

L. SCOFIELD.  
Corn-Planter.

No. 218,833.

Patented Aug. 26, 1879.

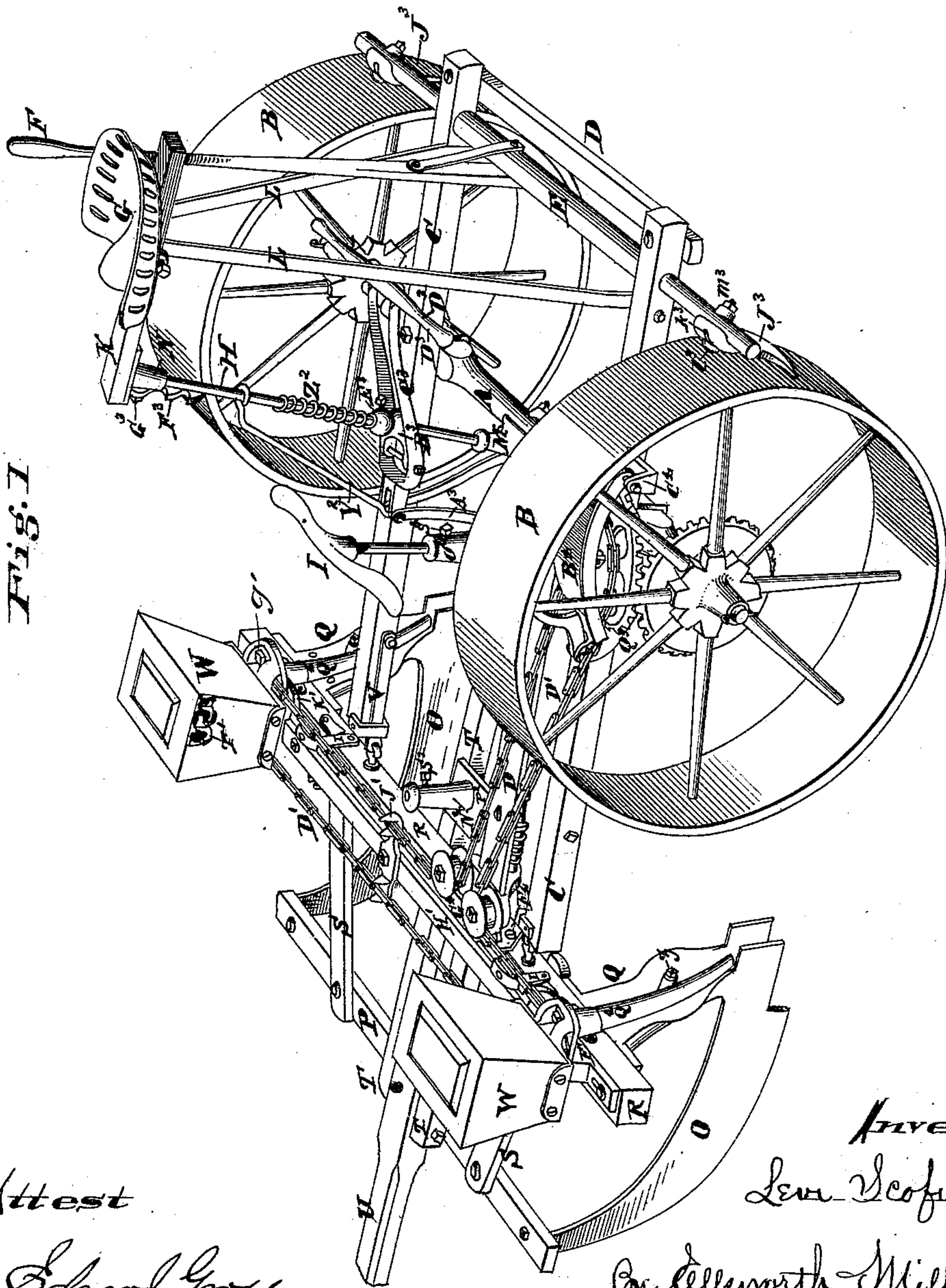


Fig. 1

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His Attorney, --

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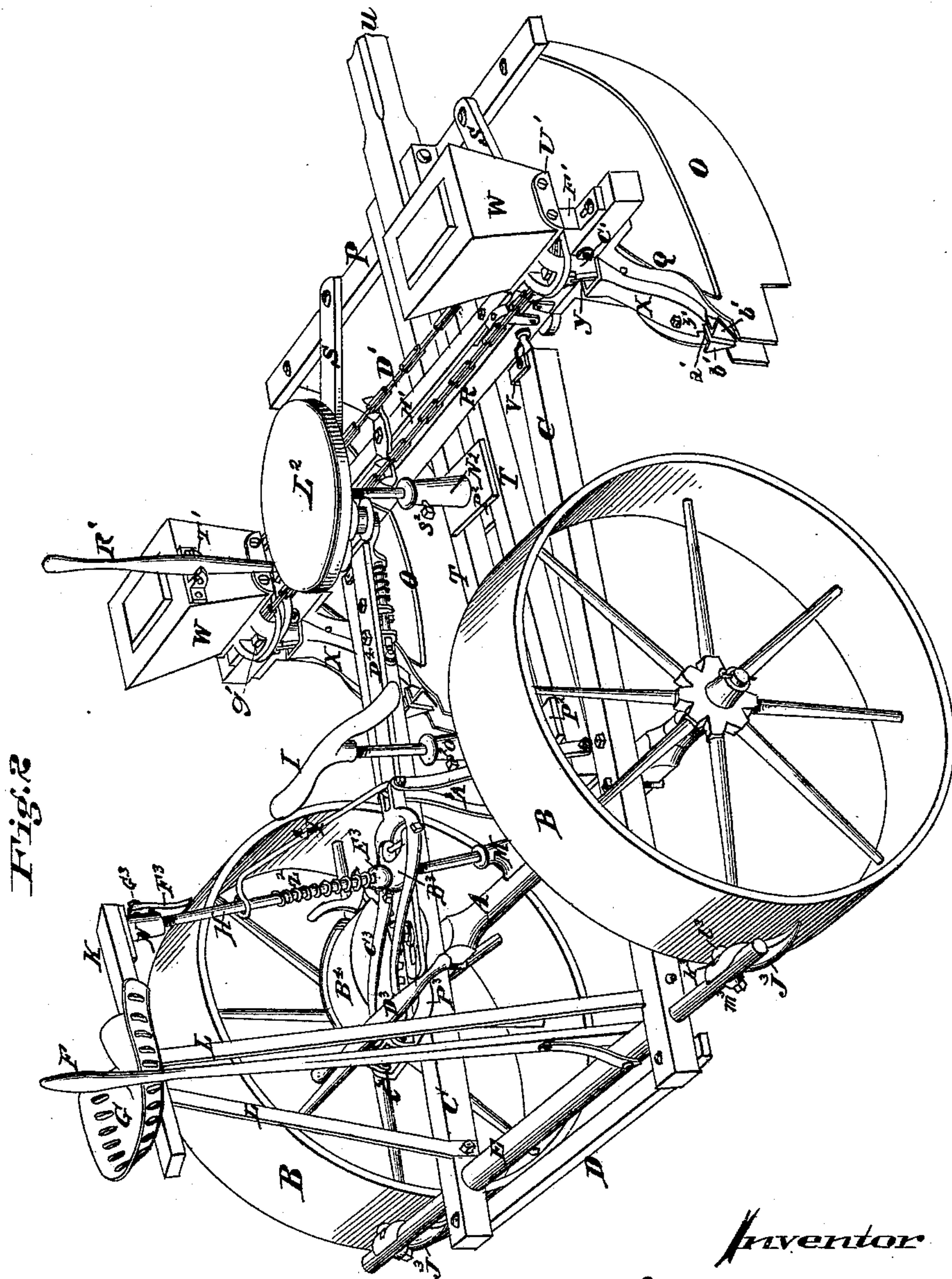


Fig. 2

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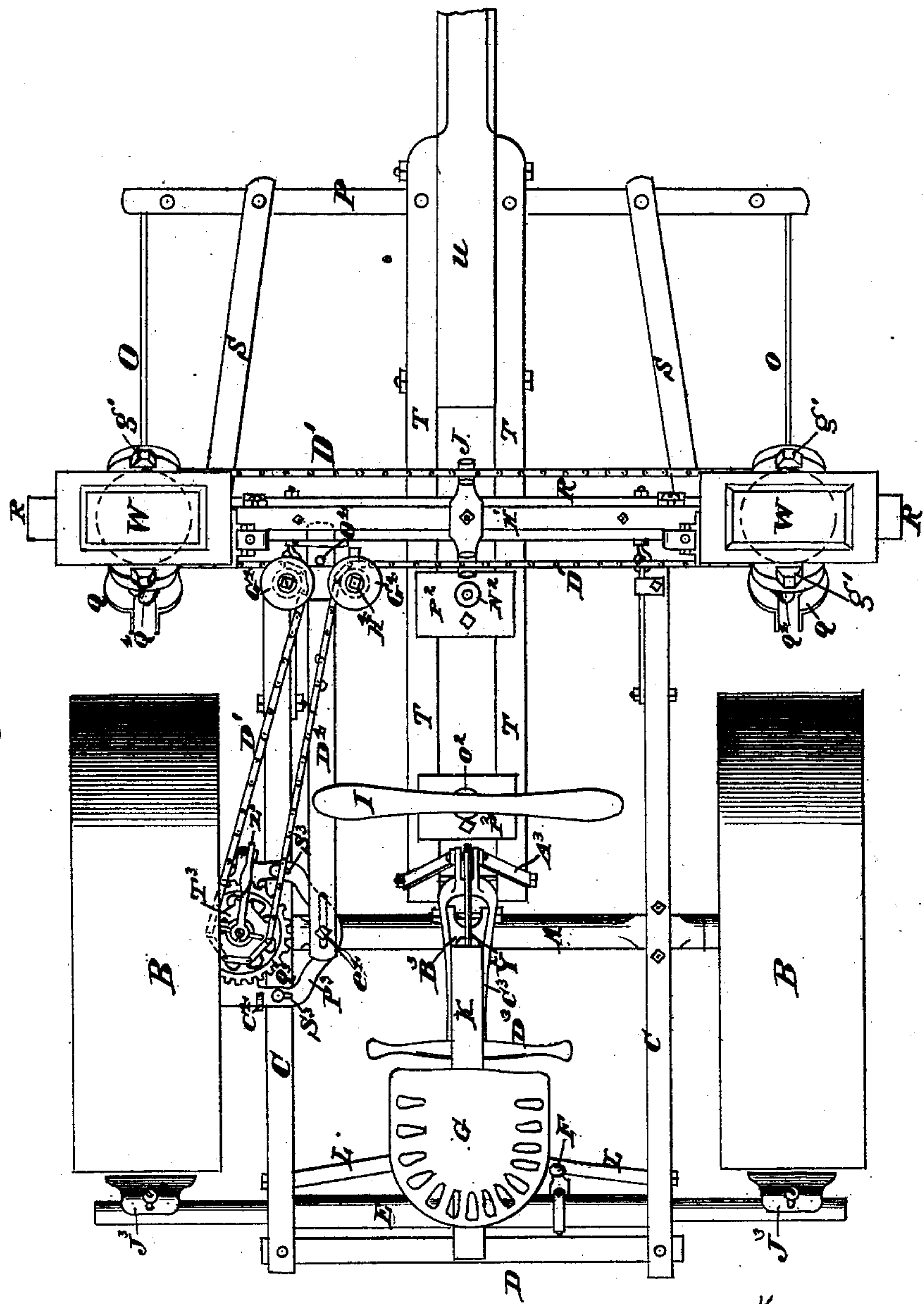


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Fig. 3



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Fig. 4.

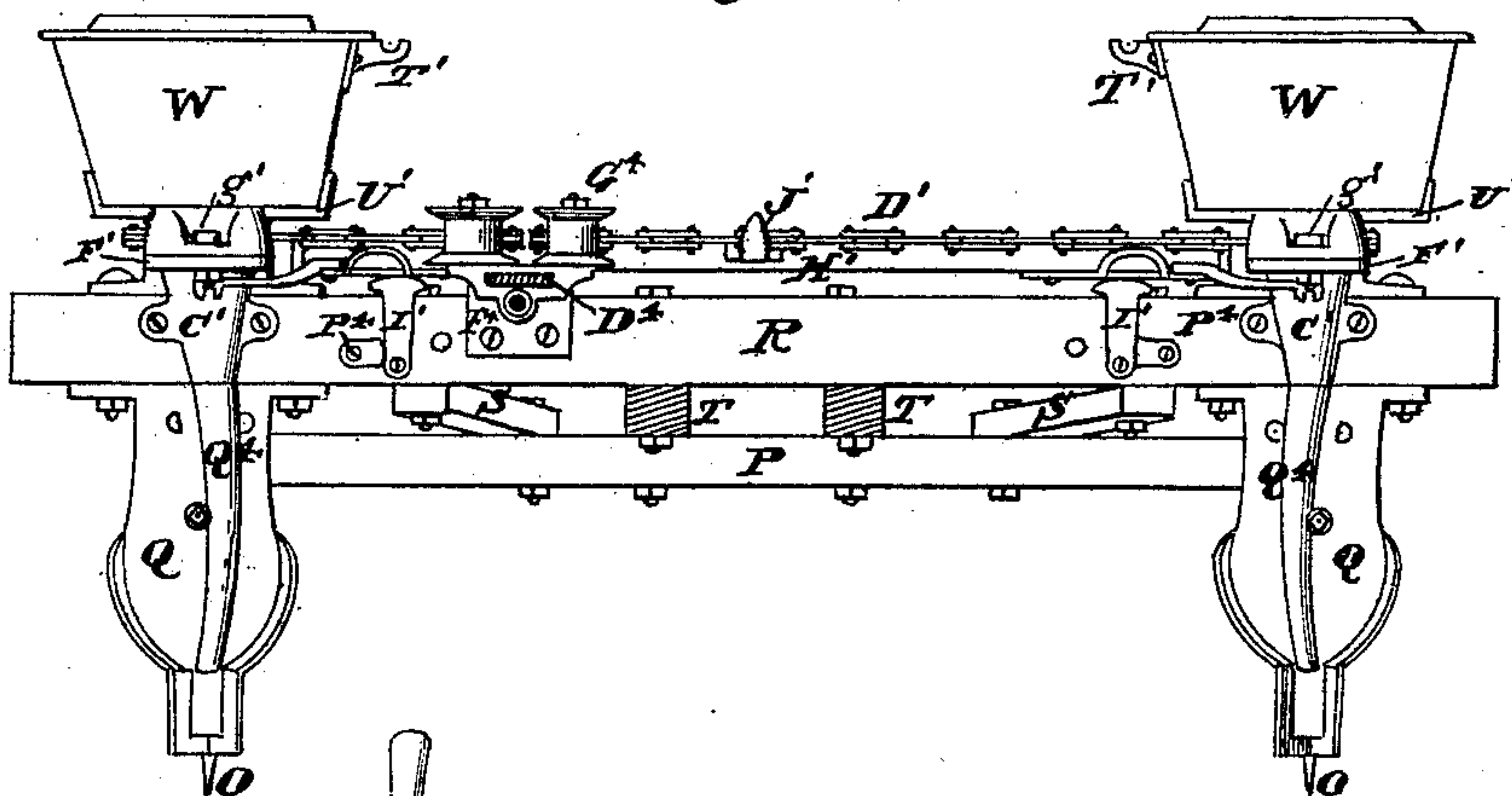
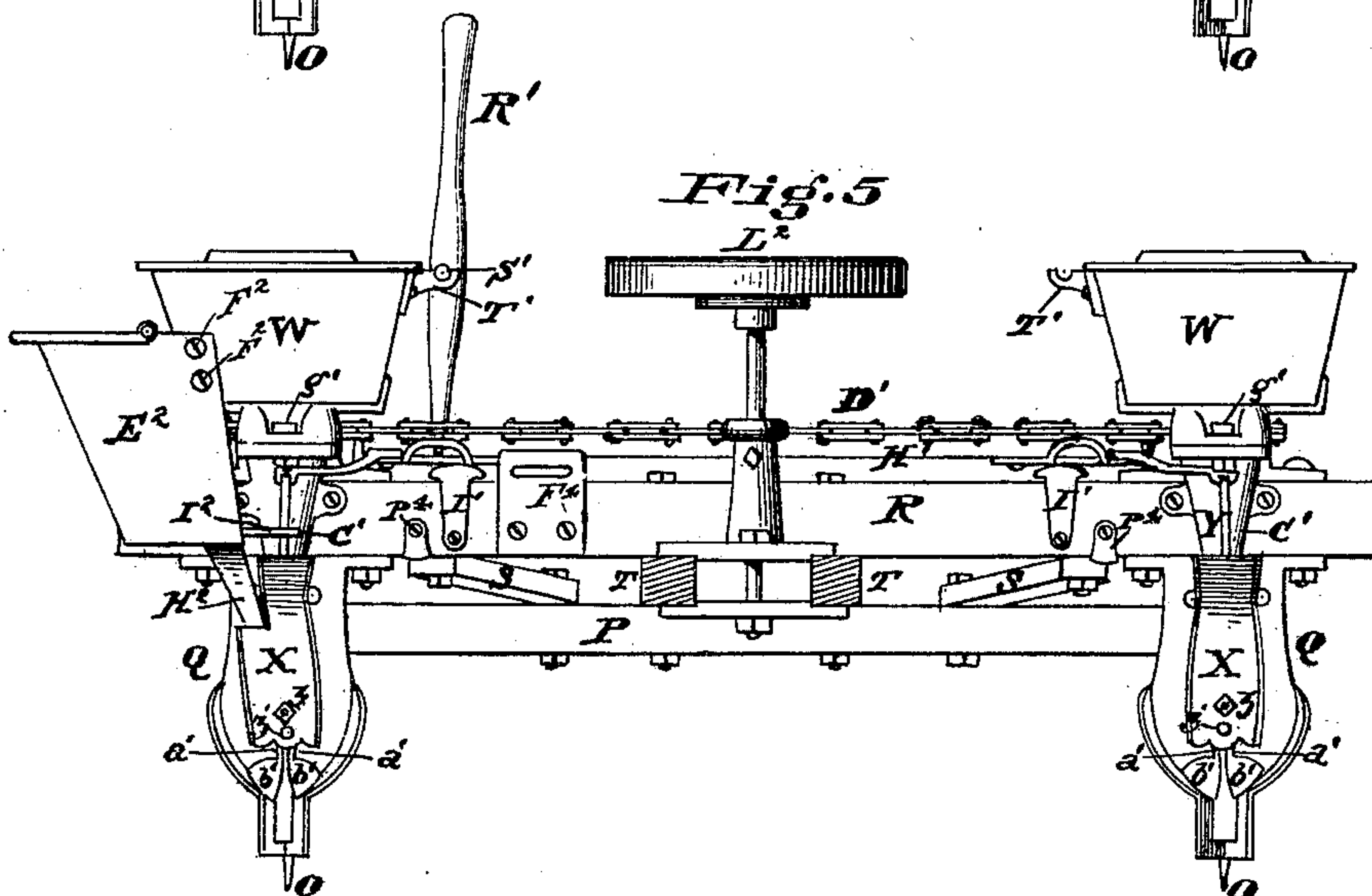


Fig. 5.



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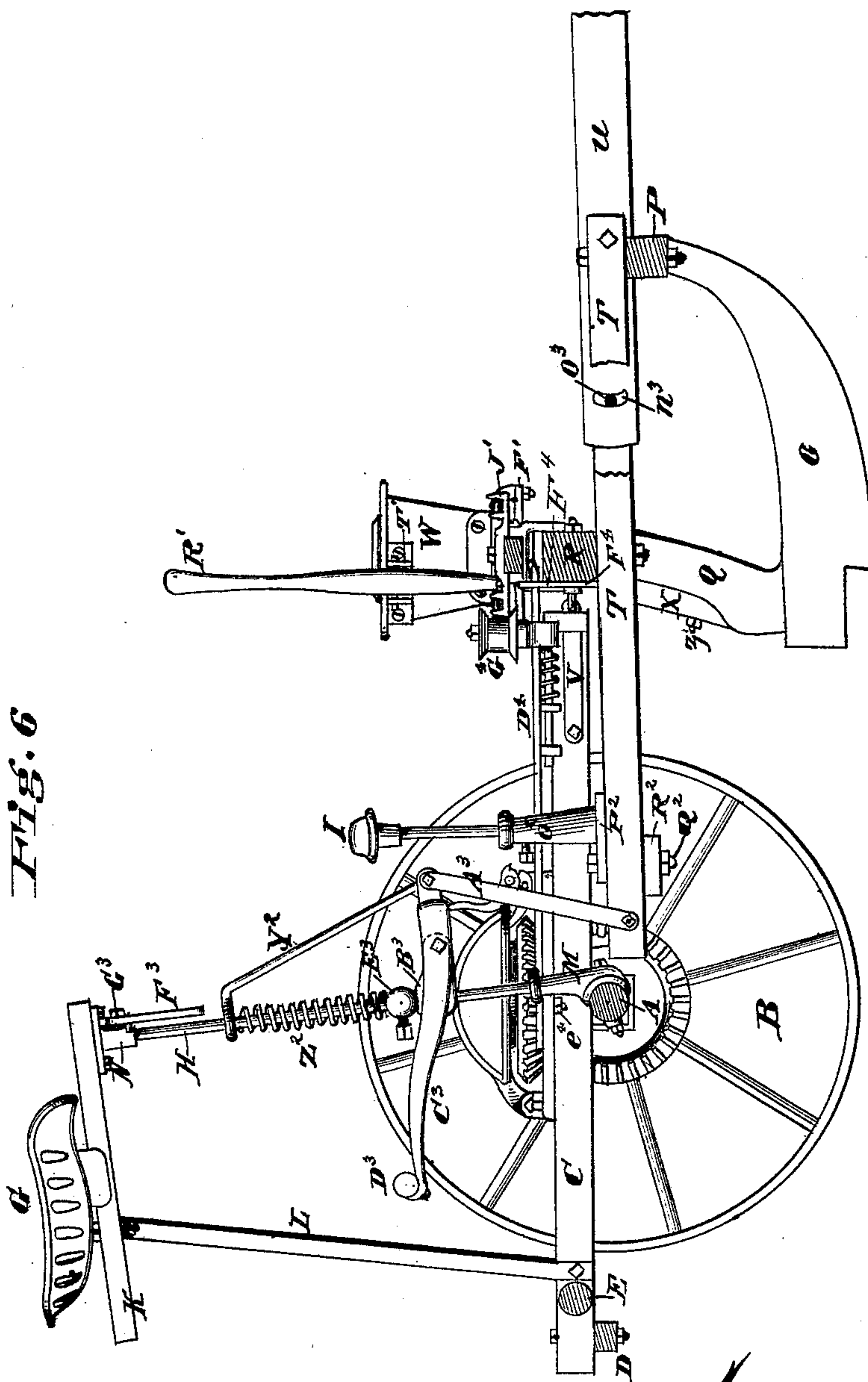


Fig. 6

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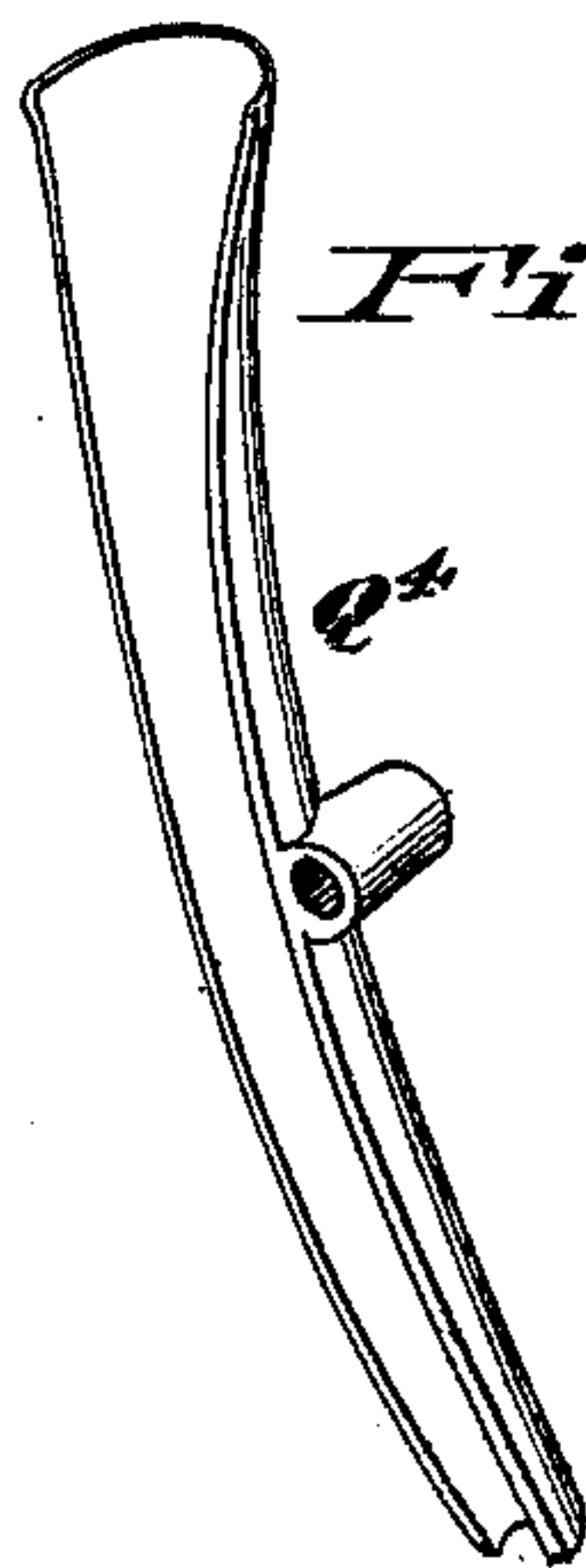
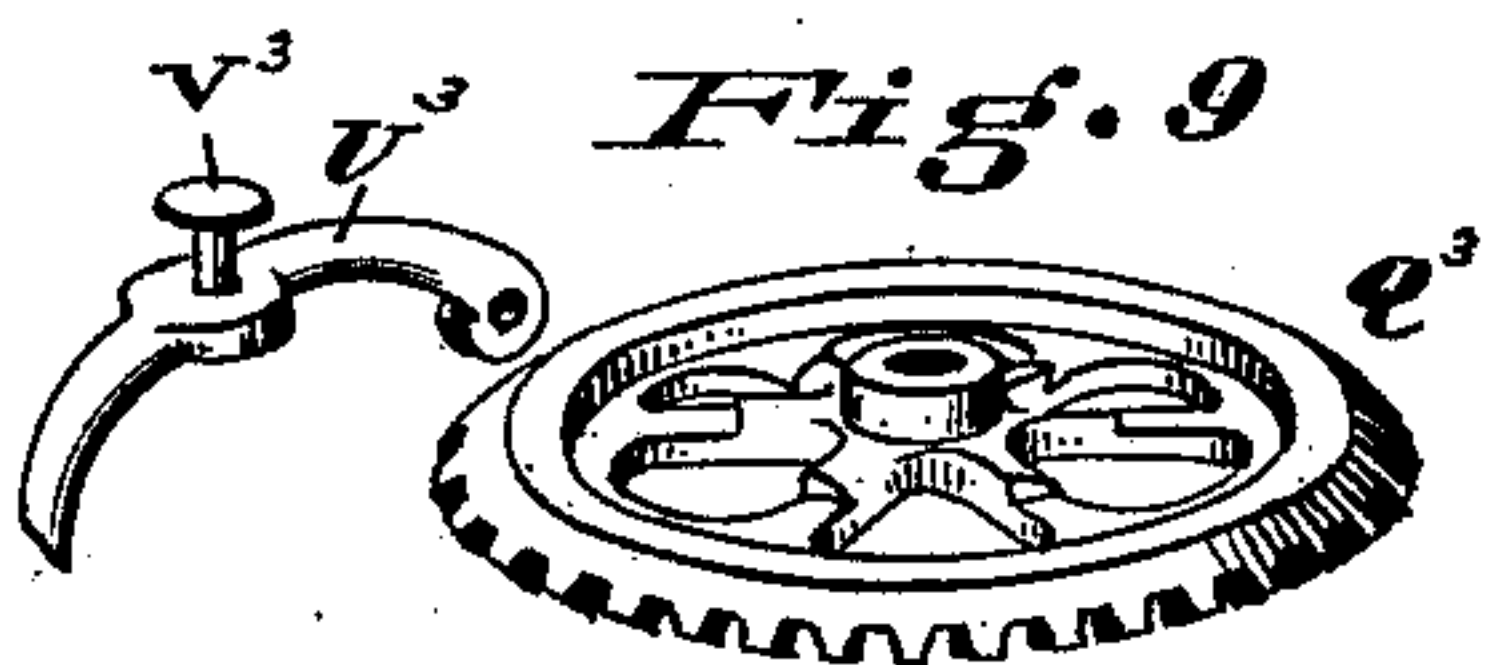
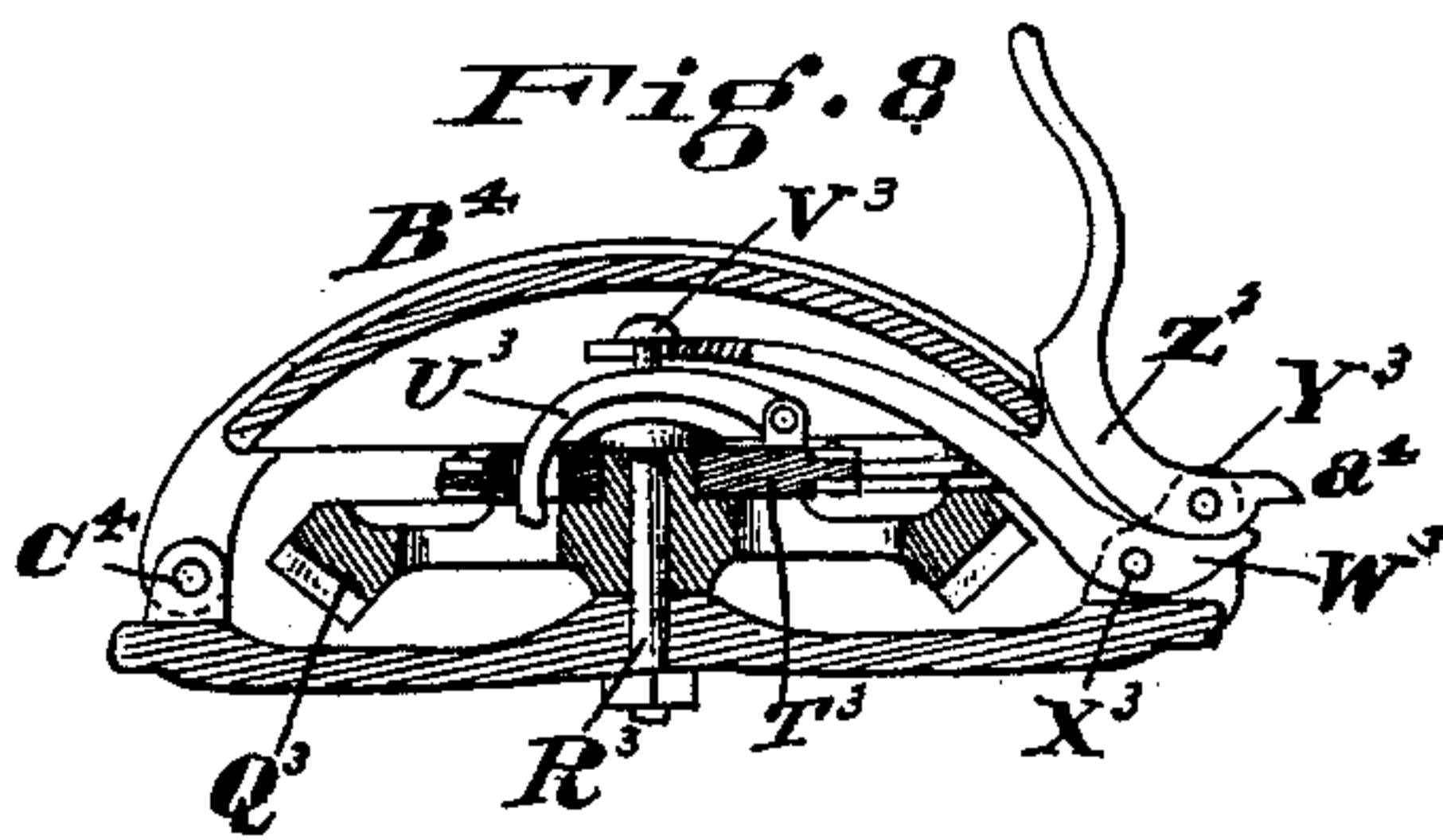
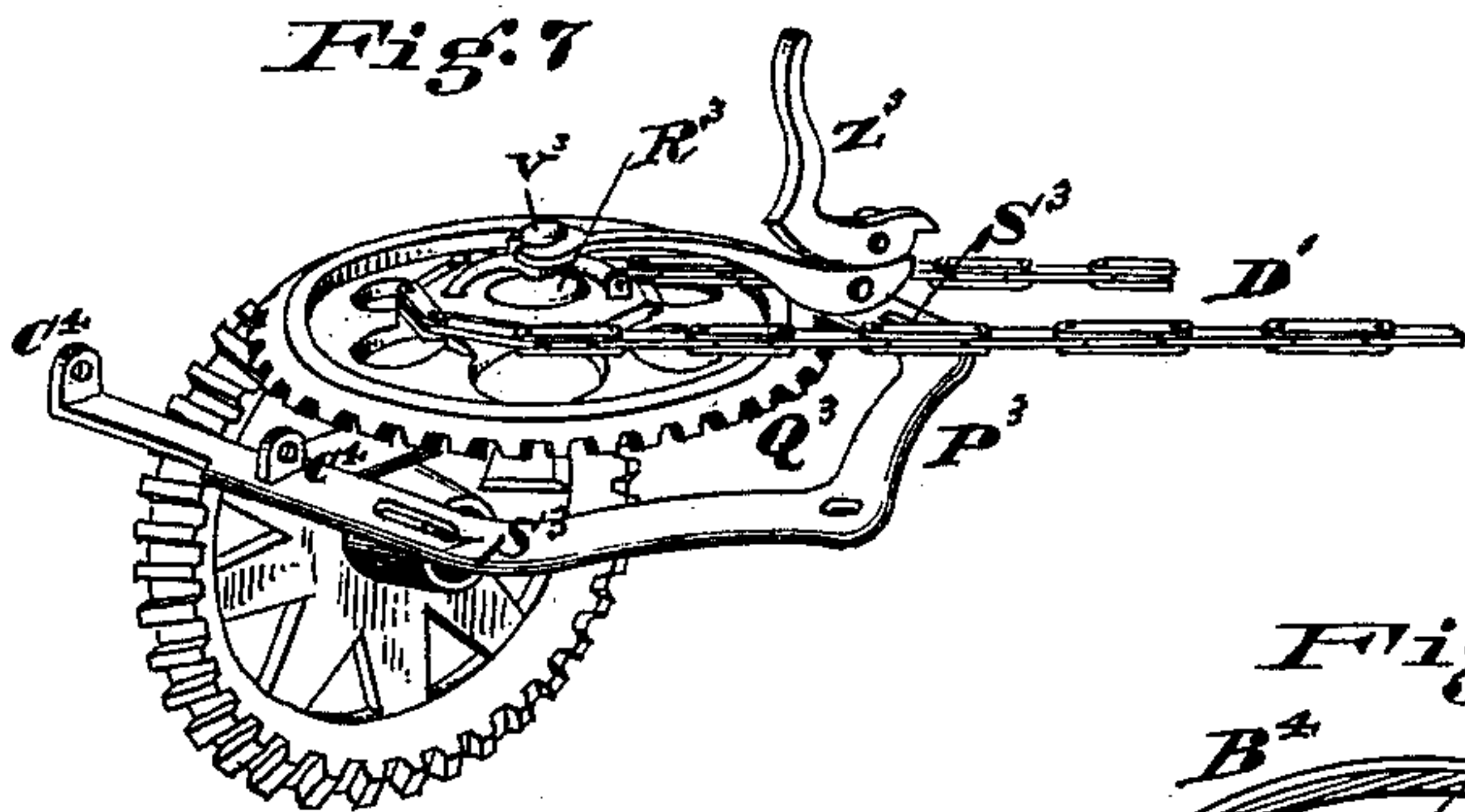
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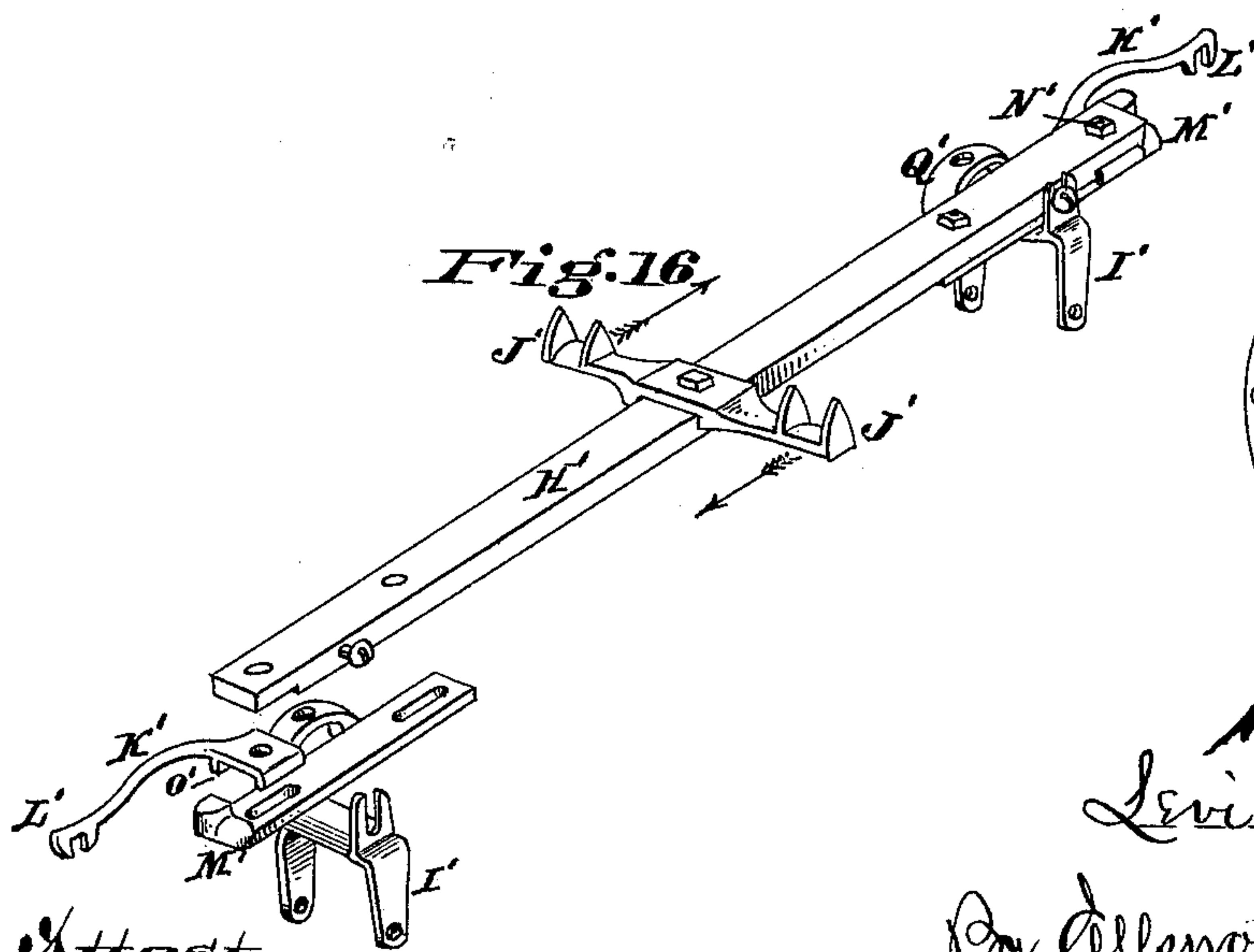
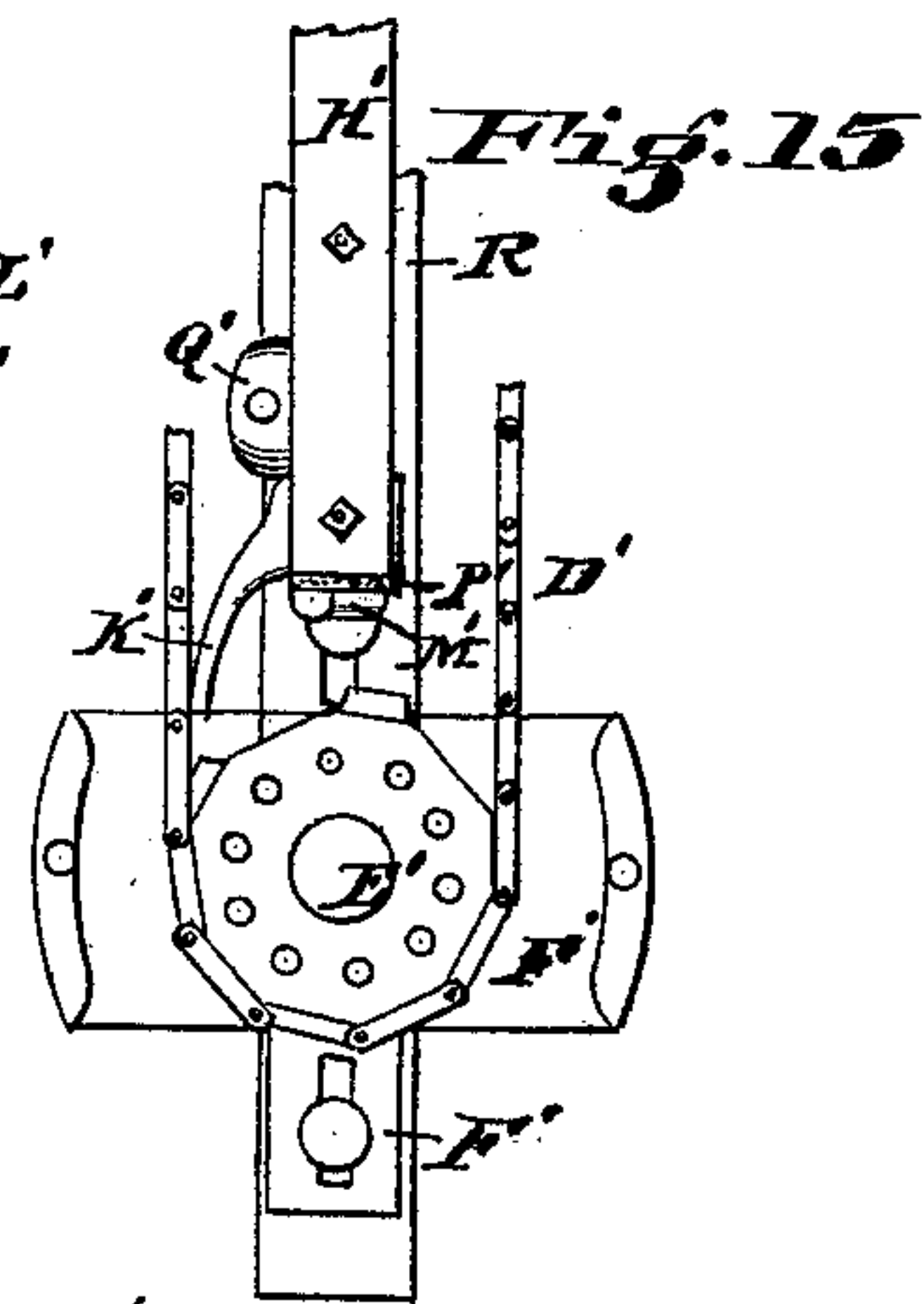
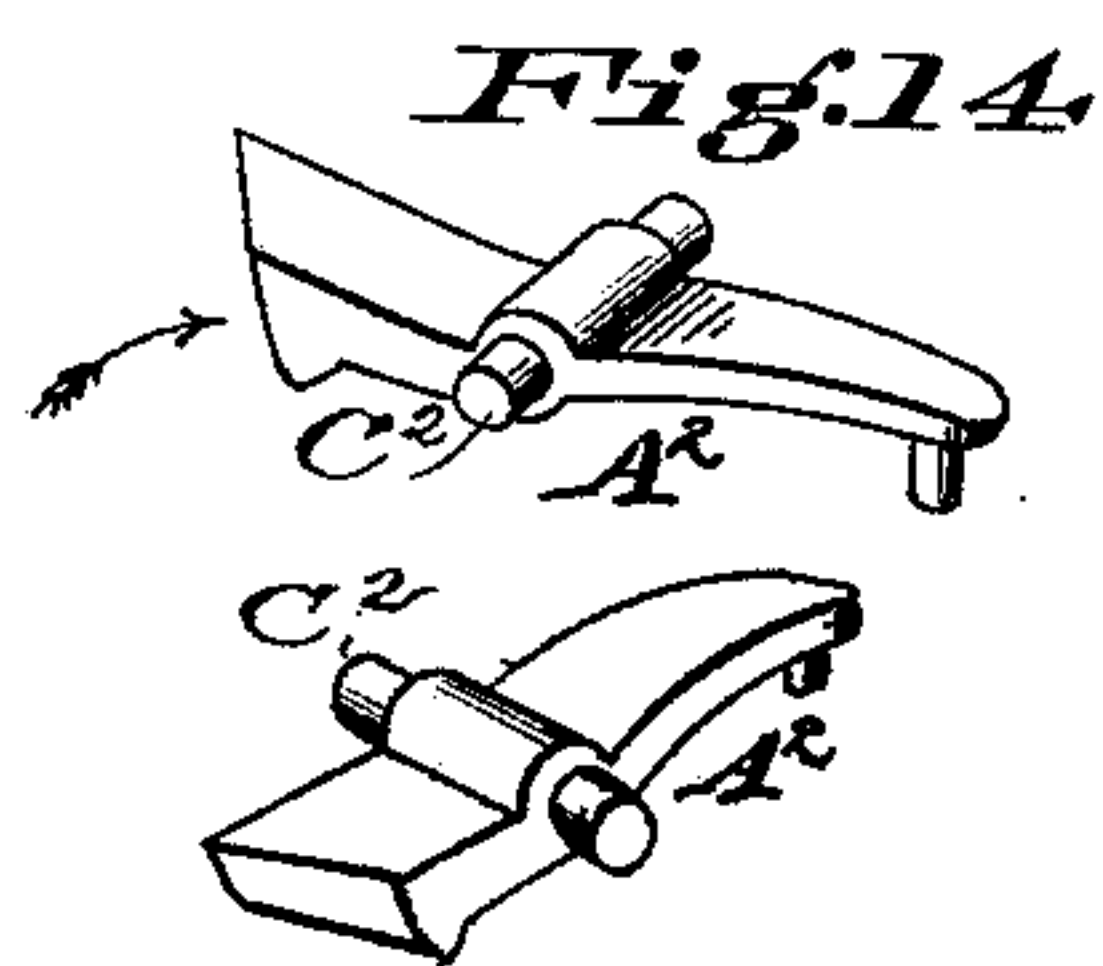
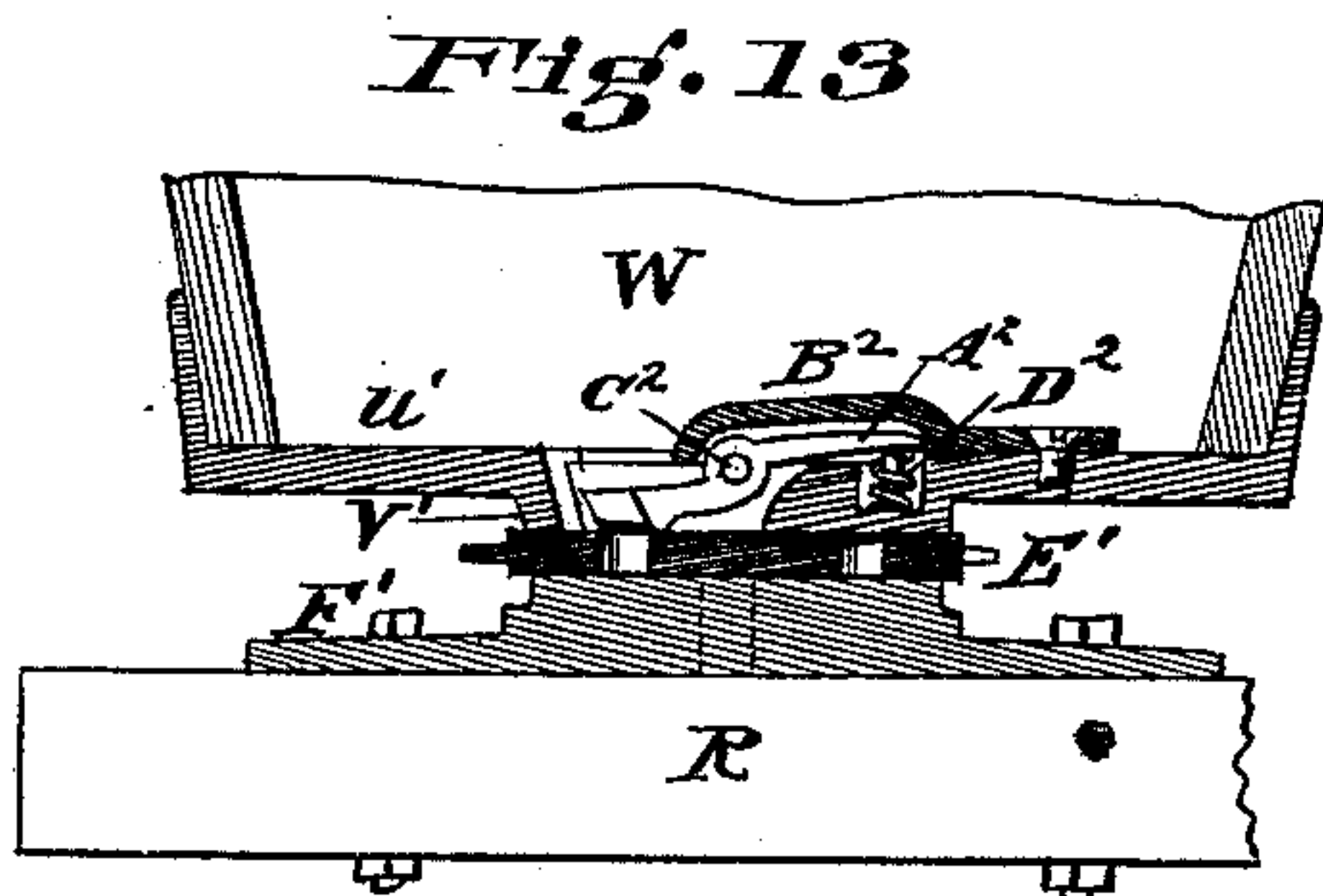
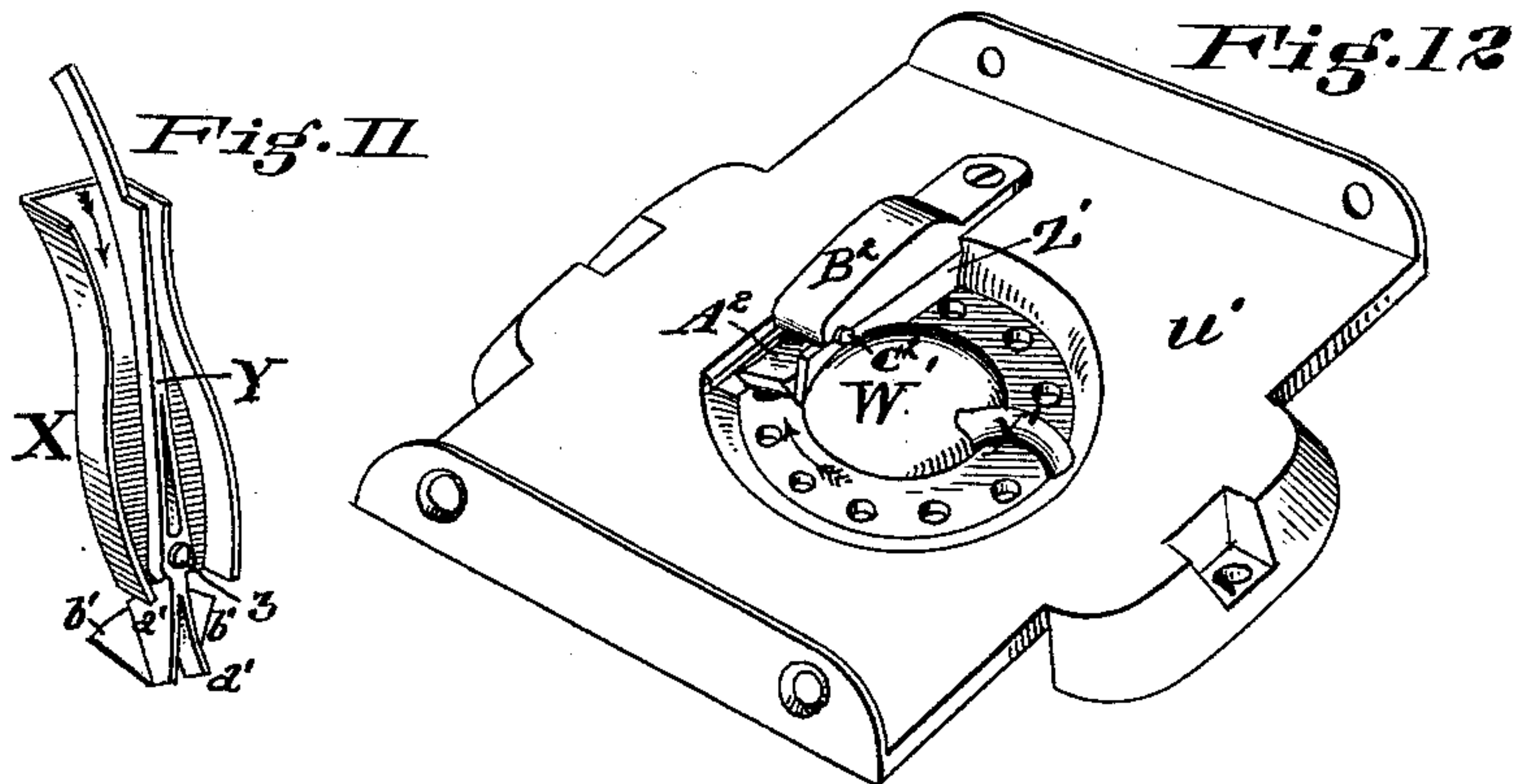
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Fig. 17

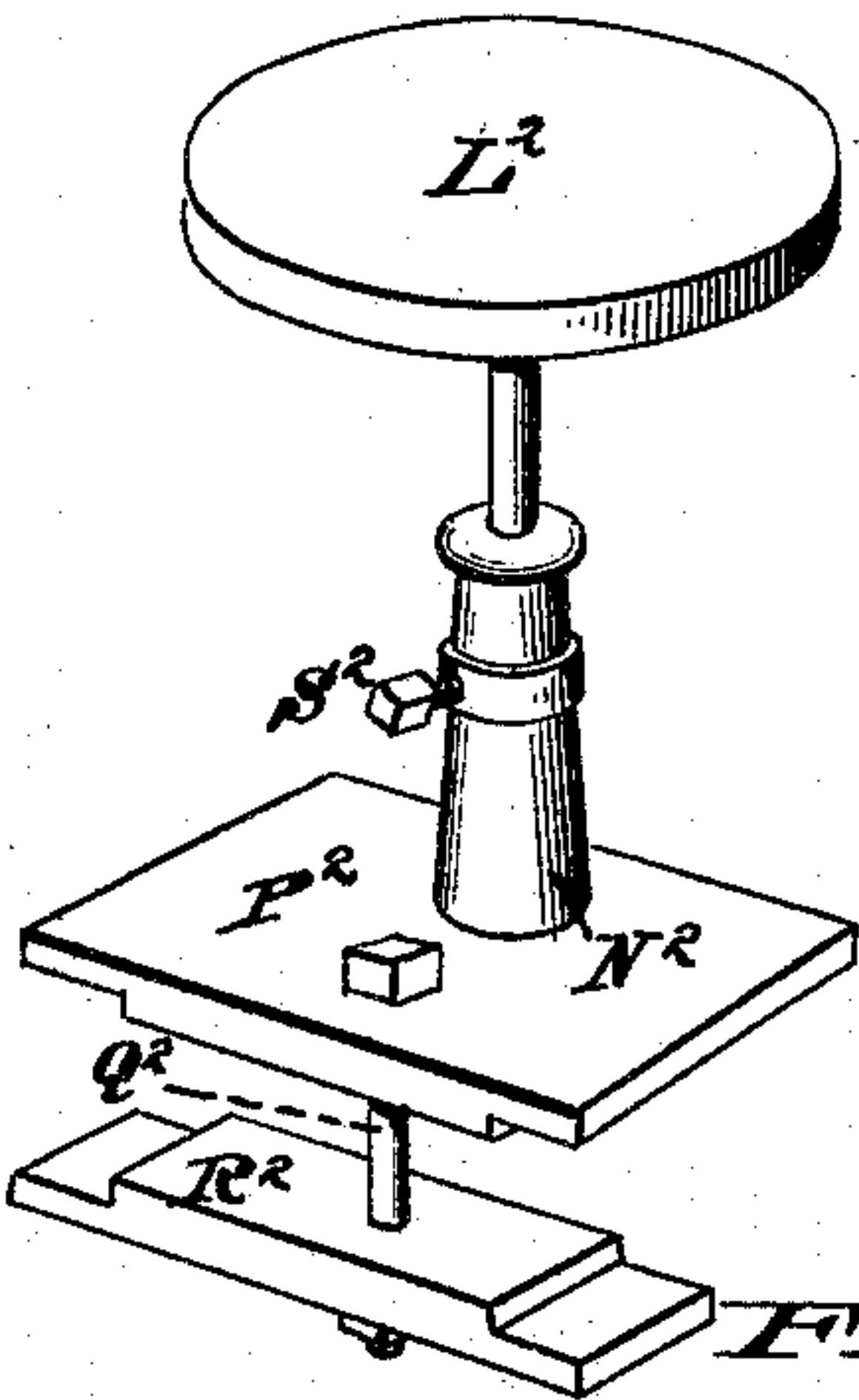


Fig. 18

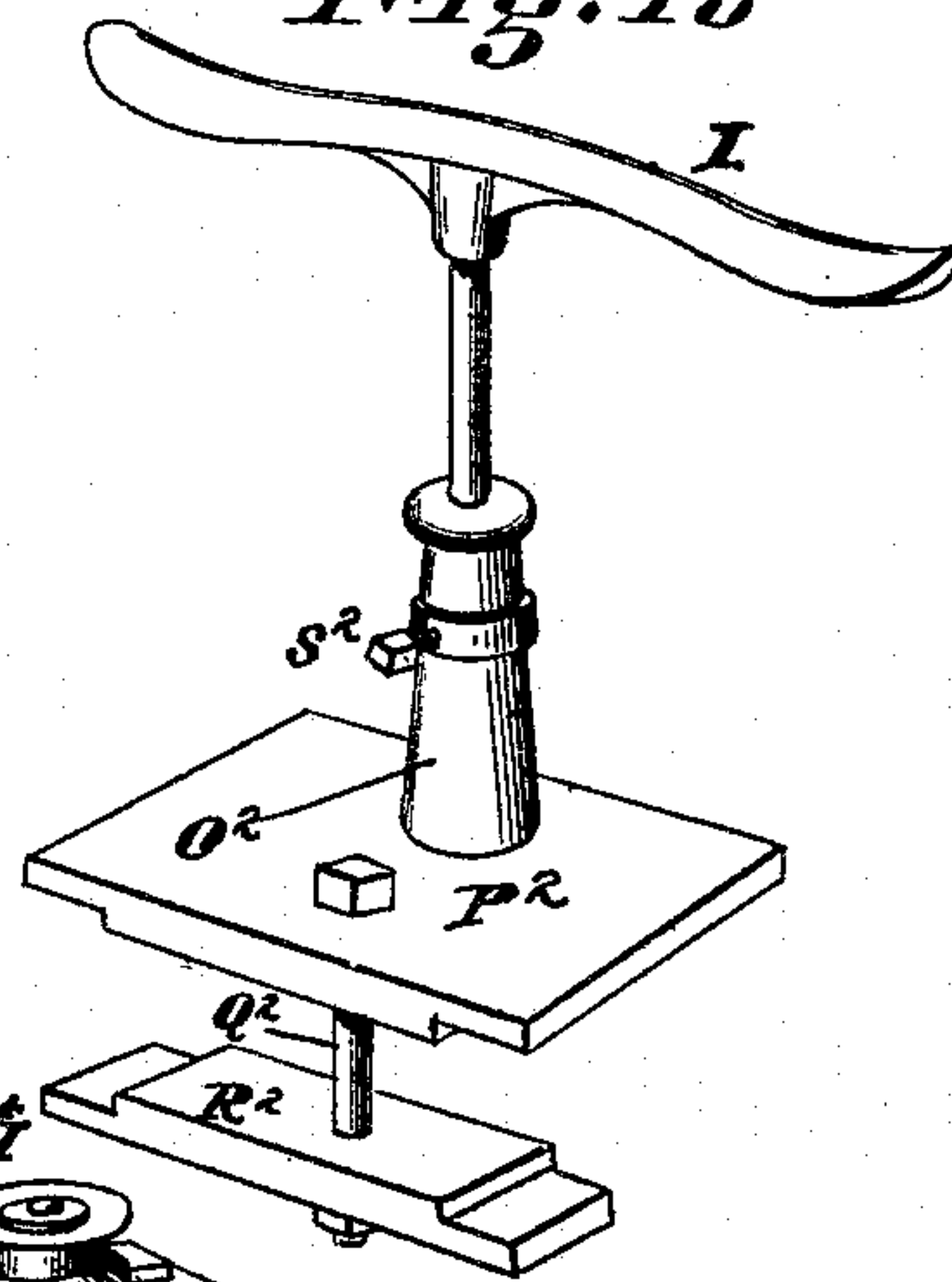


Fig. 19

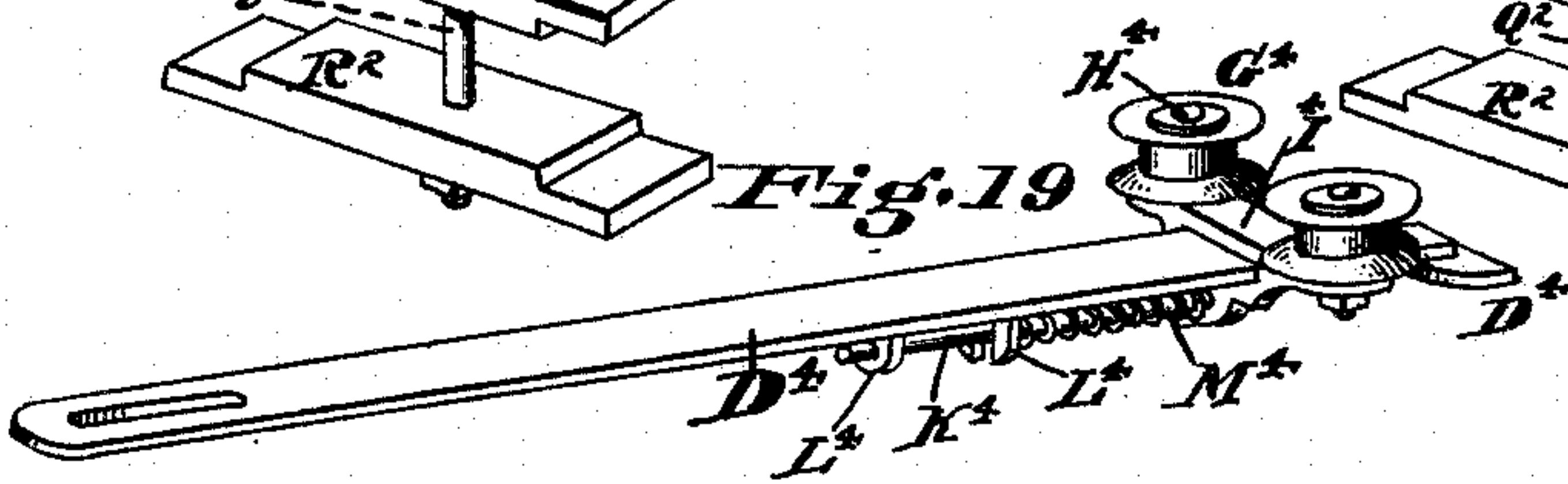


Fig. 21

Fig. 20

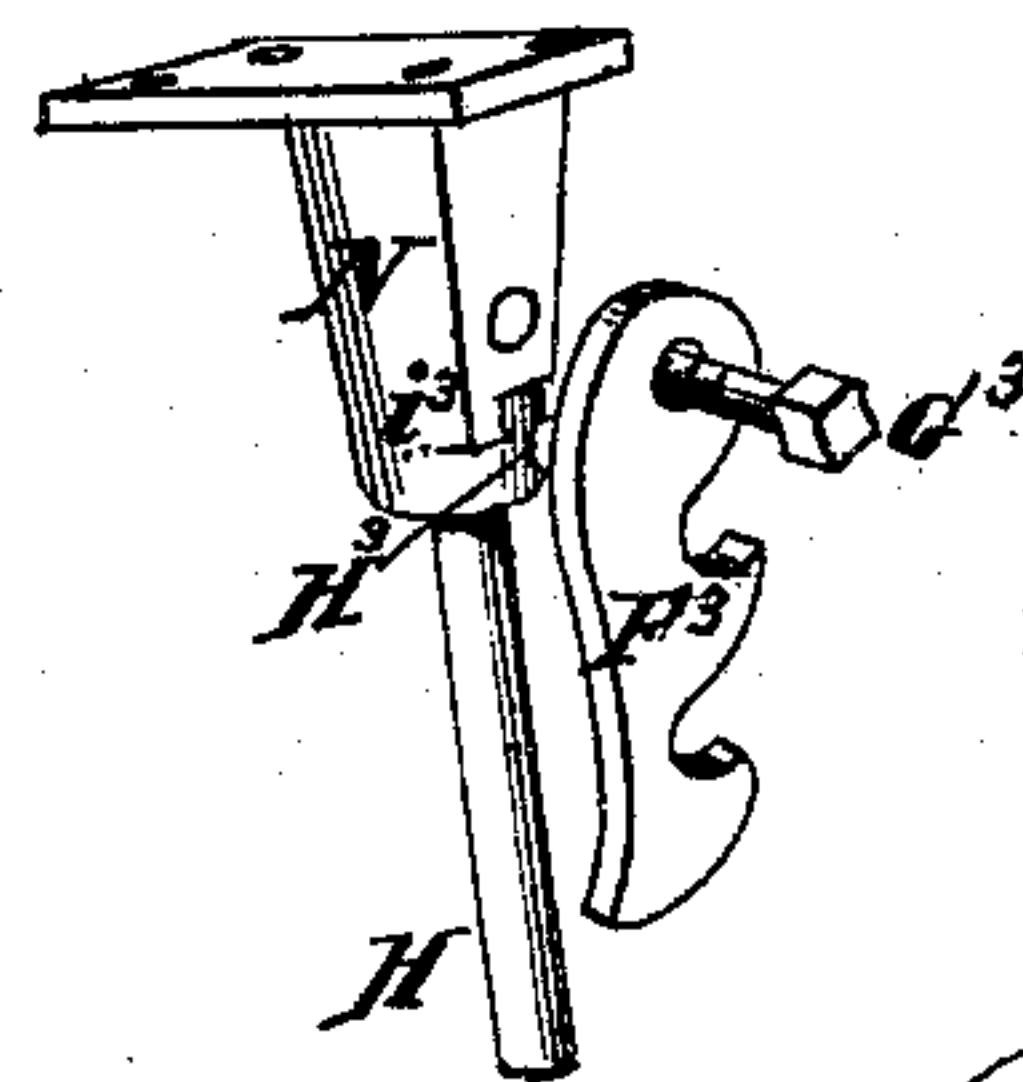
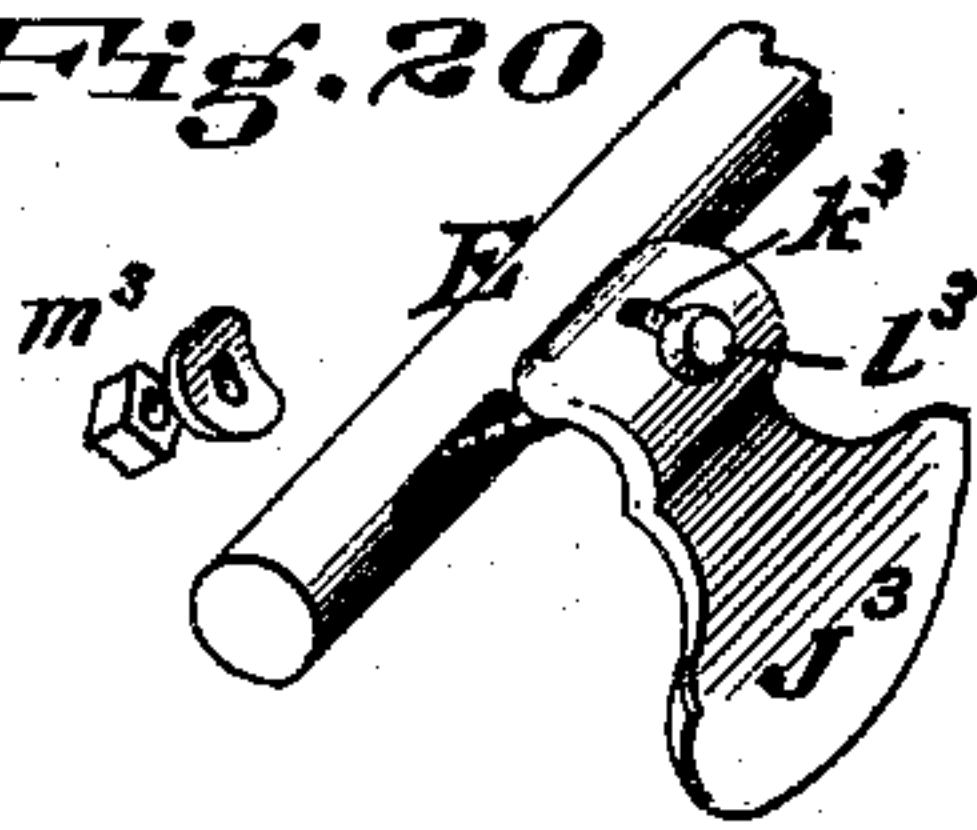


Fig. 23

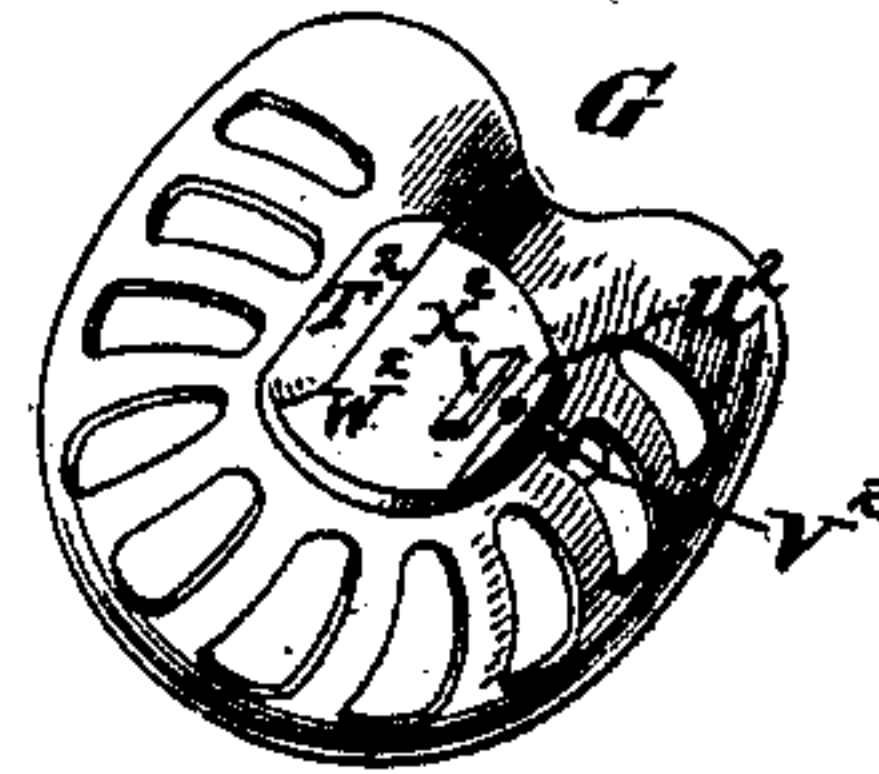
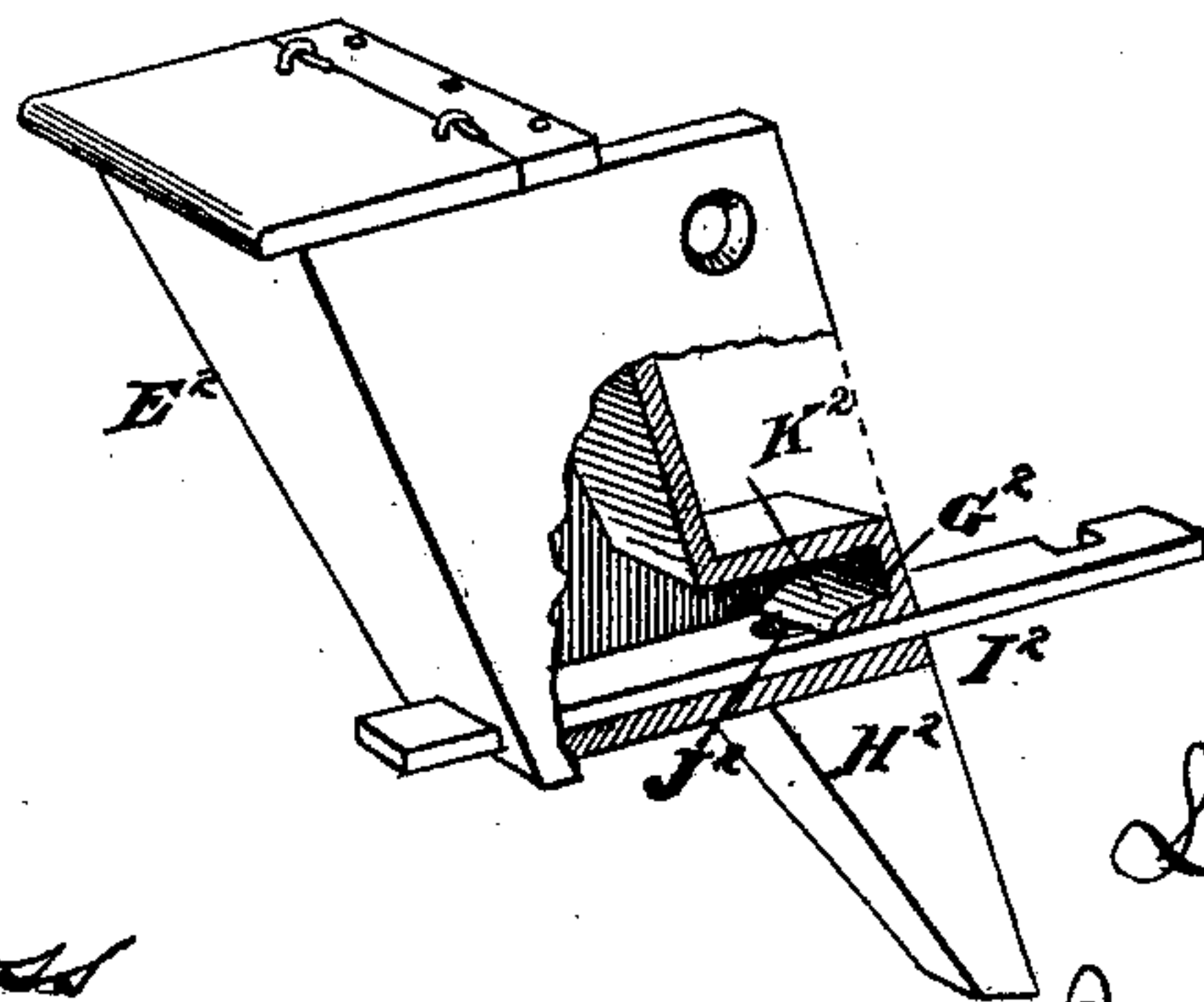


Fig. 22



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# UNITED STATES PATENT OFFICE.

LEVI SCOFIELD, OF GRAND HAVEN, MICHIGAN, ASSIGNOR OF ONE-HALF HIS RIGHT TO JUSTIN B. WAIT, OF SAME PLACE.

## IMPROVEMENT IN CORN-PLANTERS.

Specification forming part of Letters Patent No. **218,833**, dated August 26, 1879; application filed September 24, 1878.

*To all whom it may concern:*

Be it known that I, LEVI SCOFIELD, of Grand Haven, in the county of Ottawa and State of Michigan, have invented certain new and useful Improvements in Combined Check-Row and Drill Corn-Planters; and I do hereby declare the following to be a full, clear, and exact description of the same, which will enable others skilled in the art to which my invention relates to make and use it, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1, Sheet 1, is a perspective view of the machine as used for a drill. Fig. 2, Sheet 2, is a similar view of the machine from the opposite side, as used for a check-row or hill planter. Fig. 3, Sheet 3, is a top-plan view of the machine arranged for drilling, with the cover of the gearing removed. Fig. 4, Sheet 4, is a rear elevation of the dropping mechanism and runners adapted for drilling. Fig. 5, Sheet 4, is a similar view of the mechanism adapted for check-row planting, and showing the pumpkin-seed dropper. Fig. 6, Sheet 5, is a longitudinal section of the machine, adapted for use as a check-row planter. Fig. 7, Sheet 6, is a perspective view of the mechanism for operating the chain when the machine is used as a drill. Fig. 8, Sheet 6, is a sectional view of the same. Fig. 9, Sheet 6, is a perspective view of the locking-dog and one of the gear-wheels, showing the beveled spokes. Fig. 10, Sheet 6, is a perspective view of the seed-conductor used with the drill. Fig. 11, Sheet 7, is a perspective view of the seed-conductor and check-valve used with the check-row planter. Fig. 12, Sheet 7, is an enlarged perspective view of the seed cut-off devices in the hoppers. Fig. 13, Sheet 7, is a vertical section of the same through the cut-off valve. Fig. 14, Sheet 7, is a perspective view, showing the cut-off valve in different positions. Fig. 15, Sheet 7, is a top-plan view of one seed-plate and its supports, and showing a portion of the driving-chain, one end of the slide-bar and its attachments, and the means for adjusting the hopper on the runner-beam. Fig. 16, Sheet 7, is a perspective view of the slide-bar, one end showing the stop, bracket-arm, and rocking support detached, and the oppo-

site end showing them in working position on the bar. Figs. 17 and 18, Sheet 8, are perspective views of the driver's seat and dropper's foot-rest detached from the machine. Fig. 19, Sheet 8, is a perspective view of the guide-pulley bar used with the drill. Fig. 20, Sheet 8, is a perspective view, showing the method of attaching the scrapers to the scraper-bar. Fig. 21, Sheet 8, is a view of the hook for holding up the reach, and showing the means for its attachment to the thimble which supports the seat. Fig. 22, Sheet 8, is a perspective view of the pumpkin-seed dropper, partly broken away to show the interior; and Fig. 23, Sheet 8, is a perspective view of the driver's seat inverted.

Similar letters refer to similar parts.

My present invention is designed to improve certain parts of the corn-planter for which Letters Patent of the United States were granted and issued to me April 13, 1875, No. 162,106, and January 18, 1876, No. 172,280.

The improvement upon the planter patented April 13, 1875, consists, first, in the construction of the seed-conductor and check-valve, for the purpose of simplifying and rendering them more accurate and effective in check-row planting.

It also consists in a short seed-conductor secured to the runner-beam, being made wide at the top to permit a large discharge from the seed-box, thereby insuring the passage of seed from the seed-plates when the latter are adjusted on the runner-beam to compensate for the wear of the driving-chain, and made narrow at the bottom, to direct the grain into the main conductor beside the vibratory check-valve.

It also consists in the combination of the short seed-conductors with the seed-plates, main seed-conductors, and vibratory check-valves.

It also consists in adapting the seed-plates for adjustment on the runner-beam, to compensate for the wear of the chain which drives the plates.

It also consists in the construction of the notched bracket or arm which connects the slide-bar with the check-valves, whereby it is made short and curved round at the back of



the short seed-conductors to engage the valves, and fixed securely to the bar instead of being made adjustable thereon.

It also consists in the construction of the stops by which the momentum of the seed-plates is arrested when their apertures register with those of the bearing-plates beneath them, such stops being made adjustable relatively with the adjustment of the seed-plates.

It also consists in casting the stops with the sockets or eyes which receive the dropper-lever, for the purpose of economy in the manufacture and strength and security in the several parts.

It also consists in combining an elastic cushion and the adjustable stops with the slide-bar, the driving-chain, and the seed-plates, for the purpose of adapting the length of the slide-bar to the adjustments of the seed-plates when the driving-chain becomes worn, and to prevent the stops from being driven back on the slide-bar after the adjustment.

It also consists in the peculiar construction of the cut-off valves, whereby they prevent the free seed in the hoppers from catching upon any projecting seed in the seed-plate chambers or openings, and readily slide up and over such projecting seed without cutting, bruising, or otherwise injuring it.

It also consists in such an arrangement of the seed-valves that their oblique beveled ends shall sit directly over the center of the chamber in the seed-plates next in front of the one which is in the proper position to drop the seed, so that if the seed catches at all under the cut-off it will do so at the first part of the stroke or movement of the slide bar, when the operating mechanism has most power, and thereby prevent the chain or rope which actuates the seed-plates for check-row planting from slipping, and consequently insuring the correct dropping of the seed in each hill.

It also consists in the means for combining a pumpkin-seed dropper with the corn-planter, so as to simultaneously drop the pumpkin-seed and corn from one of the seed-conductors of the corn-planter.

It also consists in constructing the dropper's seat with an adjustable socket, by which it may be adjusted at any point forward or back of the runner-beam, and at the requisite height.

It also consists in constructing the driver's foot-rest with a similar socket, by which it may be adjusted vertically for drivers of different heights, and horizontally to properly balance the machine.

It also consists in the construction and means for attaching the hook by which the reach is suspended to hold the runners out of the ground.

It also consists in the construction of the reach, by which it is jointed instead of being rigid, and therefore more easily effected by its attendant mechanism.

It also consists in casting or otherwise firmly securing the boss or pivot bar of the lifting-levers to the front leg of the driver's seat, and

connecting said levers to the jointed reach, instead of making such pivot-bar adjustable on the seat-leg and connecting the levers directly with the hounds independently of the reach, as in my patent of April 13, 1875. By this improvement the foot-levers always occupy the same position on the seat-leg when the runners are raised, and the latter can therefore be more completely controlled by the driver to regulate the depth of planting.

It also consists in providing the seat-leg with an adjustable collar to support the spring of the hounds independently of the pivot-bar carrying the foot-levers, for the purpose of relieving such bar from the strain produced by the pressure of the spring when the hounds are bearing upon it.

It also consists in casting the foot-levers in one piece, for the purpose of making them strong and rigid, so that when the driver presses with his foot upon either end of the foot-bar the levers will move evenly each side the seat-leg to raise the runners, said foot-lever being combined with the fixed boss on the seat-leg and with the hounds.

It also consists in the means for adjusting the driver's seat on its support to balance the machine.

The improvement upon the planter patented January 18, 1876, consists, first, in the construction and arrangement of the devices for throwing the plate which drives the drill-chain in and out of operation.

It also consists in the combination, with the dog which locks the driving-plate to the driven gear-wheel, and the forked lever connected to the dog, of a cam-lever arranged outside the hinged cover, whereby the driver can operate the dog with his foot when the hinged cover is closed.

It also consists in the provision of means to automatically prevent the movement of the chain to operate the seed-plates when the machine is backing, and to set it in operation again when the machine moves forward.

It also consists in attaching the guide-pulleys of the driving-chain to their supporting-bar with a yielding or spring connection, for the purpose of preserving a uniform tension of the chain when the runners are raised and lowered during the operation of the drill.

It also consists in the means for converting the machine into a drill or check-row planter, according to the character of the work to be performed.

It also consists in providing one set of seed-conductors for drilling the grain into the ground, and another set for check-row planting, both sets being equally adapted for attachment to the runner-shanks under the short seed-conductors by the same means.

It also consists in the means for locking the sliding bar of the check-row mechanism to the runner-beam when the machine is to be used as a drill.

Referring to the accompanying drawings, I will now proceed to describe the parts com-



mon to the check-row and drill planter, and shown in the two patents above referred to, after which I will point out the distinctive improvements in each and those common to both.

A represents the axle of the machine; B, the supporting-wheels; C C, the side bars of the frame, mortised into the axle and joined at their rear ends by the cross-bar D.

E is the scraper-rod, journaled in the side pieces, and provided with a long lever, F, extending upward beside the driver's seat G, which is mounted upon a bar, K, supported from the axle by a long leg, H, and from the side pieces, C C, by a bent bar or bars, L. The front leg of the seat-bar is connected to the axle by being stepped in a socket, M, bolted thereto, and its upper end is fitted into a socket, N, on the under side of the seat-bar.

O are the runners, having their front ends connected by a cross-bar, P, and their rear ends provided with the runner-shanks Q, which are bolted or otherwise secured to the runner-beam R.

S S are side pieces extending from the runner-beam to the cross-bar P, to support and strengthen them.

T T are the hounds, composed of two parallel bars, firmly secured to the under side of the runner-beam and to the front cross-bar, P, with the draft-pole U between them. The side bars of the frame are joined to the rear of the runner-beam by the compound coupling-joints V, as shown in the patents referred to, so that the runners shall conform to the inequalities of the ground, and thereby insure uniformity in the depth of planting.

W W are the hoppers, carrying the seed-plates and their supports; and I is the foot-rest, by which the driver presses the runners into the ground when the machine is in operation either as a drill or check-row planter.

These various parts, with the exception of the rear cross-bar, B, of the frame, are all substantially shown in my prior patents, and are used both with the drill and check-row planter.

The improvements in the check-row mechanism are as follows, and, first, with respect to the check-valves and seed-conductors: In my Patent No. 162,106 the seed-conductors are pivoted so as to vibrate at the back of the runner-shanks, and are each formed with two channels, which alternately receive the seed from the hopper and conduct it to the ground. Their upper ends extend up alongside the runner-beam, under the hopper, where they are connected by a pin with a straight bracket on each end of the slide-bar, by which they are vibrated, such brackets passing along the runner-beam, which must be recessed to receive them, and catching over the pins at the back of the seed-conductors.

My improved seed-conductors X are short tubes, open on one side, bolted to the runner-shanks, and extending up only to the lower side of the runner-beam.

Y are the check-valves, pivoted within the

seed-conductors by means of rivets or bolts z, so as to vibrate freely; and the conductors are secured to the runner-shanks by bolts z', which pass through a slot or opening made in the check-valves, as shown in Fig. 11, the opening being wide enough for the valve to swing properly. The lower ends of the valves project below the seed-conductors, and are formed of two wings, which are first extended rearward parallel to each other, as shown at a', Figs. 2, 5, and 11, and then turned outward away from each other, to form triangular wings b' whose outer edges alternately come in contact with wings of the runner-shanks when the valves are vibrated, as shown. By this construction an open drop is formed, which will expose the seed to the driver and dropper while occupying their seats, and enable them to determine whether or not the seed is being properly dropped into the hills. The upper ends of the check-valves extend above the seed-conductors and up under the seed-boxes, to connect with the brackets of the slide-bar.

The valves are composed of malleable iron, so that their lower ends may be bent to close the open drop in any desired shape, and their upper ends to conform to the operating devices, or for other purposes connected with the successful operation. By this construction the check-valves can be easily adjusted to the shanks forming the open drop, and, together with the seed-conductors, form a simple and accurate dropping mechanism, which can be readily and easily applied and removed when desired.

C' C' are short seed-conductors, bolted or otherwise secured to the runner-beam in front of the projecting shanks of the check-valves, and fit up under the plates which are attached to the beam for supporting the hopper and seed-plates. They are made wide at the top to receive a large quantity of seed from the hoppers, and narrow at the bottom, where they meet the main seed-conductors X, so as to easily discharge just the requisite quantity of seed into the main conductor each side of the valve. The enlarged upper ends of the short conductors allow a large discharge of seed from the hoppers, which is essential to insure the discharge of seed from the seed-plates, or, in other words, to allow the seed-plates to clear themselves by letting the seed run freely through them. These enlarged upper ends also serve the purpose of receiving the seed from the seed-boxes when the latter are adjusted upon the runner-beam.

E' E' are the seed-plates, provided with peripheral teeth to enter the open links of the driving-chain D', and pivoted upon plates F' at the ends of the runner-beam. The bearing-plates F' carry the hoppers W, which are bolted to them, as shown at g', Figs. 1, 2, 3, 4, 5, and that part which rests upon the runner-beam is slotted at both ends for the passage of the bolts or screws by which they are held in place. By this method of attachment



to the runner-beam the seed-plates and hopper are made adjustable longitudinally thereof throughout the length of the slots in the bearing-plates, for the purpose of compensating for the wear of the driving-chain.

In my Patent No. 162,106, the mechanism for operating the check-valves, driving the seed-plates, and arresting their momentum at the proper points for registering their discharge-openings with the discharge-openings in the bearing-plates consists in a bar resting upon the runner-beam, and adapted to be reciprocated thereon between guides by a dropper-lever in the hands of the operator; the driving-chain  $D^1$ , above described, which is intermittently moved in the same direction when the slide-bar is reciprocated by means of two beveled catches projecting laterally from the center of the bar on opposite sides; a straight adjustable bracket at each end of the slide-bar engaging with the shanks of the check-valves; and a non adjustable stop on opposite ends of the bar, which comes in contact with the teeth of the seed-plate at the end of each stroke, for the purpose of stopping the rotation of the plate at the proper point.

My improvements upon this mechanism are as follows: The sliding bar  $H^1$ , instead of resting upon the runner-beam, is supported above it by the metal rocking bearings  $I^1$ , as shown in my Patent No. 194,004, dated August 7, 1877, and is provided with the lateral catches  $J^1$  for moving the driving-chain. In place of the straight adjustable brackets on the ends of the sliding bar, the use of which necessitates cutting recesses in the runner-beam, and thereby weakening it, I now employ the short metal brackets  $K^1$ , (shown in Fig. 16,) which are firmly secured to the under side of the slide-bar and bent or curved back behind the runner-beam, so that their notched ends  $L^1$  shall engage with the check-valves in rear of the short seed-conductors. By this construction the necessity for recessing the beam is avoided, and the brackets can be readily disconnected from the valves when required. They are also made non-adjustable on the slide-bar, because, the throw of the valves being always the same, the adjustment is not necessary; and if there should be any difficulty in fitting them properly on the valves, the latter, being made of malleable iron, can be easily bent to the right position.  $M^1 M^1$  are the metal stops; but instead of being fixed on the slide-bar, they are made adjustable by the slots and screws, for the purpose of being moved so as to act properly upon the seed-plates when the latter are adjusted to compensate for the wear of the driving-chain. The stop and bracket are secured together on the slide-bar by a bolt or screw,  $N^1$ , the bracket being placed next the bar, and the plate of the stop fitting between the two side flanges,  $O^1$ , on the bracket. This forms a secure connection, the flanges preventing the bracket from turning on its bolt.  $P^1$  is a leather or other elastic strip, which may be interposed between

the stops and ends of the slide-bar, for the purpose of lengthening the latter when the wear of the driving-chain necessitates the outward adjustment of the seed-plate bearings  $F^1$ . It also prevents the stops from being driven back on the bar after such adjustment; otherwise the force of the blows might drive the stops back on their bolts, and cause them to fail of registration with the teeth of the seed-plates. The plates of the stops serve as bearing surfaces for the rocking bearings  $I^1$ , to prevent the wear of the slide-bar, which is preferably made of wood, and they are also cast along one edge with a socket or eye,  $Q^1$ , extending up in the rear of the slide-bar, to receive the point of the dropper-lever  $R^1$  when its trunnions  $S^1$  rest in the brackets  $T^1$ , affixed to the inner ends of the seed-boxes. This forms a convenient arrangement for the dropper-lever, and places it in the best position for operation by the dropper from his seat.

Patent No. 162,106 shows the cut-off valves made in a curved form, and resting with their entire ends in close contact with the seed-plates, being held in place by supplemental plates secured to the central support in the hopper-bottom. A spring is employed to hold the point of the valve down with a yielding pressure, so as to act as a cut-off, and at the same time relieve the pressure to prevent breaking the seed in the plate.

My improvements in the cut-off mechanism consists in dispensing with the central supplemental plate, and in the peculiar form and arrangement of the cut-off valves.

The bottom of the hopper is composed of a metal plate,  $U^1$ , bolted to the bearing-plate  $F^1$ , as above described, and formed with a central circular opening, provided with a downwardly-projecting flange,  $V^1$ , resting upon the seed-plates, without obstructing their free movements.

$W^1$  is a circular boss covering the pivot of the seed-plate, and connected with the hopper-bottom by an arm,  $X^1$ , which is curved upward for the passage of seed beneath it. The opposite end of the boss is squared, so as to leave a recess between it and the flange of the hopper-bottom to receive the valve. The boss is also connected to the hopper-bottom in rear of the valve-recess by a tangential plate,  $Z^1$ , as shown in Fig. 12, which also forms the back end of the valve-recess. This plate, together with the boss and curved arm  $X^1$ , are preferably cast in one piece with the hopper-bottom, although they may be made separate therefrom, and secured in position by bolts or set-screws.

$A^2$  are the valves, which are made straight, instead of curved, so as to lie within the recess, being held in place by cap  $B^2$ , screwed to the tangential plate  $Z^1$ . The valve is hung upon trunnions  $C^2$ , having their bearings partly in the cap  $B^2$  and partly in the boss, and in the hopper-bottom, opposite the boss. The point of the valve is held down upon the seed-plate, to form a cut-off, by means of the



spring  $D^2$ , fitting under its short arm within a recess of the tangential plate, as shown in Fig. 13.

The end of the valve on the seed-plate is of peculiar form, being inclined or beveled transversely, beveled vertically, so that its upper edge shall project forward beyond the lower edge, and beveled along its outer side, so as to leave a small wedge-shaped space under it, which is open at the outer edge and closed at the inner edge of the valve, as shown in Figs. 12, 13, and 14.

By this construction the free seed in the hopper is prevented from catching upon any projecting seed in the seed-plate openings, and the valve readily moves up and slides over such projecting seed without cutting, bruising, or injuring it in any other manner, because the three bevels or inclines cause the seed to lift the valve gradually and easily. The outer end of the valve rests diametrically over that chamber or seed-opening in the seed-plate which is next in advance of the one which is in position to drop the seed through the plate  $F^1$  into the seed-conductors. The seed-passage in the plate  $F^1$  is clearly shown by the dotted lines, Fig. 13.

By this arrangement of the valve with respect to the seed-chambers, if the seed should catch under the cut-off it will do so at the first part of the stroke made by the slide-bar, when it has the greatest power, thereby preventing the driving chain or rope from slipping, and therefore insuring the proper dropping of the seed.

In rotary drop-planters having cut-off valves of the ordinary construction, the seed is dropped at the weakest or last end of the stroke just after such seed has passed under the cut-off, and if it catches against the cut-off, so as to cause the seeding mechanism to work harder than usual, the rope or knot therein that actuates the check-row attachment will slide out of place, and the seed will fail to drop. This is of frequent occurrence, and greatly impairs the efficiency of the machine. This is also true in hand-dropping, to a certain extent, as a slight obstruction at the last end of the stroke will often cause the dropper to miss a hill.

By my improvements, however, this cannot occur, because it is impossible for the seed to catch, excepting at the first part of the stroke, when the check-row attachment has full power.

$E^2$  is the pumpkin-seed dropper, which may be used with the machine, when desired, by being attached to one of the hoppers. In the drawings, Fig. 5, it is shown attached to the left-hand hopper by screws  $F^2$ . It is made in the form of a box or hopper, with an offset,  $G^2$ , at its lower right-hand corner, which communicates with a discharge-spout,  $H^2$ , connected thereto, as shown in Fig. 22.

$I^2$  is a slide-valve, resting upon the bottom of the hopper and offset, and extending through the sides of both under a cut-off,  $K^2$ , on the

wall of the offset. The seed-opening  $J^2$  of the slide-valve passes under the cut-off to register with the discharge-spout. This attachment is applied to the hopper so that its spout  $H^2$  shall enter the side of one of the main seed-conductors, which may be made with an opening for the purpose, as shown in Fig. 5.

The slide-valve is operated by the check-valve, being notched in one edge to engage with the shank of the latter.

When the check-valve is vibrated in one direction it pushes the slide-valve  $I^2$  into the hopper containing the pumpkin-seeds, a requisite number of which enter the seed-opening  $J^2$ , and when the check-valve moves in the opposite direction it carries the slide-valve with it until the seed-opening enters the offset and discharges the seed into the spout, through which it falls to the seed-conductor, and is discharged into the ground.

$L^2$  is the dropper's seat, and  $I$  the driver's foot-rest, having their respective legs stepped in metal sockets  $N^2$   $O^2$ , cast upon base-plates  $P^2$  resting upon the hounds.

Bolts  $Q^2$  pass down through the plates immediately in rear of the sockets, and through wooden or metal plates  $R^2$  under the hounds, where they receive nuts to hold the upper and lower plates to the hounds. By this means the driver's foot-rest can be adjusted upon the hounds to assist in balancing the machine, and the dropper's seat can be adjusted in front and rear of the runner-beam at any desired point.

The foot-rest and dropper's seat are also vertically adjustable in their sockets to the requisite position by means of the set-screws  $S^2$ .

The reach of the combined machine, used equally with each, instead of being rigid, is composed of two parts, pivoted together and to the lifting-levers, one part,  $Y^2$ , formed with an eye, to slide on the front leg of the driver's seat above the spring  $Z^2$ , and the other part,  $A^3$ , composed of two bars pivoted to opposite sides of the hounds. This method of constructing the reach serves the double purpose of connecting it with the lifting-levers to insure strength and unity of operation, and of preventing the reach from cramping and binding when the runners are raised and lowered, because the pivotal point allows it to yield in proportion to the length of the arc described by the rear end of the hounds.

$B^3$  is a boss or pivot-bar, cast with or otherwise rigidly secured to the seat-leg  $H$ ; and  $C^3$  are the lifting-levers, cast together in one piece, and pivoted to the boss in front of the seat-leg, so as to straddle the latter. Their rear ends are joined by a wooden or metal bar,  $D^3$ , upon which the driver presses with his feet to lift the runners.

The levers thus made are very strong and rigid, and may easily be operated without danger of displacement or strain by the driver pressing his foot upon either end of the foot-bar.

By making the levers non-adjustable they



always move about the same point on the seat-leg, and therefore enable the driver to completely control the movement of the runners for regulating the depth of planting, because the extremes of the runner's movements are always the same with respect to the surface of the ground, which could not be the case if the foot-levers were adjustable vertically.

E<sup>3</sup> is the collar for supporting the spring Z<sup>2</sup> on the seat-leg, and is made adjustable thereon by means of the set-screw, independently of the foot-lever, for the purpose of regulating the depth of planting and preventing the boss from being injured by the strain incident to the pressure of the spring under the weight of the hounds and runners.

F<sup>3</sup> is the hook with which the upper end of the reach automatically engages, when raised to the proper height, for the purpose of suspending the runners out of the ground. The hook is made double, and instead of being hung upon a collar attached to the seat-leg, as represented in my former patent referred to, it is pivoted to the front of the socket N by the same set-screw G<sup>3</sup> that secures the socket to the seat-leg, as clearly shown in Fig. 21.

The rear side of the hook is cast with a pin, H<sup>3</sup>, which bears against the outer side, i<sup>3</sup>, of the socket, when the reach engages with the hook, to prevent it from swinging out of place and releasing the reach. It yields readily in the opposite direction when the reach strikes its beveled end, and moves up the same to engage one or the other of the catches or notches.

J<sup>3</sup> are the wheel-scrapers, each cast with a concave head to fit upon the scraper-bar, and with a vertical slot, k<sup>3</sup>, for the passage of the bolt l<sup>3</sup>, by which, together with the washer and nut m<sup>3</sup>, it is secured to the bar. The latter is also slotted longitudinally for the passage of the bolt, and the two slots being at right angles to each other enable the scrapers to be adjusted to or from the wheels, and lengthwise of the bar, to the requisite position for clearing the periphery of the wheels of dirt.

The tongue U of the machine is provided with a slot, n<sup>3</sup>, in its rear end, through which passes a bolt, o<sup>3</sup>, in the hounds. By loosening the nut upon the bolt the outer end of the tongue may be raised or lowered as far as the slot will permit, to accommodate the height of the team, when the nut is set up again to lock the tongue to the hounds.

The driver's seat is cast or otherwise provided on its under side with a flat bearing-surface, W<sup>2</sup>, having a wide flange, T<sup>2</sup>, on one side, and a narrow flange, U<sup>2</sup>, on the opposite side, carrying a lateral set-screw, V<sup>2</sup>.

The proximate faces of the flanges are at right angles to the bearing-surface W<sup>2</sup>, and when the latter rests upon the seat-bar its flanges extend down upon opposite sides, the set-screw being used to clamp the seat in place.

By this construction the seat can be readily

applied and removed, as well as easily adjusted upon the seat-bar.

If necessary, a metal plate, X<sup>2</sup>, may be interposed between the seat-bar and narrow flange, for the point of the set-screw to bear against, as shown in Fig. 23.

Having pointed out the improvements in the check-row mechanism, I will now proceed to describe those relating to the drilling mechanism.

In my Patent No. 172,280 the seed-plates of the drill are driven from beveled gearing connected with one of the supporting-wheels of the machine, and by a chain which passes around the seed-plates, thence between guide-pulleys on a thin flexible bar, and back around a horizontal toothed plate mounted upon one of the gear-wheels.

The toothed plate is locked to the gear by a pivoted dog, which may be thrown up by the driver to disconnect the parts and stop the rotation of the chain. The forward end of the bar is articulated upon the runner-beam, which connection, together with the flexibility of the bar, prevent binding and cramping when the runners rise and fall in passing over the ground. The rear end of the bar is slotted to fit loosely over a pin on its support, so that when the runners rise and fall the bar shall slide back and forth, and, to a certain extent, preserve the tension of the driving-chain.

The horizontal gear is mounted upon a plate which is secured to the frame of the machine in such a manner that it cannot be adjusted, and the whole of the driving mechanism is uncovered and liable to be obstructed by dirt falling into it from the supporting-wheel.

My improvements upon this mechanism will be easily understood by the following description:

P<sup>3</sup> is an irregular open frame of cast metal, carrying the miter-wheel Q<sup>3</sup> upon a stud, R<sup>3</sup>, and secured to one of the side bars, C, of the machine, so that the miter-wheel shall engage with a corresponding gear on the hub of the supporting-wheel B. This frame, in place of being non-adjustably attached to the side bar, C, is cast with slots S<sup>3</sup> for the locking-bolts, so that it can be adjusted laterally to fit the gears properly together and to compensate for their wear.

T<sup>3</sup> is the toothed chain-plate, mounted upon the stud R<sup>3</sup> above the miter-wheel so as to turn freely, and it carries a curved dog, U<sup>3</sup>, arranged diametrically thereof, one end being pivoted to the plate, and the opposite end passing down through a hole therein to engage with a spoke of the miter-wheel, in order that the plate and wheel shall rotate together for operating the driving-chain.

The point of the dog, as shown in Fig. 9, is straight upon one side and beveled upon the other, while the spokes of the miter-wheel are similarly constructed, whereby, when the machine moves forward, the straight side of the dog shall engage the straight side of a spoke



to lock the miter-wheel and chain-plate together for operating the driving-chain, and when the machine is backed the beveled sides of the spokes shall strike against the beveled side of the dog, thereby causing the latter to ride over the spokes without engaging them, and consequently stopping the rotation of the chain-plate and the movement of the driving-chain.

This improvement is of very great value, as it prevents the seeding mechanism from being injured when the machine is moved backward.

The locking-dog is further provided with a central upright pin,  $V^3$ , having an enlarged head, under which the forked end of a lever,  $W^3$ , extends upon opposite sides of the pin. From this point the lever curves downward over the edge of the miter-wheel, and is fulcrumed at  $X^3$  to a forward extension,  $Y^3$ , cast upon the frame  $P^3$ .

$Z^3$  is an angular cam-lever, also pivoted to the projection  $Y^3$  above the lever  $W^3$ , and is formed in front of its pivot with a shoulder,  $a^4$ .

$B^4$  is the metal cover for the gearing, made in the general form of a concavo-convex shell, and hinged to two ears,  $C^4$ , upon the rear end of the frame  $P^3$ . It shuts down over the miter-wheel and the devices thereon, with its forward edge resting upon the forked lever under the cam-lever, whose long arm extends above it within reach of the driver's foot. When the cam-lever is in this position the dog is engaged by the spokes of the miter-wheel; but when the cam-lever is thrown forward its cam bears down upon the short arm of the lever  $W^3$ , causing its forked end to rise and lift the dog out of engagement with the miter-wheel and chain-plate. The cam-lever is held in an upright position when swung forward by the contact of its shoulder  $a^4$  with the point of the forked lever, and as the shoulder extends slightly beneath such point a leverage is produced, which, under the weight of the cam-lever, acts to hold up the forked end of the lever  $P^3$  and the point of the dog.

$D^4$  is the thin metal bar of the guide-pulleys, slotted at its rear end to fit over a bolt upon the frame  $P^3$ , where it is held and adjusted by a nut,  $e^4$ . Its forward end, instead of being pivoted to the top of the runner-beam, is turned up slightly and passed through the loop of a plate,  $F^4$ , fastened to the back of the runner-beam. By this means the bar is supported and slides freely through the looped plate when the runners move up and down. This arrangement and the elasticity of the bar prevents the latter from binding and cramping when the machine is in operation.

$G^4$  are the guide-pulleys, mounted upon studs  $H^4$ , which, in place of being fixed to the flexible bar, are supported upon the ends of a plate,  $I^4$ , through which the bar passes. The under side of the plate carries a rod,  $K^4$ , extending rearward through guide-eyes  $L^4$  on the under side of the bar.

A spring,  $M^4$ , is placed on the rod between

the plate  $I^4$  and one of the guide-eyes, and exerts its tension to hold the guide-pulleys forward, with the plate  $I^4$  against a stop,  $O^4$ , in the bar. The driving-chain  $D^1$  is longer than that used in the check-row planter, and is passed between the guide-pulleys and looped around the chain-plate of the gearing, as shown in Fig. 3, as well as in my former patent.

By this arrangement the elasticity of the bearings for the guide or tightening pulleys preserves the tension of the chain, and causes it to run with a uniform strain during the variable movements of the runners, and to preserve an even tension when the seed-plates and chain-plate contain any imperfections which would otherwise affect their equable rotation.

To convert the check-row planter into a drill, the short chain is removed and a long chain applied to the plates, as above described, two chains being always provided for the combined machine. The dropper-lever is also taken off and the slide-bar moved so that its stops shall clear the teeth of the seed-plates, in which position it is locked by buttons  $P^4$ , pivoted to the rear side of the runner-beam, and turned up against the edges of the revolving bearings  $I^1$ , as shown in Fig. 4. When the slide-bar is used with the check-row planter these buttons are turned down, as shown in Fig. 5, to unlock the rocking bearings and allow the bar to reciprocate. The check-valves and seed-conductors  $X$  are not used with the drill, but are removed from the runner-shanks, and their places supplied by the curved conductors  $Q^4$ , (shown in Fig. 10,) which have a free open passage through them unobstructed by valves. They are held upon the runners by the same bolt that secures the conductors  $X$ , and extend from the short conductors  $O^1$  to the vertical side walls of the runners, as shown in Fig. 4.

Each machine is supplied with a set of tubes for drill-planting, and a set for check-row planting, one set being easily substituted for the other, according to the character of the work to be performed.

Having thus described my invention, what I claim is—

1. The seed-conductors  $X$ , constructed in the form of short tubes, open on the back and bolted to the runner-shanks, so as to extend only to the lower side and in rear of the runner-beam, combined with the check-valves  $Y$ , projecting from both ends of the conductors, substantially as described, for the purpose specified.

2. The check-valves  $Y$ , constructed as described, and composed of malleable iron, and pivoted within the seed-conductors  $X$ , substantially as described, for the purpose specified.

3. The check-valve  $Y$ , constructed with the wide slot, and pivoted within the seed-conductor  $X$  by a pivot,  $z$ , both the valve and conductor being pivoted to the runner-shank by a single bolt,  $z'$ , so arranged as to pass



through the slot in the valve, thereby permitting the latter to vibrate, substantially as described.

4. The check-valves having their lower ends constructed to form the walls  $a^1$   $b^1$  below the seed-conductors X, and their upper ends extended above the seed-conductors to engage with the brackets of the slide-bar, substantially as described, for the purpose specified.

5. The short seed-conductors  $C^1$ , secured to the runner-beam between the seed-boxes and main seed-conductors X, and constructed with a large open top and a narrow discharge at the lower end, substantially as described, for the purposes specified.

6. The short seed-conductors  $C^1$ , in combination with the seed-plates, the seed-conductors X, and the check-valves Y, substantially as described, for the purpose specified.

7. The seed plates and hoppers adapted for adjustment longitudinally of the runner-beam by means of slots in the bearing-plates  $F^1$  and the bolts or screws therein, for the purpose of compensating for the wear of the driving-chain, substantially as described.

8. The recessed or notched brackets  $K^1$ , constructed with a short curved arm extending in rear of the short seed-tubes to engage with the check-valves, and made non-adjustable on the slide-bar, substantially as described, for the purpose specified.

9. The stops  $M^1$ , constructed as described, and adapted for adjustment on the slide-bar, substantially as described, for the purpose specified.

10. The combination, on the slide-bar, of the fixed brackets  $K^1$  and adjustable stops  $M^1$ , the bracket being held on the bar by one of the bolts or screws which hold the stop, and provided with flanges  $O^1$ , fitting against the edges of the stop-plate, substantially as described, for the purpose specified.

11. The combination of the adjustable stops  $M^1$  and the elastic cushions  $P^1$  with the slide-bar, the adjustable seed-plates, and the driving-chain, substantially as described, for the purposes specified.

12. The stop-plates, as described, having the socket or eye  $Q^1$ , cast upon one edge, to receive the point of the dropper-lever, substantially as described.

13. The combination of the adjustable stops on the slide-bar with the adjustable seed-plates, substantially as described, for the purpose specified.

14. The combination of the curved brackets  $K^1$ , fixed to the slide-bar, and the stops  $M^1$ , adjustable on the slide-bar, with the adjustable seed-plates and vibratory check-valves, substantially as described.

15. The combination of the stop-plates with the rocking bearings of the slide-bar, substantially as described, for the purpose specified.

16. The straight cut-off valves having their cut-off ends inclined or beveled vertically and transversely, and their under sides beveled or

inclined outwardly from the inner edge, which rests upon the seed-plates, substantially as described, for the purpose specified.

17. The cut-off valves arranged so that their outer ends shall rest upon the seed-plates diametrically over the seed-chamber or opening therein next in front of the seed-chamber or opening which is in position to discharge the seed, substantially as described, for the purpose specified.

18. The boss  $W^1$ , constructed with the tangential plate  $Z^1$ , and with the squared end, to form the valve-recess  $V^1$ , substantially as described.

19. The boss  $W^1$ , having the curved arm  $X^1$ , the squared end, and the tangential plate  $Z^1$ , in combination with the straight cut-off valve and its cap  $B^2$ , substantially as described, for the purpose specified.

20. The combination, with one of the seed-conductors of the corn-planter, of the hopper  $E^2$ , having the offset  $G^2$  and cut-off  $K^2$ , the slide-valve  $I^2$ , and spout  $H^2$ , whereby pumpkin-seed and corn are dropped simultaneously, as specified.

21. The adjustable support for the dropper's seat, consisting of an upright socket, in which the leg of the seat is stepped, and adapted for vertical adjustment by means of a set-screw or equivalent device, and also adapted for adjustment on the hounds, substantially as described.

22. The adjustable support or foot-rest for the driver's feet, the same consisting of an upright socket or hollow post, in which the leg of the rest is stepped, and adapted for vertical adjustment by means of a set-screw or equivalent device, and also adapted for adjustment on the hounds, substantially as described.

23. The reach of the machine, consisting of two parts,  $Y^2$  and  $A^3$ , pivoted together, the part  $Y^2$  being adapted to slide on the front leg of the driver's seat, and the part  $A^3$  being pivoted to the hounds, substantially as described, for the purpose specified.

24. The combination of the lifting-levers with the jointed reach  $Y^2$   $A^3$ , substantially as described, for the purpose specified.

25. The bifurcated metal lever  $C^3$ , cast in one piece, and having the foot-bar connecting its rear ends, in combination with the seat-standard H, fixed boss  $B^3$ , and the hounds, substantially as described, for the purpose specified.

26. The collar  $F^3$ , adapted for adjustment on the seat-leg H, under the spring  $Z^2$ , independently of the lifting-levers and their pivoted support, substantially as described, for the purpose specified.

27. The pivoted hook  $F^3$ , provided with a pin,  $H^3$ , to bear against the outer side,  $i^3$ , of the socket N when the reach catches into the hook, substantially as described, for the purpose specified.

28. The irregular cast-metal frame  $P^3$ , having slots  $S^3$ , a front extension,  $Y^3$ , and ears  $C^4$



at its rear end for the hinges of the cover B<sup>4</sup>, substantially as described.

29. The combination of the forked lever W<sup>3</sup> and cam-lever Z<sup>3</sup> with the frame P<sup>3</sup> and the locking-dog U<sup>3</sup>, substantially as described, for the purpose specified.

30. The combination of the cover B<sup>4</sup> with the forked lever W<sup>3</sup> and cam-lever Z<sup>3</sup>, substantially as described, for the purpose specified.

31. The cam-lever Z<sup>3</sup>, constructed with the shoulder a<sup>4</sup>, combined with the forked lever W<sup>3</sup>, whereby the weight of the cam-lever when swung forward suspends the locking-dog out of engagement with the miter-wheel, substantially as described, for the purpose specified.

32. The cam-lever Z<sup>3</sup>, arranged above the cover when the latter is closed, substantially as described, for the purpose specified.

33. The miter-wheel Q<sup>3</sup>, constructed with spokes straight on one side and beveled upon the other, substantially as described, for the purpose specified.

34. The combination of the miter-wheel having its spokes beveled on one side with the locking-dog having one side of its point beveled, substantially as described, for the purposes specified.

35. In combination with the runner-beam and geared driving mechanism, the flexible bar D<sup>4</sup> and yielding tightening-pulleys G<sup>4</sup> for

the driving-chain, substantially as described, for the purpose specified.

36. The pulleys G<sup>4</sup>, adapted for a yielding movement on the flexible bar by means of the plate I<sup>4</sup>, rod K<sup>4</sup>, guide-eyes L<sup>4</sup>, and spring M<sup>4</sup>, substantially as described, for the purpose specified.

37. The flexible bar connected with the runner-beam by having its forward end bent upward and passed through the loop of a plate, F<sup>4</sup>, secured to the back of the beam, substantially as described, for the purpose specified.

38. The runner-shanks of a combined drill and check-row corn-planter, each adapted to interchangeably receive upon the same bolt a seed-conductor for drilling the grain, and a seed-conductor and check-valve for check-row planting, substantially as described.

39. The buttons P<sup>4</sup>, rocking bearings I<sup>1</sup>, and slide-bar H<sup>1</sup>, in combination with the runner-beam, whereby the said rocking bearings of the slide-bar are locked and unlocked, substantially as described, for the purpose specified.

In testimony of which invention I have hereunto set my hand.

LEVI SCOFIELD.

Witnesses:

GEO. STICKNEY,  
W. H. SAUNDERS.