

No. 885,919.

PATENTED APR. 28, 1908.

W. F. FRASER.  
LACING HOOK SETTING MACHINE.

APPLICATION FILED NOV. 17, 1906.

14 SHEETS—SHEET 1.

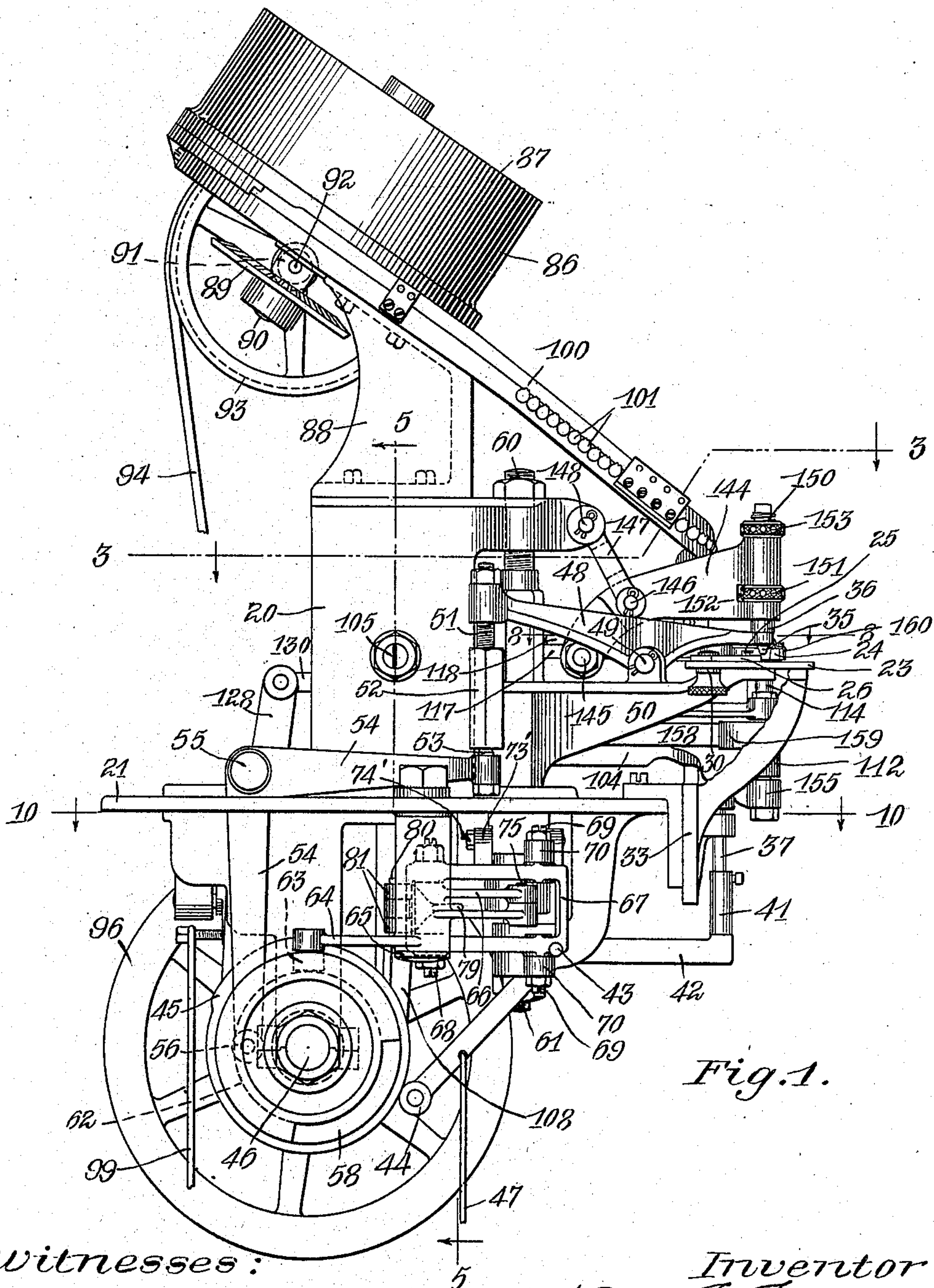


Fig. 1.

Witnesses:

Ernest A. Telfer.

Walter L. Telfer, his attorney.

Inventor

Warren F. Fraser.

Charles V. Gooding.

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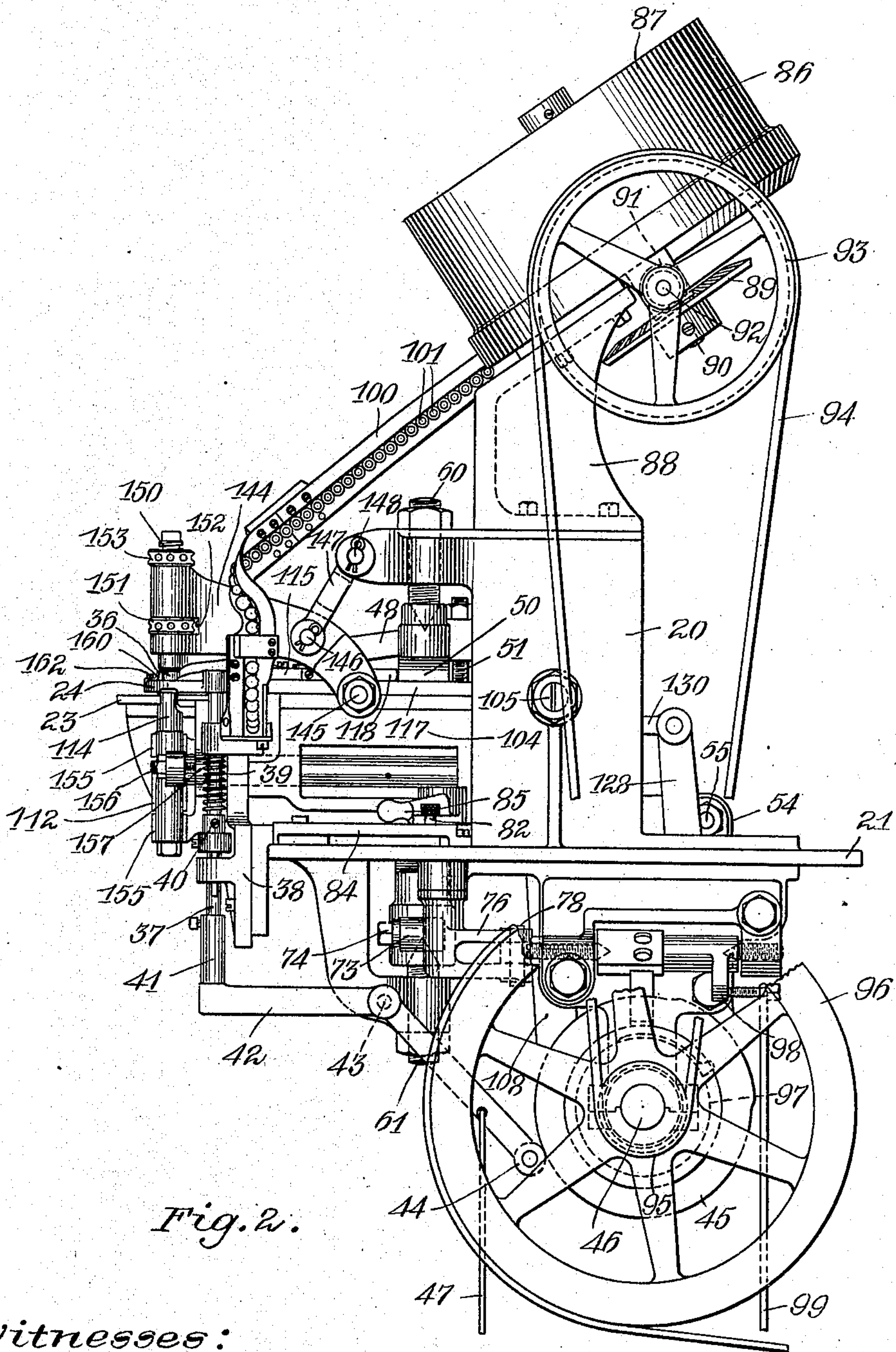


Fig. 2.

Witnesses:

Ernest A. Telfer  
Walter L. Perry

Inventor:

Warren F. Fraser,  
by his attorney, Charles S. Gooding.



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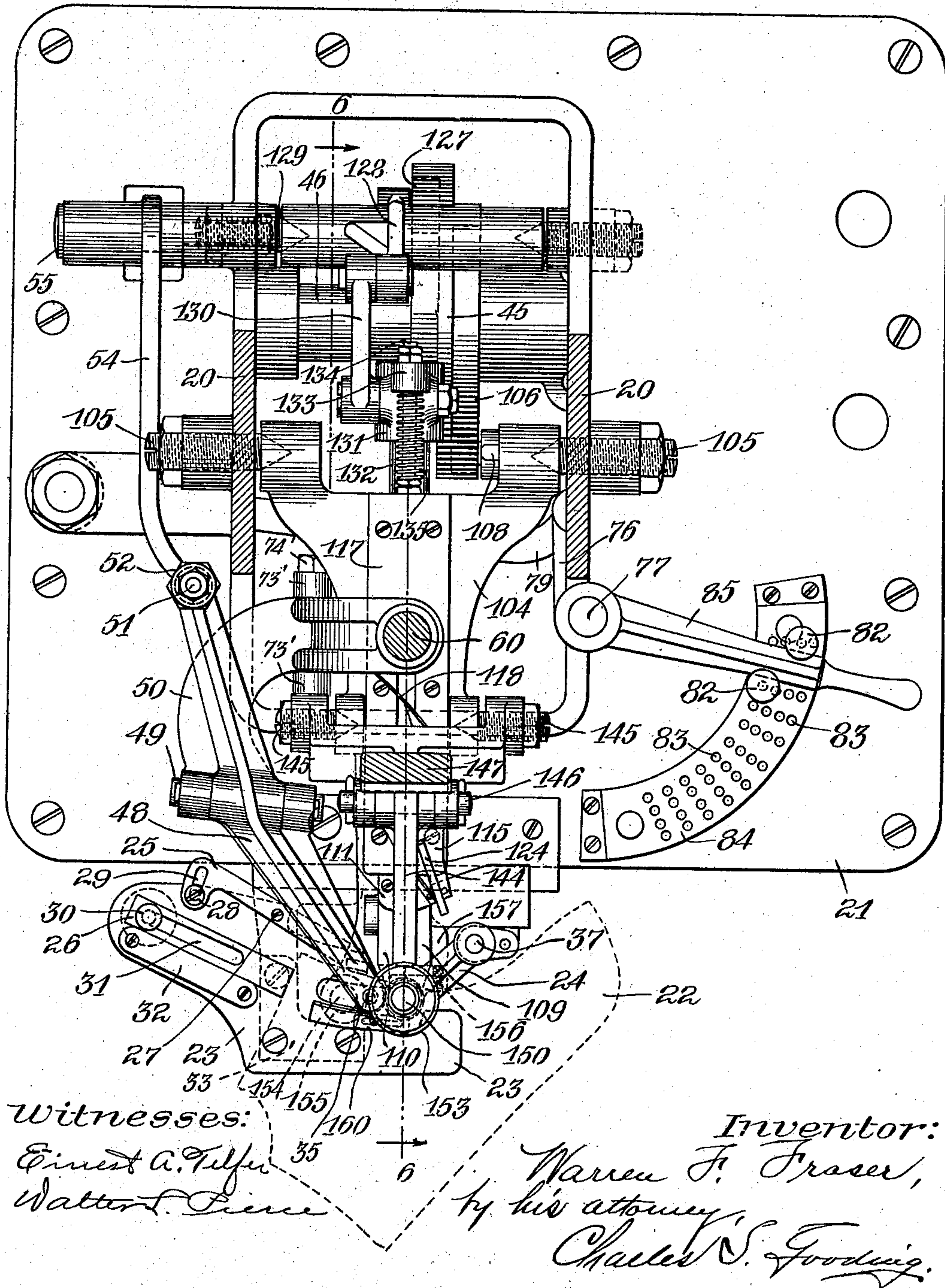
W. F. FRASER.

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14 SHEETS—SHEET 3.

*Fig. 3.*



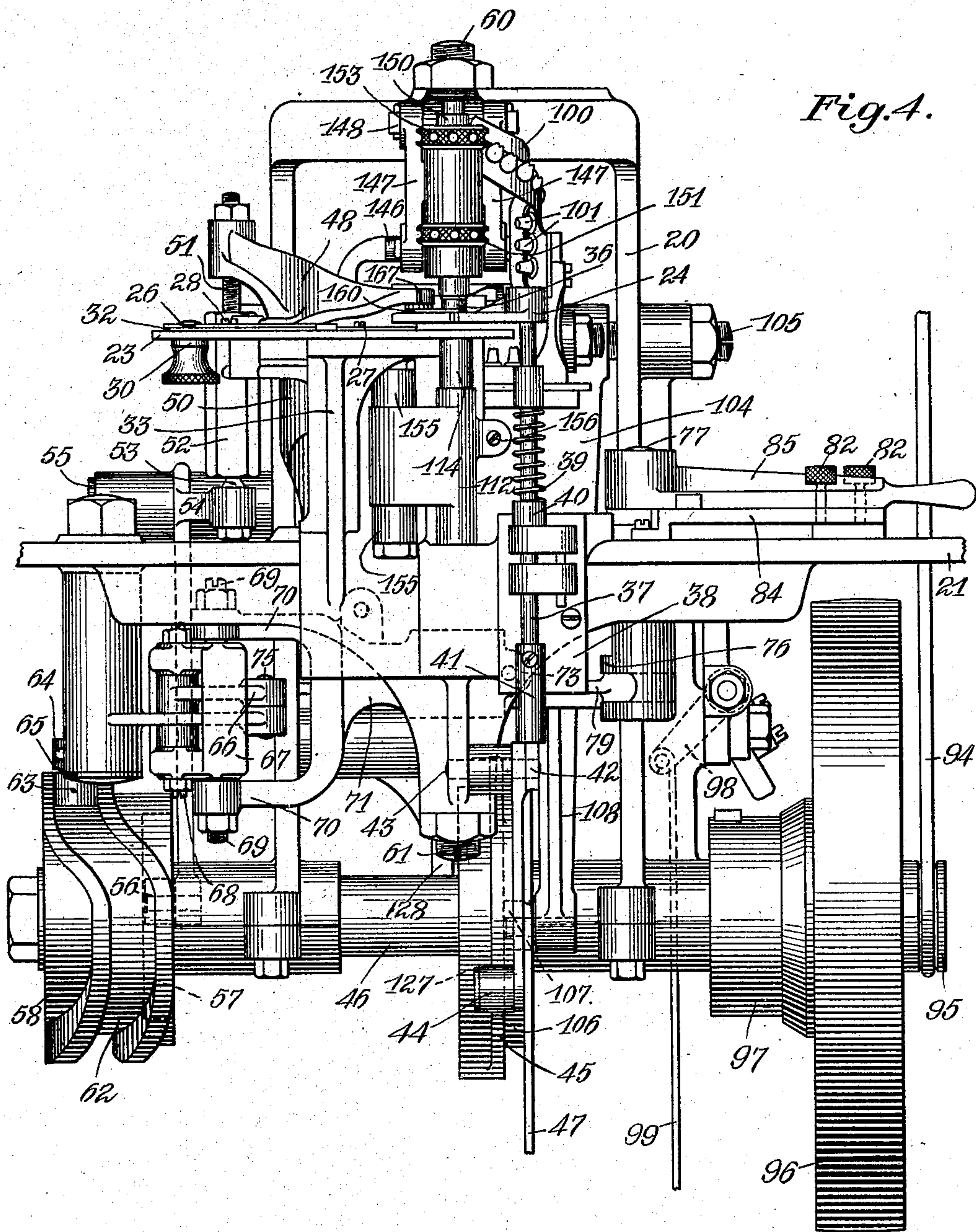
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14 SHEETS—SHEET 4.



Witnesses:

Ernest A. Telfer

Walter L. Dancy by his attorney,

Inventor:

Warren F. Fraser,

Charles S. Goring.



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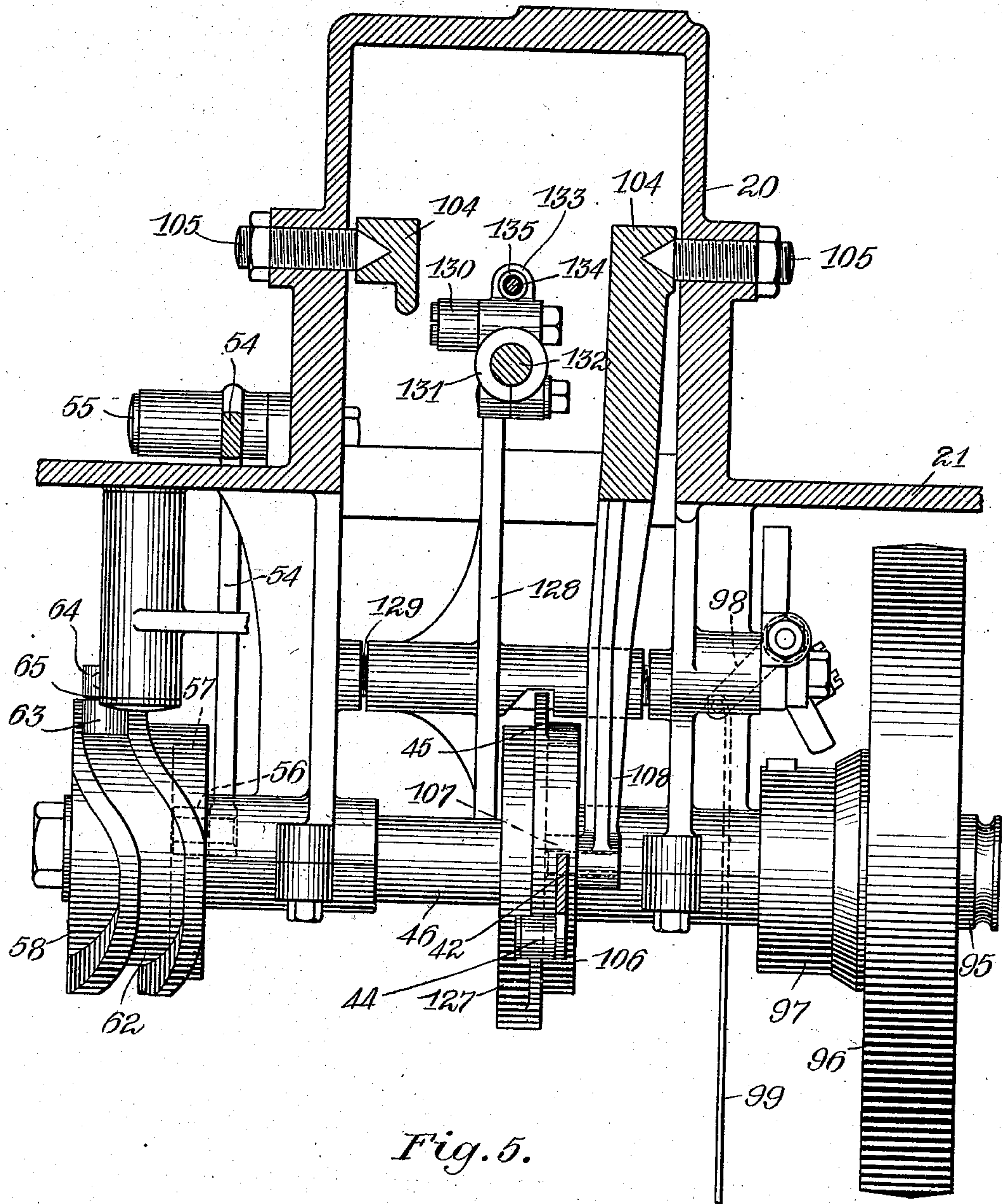


Fig. 5.

Witnesses:

Ernest A. Tyler

Walter L. Percy his attorney.

Inventor:

Warren F. Fraser

Charles N. Gooding



No. 885,919.

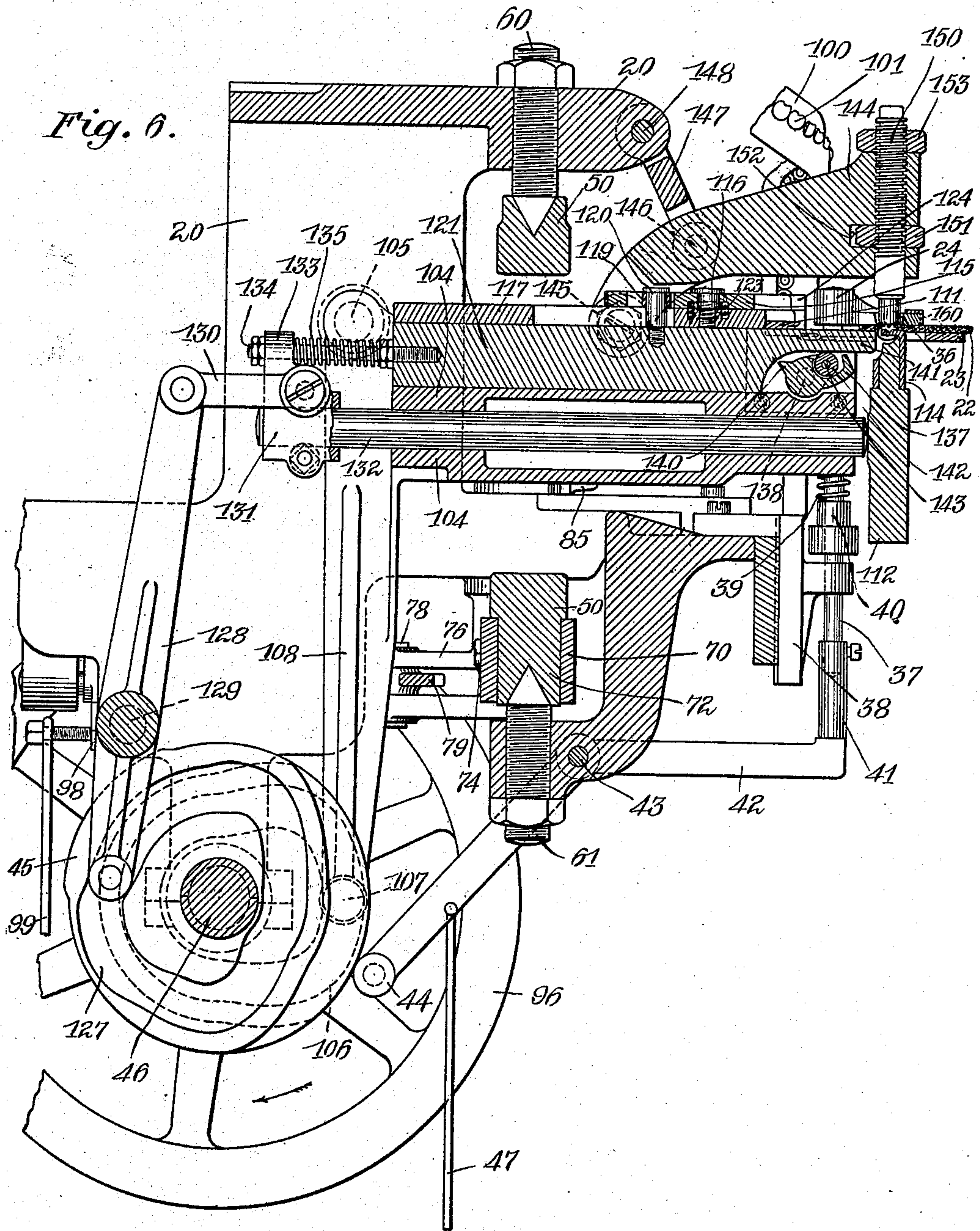
PATENTED APR. 28, 1908.

W. F. FRASER.

# LACING HOOK SETTING MACHINE.

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14 SHEETS—SHEET 6.



*Witnesses:*

Ernest A. Telfer

Walter L. Pierce

*Inventor:*

Warren F. Fraser,

By his attorney, Charles S. Gooding.



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14 SHEETS—SHEET 7.

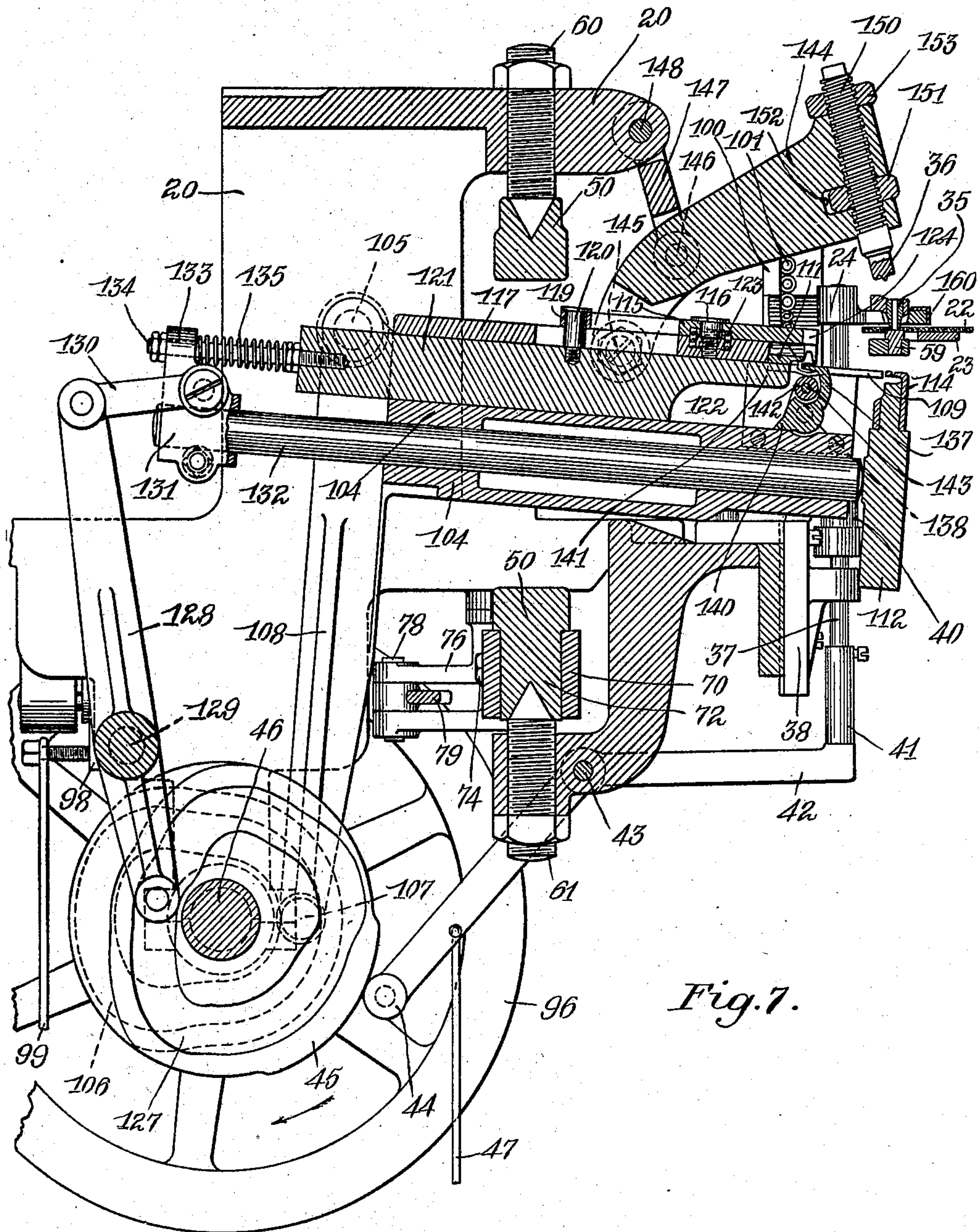


Fig. 7.

Witnesses:

Ernest A. Telfer

Walter L. French by his attorney, Charles S. Gooding.

Inventor.

Warren F. Fraser,



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14 SHEETS—SHEET 8.

Fig. 9.

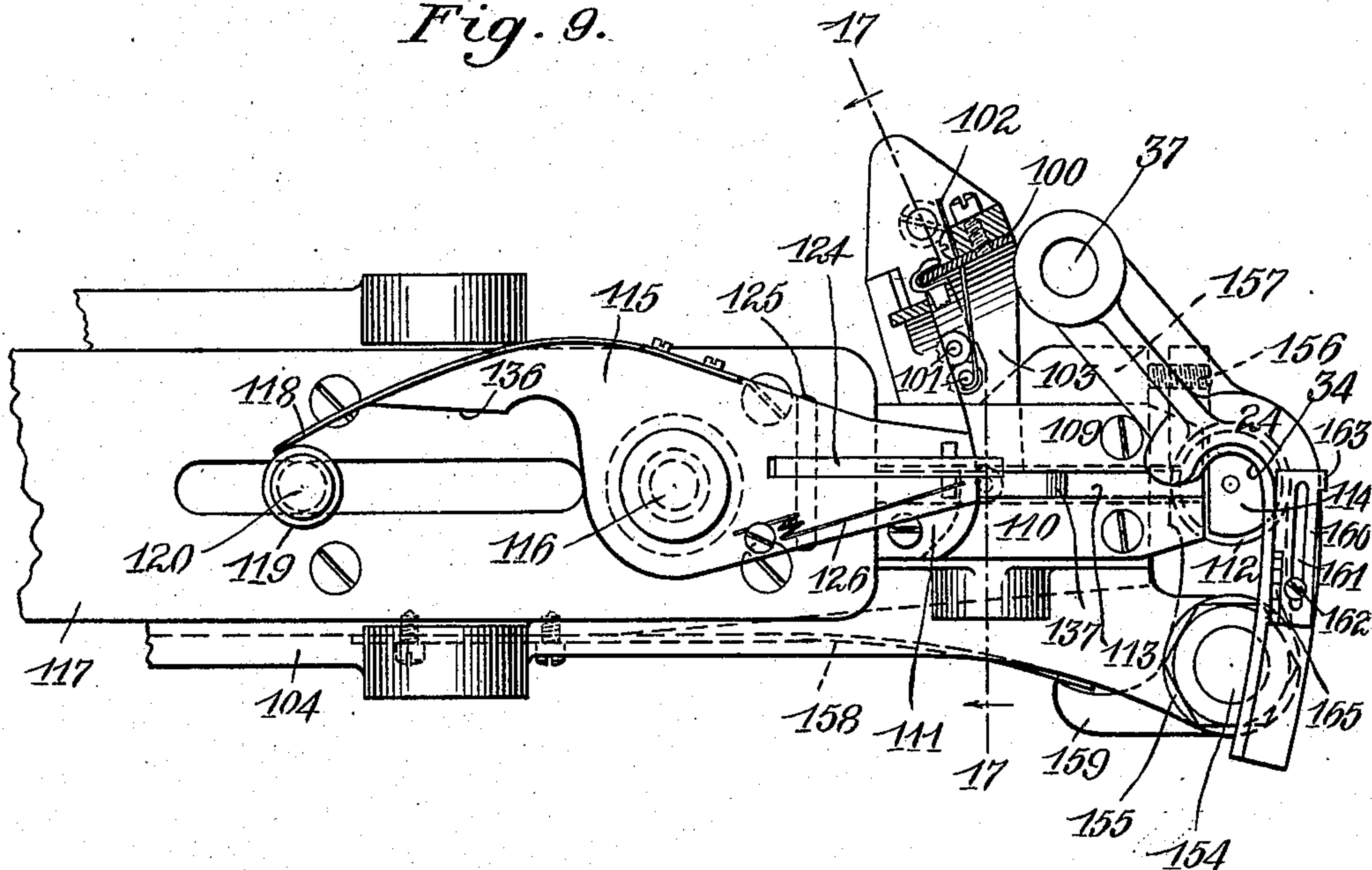
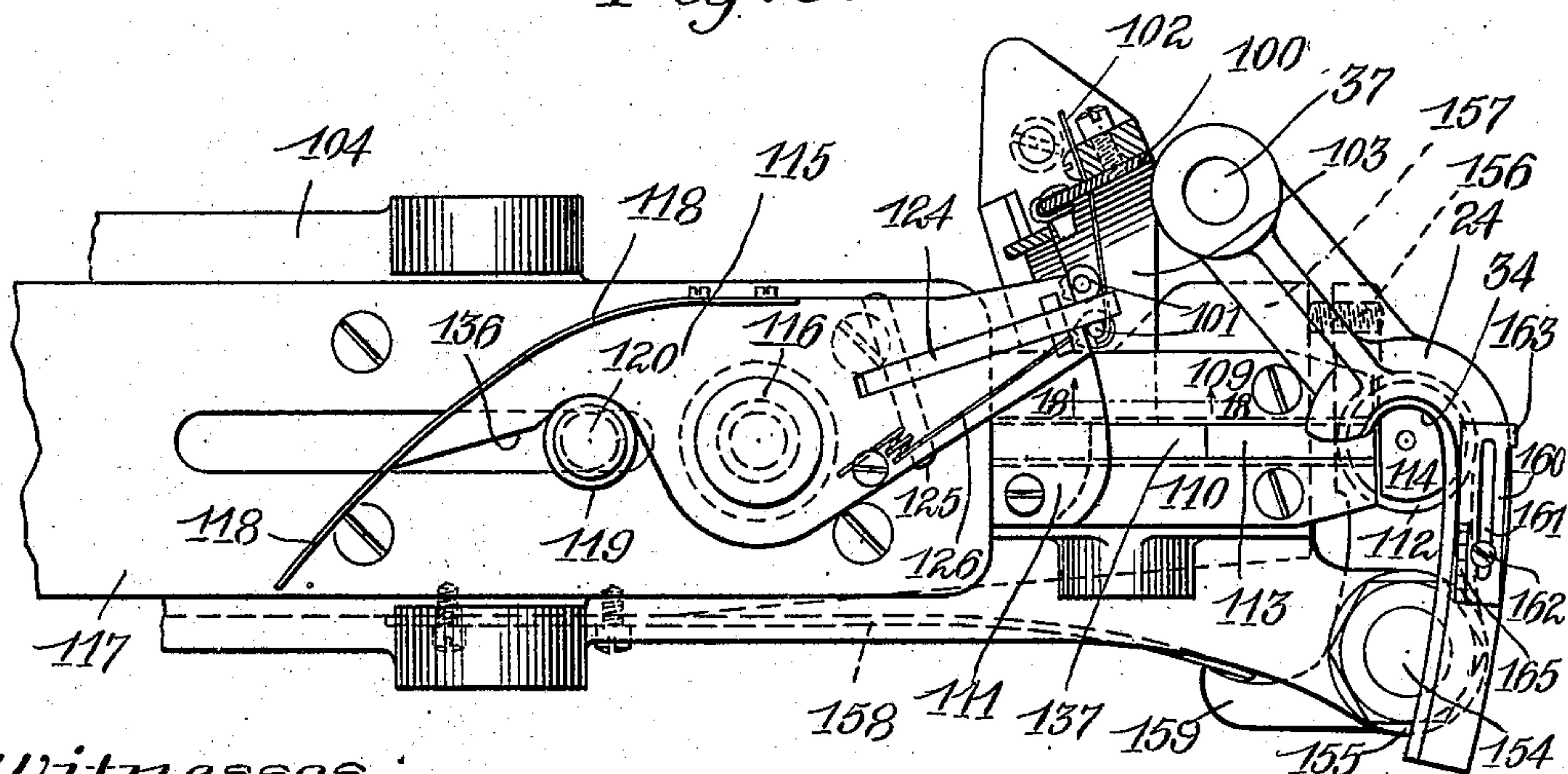


Fig. 8.



Witnesses:

Ernest A. Gilfer

Walter L. Perry

Inventor:

W. F. Fraser

by his attorney, Charles S. Gooding.



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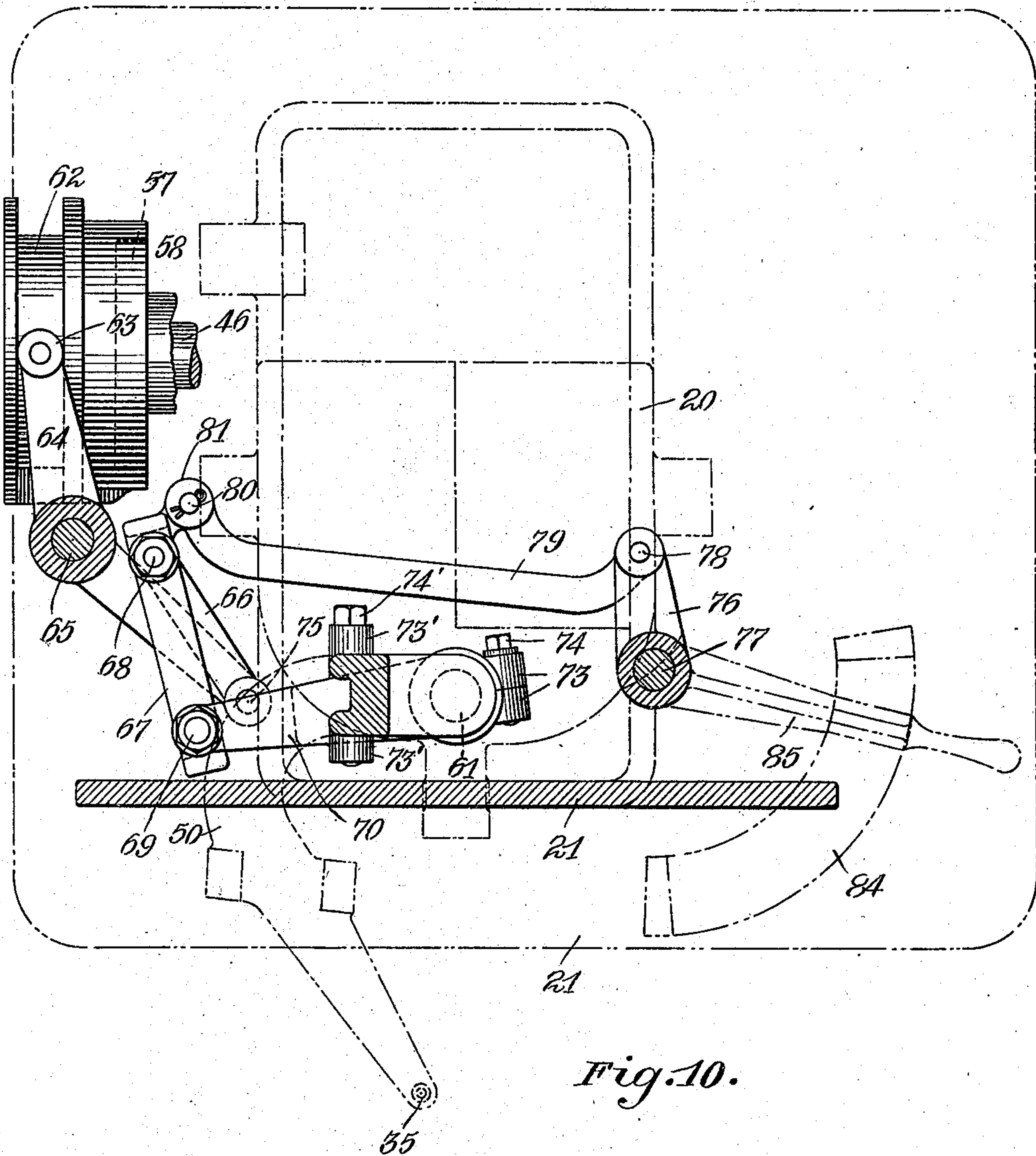


Fig. 10.

Witnesses:

Ernest A. Telfer

Walter L. Pierce

Inventor:

Warren F. Fraser,

by his attorney, Charles S. Gooding.



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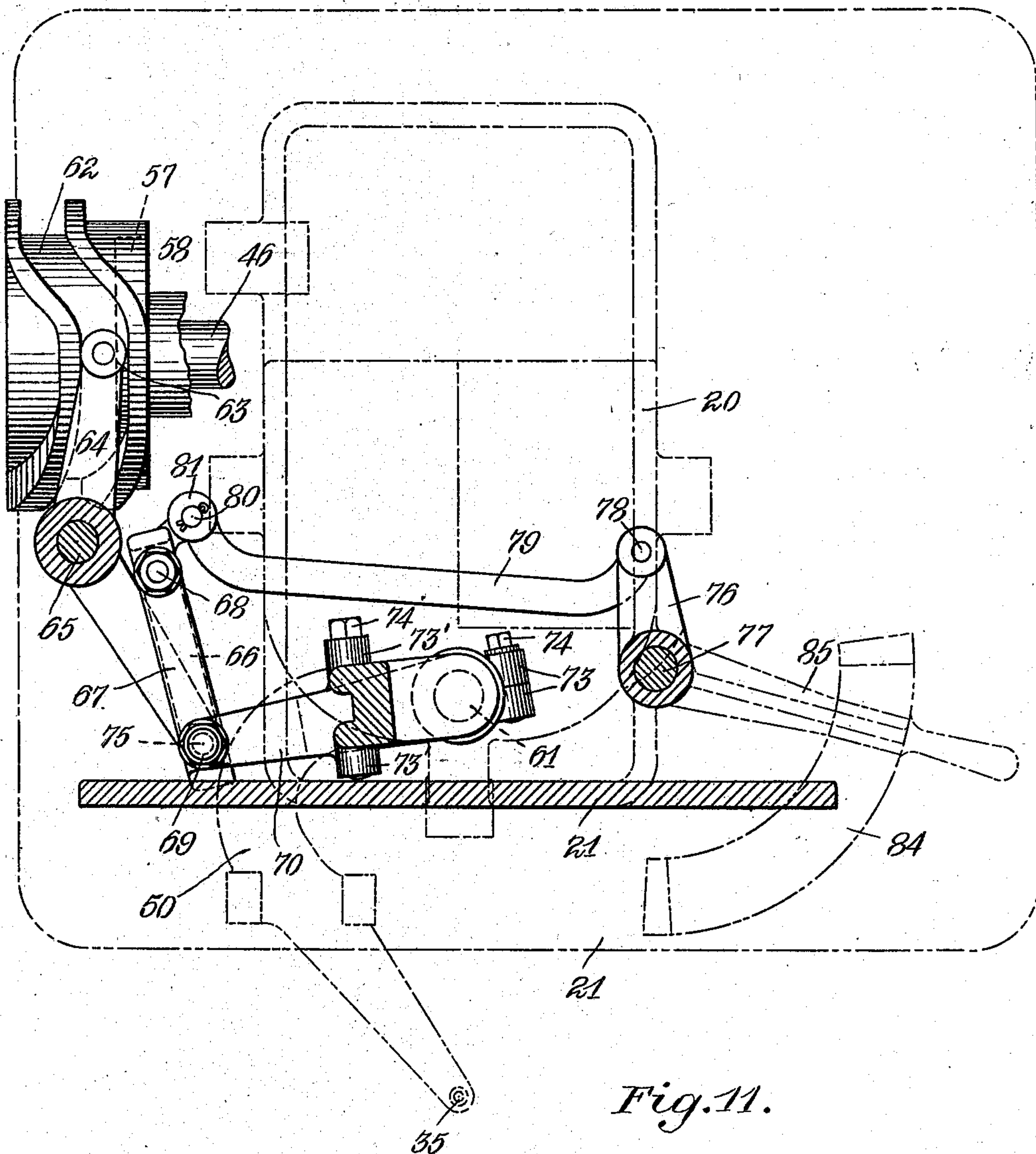


Fig. 11.

Witnesses:

Ernest A. Hilfer

Walter L. Pierce

Inventor:

W. F. Fraser

By his attorney, P. S. Gooding.



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W. F. FRASER.

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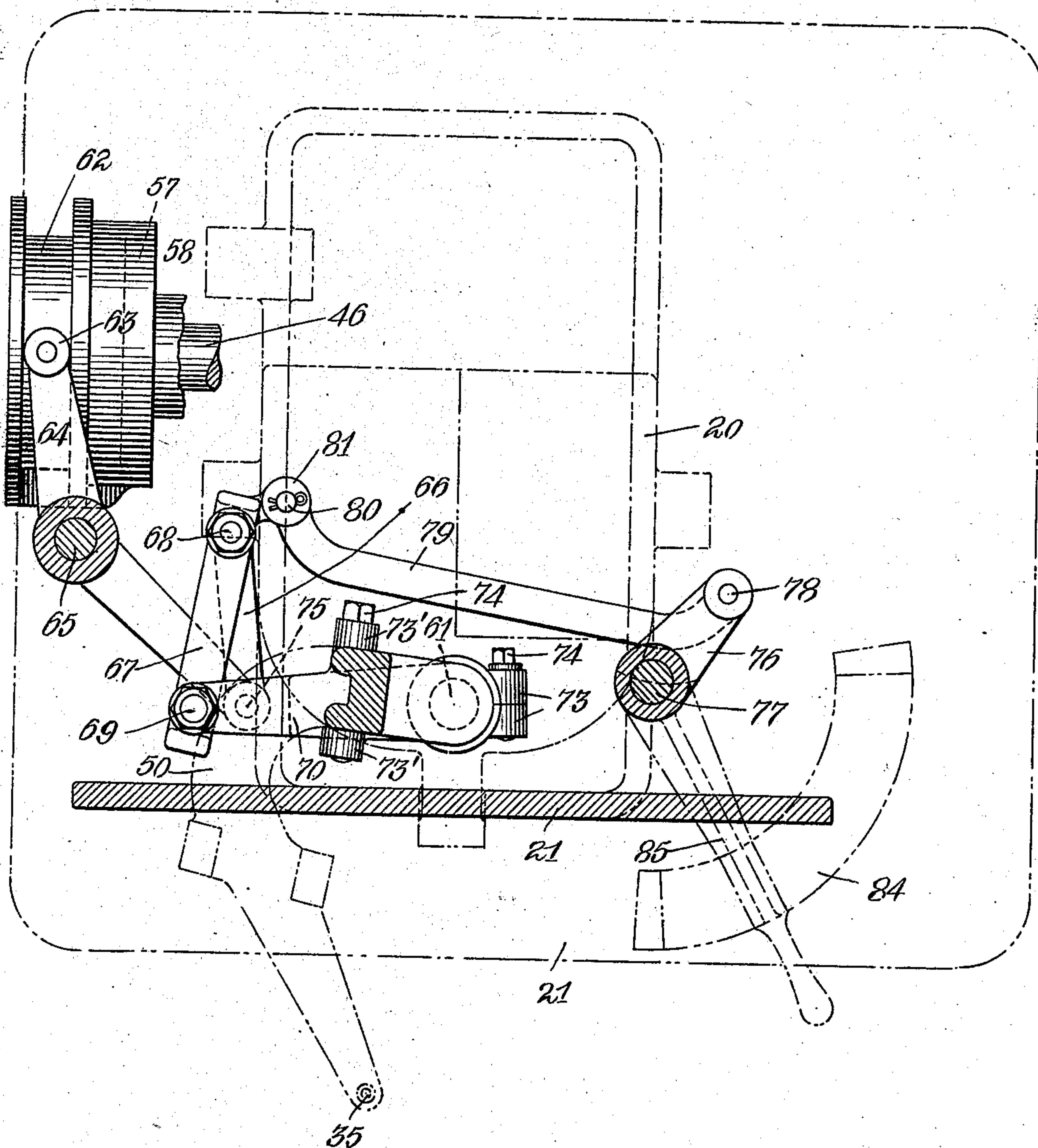


Fig. 12.

Witnesses:

Ernest A. Telfer

Walter C. Telfer

Inventor:

Warren F. Fraser

By his attorney, Philip S. Gooding



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14 SHEETS—SHEET 12.

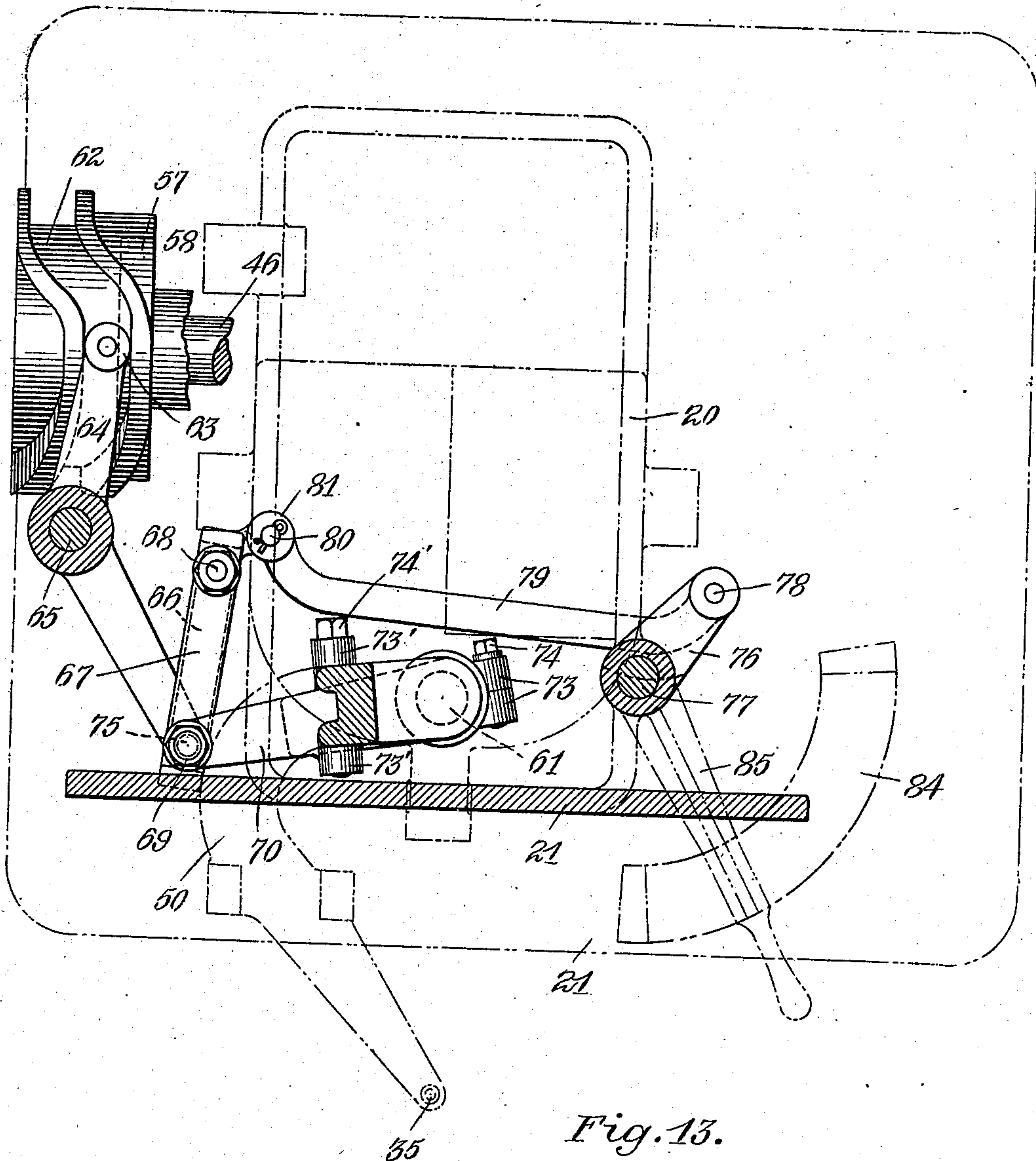


Fig. 13.

Witnesses:

Ernest A. Telfer  
Walter L. Pierce

Inventor

Walter F. Fraser,

By his attorney, Charles S. Gooding.



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14 SHEETS—SHEET 13.

Fig. 14.

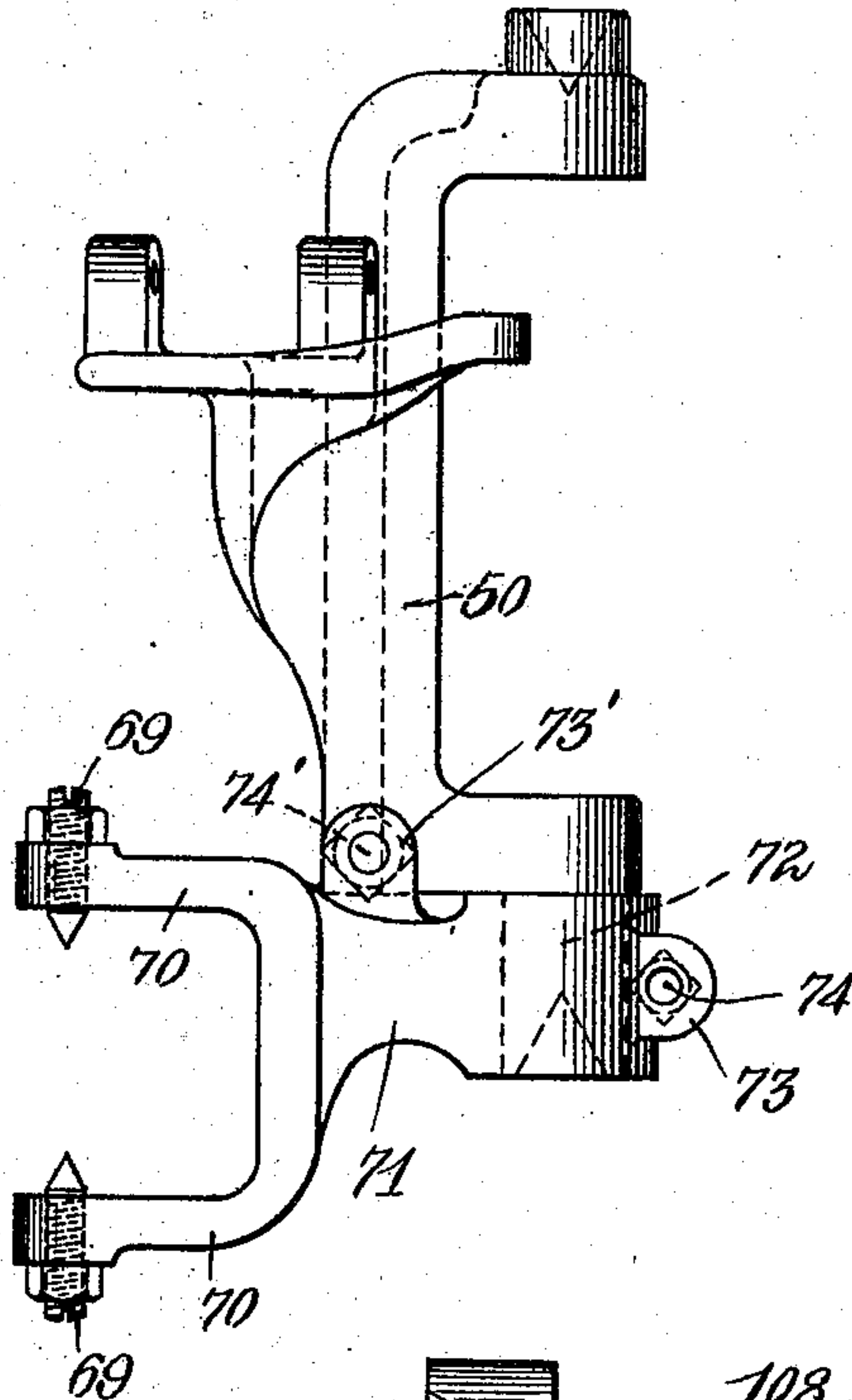


Fig. 15.

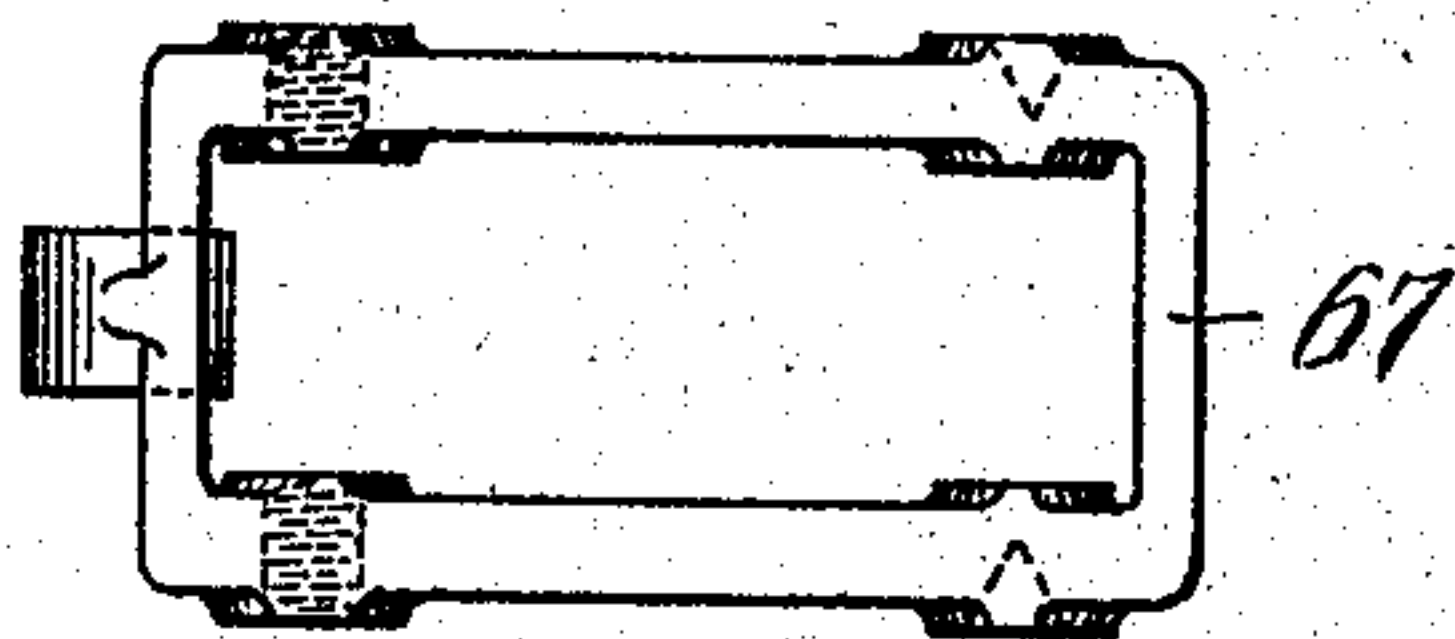
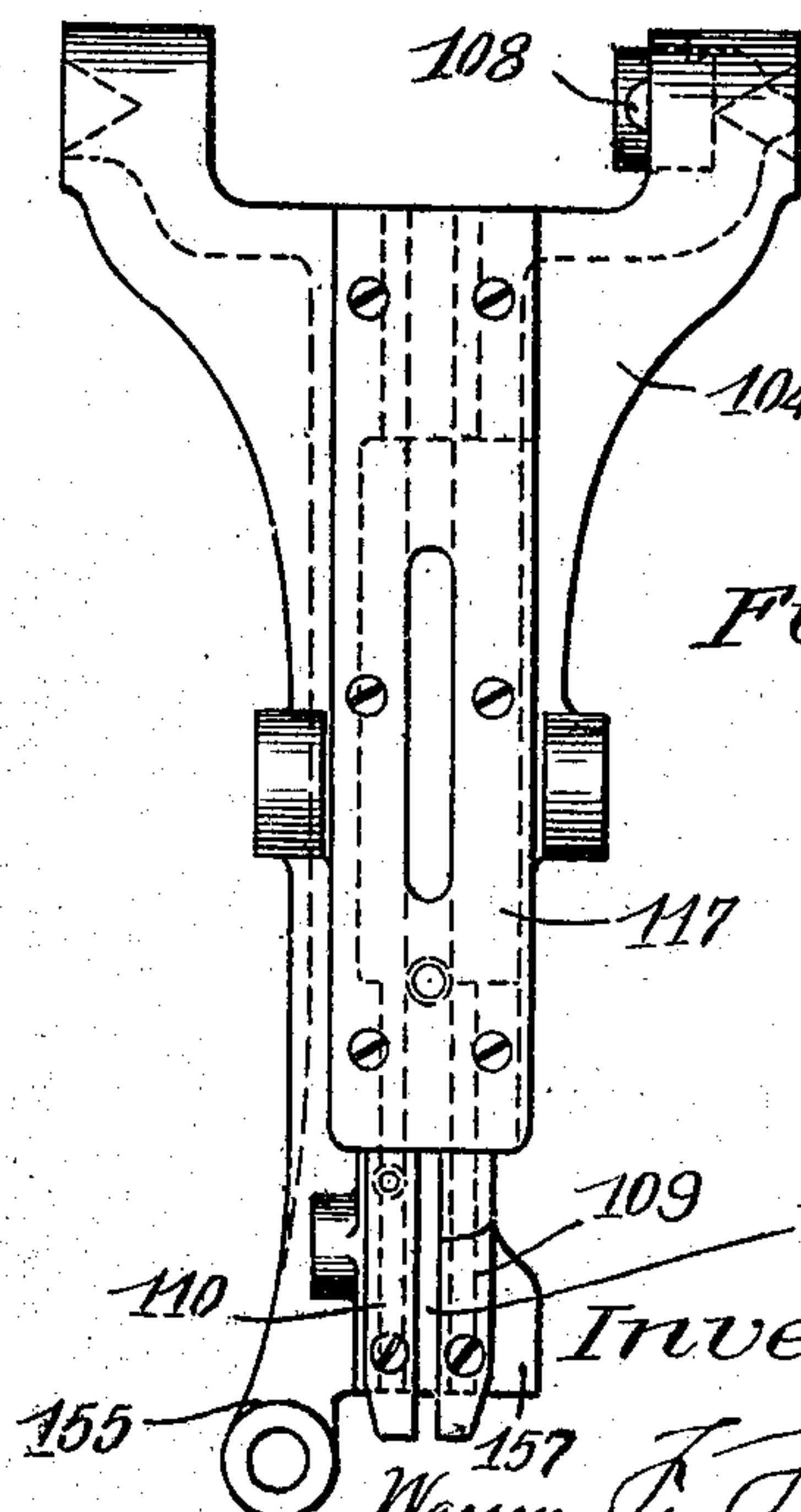


Fig. 16.



Witnesses:

Ernest A. Telfer  
Walter L. Burr

Inventor  
W. F. Fraser  
by his attorney, Charles N. Goring

No. 885,919.

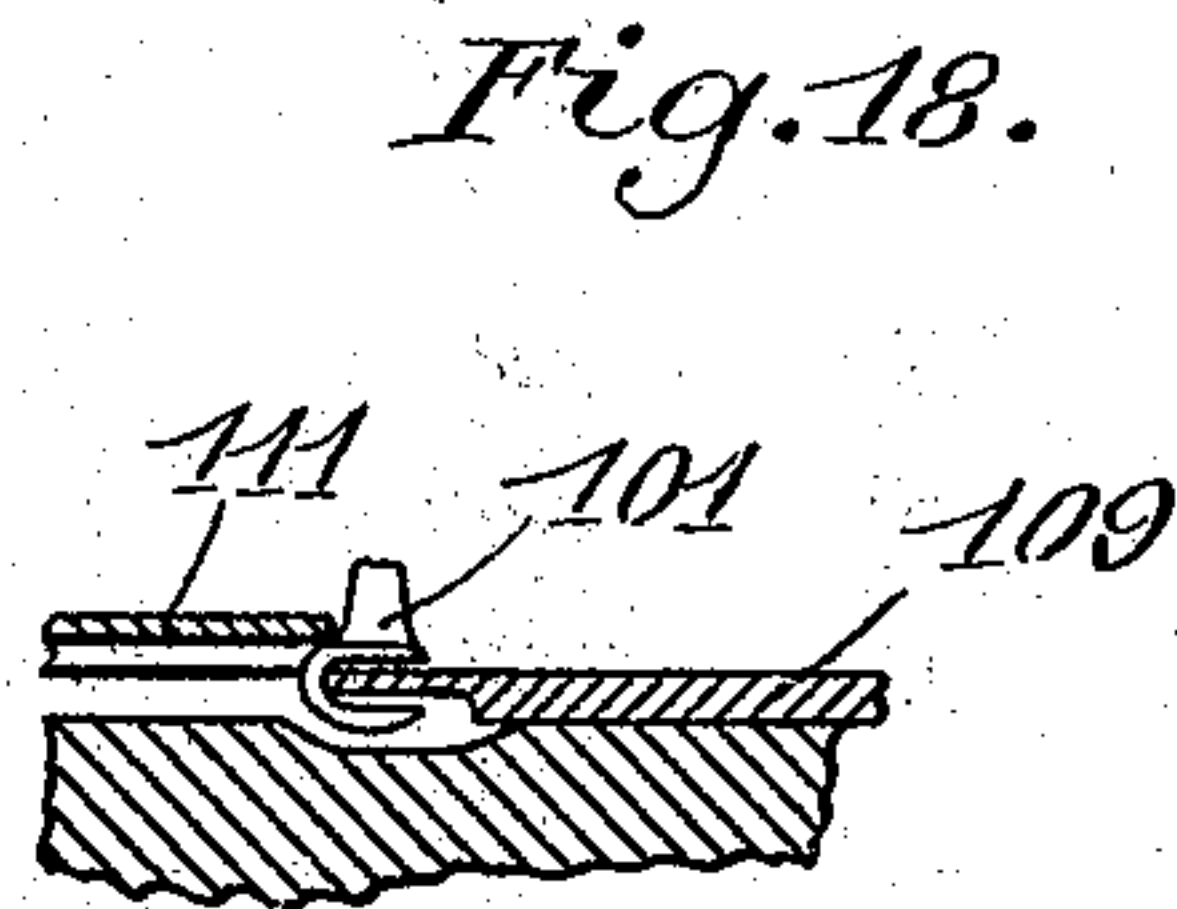
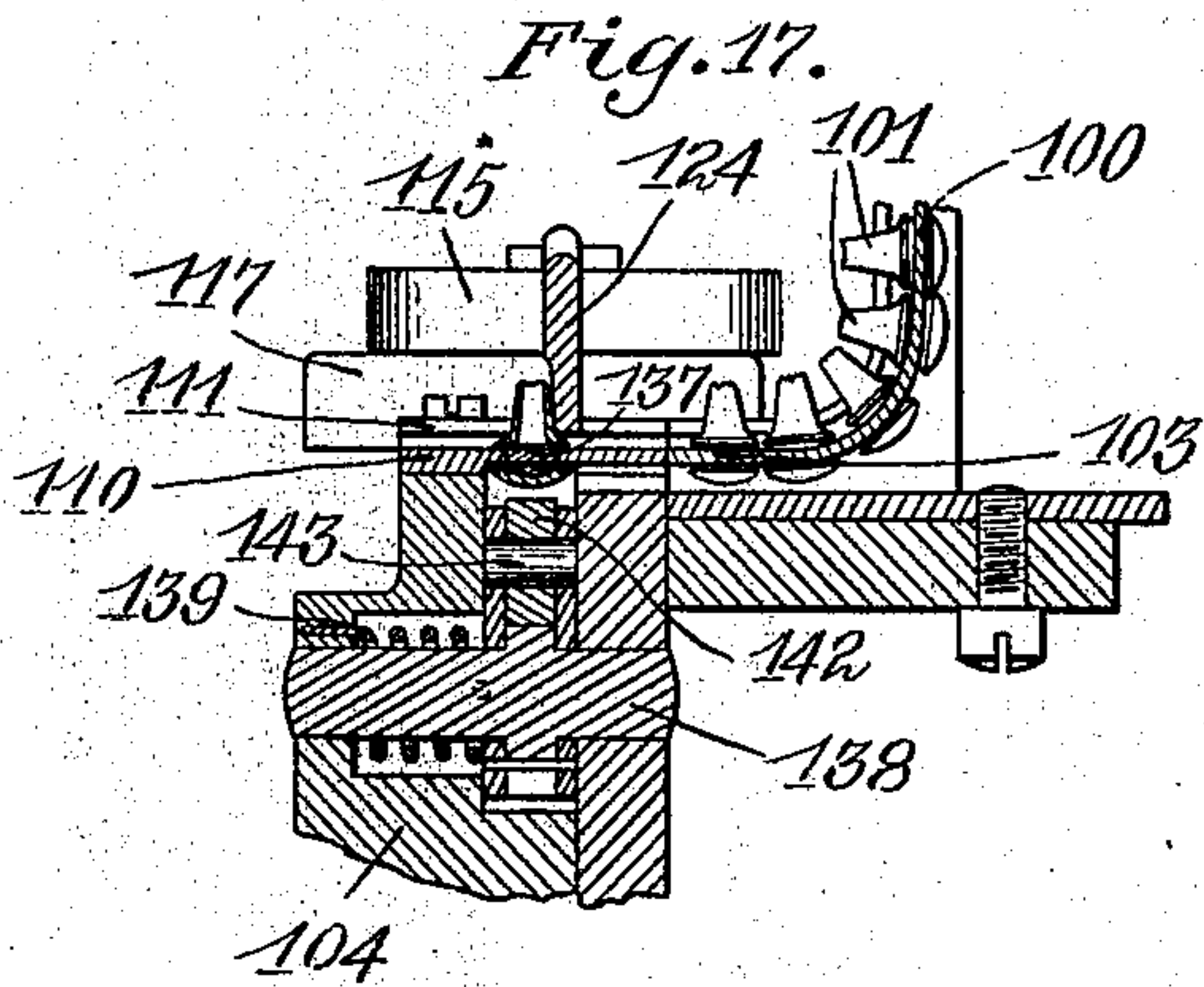
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W. F. FRASER.

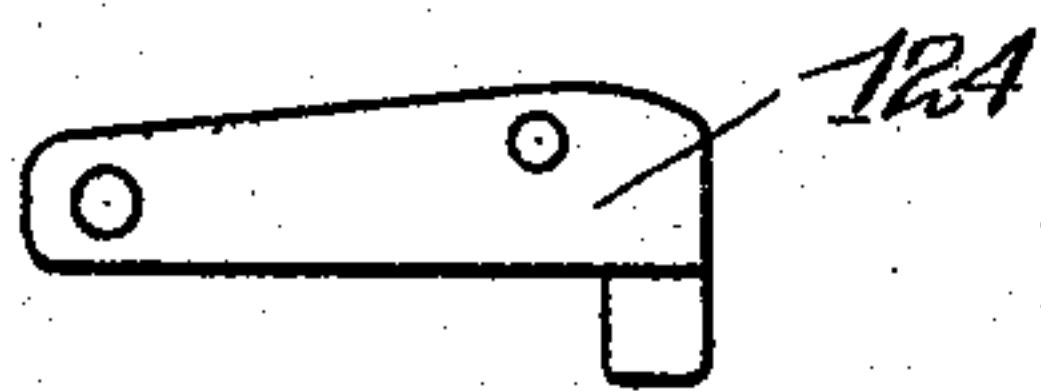
LACING HOOK SETTING MACHINE.

APPLICATION FILED NOV. 17, 1906.

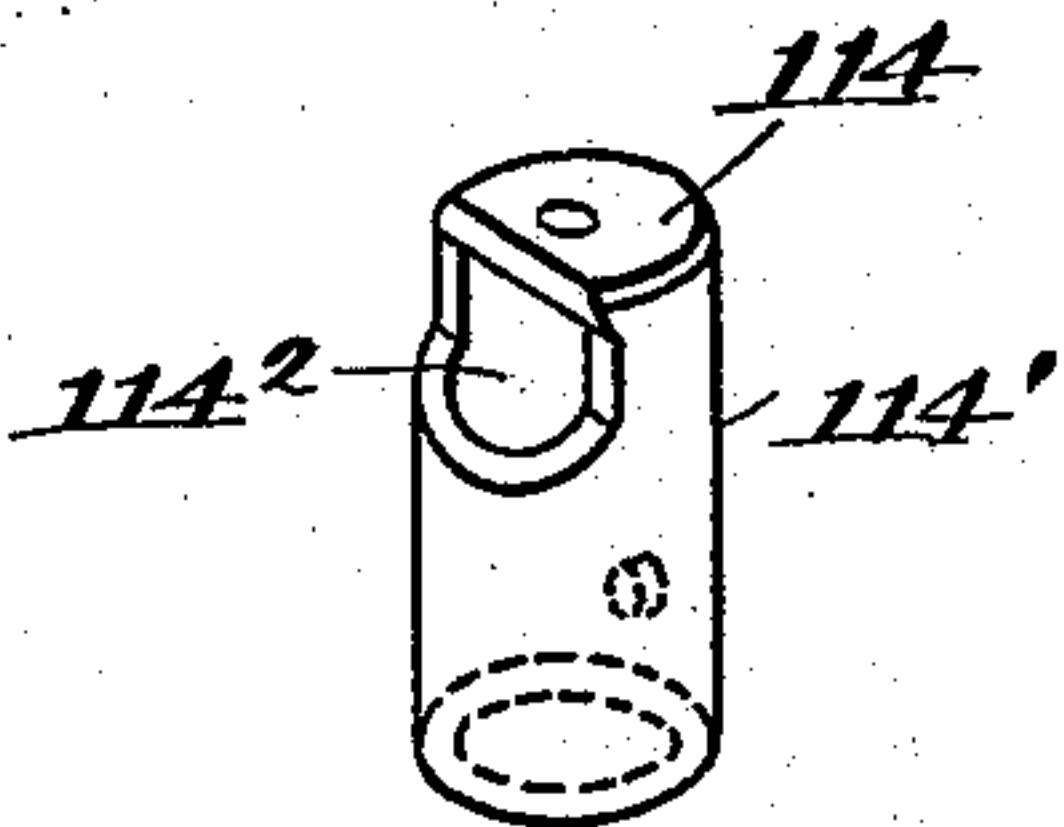
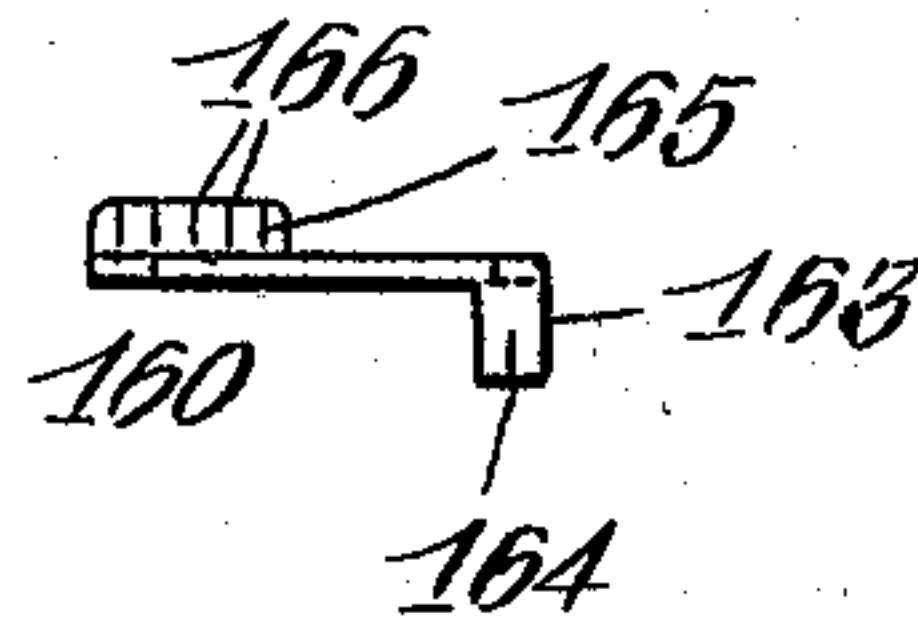
14 SHEETS—SHEET 14.



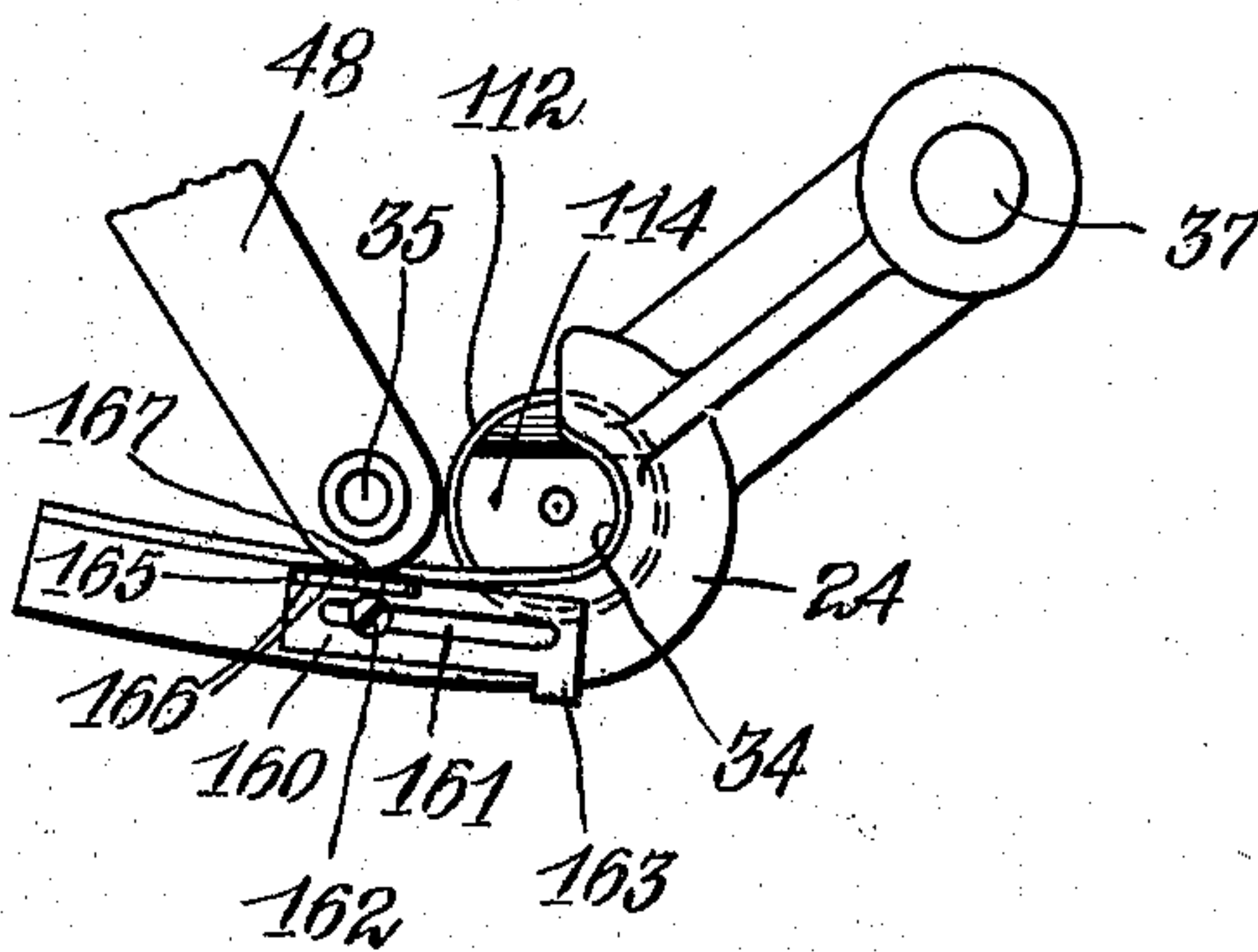
*Fig. 19.*



*Fig. 21.*



*Fig. 20.*

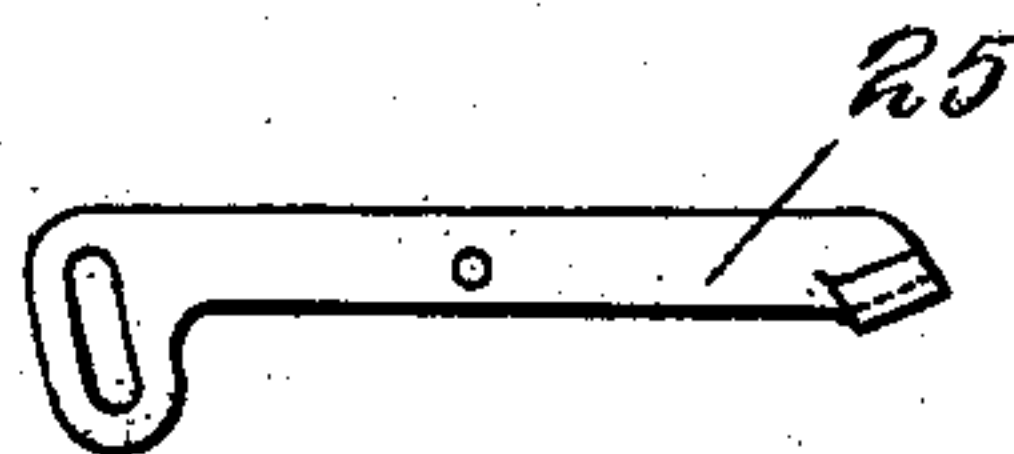


*Fig. 22.*



*Fig. 24.*

*Fig. 23.*



Witnesses:

Ernest A. Telfer

Walter L. Telfer

Inventor:

Warren F. Fraser,

by his attorney, Charles S. Fording.



# UNITED STATES PATENT OFFICE.

WARREN F. FRASER, OF DORCHESTER, MASSACHUSETTS, ASSIGNOR TO FRASER MACHINE AND MANUFACTURING CO., A CORPORATION OF MASSACHUSETTS.

## LACING-HOOK-SETTING MACHINE.

No. 885,919.

Specification of Letters Patent.

Patented April 28, 1908.

Application filed November 17, 1906. Serial No. 344,137.

*To all whom it may concern:*

Be it known that I, WARREN F. FRASER, a subject of the King of England, residing at Dorchester, in the county of Suffolk and State of Massachusetts, have invented new and useful Improvements in Lacing-Hook-Setting Machines, of which the following is a specification.

This invention relates to machines for setting lacing hooks in the uppers of boots and shoes, the object of the invention being to provide a machine which requires no skill upon the part of the operator other than to place the upper of the shoe in the machine, start the same and stop it, substantially in the manner hereinafter set forth. That is, the object of this invention is to provide a machine of the character set forth in which the upper is placed by the operator in correct position by the aid of suitable gages and after being placed in position the machine feeds the lacing hooks, punches the upper, sets the lacing hooks in the punched holes in the upper, and spaces the lacing hooks at the desired distance apart in said upper.

It is further the object of this invention to provide convenient and practical means to vary or regulate the distance between the lacing hooks set in the upper.

The invention consists in the combination and arrangement of parts set forth in the following specification and particularly pointed out in the claims thereof.

Referring to the drawings: Figure 1 is a left hand side elevation of my improved lacing hook setting machine. Fig. 2 is a right hand side elevation of the same, partly broken away. Fig. 3 is a plan view, partly in section, on line 3—3 of Fig. 1. Fig. 4 is a front elevation of my improved lacing hook setting machine, with the hopper removed and raceway broken. Fig. 5 is a front elevation, partly in section, on line 5—5, Fig. 1. Fig. 6 is a longitudinal section, partly in elevation, taken on line 6—6 of Fig. 3 viewed from the left hand side of the machine and showing the parts in the respective positions occupied thereby when the hook is being set in the upper, a portion of a shoe upper being shown in section therein and a portion of the machine being broken away to save space. Fig. 7 is a view similar to Fig. 6 with the parts in the position occupied thereby when the stock has been fed forward ready to have a lacing hook inserted therein. Fig. 8 is a plan

view, partly in section, on line 8—8 of Fig. 1, the same being partly broken away to save space, and illustrating a portion of the hook feeding mechanism. Fig. 9 is a plan view similar to Fig. 8 illustrating the hook feeding mechanism in a different position. Fig. 10 is a plan view, partly in section on line 10—10 of Fig. 1 of the mechanism for feeding the upper. Figs. 11, 12 and 13 are plan views similar to Fig. 10 showing the upper feeding mechanism in different positions. Fig. 14 is a detail front elevation of the rocker frame for feeding the upper. Fig. 15 is a detail side elevation as viewed from the left of Fig. 3 of one of the links forming a portion of the mechanism by means of which the upper is fed. Fig. 16 is a plan view in detail of the tilting frame upon which the hook feeding mechanism, the hook carrier, and the anvil are supported. Fig. 17 is a detail section, partly in elevation, taken on line 17—17 of Fig. 9. Fig. 18 is a detail section taken on line 18—18 of Fig. 8. Fig. 19 is a detail side elevation of the lacing hook feed finger. Fig. 20 is a plan view of the presser foot, a portion of the punch lever and a positioning gage for a right hand upper. Fig. 21 is a front elevation of said gage and Fig. 22 is a left hand side elevation of said gage. Fig. 23 is a plan view of the edge gage. Fig. 24 is a perspective view of the hook carrier plate.

Like numerals refer to like parts throughout the several views of the drawings.

In the drawings, 20 is the frame of the machine, said frame being provided with a bed-plate 21, which is adapted to be fastened to the ordinary bench used in shoe manufactories. The shoe upper 22 is placed by the operator upon the work-rest 23 beneath the presser foot 24, when a left-hand upper is to have lacing hooks inserted therein, as indicated in dotted lines (Fig. 3), with the front edge of said upper 22 bearing against the edge gage 25 and with the upper edge of said upper bearing against the top gage 26. The gages for positioning the shoe may be of any suitable construction.

The edge gage 25 is pivoted at 27 to the work-rest 23 and is adjusted to different positions, for the purpose of bringing the edge of the gage which bears against the front edge of the upper nearer to or farther from the punch, by means of a screw 28 which projects through a slot 29 in said edge gage and has screw-threaded engagement with



the work-rest 23, so that by loosening said screw 28 the edge gage may be rocked upon the pivot 27 until the bearing edge thereof is brought to the desired position, whereupon said edge gage is locked in position by tightening the screw 28. The top gage 26 is rendered adjustable longitudinally thereof by a screw 30 which projects through a slot 31 extending longitudinally of said top gage, said screw having screw-threaded engagement with the work-rest 23. A plate 32 fast to said work-rest bears against one side of the top gage to guide the same when the screw 30 is loosened and the gage is being moved toward or away from the punch. The work-rest plate 23 is rigidly fastened to a bracket 33 which is fast to the bed-plate 21.

The presser foot 24 is recessed at 34 to allow the punch 35 to feed the stock forward and beneath the anvil 36. The presser foot 24 is fastened to a vertical rod 37 adapted to slide in bearings formed upon a bracket 38 fast to the bed-plate 21. The rod 37 is forced downwardly to bring the presser foot 24 into contact with the work by a spring 39 the upper end of which bears against the bracket 38 and the lower end against a collar 40 fast to the rod 37. Upon the lower end of the rod 37 is fastened a sleeve 41 which is adjustable longitudinally of said rod. The lower end of said sleeve bears against a lever 42 pivoted at 43 to the frame 20. The lever 42 has a cam-roll 44 journaled thereon and bearing against a cam 45 fast to the main driving shaft 46. A treadle rod 47 is attached to the lever 42, the lower end thereof being connected to a treadle (not shown in the drawing) which may be actuated by the operator so that the lever 42 may be rocked upon its pivot to move the rod 37 and presser foot 24 upwardly against the action of the spring 39, either by foot power or by means of the cam 45.

A hole is punched in the upper 22 by a punch 35 which is fastened to a lever 48 pivoted at 49 to a rocker frame 50. The lever 48 has a screw 51 in engagement with the left hand end thereof, said screw projecting downwardly therefrom and terminating in a spherical or ball-shaped end which fits into a corresponding bearing in the upper end of a link 52. The lower end of the link 52 is supported upon a stud 53 fast to a cam lever 54 pivoted to a stud 55 fast to bed-plate 21. The vertical arm of the lever 54 has a cam-roll 56 journaled thereon which engages a cam-groove 57 formed in the cam disk 58, whereby a rocking motion is imparted to the lever 54 and through the link 52 a rocking motion is imparted to the punch lever 48.

The punch 35 moves toward and away from and coöperates in its cutting and feeding action with a die 59 which is fastened to the rocker frame 50. While I prefer to use a die 59 of a separate piece of metal to co-

operate with the punch 35, it will be noted that said die consists, merely, of a flat plate or disk with a shank thereon which fits into a corresponding hole in the rocker frame 50, but, if desired, said die might be formed integral with the rocker frame. For instance, the rocker frame might be constructed entirely of metal suitable for the die, in which case the die and the rocker frame would be in one piece, and in function it will be understood that said die and rocker frame are constructed in one piece, said die being rigidly fastened to the rocker frame and moving therewith.

The rocker frame 50 is pivoted to rock upon two pointed screws 60 and 61 having screw-threaded engagement with the frame 20 of the machine (see Figs. 6 and 7). A rocking motion is imparted to the rocker frame 50 by the cam disk 58 (Fig. 10) which has a cam-groove 62 provided in its periphery in which is located a cam roll 63 journaled upon a lever 64 pivoted to a stud 65 fast to the bed-plate 21. The lever 64 is connected by a link 66 to a link 67 by a pin 68. The link 67 is pivoted upon screws 69, 69 fast to arms 70, 70 integral with an arm 71 which is counter-bored to receive a hub 72 formed upon the rocker frame 50 (see Fig. 14). The arm 71 has ears 73 thereon which are clamped to the hub 72 by means of a clamp-screw 74. Said arm is still further fastened to the rocker-frame 50 by a screw 74' which extends through the ears 73' formed upon the arm 71, and also through the rocker frame 50. It will be understood that the arms 70 and 71 are thus rigidly attached to the rocker frame 50 and form in function a part thereof, the rocker frame and arms 70 and 71 being formed in a separate piece simply for convenience in manufacture, but the resultant structure which will hereinafter be called the "rocker frame" in operation is exactly the same as though the frame 50 and arms 70 and 71 were integral one with the other. When the lever 64 is rocked by the cam-roll 63 in the groove 62 toward the right from the position indicated in Fig. 10 to that illustrated in Fig. 11, it will be seen that the rocker frame 50 will be rocked by means of the links 66 and 67 which connect said lever 64 to said rocker frame from the position shown in Fig. 10 to that shown in Fig. 11 and the punch 35 will thus be moved into alinement with the anvil 36, and that the center of the pin 75 which connects the link 66 to the lever 64 will be brought into alinement with the axial line of the screws 69 which connect the link 67 to the arms 70 of the rocker frame 50, so that at the end of each feeding movement the axial line of the pivotal pin 75 will aline with the axial line of the screws 69.

It is essential in machines of this class that a ready means for varying the feed of the upper should be provided, so that the distance



between adjacent lacing hooks upon different uppers may be increased or diminished, as desired, and for this purpose I provide a lever 76 pivoted to a stud 77 fast to the bed-plate of the machine. The lever 76 is connected by a pin 78 to a link 79, the opposite end of said link being connected by a pin 80 to ears 81, 81 integral with the link 67. The lever 76 is locked in position by pins 82, 82 which project into holes 83, 83 provided in the plate 84 fast to the bed-plate 21. The pins 82, 82 are located upon opposite sides, respectively of the handle arm 85 and thus lock the same in position. Said pins are easily removed from the holes 83, 83 and are placed by the operator in the proper holes to lock the handle 85 in position. If desired, an index may be placed upon the plate 84 or upon the bed-plate adjacent thereto, so that the operator can set the handle 85 in position for any desired distance between the lacing hooks. When the handle 85 is rocked from the position indicated in Fig. 10 to that illustrated in Fig. 12 the link 79 is drawn toward the right in said figures, thus rocking the links 66 and 67 upon their pivots and rocking the rocker frame 50 upon its pivot to move the punch toward the left in said figures, and when the feed of the upper takes place as hereinafter described, the axial line of the punch will be brought into alinement with the axial line of the anvil at the end of the feed and the axial line of the pin 75 will be substantially in alinement with the axial line of the screws 69, as illustrated in Fig. 13.

The lacing hooks which are to be set in the uppers of boots and shoes are placed in quantity in a hopper 86 which consists, mainly, of a casing 87 supported upon a bracket 88 fast to the frame 20 and having journaled therein a rotary picker plate (not shown in the drawings) to which a rotary motion is imparted by means of a bevel gear 89 fast to a shaft 90 journaled in said casing. The bevel gear 89 meshes into a pinion 91 fast to a shaft 92 journaled in bearings upon said casing and driven by a pulley 93 fast thereto and connected by a belt 94 to a pulley 95 formed upon the hub of the main driving pulley 96 (Fig. 5). The main driving pulley 96 is loosely mounted upon the main driving shaft 46 and is connected thereto, in order to rotate said shaft, by a clutch 97 which is operated by a clutch lever 98 pivoted to the frame of the machine and operated by a treadle (not shown in the drawings) and connected thereto by a treadle rod 99. A further detailed description of said clutch 97 is deemed unnecessary as it forms no part of the present invention.

The particular description of hopper for separating the lacing hooks one from the other and feeding them to the raceway 100 is set forth by applicant in his Patent No. 828,396, dated August 14, 1906. The raceway

100 leads from the hopper 86 downwardly at an incline, the lower end of said raceway being rigidly fastened to the bracket 38. The lacing hooks 101, 101 slide down said raceway till the lowermost lacing hook rests against a detent or stop spring 102 fast to the lower end of said raceway, as illustrated in Fig. 8. Said lowermost lacing hook at this time rests upon the horizontal bend 103, as illustrated in Fig. 17. The lacing hook is next fed from said raceway and carried to a lacing hook carrier by which it is forced through the shoe upper and against the anvil, all by mechanism which I will now proceed to describe.

The mechanism for feeding the lacing hooks from the raceway to the carrier and setting the same is supported upon a tilting frame 104 (see Figs. 3, 5, 6, 7 and 16). The tilting frame 104 is pivoted to rock about a horizontal axis upon the pointed ends of screws 105, 105 fast to the frame 20. A rocking or tilting motion is given to said frame by a cam 106 having a roll 107 in the path thereof which is journaled to rotate upon a pin fast to an arm 108 integral with and projecting downwardly from the tilting frame 104. Upon the top of the tilting frame 104, at its forward end, are fastened three plates 109, 110, and 111 which constitute guide plates for the lacing hook as it is being fed from the lower horizontal portion of the raceway to the lacing hook carrier 112. The plates 109 and 111 form at their adjacent ends a continuation of the lower horizontal portion of the raceway when the tilting frame is in its lowermost position, or in the position shown in Fig. 8.

Between the adjacent edges of the plates 109 and 110 is a passageway 113 which terminates at its forward end adjacent to the hook carrier plate 114. The hook carrier plate 114 forms the top of a hollow cylinder 114' and said top is cut out to form a recess 114<sup>2</sup>, this recess also extending downwardly from the top along the rear wall of the hollow cylinder 114' which is cut through into the interior of said hollow cylinder and thus forms the recess 114<sup>2</sup>, which is adapted to receive the head of the lacing hook, while the shank projects upwardly from the top 114. The lacing hook carrier 112 has a cylindrical stem upon its upper end which projects into the hollow cylinder 114'. Said plates 109, 111 and 110 constitute, therefore, an auxiliary raceway for guiding the lacing hook from the lower horizontal portion of the raceway to the lacing hook carrier 112, it being understood that the adjacent edges of the plates 109 and 111 form one portion of said auxiliary raceway and the adjacent edges of the plates 109 and 110 the other portion of said auxiliary raceway, so that said auxiliary raceway guides the lacing hook along a substantially right angled pathway, leading first



from the horizontal portion of the raceway 100 to the passageway 113 and second along the passageway 113 to the lacing hook carrier. The lowermost hook upon the raceway  
 5 is carried from the lower portion of the raceway along between the plates 111 and 109 to the center of the passageway 113 or to the position illustrated in Fig. 9 from the position illustrated in Fig. 8 by a hook feeding  
 10 lever 115 which is pivoted upon a stud 116 fast to a cap-plate 117 which, in turn, is fastened to and forms in function a part of the tilting frame 104.

A flat spring 118 is fastened to the lever  
 15 115 and projects rearwardly beyond said lever, contacting with a roll 119 when the parts are in the position illustrated in Fig. 9. The roll 119 is journaled upon a stud 120 fast to a slide 121 constructed to slide in  
 20 ways 122 formed in the top of the tilting frame 104. The stud 116 is encircled by a torsional spring 123 (Fig. 7), one end of said spring being fastened to the cap-plate 117, the other end thereof being fastened to the  
 25 lever 115, the action of said torsional spring being to hold the lever 115 or the flat spring 118 fast thereto in contact with the friction roll 119.

In the forward end of the lever 115 is located a hook feeding finger 124 pivoted to a  
 30 pin 125 fast to the lever 115. A spring 126, which is supported upon the lever 115, bears downwardly upon the forward end of the hook feeding finger 124, so that if said finger  
 35 should strike upon the top of a lacing hook instead of between two adjacent lacing hooks, it would yield slightly and thus avoid damaging said lacing hook. The lever 115 is rocked upon its pivot 116 from the position illustrated in Fig. 8 to that illustrated  
 40 in Fig. 9, thus feeding the lowermost hook from the horizontal portion of the raceway into alinement with the passageway 113, by the roll 119 and stud 120, which, as herein-  
 45 before set forth, are fast to a slide 121. A reciprocatory motion is imparted to said slide at the right time in the operation of the machine by a cam 127 (Figs. 6 and 7) fast to the main driving shaft 46, operatively con-  
 50 nected by a cam roll and stud to a lever 128 pivoted to a stud 129 fast to the frame of the machine.

The lever 128 is connected by a link 130 to a collar 131 clamped to a rod 132 and adapted to slide longitudinally thereof in the tilting frame 104. An ear 133 projects upwardly from the collar 131 and through this ear projects a pin 134 which is fastened to the slide 121. A spiral spring 135 encircles  
 55 the pin 134, one end of said spring bearing against the slide 121 and the other against the ear 133. The rocking lever 128, by its cam 127, will impart a reciprocatory motion to the rod 132 and also to the slide 121, and  
 60 if the slide 121 or any of the parts supported

thereon should encounter an obstruction such as a misplaced lacing hook, the spring 135 will yield and thus prevent a "smash up" of the machine or damage to said lacing hook. As the slide 121 is moved backwardly from the position illustrated in Fig. 8  
 70 to that illustrated in Fig. 9 the hook feeding finger 124, which, when the parts are in the position illustrated in Fig. 8, projects downwardly between the lowermost lacing hook  
 75 upon the raceway and the lacing hook adjacent thereto, will be moved from the position illustrated in Fig. 8 to that illustrated in Fig. 9, carrying said lowermost lacing hook away from the detent 102 and along  
 80 between the plates 109 and 111 to the center of the passageway 113, as illustrated in Fig. 9. This motion is imparted to the lacing hook feed finger 124 by the reciprocating movement of the slide 121 toward the left.  
 85 The roll 119 moving along in contact with a cam face 136 upon said lever 115 will rock the same to the position illustrated in Fig. 9. During the latter part of this rocking movement of the lever 115, if the lacing hook  
 90 should encounter an obstruction or if there should be a slight difference in width between one lacing hook and another, the flat spring 118 will yield so that no jamming of the lacing hook will take place.  
 95

It is evident that if the lacing hook were to be fed, as hereinbefore described, along the plate 111 and into alinement with the passageway 113, if nothing were interposed in said passageway at the right or in front of  
 100 the lacing hook (Figs. 8 and 9) the same would be liable to fall off of the plate 111 and thus the lacing hook would be dropped out of the machine and could not be fed to the upper to be set. To prevent any such  
 105 accident a hook holding finger 137 is provided (see Figs. 6 and 7) and when the lacing hook is fed along the plate 111, as hereinbefore described, to the passageway 113, said hook holding finger will be in the  
 110 position illustrated in Fig. 7 and will form a continuation in effect of the plate 109, so that the lacing hook will be fed onto said hook holding finger. The upper portion of the finger 137 is hook-shaped and adapted to  
 115 enter the space between the head and shank of the hook. Said hook holding finger is pivoted at 138 to the tilting frame 104 and is normally held in the position illustrated in Fig. 7 by a torsional spiral spring 139, one  
 120 end of which is fastened to said finger the other to the tilting frame.

The lower edge of the hook holding finger 137 is flattened and projects toward the left of the pivot of said finger at 140, this projection resting against the bottom of the groove or space in the tilting frame 104 in which the slide 121 is adapted to move. When the slide 121 is moved forward or  
 125 toward the right, from the position illus- 130



trated in Fig. 7 to that illustrated in Fig. 6, the hook which at that time rests upon the finger 137 is pushed along the passageway 113 by a finger 141 which is rigidly fastened to said slide 121. As said finger advances the hook holding finger is pushed backwardly and downwardly from the position illustrated in Fig. 7 to that illustrated in Fig. 6 by a friction roll 142 journaled to rotate upon a pin 143 fast to the slide 121, so that as soon as said hook enters the passageway between the plates 109 and 110 and becomes guided thereby, the hook holding finger is drawn out of the hook and substantially into the position illustrated in Fig. 6. A further forward motion of the slide 121 pushes the hook along the plates 109 and 110 and onto the hook carrier plate 114.

An arm 144 is pivoted by a pin 145 to the tilting frame 104. Said arm is connected by a pin 146 to a link 147, the other end of said link being connected by a pin 148 to the frame 20. The anvil 36 is formed upon or fastened to the lower end of a screw 150 which projects through the front end of the arm 144 and is adjusted longitudinally thereof in said arm by means of a nut 151 located in a slot 152 provided in said arm. The screw 150 and anvil 36 are secured in position after having been properly adjusted by a set nut 153.

The lacing hook carrier 112 is pivoted upon the tilting frame 104 to a pin 154, said pin passing through ears 155, 155 upon the tilting frame 104, said ears being located above and below said lacing hook carrier.

It will be seen that the hook carrier 112 constitutes, in effect, a rocker arm pivotally supported upon the movable or tilting frame 104, with the hook carrier plate 114 fast to the outer end thereof, so that when said hook carrier 112 is rocked upon its pivot the same moves bodily away from the lacing hook after the same has been set in the upper and thus the hook carrier plate is disengaged from the head of the lacing hook.

The position of the lacing hook carrier can be regulated and moved toward or away from the end of the passageway 113 by a set-screw 156 having screw-threaded engagement with said lacing hook carrier and with its inner end bearing against an ear 157 formed upon the tilting frame 104. The screw 156 is held normally in contact with the tilting frame by a flat spring 158, one end of which is fastened to said tilting frame, the forward end thereof bearing against an arm 159 formed on the lacing hook carrier 112.

When the operator desires to set lacing hooks in a right hand upper, said upper is positioned by means of a gage 160 (Figs. 20 to 22 inclusive). This gage is provided with a slot 161 and is adjustably fastened to the presser foot 24 by means of a screw 162 which extends through said slot and has screw-threaded engagement with said presser

foot. An ear 163 upon the plate 160 extends downwardly therefrom in front of the presser foot 24 and has an index 164 thereon. Another ear 165 extends upwardly from the rear edge of said gage 160 and has a series of index marks 166 thereon. The mark 164 shows the operator where to place the upper edge of a right upper in starting a machine when the first lacing hook is to be inserted. One of the index marks 166 is placed in alignment with an index mark 167 upon the punch lever 48 and the gage is then fastened to the presser foot 24 by means of the screw 162. The distance from the point where the first or upper lacing hook is placed in the shoe varies with different styles of shoes and with different manufacturers. Therefore, a series of marks 166 is provided, any one of which may be placed in alinement with the index mark 167 upon the lever 48 to suit varying requirements found in different shops and existing under different conditions.

It is evident that if it is desired that the punch shall make a hole in the upper nearer the top edge, one of the marks 166 at the right (Fig. 20) will be placed in alinement with the index mark 167. On the contrary, if a longer distance from the upper lacing hook to the top edge of the upper is required, one of the index marks 166 at the left (Fig. 20) will be placed in alinement with the index mark 167, so that having the gage 160 correctly located the operator places the top of the right hand upper in alinement with the index mark 164 and then locates the upper in the proper position for the punch to perforate the same at the required distance from the top of said upper.

The operation of the mechanism hereinbefore described is as follows: The operator first depresses the presser foot treadle, raising the presser foot 24, and inserts the upper, whether it be a right hand or a left hand upper, beneath said presser foot upon the work-plate in the proper location for the punch to punch a hole therein in the correct position, being guided as to the placing of the same, so far as the front edge of the upper is concerned, by the edge gage 25, whether the upper be a right or left hand upper and being assisted in placing the upper in the correct position relatively to the distance from the top edge of the upper by the top gage 26, in the case of a left hand upper, and by the gage 160, in the case of a right hand upper, the particular manner of placing said uppers by the aid of said gages having been hereinbefore described. After having placed the upper in position the operator releases the presser foot, allowing the same to descend and clamp the upper to the work-plate. At this time the punch is raised and in its extreme position toward the left as viewed from the front of the machine. The operator now throws in the clutch and the main



driving shaft is rotated by the clutch pulley 96. The punch lever 48 is rocked by means of the link 52, cam lever 54 and cam groove 57, depressing the punch until it perforates the upper against the die plate 59. The presser foot is then raised to release the upper so that it may be fed, by the cam 45. The rocker frame then moves, together with the punch, toward the right, said rocker frame being rocked upon its pivots by means of the cam groove 62 cam lever 64, and links 66 until the median axial line of the punch is brought into alinement with a vertical plane extending through the center of the passageway 113 and through the center of the anvil 36. The presser foot now descends and clamps the upper to the work-plate. The punch is then moved upwardly and retreats toward the left, as viewed from the front of the machine, being moved by the rocker frame on which it is supported.

When the operator places the shoe upper in the machine, as hereinbefore described, the hook feeding finger 124 and the lever 115 are in the position illustrated in Fig. 8; *i. e.*, the tilting frame 104 is in its lowermost position and the auxiliary raceway is in alinement with the lower horizontal portion of the stationary raceway in readiness to have a hook fed from said stationary raceway onto said auxiliary raceway. The hook feeding finger 124 is located back of the lowermost hook on the raceway. Now, as the shaft rotates said hook feeding finger is rocked from the position shown in Fig. 8 to that shown in Fig. 9, being rocked from one position to the other by the movement of the roll 119 toward the left (Figs. 8 and 9). The slide 121 is at this time retreating or moving toward the back of the machine.

The hook feeding finger moves the hook from the lower portion of the raceway onto the tilting frame 104 between the plates 109 and 111 and by the time that said hook feeding finger has moved the hook into the passageway 113, the forward end of the slide 121 has retreated to allow the lacing hook to be pushed into said passage and also to allow the hook holding finger 137 to assume a substantially vertical position, as illustrated in Fig. 7, and to receive upon its hooked end said lacing hook. The hook feeding finger 124 finishes the feeding of the hook into the passageway 113 at about the same time that the punch finishes feeding the material forward in order to have a new lacing hook set therein. As the punch begins to rise and to retreat or move toward the left (Fig. 4) the slide 121 moves forward and the roll 142 strikes the hook holding finger 137, moving it from the position illustrated in Fig. 7 to that illustrated in Fig. 6 and pushing the hook forward along the passageway 113 and onto the hook carrier plate 114. The anvil 36, during the motions hereinbefore described,

has been in its raised position and the tilting frame in its depressed position, as illustrated in Fig. 7. During the latter part of the forward motion of the slide 121, however, the tilting frame is rocked upon its pivot by the cam 106 which rocks the arm 108 integral with the tilting frame 104, so that the tilting frame, with the hook carrier 112 and hook carrier plate 114 thereon, is raised to meet the descending anvil 36, which is fast to the arm 144, said arm being rocked downwardly when the tilting frame 104 is moved upwardly by reason of the rear end of the arm being connected to said tilting frame, while the arm itself is pivoted upon the link 147 fast to the stationary frame, so that an upward movement of the tilting frame will rock the arm 144 so as to move the front end thereof downwardly with the anvil attached thereto.

The hook carrier plate 114 moving upwardly with the tilting frame forces the shank of the lacing hook through the perforation made in the upper of the boot or shoe by the punch, as hereinbefore described, and clenches the shank of said hook upon the anvil 36. Just as the anvil is moving upwardly a slight extent or enough to release the pressure upon the upper, the rod 132 abuts against the hook carrier 112 and rocks the same upon its pivot so as to withdraw the hook carrier plate from the lacing hook, it being noted that the axis of rotation of said carrier extends parallel to the longitudinal median line of the shank of a lacing hook thereon, whereby when said carrier is rocked it may be disengaged from said lacing hook. During this forward motion of the rod 132 the spring 135 will yield and the slide 121 will remain stationary, said slide being stopped by the roll 119 abutting against the lever 115, as illustrated in Fig. 8.

It is evident that the slide 121 and the rod 132 will move as one piece unless an obstruction is encountered by the slide 121, such as hereinbefore set forth, whereupon the spring 135 will yield, the slide 121 will remain stationary, and the rod 132 will move forward to perform its function in actuating the lacing hook carrier to remove the same from the lacing hook which has been set, so that under normal conditions the slide 121 and sliding rod 132 move as one piece and constitute, as a whole, a slide.

As soon as the lacing hook carrier has been withdrawn from the lacing hook, the tilting frame, together with said lacing hook carrier and its holder, descends, the slide 121 begins its retreating motion and the lacing hook holder assumes its normal position adjacent to the end of the passageway 113 in readiness to receive a new lacing hook.

It will be noted that during the preceding movements of the different parts the presser foot 24 is raised to free the upper so that it



may be fed and lowered to clamp the same to the work-plate at the proper time by means of the presser foot lever 42 and cam 45. It will also be understood that during the setting of the lacing hooks the operator keeps his foot upon the clutch treadle until the correct number of lacing hooks have been set in the upper, when he releases said treadle, the clutch throws the clutch pulley 96 out of engagement with the driving shaft 46 and the machine stops with the punch and anvil in their elevated positions and with the tilting frame in its depressed position.

When the operator desires to increase the distance which the upper is fed, he removes the pins 82, 82 from the holes 83, 83 and moves the handle 85 toward the front of the machine, thus rocking said lever to move the link 79 toward the right (Fig. 10) and rocking the links 66 and 67 about the pivots 75, and 69, respectively, thus moving the rocker frame 50 upon its pivot in the proper direction to move the punch supported thereon and the die plate toward the left (Figs. 3 and 10), so that when the punch descends and punches a hole in the upper to feed the same, it will punch said hole at the correct distance from the anvil, thus increasing the feed, it being understood that at each rotation of the machine the axial line of the pivots 69 and 75 are brought into alinement, and any variation in the throw of the rocker frame 50 and of the punch supported thereon is accomplished by the axial line of the pivot 69 moving to a greater or less distance backwardly or toward the left (Fig. 10) from the median line of the pivotal pin 75. It will, therefore, be seen and understood by reference to Figs. 10 to 13, inclusive, that the punch will always be fed forward by the rocking of the rocker frame to the same point (see Figs. 11 and 13), but that by changing the relative positions of the links 66 and 67 by means of the handle 85 the punch will be moved to a greater or less distance toward the left to increase or diminish the feed of the upper, and consequently the distance between the lacing hooks, as illustrated in Figs. 10 and 12.

Having thus described my invention, what I claim and desire by Letters Patent to secure is:

1. In a machine for setting lacing hooks in the upper of a boot or shoe, a tilting frame, a raceway thereon, a carrier pivotally supported on said tilting frame and adapted to hold a lacing hook, and mechanism to feed a lacing hook along said raceway and onto said carrier, the axis of rotation of said carrier extending parallel to the longitudinal median line of the shank of a lacing hook thereon, whereby, when said carrier is rocked, it may be disengaged from said lacing hook, after the same has been set in said upper.

2. In a machine for setting lacing hooks in

the upper of a boot or shoe, a raceway, a tilting frame, a carrier pivotally supported on said tilting frame and adapted to hold a lacing hook, mechanism to feed a lacing hook from said raceway to said carrier, an anvil pivotally supported on said tilting frame, and instrumentalities adapted to move said lacing hook carrier toward and away from said anvil, whereby said lacing hook may be clenched against said anvil.

3. In a machine for setting lacing hooks in the upper of a boot or shoe, a raceway, a tilting frame, a carrier supported on said tilting frame and adapted to hold a lacing hook, mechanism to feed a lacing hook from said raceway to said carrier, an anvil pivotally supported on said tilting frame, and mechanism to move said anvil and tilting frame relatively to each other, whereby said carrier clenches said hook against said anvil.

4. In a machine for setting lacing hooks in the upper of a boot or shoe, a raceway, a tilting frame, a carrier pivotally supported on said tilting frame and adapted to hold a lacing hook, mechanism to feed a lacing hook from said raceway to said carrier, an anvil pivotally supported on said tilting frame, instrumentalities adapted to move said lacing hook carrier toward and away from said anvil, whereby said lacing hook may be driven through said upper and clenched therein against said anvil, and means to move said carrier away from said lacing hook.

5. In a machine for setting lacing hooks in the upper of a boot or shoe, a raceway, a tilting frame, a carrier pivotally supported on said tilting frame adjustable relatively thereto and adapted to hold a lacing hook, and mechanism to feed a lacing hook from said raceway onto said carrier.

6. In a machine for setting lacing hooks in the upper of a boot or shoe, a raceway, a tilting frame, a carrier pivotally supported on said tilting frame and adapted to hold a lacing hook, mechanism to feed a lacing hook from said raceway onto said carrier, an arm pivoted to said tilting frame, an anvil fast to said arm, and mechanism to rock said arm, whereby said lacing hook is clenched against said anvil.

7. In a machine for setting lacing hooks in the upper of a boot or shoe, a raceway, a tilting frame, a carrier pivotally supported on said tilting frame and adapted to hold a lacing hook, mechanism to feed a lacing hook from said raceway onto said carrier, an arm pivoted to said tilting frame, an anvil fast to said arm, and mechanism to simultaneously rock said tilting frame and arm, whereby said lacing hook carrier is moved toward said anvil and said lacing hook is driven through said upper and clenched therein against said anvil.

8. In a machine for setting lacing hooks in the upper of a boot or shoe, a raceway, a tilt-



ing frame, a carrier pivotally supported on said tilting frame and adapted to hold a lacing hook, mechanism to feed a lacing hook from said raceway onto said carrier, an arm 5 pivoted to said tilting frame, an anvil fast to said arm, mechanism to simultaneously rock said tilting frame and arm, whereby said lacing hook carrier is moved toward said anvil and said lacing hook is driven through 10 said upper and clenched therein against said anvil, and mechanism adapted to rock said carrier and disconnect the same from said lacing hook.

9. In a machine for setting lacing hooks in 15 the upper of a boot or shoe a stationary raceway, a tilting frame, a carrier pivotally mounted on said tilting frame and adapted to hold a lacing hook, an auxiliary raceway on said tilting frame leading from said sta- 20 tionary raceway to said lacing hook carrier, and mechanism to feed a lacing hook along said auxiliary raceway and onto said carrier, the axis of rotation of said carrier extending parallel to the longitudinal median line of the 25 shank of a lacing hook thereon, whereby, when said carrier is rocked, it may be disengaged from said lacing hook after the same has been set in said upper.

10. In a machine for setting lacing hooks 30 in the upper of a boot or shoe, a tilting frame, a lacing hook carrier on said tilting frame and an auxiliary raceway on said tilting frame, the outlet end of said auxiliary raceway terminating adjacent to said lacing hook 35 carrier, and instrumentalities mounted upon said tilting frame adapted to feed said lacing hook along said auxiliary raceway to said lacing hook carrier.

11. In a machine for setting lacing hooks 40 in the upper of a boot or shoe, a tilting frame, a lacing hook carrier pivotally mounted on said tilting frame, an auxiliary raceway on said tilting frame, the outlet end of said auxiliary raceway terminating adjacent to said 45 lacing hook carrier, instrumentalities mounted upon said tilting frame adapted to feed said lacing hook along said auxiliary raceway to said lacing hook carrier, and means to move said carrier toward and away from the outlet 50 end of said raceway.

12. In a machine for setting lacing hooks in the upper of a boot or shoe, a lacing hook carrier, a tilting frame, an auxiliary raceway thereon, said auxiliary raceway having a pas- 55 sageway between its adjacent edges, a portion of which extends longitudinally of said tilting frame, with its outlet end adjacent to said lacing hook carrier and the remainder of said passageway extending transversely of 60 said tilting frame.

13. In a machine for setting lacing hooks in the upper of a boot or shoe, a lacing hook carrier, a tilting frame, an auxiliary raceway thereon, said auxiliary raceway having a pas- 65 sageway between its adjacent edges, a por-

tion of which extends longitudinally of said tilting frame, with its outlet end adjacent to said lacing hook carrier and the remainder of said passageway extending transversely of said tilting frame, mechanism to feed said 70 lacing hooks along said transverse passageway and into said longitudinal passageway, and mechanism to feed said lacing hooks along said longitudinal passageway onto said carrier.

14. In a machine for setting lacing hooks 75 in the upper of a boot or shoe, a tilting frame, an auxiliary raceway thereon, said auxiliary raceway having a passageway between its adjacent edges, a portion of which extends 80 longitudinally of said tilting frame, the remainder of said passageway extending transversely of said tilting frame, and a hook holding finger located in said longitudinal pas- 85 sageway at one end of said transverse pas-

15. In a machine for setting lacing hooks in the upper of a boot or shoe, a tilting frame, an auxiliary raceway thereon, said auxiliary raceway having a passageway between its 90 adjacent edges, a portion of which extends longitudinally of said tilting frame, the remainder of said passageway extending transversely of said tilting frame, a hook holding finger and means to move said hook holding 95 finger into said longitudinal passageway in alinement with a hook in said transverse pas-

16. In a machine for setting lacing hooks in the upper of a boot or shoe, a tilting frame, 100 an auxiliary raceway thereon, said auxiliary raceway having a passageway between its adjacent edges, a portion of which extends longitudinally of said tilting frame, the re- 105 mainder of said passageway extending transversely of said tilting frame, a hook holding finger, means to move said hook holding finger into said longitudinal passageway in alinement with a hook in said transverse pas- 110 sageway, and mechanism to move said hook holding finger out of said passageway.

17. In a machine for setting lacing hooks in the upper of a boot or shoe, a tilting frame, an auxiliary raceway thereon, said auxiliary raceway having a passageway between its 115 adjacent edges, a portion of which extends longitudinally of said tilting frame, the remainder of said passageway extending transversely of said tilting frame, a hook-feeding lever pivoted to said tilting frame, and means 120 to rock said lever whereby a lacing hook is fed along said transverse passageway into said longitudinal passageway.

18. In a machine for setting lacing hooks in the upper of a boot or shoe, a tilting frame, 125 an auxiliary raceway thereon, said auxiliary raceway having a passageway between its adjacent edges, a portion of which extends longitudinally of said tilting frame, the re- 130 mainder of said passageway extending trans-



versely of said tilting frame, a hook-feeding lever pivoted to said tilting frame, a finger yieldingly mounted on said lever adapted to engage a lacing hook in said transverse passageway, and means to rock said lever, whereby said lacing hook is fed along said transverse passageway into said longitudinal passageway.

19. In a lacing hook setting machine, a tilting frame, a raceway adapted to guide a lacing hook thereon, a lacing hook carrier adjacent to one end of said raceway, and a slide mounted upon said tilting frame adapted to move a lacing hook along said raceway and onto said lacing hook carrier.

20. In a lacing hook setting machine, a tilting frame, a raceway adapted to guide a lacing hook thereon, a lacing hook carrier adapted to receive said lacing hook adjacent to one end of said raceway and movable upon said tilting frame toward and away from said raceway, a slide mounted upon said tilting frame adapted to move a lacing hook along said raceway and onto said carrier and means to engage said lacing hook carrier and move the same away from said raceway.

21. In a lacing hook setting machine, a tilting frame, a raceway adapted to guide a lacing hook thereon, a lacing hook carrier adapted to receive said lacing hook, said carrier pivotally mounted upon said tilting frame adjacent to one end of said raceway and movable upon said tilting frame toward and away from said raceway, and a slide mounted upon said tilting frame adapted to move a lacing hook along said raceway and onto said carrier and means to engage said lacing hook carrier and move the same away from said raceway.

22. In a lacing hook setting machine, a tilting frame, a raceway adapted to guide a lacing hook thereon, a lacing hook carrier adapted to receive said lacing hook, adjacent to one end of said raceway, said carrier being pivoted and movable upon said tilting frame toward and away from said raceway, a slide, yielding means mounted upon said tilting frame adapted to drive said slide and feed a hook along said raceway and onto said carrier, and means to rock said lacing hook carrier upon its pivot.

23. In a lacing hook setting machine, a tilting frame, a lacing hook carrier mounted thereon, instrumentalities adapted to feed a lacing hook to said lacing hook carrier, an anvil pivotally mounted upon said tilting frame, and mechanism to simultaneously rock said tilting frame and anvil, whereby said carrier and anvil are moved toward each other and a lacing hook held upon said carrier is clenched against said anvil.

24. In a lacing hook setting machine, a tilting frame, a lacing hook carrier mounted thereon, instrumentalities adapted to feed a lacing hook to said lacing hook carrier, an

anvil pivotally mounted upon said tilting frame, mechanism to simultaneously rock said tilting frame and anvil, whereby said carrier and anvil are moved toward each other and a lacing hook held upon said carrier is clenched against said anvil, and mechanism to subsequently move said carrier away from said lacing hook.

25. In a lacing hook setting machine, a tilting frame, a lacing hook carrier mounted thereon, instrumentalities adapted to feed a lacing hook to said lacing hook carrier, an arm pivoted to said tilting frame, an anvil fast to said arm, a link, one end connected to said arm and the other to a stationary member, and mechanism to rock said tilting frame, whereby said arm is simultaneously rocked and a lacing hook held upon said carrier is clenched against said anvil.

26. In a machine for setting lacing hooks in the upper of a boot or shoe, a rocker-frame, a die thereon, and a punch supported on said rocker-frame; in combination with a lever, and two links, said links pivotally connected at one end to each other and at their opposite ends, respectively, to said cam lever and to said rocker-frame, whereby said punch may be moved to a predetermined location.

27. In a machine for setting lacing hooks in the upper of a boot or shoe, a rocker-frame, a die thereon, and a punch supported on said rocker-frame; in combination with a lever, two links, said links pivotally connected at one end to each other and at their opposite ends, respectively, to said cam lever and to said rocker-frame, whereby said punch may be moved to a predetermined location, and adjusting means to vary the relative location of said links to each other and to said rocker-frame and cam lever, whereby the distance which said punch is moved may be increased or diminished.

28. In a machine for setting lacing hooks in the upper of a boot or shoe, a rocker-frame, a die thereon, and a punch supported on said rocker-frame; in combination with a lever, and two links said links pivotally connected at one end to each other and at their opposite ends, respectively, to said cam lever and to said rocker-frame, whereby said punch may be moved to a predetermined location, a lever, and a link connecting said lever to one of said links, whereby the distance which said punch is moved may be increased or diminished.

29. In a machine for setting lacing hooks in the upper of a boot or shoe, a rocker-frame, a die thereon, and a punch supported on said rocker-frame; in combination with a lever, and two links, said links pivotally connected at one end to each other and at their opposite ends, respectively, to said cam lever and to said rocker-frame, whereby said punch may be moved to a predetermined location, a lever, means to lock said lever in different



positions, and a link connecting said lever to one of said links, whereby the distance which said punch is moved may be increased or diminished.

5 30. In a machine for setting lacing hooks in the upper of a boot or shoe, a rocker frame, a die thereon, a punch supported on said rocker frame, mechanism to move said punch toward and away from said die, and  
10 mechanism to impart an intermittent rocking motion to said rocker frame; in combination with a raceway, a tilting frame, a carrier supported on said tilting frame and adapted to hold a lacing hook, mechanism to feed a  
15 lacing hook from said raceway to said carrier, an anvil pivotally supported on said tilting frame, and mechanism to move said anvil and tilting frame relatively to each other; whereby said upper may be punched  
20 and fed relatively to said anvil and said carrier operated to clench said hook against said anvil.

31. In a machine for setting lacing hooks in the upper of a boot or shoe, a work-sup-  
25 port, means to intermittently clamp said upper to said work-support, a rocker frame, a die on said rocker frame on one side of said work-support, a punch supported on said rocker frame on the opposite side of said  
30 work-support, mechanism to move said punch toward and away from said die, and mechanism to impart an intermittent rocking movement to said rocker-frame; in combination with a raceway, a tilting frame, a  
35 carrier supported on said tilting frame and adapted to hold a lacing hook, mechanism to feed a lacing hook from said raceway to said carrier, an anvil pivotally supported on said tilting frame, and mechanism to move said  
40 anvil and tilting frame relatively to each other; whereby said upper may be punched and fed relatively to said anvil and said carrier may be operated to clench said hook against said anvil.

45 32. In a machine for setting lacing hooks in the upper of a boot or shoe, a work-support provided with a slot, a rocker frame, a die thereon, a punch supported on said rocker frame, mechanism to move said punch  
50 through said slot toward and away from said die, means to position said upper on said work-support with relation to said punch, means to intermittently clamp said upper to said work-support, and mechanism to impart

an intermittent rocking movement to said 55 rocker-frame; in combination with a raceway, a tilting frame, a carrier supported on said tilting frame and adapted to hold a lacing hook, mechanism to feed a lacing hook from said raceway to said carrier, an anvil 60 pivotally supported on said tilting frame, and mechanism to move said anvil and tilting frame relatively to each other; whereby said upper may be punched and fed intermittently relatively to said anvil and said carrier may be operated to clench said hook against said anvil. 65

33. In a machine for setting lacing hooks in the upper of a boot or shoe, a movable frame, a rocker arm constituting a lacing 70 hook carrier pivotally supported on said movable frame and adapted to hold a lacing hook, and mechanism to feed a lacing hook onto said rocker-arm, the axis of rotation of said rocker-arm extending parallel to the lon- 75 gitudinal median line of the shank of a lacing hook held thereon, whereby when said rocker-arm is rocked it may be disengaged from said lacing hook after said shank has been set in said upper. 80

34. In a machine for setting lacing hooks in the upper of a boot or shoe, a frame, mechanism to impart a vertical movement thereto, a rocker-arm constituting a lacing hook carrier pivotally supported on said frame, a 85 carrier plate fast to said rocker-arm consisting of a hollow cylinder having a top, a portion of said top and the cylindrical wall adjacent thereto being cut away to form a recess adapted to receive the head of a lacing, 90 while the shank of said lacing hook projects upwardly from said top, and mechanism to feed a lacing hook onto said carrier plate, the axis of rotation of said rocker-arm extending parallel to the longitudinal median line of the 95 shank of a lacing hook held on said plate, whereby when said rocker-arm is rocked said plate may be disengaged from said lacing hook after said shank has been set in said upper. 100

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

WARREN F. FRASER.

Witnesses:

CHARLES S. GOODING,  
LOUIS A. JONES.