

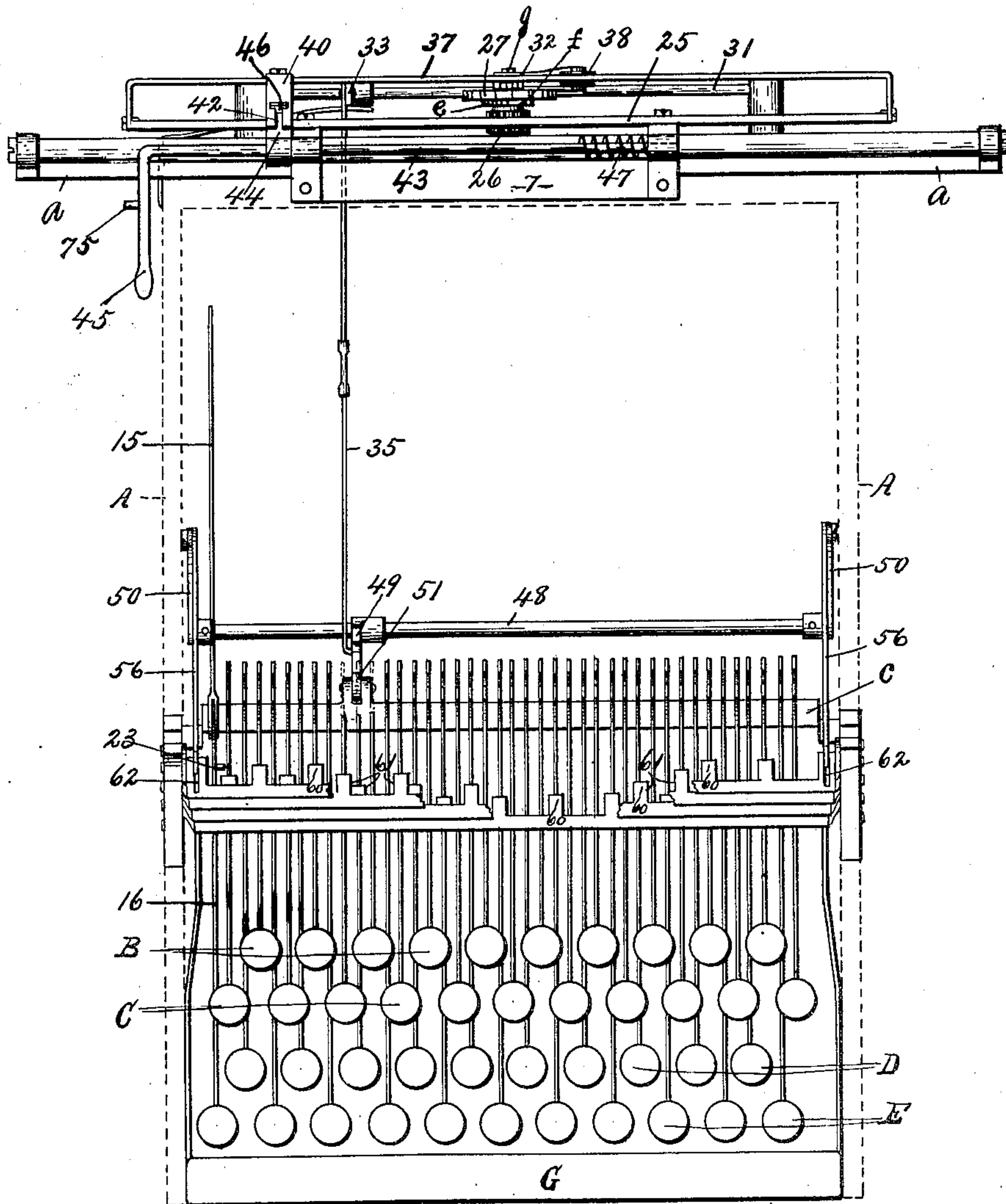
No. 896,680.

PATENTED AUG. 18, 1908.

E. E. BARNEY.  
TYPE WRITING MACHINE.  
APPLICATION FILED JUNE 11, 1900.

7 SHEETS--SHEET 1.

Fig. 1.



**WITNESSES:**

H. O. Chase.  
J. E. Arthur.

INVENTOR

INVENTOR  
Edwin Earle Barney

BY

BY  
Smith & Wilson  
ATTORNEYS.

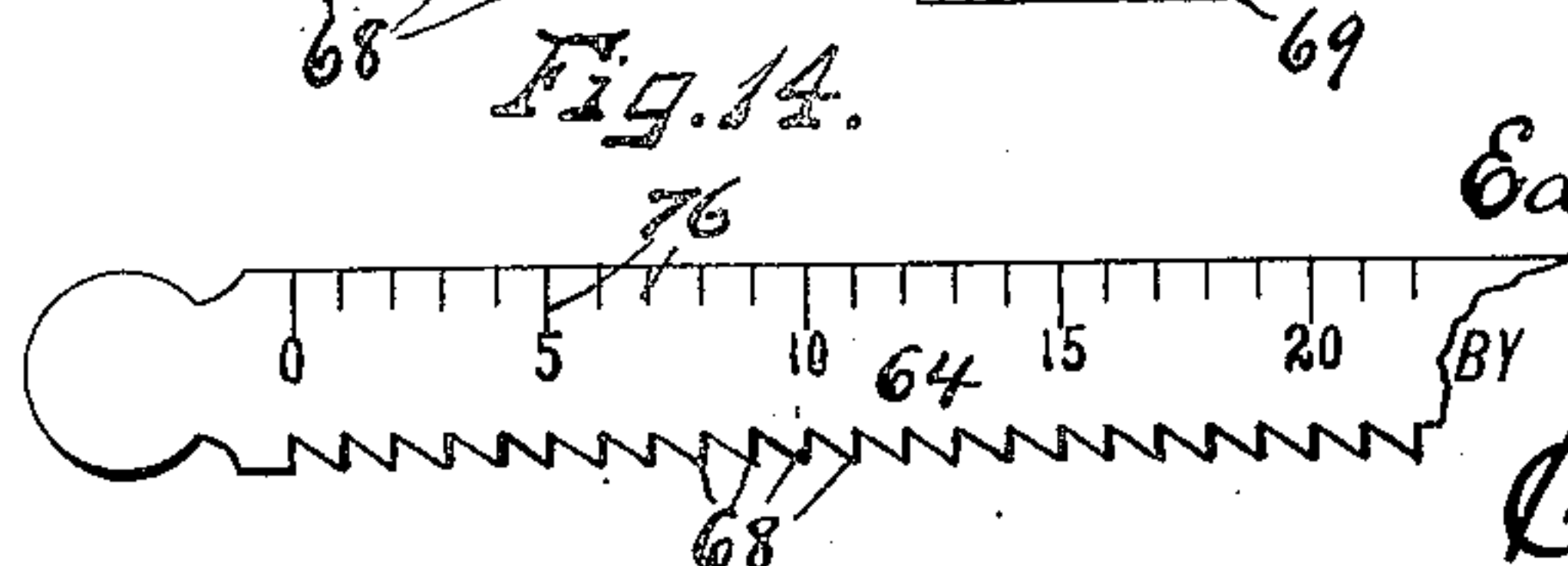
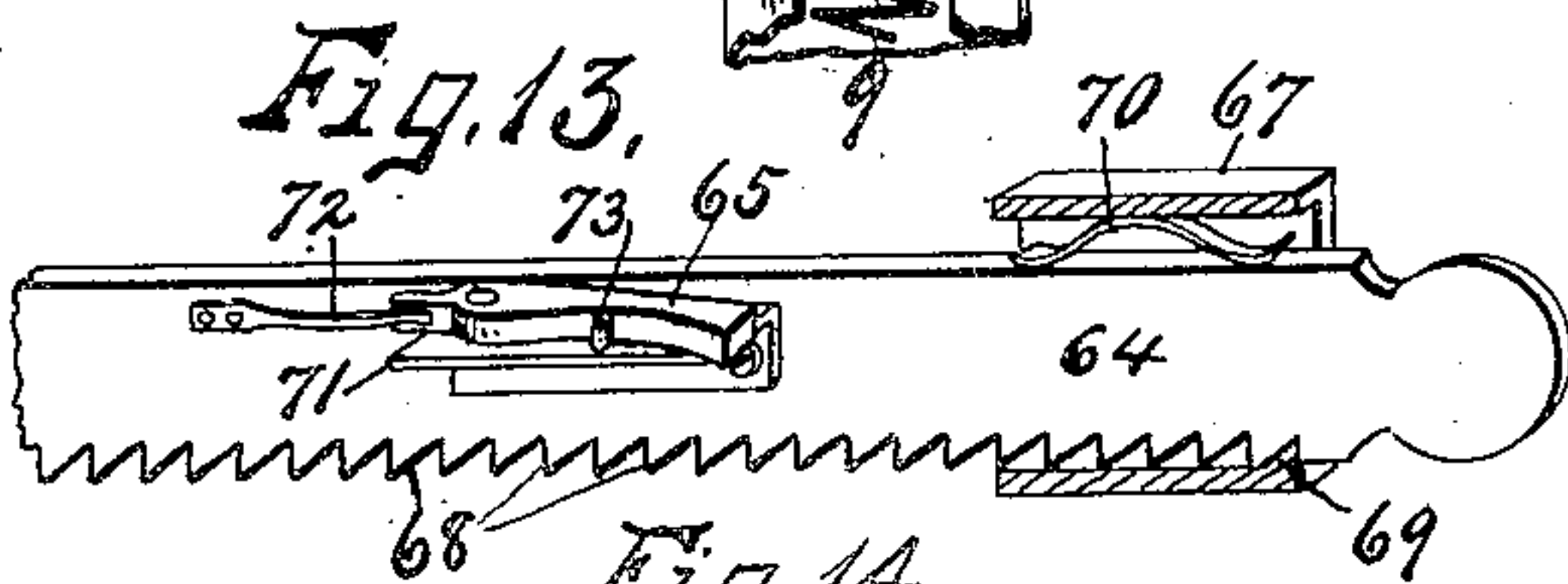
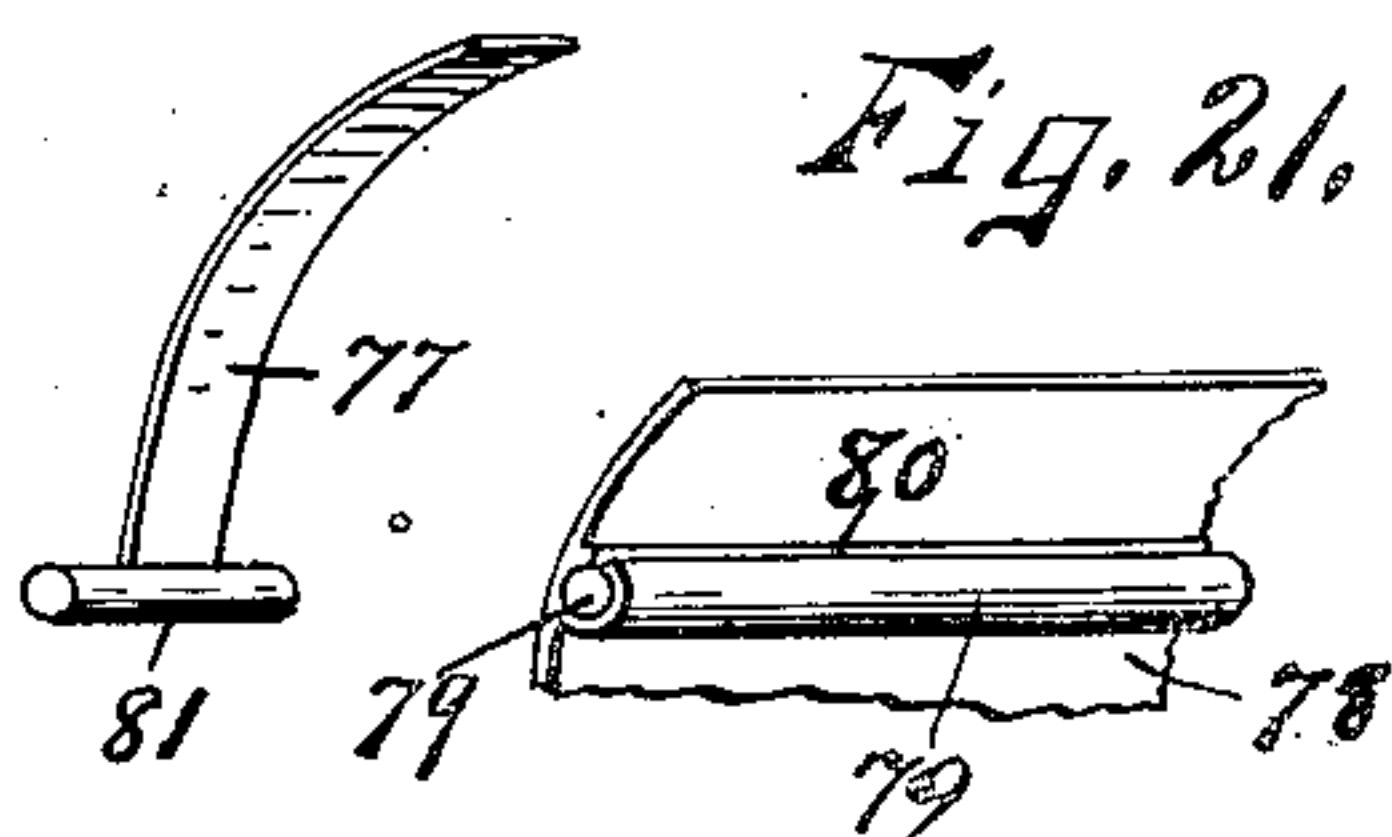
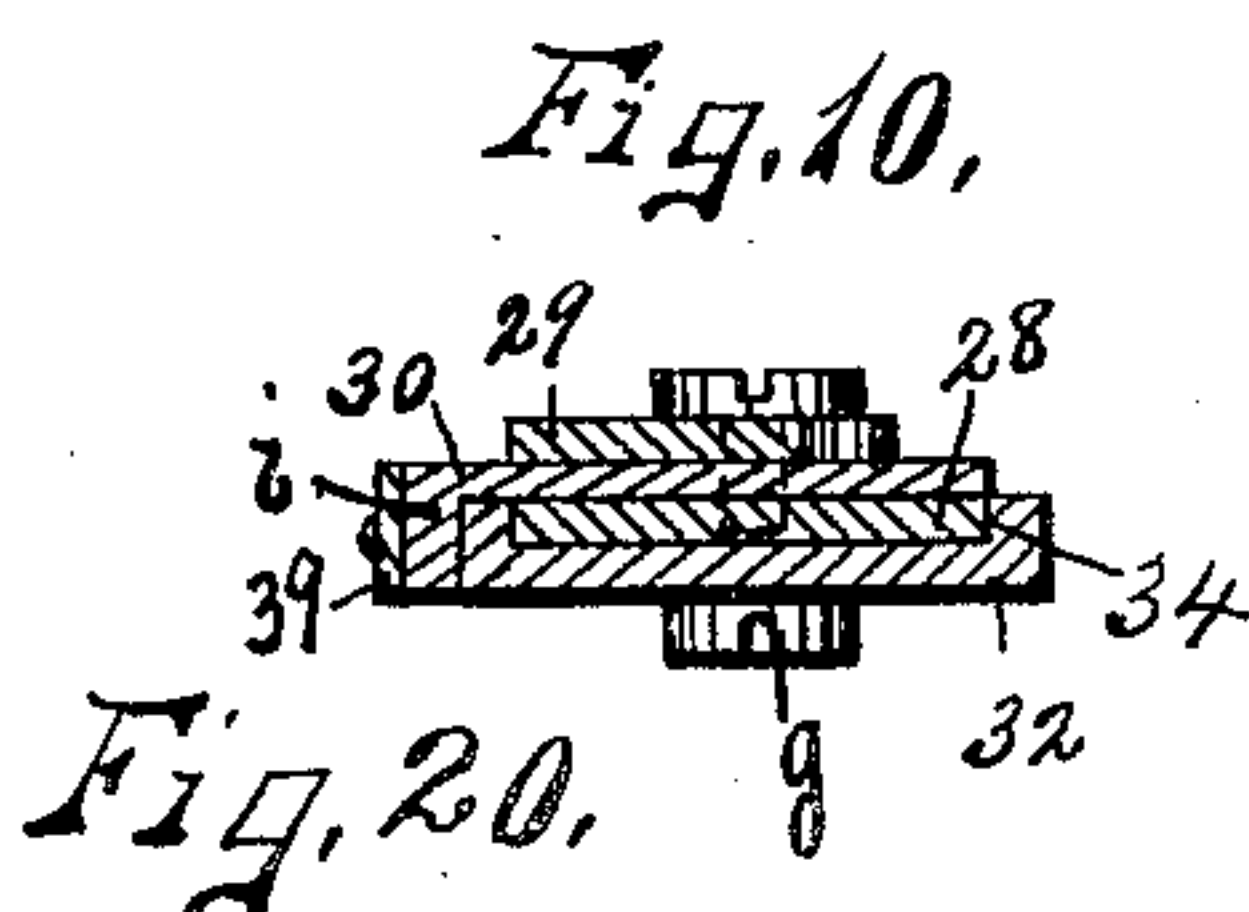
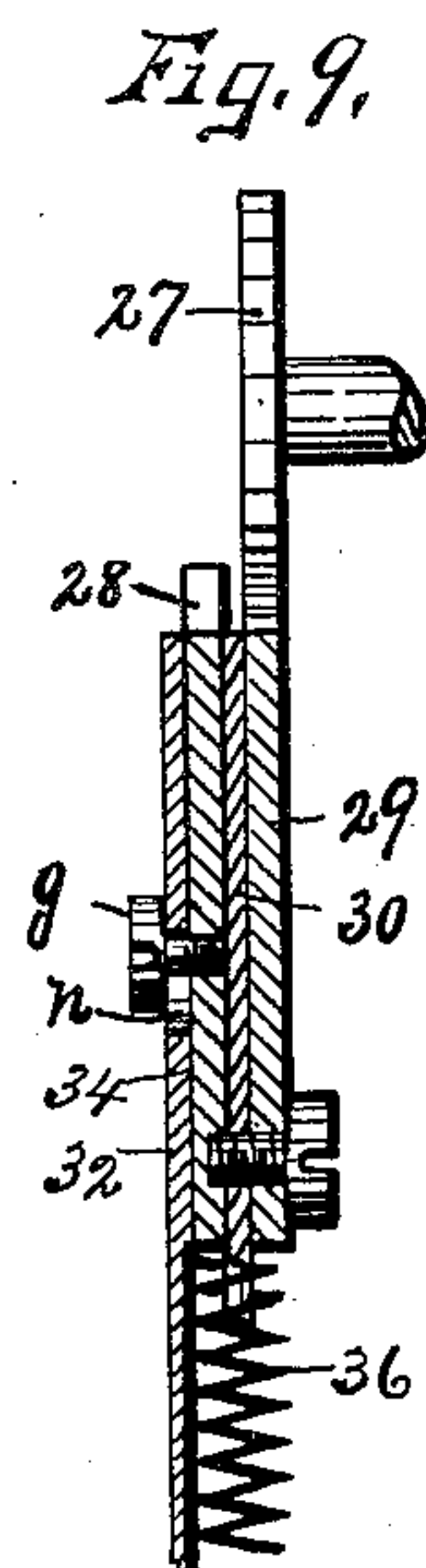
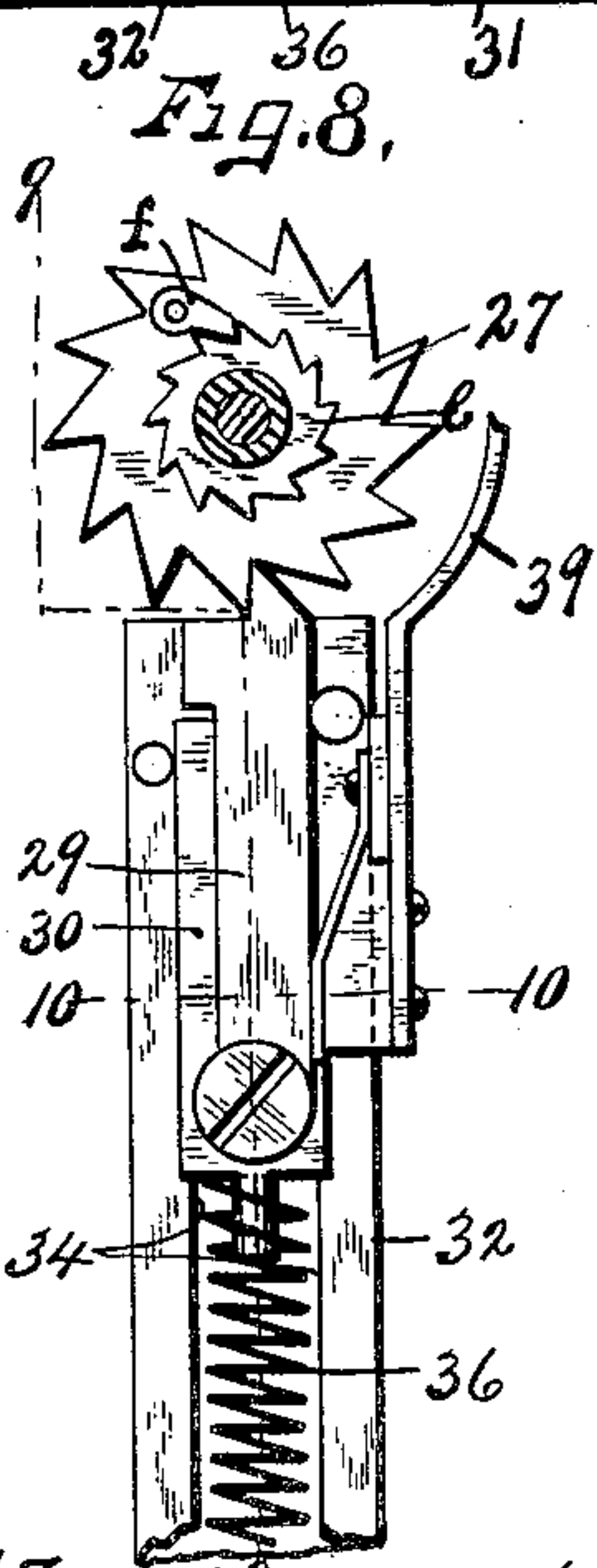
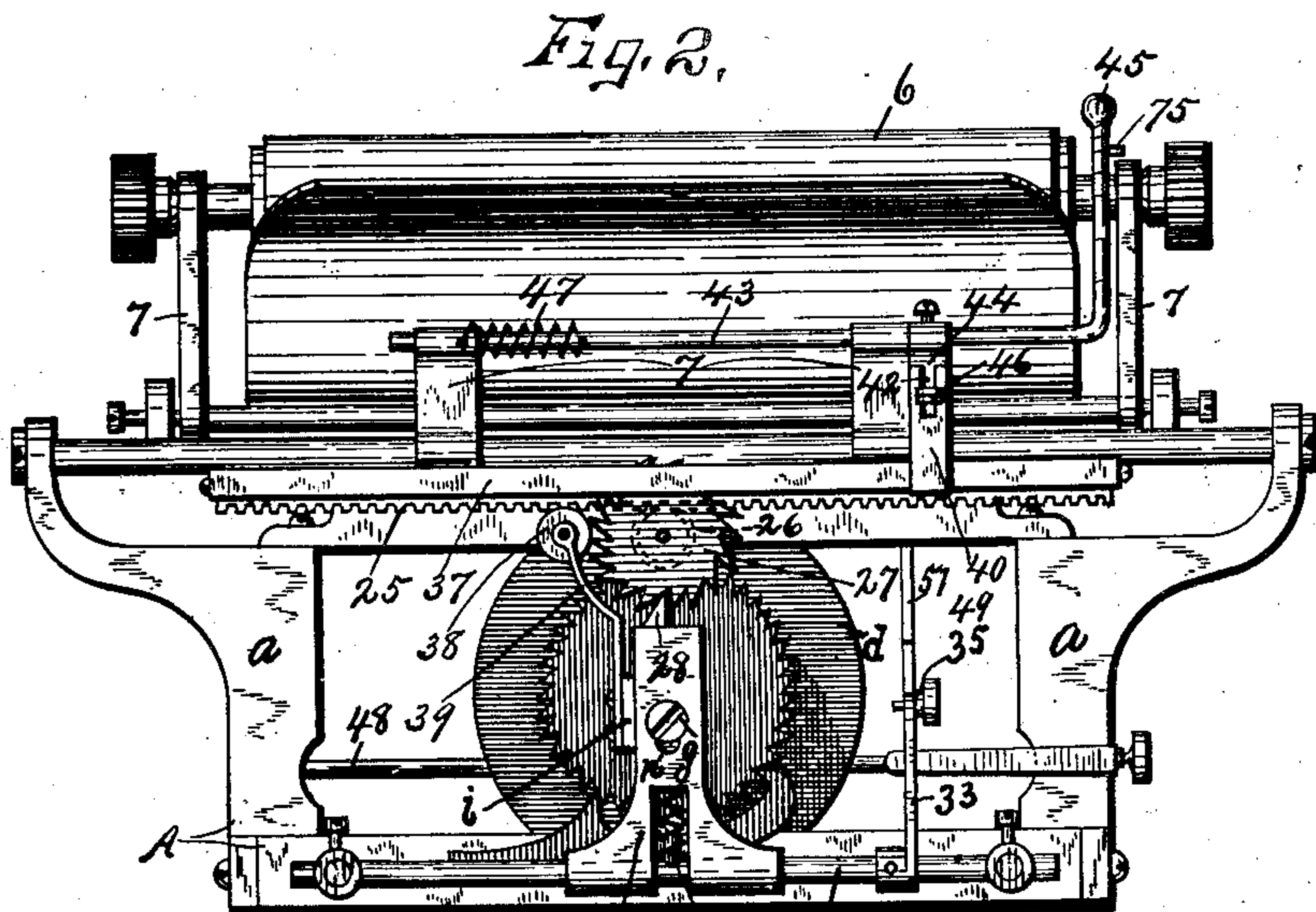
*ATTORNEYS.*

No. 896,680.

PATENTED AUG. 18, 1908.

E. E. BARNEY.  
TYPE WRITING MACHINE.  
APPLICATION FILED JUNE 11, 1900.

7 SHEETS—SHEET 2.



**WITNESSES:**

W. B. Chase  
J. E. Arthur,

INVENTOR

INVENTOR  
Edwin Earle Barney

Smith & Benson

**ATTORNEYS.**

No. 896,680.

PATENTED AUG. 18, 1908.

E. E. BARNEY.  
TYPE WRITING MACHINE.  
APPLICATION FILED JUNE 11, 1900.

7 SHEETS--SHEET 3.

Fig. 3.

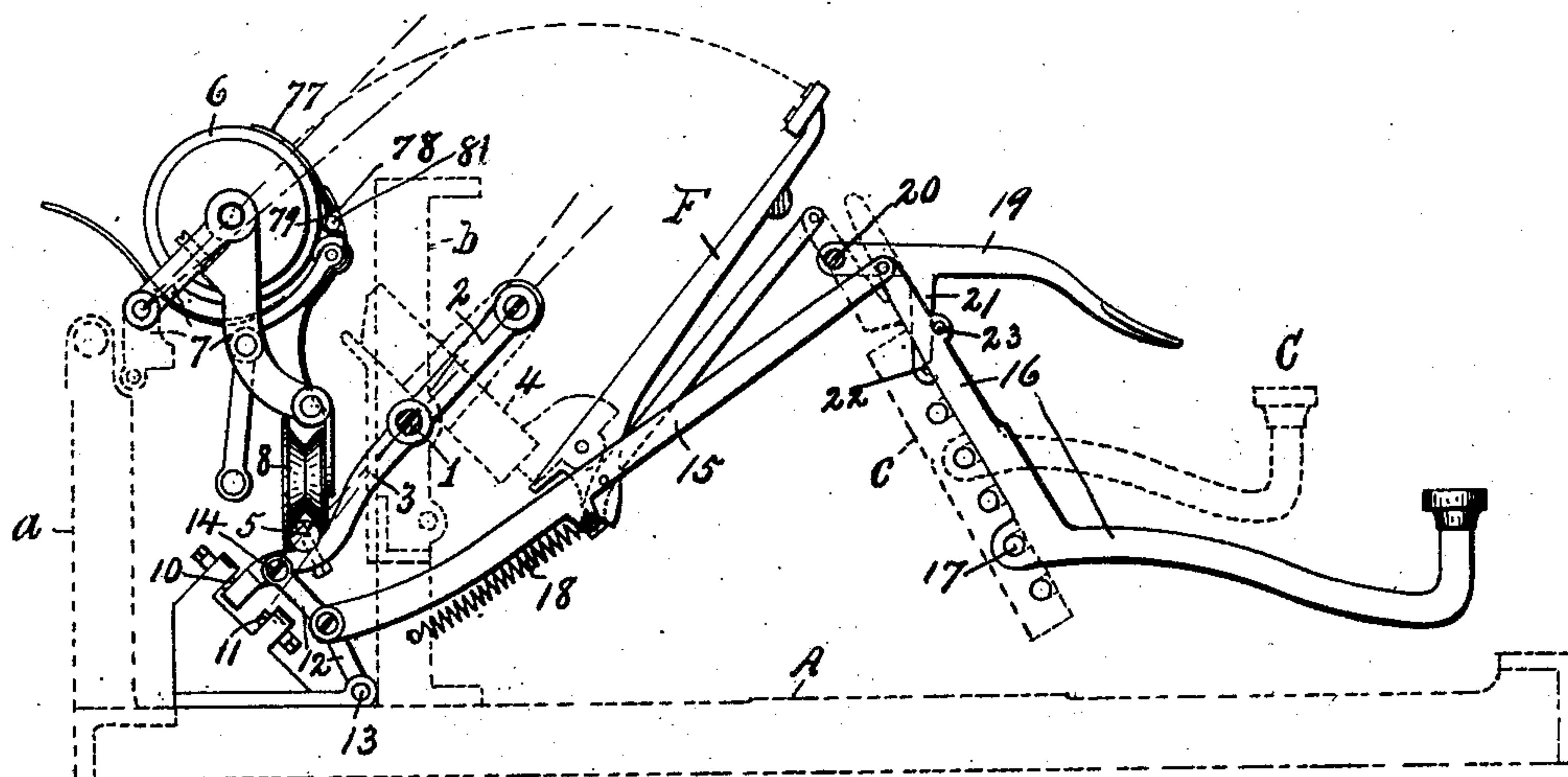
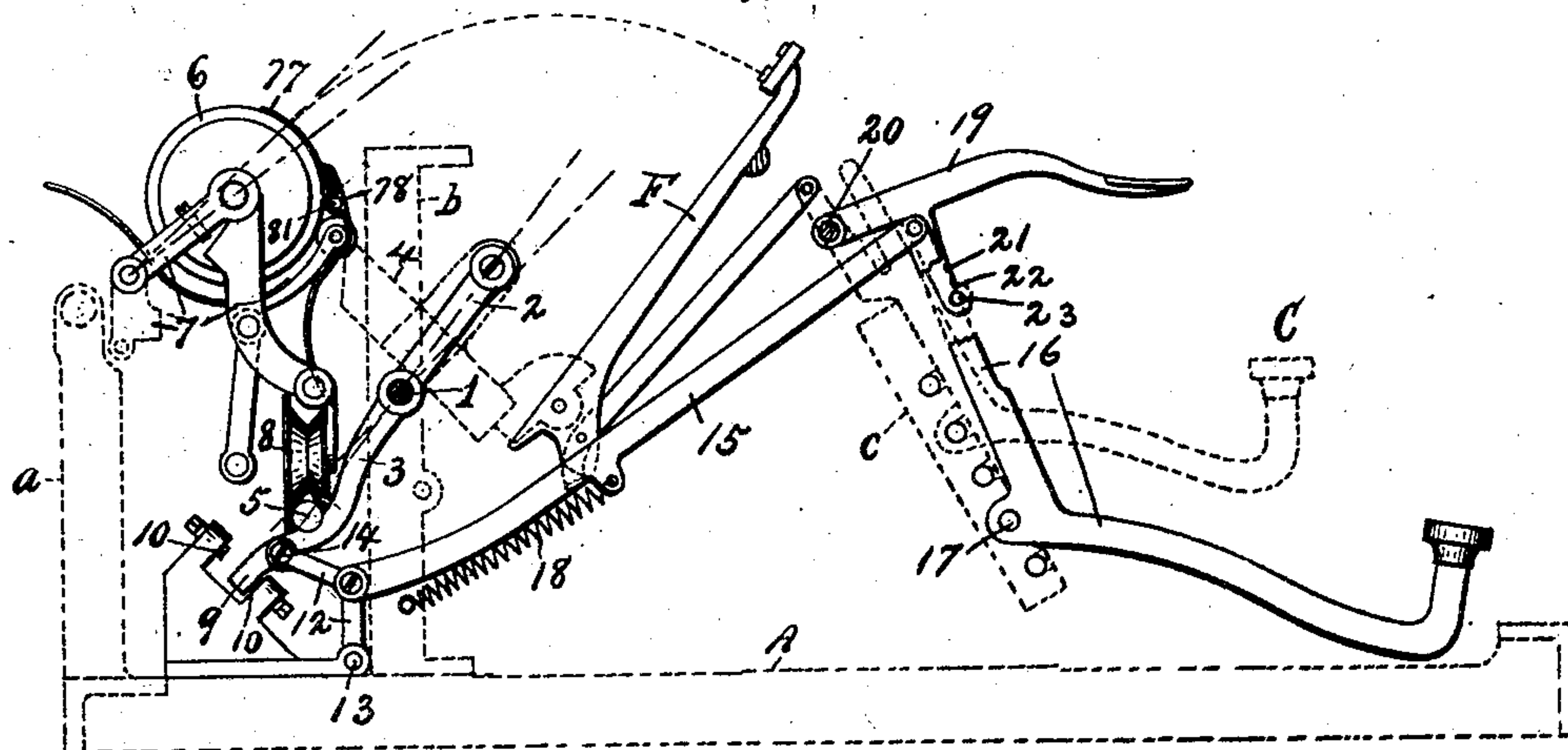


Fig. 4.



WITNESSES:

*W. B. Chan*  
*J. E. Arthur*

INVENTOR

*Edwin Earle Barney*

BY

*Smith & Snider*  
ATTORNEYS.



No. 896,680.

PATENTED AUG. 18, 1908.

E. E. BARNEY.  
TYPE WRITING MACHINE.

APPLICATION FILED JUNE 11, 1900.

7 SHEETS—SHEET 4.

Fig. 5.

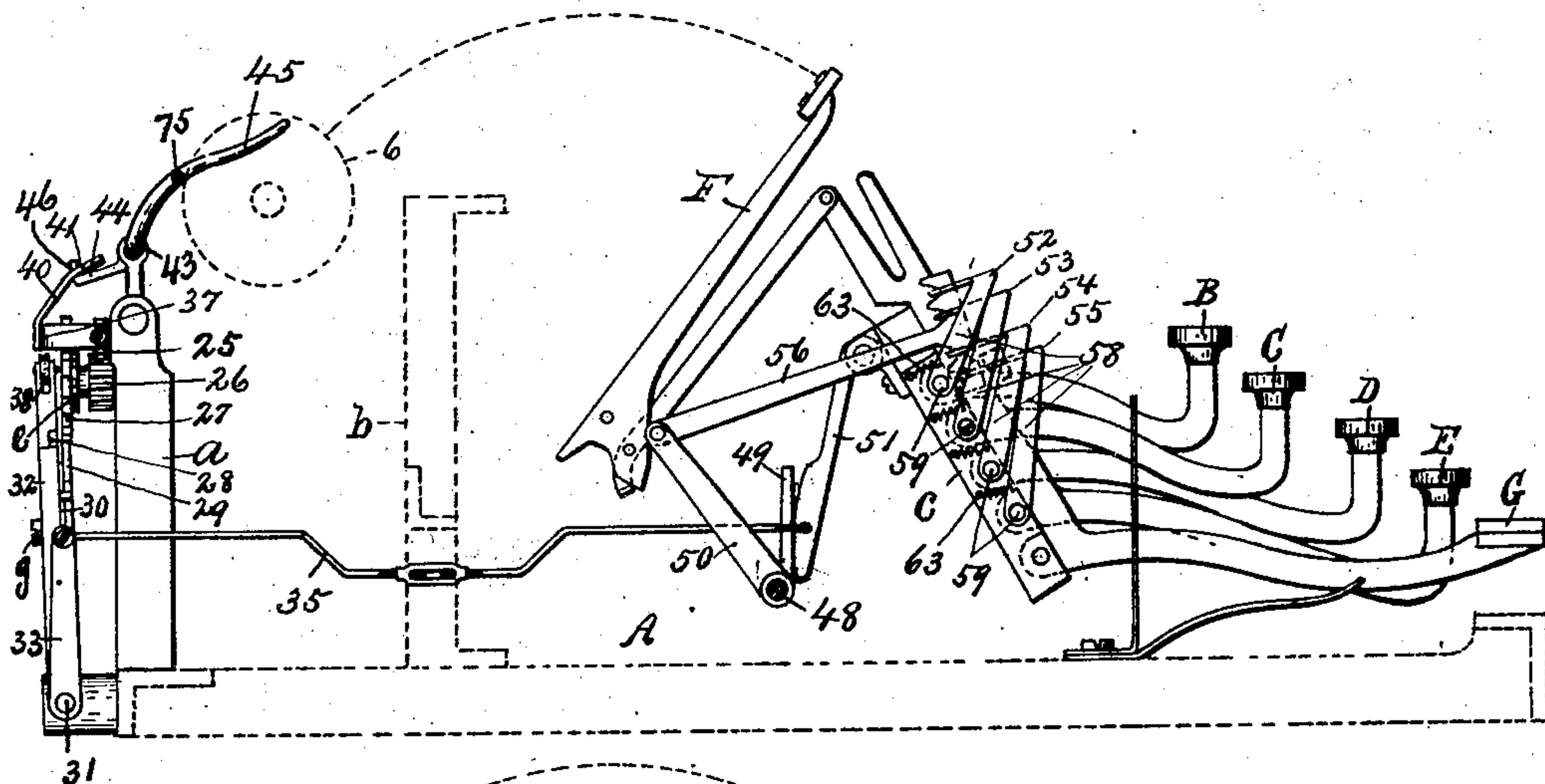


Fig. 6.

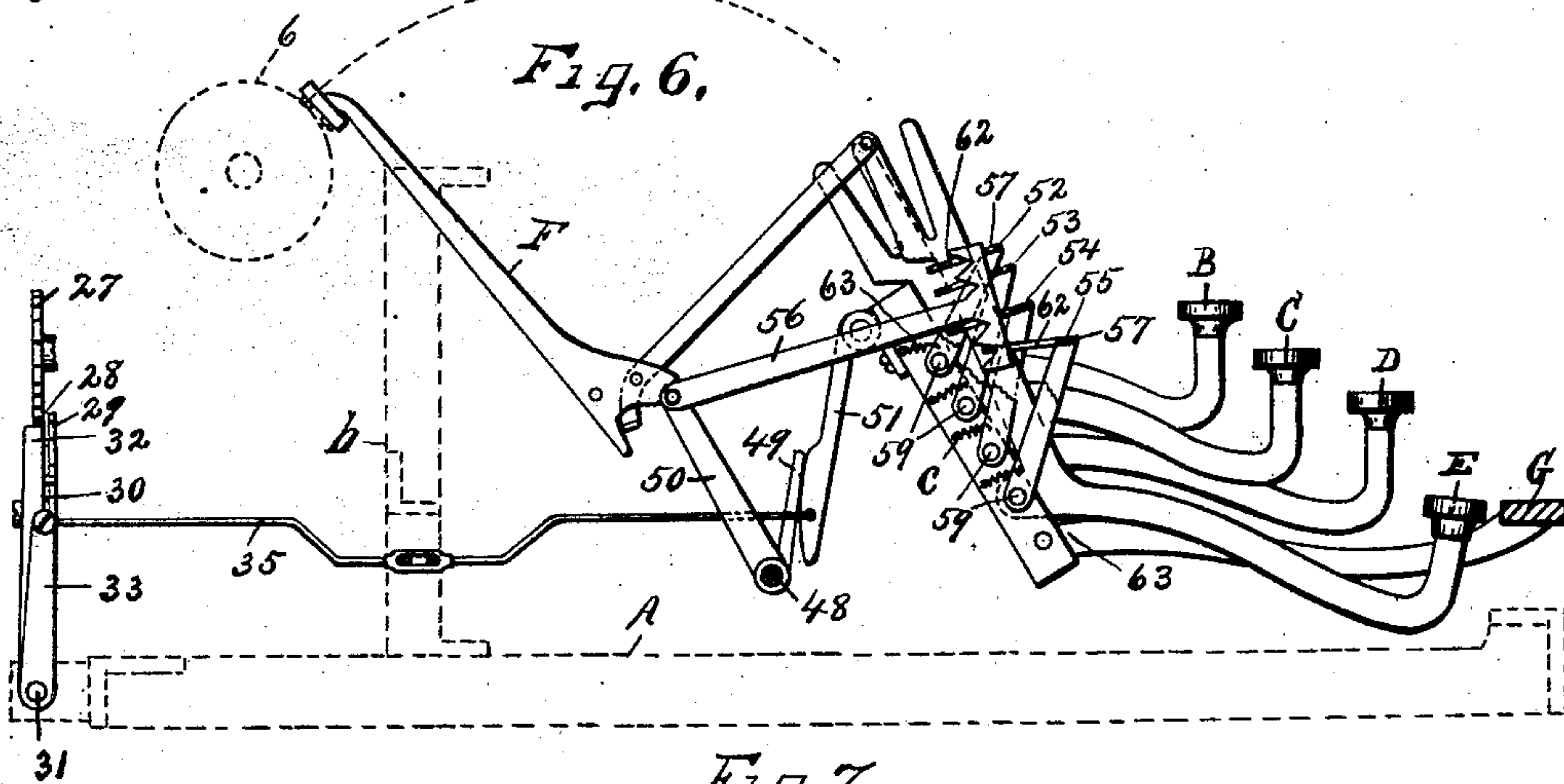
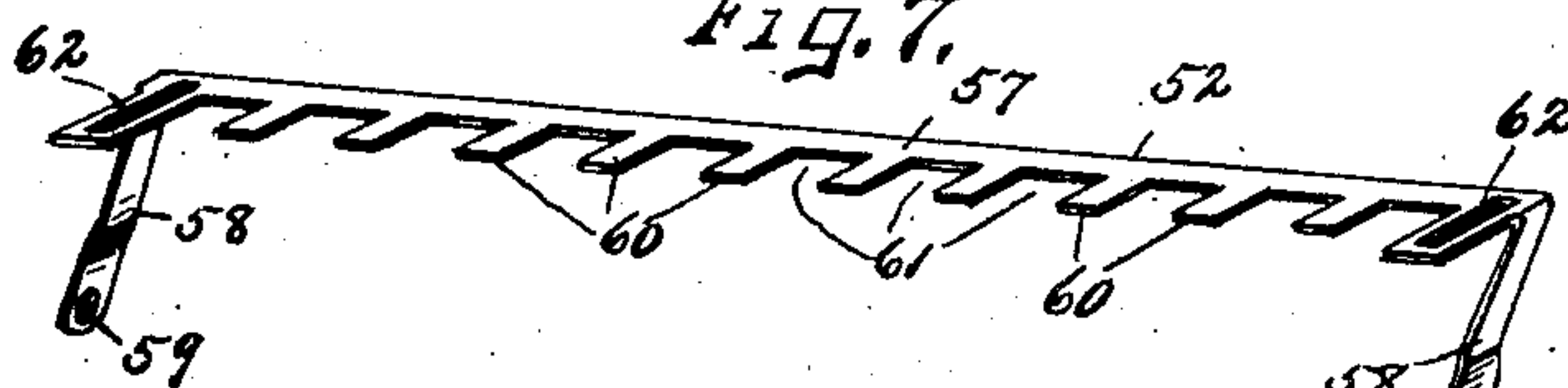


Fig. 7.



WITNESSES:  
*H. C. Chase*  
*J. E. Arthur*

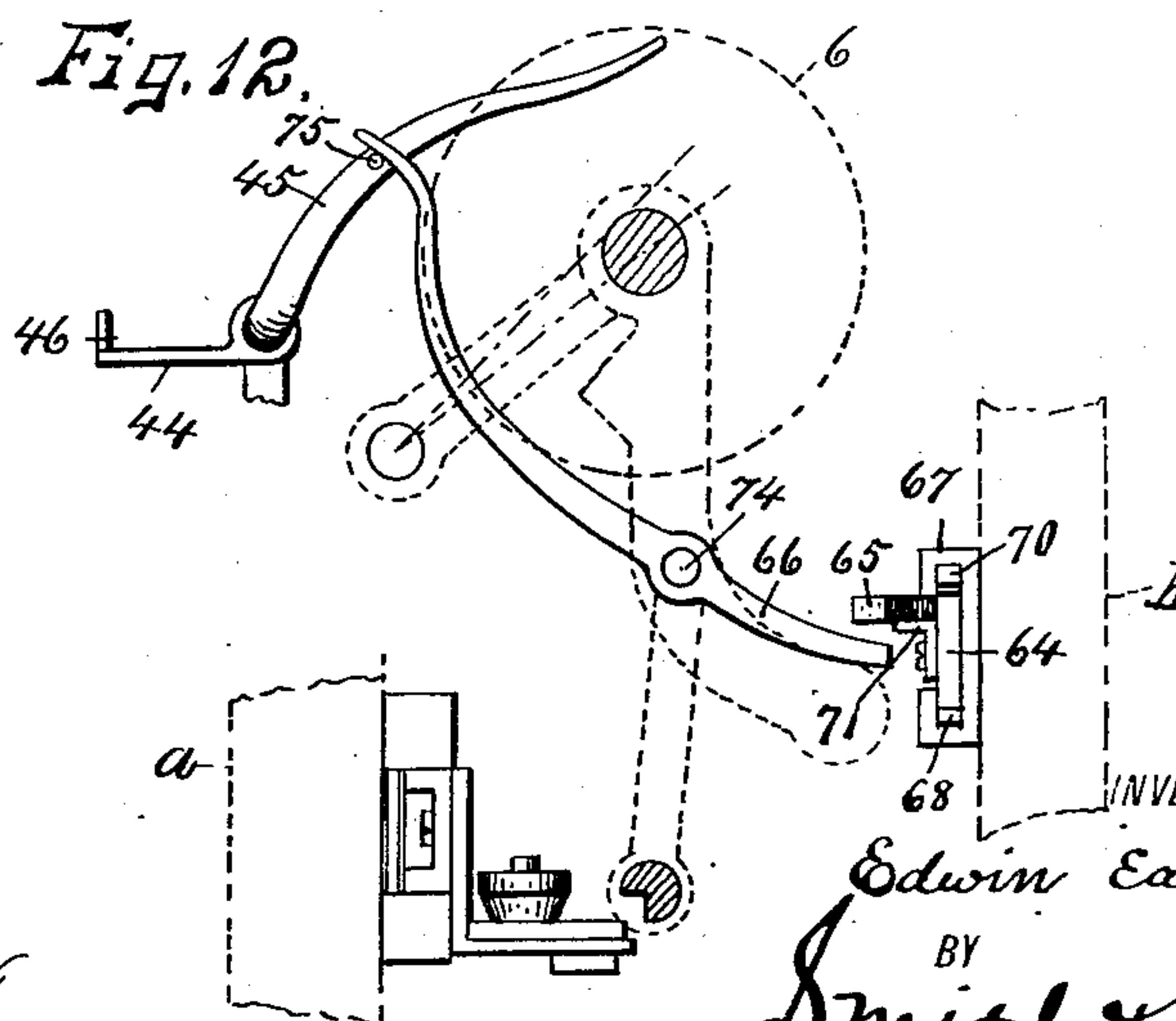
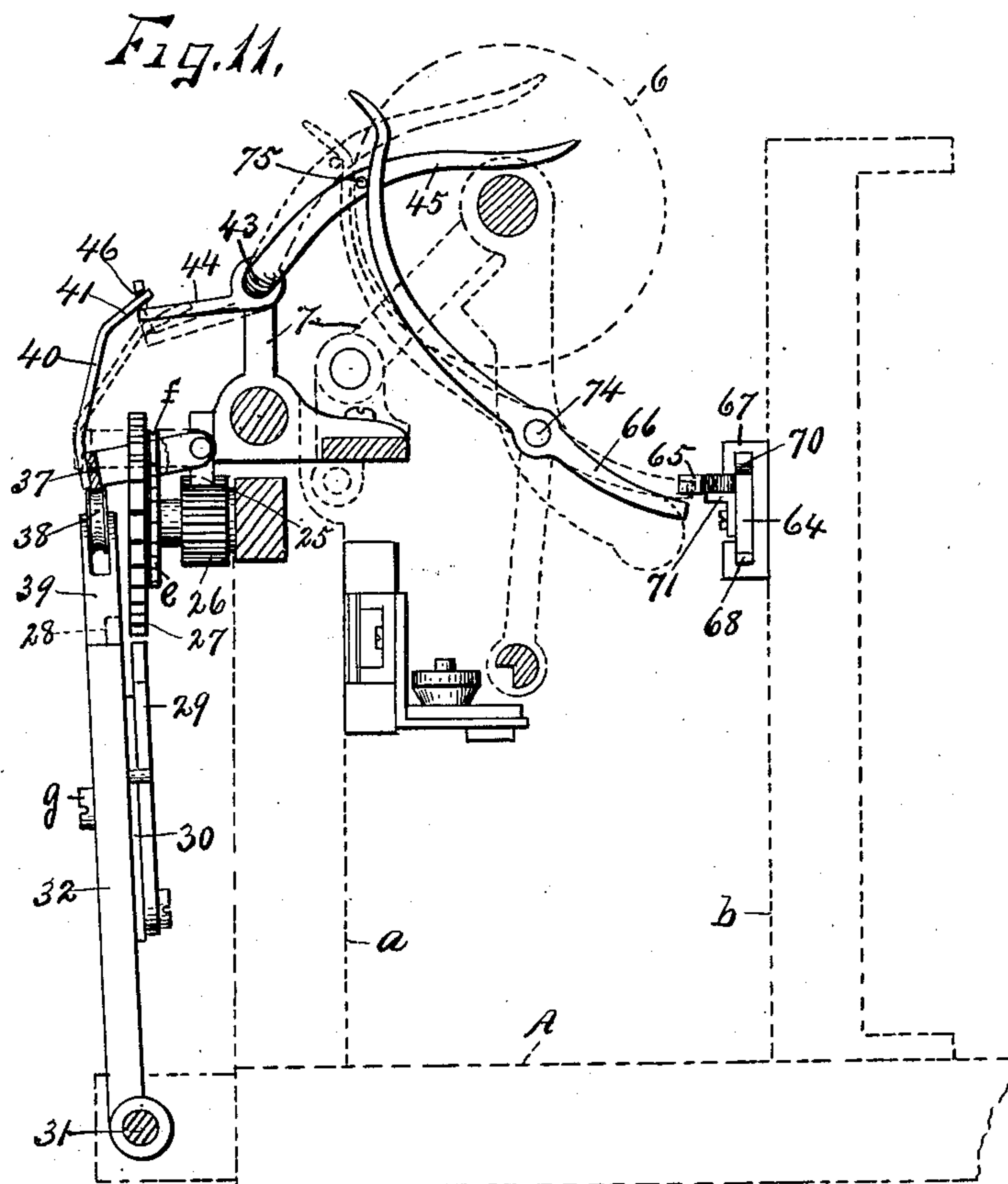
INVENTOR  
Edwin Earle Barney  
BY  
*Smith & Driscoll*  
ATTORNEYS.

No. 896,680.

PATENTED AUG. 18, 1908.

E. E. BARNEY.  
TYPE WRITING MACHINE.  
APPLICATION FILED JUNE 11, 1900.

7 SHEETS—SHEET 5.



WITNESSES:

*W. B. Chace*  
*J. E. Arthur*

INVENTOR

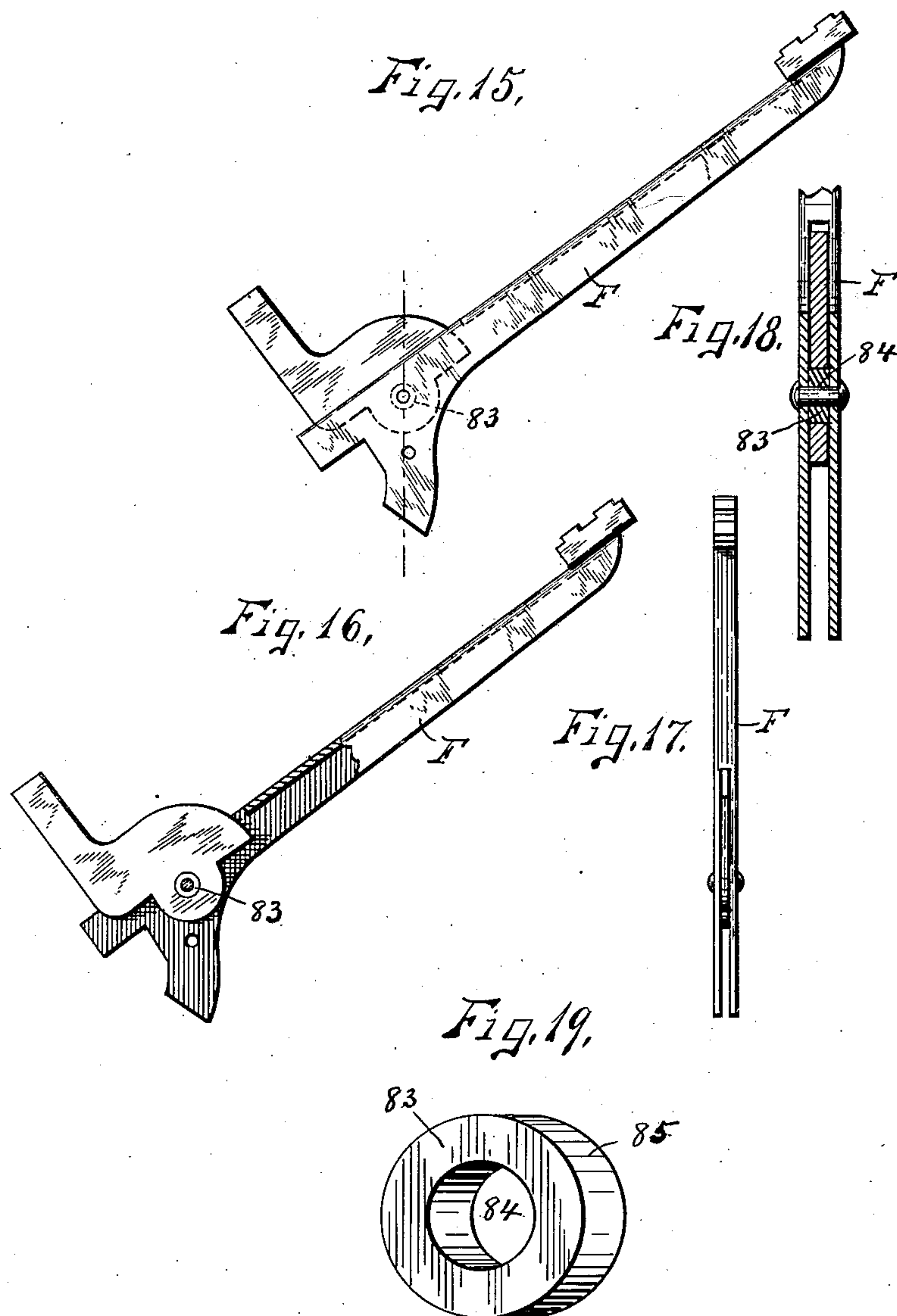
*Edwin Earle Barney*  
BY  
*Smith & Division*  
ATTORNEYS.

No. 896,680.

PATENTED AUG. 18, 1908.

E. E. BARNEY.  
TYPE WRITING MACHINE.  
APPLICATION FILED JUNE 11, 1900.

7 SHEETS—SHEET 6.



WITNESSES:

*H. B. Chase*  
*J. H. Arthur*

INVENTOR

*Edwin Earl Barney*

BY

*Smith & Wilson*  
ATTORNEYS.



No. 896,680.

PATENTED AUG. 18, 1908.

E. E. BARNEY.  
TYPE WRITING MACHINE.  
APPLICATION FILED JUNE 11, 1900.

7 SHEETS—SHEET 7.

FIG. 26.

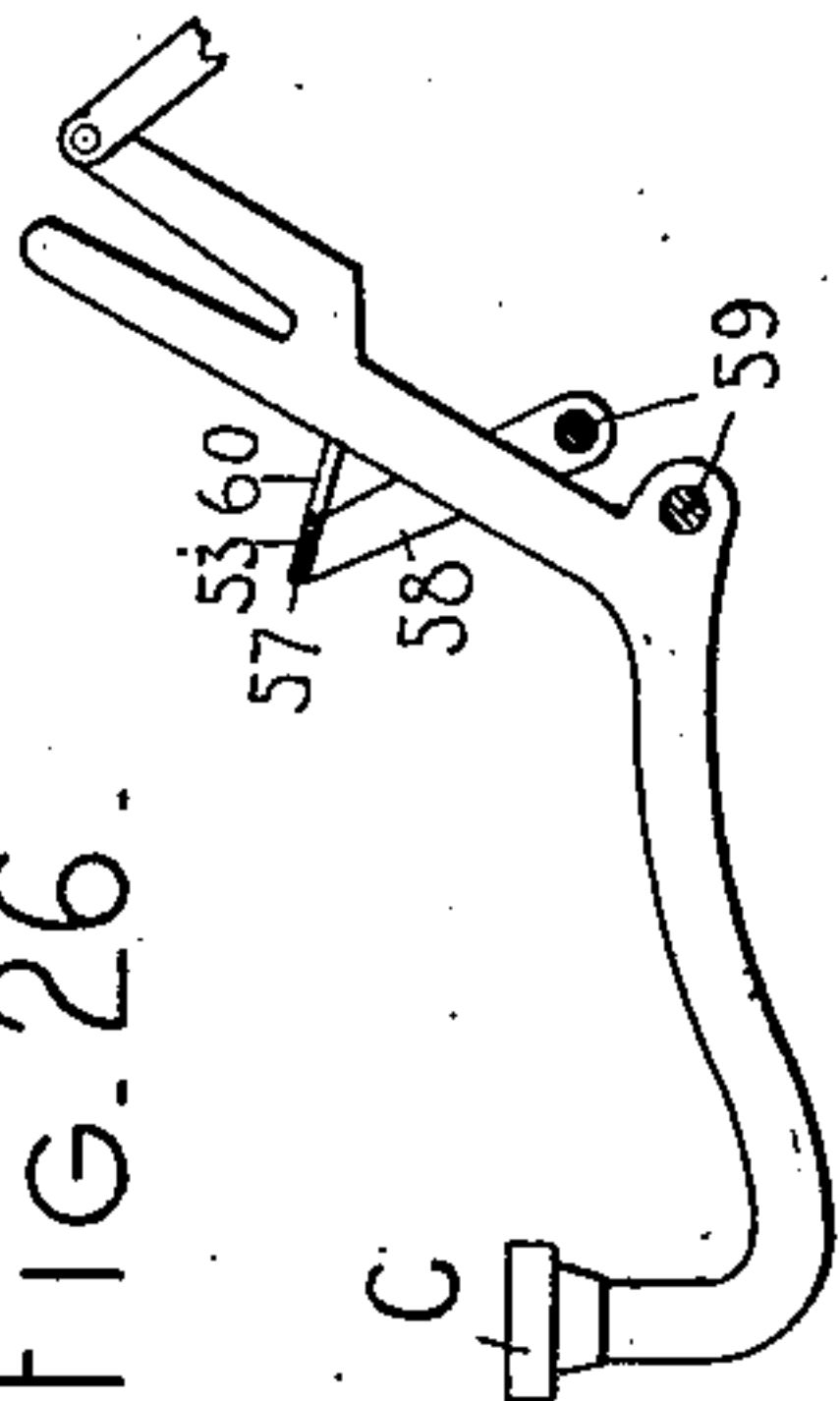


FIG. 24.

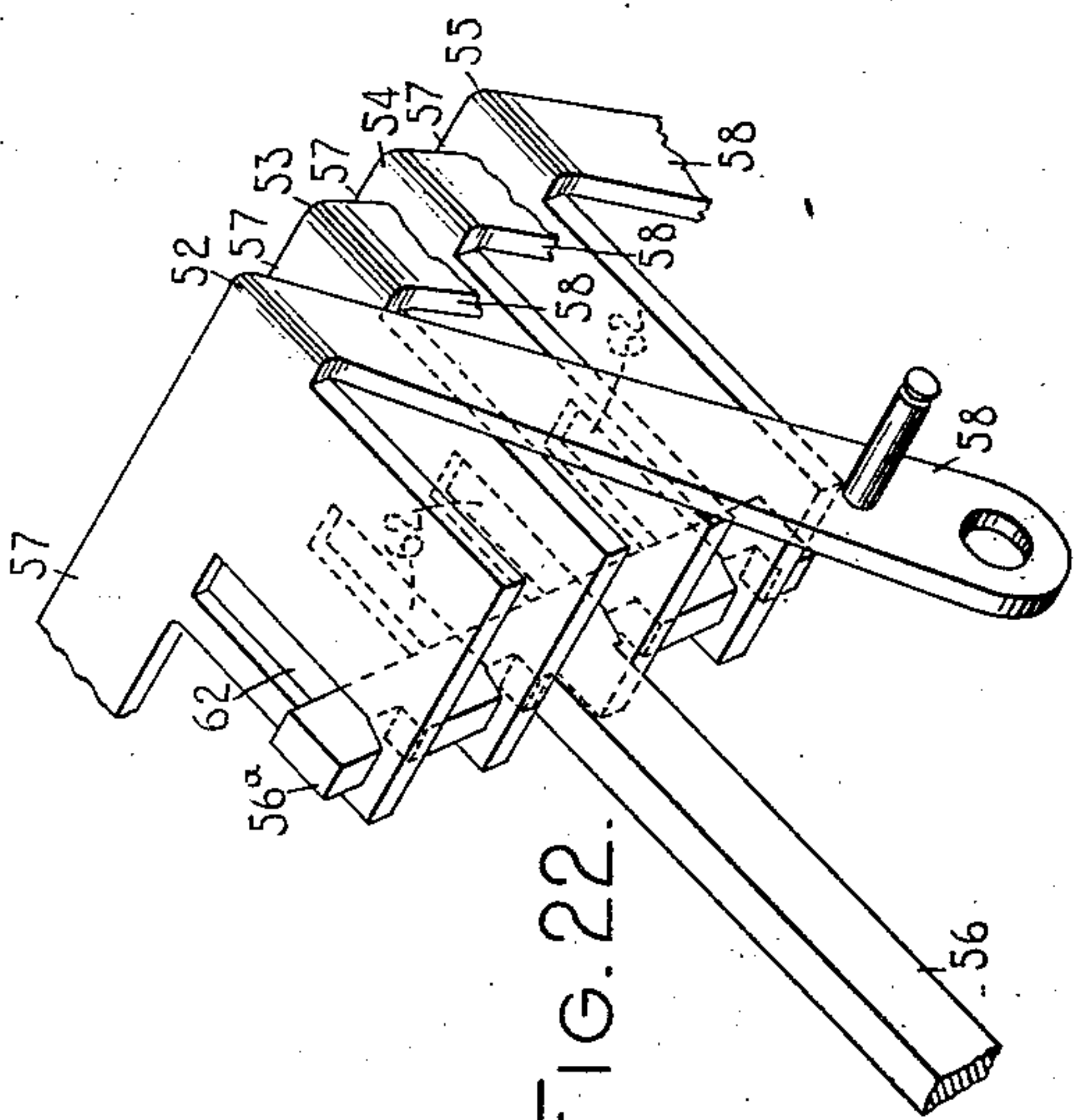
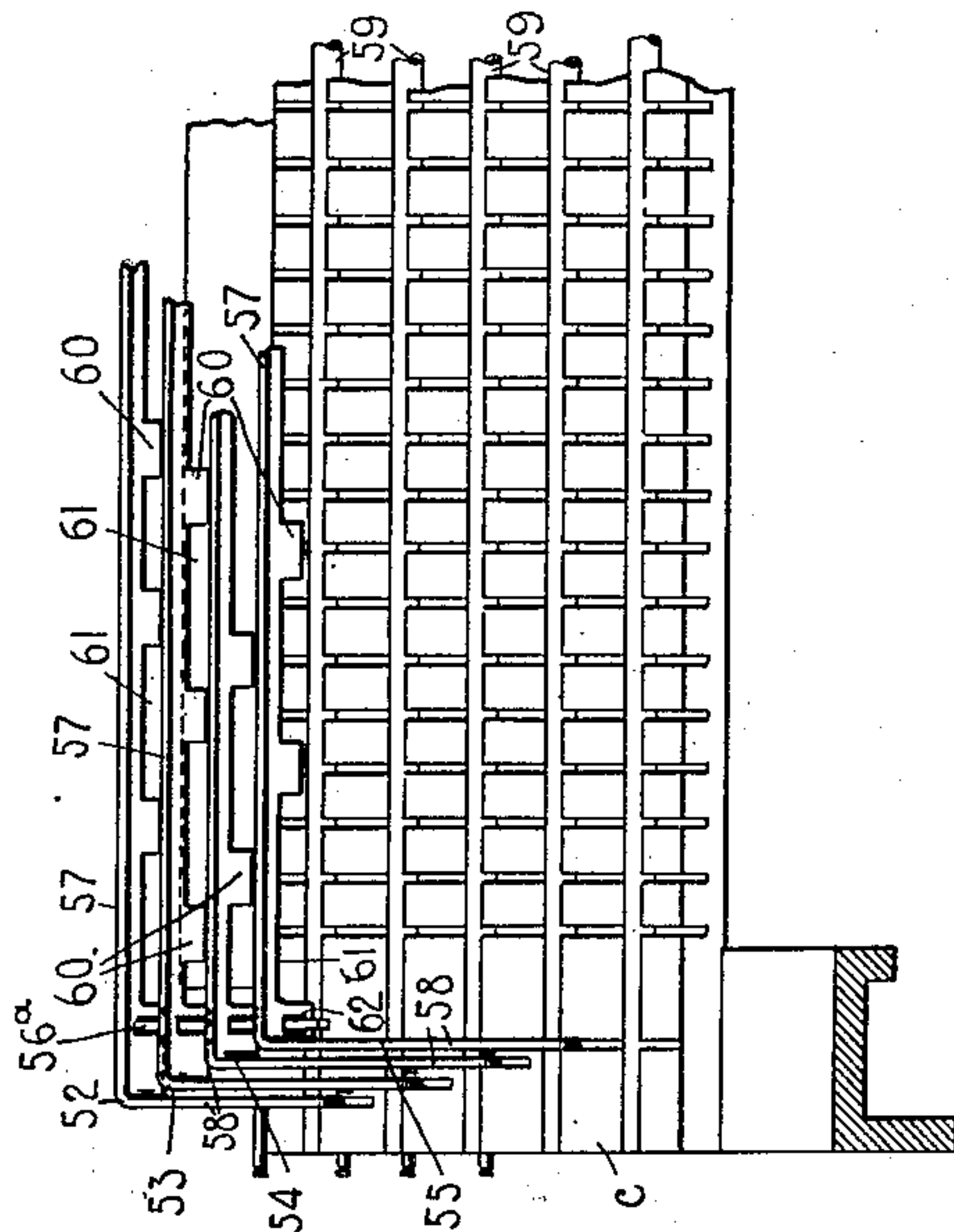


FIG. 22.

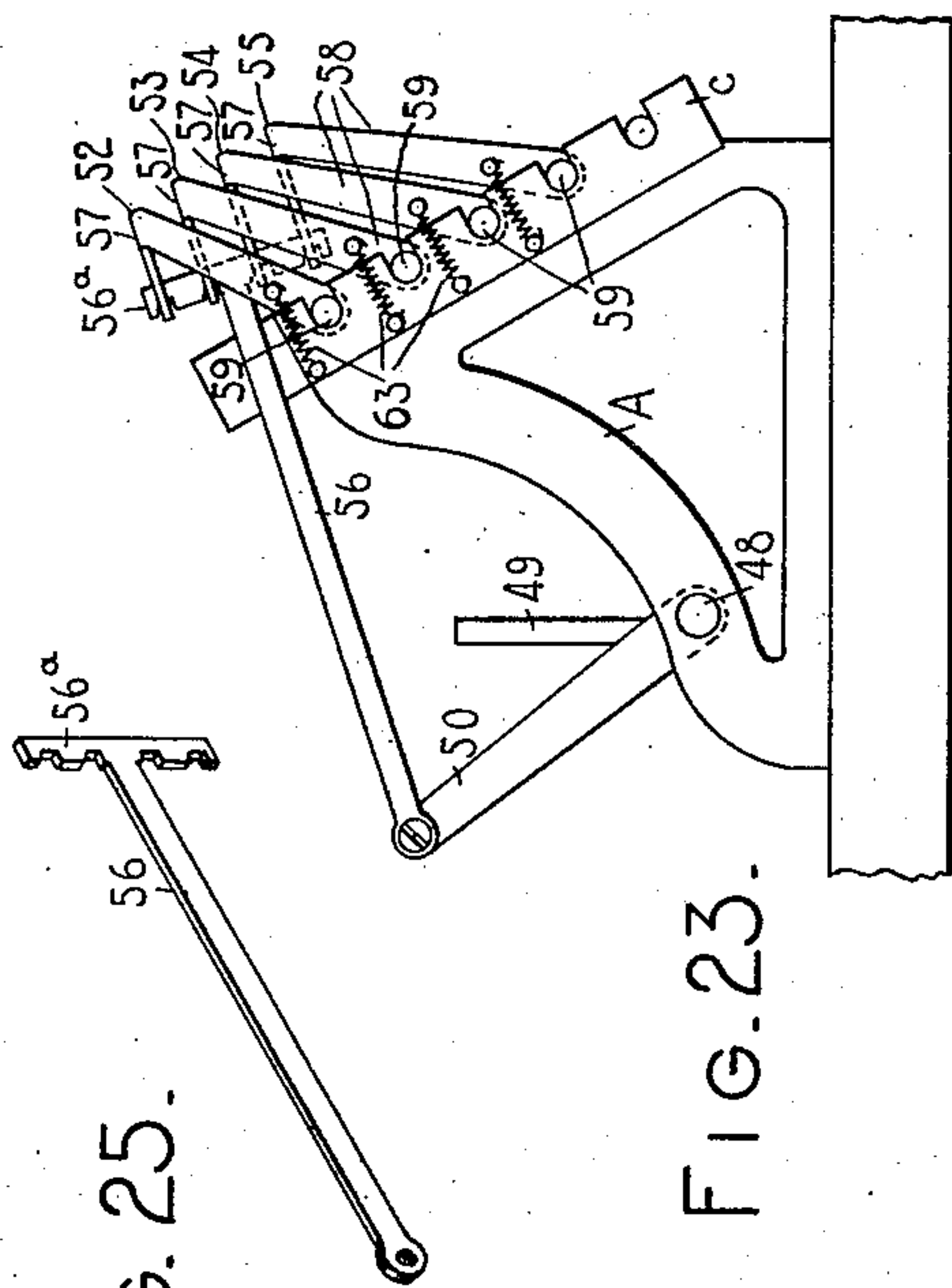


FIG. 23.

FIG. 25.

WITNESSES:

K. V. Donovan.  
Charles E. Smith

INVENTOR.

Edwin E. Barney  
by Jacob Felbel  
HIS ATTORNEY



# UNITED STATES PATENT OFFICE.

EDWIN E. BARNEY, OF GROTON, NEW YORK, ASSIGNOR, BY DIRECT AND MESNE ASSIGNMENTS, TO UNION TYPEWRITER COMPANY, A CORPORATION OF NEW JERSEY.

## TYPE-WRITING MACHINE.

No. 896,680.

Specification of Letters Patent.

Patented Aug. 18, 1908.

Application filed June 11, 1900. Serial No. 19,889.

*To all whom it may concern:*

Be it known that I, EDWIN E. BARNEY, of Groton, in the county of Tompkins, in the State of New York, have invented new and useful Improvements in Type-Writing Machines, of which the following, taken in connection with the accompanying drawings, is a full, clear, and exact description.

My invention relates to improvements in typewriting machines and particularly to the class set forth in my Patent No. 594,978 on key-lever center-strike machines in which the writing is at all times visible, and the platen and type-bar support are movable simultaneously towards and away from each other for printing upper and lower case characters as may be desired.

The object of this invention is to render such machine more practical in use and efficient in operation by embodying therein the following novel mechanisms viz:—1st, an escapement mechanism; 2nd, means for releasing the escapement mechanism; 3rd, differential leverage connections between the key levers and the escapement mechanism; 4th, universal bar mechanism; 5th, adjustable margin stop mechanism; 6th, adjustable paper holding means and a support for the same; and various other novel elements and combinations as hereinafter fully described and pointed out in the claims.

In describing this invention, reference is had to the accompanying drawings forming a part of this specification, in which like characters indicate corresponding parts in all the views.

Figure —1— is a top plan view, partly broken away, of a typewriter embodying various elements of my invention, portions thereof being removed for disclosing the underlying mechanism. Fig. —2— is a rear elevation of a portion of a typewriter, showing particularly the escapement and release mechanisms. Figs. —3— and —4— are side elevations, partly in section, of the detached mechanism for shifting the platen and type-bar support, and the locking member for locking said shifting means in one of its adjusted positions, the shifting means being shown in its normal position in Fig. —3— for printing lower case characters, and as shifted in Fig. —4— for printing upper case characters. Figs. —5— and —6— are side elevations, partly in section, showing particularly the connections between the

key-levers and the escapement mechanism and type-bars, the movable member of the escapement mechanism and one of the type-bars being shown in their normal positions in Fig. —5—, and in their operative positions in Fig. —6—, the release mechanism for the escapement also being shown in Fig. —5—. Fig. —7— is an isometric view of one of the detached universal bars seen in Figs. —1, 3, and —4—. Fig. —8— is an enlarged inner face view of portions of the detached escapement mechanism. Figs. —9— and —10— are sectional views taken, respectively, on lines —9—9 and —10—10—, Fig. —8—. Fig. —11— is an enlarged side elevation, partly in section, of the escapement and release mechanisms, the adjacent portions of the frame and carriage and the left marginal stop mechanism; the stop-dog on the carriage being shown in full lines as forced to its inoperative position. Fig. —12— is an elevation of portions of the mechanism seen in Fig. —11— illustrating more particularly the left marginal stop mechanism; the platen and portions of the carriage being shown by dotted lines in their shifted positions, and the stop-dog on the carriage being shown in full lines. Fig. —13— is an isometric view of the adjustable stop-bar and the pawl carried thereby. Fig. —14— is a face view of the stop-bar seen in Fig. —13—, showing the graduations thereon. Fig. —15— is an enlarged elevation of one of the detached type-bars and one of the supporting fins therefor. Fig. —16— is a similar view to Fig. —15—, partly broken away and showing the bearing for the type-bar. Fig. —17— is an elevation of the type-bar seen in Fig. —16—. Fig. —18— is a sectional view taken on line 18—18, Fig. —15—. Fig. —19— is an isometric view of the detached bearing for one of the type-bars. Figs. —20— and —21— are isometric views of the paper holding band and the support therefor. Fig. 22 is an enlarged detail fragmentary perspective view showing the connection between the universal bars and an actuating link. Fig. 23 is a detail side elevation of the same. Fig. 24 is a fragmentary plan view of the construction shown in Figs. 22 and 23. Fig. 25 is a detail perspective view of one of the actuating links between the universal bars and the escapement mechanism. Fig. 26 is a detail side elevation showing a key lever and one of



the universal bars which cooperate therewith.

A represents a suitable frame, provided with upright standards —a— and —b— and a transverse bar —c—. B. C. D and E indicate the several rows of key-levers for operating type-bars —F—; and —G— is a letter-space key-lever all of which parts are constructed and arranged to perform their various functions in the simplest and most efficient manner.

The shifting mechanism, Figs. 1, 2, 3 and 4, serves the purpose of simultaneously moving the quadrant and platen toward and away from each other for printing lower and upper case characters. As shown in Figs. —3— and —4— this shifting mechanism consists of a rock-shaft —1— provided with arms —2— and —3— one of which —2— is pivotally connected to a quadrant or type-bar support —4— and the other arm —3— is secured to a suitable track —5— for supporting an impression-platen —6—. The platen —6— is mounted on a suitable carriage —7— provided with one or more rollers —8— resting upon and movable along the track —5—. One of the arms as the lower arm —3— is provided with an extension —9— movable between shoulders —10—, and —11— which preferably consist of adjustable screws for limiting the movement of the arms 2, 3 and consequently limit the shifting movement of the quadrant —4— and platen —6—.

—12— represents a toggle-joint having one arm pivotally connected at —13— to the frame —A— and its other arm pivotally connected at —14— to the lower arm —3— of the rock-shaft —1—. The adjacent ends or knuckle of the toggle-joint —12— are connected by a suitable link —15— to one end of a key-lever —16— having its intermediate portion pivoted at —17— to the frame —A— and preferably to the transverse bar —c—. A suitable spring —18— is connected to the link —15— and frame —A— for retracting and holding the shifting mechanism in its normal position.

Although the above described shifting mechanism is particularly simple and efficient in operation it will be understood that so far as the features of invention herein claimed are concerned, other forms of case shifting mechanism may be used.

The locking means for the shifting mechanism, for holding the quadrant and platen in such relation that the upper case characters may be used continuously, preferably consists of a lock-lever 19 pivoted at —20— to the frame A, or other fixed support, and having its intermediate portion provided with a depending arm —21— which is formed with an engaging shoulder —22— for engaging a shoulder —23— provided on the upper arm of the key-lever —16. The

key-lever —16— and the lock-lever —19— are so relatively arranged that when the same are rocked on their pivots —17, and 20 the shoulders —22— and 23— move in arcs intersecting each other and are adapted to interlock with each other at substantially the point of intersection of said arcs. When desired to print upper case characters continuously the free end of the lock-lever —19— is elevated, the arm —21— bears against the shoulder —23— thereby rocking the shift-lever —16— and shifting the quadrant —4— and platen —6—.

When the quadrant and platen have been shifted to the desired position by the elevation of the lever 19 the shoulders —22— and —23— moving in intersecting arcs automatically interlock with each other, at one side of a right line drawn through the pivots 17 and 20, and serve to hold said quadrant and platen in position for printing upper case characters. By depressing the lock-lever —19— the shoulders —22— and —23— are disengaged from each other whereupon the spring —18— automatically returns the quadrant, platen and shifting mechanism to their normal positions. The case shifting mechanism and locking means therefor, shown and described, are not claimed *per se* herein but are claimed in a divisional application filed by me on the 13th day of May, 1908 and bearing Serial No. 432,556.

The escapement mechanism for letter-spacing consists of a rack —25— provided on the carriage —7—, a revoluble pinion —26— mounted on the frame —A— and meshing with the rack —25—, a toothed wheel —27— actuated by the pinion —26—, and dogs —28— and —29— movable into and out of engagement with the teeth of said wheel, for permitting the carriage to move step by step in the usual manner for letter spacing.

Any desired means may be employed for moving the carriage endwise and thereby actuating the pinion —26— and the escapement wheel —27—. This means is substantially the same as that shown and described in my former patent 594,978 a portion of which preferably consists of a spring actuated wheel —d— provided with a suitable cord, not illustrated, said cord having its intermediate portion secured to the wheel —d— and its opposite ends secured to the carriage in the manner described in my former patent above referred to and not necessary to herein further illustrate or describe. The pinion —26— is connected to the wheel —27— in the usual manner by means of a ratchet wheel —e— secured to the pinion —26—, and a pawl —f— pivotally connected to the wheel —27— in such manner that the carriage —7— may be moved to the right without effecting the movement of said wheel —27— and when moved to the



left, by means of the spring actuated wheel —*d*—, the wheel —27— is rotated by the pinion —26—, ratchet wheel —*e*— and the pawl —*f*—.

5 The dogs —28— and —29— are supported on a suitable oscillatory arm, presently described, are reciprocally movable lengthwise of said arm and are preferably connected to a reciprocally movable plate —30—  
10 interposed between said dogs.

31 represents a rock-shaft preferably journaled on the frame A and provided with oscillating arms —32— and —33— usually fixed to the rock-shaft. One of the arms, as  
15 —32—, is provided with a lengthwise guide —34— for receiving and guiding the dog —28— in its reciprocal movement, said dog —28— being provided with a shoulder, as a screw —*g*—, movable in a slot —*n*— formed  
20 in one of the walls of the guide —34— for limiting the movement of said dog and holding the same in its operative position. The reciprocally movable plate —30— is also  
25 movable along the guide —34—; is secured to the dog —28— and is provided with a guide rib —*i*— engaged with the arm —32— for guiding said plate in its reciprocal movement. The arm —33— is connected by a  
30 link or rod —35— to the differential leverage mechanism, previously mentioned, which, in turn, is actuated by the several type-bar and letter-spacing key-levers hereinafter described.

The means for reciprocating the dogs  
35 —28— and —29— consists of the release mechanism, previously mentioned, which forces the plate —30— and the dogs —28— and —29—, connected thereto, in one direction for disengaging said dogs from the wheel  
40 —27—, and a spring —36— for retracting said plate and dogs to their normal position.

The release mechanism, Figs. 2, 5, 8, 9, 10 and 11 consists of an oscillating bail or bar —37— pivotally connected to the carriage,  
45 and preferably to the opposite ends of rack —25—, and having its outer portion arranged substantially parallel with said rack and adapted to engage a roller bearing —38—, which is suitably connected to the  
50 plate —30— by an arm —39—.

The bail or bar —37—, Fig. 11 may be oscillated in any desired manner and is preferably provided with an upwardly extending arm —40— having an inwardly inclined  
55 cam-face —41— and a lengthwise slot —42—.

—43— is a rock-shaft mounted on the carriage —7— and provided with oppositely projecting arms —44— and —45—,  
60 the arm —44— being arranged to engage the cam-face —41— and is provided with a guide shoulder —46— movable in the slot —42— for preventing displacement of said arm with the cam-face —41—. The other arm —45—  
65 consists of a suitable hand-piece preferably

arranged at one end of the platen —6— and is limited in its movement by any desired form of stop as the adjacent end of the axle of the platen seen in Figs. —5— and —11—.

It is evident from the foregoing description 70 that, as the arm —45— is depressed, the arm —44— is elevated and rides upon the cam-face —41— thereby rocking the bail or bar —37—, which engages the roller —38— and actuates the plate —30— for forcing the  
75 dogs —28— and —29— out of the path of the teeth of the escapement wheel —27—, whereupon the carriage —7— is free to be moved in either direction for any desired purpose. As previously stated, the plate 80 —30— and the dogs —28— and —29— are returned to their normal position by the spring —36—, the rock-shaft —43— being also returned to its normal position by said spring —36— or an additional spring —47—, 85 Figs. —1— and —2—, secured to said shaft and to the adjacent portion of the carriage.

The differential leverage connections between the several key-levers and the escapement mechanism, Figs. 1, 5, 6 and 22 to 26 90 inclusive, consists of a rock-shaft —48— mounted on the frame —A— and provided with arms —49— and —50—, and an oscillatory arm —51— also mounted on the frame —A— and preferably pivotally connected to 95 the transverse bar —*c*—. The arm —49— is provided with a substantially straight engaging face, and the arm —51— is formed with a curved or cam-face engaging the straight face of the arm —49— and connected to the rock-arm —33— by means of the link or rod —35—.

The engaging faces of the arms —49— and —51— are so relatively arranged that the least power is required for operating the es- 105 capement during the initial movement of the operating key-lever, and, were it not for the compensating effect resulting from the momentum of the moving parts during said initial movement of the key-lever, the greater 110 power would be exerted at the end of the operative movement of said key-lever. In order to effect this easy key-action the portion of the cam-face of the arm —51— is normally engaged with the portion of the arm 115 —49— nearest the axis of said arm as seen in Fig. —5—, the remaining portion of said cam-face being normally separated from the arm —49—. As the arm —49— is rocked towards the arm —51— the contact point of 120 the engaging faces of said arms varies and gradually increases in distance from the axis of the arm —49— thereby producing a gradually varying leverage connection between the arm —49— and the escapement mechan- 125 ism actuated thereby.

Owing to the fact that the initial stroke of the operating key-lever is the most powerful, and that the momentum of the moving parts connected thereto facilitates the completion 130



of the movement of said moving parts, it is evident that the increasing leverage between the engaging faces of said arms —49— and —51— is compensated by such momentum and that the key-lever action is rendered easy and thereby reduces to a minimum the incidental jar to the machine and operator.

The universal connections, Figs. 1, 5, 6 and 7 between the several rows of key-levers B. C. D. and E and G, and the differential leverage mechanism, preferably consist of a series of bails or bars 52, 53 54 and 55, and links 56 connecting said bars or bails to the arm —50— of the rock-shaft —48—. The bars or bails 52, 53 54 and 55 correspond with the several rows of key-levers B. C. D. and E; are usually hinged to the transverse bar —c— in planes one above the other with their intermediate portions —57— arranged substantially parallel and extended transversely of the key-levers, and their opposite ends provided with depending arms —58— pivoted at —59— to the transverse bar —c—.

The portions —57— of the bars or bails 52, 53 54 and 55 are so relatively arranged with reference to each other and to the key-levers, that the leverage of the key-levers of each row acting upon the corresponding bar or bail is substantially the same, the distance between the fulcrum and the engaging ends of the key-levers of each row being in substantially the same ratio.

The intermediate portion —57— Figs. 1, 7, and 24 of each of the bars or bails is provided with a series of separated shoulders —60— forming a series of spaces —61— between said shoulders, the shoulders of one series being arranged out of vertical alinement with the shoulders of the remaining series in order that any one of the key-levers of the several rows B. C. D. and E. may actuate one of the bars or bails without affecting the position of either of the other bars or bails or the remaining key-levers.

The shoulders of the upper bail —52— are preferably alined with the key-levers of the upper row B; the shoulders of the next lower bail are alined with the key-levers of the next lower row C and so on, the shoulders of the lower bar or bail being alined with the key-levers of the lower row, E. Said shoulders —60— of each of the bars or bails are formed of such width that either of the key-levers of one row may independently operate its corresponding bar or bail without affecting the operation of either of the other bars or bails. The opposite ends of each of the bars or bails are provided with elongated slots —62— for receiving corresponding T-shaped cross heads 56<sup>a</sup> at the ends of the links —56— previously referred to. I preferably use but a single link for each end of the several bars or bails. The ends of said links adjacent to the bars or bails are preferably elongated vertically; are arranged with-

in the slots —62; and are provided with V-shaped cutouts, as shown in Figs. 5 and 6 or substantially V-shaped cutouts as shown in Figs. 22 and 25, arranged one above the other and registered with the rear walls of the slots —62—. The spaces —61— and the slots —62— are formed of sufficient length to permit any one of the key-levers of the several rows B. C. D. and E, and the links —56— to be operated without affecting any of the other key-levers or the bars or bails actuated thereby.

The key-lever —G— for letter-spacing independently of the operation of the type-bars —F— may be connected in any desired manner to the arm —50— of the rock-shaft —48— but is preferably arranged to engage one of the bars or bails, as the lower bail —55—, and shown by dotted lines Fig. —5—. The engaging ends of the bars or bails 52, 53 54 and 55 and the links —56— are so relatively arranged that the lower bail is registered with the lower cutout of said links; the next higher bail is connected to the next higher cutout, and so on, in like manner as said bails are engaged by the key-levers of the several rows B, C, D, and E. It is thus apparent that the leverage between said key-levers and the links —56— is substantially uniform, and that this feature, taken in connection with the differential leverage mechanism previously described, renders the action of the key-levers exceedingly easy and noiseless. Any suitable means as springs —63— may be provided for retracting and holding the bars or bails 52, 53 54 and 55 to their normal or inoperative positions.

The left marginal stop mechanism, Figs. 11, 12 and 13 and 14, previously referred to, consists of an adjustable bar 64, a movable pawl —65— mounted on the bar —64— and a movable stop-dog —66— mounted on the carriage —7—. The bar —64— is preferably mounted on the frame —A—; is movable in a plane substantially parallel to the endwise movement of the carriage —7— in a suitable guide or guides —67—, and is provided with a series of teeth —68— movable into and out of engagement with a fixed shoulder —69— on the guide —67—. A suitable spring —70— serves to hold said teeth in engagement with the shoulder —69— when the bar is adjusted to the desired position. The pawl —65— is preferably pivoted to a suitable bracket —71— secured to the bar —64—; is provided with an engaging shoulder which is normally held in the path of the stop-dog —66— by a spring —72—, and is limited in its outward movement by a stop-pin —73— also secured to said bracket —71—. The stop-dog —66— is pivotally connected at —74— to the carriage —7— and is movable into and out of alinement with the pawl —65— by means of the arm —45— of the release mechanism



previously described, and also by means of the shift lever —16—.

The dog —66— is provided with an upwardly curved extension which is engaged by a shoulder —75— provided on the arm —45— whereby the opposite end of the dog —66— is forced out of alinement with the pawl —65— when said arm is actuated for releasing the escape mechanism.

When the shift-lever —16— is operated for shifting the platen and its carrier frame, the pivot —74— is also shifted and the stop dog —66— is thereby forced out of alinement with the pawl —65— as seen in Fig. 12 it being understood that the release lever —45— and escapement mechanism may remain in its normal position during such operation of the shift-lever.

The bar —64— is provided with suitable graduations —76— movable into registration with a fixed point as the end face of the guide —67— for indicating the desired width of left marginal space on the sheet to be printed. When desired to print in the marginal space above referred to, it is simply necessary to depress the arm —45— whereupon the stop-dog —66— is forced out of alinement with the engaging end of the pawl —65— and the carriage is free to be moved, carrying the dog —66— beyond or to the right of the pawl —65—. The dog —66— and escapement mechanism is then permitted to return to its normal position; the printing is continued and the dog —66— contacts with a cam-face formed on the pawl —65— whereby said pawl is automatically forced inwardly against the action of the spring —72— and the printing may be continued without interruption.

Upon referring to Figs. 3, 4, 20 and 21 it will be seen that spring paper guides or fingers 77 are supported in place by a tubular guide or support 79 which extends longitudinally of the platen throughout or substantially throughout its length and is connected to, or formed as a part of, a member 78 which is supported in any suitable manner by the carriage 7. Each paper finger or guide 77 is provided with a cylindrical member 81 (Fig. 20) which has a diameter corresponding substantially to the diameter of the bore of the tubular guide 79 in which it is seated. Said tubular guide has a narrow longitudinal slot 80 cut through its wall and extending throughout the length thereof, and through which the paper fingers 77 project; the fingers bearing against the platen. The construction is such that the paper fingers may be adjusted along the tubular guide or support 79 to any desired position and the tension of the spring fingers maintained against the platen will cause the fingers to bear with sufficient pressure against the wall of the slot 80 to hold them in their adjusted positions.

The type-bar-bearing, previously referred to, consists of a cylindrical washer —83— having a central aperture —84— and a hardened peripheral bearing face —85— for receiving a fin —86—, which may be secured to the quadrant in any manner desired. These type-bars are bifurcated at their lower ends for receiving the fins —86— and as seen in the drawings these fins are formed of slightly less width than the distance between the inner walls of the bifurcated extremities of the type-bar and are each provided with an aperture or bearing for receiving the washer-bearing —83—. The washer-bearing —83— is formed of slightly greater width than the thickness of the fin and is substantially the same width as the distance between said bifurcated ends of the type-bars. A rivet or other securing means is passed through apertures in the type-bars alined with the aperture —84— of the washer —83— and is upset or riveted at its outer ends for firmly securing said bifurcated ends of the type-bars to the washer. It is thus apparent that the washer and type-bar are substantially integral and that by hardening the walls of the aperture of the fin —86— which bears upon the hardened periphery of the washer —83— the bearings for the type-bars are substantially indestructible and maintain a perfect and uniform alinement.

From the foregoing description it will be seen that the flexing connection comprising the pivotally connected links 12 of the shift mechanism constitute toggle links arranged end-to-end and that said links in the normal position of the parts shown in Fig. 1 are approximately in a straight line position, and that the toggle is flexed or broken from this position to shift the shiftable member so that the links constitute what may be termed a reverse toggle and that the spring 18 acts to counterbalance the weight of the platen or shifted part and to restore the shifting mechanism to normal position. It will also be seen that arms 49 and 51 comprise varying or differential leverage mechanism between the finger key and the escapement devices and between the universal bars and escapement devices and that the parts are so constructed and arranged that the least power is required for operating the letter spacing or feed devices during the initial portion of the movement of each finger key.

The operation of the machine will now be readily understood upon reference to the foregoing description and the accompanying drawings and it will be noted that the various novel elements herein shown and described may be somewhat varied without departing from the spirit of this invention.

The type bar bearing construction herein set forth forms the subject-matter of a divisional application filed January 27th, 1902.



Having thus fully described my invention what I claim as new and desire to secure as Letters Patent, is:—

1. In a typewriting machine, the combination with a carriage and an escapement wheel, of escapement dogs having oscillatory and reciprocal movements, a separating plate between the dogs, and connected thereto, and means for reciprocating the escapement dogs and said plate.

2. In a typewriting machine, the combination with a carriage and an escapement wheel, of escapement dogs having oscillatory and reciprocal movements, a separating plate between the dogs and provided with a roller, and a bar or bail pivoted to the carriage for engaging the roller and reciprocating the escapement dogs and plate.

3. In a typewriting machine, the combination with a carriage and an escapement wheel, of a rock-arm provided with a vertical guide, escapement dogs mounted on the arm and reciprocally movable along the guide, a separating plate interposed between the dogs and connected thereto, said plate being provided with an arm and a roller journaled on the arm, and a rock-bar or bail pivoted to the carriage for engaging the roller and reciprocating the escapement dogs and plate.

4. In a typewriting machine, the combination with a carriage and an escapement wheel, of escapement dogs having oscillatory and reciprocal movements, a rock-bar for reciprocating the escapement dogs, a hand-piece, and cam connections between the hand-piece and rockbar for actuating said rock-bar.

5. In a typewriting machine, the combination with a carriage and an escapement wheel, of rocking escapement dogs having an independent radial movement with relation to the escapement wheel, a rock-bar or bail for moving the dogs radially, said rock-bar being provided with a cam face, and a hand piece having an arm connected thereto for engaging the cam face and actuating the rock-bar or bail.

6. In a typewriting machine, the combination of a movable carriage, an escapement mechanism for controlling the movement of the carriage, a plurality of rows of key-levers, separate universal bars each actuated by its corresponding row of keys independently of the others, rock-arms interposed between the bars and the escapement mechanism, a link connected to one of the arms and actuated by the bars separately, one of said arms being provided with a cam-face for engaging the other rock-arm, and connections between one of the rock-arms and the escapement mechanism.

7. In a typewriting machine, the combination of a movable carriage, an escapement mechanism for controlling the movement of the carriage, a rock-arm, key-levers, separate

universal bars actuated by the key levers and connected to the rock-arm for actuating the same, a second rock-arm provided with a cam-face engaged with the former rock-arm, said second rock-arm being connected to the escapement mechanism.

8. In a typewriting machine, the combination of a movable carriage, an escapement mechanism for controlling the movement of the carriage, a rock-arm, key-levers independently movable universal bars actuated by the key levers and connected to the rock-arm for actuating the same, a second rock-arm having a cam-face arranged in the path of the former rock-arm, said cam-face having its ends adjacent to the axis of the rock-arm normally in contact therewith, and connections between the second rock-arm and the escapement mechanism.

9. The combination with key levers and an escapement mechanism of a typewriting machine, of independently movable universal bars separate from and actuated by the key-levers, two rock-arms, one being actuated by the bars, and the other being connected to actuate the escapement mechanism, said rock-arms engaging each other at variable points from their axes as the key levers are actuated.

10. The combination with key-levers and an escapement mechanism of a typewriting machine, of the herein described connection consisting of two rock-arms, independently movable universal bars actuated by the key-levers and connected to one of the arms, said rock-arms being so constructed that when the arm actuated by the universal bars is moved the point of contact between said arms moves outwardly from the axis of the arm actuated by the universal bars, and connection between the other rock-arm and the escapement mechanism.

11. In a typewriting machine, the combination with an escapement, of a plurality of rows of key-levers disposed in planes one above the other, a universal bar for each row adapted to be engaged by the key-levers of the corresponding row, the engaging faces of the key-levers and bars being so relatively arranged as to substantially equalize the leverage of the key-levers of the several rows upon the universal bars, and a link connected to the escapement mechanism and actuated by the universal bars.

12. In a typewriting machine, the combination with an escapement mechanism and a plurality of rows of key-levers, of a link connected to the escapement mechanism and provided with engaging faces corresponding to the several rows of key-levers, an independent connection between the key-levers of each row and the corresponding engaging face of the link, said engaging faces and connections being so arranged relative to the key-levers as to substantially equalize the



leverage between the key-levers of the several rows and the link.

13. In a typewriting machine, the combination with an escapement mechanism and a plurality of rows of key-levers, of a universal bar arranged in the path and intermediate the ends of the key-levers of each row, said bars being actuated by the key-levers of its corresponding row independently of the key-levers of the remaining rows, and a link connected to the escapement mechanism and actuated by the universal bars.

14. In a typewriting machine, the combination with an escapement mechanism and a plurality of rows of key-levers, of a link connected to the escapement mechanism, and connections between the key-levers of the several rows and said link whereby the key-levers of one row actuate the link, said connections coöperating with the various key levers intermediate the ends thereof, independently of the key-levers of the remaining rows.

15. In a typewriting machine, the combination with an escapement mechanism and a plurality of rows of key-levers, of a universal bar for the key-levers of each row, each of said bars being connected to the escapement mechanism and provided with projections for engaging the key-levers of its corresponding row and with cutouts alined with the key-levers of the remaining rows whereby the key-levers of one row actuate its corresponding bar independently of the remaining bars.

16. In a typewriting machine, the combination with an escapement mechanism and a plurality of rows of key-levers, of a link connected to the escapement mechanism and provided with a plurality of engaging faces corresponding to the several rows of key-levers, and independent connections between the key-levers of each of said rows and the engaging faces of the link whereby the link is actuated by the key-levers of one row independently of the key-levers of the remaining rows.

17. In a typewriting machine, the combination with an escapement mechanism and a plurality of rows of key-levers, of a universal bar for the key-levers of each row, each of said bars being provided with projections for engaging the key-levers of its corresponding row and with cutouts alined with the key-levers of the remaining rows whereby the key-levers of one row actuate the corresponding bar independently of the remaining bars, and a link connected to the escapement mechanism and provided with a plurality of engaging faces adapted to be engaged by said bars whereby the link is actuated by one of the bars independently of the remaining bars.

18. An universal connection between the key-levers and escapement mechanism of a typewriting machine, the same consisting of

a bar having its opposite ends provided with elongated slots adapted to receive links of less width than the length of the slots and having its intermediate portion formed with projections and cutouts alternating with each other.

19. The herein described connections between the key-levers and escapement mechanism of a typewriting machine said connections consisting of a plurality of universal bars each having its intermediate portion provided with alternately arranged projections and cutouts adapted to be alined with the key-levers and its opposite ends formed with elongated slots, links having portions thereof arranged in the slots and formed of less width than the length of the slots, said links being adapted to be connected to the escapement mechanism.

20. The combination with the carriage and escapement mechanism of a typewriting machine; of a left marginal stop, a dog provided on the carriage for engaging said stop, and means for simultaneously releasing the escapement mechanism and forcing the dog to its inoperative position.

21. The combination with a carriage escapement mechanism and release lever of a typewriting machine, of an adjustable left marginal stop-bar provided with a pawl, a dog provided on the carriage for engaging the pawl, said dog being movable to its inoperative position by the release lever.

22. The carriage of a typewriting machine, in combination with a fixed shoulder, a bar adjustable lengthwise of the carriage and provided with a series of shoulders for engaging the fixed shoulder, a pawl pivotally connected to the bar, and a stop-dog provided on the carriage for engaging the pawl.

23. The combination with a carriage of a typewriting machine, of a left marginal stop-bar adjustable lengthwise of the carriage and provided with a movable shoulder, means for holding the bar in its adjusted position, a stop-dog provided on the carriage for engaging said shoulder, and additional means for forcing the stop-dog out of operative position.

24. The carriage of a typewriting machine, in combination with a left marginal stop-bar adjustable lengthwise of the carriage for limiting the return movement of the carriage.

25. In combination with the carriage of a typewriting machine, of an adjustable left marginal stop-bar provided with a pawl, a stop-dog on the carriage for engaging the pawl and limiting the movement of the carriage to the left, said stop-dog being movable out of the path of the pawl and adapted to automatically force the pawl to its inoperative position when the stop-dog is moved with the carriage from left to right of the pawl.



26. In combination with the carriage and platen of a typewriting machine, of a left marginal stop for the carriage, a dog mounted on the carriage for engaging the stop, and a shift-lever for simultaneously shifting the platen and forcing the dog to its inoperative position.

27. In combination with a carriage and platen carrier of a typewriting machine, of a shift-lever for the carrier, an adjustable stop, and a dog mounted on the carrier for engaging the stop, said dog being inoperative when the carrier is shifted.

28. In a typewriting machine, the combination with a quadrant and type-bars mounted thereon, a carriage, an impression platen, of means for shifting the quadrant and platen, an adjustable left marginal stop for the carriage, a dog mounted on the carriage for engaging the stop, said dog being forced to its inoperative position by the shifting means.

29. In a typewriting machine, the combination of a frame having an engaging shoulder, a stop-bar guided on the frame and movable lengthwise of the carriage, said stop-bar being provided with a series of engaging teeth movable into and out of engagement with the shoulder of the frame, a shoulder provided on the stop-bar, and a movable carriage having a shoulder for engaging the shoulder of the stop-bar.

30. In a typewriting machine, the combination of a frame, a movable carriage, a stop-dog movable independently of the carriage, an escapement mechanism for the carriage, means for releasing the escapement mechanism, a stop-bar adjustable lengthwise of the carriage and provided with a shoulder normally aligned with a portion of the stop-dog, said stop-dog being adapted to be forced out of alignment with the shoulder of the stop-bar by said means.

31. In a typewriting machine, the combination of a frame having a guide and a shoulder projecting into the guide, a stop-bar movable in the guide and provided with a series of teeth for engaging said shoulder, a pawl pivotally connected to the stop-bar, a carriage movable lengthwise of the stop-bar, and a stop-dog pivotally connected to the carriage and movable into and out of alignment with the pawl of the stop-bar.

32. In a typewriting machine, the combination of a carriage, a platen mounted on the carriage, a support secured to the carriage and provided with a lengthwise slot substantially parallel with the platen, and a paper-holding band consisting of a spring arm having one end movable in said slot and its other end normally tensioned toward the platen.

33. In a typewriting machine, the combination of a carriage, a platen mounted on the carriage, a support secured to the carriage and provided with a tubular guide arranged

substantially parallel with the platen, a slot extending through one of the walls of the guide, and a paper-holding band having one end enlarged and movable in the guide and the band proper projecting through the slot.

34. In a typewriting machine, the combination of a quadrant and type-bars mounted thereon, a carriage having a rack, a platen, means to simultaneously move the quadrant and platen toward and from each other independently of the rack, an escapement wheel actuated by the rack, a rock arm, a sliding plate guided on the arm, escapement dogs attached to the plate and sliding therewith, and a rock bar or bail on the carriage and movable independently of the platen for moving the plate to disengage the dogs from the escapement wheel.

35. The combination with the key levers which are pivoted intermediate their ends and escapement mechanism of a typewriting machine, of independently movable universal bars separate from and actuated by portions of the key-levers which extend beyond the pivotal centers thereof, a link common to and actuated by all of the bars, and means actuated by the link and connected to operate the escapement mechanism.

36. The combination with a plurality of rows of key levers pivoted in planes one above the other and having portions thereof that are in substantial alinement, a corresponding number of universal bars pivoted in planes one above the other and having engaging faces engaging the aligned portions of the rows of key levers in planes one above the other, said bars being connected to and serving to operate other mechanisms of the machine.

37. In a typewriting machine, the combination of a carriage, letter spacing mechanism therefor, stop mechanism which normally limits the travel of the carriage, and means for releasing the carriage from its letter spacing mechanism and for automatically throwing the stop mechanism out of the operative position to enable the carriage to travel beyond the point where it is normally arrested.

38. In a typewriting machine, the combination of a carriage, letter space mechanism therefor, a margin stop on the carriage, a co-operating stop on the frame of the machine, said stops being normally one in the path of the other, and hand actuated means for releasing the carriage from its letter space mechanism and for simultaneously causing one of said stops to be moved out of the path of the other.

39. In a typewriting machine, the combination of a carriage, letter spacing mechanism therefor, printing instrumentalities, finger keys therefor, and intermediate mechanism between the finger keys and letter spacing mechanism, said intermediate mechanism



ism including a plurality of universal bars and differential leverage devices, said differential devices being operable by an actuation of any of said universal bars and operative  
5 differentially at the depression of any finger key.

40. In a typewriting machine, the combination of a carriage, carriage feed devices, a plurality of key actuated universal bars, and  
10 intermediate leverage-changing devices between the plurality of key actuated universal

bars and carriage feed devices, said leverage-changing devices being operable at each actuation of any of said universal bars and operative differentially at the depression of any  
15 key.

In witness whereof I have hereunto set my hand this 14th day of November 1899.

EDWIN E. BARNEY.

Witnesses:

MILDRED M. NOTT,

HOWARD P. DENISON.