

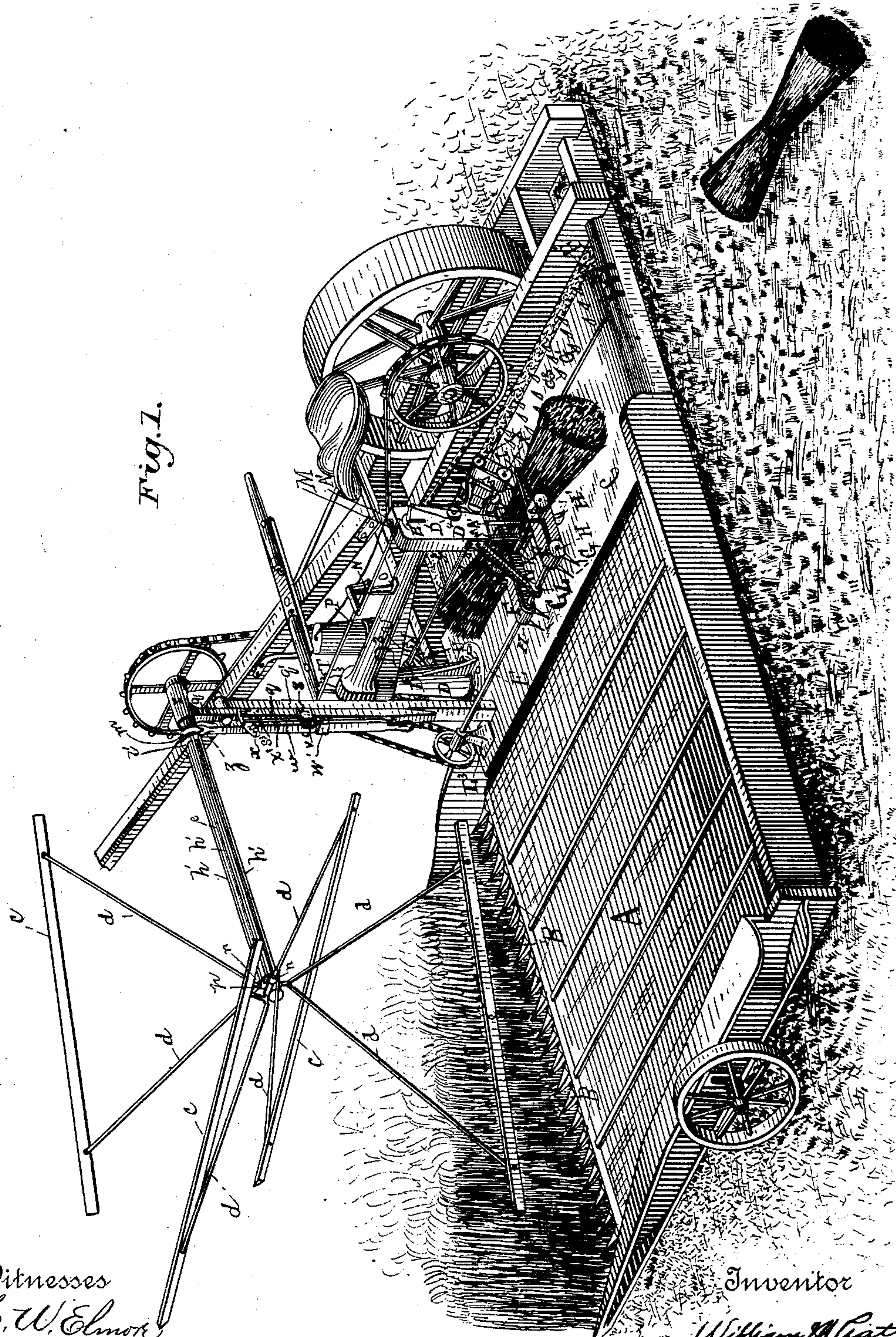
(No Model.)

8 Sheets—Sheet 1.

W. M. PIATT.
GRAIN BINDER.

No. 367,441.

Patented Aug. 2, 1887.



Witnesses
H. W. Elmore
Geo. J. Panner.

By his Attorneys

Inventor

William M. Piatt

Truitt Bros

(No Model.)

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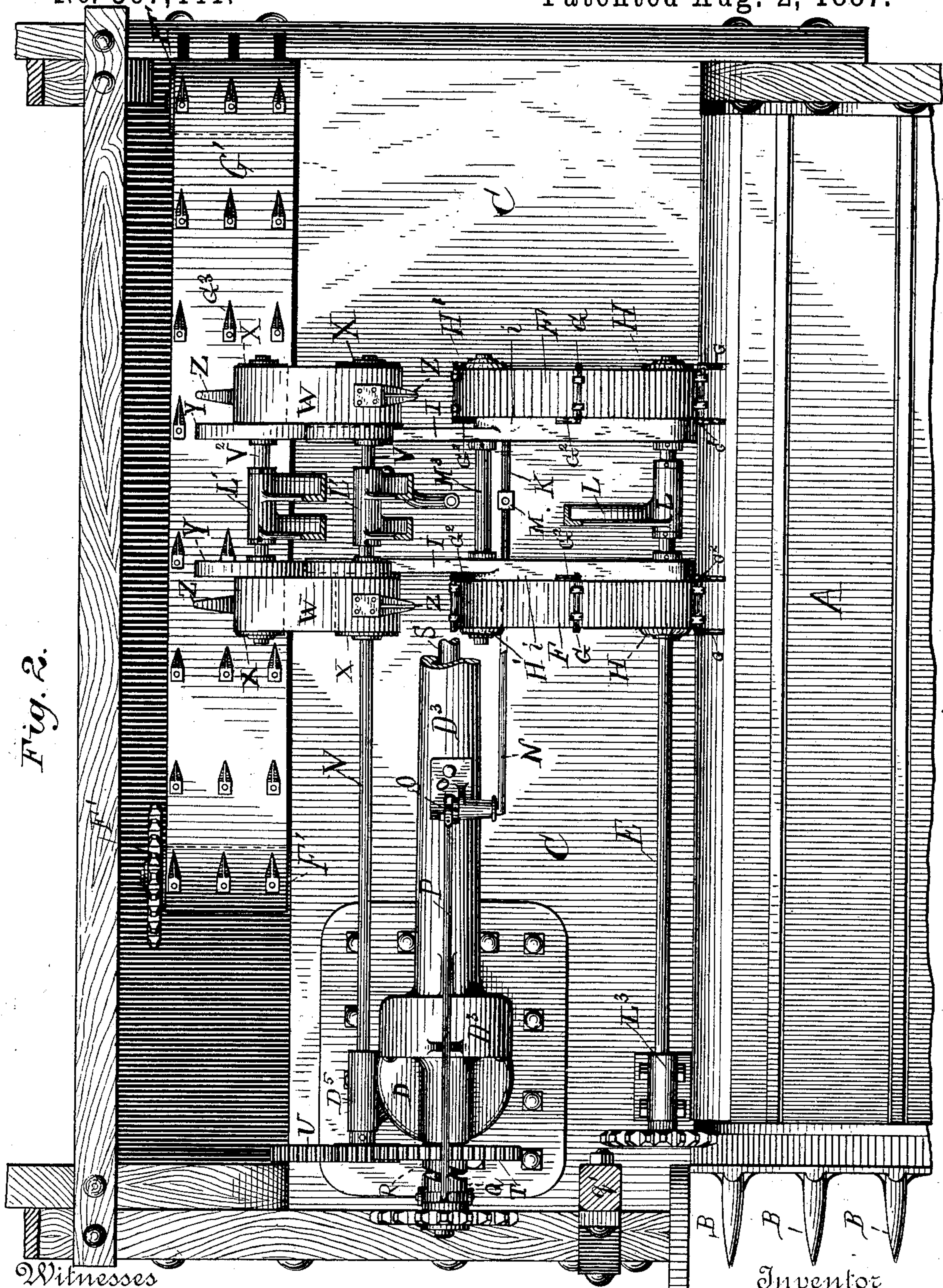


Fig. 2.

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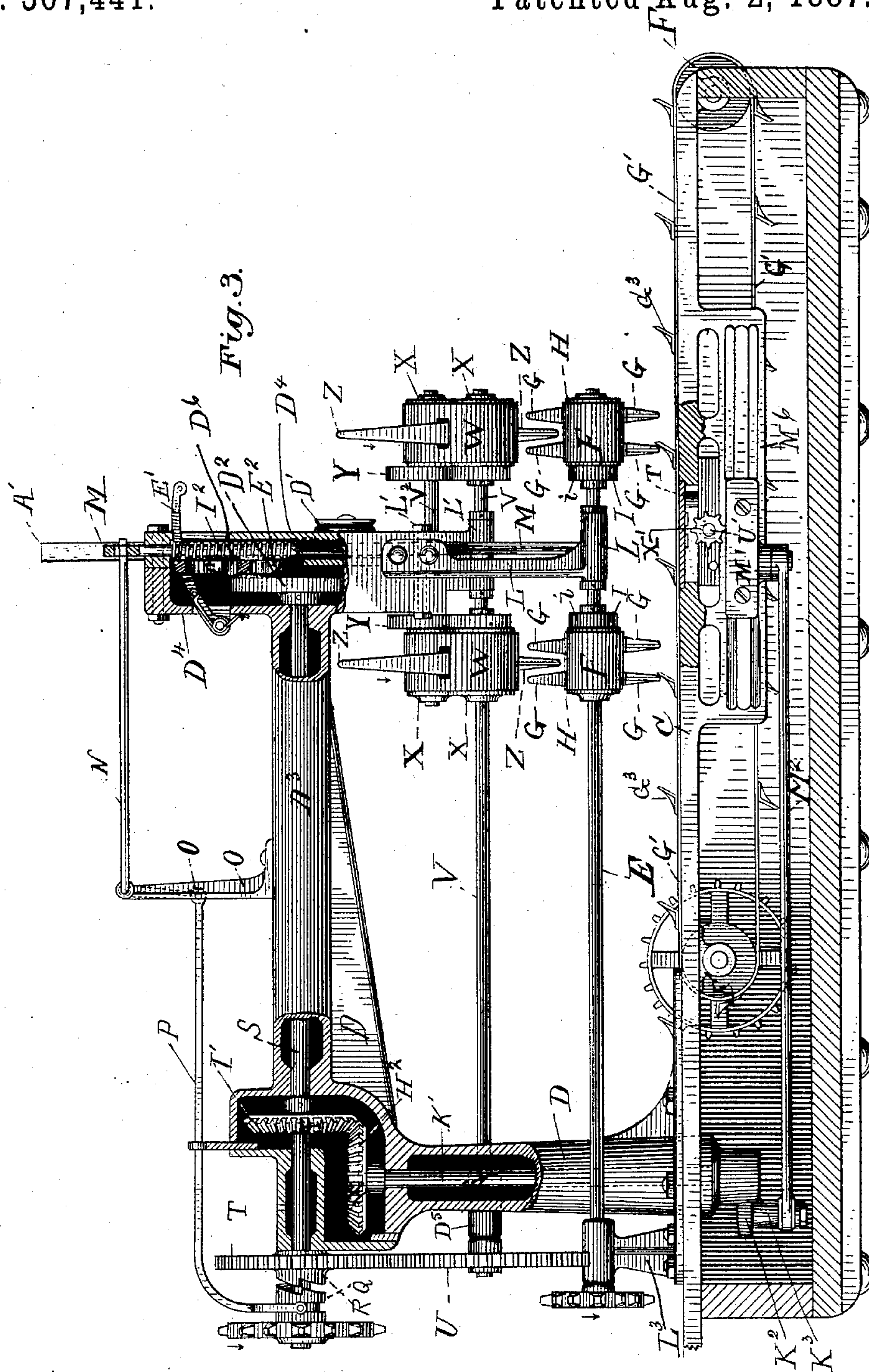
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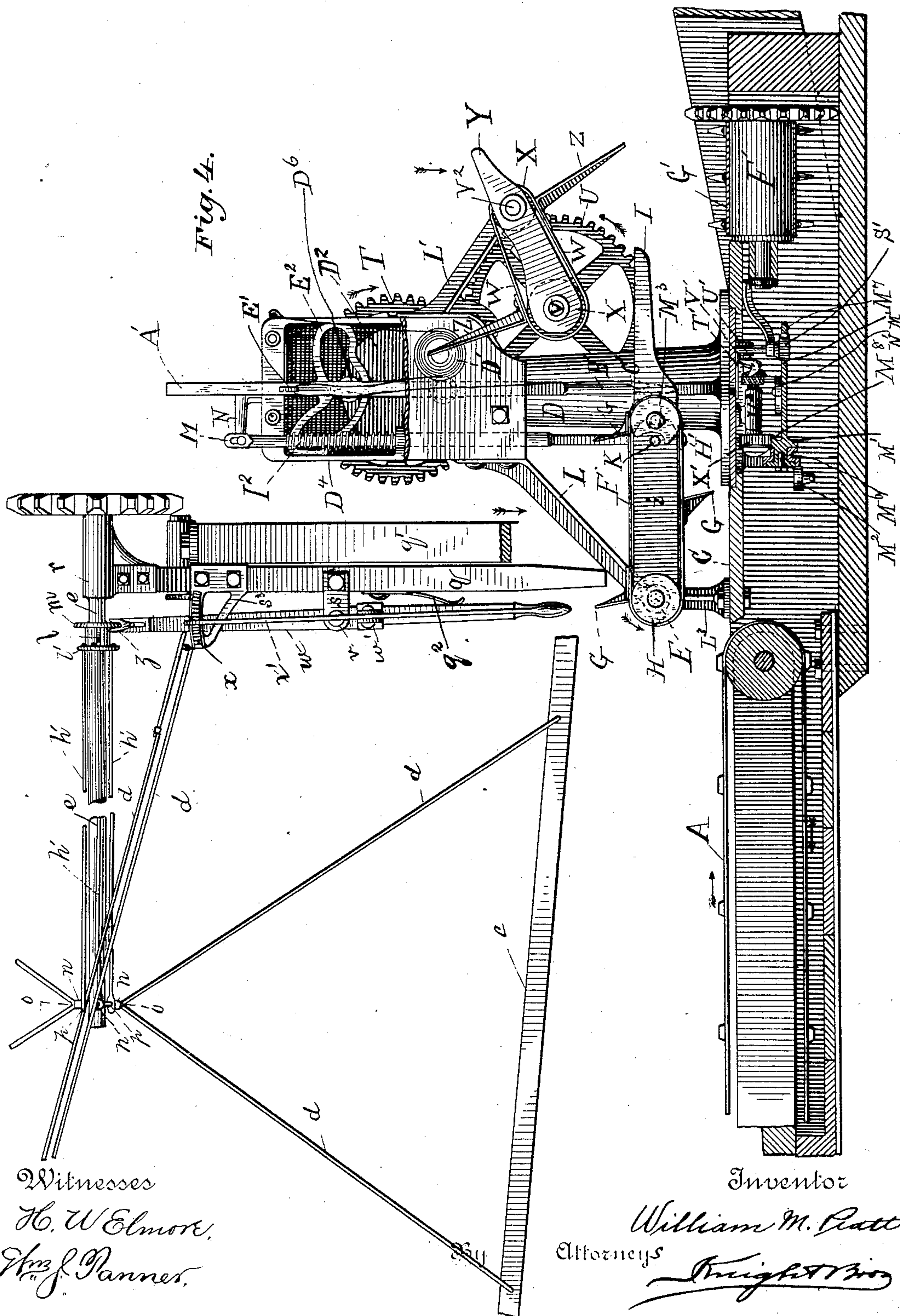
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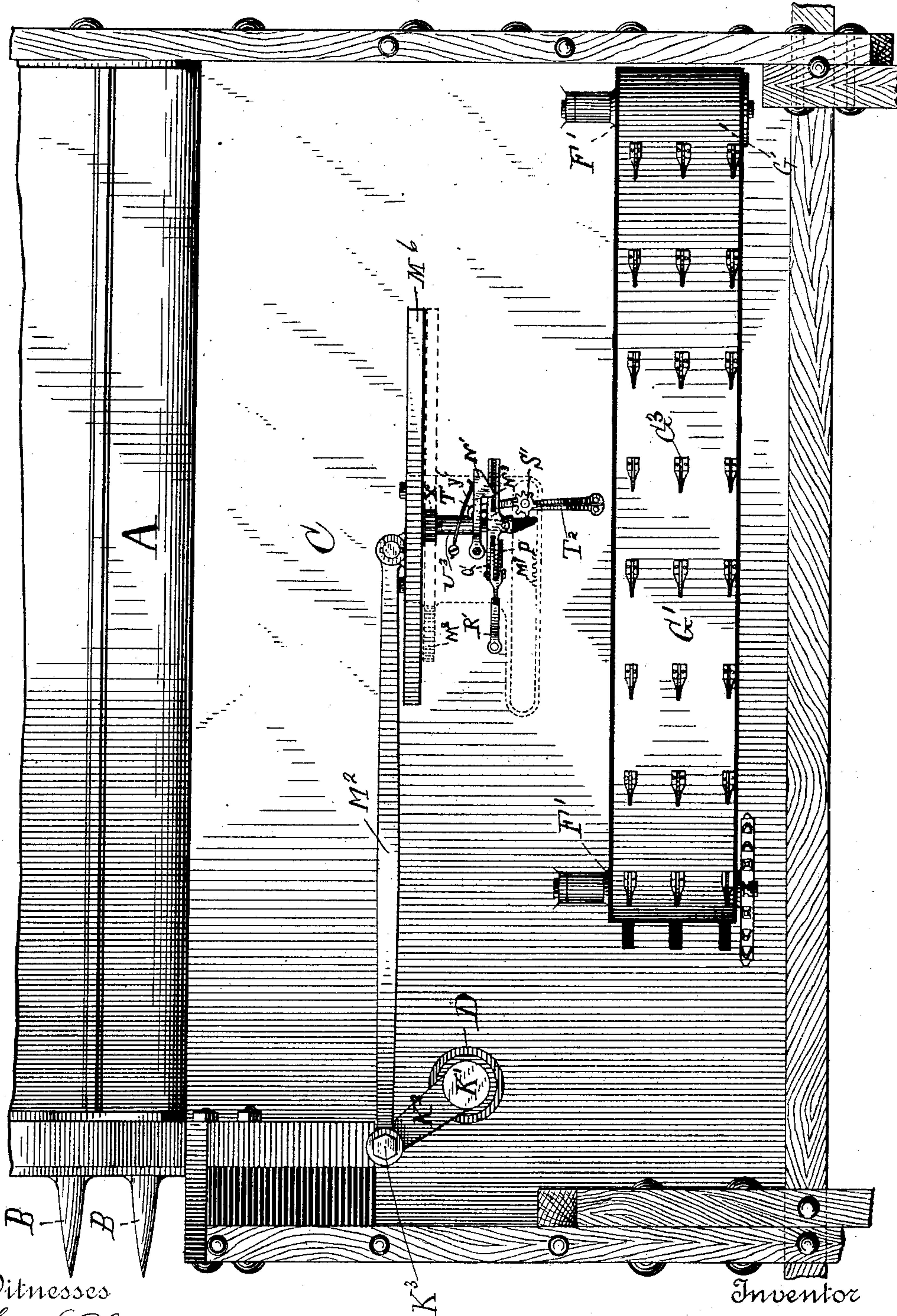
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Fig. 5.



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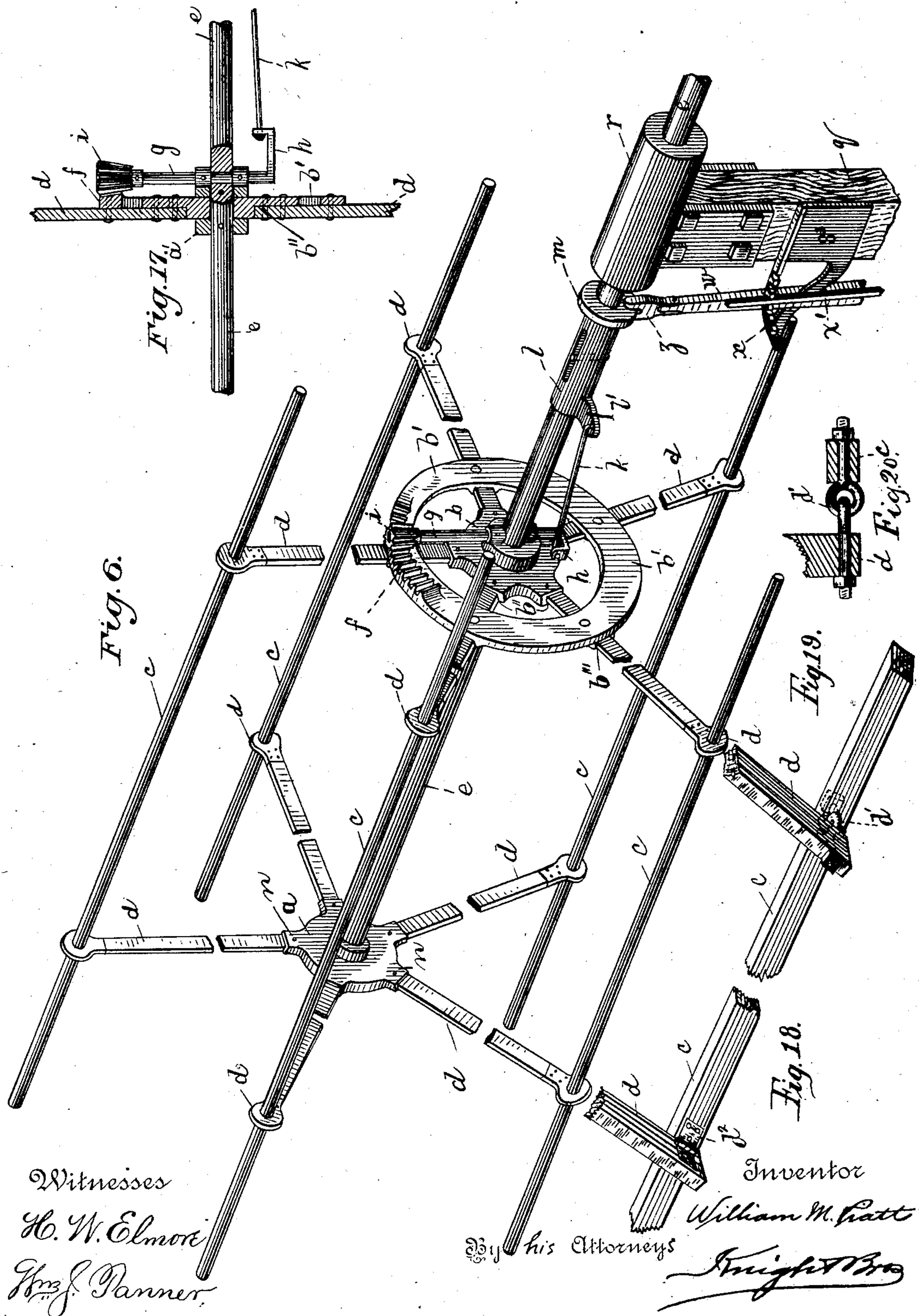
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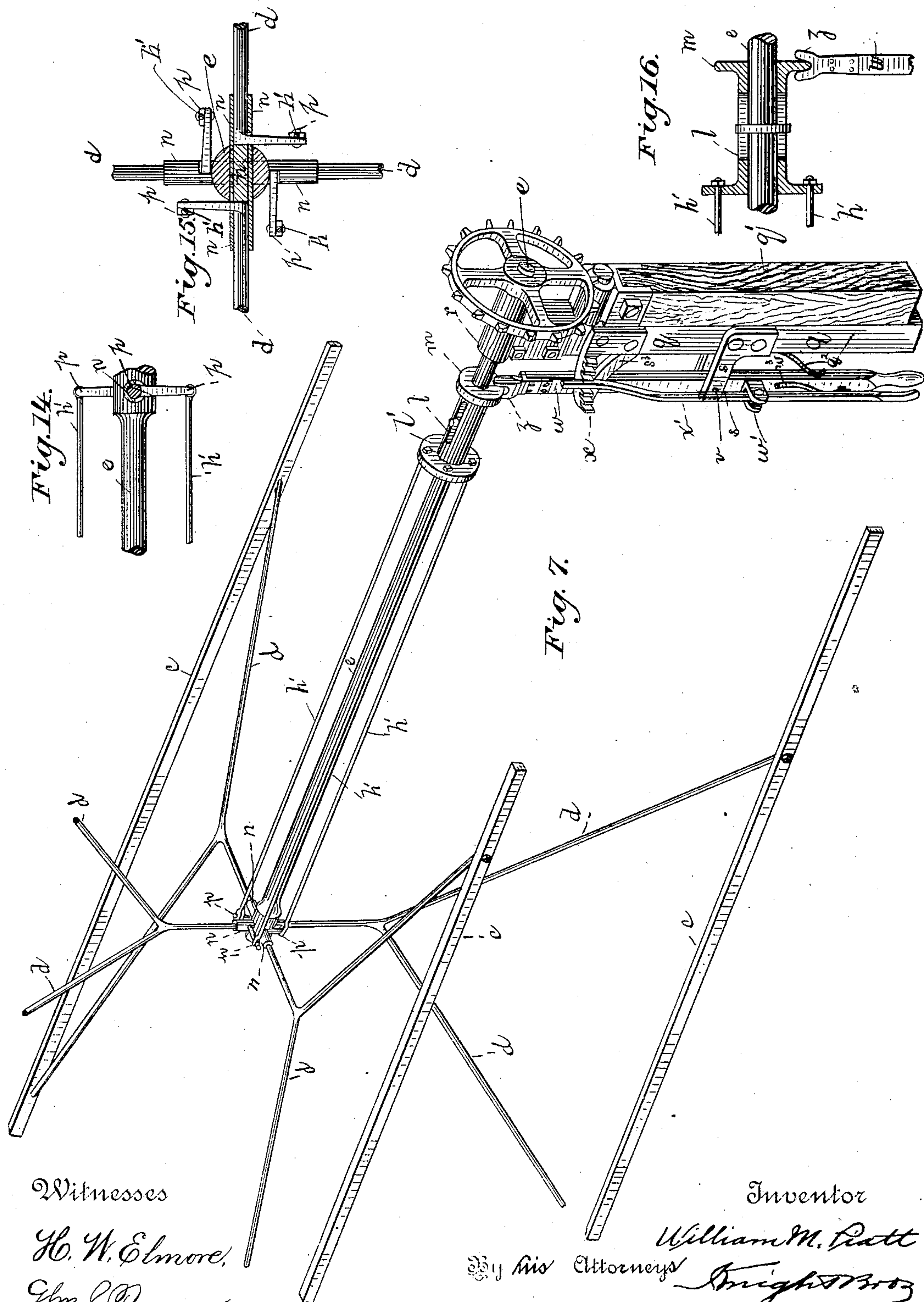
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(No Model.)

8 Sheets—Sheet 8.

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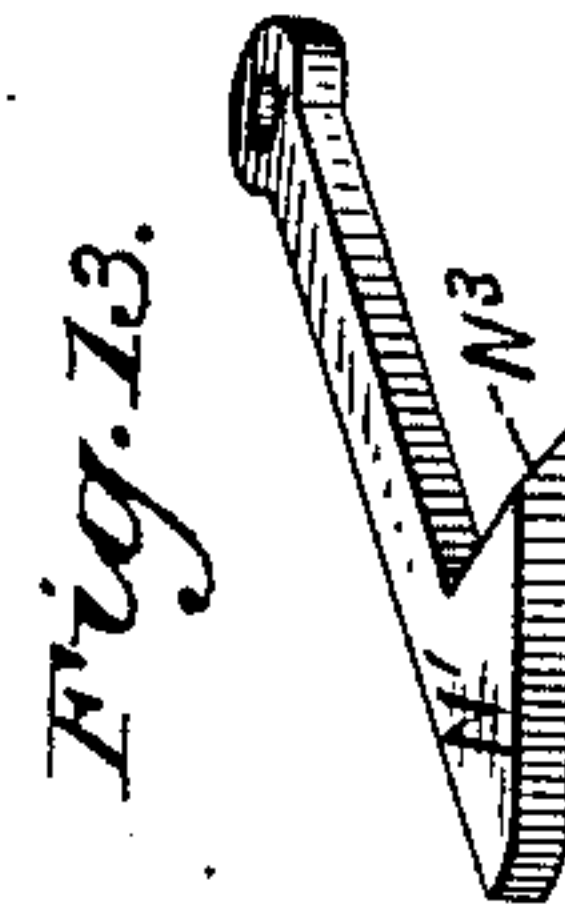
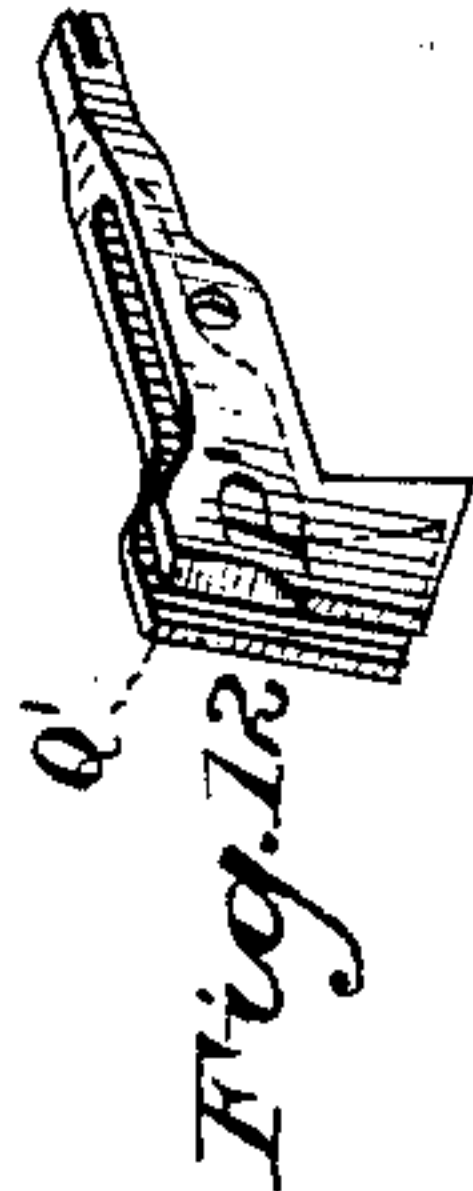
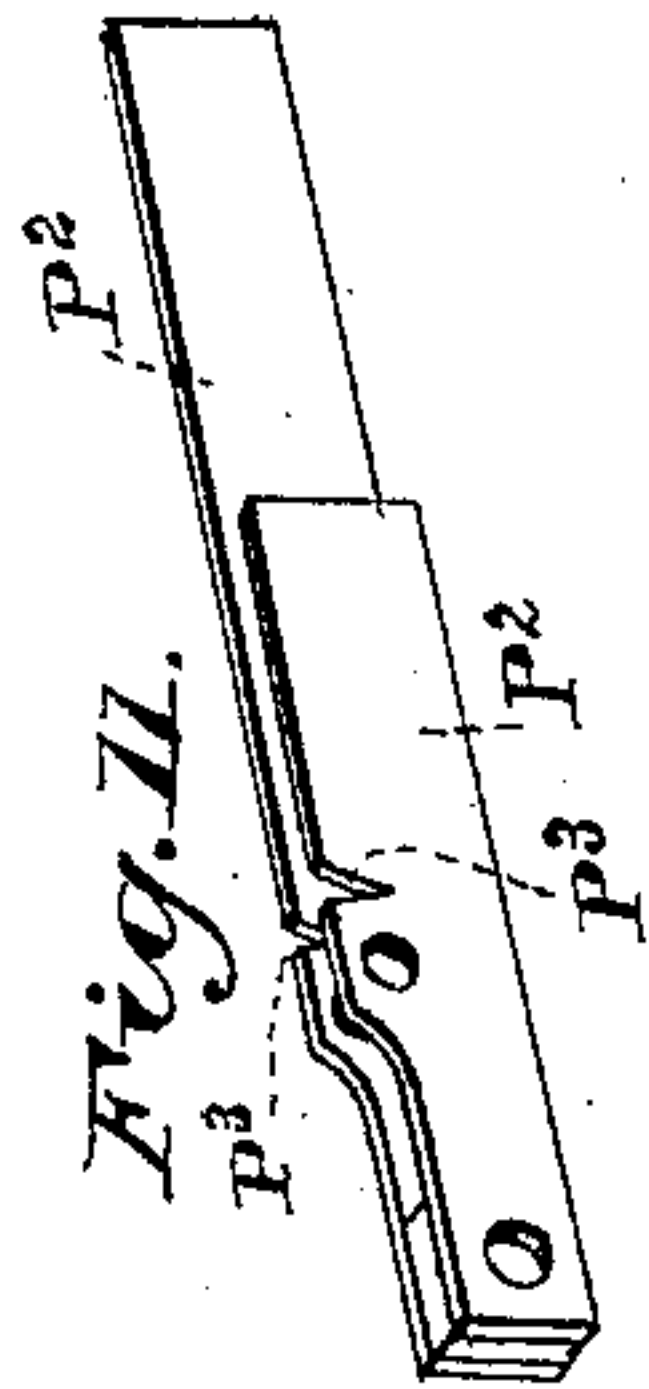
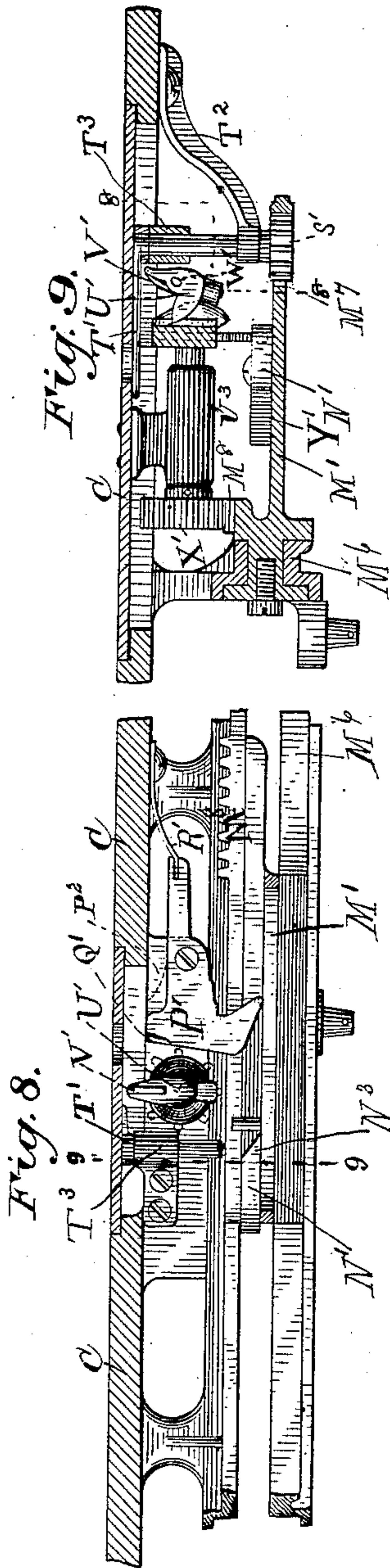
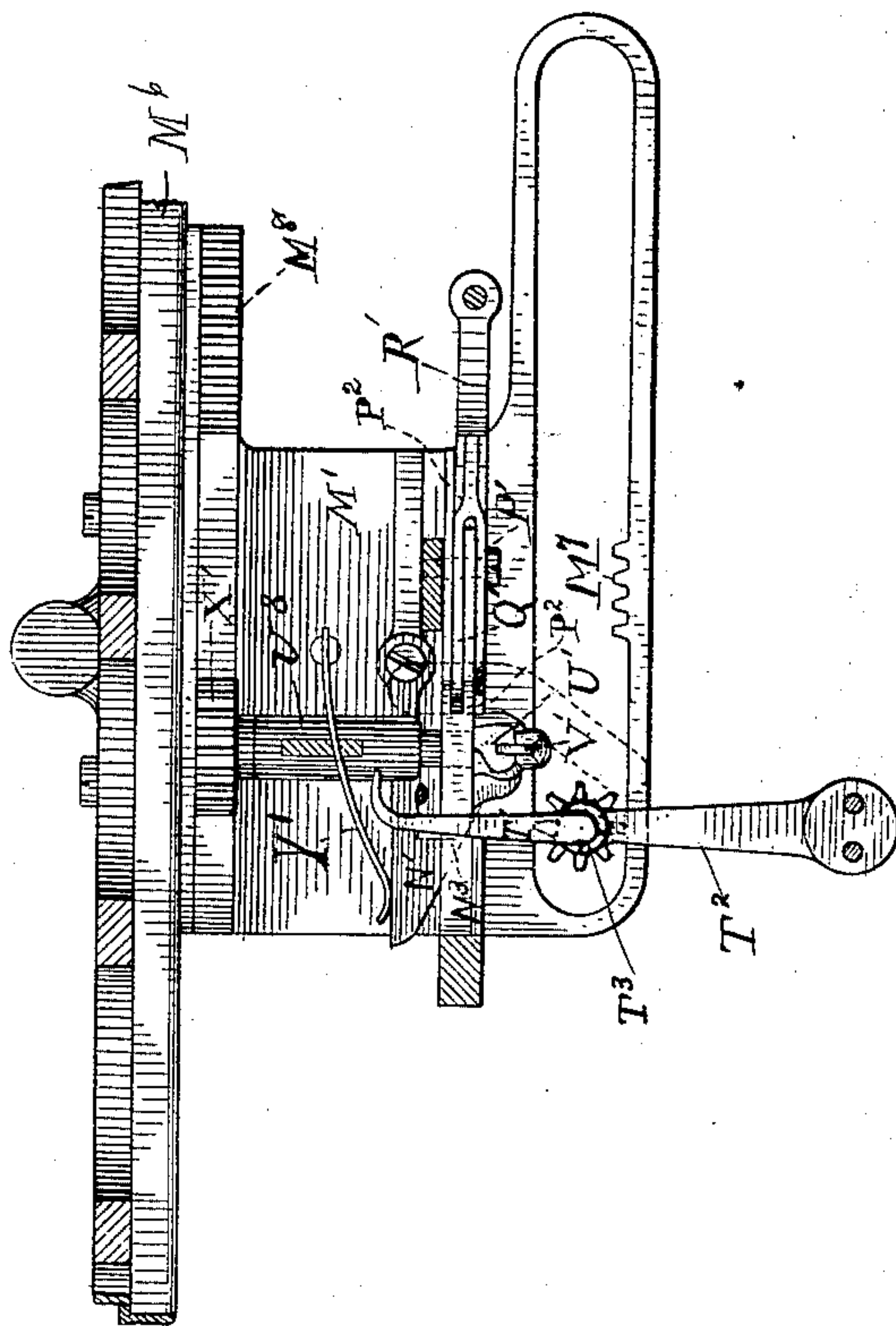


Fig. 10.



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UNITED STATES PATENT OFFICE.

WILLIAM M. PIATT, OF MACOCHEEK, OHIO.

GRAIN-BINDER.

SPECIFICATION forming part of Letters Patent No. 367,441, dated August 2, 1887.

Application filed July 16, 1885. Serial No. 171,809. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM M. PIATT, a citizen of the United States, and a resident of Macocheek, in the county of Logan and State of Ohio, have invented a new and useful Grain-Binder, of which the following is a specification.

In order that my invention may be fully understood, I will proceed to describe it with reference to the accompanying drawings, in which—

Figure 1 is a perspective view of my improved grain-binder. Fig. 2 is a plan view of the binder portion of the machine, the head of the standard being omitted. Fig. 3 is an elevation, partly in section, from the grain side of the machine. Fig. 4 is a rear elevation, partly in section. Fig. 5 is a bottom view of the binder portion. Fig. 6 is a perspective view of the reel. Fig. 7 is a perspective view of the reel, showing a modification. Fig. 8 is a section of the knoter portion on the line 8 8, Fig. 9. Fig. 9 is a section of the same on the line 9 9, Fig. 8. Fig. 10 is a plan view thereof. Fig. 11 is a perspective view of the notched plates. Fig. 12 is a perspective view of the combined retainer and cutter. Fig. 13 is a perspective view of the latch. Fig. 14 is a side elevation of the outer end of the reel shown in Fig. 7. Fig. 15 is an end elevation of the same. Fig. 16 is a vertical longitudinal section of the inner end of the reel. Fig. 17 is a vertical longitudinal section of the inner end of the reel shown in Fig. 6. Fig. 18 is a perspective view showing a modification in the means for hinging the bats to the arms of the reel. Fig. 19 is a perspective view showing still another modification in the means for hinging the bats to the arms of the reel. Fig. 20 is a section showing another view of the same.

A is the apron, B the finger-bar, and C the binder-table.

D is the binder-standard rigidly secured to the table, provided with an arm, D³, and head D⁴. To the apron side of the head is secured a bracket, L, and secured on the table is a short standard, L³.

E is a shaft-journal in the short standard and in the bracket, having pulleys or rollers H on opposite sides of the bracket, and carry-

ing the outer portions of the belts F, having teeth G for moving the grain on the table.

M is a vertical bar sliding in the head of the standard, surrounded by a spring, I², supporting it in its normal position. On the lower end of the bar are supported, by means of a rod, K, the trip-arms I, which are formed with projections i, and are hinged to the shaft E at their outer ends. The inner ends of these arms support a short shaft, M³, on which are mounted the forward rollers or pulleys, H', on opposite sides of the bracket L, carrying the inner portions of the belts F. The teeth G are hinged to the belts, and have arms G², bearing on the side projection of the trip-arms I, retaining the teeth in a position perpendicular to the belts, except when delivering the grain to the trip-arms. At this point the arms G² pass beyond the projections, and are permitted to trip and cause the teeth to pass up in a vertical position. Upon the arms coming again in contact with the projections they assume their normal positions. On the arm D³ of the standard is a post, O, in which is pivoted a bell-crank lever, N, whose long arm connects with the bar M, and whose short arm connects with a rod, P, extending to a movable clutch-half, Q, engaging with a fixed clutch-half, R, on the shaft S, mounted in the arm D³.

To the stubble side of the standard D is rigidly secured a bracket, D⁵, and to the same inner side of the head D⁴ is secured a bifurcated bracket, L'. Journaled in these brackets is a shaft, V, geared to the shaft S by cog-wheels T U. In the outer arms of the bracket L' is journaled a short shaft, V². On the shafts V and V², on opposite sides of the bracket L', are pulleys or rollers X, carrying the belts W, which have teeth Z for discharging the bound sheaf onto the delivery-belt G', having teeth G³, and working over rollers F'.

Sliding vertically within the head D⁴ is a needle-bar, A', provided with a needle, B, having a recess or notch, C', which permits a rotating hook, T', journaled in bearings T² T³ beneath the table, to pass between the needle and the twine or cord. Projecting through the front of the head is a take-up, E', and secured to the front of the head is a tension-wheel, D'.

Within the standard D on the shaft S is secured a bevel gear-wheel, I', meshing with an-

other bevel gear-wheel, H^2 , on a vertical shaft, K' . Within the head D^4 on the shaft S is a crank-wheel, D^2 , having a wrist-pin, D^6 , engaging the slot in cam E^2 , secured to the needle-bar. Beneath the binding-table on the lower end of the shaft K' is secured a crank-arm, K^2 , having wrist-pin K^3 , to which is connected a pitman, M^2 .

M' is a slide working in ways M^6 , formed with a horizontal portion having a rack, M^7 , and with a vertical portion having a rack, M^8 . To this slide the pitman M^2 is connected. The twine-hook T' has a pinion, S' , meshing with the rack M^7 , and U' is the knotter, journaled in a hanger, V^3 , having pinion X' meshing with the rack M^8 .

Secured beneath the table are plates P^2 , having notches P^3 for the passage of the cord. Between these plates is hinged a retainer, Q' , adapted to bind on the cord for holding the outer end thereof. On the outer side of these plates, and hinged to the same pivot as the retainer, is a cutter, P' , for severing the cord when the knot is formed. The plates P^2 form a support for the twine delivered to the knotter by the hook. The knotter operates to tie the knot in the twine outside these plates, through which it rotates.

N' is a pivoted wedge-shaped latch or piece, that passes under the twine-cutter P' and retainer Q' to raise them out of the way of the twine or cord. The latch is kept in position by a spring, Y' , and is formed with an incline, N^3 , so that as the front lower ends of the cutter and retainer slide upward on the incline the upper ends of the cutter and retainer are thrown back and the twine or cord is carried in front of them. As the latch passes from under the retainer and cutter, a spring, R' , secured to the outer ends of the retainer and cutter, forces them forward, cutting the string or cord, and retaining the end nearest to the needle. The knotter U' has a finger, V' , pivoted at W' .

Referring to the reel shown in Figs. 1, 4, 7, 14, 15, and 16, e is the reel-shaft, having boxes n at its outer ends, secured perpendicularly thereto. In these boxes I mount the arms d , (to which are connected the bats c ,) so as to be readily revolved therein. The inner ends of the arms are provided with cranks p , connected by rods h' to the head l' of a sliding sleeve, l , having pin-and-slot connection with the shaft.

Referring to the reel shown in Figs. 6 and 17, a is the outer head of the reel, having sockets n and arms d , and fastened rigidly to the revolving shaft e . b is the inner head of the reel, mounted so as to turn on the shaft e , having sockets b'' and arms d . c are bats secured to the arms d . In Fig. 18 I show a bat, c , connected to the arm d at one end by a butt or common leaf hinge, d^2 , and in Figs. 19 and 20 I show the bat connected to the arm d at the other end by knuckle-joint or interlocked eye-bolts d' . The inner head has a ring, b' , provided with sockets b'' , said ring being rigidly secured

to its arms and formed with a rack-segment, f . g is a shaft passing through the shaft e transversely thereof, and having a pinion, i , at one end, meshing with the rack-segment, and an arm or crank, h , at the other end, with which connects a rod, k , secured to the head l' of a sliding sleeve, l , having pin-and-slot connection with the shaft on which it slides, and a flange or rim, m . q' is an upright stanchion secured rigidly to the binder-platform, to which is adjustably connected the reel-standard q , having a journal-box, r , at top, which supports the shaft e . To the standard q , beneath the box, is secured an upper bracket, s^3 , having rack-segment x , and a lower bracket, s , having short shaft v , supporting a lever, w , having a jaw, z , at its upper end engaging the rim or flange, and at its lower end a suitable handle. Beneath the pivot v on the lever w are secured the lugs w' , to which is hinged an auxiliary lever, x' , whose upper end engages the teeth of the rack-segment x , for holding the sleeves to desired position, and at its lower end is provided with a handle. The lower end of the lever w is pressed outward and its upper end inward, accordingly, by a spring, q^2 . w^3 is a spring for holding the auxiliary lever in engagement with the rack x .

The operation of the binder is as follows: The reels feed the grain to the apron A as it is cut by the knives B , and the apron carries the grain to the edge of the table C , where it is taken by the fingers G on the belt F and fed under trip-arms or packers I and against the twine, which comes up from the retainer Q' through the needle-eye to the spool, the twine yielding to the desired position from the retainer to the upper position of the needle. As the grain accumulates under the trip-arms I , it raises them gradually, making room for more grain until sufficient has accumulated for a sheaf. As the arms I , which are attached to a vertical bar, rise, the bar is raised. As the bar M rises, the bell-crank lever N is turned on its pivot, advancing the rod P until, at the moment enough grain has been received to form a sheaf, the clutch-half R is thrown in connection with the clutch-half Q , operating the shaft S and the needle-bar, causing the needle to descend. As the shaft S revolves, the gear-wheels H^2 and I' revolve shaft K' , and, through crank K^2 and rod M^2 , move the slide M' back and forth, operating through racks M^7 and M^8 , pinions S' and X , respectively, causing the point of the twine-hook to pass through the cut-away part C' of the needle between the twine and the needle and present the twine to the knotter, which ties it in the usual manner. (The form of knotter which I use is that known as the "Behel," patented February 16, 1864, No. 41,661, though any form can be used.) By the shape of my cam e^2 my needle B' is caused to remain at its lowest point until the hook and knotter have performed their functions. As the knotter completes its work, the latch N' passes from under the twine cutter and retainer, and the spring

R' forces them forward, cutting the twine next to the sheaf and retaining the end next the needle.

On the clutch-half R on the shaft S is a gear-wheel, T, which engages with a similar wheel, U, on the shaft V. As the shaft S is caused to revolve, the wheel T revolves wheel U and shaft V, and through them operates the discharging-belts, the arms Z of which engage with the bundle in their revolution and force it from under arms I, carrying it onto the spiked delivering-belts G', which carry it to the rear into stubble. As the bundle is discharged from under the arms I, they are forced down by spring I² to their first position, and the lever N is moved so as to uncouple the clutch and arrest the action of the binding apparatus proper and discharging-arms, the needle having risen to its highest position again and stopped. The shafts E and S are run by belts from the main wheel of the reaper, which form no part of my invention.

The operation of my knotting device, in detail, is as follows: The normal position of the retainer and cutter is that in which the inner ends of these parts are depressed with their operating-faces forced forward by the spring, the retainer holding the cord which has been laid in the notches of the plates and the hooks in its forward position. The needle, having descended to the proper point, is caused to remain stationary by the shape of the cam E² in the head of the machine. As the needle reaches this point, the slide M', carrying the racks M¹ M², is advanced. In its forward movement the rack M¹ engages with the pinion S', and turns the hook T' backward. The slide M' is then retracted, and the rack M² engages the pinion S', turning the hook T' forward, the point passing through the slot C' between the needle and twine and carrying the twine across the path of the knotter over the notches, (and in front of the knife and retainer,) which at that moment is actuated by the pinion X' coming in contact with rack M² and the knot tied. The continued movement of the slide brings the spring-latch under the retainer and cutter, releasing the end last retained and setting the cutter by the act of raising the inner ends of the retainer and cutter. As the knot is completed, the slide commences its return movement, the spring-latch piece N' passes to the rear of the pivoted knife P' and retainer Q', and spring R' brings them to their former position, cutting the twine between the sheaf and the needle and retaining the end next the needle.

To render the operation more clear, it may be stated that the needle descends with the cord as the slide carrying the racks for actuating the hook T' and knotter-hook is carried to the outer extremity of its path. At this point the cam on the needle allows the needle to dwell. The return movement of the rack-head engages the hook T', carries the cord over the gripper-notch and over the path of the knotter-hook, the knotter-hook is actuated by

its respective rack, and the revolution of the knotter-hook makes the knot. The discharge of the gavel pulls the loop off the knotter-hook, and the needle at this point arrives at its station of rest.

When the needle is down to its lowest extremity, the gripper and cutter plates lie immediately between the knotter-hook and the needle-point and under the circle traversed by the guide-hook T', so that the hook T' performs a double office—that is, to present the cord to the gripper and to the knotter-hook also and to hold the cord in place while being acted upon by the gripper and knotter, respectively. The shape of the slot in the binding-table agrees with the delivery of the cord to the knotter-hook.

Having thus described my invention, the following is what I claim as new therein and desire to secure by Letters Patent:

1. The combination of the binding-table C, short standard L³, standard D, formed with arm D³ and head D⁴, bracket L, shaft E, vertical bar M, trip-arms I, and belts F, provided with teeth G, having extension-heels G², substantially as described.

2. The combination of the binding-table C, standard D, formed with arm D³ and head D⁴, the bracket D⁵ on the standard, the bracket L', secured to the head, having short arms Y, operating-shaft V, short shaft V², rollers X, and belts W, provided with arms Z, substantially as described.

3. The combination of the binding-table C, the standard D, formed with arm D³ and head D⁴, short standards L³, bracket L, shaft E, trip-arms I, short shaft M³, rollers H H', belts F, bracket D⁵, bracket L', having short arms Y, shaft V, short shaft V², rollers X, and belts W, having arms Z, substantially as described.

4. The combination of the binding-table C, trip-arms I over the binder-table, having belts F, shaft on which the arms are hinged and by which the belts are operated, vertically-sliding bar M, on which the arms are suspended, bell-crank lever N, shaft S, having fixed clutch-half R, sliding clutch-half Q, and rod P, substantially as described.

5. The combination, with a knotter, of the plates P² P², in which the knotter-shaft rotates and outside which the knotter operates, having notches P³, in which the twine is laid, the hinged retainer Q' between the plates, closing upon the twine, the hinged cutter P', having a knife-edge for severing the twine, working outside the plates, the spring R', by which the forward ends of the retainer and cutter are held in depressed position, and a slide having a spring-latch for raising the depressed ends of the retainer and cutter, substantially as described.

6. The combination, with a flat binder-platform, of a vertical needle-bar working thereover, delivery-belts transferring the grain from the main platform against the twine, a hook working in a horizontal plane beneath the table for seizing the twine on the inside of the

grain, a pair of plates, P^2 , on which the twine is laid, a knotter working outside the plates for catching and tying the ends of the loop, a hinged retainer working between the plates for closing on the ends of the twine, a hinged cutter outside the plates for severing the twine, a spring depressing the retainer and cutter, and a slide having a device for raising the retainer and cutter, substantially as described.

7. The combination of the binding-table C, standard D, formed with arm D^3 and head D^4 , the needle-bar A' , needle B' , having recesses C' , the knotter U' , twine-hook T' , notched plates P^2 , retainer Q' , cutter P' , and spring-latch N' , having incline N^3 , substantially as described.

8. The combination of the binding-table C, standard D, having arm D^3 and head D^4 , shaft S, having gear-wheel I' , shaft K' , having gear-wheel H^2 and crank K, provided with wrist-pin K^3 , slide M' , having racks M^7 and M^8 , knotter U' , having pinion X' , twine-hook T' , having pinion S' , plates P^2 , retainer Q' , cutter P' ,

spring-latch N, having incline N^3 , crank-wheel D^2 , cam E^2 , needle-bar A' , and needle B' , having recess C' , substantially as described.

9. The combination of revolving reel-shaft e , provided with the rigid head a , having sockets n , the loose head b , having sockets b'' , the arms d , the ring b' on the arms of the loose head, having rack-segment f , transverse shaft g , provided with pinion i and the crank h , the rod k , sleeve l , having head l' and flange m , standard q , box r , and the actuating mechanism, substantially as described.

10. The combination, with the reel having radial arms, of the bats, leaf or butt hinges connecting the bats to the arms at one end, and the knuckles or interlocked eyebolts connecting the bats to the arms at the other end, substantially as described.

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Attest:

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A. SANDERS PIATT.