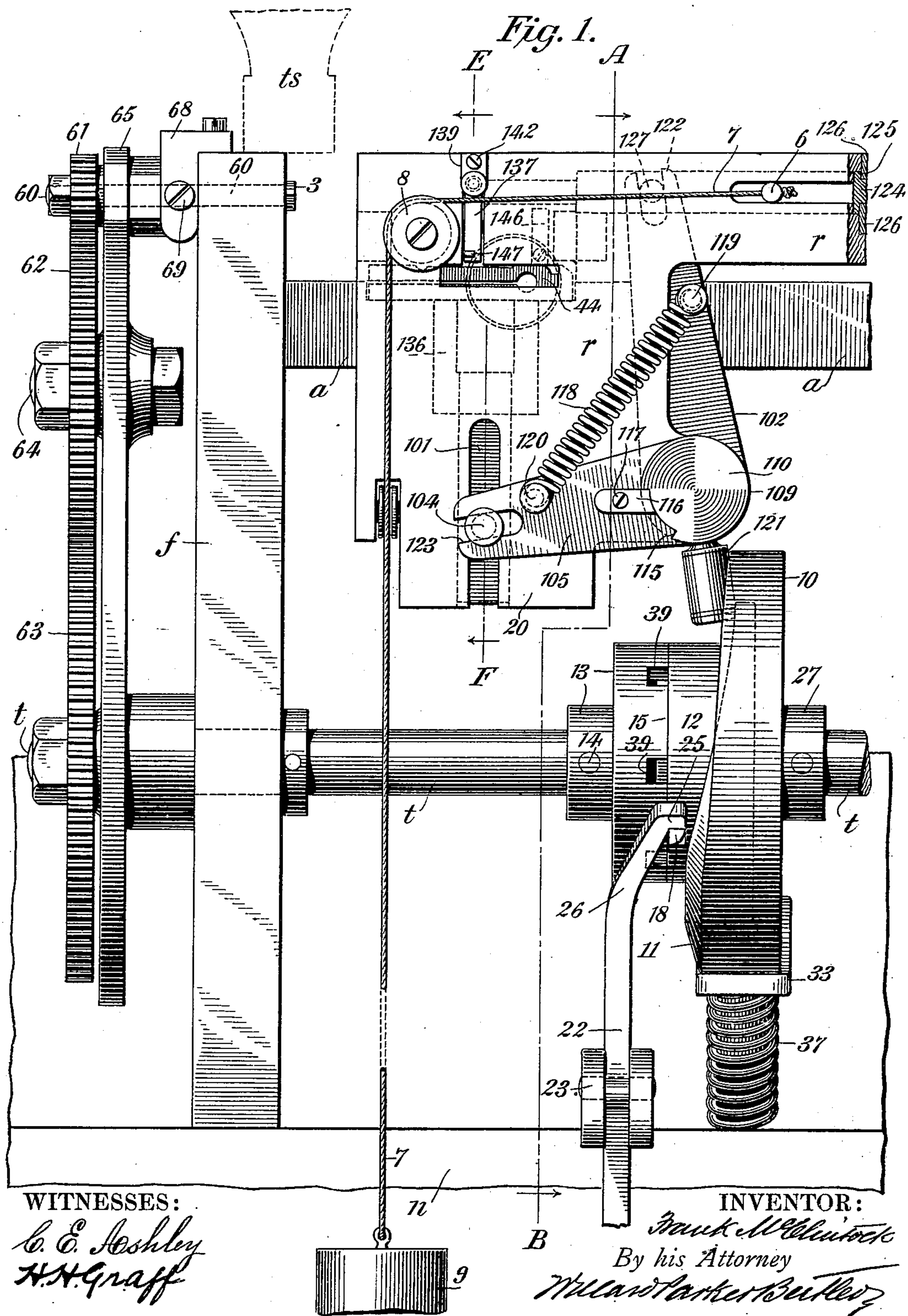


**Patented May 20, 1902.**

(Application filed June 11, 1901.)

**4 Sheets—Sheet 1.**



**No. 700,700.**

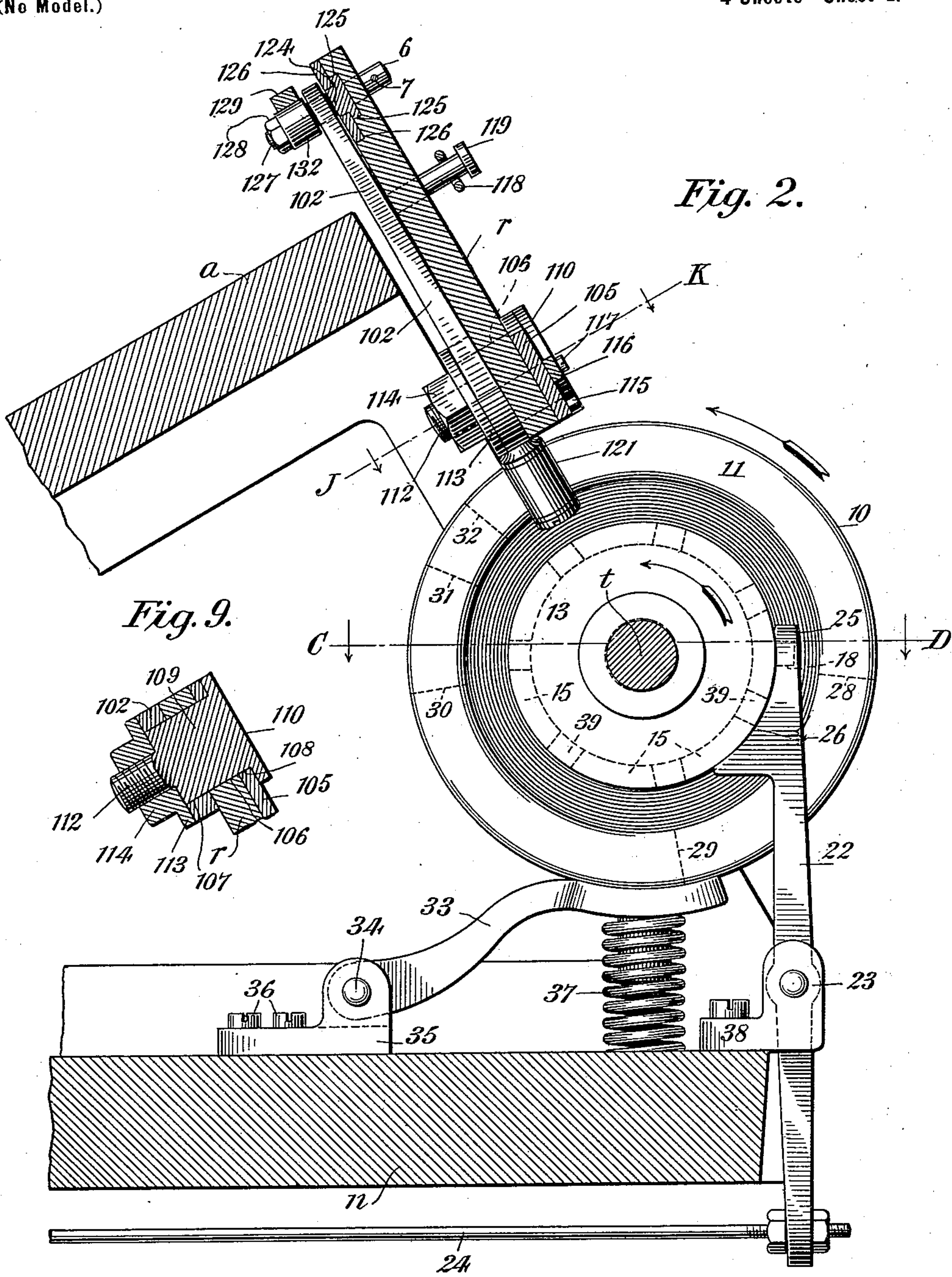
**Patented May 20, 1902.**

**F. McCLINTOCK.**  
**TYPE JUSTIFYING MACHINE.**

(Application filed June 11, 1901.)

(No Model.)

**4 Sheets—Sheet 2.**



**WITNESSES:**

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**INVENTOR:**

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William Parker Butler



No. 700,700.

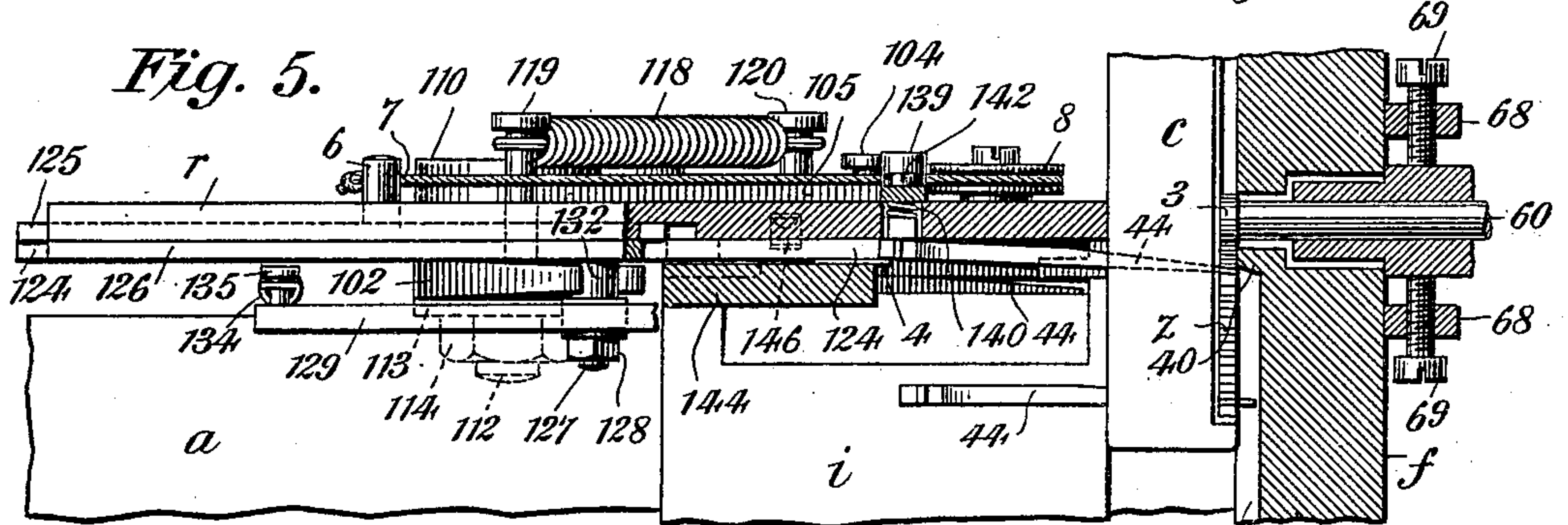
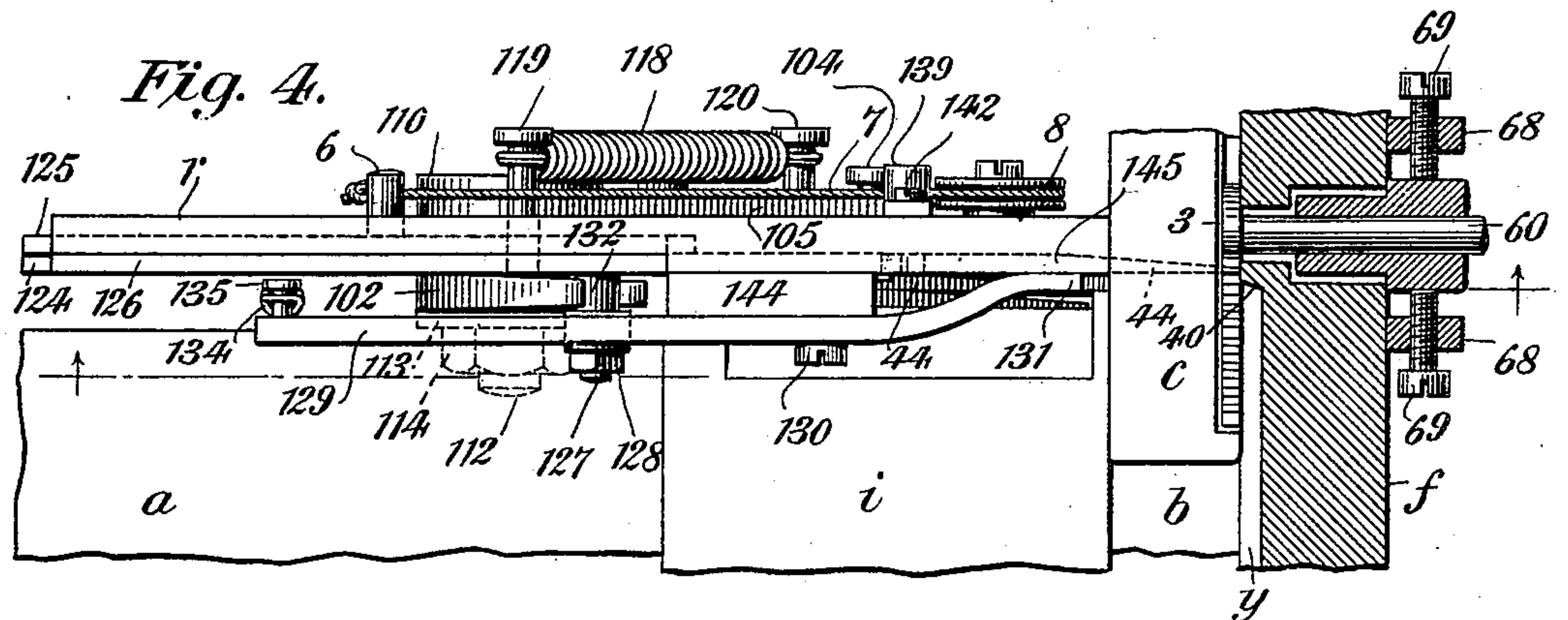
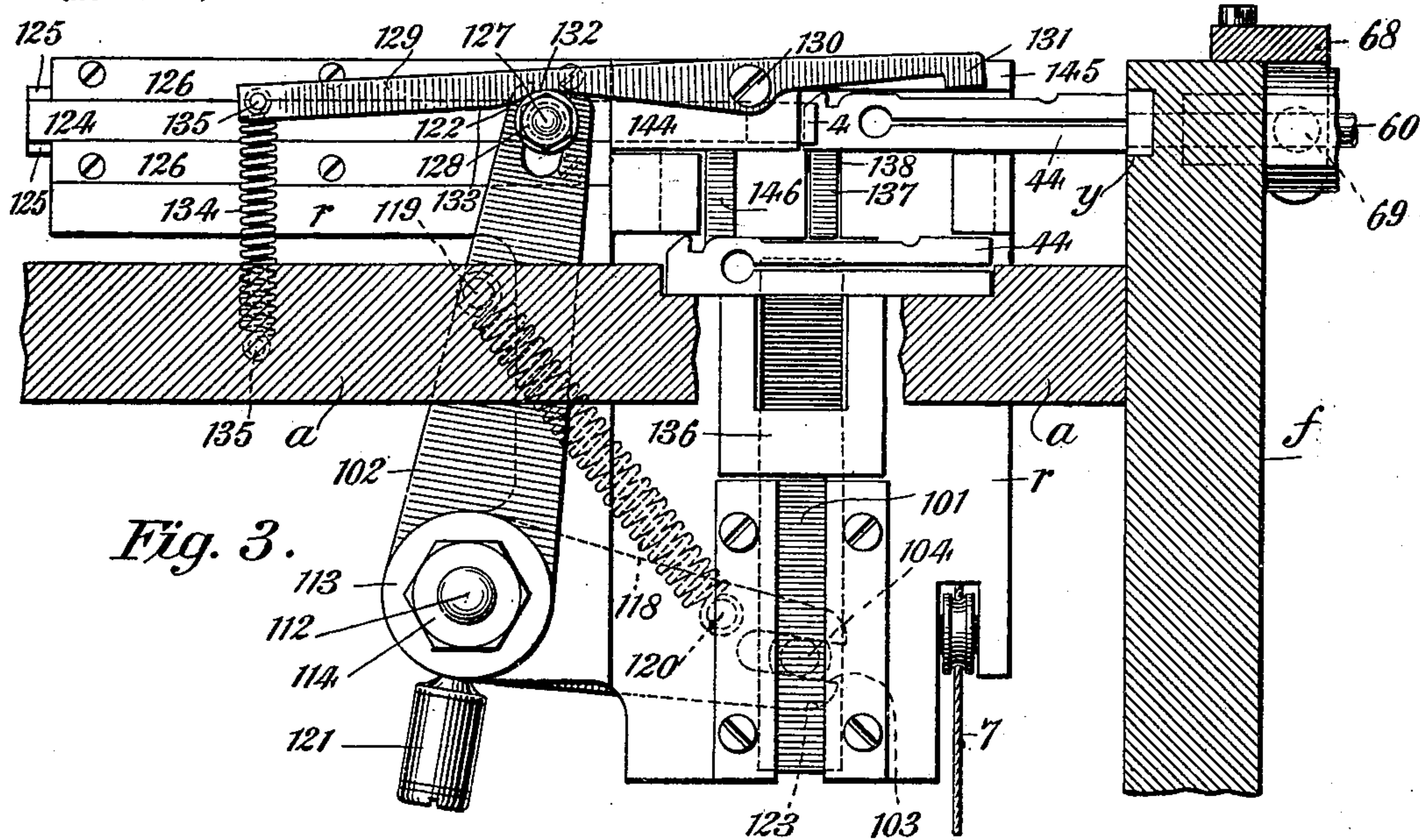
Patented May 20, 1902.

F. McCLINTOCK.  
TYPE JUSTIFYING MACHINE.

(Application filed June 11, 1901.)

4 Sheets—Sheet 3.

(No Model.)



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No. 700,700.

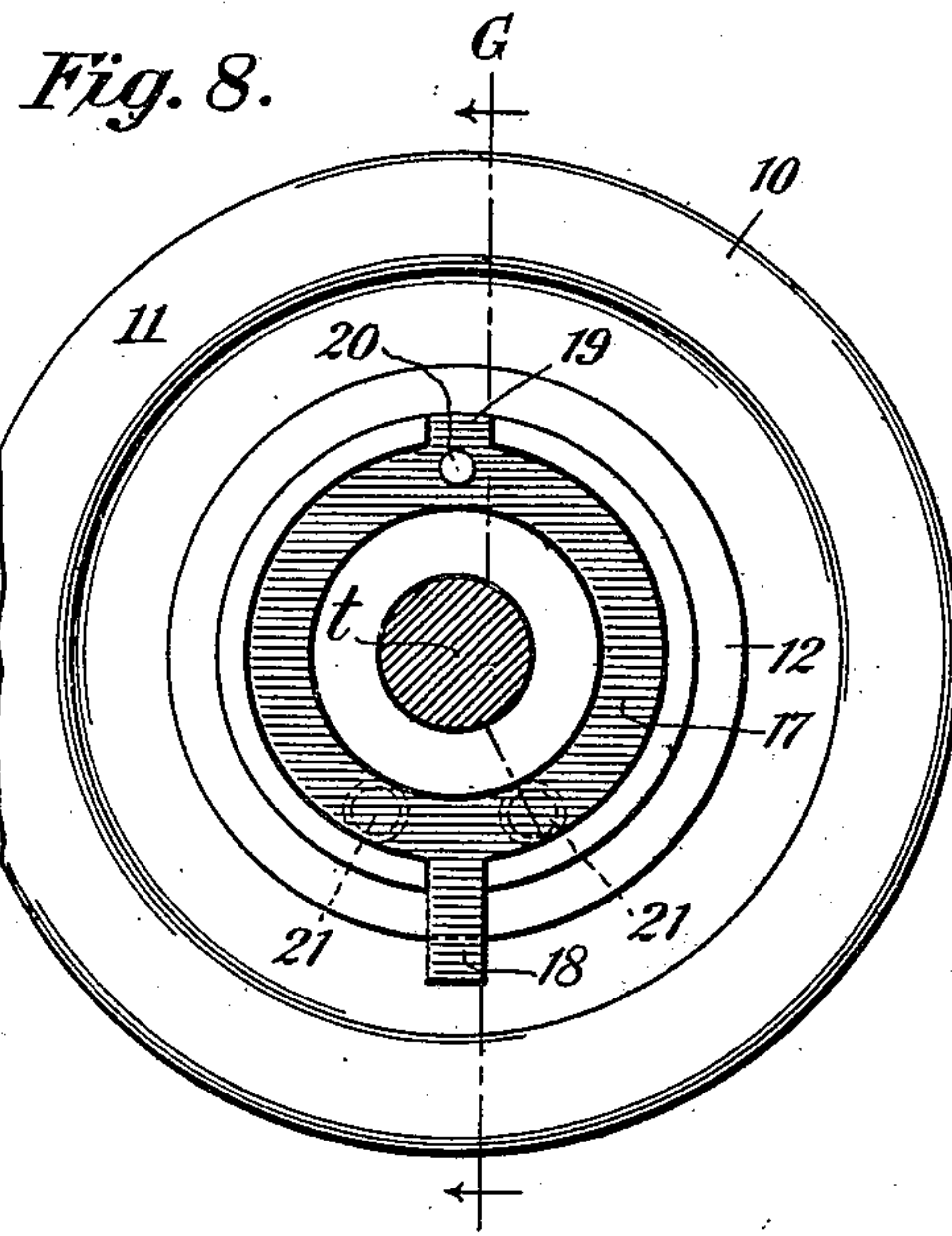
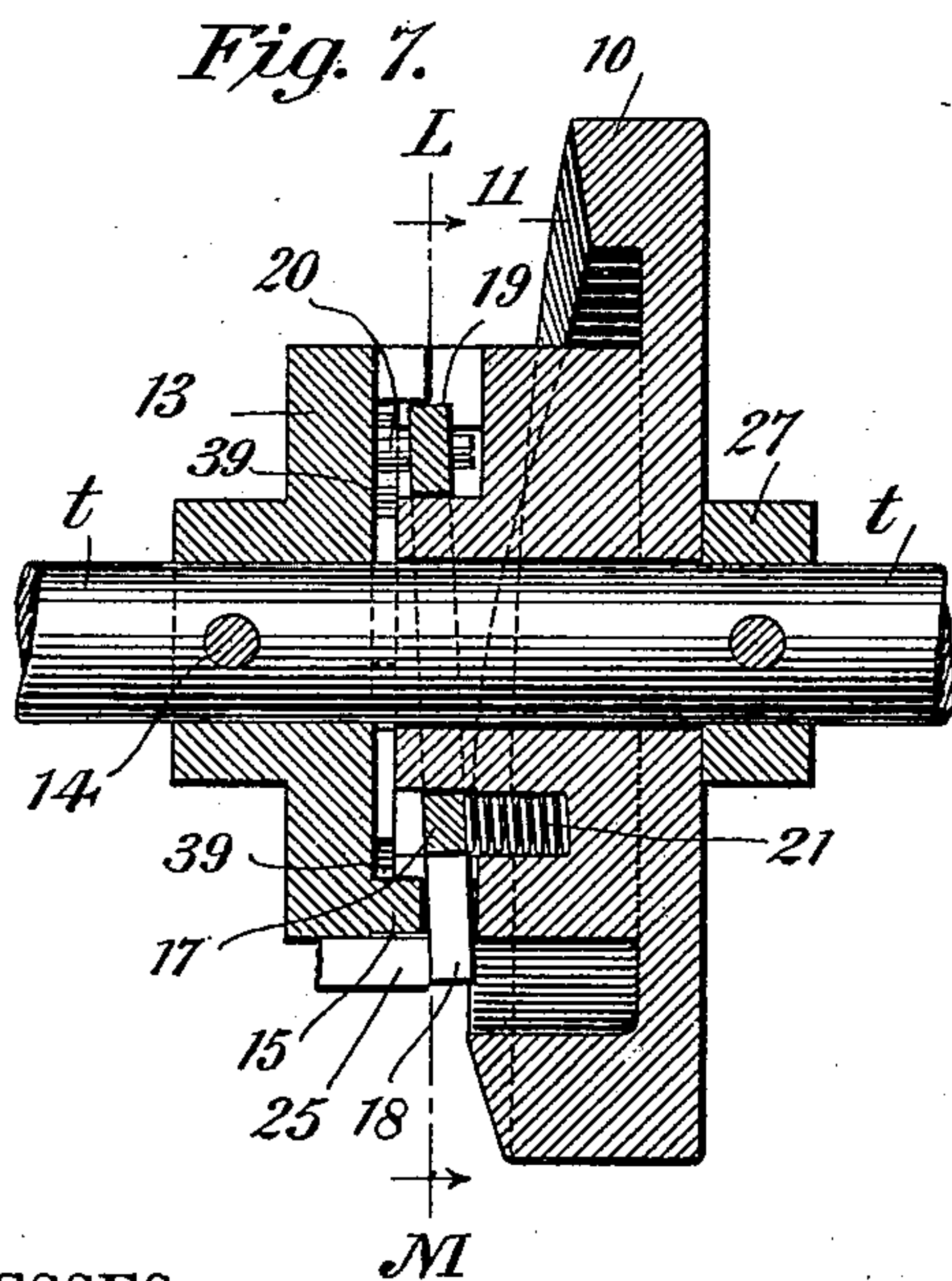
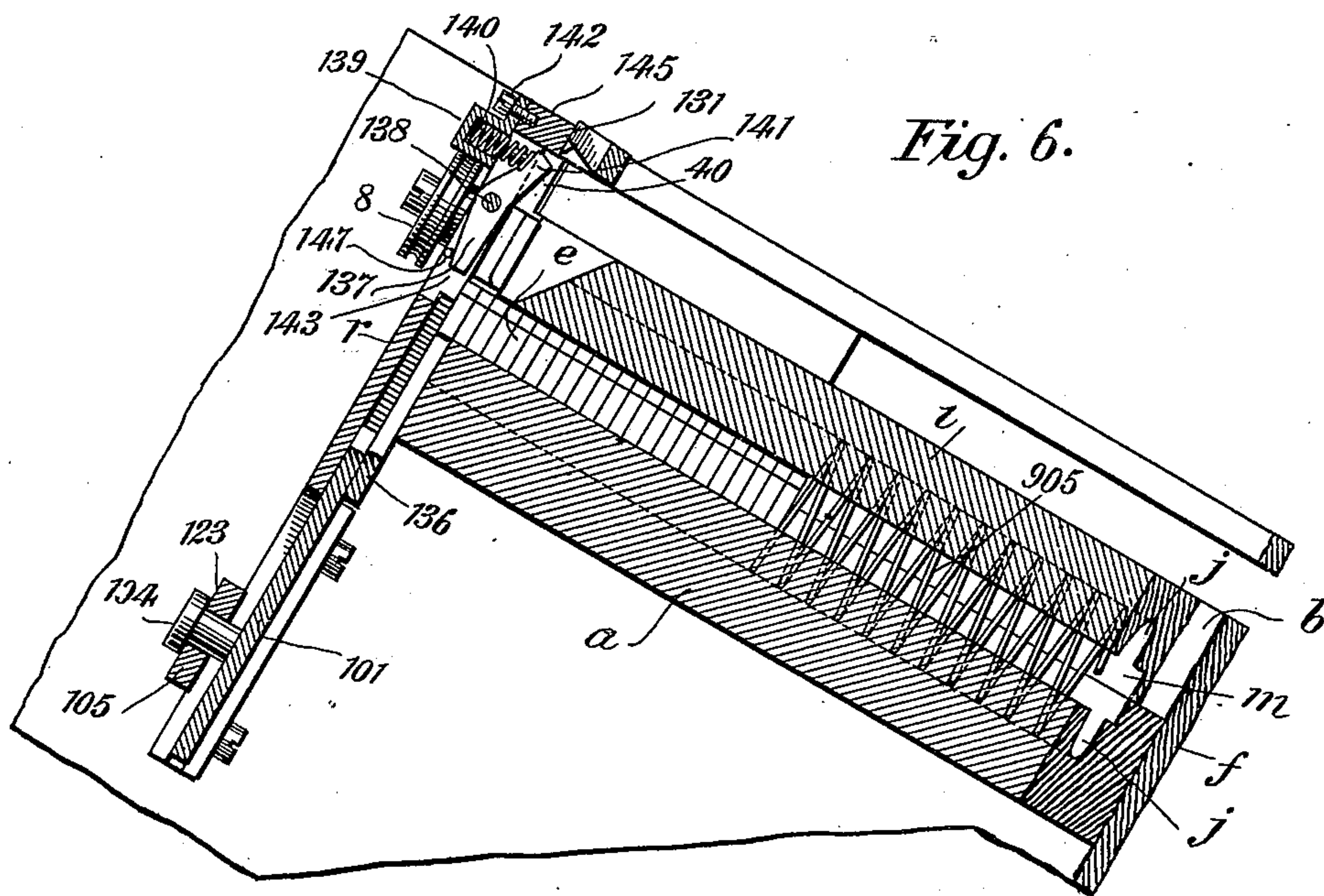
Patented May 20, 1902.

F. McCLINTOCK.  
TYPE JUSTIFYING MACHINE.

(Application filed June 11, 1901.)

(No Model.)

4 Sheets—Sheet 4.



WITNESSES:

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# UNITED STATES PATENT OFFICE.

FRANK MCCLINTOCK, OF MOUNT VERNON, NEW YORK, ASSIGNOR, BY  
MESNE ASSIGNMENTS, TO EDWIN C. HOYT AND FELIX ROSEN, OF  
NEW YORK, N. Y.

## TYPE-JUSTIFYING MACHINE.

SPECIFICATION forming part of Letters Patent No. 700,700, dated May 20, 1902.

Application filed June 11, 1901. Serial No. 64,156. (No model.)

*To all whom it may concern:*

Be it known that I, FRANK MCCLINTOCK, a citizen of the United States, and a resident of the city of Mount Vernon, in the county of Westchester and State of New York, have invented a new and useful Improvement in Type-Justifying Machines, of which the following is a specification.

My invention relates to improvements in machines for justifying type in which temporary tapering or wedge-shaped space-bars are used, being inserted during the composition crosswise between the types in the line at the points where spaces are desired, the space-bars after insertion being driven, by means of suitable automatic mechanism, farther into the line to expand it to its full length and then removed successively and replaced by space-blanks of such individual and aggregate thickness as will accurately space out and justify the line.

My improvement is specially adapted to the automatic type-justifying machines shown and described in an application for Letters Patent, No. 24,291, filed by me in the United States Patent Office on the 20th day of July, 1900.

When the thin end of a wedge is inserted into the line of type and then advanced by the type-cam a sufficient distance to allow room for the succeeding type to drop freely down therein, as described in the application referred to, it frequently happens that the wedge does not remain in such advanced position, but moves back toward the cam as its large part revolves away, thereby preventing the succeeding type from dropping down into its place and causing a "block" at the lower end of the type-chute.

The object of my improvement is to provide suitable mechanism for inserting the space-bars, whereby the thin end of each one will always be held positively in the advanced position to which it is moved by the type-cam, and in general to improve and simplify the mechanism for elevating and inserting the space-bars.

My improvement is shown in the accompanying four sheets of drawings, in which—

Figure 1 is a vertical end view of this por-

tion of the machine, showing the mechanism in its normal position. Fig. 2 is a vertical cross-section on the line A B of Fig. 1. Fig. 3 is a front elevation of the space-bar elevating and inserting mechanism, showing a wedge partially driven in. Fig. 4 is a plan view of a portion of the machine, showing a space-bar partially driven in in the same position shown in Fig. 3. Fig. 5 is a similar view of the space-bar after its thin end has been moved forward by the type-cam. Fig. 6 is a vertical sectional view substantially on the line E F of Fig. 1. Fig. 7 is a vertical sectional view through the driving-cam on the line G H of Fig. 8. Fig. 8 is an end view of the driving-cam mechanism on the line I J of Fig. 1 looking in the direction of the arrows. Fig. 9 is a vertical sectional view through the pivoted joint of the bell-crank lever.

Similar characters refer to similar parts in each of the several views.

The following elements found in the present machine are substantially identical with those shown in the machine of the character of that above referred to.

*c* is a sliding line-holder in which the types are assembled and in which the justification and spacing of the line is effected.

*f* is a vertical plate against which the line-holder slides and which forms its inner face.

*y* is a slot on the inner face of the plate *f* opposite the line-holder *c*, arranged to receive the extremities of the space-bars as they are inserted therein.

*a* is the main table of the machine; *t s*, a chute through which the type enters the line-holder *c*.

*b* is the upper of the two channels, in which the line-holder travels downward and which is formed on the upper face of the plate *a*.

*e* is a series of space-bars.

*m* is the raceway formed in the plate *a*, in which the space-bars are returned from the lower to the upper end of the machine.

*i* is the plate which covers the same.

*j* is the channel in which the spring which returns the space-bars rotates.

*n* is the main bed-plate of the machine.

*t* is the main driving-shaft.



$r$  is the end plate of the machine.

$z$  represents the assembled line of type in the line-holder.

3 represents the rotating cam by which the type and space-bars are kept constantly advanced in the line-holder as they are assembled.

60 represents the shaft upon which this cam rotates.

10 In this case, as in other machines of the character of the present machine, instead of ordinary space-blanks tapering or wedge-shaped space-bars are employed which are inserted temporarily crosswise from the line  
15 between the words as composition proceeds or as the type is transferred to the line-holder and which are thereafter replaced mechanically by ordinary space-blanks, as are fully described in the application aforesaid. A series  
20 of these space-bars is shown, (designated as  $e$ ,) and the individual space-bars composing the series are designated by 44. The position of the bars prior to insertion will be best seen by reference to Fig. 6, in which  
25 the series is shown assembled at the upper end of the inclined raceway  $m$ , held in position by a spiral spring-coil 905, rotating in the groove  $j$ , the effect of which is to cause the space-bars to be constantly pushed upward  
30 and forward in the raceway  $m$ , with the foremost one in contact with the end plate  $r$ . From the position shown at the top of the raceway  $m$  in Fig. 6 the space-bars are raised one by one, and as soon as they are raised  
35 they are pushed forward horizontally into the line-holder at the proper instant. The inserting mechanism in the earlier machines has consisted of two parts—an elevating mechanism for elevating each single space-bar  
40 from the storage-channel at the head of the raceway up to the level of the line-holder and the space-bar-inserting rod, which forces the space-bar horizontally forward into the line after it has been elevated—each of which was  
45 actuated by a separate cam. In the present case, however, the space-bar elevator and the space-bar-inserting rod are connected, so that they may be actuated simultaneously by means of a bell-crank lever composed of two  
50 parts 102 and 105, which are arranged so as to be movable at their axis relatively to each other, and the lever mechanism as a whole is pivoted to the plate  $r$  in the manner shown in Fig. 9. The plate  $r$  is provided at its lower  
55 end with an annular opening 106, and the arm 102 is provided with a similar opening 107, and the arm 105 has a similar opening 108.

Through the openings aforesaid passes a bolt 109, having a flanged head at one end  
60 and reduced and screw-threaded at 112 in the opposite end, as indicated in Fig. 9. A flanged nut is screwed down over the reduced portion of the bolt 109 to hold all three parts after assembling in the position shown in  
65 Figs. 2 and 9. The bolt 110 is inserted through the openings 106, 107, and 108 in the parts

$r$ , 102, and 105, and the nut 114 is screwed down over the reduced end of the bolt, thus holding the parts together after assembling in the manner shown in Fig. 9. It will be  
70 obvious, therefore, that the two arms 102 and 105 may be moved relatively to each other, and at the same time they will together turn on the bolt 109 with reference to the plate  $r$ . A stop 116 is provided, attached to the sur-  
75 face of the arm 105 by the screw 117, one end of which enters into an opening 115, cut in the flange of the bolt, thus limiting the radial movement of the arms 102 and 105 relative to each other on the bolt 109. In order  
80 that this compound lever may act as a single lever under normal conditions, a spring 118 of suitable tension is provided, which is attached at either end to lugs 119 and 120,  
85 formed, respectively, upon the arms 102 and 105. The arm 102 carries a roller 121 at its lower end, by means of which the proper movement is imparted directly to the arm 102 and normally to the arm 105 also in the man-  
90 ner hereinafter described. The ends of the arms 102 and 105 are provided, respectively, with the slots 122 and 123. The slot 122 engages with and actuates the space-bar-inserting mechanism, and the slot 123 engages with  
95 and actuates the space-bar-raising mechanism. The space-bar-inserting mechanism consists of a bar 124, provided with tenons 125 on either side, arranged to slide along guides 126, screwed to an extended arm on the plate  
100  $r$ , as shown in Fig. 3. The block carries a lug 127, which enters the slot 122 and by means of which motion is imparted to the rod 124. A nut 128 is screwed over the extremity of the stud 127 for the purpose of securing  
105 thereon a roller 132, the function of which will be described hereinafter. The space-bar elevator consists of a plate 101, to which is attached the plate 136, the upper edge of which is normally a little below the lower face  
110 of the upper end of the raceway  $m$  and is arranged to receive upon it the first one of the series of space-bars, and when it is raised to carry up the space-bar with it in the same manner as is shown in the aforesaid applica-  
115 tion it engages with the slot 123 on the lower arm 105 by means of the lug 104, so that as the arm 105 is raised and lowered the plate is raised and lowered with it. At the upper  
120 end of the plate  $r$  is an opening 143, in which is pivoted a lever 137 at the point 138. On the face of the plate  $r$  at the upper end of the lever is placed a small seat 139, arranged to receive a spring 140, which abuts against  
125 the upper end 141 of the lever 138, thus keeping it normally in the position shown in Fig. 6. The seat is removably attached to the face of the plate  $r$  by a screw 142 or in any other convenient manner. As the elevator  
130 136 rises, carrying with it the first space-bar in the line, the space-bar comes in contact with the inclined inner face of the lever 137 and pushes it back and compresses the spring



139, the tension of which is sufficient to throw the rear end of the space-bar forward after it has been raised and inserted into the line. The forward movement of the lever 137 is limited by a stop 147, as shown in Figs. 1 and 6, which prevents its upper end from coming in contact with the knife-edge extension 131 of the lever 129, as hereinafter described. The upper rear end of the plate *r* is provided with a projecting rib 145, extending the entire length directly over the space-bars, as shown in Figs. 3, 4, and 6. Attached to the rib 145 at its front face is a block 144. The space between the block 144 and the plate *r* is of the same width as the space-bars, and the space-bar is elevated up into the opening thereby formed. The upper end of a spring-strip 146 projects out from the face of the plate *r* and forms a seat to prevent the space-bar from dropping down again when the elevator-plate 136 is lowered. For the purpose of providing a positive mechanism for guiding the space-bar while being subjected to the action of the space-inserting mechanism and at the same time for causing any of the previously-inserted space-bars which may have for any reason failed to clear the space which opens to permit the insertion of the space-bar a lever 129 is provided, pivoted to the block 144 at the point 130 by a suitable screw. This lever is provided at one end with a knife-edge extension, which is extended downward, as shown at 131 in Fig. 3, &c., so that when operated the outer face of the extension 131 will engage with and hold the rear face of the elevated space-bar closely to the plate *r*, and the beveled or knife-edge face will force down the preceding space-bar and keep the opening clear and form a wall between it and the bar which is about to rise. The lever 129 is attached at the other end by a pin 135 to a spring 134, which spring is attached at the other end by a similar pin 135. In order to cause the forward end of the space-bar 44 to be moved positively forward in its line of travel as it is advanced by the space-bar-inserting mechanism to its final position, a beveled shoulder 40 on the plate *f* is provided, as shown in Figs. 4 and 5, just in advance of the type-cam 3. The effect of the beveled shoulder is such that when the point of the space-bar is advanced by the type-cam (shown at the commencement of the operation in Fig. 4) it will assume the position shown in Fig. 5, and when the final operation is completed be forced forward in the opening *y* to the desired position. The lever is slightly beveled or curved on its lower surface at the point 133, so as to engage with a roller 132 upon the lug 127. The object of this lever, as before explained, is primarily to guide the front end of the space-bar in a direct line into the opening between the last type set and the head of the cam 3, as shown in Fig. 4. As the space-bar-inserting mechanism operates by means of the forward movement of the lever 102 the

roller 132 engages with the inclined portion 133 of the lever 129 and permits the left-hand end in Fig. 3 to be retracted by the spring 134 and the extension 131 on the right-hand end to be raised above the space-bar, thus allowing the space-bar to be moved forward by the action of the type-cam 3, as shown in Fig. 5. In case the preceding space-bar has not already assumed its proper position the knife-edge extension 131 of the lever 129 forces it down and clears the way for the next ascending space-bar. The extremity of the type-inserting rod 124, which abuts against the rear end of the space-bar when the same is lifted, has attached thereto a thin strip of metal 4, which extends out beyond the end of the rod and engages with the front side of the space-bar at the rear end, as shown in Figs. 3 and 5, thus preventing the rear end of the space-bar from being prematurely advanced in its line of travel through the machine until after the type-cam 3 has forced the point of the space-bar into the position shown in Fig. 5. When the position shown in Fig. 5 is reached, the space-bar driver 124 has not reached its extreme line of travel. It continues to push the space-bar farther in until the space-bar has been inserted to its limit, as shown by the space-bar 44 in Fig. 6. Thereupon at that instant the bar 124 is retracted a sufficient distance to withdraw the plate 4 from engagement with the end of the space-bar. At that instant the upper end 141 of the lever 137 being free to operate the spring 140 forces it forward, thereby throwing the rear end of the space-bar forward, so as to make the space-bar assume a position in the line-holder parallel to the preceding one. The rear end of the space-bar-driving rod 124 carries a lug 6, to which is attached a cord 7, passing over roller 8, attached to the plate *r* and carrying at its extremity 9 a weight of suitable size, which is not shown. The effect of this weight is to cause the bar 124 to be normally held in an advanced position and to keep the roller 121 in contact with the cam-surface 11 on the roller 10 on the driving-shaft *t*. The roller 10 is provided on its side with a cam-surface 11, and it is arranged to rotate loosely upon the shaft *t*. The roller 10 carries a sleeve, which also carries the locking mechanism. The roller rotates loosely upon the shaft *t*, except when the connection hereinafter described is effected, and is held in position on the shaft by a fixed collar 27. The shaft *t* carries a collar 13, which is fastened to it by the pin 14 and rotates with it, by means of which the motion of the shaft can be imparted, as hereinafter described, to the collar 12. Between the collar 12 and the collar 13 is placed a ring 17, which is shown in detail in Figs. 7 and 8. This ring has an ear or lug 18 at one end and on the other end a somewhat-shorter lug 19, containing a pin 20, the shape of which is shown in Fig. 7. When the ring is placed in position between the col-



lar 12 and the collar 13, the condition of the mechanism is shown in Fig. 7. Two spiral springs 21 21 are provided on either side of the lug or ear 18, the effect of which is to keep the lug 18 on the ring 17 constantly pressed against the collar 13, which rotates with the shaft *t*. It will be obvious from Figs. 7 and 8 that as long as the lug 18 on the ring 17 is free from engagement with the teeth 15 on the face of the collar 13 the shaft *t* and the collar 13 will revolve freely and the ring, the collar 12, and the cam 10 will remain stationary. This result is effected by the lever 22, pivoted at the point 23 and actuated by a rod 24, which is connected to a suitable key-lever. The upper end of this lever is provided at the point 25 with a hook which is adapted normally with and holds the end of the lug 18 upon the ring 17, as shown in Fig. 1. By moving the lever 24 in Fig. 2 from right to left the hooked end 25 of the lever 22 will be brought away from the end 18 of the ring 17, and the effect of the springs 21 and 22 acting on the ring 17 will as soon as the collar 13 reaches in rotation the point where one of the spaces 39 between the teeth 15 comes opposite to the lug 18 the lug will be forced into that space between the teeth, and thereby the collar 12 will be locked to the collar 13, and the cam 10, attached to the collar 12, will be caused to rotate at the same speed as the shaft *t*. After a complete revolution of the cam has taken place the lug 18 will impinge against the inclined surface 26 of the lever 22, as particularly shown in Figs. 1 and 2, and will be gradually forced out of the opening between the teeth 15 and restored to its original position and there held until such time as the rod 24 is again moved.

In this type of machine, just as in the machine described and claimed in the application above referred to, it is essential that the movement of the front end of the space-bar in entering the line of type shall be so timed that it will not strike either the cam 3 or the last type set in the line-holder. It is necessary, therefore, to so time the revolutions of the cam 10 with respect to that of the type-cam 3 that whenever a space-bar is inserted into the line the type-cam 3 will be in the position shown in Fig. 4, allowing the thin end of the space-bar to be inserted into the line of type in the opening between the hub of the cam and the last preceding type set in the line-holder. This is effected by means of the gear-wheels 61 and 63, which are connected, by means of the idler 62 in connection with the teeth 15, upon the collar 13. The pitch of these gears is so proportioned that the revolution of the main shaft *t* and of the collar 13 a distance equal to the distances between the openings 39 between the teeth 15 will cause one revolution of the cam-shaft 60. In other words, one complete revolution of the main shaft *t* will cause the cam-shaft 60 to make as many complete revolutions as there are teeth

on the collar 13. In the machine shown the type-cam shaft 60 is geared to make seven revolutions to each revolution of the main shaft *t* and the type-cam is secured to its shaft 60 in such a position that the entering point of the space-bar will always find it in the position shown in Fig. 4, whichever one of the teeth of the collar 13 may be engaged with the lug 18.

The construction of the cam 10, which actuates the space-bar elevating and inserting mechanism, is as follows: 32 is the lowest point, and the surface 11 there begins to rise, going to the right in Fig. 2 up to the point 28. From the point 28 to 29 the surface is normal and there is no rise or fall. From 29 to 30 the surface drops, and from 30 to the point 31 it is again flat and normal, and from the point 31 to 32 it again drops. The rise and fall of these surfaces and the position of the normal surfaces is such that the desired movement of the parts is effected in the manner hereinafter referred to.

The method of operation is as follows: When the machine is at rest, the mechanism is substantially in the position shown in Figs. 1 and 2, the roller 121 resting on the rising portion of the cam between the points 32 and 28. When the rod 24 is operated by the key and engagement effected between the collar 13 and the collar 12 in the manner hereinbefore described, the cam begins to rotate in the direction of the arrow shown in Fig. 2, raising the roller 121 and the arm 102. As the cam moves the roller will be forced from right to left, as shown in Fig. 1, thereby throwing back the arm 102 from left to right and raising the weight attached to the cord 7 and at the same time elevating the arm 105 and raising the space-bar-elevating mechanism, with the foremost space-bar resting thereon, as above described, to a position in line with the line-holder ready for insertion. When this position is reached, the point 28 upon the cam has come in contact with the roller 121. In order to allow the machine to remain for a reasonable length of time in this position, the surface 11 of the cam 10 from 28 to 29 is made flat or normal, and during the period of time in which the roller 121 travels over the surface of the cam from 28 to 29 the parts will remain in a fixed position by reason of the fact that this particular portion of the cam is flat or normal. When the point 29 is reached, the surface begins to descend, and the effect of the weight attached to the cord 7 will cause the lever 102 to be moved from right to left, carrying with it the lug 127 and the space-bar-inserting rod 124, thereby inserting a space-bar into the line to the position shown in Figs. 3 and 4. In order to permit the type-cam 3 to force the front end of the space-bar forward to assume the position shown in Fig. 4, the mechanism must necessarily stand still for an instant. Therefore the surface of



the cam is made flat or normal for a convenient distance representing a suitable interval of time between the point 30 and the point 31. When this position has been reached  
 5 and the type-cam 3 has rotated sufficiently to bring the forward end of the wedge to the desired position, with its point just forward of the shoulder 40, formed by the rear end of the goove *y*, as shown in Figs. 3, 4, and 5,  
 10 the space-bar can then be driven its full length into the line with its thin end extending into the slot *y*. In order to cause the mechanism thus to again advance, the portion of the cam between the points 31 and  
 15 32 is again inclined, and as the roller 121 rolls from the point 31 the space-bar-inserting rod 124 will be carried still farther forward by the weight attached to the cord 7, and thus drive in the space-bar as far as it  
 20 will go. After passing this point the surface again begins to rise, thus causing the cam to move in the other direction and withdrawing the end of the space-bar-inserting rod 124 from the rear end of the space-bar a sufficient  
 25 distance to release the end of the plate 4 from engagement with the rear end of the space-bar, thus allowing the advancing lever 137 to operate. Just before this operation is complete the lug 18 will have come in contact with  
 30 the inclined surface 26 of the lever 22, and when a complete revolution of the shaft has been made the lug will be lifted out of engagement with the opening 39 between the teeth 15 on the cam 13 and the parts will assume the normal position of rest. (Shown in  
 35 Figs. 1 and 2.)

I claim as my invention—

1. In a type-justifying machine, the combination of an independent wedge-shaped  
 40 space-bar; means for driving the same a certain distance; means for then arresting the same; means for holding the rear end of the said space-bar while this is being done; means for driving the space-bar still farther to its  
 45 final position; and means for withdrawing the holding device from the rear end of the space-bar when the operation is completed.

2. In a type-justifying machine, the combination of an independent wedge-shaped  
 50 space-bar; means for driving the same a certain distance; means for then arresting the same; means for holding the rear end of the said space-bar while this is being done; means for driving the space-bar still farther to its  
 35 final position; means for withdrawing the holding device from the rear end of the space-bar when the operation is completed; and means for advancing the rear end of the space-bar after releasing, so as to cause the space-  
 60 bar to assume its proper position in the line-holder.

3. In a type-justifying machine, the combination of an independent wedge-shaped  
 65 space-bar; means for driving the same a certain distance; means for then arresting the same; means for thereupon advancing the for-

ward end of the space-bar a certain distance, and for holding the rear end of the said space-bar while this is being done; means for driving the space-bar still farther to its final position; and means for withdrawing the holding device from the rear end of the space-bar when the operation is completed. 70

4. In a type-justifying machine, the combination of an independent wedge-shaped  
 75 space-bar; means for driving the same for a certain distance; means for then arresting the same; means for thereupon advancing the forward end of the space-bar a certain distance, and for holding the rear end of the  
 80 said space-bar while this is being done; means for driving the space-bar still farther to its final position; means for withdrawing the holding device from the rear end of the space-bar when the operation is completed; and  
 85 means for advancing the rear end of the space-bar after releasing, so as to cause the space-bar to assume its proper position in the line-holder.

5. In a type-justifying machine the combination of an independent wedge-shaped  
 90 space-bar; means for driving the same a certain distance; means for then arresting the same; means for holding and guiding the thin end of the space-bar; means for holding  
 95 the rear end of the space-bar while this is being done; means for driving the space-bar still farther, to its final position; and means for withdrawing the holding device from the rear end of the space-bar when the operation  
 100 is completed.

6. In a type-justifying machine, the combination of an independent wedge-shaped  
 105 space-bar; means for driving the same a certain distance; means for then arresting the same; a spring-lever, operated by the space-bar-operating device, for holding and guiding the space-bar during the operation of insertion; means for thereupon advancing the forward end of the space-bar a certain distance  
 110 and for holding the rear end of the space-bar while this is being done; means for driving the space-bar still farther, to its final position; and means for withdrawing the holding device from the rear end of the space-bar  
 115 when the operation is completed.

7. The combination of a sliding plate arranged to slide vertically in suitable ways in the end plate; a space-bar-elevating plate, attached to and sliding vertically with the  
 120 same; means for actuating the same substantially as described; and a spring device, substantially as described, retracted by the wedge when it rises, for moving the rear end of the wedge forward after the operation of insertion has been completed. 125

8. In a type-justifying machine, the combination of an independent wedge-shaped  
 130 space-bar; means for driving the same a certain distance; means for then arresting the same; means for holding and guiding the thin end of the space-bar; means for holding



the rear end of the space-bar while this is being done; means for driving the space-bar still farther, to its final position; means for withdrawing the holding device from the rear end of the space-bar when the operation is completed; and a spring device, substantially as described, retracted by the space-bar when it rises, for moving the rear end of the space-bar forward after the operation of insertion has been completed.

9. The combination of a sliding space-bar driver, arranged to slide horizontally on the end plate; means substantially as described, for actuating the same; and a spring-lever, operated by the arm of the space-bar-operating device, for holding and guiding the space-bar during the operation of insertion.

10. The combination of a sliding plate, arranged to slide vertically in suitable ways in the end plate; a space-bar-elevating plate, attached to and sliding vertically with the same; a sliding space-bar driver, arranged to slide horizontally on the end plate; a bell-crank lever, attached to the frame-plate, engaging at one end with the vertically-sliding elevating-plate, and at the other end with the horizontally-moving space-bar driver; means substantially as described, for causing the space-bar driver to be held in a constantly-advanced position; and means, actuated at the will of the operator, for causing one arm of the lever to raise the elevating mechanism and the other arm to retract the space-bar driver, and to thereupon advance the space-bar driver and lower the elevating-plate, substantially as described.

11. The combination of a sliding plate, arranged to slide vertically in suitable ways in the end plate; a space-bar-elevating plate, attached to and sliding vertically with the same; a sliding space-bar driver, arranged to slide horizontally on the end plate; a pivoted bell-crank lever composed of two independent arms held together by a spring, attached to the frame-plate, engaging at one end with the vertically-sliding elevating-plate, and at the other end with the horizontally-moving space-bar driver; means substantially as described, for causing the space-bar driver to be held in a constantly-advanced position; and means, actuated at the will of the operator, for causing one arm of the lever to raise the elevating mechanism and the other arm to retract the space-bar driver, and to thereupon advance the space-bar driver and lower the elevating-plate, substantially as described.

12. The combination of a sliding plate, arranged to slide vertically in suitable ways in the end plate; a space-bar-elevating plate, attached to and sliding vertically with the same; a sliding space-bar driver, arranged to slide horizontally on the end plate; a bell-crank lever, attached to the frame-plate, engaging at one end with the vertically-sliding elevating-plate, and at the other end with the

horizontally-moving space-bar driver; means substantially as described, for causing the space-bar driver to be held in a constantly-advanced position; and means, actuated at the will of the operator, for causing one arm of the lever to raise the elevating mechanism and the other arm to retract the space-bar driver, and to thereupon advance the space-bar driver and lower the elevating-plate, and for stopping the movement of the parts, at desired intervals, substantially as described.

13. The combination of a sliding plate, arranged to slide vertically in suitable ways in the end plate; a space-bar-elevating plate, attached to and sliding vertically with the same; a sliding space-bar driver, arranged to slide horizontally on the end plate; a bell-crank lever, attached to the frame-plate, engaging at one end with the vertically-sliding elevating-plate, and at the other end with the horizontally-moving space-bar driver; means substantially as described, for causing the space-bar driver to be held in a constantly-advanced position; a suitable type-cam; a rotating shaft, actuated from a suitable source of power; a toothed collar, secured to the said driving-shaft, the distances between the teeth of which are properly proportioned with respect to the revolutions of the type-cam; a cam rotating loosely on said driving-shaft; a roller attached to the bell-crank lever, and arranged to be moved by the movement of the said cam; a clutch mechanism for causing the cam to rotate with the fixed collar throughout a single revolution; and means for throwing the clutch mechanism into engagement at the will of the operator.

14. In a type-justifying machine, the combination of an independent wedge-shaped space-bar; means for driving the same a certain distance; means for then arresting the same; means for thereupon advancing the forward end of the space-bar a certain distance and for holding the rear end of the space-bar while this is being done; means for driving the space-bar still farther into its final position; means for holding the forward end of the said line-holder while being so driven forward, and for holding it in its final position, and means for withdrawing the holding device from the rear end of the space-bar when the operation is completed.

15. In a type-justifying machine, the combination of an independent wedge-shaped space-bar; a spring-lever, operated by the space-bar-operating device, for holding and guiding the space-bar during the operation of insertion, provided at the end with a knife-edged projection for forcing down any preceding space-bar which has not been properly inserted in place, and means for advancing the space-bar substantially as described.

16. In a type-justifying machine, the combination of the frame-plate provided with the opening opposite the line-holder into which the front end of the space-bars projects, the



5 rear end of which is beveled so as to force the  
end of the space-bars engaging therewith posi-  
tively forward, a line - holder arranged to  
travel on said plate; space-bars inserted hori-  
zontally across the line-holder, and means  
substantially as described for inserting the  
space-bars one by one through the line-  
holder.

In testimony that I claim the foregoing as  
my invention I have signed my name, in pres- 10  
ence of two witnesses, this 27th day of May,  
1901.

FRANK McCLINTOCK.

Witnesses:

EDWIN T. RICE, Jr.,

WILLARD PARKER BUTLER.