

No. 667,295.

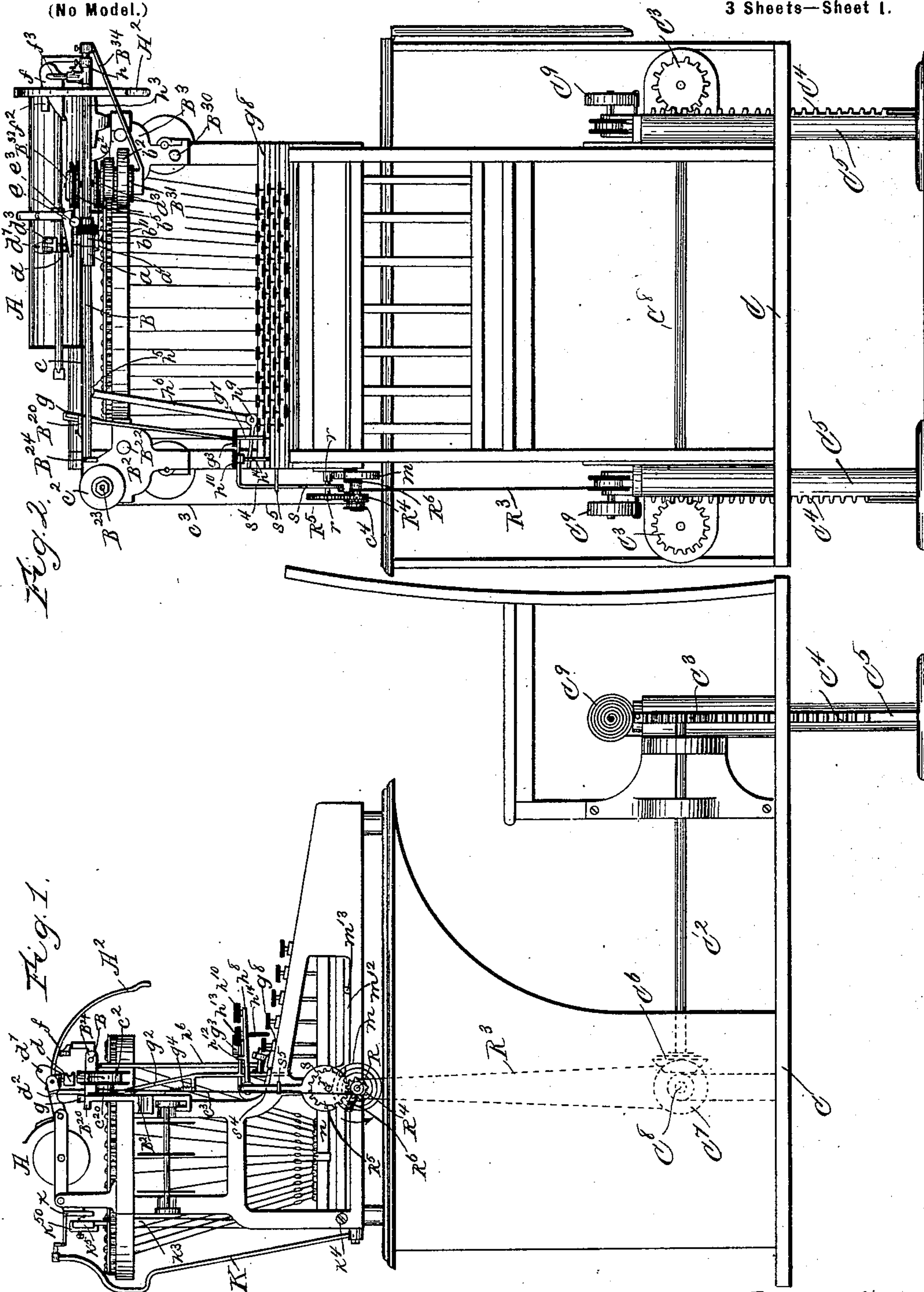
Patented Feb. 5, 1901.

P. E. COLLINS.
TYPE WRITER.

(Application filed Aug. 3, 1896.)

3 Sheets—Sheet 1.

(No Model.)



Witnesses
Jas. J. Maloney
J. J. Maloney

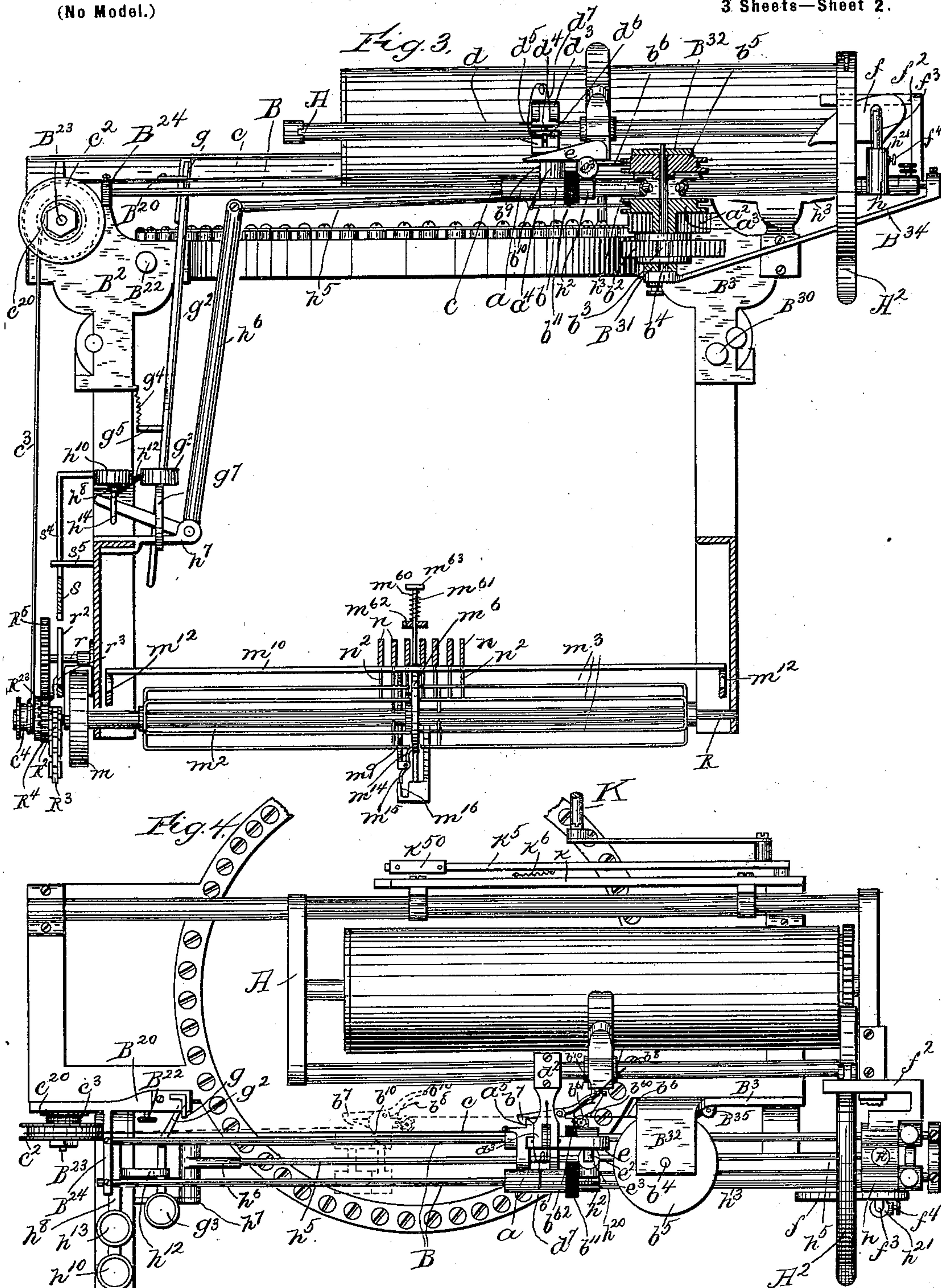
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Patented Feb. 5, 1901.

(Application filed Aug. 3, 1896.)

(No Model.)

3. Sheets—Sheet 2.



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No. 667,295.

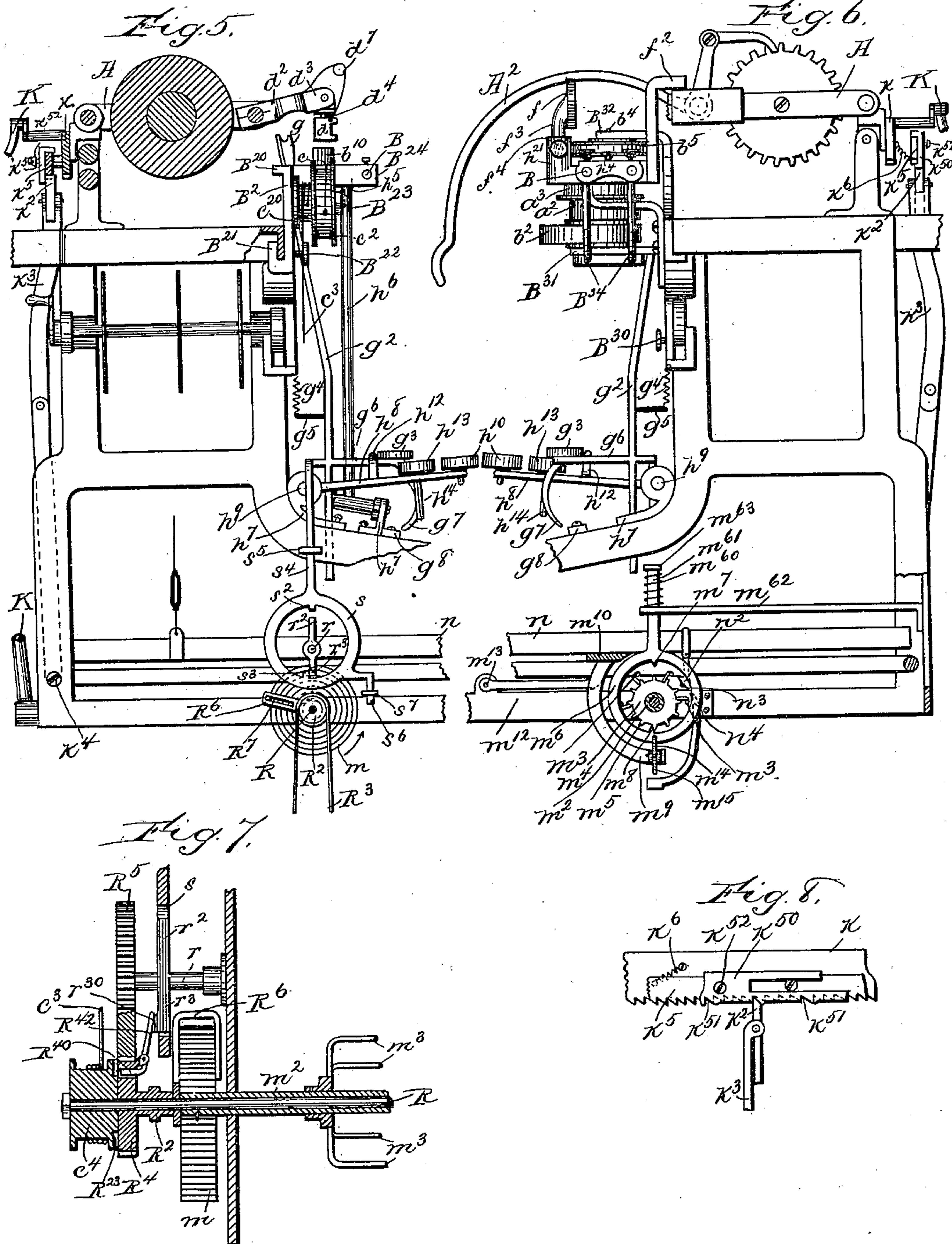
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TYPE WRITER.

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(No Model.)

3 Sheets—Sheet 3.



Witnesses.
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UNITED STATES PATENT OFFICE.

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TYPE-WRITER.

SPECIFICATION forming part of Letters Patent No. 667,295, dated February 5, 1901.

Application filed August 3, 1896. Serial No. 601,414. (No model.)

To all whom it may concern:

Be it known that I, PAUL E. COLLINS, of Boston, county of Suffolk, and State of Massachusetts, have invented an Improvement in Type-Writers, of which the following description, in connection with the accompanying drawings, is a specification, like letters on the drawings representing like parts.

The present invention relates to a type-writer, and is embodied in improved attachments therefor whereby the carriage after a line is written can be restored to its normal or initial position automatically, means being provided for winding the setting springs or weights while a line is being written or just after its completion and for releasing said springs thus wound when it is desired to restore the carriage, the restoration thereof being thus accomplished by the action of said springs or weights instead of manually.

The apparatus embodying the invention is so arranged that the power required for operating the key-levers and for restoring the carriage on the completion of a line, or for either of said purposes, may be provided through the agency of a treadle or similar device adapted to be controlled by the operator's foot or otherwise at any time during the travel of the carriage from its initial to its final position, or this may be accomplished by a main weight or spring which can be set or wound from time to time and which will operate to set the supplemental springs or weights which directly accomplish the work, said main weight being adapted to operate step by step in response to a key on the keyboard coöperating with an escapement. Furthermore, the apparatus may be and preferably is so arranged that the weight of the operator, acting through suitable mechanism, is utilized as the initial power for intermittingly winding the supplemental springs, which operate as hereinbefore described, and this may be accomplished by mounting the machine on a movable platform, upon which the operator also sits, and by providing such platform with a counterpoise weight or spring, whereby it will be restored to its initial position when the operator steps down, so that the device is completely automatic.

The apparatus embodying the invention is of such a nature that it can be readily arranged for application to any of the machines of the type which are commonly in use, but is herein shown and will be described as applied to a Caligraph, the construction and operation of which are well known and will need no detailed description except in so far as the operation of the devices embodying the present invention is related thereto. It is to be understood, moreover, that while the carriage-restoring devices and type-operating mechanism may be employed together in conjunction with a device for winding the springs which accomplish the actual work it is obvious that either of said sets of devices may be used independently of the other. Furthermore, the proper operation of these devices when applied together or separately to a type-writer does not depend upon any specific form of winding or setting appliance, it being obvious that the springs may be wound by means of a treadle or similar device which can be controlled by the operator independently of the manipulation of the keys, or they may be wound by a main power appliance, such as a weight or spring, set or wound from time to time, as occasion requires—such, for example, as the means above mentioned for utilizing the weight of the operator for this purpose.

The invention further consists in certain minor details of construction, which will be hereinafter fully described.

Figure 1 is a side elevation of a type-writer and stand embodying the invention. Fig. 2 is a front elevation of the same. Fig. 3 is a front elevation, partly in section, on a large scale, of a sufficient portion of a Caligraph type-writer provided with the carriage-restorer and key-operating appliances forming the subject of the present invention to illustrate the construction and operation thereof. Fig. 4 is a top plan view of the same. Fig. 5 is a side elevation, partly in section, looking toward the right. Fig. 6 is a side elevation, partly in section, looking toward the left. Fig. 7 is an enlarged sectional detail showing the escapement mechanism which controls the main power applied for

winding the carriage-restoring and key-operating springs, and Fig. 8 is a detail to be hereinafter referred to.

The restoring device for the carriage A consists, essentially, of a traveling member preferably comprising two separate parts *a* and *b*, adapted to travel along the front of the machine parallel with the carriage-tracks and connected to a suitable spring or springs which are adapted to be wound up as the restoring device is moved from right to left by means of a cord or strap *c*, which runs over a pulley or drum *c*² and is adapted to be pulled in any suitable way, as by a treadle controlled by the operator's foot and connected with a cord coöperating with the said drum *c*² or an automatic device, which will be hereinafter described. The restoring device is so arranged that it can be drawn to the left at any time to wind up the spring or springs, by the unwinding of which it is drawn from left to right, and means are provided whereby the said restoring device will engage and move the carriage to the right and will be disengaged therefrom after the carriage reaches the desired position.

The restoring device *a b* is mounted on a track or guideway B, consisting, preferably, of two rods extending longitudinally along the machine, the said rods (which also form a track or guideway for other devices which operate in conjunction with the restoring device hereinafter described) being supported from a frame arranged to be readily secured to and removed from a type-writer. The said frame comprises two brackets or supports B² B³, the former consisting, as shown in Fig. 5, of a plate having a strengthening-flange B²⁰ along the top edge thereof adapted to extend over the top of the type-writer frame and having a slot to form a guide for the cam *g*, hereinafter described, while the lower portion is provided with an upturned flange B²¹, thus forming a socket along the lower edge of said bracket into which the lower front edge of said frame is inserted, while the bracket is secured to the frame by means of a set-screw B²², as indicated in Figs. 3 and 5. The said bracket is provided with a spindle B²³, extending out from the front face thereof and forming a bearing for the pulley or drum *c*², and also with a projecting arm B²⁴, in which is secured the track or guideway B. The bracket B³, as shown in Figs. 3 and 6, is similarly secured to the type-writer frame by means of a set-screw B³⁰, the said bracket having a projection B³¹ and a similar projection B³², which are adapted to support the spring or springs operating the restoring device, as will be hereinafter described, the rods B being secured in an end plate secured to the projection B³¹ by supporting-arms B³⁴, as shown in Figs. 3 and 6.

The part *a* of the restoring device, which consists, as shown, of a collar or collars movable along the track B, is connected directly with the cord *c* and is provided with an inde-

pendent spring *a*², one end of which is secured to a lug B³⁵ on the bracket B³ and the other to the hub of a spool *a*³, connected by a cord *a*⁴ with the said part *a*, so that as the said part *a* is drawn to the left it will wind the said spring, which in unwinding will act to restore the said part *a* to the position shown in Figs. 3 and 4. The part *b* is preferably provided with an independent spring *b*², connected to a hub *b*³ upon a spindle *b*⁴, which is supported between the projections B³¹ and B³², the pulley *a*³ being preferably, for convenience, loosely mounted on said spindle and said spindle being also provided with a pulley *b*⁵, adapted to rotate therewith and connected by a cord or strap *b*⁶ with the part *b*, so that as the said part is drawn to the left it will wind the said spring. The strap *b*⁶ may, if desired, be wound upon a drum *b*⁶⁰, provided with a ratchet *b*⁶¹ and pawl *b*⁶² in order that the tension of the spring *b*² may be adjustable. By this construction it is obvious that the parts *a* and *b* are independently movable, so that if either of said parts is drawn to the left and the other part detachably secured thereto it becomes possible by detaching said part to cause the same to restore the carriage. Thus one of said parts may be drawn to the left at any time during the writing operation of the machine and the other part may be drawn with it and when a complete line is written may be detached to restore the carriage.

As has been above stated, the part *a* is positively actuated through the cord *c*, and in order that the part *b* may be drawn to the left with the said part *a* the former is provided with a latch or hook *b*⁷, coöperating with a projection *a*⁵ upon the part *a*. The said hook *b*⁷ is normally pressed toward the projection *a*⁵, so as to hook over the same, by a spring *b*⁸, so that as the part *a* is drawn to the left the part *b* will be drawn with it, and it is obvious that if means are provided for releasing the hook *b*⁷ when the restoring device reaches the proper position the part *b* will move to the right, owing to the stress of its spring, independent of the part *a*. If, therefore, the cord or strap *c* is drawn to the left and maintained there, it is obvious that the combined restoring device will be likewise held and that, assuming the carriage to be engaged by the part *b* and the hook released, it is obvious that the carriage will be restored to its normal position by the action of the spring *b*². The part *a* can then be released and will return, owing to the stress of its own spring, and will automatically latch under the hook *b*⁷, ready for the next operation.

In order to coöperate with the carriage, the part *b* is provided with a shoulder *b*⁹, which is adapted to engage with the side of a dog *d*, which is connected to the carriage preferably by means of a bracket or supporting-piece *d*², secured upon one of the frame-rods of said carriage, the said dog being pivotally supported as between the forked ends *d*³ of the supporting-piece *d*², so that it is capable of

transverse movement with relation to the part *b*. This is obviously necessary in order that the said part *b* may be moved from the right to the left while the carriage is in any position, it being obvious that it would otherwise be necessary to draw the restoring device to the extreme left-hand position immediately after the carriage is restored in order to allow the said carriage to move from right to left while the next line is being written. To this end the side of the projection which forms the shoulder *b*⁹ is provided with a cam-surface *b*¹⁰, adapted as the part *b* passes to the left to engage the dog *d* and cause the same to travel outward along the said cam-surface *b*¹⁰ until it drops behind the shoulder *b*⁹, so as to be engaged by the part *b* during the movement thereof toward the right. After the carriage is moved to the right, however, it is necessary to disconnect the carriage and the restoring device in order that the former may be free to travel to the left as the next line is written. To this end the cam *e* is provided and adapted to engage the under side of the dog *d*, which, as shown, is capable of both vertical and lateral movement, the pivotal support thereof having a stem *d*⁴, extending into an opening in the dog, which is secured thereto by means of a pin *d*⁵, extending laterally from said stem through a slot *d*⁶ in the dog, so that, as shown in Fig. 3, the said dog as the carriage moves to the right will ride up along the surface of the cam *e* until it is completely above the shoulder *b*⁹ and disengaged therefrom. The said dog is provided with a spring *d*⁷, arranged, as shown, to resist both the lateral and vertical movement thereof, so as to maintain it in its normal position when not engaged by the cam *e* or the cam-surface *b*¹⁰. The resistance afforded by the frictional contact of the dog with the cam serves to gradually stop the carriage and prevent too sudden a stoppage thereof as it brings up against the usual stop. A buffer *b*¹¹ is provided for the restoring device, said buffer being mounted on a movable frame, which will be hereinafter described.

In order to shift the platen-roll for the paper at the completion of each line, a cam *f* is provided and adapted to engage the under side of the handle *A*², which is commonly manually operated to turn the roll, so that the same is lifted by the cam and the roll turned. In order to prevent the carriage from being lifted by the cam instead of the handle being lifted independently thereof, a projection *f*² is provided, extending over the carriage-frame and engaging the upper side thereof.

After the restoring device has been drawn to its extreme left-hand position it is necessary in order to restore the carriage to its initial position to release the hook *b*⁷ and allow the part *b* to return, owing to the stress of its spring, and to accomplish this the said hook is provided with a projection *b*⁷⁰, adapted to cooperate with a sloping cam-surface *g* at the

end of a rod *g*², operated by a key *g*³, the said cam being so arranged that when the key *g*³ is pressed down the cam will engage the projection *b*⁷⁰, turning the hook *b*⁷ upon its pivot and disengaging the same from the shoulder *a*⁵. Assuming, therefore, for illustration, that the restoring device is adapted to be set in position to operate by means of a treadle or similar device controlled by the operator, it will be seen that at any time after a line is begun the foot can be pressed down to carry the restoring device to its extreme left-hand position and held down, and after the line is finished the key *g*³ may be touched by the operator, thus drawing down the cam *g*, releasing the hook, upon which the carriage will at once be restored to its original position and the dog connected therewith thrown out of engagement with the restoring device, so that the carriage is free to be operated for another line. The rod *g*² is guided in suitable openings in the frame and supported by a spring *g*⁴, secured at one end to a projection *g*⁵ from said rod and at the other end to the frame, the key *g*³ being preferably secured to an arm *g*⁶, secured to said rod *g*². It may, however, be desirable in some cases to allow the carriage to be restored automatically upon reaching the end of the line, and to this end the key *g*³ is provided with a hook *g*⁷, which can be caught under a cross-piece *g*⁸ (see Figs. 5 and 6) of the type-writer frame, so that the key is permanently held down and the cam *g* maintained in position to engage and unhook the part *b* as the carriage arrives at the extreme left-hand position.

By the operation of the devices thus far described it is obvious that each time the carriage is restored it will normally move to its extreme right-hand position, so that if it is desired to indent a line for the purpose of beginning a new paragraph it will be necessary to operate the space-bar a number of times in order to start writing with the carriage in the proper position. To obviate this necessity, the machine is provided with means for disconnecting the carriage from its feed-controlling device after it has been moved a certain distance to the right and means for stopping the carriage at the desired position as it moves to the left in response to its actuating-spring after being thus disconnected. In conjunction with this feature of the invention, which will be more fully described hereinafter, the cam *e* and the remainder of the device cooperating with the carriage while said carriage is obviously being moved toward the right are arranged to be shifted so as to stop the carriage approximately at the proper position instead of permitting the movement thereof completely to the margin. For this purpose these parts are mounted on a supplemental frame consisting of a portion *h*, mounted on the track *B* and capable of longitudinal movement with relation thereto, and a similar portion *h*², connected therewith by a sleeve *h*³, the said portion *h* being con-

5 nected by a set-screw h^4 to a rod h^5 , hinged
 to an elbow-lever h^6 , which is pivoted to an
 arm h^7 , secured to the type-writer frame. Co-
 operating with said elbow-lever is an arm h^8 ,
 10 pivoted at h^9 and adapted by its downward
 movement to engage said elbow-lever and
 cause the same to move the frame $h h^2$ to the
 left. The cam e is secured to the portion h^2
 in a socket h^{20} , being provided with a stem e^2
 15 and set-screw e^3 , and the buffer b^{11} is also se-
 cured to said portion h^2 , while the cam f and
 projection f^2 are mounted on the main part
 h , the former being shown as provided with
 a stem f^3 in a socket h^{21} , projecting from the
 20 frame, in which it is longitudinally adjust-
 able, and held by a set-screw f^4 , thus en-
 abling the operator by adjusting the height
 of the cam to regulate the throw of the roll
 for different widths of space between the
 25 lines. All these parts are therefore moved
 to the left as the arm h^8 is depressed, and the
 carriage will accordingly be arrested before
 it reaches its extreme right-hand position.

The arm h^8 is provided with a key or finger-
 30 piece h^{10} , adapted to be pressed down by the
 operator to produce the movement above de-
 scribed of the frame $h h^2$, and in order that
 the same movement may operate to restore
 the carriage the arm h^8 is provided with a hook
 35 h^{12} , extending over the upper surface of the
 arm g^6 , so that when the said arm h^8 is pressed
 down it will also actuate the cam g and release
 the carriage, which will be restored, as here-
 inbefore described, but arrested before it
 40 reaches its extreme right-hand position, or, in
 other words, when it reaches such a position as
 to start an indented line. It is sometimes de-
 sirable, however, to start a line at a certain dis-
 tance from the margin of the sheet—as, for ex-
 45 ample, a distance equivalent to five spaces—
 and at other times a greater distance—as, for
 example, a distance of ten spaces—and the
 arm h^8 may be so arranged that when it is de-
 pressed as far as its construction and arrange-
 50 ment will allow it will carry the frame $h h^2$
 to the left a maximum distance, and in or-
 der that the said arm may be depressed a less
 distance without exercise of judgment on the
 part of the operator a supplemental key h^{13}
 55 is shown as supported in the arm h^8 by means
 of a stem h^{14} , extending through an opening
 therein, the said stem being adapted after the
 arm has been depressed a certain distance to
 come in contact with a portion of the type-
 60 writer frame, as indicated in Fig. 5, thus pre-
 venting a further downward movement of the
 said arm. As herein shown, the complete de-
 pression of the arm is adapted to move the
 frame $h h^2$ forward such a distance that the
 65 carriage will start at the ten-space on the scale,
 the key h^{13} being adapted to depress the arm
 a sufficient distance to arrest the carriage at
 the five-space. As has been stated, however,
 the final arrest of the carriage at the proper
 position does not depend wholly upon the
 movement of the frame $h h^2$, and the means

for positively positioning the carriage at the proper initial position will now be described.

The feed mechanism of a type-writer con-
 70 sists, essentially, of what may be generically
 termed an "escapement device," in which the
 carriage, adapted to travel owing to the stress
 of a spring connected therewith, is held sta-
 tionary by a detent adapted to be moved at
 75 each operation of a key and arranged to coop-
 erate with the carriage in such a manner as
 to permit the forward movement thereof one
 space when the key is released. As the car-
 riage is restored after its step-by-step travel
 80 in the operation of printing, the relation of
 the detent thereto is substantially that of a
 pawl to a ratchet, and it is obvious that if
 means are provided for disengaging the pawl
 member of the device from the ratchet the
 85 carriage will move freely in response to its
 actuating device until arrested by a suitable
 stop or be in engagement with the detent. The
 present invention provides a device for this
 purpose, which is herein shown and described
 90 as applied to the Caligraph feed mechanism,
 although it is obviously susceptible of appli-
 cation to other machines. This device is illus-
 trated in Fig. 8, which shows a portion of the
 carriage-feed mechanism of the Caligraph ar-
 95 ranged to operate in the manner described.
 Referring to said Fig. 8 and to Figs. 5 and 6,
 the carriage has connected thereto a rack k ,
 adapted to be engaged by a laterally-movable
 tooth k^2 , pivoted on the arm k^3 , which in turn
 100 is pivoted at k^4 and adapted to be rocked at
 each depression of a key upon the keyboard.
 The said detent k^2 as it is rocked passes out
 of engagement with the teeth upon a supple-
 mental rack k^5 , where it normally stands, said
 105 supplemental rack being connected to said
 rack k , the connection being such that there
 is a lost motion provided for substantially
 equal to the distance between two adjacent
 teeth on each rack, the teeth on the said racks
 being uniform with one another. The sup-
 110 plemental rack k^5 is connected by a spring k^6
 with the main rack k , the said spring being
 of sufficient strength to move the said rack
 k^5 with relation to the rack k , but adapted to
 be overcome by the stress of the mainspring,
 115 which actuates the carriage and which is suit-
 ably connected to the rack k by means of an
 arm K , (indicated in Figs. 5 and 6,) such arm
 being a portion of the Caligraph machine and
 not requiring further illustration. As a key
 120 is depressed, therefore, the detent k^2 passes
 out from in front of the teeth on the rack k^5 ,
 thus permitting a forward movement thereof
 with relation to the rack k ; but before such
 movement takes place the said rack k is en-
 125 gaged by the said detent k^2 , which is of suf-
 ficient width to bridge said racks and engage
 one before it releases the other, so that the
 rack k is held stationary during the printing
 operation. As the arm k^3 moves back owing
 130 to the release of the key it will disengage the
 rack k and permit the forward movement of

the carriage, but will engage the supplemental rack k^5 to arrest the movement of the carriage, which is thus equal only to the amount of lost motion, or, as above stated, the space 5 between two teeth. When the carriage is restored to its initial position, the detent k^2 , being pivoted to the arm k^3 , will allow the supplemental rack k^5 to pass across its end as a ratchet travels by a pawl. It is obvious, therefore, 10 that if the return movement of the carriage is stopped with said detent in any tooth of the rack the carriage when released will be stopped at the space corresponding to such tooth. Unless, therefore, in an ordinary construction the frame $h h^2$ were positively moved 15 to a certain definite position by the operation of the key h^{10} or h^{13} the carriage might overthrow and stop one or more teeth in the rear of the position desired. To prevent this, the supplemental rack in accordance with the present invention is provided with a plate 20 k^{50} , provided with two or more notches k^{51} , the remaining surface of said plate being flat and extending slightly below the teeth of the rack k^5 , against the side of which the said plate is 25 secured, as by screws k^{52} . When, therefore, the carriage is restored or moved to the left, as shown in Fig. 8, which is a rear view, it is obvious that the detent k^2 will be disengaged from and prevented from falling into the teeth 30 along the plate or supplemental piece k^{50} , since the edge of said detent will engage the under surface thereof, except when it reaches a notch k^{51} . If, therefore, in restoring the carriage it is carried back far enough to allow a notch k^{51} upon the supplemental piece 35 k^{50} to travel by the detent k^2 , it is obvious that as the said carriage moves forward owing to the stress of its spring it will not be arrested until the said detent k^2 falls into a notch 40 k^{51} . Since, however, the movement of the detent k^2 during the feed of the carriage is a lateral movement, it is obvious that when the key is depressed it will be carried away from the supplemental piece k^{50} and engage with 45 the main rack, and as it moves back to engage with the supplemental rack it will move laterally between the teeth thereof and will not be prevented in such operation by the presence of the supplemental piece k^{50} . With 50 this arrangement, therefore, it is only necessary that the frame $h h^2$ when it is desired to stop the carriage at the five-space should be moved forward sufficiently to prevent said carriage from being restored to its extreme right-hand position, and if it is desired to restore it to the ten-space it is only necessary that the frame $h h^2$ should be moved forward far enough to prevent the said carriage from 60 passing beyond the five-space.

The supplemental piece k^{50} may, if desired, be adjustable along the rack k^5 , so that the spaces at which the carriage is to be arrested may be changed to ten and fifteen, fifteen 5 and twenty, &c., the rod h^5 being also adjustable by the set-screw h^4 , as above described, so that a corresponding movement of the frame

$h h^2$ may be secured. The plate k^{50} thus constitutes means for disconnecting the carriage from its controlling-detent, while the notches 70 in the plate constitute stops to selectively control the stopping-place of the carriage as it moves in response to its actuating-spring.

To operate the keys in accordance with the present invention, a spring m is provided, 75 which is adapted to be wound up at each operation which winds the springs which operate the restoring device, as above described. The preferred method of simultaneously winding the spring for restoring the carriage 80 and that for operating the key-levers and the means for causing the latter spring to operate will be hereinafter described, it being obvious, however, that both of the said springs may be wound by means of a treadle or similar device, the operation thereof being the 85 same after the power is once stored up within them. The said spring m is connected to the periphery of a drum or shaft m^2 , which carries a number of longitudinal rods or bars m^3 90 and which is provided with suitable escapement mechanism coöperating with the key-levers, whereby each time a key is slightly pressed downward the said drum m^2 is caused to make part of a revolution and to operate 95 the key-lever actuated by said key, as will be described.

Each of the key-levers n is provided with a hook n^2 , pivotally secured to the lower edge thereof and hung in such a position as to be 100 normally just beyond or above the path of the rods m^3 as they travel owing to the rotation of the drum m^2 . If, however, the key connected to any one of said key-levers is slightly depressed, the hook n^2 , connected to said key-lever, will be brought down into the path of 105 one of the said rods m^3 , so as to be caught thereby, as will be seen by reference to Fig. 6, so that in the rotation of the drum m^2 the said key-lever will be suddenly and sharply 110 drawn down, producing the operation of the type connected thereto, and as the hook n^2 is carried downward the sloping surface n^3 thereof will engage the outer surface of a cam projection n^4 , which, as clearly indicated in Fig. 115 6, will carry the same out of engagement with the rod m^3 , and thus allow the key-lever to become restored to its normal position in the usual way.

To permit the rotation of the drum m^2 , the 120 latter is provided with an escapement device consisting of a wheel m^4 , having teeth m^5 , said wheel being surrounded by a frame m^6 , having teeth m^7 and m^8 projecting inwardly from opposite sides thereof, so that a downward 125 movement of said frame from the position shown in Fig. 6 will cause the tooth m^4 , which normally stands, as shown in Fig. 6, in engagement with a tooth of the wheel m^9 , to become disengaged therefrom, thus permitting 130 the said wheel m^4 to rotate until a tooth thereof is engaged by the projection m^7 , which is then in a position to engage such tooth, and the corresponding upward movement, which, as

will be described, is automatic, permits the further rotation of the driver until the tooth m^8 again stops such rotation by its engagement with a tooth of the wheel m^4 .

5 To produce the downward movement of the frame m^6 , the latter is secured to an arm m^9 , which is preferably, as shown in Fig. 6, connected to the under side of the cross-piece m^{10} , extending across from one side of the
10 type-writer frame to the other and supported on pivotal arms m^{12} , pivoted at m^{13} . The said cross-piece m^{10} , as shown in Fig. 3, lies directly below the key-levers n and is depressed when any one of said key-levers is de-
15 pressed, and it is obvious that the said escapement-frame m^6 will be lowered, so as to disengage the tooth m^8 from the teeth of the wheel m^4 . It is essential, however, that the completion of that portion of a revolution re-
20 quired for the operation and subsequent disengagement of the key-lever should be attendant upon a single touch of the key and not necessarily upon the depression and subsequent release thereof. For this reason the
25 arm m^9 , by which the downward movement of the escapement-frame m^6 is produced, instead of being permanently connected to the said frame, is connected thereto by means of a pivoted latch m^{14} , which is adapted to en-
30 gage a hole or shoulder in the said frame m^6 and is also provided with a tail or projection k^{15} , adapted to engage a cam-surface m^{16} , Fig. 3, when the said frame is depressed by the key. This cam-surface m^{16} is so arranged
35 that it will cause a movement of the hook or latch m^{14} upon its pivot, throwing it out of engagement with the frame m^6 and allowing the latter to return, owing to the stress of the spring m^{60} upon a stem m^{61} , mounted in a
40 guideway or opening in a supporting-arm m^{62} , secured to the frame, the spring being interposed between the surface of said arm and the flange m^{63} at the end of said stem. Thus a downward movement of any key first de-
45 presses the arm m^9 , carrying with it the escapement-frame m^6 , permitting the wheel m^4 and drum m^2 , upon which it is mounted, to turn a portion of a revolution, and then practically instantaneously the escapement-frame
50 m^6 is released and allowed to return to its normal position, thus permitting the wheel m^4 to complete that portion of a revolution which is necessary for a complete operation of the type.

55 The springs for operating the key-levers and for restoring the carriage, the operation of which has been thus far described, may be wound up or set in any suitable way, means being provided, however, in accordance with
60 the invention for doing this work by means of a constant force, as that of a weight or spring wound or set, for example, at the beginning of the day and adapted to be utilized for a day's work, but preferably by the weight
65 of the operator, the parts being automatically restored to normal position when the operator leaves the machine. The escapement

mechanism, which will now be described in this connection, may obviously control any weight or spring wound up beforehand, but
70 is herein shown as used in connection with a suspended platform C, adapted to support the type-writer, which is mounted upon a suitable cabinet or table, and also to support a
75 chair for the operator, the weight of the operator on the platform being adapted to operate to wind up the carriage-restoring and type-operating springs intermittently, as has been described. The platform C is shown as pro-
80 vided with two shafts C^2 , each of which has a pinion C^3 , meshing with a rack C^4 , along the side of a standard C^5 , and the said shafts C^2 are each provided with a beveled gear C^6 , meshing with a similar gear C^7 upon a trans-
85 verse shaft C^8 , which may be connected to a shaft R, as by a sprocket R^2 and chain R^3 , the tendency of which will therefore be to rotate in the direction of the arrow, Figs. 1 and 5, when such rotation is not prevented. A coun-
90 terpoise-spring C^9 is also preferably provided, as the entire weight is obviously not necessary for the proper operation of the devices, and said counterpoise-spring may be and preferably is sufficiently strong to overbalance
95 the weight of the platform, cabinet, machine, and chain, so that each time the operator leaves the machine the platform is restored to its original position, the apparatus thus be-
100 ing self-restoring and always ready for operation. In connection with the shaft R, however, the escapement device is used and suitably controlled, so that when the arm g^6 is
105 pressed down and released the shaft R is permitted to make one revolution, and is so connected with the restoring device $a b$ and type-operating spring m as to wind up the springs
of the restoring device and the said spring m , which is so arranged that a single winding is sufficient to rotate the drum m^2 during the
110 operation of printing a complete line. To this end, therefore, the shaft R is geared, by means of a pinion R^4 , to a pinion R^5 on a counter-shaft r , which is provided with pro-
115 jections $r^2 r^3$ on opposite sides thereof, and a frame s is provided, preferably substantially circular or loop shaped, having along its inner periphery the projections s^2 and s^3 , the
120 said frame being mounted on stems s^4 and s^6 , longitudinally movable in the guideways s^5 and s^7 and connected to the rod g^2 , as by an extension of the arm g^6 , so as to be moved up and down by a corresponding movement of
125 the keys, which coöperate with said rod. Referring, therefore, to Fig. 5, it will be seen that when the rod g^2 is depressed to restore the carriage the frame s will be moved down-
ward, so that the projection s^3 will become disengaged from the arm or projection r^3 , allowing the shaft r to make substantially a
130 half-revolution until the projection r^3 is engaged by the projection s^2 . Again, on restoring the rod g^2 to its normal position the spring g^4 lifts the frame s and the projection r^3 will be disengaged from the projection s^2 ,

permitting the other half-revolution of the shaft r until it is again brought to a standstill by the engagement of the projection r^3 with the projection s^3 . Thus at each manipulation of the keys above described as cooperating with the rod g^2 a complete revolution of the shaft r is permitted.

During the rotation of the shaft r it is obvious that the shaft R will rotate two or three times, owing to the difference in the diameter of the gears connecting the two, and the spring m , one end of which is connected to the periphery of the drum m^2 , through which the said shaft R extends and upon which it is journaled, will be wound by means of a radial arm R^6 , projecting outward from the said shaft R and connected to the free end of the spring.

Since the drum m^2 is prevented from rotation by the escapement device hereinbefore described, it is obvious that the independent rotation of the shaft R will wind up the spring m , the arm R^6 being provided with a slotted U-shaped socket R^7 , into the slot of which is connected the end of the spring, so that as the latter winds up the end of said spring can travel inward with relation to said arm. At the same time the rotation of the shaft R is arranged to produce a movement of the cord or strap c , which has been hereinbefore described as connected with the restoring device $a b$ and to the periphery of the drum c^2 . To wind said drum, a cord c^3 , connected therewith, is also connected with a winding-drum which is adapted to be rotated by the shaft R . It is obvious that the cord c might extend over the drum c^2 or a suitable pulley and be directly connected with the drum c^4 ; but as it is desirable to multiply the effect of the rotation of the shaft R the drum c^2 is preferably connected with a supplemental drum c^{20} of smaller diameter, and the cord c^3 is connected to the periphery thereof, while the cord c is connected to the periphery of the larger drum c^2 , so that a relatively small downward movement of the cord c^3 results in a complete movement of the restoring device $a b$.

To permit the unwinding of the drum c^4 preparatory to a subsequent winding operation, it is loosely mounted on the said shaft R and adapted to be connected therewith during the rotation thereof and disconnected at the end of such rotation. For this purpose the pinion R^4 is provided with a latch R^{40} , pivoted thereto and projecting through an opening therein, the said latch R^{40} having a tail or projection R^{42} , adapted to be engaged by a projection r^{30} from the surface of the escapement-arm r^3 . Cooperating with the said latch R^{40} there is a series of shoulders R^{23} , formed by cutting recesses along the periphery of the drum c^4 , against which the said latch is adapted to project when in its normal position. Thus during the rotation of the said shaft the said latch, becoming engaged with one of the shoulders R^{23} , will cause a rotation of the drum c^4 and wind up the cords c^3 and c until the restoring device

$a b$ is carried to its extreme left-hand position, at the end of which time the projection from the arm r^3 of the escapement device will throw the latch R^{40} out of engagement with the drum c^4 , permitting the latter to rotate freely and allowing the restoring device to travel from left to right and carry with it the carriage. With this arrangement it is obvious that a restoring device having only a single member may be employed and the cam g may be dispensed with, since the downward movement of the rod g^2 in response to the operator's touch and the return movement thereof, due to the restoring-spring g^4 , results, as described, in a complete rotation of the shaft r . Such rotation being transmitted to the shaft R first turns the drum c^4 , acting through the cord c^3 , drum c^2 and c^{20} , and cord c to draw the restoring device to the left, where it engages the dog d , and then at the end of such rotation the arm r^3 , with its projection r^{30} , in conjunction with the latch R^{40} , frees the drum c^4 , so that the spring connected with the restoring device is free to act. Thus at the completion of a line a touch upon the restoring-key produces a complete operation of the restoring device.

It is to be understood that the specific construction and arrangement of instrumentalities hereinbefore described as embodying the invention may be largely modified without departing from the invention, which therefore it is not intended to limit to such specific construction.

I claim—

1. An attachment for type-writers comprising a traveler adapted to engage and restore the carriage to its initial position, a spring-actuating device for said traveler adapted to be wound by moving said traveler in one direction, and by unwinding to move said traveler in the opposite direction, means for moving said traveler in the direction required to wind the spring thereof, and a device for releasing the traveler to cause the operation thereof to return the carriage, substantially as described.

2. An attachment for type-writers comprising a traveler adapted to engage and restore the carriage to its initial position, a spring-actuating device for said traveler adapted to be wound by moving said traveler in one direction and by unwinding to move said traveler in the opposite direction, means for moving said traveler in the direction to wind the spring thereof, a latch or hook adapted to connect said traveler with said moving and winding means, and a cam cooperating with said latch to trip the same, substantially as described.

3. An attachment for type-writers comprising a traveler adapted to engage and restore the carriage to its initial position, a spring-actuating device for said traveler adapted to be wound by moving said traveler in one direction and by unwinding to move said traveler in the opposite direction, means for mov-

ing said traveler in the direction to wind the spring thereof, a latch or hook adapted to connect said traveler with said moving and winding means, a movable cam adapted to
5 cooperate with said latch and trip the same, and means for locking said cam in position to trip the latch, substantially as described.

4. The combination with a type-writer carriage, of a track secured to the frame, a traveler mounted on said track, and adapted to
10 engage and restore the carriage, a spring adapted to be wound by the movement of said traveler in one direction and by unwinding to produce a movement thereof in the op-
15 posite direction, means for moving said traveler in a direction to wind the spring and maintaining it in the position to which it is thus moved, and a device for releasing said traveler to permit its return movement in
20 response to its spring, substantially as described.

5. In a restoring device for a type-writer carriage, the combination with a track or guideway, of a two-part traveler mounted on
25 said track, a spring connected with each part, an externally-operated cord attached to one part to produce a movement thereof against the stress of said springs, means for attaching said parts, whereby a movement of said
30 cord produces a simultaneous movement of both said parts, a device for detaching said parts, and a projection from the type-writer carriage adapted to be engaged by the de-
35 tached part during a movement thereof in one direction but not in the other, substantially as described.

6. In a restoring device for a type-writer carriage, the combination with a member provided with a spring and adapted to be pulled
40 against the stress of said spring in the direction of forward travel of the type-writer carriage, of a second member provided with an independent spring, a hook or latch on one of said members adapted to engage a projec-
45 tion on the other, means whereby said second member will engage the type-writer carriage during a movement thereof in one direction but not in the other, and a cam under the control of the operator adapted to engage
50 and trip the said hook or latch, substantially as described.

7. In a restoring device for a type-writer carriage, the combination with a member provided with a spring and adapted to be pulled
55 against the stress of said spring in the direction of forward travel of the type-writer carriage, of a second member provided with an independent spring, a hook or latch on one of said members adapted to engage a projec-
60 tion on the other, means whereby said second member will engage the type-writer carriage during a movement thereof in one direction but not in the other, a cam adapted to be moved by the operator into position to en-
65 gage and trip the said latch, and means for locking said cam in such position, substantially as described.

8. The combination with the type-writer carriage, of a restoring device adapted to en-
gage and restore said carriage to its initial 70 position, a spring connected with said restoring device and adapted to be wound by a movement of said restoring device in one direction and by unwinding to produce a move-
75 ment thereof in the opposite direction, and means for automatically detaching said carriage from said restoring device when the former has been restored to its initial position, substantially as described.

9. The combination with the type-writer 80 carriage, of a restoring device comprising a traveler adapted to be moved in one direction under the control of the operator, a spring connected with said traveler and adapted to be wound or strained by such movement of
85 the traveler and to produce a movement thereof in the opposite direction to restore the carriage, a dog connected with the carriage, a cam-surface and shoulder on said traveler whereby said dog is adapted to be engaged
90 by said traveler during the movement of said traveler in one direction but not in the other, and a cam adapted to engage said dog and throw it out of engagement with the shoulder of the traveler when the carriage is com-
95 pletely restored, substantially as described.

10. The combination with the type-writer carriage, of a restoring device comprising a traveler adapted to be moved in one direction under the control of the operator, a spring
100 connected with said traveler and adapted to be wound or strained by such movement of the traveler and to produce a movement thereof in the opposite direction to restore the carriage, a dog connected with the carriage, a
105 cam-surface and shoulder on said traveler whereby said dog is adapted to be engaged by said traveler during the movement of said traveler in one direction but not in the other, a cam adapted to engage said dog and throw
110 it out of engagement with the traveler, and a device for shifting the paper-roll in response to the movement of the carriage, substantially as described.

11. The combination with the type-writer 115 carriage, of a restoring device comprising a traveler adapted to be moved in one direction by a device under the control of the operator, a spring connected with said traveler and adapted to be wound or strained by such
120 movement of the traveler and to produce a movement thereof in the opposite direction to restore the carriage, a dog connected with the carriage, a cam-surface and shoulder on said traveler whereby said dog is adapted
125 to be engaged by said traveler during the movement of said traveler in one direction but not in the other, a cam adapted to engage said dog and throw it out of engagement with the traveler, a device for shifting the paper-
130 roll in response to the movement of the carriage, and means for shifting the position of said cam, substantially as described.

12. The combination with the type-writer

carriage, of a restoring device comprising a traveler adapted to be moved in one direction under the control of the operator and in the opposite direction by a spring, a dog connected with the carriage, a cam-surface and shoulder on said traveler whereby said dog is adapted to be engaged by said traveler during the movement of said traveler in one direction but not in the other, a cam adapted to engage said dog and throw it out of engagement with the shoulder of the traveler, and a device for shifting the position of said cam and simultaneously releasing said traveler to restore the carriage, substantially as described.

13. The combination with a spring-actuated restoring device for a type-writer carriage, of means for determining the position to which said carriage is to be restored, consisting of a movable frame provided with a device for disconnecting the carriage and carriage-restoring device, and means for moving said frame, substantially as described.

14. The combination with a spring-actuated restoring device for a type-writer carriage, of means for determining the position to which said carriage is to be restored, consisting of a movable frame provided with a device for disconnecting the carriage and carriage-restoring device, an elbow-lever connected to said frame, and an arm adapted to be moved by the operator to engage said elbow-lever and produce a corresponding movement of said frame, substantially as described.

15. The combination with a spring-actuated restoring device for a type-writer carriage, of means for determining the position to which said carriage is to be restored, consisting of a movable frame provided with a device for disconnecting the carriage and carriage-restoring device, an arm provided with a key and adapted by its downward movement to move said frame a predetermined distance, and a supplemental key connected with said arm and provided with a stop to limit the movement thereof, substantially as described.

16. The combination with the carriage-restoring device, of a movable frame cooperating therewith to control the extent of movement thereof, an arm h^8 provided with a key h^{10} and connected with said frame to produce a movement thereof, and a supplemental key h^{13} provided with a stem h^{14} extending through said arm and adapted to engage a portion of the type-writer frame, substantially as and for the purpose described.

17. The combination with the carriage-restoring device, of a movable frame cooperating therewith to control the extent of movement thereof, the carriage-feeding device comprising a detent adapted to cooperate with the carriage to arrest the forward movement thereof, said detent being arranged to permit the rearward movement of said carriage,

means for moving said detent to permit a step-by-step forward movement of said carriage, and a device for preventing the arrest of said carriage by said detent at certain points in the travel thereof except when said detent is moved to permit the usual step-by-step feed of the carriage, substantially as described.

18. In a type-writer, the combination with the carriage, of the rack k connected therewith, the supplemental rack k^5 connected with the rack k but capable of independent movement in a direction parallel thereto, the detent k^2 movable transversely with relation to said racks and adapted to alternately engage the same, and the plate k^{50} secured to the rack k^5 , the lower surface of said plate extending substantially to the lower edge of said rack k^5 , and one or more notches in the lower surface of said plate, substantially as and for the purpose described.

19. The combination with the type-writer carriage, of a restoring device therefor, a spring connected with said device and adapted to be wound or strained by a movement thereof to its operative position, and a device for automatically releasing the said restoring device after it has been thus moved, to permit the operation thereof substantially as described.

20. The combination with the type-writer carriage, of a restoring device therefor, a spring connected therewith and adapted to be wound or strained by a movement thereof to its operative position, a force as that of a weight or spring constantly exerted and adapted to produce such movement of said restoring device, an escapement device controlling said force, and means for controlling said escapement device, substantially as described.

21. The combination with a restoring device for a type-writer carriage, of a drum adapted by its rotation to move said restoring device to its operative position, a spring connected with said restoring device and adapted to be wound by such movement thereof, a shaft adapted to rotate said drum, means for connecting said shaft and said drum during the rotation of said shaft, and a device for disconnecting said shaft and drum to permit the independent rotation of said drum, substantially as described.

22. The combination with a restoring device for a type-writer carriage, of a spring-actuated shaft adapted to operate said restoring device, a drum mounted on said shaft and normally free to rotate thereon, a latch connected with said shaft and adapted to be connected with said drum to produce a rotation thereof with said shaft, a force as that of a weight or spring constantly tending to rotate said shaft, an escapement controlling said force, and a tripping device for said latch, operating in response to the rotation of the said shaft, substantially as described.

23. The combination with a drum c^4 adapted

by its rotation to operate the carriage-restoring device, of a shaft R provided with a spring or motor, a counter-shaft r geared thereto, an escapement device comprising the arms r^2 and r^3 upon said counter-shaft, and the frame s cooperating therewith, a latch R^{40} pivoted to the shaft R, shoulders R^{23} upon the drum c^4 normally engaged by said latch, and the projection r^{30} from the escapement-arm r^3 adapted to trip the said latch, substantially as described.

24. The combination with a restoring device for a type-writer carriage, of an actuating-shaft adapted by its rotation to move said restoring device to its operative position, a spring connected with said restoring device, and adapted to be wound by such movement, means for automatically releasing the restoring device thus moved to permit the operation thereof, a motor for said actuating-shaft, and an escapement controlling the operation of said motor, substantially as described.

25. The combination with the type-writer carriage, of a spring-actuated restoring device therefor, a support or platform for the type-writer operator connected with the spring of said restoring device to wind the same, an escapement to control the operation thereof, and means for controlling said escapement, substantially as described.

26. The combination with the restoring device provided with a spring, of a shaft R adapted by its rotation to first move said restoring device, thereby winding the spring thereof, and afterward to automatically release said restoring device to restore the carriage, an escapement for said shaft R under the control of the operator, the platform C, the rack C^4 and the shaft C^2 provided with a pinion meshing with said rack and geared to the said shaft R, substantially as described.

27. The combination with the shaft R adapted by its rotation to operate a restoring device for a type-writer carriage, of a manually-operated escapement for said shaft, a platform adapted to hold the machine and support the weight of the operator, said platform being connected to said shaft R, so that a downward movement of said platform tends to produce a rotation of said shaft, and a counterpoise spring or weight for said platform adapted to overbalance the weight thereof together with that of the machine, substantially as described.

28. In a type-writer, the combination with the key-levers, of a hook connected with each key-lever, a spring-actuator adjacent to said hooks and adapted to engage the hook of any lever that is depressed, an escapement device for controlling the operation of said actuator, and means whereby the depression of any key-lever causes the operation of the said escapement device, substantially as described.

29. The combination with the key-levers,

of a hook depending from each lever, an actuating device common to all of said levers and adapted to engage the hook of any lever which is depressed, means for disengaging the hook therefrom during the movement of the said actuating device, a motor for said actuating device, and an escapement for said motor controlled by the movement of any of said key-levers, substantially as described.

30. In a type-writer, the combination with the type-bars, of a shaft adapted by its rotation to actuate said type-bars, a motor adapted to drive said shaft, an escapement device for said motor comprising a toothed wheel on said shaft and a spring-supported frame having a projection adapted when said frame is in its normal position to engage a tooth of said wheel, means for moving said frame to carry said tooth out of engagement with the teeth of said wheel, a second tooth on said frame also adapted to engage a tooth of said wheel, and means for automatically releasing said frame thus moved to restore the same to its initial position, substantially as described.

31. In a type-writer, the combination with a motor-driven shaft, of a spring adapted to cause successive printing operations, a carriage-restoring device, a spring for operating the same, means whereby the rotation of said motor-driven shaft is caused to wind both of said springs, an escapement device for said shaft, and common means for causing the operation of said carriage-restoring device and of the escapement mechanism for said shaft, substantially as described.

32. In a type-writer, the combination with a restoring device for the carriage, of a spring for operating the same, a spring adapted to operate the type-bars, common means for winding said springs, and devices for controlling the operation thereof when wound, substantially as described.

33. In an attachment for type-writers, the combination with the frame provided with a track, of a spring-actuated traveler movable along said track and adapted to engage and restore the carriage, a vertically-adjustable cam secured to said frame and adapted to be engaged by the shifting-lever for the platen-roll, and a holding device also secured to said frame and adapted to engage the upper portion of said carriage to prevent the same from being lifted by said cam, substantially as described.

34. The combination with the type-writer carriage, of a feeding device therefor comprising a detent adapted to cooperate with the carriage to arrest the forward movement thereof, said detent being arranged to permit the rearward movement of said carriage, means for moving said detent to permit the step-by-step forward movement of said carriage, and a device for preventing the arrest of said carriage by said detent at certain points of the travel thereof except when said

detent is moved to permit the usual step-by-step feed of the carriage, substantially as described.

35. In a type-writer, the combination with
5 a spring-actuated restoring device for the carriage, of means for disconnecting said restoring device from said carriage at a predetermined point in the movement thereof, a feeding device for the carriage comprising a de-
10 tent adapted to cooperate with the carriage to arrest the forward movement thereof, said detent being arranged to permit the rearward movement of said carriage, means for moving said detent to permit a step-by-step forward

movement of said carriage, and a device for 15 preventing the arrest of said carriage by said detent at certain points of the travel thereof except when said detent is moved to permit the usual step-by-step feed of the carriage, substantially as described. 20

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

PAUL E. COLLINS.

Witnesses:

H. J. LIVERMORE,
N. P. FORD.