

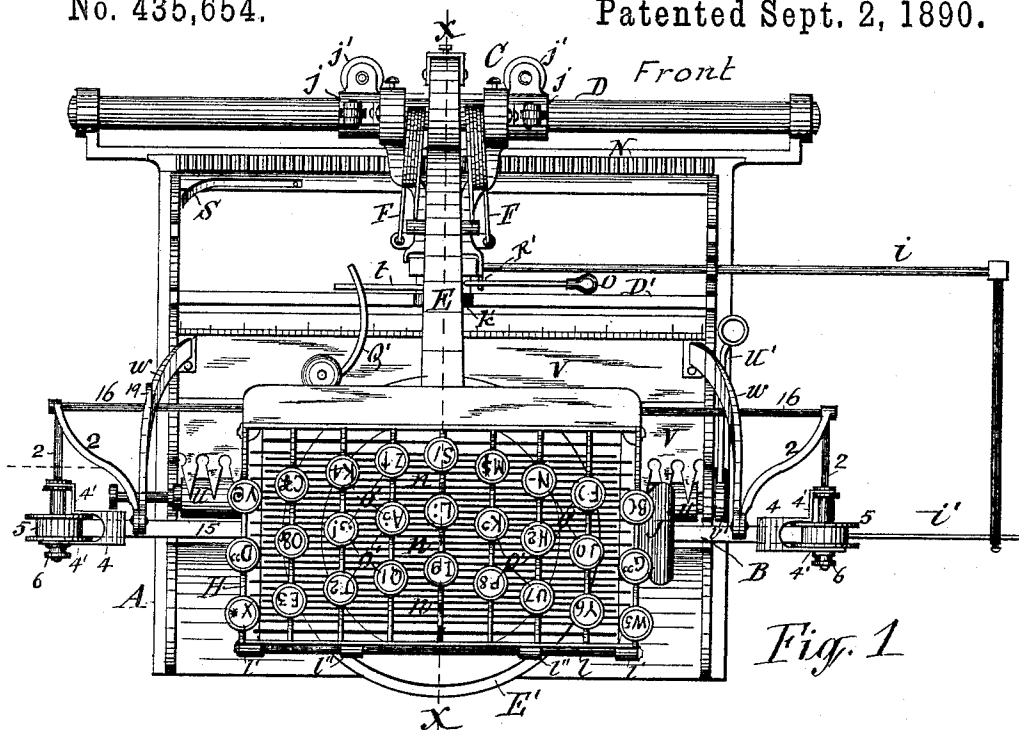
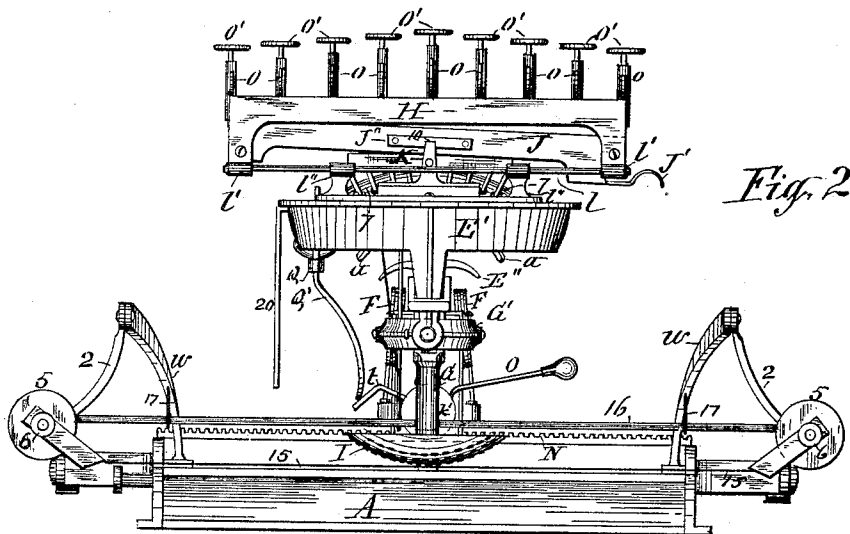
(No Model.)

7 Sheets—Sheet 1.

C. H. PERRY.
TYPE WRITING MACHINE.

No. 435,654.

Patented Sept. 2, 1890.



WITNESSES:

C. L. Burdison
H. A. Seaman

INVENTOR

Charles H. Perry
BY
Hull, Lassar & Hull
ATTORNEYS

(No Model.)

7 Sheets—Sheet 2.

C. H. PERRY.
TYPE WRITING MACHINE.

No. 435,654.

Patented Sept. 2, 1890.

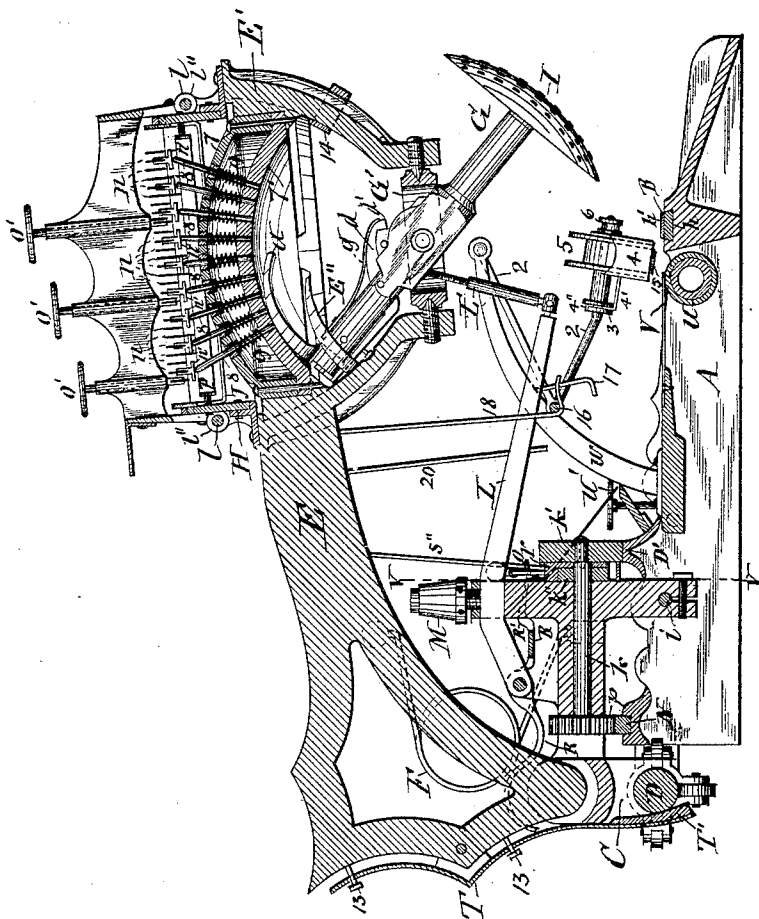


Fig. 3

WITNESSES:

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(No Model.)

7 Sheets—Sheet 3.

C. H. PERRY.
TYPE WRITING MACHINE.

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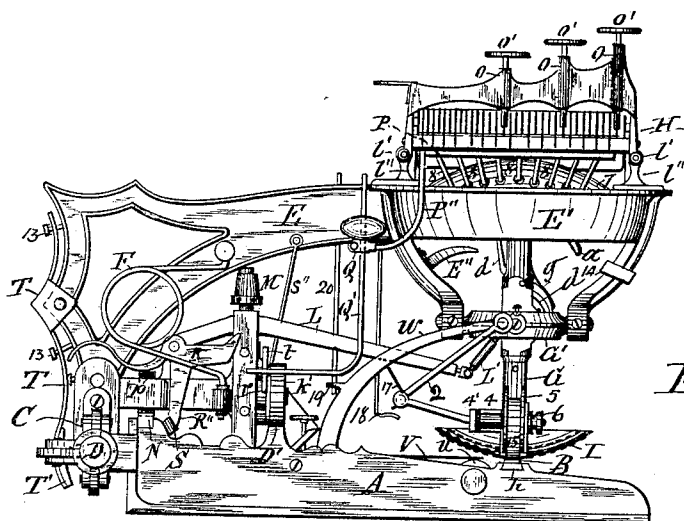


Fig. 4

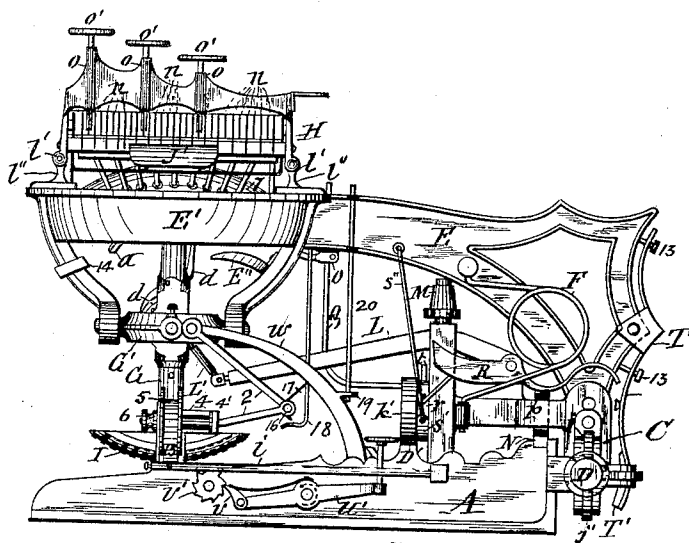


Fig. 5

WITNESSES:

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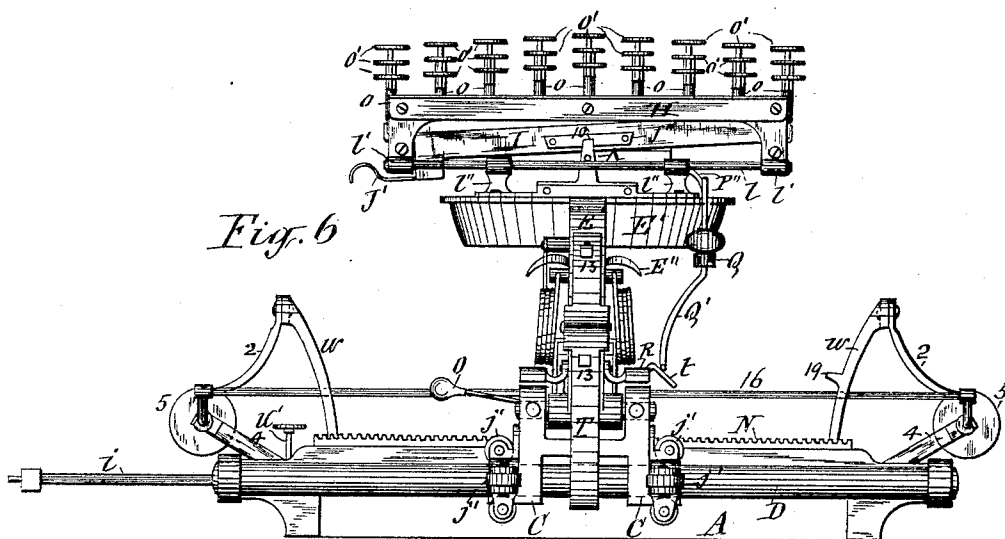
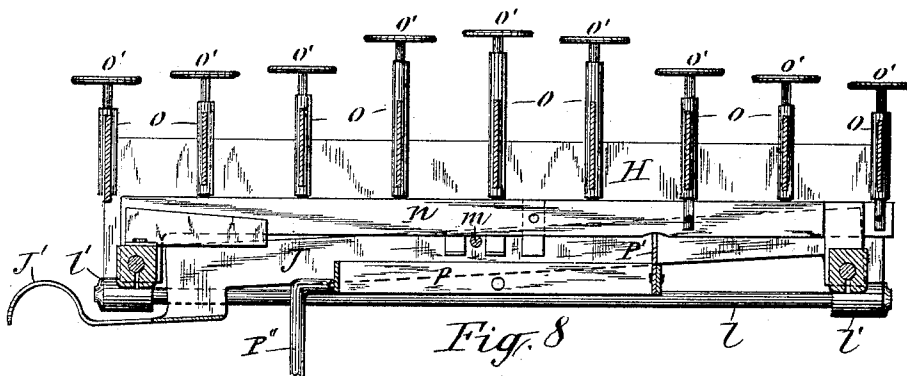
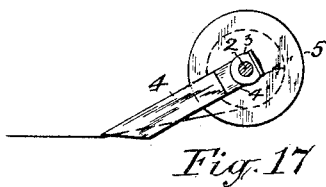
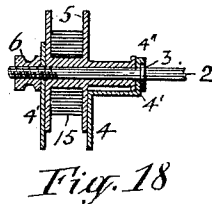
(No Model.)

7 Sheets—Sheet 4.

C. H. PERRY.
TYPE WRITING MACHINE.

No. 435,654.

Patented Sept. 2, 1890.



WITNESSES:

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INVENTOR

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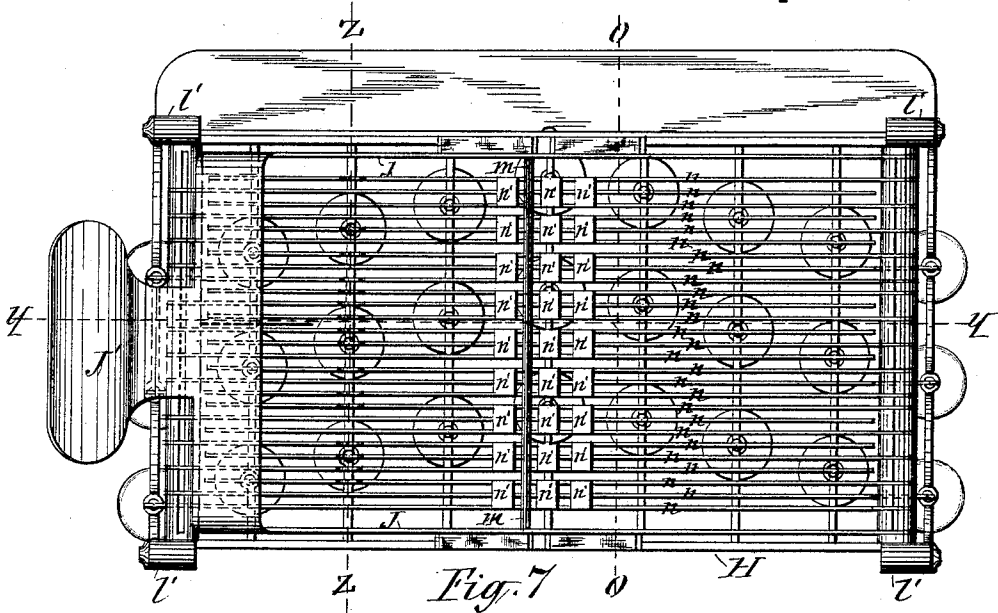
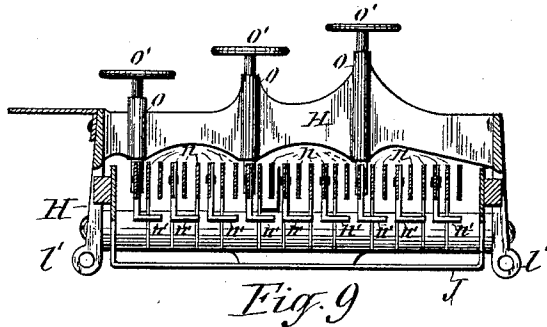
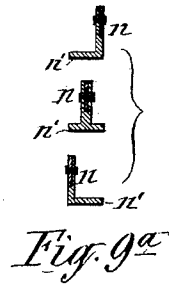
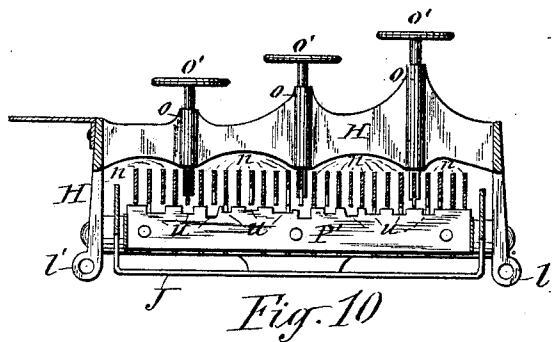
(No Model.)

7 Sheets—Sheet 5.

C. H. PERRY.
TYPE WRITING MACHINE.

No. 435,654.

Patented Sept. 2, 1890.



WITNESSES:

C. L. Bendixon
H. M. Seaman

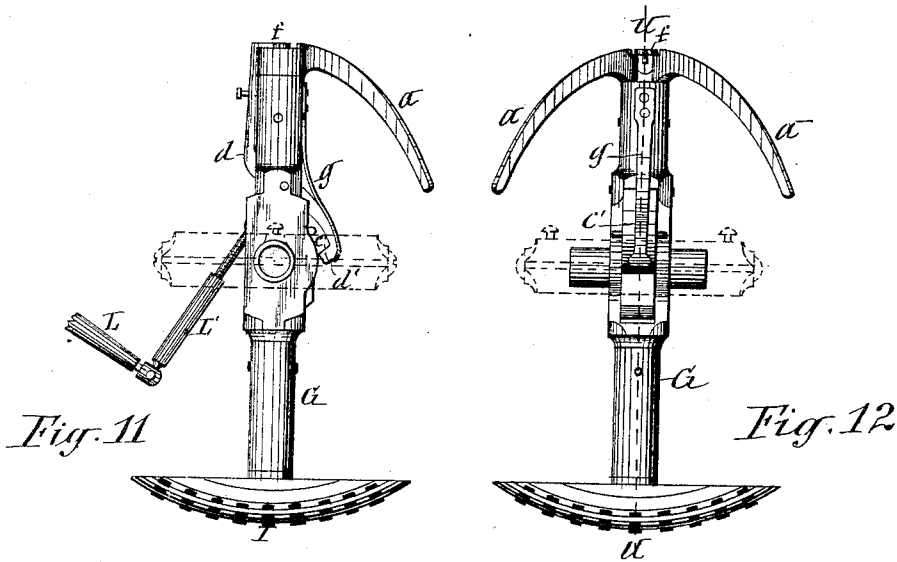
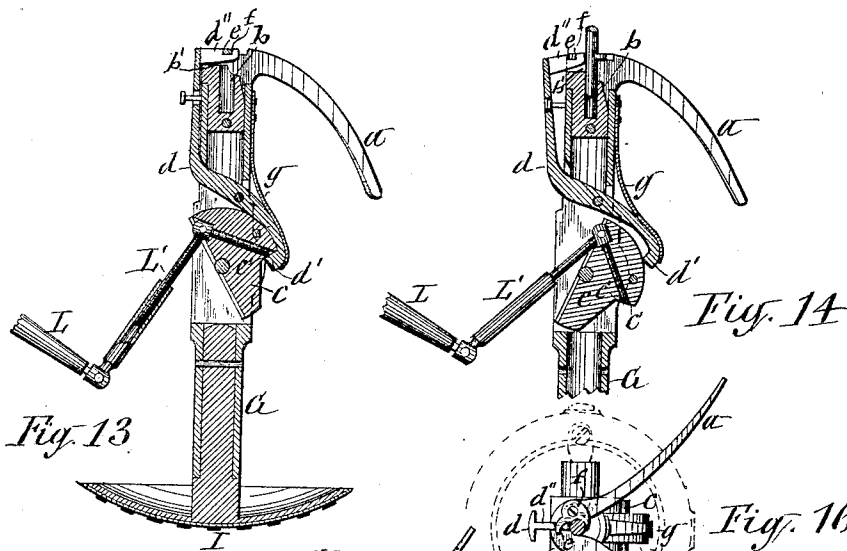
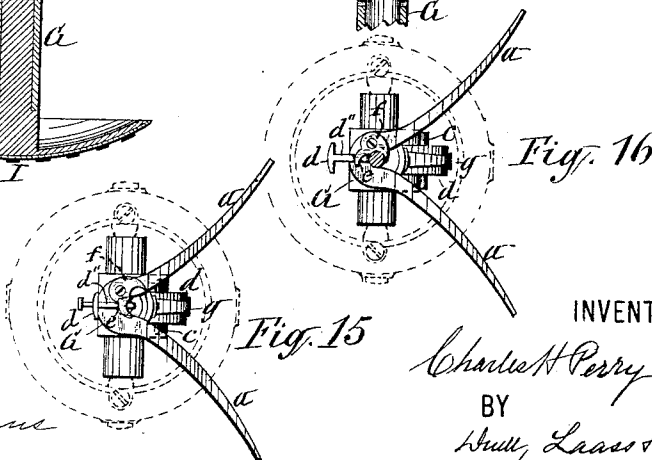
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H. L. Lasso & Co.
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C. H. PERRY.
TYPE WRITING MACHINE.

No. 435,654.

Patented Sept. 2, 1890.



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UNITED STATES PATENT OFFICE.

CHARLES H. PERRY, OF ONEIDA, ASSIGNOR OF ONE-HALF TO THOMAS R. PROCTOR, OF UTICA, NEW YORK.

TYPE-WRITING MACHINE.

SPECIFICATION forming part of Letters Patent No. 435,654, dated September 2, 1890.

Application filed March 20, 1889. Serial No. 304,030. (No model.)

To all whom it may concern:

Be it known that I, CHARLES H. PERRY, of Oneida, in the county of Madison, in the State of New York, have invented new and useful Improvements in Type-Writing Machines, of which the following, taken in connection with the accompanying drawings, is a full, clear, and exact description.

This invention relates to the class of type-writing machines in which a printing-plunger has a convex printing-face, and is set to bring the different types into their printing position by key-levers operated by a key-board.

My present invention consists in an improved construction and combination of parts, rendering the machine more efficient and more convenient in its operation; and the invention also consists in certain peculiarities of auxiliary devices employed in connection with the aforesaid parts, as hereinafter fully described, and specifically set forth in the claims.

In the annexed drawings, Figure 1 is a top plan view of a type-writing machine embodying my invention. Fig. 2 is a rear elevation of the same. Fig. 3 is an enlarged vertical transverse section on line *x x*, Fig. 1. Figs 4 and 5 are elevations of opposite sides of the machine. Fig. 6 is a front elevation of the same. Fig. 7 is an enlarged detached inverted plan view of the key-board. Fig. 8 is a vertical longitudinal section on line *y y*, Fig. 7. Figs. 9 and 10 are vertical transverse sections, respectively, on lines *O O* and *Z Z* in Fig. 7. Fig. 9^a represents sectional views of the attachment of the buttons to the different key-levers. Figs. 11 and 12 are respectively detached side and rear views of the printing-plunger. Fig. 13 is a vertical longitudinal section of the printing-plunger on line *U U*, Fig. 12. Fig. 14 is a sectional view showing the operation of the push-pin on the printing-plunger. Figs. 15 and 16 are top plan views of the printing-plunger in the conditions shown in the previous figures. Figs. 17 and 18 are enlarged side and longitudinal sectional views of one of the spools which carry the ink-ribbon, and showing the means for imparting the desired tension to said ribbon. Fig. 19 is an enlarged view of one of the push-pins and its

attachment. Fig. 20 is a face view of the printing-plunger. Fig. 21 is an enlarged vertical transverse section on line *v v*, Fig. 3; and Fig. 22 is a plan view of the bank of push-pins.

Similar letters and figures of reference indicate corresponding parts.

A represents the base or main supporting-frame of the machine, on the top of which frame is mounted the platen B, which is preferably of the form of a short straight bar sliding longitudinally in a groove or guide *h*, extending rectilinearly lengthwise of the top of the aforesaid frame and parallel with the track of the carriage. Said platen is thus maintained in a uniform plane. A suitable pad *h'* is secured to the top of the said sliding bar to receive the concussion. This pad is only as large as the largest letter or character to be printed, and the paper and ink-ribbon being supported by that extent of surface only, no impression is made on the paper, the surrounding surface of the paper being maintained perfectly clean.

Parallel with the platen or its guide *h* is a track D, preferably of the form of a straight bar secured at opposite ends to the frame A, and on this track is mounted movably longitudinally a carriage C. To this carriage is attached a horizontally-extended yoke *i*, with which is connected the platen B by a rod *i*, so that said platen is compelled to move synchronously with the carriage. In order to securely retain the carriage on its aforesaid track without incurring friction in its movement, I provide said carriage with rigid perforated ears *j j*, and pivot thereto anti-friction rollers *j' j'*, which bear on the track-rod at three or more points of its circumference. The carriage is further supported on another track D', parallel with the track D, by means of a shaft *k*, journaled in the carriage horizontally and at right angles to the tracks, and having pivoted to one of its ends a roller *k'*, which rides on the track D'.

On the carriage C is hinged a vertically-oscillatory arm E, the free end of which is over the platen and sustained normally in an elevated position by means of a suitable spring or springs F, connected at opposite

ends, respectively, to the carriage and to the arm E.

To the under side of the free end of the arm E is connected the printing-plunger G by a universal joint or gimbals G'. The lower end of this printing-plunger has affixed to it a convex type-plate I, which has formed integral with it, or otherwise firmly attached to it, different fields of types arranged in approximately straight parallel rows across the face thereof, as shown in Fig. 20 of the drawings. To the plunger is pivoted a tumbler c, to which is coupled one end of a rod L', the opposite end of which is swiveled to the end of a brace L, which is rigidly secured to the carriage C underneath the arm E. Said tumbler is formed with a catch c', and to the plunger is pivoted a latch d, having a hook d' adapted to engage the aforesaid catch. A spring g, attached to the plunger and bearing on the latch, holds the latter in contact with the tumbler.

When the machine is at rest and the arm E raised, the latch d is engaged with the catch c' of the tumbler c, and the brace L and its couplings L' draw the upper end of the printing-plunger G toward the front of the machine or toward the carriage C, as represented in Fig. 3 of the drawings. A V-shaped guide E'', attached to the under side of the arm E, receives the upper end of the plunger in its aforesaid forward-tilting movement. The upper end of the aforesaid printing-plunger is provided with an axial channel b and a diametrical slot b', and has extending from it radial guides a a, which are disposed divergent from each other toward the rear of the machine.

The upper end of the hereinbefore-described latch d is provided with a laterally-projecting lug d'', which is entered into the slot b' of the printing-plunger. Said lug is provided with a notch e on its top, and to the top of the plunger G is pivoted a dog f, which has a tongue entering the notch e, as shown in Figs. 15 and 16 of the drawings.

The free end of the arm E is formed with a ring E' central over the universal joint G' of the printing-plunger, and in this ring, concentric therewith, are firmly secured two concavo-convex plates 7 7', disposed one above the other, with their convex sides upward, and with a space between them. These plates are provided with perforations which, taken in pairs one on each plate, are in lines convergent toward the center of oscillation of the printing-plunger G or center of the universal joint G'. Through the space between the aforesaid plates and through the perforations thereof extend a bank of push-pins 8 8 8, &c. Each of said pins has affixed to it directly under the upper plate 7 a collar 8', as best seen in Fig. 19 of the drawings, and a spiral spring 9, surrounding the pin and pressing with one end on the lower plate 7' and with opposite end against the under side of the collar 8', serves to sustain the pin in

its raised position, and when in this position the lower end of the pin is flush with the under side of the bottom plate 7', while the upper end of the pin projects above the top plate 7.

Upon the free end of the arm E or ring E' thereof is mounted a key-board, which is connected thereto by longitudinal rods l l, connected to ears l' l' on the front and rear of the key-board frame H, said rod passing through sleeves l'' l'', rigidly secured to the ring E', said attachment allowing the key-board to be shifted longitudinally for the purpose hereinafter explained.

Within the key-board frame H is a series of key-levers n n n, arranged parallel side by side and lengthwise of said frame and hinged at one end to the same. Each of these key-levers has affixed to its under side a button n', by which it rests upon the upper end of one of the push-pins 8, and from the top of the key-lever projects vertically a stem which passes through a guide o, formed on the key-board frame, and to the upper end of said stem is attached the finger piece or key o', which has marked upon it the letter or character designed to be printed by said key.

The operation of the printing-plunger G by means of the described key-board is as follows: By depressing the desired key o', the push-pin 8, which supports the key-lever of said key, is also depressed and caused to protrude from the bottom plate 7'. A further downward pressure on the key depresses the arm E, and the movement of the latter causes the brace L and rod L' to throw the upper end of the printing-plunger G rearward. One of the guides a of the plunger coming in contact with the protruding lower end of the push-pin 8, guides said plunger into such a position as to bring the axial channel b thereof in range with the push-pin which enters said channel, as shown in Figs. 14 and 16 of the drawings, and when the plunger is in this position the type-plate I is caused to present to the platen a type corresponding to that marked on the key o'. In entering the axial channel b the push-pin 8 crowds the lug d'' radially out of the slot b', and thereby causes the dog f to grasp the push-pin and at the same time also causes the latch d to release its hold on the tumbler c. The latter being thus liberated and allowed to turn on its pivot relieves the plunger G from the lateral pressure of the brace L, while the plunger is retained in its requisite angle by the push-pin 8, and pressed down to make its impression on the paper lying upon the platen. After this is effected the operator allows the oscillatory arm E to rise automatically by force of the spring or springs F. In the ascent of said arm the tumbler drawn by the connecting-rod L' turns backward on its pivot until the latch d again falls into the notch in the tumbler, which allows the upper end of said latch to return to its normal position and turn back the dog f and release the push-pin,

when the upper end of the plunger is drawn forward by the brace L and the connecting-rod L' to its original position.

When it is desired to operate the oscillatory arm E without bringing the printing-plunger in contact with the paper upon the platen, it is only necessary to depress said arm without applying pressure to any of the keys *o'*, the latch *d* being thereby left in engagement with the tumbler *c*, and thus the latter is locked on the printing-plunger G, so as to cause the same to be thrown with its upper end rearward by the brace L and its coupling L'. A cushion 14, attached to the under side of the arm E, receives the said rearward thrust of the printing-plunger.

In order to allow the different fields of types on the printing-plunger to be brought into use when desired, I arrange the buttons *n'* of the key-levers *n n* for the respective fields of types in straight rows crosswise the key-board, as shown in Fig. 7 of the drawings. The key-board frame being mounted movably longitudinally on the arm E, as hereinbefore described, allows the key-board to be shifted, so as to bring the different rows of buttons *n'* into position to operate the subjacent push-pins 8 8 8.

To retain the key-board in its desired position, I pivot to one end of the key-board frame a lever J, of the form of a rectangular frame, extending along the sides of the key-board frame and to the opposite end thereof, where it is provided with a suitable handle J' for manipulating it. To the longitudinal bars of the lever J are rigidly attached latch-plates J'', provided with a notch 10 in their center. To the ring E' of the arm E are firmly secured catches K K, adapted to engage either the notches 10 in the plates J'' or the ends of said plates, according to the position into which the key-board is adjusted. When engaged with the end of the latch-plates, the ears *l'* on the corresponding end of the key-board frame abut against the ends of the sleeves *l'' l''*, and thus retain the key-board in its position.

In order to prevent the buttons *n' n'* of the key-levers from dragging on the end of the push-pins 8 8 8 during the aforesaid shifting of the key-board, I attach to the lever J a rod *m*, which is extended across the under side of the key-levers and lifts the same when the said lever is raised to release the latch-plates J'' from the catches K.

To the carriage C, directly under the arm E, is adjustably secured a stop M to limit the downward movement of the said arm, so as to obviate undue concussion of the printing-plunger upon the platen, said stop being represented in the form of a set-screw inserted vertically in the top of the carriage and provided with a suitable pad or cushion on its top.

The arm E, with the described printing mechanisms attached thereto, is arranged to move longitudinally over the platen auto-

matically with the operation of said arm by means of the following feed mechanism: Lengthwise of the bed or main supporting-frame A is extended and firmly secured a rack N, parallel with the tracks D D'. To the shaft *k*, which is journaled in the carriage horizontally and at right angles to the rack, as hereinbefore described, is secured the feed-wheel or pinion *p*, which rides on the aforesaid rack. To said shaft is also rigidly attached a hub *k''*, and a clutch-collar *r* is mounted loosely on the shaft. To this clutch-collar is pivoted a clutch-lever *s*, which is provided with a gripping-bearing *s'*, engaging the periphery of the hub *k''*, as illustrated in Fig. 21 of the drawings. The free end of this lever is connected with the oscillatory arm E by a rod *s''*. A weighted lever O is extended rigidly from the clutch-collar *r* to turn the same in opposite direction from that imparted to said collar by the gripping-lever *s*. When the oscillatory arm E rises from the platen the rod *s''* draws the gripping-lever *s* tightly against the hub *k''* and turns the same. The shaft *k* turning with it, causes the pinion *p* by its engagement with the rack N to move the carriage C. In depressing the arm E the lever *s* is caused to loose its gripping hold on the hub *k''*, and thus the carriage remains stationary during said movement of the arm E. At the same time the weighted lever O drops and turns the clutch-collar *r* into a position to allow the gripping-lever *s* to take a new hold on the hub during the succeeding ascending movement of the arm E.

In order to automatically regulate the motion of the feed mechanism to produce the various spacing required for the different widths of types, I attach to the clutch-collar *r* a clutch-tripping arm *t*, extending therefrom in opposite direction to the weighted lever O, and to the ring E', or free end of the oscillatory arm E, I pivot the spacing-lever P, which is formed with a plate P', extending across the under side of the key-levers *n n n* and presenting its top edge to the same. This edge of the plate P' is provided with a series of notches *u u* of different depths, so that in depressing the different key-levers they come in contact with the plate P' during different distances of their movements. The notch under the key-lever which prints the letter I is deeper than the notch under the key-lever which prints the letter N, and the latter notch is deeper than the notch under the key-lever which prints the letter M, and in this manner the depths of the notches in the plate P' are graduated according to the different widths of the letters to be printed by the key-lever over the respective notches, and the spacing-lever P is actuated by the different key-levers in correspondingly-varying degrees.

To the spacing-lever P is rigidly attached a downwardly-extended arm P'', which has affixed to its lower end a clamp Q, and to the latter is connected longitudinally adjustably

a rod or arm Q', which has its free end transversely over the arm *t*, which is attached to the clutch-collar *r*, as hereinbefore described. The movement of the spacing-lever P by the depression of the key-levers *n n n* causes the rod Q' to depress the arm *t*, and thereby deprive the before-described clutch of its hold on the hub *k''* and limit the movement of the shaft *k* and pinion *p*, attached to said shaft, and inasmuch as the movement of the spacing-lever is varied according to the spacing required for different-sized letters or characters to be printed, as hereinbefore described, the movement of the aforesaid shaft and pinion is correspondingly varied and the feed regulated accordingly.

In order to allow the described feed mechanism to be thrown out of gear when desired to return the carriage C to its starting-point, I fulcrum on the carriage a manipulative lever R, which is provided with a finger R', extending under the weighted lever O, so that by tilting the lever R the weighted lever is lifted, and thus the gripping-lever *s* is deprived of its hold on the hub *k''*, hereinbefore described.

The lever R is formed with a downward extension R'', and to the frame or base A at the point where the travel of the carriage is designed to be stopped is attached a tripper S, of the form of an inclined spring-plate, with which the lever-extension R'' comes in contact, and is thereby moved so as to cause the lever R to lift the weighted lever O, and thereby trip or stop the feed mechanism.

To prevent the carriage from slipping too freely on its tracks, I fulcrum on the end of the oscillatory arm E, directly over the track D, a brake-lever T, which is provided at its lower end with a brake-shoe T', by which it bears on the track D. The pressure of the brake-shoe is regulated by set-screws 13 13, connected to the brake-lever above and below its fulcrum and bearing on the arm E.

Back of the platen B, and parallel therewith, is a rubber-faced roller U, pivoted to the sides of the frame or base A. Said roller serves to shift the paper upon the platen from line to line to be printed, and is operated by means of a key-lever U', pivoted to the side of the frame A, and having connected to it a pawl *v*, which engages a ratchet-wheel *v'*, attached to the shaft of the roller U. Upon the said roller, throughout the length thereof, rests with one of its longitudinal edges a plate V, which is hinged at the opposite edge to the frame A. The paper to be imprinted passes between the roller U and plate V, and is moved toward the platen by the said roller when turned on its pivots. From the plate V rise standards *w w*, to which are hinged suitable brackets 2 2, which are adapted to oscillate at right angles to the platen, and are formed with arms, onto which are slipped metallic shoes 4 4, having perforated flexible arms 4' 4', through which the arms of the

brackets pass. One of the shanks of each shoe is formed with an offset 4'', which engages an angular fixed collar 3 on the bracket-arm, and thus the shoe is prevented from turning from its requisite position. Between the arms of each shoe is a spool 5, journaled on the bracket-arm, and by means of a clamping-nut 6 on the end of the bracket-arm pressing against the outer flexible arm of the shoe causes the spool to be subjected to the necessary pressure and friction between the two flexible arms to impart the requisite tension to the ink-ribbon 15, which is wound on the two spools 5 5, and is carried over the platen and parallel therewith by the shoes 4 4, through which the ink-ribbon passes. The described oscillatory brackets 2 2 are connected with each other by a rod 16, and they swing automatically toward the platen by gravity of said brackets. Detents 17 are attached to the standards *w w* in such positions as to be encountered by the rod 16 and arrest the movement of the brackets, so as to bring the ink-ribbon directly over the platen. To the oscillatory arm E is attached a hook 18, which engages the rod 16 during the rising of the said arm from the platen, and thus automatically carries the ink-ribbon away from the platen after each stroke of the printing-plunger. This arrangement allows the operator to observe each letter or character immediately after it is imprinted upon the paper. The standards *w w*, attached to the plate V, as aforesaid, serve as levers by which the operator can raise together the rear edge of said plate and ink-ribbon for the purpose of inserting the paper.

19 designates a stop, which may be attached either to the standard *w* or to the frame A at the side toward which the carriage travels in the operation of the machine. A pendent rod 20 is firmly secured to the oscillatory arm E and is in such a position and of such length as to cause it to strike the aforesaid stop and prevent the said arm from descending sufficiently to allow the printing-plunger to strike the paper lying upon the platen. The purpose of said stop is to arrest the printing process when the carriage is stopped at the end of the printed line.

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

1. In combination with the carriage, the printing mechanism and platen connected to the carriage to move synchronously with the same in parallel lines, substantially as set forth and shown.

2. In combination with the platen, an arm movable to and from the platen, a printing-plunger connected to said arm by universal joint and having a convex printing-face with a field of types thereon, guides controlling the lateral oscillations of the printing-plunger, a series of key-levers, a corresponding series of keys, and mechanisms actuated by the key-

levers and engaging the guides of the printing-plunger and thereby adjusting the same to its printing positions, as set forth.

3. In combination with the carriage and the platen arranged parallel with the line of travel of the carriage, an arm connected to the carriage and oscillatory toward and from the platen, a printing-plunger having a convex printing-face with a field of types thereon and connected to said arm by universal joint, a bank of push-pins controlling the lateral oscillations of the plunger, and a series of keys operating the push-pins, as set forth.

4. In a type-writing machine, the combination, with the carriage, of the platen connected thereto and moving with said carriage, an arm on the carriage arranged movable to and from the platen, a printing-plunger provided with a field of types on its printing-face and connected by universal joint to said arm, guides controlling the lateral oscillations of the printing-plunger, push-pins adapted to engage said guides, a series of key-levers operating the push-pins, and a series of keys operating said levers.

5. In a type-writing machine, the combination, with the main supporting-frame, of a track and guide parallel with each other, the carriage mounted on said track, the platen sliding on the guide and connected to the carriage to move synchronously therewith, an arm connected to the carriage and oscillatory with its free end toward and from the platen, and the printing mechanism mounted on the free end of said arm.

6. In combination with the main supporting-frame and carriage, the platen connected to the carriage to move synchronously therewith, an arm mounted on the carriage and oscillatory with its free end toward and from the platen, the printing mechanism mounted on the free end of said arm, and feed mechanism for moving the carriage actuated by the oscillatory arm, as set forth.

7. In combination with the main supporting-frame and platen, a track parallel with the platen, a carriage riding on said track, an arm hinged to the carriage and oscillatory vertically toward and from the platen, a spring supporting the arm in its raised position, feed mechanism for moving the carriage actuated by the oscillatory arm, a printing-plunger connected by a universal joint to said arm, a bank of push-pins setting the plunger in its operative position, and key-levers operating said push-pins, as set forth.

8. In combination with the main supporting-frame, two parallel tracks, a carriage riding on one of said tracks, the platen sliding on the other track and connected with the carriage to move with the same, an arm hinged to the carriage and oscillatory vertically toward and from the platen, a printing-plunger connected to the oscillatory arm, feed mechanism for moving the carriage actuated by the said arm, and a friction-brake attached

to said arm and engaging the track to limit the movement of the carriage, as set forth.

9. In combination with the track, carriage, and oscillatory arm hinged to said carriage, a brake-lever fulcrumed on said arm, a brake-shoe on said lever adapted to bear on the track, and adjusting-screws connected to the brake-lever above and below the fulcrum thereof and engaging the oscillatory arm, substantially as set forth and shown.

10. In combination with the main supporting-frame, plate, track, and rack parallel with the platen, the carriage mounted on said track, a vertically-oscillatory arm hinged to said carriage, a shaft journaled in the carriage horizontally and at right angles to the rack, a pinion on said shaft engaging the rack, a hub fixed to the shaft, a clutch-collar mounted loosely on the shaft, a lever pivoted to said collar and provided with a gripping-bearing engaging the aforesaid hub, a rod connecting said lever with the oscillatory arm, a weighted lever extending from the clutch-collar, and a lever adapted to engage the said weighted lever and controlled at the will of the operator, substantially as and for the purpose set forth.

11. In combination with the main supporting-frame and platen, two tracks and a rack all parallel with the platen, the carriage mounted on one of said tracks, a vertically-oscillatory arm hinged to said carriage and extending toward the platen, a shaft journaled in the carriage horizontally and at right angles to the rack, a roller pivoted to said shaft and riding on the second track aforesaid, a spring supporting the free end of the oscillatory arm on the carriage, a hub fixed to the aforesaid shaft, a clutch-collar mounted loosely on the shaft, a lever pivoted to said collar and provided with a gripping-bearing engaging the aforesaid hub, a rod connecting said lever with the oscillatory arm, and a pinion on said shaft engaging the aforesaid rack, substantially as described and shown.

12. In combination with the main supporting-frame, carriage, and platen, a vertically-oscillatory arm connected to the carriage and having its free end over the platen, a printing-plunger connected to said end of the arm, brackets arranged oscillatory at right angles to the platen, a rod connecting said brackets, spools mounted on the brackets, an ink-ribbon carried on said spools, and a hook attached to the oscillatory arm and engaging the connecting-rod of the brackets, substantially as described and shown.

13. The combination of the main supporting-frame provided with a rectilinear groove, a carriage arranged movably parallel with said groove, a slide in said groove connected with the carriage, a pad on top of said slide, a vertically-oscillatory arm connected to the carriage and having its free end over the aforesaid slide, and a printing-plunger connected to said end of the oscillatory arm, as set forth.

14. In combination with the main supporting frame and platen, a paper-shifting roller arranged along the side of the platen, a plate hinged at one edge to the frame and resting with the opposite edge on the aforesaid roller, standards attached to said plate and serving as levers for lifting the same, brackets connected to said standards, spools mounted on the brackets, and an ink-ribbon on said spools, substantially as described and shown.

15. In combination with the platen, ink-ribbon, and brackets 2 2, the angular collars 3 3, fixed to said brackets, the shoes 4 4, provided with perforated flexible shanks 4' 4', slipped onto the ends of the aforesaid brackets and having the offset 4'' on one of the shanks locking on the aforesaid angular collars, the spools 5 5, mounted on the brackets between the shanks 4 4, and the clamping-nuts 6 6 on the ends of said brackets, substantially as described and shown.

16. In combination with the platen and vertically-movable arm over the platen, a printing-plunger connected by a universal joint to said arm, a brace swinging the plunger automatically with the movement of the arm, guides extending from the upper end of said plunger, push-pins sustained on the oscillatory arm movably toward and from said end of the printing-plunger, and keys for operating said push-pins, as set forth.

17. In combination with the platen and vertically-movable arm over the platen, a printing-plunger connected by a universal joint to said arm, a brace swinging the plunger automatically with the movement of the arm, guides extending radially from the upper end of said plunger, a bank of push-pins carried on the aforesaid arm and disposed convergently toward the center of oscillation of the printing-plunger, springs sustaining said push-pins in their elevated position, and keys for operating said push-pins, as set forth.

18. In combination with the platen and vertically-movable arm over the platen, a printing-plunger connected by a universal joint to the said arm, a brace swinging the plunger automatically with the movement of the arm, guides extending radially from the upper end of the plunger, plates 7 and 7', secured to the aforesaid arm above the printing-plunger and provided with perforations converging toward the center of oscillation of the printing-plunger, push-pins 8 8 8, extending through said perforations, springs 9 9 9, between the aforesaid plates and supporting the push-pins in their elevated position, and keys for operating said push-pins, as set forth.

19. In combination with the platen and vertically-oscillatory arm having its free end over the platen, a printing-plunger connected by a universal joint to the said arm, a brace swinging said plunger automatically with the movement of the arm, guides extending radially from the upper end of said plunger, a bank of push-pins carried on the oscillatory arm and disposed convergently toward the

center of oscillation of the printing-plunger, key-levers lying across the upper ends of the push-pins, and keys on said levers, substantially as described and shown.

20. In combination with the platen and vertically-movable arm over the platen, a printing-plunger connected by a universal joint to the said arm, a brace swinging said plunger automatically with the movement of the arm, a convex type-plate attached to said plunger and having fields of types disposed in approximately straight parallel rows across the face thereof, a bank of push-pins supported on the aforesaid arm, a key-board frame mounted on the said arm and adapted to be shifted in a direction parallel with the key-levers, said key-levers being arranged parallel side by side and hinged at one end to the aforesaid frame, and push-buttons on the levers disposed in sets corresponding to the different fields of types, substantially as described and shown.

21. In combination with the bank of push-pins 8 8 8, the key-board frame H, arranged movably longitudinally, the key-levers *n n* over the push-pins and hinged to said frame, buttons *n' n'*, secured to the under side of the key-levers in rows crosswise of the said levers, the lever J, pivoted to the key-board frame, and the rod *m*, attached to said lever and extending across the under side of the key-levers to lift the same and prevent the buttons thereof from dragging on the ends of the push-pins while shifting the key-board, substantially as described and shown.

22. In combination with the vertically-movable arm and printing-plunger connected thereto, a bank of push-pins supported on said arm and arranged in sets, each composed of straight parallel rows of pins, a key-board frame mounted on the aforesaid arm movably at right angles to the range of the sets of push-pins, key-levers lying side by side and over the rows of push-pins and hinged at one end to the key-board frame, an extra lever pivoted to the end of the said frame and provided with a rigid bar extending across the under side of the key-levers, a catch on the vertically-movable arm, and a latch on the extra lever adapted to engage the aforesaid catch, substantially as described and shown.

23. In combination with the platen and vertically-movable arm, the printing-plunger pivoted by a universal joint to the said arm, a brace sustained rigidly under the movable arm, and a rod swiveled at one end to the aforesaid brace and connected at the opposite end to the plunger, as set forth.

24. In combination with the platen, vertically-oscillatory arm and a bank of push-pins supported on said arm, the printing-plunger connected by a universal joint to the oscillatory arm and provided with radial guides and with an axial channel and diametrical slot in its upper end adapted to receive the lower end of the push-pin, a tumbler pivoted

to the plunger and provided with a catch, a latch pivoted to the plunger and adapted to engage the aforesaid catch and provided with a lug entering the aforesaid slot, a brace sustained rigidly under the oscillatory arm, and a rod swiveled at one end to said brace and coupled at the opposite end to the aforesaid tumbler, substantially as described and shown.

25. In combination with the platen, vertically-oscillatory arm and a bank of push-pins supported on said arm, the printing-plunger connected by a universal joint to the oscillatory arm and provided at its upper end with the radial guides *a a*, axial channel *b*, and diametrical slot *b'*, the tumbler *c*, pivoted to the plunger and provided with the catch *c'*, the latch *d*, pivoted to the plunger and having the hook *d'*, adapted to engage the aforesaid catch and provided with the lug *d''*, entering the slot *b'* and provided with the notch *e*, the dog *f*, pivoted to the upper end of the plunger and formed with a tongue entering the aforesaid notch, the spring *g*, bearing on the lower end of the latch *d*, the brace *L*, sustained rigidly under the oscillatory arm, and the rod *L'*, swiveled at one end to the said brace and coupled at the opposite end to the aforesaid tumbler, substantially as described and shown.

26. In combination with the platen, vertically-movable arm and printing-plunger connected by universal joint to the said arm, a brace sustained rigidly under the said arm, a rod swiveled at one end to the said brace and coupled at the opposite end to the printing-plunger, and a stop opposite the brace to arrest the oscillation of the said plunger, as set forth.

27. In combination with the carriage and key-levers, a feed-wheel moving with the carriage, a clutch adapted to engage and release the said feed-wheel, a tripping-arm adapted to release the clutch, a spacing-lever extended across the under sides of the key-levers and provided with bearings for the respective key-levers at various distances therefrom, and an arm extended from said spacing-lever and engaging the aforesaid tripping-arm, as set forth and shown.

28. In combination with the base *A*, tracks *D D'*, carriage *C*, rack *N*, and oscillatory arm *E*, the shaft *k*, journaled in the carriage at right angles to the rack, the pinion *p* and hub *k''*, attached to said shaft, the clutch-collar *r*, mounted loosely on the shaft, the weighted lever *O* and rigid arm *t*, extending from the clutch-collar in opposite directions, the gripping-lever *s*, pivoted to said clutch-collar, the rod *s''*, connecting said gripping-lever with the arm *E*, the key-board frame *H*, mounted on the free end of the lever *E*, key-levers *n n n*, hinged to said frame, the spacing-lever *P*, having the plate *P'* extended across the under side of the key-levers and provided in its top edge with notches of varying depths under the respective key-levers, the arm *P''*, extended from the spacing-lever, and the rod *Q'*, adjustably connected to the arm *P''* and having its free end transversely over the arm *t*, all combined to operate substantially as described and shown.

In testimony whereof I have hereunto signed my name this 15th day of March, 1889.

CHARLES H. PERRY. [L. s.]

Witnesses:

J. J. LAASS,
C. H. DUELL.