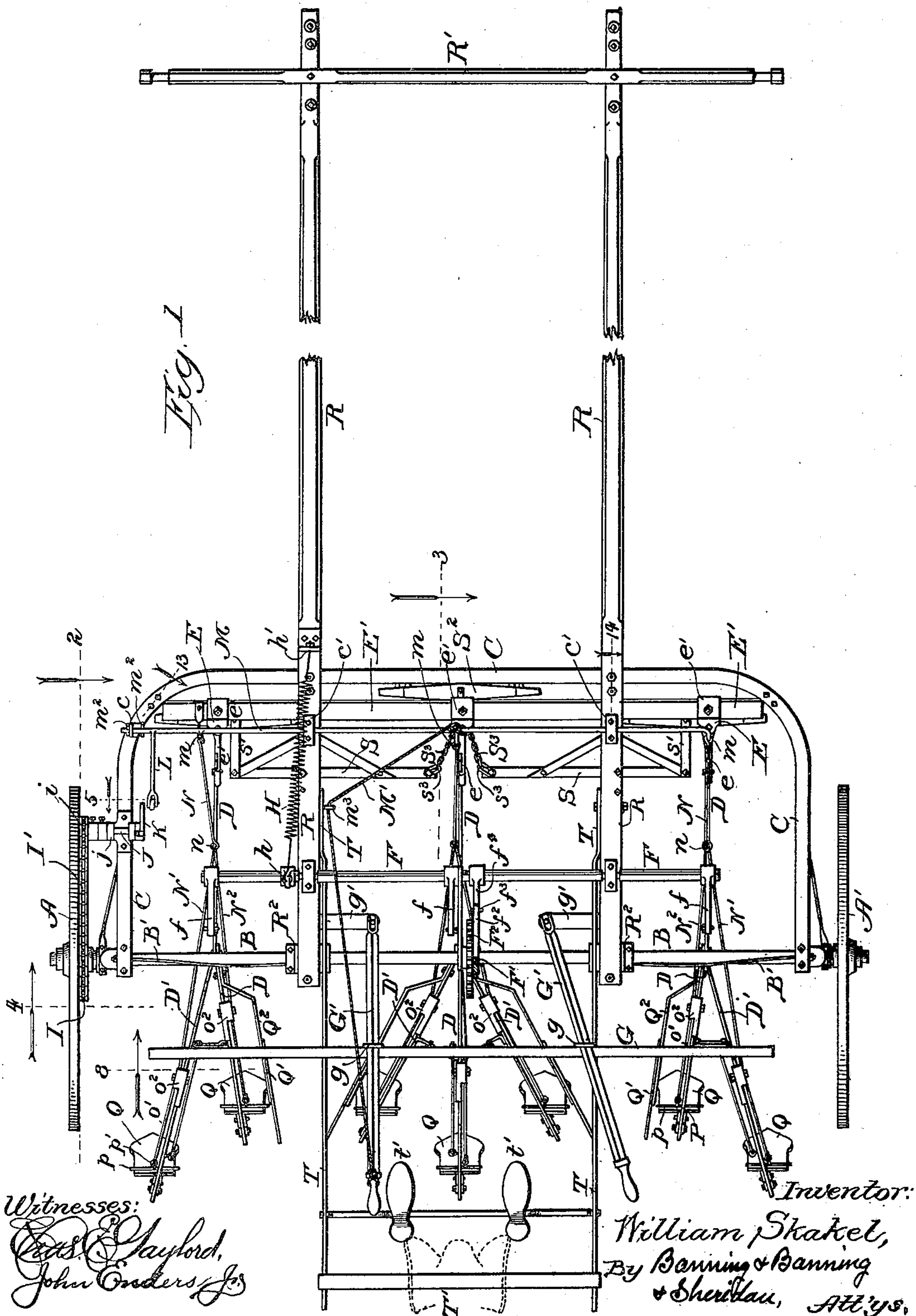


W. SKAKEL.
CULTIVATOR.

(No Model.)

(Application filed Mar. 12, 1900.)

8 Sheets—Sheet 1.



No. 667,740.

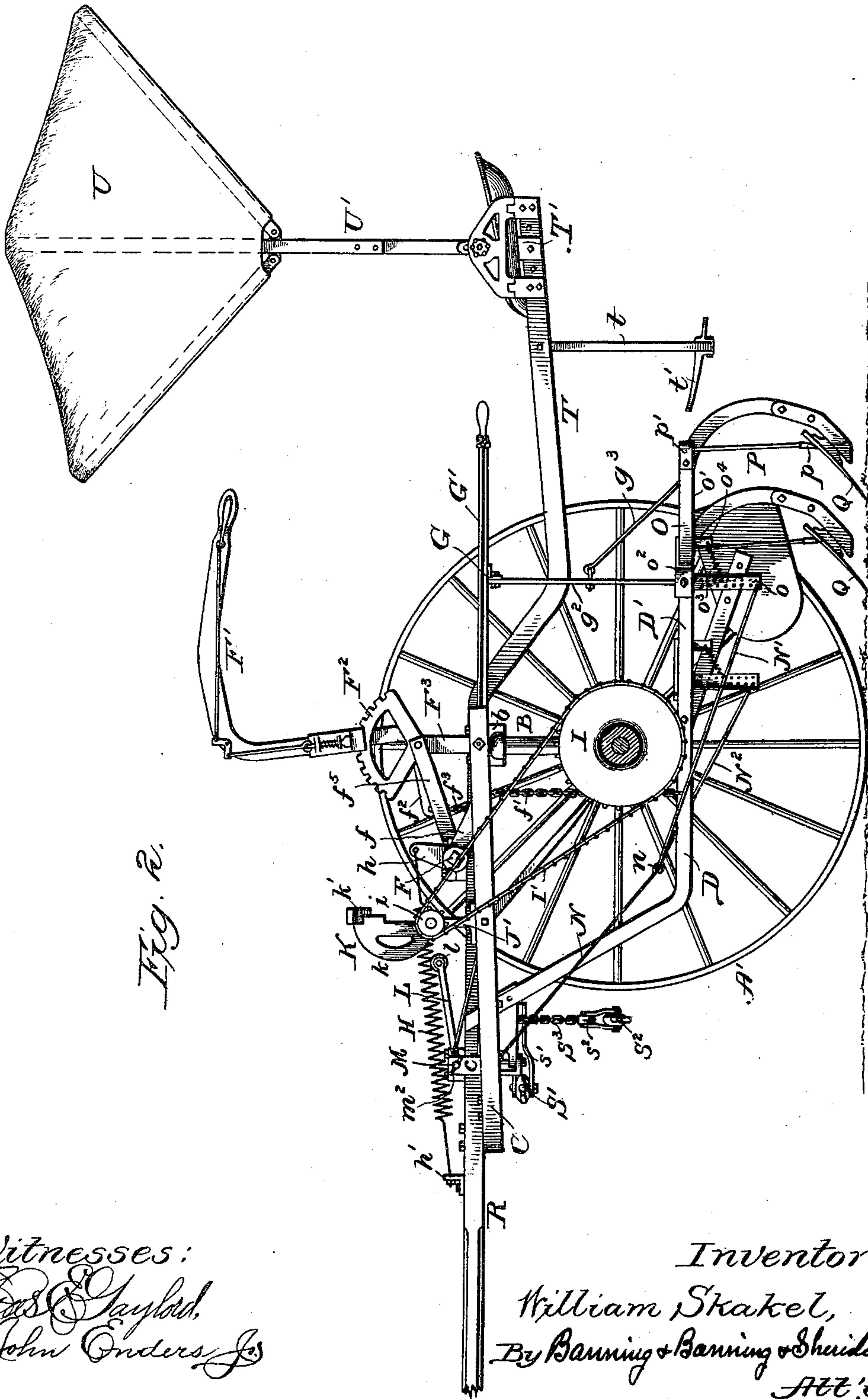
Patented Feb. 12, 1901.

W. SKAKEL.
CULTIVATOR.

(Application filed Mar. 12, 1900.)

(No Model.)

8 Sheets—Sheet 2.



Witnesses:
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No. 667,740.

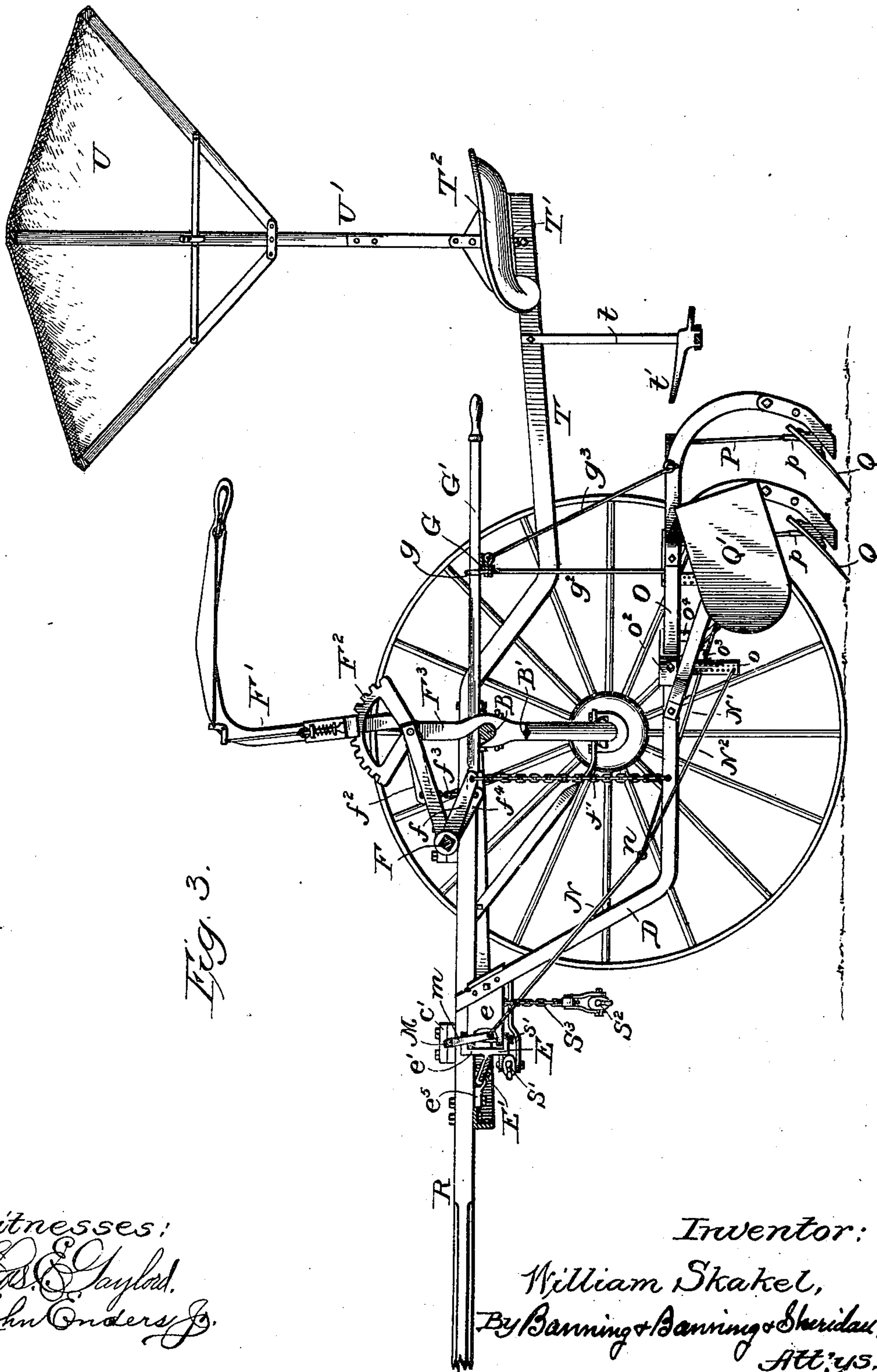
Patented Feb. 12, 1901.

W. SKAKEL.
CULTIVATOR.

(Application filed Mar. 12, 1900.)

(No Model.)

8 Sheets—Sheet 3.



Witnesses:
 E. S. Gaylord.
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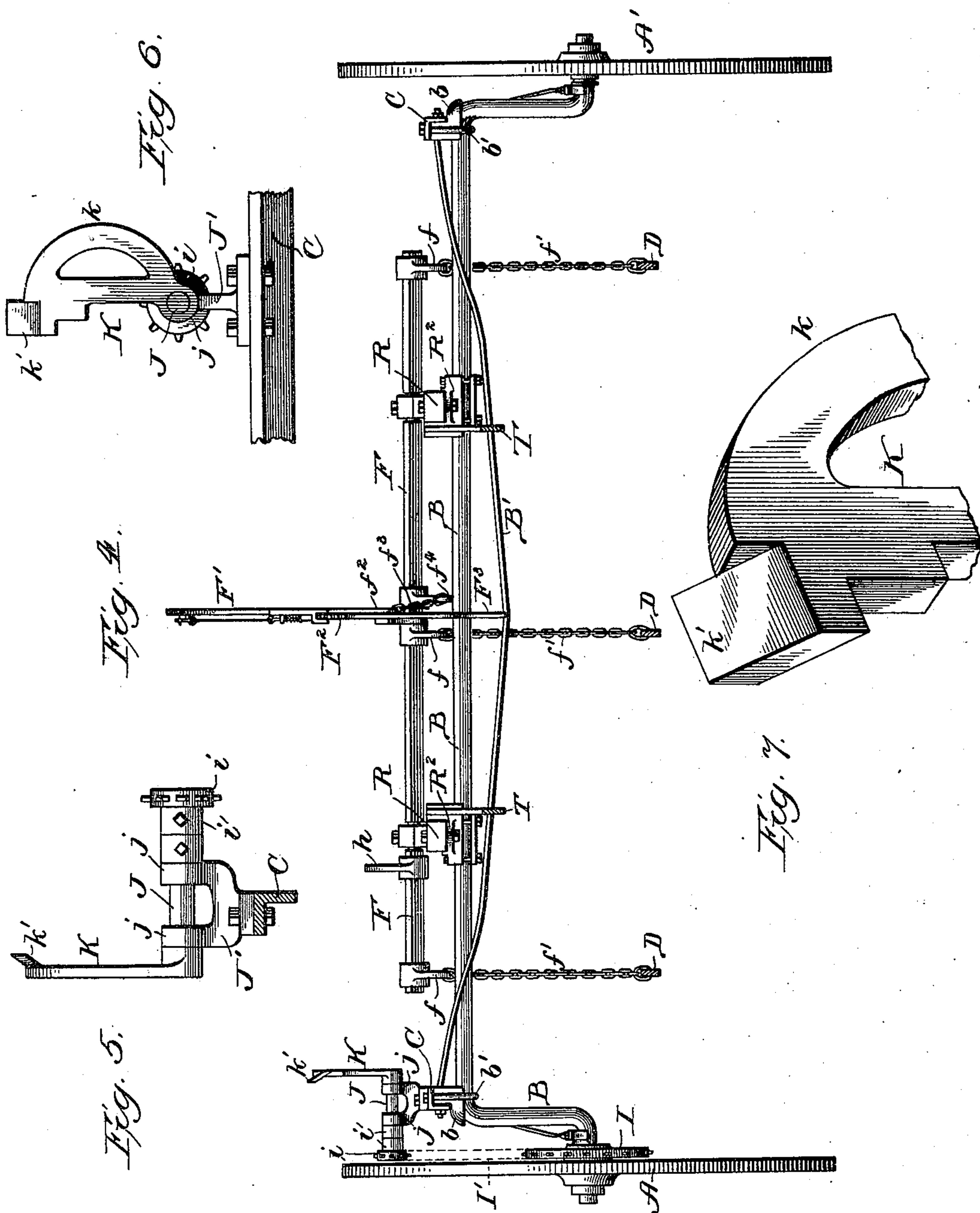
Inventor:
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CULTIVATOR.

(Application filed Mar. 12, 1900.)

(No Model.)

8 Sheets—Sheet 4.



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No. 667,740.

Patented Feb. 12, 1901.

W. SKAKEL.
CULTIVATOR.

(Application filed Mar. 12, 1900.)

8 Sheets—Sheet 5.

(No Model.)

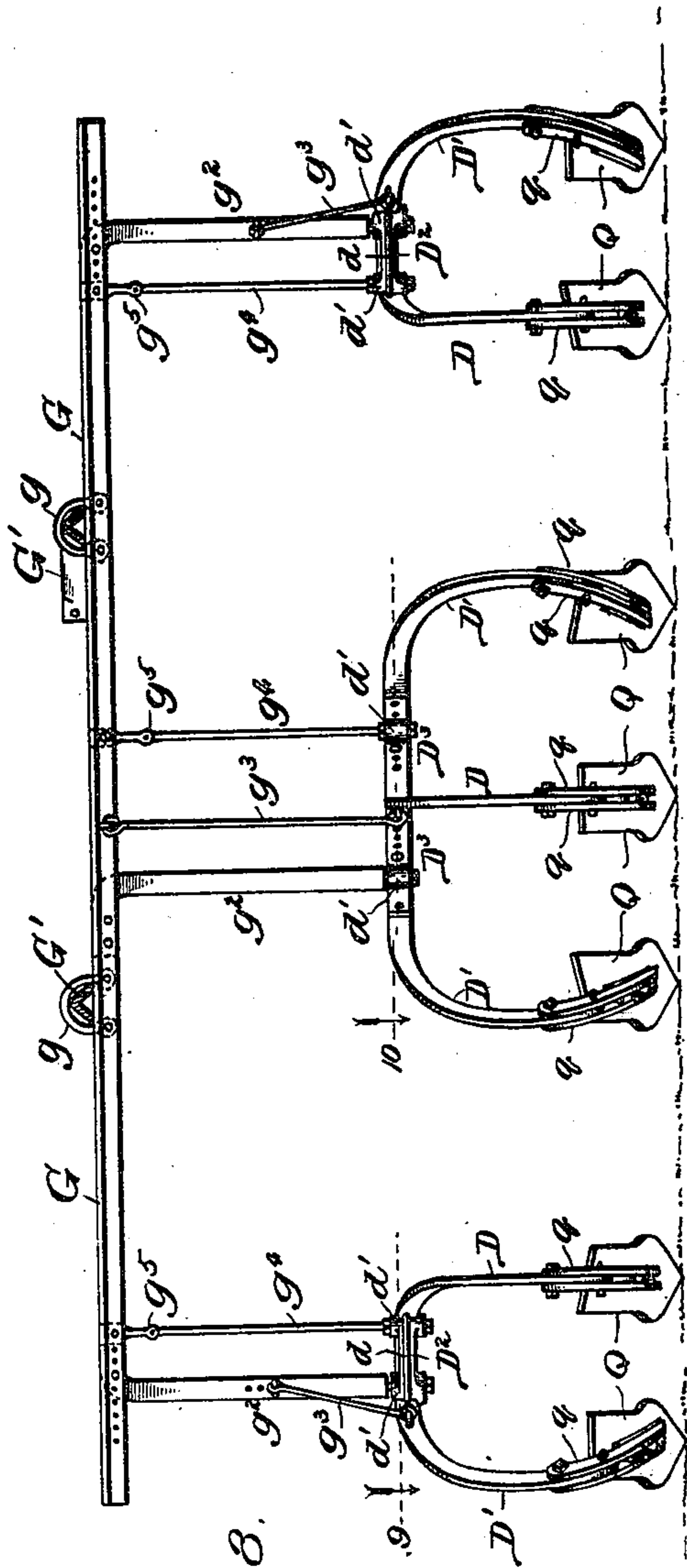


Fig. 8.

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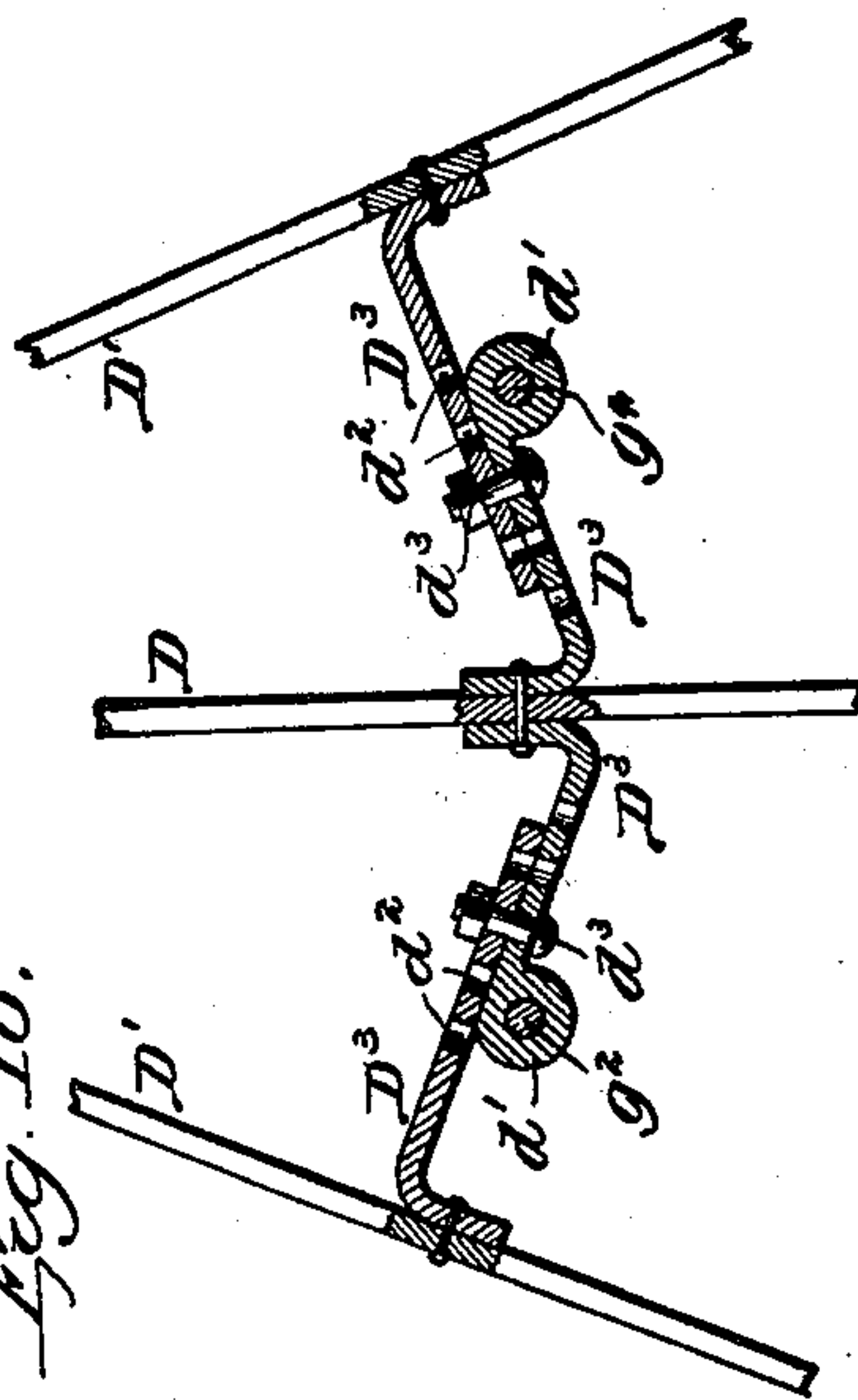


Fig. 10.

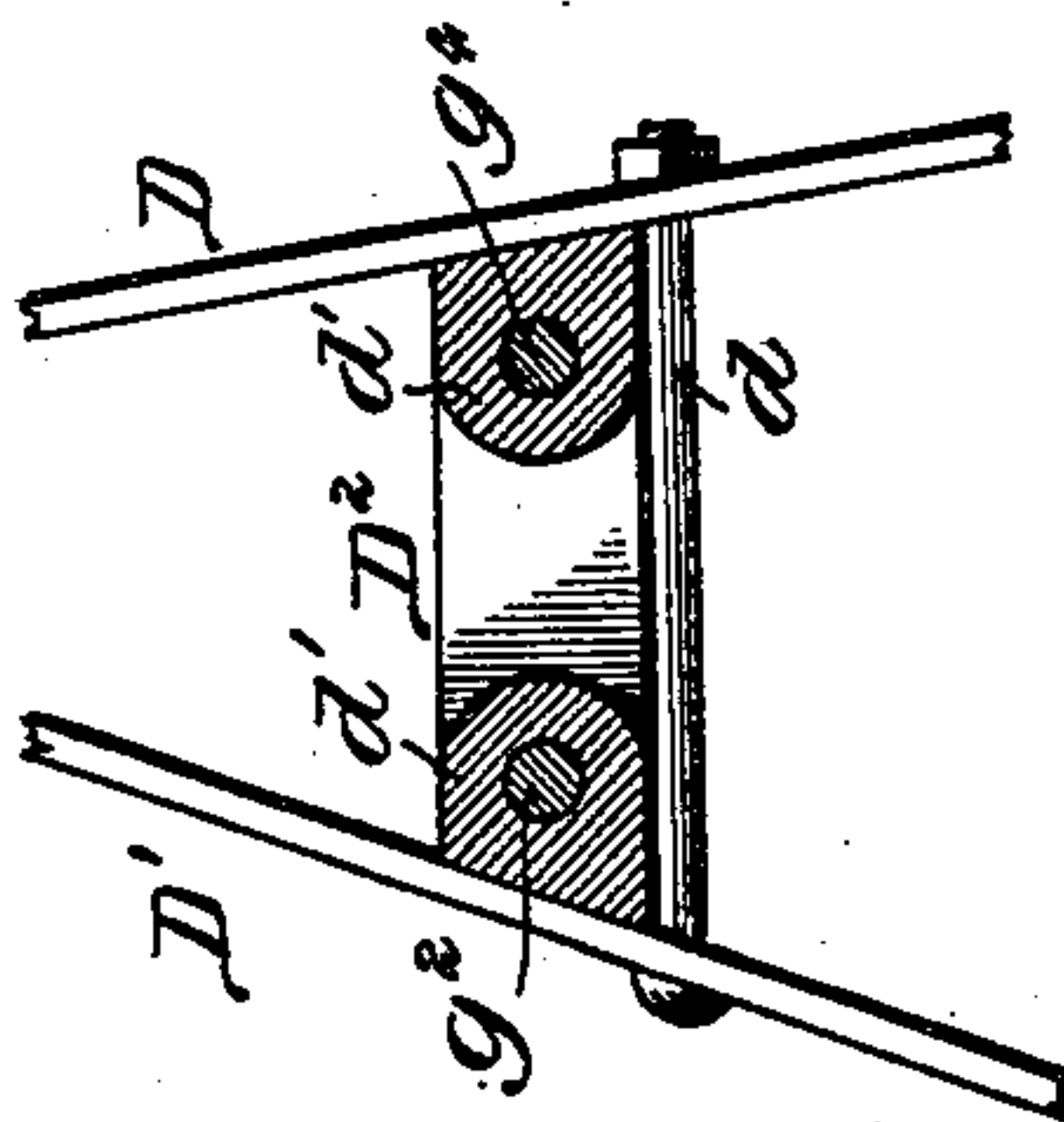


Fig. 6.

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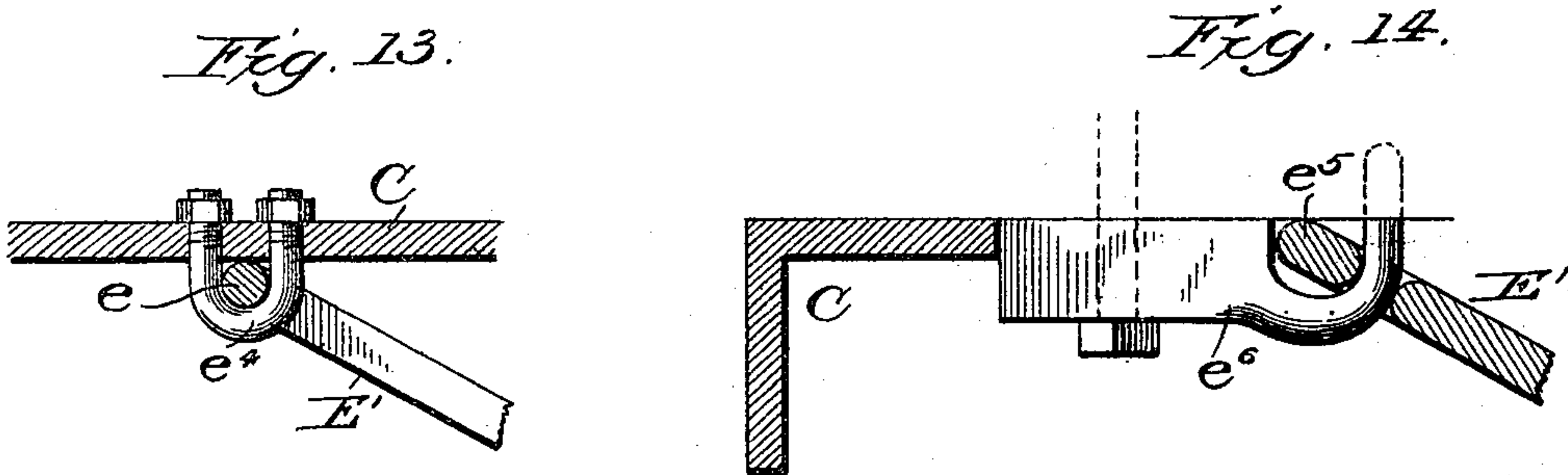
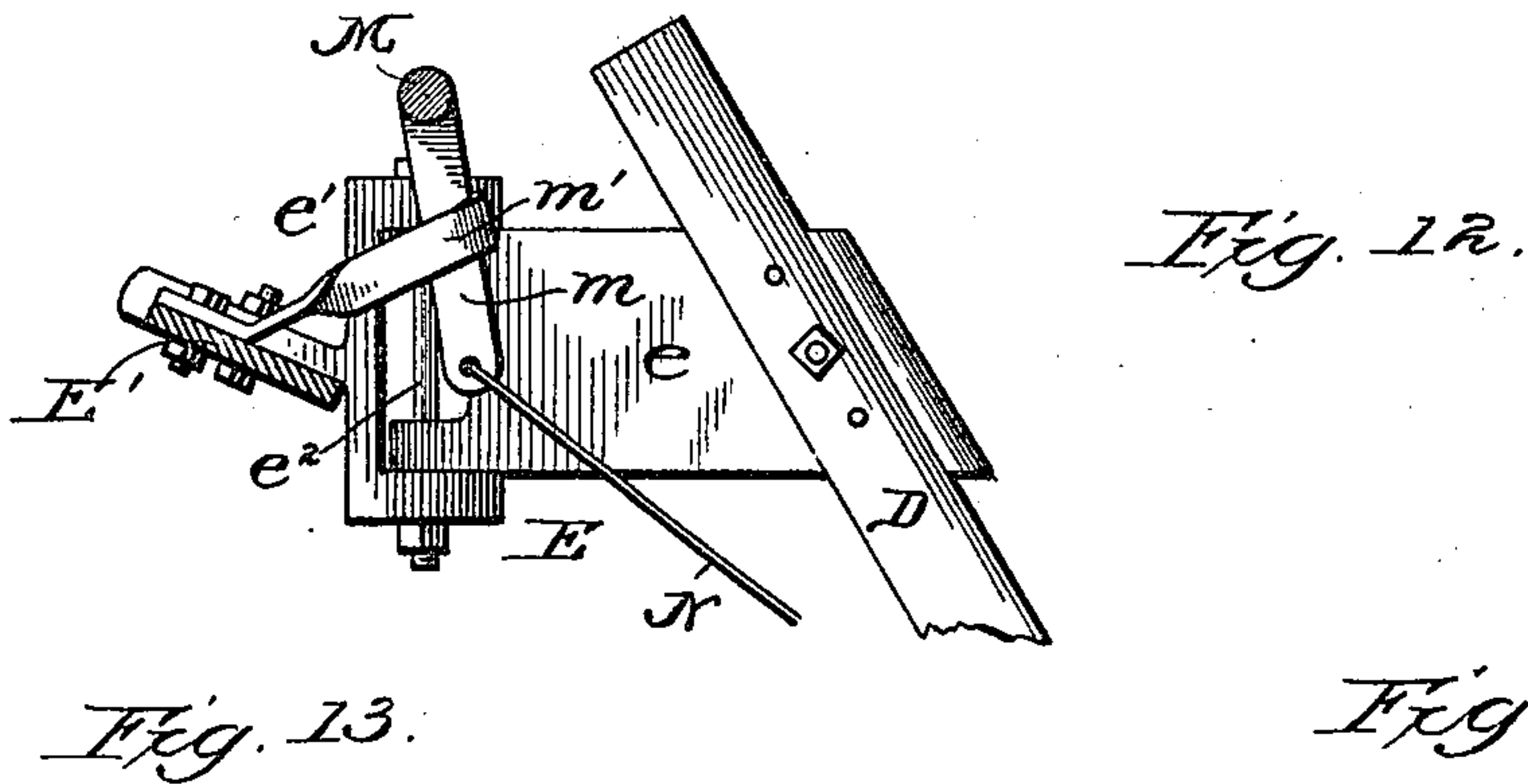
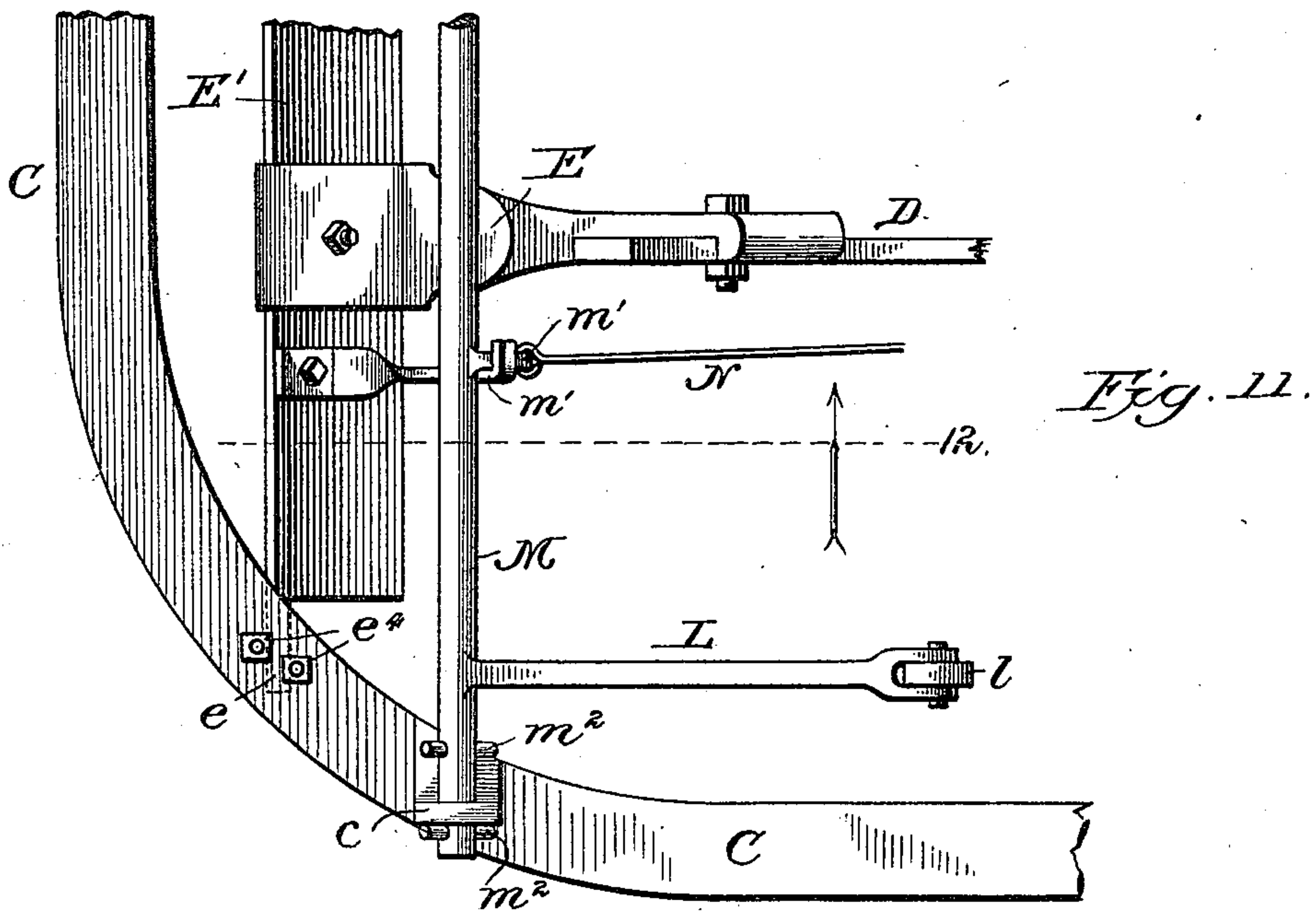
Patented Feb. 12, 1901.

W. SKAKEL.
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(Application filed Mar. 12, 1900.)

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8 Sheets—Sheet 6.



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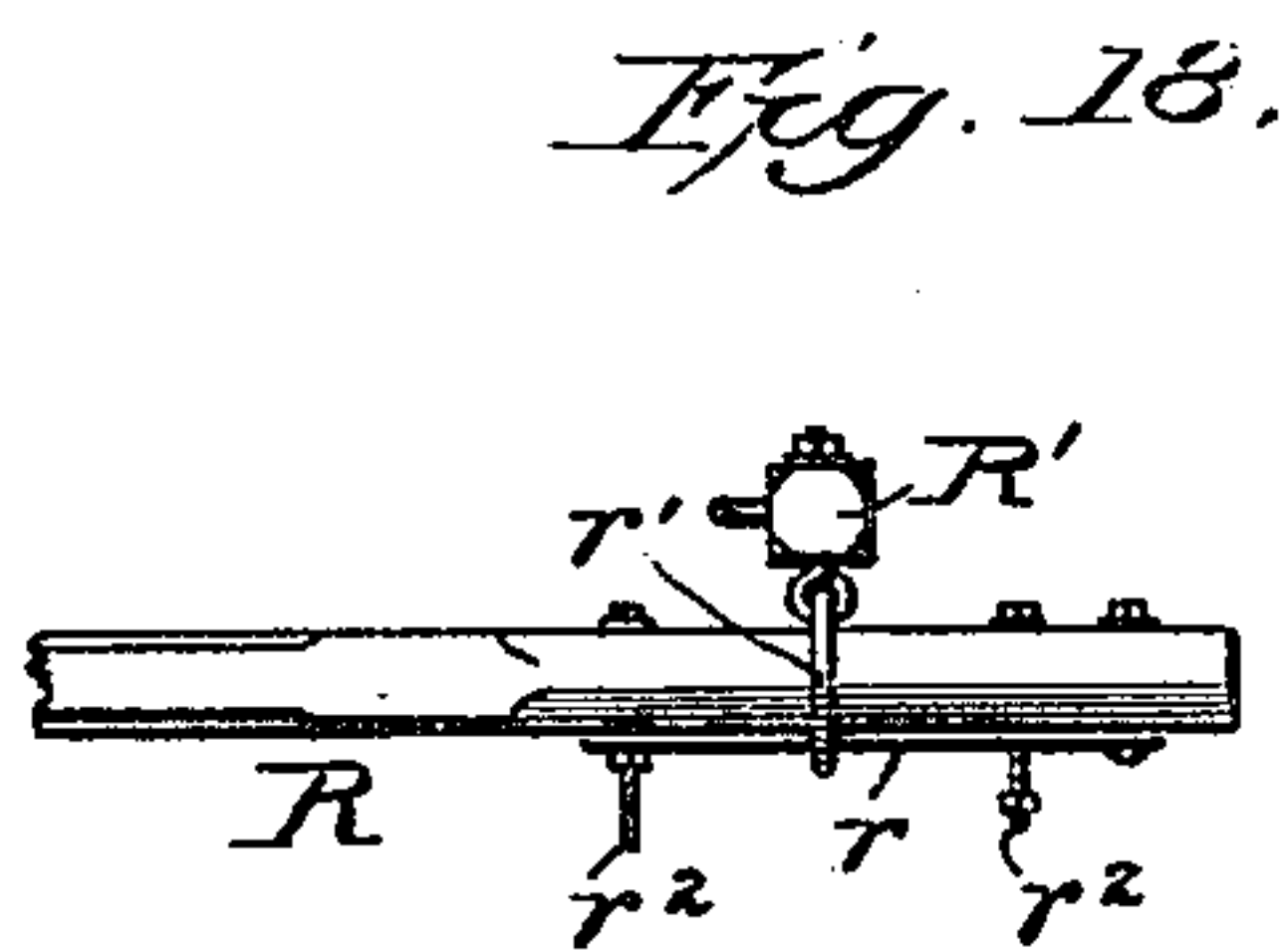
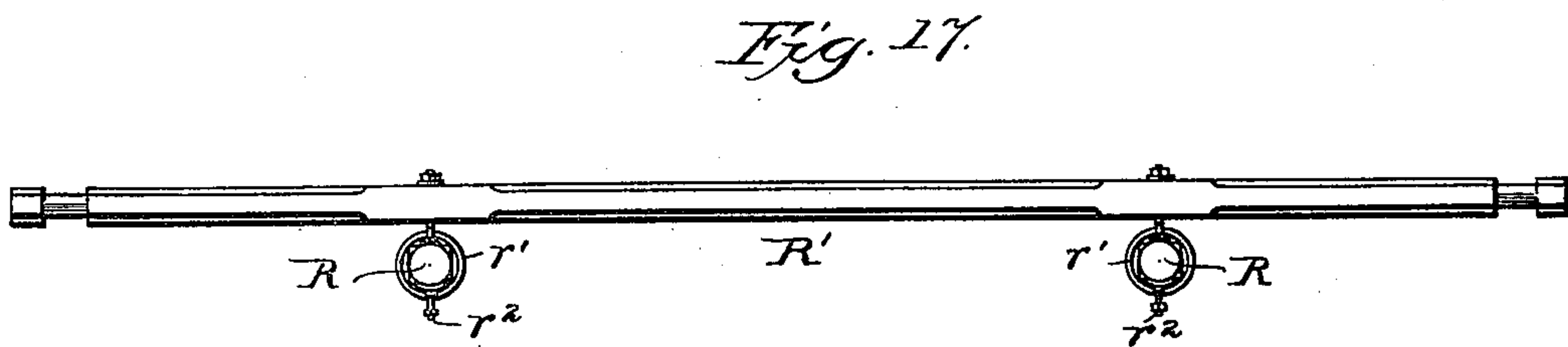
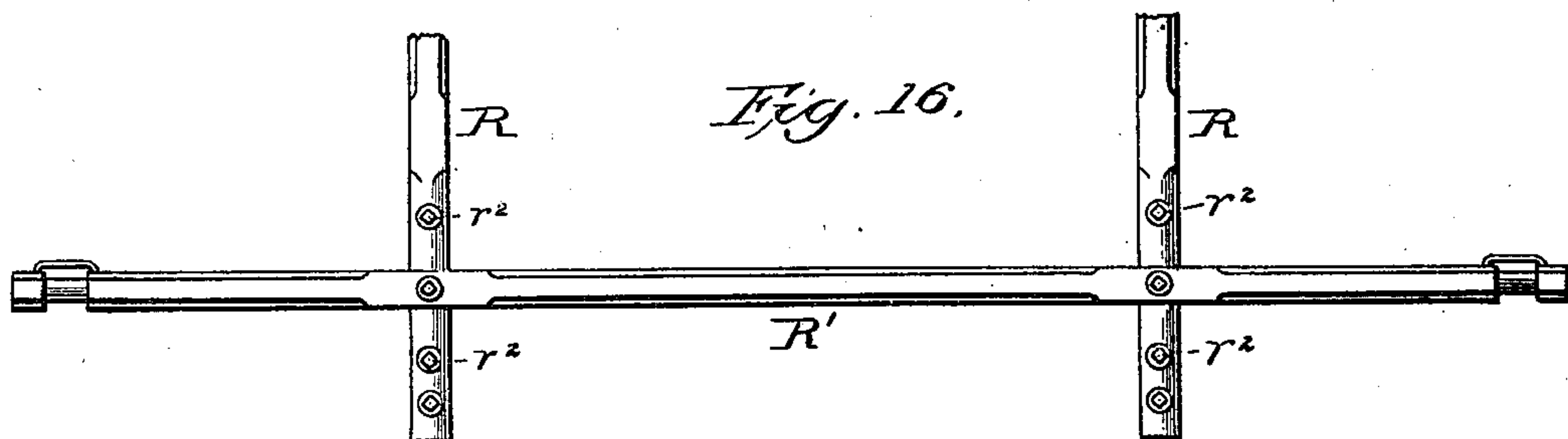
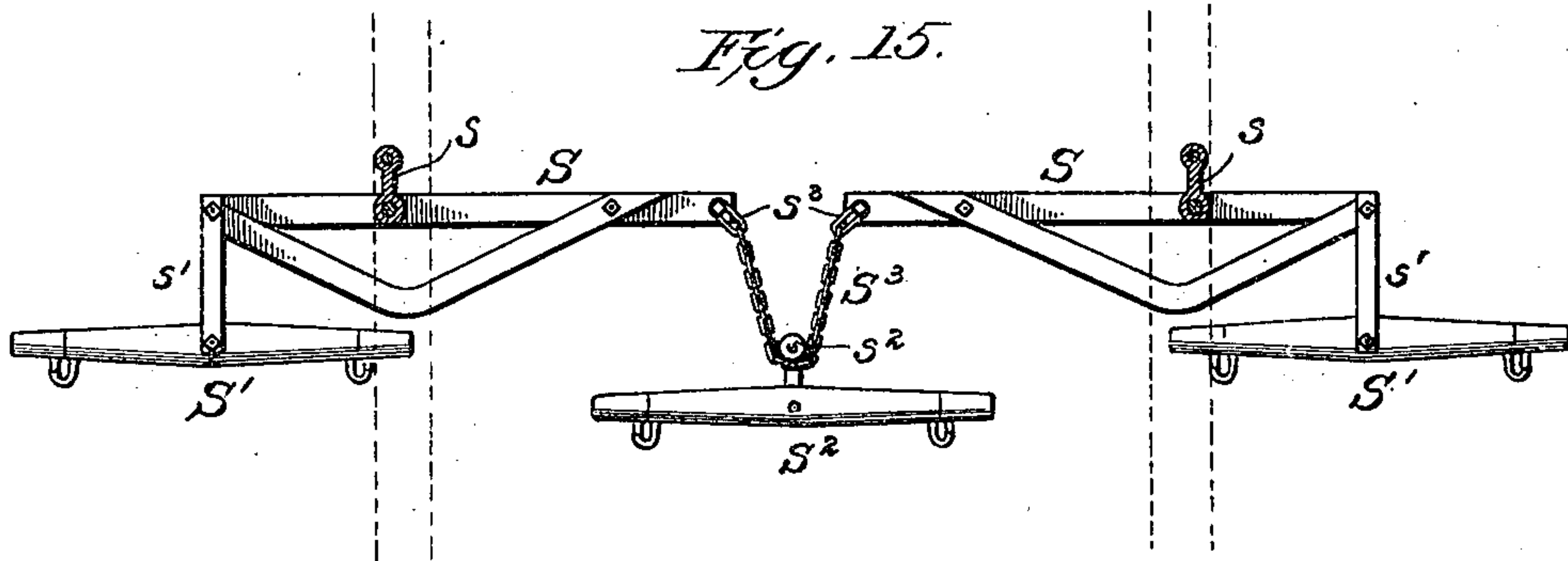
Patented Feb. 12, 1901.

W. SKAKEL.
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(No Model.)

(Application filed Mar. 12, 1900.)

8 Sheets—Sheet 7.



Witnesses:
E. S. Gaylord,
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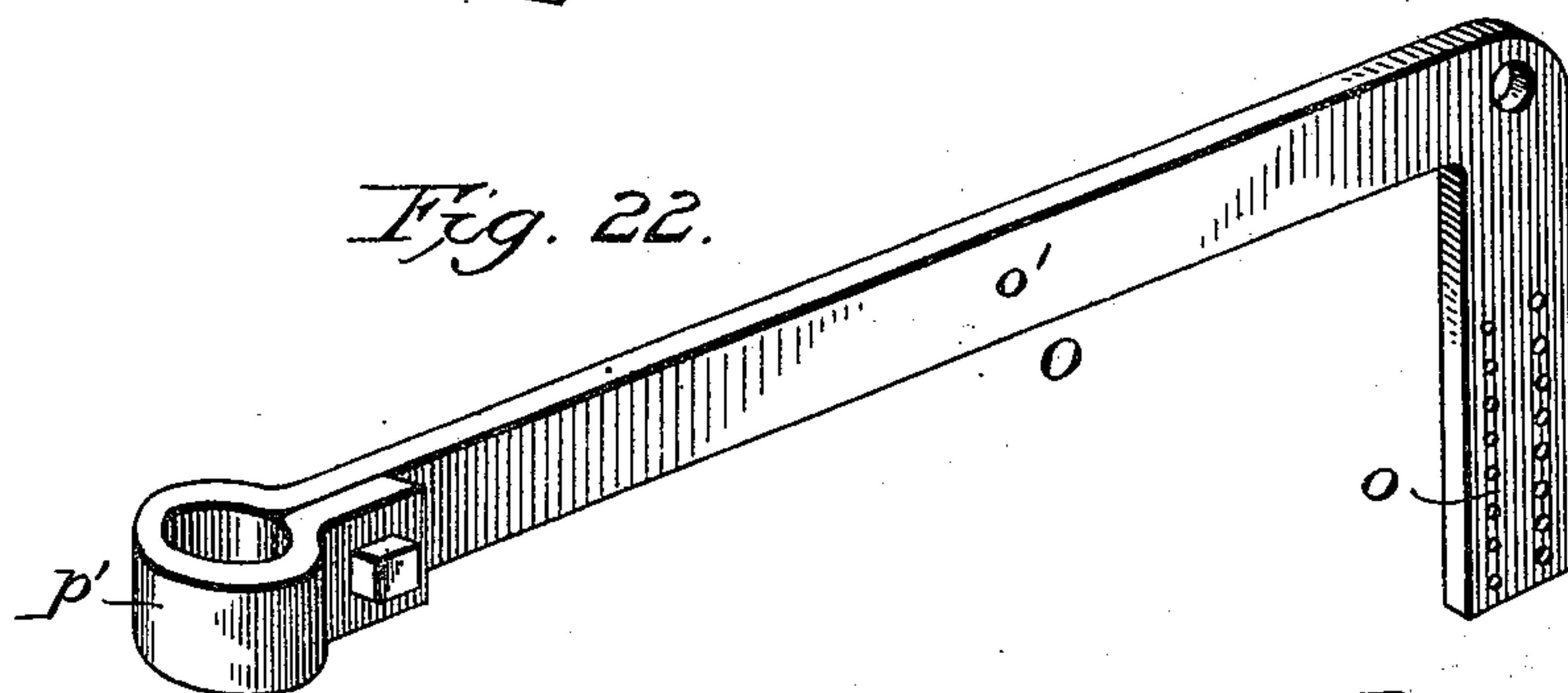
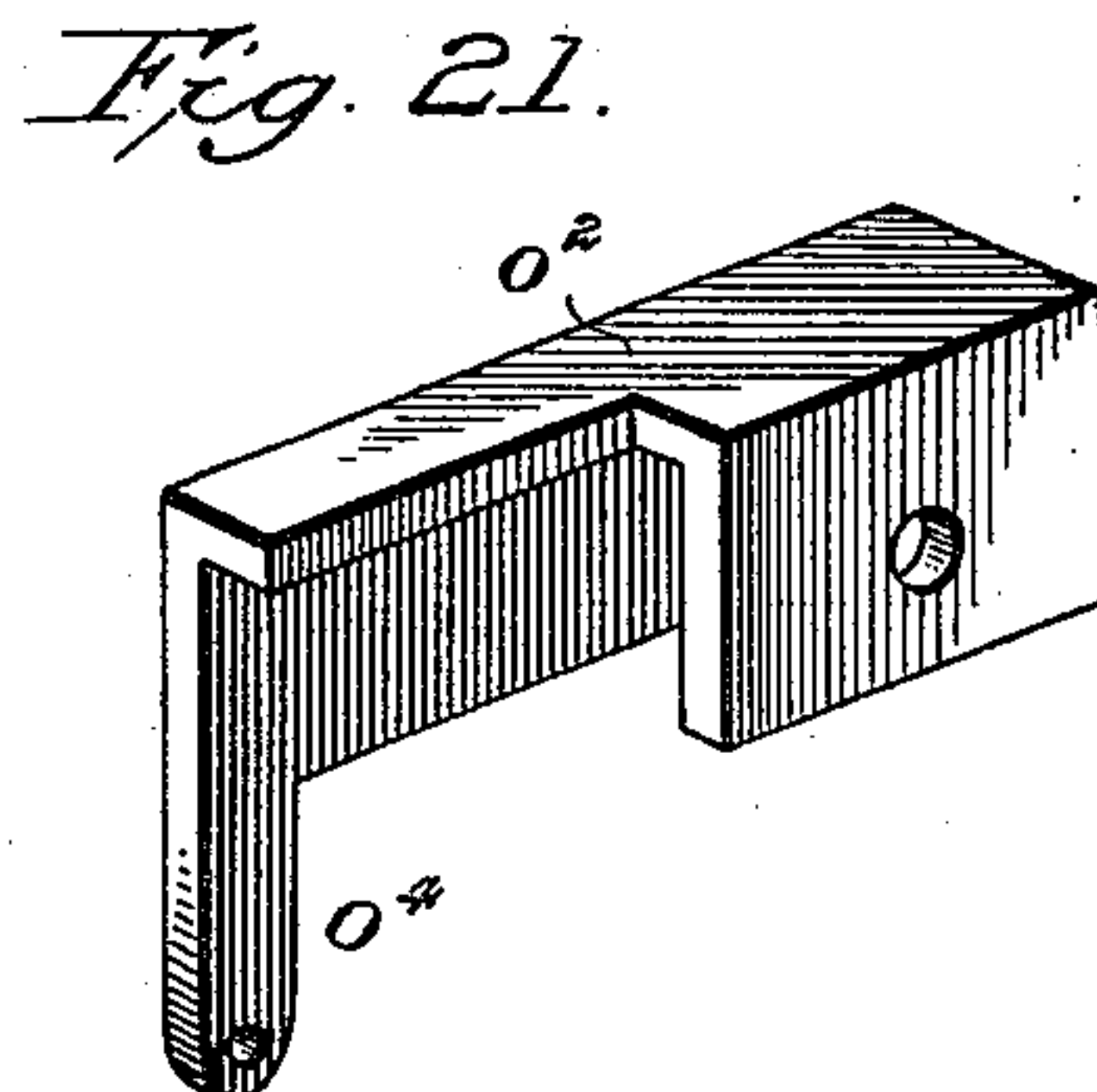
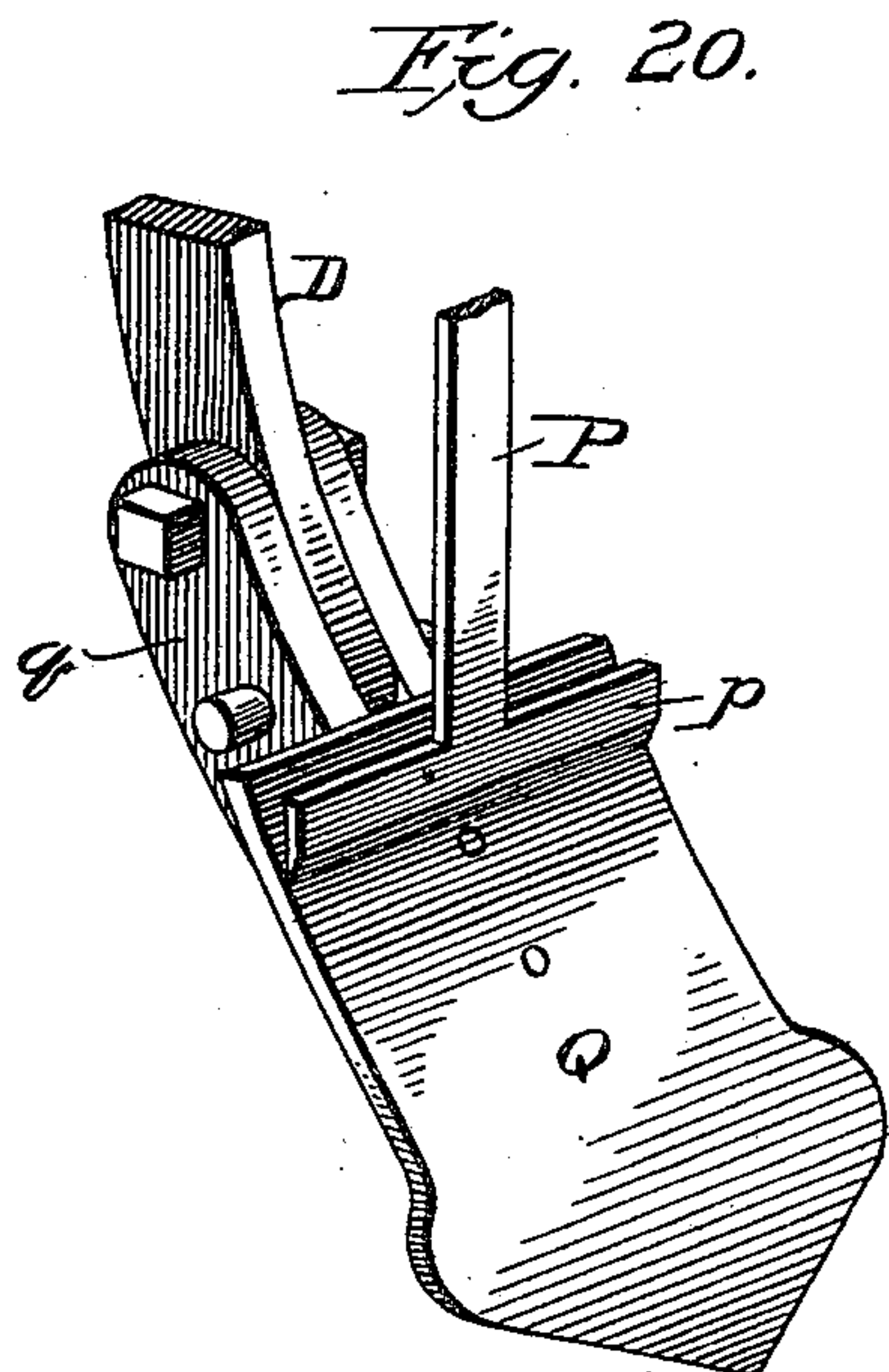
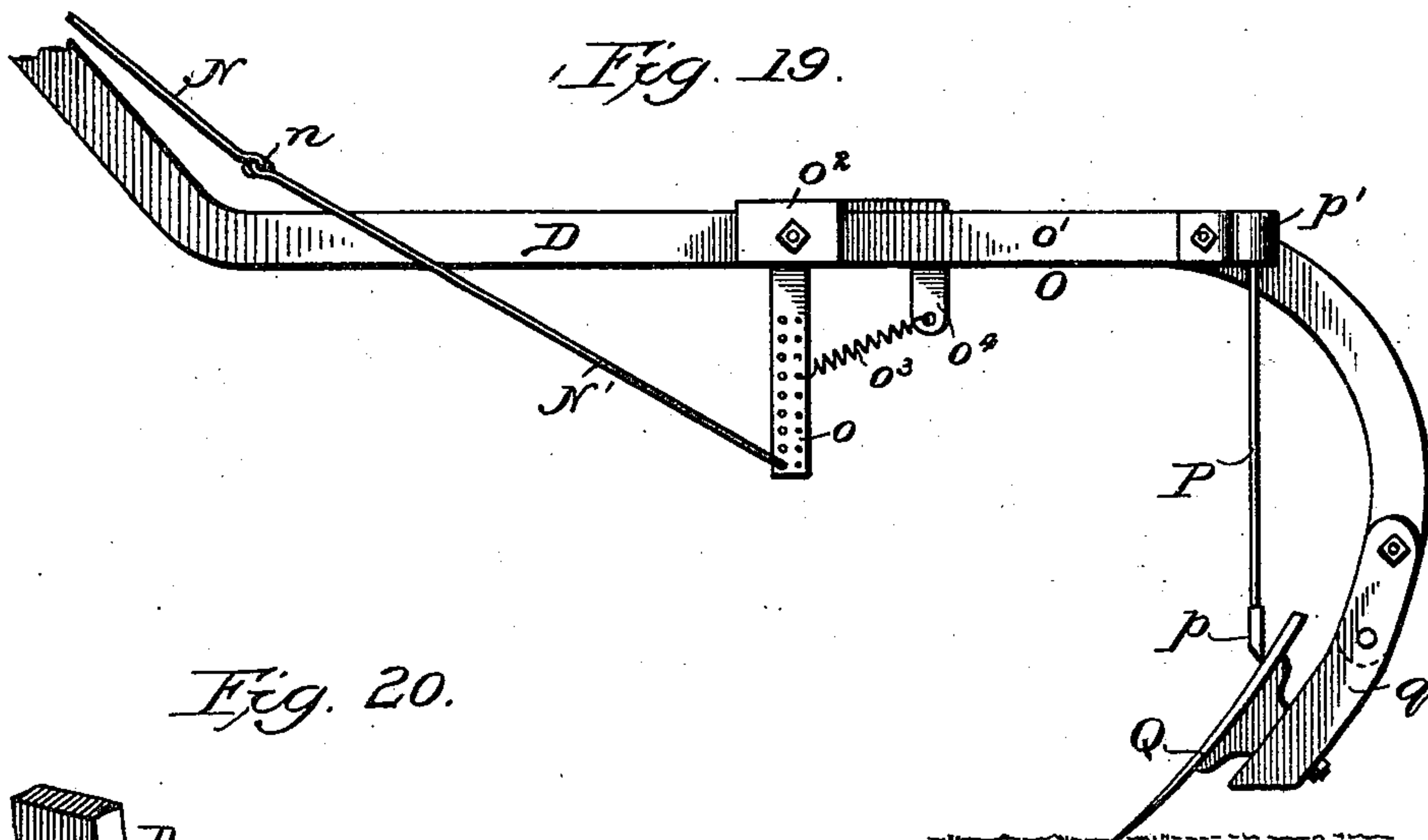
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(Application filed Mar. 12, 1900.)

(No Model.)

8 Sheets—Sheet 8.



Witnesses:
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UNITED STATES PATENT OFFICE.

WILLIAM SKAKEL, OF WAGNER, SOUTH DAKOTA.

CULTIVATOR.

SPECIFICATION forming part of Letters Patent No. 667,740, dated February 12, 1901.

Application filed March 12, 1900. Serial No. 8,308. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM SKAKEL, a citizen of the United States, residing at Wagner, in the county of Charles Mix and State of South Dakota, have invented certain new and useful Improvements in Cultivators, of which the following is a specification.

This invention relates to cultivators designed for cultivating two rows of corn at the same time, being in effect a double cultivator in one machine.

The objects of the invention are to improve the support and hanging of the plow-beams and plows and have the arrangement one by which the plows will operate on both sides of two rows of corn and be capable of swinging vertically and moving laterally all together; to support the several beams flexibly and so that all the beams can be swung or moved laterally for dodging hills of corn out of line and for following crooked rows; to enable the machine to be under perfect control by one or the other of two levers, either of which can be used for swinging the plows laterally or raising them vertically; to apply automatically-operating means for scraping or cleaning the shovels with the movement of the cultivator and from the rotation of one of the carrying-wheels; to improve the hitch of the horses to the machine both at the yoke end of the tongue and at the hitch to the draft and so that the draft will be equalized irrespective of the advance of one or the other of the horses; to provide a seat and a canopy therefor, and to improve generally the construction and operation of the machine as a whole.

The invention consists in the various features of construction and combinations of parts hereinafter described and claimed.

In the drawings, Figure 1 is a top or plan view with the lever for adjusting the depth and raising the plows out of the ground in section and the seat and its canopy removed; Fig. 2, a side elevation with one of the carrying-wheels removed; Fig. 3, a longitudinal section on line 3 of Fig. 1 looking in the direction of the arrow; Fig. 4, a transverse sectional elevation on line 4 of Fig. 1 looking in the direction of the arrow; Fig. 5, a detail in elevation of the shaft and cam for operating the shovel-cleaners; Fig. 6, a side elevation

of the parts shown in Fig. 5; Fig. 7, a perspective view of one end of the cam of the shovel-cleaning device; Fig. 8, a rear elevation showing the shovels and connecting-bar and supporting-rods therefor with the levers for manipulating the shovels in section; Fig. 9, a detail, partly in section, of the connection between the beams of the side shovels; Fig. 10, a detail, partly in section, of the connection for the center beams and shovels; Fig. 11, a detail in plan of one forward corner of the frame, showing the swing-board for the forward end of the plow-beams and the lever and rock-shaft for the shovel-cleaners; Fig. 12, a detail of the joint and swing-board and connection for the plow-beams; Fig. 13, a detail of the end pivot for the swing-board of the plow-beam; Fig. 14, a detail of the midway connection for the swing-board of the plow-beam; Fig. 15, a plan view showing the tongues and the draft-equalizer; Fig. 16, a plan view showing the forward end of the tongues and the neck-yoke; Fig. 17, a front end view of the tongues and neck-yoke; Fig. 18, a side elevation of the forward end of the tongue and the neck-yoke, showing the attachment of the yoke; Fig. 19, a detail in side elevation of one of the plow-beams, showing the shovel-cleaner and the devices for operating the same; Fig. 20, a perspective view of a shovel and a cleaner; Fig. 21, a perspective view of the bracket or support carrying the L-lever of the shovel-cleaning device, and Fig. 22 a perspective view of the L-lever of the shovel-cleaner.

The machine is to have a carrying-wheel A and a carrying-wheel A' at each end of an arch-axle B, which wheels are mounted on suitable spindles extending out from the vertical portions of the arch-axle, as usual. A frame-piece C extends forward from each end of the arch-axle and across the front of the machine. This frame-piece is preferably made of steel or iron and of an angular shape in cross-section, and its rear ends are secured to supports b, mounted on the axle and held in place by means of clips b'. A truss-rod B' also runs from each support b across the machine adjacent to the axle to brace or support the frame against lateral strain.

A plow-beam D is provided for each side and the center of the machine. The outer or

side plow-beams have a secondary beam D' , and both the main beam and the secondary beam each carry at their rear end a shovel. The center plow-beam has on each side a secondary plow-beam D' and the main plow-beam and both these secondary plow-beams each carry at the rear end a shovel. The relation between the beams and the shovels is such that a row of corn is between the center beam and its shovels and each of the outside beams and their shovels, by which arrangement two rows of corn are cultivated at the same time. The outside shovels of the outer plow-beams at the same time operate on the rows adjacent to the two rows being cultivated on one side of such adjacent rows.

The forward end of each plow-beam has a two-way coupling, by means of which each beam is free to be swung laterally and can also be raised vertically. The coupling E for the lateral swing consists of a plate or casting e , pivoted at its forward end between ears on a bracket or casting e' by a pivot-bolt e^2 . The vertical swing is secured by attaching the bracket or casting e' to a swing-board E' , extending across the front of the machine. The swing-board at each end has a journal or pivot e^3 , entered into a staple e^4 , bolted to the frame-piece C , and intermediate supports for the swinging board are furnished by a bearing e^5 , entered into a support e^6 , attached to the under side of the tongue. The swing-board through its end journals and intermediate bearings is free to rise and fall at its rear portion, permitting the requisite vertical movement for raising and lowering the plow-beam. The coupling E through the vertical pivot e^2 permits each beam to swing laterally or sidewise, and this swing, in conjunction with the vertical swing of the board E' , gives the required knuckle-joint movement for the plow-beams to be raised and lowered and to be swung sidewise or laterally.

A rock-shaft F is mounted in suitable bearings on the tongues of the machine, so as to extend laterally across the machine. This rock-shaft is provided with an arm f for each plow-beam, and a flexible connection by means of a chain f' or otherwise is had between each arm f and its plow-beam D , which connection gives the necessary flexibility for the movements of the beam. A lifting and setting lever F' is pivotally mounted on a standard F^3 , supported at its lower end on the arch-axle and truss, as shown in Figs. 3 and 4. The standard F^3 at its upper end has a rack F^2 , with which a pawl or catch on the lever F' engages, so that by means of the rack and the pawl the lever after movement in raising or lowering the plows can be locked and held in its adjusted position. The lever F' has a forwardly-extending arm f^2 , which is connected by a chain f^3 or otherwise with an arm f^4 on the rock-shaft F , so that by the downward movement of the lever the rock-shaft will be partially rotated through the arms f^2 and f^4 and chain f^3 to lift or raise the arms f

and through the chains f' raise all of the plow-beams simultaneously. The movement of the lever F' upward releases the pull on the chain f^3 and allows the rock-shaft to rotate in the opposite direction for the arms f to drop and lower the plow-beams. It will thus be seen that through the lever F' and the connecting arms and chains and the rock-shaft all the plow-beams can be raised and lowered at the same time, so that when raised they will be clear of the corn and when lowered they will be set in the ground for the depth it is desired the shovels shall run.

The three plow-beams are tied together, so as to move in unison laterally, by a cross-bar G , and the movements of the cross-bar are controlled by means of levers G' , two levers being provided in order to permit either hand of the operator by grasping one or the other of the levers to control the movements of the beams, thus leaving one hand of the operator free for driving or other purposes, while the other hand controls the lateral swing of the beams in dodging hills out of line or following sinuous or curved rows. The levers G' also enable the plow-beams to be raised vertically for the purpose of relieving the shovels in case of clogging from weeds or when the shovels need raising for any other purpose temporarily. Each lever G' passes through an eye or stirrup g on the cross-bar G , and its forward end is pivotally supported on an arm or bracket g' by a knuckle-joint connection, so as to permit the levers to move sidewise or laterally and to be raised and lowered.

Each plow-beam is connected with the cross-bar G , so as to permit of the adjustment of the shovels in or out as required for use and so as to allow the shovels to be moved in or out and set according to the distance it is desired to have them run to the hills or rows of corn. The connection should also be one that will permit of the lateral swing without changing the parallelism of the beams and shovels. Each beam in the construction shown is connected with the cross-bar G by a depending flat bar g^2 , the upper end of which bars are turned so as to lie flatwise against the face of the cross-bar and hold the supporting-bars from turning, and each flat bar is attached to the cross-bar by two bolts, and the turned upper ends of the outer bars and the cross-bar at the ends are both provided with a series of holes by means of which the beams and shovels can be moved bodily in or out by connecting the supporting-bar with the cross-bar farther in or farther out at the ends, as required. As shown, a brace g^3 extends from each outer flat supporting-bar to the plow-beam and is connected at each end by eyebolts or otherwise, so as to give a flexible connection, and a brace g^3 is also provided for the center beam, extending from the beam to the cross-bar G and connected at each end by eyebolts to furnish a flexible connection. An additional support

is furnished by a rod g^4 , extending down from the cross-bar G and connected with the plow-beam, which rod in order to permit of the lateral swing and prevent strain on the supporting-bars is provided with a universal connection g^5 at the top and a pivot connection at the bottom, and the flat supporting-bars g^2 likewise have a pivot connection at the lower end. Each outside beam has its two parts spread or separated by a cross-piece D^2 , and the two beams are held by a cross-bolt d . Each cross-piece D^2 has at each end a socket d' , into which the pivot ends of the supporting-bars are entered, as shown in Figs. 8 and 9, so as to give the pivotal connection required. The center beam has its three parts spread apart and held by means of supports D^3 , one for each side beam of the center beam and one on each side of the middle beam of the center beam, as shown in Fig. 10. Each support has a series of holes d^2 for the passage of a clamping-bolt d^3 , and these supports, in connection with the holes and clamping-bolts, permit of the in and out adjustment or spread of the two outer beams to support the two outer shovels at the distance required to the sides of the two rows of corn with which these shovels work. Each support D^3 of the midway beam has at its outer end a socket d' , one socket receiving the pivot end of the flat supporting-bar and the other socket the pivot end of the supporting-rod, as shown in Figs. 8 and 10, so as to furnish the required pivotal connection for the lower ends of the bar and rod. It will thus be seen that the side adjustment of the shovels to set them out any distance required from the rows of corn being cultivated is secured through the adjusting-holes of the outer supports and the cross-bar and through the adjusting-holes of the center-beam brackets. The several beams are supported and carried from a common cross-bar, which bar is capable of movement laterally or vertically by either one of the levers G' , so that by the movement of either lever all the beams and their shovels are simultaneously moved, by which arrangement a movement to bring a shovel properly in position for a hill of corn likewise brings all the shovels into position for the opposite hills of corn, thus enabling a single movement by a single lever and by either hand of the operator to adjust the shovels at one and the same time to the two hills in the two rows of corn.

The several beams are counterbalanced, so as to permit of their easy lifting by means of a spiral or coil spring H, one end of which is attached to an arm h on the rock-shaft F, and the other is attached to a plate or support h' on one of the tongues. This spring H has a sufficient pull to balance the weight of the beams and their shovels, and for this purpose the spring has an adjustable connection to the tongue by means of a nut on the end of the spring passing through the plate or bracket h' , which nut can be advanced or receded, so

as to enable the operator to set the spring to any tension desired.

The wheel A has secured thereto, in any suitable manner so as to revolve therewith, a sprocket-wheel I, and a sprocket-chain I' runs over this sprocket-wheel and over a sprocket-pinion i , so that with the revolution of the carrying-wheel A the link or sprocket chain will be driven and rotate the pinion i . This pinion is on the end of a shaft J, mounted in bearings j on a support J', attached to the frame-piece C, as shown in Figs. 4, 5, and 6, and, as shown, the pinion is attached to the end of the shaft and by a hub i' and suitable set-screw. The shaft J at its opposite end to the pinion i carries a cam K, which cam has an acting face k and at its outer corner has an inclined face k' . The acting face k when the cam is revolved engages an antifriction-roller l on an arm or lever L, extending out from a rock-shaft M, such engagement occurring only when the arm or lever and its roller are in the line of the path of travel of the cam and its acting face k . The rock-shaft M is supported at one end in a support c on the frame-piece C and is also supported in bearings c' on the tongues of the machine, and this shaft extends transversely across the machine so as to cover the space occupied by the plow-beams. The shaft M is provided at points in line with each plow-beam with an arm m , and its limit of throw or rock in a forward direction is stopped by a catch m' , attached to the swing-board E', as shown in Figs. 11 and 12. The shaft M, in addition to its rocking movement, has an endwise movement, which movement is limited by pins m^2 on each side of the support c , as shown in Fig. 11. This endwise movement is for the purpose of enabling the shaft, with its arms, to be moved endwise a distance required to bring the arm or lever L and its rollers l into the path of travel of the cam K and its face k , so that with the downward movement of the cam through the engagement with the roller the arm or lever L will be carried down, and such downward movement of the arm or lever moves the arms m forward, for a purpose hereinafter explained. The shaft is returned to its normal position and out of the line of engagement of the cam with the arm or lever by the incline k' on the cam, which strikes the end of the arm or lever and through its inclined face moves the rod or shaft M endwise out of position, so that on the succeeding revolution of the cam no engagement will take place between the cam and the arm or lever and no movement of the rock-shaft will occur. The rock-shaft is moved endwise so as to bring the arm or lever L in proper position for engagement by means of a cord M' in the arrangement shown, which cord at one end is attached to the rod or rock-shaft and passes through an eye m^3 on the side of the tongue and extends back to one of the levers G' , so as to be within the reach of the hand of the operator for the operator by grasping and pulling on the cord to slide the

rock-shaft endwise into operative position, which movement should be made when the shovels need cleaning.

A rod N is attached to each arm m and extends rearwardly, and at its rear end has jointed thereto at n two rods N' and N^2 . A rod N and its companion two rods N' and N^2 are provided for each pair of shovels. Each rod N' and N^2 is attached to an L-lever O, the attachment being to the arm o of such lever, which arm, as shown, is provided with a series of holes for the proper attachment of the rod on one side and the proper attachment of the return-spring on the opposite side. Each lever has an arm o and an arm o' and is pivotally mounted on each beam by means of a support or bracket o^2 , the same bolt which attaches the plate or bracket also furnishing the pivot for the lever. The plate or bracket has a depending ear o^4 , between which and the arm o of the lever is a coil-spring o^3 of the requisite tension to return the lever after each operation from the rock-shaft, such return of the lever O, also through the connecting-rods, returning the rock-shaft. A lever is provided for each shovel, and each lever at the outer end of its arm o' has depending therefrom a spring-support P, which support at its upper end is pivotally mounted in an eye or socket p' and at its lower end carries a scraper p to engage the acting face of the shovel Q. The downward rock of the shaft M, through the forward movement of the arm m , moves each rod N forward, carrying with it the connecting-rods N' and N^2 , and each of these rods operates its own lever O, producing a downward throw of the outer end of the arm o' , which forces down the spring-support P and moves the cleaner p downward over the face of the shovel.

The movement of the cleaners, as before stated, is controlled by the operator through the cord M', and when it is desired to clean the shovels the operator by pulling on the cord M' moves the rock-shaft M endwise into position for the engagement of the arm or lever L with the cam K, which engagement, as already described, carries down the scraper or cleaner for each shovel, so that all the shovels will be cleaned or operated upon at one and the same time, and when the cleaner or scraper has traveled the full length of the shovel the cam through its incline k' moves the rock-shaft endwise and out of the line of engagement with the lever L, permitting the springs o^3 to operate and return the L-levers and the scrapers or cleaners and the other parts to normal position. The cleaning operation can be performed with the shovels in the ground, or it can be performed with the shovels out of the ground, as may be desired, and such cleaning operation is had through the travel of the machine by the rotation of the carrying-wheel, which rotates the sprocket-wheel, by which arrangement the cleaning operation is automatically performed by the travel of the cultivator, except as to the re-

quirement of moving the rock-shaft endwise into engagement.

Each shovel Q is to be provided with the ordinary shield Q', carried by a bar Q² from the plow-beam, as usual.

The machine, as shown, has two tongues R for the use of three horses, one between the two tongues and one on the outside of each tongue. The neck-yoke R' at the forward end of the tongue is attached thereto by means of rings r' , depending from the yoke, and the end face of each tongue is protected by a guard-plate r , against which the ring slides. Each tongue is provided with a forward and rearward stop r^2 , which may be furnished by extending two of the bolts, as shown in Figs. 17 and 18, and these stops prevent the neck-yoke from slipping too far back or being drawn so far forward as to slip the yoke from the end of the tongue. The forward stop r^2 , in order to permit of the neck-yoke being slipped onto and off from the end of the tongue, is loose, so that it can be moved up or down as required for attaching and detaching the neck-yoke.

The employment of three horses required in a double cultivator necessitates the employment of some means for equalizing the draft. An arrangement for this purpose is shown in Fig. 15 in the form of eveners, known as a "three-horse" evenner. An evenner or doubletree S is pivoted by a stirrup to each tongue R, and the outer end of each evenner has connected thereto, by a stirrup s' , a singletree S'. The center or middle singletree S² has a roller connection s^2 with a chain S³, attached at each end, as shown, by a connection s^3 . The chain furnishes a flexible connection between the inner end of the two evenners or doubletrees and the attachment for the center singletrees, so that no matter if one horse is in advance of another the draw of all three horses will be equal, as the middle singletree will adjust its draw through the chain and roller, so as to give the required difference in the pull of all three horses for the equalizing effect. This result is secured by reason of the chain connection which travels around the roller, so that no matter at what point the chain may be in relation to the roller, whether close to the end of one evenner and far away from the end of the opposite, the draw of the chain is exactly the same.

As shown, each tongue at its rear end is supported on the axle by a support R², and each tongue is bolted to the frame-piece C, so that the axle, the frame-piece, and the tongue have a rigid attachment and connection. Extending back from each tongue and bolted thereto is a bar T, united at the rear ends by a cross-bar T', on which is mounted a seat T², and, as shown, depending from the bars T is a support t , carrying foot-rests t' , so that the driver on the seat T² has a support for his feet. A canopy U, supported on standards U', is located above the driver's seat, which

canopy serves as a protection for the driver against the sun.

I claim—

1. In a two-row cultivator, the combination of a beam on each side, each beam carrying shovels, a center beam carrying shovels, a coupling for each beam at the forward end, a swinging board carrying the couplings, a rock-shaft common to all of the beams, arms on the rock-shaft one for each beam, a flexible connection between each rock-shaft arm and its beam and means for rocking the shaft and raising and lowering the beams, substantially as described.

2. In a two-row cultivator, the combination of a beam on each side, each beam carrying shovels, a center beam carrying shovels, a cross-bar from which the several beams are suspended at the rear, and two levers each engaging with and carrying the cross-bar for the operating of either lever to swing all the beams laterally at the same time and to raise and lower all the beams at the same time, substantially as described.

3. In a two-row cultivator, the combination of a beam on each side, each beam carrying shovels, a center beam carrying shovels, a cross-bar common to all of the beams, an adjustable connection between the ends of the cross-bar and the end beams for moving the shovels sidewise, a connection between the sections of the center beam for adjusting the shovels sidewise, and a connection between the cross-bar and the center beam, substantially as described.

4. In a two-row cultivator, the combination of a series of plow-beams, a cross-bar common to all of the beams, a flat bar suspending each beam from the cross-bar and having a pivotal connection with the beam at the lower end and a fixed connection to the bar at the upper end, and a swivel-jointed suspending-rod between each beam and the cross-bar, substantially as described.

5. In a two-row cultivator, the combination of a series of plow-beams, a cross-bar common to all of the beams, a flat bar suspending each beam from the cross-bar and having a pivotal connection with the beam at the lower end and a fixed connection to the bar at the upper end, a swivel-jointed suspending-rod between each beam and the cross-bar, and a swivel-brace for the beam, substantially as described.

6. In a two-row cultivator, the combination of a beam on each side, each beam carrying shovels, a center beam carrying shovels, a coupling for each beam at the forward end, a swinging board carrying the couplings, a cross-bar from which the several beams are suspended at the rear and two levers each engaging with and carrying the cross-bar, for the operating of either lever to swing all the beams laterally and to raise and lower all the beams, substantially as described.

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