

No. 736,119.

PATENTED AUG. 11, 1903.

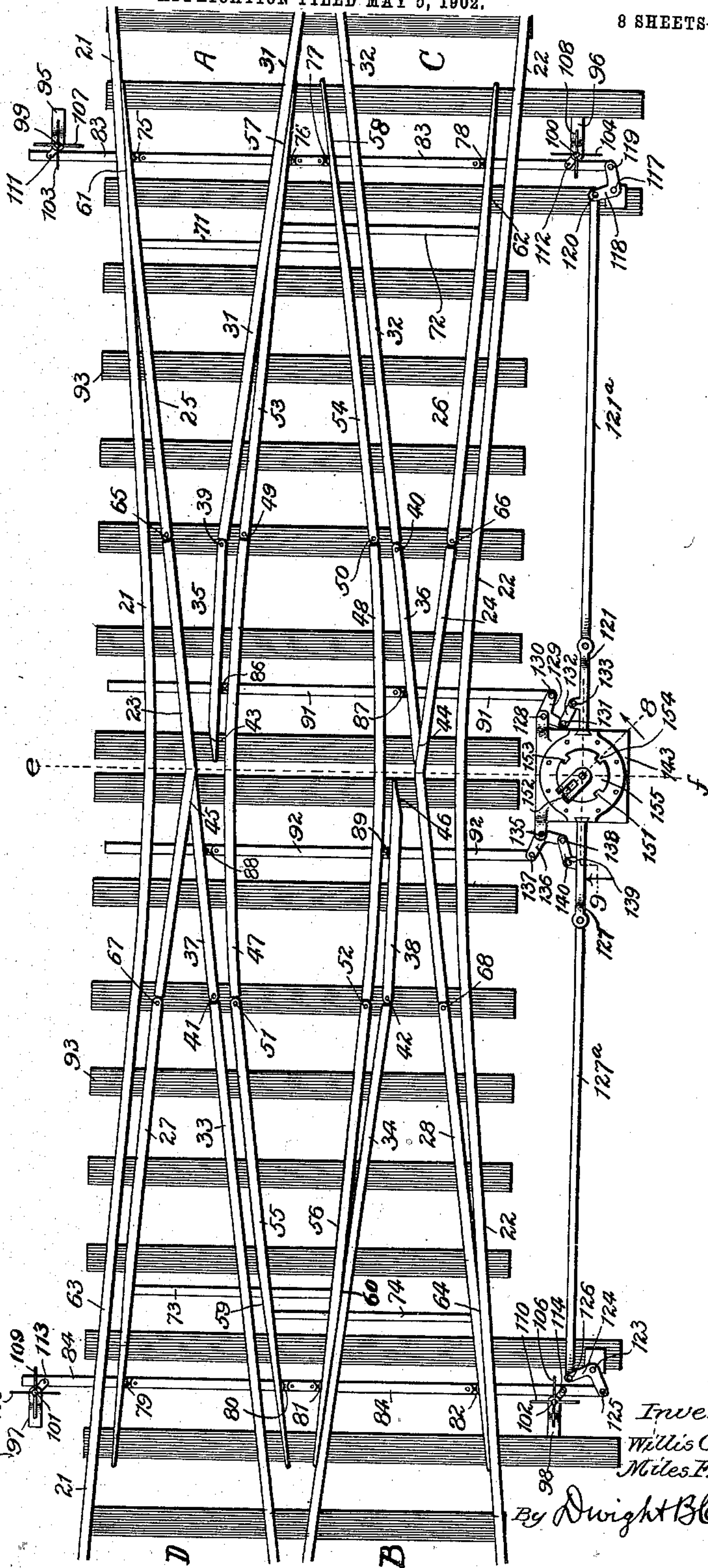
W. C. LEE & M. F. MOORE:
COMBINATION CROSSING AND DOUBLE SLIP SWITCH WITH
MOVABLE CENTER POINTS.

APPLICATION FILED MAY 5, 1902.

NO MODEL.

8 SHEETS—SHEET 1.

Fig. 1.



Witnesses:

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Inventors:

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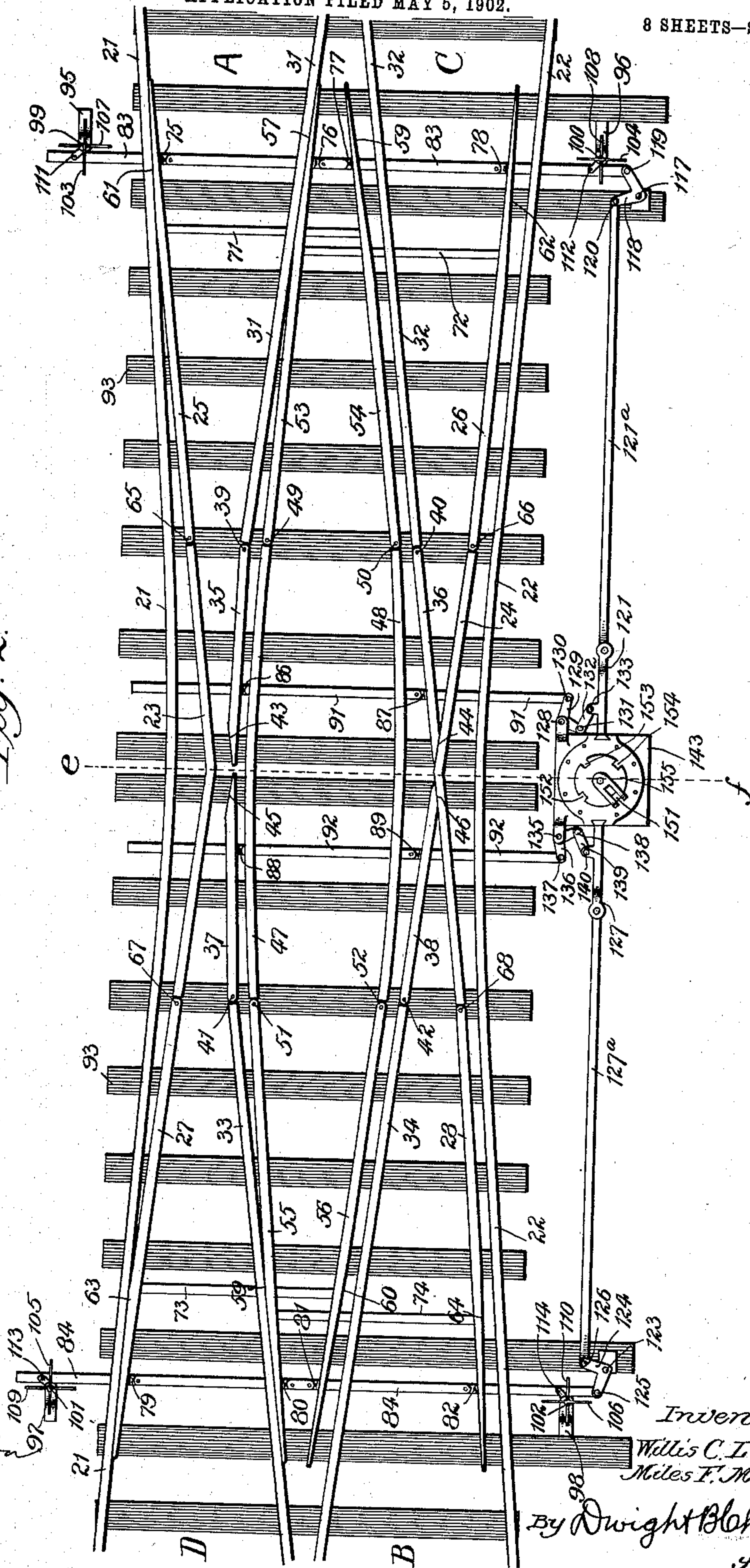
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8 SHEETS—SHEET 2.

Fig. 2.



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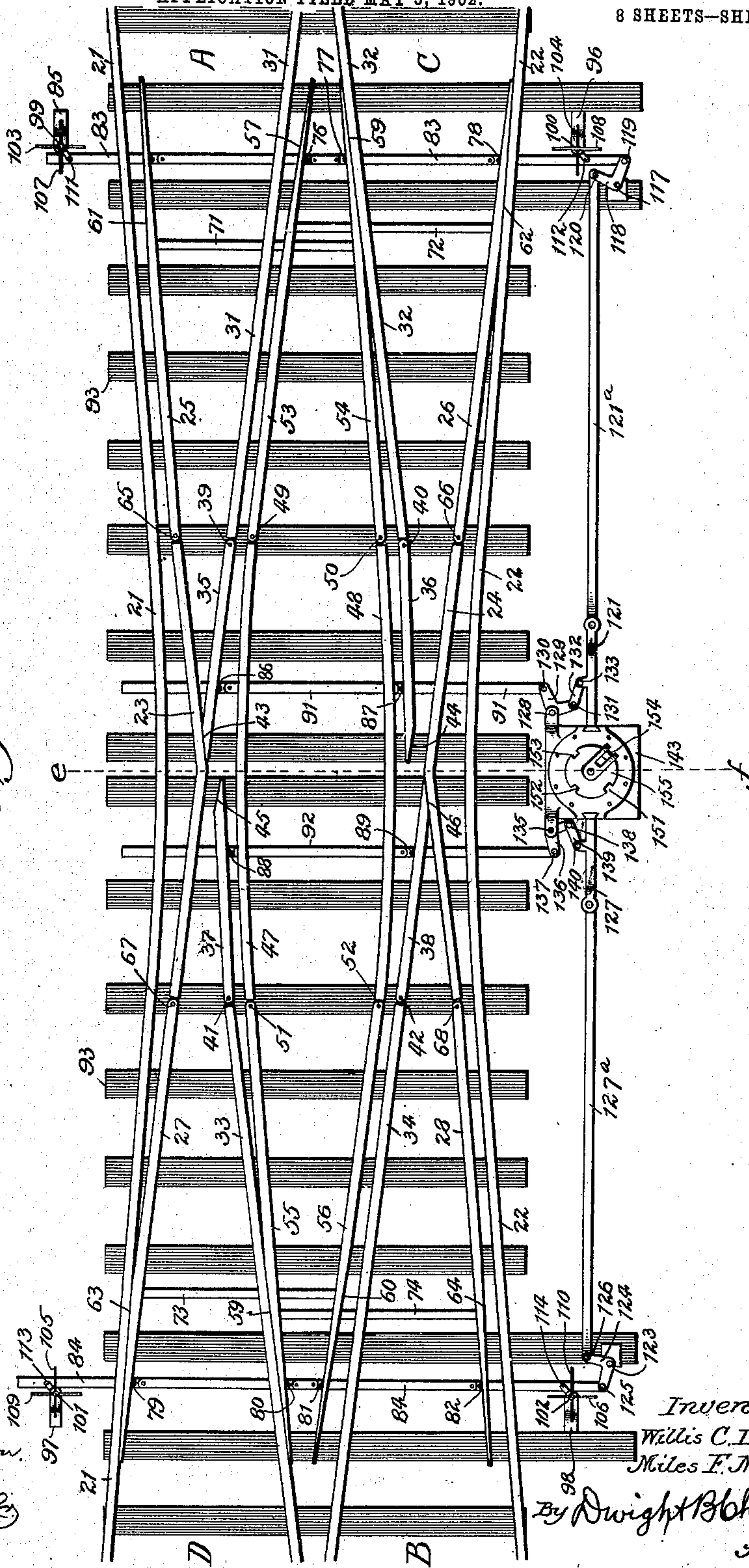
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8 SHEETS—SHEET 3.

Fig. 3.



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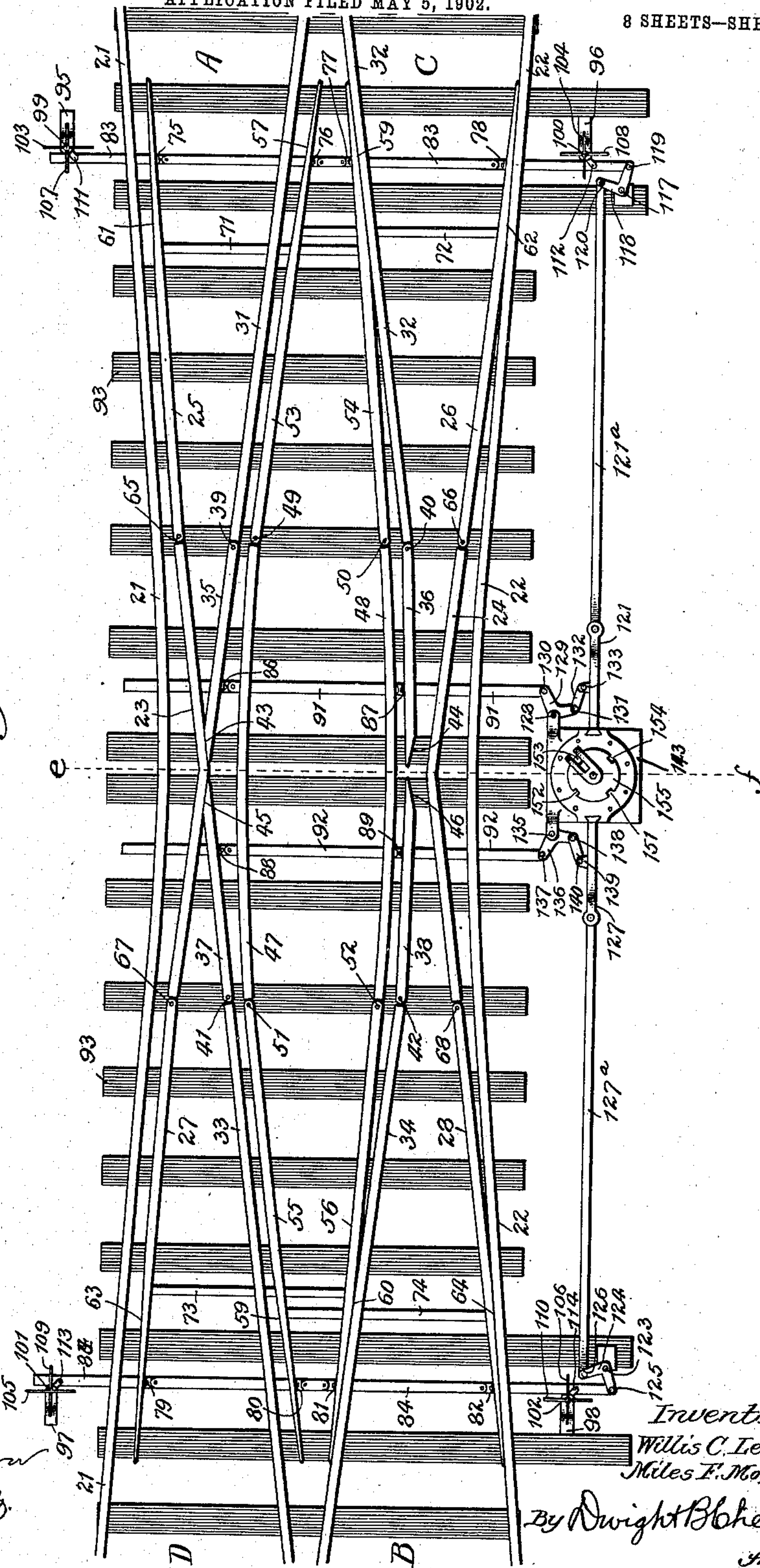
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8 SHEETS--SHEET 4.

Fig. 4.



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8 SHEETS—SHEET 6.

Fig. 7.

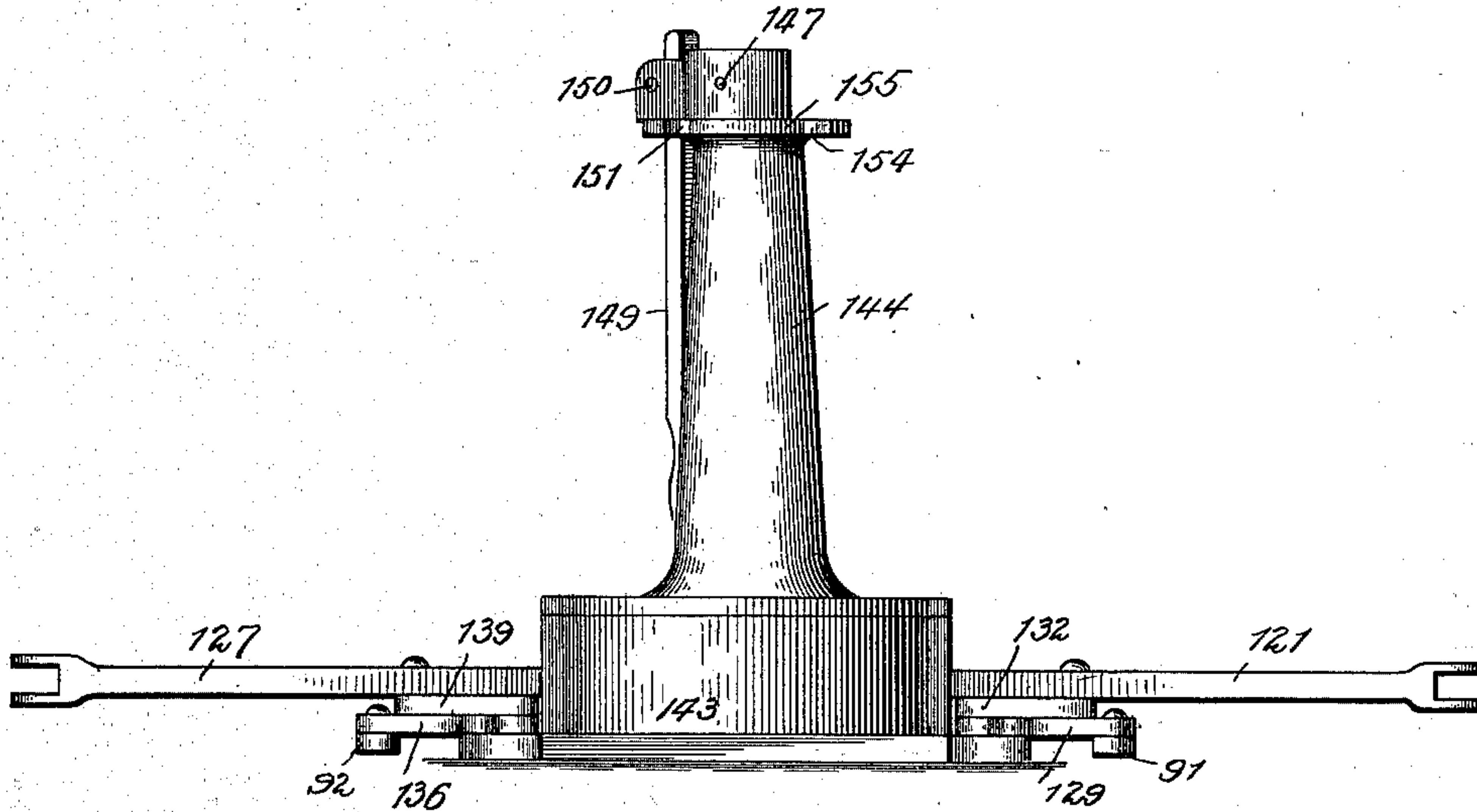


Fig. 8.

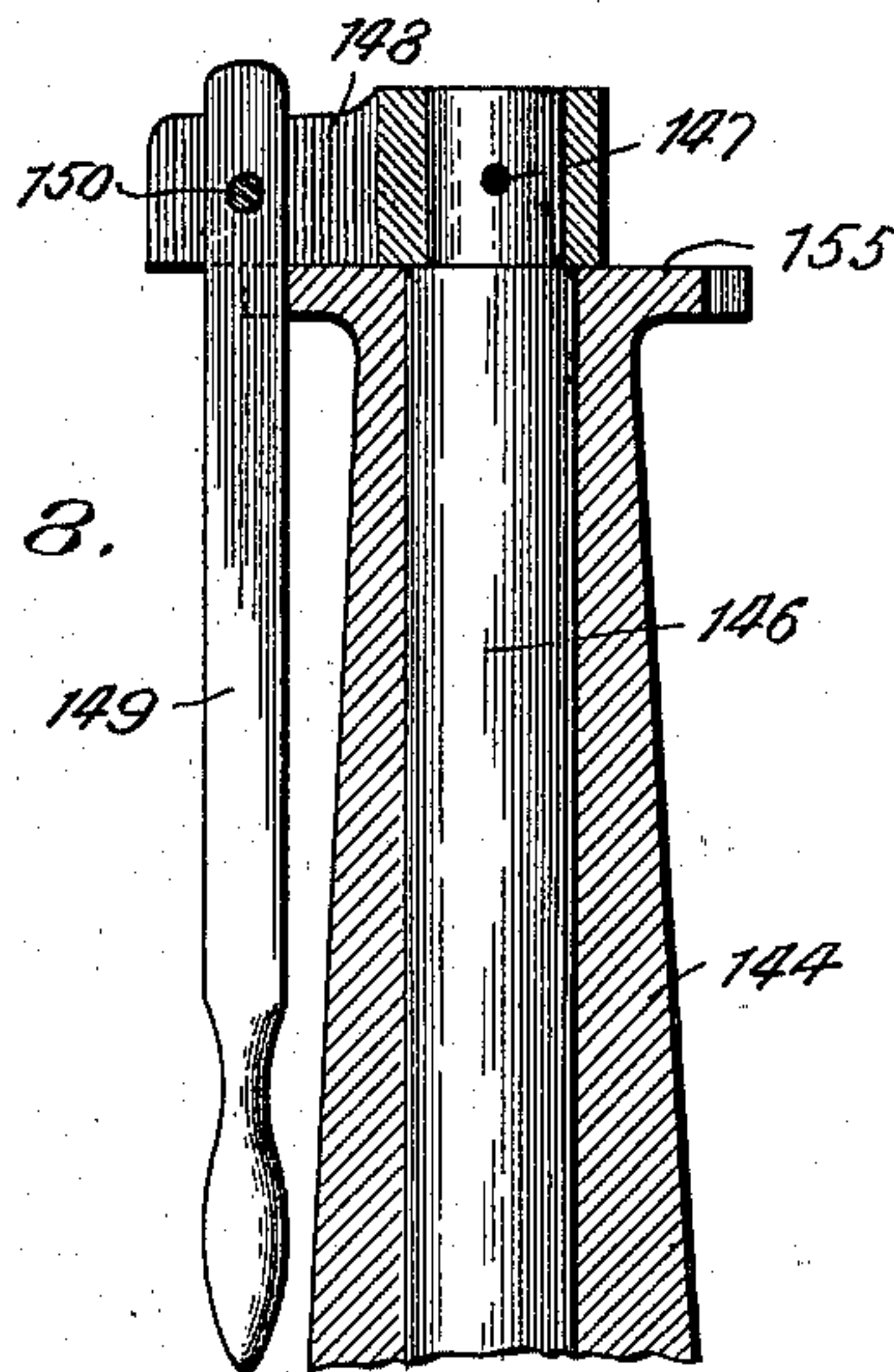
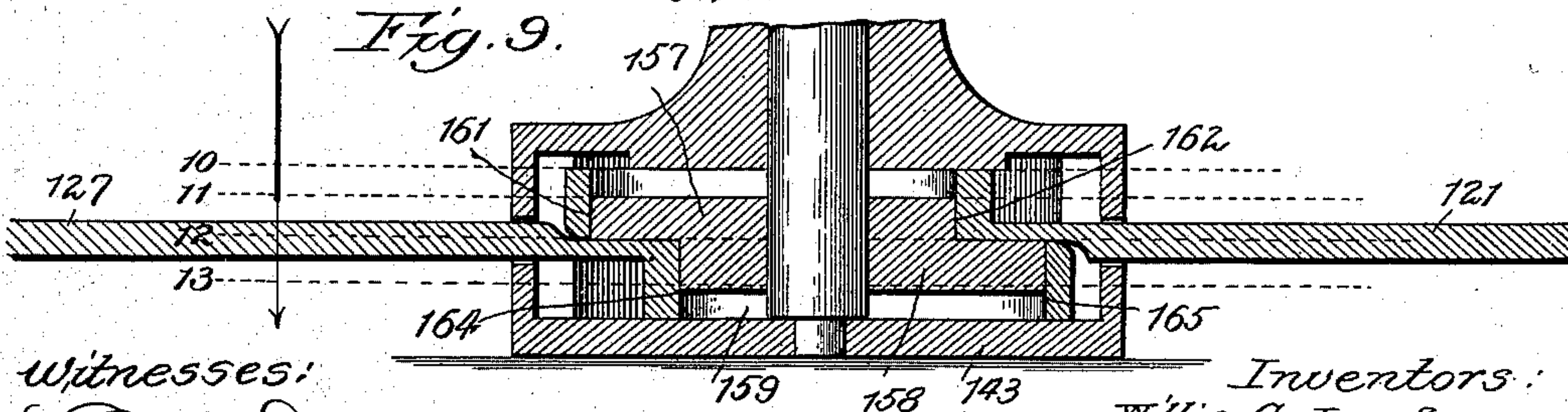


Fig. 9.



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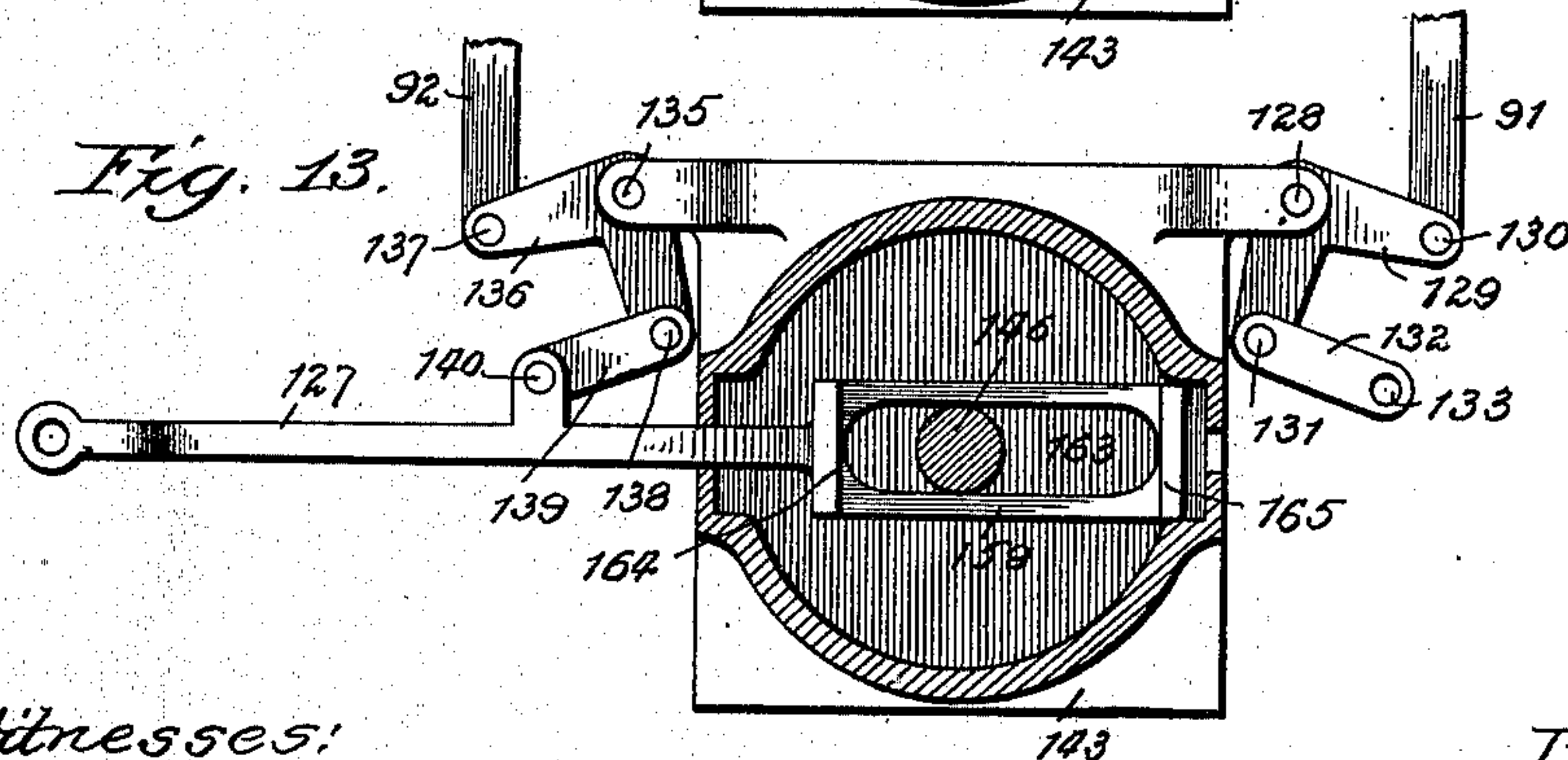
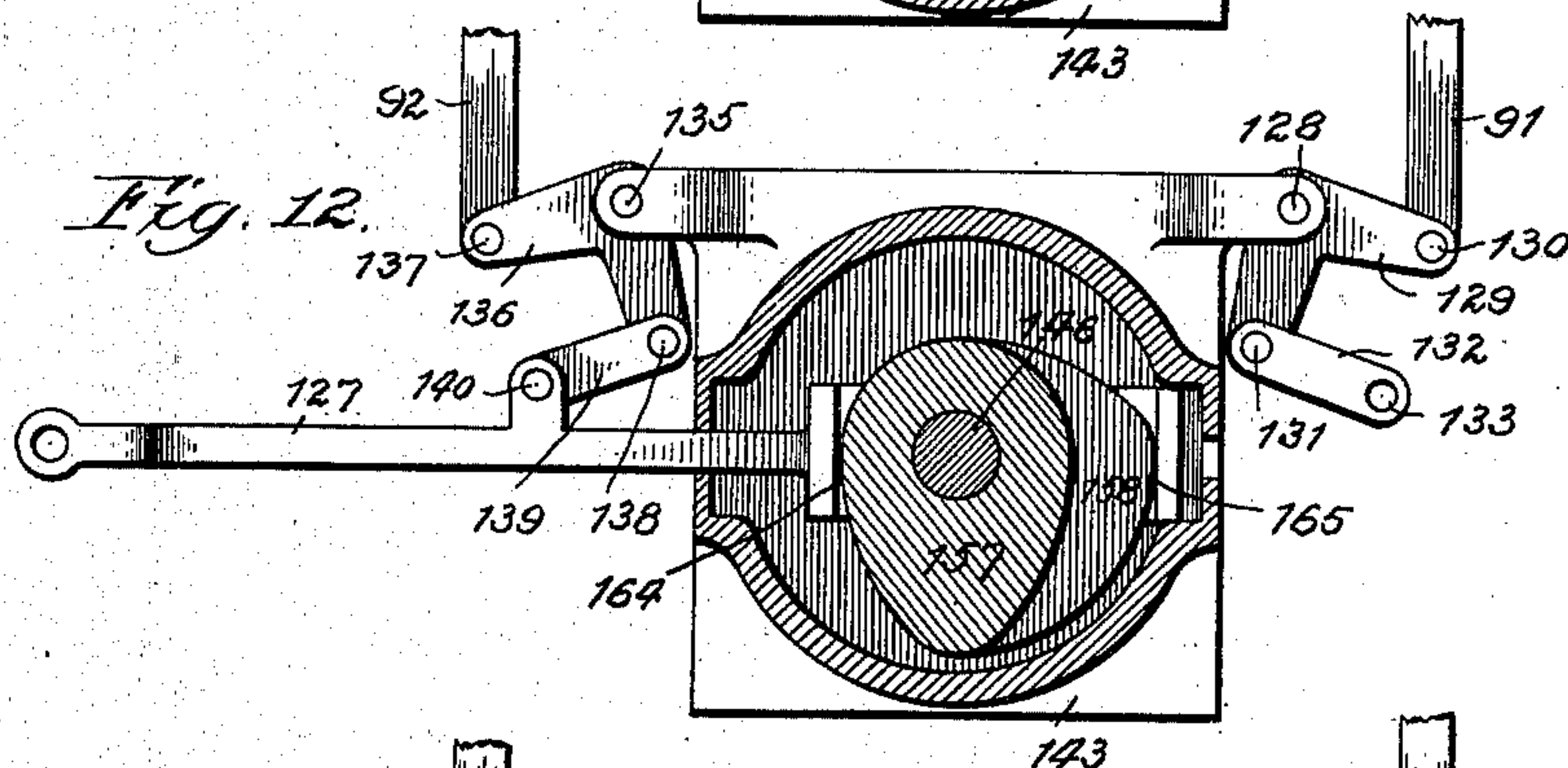
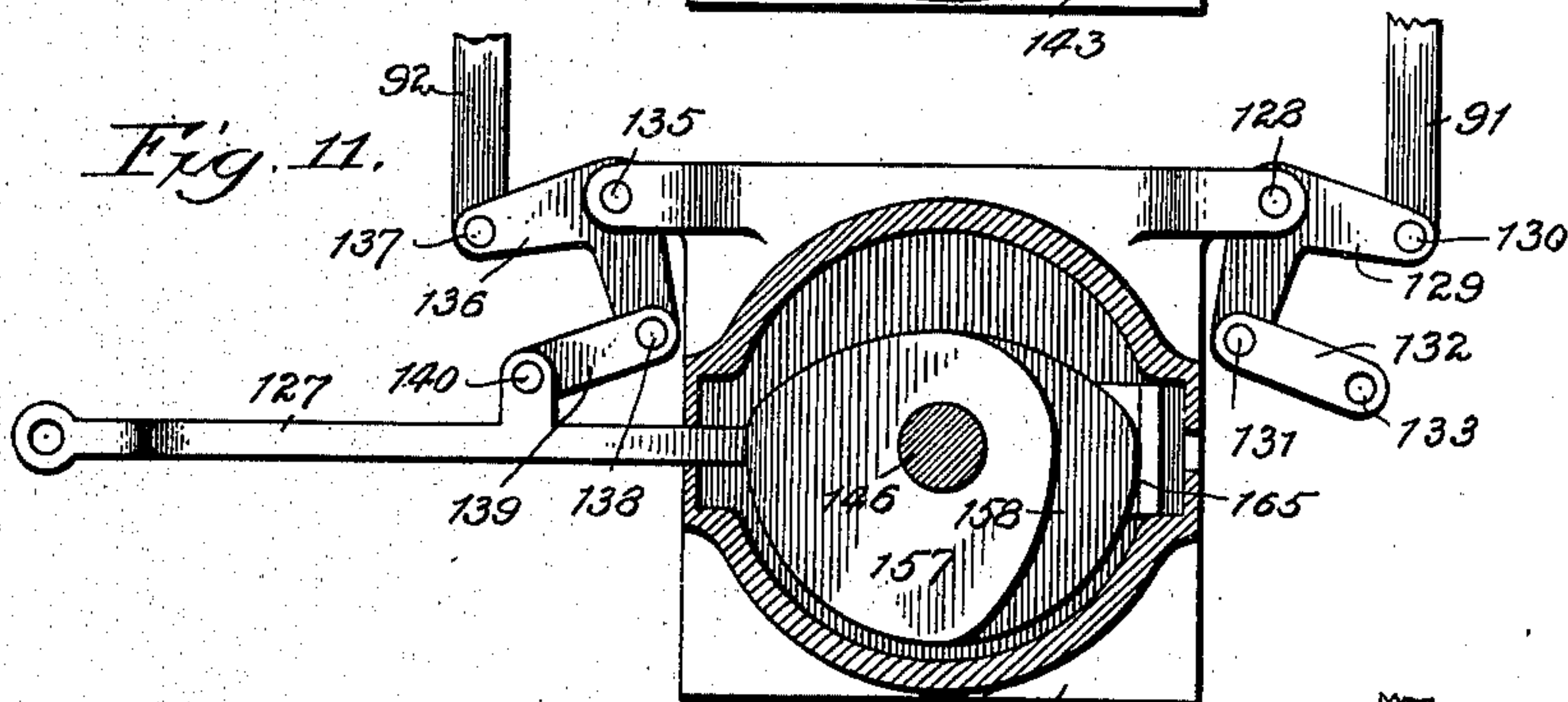
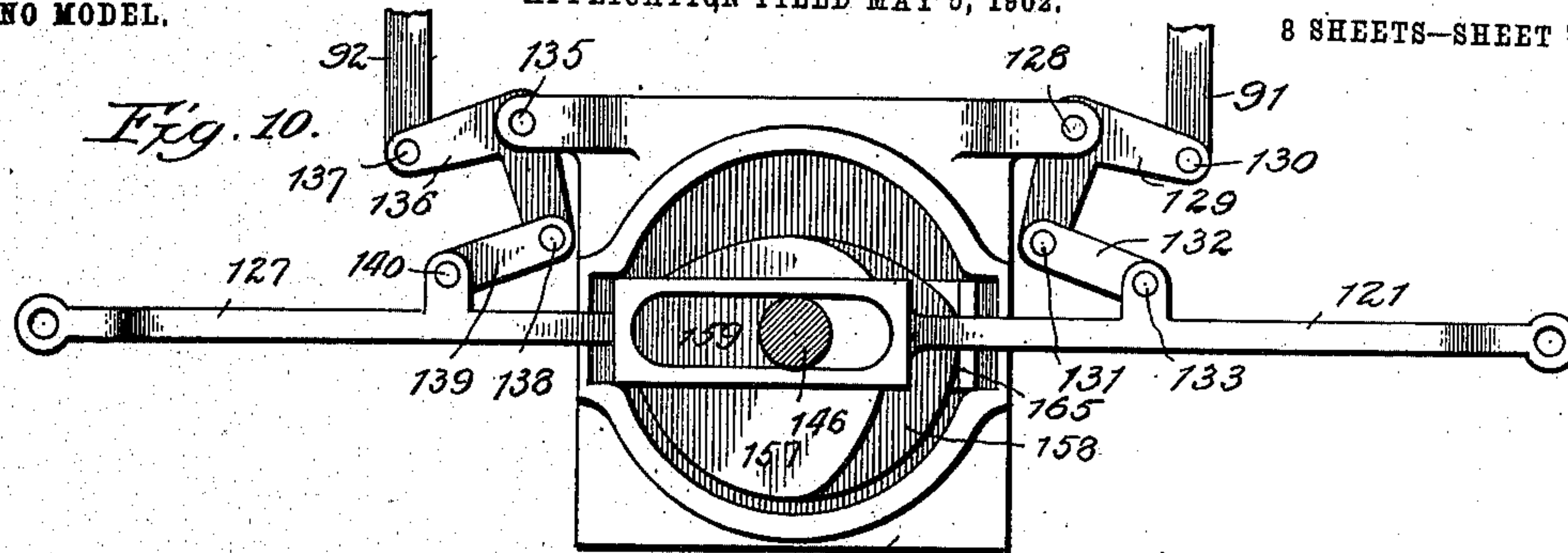
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NO MODEL.

8 SHEETS—SHEET 7.



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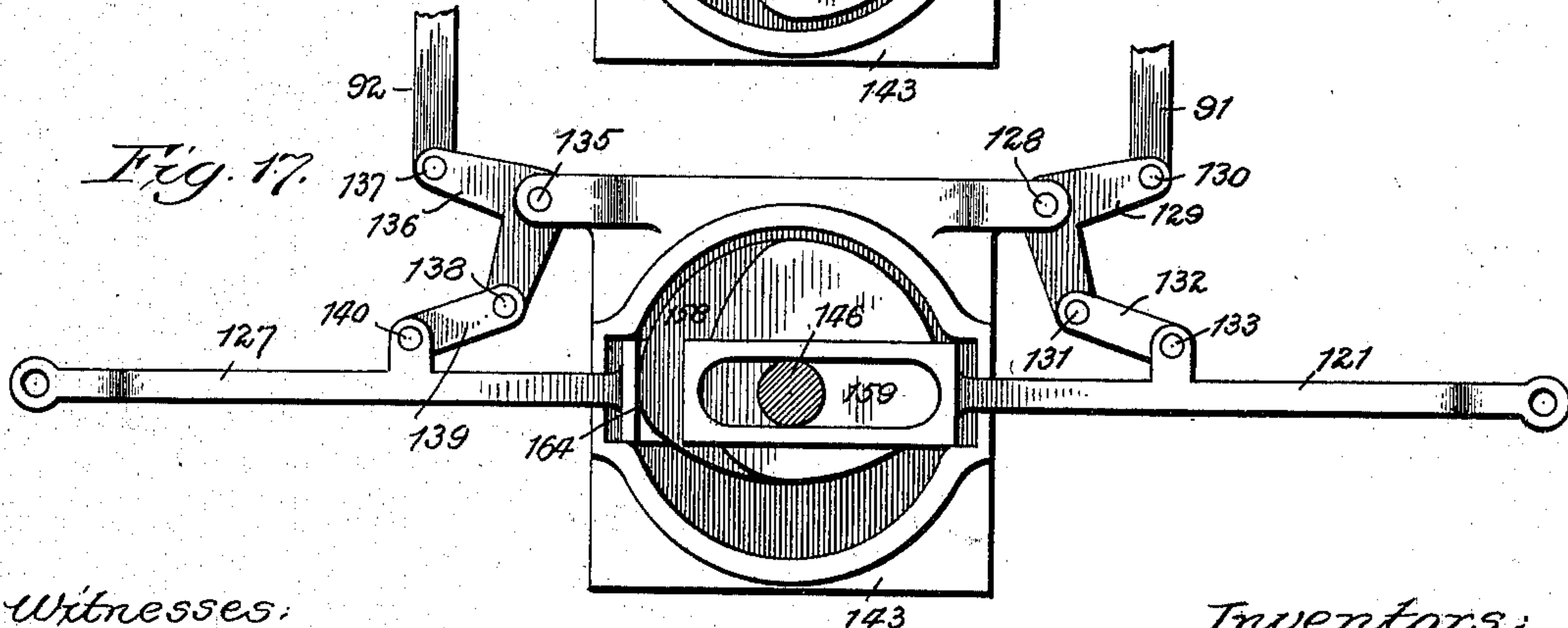
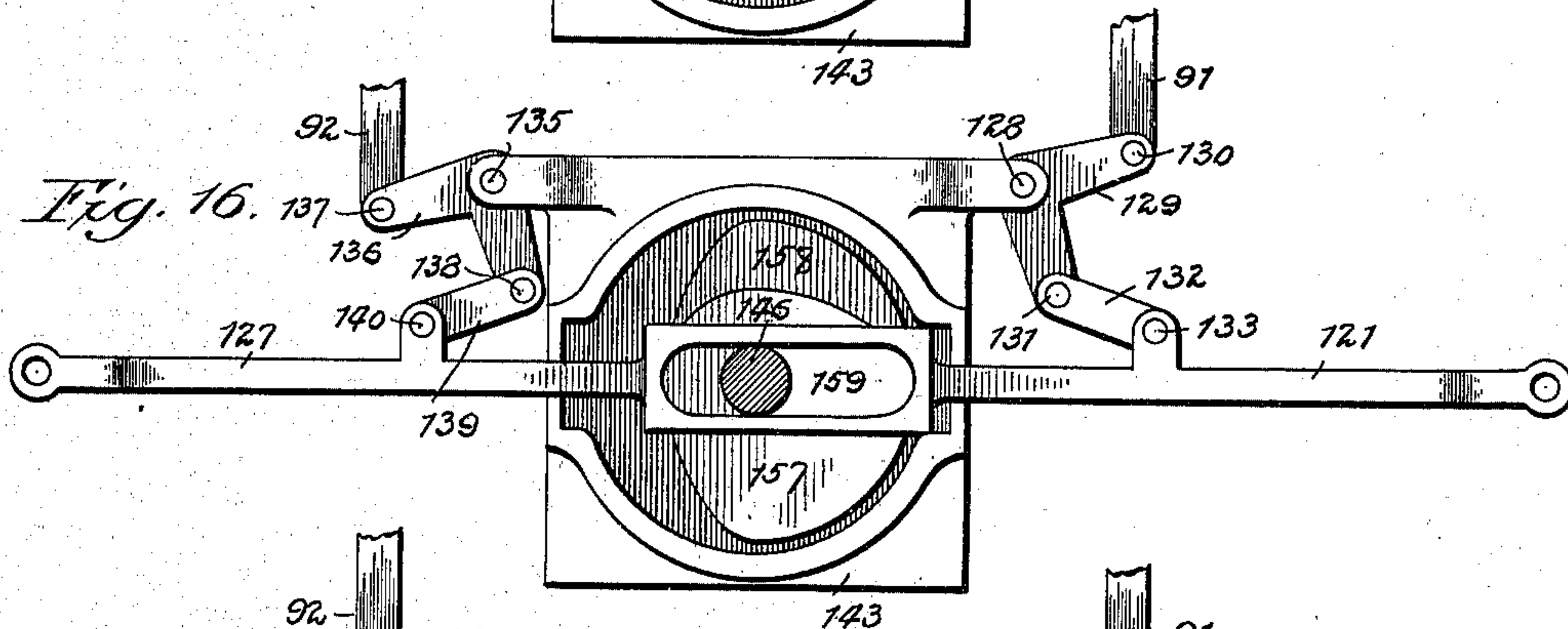
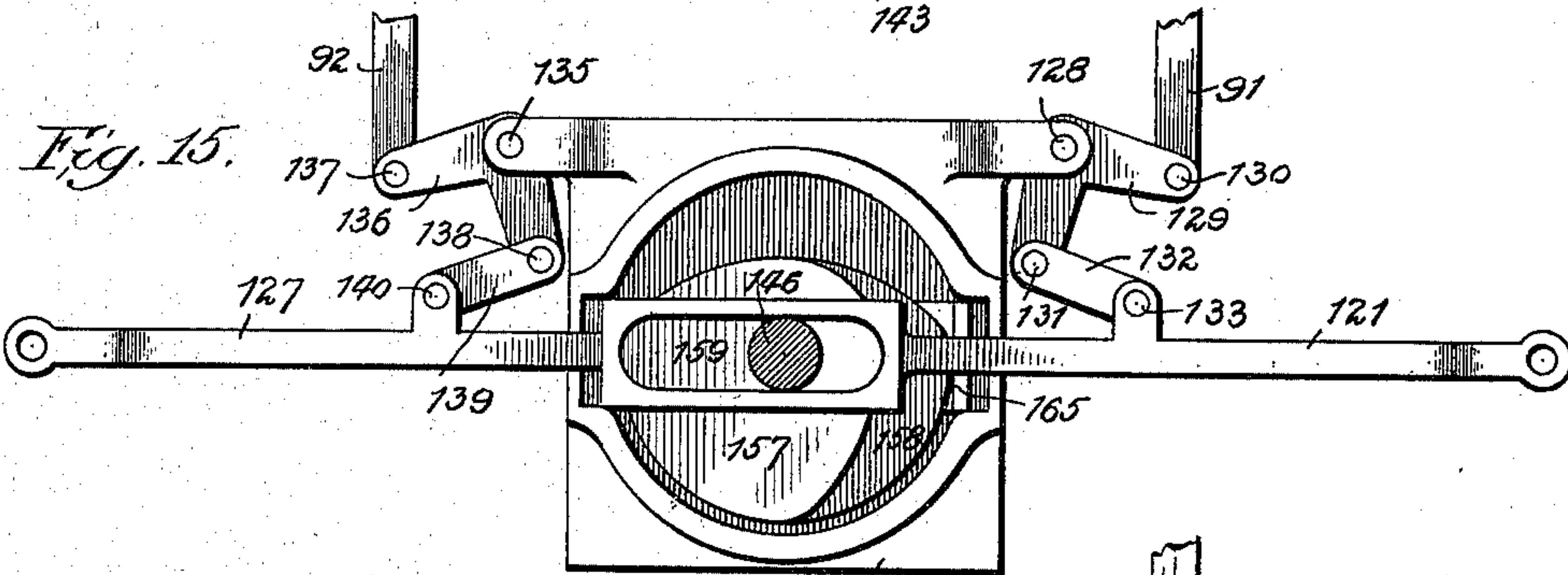
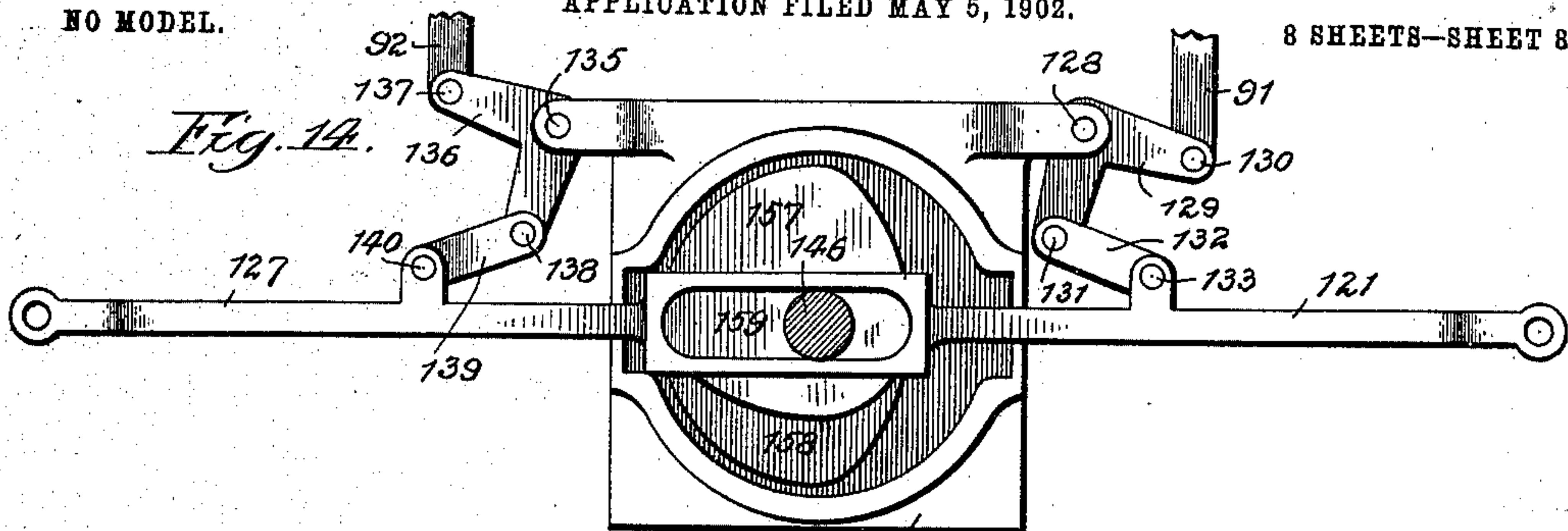
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UNITED STATES PATENT OFFICE.

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COMBINATION CROSSING AND DOUBLE SLIP-SWITCH WITH MOVABLE CENTER POINTS.

SPECIFICATION forming part of Letters Patent No. 736,119, dated August 11, 1903.

Application filed May 5, 1902. Serial No. 106,055. (No model.)

To all whom it may concern:

Be it known that we, WILLIS C. LEE and MILES F. MOORE, citizens of the United States, residing at South Chicago, a part of the city of Chicago, in the county of Cook and State of Illinois, have invented a new and useful Combination Crossing and Double Slip-Switch with Movable Center Points, of which the following is a specification in its best form now known to us, reference being had to the accompanying drawings, in which similar characters indicate the same parts throughout the several views.

Our invention relates to combined railroad crossings and slip-switches; and the object of our invention is to produce such mechanism in which it is possible when it is properly set for a train to cross at different times on either track and also by properly setting the switches to be transferred from either diagonal track to the other of said crossings.

Our invention particularly relates to mechanism for controlling such a combination crossing and double slip-switch with movable center-points by a single lever, preferably mounted in the switch-stand adjacent to the track, so that by moving this single lever to successive positions the switches on the crossing will be successively set for a crossing on one track, a slip-switch from one track to the other, a through-crossing on the other track, and the use of the opposite slip-switch.

Our invention also consists in the combination, with the above, of a system of signals also operated and controlled by the lever, so that when the crossing is set so that one through-track is clear there will be two signals upon it indicating "safety," while two signals at the opposite through-track indicate "danger," and when the switch is set so that said through-track is not clear for the passage of trains at least one of the two signals referred to will show "danger."

Our invention consists in a combined switch-crossing having all of the above advantages which can be more easily and cheaply constructed and which is less liable to get out of order than any heretofore made; and it also consists in many details of con-

struction hereinafter more fully described and claimed.

Referring to the drawings, Figure 1 is a plan view of mechanism illustrating our invention, showing one main track set for "safety" and the other main track and both slip-switches closed. Fig. 2 shows the position of the same parts when the lever operating the device has been turned so that one slip-switch is open. Fig. 3 shows the position of the parts when the opposite through-track from the one shown in Fig. 1 is ready for use, and Fig. 4 shows the position of the parts when the opposite slip-switch from the one shown in Fig. 2 is ready for use. Fig. 5 is a detail plan, and Fig. 6 is a detail sectional view, of the connections of the four end switch-points and the signals connected to the same. Fig. 7 is a side elevation of the switch-stand preferably used in our invention. Fig. 8 is a sectional detail view of the upper portion of the stand, taken diagonally from the base of the stand on line 8 of Fig. 1. Fig. 9 is a detail sectional view of the lower portion of the switch-stand, taken directly through the center of the stand on the dotted line 9 of Fig. 1. Figs. 10, 11, 12, and 13 are respectively detail plan views taken on the lines 10, 11, 12, and 13 of Fig. 9, the parts above each of said dotted lines being removed. Figs. 14, 15, 16, and 17 are respectively plan views taken on line 10 of Fig. 9, showing the positions of the cams when the lever is set, respectively, at the positions shown in Figs. 1, 2, 3, and 4.

For purposes of description one through-track is lettered A B, while the opposite through-track is lettered C D. Each single letter represents the portion of the track between the point where the letter is located and the center line *e f* of the crossing. At some points in the specification these portions designated by letters will be referred to as "ends" of the crossing.

Referring to the drawings, 21 and 22 are respectively the curved stock-rails of mechanism of the class described, being connected at their outer ends (beyond the figure) to the outer main rails of the railroad-tracks A B

and C D, which cross each other, by means of the mechanism of our invention. Inside of these curved stock-rails are bent connecting-rails 23 and 24. Pivoted to the ends of these bent connecting-rails are the switch-points 25, 26, 27, and 28. Inside of the bent connecting-rails just described are straight connecting-rails 31, 32, 33, and 34, connecting at their outer ends (beyond the figure) to an ordinary frog, which is in turn connected to the inner rails of the main tracks, which cross each other, by means of our mechanism. On the inner ends of these straight connecting-rails 31, 32, 33, and 34 are movable switch-points 35, 36, 37, and 38, pivoted, respectively, at 39, 40, 41, and 42. These movable points are tapered at their ends in the angular lines 43, 44, 45, and 46, conforming to the angle of the bent connecting-rails, so that these movable points may be moved against the bent connecting-rails, and the connecting-rail, movable point, and the straight stock-rail to which the movable point is pivoted form a continuous rail. Inside of the mechanism just described are the curved connecting-rails 47 and 48. Pivoted to the ends of these curved connecting-rails at 49, 50, 51, and 52 are switch-points 53, 54, 55, and 56. The outer edges of these switch-points are cut away in the angular lines 57, 58, 59, and 60 in such a way that when one of these switch-points is brought in contact with the straight connecting-rail the curved rail, the switch-point pivoted to it, and the straight connecting-rail form a continuous track. The outer edges of the switch-points 25, 26, 27, and 28 are cut away in the angular lines 61, 62, 63, and 64, so shaped that when these switch-points are moved on their pivots 65, 66, 67, and 68 so that one of the points is brought in contact with the curved connecting-rail to which it is adjacent the bent connecting-rail to which the switch-point is pivoted, the switch-point, and this curved connecting-rail will form a continuous track. The switch-points 25 and 54 are connected together by tie-bars 71, which permit of their being moved together. In a similar manner switch-points 53 and 26 are connected by tie-bar 72, switch-points 27 and 56 by tie-bar 73, and switch-points 55 and 28 by tie-bar 74. Bolted to the switch-points 25, 53, 54, 26, 27, 55, 56, and 58 are lugs 75, 76, 77, 78, 79, 80, 81, and 82. Passing below these lugs on the ends of each set of switch-points are head-rods 83 and 84, the same being connected to the lugs just described by bolts 85 in the manner illustrated in Fig. 6, so that when these head-rods are moved back and forth longitudinally across the rails the four switch-points connected to each head-rod will be moved simultaneously in the same direction. Secured to the movable points 35, 36, 37, and 38 are other lugs 86, 87, 88, and 89 similar to those just described, and illustrated in Fig. 6. Passing under the rails near the center of the crossing are movable-point head-rods 91 and 92, rod 91 being con-

nected by the lugs 86 and 87 to movable points 35 and 36 and the head-rod 92 being connected by lugs 88 and 89 to the movable points 37 and 38 by bolts similar to bolt 85, (shown in Fig. 6,) so that as either movable-point head-rod is moved the movable points connected to it are moved simultaneously in the same direction.

It is of course to be understood that all of the rails heretofore mentioned are securely fastened to the ties 93 by spikes or other suitable mechanism.

Journaled in suitable stationary standards 95, 96, 97, and 98, the former two adjacent to head-rod 83 and the latter two adjacent to head-rod 84, as shown, are upright signal posts or masts 99, 100, 101, and 102. Secured to these posts are signal-targets having red signals 103, 104, 105, and 106 and white signals 107, 108, 109, and 110. These signal-masts 99 to 102 are connected to the respective head-rods to which they are adjacent by slotted lever-arms 111, 112, 113, and 114. The signal post or mast 99 is so arranged that it shows white along the main track A when switch-point 25 is adjacent to the curved rail 21 and red when it is not. The signal on post 100 is so arranged that it shows white along the main track C when switch-point 26 is adjacent to curved rail 22 and red when it is not. The signal on post 101 is so arranged that the signal shows white on track D when switch-point 27 is adjacent to curved rail 21 and red when it is not. Post 102 is so arranged that the signal on it shows white on track B when switch-point 28 is adjacent to the curved rail 22 and red when it is not. Pivoted at 117 to a tie or other fixed point is a bell-crank 118, having one arm pivotally connected to the end of head-rod 83 and having its other end pivotally connected at 120 to the connecting-rod 121^a. Similarly pivoted at a fixed point 123 is another bell-crank 124, having one arm pivotally connected at 125 to the head-rod 84 and having its other end pivotally connected at 126 to the connecting-rod 127^a. Pivoted at a fixed point 128 is a bell-crank 129, having one end pivotally connected at 130 to movable-point head-rod 91 and the other end pivotally connected at 131 to a short link 132, connected at 133 to the connecting-rod 121. Similarly pivoted at 135 is another bell-crank 136, having one arm pivotally connected at 137 to movable-point head-rod 84 and its other arm connected at 138 to a short link 139, connected at 140 to the connecting-rod 127.

Mounted adjacent to the above-described mechanism on a suitable base 143 is a four-way switch-stand frame 144. Journaled in the switch-stand is a shaft 146, having rigidly secured to it by a pin 147 or other suitable means a lever-arm 148. This lever-arm has an extension-handle 149, pivoted at 150 in such a way that when it is desired to turn the shaft 146 the arm may be raised to a horizontal position to obtain an additional leverage,

and when the mechanism is at rest the handle may be lowered to the vertical position shown in Fig. 8 and rest in one of the four notches 151, 152, 153, and 154, cut in the top 5 155 of the switch-stand, thereby locking the lever 148 in a fixed position until such time as the extension-lever 149 is raised out of the notch. Rigidly secured to the lower end of shaft 146 are two cams 157 and 158, placed at 10 right angles to each other and shaped substantially as shown. Connecting-rod 121 has a slot 159, adapted to allow the rod to fit over shaft 146, and has bearing-faces 161 and 162, adapted to fit against the sides of cam 157. 15 In a similar manner the rod 127 has a slot 163 in it, adapted to fit over the shaft 146, and has bearing-faces 164 and 165, adapted to bear against the cam 158, the rod having the portion 159 passing under said cam, as 20 shown in Fig. 9. These cams are so shaped and arranged that starting when they are in the position shown in Fig. 14 and the lever 148 is accordingly in position shown in Fig. 1 and moving the lever a quarter of a revolution to the position shown in Fig. 2 the 25 connecting-rod 127 will be drawn inward until the parts are in the position shown in Fig. 15, the connecting-rod 121 remaining stationary during the operation. When the lever 148 is moved another quarter of a revolution to the position shown in Fig. 3, the connecting-rod 121 will be moved outward to the position shown in Fig. 16, the rod 127 remaining stationary. When the lever 148 is moved 35 another quarter of a revolution to the position shown in Fig. 4, connecting-rod 127 will be moved outward to the position shown in Fig. 17, the rod 121 remaining stationary, and when the lever 148 is moved on around 40 the circle to its original position the connecting-rod 121 will be again moved inward to the position shown in Fig. 14, rod 127 remaining stationary. In other words, the cams are so shaped that during each quarter of 45 of the motion of the lever in one quadrant of its swing one of the connecting-rods is moving in one direction, the same rod being moved in the opposite direction when the lever is in the opposite quadrant of its circle of motion, and when one rod is moving in either direction the opposite connecting-rod remains stationary. 50

In the operation of our invention we first set all of the parts in the position shown in 55 Fig. 1, in which the lever-handle is in the position shown, the cams being in the position of Fig. 14. In this position the rails are set for main track A B and the masts 99 and 102 are turned so that the white signals 107 60 and 110 appear on said track, while the masts 100 and 101 are so set that the red signals 104 and 105 appear upon the opposite track C D. In this position the two white signals 107 and 110, considered together, indicate to the engineer approaching from either direction on 65 the track A B, which these signals control, that said track is clear and he may proceed

through the crossing on the main track. The signal nearest to him also conveys to him the information that the switch nearest to him is 70 not set for slip-switching. On the other hand, the presence of the red signals 104 and 105 indicate to the engineer approaching on the opposite track C D from either direction that the track is not set for through traffic, and 75 the signal nearest to him indicates to him that the switch at that point is set for slip-switching; but it does not give him permission to proceed onto the slip-switch. We now raise the handle 149 and turn the lever 148 a 80 quarter of a revolution to the position shown in Fig. 2 and let the handle drop down into its notch in the stand, thereby locking the parts in position. In making this quarter of a revolution we move the cams of the stand 85 to the position shown in Fig. 15, thereby drawing in the connecting-rod 127, which has moved the movable-point head-rod 92, and consequently moved the movable point 37 on track B away from the bent connecting-rail 90 23 and the movable point 38 on track D into contact with the bent connecting-rail 24. This motion of the lever-handle 148 has also simultaneously moved the head-rod 84 to the left, thereby moving switch-point 27 against 95 curved stock-rail 21, switch-point 55 against straight connecting-rail 33, switch-point 56 away from straight connecting-rail 34, and switch-point 28 away from curved stock-rail 22. During this motion the points in tracks 100 A and C remain stationary. In this position the mechanism is set, as shown, for slip-switching from track B to track C, or vice versa. This motion of the lever has also 105 turned the signals on masts 101 and 102 a quarter of a revolution, so that the red signal 106 now shows on the track B and the white signal 109 shows on track D. The signals now show an engineer approaching the crossing from either direction on either main track 110 one red and one white signal set against him on his own main track. An engineer approaching on tracks B or C will find the red signal on his own track nearest to him as he approaches and the corresponding red signal 115 on the slip-switch to which he desires to go, these two red signals indicating to him that he can pass around from track B to C, but cannot pass from C to D or A to B—in other words, that the main-line crossing is closed. 120 We now raise the handle 149 and move the lever 148 another quarter of a revolution to the position shown in Fig. 3 and again let the lever 149 drop, locking the parts in position. This motion has moved the rod 121 upward 125 to the position shown in Figs. 2 and 16, which motion has moved the movable points and switch-rods in the upper half of the figure or on tracks A and C to the position shown in Fig. 3, the movable points having been 130 moved to the right, the four switch-points having been moved to the left. The tracks are now set so that there is a straight through-track from C to D, and, as shown, the signals

are so set that both signals on these tracks show white, while the signals on tracks A and B show red. In the above movement the parts at the lower half of the figure (B D) remain stationary. We now move the lever 148 another quarter of a revolution until the cams are in the position shown in Fig. 17, thereby moving rod 127 outward and the movable points and switch-points on tracks B and D to the position shown in Fig. 4, the movable points being moved to the left, the four switch-points being moved to the right, the signals on track B being moved to white and on track D to red. During this motion the parts on tracks A and C are stationary. In this position it will be seen that slip-switching is afforded from track D to track A, or vice versa, and that the two signals on said track D indicate red, while the two signals on tracks C and B indicate white. We now move the lever another quarter of a revolution and return the parts to their first position. The lever may now be moved around again in the same or reverse direction, as desired, in the latter case reversing the order of successive positions of the parts.

We desire to call particular attention to the fact that we are the first to move the switch-points and the movable points in one end of the crossing simultaneously by one lever motion, while the switch-points and the movable points in the other end of the crossing remain absolutely at rest, and that by this feature we obtain the two results of, first, being able to have each of the four separate positions of the controlling-lever set the mechanism for a direct crossing on one track, a slip-switch from one track to the other, a track-crossing on the opposite through-crossing and for the opposite slip-switch, only one of said passage-ways being open at a time. We are also by this construction able to so operate the signals that, as described, the signal nearest the engineer as he approaches the crossing always indicates to him whether or not the switch nearest to him is set for the main line or for slip-switching and also that the two signals on opposite portions of the same main track indicate, when taken together, whether or not the main track is clear for a crossing.

Having thus described our invention, what we claim as new, and desire to secure by Letters Patent, is—

1. In apparatus of the class described, the combination of rails of various shapes, movable points and switch-points, provided with means for properly setting the same, to afford at different times direct crossing on either track and slip-switching from either track to the other; a single switch-lever and mechanisms connecting said lever to different groups of movable points and switch-points whereby as said lever is successively moved to four different positions the apparatus will be successively set for; a direct crossing on one track, one slip-switch, direct crossing on the

other track, and for the other slip-switch, only one of said passage-ways being open at a time for the purposes set forth.

2. In apparatus of the class described, the combination of rails of various shapes, movable points and switch-points, provided with means for properly setting the same, to afford at different times direct crossing on either track and slip-switching from either track to the other; a single switch-lever movable in a circle in either direction, and mechanisms connecting said lever to different groups of movable points and switch-points whereby as said lever is successively moved to four different positions on the circle in which the lever moves the apparatus will be successively set for; a direct crossing on one track, one slip-switch, direct crossing on the other track, and for the other slip-switch, only one of said passage-ways being open at a time for the purposes set forth.

3. In apparatus of the class described, the combination of rails of various shapes, movable points and switch-points, provided with means for properly setting the same to afford at different times direct crossing on either track and slip-switching from either track to the other; a single switch-lever, mechanisms connecting said lever to different groups of movable points and switch-points whereby as said lever is successively moved to four different positions the apparatus will be successively set for; a direct crossing on one track, one slip-switch, direct crossing on the other track, and for the other slip-switch, only one of said passage-ways being open at a time; and a signal on each main track on each end of the crossing, connected to and controlled by the mechanism connecting the switch-point to which the signal is adjacent with the lever, whereby when either through-crossing track is clear for the passage of trains the signals on both ends of said track will show safety, and when the lever is turned so that said through-track is not clear at least one of said signals will show danger, for the purposes set forth.

4. In apparatus of the class described, the combination of rails of various shapes, four movable points and eight switch-points provided with means for properly setting the same to afford at different times direct crossing on either track and slip-switching from either track to the other; and a four-waysingle-lever switch-stand having its lever connected by independent mechanism to the two movable points and four switch-points on one end of the crossing and also connected by independent mechanism to the other two movable points and four switch-points on the other end of said crossing whereby by moving the lever of the stand successively to the different positions of the four-way stand the switch mechanism will be successively set for; a direct crossing on one track, slip-switching on one track, direct crossing on the other track,

and for the other slip-switch, only one of said passage-ways being open at a time for the purposes set forth.

5. In apparatus of the class described, the combination of rails of various shapes, four movable points and eight switch-points, provided with means for properly setting the same to afford at different times direct crossing on either track and slip-switching from either track to the other; a four-way single-lever switch-stand having its lever connected by independent mechanism to the two movable points and four switch-points on one end of the crossing and also connected by independent mechanism to the other two movable points and four switch-points on the other end of said crossing whereby by moving the lever of the stand successively to the different positions of the four-way stand the switch mechanism will be successively set for; a direct crossing on one track, one slip-switch, direct crossing on the other track and for the other slip-switch; only one of said passage-ways being open at a time and a signal on each main track, on each end of the crossing, so connected to and controlled by the mechanism connecting the switch-point to which the signal is adjacent to the lever that when either through-crossing track is clear for the passage of trains both signals on it will show safety and when the lever is turned so that said track is not clear at least one signal on it will show danger, for the purposes set forth.

6. In a combination crossing and double slip-switch with movable center points, the combination of two center movable points and four end switch-points on one end of the crossing, a lever, and mechanism connecting said lever to said points whereby a single motion of the lever moves all of said switch-points in one direction and simultaneously moves said movable points in the opposite direction, for the purposes set forth.

7. In a combination crossing and double slip-switch with movable center points, the combination of two center movable points and four end switch-points all on the same end of the crossing, a movable-point head-rod connected to said two movable points, a single head-rod connected to all four of said switch-points, a lever, and mechanisms so connecting said lever to said movable-point head-rod and to said head-rod that a single motion of the lever moves said movable-point head-rod with the movable points connected to it in one direction and simultaneously moves said head-rod with the switch-points connected to it in the opposite direction, for the purposes set forth.

8. In a combination crossing and double slip-switch with movable center points, the combination of two center movable points and four end switch-points all on the same end of the crossing, a movable-point head-rod connecting the said two movable points, a single head-rod connected to all four of said switch-points, a connecting-rod, adapted to be

moved backward and forward, and mechanisms so connecting said connecting-rod to said movable-point head-rod and to said head-rod, that as said connecting-rod is moved in one direction the movable-point head-rod and the head-rod are moved in opposite directions with reference to each other, for the purposes set forth.

9. In a combination crossing and double slip-switch with movable center points, the combination of two center movable points and four end switch-points on one end of the crossing, duplicate parts on the opposite end of the crossing, a lever, two cams operated by said lever, connecting mechanism between one cam and the points on one end of the crossing, similar connecting mechanism between the second cam and the points on the opposite end of the crossing, the whole so arranged that in moving the lever through one quadrant of a circle the switch-points on one end of the crossing will be moved in one direction and the movable points on the same end moved simultaneously in the opposite direction, while all the points on the opposite end of the crossing will remain at rest and that by moving said lever through the next quadrant of its revolution all the first-mentioned points will remain at rest while the points on the opposite end of the crossing will be given corresponding motion, the end points in one direction and the movable points in the opposite direction, for the purposes set forth.

10. In a combination crossing and double slip-switch with movable center points, the combination of two center movable points and four switch-points, all on one end of the crossing, duplicate points on the opposite end of the crossing, a movable-point head-rod on each end, connected to the movable points there located, a head-rod on each end connecting all four of the switch-points there located, a lever, two cams operated by such lever, a connecting-rod engaging each cam adapted to be moved backward and forward by said cam, mechanisms connecting one connecting-rod to the movable-point head-rod and to the head-rod at one end of the crossing, duplicate mechanisms connecting the other connecting-rod to the movable-point head-rod and the head-rod on the opposite end of the crossing, the whole so arranged that in moving the lever through one quadrant of the circle the switch-points on one end of the crossing will be moved in one direction, and the movable points on the same end moved simultaneously in the opposite direction, while all the points on the opposite end of the crossing will remain at rest, and that moving the said lever through the next quadrant of its revolution all of the first-mentioned points will remain at rest, while the points on the opposite end of the crossing will be given a corresponding motion, the end points in one direction the movable points in the opposite direction, for the purposes set forth.

11. In apparatus of the class described, a

switch-stand having a shaft mounted therein,
 a lever on said shaft adapted to move in a
 complete circle in either direction, two cams
 on said shaft, a connecting-rod operated by
 5 each cam, the cams being so shaped and ar-
 ranged with reference to each other that a
 motion of the lever through one quarter of
 its stroke moves one connecting-rod outward,
 a further motion through another quarter
 10 moves the opposite rod outward, a further
 quarter-turn of the lever moves the first rod
 backward, and a final quarter-turn of the le-
 ver moves the second rod backward.

12. In apparatus of the class described, a
 15 switch-stand having a shaft mounted therein,
 a lever on said shaft adapted to move in a
 complete circle in either direction, two cams
 on said shaft, a connecting-rod operated by
 each cam, the cams being so shaped and ar-
 20 ranged with reference to each other that a
 motion of the lever through one quarter of

its stroke moves one connecting-rod outward,
 a further motion through another quarter
 moves the opposite rod outward, a further
 quarter-turn of the lever moves the first rod 25
 backward, and a final quarter-turn of the le-
 ver moves the second rod backward, and two
 bell-crank mechanisms connected to each rod
 whereby as the rod is moved, one set of switch-
 points connected to one bell-crank mechan- 30
 ism are moved in one direction and another
 set of switch-points connected to the other
 bell-crank mechanism are moved simulta-
 neously in the opposite direction with refer-
 ence to the motion of the first point, for the 35
 purposes set forth.

WILLIS C. LEE.
 MILES F. MOORE.

Witnesses:

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 ROBERTA LEE TERRY.