

No. 692,664.

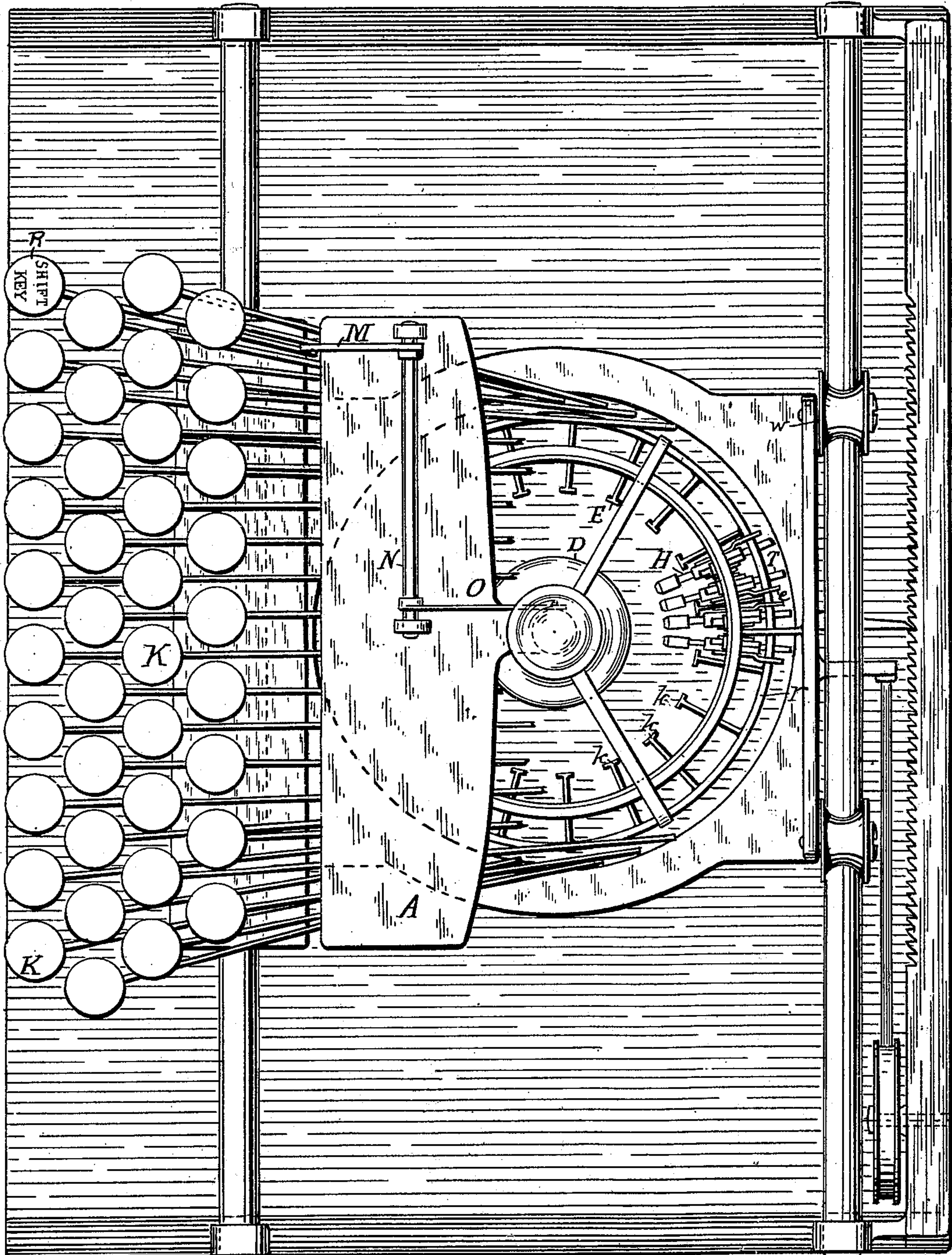
Patented Feb. 4, 1902.

F. W. HILLARD.  
TYPE WRITING MACHINE.

(Application filed May 25, 1897. Renewed July 31, 1900.)

(No Model.)

3 Sheets—Sheet 1.



Witnesses: *Samuel W. Batch* *Walter Hatch* Fig. 1. *B* Inventor, *Frederic W Hillard,*  
*by Thomas Cowg, Jr.,* Attorney.

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3 Sheets—Sheet 2.

Fig. 2

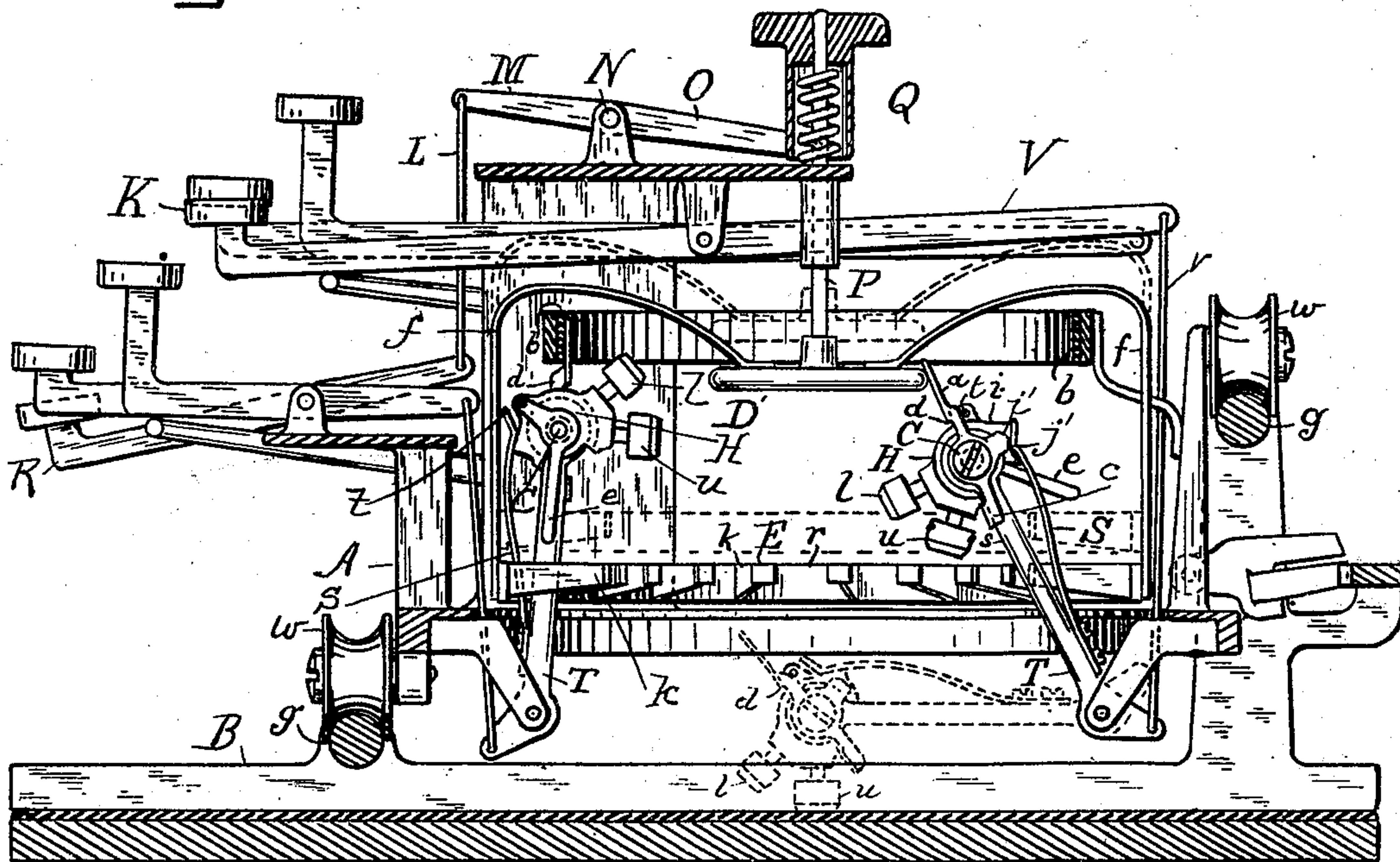


Fig. 3.

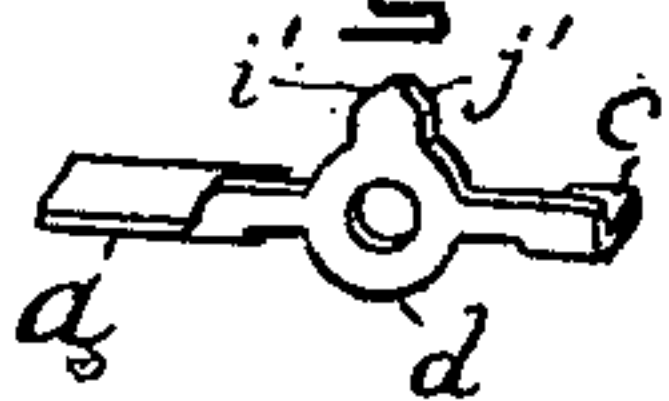


Fig. 4.

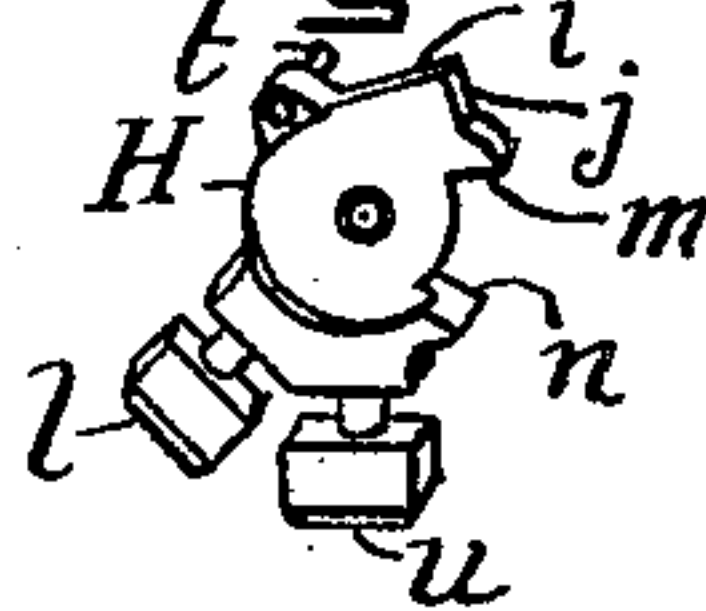


Fig. 5.

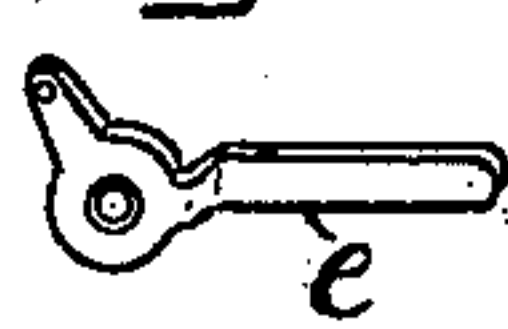
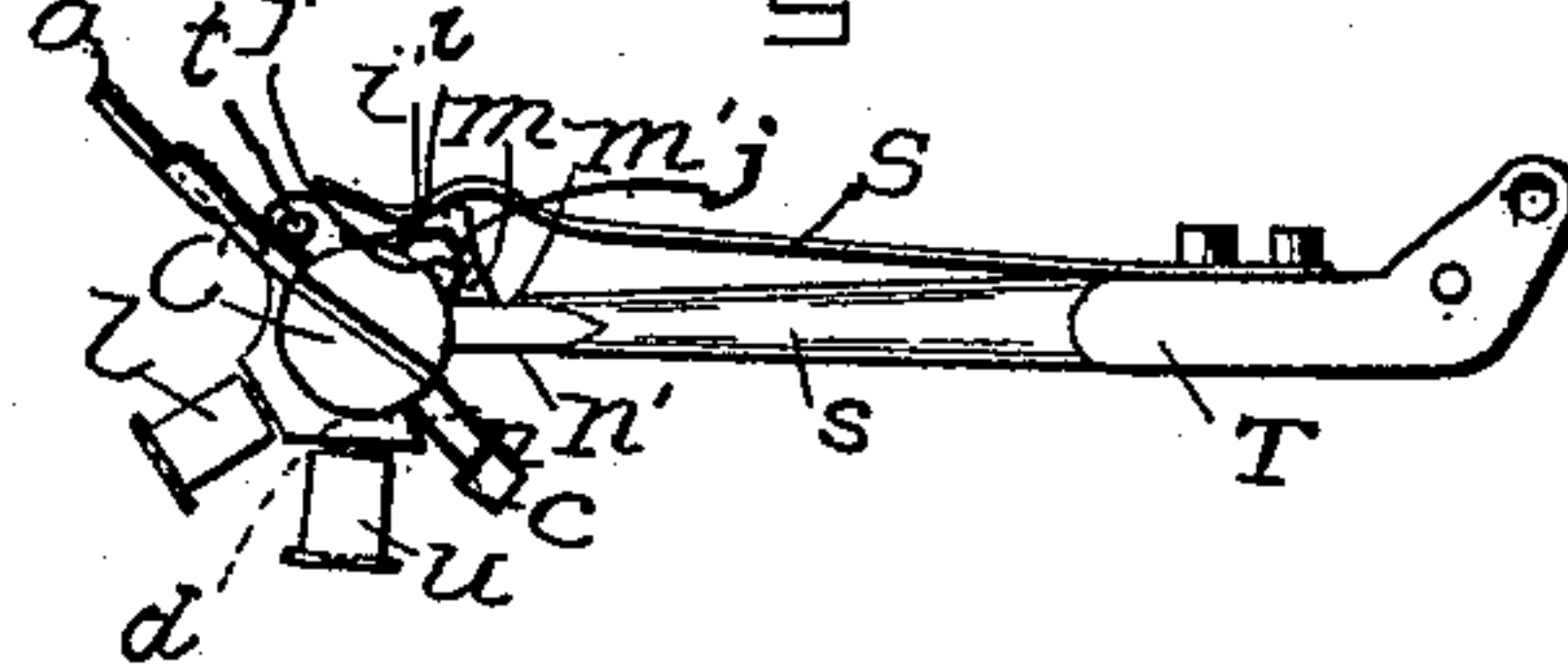


Fig. 6.



Fig. 6<sup>a</sup>



Witnesses:

*Samuel W. Balch*  
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Inventor,

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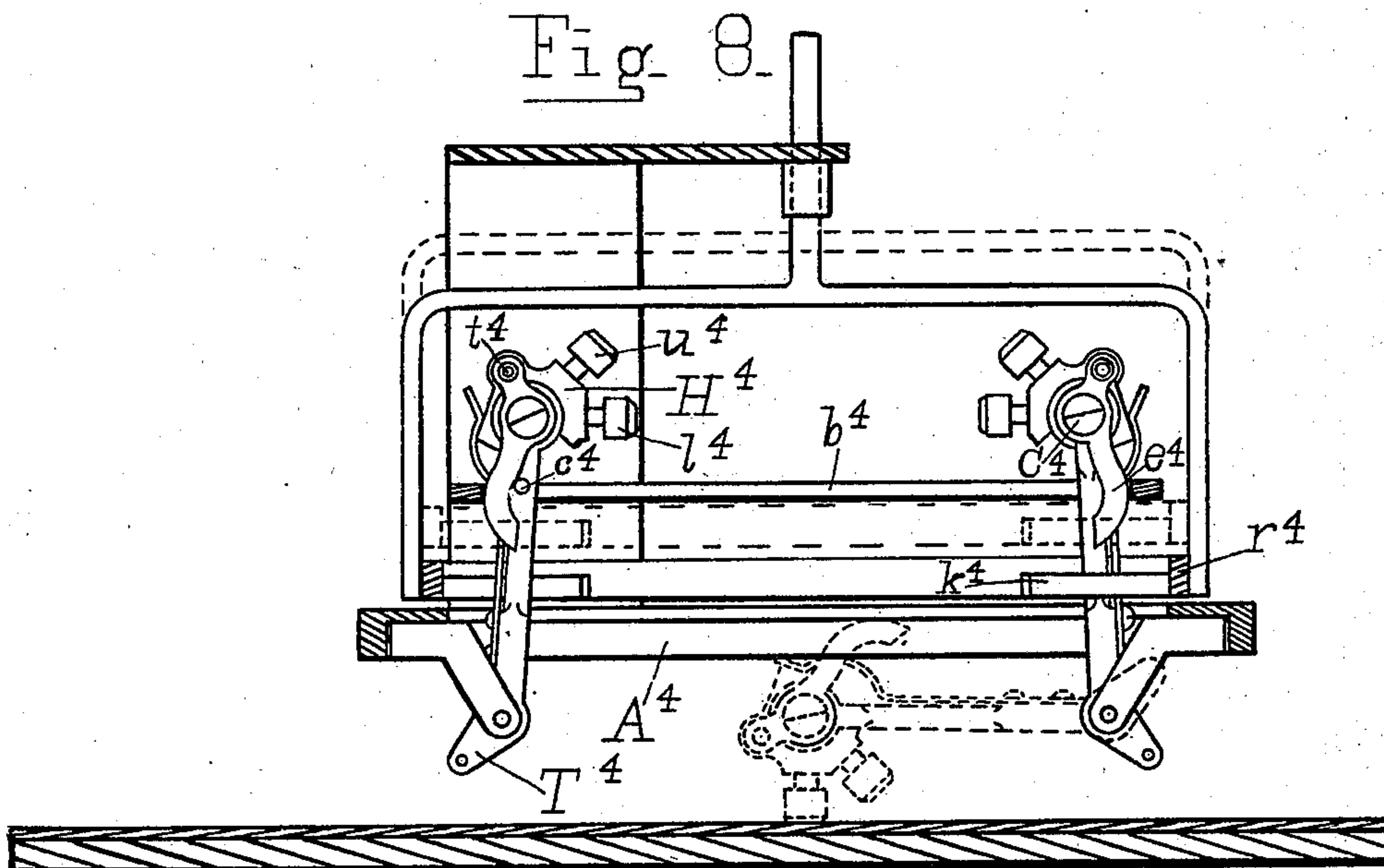
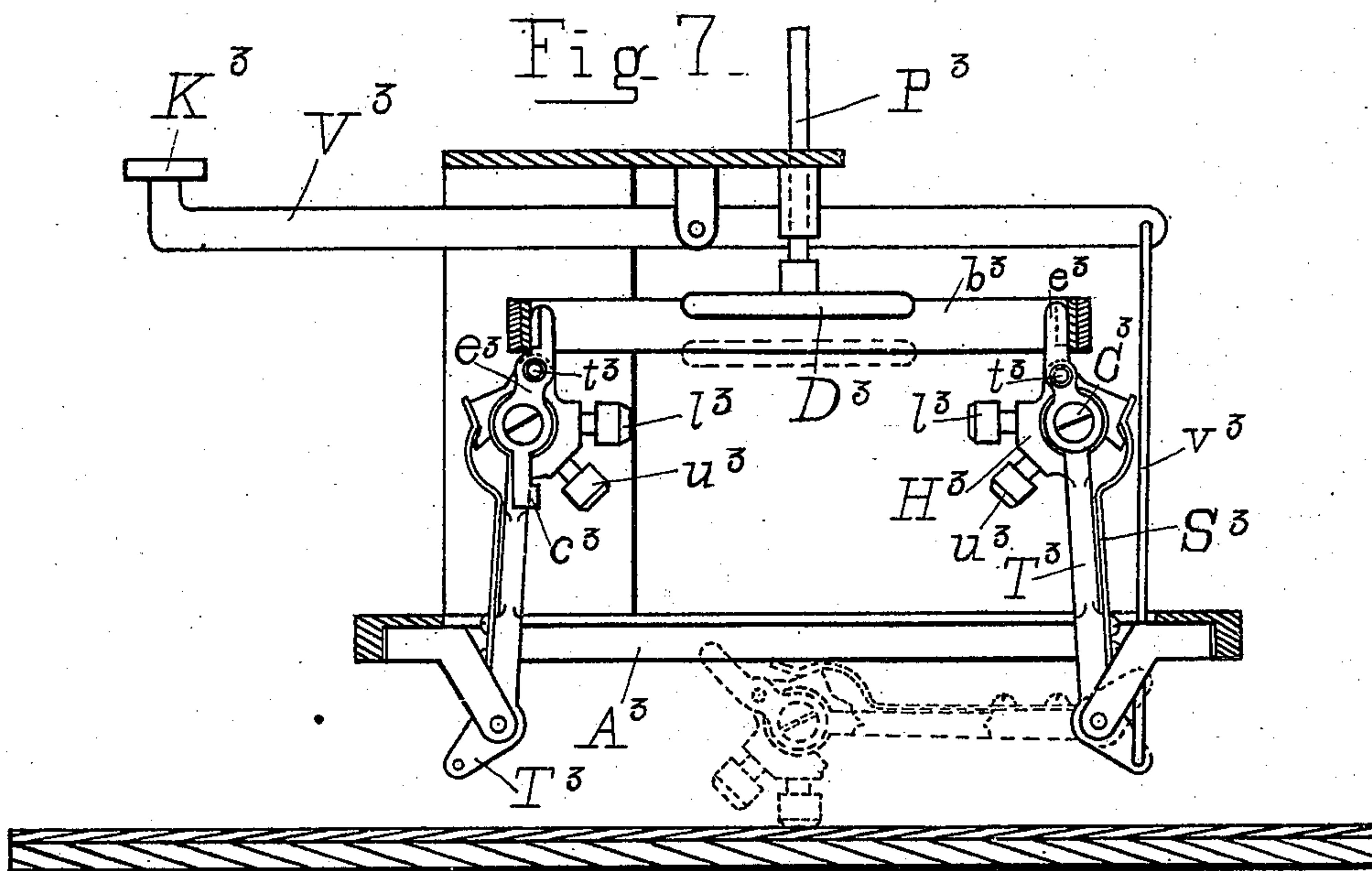


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TYPE WRITING MACHINE.

(Application filed May 25, 1897. Renewed July 31, 1900.)

(No Model.)

3 Sheets—Sheet 3.



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# UNITED STATES PATENT OFFICE.

FREDERIC W. HILLARD, OF BROOKLYN, NEW YORK, ASSIGNOR TO THE  
ELLIOTT & HATCH BOOK-TYPEWRITER COMPANY, A CORPORATION OF  
NEW YORK.

## TYPE-WRITING MACHINE.

SPECIFICATION forming part of Letters Patent No. 692,664, dated February 4, 1902.

Application filed May 25, 1897. Renewed July 31, 1900. Serial No. 25,454. (No model.)

*To all whom it may concern:*

Be it known that I, FREDERIC W. HILLARD, a citizen of the United States of America, residing at Brooklyn, Kings county, State of New York, have invented certain new and useful Improvements in Type-Writing Machines, of which the following is a specification.

In its general plan and manner of operating my improved type-writer comprises a number of type-bars, each bar carrying on its end a type-head, some or all of which are provided with two or more type characters, forming two or more series of characters; and my type-writer also comprises means, operated preferably by the usual shift-key, for bringing the characters of either series into position for printing. The machine herein shown is designed with special reference to printing upon flat surfaces rather than upon the cylindrical surface of the ordinary type-writer platen, and the usual style of type-head, with several types having their faces in the same plane, cannot be used, since all the characters on a type-head would strike and print simultaneously. This difficulty is avoided by placing the types in different planes upon a type-head which is movably supported at the end of the type-bar, so that it can be rocked to bring either of the type into position to print. Type-heads that rock or are shiftable on their type-bars are well known in the art.

My invention comprises the hereinafter-described improvements in the method of shifting and controlling such type-heads on their type-bars.

One of the difficulties heretofore encountered in the manipulation of the shifting type-head consists in a liability that after it has been shifted from one printing position to another the means employed to restore it to its first printing position will fail to restore it. The means for moving the type-head to its shifted position have usually consisted in a positive shifter or tripper, or else in the use of centrifugal force for the purpose. Where a positive tripper is employed, the tripper is moved into the path of the type-head when it is desired to shift the type-head to a new printing position, so that the type-head can-

not be moved to the printing-point unless it is first shifted on the type-bar. Where centrifugal force is employed, the type-head is normally locked in one printing position on the type-bar, and it is so balanced on the bar that when released from the lock it will be thrown by centrifugal force to its shifted position during the printing stroke of the type-bar. The means heretofore employed to restore the type-head to its first printing position have usually consisted of a tripper and a spring or else gravity and the overbalancing-weight of the type-head itself. Such restoring means have proven unreliable in reshifting the type-head to its first position, and I have therefore devised improved means to accomplish this result. One such improved means is a tripping member mounted on the type-bar and movable thereon independently of the type-head. The means heretofore in use for reshifting the type-head to its first position may be discarded altogether and that function performed exclusively by my tripping member, or the tripping member may be used in conjunction with any of the means heretofore used, so that if such other means fail to reshift the type-head my tripping member will contact with the type-head and reshift it to its first position. The tripping member may be arranged to reshift the type-head during the return stroke of the type-bar after printing or during a subsequent printing stroke of the type-bar.

My tripping member may be used to perform other functions than that of reshifting the type-head to its first printing position. For instance, it may be employed to shift the type-head to either of its printing positions or it may be employed to alternately shift the type-head to different printing positions.

Still another function that may be performed by the tripping member is that of a guard for the type-head banking-stops. This function is effected by providing the tripping member with a part that rests in the buffer or basket in the normal or unused position of the type-bar, and by also providing a banking-face on the tripping member which contacts with a banking-stop on the type-bar to limit the movement of the tripping member on the type-bar, and by still further provid-



ing such a connection between the tripping member and the type-head that the tripping member is capable of more or less movement independent of the type-head, whereby the force of the spring which, as usual, restores the type-bar to its normal position after printing is taken up by the tripping member banking-stop instead of by the type-head banking-stop. In this manner the type-head banking-faces and their banking-stops are guarded and preserved by the tripping member, so that the several types will register properly with one another for a longer period of use than they would do if not so protected.

My third improvement above indicated—viz., the tripper for shifting the type-head to its several printing positions during the printing stroke of the type-bar—assures that the type-head shall always print the desired type if the tripper is properly manipulated. This assures that only one type can be printed as long as the tripper remains in any one position. Whenever the tripper is moved to another position, the type-head is necessarily moved thereby into position for printing another type before the type-head can be brought to the printing-point. This obviates entirely the necessity of reshifting the type-head to its first printing position during the return stroke of the type-bar, and therefore when a type-head is in position for printing with any one of the type the type-head is held in that position until shifted positively into position to print with some of the other type. It is shifted on the printing stroke and not on the return stroke of the type-bar. The same character may be printed an indefinite number of times without the type-head being shifted. This shifting of the type-head on the printing stroke of the type-bar and downstroke of the key from each printing position into any other printing position, which is a distinguishing feature of this part of my invention, makes it impossible to print the wrong letter, provided the operator manipulates the shift-key and printing-key properly on the downstroke. The shifter should be operated immediately before depressing the printing-key, as is the common practice of type-writers provided with shifts.

With the above explanation this part of the improvement may be stated to consist in the combination of a type-bar, a type-head movably supported thereon bearing a plurality of type, means preferably but not necessarily of the character hereinafter described for holding the type-head in the position in which it is set in all positions of the type-bar when it is not intended to shift the type-head, and means operative on the downstroke of the keys for shifting the type-head from each printing position to any other printing position—by which is meant that whenever it is intended to change the position of the type-head, so as to bring the different characters into position for printing, it is necessary that the trip-

per shall be in position to operate during the downstroke of the printing-key.

It will also be seen by the further description given herein that the tripper is moved into the path of the type-head and operates to throw the type-head into the desired position, which is out of the path of the tripper unless the tripper is again moved. When the tripper has been operated or moved so as to bring it again into the path of the type-head, it brings the desired type into position for printing and again throws the type-head out of its path—that is, the tripper is moved into the path of the type-head to shift the type-head from one printing position into another. The tripper is then not moved out of the path of the type-head, but the type-head is moved out of the way of the tripper. The tripper may then again be moved into the path of the type-head, and when the key is struck the type-head will be again moved out of the way of the tripper and at the same time be shifted. In this aspect the improvement may be said to consist of the combination of the type-bar, a type-head movably supported thereon having a plurality of type, a tripper operative on the printing stroke of the type-bar for shifting the type-head from each printing position into any other printing position, and means for moving the tripper into the path of the type-head to shift it from one position to another.

My invention also comprises the further details of the combination of the type-bar and the type-head, which will now be more fully described and claimed.

In the accompanying three sheets of drawings, which form a part of this specification, Figure 1 is a plan view of a machine containing my invention. Fig. 2 is a cross-sectional view of the machine shown in Fig. 1, cutting on a vertical plane through the machine from front to back at the printing-point. Figs. 3, 4, 5, and 6 are detail views of the type-bar of Figs. 1 and 2, with its type-head and various parts. Fig. 3 is a perspective view of the loose tripping member of the type-head. Fig. 4 is a perspective view of the type-head. Fig. 5 is a perspective view of the tight tripping member of the type-head. Fig. 6 is a perspective view of the type-bar. Fig. 6<sup>a</sup> is a side elevation of a completed type-bar on a slightly-enlarged scale. Figs. 7 and 8 are modifications of my invention. Fig. 7 is a modification in which a single tight tripping member shifts the type-head in both directions. Fig. 8 is another modification in which a single tight tripping member shifts the type-head in both directions.

By "tight" tripping member I mean one that is integral with the type-head or operatively connected thereto in such a manner that it cannot be shifted without shifting the type-head. Some of the tight tripping members herein shown have a slight play on their pivots independent of the type-head; but as they cannot be shifted from one working po-



sition to another without shifting the type-head I have designated them as "tight" tripping members.

The machine in connection with which my improvements are shown is intended for type-writing in a book. It is mounted so that it shall move over the paper as the printing of the line progresses.

Referring now particularly to Figs. 1 and 2, the carriage A rides on a frame B, which is intended to rest upon the book or sheet to be printed upon. The frame is provided with guide-rails *g*, and the carriage rests upon rollers *w*, which bear upon these rails. The type-bars T are pivoted around a circular opening in the base of the carriage and are operated by keys K in the usual way. These keys are pivoted to the framework of the carriage. No claim is here made to novelty in the construction of these parts.

Of the essential parts the type-bar and its attachments will first be described, and then the shifter will be described.

The type-bar T has pivoted on its end a type-head H, provided with two or more type *u l*—as, for example, the upper and lower case representations of a letter. Only two type are shown, as it is ordinarily not convenient to have more than two printing positions. The type-head is movably mounted on the end of the type-bar, so that it can be rocked from one printing position to another printing position. The type-bar is broadened and flattened at the end to afford a suitable mounting for the type-head. The type-head is flat; but the blocks upon which the type are cut are somewhat broader than the rest of the type-head. A screw C joins the type-head and the type-bar. Its shank passes through the loose tripping member *d* of the type-head and the flat end of the type-bar, and its threaded end is screwed into the type-head and the tight tripping member *e*, which serves as a lock-nut. The tight tripping member is fastened to a projecting pin *t* of the type-head in order to firmly secure the two together. The type-head has a certain movement about the axis of the screw by which it is attached to the head of the type-bar. This range of movement is limited by two banking-faces *m n*, which engage the banking-stops *m' n'* on the front and rear of the shank *s* of the type-bar T, when the type-head is moved the desired distance to bring the two type each respectively into proper position for printing. It is convenient to mount the two type about forty-five degrees apart on the type-head. On the edge of the type-head are two inclined surfaces *i j*, which meet and form an apex. A flat spring S is attached to the type-bar and extends along its length. At the end of the spring are two inclined surfaces *p q*, meeting at an apex. This apex and the apex on the type-head are so positioned relatively to each other that the latter will pass the former when the type-head is shifted from one printing position to the other. Whenever

the type-head is moved far enough either way to bring the apex between *i* and *j* past the apex formed at the end of the spring, the pressure of the spring will be transferred from one of the inclined surfaces on the type-head to the other, and the type-head will be forced around the balance of the distance until the other of the banking-faces on the type-head engages with the corresponding banking-stop on the shank of the type-bar, the type-head being held in its shifted position by the spring S until moved to another position by the tripping mechanism.

The type-head is provided with two tripping members, a loose tripping member *d* and a tight tripping member *e*. The type-head is shifted from one printing position to the other by means of a tripper consisting of two parts D and E, which respectively engage the tripping members *d* and *e* of the type-head. The part D is a disk, and the part E is composed of a series of inwardly-projecting brackets *k*, with laterally-projecting ends, and the supporting-ring *r*. Each inwardly-projecting bracket is shown with two laterally-projecting ends, which serve to trip the type-heads of the two adjoining type-bars. The type-heads are made alternately right and left for this purpose—that is to say, the tight tripping member *e* of one bar is located on the right thereof and the tight tripping member of an adjacent bar on the left of the latter, the type-bars being thus arranged in groups of two, as shown in Fig. 1. Only half as many brackets as type-levers are therefore required. These brackets *k* are supported in the ring *r*, which is connected by rods *f* to the disk D, the two parts D and E thus forming one piece, which is supported and guided and has a limited vertical movement in the carriage A under the control of the shift-key R. The connections are through the rod L, arm M, shaft N, arm O, and rod P. In Fig. 2 the shift-key is shown depressed. When released, it is returned by the spring Q, and the tripper is lifted to the position shown in the dotted lines.

The action of the tripper in shifting the type-head will now be described. In the ordinary operation of the machine in printing lower-case characters the tripper will be in the position shown in the dotted lines in Fig. 2, and in each type-bar the type-head will be in the position relative to the shank which is shown in the type-bar at the right of the figure with the type *l* in position to print. When the tripper is in this position, the tripping members *d e* will clear the tripper when the type-bar is operated. If now the tripper is lowered to the position shown in full lines by the depression of the shift-key, then the tripping member *d* will engage with the disk D of the tripper when the type-bar makes its printing stroke, and the type-head will be tripped so as to bring the type *u* into printing position, as shown in the dotted position of the lever at the right and also in the lever



at the left of Fig. 2. The type-head having been tripped, the tripping member *d* will clear the tripper-disk D and the type-bar will return with the type-head in the new position, which the type-head will then keep, not only as long as the shift-key and tripper are held down, but until the type-bar is operated again after the tripper has returned on the release of the shift-key. If during the depression of the shift-key the same type-bar is operated more than once, the type-head will be tripped only on the first printing stroke, and, as the type-head remains in the tripped position, it will not trip on subsequent operations of the type-bar. If now the shift-key is released and the type-bar again operated, one of the tripping-brackets *k* of the part E of the tripper will lie in the path of the tripping member *e*, connected with the type-head, and on the printing stroke the bracket *k* and the tripping member *e* will engage, and the type-head will be thrown back, so as to bring the type *l* again in position to print.

The type-bars stand normally when out of use in a position nearly perpendicular with the loose tripping member *d* in the leather-covered basket or buffer-ring *b*. They are controlled in this position by the ordinary key-lever springs (not shown) which support the printing-keys and the type-bars in their normal positions of rest. The type-bars and key-levers V are operatively connected together by the connecting-wires *v* in the usual manner.

In the position in which the type-bar is shown at the printing-point in the dotted lines in Fig. 2 the type-head is so placed that the type *u* is in the printing position, the type-head having been shifted on the type-bar from the position shown in full lines by the contact of the loose tripping member *d* with the tripper-disk D, as hereinbefore described.

While the type-bar is in the position shown in Fig. 2 in dotted lines, it will of course be understood that the corresponding key is depressed. Upon the release of the key the type-bar and the key will both be returned to their normal positions by the key-lever spring, the tripping member *d* being forcibly thrown against the buffer-ring *b*, and the tripping member *d* will thereby be restored or tripped back to its first position by its forcible contact with the buffer-ring *b*; but this movement of the tripping member back to its first position does not operate to trip the type-head back into position to print with the type *l*. When the tripping member *d* on the type-bar toward the rear of the carriage, Fig. 2, is moved from the position shown in full lines to the position shown in dotted lines, it presses against the pin *t* on the type-head and thereby causes the type-head to trip from the position for printing type *l* to the position for printing type *u*; but when the tripping member *d* is moved in the opposite direction it is disengaged from its contact with the pin *t*, and the type-head remains stationary on the type-bar,

in position for printing type *u*. Thus when the type-head is in the position shown in dotted lines in Fig. 2 the loose tripping member may be moved in either direction independently of and without moving the type-head. The type-bar toward the front of the machine in Fig. 2 shows the type-head positioned to print with type *u*, having been moved into that position by the disk D, and with the loose tripping member *d* at the limit of its movement in the other direction. The same construction which permits the loose tripping member to be moved back and forth when the type-head is in the position shown in dotted lines in Fig. 2, or in the position of the type-head upon the type-bar at the front of the machine in that figure, without affecting the position of the type-head will permit the type-head, when the loose tripping member is in the position shown in full lines in Fig. 2, to be tripped in either direction independently of and without moving the loose tripping member. While the type-head is in position for printing type *u*, the tripping member *d* is tripped back and forth each time the type-bar is operated for printing, but, as before stated, without shifting the type-head. On the other hand, when the type-head is in position for printing type *l* the loose tripping member *d* remains in the position shown in full lines on the rear type-bar, and since the tripper-disk D is in its raised position (shown in dotted lines in Fig. 2) the loose member *d* is not tripped back and forth when the type-bar is operated. It is therefore preferable that the more frequent character used, which is generally the lower-case letter, should be placed on the type *l* and the less frequent character on the type *u*—that is to say, the lower-case letter should be placed in position on the type-head nearest the tripping portion (as, say, *a*) of the loose tripping member (as, say, *d*) and the capital letter should be placed farthest from the tripping portion.

It will be seen that I have provided mechanism that when the type-head has been tripped by the loose tripping member holds it in its tripped position independent of the subsequent movement of the loose tripping member until upon a succeeding printing stroke of the type-bar the type-head is thrown in the opposite direction. The means here shown for this purpose is the spring S; but I do not limit my invention thereto, for it is obvious that any other acceptable device for that purpose could be employed; nor is it material in this aspect of my invention what means be employed to shift the type-head in the direction opposite to that in which it is shifted by the loose tripping member, it being only required that such means be operative only on the movement of the type-bars. It will be seen that the means for thus shifting the type in the last-named direction upon the movement of the type-bar are independent of the movement of the loose tripping member, and, as before stated, the type-head may be so



shifted upon the printing stroke of the bar independent of and without moving the loose tripping member. The movement of the loose tripping member to the position shown in dotted lines on the rear bar of Fig. 2 necessarily insures, however, that the type-head be moved into the position there shown in the dotted lines, if it be not already in that position.

10 In order to avoid any danger of accidentally flinging the loose tripping member *d* out of its position, that member is provided with two inclined faces *i'* and *j'*, corresponding to the inclined faces *i* and *j* on the type-head; but the faces *i'* and *j'* are only slightly inclined, and hence but little force is required to move these faces across the end of spring *S*.

The movements of the tripping member on the type-bar independently of the movement of the type-head thereon may be utilized to preserve and protect the alinement of the printing. This function is effected in the form of type-head shown in Fig. 2 by providing the loose tripping member *d* with the banking-face *c*, which normally engages with the shank of the type-bar below the banking-stop *n'* and receives the shock of the blow of the type-bar against the buffer-ring *b* upon the return of the bar into the buffer after printing, that shock being received by the contact of the part *a* of the tripping member *d* with the buffer-ring and transmitted through the tripping member to the banking-face *c*. In order that the capital letter shall align properly with the lower-case letter on a type-head, it is requisite that the distance between the banking-faces *m* and *n* on the type-head and the corresponding distance between the banking-stops *m'* and *n'* on the type-bar shall be very accurate. If the tripping member *d* were made integral with the type-head, the banking-face *n* would be thrown forcibly against the banking-stop *n'* each time the type-bar was returned into the buffer after printing, and consequently in the course of time the banking-face *n* and the banking-stop *n'* would become damaged from wear and the alinement would be affected. This difficulty is avoided by banking-face *c* contacting with the shank of the type-bar and receiving the shock of the blow of the type-bar in the buffer-ring after printing. The tripping member *d* is formed from a piece of sheet metal which is folded over near each end, the fold at the lower end being to form the banking-face *c* and the fold at the upper end being to form a broad surface *a* for contact with the leather-lined buffer-ring *b*.

From the foregoing description it is obvious that my invention in so far as it relates to the type-bar and the type-head is divisible, broadly, into three improvements for controlling and shifting the type-head on the type-bar.

65 The improvements are as follows: First, the loose tripping member and its various parts;

second, the means for shifting both type *l* and *u* into printing position during the printing stroke of the type-bar; third, a banking-stop *c* on a tripping member having more or less movement independent of the type-head, the banking-stop contacting with a stop upon the type-bar, whereby the shock of the blow is taken up. These three improvements are independent of each other and either one may be employed without the others. Figs. 7 and 8 illustrate modifications of type-bars and type-heads, each comprising one or more of my said improvements; but neither of the modifications comprises all of the improvements shown in Figs. 1 to 6.

In the modifications of Figs. 7 and 8 the loose tripping member is discarded and the buffer-ring is relied on wholly to reshift the type-head from its upper-case printing position to its lower-case printing position. In each of these figures the type-bars are provided with the banking-faces *c*<sup>3</sup> in the one and banking-pin *c*<sup>4</sup> in the other and an enlarged hole encircling the pins *t*<sup>3</sup> *t*<sup>4</sup> on the type-heads, so as to preserve the banking-faces on the type-heads and the corresponding banking-stops on the type-bars in order to protect the alinement.

In Fig. 7 the tripping members *e*<sup>3</sup> extend upward beyond the ends of the type-bars, and the tripping on the downstroke is accomplished by the tripper-disk *D*<sup>3</sup>, while in Fig. 8 the tripping members *e*<sup>4</sup> extend downwardly along the shanks of the type-bars, and the tripping is done by the tripper-brackets *k*<sup>4</sup>.

It is obvious that many changes can be made without departing from the spirit of my invention. Hence without limiting myself to the precise details shown,

What I claim, and desire to secure by Letters Patent of the United States, is—

1. In a type-writing machine, the combination of a type-bar, a spring-controlled type-head pivoted on the type-bar, a tripping member pivoted on the type-bar concentrically with the type-head, and a loose connection between the type-head and tripping member, substantially as described.

2. In a type-writing machine, the combination of a type-bar, a type-head pivoted to said bar and carrying a plurality of type, a loose member pivoted to the type-bar, and adapted to move the type-head positively in one direction, a tripper arranged to engage the loose member during the printing stroke, to move the same and thereby the type-head in one direction, and a buffer arranged to restore the loose member to its original position on the return of the type-bar to its normal position.

3. In a type-writing machine, the combination of a type-bar, a type-head pivoted thereon and having a plurality of type, a loose member on the type-bar acting to move the head, a tripper engaging the loose member during the printing stroke to move the same in one direction, and a fixed buffer for restoring the



loose member on the return of the type-bar from the printing stroke substantially as described.

4. In a type-writing machine, the combination of a type-bar, a type-head having a plurality of type, a loose tripping member on the type-bar capable of movement on the type-bar in one direction without causing movement of the type-head, the loose tripping member and type-head having contacting parts whereby the type-head may be shifted by the movement of the loose tripping member in the opposite direction, substantially as described.

5. In a type-writing machine, the combination of a type-bar, a type-head having a plurality of type, a loose tripping member on the type-bar, the loose tripping member being capable of movement in one direction without causing movement of the type-head, and contacting parts on the loose tripping member and type-head whereby a movement of the loose tripping member in the other direction insures that the type-head assume a definite position, substantially as described.

6. In a type-writing machine, the combination of a swinging type-bar, the type-head pivoted on said bar, and having a plurality of type, a member on the type-bar movable in one direction independently of the type-head, and adapted by its movement in the other direction to turn the type-head, means for tripping the loose member to disengage it from the head, and means operative during the printing stroke of the type-bar to turn the type-head after disengagement from the loose member.

7. In a type-writing machine, the combination of a type-bar, a type-head having a plurality of type, a loose tripping member on the type-bar, the loose tripping member and type-head having contacting parts whereby the type-head may be shifted in one direction by the loose tripping member, and means not effecting the movement of the loose tripping member, and operative only upon a movement of the type-bar for tripping the type-head in the opposite direction, substantially as described.

8. In a type-writing machine, the combination of a type-bar, a movable type-head having a plurality of type, a movable tripper, a loose tripping member engaging with and moved in one direction by the said tripper upon the initial movement of the type-bar and escaping from the tripper on further movement of the type-bar, means for moving the tripping member in the opposite direction upon the return of the type-bar to normal position, and engaging faces on the loose tripping member and type-head whereby on the movement of the loose tripping member in one direction the type-head is positively shifted in one direction and whereby upon the movement of the loose tripping member in the opposite direction the type-head is re-

leased for movement in the opposite direction to that in which it was moved by the tripping member, substantially as described.

9. In a type-writing machine, the combination of a type-bar, a type-head having a plurality of type, a loose tripping member on the type-bar, the loose tripping member and type-head having contacting parts whereby the type-head may be shifted by the loose tripping member in one direction, and whereby the loose tripping member subsequent to such tripping of the type-head may be moved without causing movement of the type-head, and means, brought into action on the movement of the type-bar for shifting the type-head in the opposite direction, substantially as described.

10. In a type-writing machine, the combination of a type-bar, a type-head having a plurality of type, a loose tripping member on the type-bar, the loose tripping member and type-head having contacting parts whereby the type-head may be shifted in one direction by the loose tripping member, means independent of the loose tripping member for holding the type-head in such tripped position in the normal unused position of the type-bar, and means operative upon a movement of the type-bar for tripping the type-head in the opposite direction, substantially as described.

11. In a type-writing machine, the combination of a type-bar, a type-head bearing a plurality of type, a loose tripping member, contacting parts on the loose tripping member and type-head, means including the loose tripping member for shifting the type-head in one direction, means for shifting the type-head in the opposite direction, and a basket-ring or buffer positioned to support and reset the loose tripping member independently of the type-head, substantially as described.

12. In a type-writing machine the combination of a type-bar, a loose tripping member pivoted on the type-bar, a type-head bearing a plurality of type pivoted on the type-bar and having a limited movement on its pivot independently of the loose tripping member, when the latter has been tripped in one direction, means for tripping the loose tripping member in the opposite direction, and contacting parts on the loose tripping member and type-head for tripping the type-head in one direction by the loose tripping member.

13. In a type-writing machine the combination of a type-bar, a type-head bearing upper-case type and a lower-case type, pivoted on the type-bar and having a limited movement on its pivot whereby each type is brought to the printing position, a loose tripping member pivoted on the type-bar and having a movement on its pivot, means for shifting the loose tripping member in either direction independently of the type-head when the type-head is in position for printing the lower-case type, and contacting parts on the loose tripping member and the type-head for moving



the type-head into position for printing the lower-case type.

14. In a type-writing machine, the combination of a type-bar, a type-head movably supported thereon having a plurality of type, a tripper, means for moving the tripper into the path of the type-head in each printing position of the type-head, whereby upon the printing stroke of the type-bar, the type-head is shifted free of the tripper in each position of the tripper, substantially as described.

15. In a type-writing machine the combination of a type-bar, a type-head movably supported thereon having a plurality of type, means for holding the type-head in the position in which it is set in all positions of the type-bar, and means operative on the printing stroke of the type-bar for shifting the type-head from each printing position into any other printing position, substantially as described.

16. In a type-writing machine, the combination of a type-bar, a type-head movably supported thereon, having tripping members, the type-head also having a plurality of type, a tripper operative on the printing stroke of the type-bar for shifting the type-head from each printing position into any other printing position, and means for moving the tripper into the path of the type-head tripping members to shift the type-head from one printing position to another, substantially as described.

17. In a type-writing machine, the combination of a type-bar, a type-head movably supported thereon having tripping members, the type-head also having a plurality of type, a tripper operative on the printing stroke of the type-bar for shifting the type-head from each printing position into any other printing position, means for moving the tripper into the path of the type-head tripping members to shift the type-head from one printing position to another, and means for holding the type-head in each position into which it is shifted by the tripper, while the position of the tripper remains unchanged, substantially as described.

18. In a type-writing machine, the combination of a type-bar, a type-head movably supported thereon having two type, a tripper operative on the printing stroke of the type-bar for shifting the type-head from each printing position into the other printing position, means for bringing the tripper into each of its operative positions to shift the type-head from one printing position into the other printing position, and means for holding the type-head in each position into which it is shifted by the tripper in all positions of the type-bar until the position of the tripper is changed, substantially as described.

19. In a type-writing machine, the combination of a series of type-bars each provided with a type-head movably supported thereon and having a plurality of type, a series of

tripping members and a series of brackets between the type-bars each provided with projecting parts for tripping the type-heads of the adjoining type-bars, substantially as described.

20. In a type-writing machine, the combination of a series of type-bars each provided with a type-head movably supported thereon and having two type, a series of tripping members on the type-bars, and a series of brackets between the type-bars provided with projecting parts to engage with the tripping members and trip the type-heads of the adjoining type-bars into position for printing with one type, and means for tripping the type-heads into position for printing with the other type, substantially as described.

21. In a type-writing machine, the combination of a type-bar, a type-head bearing a plurality of type, an independent tripping member, means for shifting the type-head by the tripping member from its position for printing one type to its position for printing the other type, means for shifting the tripping member independently of the type-head, a spring for controlling the type-head in each printing position, and means whereby the spring is flexed through a greater distance when the type-head is shifted and through a lesser distance when the tripping member only is shifted, substantially as described.

22. In a type-writing machine, the combination of a type-bar, a type-head on the type-bar, and a tripping member on the type-bar tripping the type-head and having a movement independent thereof, the tripping member having a banking-stop contacting with the type-bar and limiting its movement, substantially as described.

23. In a type-writing machine the combination of a type-bar, a type-head on the type-bar, and a loose tripping member on the type-bar for tripping the type-head, the loose tripping member having a banking-stop to contact with the bar to limit its movement, substantially as described.

24. In a type-writing machine, the combination of a type-bar, a type-head pivoted on said bar and provided with two type and with stop-shoulders to bank against the bar, and a spring acting to press the stop-shoulders into contact forcibly with the bar whereby the type-head is stopped and held in exact relation to the bar.

25. In a type-writing machine, the combination of a type-bar T, a type-head H, carrying two type, and having stop-shoulders *m* and *n*, to encounter the bar, and a spring S attached to the bar and acting on the head to hold one shoulder or the other forcibly in intimate contact with the bar.

26. In a type-writing machine, a type-bar T, having a circular end, a pivoted type-head H, provided with two type and with a recess to receive the end of the bar, and two shoulders *m* and *n* to bank on said bar, and means



for turning said head on the bar, and alternately holding its stop-shoulders forcibly in contact with the bar.

27. In a type-writer, the combination of a  
5 movable type-bar, a type-head pivotally  
mounted thereon and provided with a plurality of type, a tripping member mounted  
on the type-bar and connected with the type-  
10 head to shift it, means contacting with the  
tripping member to shift and reshift it on  
the type-bar during the printing and return-  
ing stroke of the type-bar and a banking-face  
between the type-head and type-bar, substan-  
tially as described.

15 28. In a type-writer, the combination of a  
movable type-bar, a type-head pivotally  
mounted thereon and provided with a plu-  
rality of type, a tripping member mounted on  
the type-bar and connected with the type-  
20 head to shift it, the type-head and tripping  
member being free for limited relative move-  
ment, means contacting with the tripping  
member to shift and reshift it on the type-  
bar during the printing and returning stroke  
25 of the type-bar, a banking-face between the

tripping member and type-bar and a bank-  
ing-face between the type-head and type-bar,  
substantially as described.

29. In a type-writing machine, the combi-  
nation with the type-bar, and the type-head 30  
pivoted thereto and having a projecting por-  
tion, of a device carried by the type-bar sepa-  
rate from the type-head and cooperating with  
the projecting portion to effect the turning  
of the head. 35

30. In a type-writing machine, the combi-  
nation with the type-bar, of a type-head piv-  
oted thereon and having a plurality of type,  
a device on the type-bar acting to move the  
head, a tripper engaging the device during 40  
the printing stroke to move the same, and a  
buffer for restoring said device on the return  
of the type-bar from the printing stroke.

Signed by me in New York city this 22d  
day of May, 1897.

FREDERIC W. HILLARD.

Witnesses:

THOMAS EWING, Jr.,  
SAMUEL W. BALCH.