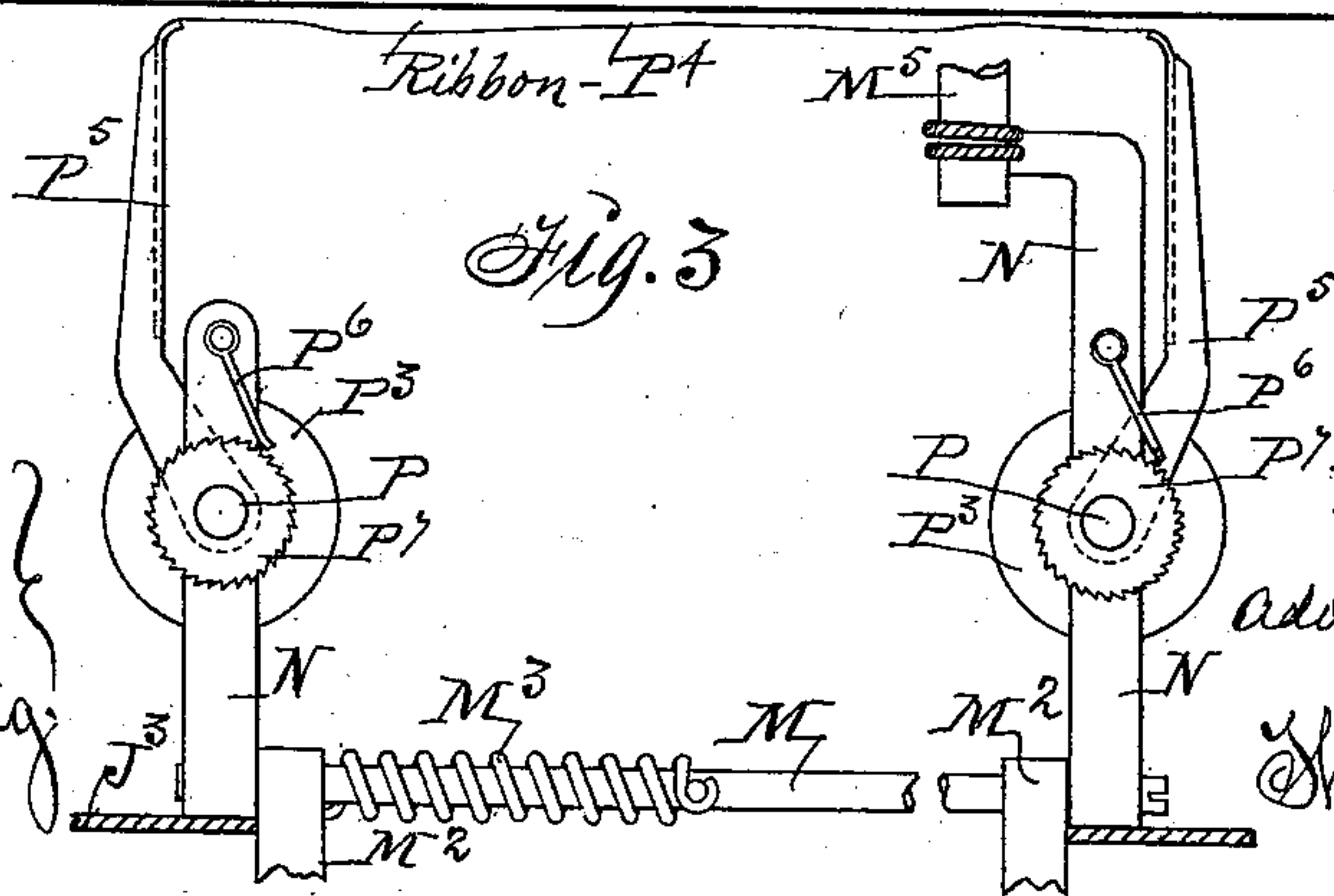
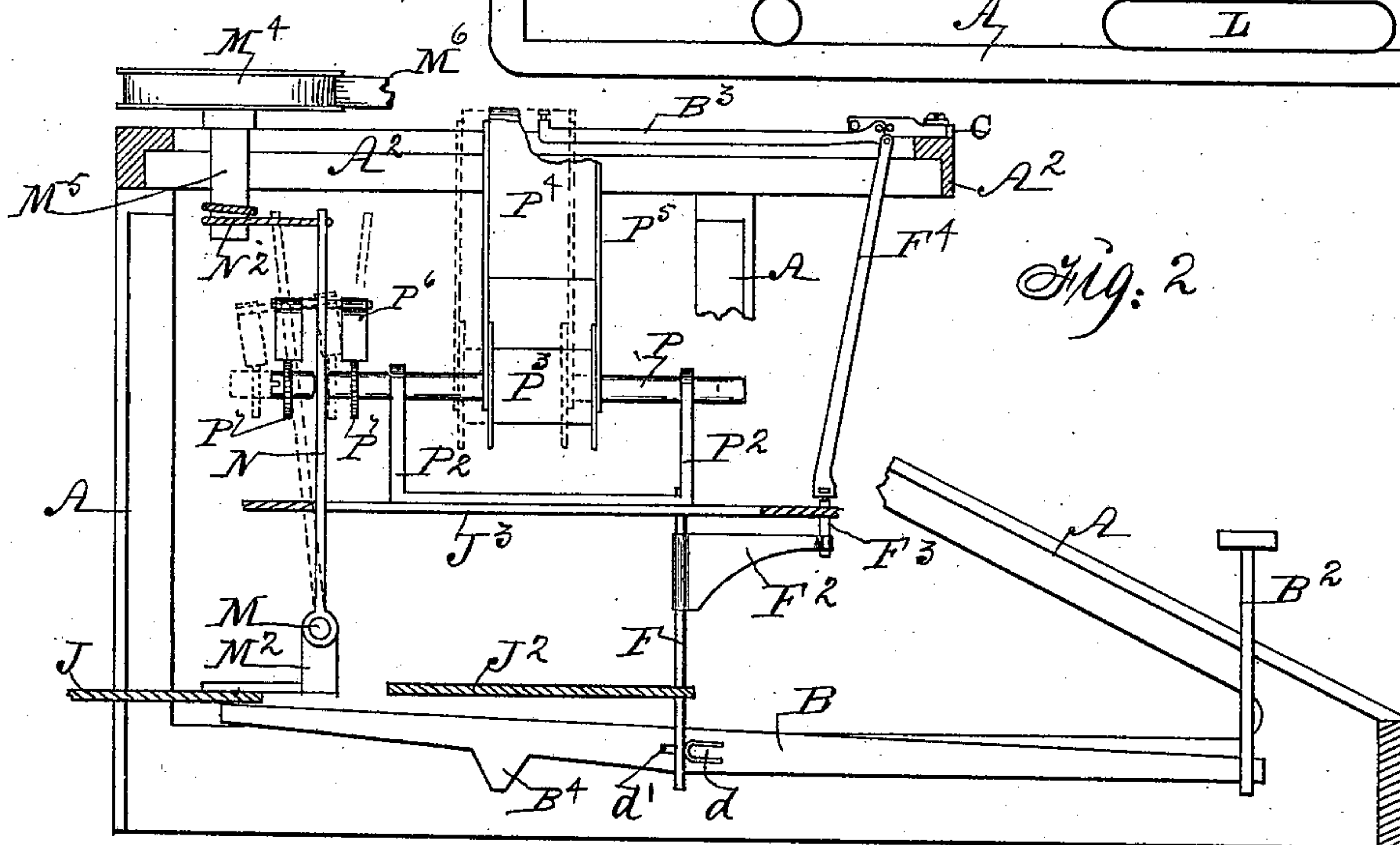
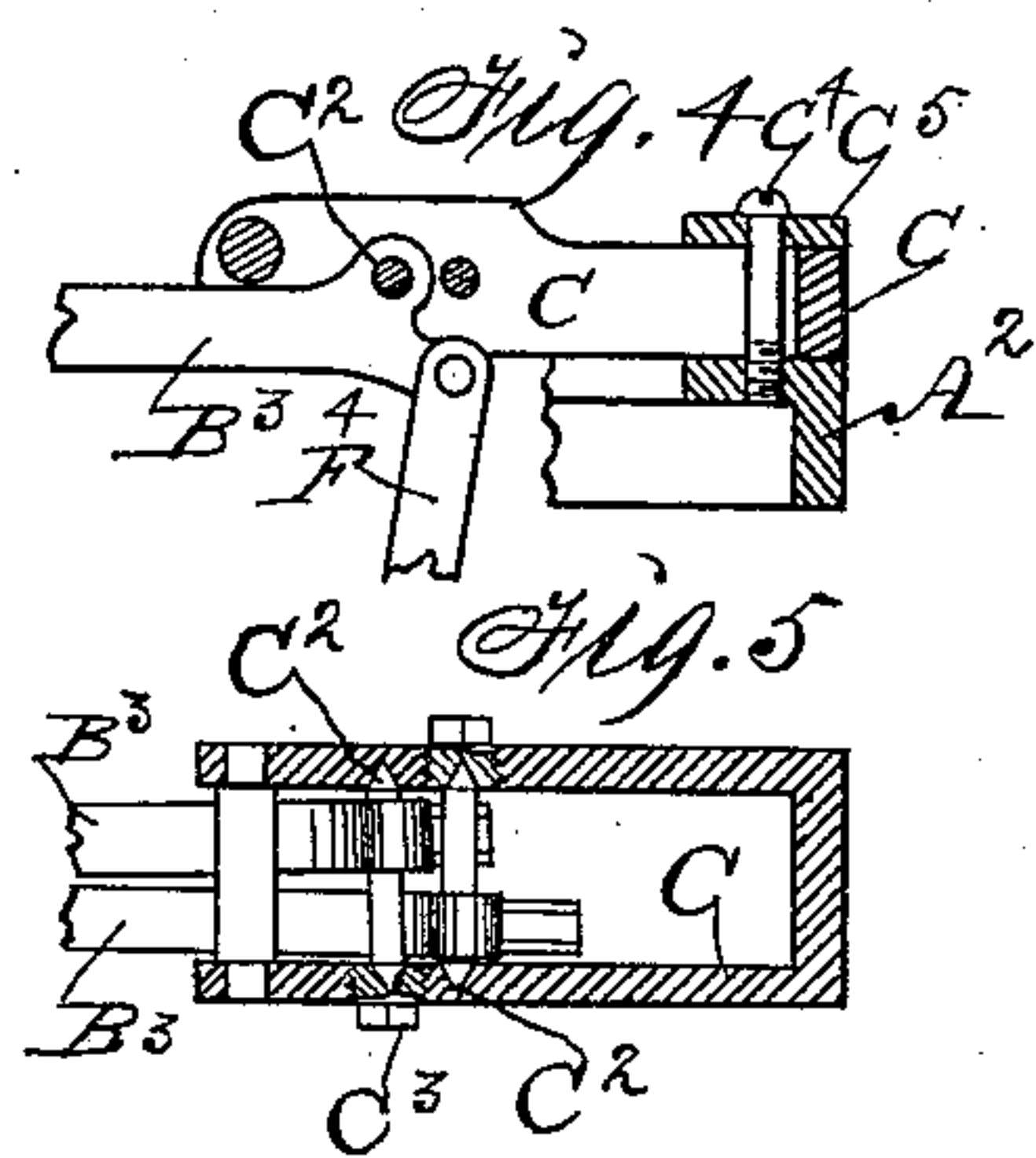


3 Sheets—Sheet 1.

No. 543,085.

Patented July 23, 1895.



Witnesses: }
M. J. Sankley. }
J. Ralph Orwig }

Inventor:
Adolphus S. Dennis,
By
Thomas C. Orwig,
Attorney.

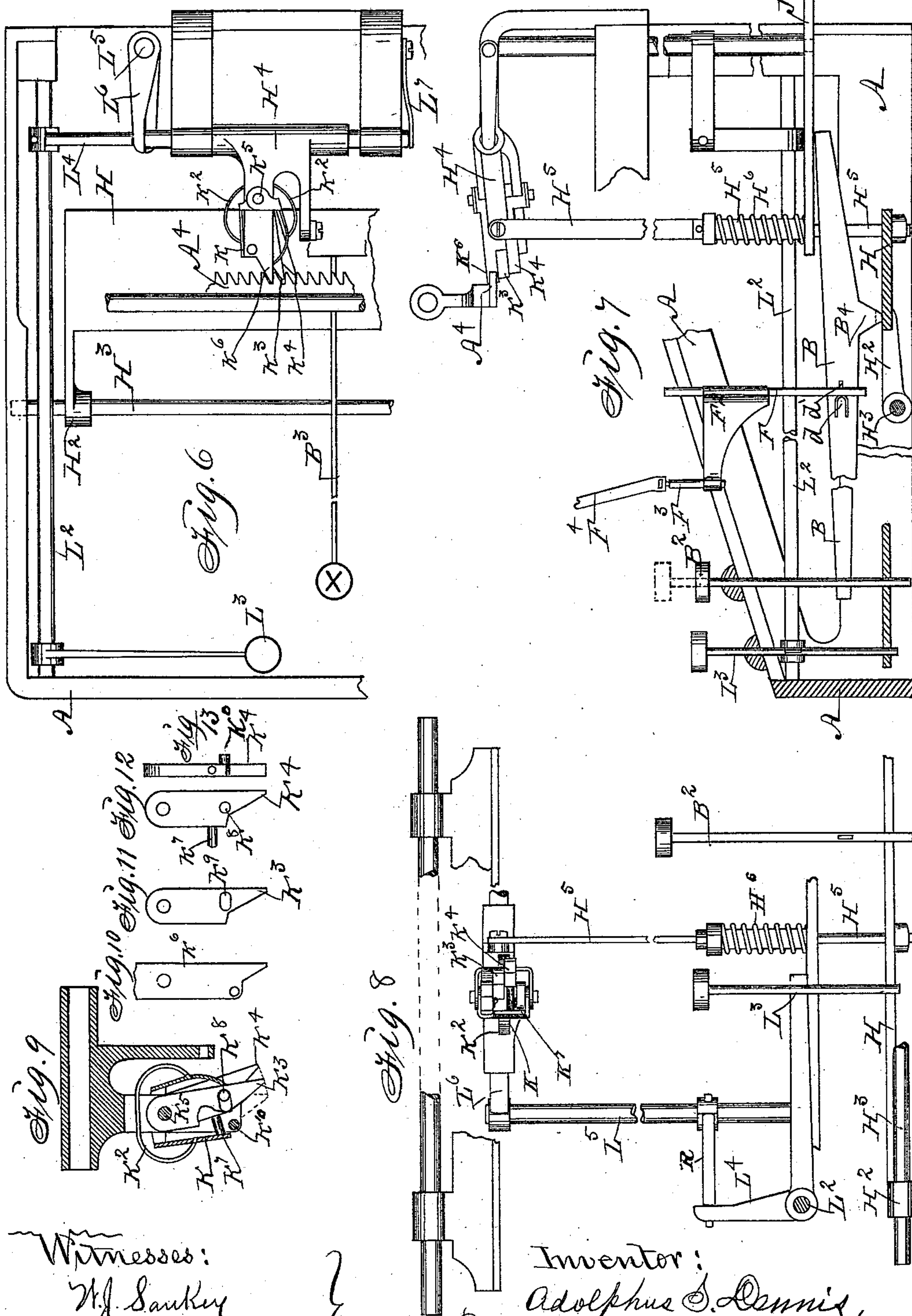
(No Model.)

3 Sheets—Sheet 2.

A. S. DENNIS.
TYPE WRITING MACHINE.

No. 543,085.

Patented July 23, 1895.



Witnesses:

H. J. Sankley

J. Ralph Orwig.

Inventor:

Adolphus S. Dennis,

By Thomas G. Orwig, Attorney.

(No Model.)

3 Sheets—Sheet 3.

A. S. DENNIS.
TYPE WRITING MACHINE.

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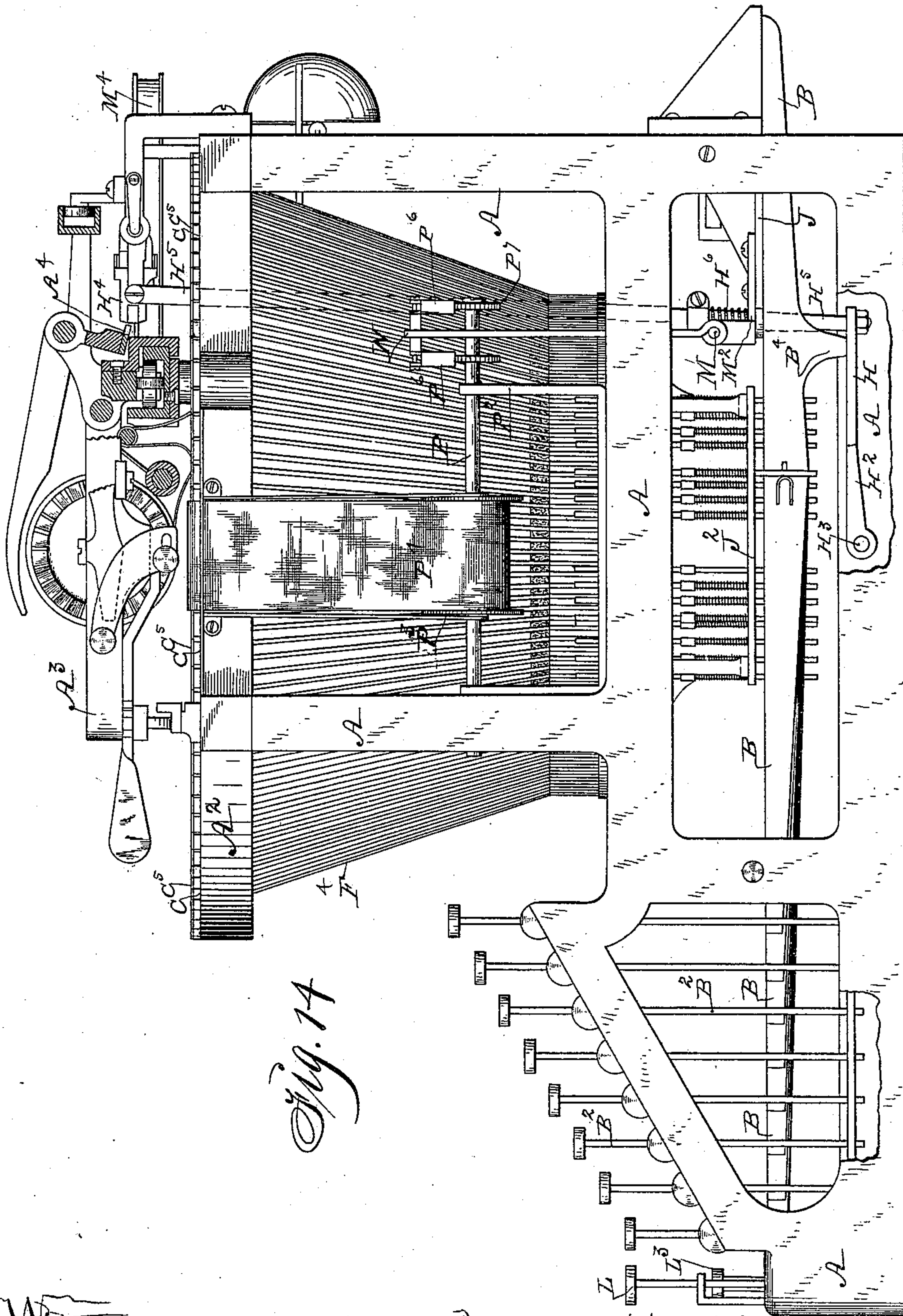


Fig. 14

Witnesses:
W. J. Saukey.
J. Ralph Orwig.

Inventor: Adolphus S. Dennis,
By Thomas G. Orwig, Attorney.

UNITED STATES PATENT OFFICE.

ADOLPHUS S. DENNIS, OF DES MOINES, IOWA.

TYPE-WRITING MACHINE.

SPECIFICATION forming part of Letters Patent No. 543,085, dated July 23, 1895.

Application filed April 14, 1894. Serial No. 507,621. (No model.)

To all whom it may concern:

Be it known that I, ADOLPHUS S. DENNIS, a citizen of the United States of America, residing at Des Moines, in the county of Polk and State of Iowa, have invented an Improved Duplex Type-Writing Machine, of which the following is a specification.

My invention relates to the machine for which United States Letters Patent No. 297,086 were granted to Henry Orpen April 15, 1884; and my object, primarily, is to improve different portions thereof, as hereinafter set forth, so that both hands of an operator can be simultaneously applied on the opposite sides of the center of the keyboard as required to prevent passing the hands across the center of the machine and alternately from one side of the machine to the other as required to avoid the hands from coming in contact with each other in operating two levers at the same time to simultaneously print two letters in alignment in a horizontal line upon paper on the platen or roller.

My invention consists in a novel arrangement and combination of alphabets, numerals, and punctuation-marks with levers, type-carrying arms, carriage moving and spacing mechanism, and ribbon holding and operating mechanism, as hereinafter set forth, pointed out in the claims, and illustrated in the accompanying drawings, in which—

Figure 1 is a plan view showing the relative positions of the alphabets, numerals, and punctuation-marks on the keyboard and the positions of type-bars suspended to the frame as required to be adapted to print two letters simultaneously in alignment. Fig. 2 is a vertical longitudinal sectional view of a machine, showing mechanism for operating a type bar, mechanism for supporting and operating an inking-ribbon, and mechanism for operating a sliding carriage. Fig. 3 is a rear view of the ribbon-supporting and ribbon-moving mechanism. Fig. 4 is a vertical longitudinal sectional view, and Fig. 5 a corresponding horizontal sectional view of a type-bar hanger adapted to support two type-bars detachably connected therewith by means of pointed journals and screws fitted thereto. Fig. 6 is a top view of a portion of the machine-frame, showing the spacing mechanism connected with said frame and a sliding carriage. Fig.

7 is a vertical longitudinal sectional view showing mechanism for operating type-bars and spacing mechanism combined. Fig. 8 is a front view of a portion of the machine, showing the relative positions of different parts of the spacing mechanism. Fig. 9 is a sectional view of the pawl-bearer, showing two pawls jointly and pivotally connected therewith. Fig. 10 is a top view of a pawl broken off from the pawl-bearer. Fig. 11 is a top view of one of the pawls detached from the bearer. Fig. 12 is a top view, and Fig. 13 an edge view, of another pawl detached from the bearer shown in Fig. 8. Fig. 14 is an end view of the machine, showing the relative positions of the different elements shown in the other views.

The letter A is used to designate the main frame of the machine, and A^2 the circular frame on its top, to which the type-bars are connected in two distinct series and each series in a semicircle, so that one bar in each series can be operated at the same time as required to print two letters or characters simultaneously by means of keys and levers, as hereinafter set forth.

B are straight levers corresponding in number with the key-stems B^2 connected with the front ends of the levers, and also corresponding in number with the type-bars B^3 connected with the circular frame A^2 . The two distinct series of type-bars and the two distinct series of levers connected with the type-bars are on opposite sides of the center of the circular frame A^2 , and may be properly termed "right" and "left" hand series, because they are adapted to be simultaneously operated by the two hands of a person.

A lower-case letter of the alphabet is fixed to key-stems B^2 of levers B in the left-hand series, and a corresponding letter of the alphabet is fixed to key-stems B^2 in the right-hand series. An upper-case letter of the alphabet is also fixed to key-stems of levers in the left-hand series and numerals and punctuation-marks to key-stems of levers in the right-hand series of levers B. This arrangement of three distinct alphabets and numerals and punctuation-marks is clearly shown in Fig. 1, and by means of such arrangement and combination of right and left hand alphabets or characters, two distinct series of

straight levers, and two distinct series of type-bars relative to each other and the center of the circular frame A^2 two letters can be simultaneously printed by a person without moving either hand across a central line of the key board and without bringing the hands in contact with each other, a desideratum that is essential to the use of both hands at the same time as required to simultaneously print two letters in alignment in a line extending across a sheet of paper on the platen-roller.

The type-bars B^3 are detachably connected with the circular frame A^2 by means of hangers C in such a manner that they will be in two semicircles that are eccentric to each other as required to produce a distinct center for each of the right and left hand series of type-bars and to simultaneously print two letters in alignment by means of two levers B , one of which is in the right-hand series and the other in the left-hand series.

Each type-bar B^3 in the right-hand series is connected with a type-lever in the right-hand series, and each type-lever in the left-hand series is connected with the left-hand series of type-levers in such a manner that all the levers B in each series will be in parallel position to each other.

The hangers C are quadrangular metal frames, shaped as shown in Figs. 4 and 5, and adapted to be clamped fast on top of the circular frame A^2 to extend radially inward. Each hanger C is adapted in width to admit two type-bars B^3 .

C^2 is a pointed journal fixed to a type-bar B^3 and extended into a bearing in the inside face of a hanger C at one end and into a screw-threaded perforation in the other side of the hanger, and C^3 is a screw that has a bearing to admit the pointed end of the journal and that is fitted and operated in the screw-threaded perforation of the hanger. A turn of said screw will effect the friction of the journals and therefore is adapted for regulating the pressure upon the ends of the journal and to compensate for wear as required to vibrate the type-bar without deviating from a vertical plane and to maintain perfect alignment. The type-bars B^3 thus journaled in pairs within the hangers C differ in length and are jointly adjusted relative to the center as required to make prints successively at the same point by adjusting the hangers relative to the frame A^2 , to which they are attached by means of screws C^4 and washers C^5 , as clearly shown in Fig. 8.

F is a vertically-moving rod extended through a perforation in the plate J^2 and connected with the type-bar by means of parts F^2 , F^3 , and F^4 as required to actuate the type-bar. The lower end of the rod F has an elongated slot through which a lever B is extended. The lever has an integral spring-tongue d , that normally projects out of the plane of the lever, and an integral projection d' . In passing the lever B through the slot

in the rod F the tongue d bends inward as it goes through the rod, and the projection d' arrests the further passage of the lever, and the tongue d then resumes its normal position and prevents any backward motion of the lever. The lever is thus securely and detachably connected with the rod without any extraneous fastening device.

H is a wide flat plate fixed to arms H^2 that extend from a rock-shaft H^3 that is in bearings in the frame A and connected with the vibrating pawl-bearer H^4 by means of a rod H^5 , so that the pawl-bearer will be actuated by means of the rock-shaft H^3 to operate pawls relative to the rack carried by the sliding carriage as required in spacing.

The levers B vary in length and each one has a downward projection B^4 , adapted to engage the top surface of the plate H at different points. The positions of the fulcrums of the levers B thus provided compensate for their varying lengths as required to make the levers act uniformly in actuating the type-bars and also the pawls that engage the rack.

J is a flat plate fixed to the rear and lower portion of the frame A in a level with the levers B , so that the rear ends of said levers engage the under side of said plate at different points in such a manner that when any one of the said levers is depressed at its front end the plate H will be depressed as required to actuate the pawl-bearer and spacing mechanism in concert with the lever B .

J^2 and J^3 are flat plates fixed to the frame A to extend horizontally at different elevations and to serve as bearers for the perpendicular vertically-moving posts F .

K is a flanged plate pivoted in the pawl-bearer H^4 , and K^2 is a curved spring that has its ends connected with the flanges of the plate, as shown in Fig. 9, in such a manner that it will engage and press against pawls K^3 and K^4 , jointly pivoted with the plate K in overlapping positions with the pawl-bearer, by means of a pin K^5 . The upper part of the bifurcated pawl-bearer H^4 terminates in an integral pawl K^6 . The pawl K^4 has a projection K^7 extending from its edge and adapted to engage the flange on the plate K , as shown in Fig. 8, and as required to restrict the horizontal motion of the pawl K^3 . It also has a stud K^8 , adapted to enter a slot K^9 in the pawl K^3 in such a manner that the two pawls K^3 and K^4 will have restricted independent horizontal motion.

K^{10} is a post fixed between the overlapping end portions of the pawl-bearer H^4 , that restricts the motions of the pivoted pawls.

A^3 represents the frame of a sliding carriage mounted on top of the circular frame A^2 , and A^4 is a rack fixed to the carriage in such a manner as to be engaged by the pawls carried by the vibrating pawl-bearer H^4 .

On striking a key to operate a lever B the projection B^4 presses the plate H downward, as shown in Fig. 7, and by means of the rod H^5 vibrates the pawl-bearer, thereby drawing

the pawls K^3 and K^4 down through the rack A^4 and the fixed pawl K^6 into engagement with the rack, as clearly shown in Fig. 6, and as required to advance the carriage a double space by the operation of a lever B, and when pressure is relaxed on the key the pawl K^4 is thrown forward by the spring K^2 acting upon the flanged plate K, and the pawl K^3 is also returned to its normal position by means of the stud K^8 , that traverses the slot K^9 in the pawl K^3 , and a spring H^6 on the rod H^5 elevates the pawl-bearer to its normal position, and the force that moves the sliding carriage and rack carried thereby overcomes the force of the spring K^2 as required to retain the pawls in engagement with the rack.

It is obvious that the numerals and punctuation-marks will generally not be duplicated in a sentence, or, in other words, printed in juxtaposition to each other in a line, and hence provision must be made for advancing the carriage a single space when a lever B is operated to print a numeral or punctuation-mark, and this is effected by making the projection B^4 of each lever B connected with a numeral or punctuation-mark shorter than on the levers B that are connected with right and left hand alphabets, as indicated by a dotted line across the bottom portion of the projection B^4 , (shown in Fig. 14,) so that when it is desired to advance the carriage a single space the depression of the plate H by means of a lever B having a short projection B^4 will be restricted, so that the pawl-bearer H^4 will be vibrated only sufficiently to release the pawl K^4 from the rack A^4 and allow the pawl K^3 to remain in engagement with the rack.

L is an elongated key-plate connected with plate H by means of levers B as required to actuate the spacing mechanism and advance the carriage without at the same time operating a type-bar.

In order to avoid the necessity of two sets of punctuation-marks, I have constructed a device and connected it with the pawl-bearer in such a way that it can be operated by the pressure of a finger to move the carriage one space to the right and retain it stationary until the finger-pressure is relaxed, when the device will automatically reverse the motion of the carriage and move it one space to the left and into its normal position relative to the spacing mechanism for moving the carriage forward and the levers for operating the type-bars. When a right-hand key-lever is depressed it always strikes the impression-letter connected therewith two spaces to the right of any preceding letter printed by the operation of a right-hand lever. Therefore when it is necessary to punctuate after a word containing an even number of letters, or one in which the right-hand key-lever has been used for the final letter, the device to throw the carriage to the right one space is used. This brings the punctuation-mark to the proper place. When a word containing an odd number of letters is to be followed by a

punctuation-mark the final letter and the punctuation-mark can be printed simultaneously by depressing the levers connected with them at the same instant.

To move the carriage back one space to locate a punctuation-mark at the end of a word, I have placed a rock-shaft L^2 in bearings fixed to the frame A. This shaft has an arm extending horizontally at its front end and a finger-piece L^3 extending vertically from the end of the arm. L^4 is an arm extending upward from the rear end, and is connected, as shown in Fig. 8, with an arm R of the rock-shaft L^5 that has its bearings formed in or fixed to the frame A, as shown in Fig. 6, in such a manner that a motion will be imparted to the shaft L^5 , and an arm L^6 projecting from the top of the shaft will engage and move the sliding journal of the rocking pawl-carrier H^4 , and when pressure upon the key L^3 is relaxed a spring L^7 fixed to the frame A will cause a reverse motion of the said journal and the pawl-carrier H^4 , and also the carriage connected with the pawl-carrier, by means of the pawls carried by the pawl-carrier. A reciprocal motion is thus imparted to the carriage by a single finger-pressure to facilitate the work of the type-writing.

M (shown in Figs. 2 and 3) is a rock-shaft in bearings M^2 fixed to the plate J.

M^3 is a coiled spring fixed to the shaft M at one of its ends and to one of the bearers M^2 at its other end to produce torsional pressure upon the spring M^3 .

M^4 is a drum fixed to a shaft M^5 , mounted in bearings fixed to the frame A, and connected with the sliding carriage by means of a tape M^6 .

N is an arm fixed to the rock-shaft M and connected at the top end with the shaft M^5 by means of a cord N^2 . When the carriage is moved rearward the drum is rotated by means of the tape M^6 and power stored in a spring concealed within the drum and the cord N^2 is wound on the shaft M^5 as required to draw the arm N toward that shaft.

P are shafts mounted in bearings P^2 fixed on top of the plate J^3 , and P^3 are spools fixed to the shafts P to support and operate an ink-ribbon P^4 , attached thereto at its ends. The shafts carrying the spools are connected with the arms N of the rock-shaft M in such a manner that the lateral motions of said arms will move the shafts P longitudinally and carry the ribbon on the spools along to adjust the ribbon relative to the types carried on the ends of the type-bars in such a manner that a lateral motion of the ribbon will occur at each operation of each type-bar.

P^5 are ribbon-supports connected with the shafts to retain the ribbon elevated in such a manner that each type-bar will swing upward below the ribbon as required to print a character by means of the ribbon and type on the end of the bar.

P^6 are pawls pivoted to the bearers P^2 to engage ratchet-wheels P^7 on the shafts P as re-

quired to rotate the shafts and move the ribbon longitudinally. To reverse the ribbon, the positions of the pawls are reversed on the ratchet-wheels by hand.

- 5 Intermittent motions are imparted to the ratchet-wheels by means of the pawls carried by the bearers P^2 every time a type-bar is operated and a lateral motion of the arm N occurs.

From the foregoing description of the construction and function of each element the unitary actions of the different parts and the practical operation of the complete machine will be readily understood by persons familiar with the art to which the invention pertains.

I claim as my invention—

1. In a type writing machine mechanism for moving the sliding carriage backward, comprising a rock shaft in a horizontal position having an arm at its front end and a key on the outer end of the arm, an arm at the rear end of said rock shaft, a rock shaft extended at right angles to said horizontal rock-shaft and having an arm at its lower end connected with the arm on the rear end of the horizontal rock shaft and an arm at its top end connected with the journal of a sliding pawl carrier, a sliding pawl carrier, a spring for reversing the motion of the sliding pawl carrier and a sliding carriage connected with the sliding pawl carrier by means of pawls carried by the pawl carrier, arranged and combined to operate in the manner set forth for the purposes stated.

2. In spacing mechanism for type writing machines, the combination of a bifurcated pawl bearer, a spring actuated flanged plate pivoted in the bifurcated end of the pawl bearer, a pawl adapted to engage a rack rigidly connected with the pawl bearer, a pawl having a projection on its edge to engage one of the flanges of said pivoted plate and a stud on its top face adapted to traverse a slot in an overlying pawl and a pawl having a slot to admit said stud, and the two pawls connected by means of the stud and slot, jointly pivoted with the flanged plate to the pawl bearer to engage a rack, and a rack carried by a sliding carriage to operate in the manner set forth, for the purposes stated.

3. In a type writing machine, the arrangement and combination of a sliding carriage adapted to carry paper, a right hand series of type bars, and a left hand series of type bars, a right hand series of levers connected with the right hand series of type bars, a left hand series of levers connected with the left hand series of type bars, a right hand alphabet connected with a right hand series of levers and a left hand alphabet connected with the left hand series of levers to operate one lever of the right hand series by means of the right hand and one lever in the left hand series with the left hand simultaneously spacing mechanism, and means for moving the carriage backward and retaining it stationary by pressing upon a key and reversing the motion of the carriage by relaxing the press-

ure upon the key in the manner set forth for the purposes stated.

4. In a type writing machine having two common centers and adapted to print two letters or characters simultaneously, a set of letters or characters on the right hand side of the key board connected with type bars arranged on the right hand semicircle and a set of letters or characters on the left hand side of the key board connected with type bars arranged on the left side of the key board connected with type bars arranged on the left hand semi-circle of the machine and a sliding carriage adapted to carry paper, means for moving the carriage forward by pressing upon a key, and means for moving a carriage backward and retaining it stationary by pressing upon a key and reversing the motion of the carriage by relaxing that pressure, to operate in the manner set forth, for the purposes stated.

5. In a duplex type-writer adapted for printing two letters or characters simultaneously, a right hand set of letters located on the right of the center of the key board, a left hand set of letters on the left of the center of the key board, levers adapted to actuate the spacing mechanism as required to advance a sliding carriage two spaces at each operation of a lever, mechanism to move a carriage backward one space and retaining it stationary by pressing upon a key and reversing the motion of the carriage by relaxing the pressure, spacing mechanism and a sliding carriage adapted to carry paper, arranged and combined to operate in the manner set forth, for the purposes stated.

6. In a type writing machine, two sets of type bars and each set having a common and distinct focal center for striking the types carried thereby upon paper carried by a sliding carriage, a sliding carriage adapted to carry paper, an upper case and also a lower case alphabet on key stems connected with the left hand set of type bars, and a lower case alphabet a series of punctuation marks, and a series of numerals on key stems, connected with the right hand set of type bars, spacing mechanism for advancing the carriage and spacing mechanism for moving the carriage backward and retain it stationary by finger pressure upon a key and advancing the carriage by relaxing that pressure, arranged and combined relative to each other as and for the purposes shown and described.

7. A duplex type writing machine comprising a right hand series of levers having key stems upon which are fixed the letters of a complete alphabet, a left hand series of levers having key stems upon which are fixed the letters of a complete alphabet, type bars connected with each series of said levers and carrying letters or characters corresponding with the letters or characters on the key stems, and the type bars of the right hand series of levers and the type bars of the left hand series of levers arranged to strike at two distinct

and contiguous centers, a sliding carriage carrying a platen and a rack, mechanism for engaging the rack and regulating and spacing the motions of the sliding carriage, means for
5 moving the carriage backward and retaining it stationary by pressing upon a key and advancing the carriage by relaxing that pressure, mechanism for supporting and adjusting an inking ribbon laterally and longitudinally,
10 and also reversing its motion, and means for

retaining and adjusting paper on the platen carried by the sliding carriage, all arranged and combined with a suitable frame work to operate in the manner set forth, for the purposes stated.

ADOLPHUS S. DENNIS.

Witnesses:

J. RALPH ORWIG,
THOMAS G. ORWIG.