

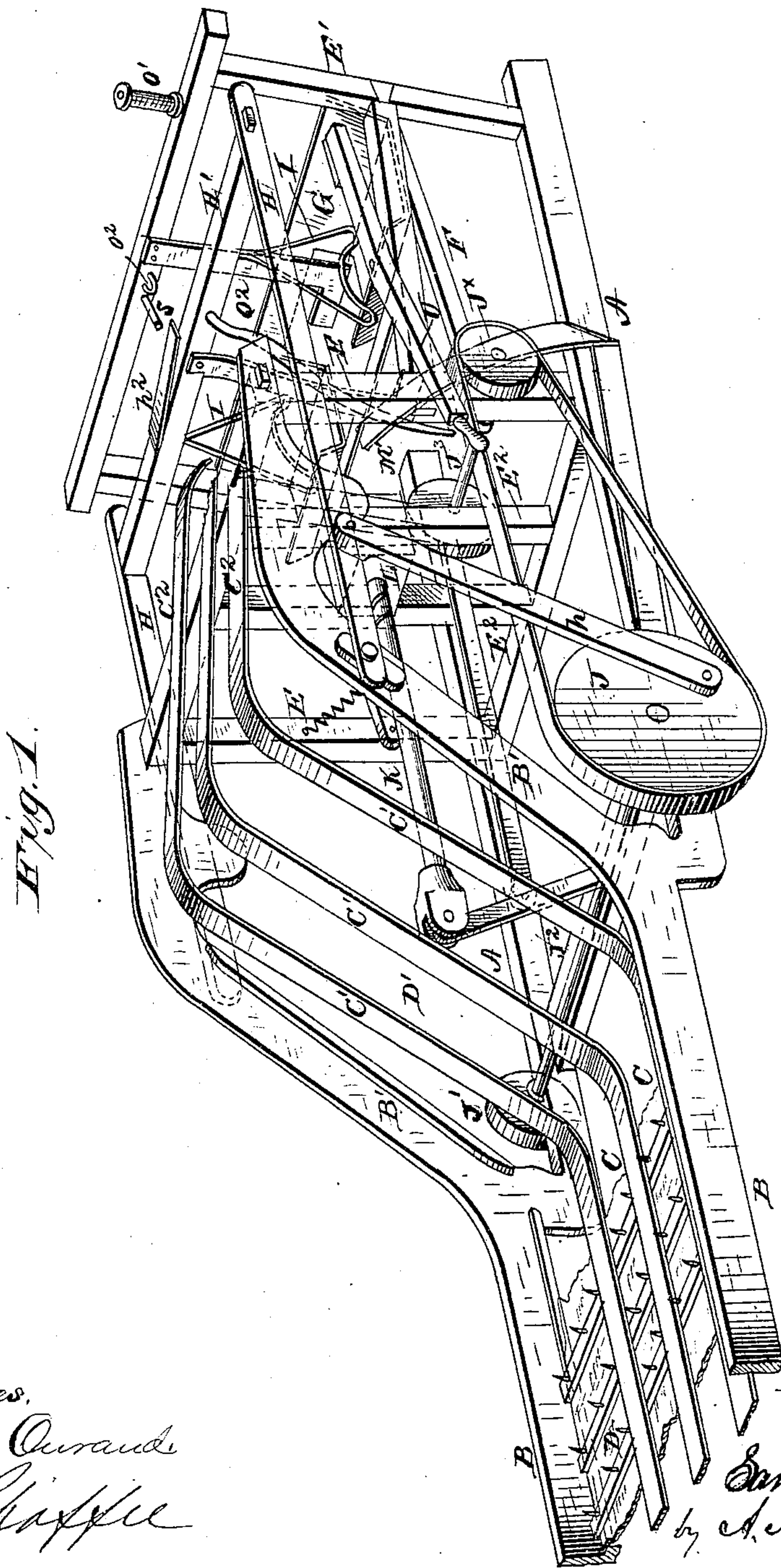
(Model.)

4 Sheets—Sheet 1.

S. V. ESSICK.
Grain Binder.

No. 238,747.

Patented March 8, 1881.



Witnesses,
Frank L. Curand
W. C. Chapple

Inventor,
Samuel V. Essick
by A. M. Smith & Co
Attorneys

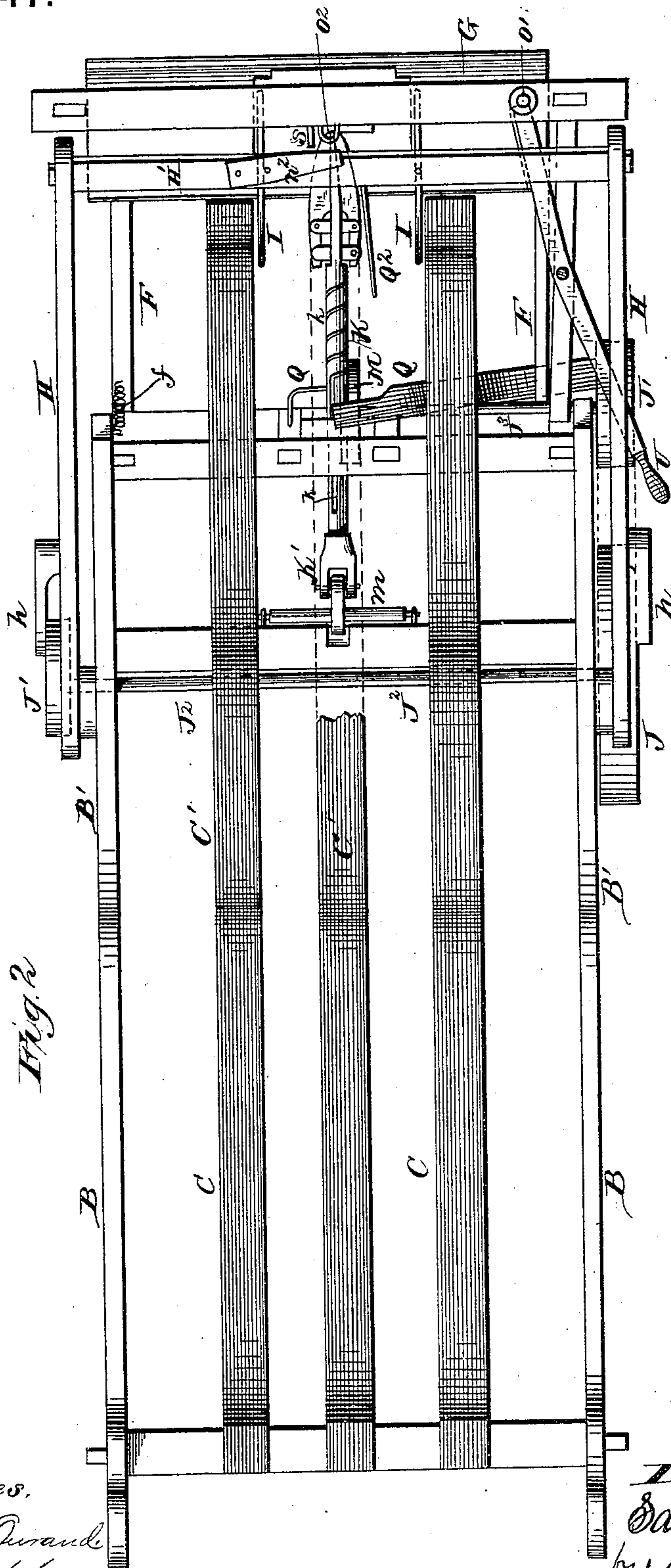
(Model.)

4 Sheets—Sheet 2.

S. V. ESSICK.
Grain Binder.

No. 238,747.

Patented March 8, 1881.



Witnesses,
Frank L. Curande
W. C. Chaffee

Inventor,
Samuel V. Essick
by A. H. Smith & Co.,
Attorneys

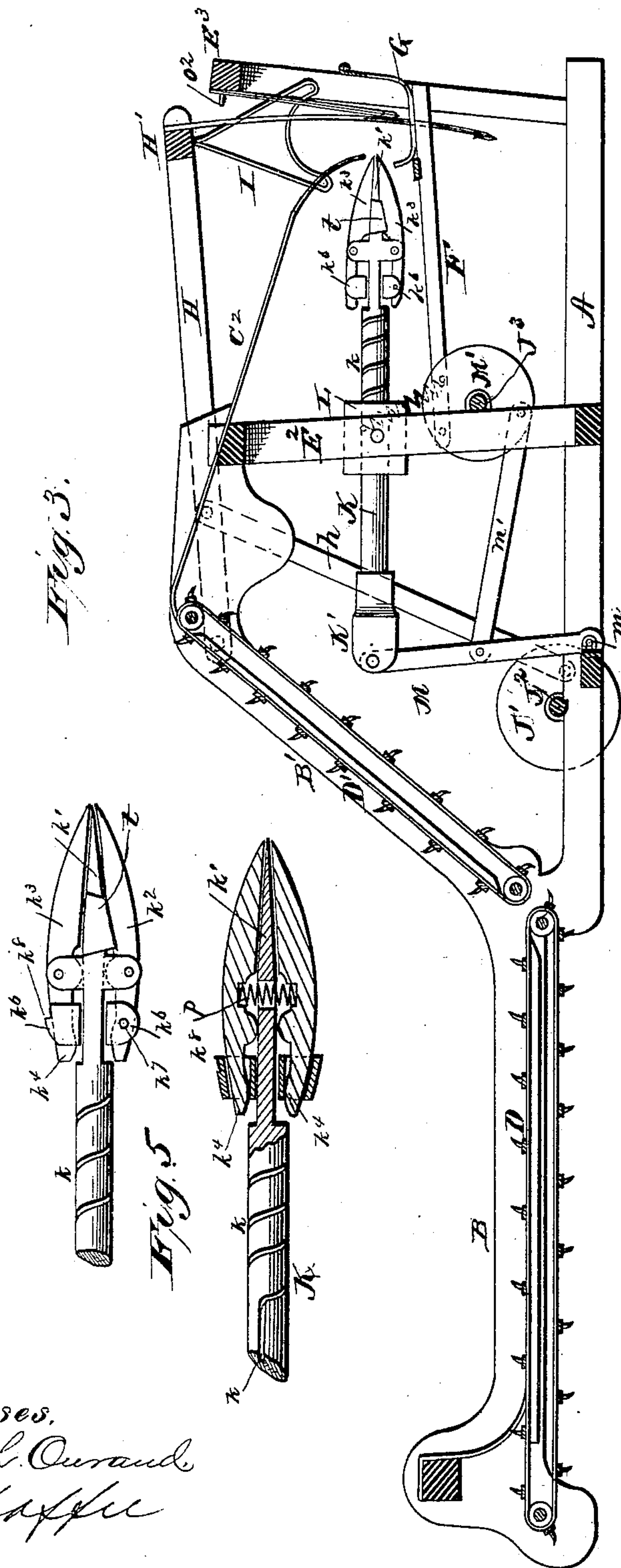
(Model.)

4 Sheets—Sheet 3.

S. V. ESSICK.
Grain Binder.

No. 238,747.

Patented March 8, 1881.



witnesses,
 Franck L. Ouraud.
 W. Chaffee

Inventor.
Samuel V. Essick
by A. L. Smith & Co.
Attorneys

(Model.)

4 Sheets—Sheet 4.

S. V. ESSICK,
Grain Binder.

No. 238,747.

Patented March 8, 1881.

Fig. 4

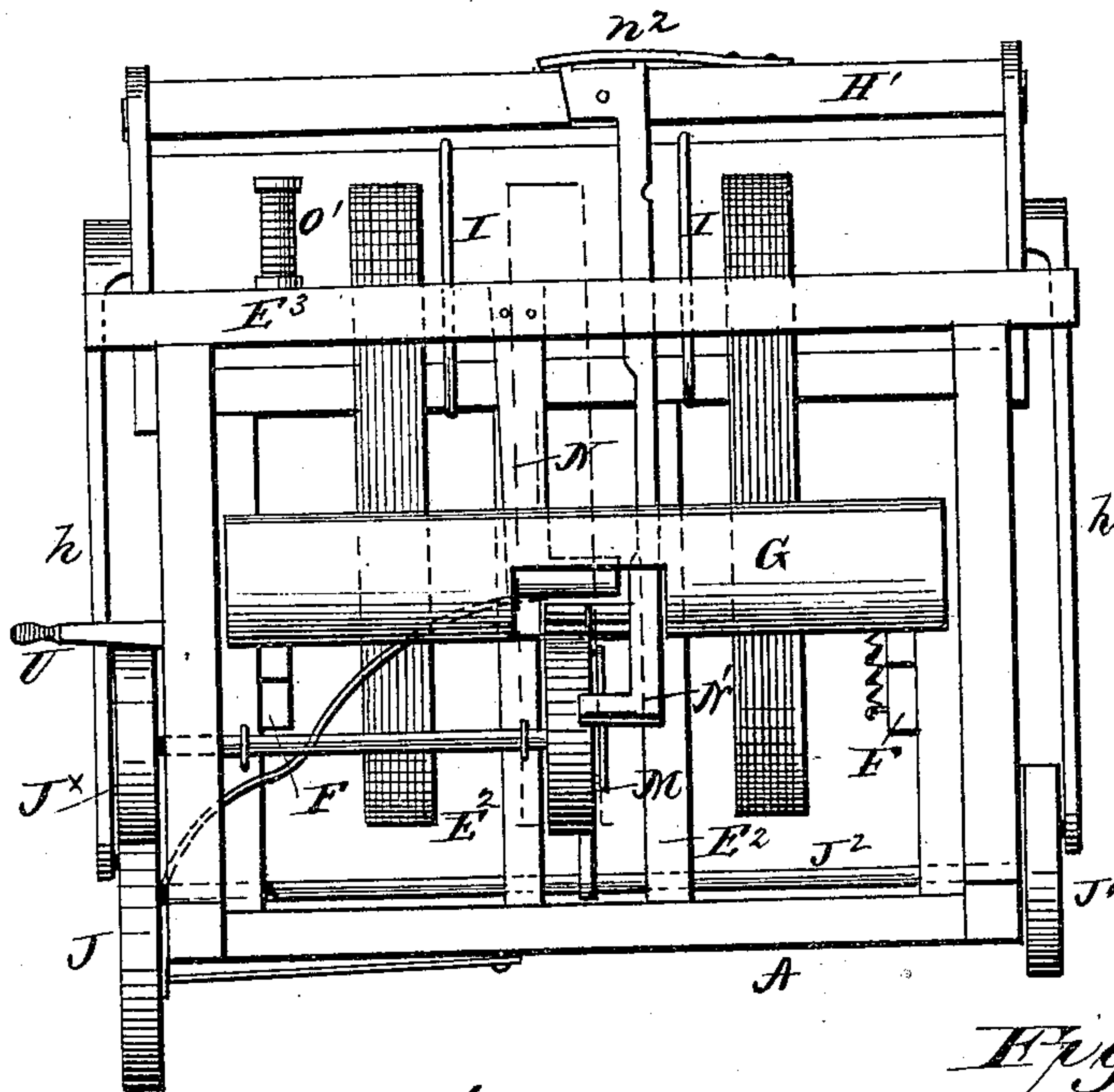


Fig. 6

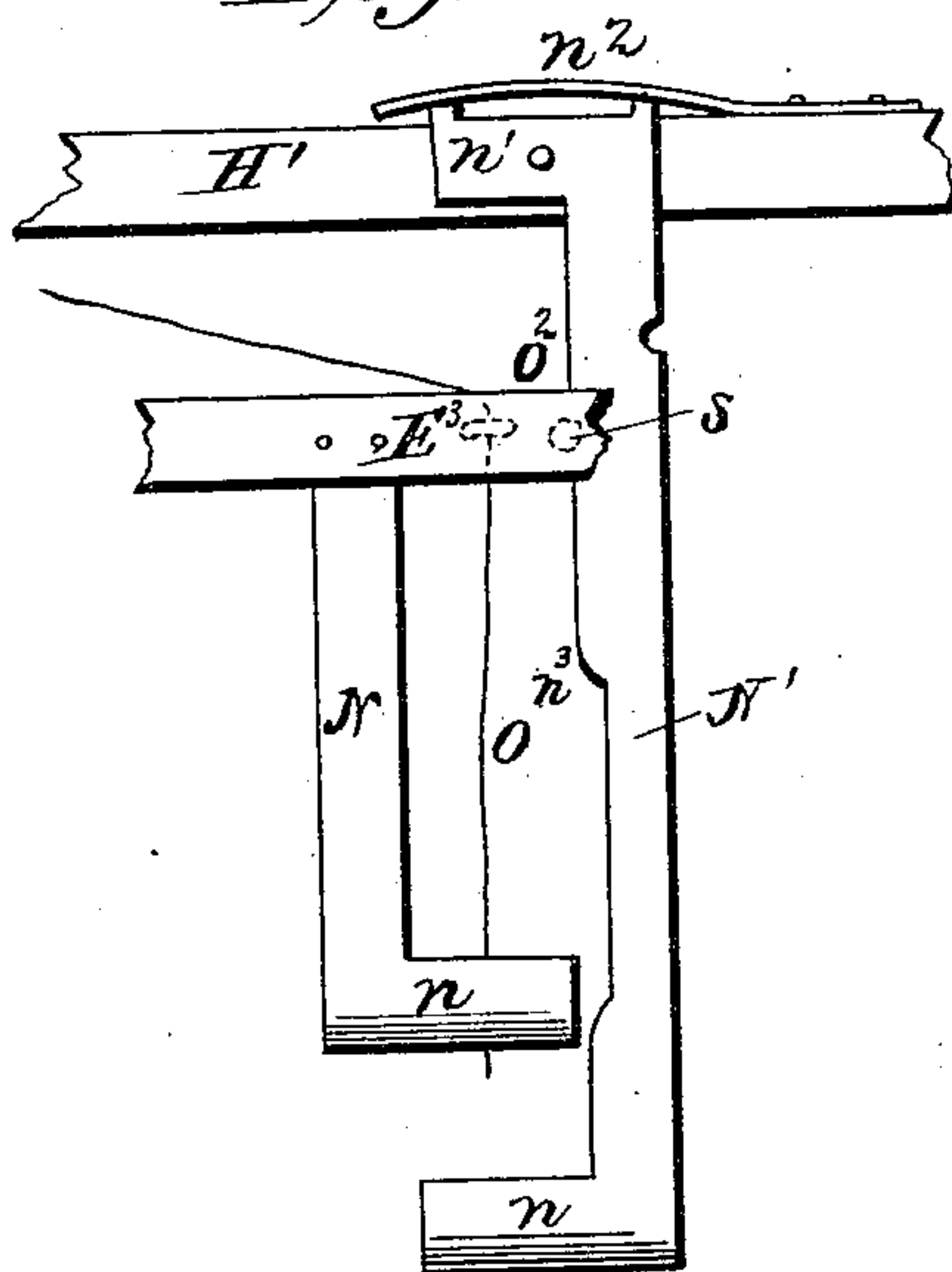
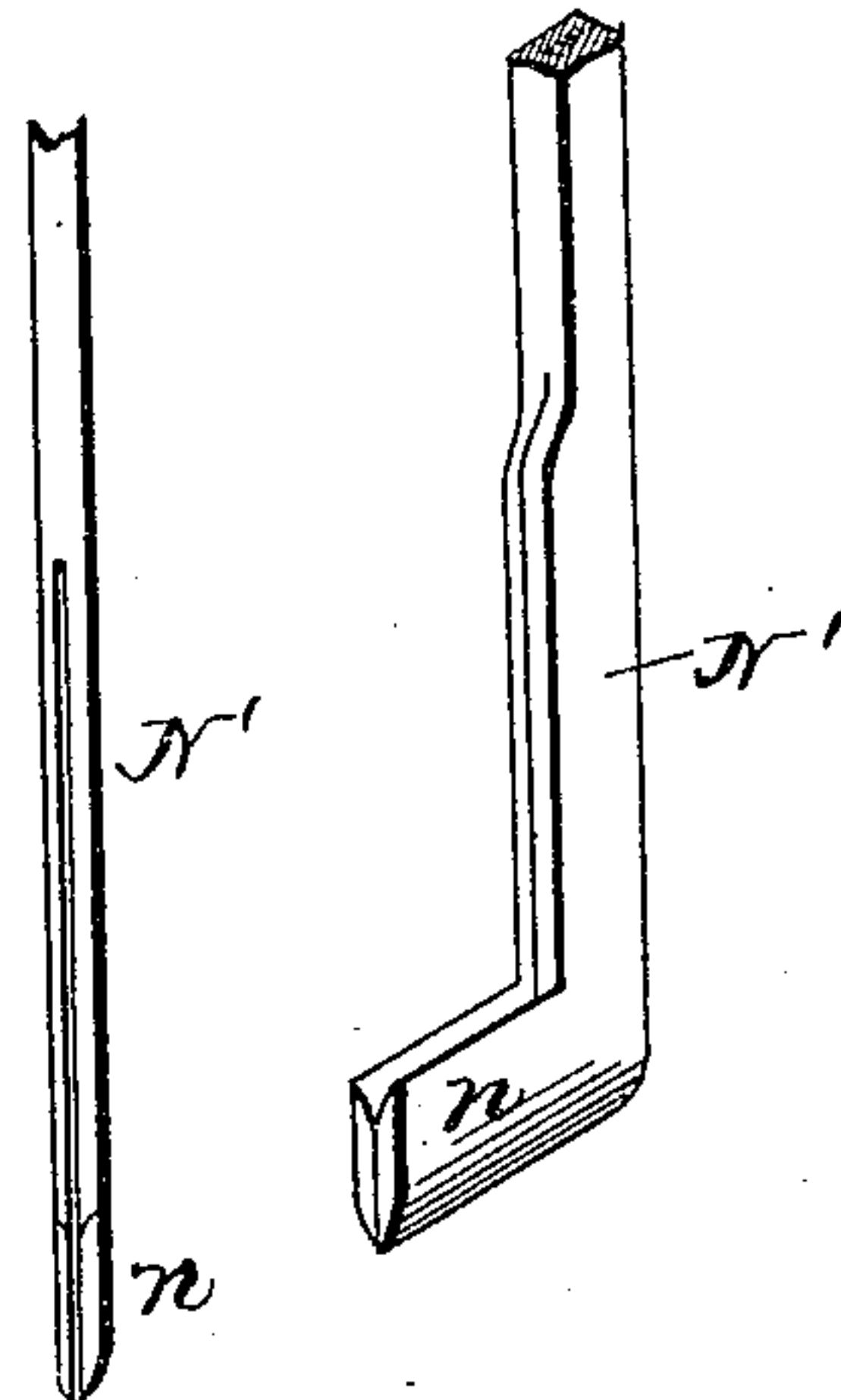


Fig. 7



Witnesses.
Frank L. Curand
W. B. Chaffie

Inventor,
Samuel V. Essick
by A. L. Smith & Co.,
attorneys.

UNITED STATES PATENT OFFICE.

SAMUEL V. ESSICK, OF ALLIANCE, ASSIGNOR OF ONE-HALF TO ISAAC
HARTER, OF CANTON, OHIO.

GRAIN-BINDER.

SPECIFICATION forming part of Letters Patent No. 238,747, dated March 8, 1881.

Application filed September 13, 1880. (Model.)

To all whom it may concern:

Be it known that I, SAMUEL V. ESSICK, of Alliance, county of Stark, State of Ohio, have invented certain new and useful Improvements in Grain-Binders, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, making part of this specification, in which—

Figure 1 is a perspective view of a harvesting-machine, or of so much thereof as is necessary to show my improvements. Fig. 2 is a plan or top view of the same. Fig. 3 represents a transverse vertical section, and Fig. 4 an end elevation, of the same. Fig. 5 shows the plunger or nippers in side elevation and in section; and Figs. 6 and 7 are detail views, showing the construction and arrangement of the wire-holders.

My invention relates to a novel construction and arrangement of means for compressing the gavel, holding the band, and presenting the same to the band-uniting devices, and of the uniting devices themselves, whereby, by a reciprocating movement of the latter and of the compressing devices, the former are made to grasp the end of the band or wire, draw the same underneath the bundle, and then to move back again over the bundle, thus carrying the band around the bundle, when they are made again to grasp the wire from the spool and cut the same, and, by a backward reciprocation and a rotary or twisting movement, to partially turn the bundle and to twist the end of the band, as hereinafter explained.

The several features or details of the improvement will be best understood from the following description with reference to the drawings, in which—

A represents the main frame of the machine; B, the cutter-frame, provided with a slatted grain-platform; C and D D', the endless apron or aprons or belts carrying the rake-heads, the teeth of which pass up between the slats of the grain-platform and of the elevator-incline C', for removing the grain and carrying it up over the main driving-wheel, said parts, together with other parts not hereinafter particularly described, being constructed and arranged in any usual or preferred way. The transverse main-frame timbers in front and in rear of the

main driving wheel or wheels, (not shown,) if combined with front-cut machine, or both in rear of rear-cut machine, project beyond said wheel on the stubble side, and have an upright binder-frame, E E', supported upon them, the portion E thereof serving, also, as the inner end of the elevator-frame B', the inclined slats or delivery-apron C² thereof resting on the upper horizontal bar, as shown.

To the front and rear posts of the portion E of the binder-frame, a little below midway of their height, are pivoted the inner ends of horizontal bars F, which at their outer ends have the grain table or receptacle G secured to them, the frame F and receptacle G being upheld in the desired position by means of springs f, connecting the bars with the frame-work, as shown. The receptacle G is made in concave or angular form in cross-section, (shown in Fig. 3,) and has its inner and lower walls and the lower part of its outer wall or ledge cut away midway of its length, to permit the movements of the wire carrying and tying devices, as hereinafter described. The outer end of the inclined slats or delivery-apron C² overhang this receptacle, and deposit the grain discharged by the elevator-rakes therein.

H H are transverse bars or arms, pivoted at their inner ends to the front and rear of the elevator-frame, near its upper end, or to some other convenient support, said bars being connected at their outer swinging ends by a longitudinal bar, H', said bars forming a vibrating frame, to which the compressor I is attached. The form of this compressor is shown in Figs. 1 and 3, and it is made by preference of two or more light rods of metal, bent into triangular form, with the ends united in and secured to the bar H', and with the lower side of the triangle bent into an arching form, approaching (more or less) a semicircle, as shown, adapting it, in connection with the concave grain-receptacle, to compress the grain into the form of a bundle for binding. The bars H H are connected by rods h with crank-wheels J J', mounted upon a longitudinal shaft, J², to which motion is imparted in any convenient way from the driving-wheel, and which in practice will be so arranged that it can be readily thrown into or out of gear therewith, as may

be necessary for regulating the size of the bundle.

K is a plunger or reciprocating and rotating rod, mounted in a sleeve box or bearing, L, secured between two uprights, E^2 E^2 , of the part E of the binder-frame, and connected at its inner end by a swivel joint or pin with a block or wrist, K' , which is pivoted, in turn, to the upper end of a vibrating rod or arm, M, secured at its lower end to a longitudinal rock-shaft, m , mounted in suitable bearings on the main frame. The plunger rod or shaft has a groove formed in it at k , made spiral in form at and near its outer end, and extending in a right line, thence longitudinally to the inner end of the rod, by means of which a direct reciprocation of said rod is obtained during a portion of its reciprocating movement, and a rotary in connection with such reciprocating movement during another portion of its throw. A pin secured in the bearing-block L and entering the groove k serves to impart the rotary movement when passing through the spiral portion of the groove, and to hold the rod against such movement while in the straight portion of the groove. The reciprocating movement is imparted to the rod K by means of a rod, m' , which connects the pivoted arm M with a crank-wheel, M' , on a longitudinal shaft, J^3 , mounted in suitable bearings on the frame E. The forward end of this shaft has a band or sprocket wheel, J^x , upon it, connected by a band or sprocket-chain with the crank-wheel J, which is also made in the form of a band or sprocket wheel, and serves to impart motion to wheel J^x , and thence, through the connections described, to the reciprocating plunger-rod K; or the said wheels J^x and J may be cog-wheels and be brought together. By thus connecting the shafts J^2 and J^3 , one of which actuates the bundle-compressor and the other the plunger-rod which carries the wire carrying and tying devices, hereinafter described, the movements of these parts will be timed, the one to correspond with those of the other, and as two reciprocations of the plunger-rod are required to one of the compressor in the operation hereinafter described, the wheel J^x on the shaft which operates the plunger is shown reduced in size to accommodate or effect that result.

The longitudinal frame-bar E^3 has a pendent wire-holder, N, secured to it, made in L shape, with its lower end slit longitudinally, and the horizontal arm n thereof made in or approximating a V shape in cross-section—that is to say, with the lower edges brought together and to an edge and diverging, or with a V-shaped opening at the upper edge, as shown in Figs. 6 and 7. This holder is rigidly secured to the stationary frame-bar E^3 , and constitutes the stationary band or wire holder, the band being grasped in the slit between the arms of the V-shaped foot and held by the elasticity of the spring in the slit in the vertical portion of said holder. The moving wire-holder N' is similar in construction and ar-

range of its parts, except that it stands in a reversed position, (shown in Fig. 6,) and has a stronger grasp or spring-arms than holder N, for enabling it to draw the wire through the latter. The holder N' is pivoted at its upper end to the bar H' of the vibrating compressor-frame, and has an angular extension, n' , formed on its upper end, a spring, n^2 , secured to the bar H' , and resting thereon, as shown in Figs. 4 and 6, serving to hold the holder in the required position, while allowing it to yield slightly for placing the wire in either the right or left hand nipper of the wire carrier and twister, hereinafter described. The wire O passes from a spool, O' , on the binder-frame down through an eye, O^2 , midway of bar E^3 , and directly over holder N, and thence to the holders, as hereinafter explained.

The wire carrier and twister is shown in detail views, Fig. 5, and is applied to the outer end of the plunger-rod K, said end being extended in the form of a flat tapering blade, k' , terminating at its end in an edge or point. To this flattened extension are pivoted two nippers, k^2 k^3 , one on each side, as shown, said nippers being pivoted to the central point or blade, k' , a little back of midway of their length, and springs p are interposed between said nippers, or between the blade and nippers, for holding the nippers open or away from the plunger-point when not forced up toward the same for grasping the wire. The heel-extensions of these nippers are slightly removed from the blade or plunger point, and have inclines or cam-shaped projections k^4 on their inner faces, near their ends, and upon these ends are placed sliding boxes or sleeves k^5 , provided with pins k^7 and shoulders or projections k^8 , either or both, by means of which said slides are reciprocated back and forth over the inclines and between the same and the plunger-point, for closing the nippers upon or releasing the wire, as hereinafter explained.

Q Q' are stops arranged at the inner side of the binder-frame for moving the slides inward and releasing the wire, and Q^2 a stop or stops at the outer end for closing the same for grasping the wire.

The operation is as follows: Supposing the wire to be passed from the spool down through, and its end to be held by, the stationary holder N, with the holders in the relative position shown in Figs. 4 and 6, or thereabout, and the compressor-frame is moving upward to permit the grain to fall upon the grain table or receptacle and under the compressor, as the moving holder N' rises, the lower edge of the stationary holder enters the V-shaped opening between the upper edges of the blades of the moving holder, and, wedging them apart, causes them to pass up outside of the stationary holder, after which they spring together and grasp the wire above said holder N. The grain to be bound is now supposed to be in position on the table to be compressed and bound, and the compressor begins its downward movement, when the action of the wire-

holders is reversed, and the moving holder passes down between the blades of the stationary holder N, still holding the end, but, by its stronger grasp, drawing the wire down through the latter, which thus becomes a tension device until the moving holder has passed just below the grain-receptacle, giving space between it and the stationary holder for the passage of the plunger or nippers between them. In this movement an incline at n^3 on the shank of the moving holder passes over a pin at s on the frame-bar E^3 , and moves the holder N' , with the wire, just a little to one side of the plunger-point, for causing it to assume the proper position to be grasped by the left-hand nipper, which seizes it, withdraws it from the holder N' , and, by a backward movement of the plunger, draws the wire inward underneath the bundle to be bound. The compressor I continues its downward movement, compressing the bundle into the desired form, and carrying it, together with the grain-receptacle, downward until it has carried the bundle below the plane of the plunger, when the latter moves forward over it, and the right-hand nipper is this time made to seize the wire just below the stationary holder N, and a small blade, t , secured to the plunger-point, as the right-hand nipper closes under it, severs the wire, leaving the end in the holder N ready for a repetition of the operation described. The plunger, with the nippers grasping the two ends of the band, as described, is now again withdrawn, turning the bundle over on its side, and through the action of the spiral portion of groove k a rotary movement is at the same time imparted to the plunger and nippers for twisting the ends of the wires together, forming the knot, when at the inner end of its throw the slides are operated upon by the stops Q Q' , and the wires are released, when the bundle, which has been drawn by the operation described over the inner edge of the platform, drops on the ground.

U is a lever pivoted in the frame E E' , and provided on its outer end with a blade or scraper conforming in shape to the concavity of the platform, and working therein against the butts of the grain, for leveling up the same or moving the grain endwise into proper relation to the binding devices.

Where cord is used as the band material, devices for forming the knot therein may be applied to the reciprocating rod or plunger in lieu of the twisting devices herein described for uniting the ends of the band.

Having now described my invention, I claim—

1. The reciprocating rod or plunger carry-

ing the band and the band-uniting devices, and having the double endwise-reciprocating movement and a rotary movement on its longitudinal axis, substantially as described, adapting said devices to seize the band, draw it under the bundle, and to pass back over the bundle, and again seize the band for uniting the ends of the same.

2. The horizontally reciprocating and rotating rod or plunger carrying the band and band-uniting devices, in combination with the vertically-vibrating grain-table, permitting the movement of the bundle across the plane of reciprocation of said band carrying and uniting devices during the process of binding the same, substantially as and for the purpose described.

3. The combination of the reciprocating band carrying and tying devices and the vertically-vibrating compressor and grain-receptacle, moving together to carry the bundle across the plane of reciprocation of said devices, substantially as described.

4. The stationary and moving band-holders, in combination with the wire carrying and twisting devices, operating in the described relation to said holder for taking the band therefrom, passing it around the bundle, and uniting the ends thereof.

5. The moving band-holder pivoted to the vibrating compressor frame and moving across the plane of movement of the band carrying and uniting devices, in combination with means for vibrating said holder on its pivot, for the purpose and substantially as described.

6. The reciprocating rod or plunger having the fixed central jaw, and the two pivoted jaws or nippers operating against said fixed jaw, in combination with the slides and springs for actuating said jaws, substantially as described.

7. The reciprocating and rotating rod or plunger having the fixed central jaw, and the two pivoted jaws operating against said fixed jaw, in combination with the slides and the stops on the frame for actuating said jaws, substantially as described.

8. The combination of the reciprocating band carrying and twisting devices, the vibrating grain table or receptacle, and compressor moving the bundle across the plane of reciprocation of said devices, and the fixed and moving band-holders, all arranged and operating substantially as and for the purpose described.

SAMUEL V. ESSICK.

Witnesses:

DAVID FORDING,

E. W. GRAY.