

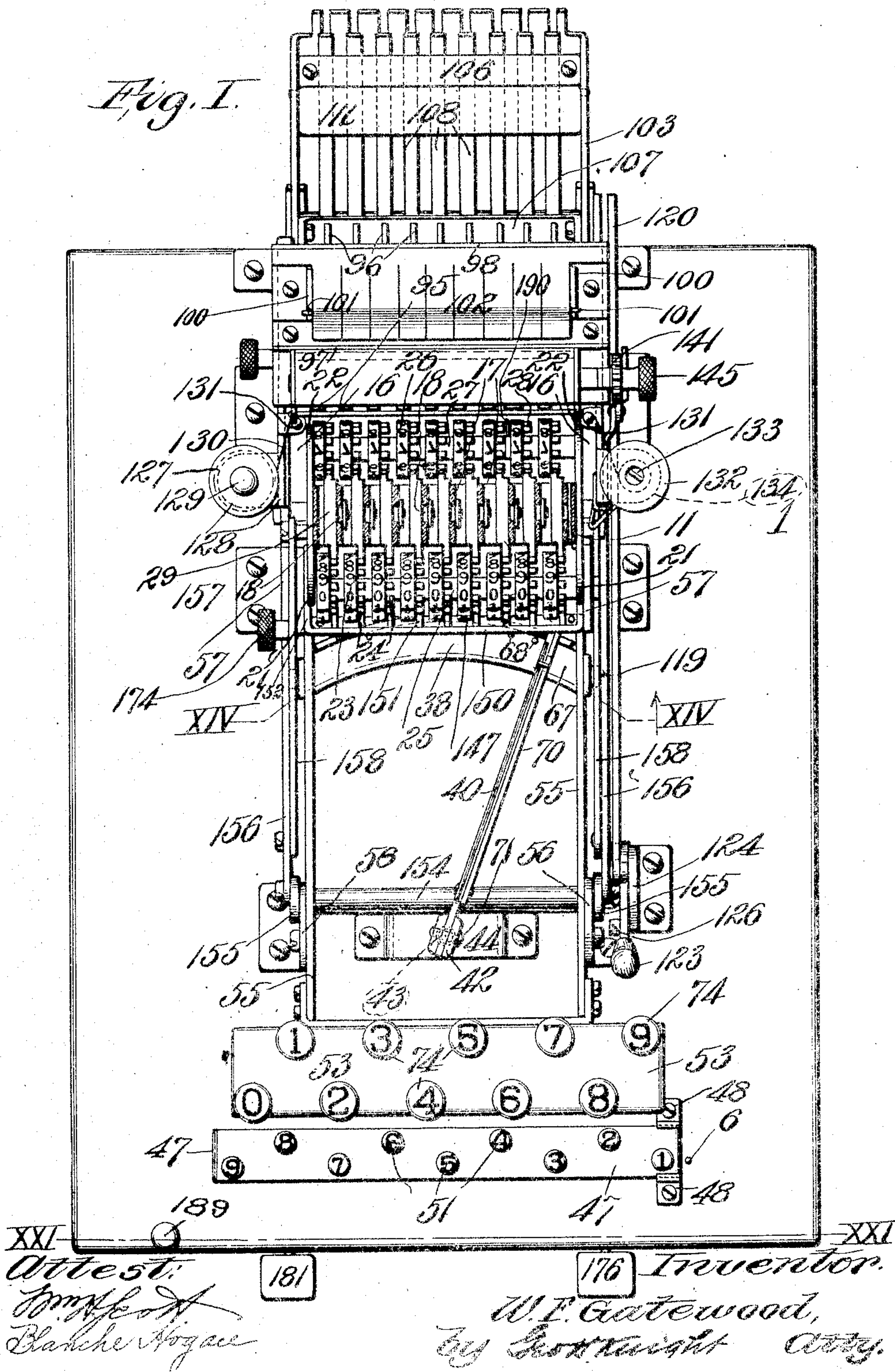
No. 875,423.

PATENTED DEC. 31, 1907.

W. F. GATEWOOD.  
ADDING MACHINE.

APPLICATION FILED JUNE 18, 1906.

9 SHEETS—SHEET 1.



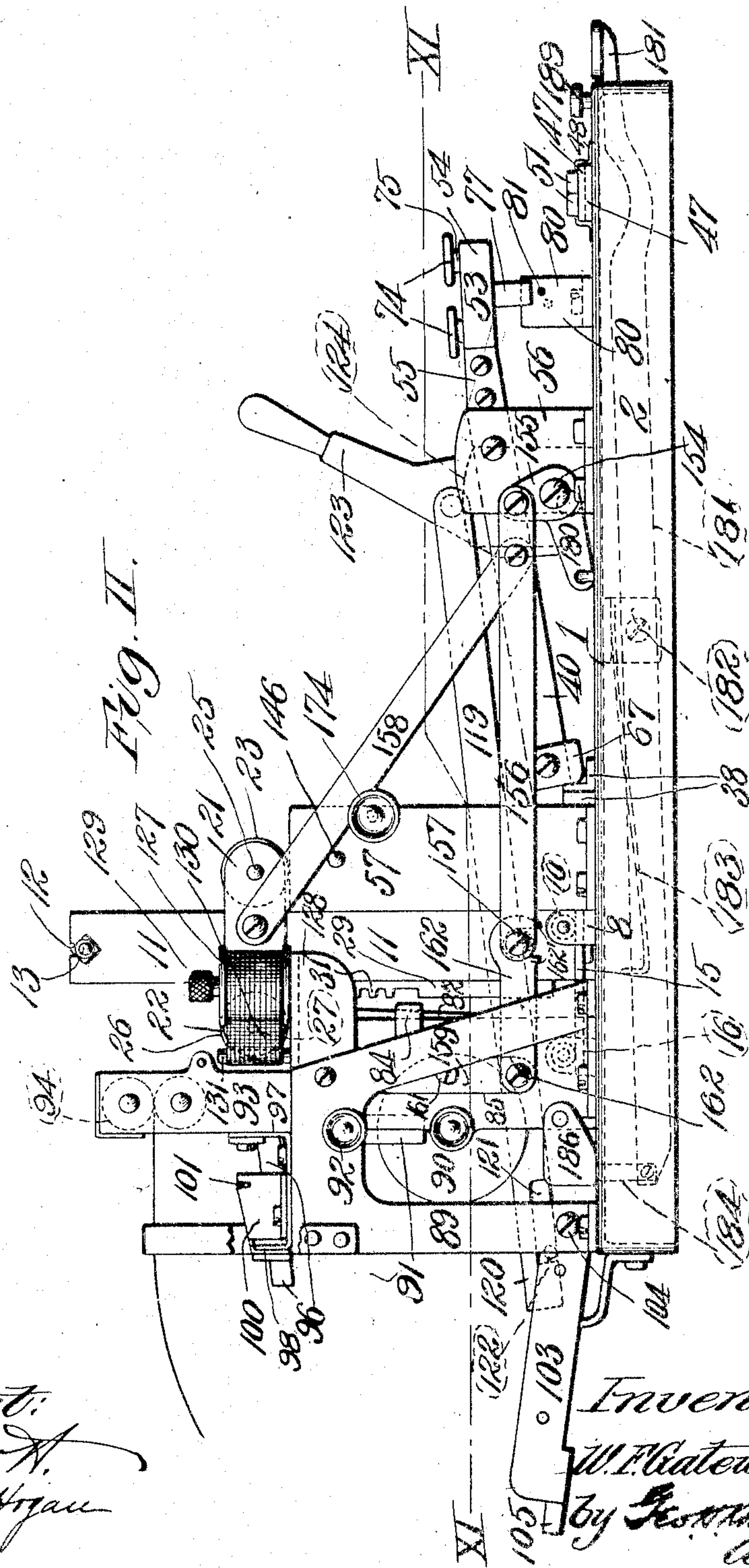
No. 875,423.

PATENTED DEC. 31, 1907.

W. F. GATEWOOD.  
ADDING MACHINE.

APPLICATION FILED JUNE 18, 1906.

9 SHEETS—SHEET 2.



Attest:  
J. S. Smith  
Blanche Hogan



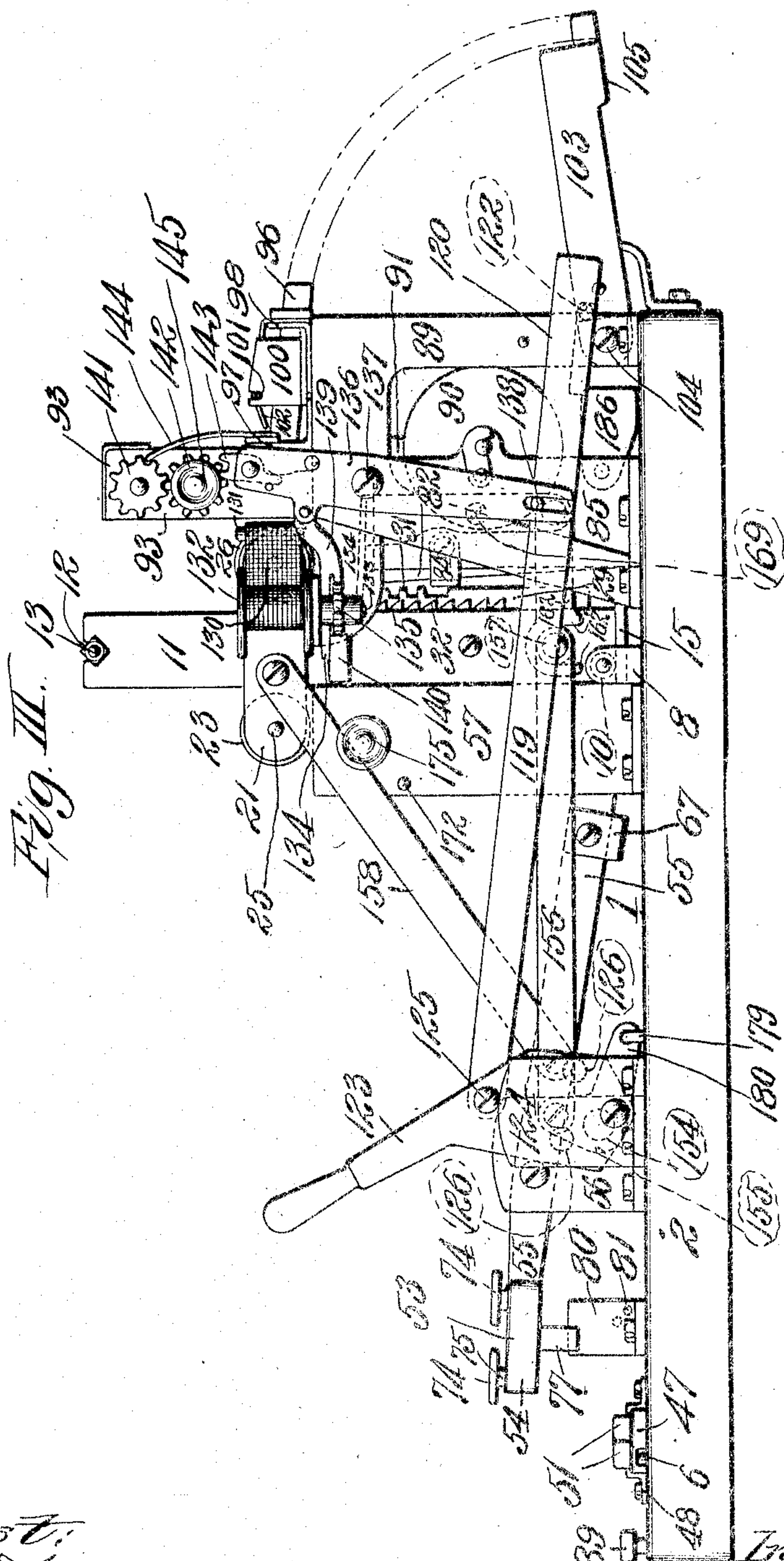
No. 875,423.

W. F. GATEWOOD.  
ADDING MACHINE.

PATENTED DEC. 31, 1907.

APPLICATION FILED JUNE 18, 1906.

9 SHEETS—SHEET 3.



Attest:  
J. H. Scott.  
Blanche Hogue

189  
9/16  
Inverton  
W. H. Eatwood,  
by Geo. Knight  
Atty.

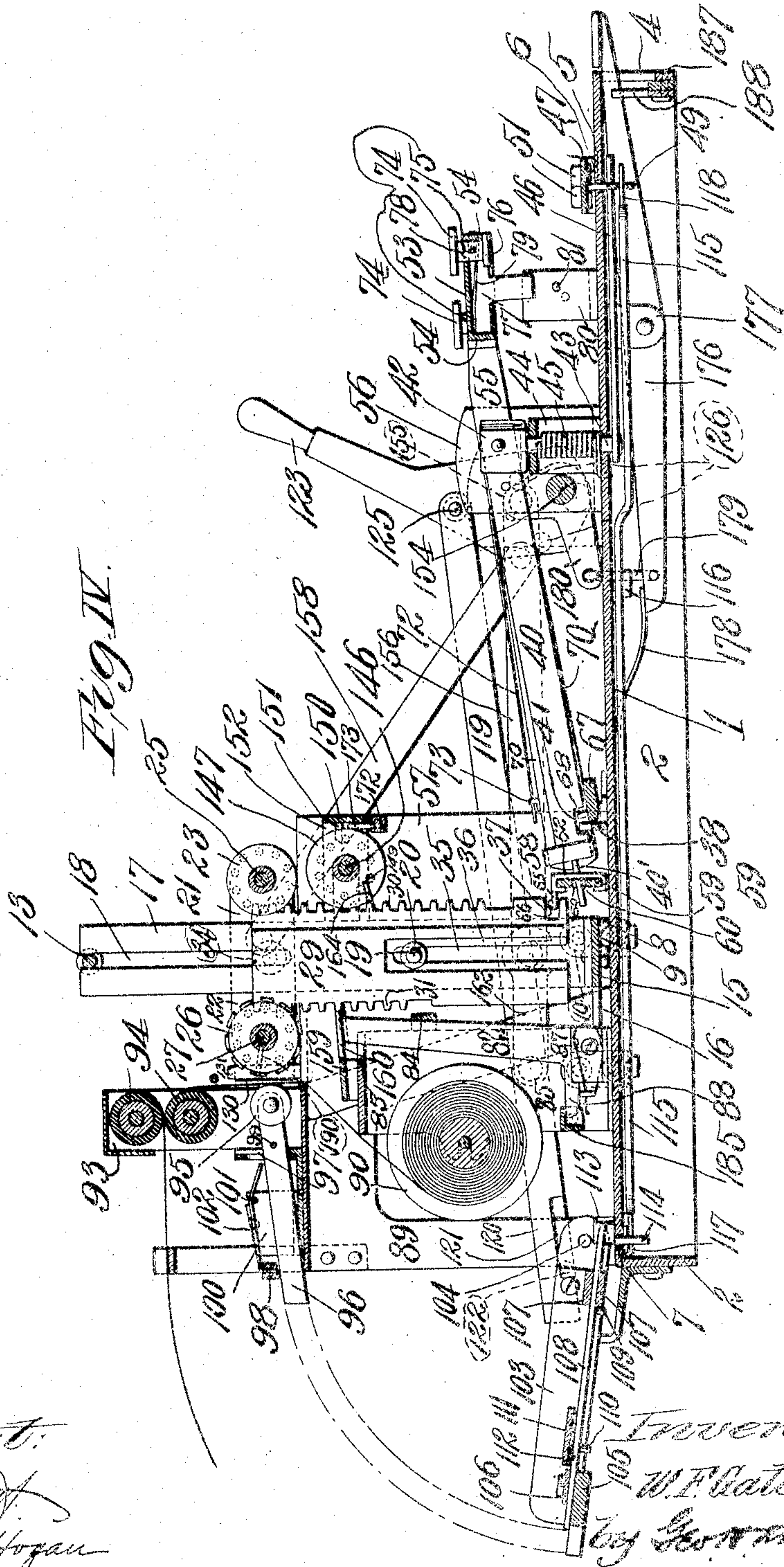
No. 875,423.

W. F. GATEWOOD.  
ADDING MACHINE.

PATENTED DEC. 31, 1907

APPLICATION FILED JUNE 18, 1906.

9 SHEETS—SHEET 4



Attest:  
Blanche Hogan

1911/907  
Feverton,  
W. F. Gatewood,  
by Geo. M. Miller  
Oct 1911

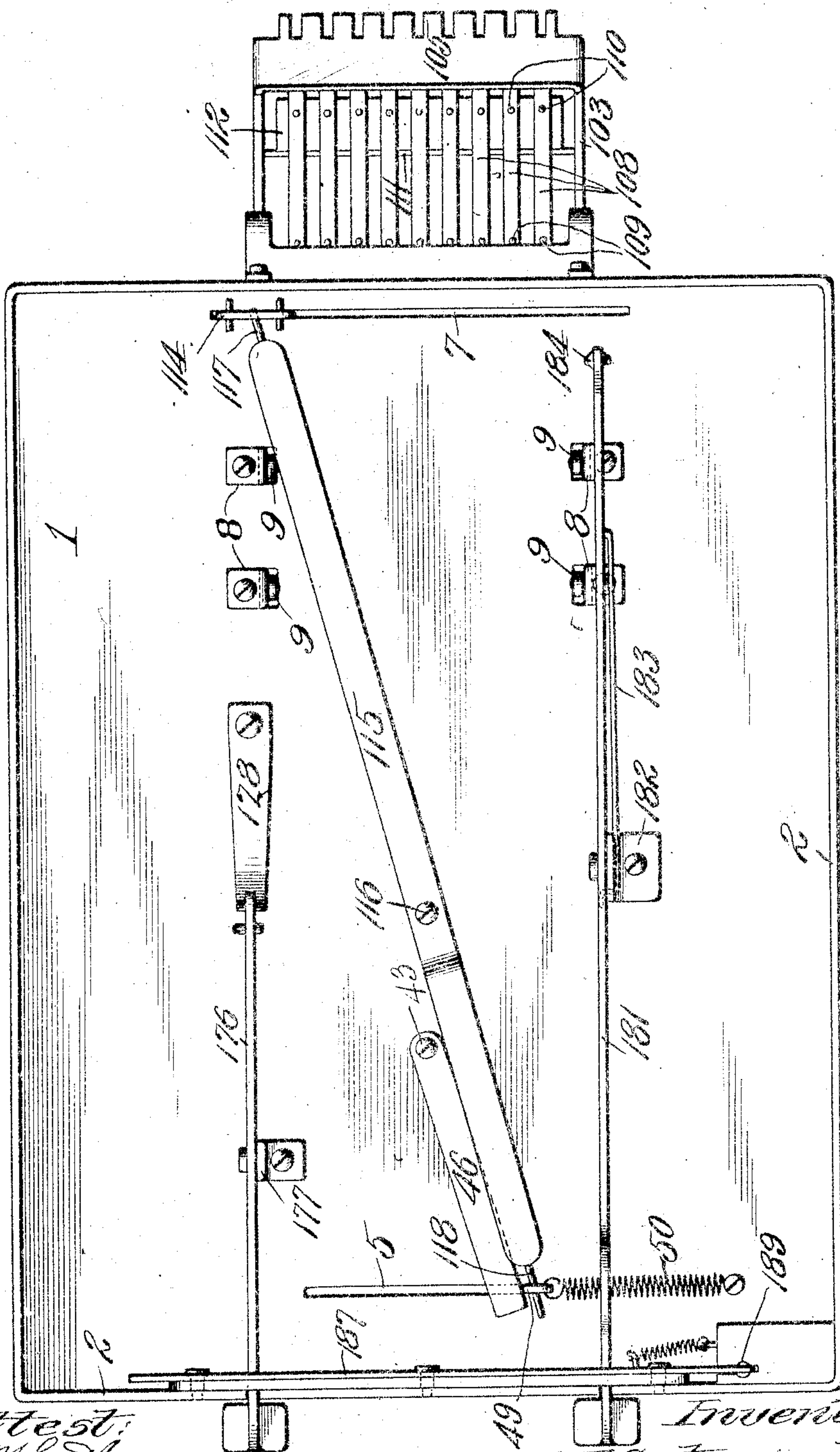


W. F. GATEWOOD.  
ADDING MACHINE.

APPLICATION FILED JUNE 18, 1906.

9 SHEETS—SHEET 5.

Fig. V.



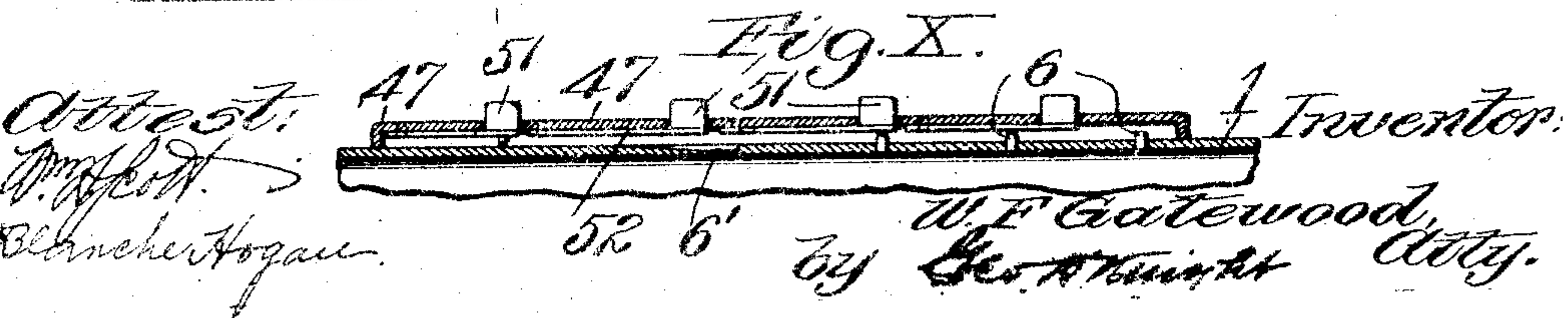
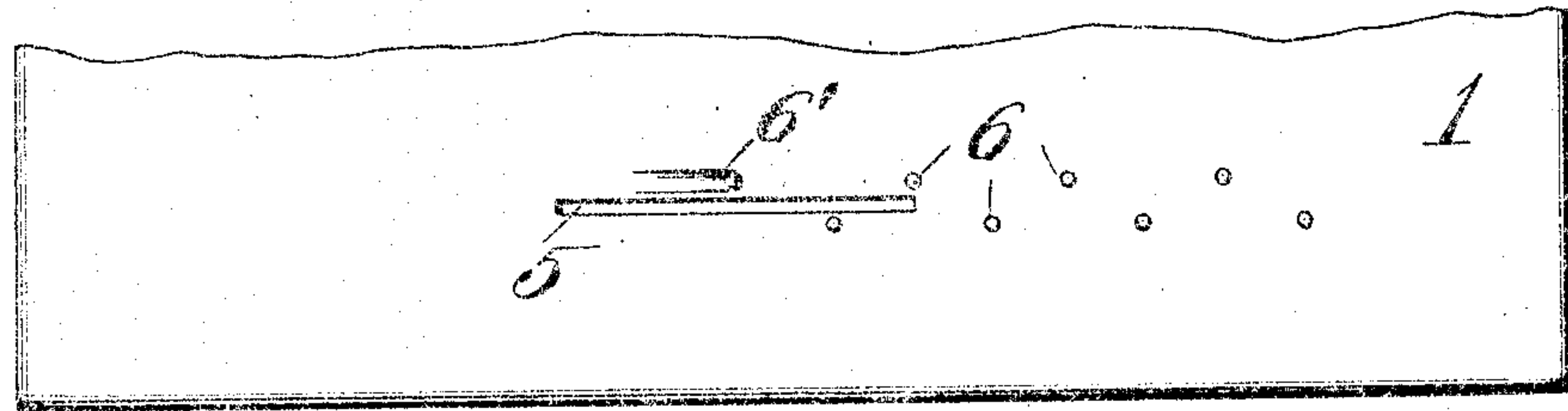
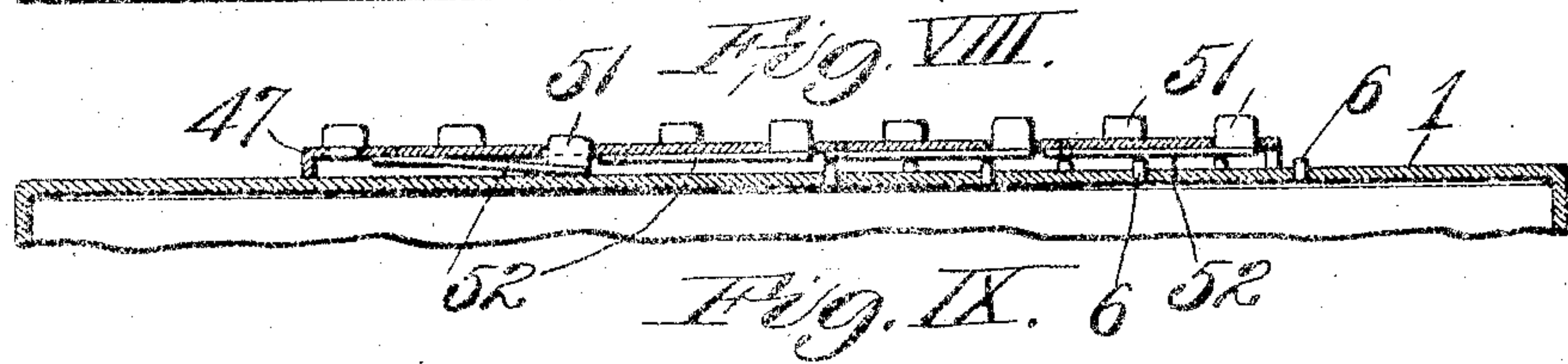
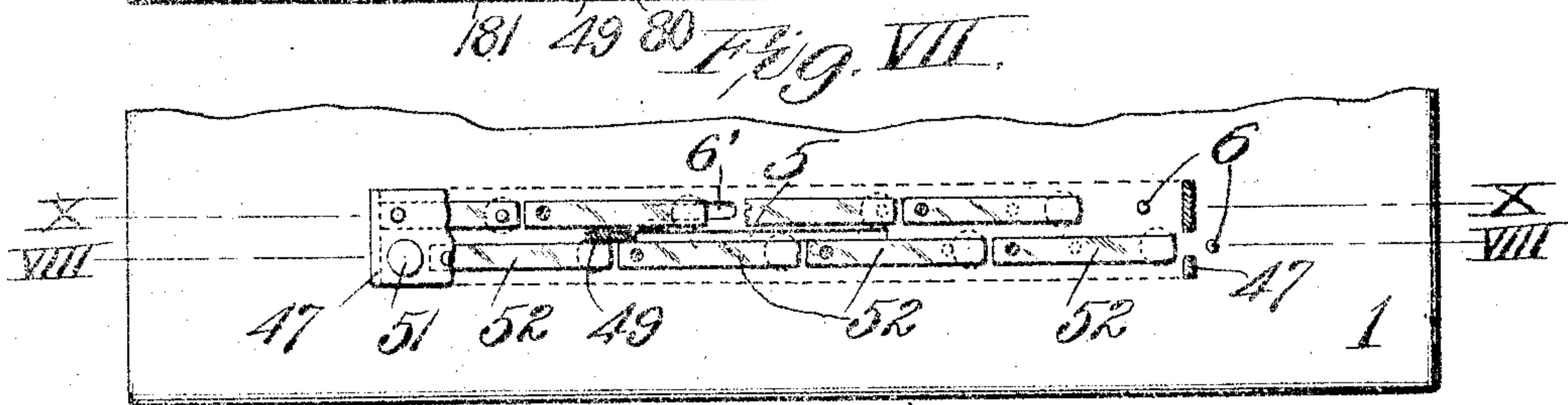
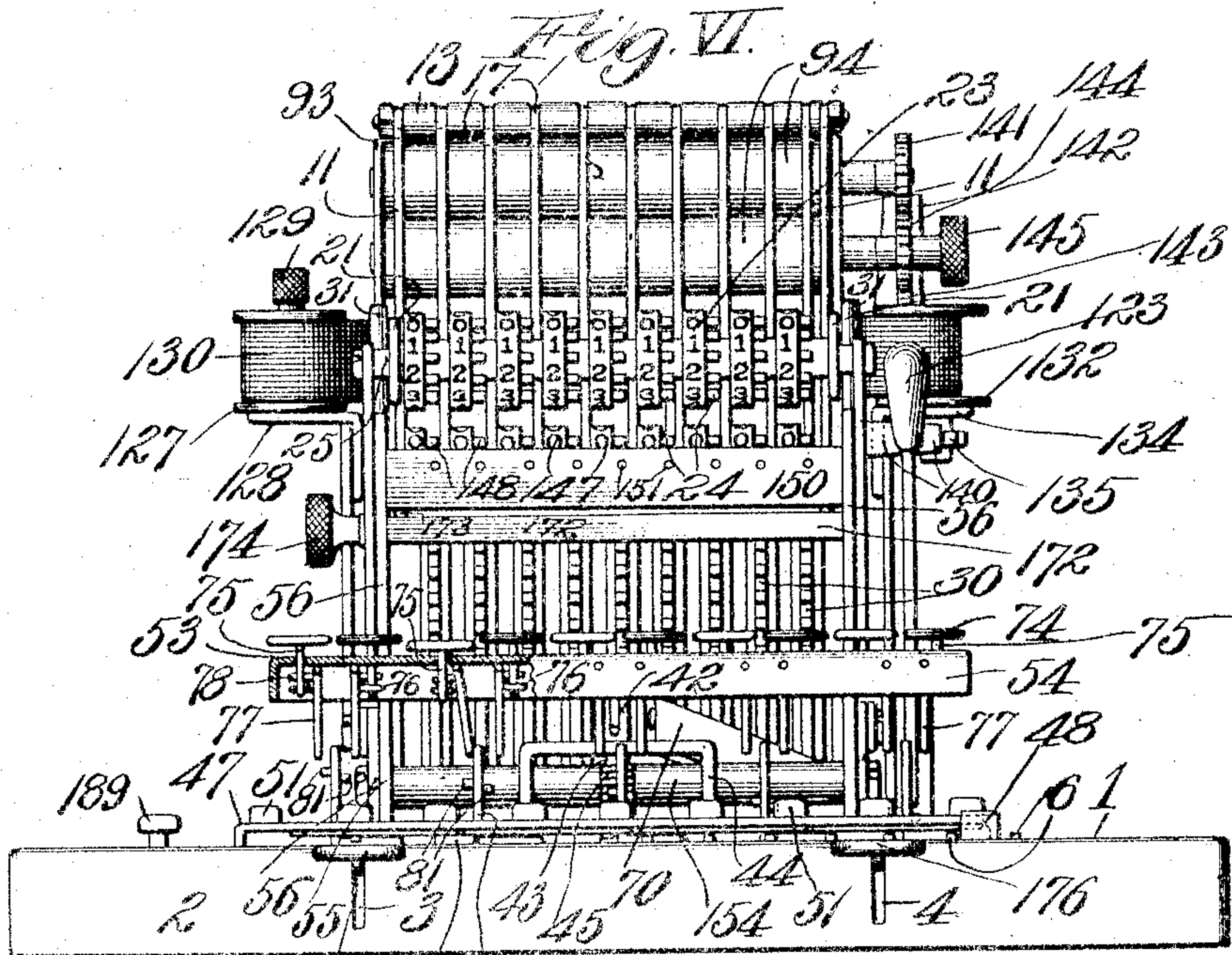
Attest:  
*Blanche Hogue*

Inventor:  
W. F. Gatewood,  
by *Geoff. H. H. H. H.*

W. F. GATEWOOD.  
ADDING MACHINE.

APPLICATION FILED JUNE 18, 1906.

9 SHEETS—SHEET 6



Attest:  
W. F. Gatewood  
Blancher Hogan.

Inventor:  
W. F. Gatewood  
by Geo. A. Mink Atty.



No. 875,423.

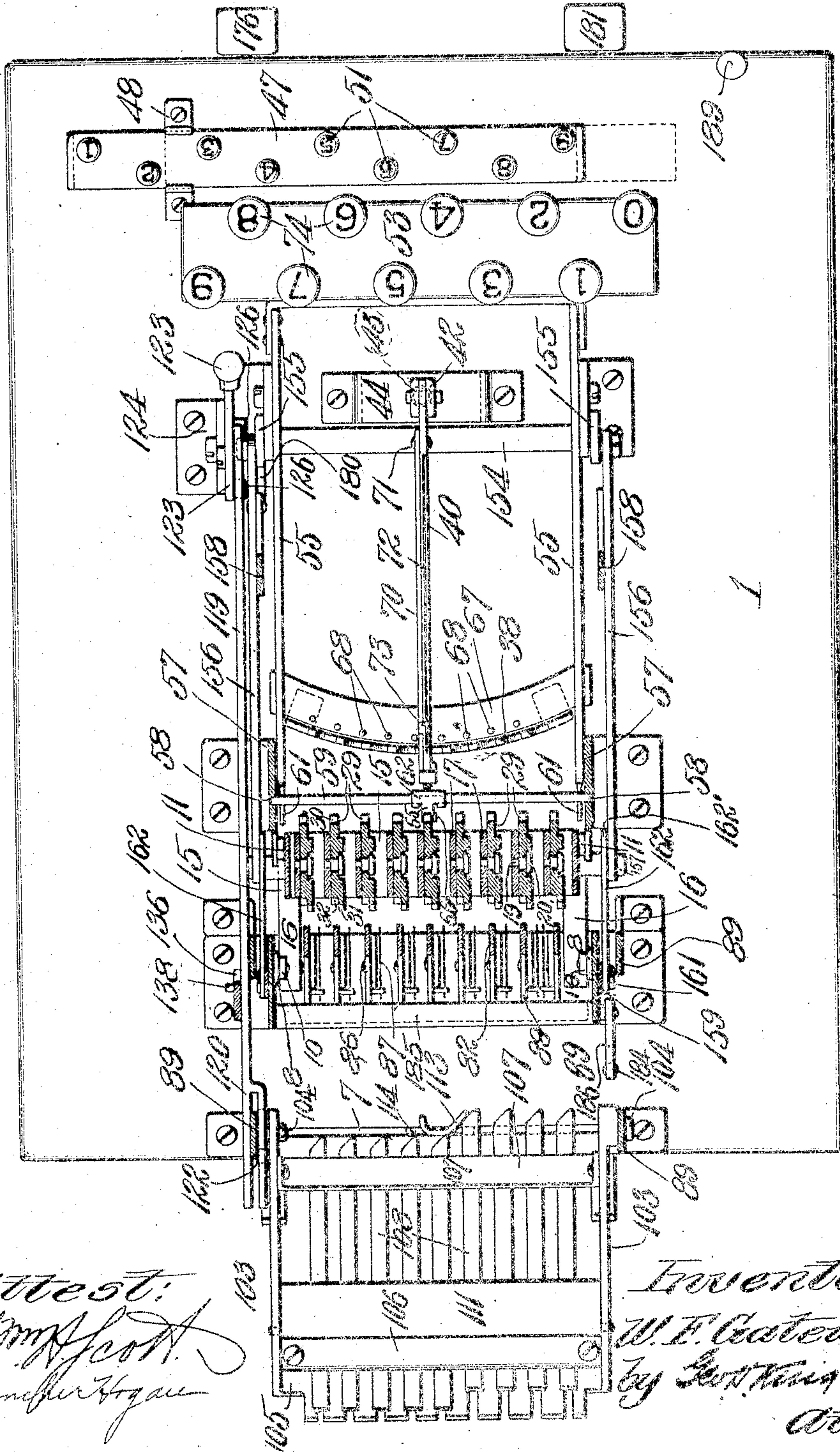
PATENTED DEC. 31, 1907.

W. F. GATEWOOD.  
ADDING MACHINE.

APPLICATION FILED JUNE 18, 1906.

9 SHEETS—SHEET 7.

Fig. XI.



Attest:  
Wm. Scott  
Blanchard & Co.

Inventor:  
W. F. Gatewood,  
by Geo. H. Knight  
Atty.



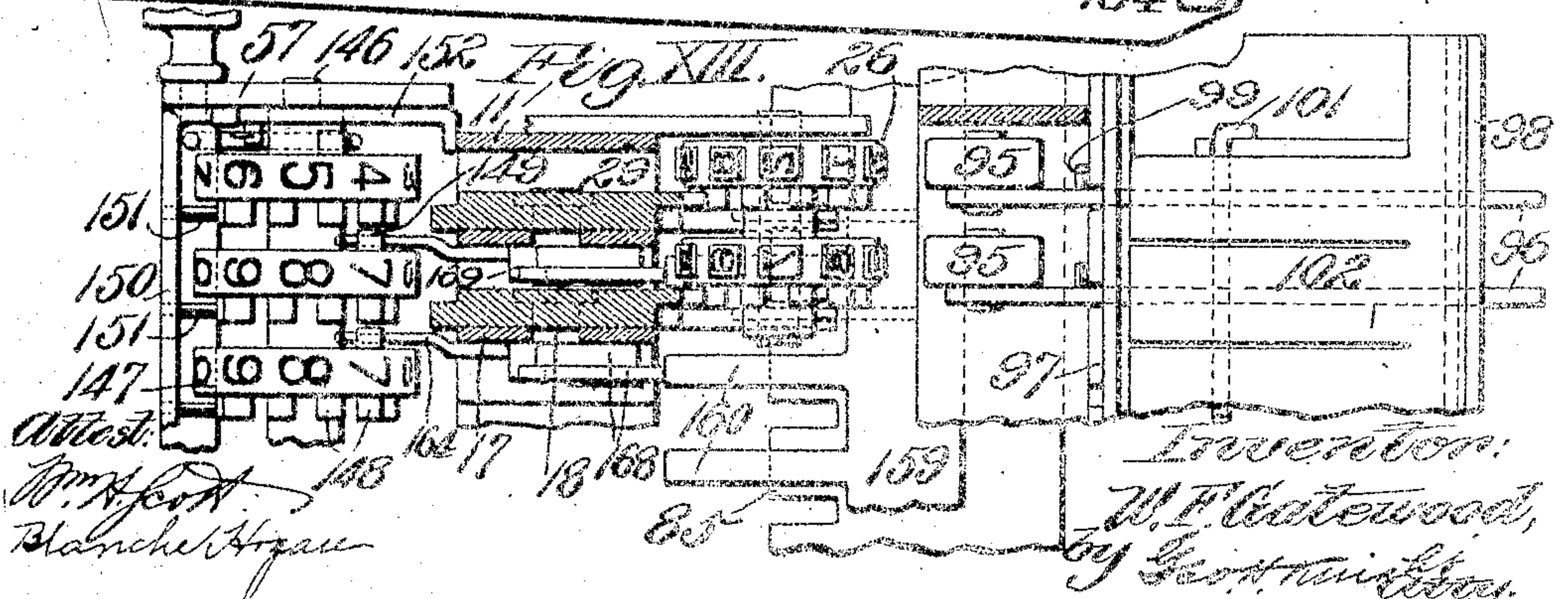
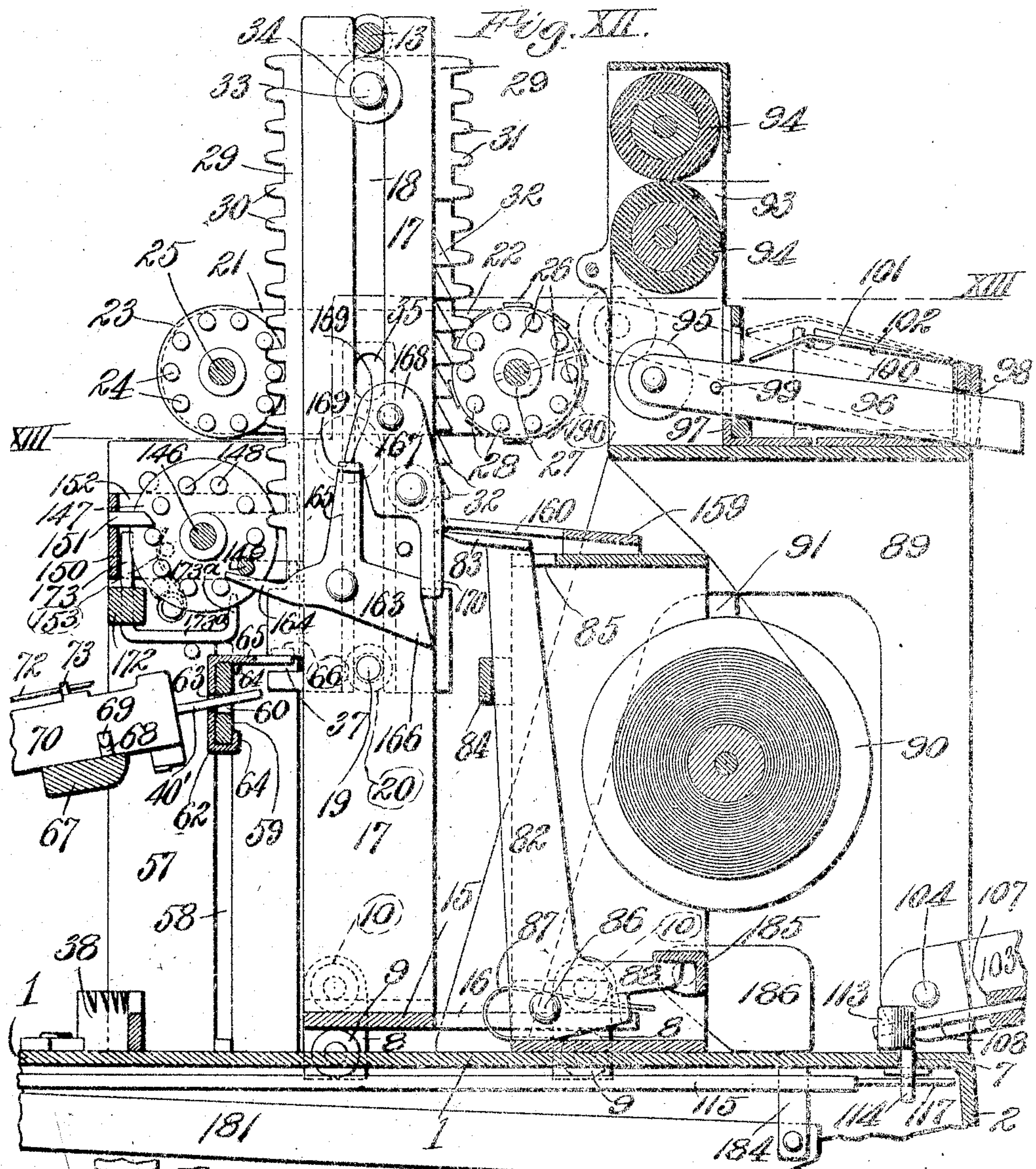
No. 875,423.

PATENTED DEC. 31, 1907.

W. F. GATEWOOD.  
ADDING MACHINE.

APPLICATION FILED JUNE 18, 1906.

9 SHEETS—SHEET 8.

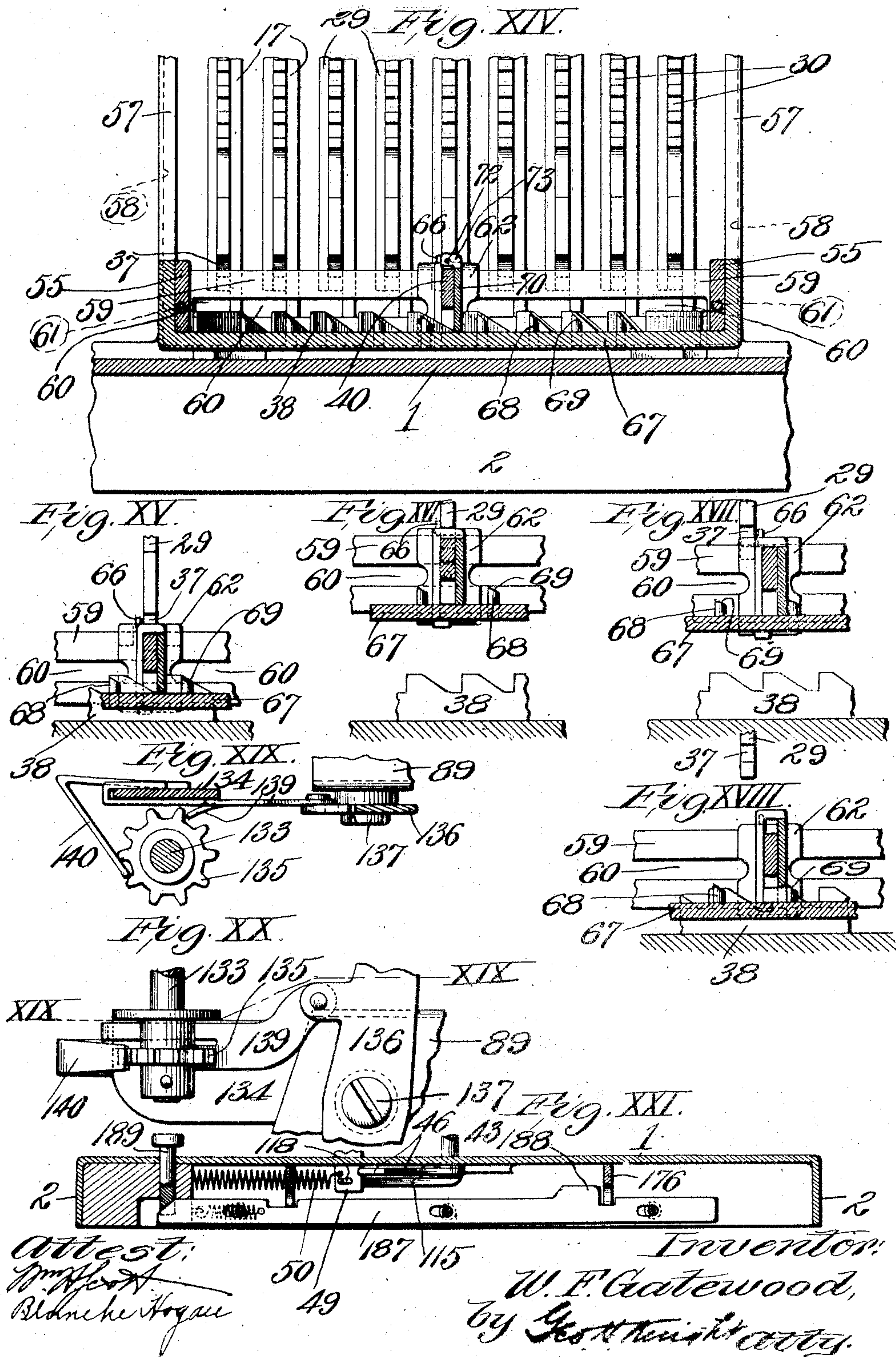




W. F. GATEWOOD.  
ADDING MACHINE.

APPLICATION FILED JUNE 18, 1906.

9 SHEETS—SHEET 9





# UNITED STATES PATENT OFFICE.

WILLIAM F. GATEWOOD, OF PIERCE CITY, MISSOURI, ASSIGNOR OF ONE-THIRD TO  
ETHELBERT P. LAMPKIN, OF ST. LOUIS, MISSOURI, AND WILLIAM W. LOCKE, OF  
PIERCE CITY, MISSOURI.

## ADDING-MACHINE.

No. 875,423.

Specification of Letters Patent.

Patented Dec. 31, 1907.

Application filed June 18, 1906. Serial No. 322,138.

*To all whom it may concern:*

Be it known that I, WILLIAM F. GATEWOOD, a citizen of the United States of America, residing at Pierce City, in the county of Lawrence and State of Missouri, have invented certain new and useful Improvements in Adding-Machines, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification.

My invention relates to that class of adding machines having mechanism for performing addition and also having printing mechanism for recording the result of the operation of the adding mechanism.

The printing mechanism for recording is described, shown and claimed in another application filed February 4, 1907, Serial Number 355,618.

The invention has for its object to produce a simple machine of this character which has the efficiency of many other expensive and very complicated machines of the same type, but which is much less expensive to manufacture and much less liable to become impaired due to its simplicity.

Figure I is a top or plan view of my adding machine with the guide posts by which the actuating racks of the item wheels, accumulator wheels and type wheels are operated shown in horizontal section. Fig. II is a side elevation of the machine. Fig. III is a side elevation looking at the reverse side of the machine from that shown in Fig. II. Fig. IV is a view partly in longitudinal section taken through the machine and partly in elevation. Fig. V is an inverted plan view of the machine. Fig. VI is a front elevation of the machine with a portion of the key plate shown in vertical section. Fig. VII is a top or plan view of the forward portion of the base of the machine and the shift mechanism for actuating the sweep through the medium of which the rack bars are operated, the slide bar forming a part of this mechanism being partly omitted. Fig. VIII is a vertical cross section taken on line VIII—VIII, Fig. VII. Fig. IX is a top or plan view of the forward portion of the base of the machine with the shifting mechanism omitted. Fig. X is a longitudinal section taken on line X—X, Fig. VII. Fig. XI is in part a top or plan view of the machine with the rack bars, their guide posts and the rack

bar controlling members shown in horizontal section. Fig. XII is an enlarged view partly in longitudinal section and partly in elevation taken through the central portion of the machine. Fig. XIII is a view partly in plan and partly in horizontal section taken on line XIII—XIII, Fig. XII. Fig. XIV is an enlarged view partly in elevation and partly in transverse section of the middle part of the machine taken on line XIV—XIV, Fig. I. Figs. XV to XVIII inclusive are diagrammatical views illustrating the various positions of the rack bar operating sweep of the machine while at rest and during its operation. Fig. XIX is an enlarged view partly in plan and partly in horizontal section taken on line XIX—XIX, Fig. XX, of the ink ribbon feeding mechanism. Fig. XX is a side elevation of the parts shown in Fig. XIX. Fig. XXI is a transverse section of the forward end of the machine taken on line XXI—XXI, Fig. I with the stop mechanism that controls the main release lever of the machine shown in elevation.

1 designates the hollow base of the machine which is provided with a surrounding bottom flange 2 that at its forward end contains vertical slots 3 and 4 (see Figs. IV and VI), which provide for the operation of certain levers to be hereinafter described.

5 is a slot extending transversely of the base near its forward end (see Figs. IV, V, VII and IX) and adjacent to said slot and in lines extending transversely of the base are vertical stop pins 6, (see also Figs. VIII and X) and a depression 6' as seen in Figs. VII, IX, and X. Near the rear end of the base is a transverse slot 7 (see Figs. IV, V, XI and XII).

8 designates short posts (see Figs. II, III, IV, V, and XII) which are arranged in aligning pairs and secured to the under side of the base 1 at its rear portion and extending upwardly therethrough, as seen most clearly in Figs. V and XII. These posts have journaled to them lower anti-friction rollers and upper anti-friction rollers arranged in pairs and so applied to the posts that they will rotate in a direction longitudinally of the base of the machine. The lower rollers 9 serve as supports for, and both the lower rollers 9 and the upper rollers 10 in each pair, act as guides for a reciprocatory carriage by which the item and type wheels of



the machine are carried and which carriage will next be described.

11 are the upright side bars of the carriage which are notched at their upper ends as seen at 12 (Figs. II and III) to receive a spacing rod 13. The side bars are flanged at their lower ends and seated upon a transverse base bar 15 to which the side bars are secured by screws or other suitable means. The base bar 15 is provided with rearwardly extending arms 16 (see Figs. II, IV, XI and XII), that operate between the rearmost pairs of anti-friction lower rollers 9 and upper rollers 10 while the ends of said base bar project beyond the side bars of the carriage and operate between the forward pairs of said anti-friction rollers. 17 are guide posts also secured to the base bar 15 of the carriage and provided with vertical slots 18 extending downwardly from their upper ends. The slots 18 serve to receive a member to be hereinafter described, and they also receive the spacing rod 13 which is notched at proper intervals in order that smaller portions of the rod may enter into said slots while the larger intervening portions of the rod serve to space and hold the guide posts in separated condition. Each guide post has fixed to it a stud 19 that is preferably equipped with an anti-friction roller 20 (see Fig. IV). The carriage side bars 11 are provided with forwardly extending horizontal arms 21 and rearwardly extending horizontal arms 22.

23 are item wheels, each of which bears upon its periphery the numerals "1" to "9" and the "0" sign. At the side of each item wheel are pins 24 corresponding in number to the number of characters upon the periphery of the wheel. The entire series of item wheels, of which there may be any number, is loosely mounted upon a supporting shaft 25 mounted in the forward horizontal arms 21.

26 are type wheels of a number corresponding to the number of item wheels and each of which bears at its periphery type characters corresponding to those borne by said item wheels. The type wheels are supported in alignment with the item wheels but are spaced apart therefrom and the entire series of type wheels is loosely mounted upon a supporting shaft 27 mounted in the rear horizontal arms 22. At the side of each type wheel are pins 28 corresponding in number to the number of characters on the wheel and adapted to receive the engagement of the same members that operate the item wheels by engaging their pins, whereby the item wheels and type wheels are caused to be operated in unison, as will hereinafter appear.

29 designates drop or gravitative rack bars corresponding in number to the number of item wheels and type wheels and each of which is provided at its forward edge with rack teeth 30 adapted to engage the item

wheels and at its rear edge with rack teeth 31 adapted to engage the type wheels, the engagement of said teeth in each instance with the wheels being through the medium of the pins of the wheels. At the rear edge of each rack bar is also a plurality of ratchet teeth 32. Each of the rack bars is provided at its upper end and at one side thereof, with a guide stud 33 that travels in the slot 18 of its guide post 17 and on which is an anti-friction roller 34 (see Fig. XII). Each rack bar is provided with a slot 35 (see Figs. IV and XII) extending upwardly from its lower end and which receives the guide stud 19 of the corresponding guide post 17 for the purpose of providing for the guidance of the lower end of the rack bar. The side of each rack bar is preferably recessed as seen at 36 Fig. IV, to accommodate the anti-friction roller 20. In each rack bar near its lower end and at its forward edge is a notch 37 that receives a member (66) by which the rack bar is lifted to cause it to actuate the item wheels and type wheels.

38 designates a segmental or curved ratchet bar (see Figs. I, IV, XI XII and XIV) mounted in a fixed position upon the base 1 of the machine at a point in front of the rack bars 29 and the carriage by which they are supported. The ratchet bar is provided with a number of vertical teeth corresponding to the number of rack bars.

40 designates a sweep arm that is arranged to swing longitudinally of the ratchet bar 38 and which is provided with a notch 41 in its under edge (see Fig. IV) to receive the teeth of said ratchet bar when said sweep arm is in a lowered position. The sweep arm is pivoted to a bifurcated head 42 of a rock shaft 43, thereby providing for vertical, as well as swinging movement of said sweep arm. The rock shaft 43 is journaled in a bracket 44 surmounting the base of the machine and it extends downwardly through said base.

45 is a torsion spring attached at one end to said rock shaft and fixed at its other end to the base 1. This torsion spring acts to rotate the rock shaft 43 in a direction toward the units side of the machine.

46 is a lever fixed to the lower end of the rock shaft 43 beneath the base 1 and by which said rock shaft is rotated to shift the sweep arm 40 away from the units side of the machine, in order that said sweep arm may be carried into juxtaposition with any desired rack bar 29.

47 designates a spacing plate that is slidably mounted upon the base of the machine at the location of the transverse slot 5 and the stop pins 6. This spacing plate is adapted to be moved transversely of the machine and it is directed in its movement by guides 48. Extending downwardly from the lower side of the spacing plate is a leg 49



which operates in the slot 5, as seen in Figs. IV, V and VII, and which is adapted to engage the forward end of the lever 46 for the purpose of shifting said lever, rotating the rock shaft 43, and swinging the sweep arm 40.

50 is a return spring connecting the spacing plate leg 49 to the base of the machine by which said spacing plate and leg are returned to their normal positions.

51 designates spacer buttons carried by the spacing plate 47 and which bear the various characters indicating integers "1" to "9". The spacer buttons are carried by and normally held in elevated positions by spring arms 52 which connect them to the spacing plate and serve to return them to their normal elevated positions after they have been lowered for a purpose now to be stated. When either of the spacer buttons (with the exception of that bearing the character 8) is pressed downwardly and the spacing plate is shifted transversely of the machine, the button is so placed that it is caused to strike a stop pin 6 and the depression 6' provided for its particular engagement and by which the movement of the spacing plate is determined according to the particular spacer button depressed. Inasmuch as the button bearing the character "8" must necessarily travel a greater distance than either of the other depressible buttons, when the spacing plate is shifted, I provide the depression 6' in the base into which a pin carried by the spring plate of said button is adapted to enter when depressed to restrict the movement of the spacing plate in the desired degree. This is rendered necessary for the reason that the required travel of the plate in such instance is so great that if a stop-pin were used it would have to be so positioned as to cause it to be struck by the next spring plate in advance of the character "8" button and prevent the desired movement of the spacing plate as required when the foremost of the two spring plates mentioned is depressed. The stop pins or depressions 6' that correspond to the various spacer buttons are so disposed that when any individual spacer button is depressed the movement of the spacing plate is caused to be such that the spacing plate will actuate the lever 46 to a degree that will cause the sweep arm 40 to be carried into juxtaposition with a rack bar 29 that corresponds in number (counting from the units side of the machine) to the number of the spacer button operated upon. It will be seen that inasmuch as the springs return the spacer buttons after they have been depressed, said buttons are normally in a position to prevent engagement with any stop pin, except that which is to be engaged by a particular depressed button.

While I have described the buttons as being loosely mounted and depressible relative to the spacing plate, it is obvious that the

integer "9" button may be solidly mounted upon the plate and that insofar as this button is concerned the travel of the spacing plate is restricted when the leg of the spacing plate reaches the end of the slot 5 in which it rides.

53 designates the key board of the machine which is provided with front and rear downwardly extending flanges 54. This key board is supported by a pair of rearwardly extending arms 55 which are rockingly fitted to posts 56 and are adapted to move vertically, the arms extending forwardly from said posts to receive said key board and rearwardly into juxtaposition with the item 80 wheel and type wheel carriage.

57 are posts surmounting the base of the machine immediately in front of the carriage just referred to and in which are vertical guideways 58. 59 is a vertically movable slide bar that extends transversely of the machine and is adapted to ride in said guideways, the said slide bar being provided with a longitudinal slot 60 (see Figs. IV, XII and XIV). The key board arms 55 are loosely fitted to the slide bar 59 through the medium of stems 61 located in their rear ends, as seen in Fig. XI, whereby said slide bar is raised and lowered during the movement of the key board and its arms.

62 is a lift sleeve or member loosely fitted to the slide bar 59 and provided with an aperture 63 through which a stem 40' carried by the sweep arm 40 at its rear end passes, as seen in Figs. IV and XII. The lift sleeve is preferably held to the slide bar by tongues 64 that embrace the bar. The sleeve is provided with a rearwardly extending finger 65 which is adapted to engage either of the rack bars 29 to which it may be moved by entering the notch 37 therein, and upon the finger is a wing 66 which is adapted to engage against the edge of the rack bar for the purpose of preventing escape of said finger until the rack bar has been actuated.

67 is a cross bar attached to the key board arms 55. The cross bar has mounted upon it a plurality of stop pins 68 which are preferably tapered at 69. (See Figs. XII, XIV, XV, XVI, XVII, and XVIII).

70 designates a latch pivoted at 71 to the sweep arm 40 and loosely embracing the rear end of said sweep arm in a position that will cause it to engage the teeth of the ratchet bar 38 when the rear end of the sweep arm is in lowered position and the key board is at rest, and also to engage the stop pins 68 carried by the cross bar 67 when the key board is depressed and the cross bar is elevated.

74 designates the key board keys. Each of these keys is provided with a stem 75 (see Figs. II, III, IV and VI) loosely seated in the top of the key board and said stems are guided beneath the top of the key board in



loops 76 (see Figs. IV and VI) which are secured to the front and rear flanges of said board.

77 are rockable legs extending transversely of the key board and pivoted to its front and rear flanges adjacent to the key stems 75. These legs are provided with lateral pins 78 that seat in the key stems and are adapted to be actuated during the downward movement of each key stem for the purpose of imparting a rocking motion to the leg. The rockable legs are controlled by return springs 79 which are attached to the key board and bear against the pins 78.

80 (see Figs. II, III and IV) are posts surmounting the base of the machine beneath the key board 53. These posts are provided with stop studs 81, of a number corresponding to the number of rockable legs and which are placed upon the posts at various degrees of elevation in order that the different rockable legs may be required to travel different distances before engaging said stop studs. The object of this is to provide for the key board being depressed very slightly when either the "0" sign key or the integer "1" key is operated upon, and gradually increasing distances in operating upon the remaining keys. By this means I provide for the slide bar 59 being elevated to the proper distance in each instance to raise the rack bar 29 corresponding to any particular key, so that said rack bar will move the corresponding item wheel and corresponding type wheel to a degree identical with the degree of movement of the rack bar.

During the operation of the machine for adding action the spacing plate is first moved to the necessary degree in the manner previously explained, in order that the sweep arm may be carried to the proper rack bar according to the highest denomination of the item to be added. The figures of the item are then secured upon the item wheels 23 and the type wheels 26 by operating the proper keys which cause the key board to be depressed, the rear ends of the key board arms to be elevated and carry the vertically movable slide bar 59 therewith. The slide bar elevates the lift sleeve 62 with it and said sleeve acts upon the rack bars through the medium of its finger to produce their operation upon the item wheels and type wheels. Each time that the key board is depressed, the sweep arm 40 is elevated, due to the upward pressure of the cross bar 67 of the key board arms against it, thereby withdrawing the latch 70 from a tooth of the ratchet bar 38, which is previously engaged as shown in Fig. XV and during this withdrawal the wing 66 of the lift sleeve finger 65 moves into engagement with the adjacent rack bar 29 (see Fig. XVI) against which it is held by the action of the sweep arm controlling spring 65 45. As the rear ends of the key board arms

and the vertically movable slide bar fitted thereto descend after elevating a particular rack bar, said slide bar carries with it the lift sleeve while the elevated rack bar is maintained in its uplifted position by means to be presently described, and immediately upon the wing of the lift sleeve finger becoming disengaged from the elevated rack bar the sweep arm and latch are carried by their controlling spring in a direct <sup>75</sup> toward the unit side of the machine until the latch engages the next stop pin in front of it (as seen in Fig. XVII) and its forward movement is restricted. Then as the rear ends of the key board arms and the cross bar 68 descend to the ratchet bar 38, the latch strikes upon a tooth of said bar, (as seen in Fig. XVIII) whereby it is withdrawn from the stop pin just engaged, while the stop pin carrying cross bar continues to descend and the latch 85 moves into engagement with the next succeeding tooth of said ratchet. The rack bars are held in elevated positions after they have been actuated in the manner described to operate the item and type wheels, by trigger arms 82 (see Figs. VI, XI, and XII) which are provided with fingers 83 that engage the ratchet teeth 32 of the rack bars. The trigger arms are restricted in their forward movement by a stop bar 84 attached to a frame 85 having a slotted top member in which said arms are guided. The trigger arms are pivoted at 86 to the frame 85.

87 are springs which bear against the trigger arms and hold their upper ends in forward positions. Each trigger bar is provided at its lower end with a rearwardly extending heel 88.

During the forward movement of the carriage with the series of item wheels the series of type wheels and the drop or gravitative rack bars, the ratchet teeth of the rack bars are withdrawn from the engaging trigger arm fingers 83 and as a consequence the rack bars are free to drop or descend by gravity while their teeth are in engagement with pins 148 of accumulator wheels 147 hereinafter described. The result is the accumulator wheels 147 are rotated to degrees corresponding to the degrees to which the rack bars were elevated and that accumulation is made thereon according to the items that were previously present upon the item wheels and the type wheels. During the downward movement of the carriage with the rack-bars the item wheels and type wheels are returned to their normal positions and are properly placed to be again operated as before in adding additional items.

89 designates a pair of standards mounted upon the rear portion of the base of the machine.

90 is a paper reel journaled to the frame 85 and adapted to contain a ribbon of paper on which the items of addition are printed from



the type wheels 26. The reel is controlled in its rotation by a spring brake 91 that is attached to one of the standards 89 and bears against one end of the reel, as seen in Fig. II, the desired tension upon the spring brake being secured by an adjustment screw 92.

93 are posts surmounting the standards 89.

94 are paper feed rollers having shafts journaled in the posts 93 to which the paper is delivered from the reel 90. In passing to the rollers the ribbon of paper travels in a course in juxtaposition to the type wheels 26.

95 designates a plurality of roller platens that are arranged in opposition to the type wheels 26 and by which the ribbon of paper is carried to the characters on said type wheels for the purpose of causing impressions to be made on the paper by the type. The roller platens are carried by slide bars 96 extending longitudinally of the machine (see Figs. IV, XII and XIII). The slide bars are mounted in a frame supported by the standards 89 and having a forward slotted wall 97 and a rear slotted wall 98 in which the bars operate, the slots in the forward wall being of greater height than the slots in the rear wall, in order that the platen carrying bars may be held in inclined positions with their front ends highest. The slots in the forward wall 97 are of a sufficient vertical length to permit of an upward movement of the platen carrying bars when they are pressed forward in the manner to be presently explained, in order that the roller platens will rotate against the face of the type of the type wheels while performing the printing action, and thereby produce a more perfect impression upon the paper, due to a more gradual printing than could be secured by a direct forward pressure against the type. The rearward movement of the platen carrying bars is restricted by stop pins 99 that are seated in said bars and are adapted to engage the forward frame wall 97.

100 are the end walls of the platen carrying bar frame and 101 is a cross rod mounted in these end walls.

102 are spring fingers that extend over the roller platen bars and terminate in juxtaposition to the upper edges of said bars as seen in Fig. XII. These springs are adapted to resist the upward movement of said bars in a yielding manner, in order that the roller platens may be held firmly, yet yieldingly, against the type of the type wheels during their rising movement in printing action.

103 designates a bumper frame pivoted at 104 to the standards 89 and having a slotted cross head 105 at its outer end. This bumper frame is adapted to be elevated to the rear side of the frame in which the platen bars are located and the slots in its cross-head are of sufficient dimensions to permit of the rear projecting ends of said platen carrying bars passing through

them except when said slots are guarded in the manner to be hereinafter explained.

106 is a rear guide strip secured to the cross head of the bumper frame.

107 are forward guide strips (see Figs. 70 IV and XI) that are secured to the arms of the bumper frame.

108 are bumper slides which correspond in number to the number of roller platen bars and which are loosely positioned between the guide strips 107 and the bumper frame cross head 105 and guide strip 106 to be guided thereby during their sliding movement. These bumper slides are provided with stop pins 109 and 110 (see Fig. IV) which are adapted to strike respectively against one of the guide strips 107 and against the bumper frame cross head 105 to restrict the movement of the slides. The bumper slides are adapted to be moved rearwardly by means to be hereinafter described, for the purpose of causing their rear ends to close the slots in the bumper frame cross head in order that said slides will strike against any desired number of the roller platen bars 96 when the bumper frame is elevated into a vertical position.

111 is a brake bar pivoted to the bumper frame and extending across the bumper slides, the said brake bar being preferably provided at its rear side with a rubber or other facing strip 112 which by bearing against the bumper slides will create sufficient friction between said parts to prevent retrograde movement of the bumper slides in a forward direction while they are being elevated with the bumper frame to strike the platen bars.

113 is a cam that is arranged immediately in front of the bumper mechanism of the machine and which is provided with a leg 114 that operates in the slot 7 of the base 1, as seen in Figs. IV, V, XI and XII. This cam is adapted to be moved transversely of the base of the machine for the purpose of causing it to engage against the inner ends of the bumper slides 108 and throw them rearwardly to close the slots in the bumper frame cross head in the manner stated. 115 is a lever pivoted at 116 to the base of the machine (see Figs. IV and V). The rear arm of this lever is provided with a stem 117 loosely seated in the leg of the cam 113. The forward arm of the lever 115 is provided with a stem 118 loosely seated in the leg 49 of the spacing plate 47. It will be seen that when the spacing plate is moved to the desired distance in the operation of the machine as previously described, the lever 115 will be actuated thereby and will in turn impart movement to the cam 113 for the purpose of moving a number of the bumper slides 108 rearwardly to close the



slots in the bumper frame cross head and that the number of bumper slides so moved depends upon the degree of movement of the spacing plate.

5 119 designates a pull rod by which the bumper frame 103 is elevated. This pull rod has a bifurcated rear end 120 (see Fig. XI) which straddles a leg of a standard 89 by which said bar is guided. One arm of the  
10 bifurcated end of the rod 119 is provided with a notch 121 which provides a shoulder in said arm. The shoulder is adapted to engage a stud 122 projecting from the adjacent side of the bumper frame (see Fig. XI) so  
15 that when the pull rod is moved forwardly the bumper frame will be elevated to a vertical position for the purpose of carrying the bumper slides that have been moved rearwardly into impact with the projecting rear  
20 ends of the roller platen bars 96.

123 is a lever pivoted to a post 124 mounted on the base of the machine at the right hand side thereof. This lever is pivotally connected at 125 to the pull rod 119.  
25 When the lever is moved rearwardly the notch 121 of the pull rod receives the stud 122, and when the lever is moved forwardly the shoulder at the rear end of said notch engages said stud for the purpose of lifting  
30 the bumper frame, and as the bumper frame reaches the limit of its upward movement and strikes the frame wall 98 a jar is occasioned, due to which the pull rod is shaken from the stud 122, thereby permitting the  
35 bumper frame to immediately resume its normal lowered position. The lever 123 is provided with a pair of studs 126 (more particularly referred to hereinafter) located at its inner side (see Fig. I and dotted lines  
40 Figs. III and IV).

127 is an ink ribbon spool mounted on a bracket 128 located at the opposite side of the machine from that at which the bumper frame actuating mechanism is located. This  
45 spool is provided with a knob 129 by which it may be rotated on a stem supported by said bracket and the spool has connected to it one end of an ink ribbon 130. The ink ribbon extends transversely of the machine between  
50 the type wheels 26 and the roller platens 95 and immediately in front of the ribbon of paper delivered from the reel 90 to the feed rollers 94, the ribbon being directed in its travel by guide stems or rollers 131 (see Fig. I). The ink ribbon leads to a spool 132  
55 which is provided with slot and pin connection with a vertical shaft 133 that is loosely mounted in a bracket 134. The shaft 133 has fixed to it a ratchet wheel 135 (see Fig. III, VI and XIX).

136 is a lever pivoted at 137 to the standard adjacent to the pull rod 119 and with which pull rod said lever has slot and pin connection at 138 (see Fig. III).

139 is a pawl pivoted to the upper arm of 65 the lever 136 and adapted to engage the ratchet wheel 135 of the shaft 133 which carries the ribbon spool 132, whereby upon each rearward movement of said pull rod, rotation is imparted to the ribbon spool shaft to wind 70 the ink ribbon thereon.

140 is a spring restraining arm attached to the bracket that supports the ink ribbon spool 132, and which by engaging with the ratchet wheel 135 serves to prevent retro- 75 grade rotation of said spool. The upper paper feed roller 94 is provided with a feed wheel 141 and the lower paper feed roller is provided with a feed wheel 142, these wheels being arranged in mesh with each other. 80

143 is a spring controlled pawl carried by the upper arm of the lever 136 and arranged to engage the teeth of the feed wheel 142, the pawl being so applied to the lever that it will move freely beneath said feed wheel when 85 the upper arm of the lever is moved rearwardly and be restrained from swinging motion when said lever arm is again moved forwardly, whereby the pawl is caused to operate said feed wheel to rotate the feed rollers 90 for paper feeding action.

144 is a spring stop arm which engages the upper feed wheel 141 to restrain the feed rollers from retrograde rotation.

145 is a knob fixed to the shaft of the 95 lower feed roller 94 and by which the feed rollers may be rotated in introducing the ribbon of paper between them.

146 designates a shaft mounted in the posts 57 and extending transversely across 100 the machine in front of the carriage which carries the item wheels 23, the type wheels 26, and drop or gravitative bars 29.

147 are accumulator wheels loosely mounted on said shaft and each bearing the integers 105 "1" to "9" and the "0" sign. At one side of each of these accumulator wheels is a plurality of pins 148 corresponding in number to the number of characters on the wheel and at the opposite side of each wheel is a trip pin 149. 110 The pins 148 are adapted to be engaged by the front teeth 30 of the rack bars 29 which are normally out of engagement with said pins during the act of elevating the rack bars to operate the item wheels and type wheels 115 of the machine.

150 is a guard bar located in front of the accumulator wheels and provided with guard pins 151 adapted to normally occupy positions between adjacent pairs of the pins 148 120 of the accumulator wheels for the purpose of preventing accidental rotation of said wheels. The guard bar is provided at its ends with bifurcated arms 152 which straddle the shaft 146 on which the accumulator wheels are 125 mounted and which extend into engagement with the carriage side bars 11 (see Fig. XIII). The guard bar is normally held in



retracted position by springs 153 that are attached to the posts 57 and bear against the arms of the bar, as seen in Fig. XII.

154 designates a rock shaft journaled in the posts 56 (see Figs. I and IV) and to the ends of which are fixed crank arms 155.

156 are links having their forward ends pivoted to said crank arms and their rear ends pivoted to the carriage side bars 11 by pivot pins 157.

158 are links connected to the links 156 and to the upper portions of the carriage side bars. These links 156 and 158 serve to draw the item wheel and type wheel carriage forwardly when the rock shaft 154 is rocked, and rocking motion is imparted to said rock shaft through the medium of the lever 123, after the bumper of the printing mechanism has been actuated by the movement of said lever and the actuation of the rock shaft is accomplished, through the medium of the rearmost stud 126 carried by said lever striking against the pivot pin adjacent thereto that connects the adjacent link 156 and crank arm 155. When the lever 123 is moved in the opposite direction the forward stud 126 strikes against said pivot pin and returns the item wheel and type wheel carriage to its former position and away from the accumulator wheels toward which it was previously moved.

It is to be understood that when the item wheel and type wheel carriage is moved forwardly the rack bars 29 have been previously elevated to operate the item wheels and type wheels and that they are held in their elevated positions. As the carriage moves forwardly its side bars 11 press against the arms of the guard bar 150, thereby forcing said guard bar forwardly and withdrawing the guard pins 151 from positions between the pins 148 of the accumulator wheels. At the same time the forward rack teeth 30 of the rack bars engage the pins 148 of the released accumulator wheels.

159 designates a rocker frame that is located between the standards 89 and is provided with forwardly projecting fingers 160, which enter between the item wheel and type wheel carriage posts 17 and are adapted to operate against members carried by these posts. The arms of the rocker frame are pivoted at 161 to the standards 89 and the lower ends of these arms have connected to them hooks or links 162 which engage the pivot pins 157 by which the links 156 are connected to the carriage side bars 11. Upon each forward movement of the links 156 the hooks 162 are drawn forwardly and the upper end of the rocker frame with its fingers is moved rearwardly and away from the guide posts of the wheel carriage.

163 are dogs which are pivoted to the guide posts 17. (See Figs. XII and XIII). These dogs have forwardly extending fingers

164 that normally project into the path of travel of the trip pins 149 carried by the accumulator wheels 147. The dogs also have upwardly projecting arms 165 and rearwardly projecting arms 166 which are inclined at their rear edges. 167 are pawls also pivoted to the guide posts and having upper arms 168 provided with shoulders 169 that are adapted to receive the upper arms of the dogs 163. The pawls also have downwardly extending arms 170 which are adapted to ride against the inclined rear edges of the rear arms of the dogs 163. The dogs 163 and pawls 167 are normally maintained in the positions illustrated in Figs. XII and XIII, and the rack bars 29 are normally upheld one step from the limit of their downward movement, when in lowered positions, due to the rollers 34 carried by the rack bars resting upon the upper ends of the pawls 167. I thus provide for the descent of the rack bars an additional step when they are released as will be presently stated, in order that transfer may be made from an accumulator wheel of a lower denomination to an accumulator wheel of a higher denomination. Each time that transfer is made the trip pin 149 of the accumulator wheel of lower denomination strikes against the finger 164 of the adjacent dog 163, thereby tripping said dog so that its finger moves downwardly and its upwardly extending arm 165 moves forwardly to release the pawl 167 associated with said dog. These movements take place while the item wheel and type wheel carriage is in forward position, and as a consequence of the forward movement of the upper end of the pawl 167 the rack bar which is in engagement with the accumulator wheel of a higher denomination and to which transfer is to be made is permitted to descend a single step to the limit of its movement, thereby moving the accumulator wheel of higher denomination a single step and performing the carrying operation from the lower denomination wheel to the higher denomination wheel. When the item wheel and type wheel carriage is returned to its normal position the lower arm 170 of the pawl 167 is engaged by the opposing finger 160 of the rocker frame 359 and said finger acts to return the pawl to its normal position, due to said pawl arm riding into engagement with the inclined rear edge of the dog arm 166 and acting to throw said arm downwardly, the dog finger 164 upwardly into the path of travel of the corresponding trip pin 149 and the upper arm 165 into engagement with the shoulder 169 of the pawl 167.

It now being understood how, when each item is placed into the item and type wheels upon the upward movement of the rack bar 29 and how the printing upon the strip of paper is effected while said wheels are in



such position, how upon the forward movement of the carriage carrying said wheels and rack bars causes the engagement of the latter with the accumulator wheels, and how upon the release and downward movement of said rack bars all of the item and type wheels are returned to zero and the accumulator wheels accumulate or add all of the previous items. I will now explain how the total is printed upon the strip of paper. The item and type wheels all being at zero and the accumulator wheels exhibiting the total, which it is desirable to print on the strip of paper, under the items previously printed thereupon, the spacer button 51 of the spacing plate 47 corresponding to the highest digit used in the total is depressed and the spacer plate is moved as far as it is permitted to go, after which the total is copied from the accumulator wheels by pressing the proper key board keys 74, whereupon it will be seen that both the item and type wheels have the same figures (the total) as the accumulator wheels and upon the manipulation of the lever 123 the printing of the same will be effected in like manner as the printing of any item heretofore printed. For example, if the total exhibited on the accumulator wheels was 1,234, the type and item wheels being at zero, the spacer button of the fourth digit is depressed and the spacer bar is moved to its limit of movement, after which the key board keys 74 are depressed in 1—2—3—4 order, whereby the number 1,234 will be placed in the item and type wheels and afterwards printed as before described.

For the purpose of releasing the guard bar pins 151 from the pins of the accumulator wheels 147 in order that said wheels may be returned to clearing position, I employ the following parts: 172 is a rock bar mounted in the posts 57 and provided with arms 173 which are adapted to engage the guard bar 150. The rock bar is provided with a knob 174 by which it may be grasped to rock it and throw the arms 173 against the guard bar. In restoring the accumulator wheels the shaft 146 on which they are mounted is rotated through the medium of knob 175 fixed to said shaft in the opposite direction to which the wheels move when accumulating, until the trip pins 149 on all of the wheels save the one of the highest order contact with the finger 164 of the dogs 163, whereupon all of said mentioned wheels are brought to a stop and exhibit through a sight opening in a suitable casing not shown, a cipher. As there is no dog 163, hence no carried finger 164, for co-operation with the trip pin 149 of the accumulator wheel of the highest order, to effect a stop therefor I employ a rearwardly and upwardly extending finger 173<sup>a</sup> secured to the rock shaft 172 which, when said rock shaft is rocked in the proper direction will

elevate said finger 173<sup>a</sup> into the path of travel of the trip pin 149 and when the shaft 146 is properly rotated the accumulator wheel of the highest order will be brought to proper position in like manner as the accumulator wheels before described, due to the contact of said trip pin with said finger 173<sup>a</sup>.

In some instances it is desirable to carry on the operation of an adding machine without the printing action, and to provide for this being done in my machine I employ the following parts. 176 is a lever pivoted to a bracket 177 attached to the base of the machine (see Figs. IV and V) and extending through the slot 4 in the front flange 2. The rear end of this lever is held depressed by a spring 178 and the lever is connected by a link 179 to an arm 180 carried by the rock shaft 154. When the lever 176 is depressed the rock shaft is operated and the wheel carriage and parts associated therewith are operated in a manner similar to that in which they are operated by the lever 123 and without the printing action accomplished through the medium of the lever 123 being carried out.

It sometimes occurs that mistakes are made in the operation of the item wheels and it is therefore desirable to provide means whereby the item wheels may be returned after they are operated and before the printing mechanism and the accumulator mechanism are brought into action. To provide for the release of the rack bars and the return of the item wheels and type wheels to their cleared positions, I make use of the following parts: 181 is a lever pivoted to a bracket 182 attached to the base of the machine. (See dotted lines in Fig. II and full lines in Figs. V and XII.) This lever extends through the slot 3 in the base flange 2 and its rear end is normally held depressed by a spring 183. 184 is a lift pin pivoted to the rear end of said lever and extending vertically through the base of the machine at its rear end. 185 is a rock bar journaled in the frame 85 and projecting over the heels 88 of the trigger arms 82. This rock bar has fixed to it an arm 186 which occupies a position over the lift pin 184 and which is adapted to be lifted by said pin for the purpose of rocking the rock bar and withdrawing the fingers of the trigger arms from the ratchet teeth of the rack bars 29. It will be seen that by this means all of the rack bars that have been elevated may be lowered without affecting the machine otherwise than to return the rack bars, item wheels and type wheel to their normal positions.

I find it desirable to retain the total of a column of figures in the accumulator wheels after the total has been printed upon the strip of paper, in order to verify the same and inasmuch as the total to be printed had to be separately placed in the item and type



wheels, and as the accumulator wheels would, were no means employed to prevent them, add this total in said item and type wheels to the total already exhibited in the accumulator wheels upon the downward movement of said rack bars 29, I employ a guard bar 187 which is slidably mounted in the forward end of the base of the machine and in juxtaposition to the lever 176, (see Figs. IV, V, and XXI) which bar 187 is provided with a ledge 188 which, when said bar 187 is moved in the proper direction, will cause said ledge 188 to be carried under the lever 176, rendering the same inoperative. The guard bar 187 is shifted longitudinally by a push pin 189 having a beveled lower end which engages a beveled portion of the guard bar as seen in Fig. XXI.

By rendering the lever 176 inoperative the carriage carrying the item and type wheels cannot be brought to a forward position, consequently the rack bar carried thereby will not mesh with the accumulator wheels, hence it will be seen that the rack bars on their downward movement will leave the total in said accumulator wheels undisturbed. This operation, however, does not in the least prevent the operating of the handle 123 and the printing effected thereby. 190 designates a pin (see Figs. IV and XII) stationarily mounted in the shaft 27 of the type wheels and is located between the second and third digit wheels thereof. This pin 190 is of sufficient length to cause the ink ribbon and paper to be impinged between it and one of the platen rollers 95 when the latter is drawn forwardly in the act of printing and producing upon said paper a decimal point.

I claim:

1. In an adding machine, the combination of a series of accumulator wheels, a carriage movable relative to said accumulator wheels, gravitative means and item wheels carried by said carriage, and means for elevating said gravitative means; the item wheels being actuated by the upward movement of said gravitative means, and the accumulator wheels, and item wheels, being actuated by the dropping of the gravitative means when the carriage is advanced.

2. In an adding machine, the combination of a series of accumulator wheels, a carriage movable relative to said accumulator wheels, gravitative rack-bars and item wheels carried by said carriage; and means for elevating said gravitative rack-bars, the item wheels being actuated by the upward movement of said gravitative rack-bars, and the accumulator wheels, and item wheels being actuated by the dropping of the gravitative rack-bars when the carriage is advanced.

3. In an adding machine, the combination of a series of accumulator wheels, a carriage movable relative to said wheels, gravitative

rack bars carried by said carriage, means for elevating said rack bars, means for sustaining the rack bars in elevated positions, and means for moving said carriage toward said wheels to bring said rack bars into engagement with said wheels before the rack bars descend and cause the rack bars to operate the wheels while the rack bars are descending by gravity, substantially as set forth.

4. In an adding machine, the combination of a series of accumulator wheels, means for guarding said wheels against movement, a carriage movable relative to said wheels, gravitative rack bars carried by said carriage, means for elevating said rack bars, means for sustaining the rack bars in elevated positions, and means for moving said carriage toward said wheels to bring said rack bars into engagement with said wheels previous to their descent by gravity, substantially as set forth.

5. In an adding machine, the combination of a series of accumulator wheels, a series of item wheels, a carriage by which said item wheels are supported, rack bars carried by said carriage and arranged to engage said item wheels, means for elevating said rack bars, means for sustaining the rack bars in elevated positions, and means for moving said carriage toward said accumulator wheels to bring said rack bars into engagement with said accumulator wheels, substantially as set forth.

6. In an adding machine, the combination of a series of accumulator wheels, a reciprocal carriage, gravitative rack-bars and item wheels and type wheels carried by said carriage, and means for elevating said rack-bars; the item wheels and type wheels being actuated by the upward movement of said rack-bars, and the item wheels, type wheels and accumulator wheels being actuated by the dropping of the rack-bars when the carriage is advanced.

7. In an adding machine, the combination of a series of accumulator wheels, a reciprocal carriage, gravitative rack-bars having ratchet teeth and item wheels and type wheels carried by said carriage, means for elevating said rack-bars, and trigger arms arranged to engage the ratchet teeth of the said rack-bars; the item wheels and type wheels being actuated by the upward movement of said rack-bars, and the item wheels, type wheels and accumulator wheels being actuated by the dropping of the rack-bars when the carriage is advanced and the ratchet teeth released from the trigger arms.

8. In an adding machine, the combination of a series of accumulator wheels, a reciprocal carriage, gravitative rack-bars having ratchet teeth and item wheels and type wheels carried by the carriage, means for elevating said rack-bars, trigger arms arranged to engage the ratchet teeth of the



rack-bars, and means for releasing the rack-bars; the item wheels and type wheels being actuated by the upward movement of said rack-bars, and the item wheels, type wheels and accumulator wheels being actuated by the dropping of the rack-bars when the carriage is advanced and the ratchet teeth released from the trigger arms.

9. In an adding machine, the combination of a series of accumulator wheels, means consisting of drop rack bars for operating said wheels, a carriage carrying said wheel operating means and movable relative to said wheels, and a guard bar for controlling the movement of said wheels and arranged to be released upon the movement of said carriage, substantially as set forth.

10. In an adding machine, the combination of a series of accumulator wheels, means consisting of drop rack bars for operating said wheels, a carriage by which said wheel operating means are carried, and which is movable relative to said wheels, a spring controlled guard bar for engagement with said wheels, said guard bar being arranged in engagement with said carriage, whereby the guard bar is moved upon the movement of the carriage, substantially as set forth.

11. In an adding machine, the combination of a series of accumulator wheels provided with pins, a carriage movable relative to said wheels, means consisting of drop rack bars carried by said carriage for operating said wheels by engagement with their pins, and a spring controlled guard bar adapted to be engaged by said carriage and having pins arranged to engage the pins of said wheels, substantially as set forth.

12. In an adding machine, the combination of a vertically movable key board, a key loosely mounted in said key board, a rockable member fitted to said key board and having engagement with said key, and means adapted to be engaged by said rockable member to limit the downward movement of said key board, substantially as set forth.

13. In an adding machine, the combination of a vertically movable key board, a key loosely mounted in said key board, a spring controlled rockable member fitted to said key board and having engagement with said key, and means adapted to be engaged by said rockable member to limit the downward movement of said key board, substantially as set forth.

14. In an adding machine, the combination of a vertically movable key board, a key loosely mounted in said key board, a rockable member provided with a pin fitted to said key, and means adapted to be engaged by said rockable member to limit the downward movement of said key board, substantially as set forth.

15. In an adding machine, the combination of a base, a vertically movable key

board, a key loosely mounted in said key board, a rockable member fitted to said key board and having engagement with said key, and a post mounted on said base and provided with a stop stud adapted to be engaged by said rockable member, substantially as set forth.

16. In an adding machine, the combination of a base, a vertically movable key board, a plurality of keys loosely mounted in said key board, a plurality of rockable members fitted to said key board and having engagement with said keys, and a plurality of posts mounted on said base; said posts being provided with stop studs arranged at different elevations thereon and adapted to be engaged by said rockable members to limit the downward movement of said key board, substantially as set forth.

17. In an adding machine, the combination of a series of item wheels, means for engaging and operating said wheels, a shiftable member for operating said wheel engaging means, a sweep arm for engagement with said shiftable member, a spring for moving said sweep arm laterally in one direction and a spacing member for setting said sweep arm, substantially as set forth.

18. In an adding machine, the combination of a series of item wheels, means for engaging and operating said wheels, a shiftable member for operating said wheel engaging means, a sweep arm for engagement with said shiftable member, a spacing member for operating said sweep arm, stop members, and means carried by said spacing member adapted to engage said stop members to limit the movement of said spacing member, substantially as set forth.

19. In an adding machine, the combination of a series of item wheels, means for engaging and operating said wheels, a shiftable member for operating said wheel engaging means, a swinging sweep arm for engagement with said shiftable member and having an arm associated therewith and a spacing member for operating said sweep arm through the medium of said associated arm, substantially as set forth.

20. In an adding machine, the combination of a series of item wheels, means for engaging and operating said wheels, a shiftable member for operating said wheel engaging means, a sweep arm for engagement with said shiftable member, a spacing plate for setting said sweep arm, and a spring for imparting lateral movement to said sweep arm, substantially as set forth.

21. In an adding machine, the combination of a series of item wheels, means for engaging and operating said wheels, a lift member for engagement with said operating means, a sweep arm fitted to said lift member, a spacing member for setting said sweep arm, and a spring for imparting lateral move-



ment to said sweep arm, substantially as set forth.

22. In an adding machine, the combination of a base, a series of item wheels, a series of rack bars for operating said wheels, a lift member for engagement with said rack bars, and means for moving said lift member to said bars; said means comprising a sweep arm, a spacing plate for imparting movement to said sweep arm, spring controlled buttons mounted in said spacing plate, and stops surmounting said base and adapted to be engaged by said buttons, substantially as set forth.

23. In an adding machine, the combination of a series of item wheels, rack bars for operating said item wheels, a key board, arms by which said key board is rockingly supported, a vertically movable bar carried by said arms, a lift member loosely fitted to said bar and adapted to engage said rack bars, a sweep arm engaging said lift member, and means for operating said sweep arm to carry said lift member to said rack bars, substantially as set forth.

24. In an adding machine, the combination of a series of item wheels, rack bars for operating said item wheels, a key board, arms by which said key board is rockingly supported, a vertically movable bar carried by said arms, a lift member loosely fitted to said bar and provided with a finger having a wing adapted to engage said rack bars, a sweep arm engaging said lift member, and means for operating said sweep arm to carry said lift member to said rack bars, substantially as set forth.

25. In an adding machine, the combination of a base, a series of item wheels, rack bars for operating said wheels, a ratchet bar mounted on said base, a key board, vertically movable arms by which said key board is carried, a lift member for engagement with said rack bars, a bar carried by said key board arms, and to which said lift member is loosely fitted, a spring controlled sweep arm fitted to said lift member and adapted to engage said ratchet bar, and means carried by said key board arms for moving said sweep arm out of engagement with said ratchet bar, substantially as set forth.

26. In an adding machine, the combination of a base, a series of item wheels, rack bars for operating said wheels, a ratchet bar mounted on said base, a key board, vertically movable arms by which said key board is carried, a lift member for engagement with said rack bars, a bar carried by said key board arms and to which said lift member is loosely fitted, a spring controlled sweep arm fitted to said lift member and adapted to engage said ratchet bar, and means carried by said key board arms for moving said sweep arm out of engagement with said ratchet bar; said sweep arm lifting means being pro-

vided with stop pins, substantially as set forth.

27. In an adding machine, the combination of a base, a series of item wheels, rack bars for operating said wheels, a ratchet bar mounted on said base, a key board, vertically movable arms by which said key board is carried, a lift member for engagement with said rack bars, a bar carried by said key board arms and to which said lift member is loosely fitted, a spring controlled sweep arm fitted to said lift member and adapted to engage said ratchet bar, and means carried by said key board arms for moving said sweep arm out of engagement with said ratchet bar; said sweep arm lifting means being provided with stop pins, and said sweep arm being provided with a latch adapted to engage said ratchet bar and said stop pins, substantially as set forth.

28. In an adding machine, the combination of a base, a series of item wheels, rack bars for operating said wheels, a ratchet bar mounted on said base, a key board, vertically movable arms by which said key board is carried, a lift member for engagement with said rack bars, a bar carried by said key board arms and to which said lift member is loosely fitted, a spring controlled sweep arm fitted to said lift member and adapted to engage said ratchet bar, and means carried by said key board arms for moving said sweep arm out of engagement with said ratchet bar; said sweep arm lifting means being provided with stop pins, and said sweep arm being provided with a spring controlled latch adapted to engage said ratchet bar and said stop pins, substantially as set forth.

29. In an adding machine, the combination of a series of accumulator wheels, a series of item wheels, a carriage by which said item wheels are carried, and which is movable relative to said accumulator wheels, a series of rack bars carried by said carriage adapted to operate said item wheels in one direction of their travel and said accumulator wheels in the other direction of their travel, and means for operating said series of rack bars, substantially as set forth.

30. In an adding machine, the combination of a series of accumulator wheels provided with trip studs, a carriage movable relative to said accumulator wheels, rack bars adapted to engage said accumulator wheels, dogs pivoted to fixed parts of said carriage and having members arranged in the path of travel of said trip studs, and pawls engaging said dogs and adapted to temporarily support said rack bars, substantially as set forth.

31. In an adding machine, the combination of a series of accumulator wheels provided with trip studs, a carriage movable relative to said accumulator wheels, rack bars adapted to engage said accumulator



wheels, dogs pivoted to fixed parts of said carriage and having members arranged in the path of travel of said trip studs, pawls engaging said dog and adapted to temporarily support said rack bars, and means for returning said pawls and dogs to their normal positions, substantially as set forth.

32. In an adding machine, the combination of a series of accumulator wheels provided with trip studs, a carriage movable relative to said accumulator wheels, rack bars adapted to engage said accumulator wheels, dogs pivoted to fixed parts of said carriage and having members arranged in the path of travel of said trip studs, and pawls engaging said dogs and adapted to temporarily support said rack bars; said dogs being provided with upwardly extending arms and said pawls being provided with shoulders to receive said arms, substantially as set forth.

33. In an adding machine, the combination of a series of accumulator wheels provided with trip studs, a carriage movable relative to said accumulator wheels, rack bars adapted to engage said accumulator wheels, dogs pivoted to fixed parts of said carriage and having members arranged in the path of travel of said trip studs, and pawls engaging said dogs and adapted to temporarily support said rack bars; said dogs being provided with upwardly extending arms and rearwardly extending arms having inclined edges and said pawls being provided with shoulders adapted to receive

said upwardly extending arms and downwardly extending arms adapted to engage the inclined edges of said rearwardly extending dog arms, substantially as set forth.

34. In an adding machine, the combination of a series of accumulator wheels, a reciprocatory carriage, gravitative rack-bars having ratchet teeth and item wheels and type wheels carried by said carriage, means for elevating said rack-bars, trigger arms arranged to engage the ratchet teeth of the rack-bars, and a trip lever for operating said trigger arms for releasing the rack-bars; the item wheels and type wheels being actuated by the upward movement of said rack-bars, and the item wheels, type wheels and accumulator wheels being actuated by the dropping of the rack-bars when the carriage is advanced and the ratchet teeth released from the trigger arms.

35. In an adding machine, the combination of a series of accumulator wheels, a series of item wheels, drop rack bars for operating the accumulator wheels a carriage by which said item wheels and drop rack bars are carried, pull members connected to said carriage and by which the carriage is moved toward said accumulator wheels, a lever for operating said pull members, and a slide bar for restricting said lever from movement, substantially as set forth.

WILLIAM F. GATEWOOD.

In presence of--

BLANCHE HOGAN,  
WM. H. SCOTT.