(No Model.) 2 Sheets—Sheet 1.

G. ESTERLY.

GRAIN BINDER.

No. 384,140. Patented June 5, 1888.

Fig. 1.

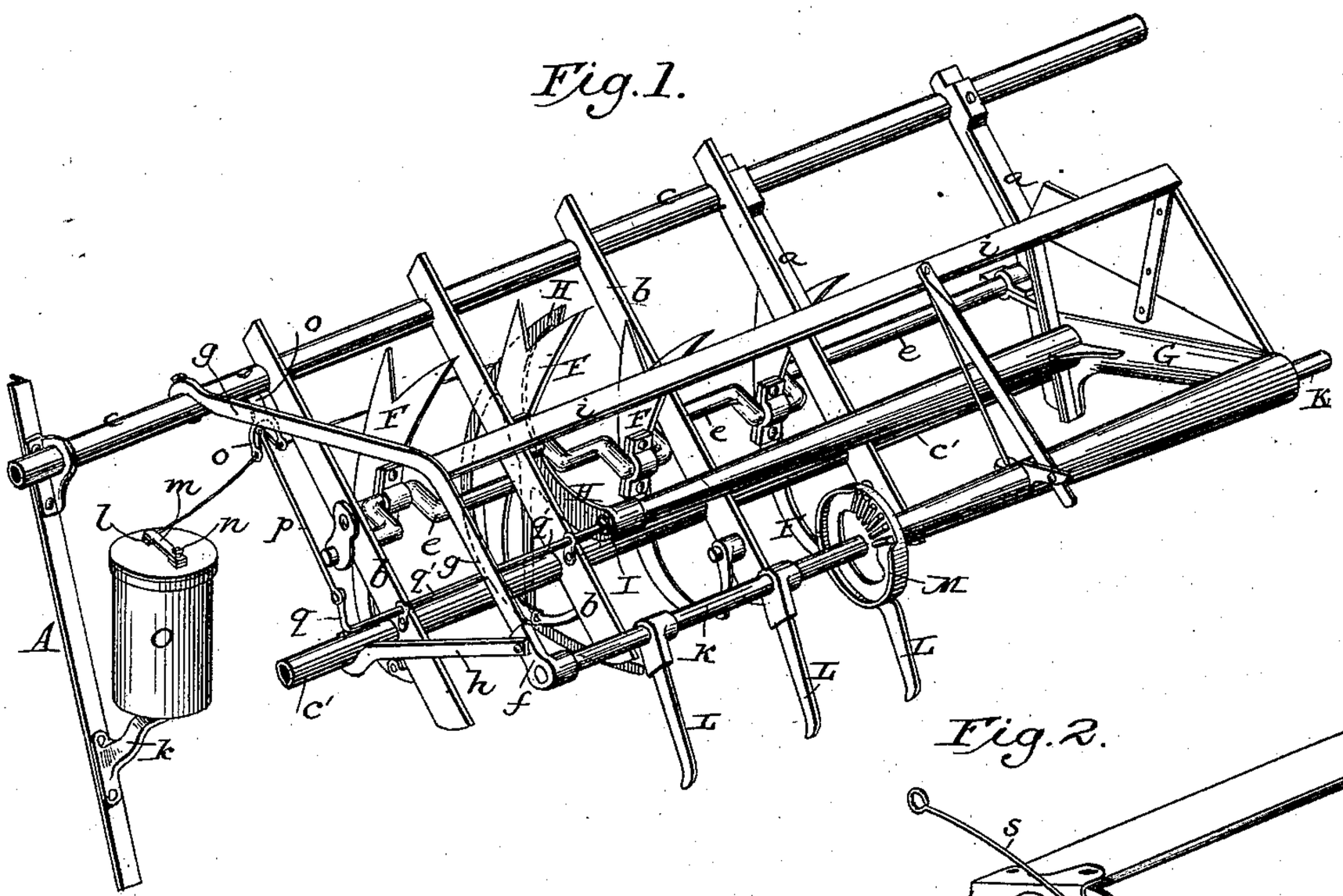

Fig. 2.

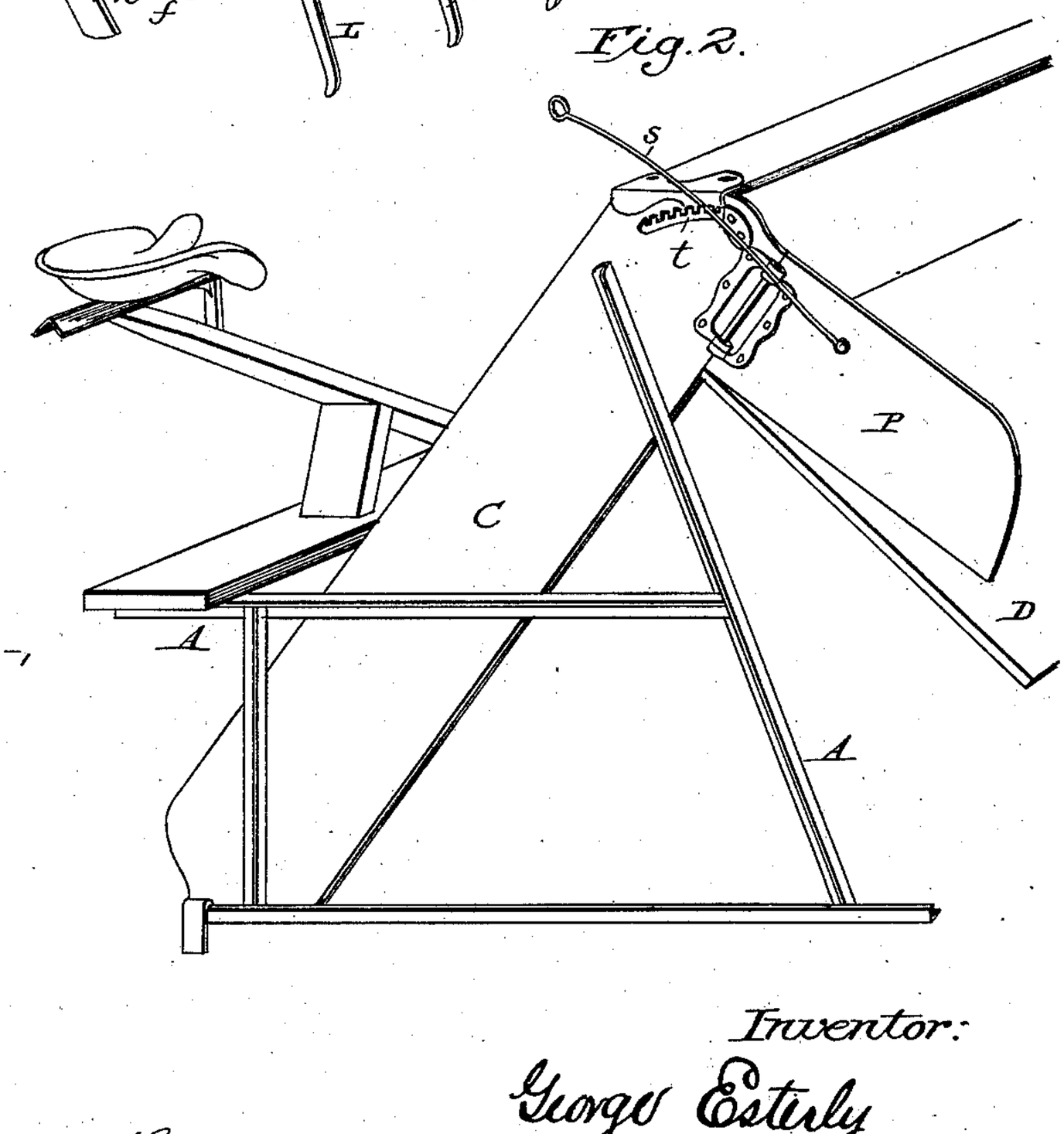

Fig. 3.

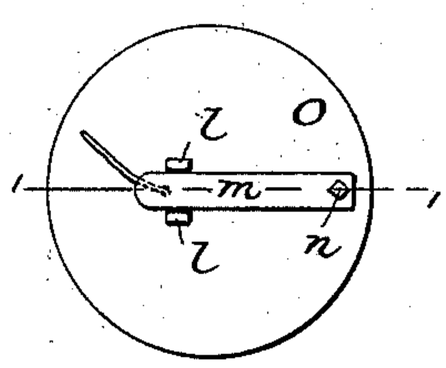

Fig. 4.

ON LINE 1–1

Inventor:

George Esterly.
By his Atty.
Chas. T. Dodge.

Attest.

Sidney P. Hollingsworth
H. R. Kennedy.

(No Model.) 2 Sheets—Sheet 2.

G. ESTERLY.

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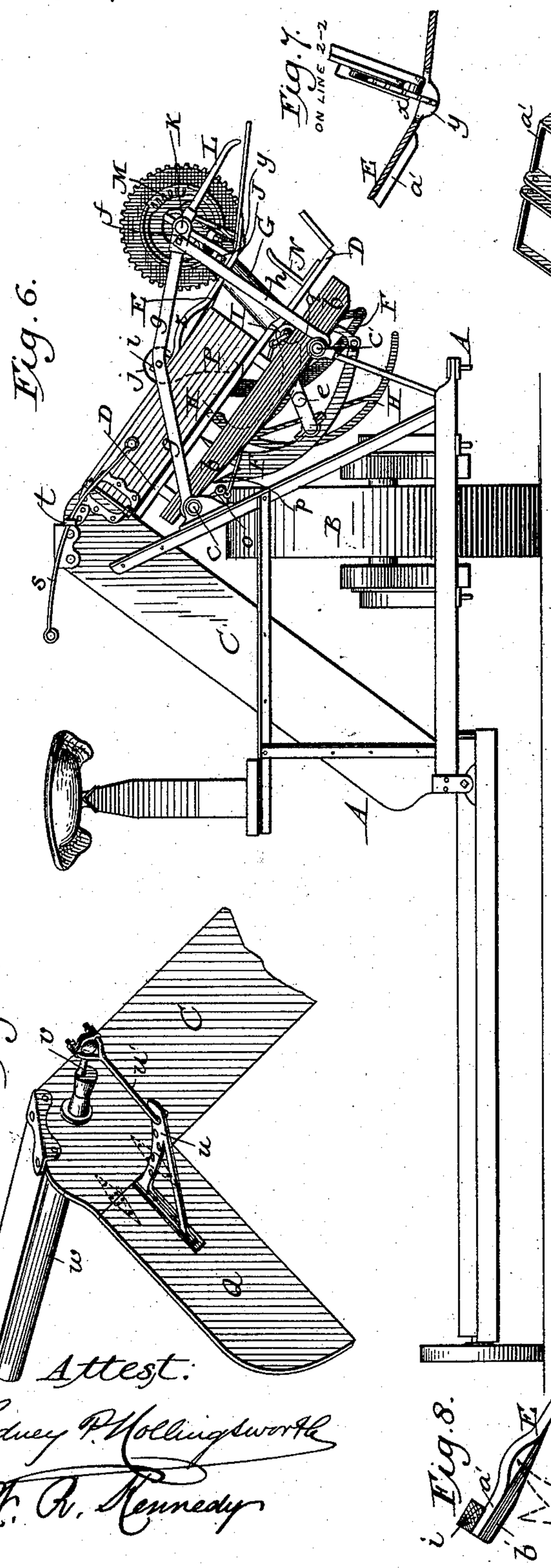

Fig. 6.

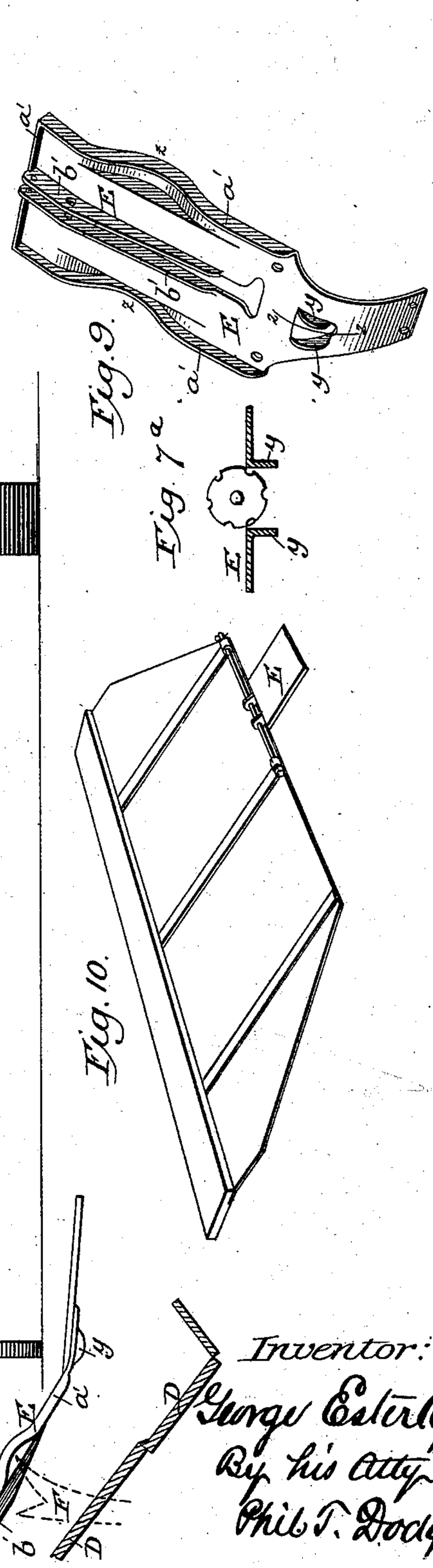

Fig. 9.

Fig. 7a

Fig. 10.

Fig. 5.

Fig. 8.

Attest:

Sidney P. Hollingsworth

F. R. Kennedy

Inventor:

George Esterly

By his Atty

Phil T. Dodge.

UNITED STATES PATENT OFFICE.

GEORGE ESTERLY, OF WHITEWATER, WISCONSIN.

GRAIN-BINDER.

SPECIFICATION forming part of Letters Patent No. 384,140, dated June 5, 1888.

Application filed June 3, 1887. Serial No. 240,154. (No model.)

To all whom it may concern:

Be it known that I, GEORGE ESTERLY, of Whitewater, in the county of Walworth and State of Wisconsin, have invented certain Improvements in Grain-Binders, of which the following is a specification.

This invention has reference more particularly to binders of the well-known Esterly-Appleby type, in which the grain delivered on the upper end of an inclined table is carried downward between the table and an overlying breast-plate, and accumulated against a compressor by circulatory packers which rise through slots in the table, and in which the gavel thus formed is reduced between the compressor and a binding-needle, which rising through the table passes the cord around the gavel and through the breast-plate to the clamping, tying, and severing devices thereover.

The improvements relate to the binder-frame and the breast-plate and packers, as hereinafter more fully explained.

In the accompanying drawings, Figure 1 is a perspective view showing the upper portions of the frame-work of the binder together with other parts to which my invention relates, the binding-table, breast-plate, tying mechanism, and other ordinary parts being omitted. Fig. 2 is a perspective view looking from the rear and showing the deflector-board for longitudinal adjustment of the grain together with the neighboring parts. Fig. 3 is a top plan view of the cord-box and tension device therein. Fig. 4 is a central cross-section through the top of said box on the line 1 1 of Fig. 3. Fig. 5 is a perspective view looking from the front, showing the vibratory butt-adjuster and the mechanism for driving the same. Fig. 6 is a rear elevation of a harvesting and binding machine with my improvements incorporated therein. Fig. 7 is a vertical section on the line 2 2, Fig. 9, showing the manner in which the cord-clamp is projected through and below the breast-plate. Fig. 7ª is a cross-section of the breast-plate through the ribs *y y*. Fig. 8 is a vertical cross-section through the binding-table at one side of the breast-plate, which latter is shown in side elevation to illustrate the grain-passage enlarging in the direction of the delivery. Fig. 9 is a perspective view of the breast-plate in an inverted position. Fig. 10 is a perspective view showing the manner in which the upper end of the breast-plate is connected by a sliding joint to the guard or decking which overlies the grain-passage.

Referring to the drawings, A represents the harvester-frame; B, the main or ground wheel by which it is carried and from which the operative parts are driven; C, the frame containing the elevator by which the loose grain is delivered over the main wheel to the binder; D, the binder table or deck; E, the overlying breast-plate; F, the packers; G, the upright portion of the binder-frame, commonly known as the "gear-standard;" H, the binding-needle secured to the rock-shaft I located beneath the table in the base of the standard; J, the cord-fastening mechanism; K, the knotter-shaft mounted in the top of the standard and carrying the ejector-arms L and the main gear-wheel M, which actuates the band-fastening and the compressing mechanisms, as usual, and N the compressor.

In their general construction and mode of action the foregoing parts resemble those employed in machines now in use; but as herein shown certain of them contain peculiarities which I will now describe.

The binder-frame, which is arranged to slide forward and backward on the harvester-frame in a familiar manner, is made of much greater width from front to rear than usual, in order that the machine may bind cornstalks, very long grain, and other materials. To give this widened frame the necessary rigidity, I construct it as shown in Fig. 1.

The binder-gear standard G is formed and bolted at its base, as usual, to the deck-sustaining sills *a*, which, together with sills *b*, are bolted to the two supporting rods or tubes *c c'*, arranged to slide in bearings on the harvester-frame. These rods are prolonged toward the rear and provided with one or more additional sills to sustain the rear part of the widened table and the end of the packer-shaft. The knotter-driving shaft K is prolonged in like manner, and the packer-shaft *e* extended and provided with one or more additional cranks and packer-arms of the usual form.

The rear end of the knotter-shaft K is sustained by a bearing, *f*, secured to an angular brace, *g*, bolted to the rod *c*, and supported by

a second brace, *h*, bolted to rod *c'*. Near its middle, brace *g* is secured to and supports the rear end of the elongated bar *i*, which carries the usual spring-fingers, *j*, overlying the grain-passage. By extending the various parts and supporting them as above, I adapt the machine to bind very long material without destroying its strength and rigidity.

The twine-box O is bolted at its base to a rigid arm, *k*, on the harvester-frame, and provided in its top with a cast-metal head having a hole from which the twine passes between studs *l* thereon and the end of a tension-spring, *m*, seated between the studs on the plate and secured to the top by an adjusting-screw, *n*, serving to regulate the tension. The twine is bent at a right angle in passing over the plate, and passes thence through holes in the arms of a forked plate, *o*, or other support fastened rigidly to the binder-frame, and also through a hole in a rod, *p*, the lower end of which is carried by a crank, *q*, on the rod *q'*, attached to and forming a continuation of the needle-shaft I. As the shaft turns to carry the needle upward and pass the twine around the gavel, the crank *q* moves the rod *p* and carries its eye out of line with those of plate *o*, thereby bending the twine and drawing an additional length from the box or spool. As the needle retreats, the eye of the rod is brought in line with the others, thereby permitting the cord to straighten and give up the requisite slack for the binding of the next bundle. The crank-rod *q'* is preferably threaded at its forward end, screwed into the end of the needle-shaft, and secured by a check-nut bearing against the shaft; but it may be otherwise attached.

To assist in determining the longitudinal adjustment of the grain on the binding-table to secure the application of the band at the middle, I use, either alone or with suitable butt-adjusting devices, a deflector-board, P, hinged at its upper end and lying obliquely along the rear side of the table to act on the heads of the grain. To permit the convenient adjustment of this deflector, which is in itself old, I attach thereto a vertically-elastic arm, *s*, extended upward in position to be conveniently grasped by the driver while in his seat, and arranged to engage a notched locking-plate, *t*, fixed in position.

As an additional means of adjusting the grain endwise, I employ a swinging or vibrating butt-board, Q, of a familiar form; but in place of the stationary controlling devices I provide the board with a rigid perforated arm, *u*, and connect this arm, as shown in Fig. 5, by a pitman, *u'*, to a crank, *v*, carried by the journal of roll *w*, which carries the upper end of the elevator-canvas. By this combination a constant vibration in the direction of the length of the grain is imparted to the board. By changing the pitman from one to another of the holes in the arm the distance which the board moves forward may be varied as the length of the grain may demand. In place of the holes, any other suitable means may be used to permit a change in the point of attachment of the pitman.

To prevent the grain from choking the passage between the binding table or deck and the breast-plate, I make the latter substantially flat or straight on the under side and arrange its lower face at the point where the gavel is bound, somewhat farther from the binding-table than at its upper end, as shown in Figs. 6 and 8. This arrangement produces a grain-passage of increasing vertical width from its upper toward its lower end, through which the grain may be delivered with less power than through those of the ordinary form. The end of the cord is held by a clamping device of the ordinary disk form or other appropriate form arranged above the breast-plate. In machines as commonly constructed the clamp is arranged above the body of the breast-plate and at a considerable distance from the bundle. In order to overcome difficulties incident to this arrangement and grasp the applied band at a point nearer the bundle than usual, I lower the clamp into or through the breast-plate, as shown at *x*, Fig. 7, and in order to protect the clamp thus arranged from the entrance of straw or other obstructive matters I provide the breast-plate with lips or ribs *y* of the form shown, or other appropriate form, extending downward at the sides of the clamp and serving as fenders to hold the straw therefrom.

The essence of my invention resides in seating the clamp wholly or partly within or below the surface of the breast-plate, so that it may grasp the cord near the bundle, and it is manifest that the details may be variously modified without departing from the limits of the invention.

In binding-machines as ordinarily constructed the points of the circulatory packers rising through the binding-table pass beneath the breast-plate during their advance, and considerable difficulty is at times experienced by reason of the grain escaping between the packers and the breast-plate. To overcome this difficulty, I extend my packers upward, so that during their forward movement their points pass above the under or grain-confining surface of the breast-plate. In this way the grain is held downward below the point of the packers and prevented from escaping their grasp while being moved forward. This arrangement is plainly represented in Fig. 8.

In practice it is found advisable to have the breast-plate reasonably wide. To admit of this construction without interfering with the packers rising above its under surface, I propose to construct the plate, as shown in Figs. 8 and 9, with two upwardly-curved portions, *z*, at its sides to admit of the packer-points sweeping thereunder. The breast-plate thus formed is provided with the usual strengthening-flange *a'* around its outer edge, and with the depending cheeks or ribs *b'* along the sides of the needle-slot.

Having thus described my invention, what I claim is—

1. In a grain-binder, the parallel base-rods *c c'*, in combination with the cross-sills connecting them, the rigid binder-standard having the horizontal upper and lower arms, as usual, the shaft *k*, carried by and extended beyond the upper arm, the bearing for said shaft at its overhanging end, and supports for said bearing connected to the base-rods, substantially as shown.

2. In a grain-binder, a base-frame, a gear-standard of the Appleby type secured thereto and overhanging the binding-table, the knotter-driving and ejector-carrying shaft mounted in the top of the standard and prolonged beyond its overhanging end, the bearing for the extended end of the shaft, and supports for said bearing extended downward across the grain-passage to the base.

3. In combination with the circulatory packers rising through and above the grain-space, the overlying breast-plate provided at its sides with the elevated portions above its grain-confining face to cover and protect the points of the packers.

4. In combination with the cord-clamping disk seated therein, the breast-plate provided with the opening and with the downwardly-extending guards or cheeks *y* at the sides of the disk.

In testimony whereof I hereunto set my hand, this 10th day of February, 1887, in the presence of two attesting witnesses.

GEORGE ESTERLY.

Witnesses:
J. Z. MERRIAM,
T. C. HOLLENERGER.