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C. CLAPP.

GRAIN HARVESTER.

No. 370,608. Patented Sept. 27, 1887.

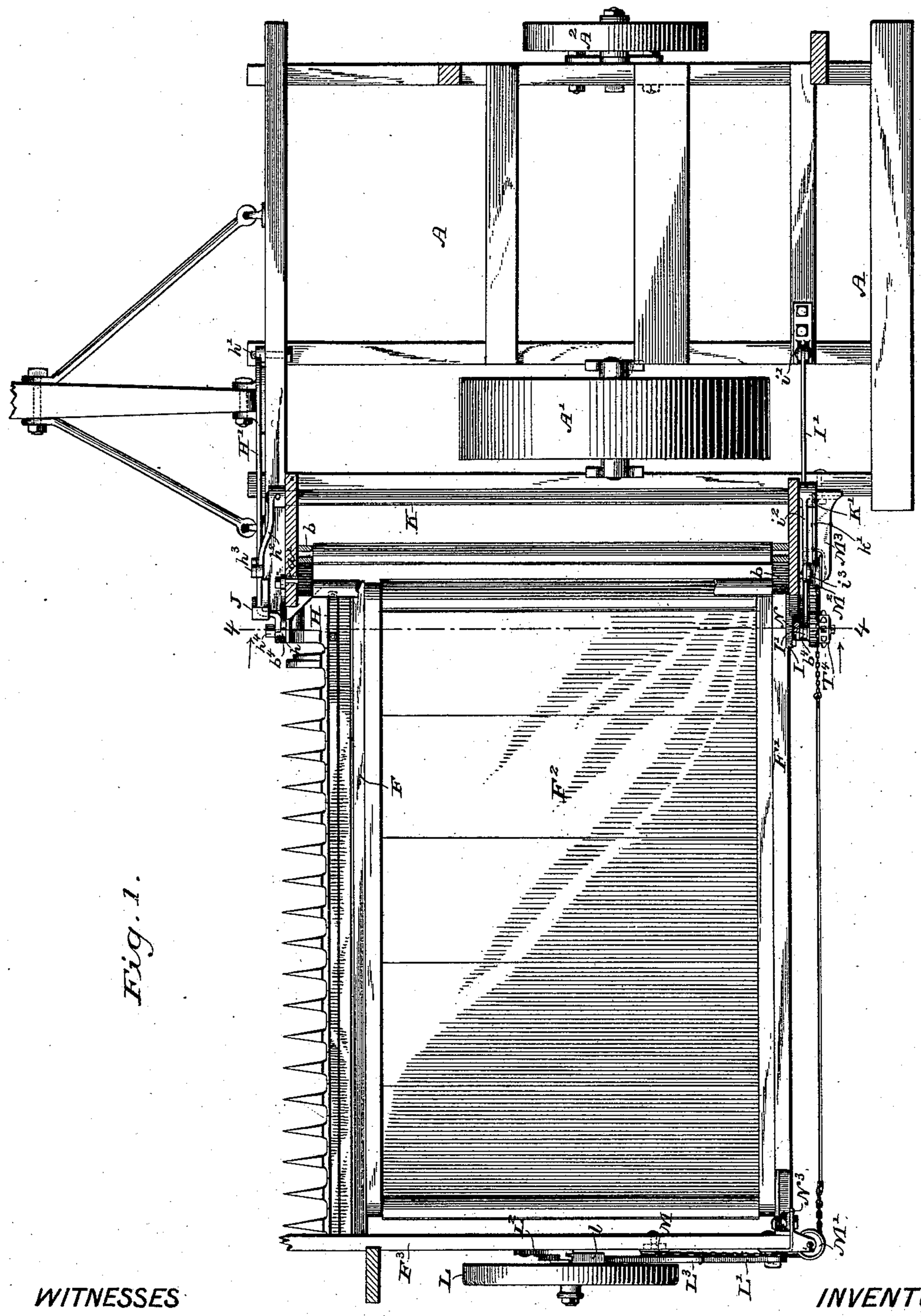

Fig. 1.

WITNESSES

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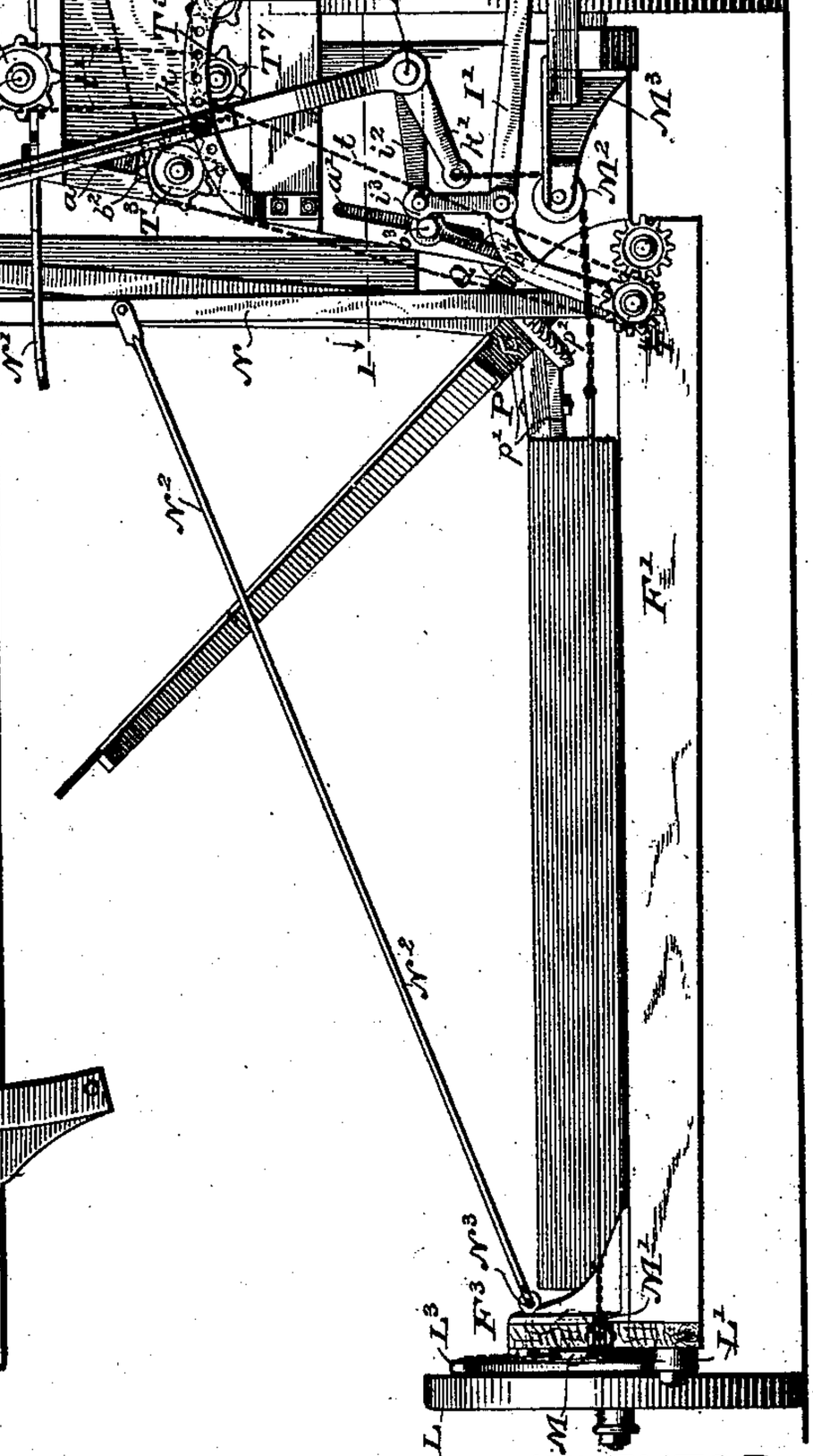

Fig. 2.

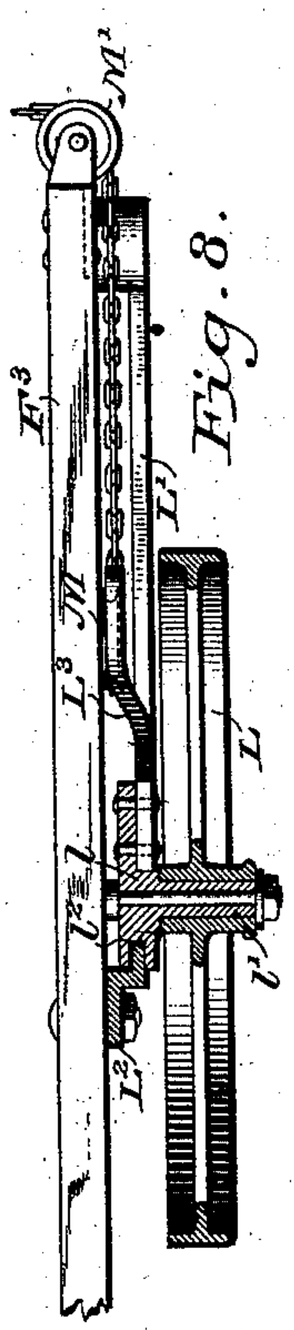

Fig. 8.

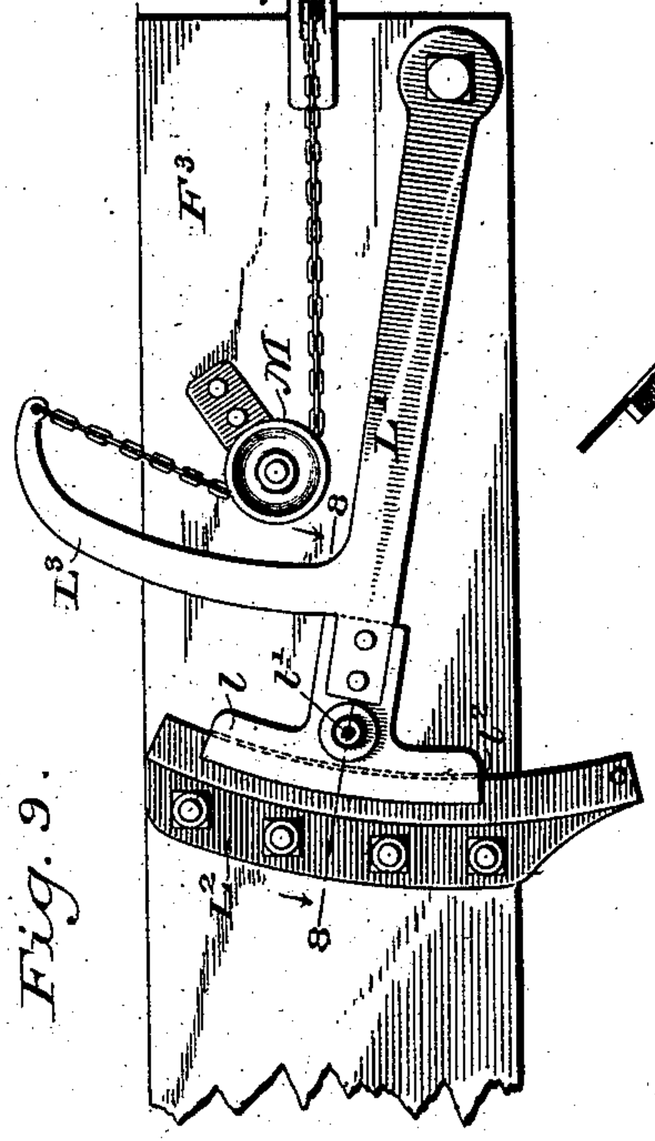

Fig. 9.

WITNESSES

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GRAIN HARVESTER.

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Fig. 6.

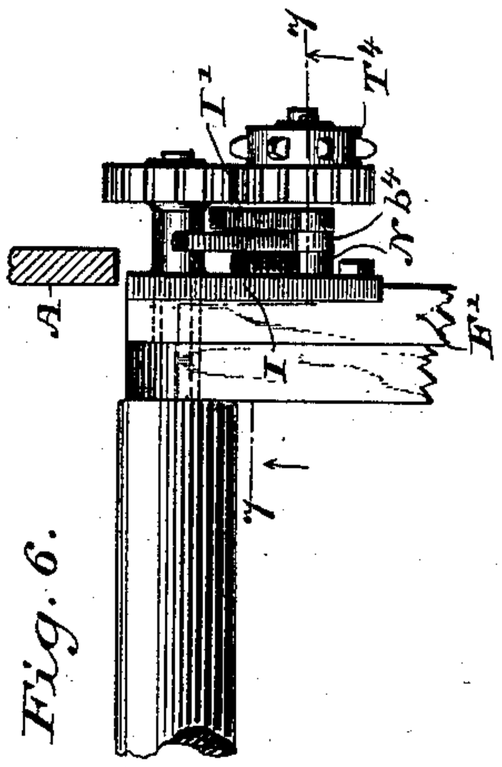

Fig. 7.

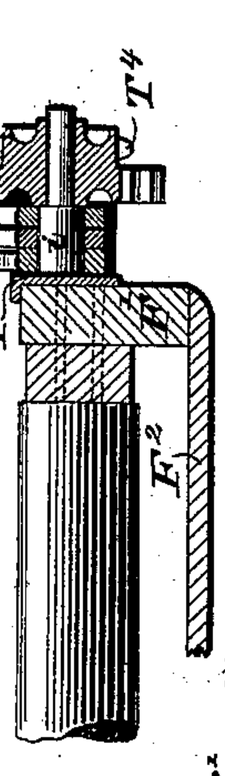

Fig. 3.

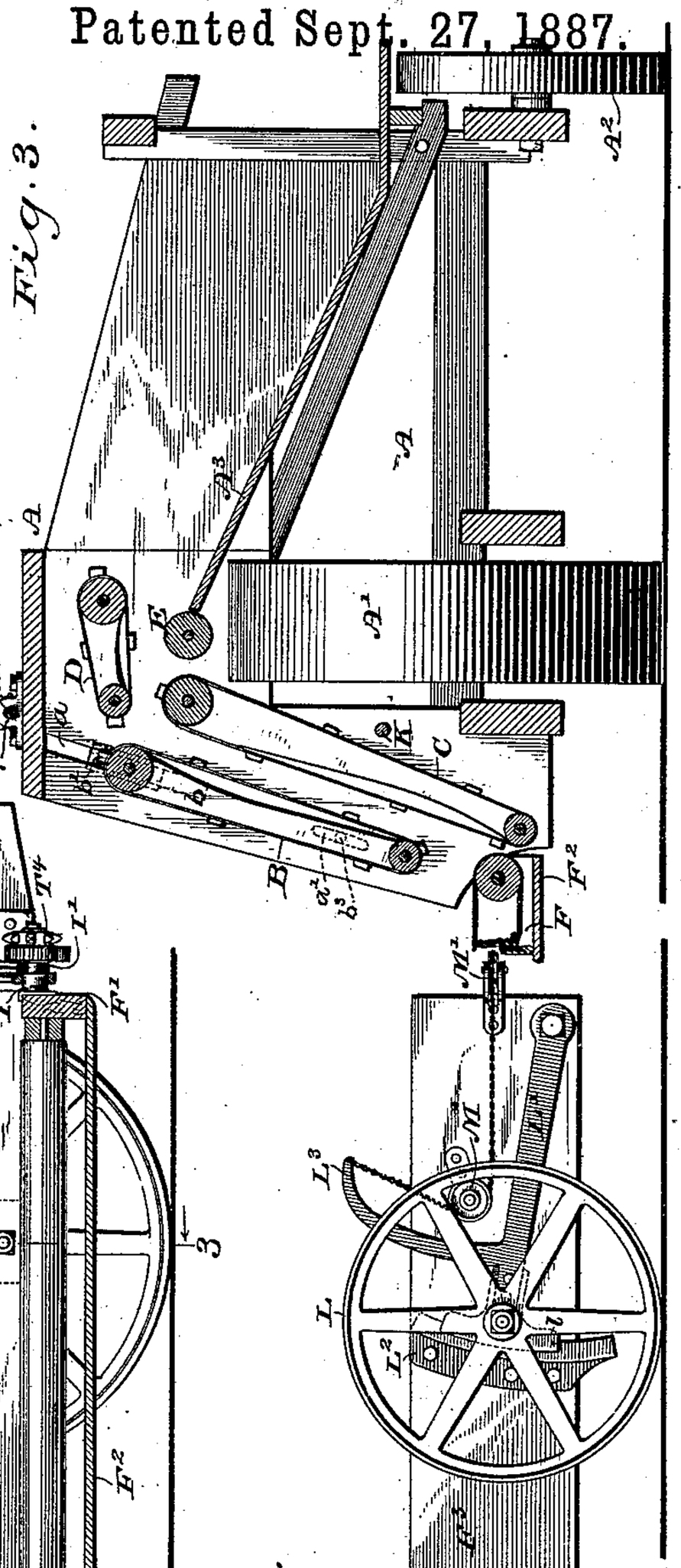

Fig. 4.

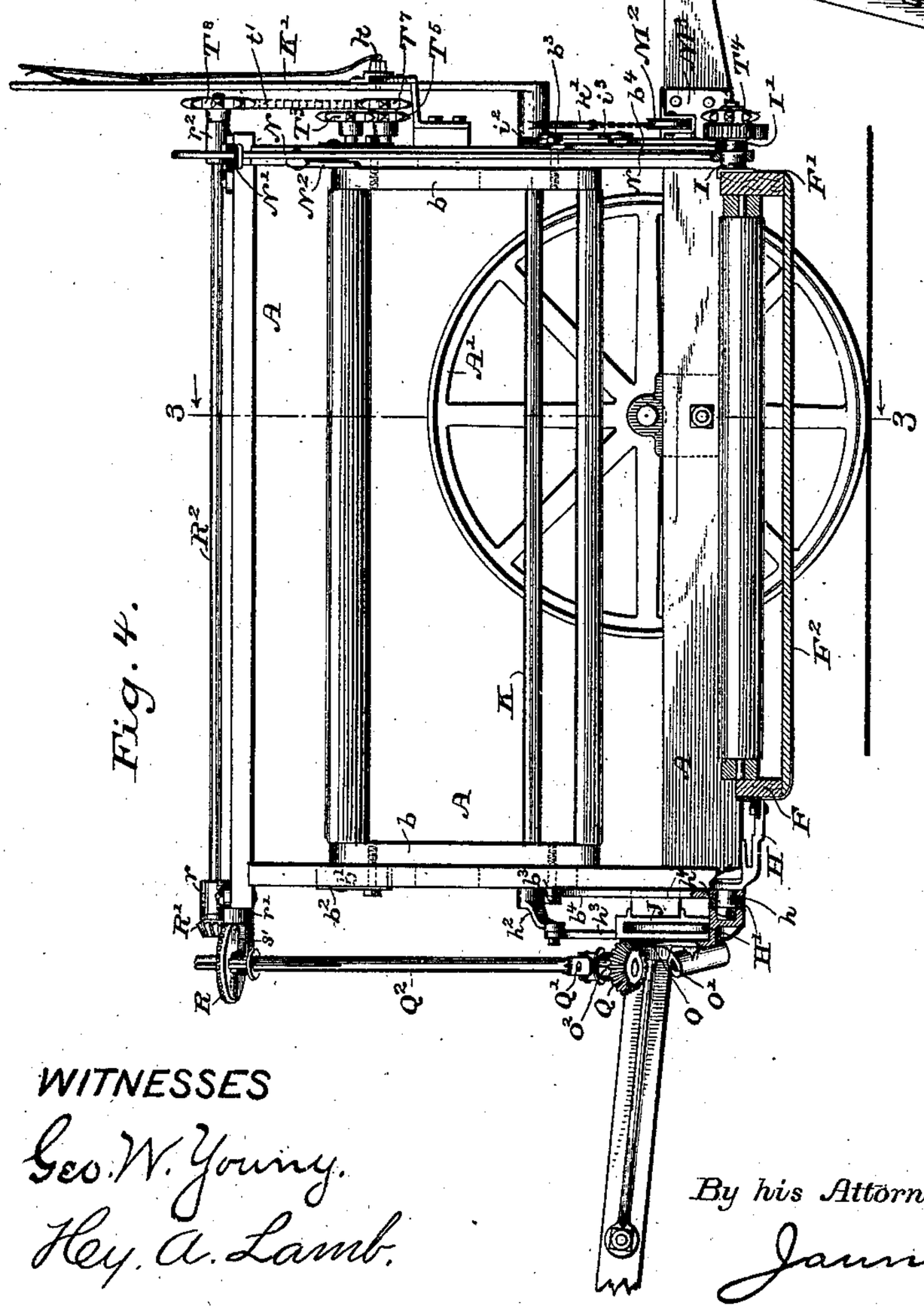

Fig. 5.

WITNESSES

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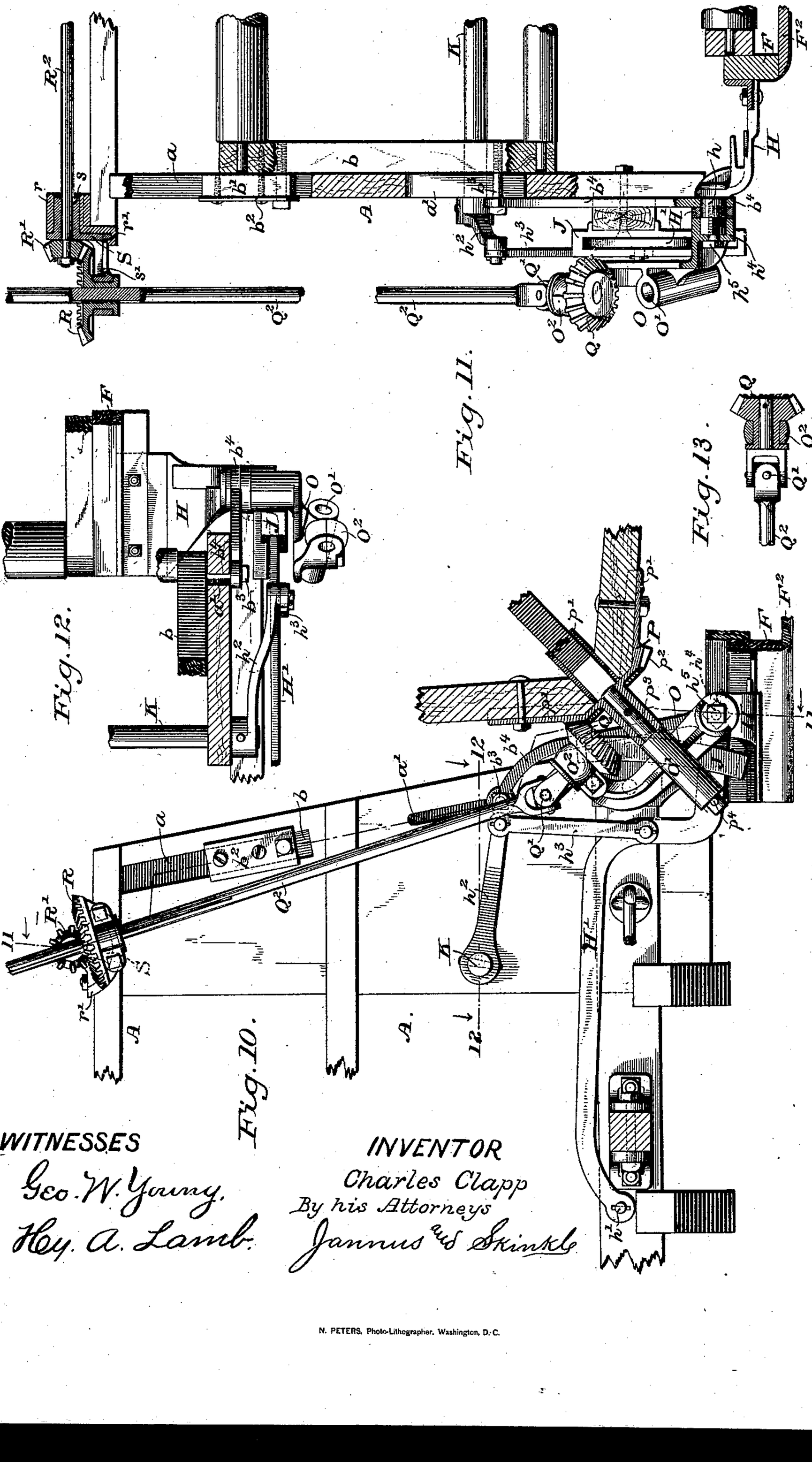

Fig. 11.

Fig. 12.

Fig. 13.

Fig. 10.

WITNESSES

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GRAIN HARVESTER.

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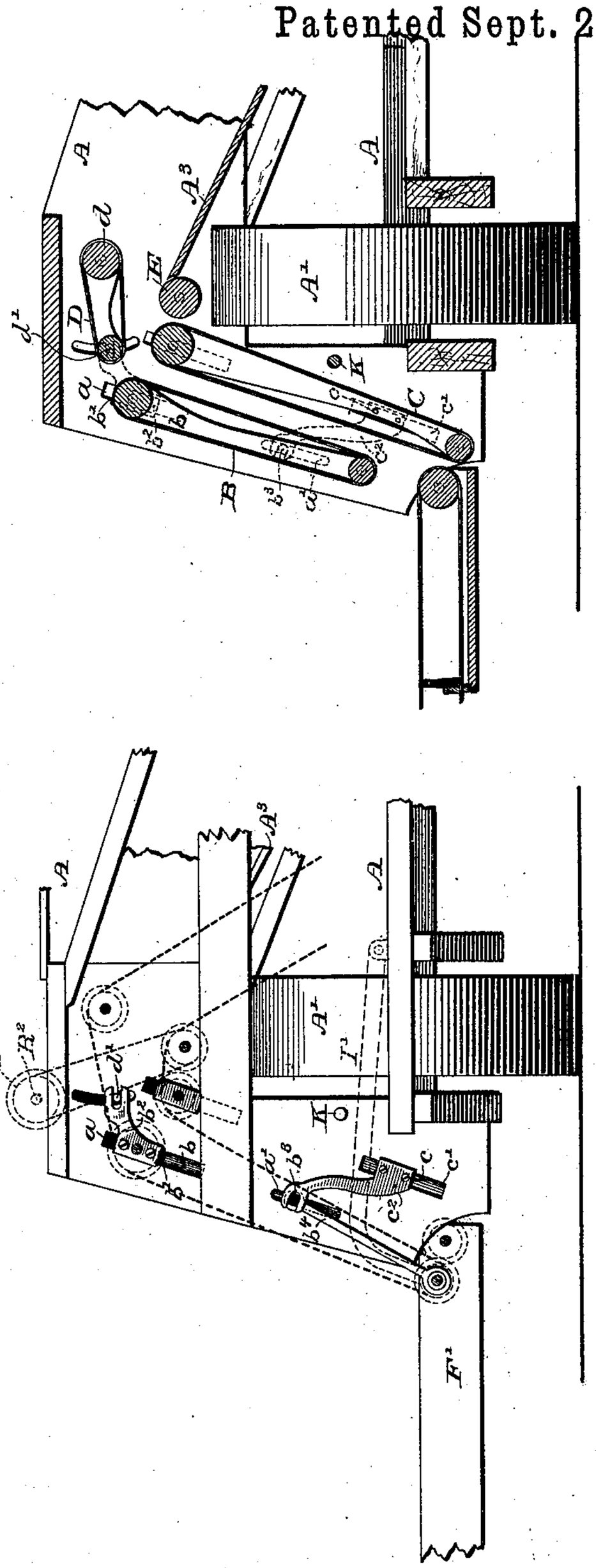

Fig. 15.

Fig. 14.

Witnesses
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Inventor
Charles Clapp.

By his Attorneys
Jaynes and Brinkle

UNITED STATES PATENT OFFICE.

CHARLES CLAPP, OF TRUMANSBURG, NEW YORK, ASSIGNOR TO GREGG & CO., OF SAME PLACE.

GRAIN-HARVESTER.

SPECIFICATION forming part of Letters Patent No. 370,608, dated September 27, 1887.

Application filed November 19, 1885. Serial No. 183,315. (No model.)

To all whom it may concern:

Be it known that I, CHARLES CLAPP, a citizen of the United States, residing at Trumansburg, in the county of Tompkins and State of New York, have invented certain new and useful Improvements in Grain-Harvesters, of which the following is a specification, reference being had to the accompanying drawings.

My invention has for its object the improvement of grain-harvesters—such, for example, as that patented by W. P. Hale, August 25, 1885, No. 325,208, to which my improvements, as shown herein, are particularly applicable. In this harvester the elevating devices, binding apparatus, &c., are carried by a suitable main frame supported independently upon two wheels, and to this frame the platform is hinged at its outer end to permit the grain end to rise and fall in following inequalities of the ground, and also to permit of its being folded against the main frame to facilitate its transportation from place to place.

My improvements relate to improved means of hinging the platform to the main frame; to adjusting it vertically relatively to the main frame; to maintaining the proper relative position of the elevator and platform carrier-belts during such adjustment; to so supporting the reel that it shall follow the vertical adjustments of the platform as well as its rocking motion caused by the rise and fall of the grain-wheel over undulating ground, whereby the relative position of the reel-blades to the finger-bar may under all conditions be preserved; to guard against the upsetting of the main frame on the platform, and to limit the undulatory movement of the grain end of the platform.

In the accompanying drawings, Figure 1 represents a plan or top view, partly in section, on the line 1 1 of Fig. 2, of the harvester with my improvements applied thereto. Fig. 2 is a rear elevation of the same. Fig. 3 is a vertical section through the main frame and driving-roller of the platform-carrier on the line 3 3 of Fig. 4. Fig. 4 is a vertical transverse section across the platform at the point of its pivotal connection with the main frame, as shown by the line 4 4 of Fig. 1. Fig. 5 is an end view of the platform, showing the method of mounting and controlling the grain-wheel. Fig. 6 is an enlarged plan view of the inner rear corner of the platform, showing details of the rear hinge-joint. Fig. 7 is a vertical section of the same on the line 7 7 of Fig. 6. Fig. 8 is an enlarged plan view, partly in section, on the line 8 8 of Fig. 9 of the grain-wheel and its support. Fig. 9 is an elevation of the same with the grain-wheel removed. Fig. 10 is an elevation of the front inner corner of the platform and adjacent parts of the main frame, showing the details of the front hinge-joint and the manner of supporting and driving the reel. Fig. 11 is a grain side elevation of the same, partly in section, on the line 11 11 of Fig. 10; and Fig. 12 is a plan view of the same, partly in section, on the line 12 12 of Fig. 10. Fig. 13 is a detailed view, partly in section, of the reel-driving pinion and its universal joint of shaft-coupling. Figs. 14 and 15 show a modification of one of the features of my invention.

In its general features of construction the main frame A of my harvester is similar to that shown in the before-mentioned patent to Hale, and therefore it need not be minutely described here. It is supported, as before, upon the main driving-wheel A' and a smaller stubble-wheel, A^2, and is provided with elevator-aprons B C, an overhead clearing-apron, D, and a smooth-surface clearing-roll, E. The office of these aprons and the roll is to take the grain from the platform carrier-apron, elevate it above the main wheel, and deposit it upon the binding-table A^3 in a well-understood manner; but they form no part of my invention, except in combination with my improvements thereon and as fully set forth in the following description and claims.

The platform is constructed with the usual front and rear sill-bars, F F′, united by bottom boards, F^2, and by the vertical grain board or divider F^3, to which is attached the guiding and supporting mechanism of the grain-wheel. A shoe, H, and a bracket, I, at the front and rear corners, respectively, of the platform are provided with cylindrical projections or wrists *h i*, upon which are mounted the ends of links or radius-bars H′ I′, by means of which the platform is connected to the main frame. These links are

pivoted at h' i' to the main frame, the pivots being in axial line with each other, as are also the wrists of the shoe and bracket on the platform, the wrists and pivotal points being so nearly in the same horizontal plane that the platform, when adjusted, will move in substantially a vertical plane. The links are bent to the peculiar shape shown to adapt them to the positions they occupy and enable them to move freely past the projections, &c., on the frame. The link I′ extends from its pivot to a point nearly above the wrist i on the bracket I, where it is bent downward at nearly a right angle and terminates in an eye or loop, which encircles the wrist. The front link, H′, reciprocates at its free end in a guide-yoke, J, securely bolted to the main frame, this yoke embracing the link near its point of connection with the wrist of the shoe H and holding it against the backward pull and twisting strains of the platform. The link extends outwardly from its pivot to a point near the yoke, where it is bent downward and then outward and passes through the yoke in about the plane of the wrist-pin, when it is again offset or bent sidewise to bring its eye which encircles the wrist close in to the main body of the shoe. A rock-shaft, K, supported in suitable bearings in the front and rear sides of the main frame, has secured upon its projecting ends short arms h^2 i^2, which are connected to the radius-bars h' i' by link-bars h^3 i^3, as shown. At its rear end the rock-shaft has also mounted upon it a hand-lever, K′, which stands within easy reach of the driver on his seat, and is provided with a suitable locking-detent, k, and to the frame is secured a perforated segmental locking-plate, as shown. The rocking of the shaft K by the lifting-lever will elevate or depress the radius-bars, and consequently the inner end of the platform, relatively to the main frame.

In order to adjust the grain end of the platform simultaneously with its inner end the grain-wheel L is mounted upon the end of a radius-bar, L′, pivoted at the rear end of the grain-board. A casting, l, secured to the free end of this bar, has upon it the stud-axle l', upon which the grain-wheel is mounted, and is provided with a T-shaped head, which is grooved, as at l^2, to fit over and slide upon the projecting edge of a guide-plate, L^2, secured to the grain-board and shaped as shown. This guide-plate and the T-head are curved about the pivotal center of the bar L′. An arm, L^3, extends from the top of the bar L′ and terminates in a rearwardly-projecting eye, and a guide-pulley, M, is mounted upon a stud-axle securely fastened to the grain-board at a suitable point beneath the overhanging arm L^3. A chain or other flexible connection is attached to the arm L^3 and passes around the pulley M, and extends thence to a guide-pulley, M′, supported by a corner bracket at the rear end of the grain-board, and from thence to a guide-pulley, M^2, supported by a bracket, M^3, secured to and forming part of the main frame, and from thence to an arm, k', secured upon the rock-shaft K. When this shaft is rocked in a direction to elevate the platform, the chain is drawn up by the arm k', and the distance between the pulley M and overhanging arm L^3 shortened, causing the grain end of the platform to rise simultaneously with the stubble end. When the shaft K is rocked to lower the platform, the chain is of course paid out by the arm k', permitting the grain end of the platform to fall through its own weight.

It will be seen that while the general elevation of the platform is positively controlled by the hand-lever, its outer end is free to rise and fall to follow the inequalities of the ground irrespective of the main frame, or the whole platform may be folded up against the main frame to facilitate transportation from place to place.

I have found it necessary in practice with a machine constructed and proportioned as this is to limit the amount of free movement of the grain end of the platform, and also to guard against the accidental upsetting of the main frame or its rolling over on the platform, as may sometimes happen when the machine is working on a steep hillside with the frame above the platform, or in going through ditches or over large obstructions that would tend to throw the main frame farther off its center of gravity than it is designed to go. In order to effect this limitation without interfering with the vertical adjustments of the platform I pivot a bar or lever, N, on the wrist-pin i of the bracket I on the platform, the upper end of which plays through a slot in a bar, N′, secured at the top of the main frame near its rear edge and extending over the platform. A link or thrust bar, N^2, is secured at one end to the outer rear corner of the platform by means of an eyebolt, N^3, while at its other end it is hinge-jointed to the bar N below the slotted bar N′, or at any other convenient point. When the platform is adjusted vertically, the end of the bar N will rise and fall through the slot, in which it is free to reciprocate to permit the independent movement of the grain end of the platform at whatever height of adjustment the platform may have.

In order to insure the proper operation of the elevator-aprons in taking the grain from the platform at any height to which it may be adjusted, I have found it necessary to adjust at least one of these aprons simultaneously with the platform. The roller-spindles of the upper elevator-apron, B, are journaled in bars b b at each side of the elevator-frame, the bars being so connected to the frame that they may be reciprocated vertically therein for a limited distance. Attached to their upper ends are guide-blocks b', which play in slots a in the sides of the main frame and have guard-plates b^2 attached to their outer faces, which overlap the edges of the slots, as shown in Fig. 10. Bolts b^3 are screwed into the lower ends of the bars and extend through slots a' in the sides of the frame, from which they project far enough to receive the upper ends of links

is constructed and operates precisely in the manner before described, while the frame for the lower apron, C, is suitably mounted and reciprocated in guideways in the main frame. Guide-blocks *c* are attached to its side bars near their lower ends and project through slots *c'* in the sides of the main frame. On the outer faces of these blocks are rigidly attached metal plates C^2, provided with forked extremities which embrace the projecting guide-pins b^3 of the upper frame, as shown. It will be obvious that any motion imparted by the platform to the upper frame will also be communicated to the lower frame through its forked connecting-plates. Instead of connecting the two frames, they both may be mounted in a manner similar to the upper one, and each connected by a separate link to the wrists of the platform.

When the elevator-aprons are vertically adjustable with the platform, it may also be desirable to adjust the overhead clearing-apron, D, at its end nearest the elevator-aprons to maintain their best relative working positions. To accomplish this the side bars, which constitute the apron-frame, are pivoted on the shaft of the outer or driving roller, *d*, and have the inner roller, *d'* journaled in their free ends. The shaft of the roller *d'* extends beyond the side bars and plays through slots in the main frame, which are curved about the center of the roller *d*. The metal plates b^2 on the upper bearing-blocks, *b'*, of the apron-frame *b* are provided with forked extensions which embrace the projecting ends of the shaft *d'* outside of the main frame and raise or lower the free end of the apron D when the apron B is adjusted by the platform, as will be readily understood.

These details of construction may be varied through a wide range without departing from the spirit of my invention as set forth in the following claims:

What I claim, and desire to secure by Letters Patent, is—

1. The combination of the main frame, a vertically-adjustable grain-platform connected thereto and provided with an endless carrier-apron, and an endless elevator-apron carried by a reciprocating frame which is mounted in suitable guideways in the main frame and connected by links to the platform, so that the relationship of the elevator-apron to the platform-carrier will be the same at any elevation to which the latter may be adjusted, substantially as set forth.

2. The combination of the main frame, the vertically-adjustable grain-platform connected thereto and provided with an endless carrier-apron, the upper elevator-apron and its movable frame, consisting of side bars held in position and guided by projections at their ends which extend through slots in the sides of the elevator-frame, and the apron-rollers having bearings in the ends of the side bars, and links connecting the lower ends of the side bars to the platform, substantially as and for the purpose set forth.

3. The combination of the main frame of a harvester, a vertically-adjustable platform connected thereto in the manner described, a lower elevator-apron supported in fixed journals in the main frame, an upper elevator-apron supported in a frame which reciprocates in suitable guideways in the main frame and is controlled in its movements by the platform, an overhead apron, D, a smooth-face clearing-roll, E, and a binding-table, A^3, substantially as arranged, and for the purpose described.

4. The combination of the main frame and the vertically-adjustable elevator-apron mounted therein, with an overhead clearing-apron, D, supported in a frame which is pivoted concentrically with the driving-roller *d*, and an idle-roller, *d'*, mounted in the free end of the frame, its shaft projecting through curved slots in the sides of the main frame and connected to suitable mechanism for raising and lowering it.

5. The combination of the main frame and the elevator-aprons mounted in frames the upper one of which reciprocates vertically in suitable guideways in the main frame, with an overhead clearing-apron mounted in a frame pivoted concentrically with the axis of its driving-roller *d*, and the idle-roller *d'*, mounted in the free end of the frame which is so connected to the frame of the movable elevator-aprons that it will follow the vertical adjustments thereof, substantially as set forth.

6. The combination of the main frame, a vertically-adjustable grain-platform hinge-jointed thereto at its inner corners, an upright bar, N, attached to the rear inner corner of the platform and embraced at its upper end by a slotted bar, N', which is attached to the top of the main frame and limits the vibration of the bar N, and a link or thrust-rod, N^2, connected to the bar N and to the rear outer corner of the platform, substantially as and for the purpose described.

7. In a harvester, the combination of a vertically-adjustable grain-platform, means, substantially as described, for raising and lowering the same, a reel-supporting bracket having a socket for the reel-spindle and rigidly attached to the front connection between the platform and frame, and a reel the arms of which are rigidly connected to its support, which is pivotally mounted in said socket in fixed relation to the vertically-moving platform, substantially as described.

8. The combination of the main frame and main platform pivotally connected thereto, a shoe at the front inner corner of the platform having a wrist which forms one of its pivots, and a reel-supporting bracket provided with a socket for the reception of the reel-spindle and rigidly attached to the projecting end of the wrist-pin and solely supported thereby, and a reel, the arms of which move in a fixed

b^4, the lower ends of which are provided with loops or eyes which encircle the wrists of the shoe and bracket on the platform. When the platform is adjusted vertically, these links communicate a corresponding movement to the side bars, *b b*, of the elevator-apron, causing said apron to rise or fall with the platform and remain at a constant distance from the driving-roller of the platform-apron,

In order to preserve relationship of the reel to the platform, I connect the reel-support directly to the platform in such a manner that the reel shall automatically follow all its changes in position or angle. The reel-support, as shown, consists of a cast crank or bracket, O, provided with a recess or socket, O′, for the reel-spindle p^3, and a split journal or bearing, O^2, for the reel-driving pinion Q. The extremity of the wrist *h* of the shoe is squared, as shown in Figs. 10 and 11, and the lower end of the reel-supporting bracket has a projecting square-socketed end, h^4, which fits upon the end of the wrist, while a tap-bolt, h^5, passes through the end of the socket and screws into the wrist, holding the parts firmly together. It will be obvious that by this construction the reel must necessarily follow the platform in its vertical adjustment or in the independent movement of the grain-wheel L, and that the reel may be set to work as closely as desired to the guard-finger bar and not vary its relationship thereto by the independent movements of the platform, as would be the case with the reel mounted on the main frame and not partaking of the movements of the platform, as has been the previous practice. The reel-head consists of a simple casting, P, having as many sockets p' for the attachment of reel-arms as may be desired, the arms being attached thereto as shown, or in any suitable manner. On the under side of this casting is formed a bevel-wheel, p^2, which is engaged by the pinion Q, and also a spindle, p^3, by which it revolves in the socket O′ of the supporting-bracket, being held therein against accidental displacement by a cross-pin, p^4, which passes through the spindle just below the socket.

When it is desired to fold up the platform for transportation, the pin p^4 may be withdrawn and the reel removed from its support and carried upon any convenient part of the main frame, being readily replaced for a renewal of the harvesting operations.

The pinion Q is provided with a shank or hub having a flange at its end, between which and the back of the pinion the shank is embraced by the bearing O^2 on the reel-support. A knuckle or universal joint, Q′, is formed at the back of the pinion, to which is attached a driving-shaft, Q^2. At its upper end this shaft passes through the hub of a bevel-wheel, R, being connected to it by a feather, which permits free longitudinal movement of the shaft through the wheel, but compels them to rotate together. This bevel-wheel is driven by a pinion, R′, mounted on the end of a driving-shaft, R^2. The wheel R is mounted in a split box or journal formed on the projecting end of a rocking bracket, S, which swings about the axis of the driving-shaft R^2. This bracket supports the wheel and holds it in engagement with the pinion, while permitting it to swing round the shaft of the pinion and accommodate the shaft Q^2 at any angle it may take in following the adjustments of the platform. The bracket has an extending hub, *s*, which is bored to form a bearing for the shaft R^2, and it is mounted in a bearing, *r*, secured to the top of the main frame at its front edge. This bearing has depending from its front face a segmental flange provided with a grooved projection, *r′*, along its lower curved edge. A flange on the front face of the hub *s* fits against the face of the flange on the bearing *r*, with its lower edge embraced by and playing in the groove *r′*. From this flange extends an arm, *s′*, which terminates in a split box that embraces the hub of the bevel-wheel R between the back of the wheel and a collar on the end of the hub. At its rear end the shaft R^2 is supported in a suitable bearing, r^2, as shown.

The several moving parts of the mechanism are driven as follows: A constantly-revolving shaft, T, driven in any suitable manner from the main wheel A′, is provided at its rear end with a chain sprocket-wheel, T′, which drives an endless chain, *t*, in the direction of the arrows on Fig. 2. This chain passes from the wheel T′ over a wheel, T^2, which drives the overhead clearing-apron, D, thence over a wheel, T^3, which drives the elevator-apron B, thence over a wheel, T^4, which drives the platform carrier-apron, thence over a wheel, T^5, which drives the elevator-apron C, thence over a wheel, T^6, which drives the clearing-roll E, thence back to the starting-point. A wheel, T^7, mounted on the spindle with the wheel T^5, drives an endless chain, *t′*, which passes over a sprocket-wheel, T^8, on the end of the reel-driving shaft R^2. When the platform is raised or lowered, the distance between the sprocket-wheels T^3, T^5, and T^4 is varied, and the varying length of the chain required must be compensated for.

At any suitable point in the length of the chain *t* is placed an idler-wheel to take up the slack chain occasioned by the raising of the platform. As shown in the drawings, this take-up pulley U is mounted on the end of a lever, U′, pivoted to the main frame at any suitable point and provided with a locking-detent and perforated rack-segment, U^2.

Instead of the idler-wheel being sprocketed, as shown, it might be a smooth-faced pulley with side flanges, and instead of its being mounted upon a hand-lever requiring the attention of the operator it might be controlled by an automatic spring take-up device such as is commonly employed in grain-binding harvesters.

In Figs. 14 and 15 I show a modification of the elevator-apron device in which both aprons are vertically adjustable in the main frame to follow the adjustment of the platform. The movable frame for the upper apron

path in fixed relation to the grain-platform, substantially as described.

9. The combination of a main frame, a vertically-adjustable grain-platform pivotally connected thereto, substantially as described, a reel-supporting bracket rigidly attached to the projecting end of the wrist-pin which forms the front pivot of the platform, a socket on said bracket for the reception of the reel-spindle, a reel-driving pinion mounted in a bearing in said bracket and connected by a universal joint to a shaft, and a beveled wheel having feathered connection with the shaft and supported by a swinging bracket which rocks about the axis of a pinion mounted upon the end of a driving-shaft and engaging the bevel-wheel, the driving-shaft being supported in fixed bearings on the main frame, as set forth.

In testimony whereof I hereunto affix my signature in presence of two witnesses.

CHARLES CLAPP.

Witnesses:

R. H. STEWART,

W. L. OSTROM.