

No. 652,207.

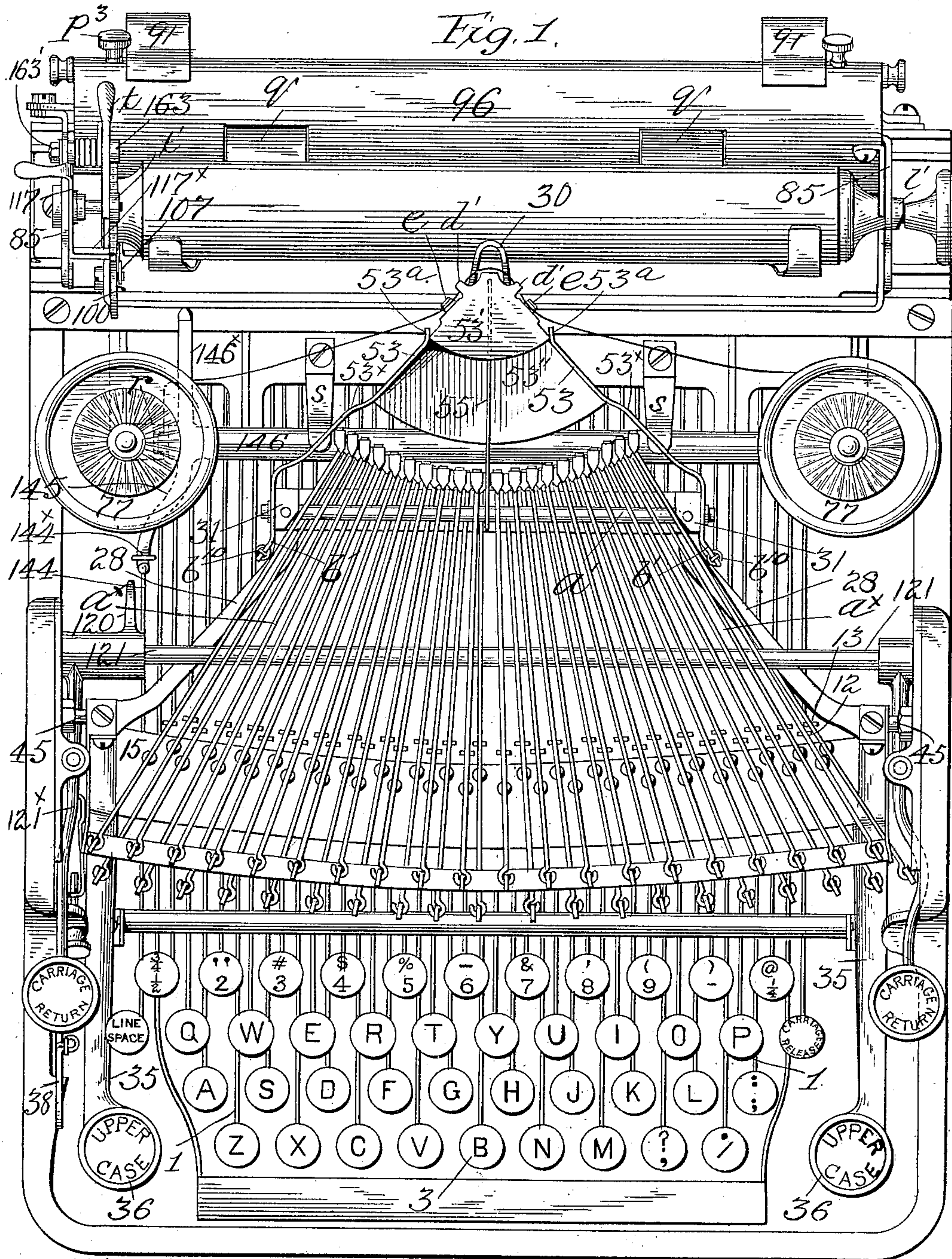
Patented June 19, 1900.

B. GRANVILLE.
TYPE WRITER.

(Application filed Oct. 12, 1897.)

(No Model.)

8 Sheets—Sheet 1.



Attest
Walter Donaldson
C. S. Middleton

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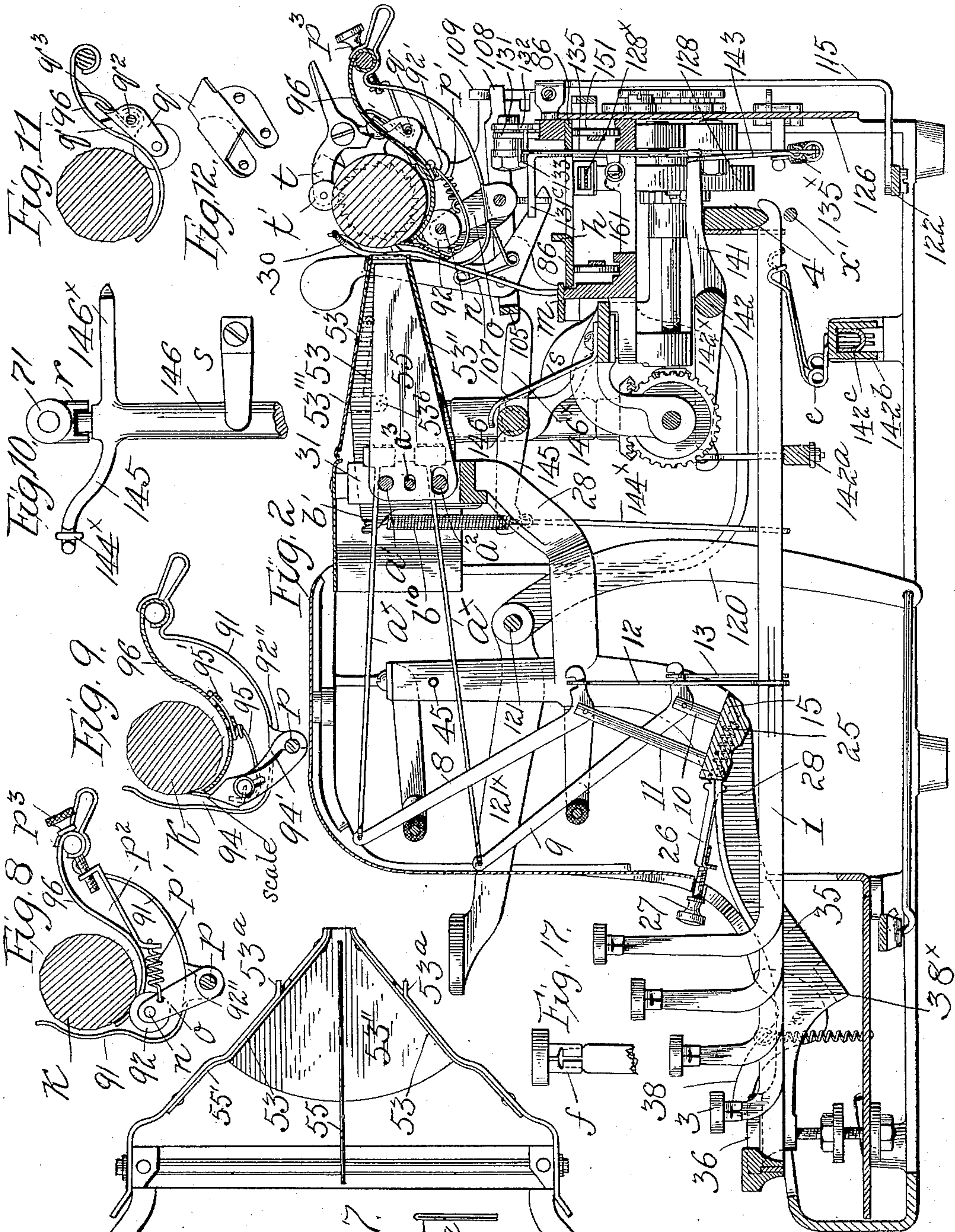
B. GRANVILLE.

TYPE WRITER.

(Application filed Oct. 12, 1897.)

(No Model.)

6 Sheets—Sheet 2.



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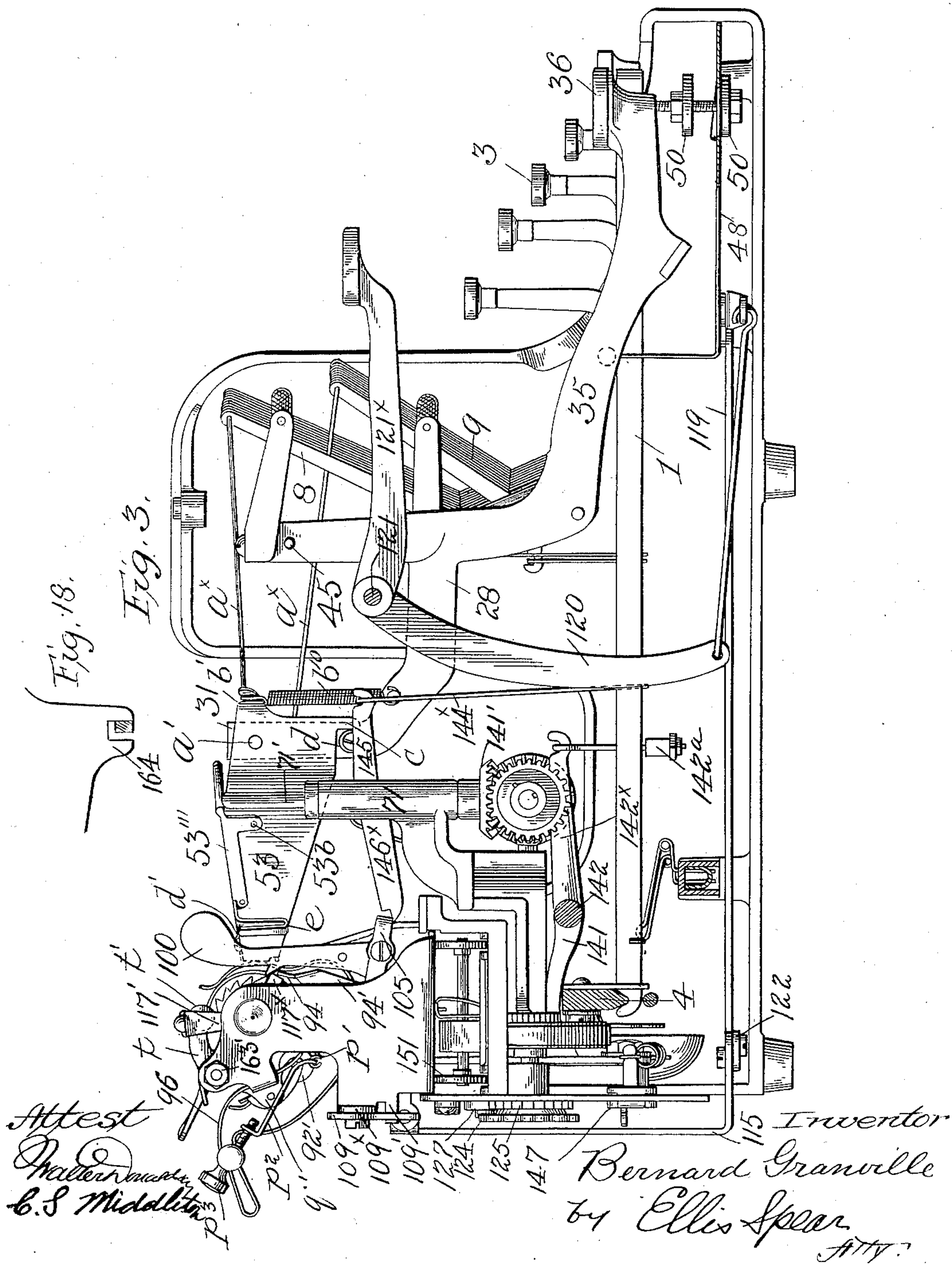
B. GRANVILLE.

TYPE WRITER.

(Application filed Oct. 12, 1897.)

(No Model.)

8 Sheets—Sheet 3



No. 652,207.

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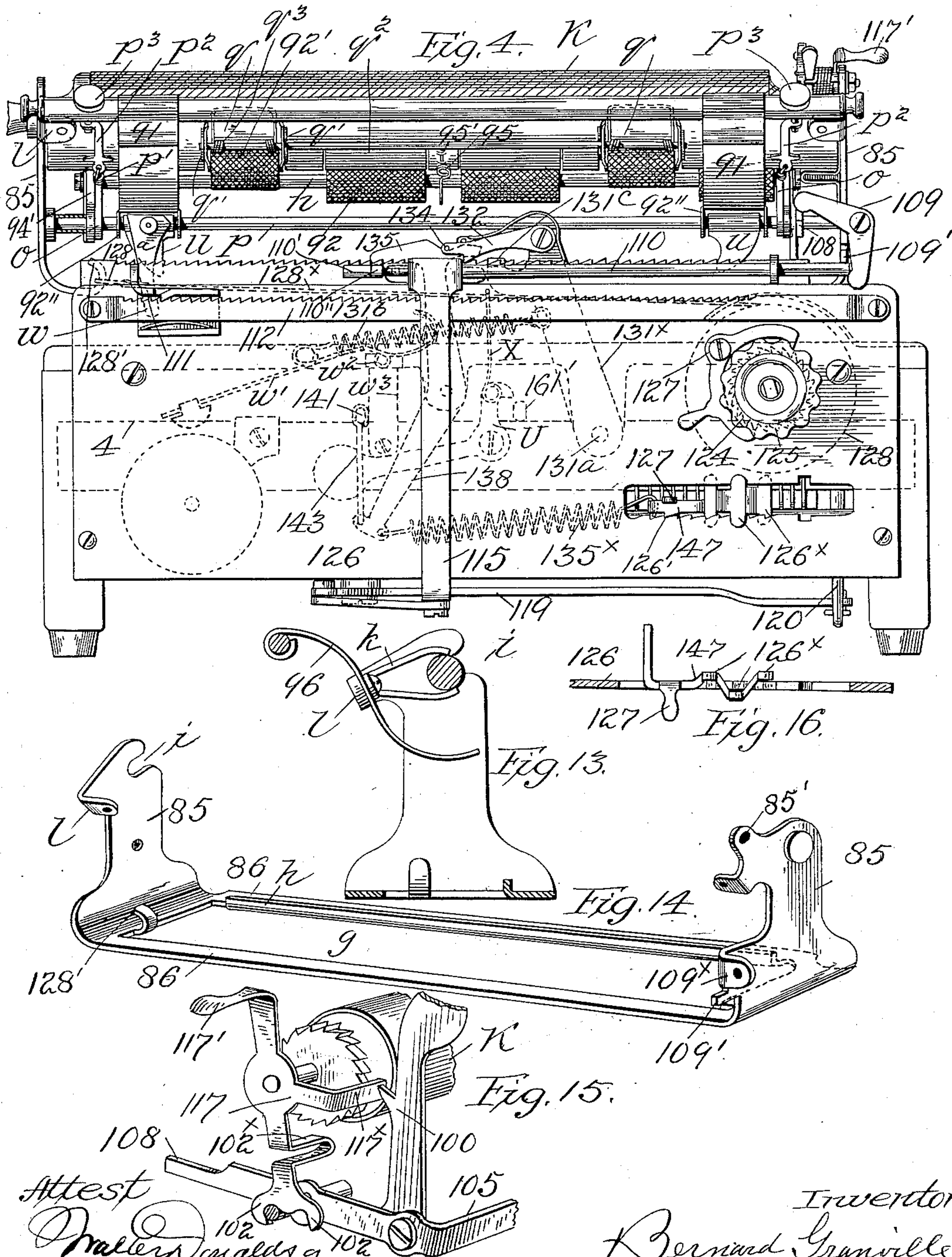
B. GRANVILLE.

TYPE WRITER.

(Application filed Oct. 12, 1897.)

(No Model.)

8 Sheets—Sheet 4.



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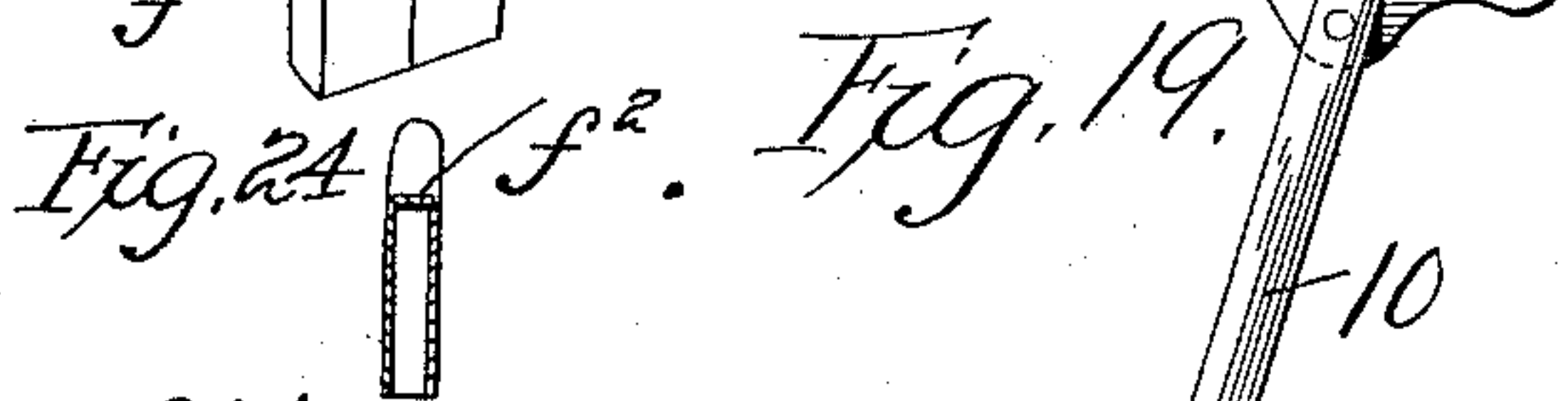
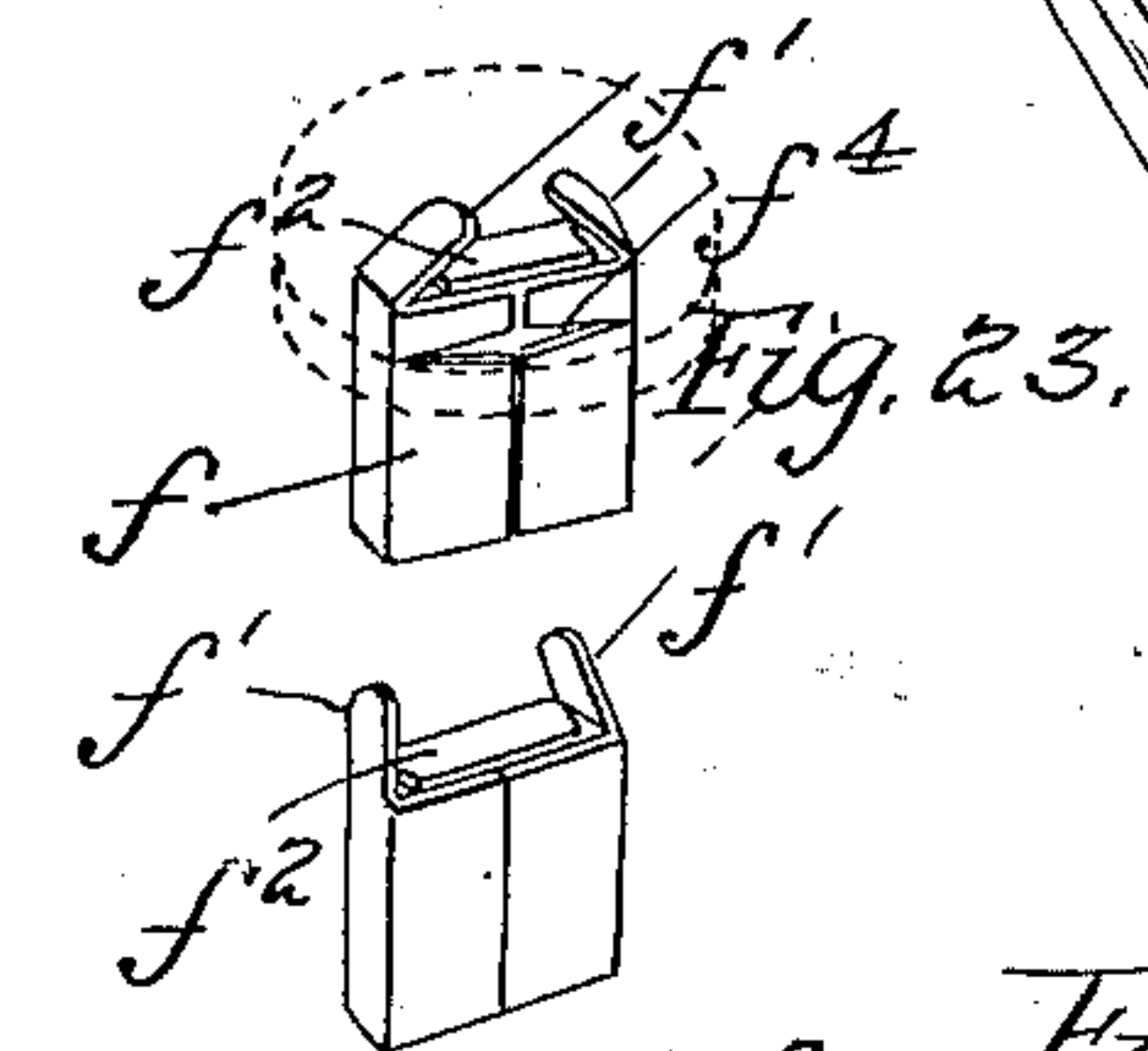
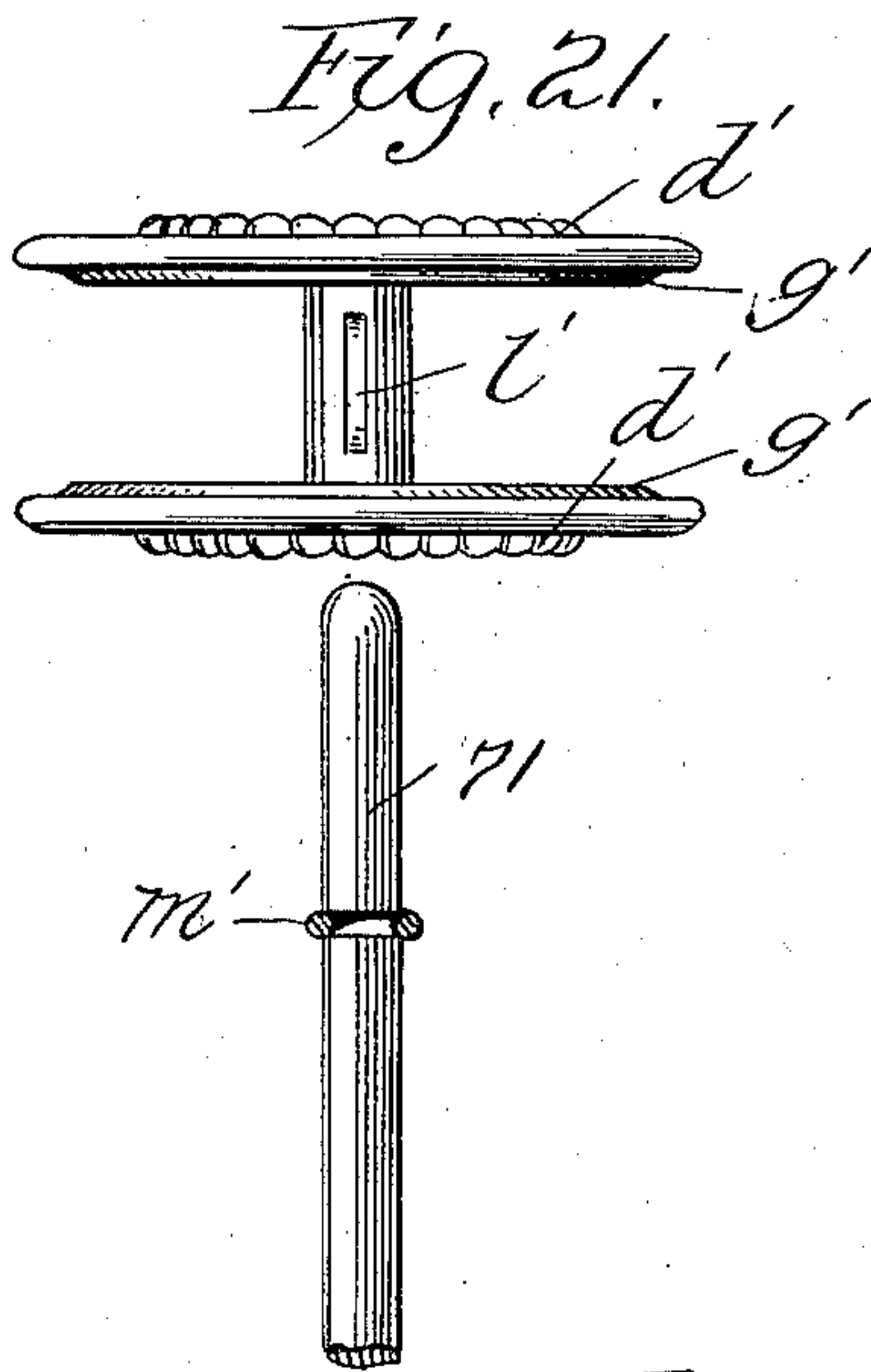
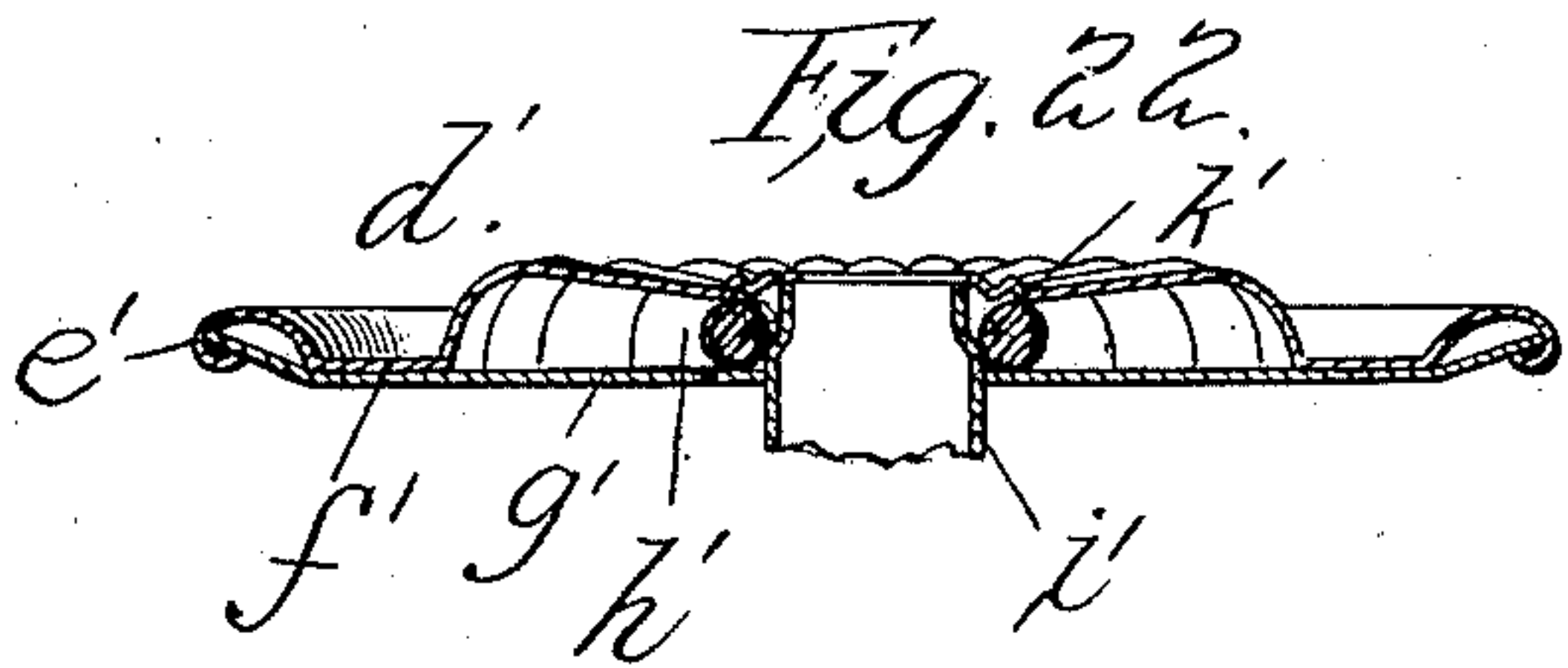
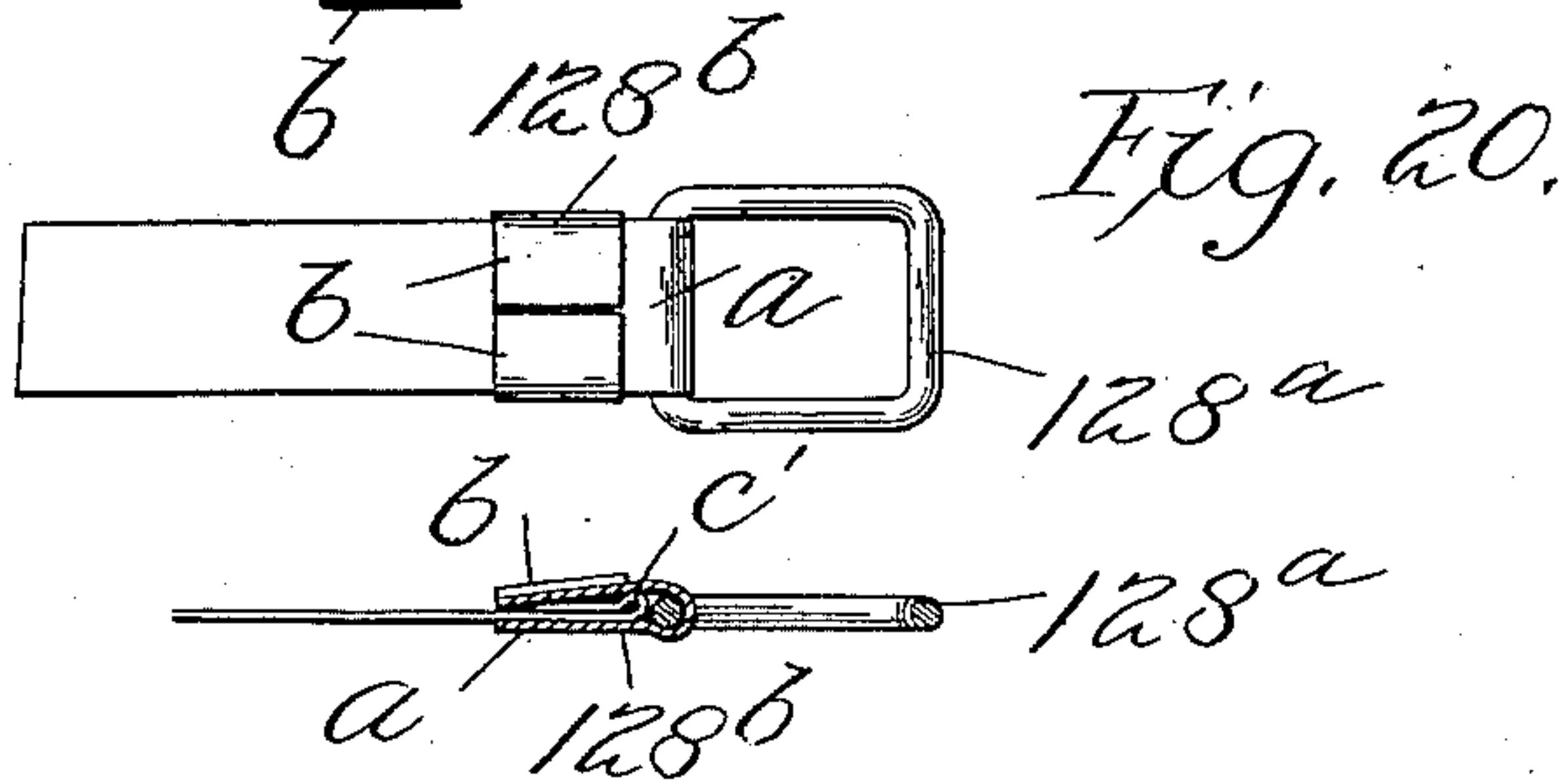
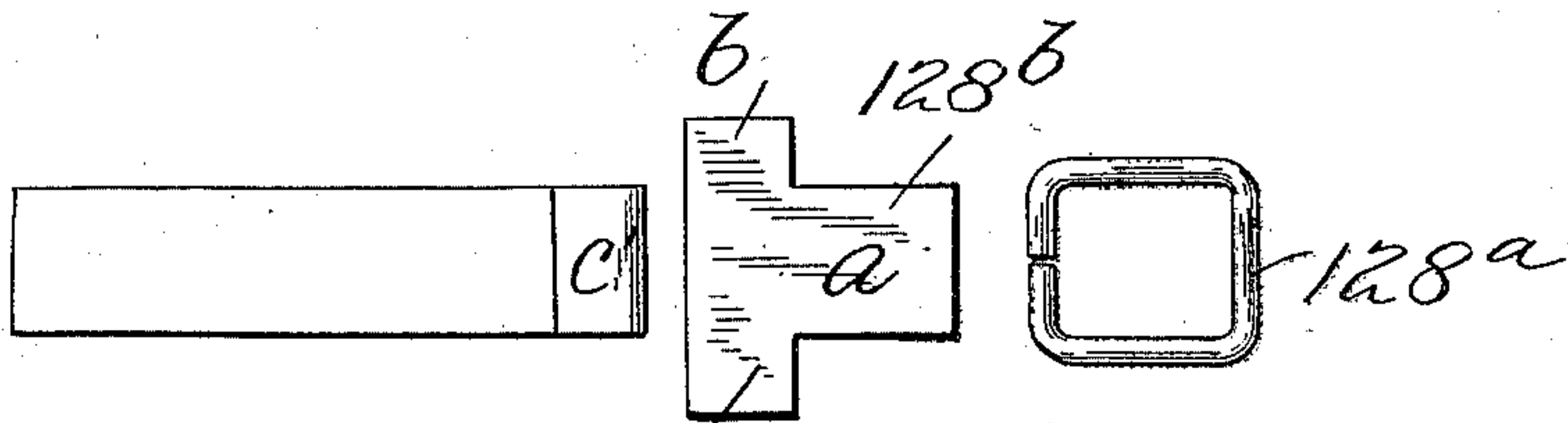
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B. GRANVILLE.
TYPE WRITER.

(Application filed Oct. 12, 1897.)

(No Model.)

6 Sheets—Sheet 6.



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UNITED STATES PATENT OFFICE.

BERNARD GRANVILLE, OF PROVIDENCE, RHODE ISLAND, ASSIGNOR TO THE
MOSSBERG & GRANVILLE MANUFACTURING COMPANY, OF SAME PLACE.

TYPE-WRITER.

SPECIFICATION forming part of Letters Patent No. 652,207, dated June 19, 1900.

Application filed October 12, 1897. Serial No. 654,968. (No model.)

To all whom it may concern:

Be it known that I, BERNARD GRANVILLE, a citizen of the United States, residing at Providence, Providence county, Rhode Island, have invented certain new and useful Improvements in Type-Writers, of which the following is a specification.

My present invention is an improvement upon that form of type-writer disclosed in Patent No. 570,433, dated October 27, 1896, and while I have adhered in the present machine to the general principle of operation as disclosed in said patent I have greatly simplified the construction and lessened the number of parts.

In the drawings, Figure 1 is a plan view of the machine. Fig. 2 is a central vertical section. Fig. 3 is a side view of the machine with the casing removed. Fig. 4 is a rear view of the machine. Fig. 5 is a plan view of the platen-carriage bed, showing also the escapement and attached parts. Fig. 6 is a detail view of the platen-carriage stripped of some of its attachments, illustrating the connections to the wiper-lever and the escapement. Fig. 7 is a detail plan view of the type-bar-guide frame. Fig. 7^a is a detail sectional view of the shifting tongue. Figs. 8 and 9 are detail views relating to the platen and adjacent parts. Fig. 10 is a view of a detail. Figs. 11 and 12 are detail views of the spring-support for the pressure-roller. Figs. 13 and 14 are details relating to the platen-carriage. Fig. 15 is a detail view of the line-space mechanism. Figs. 16, 17, and 18 are views of details. Fig. 19 is a detail view of one of the pivot-posts. Fig. 20 shows the connection between the carriage and the band of the spring-drum. Figs. 21 and 22 show the construction of the ribbon-spools. Fig. 23 is a detail view of a clip for holding the glass key-top to the key-levers. Fig. 24 is a similar view of a slightly-different form of this clip.

The series of type-bars a^x are arranged converging toward the printing-point, and they are reciprocated by the manipulation of the keys 3, the levers 1 of which are connected by links 12 13 to the bell-crank levers 8 and 9, pivoted to posts 10 and 11. The connec-

tion between the type-bars and the upper ends of these levers is made simply by inserting the hooked ends of the type-bars into the openings in the levers, and the type-bars are easily detached. This connection is a direct one, no rivets or pins being necessary in either the lever or the type-bar.

I have improved the manner of supporting and guiding the type-bars, my object being to insure perfect freedom and ease of movement of the bars and to secure absolute accuracy in the alinement of the printing.

The type-bars at their rear ends rest upon cross-rods, the one marked a' supporting the upper series of bars, while the bar a^2 supports the lower series of bars. These cross-rods extend between the upwardly-extending posts 31 of the cradle-frame 28, which frame is pivoted at 45 to the stationary framework and is adapted upon the depression of the keys 36 at each side of the bank of keys to shift the upper series of type-bars out of and the lower series of bars into line with the printing-point to change from upper to lower case printing. The type-bars merely rest loosely upon these cross-rods a' and a^2 , and these rods, taken with the bell-crank levers connected to the type-bars at their front ends, constitute the sole support of the said type-bars. The rear heads of the type-bars lie in a group between the converging sides 53 of the type-guiding frame, which is carried directly by the cradle-frame instead of independently, as before. In my present construction I depend upon this frame entirely for the proper guiding of the type to the printing-point, and for this purpose the sides 53 of the frame are extended forward far enough to include between them the rear ends or heads of the type-bars, so that whenever a type-bar is moved it will be guided by this frame toward the printing-point. The shifting tongue 55 used in my former patents I employ in the present case; but in this instance I mount it loosely upon the cross-bars a' a^2 of the cradle-frame. The converging sides 53 53 are sufficiently far apart to permit a loose assembling of the type-bars, so that free lateral play will be allowed and all possibility of the type-bars sticking will be

avoided. The proper lateral guiding of the type-bars is insured by the converging sides 53 of the guiding-frame in connection with the shifting tongue, as above indicated, and the guiding in a vertical direction is afforded by the converging upper and lower walls 53' 53'' of the guiding-frame. The upper wall 53' is extended forwardly in the form of a cover 53''' for the guiding-frame, and this cover confines the type against vertical displacement or jumping out of place, while at the same time allowing sufficient vertical play to insure perfect freedom of movement of the type-bars.

When a key is depressed, the type-bar slides freely and loosely over the cross-bar a' or a^2 , and it can have both lateral and vertical play within certain bounds until the head of the type-bar strikes the converging walls of the guiding-frame and the side of the shifting tongue, when the bar will be directed accurately into its place. The converging guiding sides 53 are flared at 53^x to provide additional room laterally for the type-bars. The cover 53''' is pivoted to the guiding-frame, the pivots passing through ears 53^a, struck out from the converging guiding-walls, Figs. 1 and 7, and through ears on the cover. The cover is held down in place by its spring-arms 53^b, which have indents to engage depressions in the outer sides of the guiding-frame. By this cover access may be had to the type-bars for cleaning, and the type-bars may be lifted up and removed from the machine.

The shifting tongue has elongated openings to receive the cross-rods a^2 a^3 , while an upper circular opening in the tongue engages the upper rod, this construction affording sufficient looseness for the free working of the shifting tongue.

The guiding-frame has a pivotal action independent of the cradle-frame. Its converging sides 53 are extended forward outside of the posts 31 and are pivoted on the extended ends of the cross-rod a' , springs b^{10} serving to hold the frame normally up opposite the printing-point by drawing down upon the hooked forward extensions b' of the frame. The lower ends of the springs are attached to the cradle-frame, Figs. 2 and 3. By pressing down upon the rear end of this type-bar-guiding frame the printing-point and the last letter printed may be fully exposed, and then by removing the pressure the guiding-frame will rise automatically to normal position. The movement of the guiding-frame is stopped by a projection C thereon engaging an adjustable washer or disk d , Fig. 3. A lug 164, Fig. 18, on the opposite side of the frame from that shown in Fig. 3, limits the downward movement of the type-bar-guiding frame. The top plate of the guiding-frame carries the guides d' e for directing the ribbon from the spools 77 in front of the printing-point. The depression of the guiding-frame thus serves to lower the ribbon from the printing-point, and no separate carrier is needed for

the ribbon, the pivoted guide-frame answering all the requirements as a ribbon-guide and displaceable support.

The pivot-posts 10 11 of the bell-crank levers are carried by the cross-bar 15 of the cradle-frame, and the arms 35 connect this cross-bar with the keys 36. The keys 36 are placed under variable tension through the springs 25, the links 26, and the screws 27, Fig. 2, at the front of the machine. The movement of the cradle-frame is limited by disks 50, adjustably carried by screw-studs depending from the arms 35 of the cradle-frame, said studs passing through openings in the comb-plate 48, so that the disks can strike upon the upper and lower faces of the said plate. A locking-lever 38, Fig. 2, is used to hold the cradle-frame in position for printing with upper-case type. Thus when the forward end of the lever is thrown up and to the rear the curved end (shown dotted in Fig. 2) will engage the lug 38^x on the cradle-frame and tilt the same.

The finger pieces or keys are secured to the upturned ends of the key-levers by the sheet-metal shanks f of the keys, Fig. 17, being bent around the reduced ends of the key-lever.

The carriage of the platen is of special construction. As shown in Fig. 14, it comprises one piece of sheet metal struck up to provide the end frames or brackets 85 and the horizontal connecting-bars 86, leaving an open center g . One edge of the forward bar 86 is turned up for strengthening the frame, as shown at h . The frame also has a number of ears struck up thereon for supporting the parts hereinafter referred to. The platen K, as shown in Figs. 6 and 8, has a plurality of flat faces, and it is supported by the upturned end frames 85. One frame has a notch i to permit the removal of the platen-journal, said journal, as in Fig. 13, being engaged by a spring-retaining fork k , which is screwed in place, as shown in Figs. 1 and 13, the same screw passing through the paper-shelf 96 and into an ear l , struck up on the carriage-frame. The boss l' is beveled to permit the platen to be removed, Fig. 1. The other end of the shelf is screwed to a similar ear on the other end frame of the carriage. The platen-carriage runs on a roller-frame 151, as in my former construction, and it is guided by the front edge of its front bar 86, fitting under a plate m on the carriage-bed. The rear bar 86 of the carriage has the escapement rack-bar riveted thereto.

I provide two sets of pressure-rollers in the present construction, one set 92, Figs. 2, 4, and 8, being carried by a shaft n , supported by arms o , pivoted on a cross-rod p of the carriage-frame, said arms being under tension of the springs p' , connected with links p^2 , which are adjustable by the screws p^3 , carried by the rear bar of the paper-shelf. The other set of rollers 92', Figs. 2, 4, and 11, are carried by small frames q , pivoted on a shaft q^2 ,

held in ears q' , struck out of the paper-shelf, springs q^3 being arranged to press the frames, so that the rollers will be forced against the platen. The frames q are of channeled form, and the rollers are journaled in their sides, which are bent up from the main portion.

The paper-scale 94 (designated as such in Fig. 9) is carried adjustably on arms 94', pivoted on the cross-rod of the platen-carriage, and the scale is pressed against the platen by the spring 95, held by loops 95', pressed out of the paper-shelf, Figs. 2, 4, and 9. The paper-scale may be adjusted by the slot-and-screw connection, as indicated in Fig. 9.

The paper-clips 91 are supported slidably by engaging the rear bar of the paper-shelf and also by engaging the cross-rod of the platen-carriage, for which purpose the clips, which are made of sheet metal, are struck up with ears 92' to engage the cross-rod.

The line-space mechanism is substantially the same as that disclosed in my former patent with the few exceptions hereinafter noted. The ratchet-wheel is adapted to be engaged by the pawl 100, pivoted to the frame 105, which is journaled on the cross-rod of the platen-carriage, a spring 107 being used to hold the pawl to its work. The frame 105 is operated from the line-space key through the key-lever 144, the link 144^x, the lever-arm 145, and the rock-shaft 146, which has lever-arm 146^x projecting rearwardly therefrom, so as to project under the front bar of the frame 105, so that when the key is depressed the frame is operated to lift the pawl and turn the platen. The shaft 146 is simply arranged by having its journal-pins, Figs. 1 and 10, dropped into open sockets r , formed on the posts 71, which support the ribbon-spool shafts. The shaft is held from displacement by clips s reaching thereover. The line-space regulator 117 is struck up and bent into shape from a single piece of sheet metal. It is journaled on the shaft of the platen and has a guard 117^x arranged when the regulator is adjusted rearwardly to shield a portion of the ratchet-teeth from the stroke of the pawl 100, so that only a part of the pawl's movement will be effective in turning the platen, but when the finger-piece 117' of the regulator is pressed forwardly the guard 117^x will be thrown below the pawl-tooth and said pawl will be active on the teeth throughout its whole movement. The lower end of the regulator is forked to provide stops 102 by striking against the cross-rod, and a spring portion 102^x of the regulator places the same under sufficient tension, so that the same will remain in either of its adjusted positions. The space-frame 105, has the rearwardly-extending arm 108, as in my former construction, which is engaged by the bell-crank lever 109 to operate it automatically when the carriage is returned forcibly to the right. This is done by the rod 110, Fig. 4, striking the stop 111, which is adjustable on the rack-bar 112. An adjustable stop 110' on the rod

is locked by a nut 110". This is convenient for assembling.

In stamping out the platen-carriage an ear 109^x is formed for the lever 109, as in Fig. 14. A stop 109' is also formed on the platen-carriage for the lever 109. The detent for the platen consists of a spring-pressed lever t , carrying a roller t' to bear on the ratchet-teeth. This lever is carried by a stud 163, held by the nut 163' in the slot 85', Fig. 14, so that the arm t , which carries the roller t' , can be moved backward or forward in order that the flat surfaces of the roller may be brought parallel with the type-face—that is, the roller t' bearing on the points of two adjacent teeth determines the position of the platen-roller, and if this roller is positioned to the front or back the flat face of the roller (see Figs. 8, 9, and 11) can be made to assume vertical position.

The escapement mechanism is substantially like that disclosed in my former patent, consisting of the two pawls 131 132 and the wiper 135 with its inclined edge bearing on the pins 133 134 of the pawls. The wiper in the present instance is pivoted to an ear cast on the supporting-bed of the carriage, and it is connected with the arm 141 of the rock-shaft 142 by a link 143 instead of being operated by direct contact with the said arm. The rock-shaft is operated through the lever 142^x thereon from the bar 142^a, extending under the key-levers. The pawl 132 is normally in engagement with the rack, while the pawl 131 is normally out of engagement, being held so by its pin 133, resting on a high part of the wiper, while the pin 134 of pawl 132 rests on the low part of the wiper. When the wiper is moved to the right, Fig. 4, by the depression of the bar 142^a, the pin 134 will ride up on the inclined edge of the wiper, lifting the pawl 132, and at the same time the pin 133 will ride down toward the low part, so that it will engage the rack when the same is free from the pawl 132. When the wiper returns to the left, the pawl 132 falls and the pawl 131 rises. The points of the pawls are so positioned in relation to each other and the teeth of the rack as to give the step-by-step movement to the carriage.

The tension on the keys is varied by a spring 135^x, connected to the wiper-arm 138, the other end of the spring being carried by a sliding pawl 147, adjustable in a slot in the back plate 126 of the machine, the lower edge of the slot being toothed and the sliding pawl having a tooth 126' to engage the same. The sliding pawl is provided with studs 126^x, fitting on the inner and outer sides of the back plate to guide it in its movement, and by raising the finger-piece 127 the sliding pawl is lifted out of engagement with the teeth and may be moved in either direction to increase or decrease the tension on the keys.

As in my former patent, a special key (designated as the "carriage-release") is provided, having a greater dip than the other keys, so

that upon its depression the wiper will be moved to such a position that both pawls will be released from engagement with the rack-bar and the carriage will be free to run toward the left until the pawls are allowed to drop into engagement again with the rack-bar or until the end of the run is reached. I provide, as in my former case, a yielding support for the pawls, so that when the freely-running carriage is arrested the shock will be taken up by said support. This is an arm 131^x, pivoted at 131^a to an ear or boss cast on the under side of the bed-frame of the carriage. A spring 131^b holds it normally in position against a stop 160 on the cross-bar 161 of the bed-frame. This arm also has a horizontal extension 131^c in the path of stops *u*, carried on the cross-rod of the platen-carriage between the ears of the paper-clips, so that the paper-clips will be prevented from crossing the printing point by the stops striking this extension. The stops also act as the means for arresting the movement of the carriage to the left by striking the extension.

In order to lock the key-levers when the end of the line is reached to prevent further printing, I provide an arm 161' on the rock-shaft 142, extending rearwardly into proximity to the hooked end of a lever *U*, which is pivoted to the comb-bar 4. This lever has a weighted end which holds its hooked end out of line with the arm 161', but when the carriage reaches a certain point the finger *w* on the carriage engages the spring extension *X* of the locking-lever and moves the hook over the arm 161', so that this arm cannot rise, and consequently the key-levers cannot be operated.

It often happens that in operating the machine the arm 161' is raised at the time when the finger *w* comes in contact with the top of the spring. If this spring *X* was not made sufficiently elastic for the barrel-spring contained in 128 to overcome its flexibility, the rack would be prevented from advancing and the letters would keep on piling up by reason of the arm 161' rubbing against the end of the catch *U*. Owing to the greater strength of the spring contained in 128, the weaker spring *X* is caused to deflect, and upon the arm 161' being released the tension of the spring *X* causes the catch *U* to snap over the arm 161' and prevents its rising, and consequently stopping the keys from being depressed. The finger *w* is pivoted to an ear *y*, which is struck out of the paper-clip. When, therefore, this paper-clip reaches the printing-point, the keys will be locked to prevent further printing. The finger *w* also operates the bell-hammer *w'*, Fig. 4, which is pivoted at *w*² to the bracket *w*³.

The spring-drum 128 is connected with the carriage by a band 128^x, which has a loop at its end to engage a hook 128', struck up from the carriage-frame. This loop 128^a is secured on the end of the band by a sheet-metal clip 128^b, Fig. 20, which is of T form, the part *a*

being bent over the meeting ends of the loop, while the side portions *b* are bent over the main part. The band is held in the contracted space formed by the converging upper and lower walls of the clip by simply doubling the end of said band to form an enlarged or wedge-shaped end *c'*. The tape or band is guided to the spring-drum through a bracket or guide 128^c, which is formed of sheet metal, with a guide-opening at one end, the other end or foot being secured to the cross-bar on the carriage-bed.

The "carriage-return" mechanism is substantially the same as that formerly used by me, consisting, essentially, of the arms 121^x, having finger-pieces and connected with a rock-shaft 121, which has a depending arm 120, connected by a link with the bell-crank 119, pivoted under the machine-frame, the long arm of said bell-crank extending to the rear and being connected through a link 122 with an arm 115, connected with the rack-bar of the carriage.

The means for winding up the spring-drum consists of a disk 124, having a roughened periphery to be grasped by the thumb and fingers, and a ratchet 125 and pawl 127. The disk fits closely to the back plate, and the arm 115 can move across the rear face thereof.

The type pass through the wire shield 30 when they leave the guiding-frame, and this shield keeps the ribbon off of the platen.

The pivot-posts 10 11 of the bell-crank levers are, as shown in Fig. 19, knurled at their lower ends, thus providing a series of longitudinal corrugations, and these posts are simply forced into the cross-bar 15 of the cradle-frame. This same method of attachment is employed between the lower end of the spool-shaft 71, Fig. 3, and the miter-gear 141', and it is found that this connection is strong and obviates entirely the necessity of using pins or other fastening means. As shown in Fig. 2, the springs *c*, which act upon the type-levers, are held by an inverted-U-shaped bar 142^b. Within this bar another bar 142^c is placed, with its open side uppermost, and the right-angular extensions of the springs project through these bars. This construction gives an extended bearing to the springs, so that they will be prevented from tilting or turning under pressure.

The key-levers at their rear ends are notched, and they engage the comb-bar 4, a stop-rod *X'* extending under the said rear ends to insure the proper position of the levers.

The ribbon-spools are of special construction. As shown in Figs. 21 and 22, they comprise sheet-metal heads *d'*, which are struck up with flanges *e'*, and flat portions *f'*, the latter forming rests or bearings for the sheet-metal back plates *g'*, which are dished or bent at their edges, and the flanges *e'* are turned over into engagement therewith. In the cavity *h'* of the heads a spring-ring *k'* is placed, through which extends the end of the sheet-metal sleeve *i'*, which connects the heads, said

sheet-metal sleeve fitting with its main part within an opening in the metal backing portion and having a shouldered bearing against the spring-ring k' , which determines the relative location of the parts. The sleeve has its reduced ends extending through openings in the sheet-metal heads, and these projecting ends firmly engage said heads, thus securely binding the parts together. The ring serves to space the disks of the spool the proper distance apart and to afford a shoulder for riveting over the end of the tube or sleeve, by which riveting the sleeve and head are connected. The sleeve itself is formed of sheet metal pressed into cylindrical form, and this provides a split cylinder which will hold to the spool shaft or spindle by its friction, and this frictional hold on the spindle is increased by the spring portion l' , struck up out of the sleeve.

The position of the ribbon-spools on the spindles is determined by spring-ring stops m' , fitting in grooves in the spindles. This forms a simple stop and may be used at other points on the machine.

The shifting tongue is formed of two thicknesses of metal, which are brought together so that the two lips of these thicknesses are brought into contact. I prefer to make these two metal parts of different thicknesses, so that the sound-wave lengths will be different and the vibration of one will neutralize the vibration of the other. This has the effect of deadening the sound by destroying all ringing effect. As shown in Fig. 7^a, I may make the two thicknesses of metal forming the tongue by folding the metal back upon itself, one half of the metal piece being thinner than the other. This same principle is carried out in connection with the converging walls and cover of the type-guiding frame—that is, the guide-frame is lined with a thin sheet of metal $55'$, as shown in Fig. 7—and this has the effect of deadening the sound.

As shown in Fig. 23, the clip f , previously mentioned, which holds the key tops to the key-levers, is provided with two spurs or projections f' , which are embedded in the glass key top, the said glass being cast into connection with the said spurs. The clip has also a turned-over lip f^2 , which prevents the glass from running down into the slot of the clip. The lower split portion of the clip embraces the upturned end of the key-lever, and thus holds the key tops securely thereto. As shown in Fig. 23, I prefer to slot the shank or body part of the clip, which is punched out crosswise of the clip at f^4 . This is done so as to prevent breaking of the glass by allowing the metal piece to spring in case of variation of the key tops.

I claim—

1. In combination in a type-writer, the converging type-bars, the levers connected with the bars at their front ends, the support for the rear ends of the bars holding the same to permit lateral and vertical play, said bars

bearing against each other laterally and loosely and a guiding-frame having converging walls to direct both the vertical and lateral movements of the type-bars to the printing-point, substantially as described.

2. In combination in a type-writer, the converging type-bars, the guiding-frame holding the rear ends of the bars loosely to permit free play thereof, laterally and vertically and to permit also their removal from the machine, and the bell-crank levers with operating means therefor, said type-bars having hooked ends engaging the levers detachably, substantially as described.

3. In combination the converging type-bars, the guiding-frame having upper, lower and side walls converging toward the printing-point, said frame receiving the rear ends of the type-bars bearing against each other laterally and loosely, and means for operating the type-bars detachably connected thereto, said upper wall having a movable portion to expose and permit the removal of the type-bars, substantially as described.

4. In combination, the converging type-bars with means for sliding them, the guiding-frame having converging side walls to direct the type to the printing-point, said side walls being extended forward to receive the rear ends of the type-bars between them and bearing loosely against each other laterally, and the shifting tongue dividing the series of type-bars into two lateral groups, substantially as described.

5. In combination in a type-writer, the converging type-bars, means for reciprocating the same along direct lines, a guiding-frame having upper, lower and side walls converging toward the printing-point, the said type-bars being arranged within the guiding-frame and bearing against each other at their rear ends laterally and loosely to have free play both laterally and vertically, and a shifting tongue dividing the guiding-frame into two parts, substantially as described.

6. In combination, the converging type-bars with means for reciprocating them along direct lines toward the printing-point, the cradle-frame and the converging guides for the type-bars carried by the said cradle-frame, substantially as described.

7. In combination, the converging type-bars with means for reciprocating them along direct lines toward the printing-point, the cradle-frame, and a guiding-frame comprising upper, lower and side guiding-walls, said side walls being extended to the front to embrace the type-bars, the said guiding-frame being carried by the cradle-frame, substantially as described.

8. In combination, the converging type-bars with means for reciprocating them along direct lines toward the printing-point, the cradle-frame, the converging guides for directing the type-bars to the printing-point, and the shifting tongue operating between the converging guides, said guides and the

shifting tongue being carried by the cradle-frame, substantially as described.

9. In combination, the converging type-bars with means for reciprocating the bars along direct lines toward the printing-point, the cradle-frame, the cross-rods extending between the posts 31 of the said cradle-frame, the said type-bars resting loosely on the cross-rods, and the converging guides for the type-bars carried by the cradle-frame, substantially as described.

10. In combination, the converging type-bars with means for reciprocating the same along direct lines toward the printing-point, the cradle-frame having the posts 31 with cross-rods extending between them, the converging guiding-walls for the type-bars carried by the cradle-frame, and the shifting tongue supported on the cross-rods, substantially as described.

11. In combination, the reciprocating type-bars, with means for reciprocating the same, the cradle-frame, and the guiding-frame for the type-bars comprising the converging walls, said guiding-frame being pivotally supported to be depressed from the printing-point, substantially as described.

12. In combination, the reciprocating type-bars, with means for reciprocating them, the cradle-frame and the guiding-frame comprising converging walls, the said guiding-frame being pivotally supported, means for holding the frame normally up, the ribbon-spools and the ribbon-guides carried by the pivoted guiding-frame, substantially as described.

13. In combination, the type-bars, the cradle-frame, and the guiding-frame for the type-bars comprising converging walls, said guiding-frame being pivotally carried by the cradle-frame, substantially as described.

14. In combination, the type-bars, the cradle-frame, the guiding-frame pivoted thereon and comprising converging walls, and the ribbon supported by the said pivoted guiding-frame, substantially as described.

15. In combination, the reciprocating converging type-bars, the cradle-frame carrying the same and having the posts 31, the guiding-frame having the converging walls and pivoted to the cradle-frame posts 31, and the springs between the extensions of the converging walls and the cradle-frame, and the stops for the guiding-frame, substantially as described.

16. In combination, the reciprocating type-bars, the cradle-frame carrying the same, and means for placing the cradle-frame under tension comprising the springs and the adjusting-screws extending to the front of the machine, substantially as described.

17. In combination, the reciprocating type-bars with operating means therefor, the guiding-frame for the type-bars comprising the converging guiding-walls, the upper wall having a hinged cover held by spring-arms and the said type-bars being detachable at their front ends, substantially as described.

18. In combination, in a type-writer, the type-bars with operating means, the platen and the platen-carriage comprising a single sheet of material having an open center pressed into U shape with upturned ends for supporting the platen and with front and rear connecting-bars, substantially as described.

19. In combination, the type-bars, the platen, means for operating the type-bars and the carriage for the platen comprising a single sheet of material having bent-up end frames, front and rear bars, ears for the attachment of the parts being struck up from the material and a hook for the attachment of the carriage-impelling band, substantially as described.

20. In combination, the platen, the carriage having the upturned ends one of which has a notch for the removal of the platen, and the spring-fork for retaining the platen in place, the arms of said fork lying on opposite sides of the notch substantially as described.

21. In combination, the carriage having the ears, the paper-shelf secured to the ears, the removable platen, the spring retaining-fork and the screw passing through the fork, the paper-shelf and one of the ears, substantially as described.

22. In combination, the platen, the carriage bent up from a single piece of material with end frames and with front and rear connecting-bars, the front bar having an upturned strengthening portion *h* and an extended edge fitting under a flange on the carriage-bed, and the rear bar having the rack-bar secured thereto, substantially as described.

23. In combination, the platen, the carriage, the cross-rod between the end frames of the carriage, the paper-shelf and the paper-clips having sliding connection with the rear of the paper-shelf and having sliding connection with the cross-rod, substantially as described.

24. In combination, the platen, the carriage, the ratchet, the line-space pawl, the frame carrying the same, the rock-shaft having the arms to engage the frame, means for operating the rock-shaft, the ribbon-spool supports having open bearing-sockets to receive the journals of the rock-shaft, and means for retaining the rock-shaft in said bearings, substantially as described.

25. In combination, the platen, the line-space mechanism including the pawl and ratchet and a line-space regulator pivoted on the platen-shaft and having a guard to shield the ratchet-teeth, a forked stop-arm or extension, and the spring portion 102^x between the fork and the pivot-point, substantially as described.

26. In combination, the escapement comprising the pawl, the rack-bar and the wiper, the key-levers having a connection with the wiper, and means for placing a tension on the keys comprising a spring and an adjusting-clip therefor having studs to fit on the

opposite sides of the back plate, said plate being slotted and toothed to engage a tooth on the clip, substantially as described.

27. In combination, the escapement comprising the rack-bar, the pawls and the wiper, the carriage-release key adapted to release both pawls through the operation of the wiper, the spring-support for the wiper having the extending portion forming a stop, and the stop on the carriage to engage the said stop, substantially as described.

28. In combination, the carriage having the cross-rod, the paper-clips having the ears engaging the cross-rod, the stops on the cross-rod held between the ears of the paper-clips, and the stop on the yielding support to be engaged by the stops of the paper-clips, substantially as described.

29. In combination, the carriage, the escapement consisting of the rack, pawls and wiper, the connection from the keys to the escapement comprising the rock-shaft connected to the wiper, and a key-locking device comprising a locking-lever to engage an arm on said rock-shaft, and a projection on the carriage to move the locking-lever into engagement with the arm of the rock-shaft, substantially as described.

30. In combination, the carriage, the escapement, the connection from the keys to the escapement comprising the rock-shaft, a key-locking device comprising a locking-lever to engage an arm on the rock-shaft, the cross-rod on the carriage the paper-clip having ears engaging the cross-rod and having an ear struck out therefrom, and a finger on the said ear to engage the locking-lever, substantially as described.

31. In combination, the platen having a plurality of flat faces, the mechanism for turning the platen including the pawl and ratchet, and the means for holding the platen in position comprising the roller bearing on the ratchet-teeth and the arm carrying the roller, said arm being adjustable toward the back and front of the machine to adjust the flat faces of the platen relatively to the type-faces, substantially as described.

32. In combination, the type-bars, the cradle-frame, the guide-frame for directing the type-bars pivoted to the cradle-frame, and the adjustable stop for limiting the movement of the guide-frame.

33. In combination, the key-levers, the springs and the support for the springs comprising the two U-shaped bars, one placed within the other and reversed, substantially as described.

34. In combination, the carriage, the band having its end bent back upon itself, the loop and the clip embracing with its main part the loop and the enlarged end of the tape, the lateral parts of said clip being bent over the doubled main part and forming a contracted or tapering space, substantially as described.

35. In combination, the carriage, the finger thereon, the means for operating the carriage, the keys and the lock comprising a spring portion to be placed under tension through contact with the finger of the carriage, said spring portion being adapted to set the lock when the parts of the key mechanism are returned to normal position, substantially as described.

36. In combination, the carriage, the finger thereon, the escapement, the key mechanism connected thereto, the spring-drum with its band connected to the carriage, and the lock comprising the arm 161' connected to the key mechanism, and the hook U having a spring extension to be engaged by the finger of the carriage, said extension being adapted to be placed under tension through the spring of the carriage, when the arm 161' is raised and to set the lock when said arm is lowered, substantially as described.

37. In combination, the type-bars and the shifting tongue formed of a sheet of metal folded back upon itself with the edges of the two portions adjacent to each other, substantially as described.

38. In combination with the keys and their glass tops, the clip having the engaging prongs, the turned-over lip and the shank portion, substantially as described.

39. In combination with the keys and their glass tops, the clip having the engaging prongs, the turned-over lip and the split shank having the cross-slot, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

BERNARD GRANVILLE.

Witnesses:

A. MILLER,
GEO. W. LAWRENCE.