

(Model.)

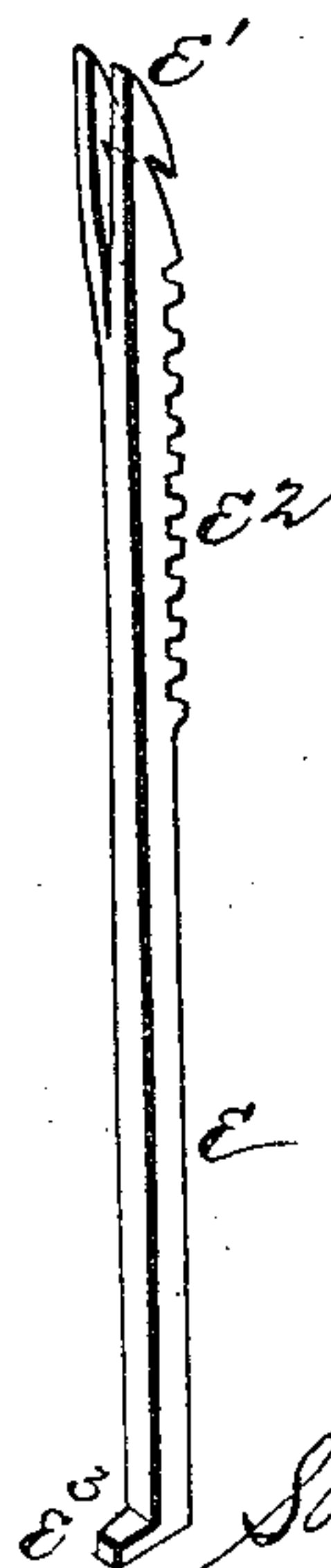
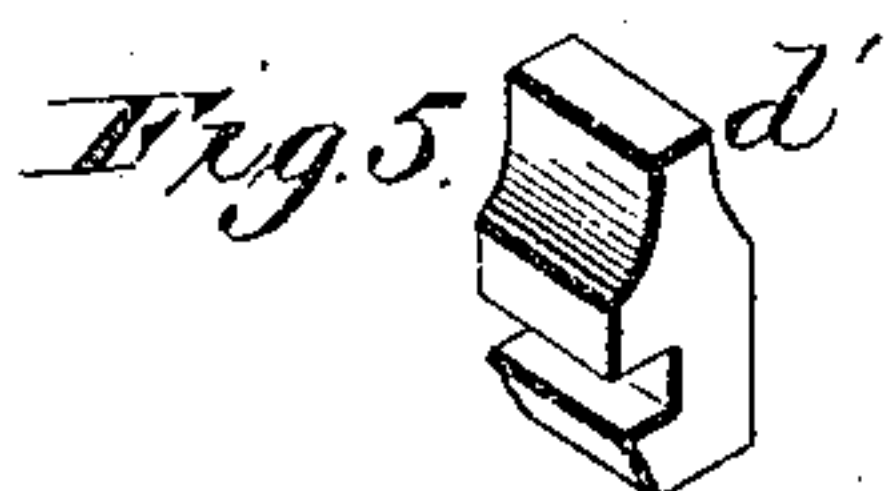
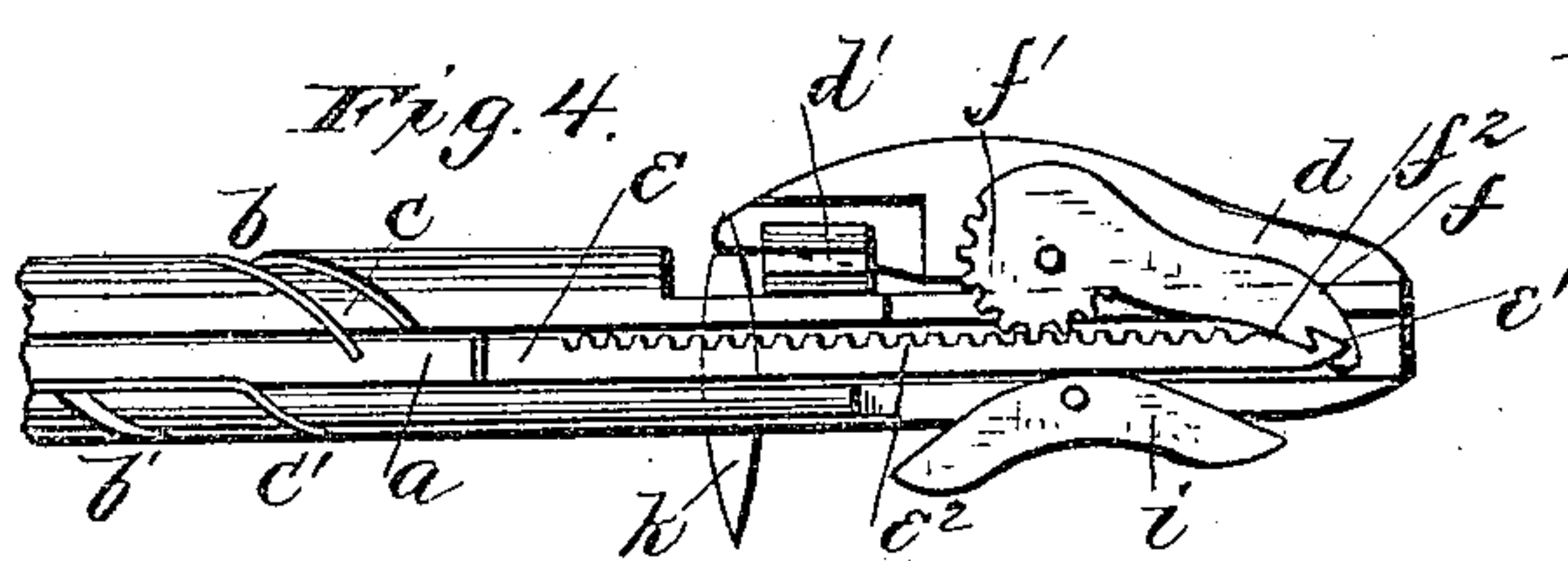
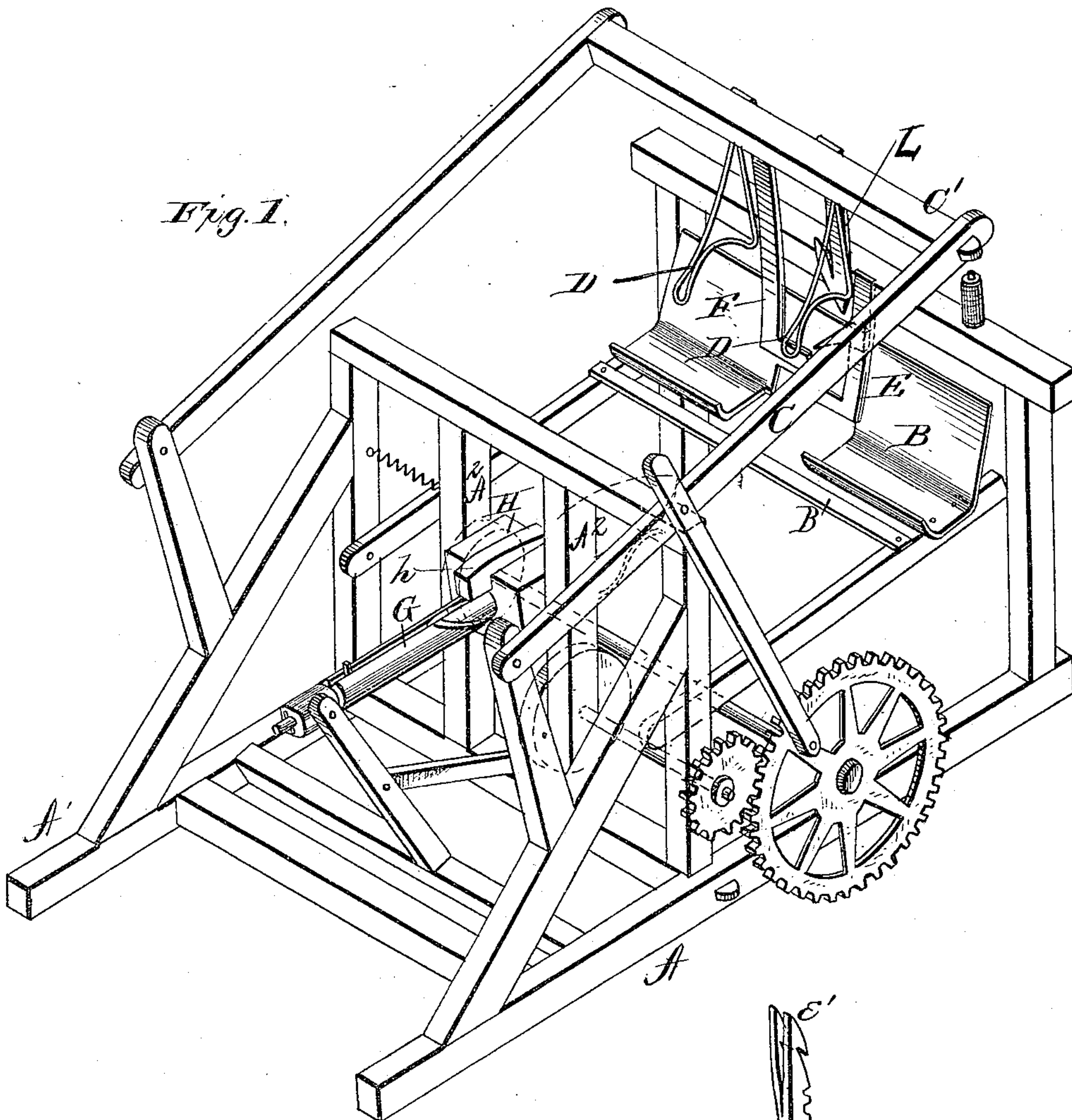
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S. V. ESSICK.

Automatic Grain Binder.

No. 238,371.

Patented March 1, 1881.



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(Model.)

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Fig. 2.

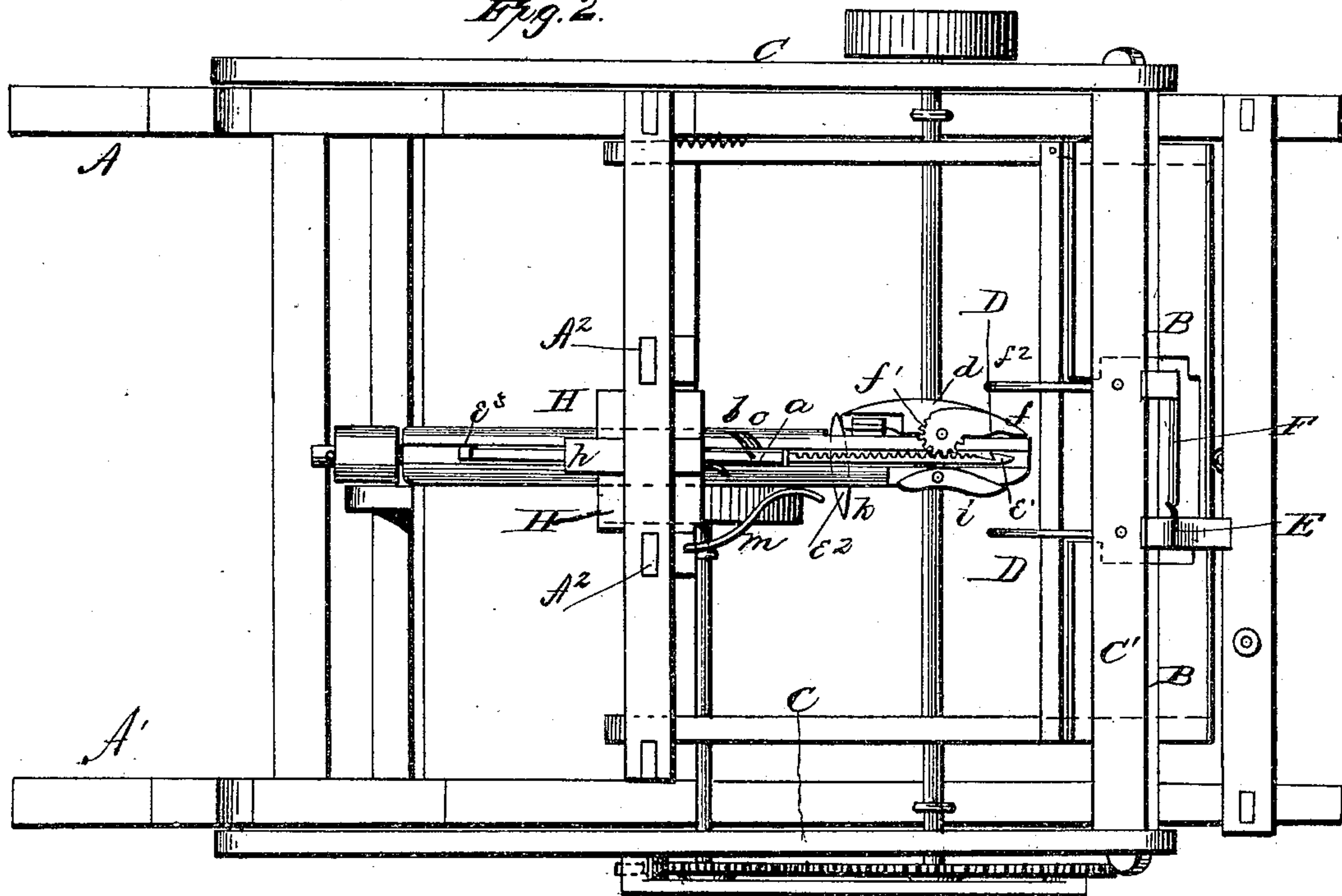
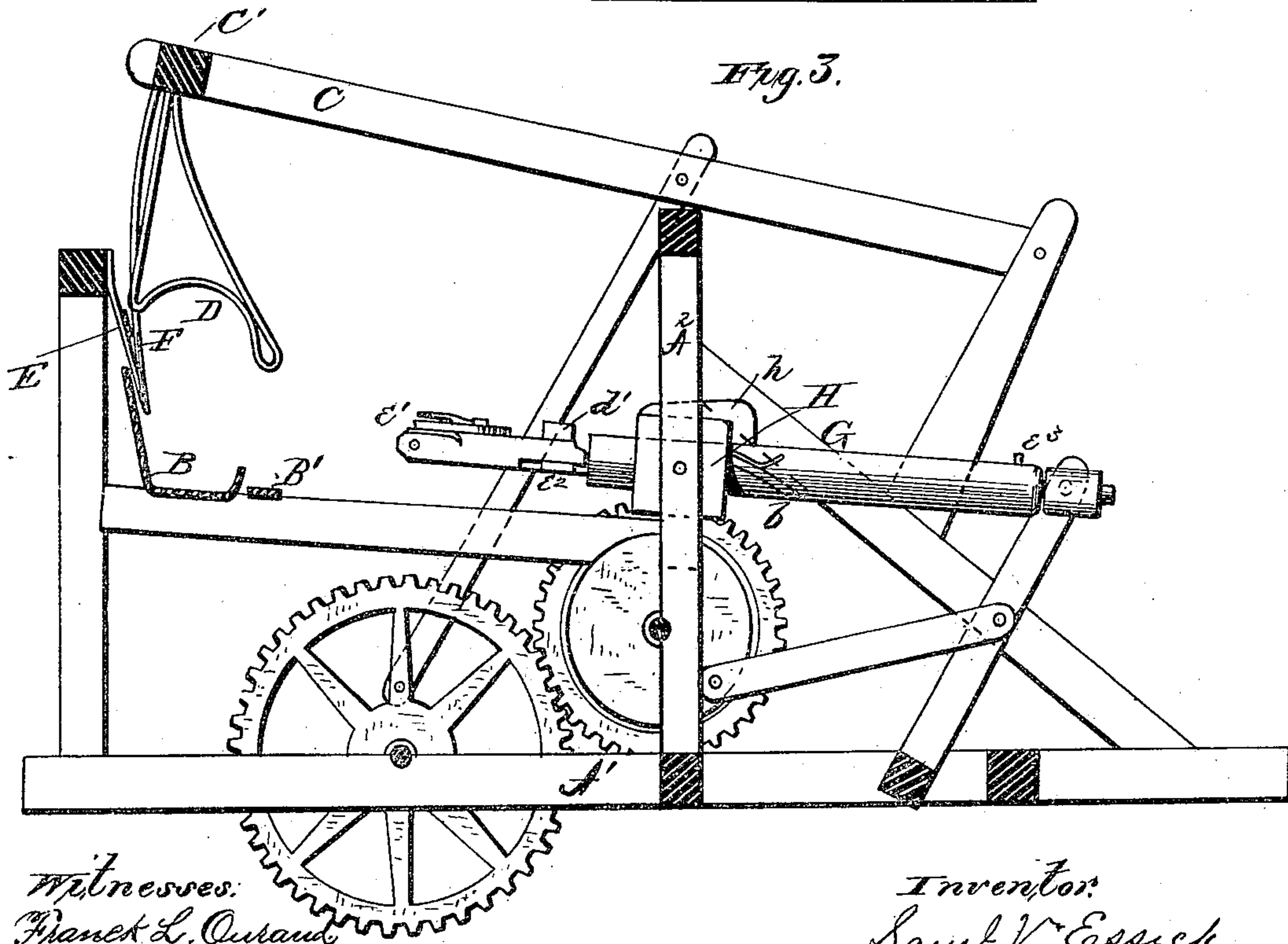


Fig. 3.



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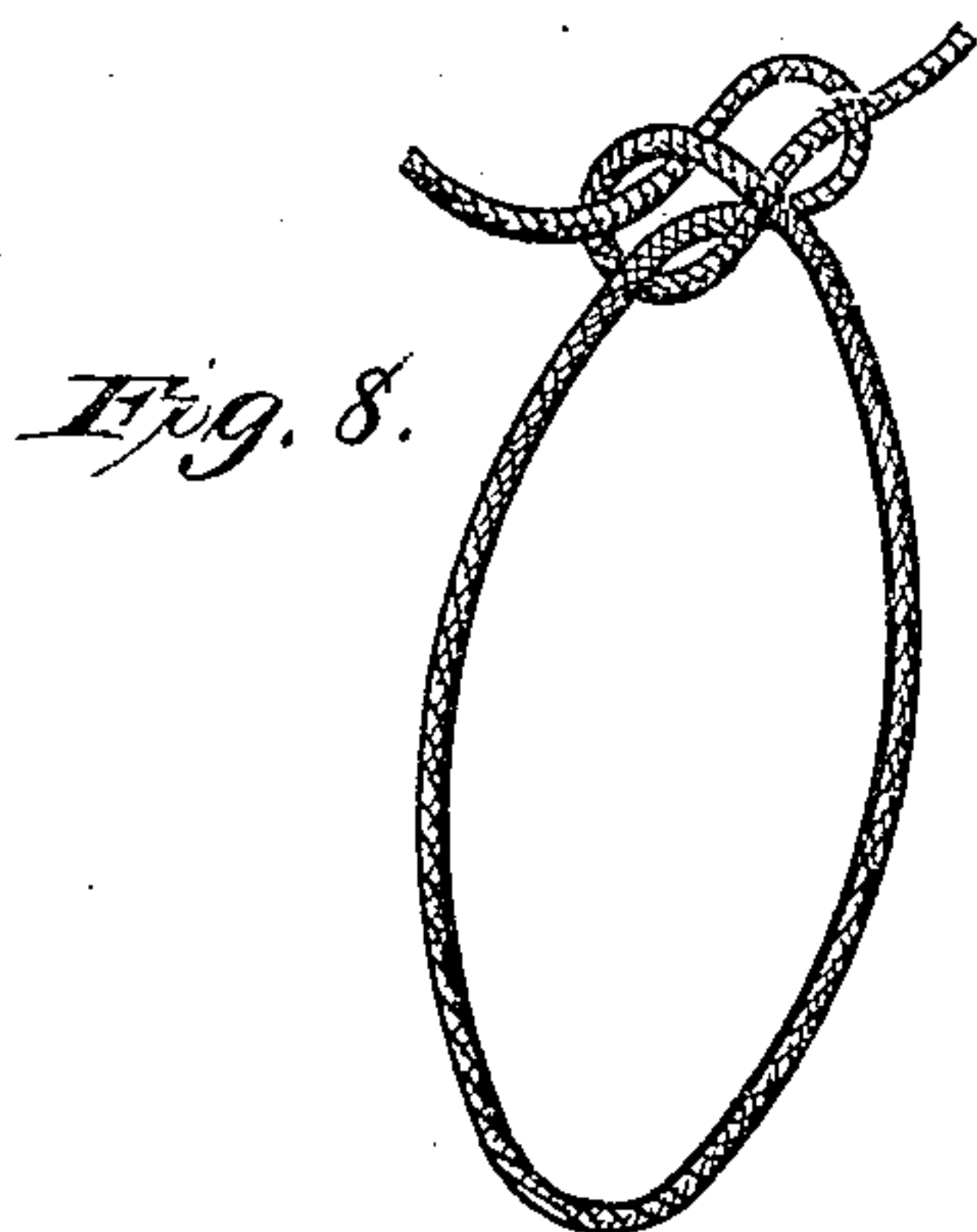
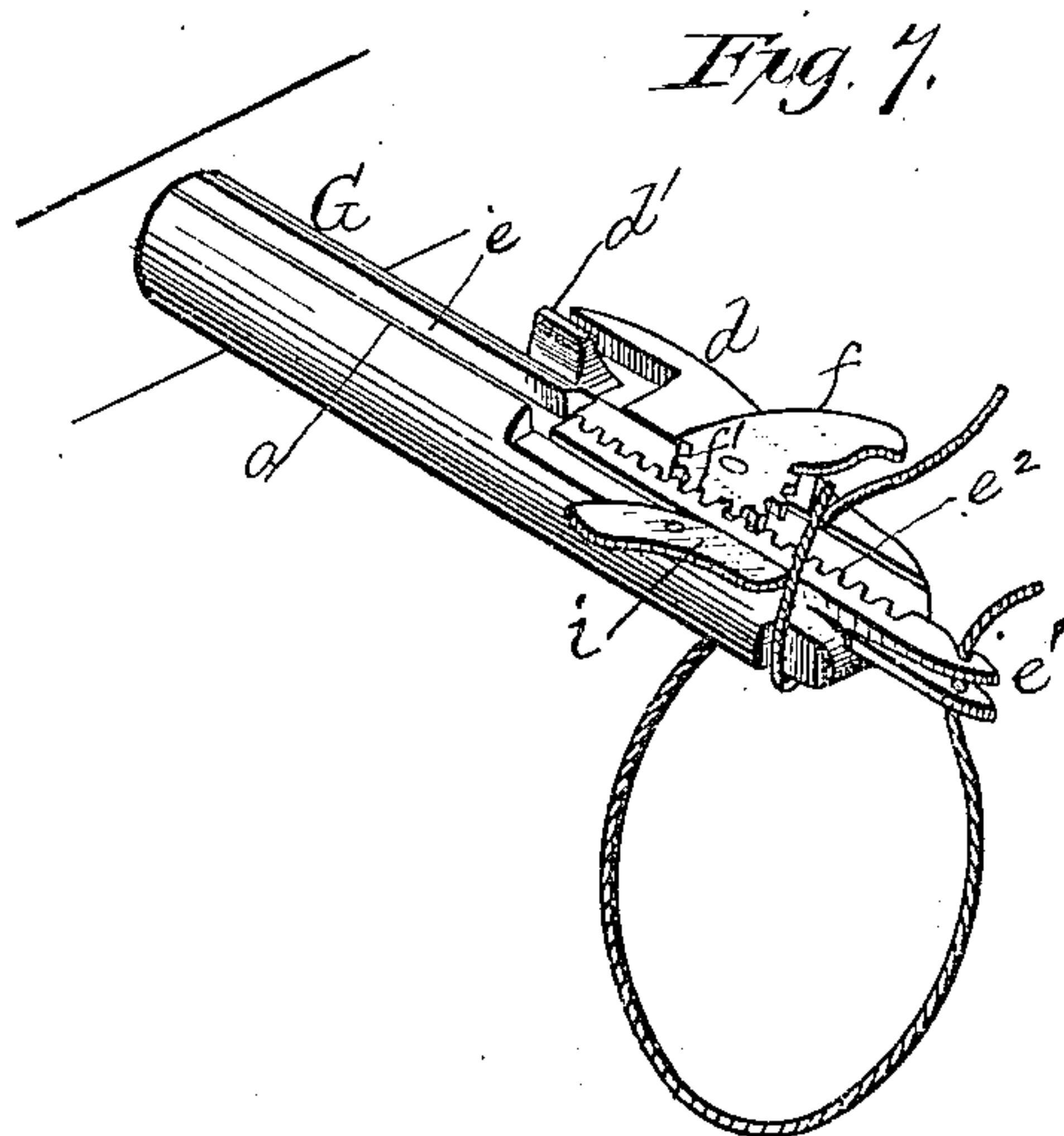
(Model.)

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S. V. ESSICK.
Automatic Grain Binder.

No. 238,371.

Patented March 1, 1881.



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UNITED STATES PATENT OFFICE.

SAMUEL V. ESSICK, OF ALLIANCE, ASSIGNOR OF ONE-HALF TO ISAAC
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AUTOMATIC GRAIN-BINDER.

SPECIFICATION forming part of Letters Patent No. 238,371, dated March 1, 1881.

Application filed October 9, 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 Automatic 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—

10 Figure 1 is a perspective view of so much of a harvesting-machine as is necessary to show my improvements. Fig. 2 is a plan or top view, and Fig. 3 a transverse vertical section, of the same. Figs. 4, 5, and 6 are detail
15 views of the tying devices. Fig. 7 is a perspective view of the end of the band carrying and tying arm in the position it assumes after it has seized the end of the band, drawn it under the bundle, and has it advanced over the
20 same for again seizing the band; and Fig. 8 is a perspective view of the band and of the knot formed therein previous to its being drawn tight.

My invention relates to an improvement
25 upon the grain-binder described in my application filed September 13, 1880, for adapting said machine to be used in connection with a cord band in lieu of the wire band therein described; and it consists in a novel means
30 for grasping the band and tying the knot therein, as hereinafter described.

The construction or organization of the machine as a whole, and the means for compressing the gavel and depressing the grain-receptacle and for holding the band material and presenting the same to the tying devices, are
35 similar to those described in my former application, referred to, and these features are therefore not described in detail herein except so
40 far as is necessary to an understanding of my present improvement.

A A' represent the elevator and binder-frame; B, the grain-receptacle; C, the compressor-frame; D, the compressor; E, the stationary and F the moving, band-holder, arranged and operating substantially as described in my former application. G is the reciprocating rod or plunger carrying the knotting or band-tying devices moving in a
50 perforated bearing or guide-block H, pivoted

between two uprights; A² A², of the main frame, to accommodate the slight vibratory movement of the rod.

The rod or plunger has two longitudinal grooves formed in it—one shown at *a*, the other 55 being upon the opposite side—and these are connected by two spiral grooves, *bb'*, beginning one near the forward end of each longitudinal groove and running thence spirally back until it terminates in the opposite longitudinal 60 groove, and at the ends of these spiral grooves are arranged springs *c c'*, forming gates, through which a pin provided with a friction-roller, arranged within the bearing-block H, passes as the rod G is reciprocated. The 65 spring or gate *c* at the forward end of each spiral groove is made to form an extension of the rear wall of said groove across one of the longitudinal grooves *a*, and the spring or gate *c'* at the rear end of each spiral groove forms 70 a gate across said end, permitting the roller referred to to pass out of the spiral groove into the longitudinal groove, but closing the rear end of the spiral groove against the entrance of the roller in the backward move- 75 ment of the rod. By this arrangement of the grooves and gates it will be seen that a half-revolution is imparted to the rod or plunger at each forward throw, while its backward throw will be a direct reciprocation in a 80 right line. The forward end of the rod or plunger is cut away on one side, and has a nipper, *d*, pivoted to it, which is operated by means of a slide, *d'*, for grasping the first end of the band material and withdrawing it from 85 the moving holder F, in a manner similar to that described in my former application. Within one of the longitudinal grooves *a*, which is made deeper to accommodate it, is arranged a slide-rod, *e*, the form or construction of which is shown in detail view, Fig. 6, in perspective, said rod or slide being provided at its point or forward end with a double or bifurcated hook, *e'*, and in rear thereof, upon one side, it has a toothed rack, *e²*, formed upon 95 it, and at its rear end a spur or tooth, *e³*, which projects from the groove *a* and serves, by striking against the guide-block H or a spur or stop, *h*, secured thereto or to the frame, to act upon the slide *e* at or near the end of the 100

forward throw of the plunger-rod G. The plunger-rod, near its point or forward end, has a hook-arm, *f*, pivoted to it, which at its pivoted end is made in the form of a toothed segment, *f'*, which engages with and is actuated by the rack *e*² on the slide *e*. The outer swinging end of arm *f* is made to curve inward, giving it somewhat of a hook form at *f*², for adapting it to carry the end of the cord between the arms of the bifurcated hook *e* and through the loop in the formation of the knot, as hereinafter explained.

To the plunger near its point, and on the opposite side of slide *e* to the hook-arm *f*, is secured a holder, *i*, made, by preference, in the form of a short lever, pivoted near midway of its length and held in place for retaining the end of the band by means of a spring, or it may itself be made in the form of a spring for that purpose. In rear of slide *d'* is a transverse lever, *k*, pivoted to the plunger-rod, and which serves, by coming in contact with a stop on the frame, as hereinafter described, to move said slide for releasing the end of the band held by the nipper *d*.

The vibrating compressor-frame has a pendent hook, L, attached to its outer bar, O', and moving with it, for picking up the band on its upward movement and carrying it to the cutter, and suitable stops (hereinafter referred to) are attached to the frame and its attachments for actuating the tying devices, as will now be described. Supposing the bundle to be in place in the receptacle B, and the compressor to have moved downward until the moving band-holder F has passed through the stationary holder, carrying the end of the band material with it, as described in my former application, referred to. The plunger-rod now moves forward and is given a half-revolution as it moves, bringing the nipper *d* to the right-hand side of the plunger-rod, looking in the direction of its movement, and the nipper is made to grasp the end of the band, the slide *d'* striking a bar, B', on the grain-receptacle frame or other suitable stop, and closing the nipper just as the plunger-rod completes its outward throw or movement. The rod is now retracted in a right line or direct reciprocation, carrying the end of the band released from the moving holder F with it until it reaches the extreme inner end of its throw, drawing the band underneath the gavel, which, during such movement of the plunger is depressed, together with the grain receptacle, by the movement of the compressor D until it is below the plane of the plunger-rod G. The rod G now moves forward again, this time over the bundle, and has a half-revolution imparted to it, which, owing to the position in which the band is held by the bundle, wraps the band around the point of the plunger opposite the nipper, bringing it in front of the hook-arm *f*, and the hook *e'*, thrown out in advance of the point of the plunger by any suitable means for that purpose, passes and seizes the portion of

the band passing from the stationary holder E around the bundle, when the spur *e*³, coming in contact with the guide or bearing block H or *h*, or other suitable stop, as explained, the slide *e* is retracted relatively to the outwardly-moving plunger-rod, and the portion of the band seized by the hook *e'* just before the plunger-rod is again moved back is drawn inward, giving it somewhat of a loop-form relatively to the stationary holder and bundle. At the same instant the hook-arm *f* is vibrated by the movement of the slide *e*, and the projecting end of the band—that which was at first seized by the nipper *d*—is carried by it over the body of the band wrapped on the point of the plunger and through the loop formed by the hook *e'*, and is tucked under the outer end of the spring arm or lever *i* and between it and the point of the plunger. At about the same instant the end of the cord is seized by the arm *i*, and just as the plunger is completing its forward movement the lever *k* strikes a pendent arm or stop on the compressor-frame or other suitable support, and is made to move the slide *d'* outward for releasing the grasp of the nipper *d* on the end of the band, which is now held by the spring or lever *i*. The opposite end or part, passing through the stationary holder E to the bundle, is now caught by the pendent V-shaped hook L as the latter moves upward, drawing said portion up, and as the end held by the arm *i* is drawn out all slack in the band is taken up and the knot is drawn tight. In other words, in the formation of the band and knot the cord is first caught by the nippers on the right-hand side of the plunger, which draws it backward in its first backward movement. The depressor then forces the bundle downward below the plane in which the plunger moves, and the latter, again moving forward, has a half-revolution imparted to it, which, in connection with the position of the bundle relative to the plunger, causes the cord to wrap itself on the point of the plunger, as shown in Fig. 7. At the same time the bifurcated hook *e* is thrust forward and caused to grasp the portion of the cord pendent from the stationary holder, and, passing thence down around the bundle, draws the same, in the form of a loop, through the loop, wrapping the point of the plunger, when the hook-arm *f*, which is actuated by the backward movement of the rack-bar carrying the bifurcated hook, carries the end of the band over the portion of cord wrapping the point of the plunger and tucks it through the loop held by the bifurcated hook *e*, and under the spring jaw or holder *i*, which holds said end until the loop wrapping the point of the plunger slips off, and the knot, in form shown in Fig. 8, is drawn tight.

On the stationary holder E or at any suitable point on the frame is arranged a shear-blade, which, as the pendent hook L moves up, acts in conjunction with said hook to cut the band material, leaving the end thereof in the sta-

tionary holder and releasing the bundle therefrom. The first end of the band surrounding the bundle is still held by the spring-arm *i*, which as the plunger moves outward to complete its backward throw draws the bundle with it until it is drawn over the inner side of the platform or grain-receptacle, when the spring-arm *i* comes in contact with an incline, *m*, or other suitable device for vibrating said arm *i*, and releases the bundle, which falls to the ground.

The means for imparting a reciprocating movement to the plunger-rod are similar to those described in my former application, except that gear-wheels are substituted for the band or sprocket wheels there shown.

It will be obvious that the stops referred to may be differently arranged and supported from those hereinabove described, and still made effective for actuating the tying devices without departing from my invention.

I do not claim, broadly, the rod or plunger having the double reciprocation, the vibrating platform and compressor for carrying the bundle past the reciprocating plunger, nor the arrangement of the stationary and moving band-holders in connection therewith, these features being made the subject-matter of claim in another application hereinbefore referred to; but

Having now described my invention, I claim—

1. The reciprocating rod or plunger which carries the tying devices, provided with the longitudinal grooves and the cam or spiral grooves connecting said longitudinal grooves, substantially as and for the purpose described.

2. The rod or plunger which carries the tying devices, provided with the parallel longitudinal grooves, and the connecting spiral or cam grooves having gates for governing the path of the friction-roller traveling in said grooves, substantially as described.

3. The combination, with the reciprocating

rod or plunger, of the sliding rack provided with the bifurcated hook, substantially as described.

4. The reciprocating rod or plunger provided with the sliding bifurcated hook, in combination with the pivoted hook-arm operating in connection therewith, substantially as described.

5. The combination, with the reciprocating rod or plunger, of the sliding hook, the pivoted hook-arm, and the spring-arm or lever for taking the end of the band from the nipper after the knot is formed.

6. The plunger-rod provided with the devices for forming the knot in the band, in combination with the pendent hook or its equivalent on the vibrating compressor-frame, for assisting in tightening the knot and carrying the band to the cutter, substantially as described.

7. The knot-tying devices attached to the reciprocating rod or plunger, in combination with mechanism for imparting a half-revolution to said plunger at each reciprocation, substantially as and for the purpose described.

8. The reciprocating rod or plunger, in combination with mechanism for imparting to it two reciprocating movements and two intermittent half-revolutions in the process of placing the band around the bundle and tying the knot therein, substantially as described.

9. The combination of the nipper *d*, the hook-arm *f*, and the sliding hook *e'* with the plunger-rod, arranged and operating substantially as described.

10. The combination of the band-holders *E* and *F*, the rod or plunger *G*, provided with the nipper *d*, hook *e'*, and hook-arm *f*, and the pendent vibrating hook *L*, arranged and operating substantially as described,

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