(No Model.) 4 Sheets—Sheet 1.

J. H. WAITE.

TYPE WRITING MACHINE.

No. 371,997. Patented Oct. 25, 1887.

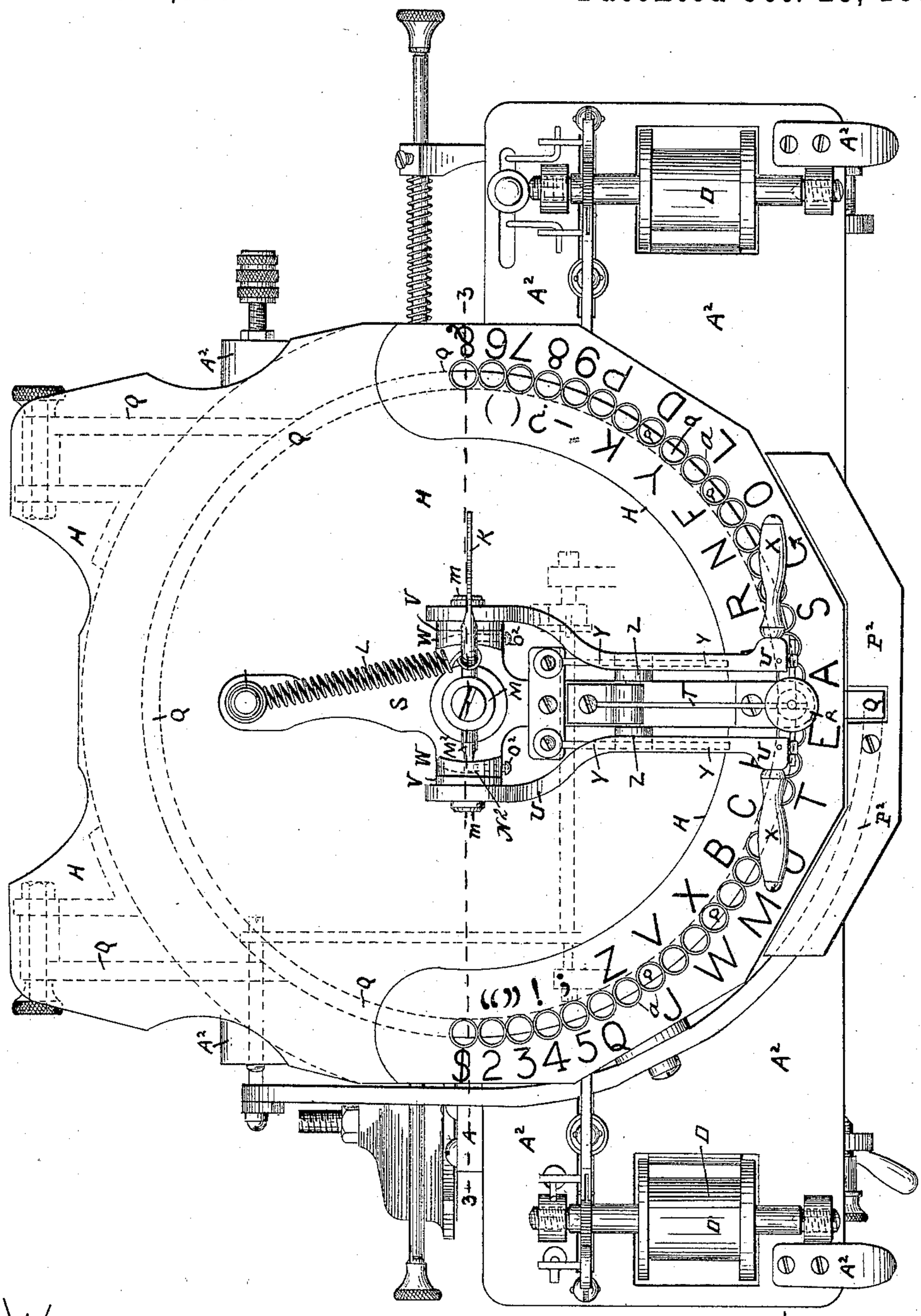

Fig. 1.

WITNESSES:

Frances M. Brown.

John F. Nelson

INVENTOR:

James H. Waite

by his Attys

Brown Bros.

(No Model.)

4 Sheets—Sheet 2.

J. H. WAITE.

TYPE WRITING MACHINE.

No. 371,997. Patented Oct. 25, 1887.

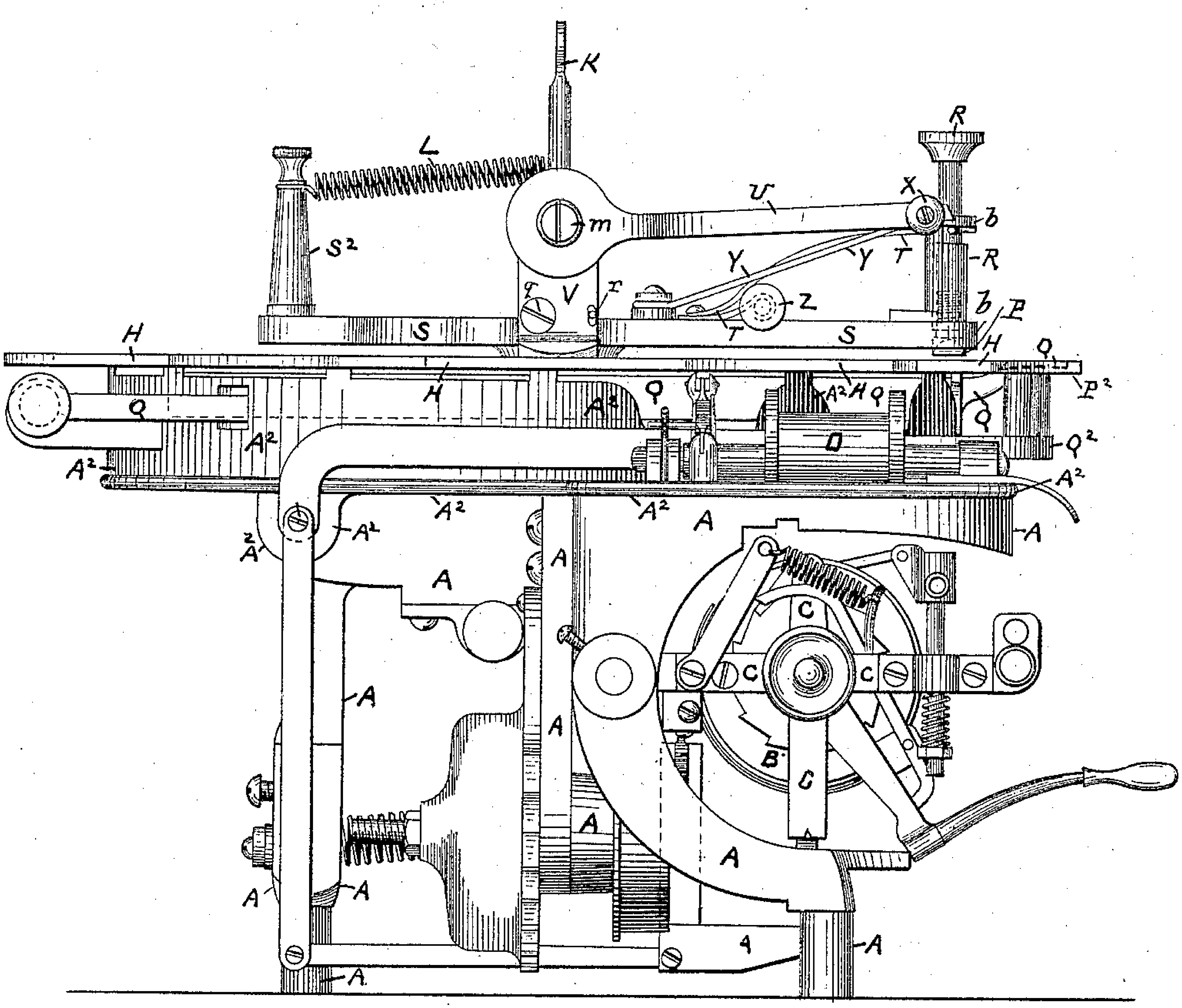

Fig-2-

WITNESSES:

Frances M. Brown.

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INVENTOR:

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N. PETERS. Photo-Lithographer, Washington, D. C.

(No Model.)

4 Sheets—Sheet 3.

J. H. WAITE.

TYPE WRITING MACHINE.

No. 371,997. Patented Oct. 25, 1887.

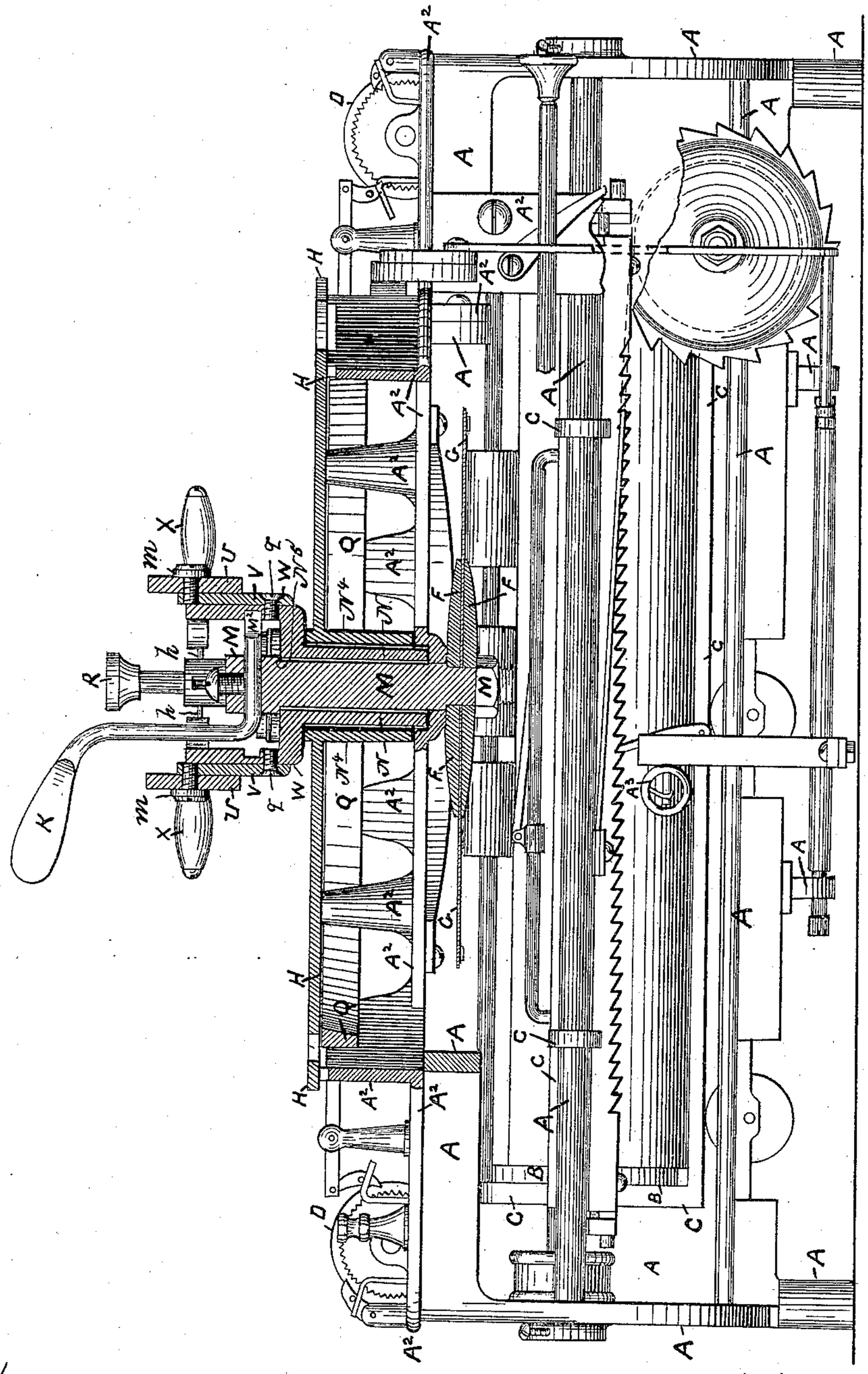

Fig. 3.

WITNESSES:

Frances M. Brown

John H. Nelson.

INVENTOR:

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Brown Bros

(No Model.) 4 Sheets—Sheet 4.

J. H. WAITE.

TYPE WRITING MACHINE.

No. 371,997. Patented Oct. 25, 1887.

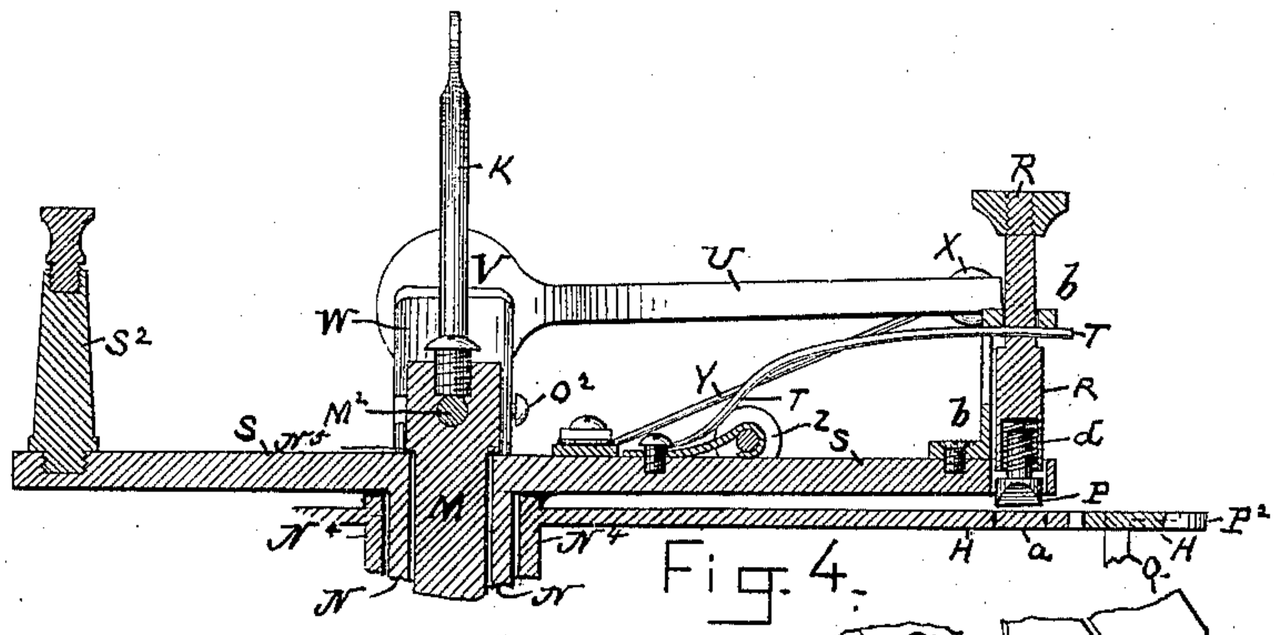

Fig. 4.

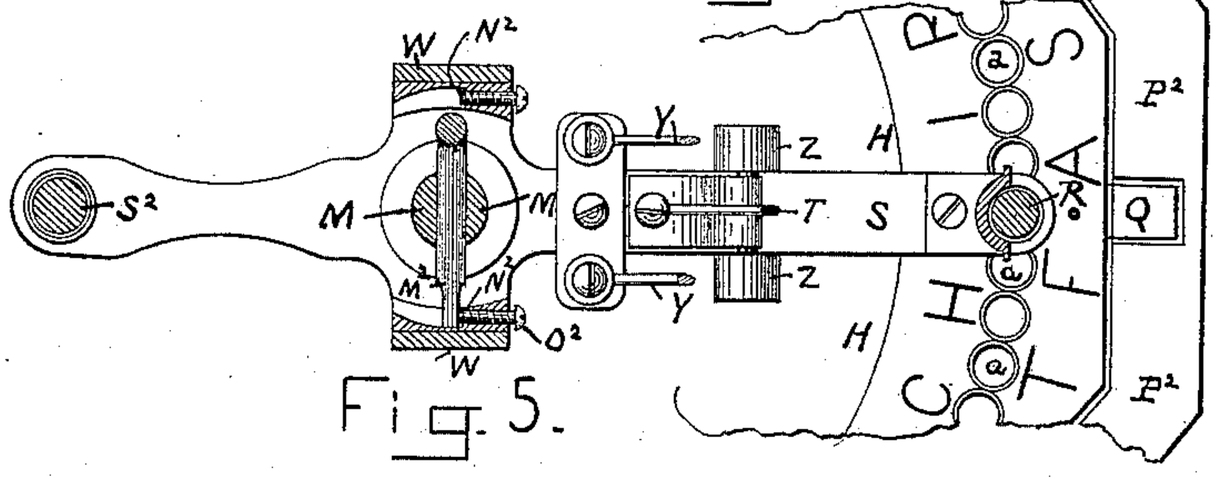

Fig. 5.

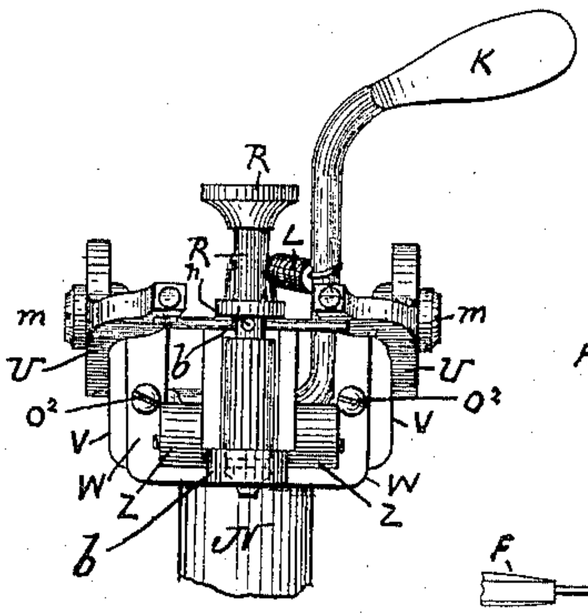

Fig. 6.

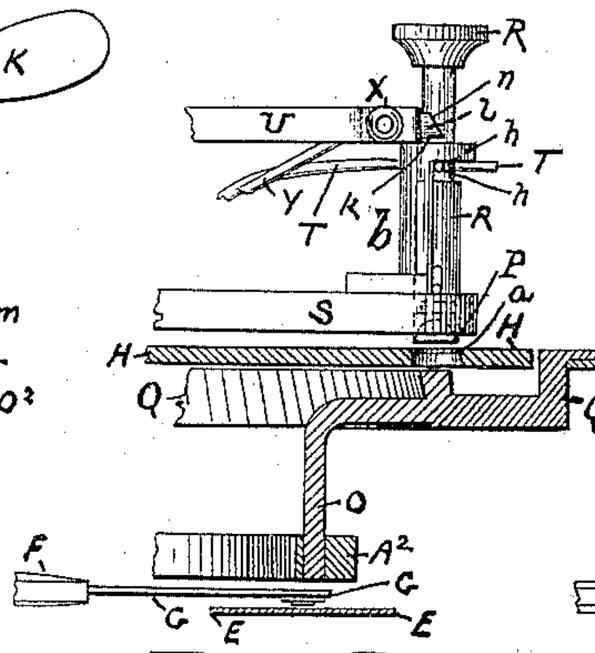

Fig. 7.

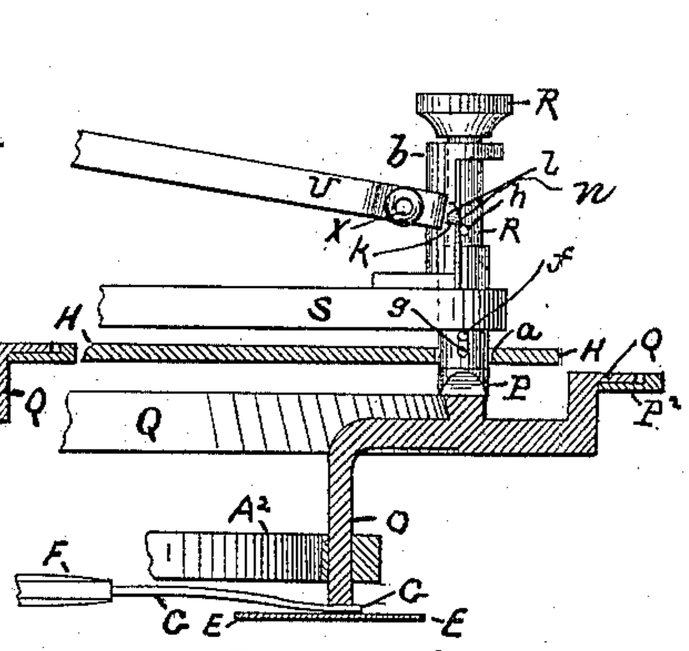

Fig. 8.

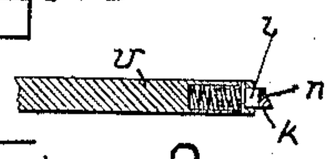

Fig. 9.

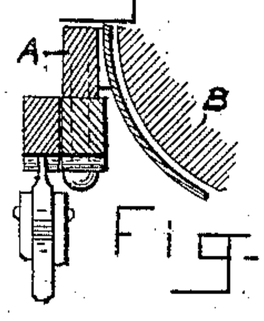

Fig. 10.

WITNESSES:

Frances M. Brown

John F. Nelson

INVENTOR:

James H. Waite

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Brown Bros.

UNITED STATES PATENT OFFICE.

JAMES H. WAITE, OF ORANGE, MASSACHUSETTS, ASSIGNOR TO THE AXIAL TYPE WRITER COMPANY, OF PORTLAND, MAINE.

TYPE-WRITING MACHINE.

SPECIFICATION forming part of Letters Patent No. 371,997, dated October 25, 1887.

Application filed September 28, 1886. Serial No. 214,759. (No model.)

To all whom it may concern:

Be it known that I, JAMES H. WAITE, of Orange, in the county of Franklin and State of Massachusetts, have invented certain new and useful Improvements in Type-Writing Machines, of which the following is a full, clear, and exact description.

This invention particularly relates to that class of type-writers containing a series of type-characters—such as letters, (capital and small,) marks of punctuation, &c.—severally arranged in a circular line and carried by a common holder, mechanism for rotating said type holder or carrier, and a stylus or plunger, and all otherwise so that any one of the series of type-characters can be brought to a given and determined point and an imprint there taken of it upon the paper carried by a paper-supporting roller, all as well known.

The present invention consists in certain mechanisms for rotating the common type holder or carrier and in a construction and arrangement of the stylus or plunger, all substantially as hereinafter fully described.

In the drawings forming a part of this specification, in Plate 1 Figure 1 is a plan view of a type-writing machine and of the mechanism constituting the features of the present invention. In Plate 2 Fig. 2 is an elevation at one end. In Plate 3 Fig. 3 is a longitudinal vertical section on line 3 3, Fig. 1. In Plate 4 Figs. 4 to 9, both inclusive, are views in detail of the mechanism for operating the stylus or plunger of the machine; and Fig. 10 is a sectional view in detail, all as will hereinafter appear.

In the drawings, A A^2 represent the two main parts of the supporting frame-work of the machine. The part A, and which is the lower or under part of the two parts A A^2, makes the support for and carries a paper-supporting roller, B, and carriage C for said roller, and all the connecting and operating mechanisms for intermittently feeding said carriage and paper-supporting roller lengthwise, for returning the carriage and paper-supporting roller, and for intermittently rotating said roller, and also for sounding the alarm-bell. The part A^2, the upper part of the two parts A A^2, makes the support and carries the ink-ribbon rollers D D, arranged at opposite points in length of the ribbon E, (shown only in detail, Figs. 7 and 8,) and extending from one to the other and attached to each of said rollers; also the mechanism for intermittently operating said ink-ribbon rollers to feed the ribbon lengthwise from one to the other thereof, winding the ribbon upon one and unwinding it from the other; also the indicator H, having a vertical tubular bearing, N^4, which supports the sleeve N, said sleeve surrounding the arbor M, to the lower end of which is attached the rotating holder F, common to a series of independent and separate acting type-bars, G, all having their several types in a circle concentric with the axis of said rotation; also the stationary perforated indicator or plate H; also the mechanism for rotating the holder for the type-bars and the mechanism for securing an imprint from a type of the types of the several type-fingers G, the mechanism for setting free the mechanism of the paper-supporting roller B and its carriage C, and by the operation of which said paper-supporting roller and its carriage are intermittently fed lengthwise, and which said so-operating mechanism is carried by the two parts of the frame-work A A^2, as before stated.

In the ordinary use and operation of the machine both parts of the frame-work A A^2 are stationary and each is suitably constructed to support and carry the various devices above stated, and the upper part, A^2, at its rear side is hinged to the lower part, A, so that it may be swung upward and backward therefrom and, so swung, supported against falling. Again, said two-part frame-work in each of its parts is constructed, furthermore, in every respect the same as ordinary in type-writing machines of the class to which this invention relates. Therefore said construction needs no particular description herein. Again, except as to the features of this invention, and which will hereinafter appear, all of the several parts of this machine as before recited—as, for instance, the paper-supporting roller B and its carriage C, the ink-ribbon rollers D D, the stationary perforated indicator H, and also the several mechanisms above referred to, such as

the mechanism for intermittently feeding lengthwise the paper-roller B and its carriage, &c.—are the same as ordinarily.

The type-bars G and their holder F may be in one piece, or the type-bars in separate pieces secured to the common holder, F, and all as well known, and also as described and shown in Letters Patent of the United States, dated February 15, 1887, No. 357,878. Each type-bar G is provided with a type-character—for instance, a capital or a small letter of the alphabet, or one of the digits or marks of punctuation, or other character or series of characters to which it is intended the type-writing machine shall be adapted. A desirable combination of type-characters for the several type-bars G, and one which for the purposes of this machine, as shown and to be hereinafter described, consists in the use of all the letters of the alphabet, both capitals and small letters, of the digits and of the ordinarily-used marks of punctuation, together with other characters, and all as generally used in type-writing machines; but whatever characters are employed they are arranged in a circle concentric with the axis of rotation of the holder or carrier F, carrying the type-bars G, and upon one and the same side of the bars. The type characters, preferably, are formed independently of the type-bars, as well known in the art of making printing-types, and attached to the type-bars; but they may be formed directly upon the bars by the well-known process for the electro-deposit of the metal of which the types are made upon the metal of the bars.

The type-bars G and their holder F are located in the machine in a horizontal plane, and the holder is axially and concentrically attached to a vertical arbor, M, turning in bearings carried by the upper part, A^2, of the frame-work of the machine, and all as hereinafter fully described. The holder F for the series of type-bars G, arranged as above described, is rotated by the rotation of the arbor M, and, so rotated, each of the types can be brought to a given and determined point or place over the ink-ribbon E of the machine, and which ribbon is arranged to be intermittently moved lengthwise under and across said so-determined point or place, traveling from one to the other of the ribbon-rollers D, as well known in type-writing machines. A type of a type-finger in the position above stated is then located for an imprint thereof to be made upon the surface of the paper sheet, which is directly below the ink-ribbon, and is confined to the surface of the paper-supporting roller B, extending in the same direction as the lengthwise movement of the ink-ribbon and arranged for an intermittent lengthwise movement under the ink-ribbon and along the length of the same and for its return at any time and the paper carried by it either to its original or to any other position within the limits of its said intermittent lengthwise movement.

The imprint of the type of a type-bar, as above referred to, is secured by the co-operative action of said type and of the ink-ribbon next below upon the part of the paper on the paper-supporting roller directly below the type, as well known in type-writing machines, the type-bar for this purpose being depressed with sufficient force and pressure therefor and by and through the operation of mechanism hereinafter described, and which forms one of the features of this invention.

The mechanism just above referred to works on a horizontal circular-shaped frame, Q, which is located directly above the type bars and concentrically with the axis of rotation of their common holder, F. This frame Q is hinged at the rear side of the upper part, A^2, of the frame-work of the machine, and its circular line of direction is coincident with the circular line of direction of the series of equidistant holes or perforations *a* in and through a stationary horizontal plate or indicator, H, placed above said frame and supported in any suitable manner by the upper part, A^2, of the frame-work, and its said holes are arranged in a circular line concentric with the axis of rotation of the common holder of the type-bars G. The depression of this circular frame Q is against a spring suitably applied therefor, and the reaction of this spring returns it to its normal position, the circular frame in both instances swinging upon its hinge, and as it is depressed it presses through its downwardly-extending leg O, preferably in one piece with it, the type-bar which is under it and at the position before referred to, and thus secures the imprint of the type of said type-bar upon the paper supported by the paper-supporting roller B.

The depression of the frame Q, as above described, is secured through a stylus or plunger, R, which is entered into and pressed through a hole *a* of the perforated indicator H. This plunger R is arranged to play vertically through horizontal ear-pieces *b* at one end of a horizontal arm, S, which at its other end has a vertical tubular sleeve, N, attached to it and concentrically surrounding a vertical arbor or shaft, M, having the type-bar holder F attached to its lower end. The arm S is above and its sleeve N is supported and is free to turn in a vertical tubular bearing, N^4, of the perforated indicator or plate H, and said arbor M is supported by the rest of its shoulder N^5 on the upper end of the tubular sleeve N. The plunger R is vertical, and its lower end has a toe-piece, P, made vertically yielding by means of a spiral spring, *d*, which is incased in the plunger and bears against the upper end of the toe-piece. The yielding toe-piece P has a side horizontal projecting pin, *f*, which enters in a vertical slot, *g*, of the plunger, and thus the toe-piece is guided and limited in its vertical and yielding movement.

T is a bent spring, at one end secured to the horizontal arm S and at the other end connected to the plunger, and all so as to return the plunger to its normal position after it has been forced through a perforation *a* of the perforated indicator H to depress the frame Q, and through it a type-bar G. In this depression of the plunger its toe-piece P yields to the force of the impact, and thus operates to secure uniformity in pressure and operation of the plunger to secure an imprint of a type of the type-bars.

h h are two horizontal arms or pins projecting radially from opposite sides of the plunger R and at right angles to the length of the radial arm S, and each making an abutment to the under side, *k*, of a block, *l*, projecting from the outer end of a horizontal arm or lever, U. Each lever U is hung upon a separate horizontal fulcrum-pin, *m*, of separate vertical plates V, similarly secured, as hereinafter described, to separate and diametrical oppositely-located uprights W of the horizontal arm S. Each lever U has at its outer end a side handle, X, for convenience in operating it, and its abutting block or end piece, *l*, is made yielding in the direction of the length of the lever, and also beveled, as at *n*, and in the depression of the lever, which is against a bent spring, Y, suitably attached to the arm S by the then abutment of the under side of the end piece or block, *l*, against a horizontal cross-pin *h* of the plunger R, said plunger is depressed until by the continued downward movement of the lever its end piece, *l*, escaping from said cross-pin, leaves the plunger R free to be returned to its normal position by the reaction of its spring T, which it then does, and on which, having released the pressure on the lever U, it (said lever) is returned to its normal position by the reaction of its spring Y, its end piece, *l*, then passing at its bevel end *n* freely by the cross pin *h* of the plunger R yielding therefor, and returning to its normal position to again operate upon the stylus, as before, in the next downward depression of the lever.

Z is a yielding bumper carried by the horizontal arm S for the abutment of each lever U in its downward swing.

K is a finger-piece for turning the arbor M of the type-bar holder F, and L is a coiled spring, at one end secured to said finger-piece and at the other end to a post, S^2, at the outer and opposite end of the horizontal arm S to that carrying the plunger R.

M^2 is a radial abutment at one side of the arbor M and in position to make abutment and to rest against an abutment, N^2, of each of the uprights W of the horizontal arm S, having the plunger R, as has been described. These abutments N^2 of the uprights W are located so as to stop and secure a rest of the arbor M of the type-bar holder F in its swing in opposite directions at suitable points to place either set of its two sets of type-characters in position for having imprints taken from them by the operation of the plunger R, as herein described, and as will hereinafter more fully appear. Again, these abutments N^2 have their abutting faces for the abutment of the radial abutment M^2 of the arbor M at the end of a screw, O^2, capable of adjustment, as may be desired.

The arbor M of the type-bars in abutment with the swinging arm S, carrying the plunger R, through an abutment N^2 of an upright W of said arm and the radial abutment-pin M^2 of the arbor M, is thus adapted to be rotated, carrying with it the type bar holder F and its type-bars by the swing of the longitudinal arm S to the right or left, as the case may be, to bring the plunger R into proper position for being operated to secure an imprint of a type of the type-bars, as has been described.

In order to secure a determined and known imprint of a type from the entrance of plunger R into a hole of the perforated indicator-plate H, each hole of the indicator is marked in accordance with the type desired to be imprinted upon the paper by the operation of the plunger, as described, and also the types of the type-bars are arranged in such relation to each other and to the marking of said holes that when said plunger is entered into any given and marked hole of the perforated indicator the type of the type-bar corresponding therewith will be at the before-referred-to determined and given points of the machine—that is, under the leg O of the swinging frame Q—and thus in position to secure, by forcing said plunger through said hole acting upon the swinging frame under it, an imprint of the type of said type-bar upon the paper, as before stated. This relative arrangement of types and of the marked holes in the perforated indicator is well known in the class of machines to which this invention relates, and, furthermore, the relative position of the type for an imprint thereof, as has been stated, in accordance with the marked holes of the perforated indicator into which plunger R is entered, as has been stated, is insured by the rotation of the type carrier or holder F, through the swinging of the arm S, to bring said plunger into position to be entered into the desired hole of the perforated indicator, all as is well known in the class of type-writing machines before referred to; and with an arrangement of plunger R and of carrying-arm S and of finger-piece K, for turning the arbor of the type-bar holder F, all as has been described, either half of the circle of the type-bars may be brought into position for operation by the plunger R, as stated, thus enabling, by combining in a complete circle of type-bars, letters, both capital and small, and other characters, and from a given series of holes in a perforated indicator H, of only one-half the whole number of the type-characters, either capital or small letters, &c., to be brought into operative position for plunger R, all as is well known in this class of type-writers.

On the depression of plunger R, as herein described, the plunger R is set free for a return independent of and separate from the lever U by which it was depressed, because of the then escape of the end piece or block, *l*, of the lever from the cross-pin or abutment *h* therefor of the plunger R. This independent and separate return of the plunger R, as above described, leaves the swinging arm S free to be swung as may be desired without reference to the position of the lever U by which the plunger was operated, as has been described, and whether the same has been returned or not to its normal position. With the hand and fingers in position to operate the lever U to depress the plunger R, the type-holder may be changed to either one or the other of its set of type-characters, without necessarily removing either hand from the lever, by simply using a finger of the hand to throw the arbor M of the type-holder F, through the finger-piece K of the arbor, to the right or left, as the case may be, and in either direction of said movement the spiral spring L, connected to the finger-piece, secures the movement of the arbor when once the arbor is set free to its action.

The ring Q, through which plunger R acts to depress a type-bar, as has been described, overlaps a letter-spacing rail, P^2, partially surrounding the indicator-plate H at its front side and otherwise suitably arranged and connected, but which forms no part of this invention, to secure from each depression of the ring Q a depression of the letter-spacing rail P^2, and through the latter a step-by-step movement of the carriage for the spacing of the letters, all as well known and needing no particular description herein.

Each plate-support V of the fulcrum-pin *m* for the plunger-operating lever U at its lower portion is hung upon a center pin, *q*, which is at one side of the fulcrum of the lever U, and so as to be swung thereon to adjust the lever in the relation of its abutting and yielding end piece, *l*, to the cross abutment-pin *h* of the plunger R as to the time of the escape of such yielding end piece from said plunger-abutment in the operation of the lever, the said plate V after its said adjustment being fastened against movement by a set-screw, *r*, passing loosely through it and screwing into the upright W of the horizontal arm S. The plunger R is free to be operated independently and separately from its operating lever or levers U, as has been described.

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

1. In a type-writer of otherwise suitable construction, in combination, a series of type-characters carried by a common rotary holder, F, and arranged horizontally in a circle concentric with the center of the holder, a stationary perforated indicator, H, having its holes *a* in a circle concentric with the axis of rotation of said type-holder, the central vertical shaft or arbor, M, of said holder, supported and free to rotate in a surrounding and concentric sleeve, N, in turn free to rotate in a suitable stationary bearing, N^4, of the machine, a radial arm, S, of said sleeve N, and having at its outer end a stylus or plunger, R, vertically movable thereon for insertion in the holes of said indicator, and thereby to secure, and by means substantially as described, an imprint of a type of the series of type-characters, opposed diametrical abutments M^2 N^2, respectively on said shaft M and said sleeve N, to engage said shaft and said sleeve, and a spring, L, applied to said shaft to be rotated independently and within the sleeve N of said arm, substantially as described, for the purpose specified.

2. In a type-writer of otherwise suitable construction, a series of type-characters carried by a common rotatory holder and arranged horizontally in a circle concentric with the center of the holder, a stationary perforated indicator, H, having its holes *a* in a circle concentric with the axis of rotation of said type-holder, a horizontal arm, S, of said type-holder for rotating it, and stylus or plunger R, vertically movable on said arm S for insertion in the holes of said indicator, and thereby to secure, and by means substantially as described, an imprint of a type of the series of type-characters, and provided at its lower and operating end with a separate and vertically-yielding toe-piece, P, substantially as described, for the purpose specified.

3. In a type-writer of otherwise suitable construction, a series of type-characters carried by a common rotatory holder and arranged horizontally in a circle concentric with the center of the holder, a stationary perforated indicator, H, having its holes *a* in a circle concentric with the axis of rotation of said type-holder, a horizontal arm, S, of said type holder for rotating it, a stylus or plunger, R, vertically movable on said arm S for insertion in the holes of said indicator, and thereby to secure, and by means substantially as described, an imprint of a type of the series of type-characters, a horizontal side abutment, *h*, of said stylus R, and a vertical reciprocating lever, U, fulcrumed on said arm S and having a side abutment, *l*, to work in one movement of said lever upon and in the other movement of said lever to pass freely by said side abutment of the stylus, substantially as described, for the purpose specified.

4. In a type-writer of otherwise suitable construction, a series of type-characters carried by a common rotatory holder and arranged horizontally in a circle concentric with the center of the holder, a stationary perforated indicator, H, having its holes *a* in a circle concentric with the axis of rotation of said type-holder, a horizontal arm, S, of said type-holder for rotating it, a stylus or plunger, R, vertically movable on said arm S for insertion in the holes of said indicator, and thereby to secure, and by means substantially as described, an imprint of a type of the series

of type-characters, a horizontal side abutment, *h*, of said stylus R, and a vertical reciprocating lever, U, adjustably fulcrumed on said arm S and having a side abutment, *l*, to work in one movement of said lever upon and in the other movement of said lever to pass freely by said side abutment of the stylus, substantially as described, for the purpose specified.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

JAMES H. WAITE.

Witnesses:
ALBERT W. BROWN,
FRANCES M. BROWN.