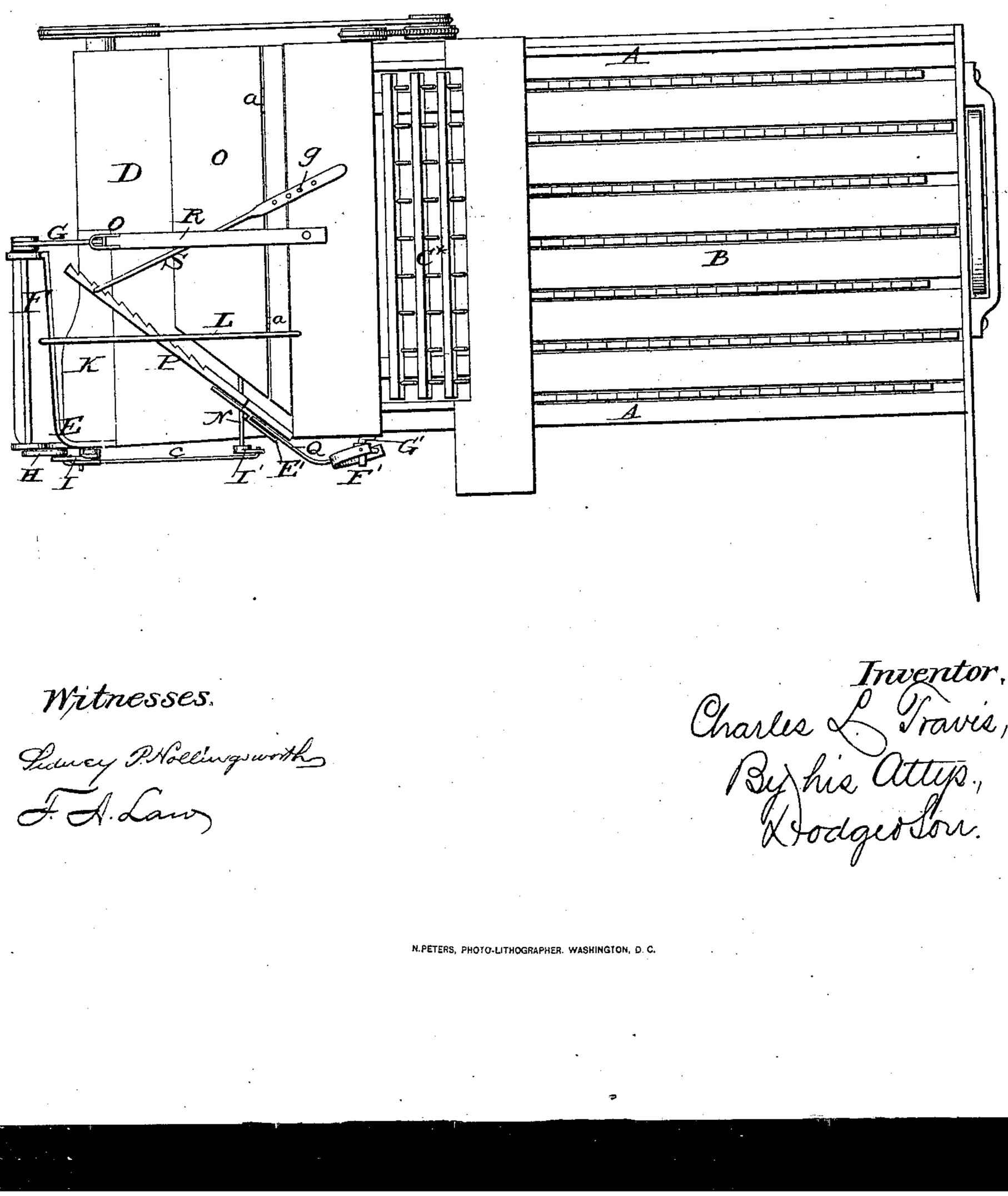



*Fig. 2.*




Witnesses.

Sidney P. Hollingsworth

F. A. Law

Inventor.

Charles L. Travis,

By his Attys.,

Dodger & Son.

2 Sheets—Sheet 2.

# C. L. TRAVIS.

## Grain Binding Machine.

No. 238,750. Patented March 8, 1881.

*Fig. 3.*

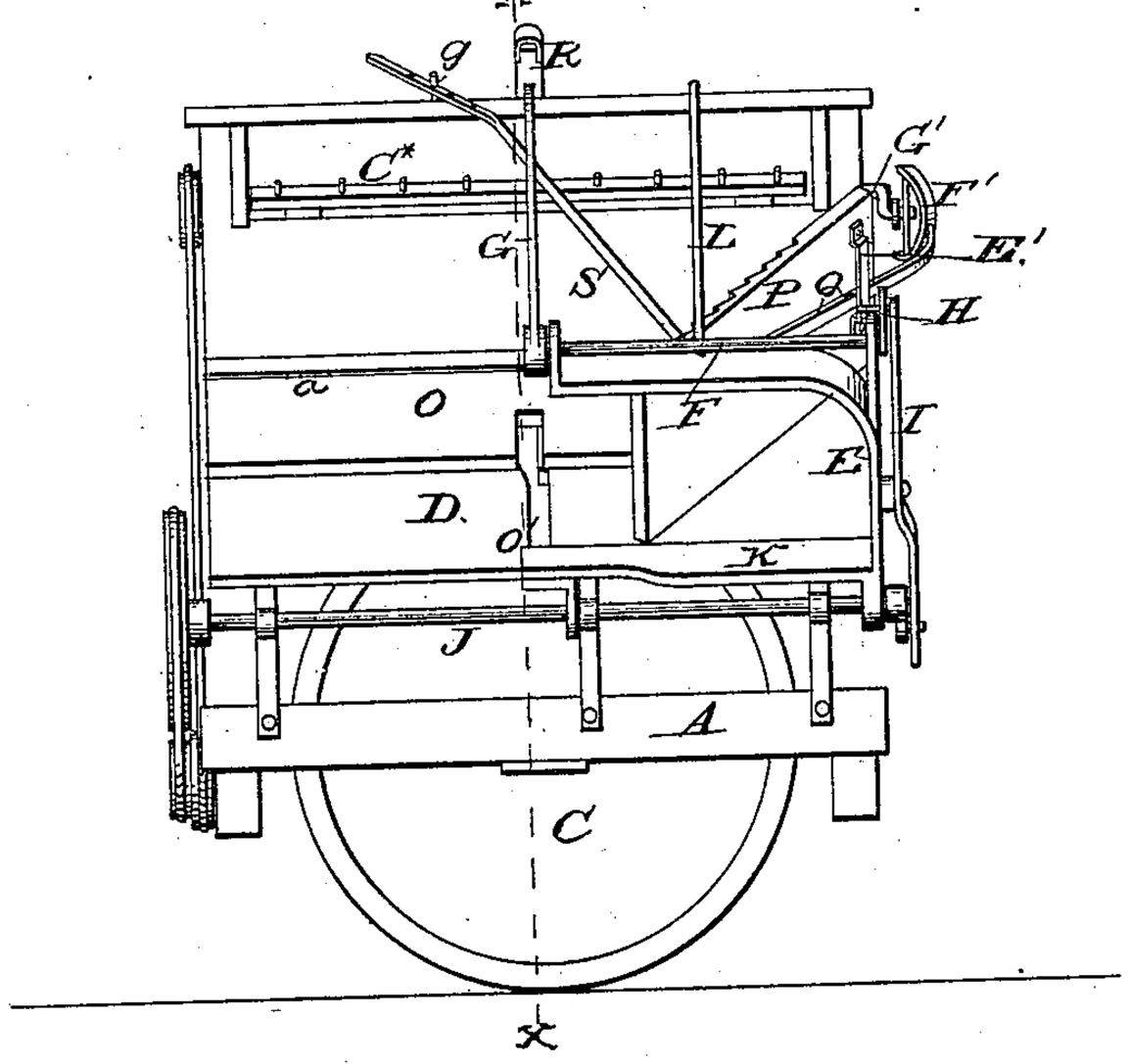



*Fig. 4*

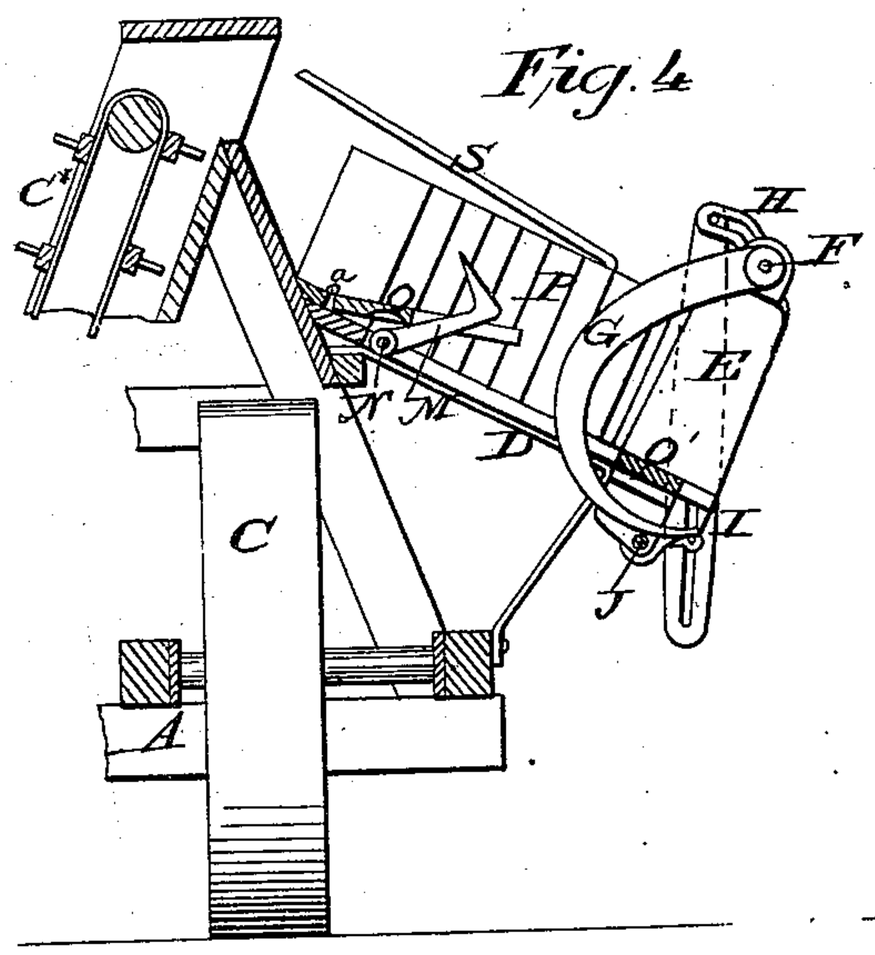
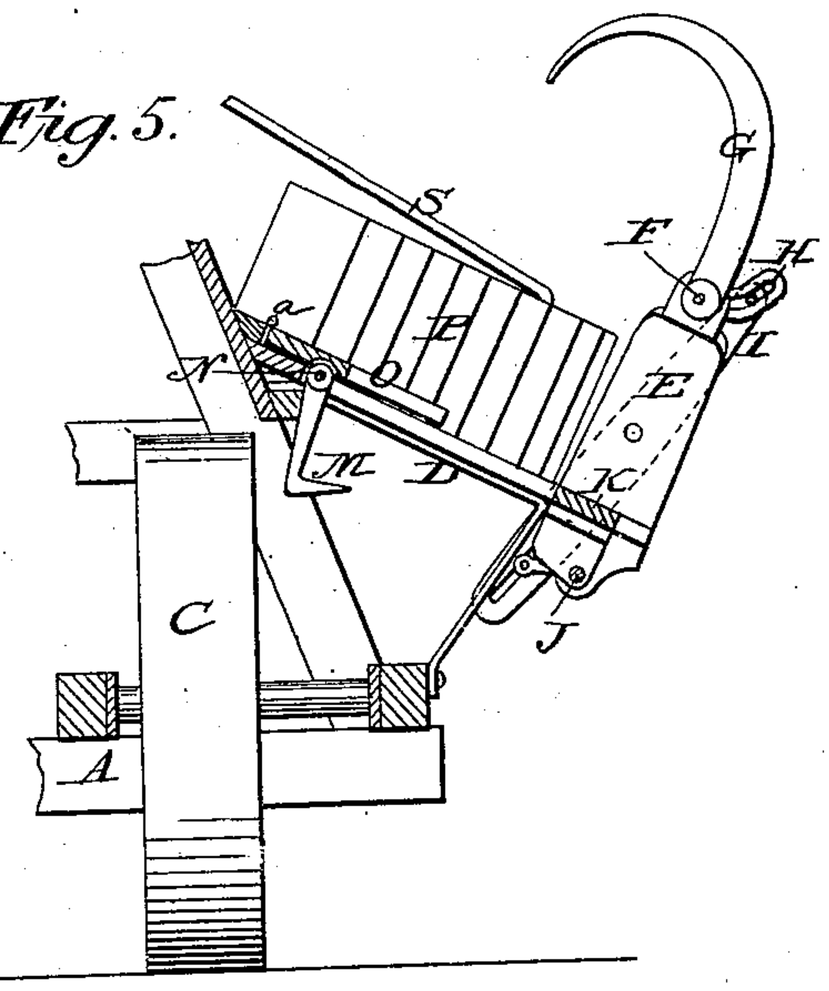



*Fig. 5.*




*Witnesses.*

Sidney P. Hollingsworth
F. A. Laws

*Inventor.*

Charles L. Travis,
By his Attys.,
Dodger & Son.

# UNITED STATES PATENT OFFICE.

CHARLES L. TRAVIS, OF MINNEAPOLIS, MINNESOTA, ASSIGNOR TO MINNEAPOLIS GRAIN BINDER COMPANY, OF SAME PLACE.

## GRAIN-BINDING MACHINE.

SPECIFICATION forming part of Letters Patent No. 238,750, dated March 8, 1881.

Application filed February 27, 1880.

*To all whom it may concern:*

Be it known that I, CHARLES L. TRAVIS, of Minneapolis, in the county of Hennepin and State of Minnesota, have invented certain Improvements in Grain-Binding Machines, of which the following is a specification.

My invention consists in the combination of a binder-arm and a divider which pierce the grain at a common point, the divider being arranged to move back bodily the mass of grain remaining behind the gavel after the separation of the latter therefrom, and in certain peculiarities in the arrangement and action of said divider hereinafter described.

It also consists in a vibratory butting-board located at the end of the grain table or receiver, in the special manner described herein, to adjust the inflowing grain endwise, and in various details relating thereto and connected therewith, as hereinafter fully explained.

The invention also consists in the special construction of the butting-board, and in the peculiar mechanism for operating the same.

It also consists in details of minor importance.

My improvements are applicable to harvesting and binding machines of different forms and constructions; but it is preferred to employ a harvester in which the grain is carried over the main wheel by elevating-aprons and a binder of the same general constructions as those shown and described in Letters Patent Nos. 219,187 and 216,241, heretofore granted to me.

The drawings represent my improvements applied to machines of the above character.

Figure 1 represents a front elevation of a harvester provided with my improved binding mechanism; Fig. 2, a top-plan view of the same; Fig. 3, an end elevation of the same, looking from the delivery side; Figs. 4 and 5, vertical sections on the line *x x*, the former showing the position of the parts after and the other previous to the separation of the bundle or gavel.

A represents the frame of the harvester, of which B is the main platform, and C the main supporting and driving wheel.

C* represents the grain-elevator, by which the cut grain is delivered from the main platform to the binding table or receiver D, located outside of the main wheel. The binding-table or receiver, which may be varied in form, is here shown of a flat form, with an inclination downward and outward from the machine, in order to cause the grain to slide in that direction.

E represents a rigid bracket or standard, located at the outer side of the binding-table and overhanging the same, to sustain the rock-shaft F, the inner end of which carries the binder-arm G. This arm receives a vertical vibratory motion through the medium of a slotted arm, H, applied to the outer end of the rock-shaft, and actuated in turn by a vertical lever, I, which is pivoted at its middle and vibrated at its lower end by means of a crank upon the end of a horizontal driving-shaft, J, as shown in the various figures. The driving-shaft is sustained in bearings on the main frame, and extends through the base-plate or frame K of the binder. This plate K forms a continuation of the binding-table, and is supported upon the driving-shaft J. This arrangement produces upon the shaft an amount of friction to hold the parts in position and prevent the binder-arm from falling when the binder is unclutched or disconnected from the driving-gear of the harvester. This arrangement answers all the purposes of the various clutching and locking mechanisms hitherto employed to sustain the binder-arm when out of action.

The binder-arm bracket or support E is sustained in its upright position by means of an overhead brace, L, which extends from the bracket to the harvester-frame at a point above the elevator. This brace, however, forms no part of my invention, separately considered, and may be replaced by other means or devices for sustaining the bracket.

One feature of my invention consists in the grain-divider, to assist the binder-arm in separating the bundle from the remaining loose grain. This device is shown at M in the various figures, and consists of an arm mounted upon a rock-shaft, N, in or beneath the binding-table, and provided with a sharp upturned end or point. The divider-arm extends from its shaft toward the binder-arm, and is ar-

ranged to swing upward through the table and the grain thereon. The binder-arm and divider pierce the grain at the same time and at the same point from opposite directions, and the parts are so disposed and arranged with reference to each other that the divider swings upward away from the path of the binder toward the harvester. This peculiar movement of the divider constitutes one of the essential features of my invention, and is of special importance, since the divider is caused to force the loose grain backward from the binder-arm and tear the same loose from the grain within the grasp of the arm. It is to be particularly noted that my divider is adapted to separate the grain widely at the under side as well as at the top of the mass, and also to raise the remaining grain bodily as it rises from the gavel.

I do not claim, broadly, an ascending divider operating in connection with a descending binder-arm; nor do I claim a divider which ascends through a small hole in the table, so as to divide and open the mass of grain at the top without opening it at the bottom, next to the face of the table, my invention being restricted to a divider which moves back at the bottom of the mass as well as at the top; but I believe myself to be the first to construct a divider which swings upward through and above the binding-table, away from the binder-arm, in the manner shown.

The next feature of the invention is the dividing-board O, in combination with the dividing-arm. The board is made of flat form and placed upon the upper part of the binding-table, to which it is hinged at the upper edge, as shown at *a*, so that its lower edge may be raised from the table to or above a horizontal position. When the board is depressed it lies upon and forms in effect a part of the binding-table, as shown in Fig. 5, that the grain may pass freely over it to the binder-arm; but upon raising the board it arrests the downward flow of the grain and serves to sustain and hold back the loose grain and separate the same from the gavel or bundle within the grasp of the binder-arm. While the divider-board is shown in a flat form, it is manifest that it may be curved to conform to machines having concave grain receivers or tables. The elevation of the divider-board takes place at or during the descent of the binder-arm into the grain. The movement may be effected by any suitable mechanism, but in the present instance is caused by the divider-arm, which swings upward beneath the board, as represented in Fig. 4. The board is slotted transversely, and the parts so arranged that the end of the divider-arm swings upward through the slot and inward above and over the board. This action causes the grain to be held more securely upon the board and insures a cleaner and more perfect separation than could otherwise be secured. The essential feature of the dividing-board is in having it rise and fall at the rear edge, and it is manifest that it may be hinged at a greater or less distance from its front edge, provided the above action is retained. The board and the divider-arm may be used, as shown, either without the other; but it is preferred to use them jointly, as each has certain actions and effects not secured by the other. The divider-arm receives motion from a crank-arm, I′, applied to the end of its shaft, and connected by a rod or link, *c*, to the lever which actuates the binder-arm.

The next feature of the invention consists in the vibratory butting-board P. This board is arranged in an upright position obliquely across the forward end of the binding-table or receiver, in position to act upon the butt-ends of the grain and force the same backward endwise upon the table as it passes downward from the elevator to the binder-arm. An arm, Q, is pivoted and extends along the back of the board through a guide, E′, thereon, and thence to a universal joint or coupling, F′, mounted on a crank, G′, attached to the upper roll of the grain-elevator, as shown, the connection between the arm Q and the board being such that as the arm is carried by the crank it moves the board P endwise without giving it vertical play. The lower end of the board P is connected to and pivoted upon the end of a brace-rod, S, which extends thence above the elevator-apron to a point on the main frame, to which it is adjustably pivoted. The effect of the combined action of the reciprocating arm Q and the swinging brace S is to cause the board to reciprocate endwise obliquely across the table, with a small movement at the same time lengthwise of the table. The effect of this action upon the descending grain is to move the same backward endwise upon the table, and also to hasten the movements of the butts and render their speed equal to that of the heads. The movement of the grain forward endwise determines the point at which the band is applied thereto, so that by properly graduating the movement the band may be applied to the middle of both long and short grain. In order to render the board more effective in its action its face may be provided, as shown, with vertical ratchet-teeth having their inclined faces toward the upper end. These teeth, taking hold upon the grain, advance the same with a positive action. In returning, the board retreats from and clears the butts of the grain, so as not to carry the butts up again. The brace which controls the lower end of the board is provided in its forward end with a series of holes to receive a pivot-pin, *g*, on the frame, so that by shifting from one hole to another the lower end of the board may be adjusted forward or backward, as the varying length of the grain may require. The brace may be connected to the frame in any suitable manner that will admit of its being readily adjusted by the driver when the machine is in action to vary the position of the butting-board.

The wire-guiding arm is secured rigidly to

the harvester above the elevator, and extends outward over the binding-table and binder-arm, but stops considerably short of the vertical plane in which the axis of the binder-arm is located.

The tying and cord-holding devices will be located, as usual; at the point O′. Under this arrangement the binding cord or wire, when extended, forms a chord of the arc described by the point of the binder-arm, and as the arc is less than one hundred and eighty degrees there is very little slack produced when the arm rises. In this way I am enabled to dispense with the movable take-up arms which are commonly employed in machines of this class to prevent the slack cord from winding around the point of the binder-arm.

I am aware that a stationary adjustable board has been located obliquely across the end of the grain-table to adjust the grain endwise, and also that a vibrating and longitudinally-moving toothed bar has been located at the front edge of the grain-elevator to act upon the butts of the thin stream of grain thereon, and these arrangements I do not claim.

I believe myself to be the first to arrange a butting-board obliquely across the end of the grain-table or binding-table and give the same a vibratory motion by suitable driving mechanism, in order that the board, constructed and arranged as above, may serve the three purposes of adjusting the grain endwise, advancing the butts, and protecting the grain from the wind, all during the time that the bundle is being formed and bound, so that the bundles are delivered in regular and proper form.

I am also aware that in a grain-binding machine having grain receiving and compressing arms and reciprocating toothed bars to force the grain therein a grain-table has been arranged to lift bodily, in order to rise above the feeding-bars, and this I do not claim.

In my machine the grain-table is stationary, and the grain descends thereon by reason of its gravity to the binder-arm, and the dividing-board is located upon the table so as to form, when raised, a fence or abutment thereon to arrest the grain. By using the supplemental board the action is rendered easier and quicker, and the grain falling on the table permitted to flow down and accumulate in a mass upon or against the divider, so that it will fall quickly and in compact shape within reach of the binder-arm when the divider is lowered.

The application of the weight of the mechanism to sustain the binder-arm by the friction produced in an elevated position forms no part of the present invention, but will be embraced in another application to be filed hereafter.

Having thus described my invention, what I claim is—

1. In a grain-binding machine, the combination of a grain table or receiver whereon the grain is delivered in a continuous stream with a binder-arm and a divider arranged to pass through the loose grain at one and the same point to separate a gavel therefrom, the divider arranged to raise the grain remaining behind the gavel bodily away from the binder-arm, as set forth.

2. In combination with a binding table or receiver whereon the grain is delivered in a continuous stream, the binder-arm and the divider, both passing through the mass of grain at the same point, and the latter arranged to move the entire front of the grain lying on the table behind the gavel bodily backward therefrom.

3. In a grain-binding machine, the combination of a binding-table which receives the grain in a continuous stream, a binder-arm, and a divider-arm arranged to pass through the mass of grain on the table to separate a gavel therefrom, the divider being arranged to move the front of the mass behind the gavel bodily backward.

4. In a grain-binding machine, the combination of an inclined table or receiver, over which the grain descends by gravity, and a toothed vibrating board arranged obliquely across the end of the table, to advance the butts of the grain upon the table as the grain is grasped by the binding-arm.

5. In a binding-machine, the combination of the table whereon the grain is bound and the vibratory power-driven board located across the end of the table, as shown, whereby the single board is caused to serve the three purposes of adjusting the grain endwise and sidewise and of protecting the butts from the wind.

6. In a grain-binding machine, the butting-board having a lateral and longitudinal vibration, and having on its face teeth inclined on the rear side, as shown.

7. In combination with the table D and board P, the crank G′ and pivoted arm Q.

8. The combination of the dividing-board and dividing-arm, substantially as described and shown.

CHAS. L. TRAVIS.

Witnesses:
CHAS. R. CHUTE,
ALBERT B. OVITT.