(No Model.) 2 Sheets—Sheet 1.

C. SPIRO.

TYPE WRITING MACHINE.

No. 481,377. Patented Aug. 23, 1892.

Fig. 1.

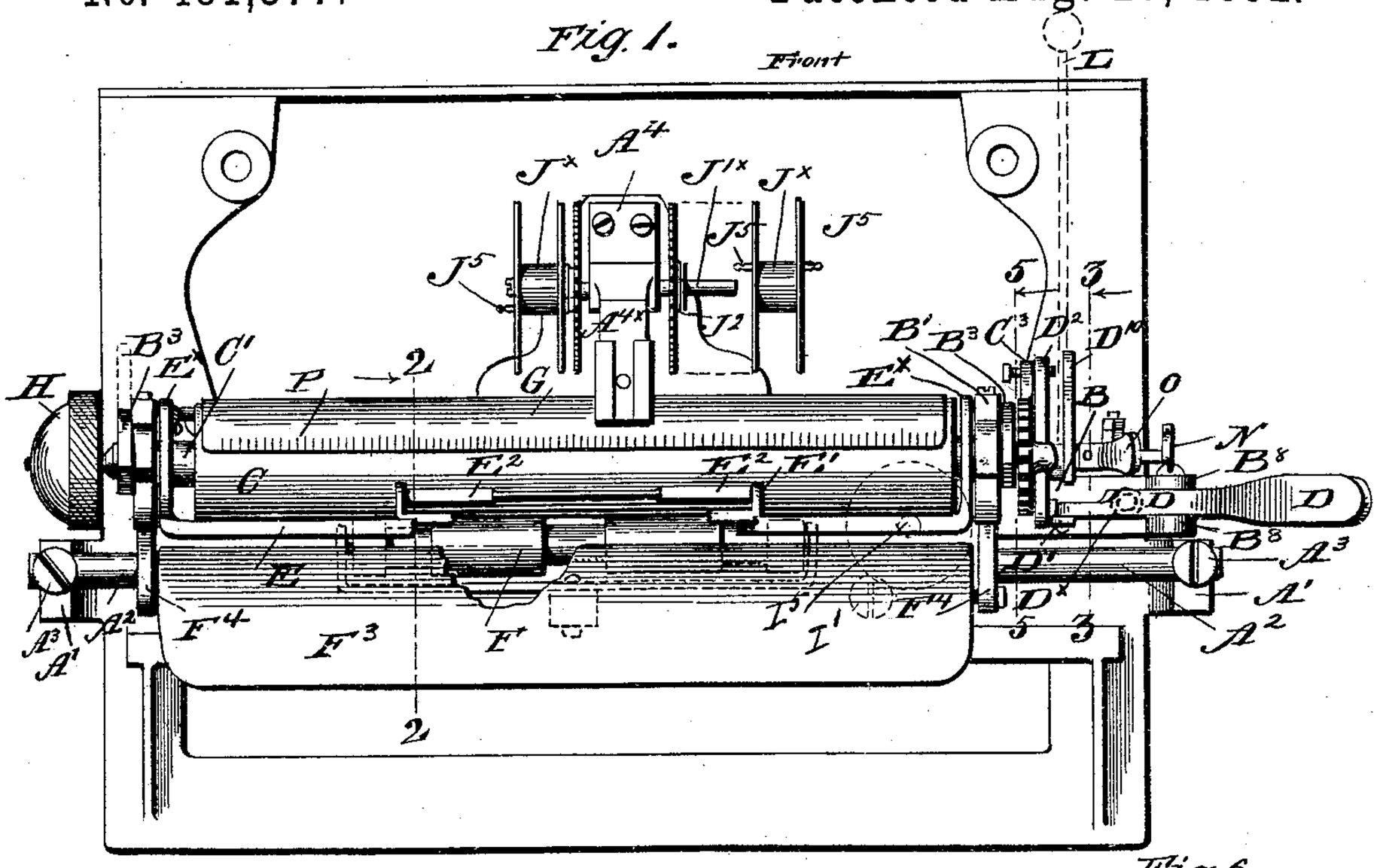


Fig. 6.

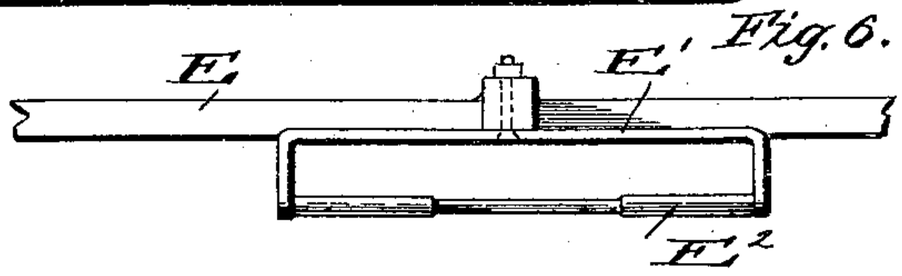


Fig. 2.

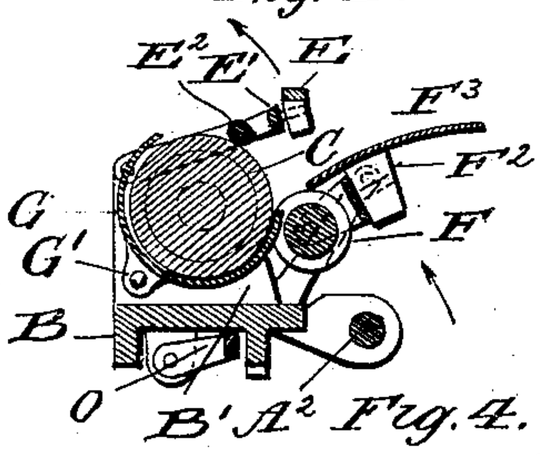
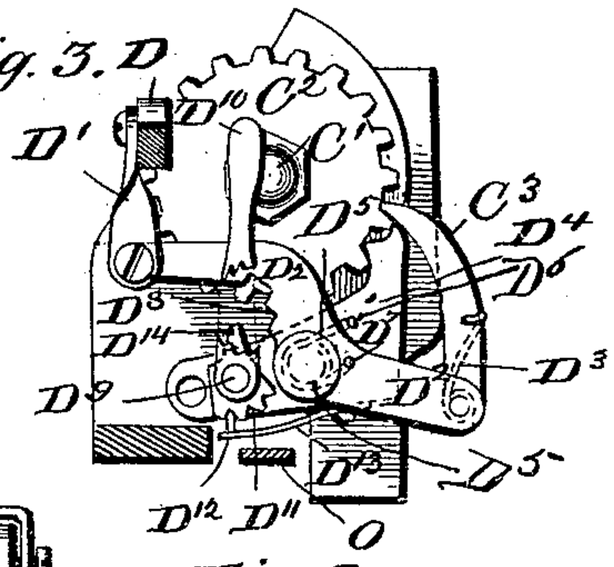


Fig. 3.



B' A2 Fig. 4.

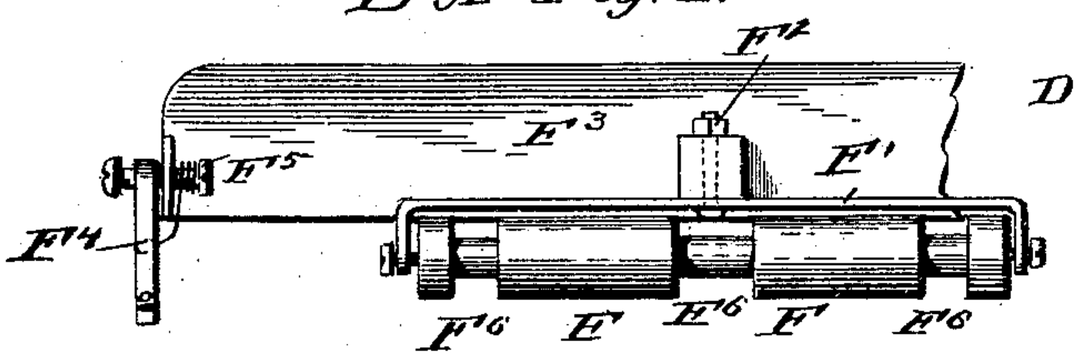


Fig. 5.

Fig. 8.

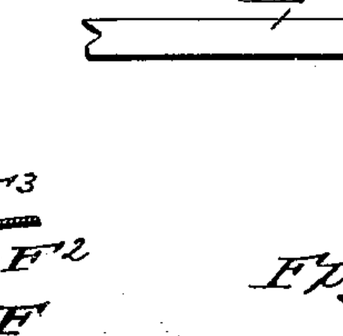


Fig. 7.

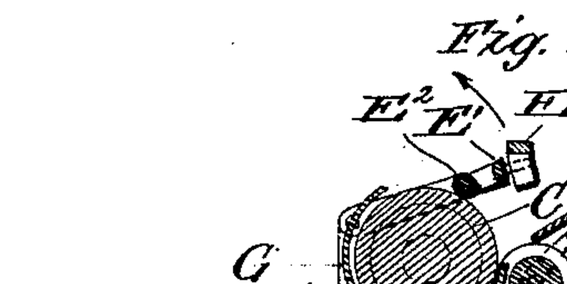
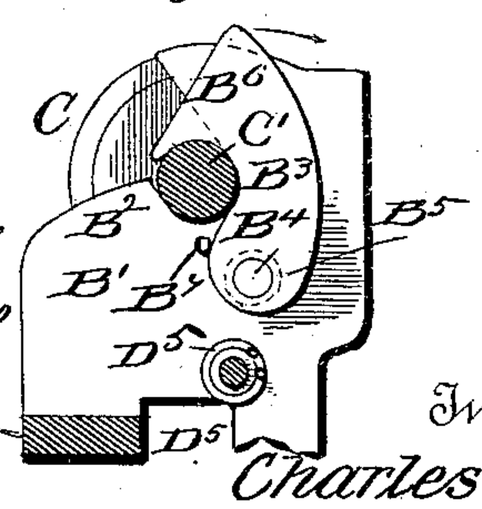


Fig. 9.



Witnesses
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Charles Spiro.
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Attorney

(No Model.) 2 Sheets—Sheet 2.

C. SPIRO.

TYPE WRITING MACHINE.

No. 481,377. Patented Aug. 23, 1892.

Fig. 10.

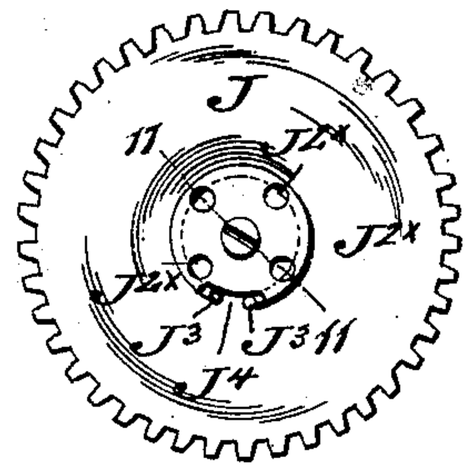


Fig. 11.

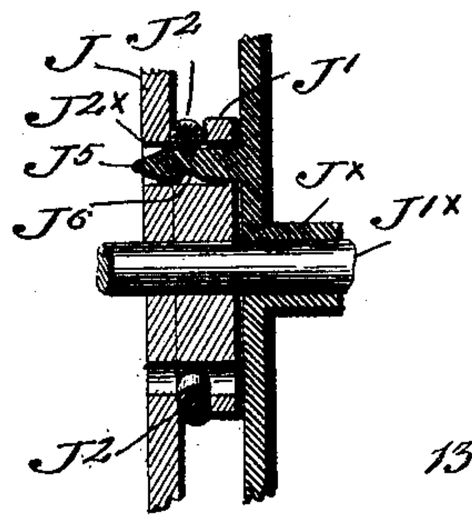


Fig. 12.

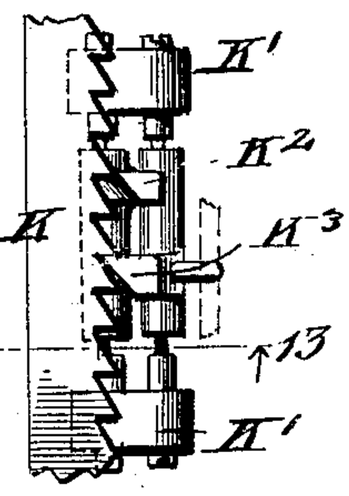


Fig. 13.

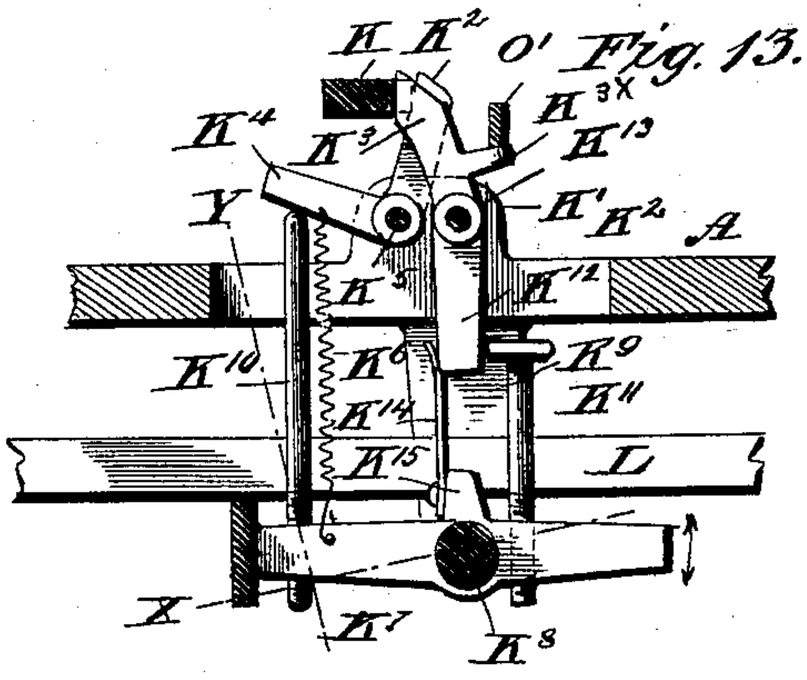


Fig. 14.

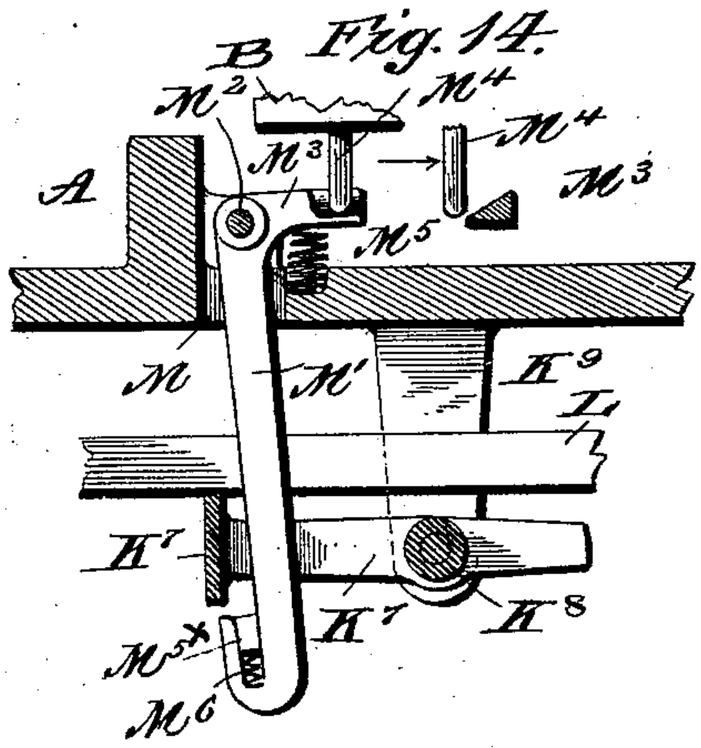


Fig. 15a.

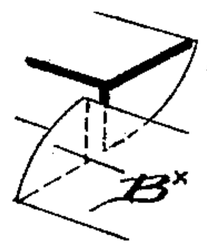


Fig. 15.

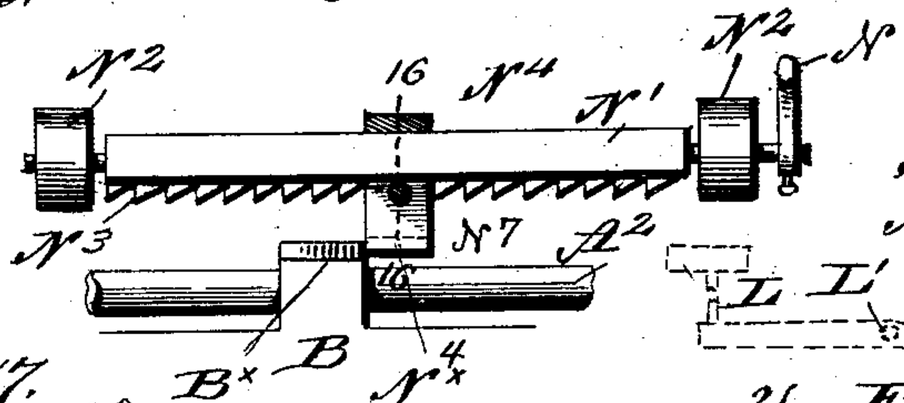


Fig. 16.

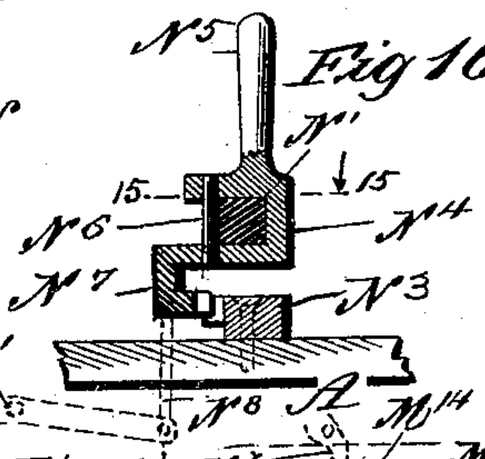


Fig. 17.

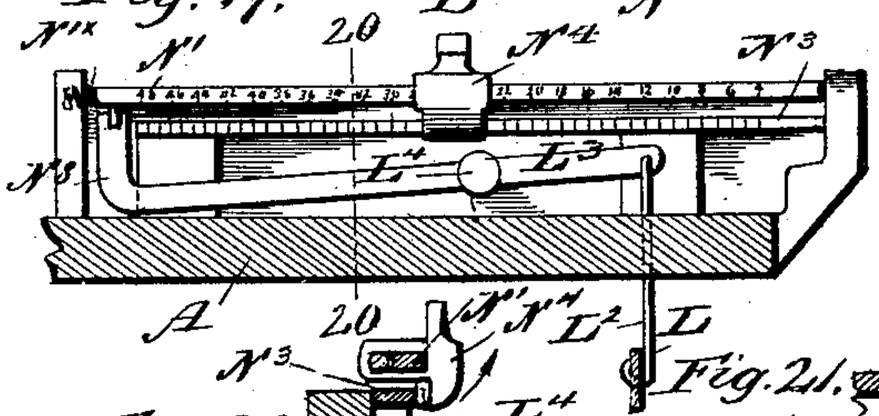


Fig. 18.

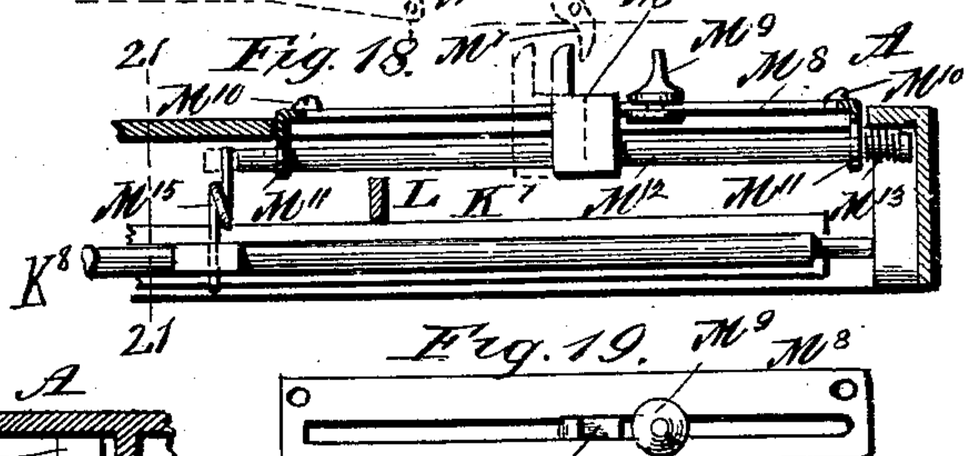


Fig. 19.

Fig. 20.

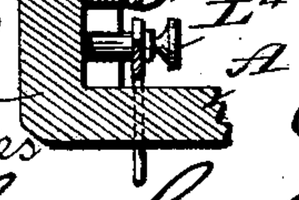
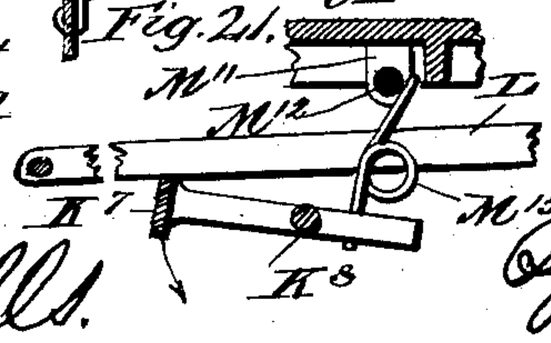


Fig. 21.



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E. B. Bond

Inventor
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By E. B. Stocking
Attorney

UNITED STATES PATENT OFFICE.

CHARLES SPIRO, OF NEW YORK, N. Y.

TYPE-WRITING MACHINE.

SPECIFICATION forming part of Letters Patent No. 481,377, dated August 23, 1892.

Application filed January 5, 1892. Serial No. 417,100. (No model.)

To all whom it may concern:

Be it known that I, CHARLES SPIRO, a citizen of the United States, residing at New York, in the county of New York, State of New York, have invented certain new and useful Improvements in Type-Writing Machines, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention has relation to type-writing machines; and the objects, construction, and operation of the invention will be set forth in the following description, and the novel features will be particularly pointed out in the claims.

Referring to the drawings, Figure 1 is a plan of the principal parts of a type-writing machine involved. Fig. 2 is a transverse vertical section on the line 2 2, Fig. 1. Fig. 3 is a side elevation of the line-feeding mechanism with the carriage in cross-section on the line 3 3 of Fig. 1, looking in the direction of the arrow. Fig. 4 is a bottom view of one of the paper-feeding or pressure rolls and the adjacent portions supporting the same. Fig. 5 is an elevation with parts in section on the line 5 5, Fig. 1, looking in the direction of the arrow and illustrating the manner of removably securing the platen upon the carriage. Fig. 6 is a plan of the upper roller employed in feeding the paper and of a portion of the bail which supports said roller. Fig. 7 is a plan, with portions broken away, of the spring-barrel and its adjuncts. Fig. 8 is a plan of the barrel, stud, and spring-barrel locking and winding screw and a perspective of the spring-sleeve. Fig. 9 is a bottom view of the spring locking and winding gear. Fig. 10 is a side view of a ribbon-spool gear. Fig. 11 is a section of the spool-gear, spool, and retaining-spring, the section being on the line 11 11 of Fig. 10. Fig. 12 is a plan of the carriage-feed mechanism. Fig. 13 is a vertical section of the carriage-feed mechanism, taken on the line 13 13 of Fig. 12. Fig. 14 is a side elevation, with parts in section and projected, of the key-locking mechanism. Fig. 15 is a plan of the margin-determining mechanism, a portion being in section taken on the line 15 15 of Fig. 16, looking in the direction of the arrow. Fig. 15^a is a perspective of the tapered portions of the margin-determining mechanism on an enlarged scale. Fig. 16 is a vertical section taken on the line 16 16 of Fig. 15. Fig. 17 is a front elevation of a key-operated margin-gage. Fig. 18 is a yielding key-lock mechanism which is adjusted as to the time of its operation. Fig. 19 is a plan of Fig. 18. Fig. 20 is a section on line 20 20 of Fig. 17. Fig. 21 is a section on the line 21 21 of Fig. 18.

Like letters refer to like parts in all the figures of the drawings.

A represents the base of the machine, from which risers A′ project to receive and support the carriage-rod A^2, secured in position by thumb-screws A^3. The base is provided with a bracket A^4 for the support and operation of the ribbon-spool mechanism and for the type-bar-locking plate, which is supported on the upper end $A^{4\times}$ of the bracket.

As my improvements refer to machines like that shown and described in my patent, No. 447,438, of March 3, 1891, a particular description of all of said machine is rendered unnecessary by this reference to said patent.

In this invention I have provided means for readily removing the platen from the carriage in order that a hard, medium, or pliable surfaced platen may be employed, the former being preferred in cases where it is desired to manifold the work and the latter in other cases, as a better impression and some other advantages are secured.

The riser B′ of the carriage B is formed with a recess B^2 for the reception of the journal C′ of the platen C. Each riser has this recess and a hook B^3, the pivot B^4 of which is placed substantially in line with the point of the hook and the center of the platen-journal, so that lifting the platen in an inclined direction will not release the same from its bearings. A coiled spring B^5, dotted lines, Fig. 5, serves to keep the hook on the journal, while the upper end of the hook projects upwardly within easy access, so that it can be swung on its pivot in the direction of the arrow in Fig. 5 to release the journal and permit the platen to be lifted bodily from the carriage. In replacing the platen the front edges of the hook, being inclined, as shown at B^6, are forced backward by the platen-journal, so that it is not necessary to move the hooks back by hand. A stop B^7 is arranged to prevent the hook from being thrown by its

coiled spring B^5 too far over or across the recess to prevent the introduction of the platen-journals, as just described.

The journal C′ of the platen carries a gear C^2, into which a pawl C^3 takes for the purpose of effecting the line-feed of the paper. On the carriage B are formed ears B^8, in which is pivoted a bell-crank lever D, the outer arm of which projects beyond the end of the carriage and the inner arm of which (see Fig. 3) is connected by a link D′ to an arm D^2, which carries the pawl C^3 and a spring D^3, which has a tendency to keep the pawl C^3 in operative contact with the face of the gear C^2, so that an elevation of the outer end of the lever D depresses its inner end, the link, and the inner end of the arm D^2, and elevates the pawl C^3, which effects a partial rotation of the platen, so as to produce a line-feeding of the paper. A spring $D^\times$, of rubber or other suitable material under the inner end of the lever D, returns the parts mentioned in position for an other operation. A detent D^4 is pivoted concentrically with the arm D^2 and a coiled spring D^5 encircles the pivot and has one end fixed in the riser at D^6 and the other in the detent at D^7. The arm D^2 has a series of steps D^8 and the detent has a pivot D^9, on which a lever D^{10} is mounted. This lever terminates in teeth D^{11}, into which a detent D^{12} takes and is held by the spring D^{13}, on which the detent is mounted to retain the lever D^{10} at different points in its oscillation on its pivot D^9. The lever is also provided with a long tooth or stud D^{14}, which is in the position shown in Fig. 3 to serve as to stop to a downward movement of the arm D^2 by contacting with said arm at its upper and deepest step. This provides for the longest movement of the arm D^2 and the pawl C^3, carried thereby, so that the widest line spacing or feeding is accomplished with the parts in the position shown in Fig. 3. By throwing the lever D^{10} so as to contact by its long tooth D^{14} with the remaining steps D^8 of the arm D^2 a medium and a shortest line-feeding is accomplished. It will be noted that as line-feeding occurs after the completion of each line of work and when the carriage is at the extreme left of its movement a hand placed under the lever D to move the carriage to the right simultaneously and conveniently produces by the mechanism just described the necessary line-feeding. An inversion of Fig. 1 will bring the lever D at the left side of the machine, (its proper location;) but for convenience in illustration it is shown on the right.

I will now proceed to describe the means employed for feeding the paper. More or less difficulty is met in all paper-feeding devices which employ rubber bands partially encircling and taking their motion from the platen. They are liable to run off their supports and guiding-pulleys, to vary in their elasticity, so as to give difference in firmness of contact with the platen of the paper at opposite sides, and to require frequent renewal on account of the natural decomposition of the rubber. I overcome these difficulties by entirely discarding feed-bands and the use of rubber. I employ a bail E pivoted at $E^\times$, to each of the risers B′, so as to be capable of swinging to the front over the platen to facilitate the insertion of paper. Pivoted substantially at the center of the bail E is a yoke E′, which carries a roller E^2, which may be of uniform diameter throughout its length or not, as desired. It will be seen that when the bail is down the roller E^2 will bear upon the surface of the platen or upon paper wound upon the platen, and that by reason of the pivotal support of the yoke the roller will automatically adjust itself to any inequalities of thickness of the paper or in the surface of the platen and will maintain an alignment parallel with the axis of the platen. A second roller F, mounted in a yoke F′, is pivoted at F^2 beneath the shelf or plate F^3, which is pivoted in brackets or extensions F^4 of the risers of the carriage. A curved sheet-metal shield G is supported with slight pivotal action at G′ on each riser B′ of the carriage B and partially encircles the platen. The shield G and the plate F^3 are spring-pressed, so as to leave a space between the platen and the upper edge of the shield to facilitate the introduction of paper and in case of the plate F^3 to cause the roller F to bear yieldingly upon the platen. Such an arrangement of a coiled spring is shown in Fig. 4 at F^5, where one end of the spring is attached to the pivot and the other to a fixed part—as, for example, the bracket F^4. A similar spring is provided for the bail E to cause the roller E^2 to bear yieldingly upon the platen and the paper thereon. The lower edge of the guard G is intended to bear slightly upon the paper and keep the same smooth, and to enable this edge to reach a higher point than otherwise the roller F may be cut away at points, as F^6, to permit finger-like projections on the guard G to reach such high point. To insert a sheet of paper, the bail E is thrown to the front, as shown by arrow, Fig. 2, and the plate F^3 is swung downward, carrying the roll F away from the platen, and the latter is rotated by means of the bell H or otherwise, and the paper is drawn around by rotating the platen until the head of the sheet is in a position to be held down by the roller E^2. By inserting the leading edge of the sheet between the roll F and the platen, the top edge of the guard being temporarily depressed, so as to move its lower edge away from the platen, the rotation of the platen and the roll F serves to feed the paper around within the guard, and by slightly raising the bail E under the roller E^2. In this way the line of print on the paper is coincident with the printing-point on the top of the platen. By this construction rubber and other paper-feeding bands are rendered unnecessary, are discarded, and a positive, true, and satisfactory feeding of the paper is

assured. Furthermore, the relative proximity of the roller E^2 to the printing-line enables me to print upon the extreme lower edge of a sheet.

Heretofore it has been necessary to employ both hands in the operation of regulating the tension of the carriage-feed spring—that is, in the construction which I have heretofore employed it has been necessary to manually guard against the unwinding of the spring while increasing its tension.

In the present invention the spring-drum I is located, as before, on the base of the machine below the carriage. Adjacent to the drum I place a spindle I′, which may be knurled or provided with a screw-driver slot I^2, whereby it may be rotated either by hand or by a tool. The spring-spindle I^5 extends down through the base, and fixedly secured thereon is a gear I^3, the teeth of which have concave faces I^4. On the separate stud I′, I mount a disk I^6, having two diametrically-opposite teeth I^7, which are adapted to mesh with the teeth of the gear I^3 and having a curvature to agree with that of the faces I^4 of the gear I^3 and extending from one to the other of the teeth I^7. The spindle I^5 projects upwardly through the base and through the drum I. It is cut away at opposite sides I^8 to receive a sleeve I^9, having springs I^{10}, which embrace the spindle, so as to rotate therewith. A lug I^{11} serves to connect one end of the spring with the sleeve, the other end being connected in the usual manner with the drum. A strap or cord I^{12} is secured to the drum, and its free end is provided with a metallic eye-plate I^{13}, which can be connected with the carriage by means of any convenient pin or hook $B^\times$, Fig. 7, projecting from its lower surface. The eye-plate is bent at I^{14}, so as to prevent the passage of the cord or band I^{12} between the spindle I′ and the drum. This slight improvement is very convenient in that it is impossible for the tape and drum to get out of control when the free end of the tape inadvertently escapes from the hand when detached from the carriage. The bend or flange insures a stoppage of the tape against the drum and spindle, from which point it can be readily seized and again connected with the carriage. Whether the tape be disconnected from the carriage or not a turning of the spindle I′ causes the disk I^6 to rotate, so that the spring may be wound up by the meshing of a tooth I^7 with the gear I^3, when the latter will be turned one tooth and an opposite curved face of the disk will come into contact with the next concave face of the tooth I^4, which locks the gear I^3 against backward rotation until another tooth I^7 is brought to mesh with the next tooth I^3. A reversal of the rotation of the disk I^6 allows a relaxation of the tension of the spring as each tooth I^7 is brought to mesh with the gear I^3. Thus the adjustment of the tension of the spring is accomplished by the use of a single hand and the direct operation of a single device.

I have found it essential to convenience that the ribbon-spools may be removed from and applied to their spindles by the most simple operation. The ribbon-guide which is employed in my machine is so constructed, arranged, and located that the type impinge thereon at points in a line at one side of the longitudinal center of the ribbon, so that by removing the ribbon-spools and turning them around the opposite half of the ribbon is brought into use. I therefore have devised a simple and very convenient means of removably securing the ribbon-spools upon their spindle.

In Figs. 10 and 11 I have illustrated the construction which I have devised. On the face of the ribbon-spool gear J, I form a circumferentially-grooved hub J′, which is provided with one or more transverse perforations. Within the groove I arrange a simple wire ring J^2 of a normal diameter less than that of the hub, so that said spring-ring normally projects within the cross-area of the hole or holes $J^{2\times}$. To give the ring resiliency, it is incomplete, and, if desired, the two ends J^3 may be bent and projected into a recess J^4, formed by removing a portion of the hub, as clearly shown in Fig. 10. Each spool is provided with projecting pins J^5, which are annularly grooved at J^6 to receive the spring-ring J^2 when a pin is inserted in any one of the holes $J^{2\times}$. Now it will be seen that it only requires the simple application of a spool $J^\times$ on its spindle $J'^\times$ and a slight pressure to force the pin J^5 into the hole $J^{2\times}$, the latter when provided in sufficient number being easily found by a slight rotation of the spool on its spindle, when its coned or pointed pin readily enters beneath the spring-ring, which by its resiliency as readily seats itself in the groove of the pin, and thus satisfactorily retains the spools in operative connection with the gear.

More or less difficulty has always attended the provision of suitable carriage-feed or escapement devices, and the difficulty appears to be increased where positive control is sacrificed and momentum of the moving parts more or less relied upon.

In Figs. 12 and 13 I have illustrated a novel construction and arrangement of feed pawls or dogs.

K represents the feed-rack, which is secured to the under side of a carriage B in a horizontal position, so that the teeth of the rack are at one edge. In standards K′, projecting upwardly from the base A and at the margin of an opening K^2 in said base, I pivot in parallel lines the feed-dogs K^2 K^3. The former is in the form of a bell-crank lever, the arm K^4 of which extends from its axis K^5 nearly at a right angle and is connected by a coiled spring K^6 with the universal bail K^7, mounted on a shaft K^8 and arranged below the key-levers L of the machine, the shaft having bearing in depending brackets K^9, as usual. Projecting upwardly from the bail is a pin

K^{10}, which may be screw-threaded in the bail for vertical adjustment, if desired, and this pin bears at times against the lower surface of the arm K^4 of the dog K^2. On the opposite side of the shaft K^3 another pin K^{11} projects upwardly, so as to bear at times against the depending arm K^{12} of the pawl or dog K^3. The axis K^{13} of this dog may be conveniently located, and in this instance is shown arranged parallel with the axis K^5 of the other dog. The acting faces of the pawls or dogs K^2 or K^3 are inclined to substantially agree with the inclination of the rack-bar teeth, while the adjacent sides of the dogs agree substantially with the vertical faces of said teeth. The distance of the dogs from each other may be as desired, so long as the point of one shall be just opposite, or it may be slightly in contact with, the higher point or end of the inclined face of the rack-bar tooth when the straight side of the other dog is in similar relation to the vertical face of another tooth of said bar. A flat spring K^{14} is secured to the universal bail, or it may be to a lug K^{15}, formed thereon, and is at its free end in contact with the arm K^{12} of the dog K^3. When the key-levers L are at rest, the parts assume or occupy the position shown in Fig. 13, the dog K^2 being out of mesh with the rack, as heretofore described, and the dog K^3 being in mesh with a tooth of the rack. When a key-lever L is depressed, the center line horizontally of the universal bail takes the position indicated by the dotted line *x*, Fig. 13, and the center line vertically of the pin K^{10} takes the position of the dotted line *y* in said figure. This action lowers the pin K^{10} away from the arm K^4 and puts the spring K^6 under tension, so that thereafter in a continuance of the motion the tension thus produced will act quickly to throw the dog K^2 into mesh with a tooth of the rack. As the spring K^{14} is fixed to the bail, as is the pin K^{10}, it follows that when the pin K^{11} rocks the dog K^3 the spring K^{14} moves in the same direction and is not put under tension; but it is the pin alone that positively takes the dog K^3 out of mesh with the rack, while at the same time the lowering of the bail and the pin K^{10} puts under tension the dog K^2, and as soon as the rack is freed from the restraint of K^3 the dog K^2 is allowed to bottom in the rack against the straight face of an adjacent tooth. On the return motion of the bail (permitted so by the return of a key,) the pin K^{10} positively disengages the dog K^2 from the rack while the pin K^{11} is removed from contact with the dog K^3, while at the same time the spring K^{14} is put under tension, and when the rack is removed from the restraint of the dog K^2, the dog K^3 is allowed to bottom in the rack against the flat side of an adjacent tooth. It will thus be seen that in effecting a mesh with the rack both the dogs are put under spring-tension, while when the dogs are to be removed from mesh with the rack they are positively removed therefrom. It will thus be seen that each of the dogs is, just before making mesh, under the tension of a spring, so that a positiveness of operation is secured and the connection is most direct with the universal bail and the key-lever. Direct application of power from key to rack-bar, a minimum number of devices, and continuity of control exist in this construction and produce rapidity and accuracy in the intermittent step-by-step motion of the carriage.

It is at times desirable to provide in machines of this character devices which shall automatically prevent the making of an impression upon the paper after a line has been completed, and thus to insure a return of the carriage to the starting-point when required. In Fig. 14 I have illustrated a simple means for accomplishing this purpose. Through an opening M, formed in the base A, there is projected a hook M′, pivoted at M^2 on the base. The projecting arm M^3 is beveled laterally, so that a pin M^4, projecting downwardly from the carriage B, will act to throw the free end of the hook under the universal bail K^7. A spring M^5 serves to remove the free end from beneath the bail. The pin M^4 is arranged or located at such a point on the carriage as that when a line is completed it rides the bevel of the arm M^3 and throws the hook under the universal bail. When in that position, it is apparent that none of the keys or key-levers L can be depressed until the carriage is moved to free the pin M^4 from the arm of the hook. By this simple device the objects sought are secured. It is also desirable to provide means for yieldingly locking the keys, as an abrupt positive lock is distasteful and unpleasant to an operator. I therefore interpose a spring or other yielding abutment between the key-lever and the locking device.

There are many ways of locating and arranging such an abutment, and I do not limit my invention to the exact details herein shown and described, but present these as examples of an embodiment of my idea. One way is to mount on the hook M′ a spring-seated block $M^{5\times}$, the spring being placed below the block with the hook. In this case the bail K^7 strikes the block when a key is repressed and the spring M^6 allows a straight depression of the bail, but not sufficient to bring a type to the printing-point.

In Figs. 18, 19, and 21 I have shown an adaptation of my idea in which the bell-trip M^7, dotted lines, Fig. 18, which is usually mounted on the carriage of the type-writer, is employed instead of a pin M^4, depending from the carriage to operate the lock.

M^8, Figs. 18 and 19, represents the slotted plate in which the adjustable bell-trip pin M^9 is mounted. The base A is slotted beneath the plate, which is secured over the slot by screws M^{10}, passing into the base. The plate has depending ears M^{11}, which are bored for the reception and endwise movement of a rod M^{12}, about which is coiled a spring M^{13}, which has a tendency to keep the rod to the right,

but which will permit a slight movement of the rod to the left. Upon the rod there is a block M^{14}, which is fitted to the rod, so as to be retained in a desired position thereon by friction, so that when moved a greater or less distance from the bell-trip pin M^9 it will remain where placed, the frictional connection with the rod being such that a movement of the block will carry with it the rod against the tension of the spring M^{13}. The universal bail K^7 has mounted thereon a spring M^{15}, which when the rod M^{12} is held to the right by the spring M^{13} and when a key-lever is depressed and the bail K^7 rocked moves freely in front of the end of the rod M^{12}; but when the block M^{14} is moved to the left by contact therewith of the bell-trip M^7, depending from the carriage, the end of the rod M^{12} is thrown into the path of the spring M^{15}, as shown by dotted lines, Fig. 18. The spring M^{15} is therefore the yielding abutment, which prevents a complete rocking of the bail, but, however, will permit a partial rocking of the bail, but insufficient to bring type to the printing-point. The adjustability of the block M^{14} on the rod M^{12} is for the purpose of determining the number of letters which may be printed after the bell is struck. Where a wide right-hand margin is desired in the work, the bell-trip pin may be adjusted to the desired margin-line and the block may be adjusted for a greater or less number of letters to be impressed after the bell has been struck. In fact, the same advantages are present regardless of the width of the margin.

In Figs. 15 and 16 I have shown a novel construction for determining the width of left-hand margin in the printed work of the machine, and I have also added to such construction a simple modification which enables a margin once arbitrarily determined to be temporarily departed from. The convenience of this modification occurs, for example, in numbering paragraphs and answers in depositions outside of the arbitrary margin of the page.

N, Figs. 1 and 15, represents a lever which is secured to the journals of a square or other polygonal shaft N′, mounted in brackets N^2, formed on the base of the machine in proximity to the carriage B. Beneath the square shaft and parallel therewith there is secured to the base of the machine the rack-bar N^3. A box N^4, which fits the shaft N′, is mounted thereon and provided with a lever or handle N^5. A pin N^6 in this case is used to retain the box on the shaft in such a manner as to permit the former to be moved lengthwise upon the latter. The lower surface of the box carries a short section N^7 of a rack-bar, which is adapted to fit the teeth of the bar N^3. This lower part of the box projects into the path of one of the guide-lugs of the carriage B, so as to stop a further movement of the carriage. The point at which the carriage shall be stopped within the limits of the bar N′ is determined by the position of the box on the bar or shaft. This position can be changed to change the width of the margin by a quarter-rotation of the bar to free the rack-section N^7 from the rack N^3, and by then moving the box along the bar in either direction by lever N^5 to a desired point, and this adjustment is retained by bringing the lever N^5 to a vertical position and the section N^7 in mesh with the bar N^3. When it is desired to print outside of the arbitrary margin thus determined, the lever N^5 may be again partially rotated, so as to lift the lower portion of the box out of the path of the carriage guide-rod lug, when the carriage may be moved beyond the box and printing may be performed outside of the margin. The same operation may be perhaps more conveniently performed by means of the lever N, as it is more accessible than the lever N^5. After the printing outside of the general margin has been produced and in order to avoid the necessity of operating either of the levers N N^5, I may bevel the upper surface of the guide-rod lug of the carriage B in one direction, as shown at $B^\times$, Fig. 15, so that simply pushing the carriage to the left in Fig. 15 will cause the box and its section to be lifted until the guide-rod lug passes it, when it will drop and serve thereafter to stop the carriage at the arbitrarily-determined and general margin of the work. I may slightly bevel the lower portion of the rack-bar section N^7, as shown by dotted lines $N^{4\times}$, in the opposite direction to the bevel of the lug B to facilitate the above operation.

Fig. 15^a shows the beveled surfaces of these parts in perspective. When going in one direction, the carriage guide-lug $B^\times$ abuts against the box N^7, thus determining the margin. When, however, a narrower, margin is desired, the polygonal shaft N′ is oscillated, whereby the box N^7 is raised to allow the carriage a further travel. The box N^7 now drops, but the carriage may return by reason of the beveling of its lug and of the box or either of them, as the lug serves to lift the box when the carriage is returning.

In Fig. 16 I have shown a simple application of a key-lever L, whereby the box N^4 and shaft N′ of the margin-gage may be turned up out of mesh with the rack-bar N^3. A simple pin N^8 passes through the base and impinges the under surface of the back rack-section N^7, so that a depression of the key when the parts are in the position shown in Fig. 15 causes the pin to throw the rack N^7 out of mesh and out of contact with the lug of the carriage, so that the latter may be moved beyond the margin-line determined by the adjustment of the block N^4.

In Figs. 17 and 20 I have illustrated a form of connection between the margin-gage and the key-lever which does not require the pivot L′ of the lever, Fig. 16, to be between the key and the end of the lever. In other words, the arrangement shown in Figs. 17 and 20 is adapted for use in connection with key-le-

vers in which the pivot is at the end of the lever. A downward depression of the key and lever L draws the link L^2 downwardly and one arm of an interposed lever L^3 in the same direction. The other arm beyond the pivot L^4 terminates in an upward projection or pin N^8, which abuts against the under surface of the square shaft N′, so as to raise the same on its pivots, while a coiled spring $N'^{\times}$, Fig. 17, serves to positively lower the shaft. The box N^4 has upon its front edge a gage or scale, as clearly shown, to assist in determining the adjustment of the parts to produce a desired margin. In cases where it is unobjectionable to extend the hand from the keyboard to operate the lever N^2 or handle N^5 of the square shaft and box, respectively, and, when desired, to place the control of the margin in means located on a keyboard the application of a key-lever in either of the forms shown or in any other skillful manner can be resorted to, and the printing of matter outside of the predetermined margin can rapidly and conveniently be accomplished.

I do not limit my invention to a use of all of the novel features thereof in a single machine, nor to the exact construction and proportion and arrangement of the parts as shown and described; but I hold them subject to the common right of variation in any manner and to any extent within the skill of persons conversant in the construction, operation, and use of machines of this class.

In order to release the holding-dog K^3 from the rack-bar K, so as to permit movement of the carriage by hand in either direction, I have provided the usual bail O′, which is operated by the lever O, Fig. 1, and have formed on the dog K^3 a projection $K^{3\times}$, against which the bail can operate to withdraw the dog from the rack, which, the key-levers being at rest, leaves the carriage to be moved as desired.

What I claim is—

1. A carriage having forwardly-inclined open bearings in its risers and having upon each riser a pivoted hook, the free end of which is extended to form a rearwardly-inclined edge, in combination with a platen the journals of which are extended beyond said bearings and adapted to force said hooks away from said open bearings, and springs for forcing said hooks over said journals, substantially as specified.

2. The combination, with a platen, line-spacing gears, and pawl, of a pawl-arm having steps and a lever mounted for projection into the path of the different steps of the pawl-lever, substantially as specified.

3. The combination, with the line-spacing gear of a platen and its pawl, of a pawl-arm and a detent mounted to operate in a plane parallel with the gear on a common pivot independently of each other, and a spring for operating the detent, arranged independent of the pawl-arm, substantially as specified.

4. The combination, with a line-spacing gear and its pawl-arm, of a detent mounted for independent movement on the pawl-arm pivot and carrying a pawl-arm-obstructing device, substantially as specified.

5. The combination of a line-spacing pawl, its lever and its arm, a detent mounted on the pivot of the pawl-arm, and a pawl-arm-limiting device pivoted on the detent and capable of springing into and out of contact with the pawl-arm, substantially as specified.

6. The combination, with a line-spacing pawl, its arm, and a detent, and with the line-spacing gear, of a lever pivoted on the detent, a secondary detent for said lever fixed to the primary detent, and means for oscillating the secondary lever on its pivot, substantially as specified.

7. The combination, with the carriage and its platen, of a bell-crank lever pivoted to the carriage, an interposed spring for raising one arm of the lever, a pawl-arm and pawl operatively connected with the lever, and a detent carrying a pawl-arm-limiting device, substantially as specified.

8. The combination, with a platen, of a pressure-roller carried by a support mounted on a pivot located at a point between the ends of the roller, substantially as specified.

9. The combination, with a platen, of a pressure-roller carried by a pivoted spring-pressed yoke, the pivot of which is located at a point between the ends of the roller, substantially as specified.

10. The combination, with a platen, of a bail carrying a pressure-roller in a yoke pivoted to the bail, the pivot of which is located at a point between the ends of the roller, substantially as specified.

11. The combination, with a platen, of a shelf or plate pivotally mounted on the carriage and extended along the platen and a roller carried by the shelf or plate and mounted on a pivot located between the ends of the roller for alignment with the platen, substantially as specified.

12. The combination, with a platen, of two or more rollers arranged adjacent to and to bear upon the platen and each mounted on a pivot located between the ends of the roller, whereby said rollers are free to align themselves with and to the surface of the platen, substantially as specified.

13. The combination, with a platen, of two bails mounted for movement in opposite directions away from the platen and each carrying pivoted yokes and pressure-rollers mounted therein and a pivoted guard-plate, said plate being provided with an eye for connection with a hook upon the carriage, substantially as specified.

14. The combination, with the spring-drum and its spindle having portions thereof removed, of a sleeve adapted for connection with the spring and with the spindle, substantially as specified.

15. The combination, with a spring-drum of a type-writing machine and the tape there-

of, of a stud or projection fixed upon the machine adjacent to the drum and a plate secured to the tape and projecting from the surface thereof, said plate being provided with an eye for connection with a hook upon the carriage, substantially as specified.

16. The combination, with the spring-drum, of its spindle passing through the base of the machine, a gear of the character described secured to the spindle at the lower side of the base, and a gear-operating disk arranged to mesh with the gear and mounted upon an adjacent spindle passing up through the base of the machine and having a slotted head, substantially as specified.

17. A ribbon-spool having oppositely-projecting circumferentially-grooved pins, in combination with a spool-gear having a circumferentially-grooved hub and a pin-retaining spring, substantially as specified.

18. The combination, with a hub and a ribbon-spool adapted to be connected therewith, of a spring-ring lying in the plane of an aperture in the hub, substantially as specified.

19. A spool-gear having a circumferentially-grooved and perforated hub, a ribbon-spool adapted to be connected therewith, and a ring arranged within the groove and having its ends bent, substantially as specified.

20. The combination, with a carriage and its rack, of independently-pivoted spring-pressed pawls and means for alternately storing tension in said springs, which springs are put under tension to throw the pawls into mesh with the rack, substantially as specified.

21. The combination, with the feed-rack, of independently-pivoted pawls, a universal bail, springs extending from each pawl to the bail, and means mounted on the bail for operating the pawls, substantially as specified.

22. The combination of a feed-rack, independently-pivoted pawls, a universal bail, and a yielding and rigid device connecting the bail with each of the pawls, substantially as specified.

23. The combination of a feed-rack, two pawls, and yielding and rigid devices for operating each pawl, said devices being arranged at different points on the universal bail, substantially as specified.

24. The combination, with a feed-rack, of two pawls, a universal bail, springs extending from each pawl to the bail, and rigid devices for operating the pawls, projecting from the bail and from points on opposite sides of its shaft, substantially as specified.

25. The combination, with a bail, of a movable yielding abutment and means mounted upon the carriage for rendering said abutment operative, as set forth.

26. The combination, with the carriage, of a fixed rack-bar, a rotatable shaft, and a movable section of a rack-bar mounted on said shaft, substantially as specified.

27. The combination, with a carriage, a fixed rack-bar, and a movable section of a rack-bar, of a shaft for carrying the section, mounted for rotation to disconnect the section from the rack-bar, substantially as specified.

28. The combination, with a fixed rack-bar and a movable section of a rack-bar, of a shaft, and a sliding member carrying the section, and means for rotating the shaft, substantially as specified.

29. The combination of a carriage having a projection which is beveled, a fixed rack-bar, and a section of a rack-bar which is movable and provided with a bevel, and a rotatable shaft for carrying the movable section of a rack-bar, substantially as specified.

30. The combination, with the universal bail and the carriage of a type-writing machine, of interposed yielding bail-locking mechanism, substantially as specified.

31. The combination, with the universal bail and the carriage of a type-writing machine, of a bail-locking device and a yielding obstruction or abutment, substantially as specified.

32. The combination, with a bail, of a movable rod, a spring interposed between the rod and bail, and a spring for moving the rod in one direction, and devices operatively connected with the carriage for moving the rod in the opposite direction, substantially as specified.

33. The combination, with a carriage having a bell-trip mounted thereon, of a bell-trip pin, a block adjustable with relation to the bell-trip pin on a sliding rod, a bail, and means for yieldingly connecting the rod with the bail, substantially as specified.

34. The combination, with a margin-gage, of a key-lever and an interposed disconnected pin, substantially as specified.

35. The combination, with the margin-gage comprising a fixed and an adjustable rack, of a rotatable bar carrying the adjustable rack, a key-lever, and connections between the lever and the rotatable bar, substantially as specified.

36. The combination, with a carriage and its spring-drum and feeding-tape, of a gear secured to the spring-drum spindle and a gear rotating and locking disk secured to a spindle arranged adjacent to the spring-drum and accessible for purposes of adjustment from adjacent to or at the upper surface of the base of the machine, substantially as specified.

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

CHARLES SPIRO.

Witnesses:
J. FRENDENTHAL,
JULIUS E. LEVY.