

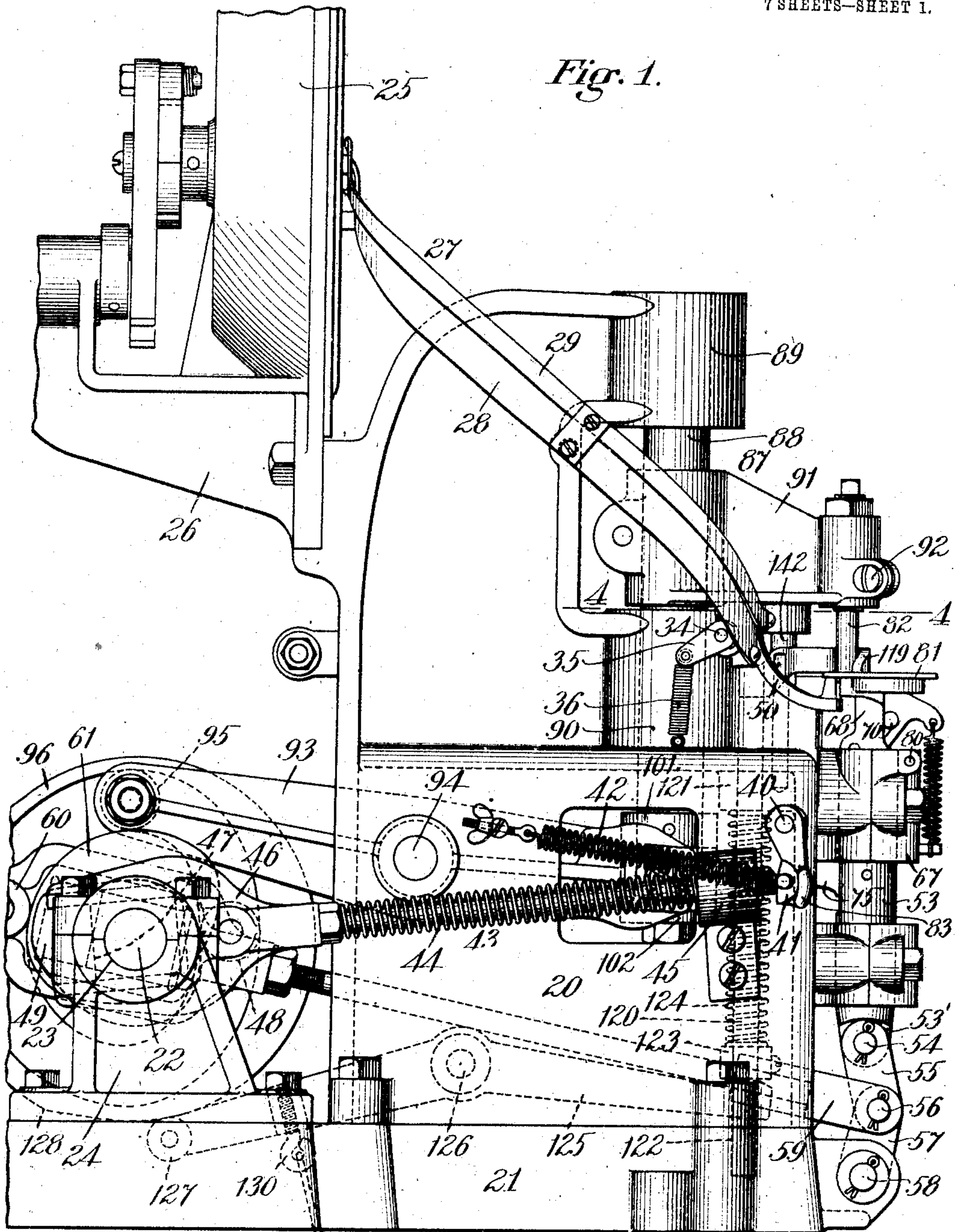
No. 883,256.

PATENTED MAR. 31, 1908.

S. E. TAFT.
LACING HOOK SETTING MACHINE

APPLICATION FILED APR. 2, 1907.

7 SHEETS—SHEET 1.



Witnesses: 129
Walter L. Giese

Inventor: Sydney E. Taft.
William C. Glass, by his attorney, Charles S. Gooding.

No. 883,256.

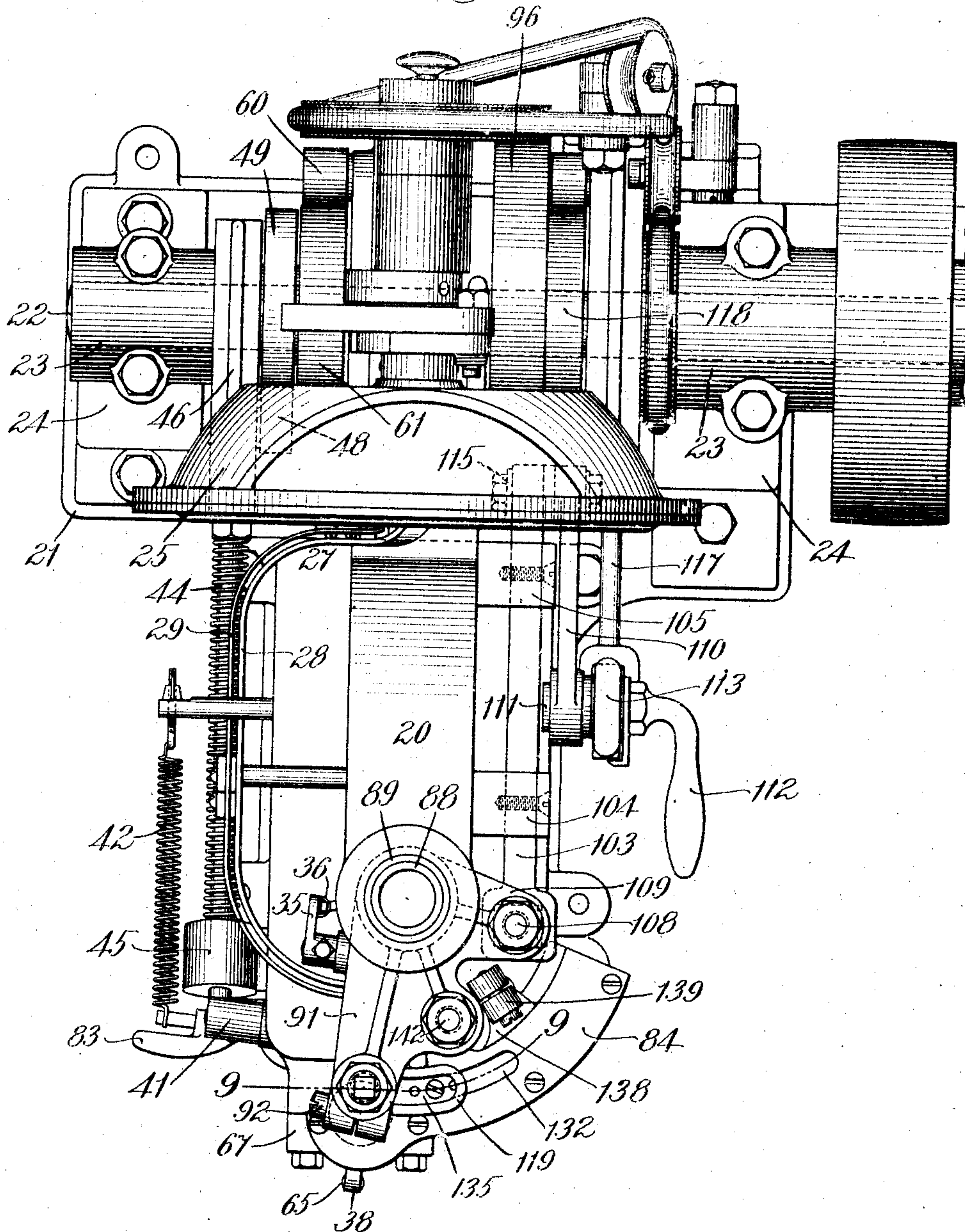
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7 SHEETS—SHEET 2.

Fig. 2.



Witnesses:

Walter F. Turner
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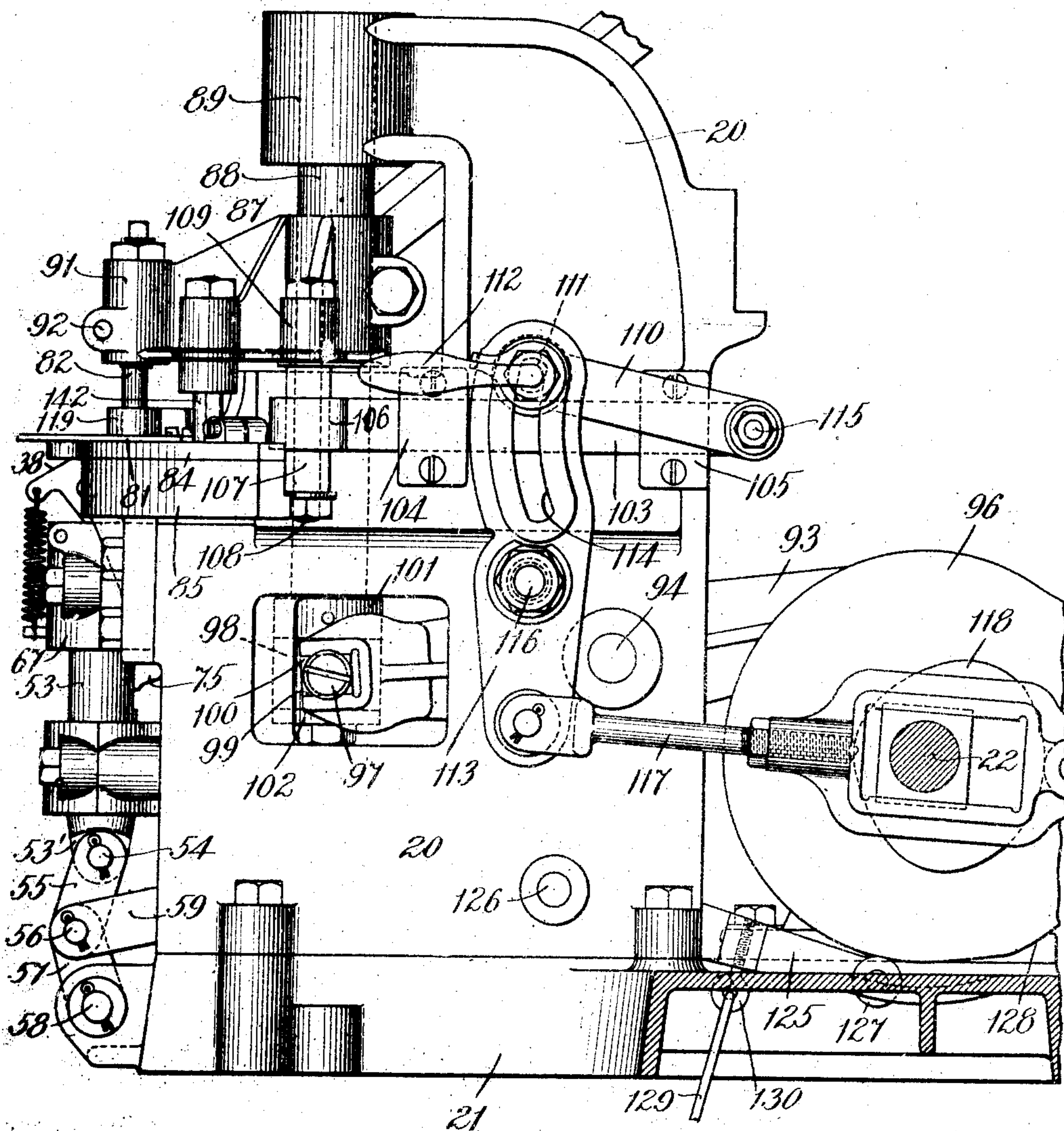
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7 SHEETS—SHEET 3.

Fig. 3.



Witnesses.

Walter L. Pierce

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7 SHEETS—SHEET 4.

Fig. 4.

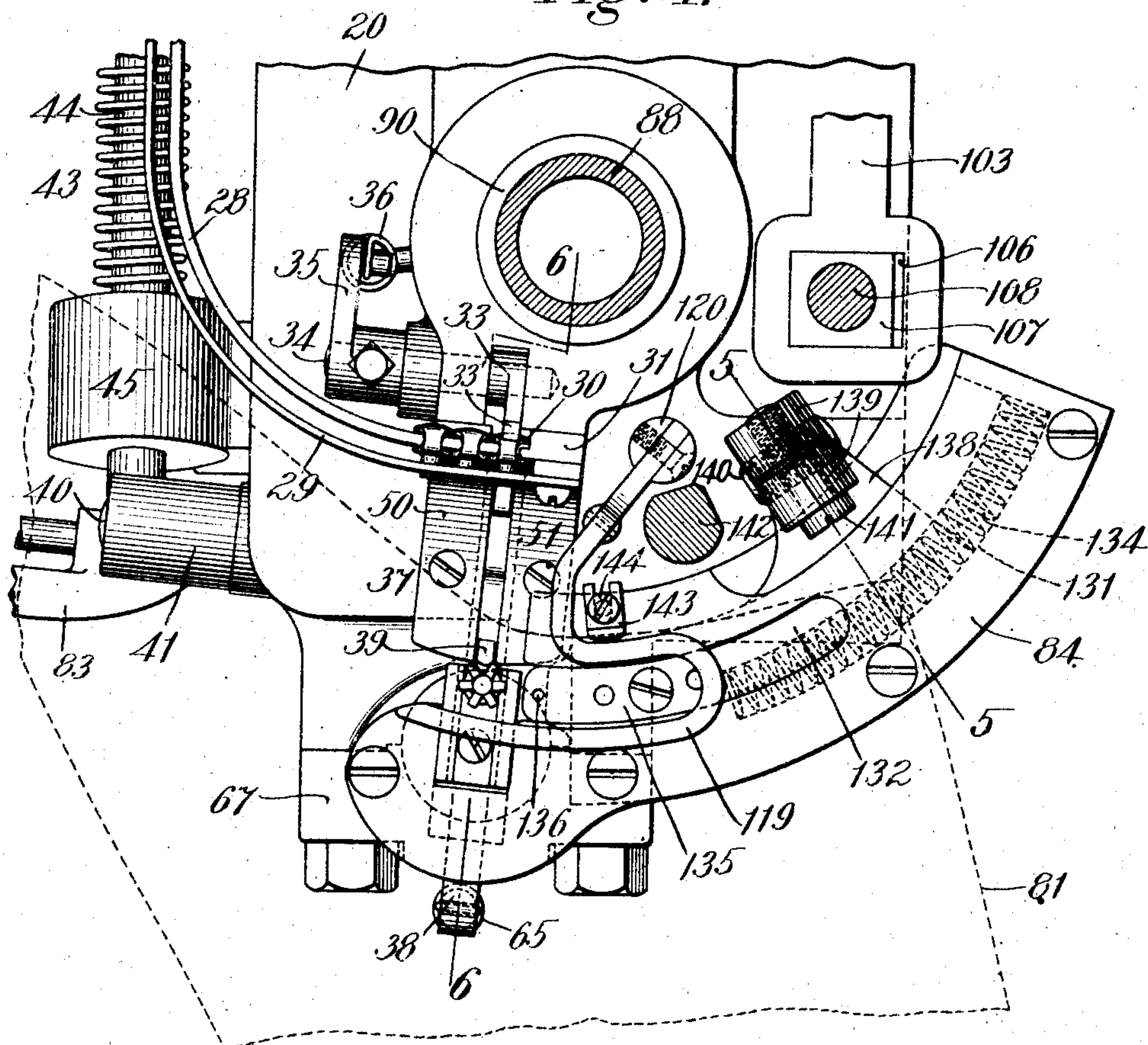
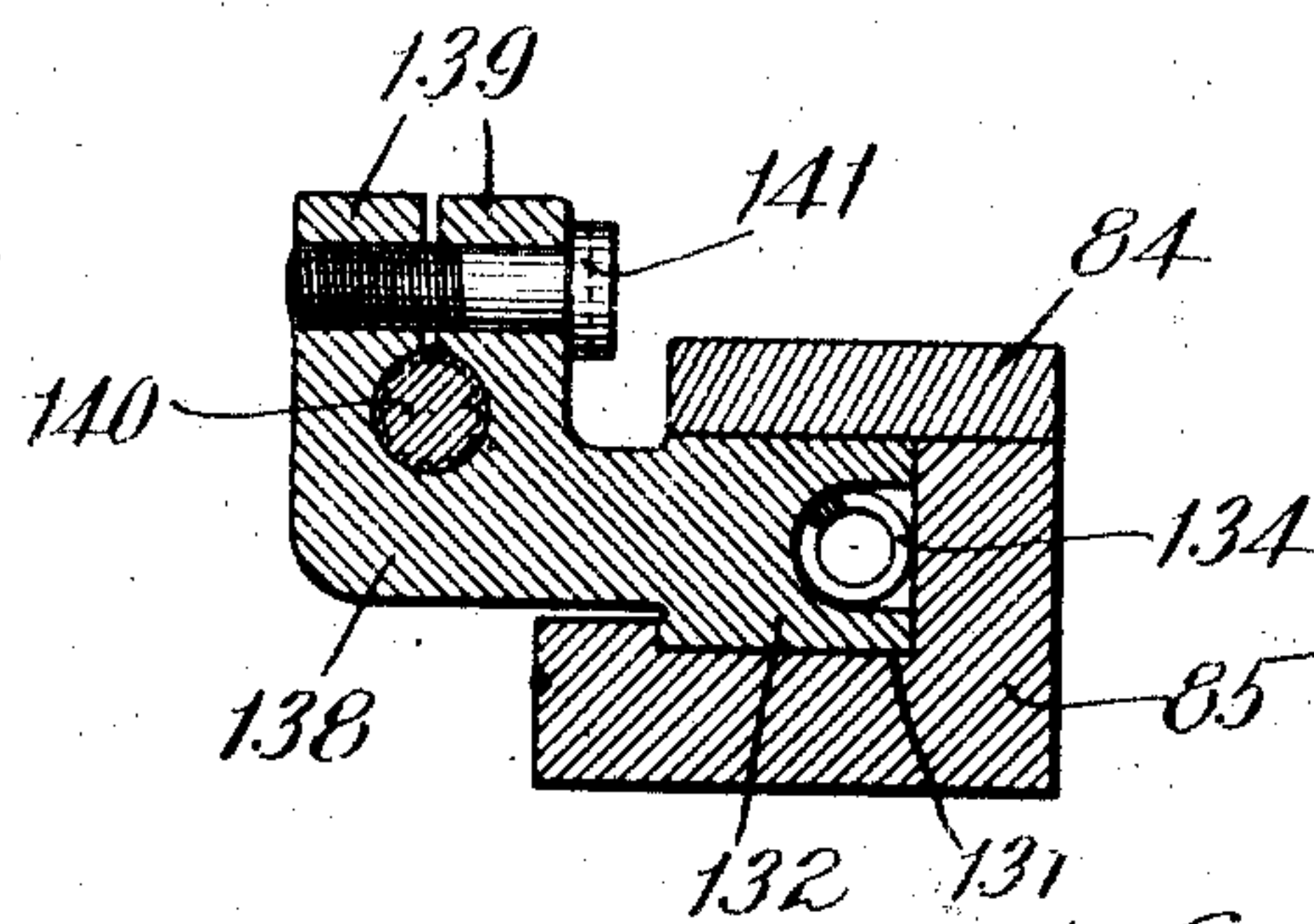


Fig. 5.



Witnesses:

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7 SHEETS—SHEET 5.

Fig. 6.

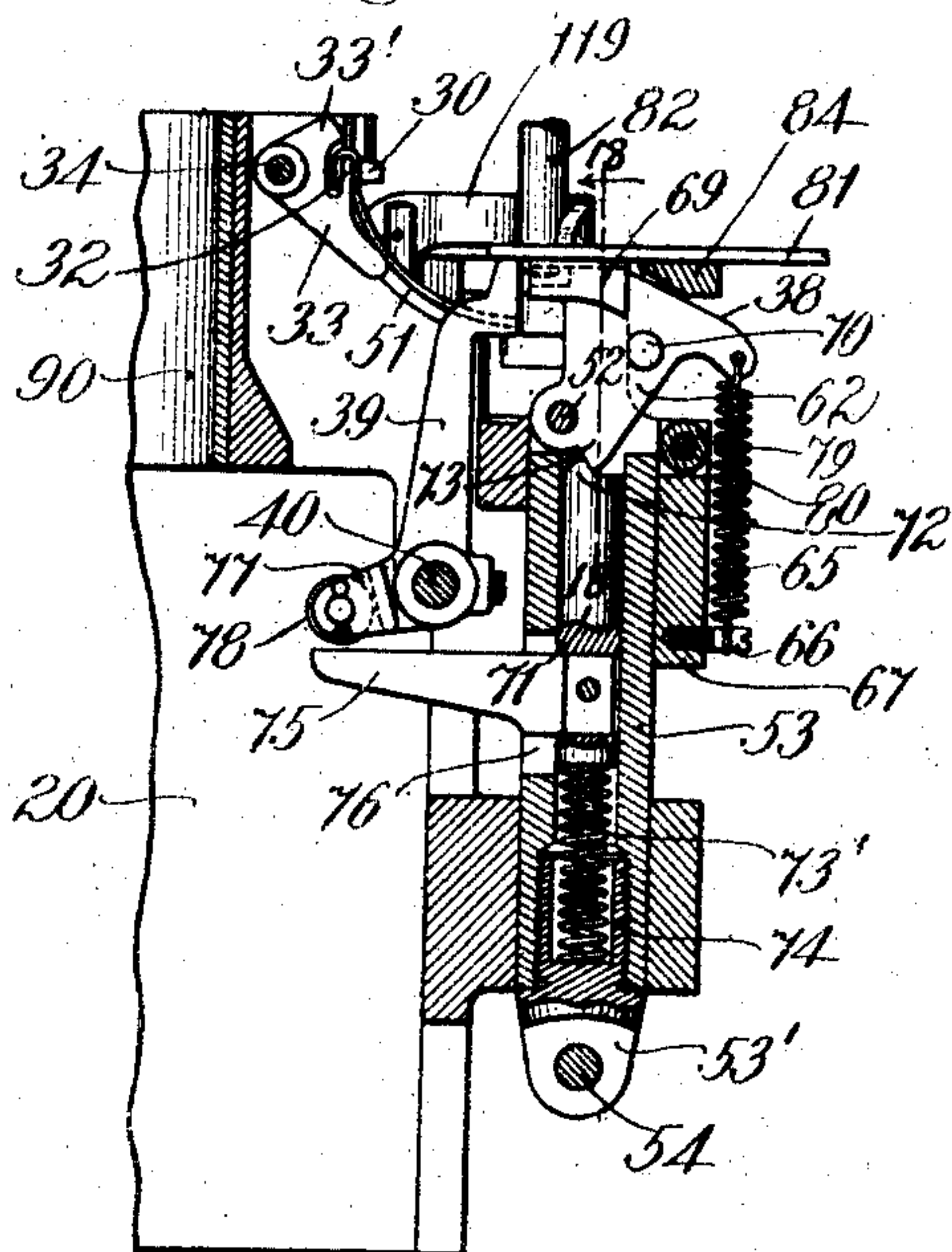


Fig. 7.

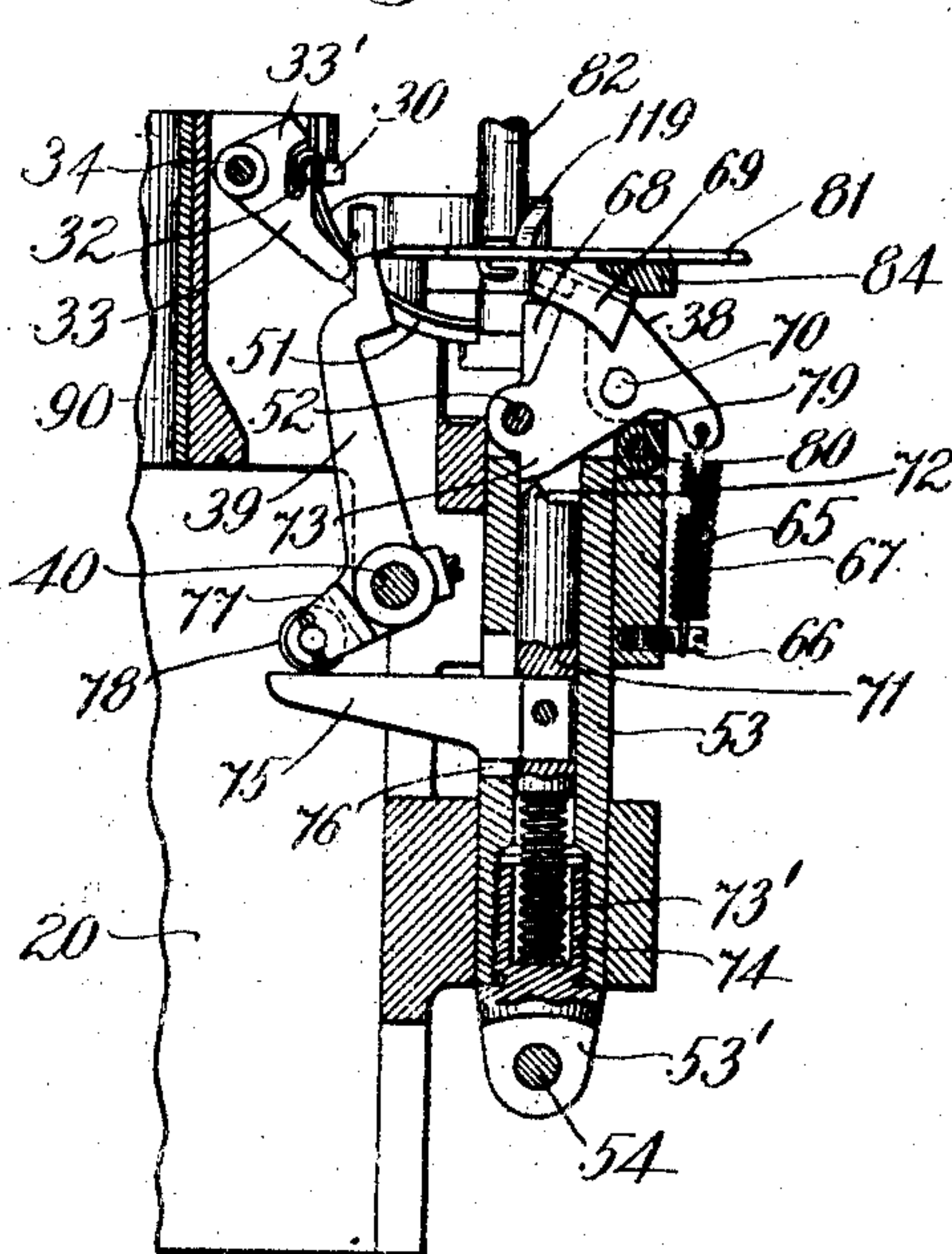
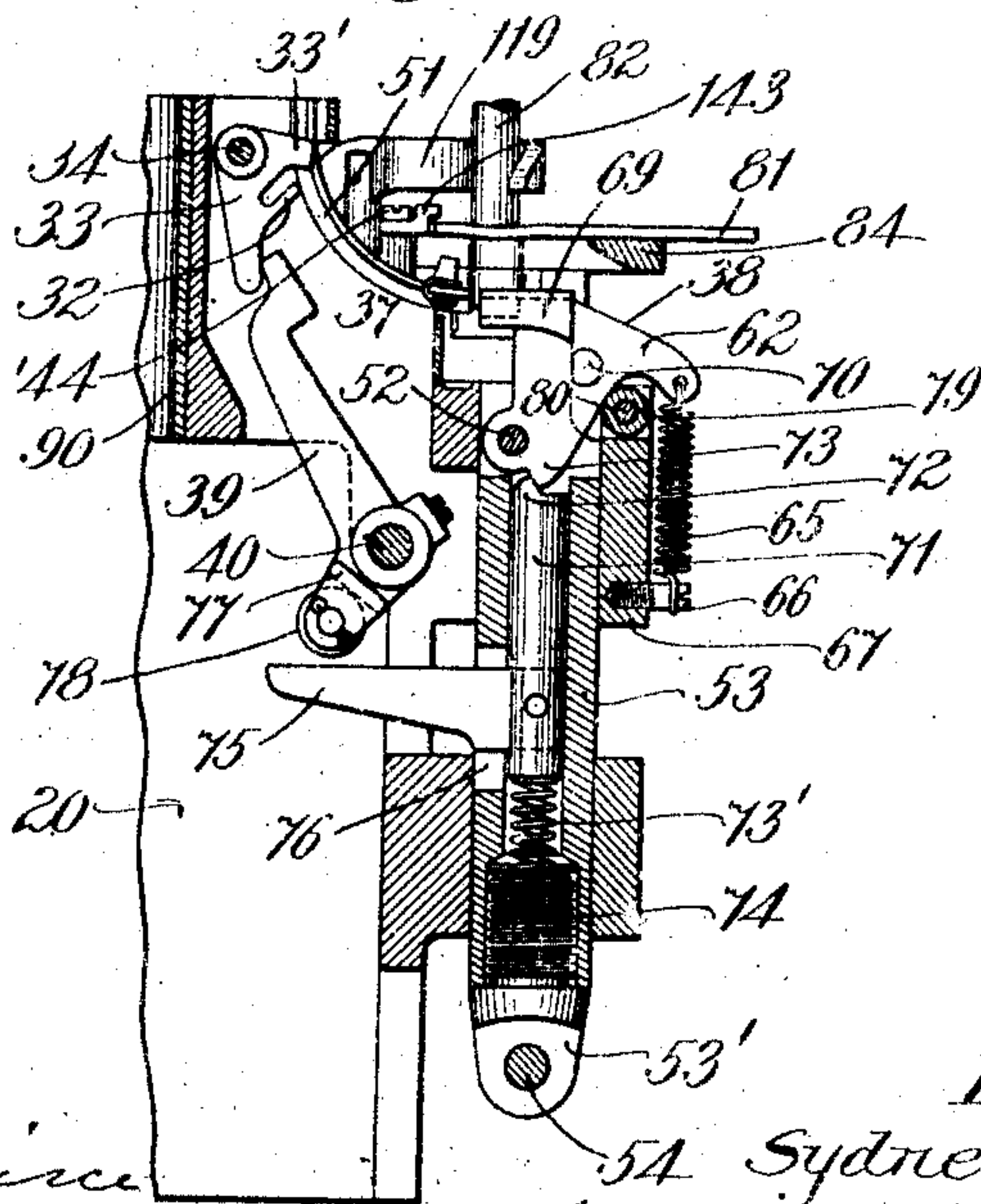


Fig. 8.



Witnesses:

Walter L. Pierce

William C. Glass

Inventor

Sydney E. Taft.

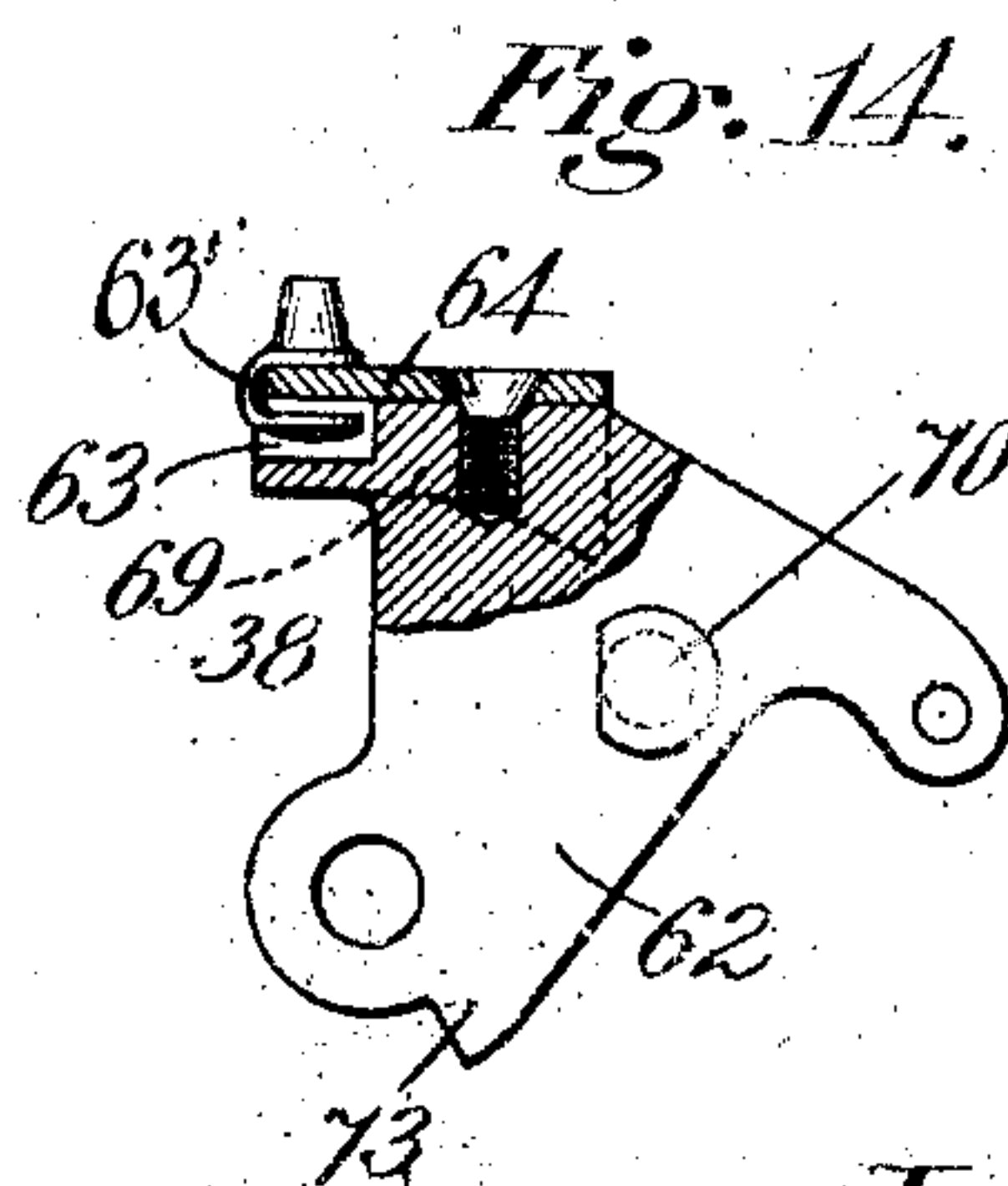
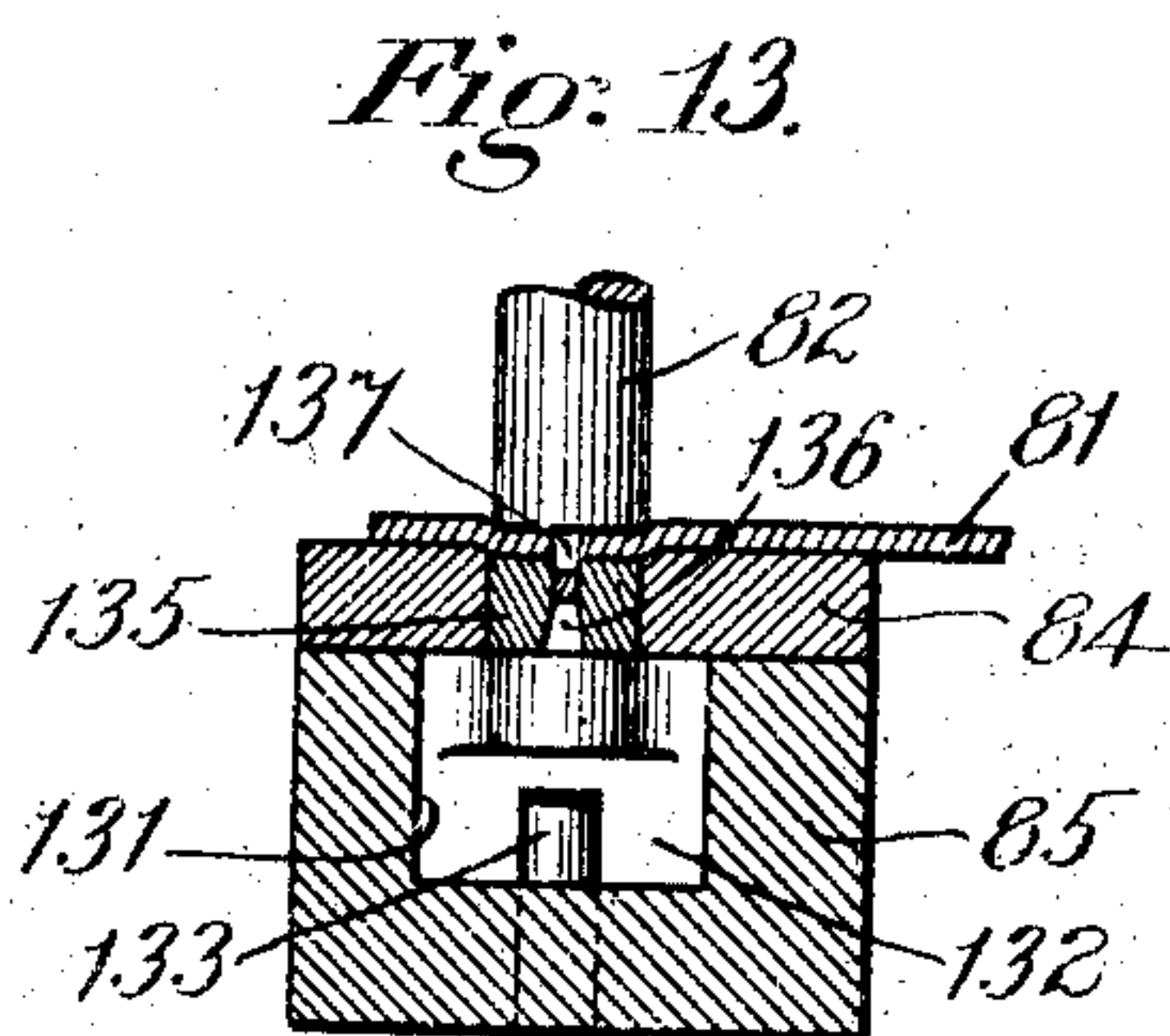
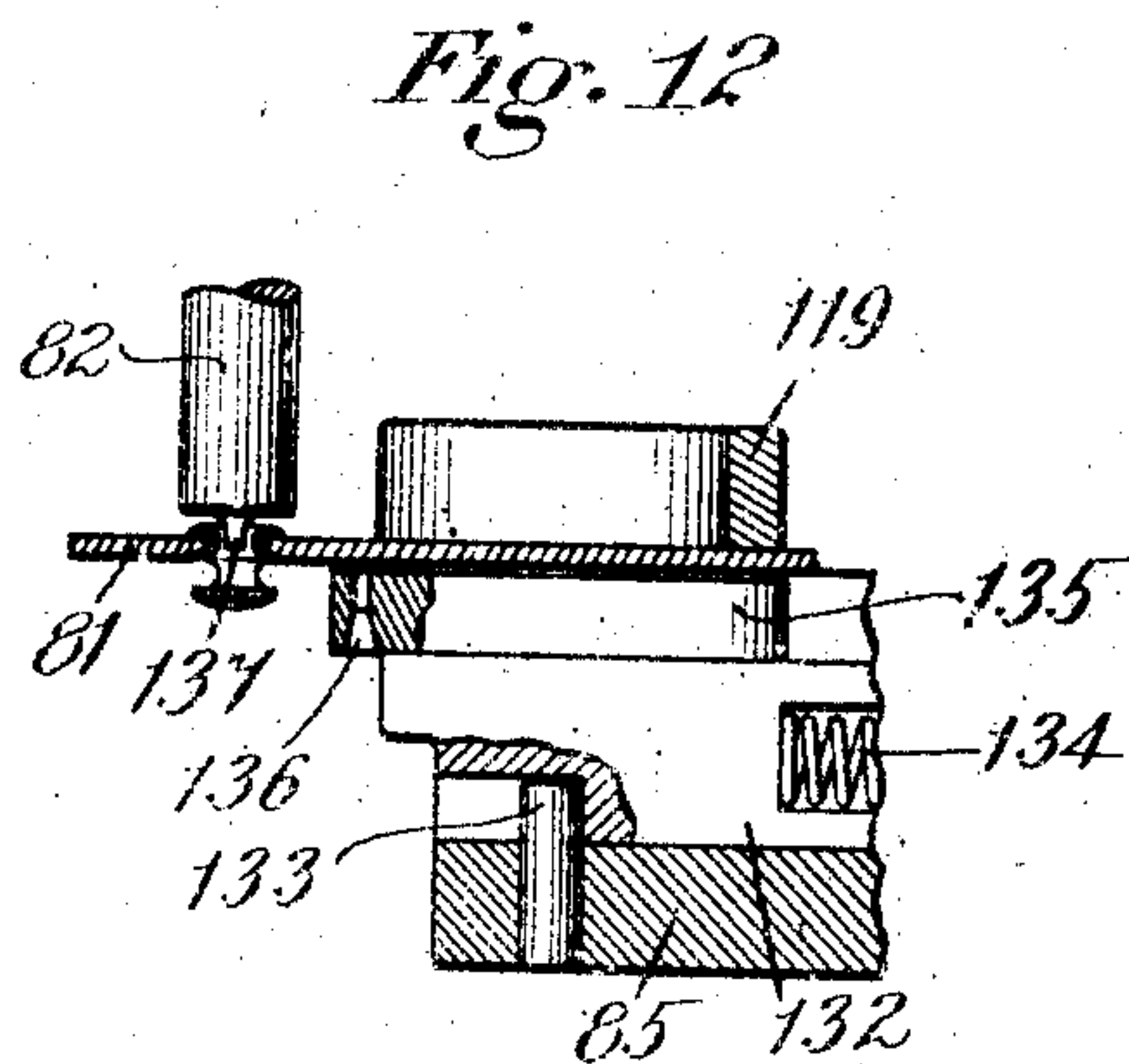
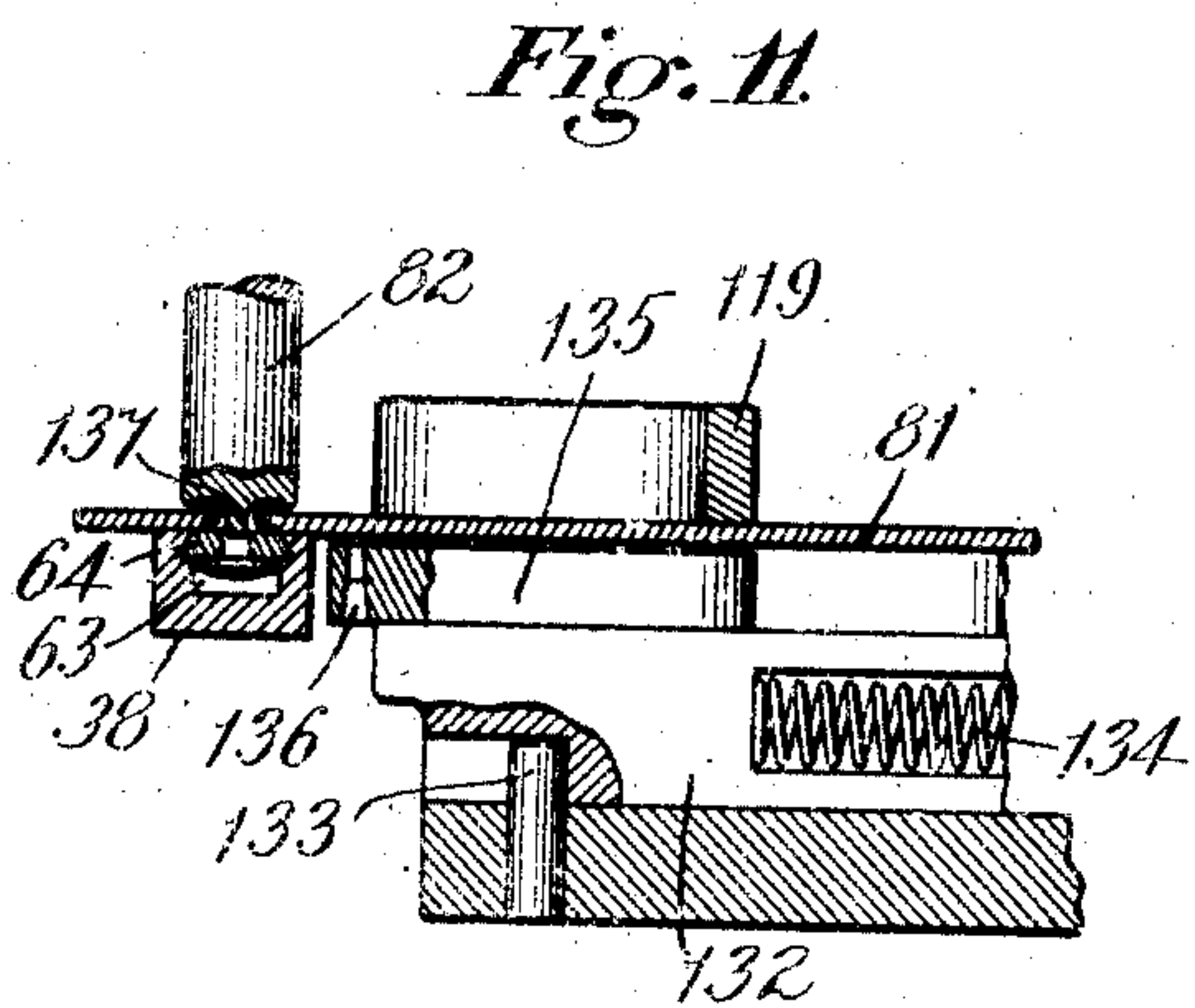
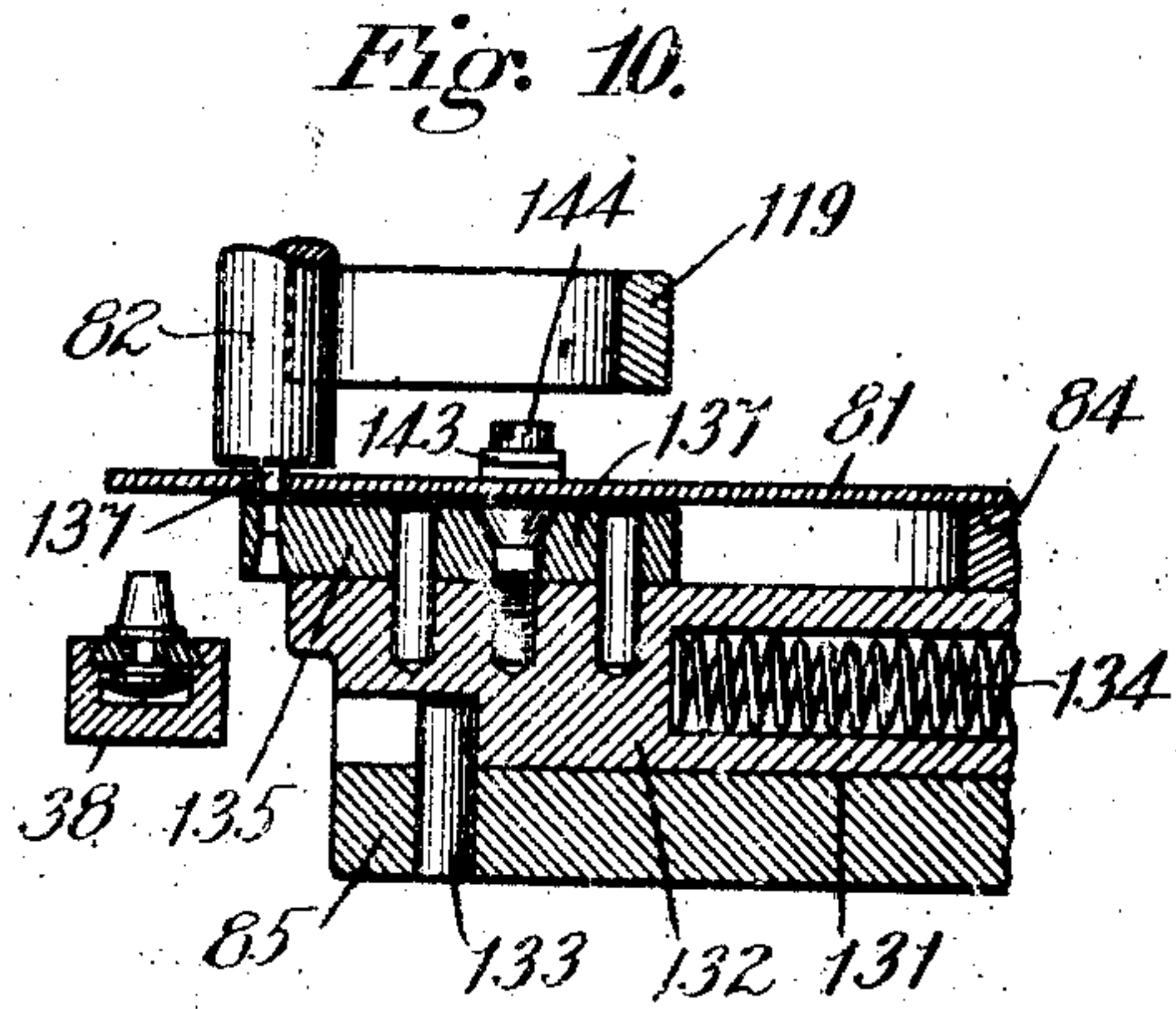
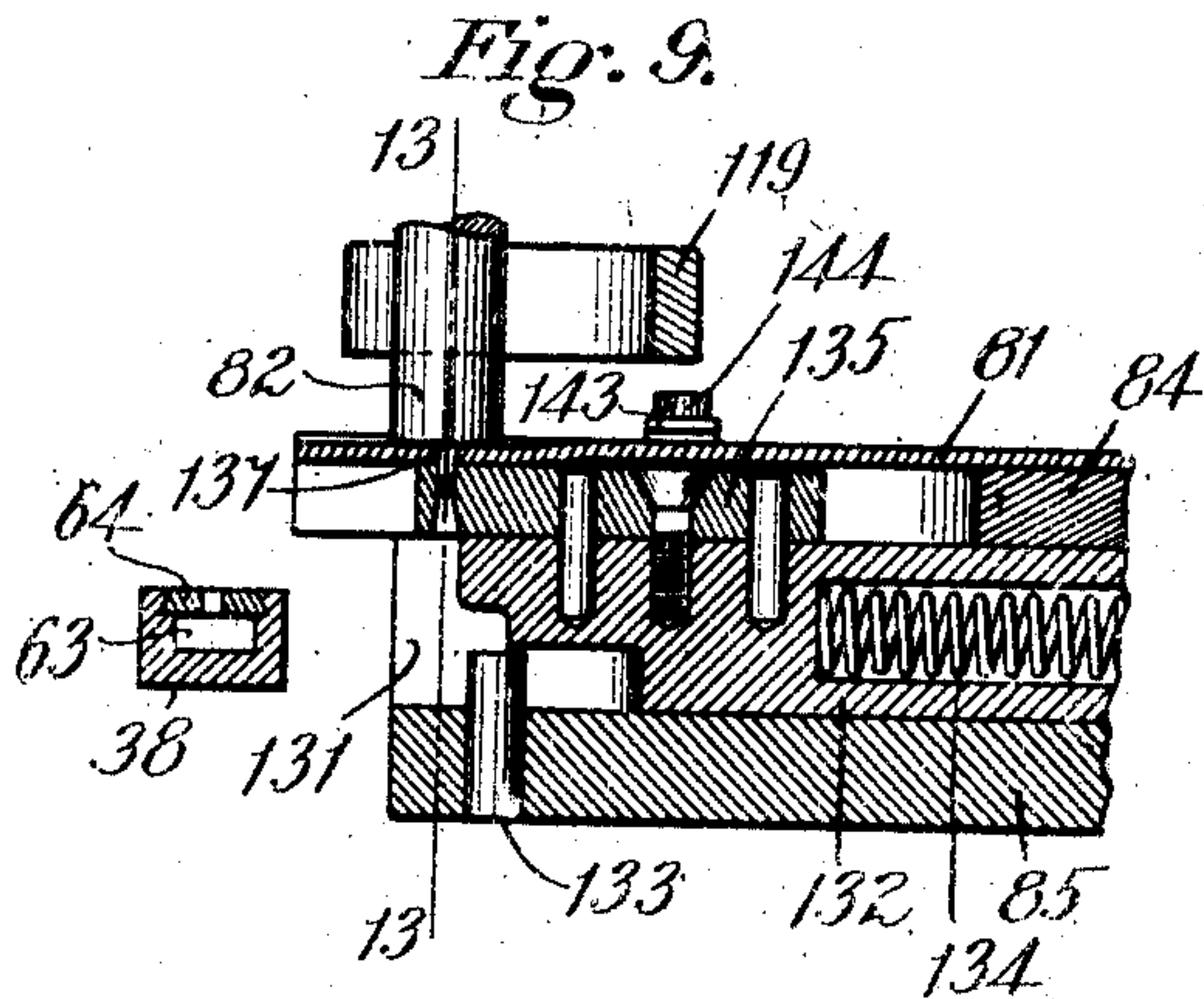
by his attorney,

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S. E. TAFT.
LACING HOOK SETTING MACHINE.

APPLICATION FILED APR. 2, 1907.

7 SHEETS—SHEET 3.



Witnesses:

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PATENTED MAR. 31, 1908.

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LACING HOOK SETTING MACHINE.

APPLICATION FILED APR. 2, 1907.

7 SHEETS—SHEET 7.

Fig. 15.

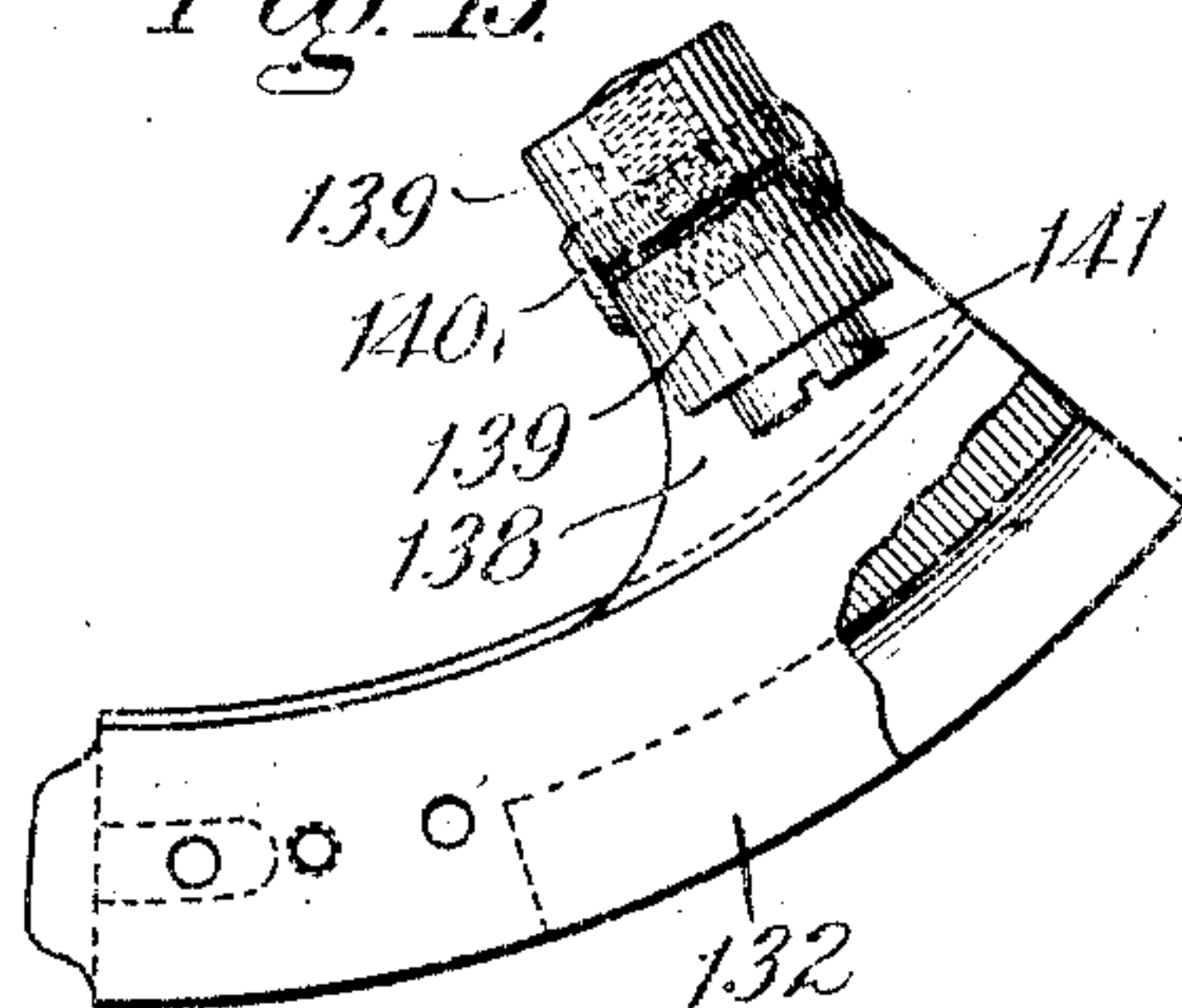


Fig. 18.

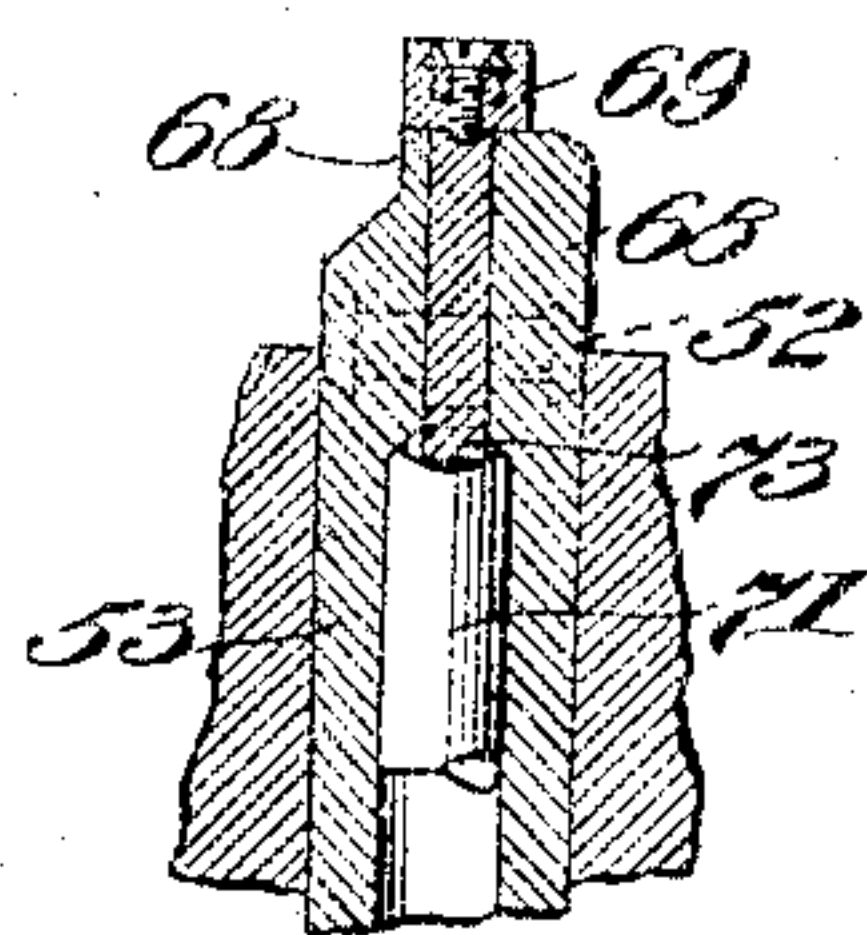


Fig. 16.

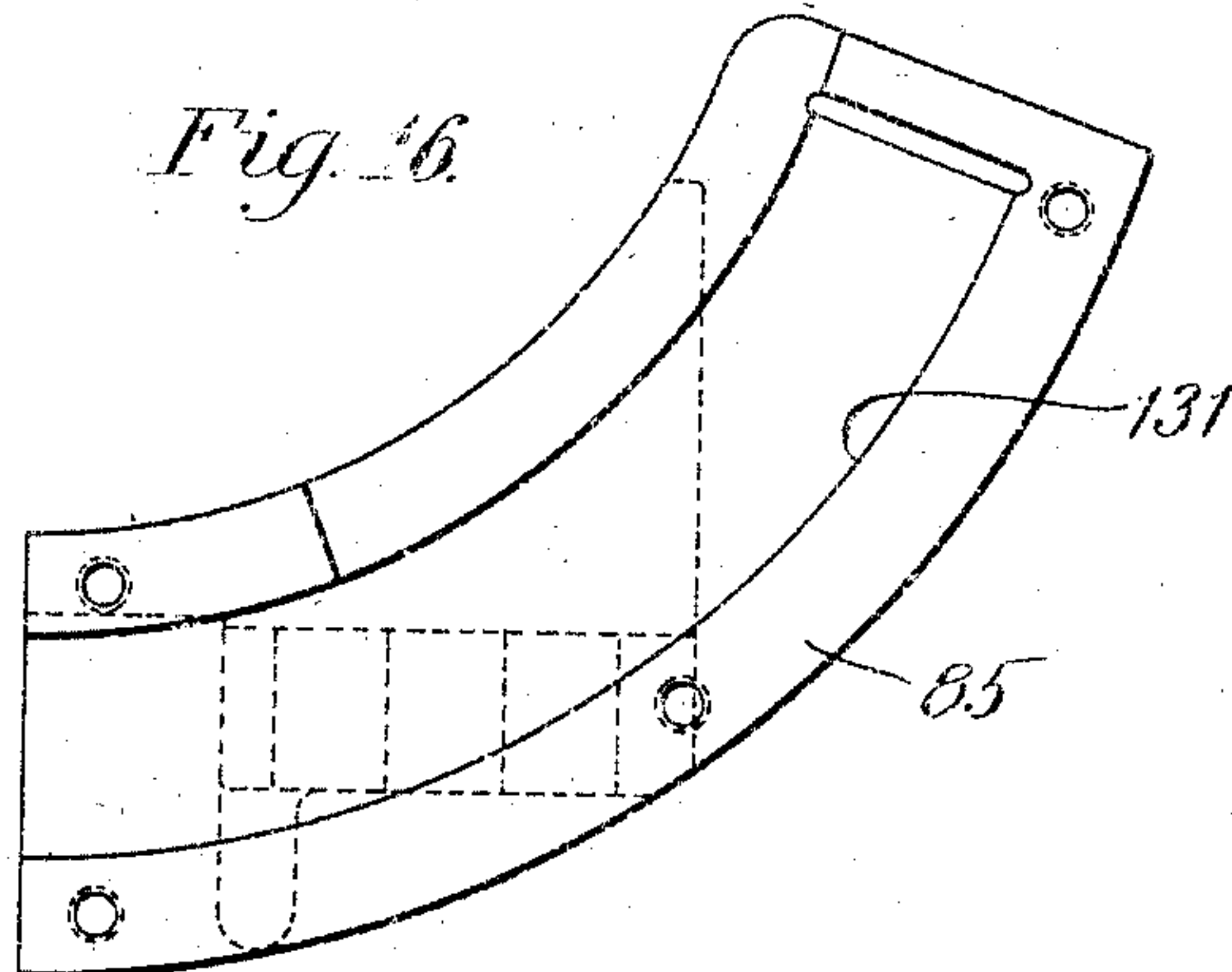
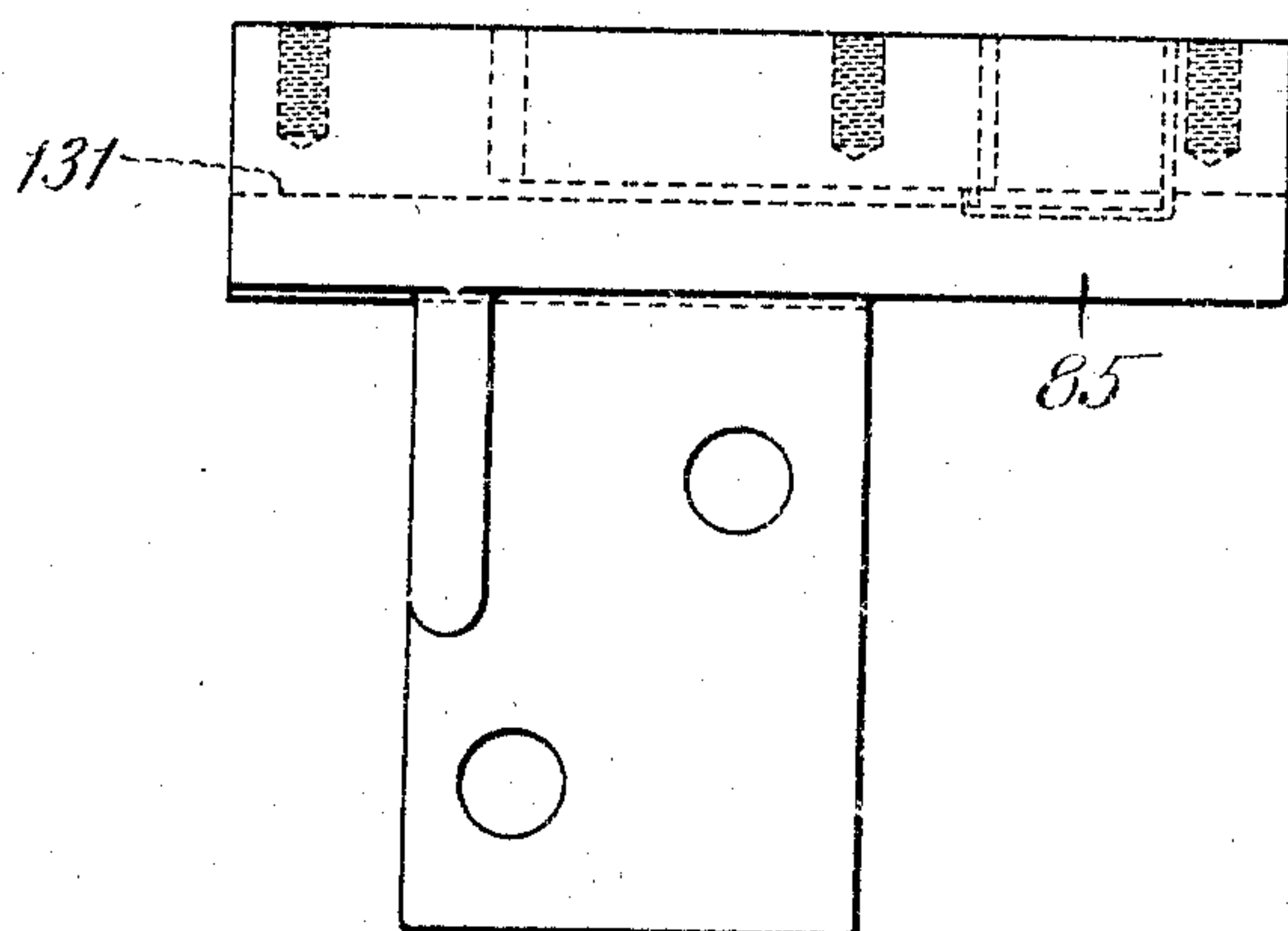


Fig. 17.



Witnesses.

Walter L. Paine

William C. Glass, by his attorney

Inventor.
Sydney E. Taft.

Charles S. Gooding.

UNITED STATES PATENT OFFICE.

SYDNEY E. TAFT, OF SOUTH FRAMINGHAM, MASSACHUSETTS, ASSIGNOR TO AMERICAN LACING HOOK CO., A CORPORATION OF NEW JERSEY.

LACING-HOOK-SETTING MACHINE.

No. 883,256.

Specification of Letters Patent.

Patented March 31, 1908.

Application filed April 2, 1907. Serial No. 366,033.

To all whom it may concern:

Be it known that I, SYDNEY E. TAFT, a citizen of the United States, residing at South Framingham, in the county of Middlesex 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 automatic lacing hook setting machines, *i. e.*, to that class of machines for setting lacing hooks in the uppers of boots and shoes in which the upper is placed by the operator in the machine against a suitable gage or gages, the machine is started in the usual manner by means of a suitable clutch mechanism operated by a treadle, the upper is then punched and fed forward to the lacing hook setting instrumentalities, a lacing hook is set in the hole formed in the upper by the punch and clenched against the anvil integral with said punch, the punch moves upwardly, retreats, descends and punches a new hole in the upper, feeds said upper forward and so on until the desired number of lacing hooks have been set in said upper, when the operator removes his foot from the treadle, the clutch is thrown out, and the machine stops. During this series of operations the only work performed by the operator is to place the upper in the machine, as set forth, hold the front edge of the upper against the front edge gage during the feeding operation, and remove the upper from the machine after it has stopped.

The object of the machine is to provide a machine which can be run at a high rate of speed and which will attach the lacing hooks to the uppers of boots and shoes at equal distances apart without the operator being obliged to do anything more than hereinbefore set forth.

In certain features of its construction the machine of this invention is similar to another machine of like character for which Letters Patent of the United States, No. 855,497 were issued to William P. Bartel and applicant June 4, 1907, this invention differing, however, from the invention set forth in said Letters Patent in the manner of feeding the lacing hooks from the raceway to the lacing hook carrier, in the construction and operation of said lacing hook carrier, and in the combination with the feeding punch and anvil of a die which cooperates with the feed punch in the punching and feeding of the up-

per preparatory to having a lacing hook set therein and clenched upon said anvil by said lacing hook carrier.

To these ends 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, the same being partly broken away to save space in the drawings. Fig. 2 is a plan view of the same, broken away to save space. Fig. 3 is a right hand side elevation of the same, broken away to save space. Fig. 4 is an enlarged plan broken away and partly in section on line 4—4 of Fig. 1, illustrating the lacing hook feeding mechanism and the die which cooperates with the punch in punching and feeding the upper. Fig. 5 is a sectional elevation taken on line 5—5 of Fig. 4. Fig. 6 is a sectional elevation illustrating the lacing hook feeding and setting mechanism taken on line 6—6 of Fig. 4, with the lacing hook just being set against the anvil and clenched in the upper. Fig. 7 is a sectional view similar to Fig. 6 illustrating the parts in different positions, with the lacing hook freed from its carrier so that the upper may be fed. Fig. 8 is a view similar to Figs. 6 and 7 with the lacing hook carrier lowered in position to have a lacing hook fed thereonto. Figs. 9, 10, 11 and 12 are detail sectional elevations, broken away to save space, taken on line 9—9 of Fig. 2, illustrating different steps in the punching, feeding of the upper and setting of the lacing hook therein. Fig. 13 is a detail sectional elevation taken on line 13—13 of Fig. 9. Fig. 14 is a detail side elevation, partly broken away and shown in section of the lacing hook carrier. Fig. 15 is a detail plan of the die holder, broken away and shown in section. Fig. 16 is a detail plan of the work-support, without cap. Fig. 17 is a front elevation of the same. Fig. 18 is a sectional elevation taken on line 18—18, Fig. 6.

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

In the drawings, 20 is the frame of the machine supported upon a base 21, the main driving shaft 22 being journaled in suitable bearings 23 formed in brackets 24 fast to said base. The shaft 22 is driven by a clutch pulley and clutch adapted to be operated by

a treadle in a manner well known to those skilled in this art, but not shown in the drawings.

The lacing hooks are placed in a hopper 25 supported upon a bracket 26 fast to the frame 20. Said hopper and the mechanism for separating the lacing hooks and feeding them to the raceway may be of any suitable form, the mechanism shown in the drawings being substantially like that forming the subject matter of a separate application for Letters Patent Serial No. 292,274, filed December 18, 1905, by William P. Bartel and applicant. The lacing hooks are fed from the hopper 25 to a raceway 27 formed of two pieces of sheet steel 28 and 29 and curved at their lower ends, as shown in Fig. 2. The lacing hooks slide upon the part 28 of the raceway and are held thereon by the part 29 which bears against the shanks of said lacing hooks. The lowermost lacing hook 30 slides down the raceway 27 until it abuts against the stop 31 upon said raceway, and when in this position as illustrated in Fig. 4 and in Figs. 6 and 7, said lacing hook rests upon a finger 32 forming a part of a lever 33 fast to a rock-shaft 34 journaled to rock in a bearing formed in the frame 20. The outer end of the rock-shaft 34 has an arm 35 fast thereto, to which is attached one end of a spiral spring 36, the other end of said spiral spring being fastened to a pin fast to the frame 20.

The finger 32 aligns with the part 28 of the raceway 27, so that as the lacing hooks slide down said raceway the lowermost lacing hook slides from the part 28 onto said finger 32 and stops against the stop 31. Said lacing hook is then in position to be fed down an auxiliary raceway 37 which terminates at its lower end adjacent to a lacing hook carrier 38 (Fig. 8) when said lacing hook carrier is in its lowermost position. The lever 33 is tipped to feed the lacing hook 30 held thereon to the auxiliary raceway 37 by a lever 39, as shown in Fig. 8. Said lever 39 is fast to a rock-shaft 40 journaled to rock in the frame 20 and having fastened to the outer end thereof an arm 41 (Fig. 1). The free end of the arm 41 is held by a spring 42 against the end of a cam slide 43 which consists of a rod 44 adapted to slide in a bracket 45 fast to the frame 20, said rod being fastened to a forked slide piece 46 which slides upon a block 47 supported upon the shaft 22. A cam-roll 48 on said slide piece is engaged by a cam 49 of suitable shape. A reciprocatory motion is thus imparted to the slide 43, which imparts a rocking movement to the arm 41 and to the lever 39 in one direction, the spring 42 rocking said lever in the opposite direction. The upper end of the lever 39 projects between the two plates 50 and 51 (which form the auxiliary raceway 37) when said lever is tipped to its forward position, as illustrated in Fig. 6, so that a lacing hook resting upon

said auxiliary raceway, as illustrated in Fig. 8, will be pushed by the upper end of said lever 39 along said raceway and onto the lacing hook carrier 38. The lacing hook carrier 38 is pivoted at 52 to a slide 53, said slide being preferably cylindrical in form and terminating in an ear 53' at its lower end, to which is pivotally attached by means of a pin 54 a link 55. The lower end of the link 55 is connected by a pin 56 to a link 57, which, in turn, is pivoted at its lower end to a pin 58 fast to the bed-plate 21. The pin 56, in addition to connecting the links 55 and 57 to each other, connects said pins to a cam slide 59 to which a reciprocatory motion is imparted by a cam roll 60 which engages a cam 61. The reciprocatory motion imparted to the cam slide 59 imparts a vertical reciprocatory motion to the slide 53 through the links 55 and 57, (Figs. 1 and 3).

The lacing hook carrier 38 consists of a lever 62 provided with a recess 63 in its upper end adapted to receive the head of a lacing hook and a plate 64 rigidly fastened to said lever and projecting over said recess. The plate 64 projects into the space between the head and the shank of the lacing hook, the end of said plate which projects over said recess being preferably provided with a slight depression 63' to receive the neck of the lacing hook. The carrier 38 is connected by a spring 65 to a screw 66 fast to a cap 67, said cap being adjustably fastened to the frame 20.

The upper end of the slide 53 is forked at 68 and the lacing hook carrier plays between said forks 68, 68, thus preventing any lateral movement of said lacing hook carrier relatively to the slide 53. Upon each side of the lacing hook carrier 38 are lateral projections 69, curved upon their under side and adapted to rest upon the forks 68, 68, so that when the pressure of setting the hook, hereinafter described, is brought to bear upon the plate 64, said pressure will be transmitted not upon the pivot 52 but upon the forks 68, 68, thus supplying a solid foundation for the lacing hook carrier during the setting operation of the lacing hook. A pin 70 is fast to the lacing hook carrier 38 and projects laterally from opposite sides thereof, being adapted to contact with the front edges of the forks 68, 68 when the lacing hook carrier is in the position illustrated in Fig. 6, or when it is in the position of setting the hook against the anvil.

The lacing hook carrier 38 is locked to the slide 53 when the same is in the position illustrated in Figs. 6 and 8 by a stop 71, which is movable relatively to said slide and is preferably cylindrical in shape to fit a cylindrical bore in said slide. The upper end of the stop 71 has a tooth 72 thereon which engages a tooth 73 formed upon the under side of the carrier lever 62. The stop 71 is

held upwardly by a spiral spring 73', one end of which bears against the lower end of said stop, the other end bearing against a screw-threaded shank 74 integral with the ear 53'.

5 An arm 75 is rigidly fastened to the stop 71 and projects laterally therefrom through a slot 76 formed in the slide 53. At a certain time in the operation of the machine, as hereinafter described, the arm 75 is moved
10 downwardly, together with the stop 71 to which it is attached, by the short arm 77 of the lever 39. Said short arm is provided with a friction roll 78 which contacts with the upper surface of said arm 75, and as said lever
15 is rocked, pushes the arm 75 downwardly thus lowering the stop or locking piece 71 until the tooth 72 is disengaged from the tooth 73, and the spring 65 then acts as
20 illustrated in Fig. 7, to rock the lacing hook carrier upon its pivot 52, withdrawing the plate 64 from the lacing hook which at that time is held in the stock, and pulling the
lacing hook carrier downwardly until the front edge thereof rests against a roll 79
25 journaled to rotate upon a pin 80 fast to the cap 67.

The operation of feeding the hook along the auxiliary raceway onto the lacing hook carrier and of setting the hook in the stock
30 by means of said carrier in coöperation with the anvil and punch is as follows: As hereinafter set forth, the lacing hook descends the raceway 27 until it comes to a stop against the stop 31. At that time the lower-
35 most lacing hook 30 rests upon the finger 32 which forms a part of the lever 33 and projects between two sides 50 and 51 of the auxiliary raceway 37. Assuming the parts to be in the position illustrated in Fig. 6, the
40 lever 39 will be rocked from the position shown in Fig. 6 to that shown in Fig. 7, the rocking of said lever being accomplished by means of the rock-shaft 40, rocker-arm 41, cam slide 43 and cam 49 (see Fig. 1). Dur-
45 ing this rocking of the lever 39, the short arm 77, with its roll 78, forces the arm 75 and stop 71 downwardly, disengaging the tooth 72 from the tooth 73, thus unlocking the lever 62 and allowing the spring 65 to
50 rock the lacing hook carrier upon its pivot 52 into the position illustrated in Fig. 7, with the front edge of the lever 62 resting against the roll 79. The slide 53 now descends, being moved downwardly by the links 55 and
55 57, cam slide 59 and cam 61 to the position illustrated in Fig. 8. As the slide 53 moves downwardly, the front edge of the lever 62 bears against the roll 79, which is affixed to a stationary piece, viz, the cap 67, so that the
60 lever 62 or the lacing hook carrier 38 is rocked upon its pivot 52 to the position illustrated in Fig. 8—that is, with the plate 64 in alinement with the lower end of the auxiliary raceway 37, in readiness to have a hook
65 pushed thereon by the lever 39. At the last

part of its backward rocking movement the free end of the lever 39 engages the lever 33 and tips the same into the position illustrated in Fig. 8, freeing the finger 32 from the lacing hook 30 and allowing said lacing
70 hook to slide downwardly upon the auxiliary raceway 37, as illustrated in Fig. 8. The lever 33 also has an arm 33' thereon which moves into the space formerly occupied by the lacing hook 30 and prevents any other
75 hooks from descending the raceway 27 until the lever 33 has resumed the position illustrated in Fig. 6. The lacing hook 30 may slide down the auxiliary raceway 37 and onto the plate 64, but if it does not it will be
80 pushed onto said plate by the lever 39 when it moves forward to the position illustrated in Fig. 6, and after said lacing hook has thus been landed upon the lacing hook carrier, the slide 53 moves upwardly, with the lacing
85 hook thereon, and forces the shank of the lacing hook through the upper 81, clenching the same against the anvil 82. The operation of unlocking the lacing hook carrier, hereinbefore described, is then repeated, and
90 the lacing hook carrier is drawn outwardly, freeing the hook, in order that the upper may be fed, as hereinafter described.

The arm 41 has a handle 83 thereon by means of which said arm may be rocked in
95 order to unlock the lacing hook carrier, when desired, independently of the operation of the machine, such a device being convenient in cases where an imperfect lacing hook becomes jammed upon the carrier and
100 interferes with the operation of the machine.

The material into which the lacing hooks are to be set, viz., the upper 81, rests upon the cap 84 of the work-support 85 fast to the frame of the machine. The upper is fed
105 along the upper surface of said work-support, or the cap thereof, by a feed-point 137 which projects below the clenching surface of the anvil 82. The anvil 82 is adjustably fastened to an anvil carrier frame 87 which con-
110 sists of a vertical shaft 88 constructed to slide in bearings 89 and 90 formed upon the frame of the machine and an arm 91 rigidly fastened to said shaft. The anvil 82 has screw-threaded adjustment in and is support-
115 ed directly upon the arm 91 to which it is clamped by a screw 92.

A vertical motion is imparted to the carrier frame 87 by a cam lever 93 pivoted at
120 94 to the frame of the machine and having rotatably mounted thereon a cam roll 95 which engages a cam 96. The cam lever 93 is connected to the shaft 88 by screws 97 fast to a collar 98. Said cam lever is bifurcated at the free end thereof and each arm of said
125 bifurcated end has a slot 99 formed therein, each of said slots having a sliding block 100 located therein. Each of the screws 97 is fast to the collar 98 and extends through one of said sliding blocks, respectively, so that
130

the same are free to rock thereon. The collar 98 is loosely mounted upon the shaft 88, so that said shaft is free to rock in said collar and said collar is prevented from longitudinal movement upon said shaft by means of a collar 101 fast to said shaft above said collar 98 and by a washer 102 fast to the lower end of said shaft 88. It will, therefore be seen that the shaft 88 can be reciprocated in the bearings 89 and 90, while at the same time it may be rocked in said bearings and this rocking motion is imparted to the shaft 88 and to the arm 91 by a slide 103 arranged to slide in bearings 104, 105 formed upon the frame 20. The front end of said slide 103, or the left hand end (Fig. 3) is slotted at 106 to receive a sliding block 107 which is rotatably mounted upon a stud 108 fast to an arm 109 which is integral with the arm 91. A reciprocatory motion is imparted to the slide 103 by a link 110, pivotally connected at one end at 115 to said slide and at the other end to a stud 111. The stud 111 may be clamped by the handle nut 112 to a lever 113, said stud projecting through a curved slot 114 concentric with the center of the pivot 115. The lever 113 is pivoted at 116 to the frame 20 and has a rocking motion imparted thereto by a cam-slide 117 actuated by a cam 118 fast to the main shaft 22, said cam slide being pivotally connected to the lower end of the lever 113.

The upper 81 is pressed against the work-support 85 by a presser foot 119 which is fastened to a vertical rod 120 (Fig. 1) adapted to slide in a bearing 121 formed in the frame 20, and in a bearing 122 formed in the base 21. A collar 123 is fast to the rod 120 intermediate the bearings 121 and 122 and a spring 124 encircles the rod 120 and holds the presser foot 119 normally pressed against the upper surface of the work support 85, or against the upper which rests upon said work-support. The presser foot is moved upwardly away from the work-support by means of a lever 125 pivoted at 126 to the frame of the machine and having a cam-roll 127 rotatably supported thereon and bearing against the periphery of the cam 96. The right hand end of the lever 125 (Fig. 1) bears against the under side of the collar 123 and the cam 96 is provided upon its periphery with a rise or open cam path 128, whereby, in the rotation of the machine, the presser foot at certain intervals in the cycle of operations, is raised by the cam away from the work-support for the purpose of allowing the upper to be fed, as hereinafter described. If the operator desires to raise the presser foot, independent of the operation of the machine, in order to insert or remove an upper therefrom, he presses upon the treadle (not shown in the drawings) connected by a rod 129 and hook 130 to the lever 125.

The work-support 85 has a curved groove 131 therein concentric with the axis of the

vertical shaft 88 and in said curved groove is located a curved slide or die holder 132. Said slide is normally held in contact with a stop-pin 133 by a spiral spring 134 located also in said groove 131, one end thereof bearing against said slide and the other end against the work-support. A die 135 is fastened to the die holder 132 and has a hole 136 extending vertically therethrough which is adapted to aline at certain times during the operation of the machine, as hereinafter described, with a projection 137, constituting a punch, which extends downwardly from the anvil 82. The cap 84 is fast to the work-support and extends over the top of the die holder 132 as illustrated in Fig. 5. The die holder 132 has an arm 138 thereon (see Figs. 4 and 5) with upwardly projecting ears 139 adapted to be clamped upon an adjusting screw 140 by a clamp screw 141.

A stud 142 is rigidly fastened to the anvil carrier frame 87 and forms, in effect, a portion thereof, said stud being adapted to abut against the screw 140 when the anvil carrier frame is moving toward the right (Fig. 4), thus moving the die holder and die toward the right against the action of the spring 134.

The start and stop clutch motion for the machine is substantially the same as that described in said Letters Patent No. 855,497. Suitable gages are used to assist the operator in placing the upper in correct location to be punched and fed by the anvil punch. The front edge gage 143 is shown in Fig. 4, against which the operator places the front edge of the upper, said front gage being adjustably fastened to the work-support by means of a screw 144 which projects through a slot in the gage 143 and has screw-threaded engagement with the work-support 85.

The general operation of the mechanism hereinbefore specifically described is as follows: The operator places the upper upon the work-support 85 in the position illustrated by dotted lines (Fig. 4) when a right hand upper is to have a lacing hook set therein, with the front edge of said upper bearing against the front edge gage 143. He then places his foot upon the clutch treadle which throws the driving pulley into clutch with the main driving or cam shaft, rotating said shaft and depressing the anvil with its punch projection 137 thereon. This downward motion of the punch is obtained by the anvil carrier frame 87 and the vertical shaft 88, to which it is rigidly fastened, being moved downwardly by the lever 93 and its cam 96. The punch 137 is thus forced through the upper and into the hole 136 in the female die 135, as illustrated in Fig. 9. The presser foot is then released to allow the upper to feed and said upper is then fed by the punch 137, said punch being moved from the right to the left to accomplish this feed of the upper by the rock-

ing of the anvil carrier frame 87. The anvil carrier frame is then rocked from the right toward the left (Fig. 3) by the slide 103, link 110, lever 113, cam slide 117 and cam 118. As the punch feeds the upper toward the left (Fig. 4) or toward the lacing hook carrier, the die 135 slides, together with the holder 132, in the curved groove 131 until said die holder arrives at a point where it is about to abut against the pin 133, but just previous to said holder abutting against said pin the anvil and punch are slightly raised to remove the punch 137 from the hole 136 (Fig. 10). The die and its holder then stop, by reason of the holder abutting against the pin 133 and the punch and anvil continue their movement toward the left from the position illustrated in Fig. 10 until said punch is brought into alinement with a lacing hook held upon the lacing hook carrier 38. The presser foot now descends and clamps the upper to the work-support. The punch then remains stationary, together with the anvil, until the lacing hook carrier drives the lacing hook through the upper and clenches the same upon the anvil, as hereinbefore described.

By reference to Figs. 9 and 13 it will be seen that when the punch first penetrates the upper it passes entirely therethrough and projects slightly below the lower surface of said upper, while the anvil crowds the upper downwardly against the upper surface of the die which is located beneath the upper surface of the cap of the work-support (see Fig. 13). The punch remains in this position until it is withdrawn from the die, and as it is withdrawn the natural resiliency of the leather causes it to spring upwardly out of the depression formed by the location of the upper face of the die relatively to the upper face of the work-support, so that the upper remains upon the punch during the latter part of the feeding movement of the same, and the punch remains projecting through the upper to assist in guiding the shank of the lacing hook as it is driven by its carrier through the leather and clenched upon the anvil.

The next step in the operation of the machine is to slightly release the anvil and punch, or move the same upwardly in order that there may be no pressure upon the top of the lacing hook carrier to prevent said lacing hook carrier from being withdrawn from the lacing hook by the spring 65, as illustrated in Fig. 7. The punch, however, is not withdrawn entirely from the lacing hook, but is left projecting into the hollow shank thereof, as illustrated in Fig. 12, so as to hold said lacing hook against the pull of the lacing hook carrier when being withdrawn therefrom by the spring 65, as illustrated in Fig. 7.

The operation of the lacing hook carrier

and slide to which it is attached, as well as the means by which the lacing hook is fed from the main raceway to the auxiliary raceway and onto said lacing hook carrier have been fully hereinbefore described. The operation of setting the lacing hook is timed in such a manner that the lacing hook is set, as hereinbefore described, as soon as the upper has been fed into proper position, with the punch and anvil in alinement with a lacing hook upon the lacing hook carrier. After the lacing hook carrier has freed itself from the lacing hook, the punch rises and returns to its former position, ready to be depressed and perform again the cycle of operations hereinbefore described. As soon as the desired number of lacing hooks have been set in the upper, the operator releases the clutch treadle and the machine comes to a stop and the operator removes the upper from the machine.

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 uppers of boots and shoes, a slide, a carrier adapted to receive a lacing hook and pivoted to rock on said slide, means to lock said carrier to said slide, and a spring adapted to rock said carrier on its pivot.

2. In a machine for setting lacing hooks in the uppers of boots and shoes, a slide, a carrier adapted to receive a lacing hook and pivoted to said slide, instrumentalities adapted to rock said carrier on said slide, a stop on said slide adapted to engage said carrier and prevent the same from rocking, and means adapted to operate said stop to release said carrier and allow the same to be rocked while said slide is stationary.

3. In a machine for setting lacing hooks in the upper of a boot or shoe, a slide, a carrier adapted to receive a lacing hook and pivoted to rock on said slide about a horizontal axis, means on said slide adapted to lock said carrier to said slide, and means to feed said upper in a direction substantially longitudinally of said horizontal axis.

4. In a machine for setting lacing hooks in the uppers of boots and shoes, a slide, a carrier adapted to receive a lacing hook and pivoted on said slide about a horizontal axis, instrumentalities adapted to rock said carrier on said slide, means on said slide adapted to lock said carrier to said slide, and means to feed said upper in a direction substantially longitudinally of said horizontal axis.

5. In a machine for setting lacing hooks in the uppers of boots and shoes, a slide, a carrier adapted to receive a lacing hook and pivoted to rock on said slide about a horizontal axis, instrumentalities adapted to rock said carrier on said slide, a stop supported on said slide and movable relatively thereto adapted to engage said carrier and prevent

the same from rocking on its pivot, and means to feed said upper in a direction substantially longitudinally of said horizontal axis.

5 6. In a machine for setting lacing hooks in the uppers of boots and shoes, a slide, a carrier adapted to receive a lacing hook and pivoted to rock on said slide, a stop movable relatively to said slide adapted to engage
10 said carrier and prevent the same from rocking on its pivot, means to move said stop out of contact with said carrier, and a spring adapted to rock said carrier on its pivot.

7. In a machine for setting lacing hooks in
15 the uppers of boots and shoes, a slide, a carrier adapted to receive a lacing hook and pivoted to rock on said slide about a horizontal axis, said carrier having lateral projections 69 thereon adapted to rest upon said
20 slide for the purpose specified, instrumentalities adapted to rock said carrier on said slide, a stop adapted to engage said carrier and prevent the same from rocking, and means adapted to operate said stop and release said
25 carrier and allow the same to be rocked, while said slide is stationary.

8. In a machine for setting lacing hooks in the uppers of boots and shoes, a slide, a carrier adapted to receive a lacing hook and pivoted to rock on said slide about a horizontal
30 axis, a spring adapted to rock said carrier in one direction, a stationary member which said carrier engages during the movement of said slide, whereby said carrier is rocked in the opposite direction, and means to lock
35 said carrier against rocking movement on said pivot.

9. In a machine for setting lacing hooks in the uppers of boots and shoes, a slide, a carrier consisting of a lever and a plate rigidly fastened to said lever adapted to receive a lacing hook, said lever pivoted to rock about a horizontal axis on said slide, and a stop movable relatively to said slide adapted to
40 engage said lever and prevent the same from rocking on its pivot.

10. In a machine for setting lacing hooks in the uppers of boots and shoes, a raceway, a slide, a carrier pivoted to rock on said slide, instrumentalities adapted to feed a lacing
50 hook along said raceway and from said raceway directly onto said carrier, and means on said slide adapted to lock said carrier to said slide.

11. In a machine for setting lacing hooks in the uppers of boots and shoes, a raceway, a slide, a carrier pivoted to rock on said slide, a stop movable relatively to said slide, adapted to engage said carrier and prevent the same from rocking on said pivot, and a lever adapted to feed a lacing hook along said
60 raceway and onto said carrier, said lever also adapted to move said stop to allow said carrier to be rocked.

65 12. In a lacing hook setting machine, a

movable member, a lacing hook carrier pivoted to rock thereon about a horizontal axis, means on said movable member adapted to lock said carrier thereto, and instrumentalities adapted to rock said carrier, while said
70 movable member is stationary.

13. In a lacing hook setting machine, a movable member and a lacing hook carrier pivoted to rock thereon about a horizontal axis, means on said movable member adapted to lock said carrier thereto and instrumentalities adapted to rock said movable member while said carrier is stationary, said carrier consisting of a lever provided with a recess in its upper end adapted to receive the
75 head of a lacing hook and a plate rigidly fastened to said lever and projecting over said recess.

14. In a lacing hook setting machine, a movable member and a lacing hook carrier
85 pivoted to rock thereon about a horizontal axis, means on said movable member adapted to lock said carrier thereto and instrumentalities adapted to rock said movable member while said carrier is stationary, said
90 carrier consisting of a lever provided with a recess in its upper end adapted to receive the head of a lacing hook and a plate rigidly fastened to said lever and projecting over said recess, said plate provided in the end thereof
95 which projects over said recess, with a depression.

15. In a lacing hook setting machine, an anvil, a slide, instrumentalities adapted to move said anvil and slide toward and away from each other, a carrier adapted to receive a lacing hook and pivoted to rock on said slide about a horizontal axis, means on said slide adapted to lock said carrier to said slide, and instrumentalities adapted to rock
100 said carrier while said slide is stationary.

16. In a lacing hook setting machine, a raceway, an anvil, a slide, instrumentalities adapted to move said anvil and slide toward and away from each other, a carrier adapted to receive a lacing hook pivoted to rock on said slide about a horizontal axis, means on said slide to lock said carrier to said slide, mechanism to move a lacing hook along said raceway and onto said carrier, said instrumentalities adapted to rock said carrier while
110 said slide is stationary.

17. In a lacing hook setting machine, a raceway, an anvil, a slide, instrumentalities adapted to move said anvil and slide toward and away from each other, a carrier adapted to receive a lacing hook pivoted to rock on said slide about a horizontal axis, means to lock said carrier to said slide, and mechanism to move a lacing hook along said raceway and onto said carrier, said mechanism also adapted to engage said locking means and operate the same to unlock said carrier from said slide to allow said carrier to rock.
120

18. In a machine for setting lacing hooks
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in the uppers of boots and shoes, a slide, mechanism to impart a vertical reciprocatory motion thereto, a carrier adapted to receive a lacing hook and pivoted to rock on said slide about a horizontal axis, means on said slide adapted to lock said carrier thereto, and instrumentalities adapted to rock said carrier while said slide is stationary, a raceway, means adapted to feed lacing hooks along said raceway and from said raceway onto said carrier, and means to cooperate with said carrier in setting said hooks in said uppers.

19. In a machine for setting lacing hooks in the uppers of boots and shoes, a slide, mechanism to impart a vertical reciprocatory movement thereto, a carrier adapted to receive a lacing hook and pivoted to rock on said slide about a horizontal axis, means to impart a rocking movement to said carrier, a raceway, means adapted to feed lacing hooks along said raceway and from said raceway onto said carrier; in combination with an anvil, mechanism for imparting a vertical reciprocatory motion to said anvil, and mechanism for moving said anvil laterally into and out of alinement with a lacing hook held on said carrier.

20. In a machine for setting lacing hooks in the uppers of boots and shoes, a slide, mechanism to impart a vertical reciprocatory motion thereto, a carrier adapted to receive a lacing hook and pivoted to rock on said slide about a horizontal axis, means to impart a rocking movement to said carrier, a raceway, means adapted to feed lacing hooks along said raceway and from said raceway onto said carrier; in combination with an anvil, a feedpoint on said anvil, mechanism to impart a reciprocatory movement to said anvil and feedpoint, and mechanism to impart an oscillating movement to said anvil and feedpoint, whereby said uppers may be fed into position to have said lacing hooks set therein.

21. In a lacing hook setting machine, a pivotally supported anvil carrier frame, mechanism to impart a vertical sliding reciprocatory movement to said carrier frame, mechanism for imparting a horizontal rocking movement to said carrier frame, and an anvil fast to said carrier frame, said anvil having a projection thereon constituting a feed point; in combination with a die adapted to be moved in a path concentric with the axial line of said anvil carrier frame.

22. In a lacing hook setting machine, a pivotally supported anvil carrier frame, mechanism to impart a vertical sliding reciprocatory movement to said carrier frame, mechanism for imparting a horizontal rocking movement to said carrier frame, and an anvil fast to said carrier frame, said anvil having a projection thereon constituting a feed point; in combination with a die holder adapted to be moved in a path concentric

with the axial line of said anvil carrier frame and a die fast to said die holder.

23. In a lacing hook setting machine, a pivotally supported anvil carrier frame, mechanism to impart a vertical sliding reciprocatory movement to said carrier frame, mechanism for imparting a horizontal rocking movement to said carrier frame, and an anvil fast to said carrier frame, said anvil having a projection thereon constituting a feed point; in combination with a die holder adapted to be moved in a path concentric with the axial line of said anvil carrier frame, a die fast to said die holder, and a spring adapted to move said die holder in one direction, said anvil carrier frame adapted to abut against said die holder and move the same in the opposite direction.

24. In a lacing hook setting machine, a pivotally supported anvil carrier frame, mechanism to impart a vertical sliding reciprocatory movement to said carrier frame, mechanism for imparting a horizontal rocking movement to said carrier frame, and an anvil fast to said carrier frame, said anvil having a projection thereon constituting a feed point; in combination with a die holder adapted to be moved in a path concentric with the axial line of said anvil carrier frame, a die fast to said die holder, a spring adapted to move said die holder in one direction, and a screw fast to said die holder against which screw said anvil carrier is adapted to abut and move said die holder in the opposite direction to that in which it is adapted to be moved by said spring.

25. In a lacing hook setting machine, a vertical shaft, an arm rigidly attached to said shaft, an anvil fast to said arm, said anvil having a projection thereon constituting a feed point, mechanism to impart a reciprocatory motion to said shaft, and mechanism to impart a rocking movement to said shaft, in combination with a die adapted to be moved in a path concentric with said vertical shaft.

26. In a lacing hook setting machine, a vertical shaft, an arm rigidly attached to said shaft, an anvil fast to said arm, said anvil having a projection thereon constituting a feed point, a lever pivotally supported upon the frame of said machine and operatively connected to said shaft, means to impart a rocking movement to said lever, whereby a reciprocatory movement is imparted to said shaft, and mechanism to impart a rocking movement to said shaft, in combination with a die adapted to be moved in a path concentric with said vertical shaft.

27. In a lacing hook setting machine, a vertical shaft, an arm rigidly attached to said shaft, an anvil fast to said arm, said anvil having a projection thereon constituting a feedpoint, mechanism to impart a reciprocatory motion to said shaft, a slide operatively

connected to impart a rocking movement to said arm, a lever pivotally supported upon the frame of said machine and operatively connected to said slide and mechanism to impart a rocking movement to said lever, in combination with a die adapted to be moved in a path concentric with said vertical shaft.

28. In a lacing hook setting machine, a vertical shaft, an arm rigidly attached to said shaft, an anvil fast to said arm, said anvil having a projection thereon constituting a feed point, mechanism to impart a reciprocatory motion to said shaft, a slide operatively connected to impart a rocking movement to said arm, a lever pivotally supported upon the frame of said machine, mechanism to impart a rocking movement to said lever, and means connecting said lever to said slide, said connecting means adjustably attached to said lever relatively to the pivot of said lever, whereby the extent of movement of said slide may be varied, in combination with a die adapted to be moved in a path concentric with said vertical shaft.

29. In a lacing hook setting machine, a vertical shaft, an arm rigidly attached to said shaft, an anvil fast to said arm, said anvil having a projection thereon constituting a feed point, mechanism to impart a reciprocatory motion to said shaft, a slide operatively connected to impart a rocking movement to said arm, a lever pivotally supported upon the frame of said machine, mechanism to impart a rocking movement to said lever, and a link connecting said lever to said slide, said link adjustably attached to said lever relatively to the pivot of said lever, whereby the extent of movement of said slide may be varied, in combination with a die adapted to be moved in a path concentric with said vertical shaft.

30. In a lacing hook setting machine, a vertical shaft, an arm rigidly attached to said shaft, an anvil fast to said arm, said anvil having a projection thereon constituting a feed point, mechanism to impart a reciprocatory motion to said shaft, a slide operatively connected to impart a rocking movement to said arm, a lever pivotally supported upon the frame of said machine, mechanism to impart a rocking movement to said lever, a link pivoted at one end thereof to said slide and a stud to which the other end of said link is connected, said stud projecting through a curved slot provided in said lever and adapted to be fastened to said lever, in combination with a die adapted to be moved in a path concentric with said vertical shaft.

31. In a machine for setting lacing hooks in the uppers of boots and shoes, a carrier adapted to receive a lacing hook, mechanism for imparting a vertical sliding reciprocatory motion thereto, mechanism for imparting a rocking movement thereto, a raceway, mech-

anism for feeding a hook along said raceway and from said raceway onto said carrier; in combination with a work-support, a pivotally supported anvil carrier frame, an anvil fast to said carrier frame, said anvil having a projection thereon constituting a feed point, a die adapted to be moved upon said work-support in a path concentric with the axis of said carrier frame, mechanism to impart a vertical sliding reciprocatory movement to said anvil carrier frame toward and away from said work-support and at right angles to said die, and mechanism to impart a horizontal rocking movement to said anvil carrier frame, whereby said feed point is adapted to perforate the upper of a boot or shoe at right angles thereto and to project into a hole provided in said die and feed said upper laterally along said work-support toward said lacing hook carrier, a stop adapted to limit the movement of said die toward said lacing hook carrier, said feed point adapted to be moved out of alinement with said die during the latter part of its movement toward said lacing hook carrier, whereby said upper may be fed laterally along said work-support until said perforation and anvil aline with said lacing hook.

32. In a machine for setting lacing hooks in the uppers of boots and shoes, a carrier adapted to receive a lacing hook, mechanism for imparting a vertical sliding reciprocatory movement thereto, mechanism for imparting a rocking movement thereto, a raceway, mechanism for feeding a hook along said raceway and from said raceway onto said carrier; in combination with a work-support, a pivotally supported anvil carrier frame, an anvil fast to said carrier frame, said anvil having a projection thereon constituting a feed point, a die adapted to be moved in a path concentric with the axis of said anvil carrier, mechanism to impart a vertical sliding reciprocatory movement to said anvil carrier frame toward and away from said work-support and at right angles to said die, mechanism to impart a horizontal rocking movement to said anvil carrier frame, a presser foot, and mechanism to move said presser foot toward and away from said work-support, whereby said feed point is adapted to perforate the upper of a boot or shoe at right angles thereto and feed the same laterally along said work-support until said perforation and anvil aline with said lacing hook and said upper is held clamped against said work-support during the forward lateral rocking movement of said carrier frame and anvil.

33. In a machine for setting lacing hooks in the upper of a boot or shoe, a carrier adapted to receive and hold a lacing hook, an anvil, said anvil having a projection thereon constituting a punch and feed-point, a female die, and instrumentalities adapted to move said punch toward and into cooperation with

said die, whereby a hole is punched through said upper, with said feed-point projecting through beneath said upper, said instrumentalities adapted to move said die and punch toward said carrier, said instrumentalities adapted to subsequently move said punch vertically away from said die and laterally relatively to said die and into alinement with a lacing hook held on said carrier.

34. In a machine for setting lacing hooks in the upper of a boot or shoe, a carrier adapted to receive and hold a lacing hook, an anvil, said anvil having a projection thereon constituting a punch and feed point, a die holder, a female die fast to said die holder and having a hole therein, instrumentalities adapted to move said punch and anvil toward and into coöperation with said die, whereby a hole is punched through said upper, said instrumentalities adapted to subsequently move said punch and anvil away from said die and into and out of alinement with a lacing hook held on said lacing hook carrier, a stop, and means to move said die holder thereagainst, whereby said upper may be punched and fed and the lacing hooks clenched therein.

35. In a lacing hook setting machine, a carrier adapted to receive and hold a lacing hook, an anvil, said anvil having a projection thereon constituting a punch and feed point, a die having a hole therein adapted to receive said projection, mechanism to move said punch and anvil toward and away from said die, mechanism to move said punch and anvil laterally into and out of alinement with a lacing hook held on said carrier, means to move said die toward said carrier, a stop to limit the movement of said die toward said carrier, and means to move said die away from said carrier.

36. In a machine for setting lacing hooks or the like in sheet material a work-support and a female die adapted to slide thereon, the upper face of said die located beneath the upper face of said work-support.

37. In a machine for setting lacing hooks or the like in sheet material, a work-support, a female die adapted to slide thereon, the upper face of said die located beneath the upper face of said work-support, a punch having an annular flange constituting an anvil thereon, and mechanism to move said punch toward and away from said die.

38. In a machine for setting lacing hooks or the like in sheet material, a work-support, a female die adapted to slide thereon, the upper face of said die located beneath the upper face of said work-support, a punch having an annular flange constituting an anvil thereon, mechanism to move said punch toward and away from said die, and mechanism to move said punch laterally thereof.

39. In a machine for setting lacing hooks or the like in sheet material, a work-support,

a female die adapted to slide thereon, the upper face of said die located beneath the upper face of said work-support, a punch having an annular flange constituting an anvil thereon, mechanism to move said punch toward and away from said die, mechanism to move said punch laterally thereof, a stop, and means to move said die toward said stop.

40. In a machine for setting lacing hooks or the like in sheet material, a work-support, a female die adapted to slide thereon, the upper face of said die located beneath the upper face of said work-support, a holder for said die, an anvil having a projection thereon constituting a punch, a carrier frame to which said anvil is fastened, a stop, a spring adapted to move said die holder thereagainst, mechanism to impart a vertical sliding reciprocatory movement to said anvil carrier frame, a carrier adapted to receive and hold a lacing hook, mechanism to impart a vertical reciprocatory movement thereto, and mechanism to move said anvil carrier frame toward and away from said lacing hook carrier, whereby said punch may be brought into alinement with a lacing hook held on said lacing hook carrier, said anvil carrier frame adapted to abut against said die holder and move the latter with said die away from said carrier.

41. In a machine for setting lacing hooks or the like in sheet material, a work-support, a female die adapted to slide thereon, the upper face of said die located beneath the upper face of said work-support, a holder for said die, an anvil having a projection thereon constituting a punch, a carrier frame to which said anvil is fastened, a stop, a spring adapted to move said die holder thereagainst, mechanism to impart a vertical reciprocatory movement to said anvil carrier frame, a slide, a lacing hook carrier pivoted to said slide and adapted to receive and hold a lacing hook, mechanism to impart a vertical reciprocatory movement to said slide, and mechanism to move said anvil carrier frame toward and away from said lacing hook carrier, whereby said punch may be brought into alinement with a lacing hook held on said lacing hook carrier, said anvil carrier frame adapted to abut against said die holder and move the latter with said die away from said carrier.

42. In a machine for setting lacing hooks in the upper of a boot or shoe, a carrier adapted to receive and hold a lacing hook, mechanism to impart a vertical reciprocatory motion thereto, an anvil, said anvil having a projection thereon constituting a punch and feed-point, a female die, and instrumentalities adapted to move said punch toward and into coöperation with said die, whereby a hole is punched through said upper, with said feed-point projecting through beneath said upper, said instrumentalities

adapted to move said die and punch toward
said carrier, said instrumentalities adapted
to subsequently move said punch vertically
away from said die and laterally relatively
5 to said die and into alinement with a lacing
hook held on said carrier, whereby said lac-
ing hook may be set in said upper, said in-
strumentalities adapted to move said punch
and die away from said carrier after the set-

ting operation and into alinement with each 10
other.

In testimony whereof I have hereunto set
my hand in presence of two subscribing wit-
nesses.

SYDNEY E. TAFT.

Witnesses:

CHARLES S. GOODING,
LOUIS A. JONES.