

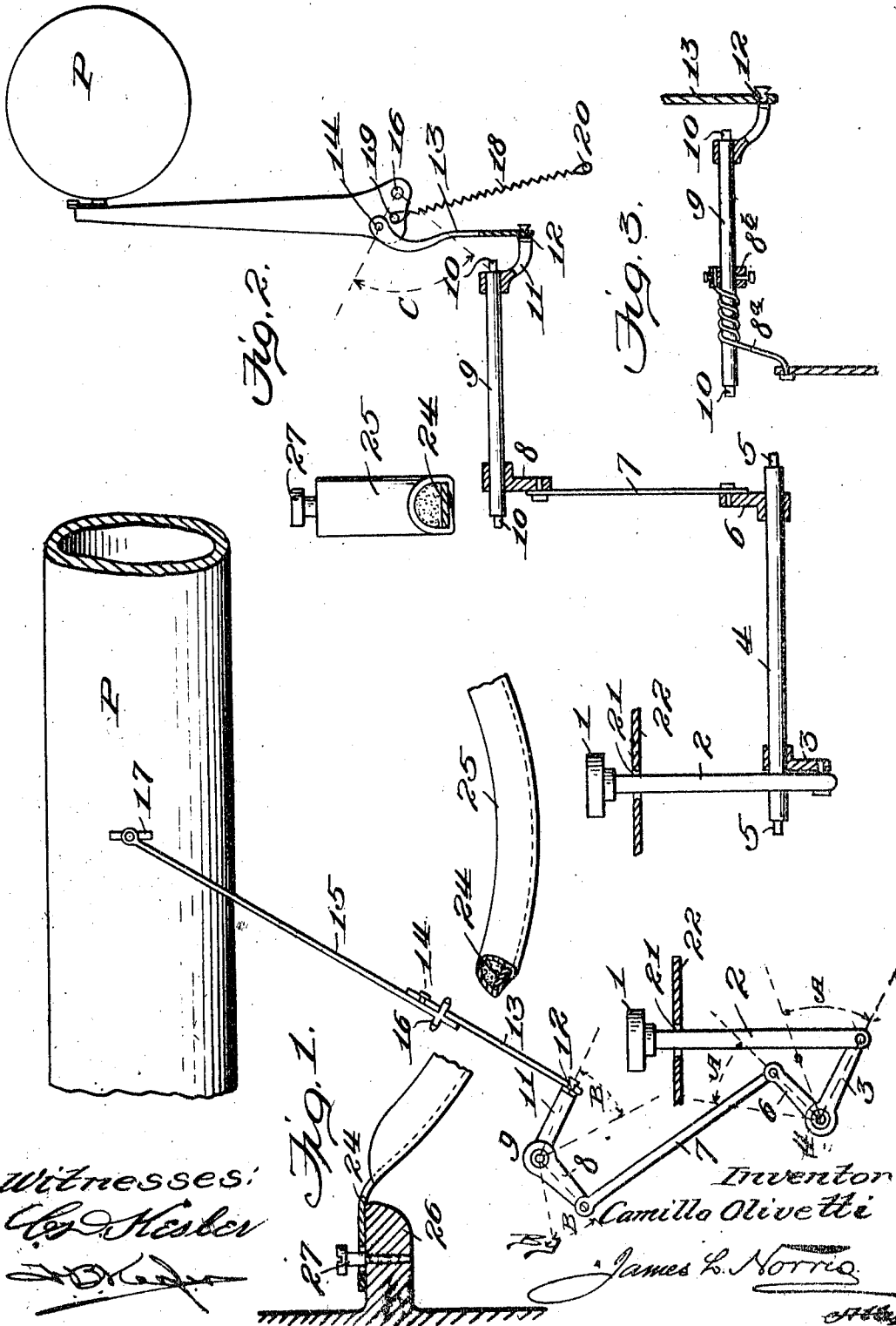
C. OLIVETTI.
TYPE WRITER.

APPLICATION FILED FEB. 18, 1909.

993,189

Patented May 23, 1911.

4 SHEETS—SHEET 1.



Witnesses:
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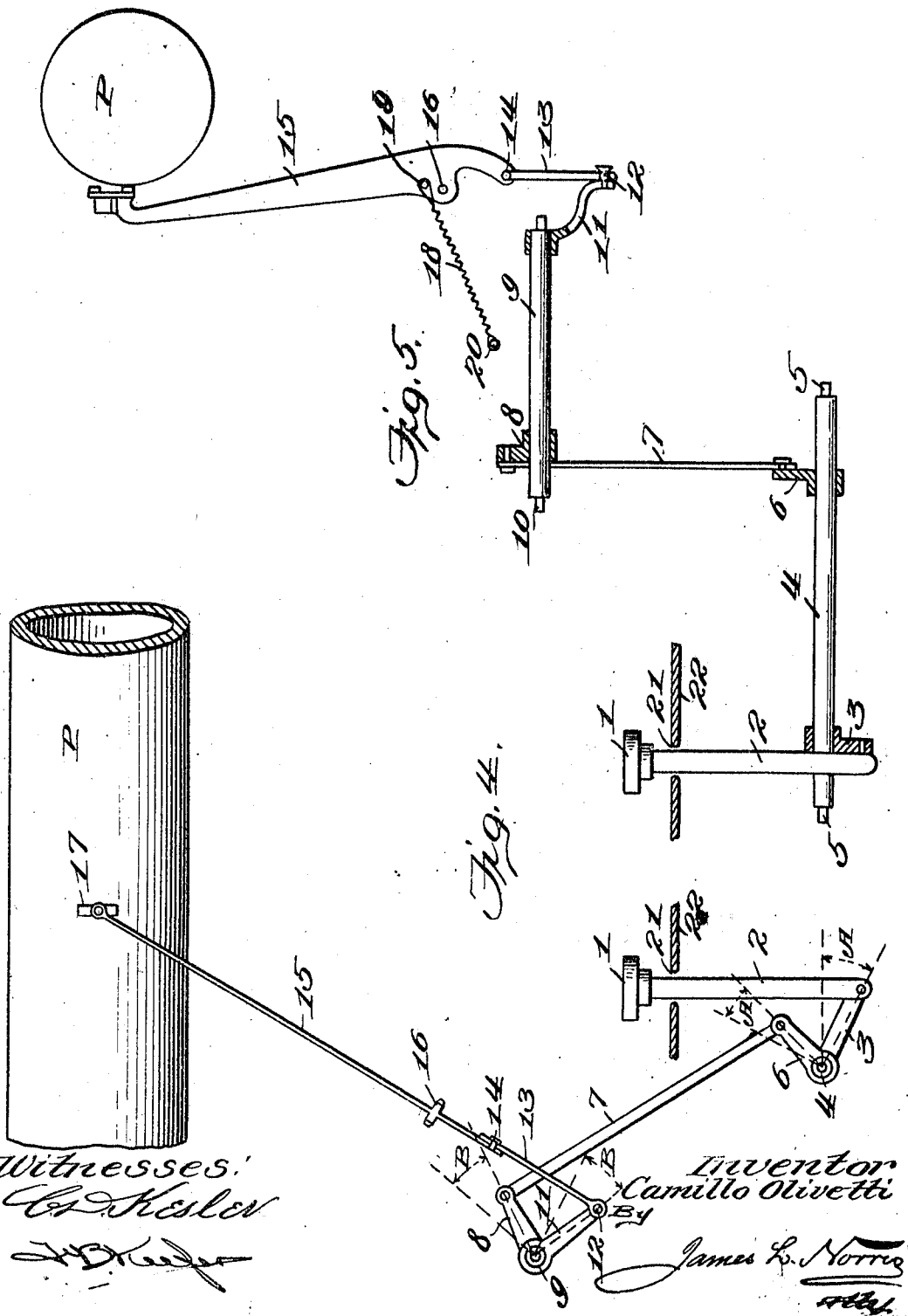
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4 SHEETS-SHEET 2.



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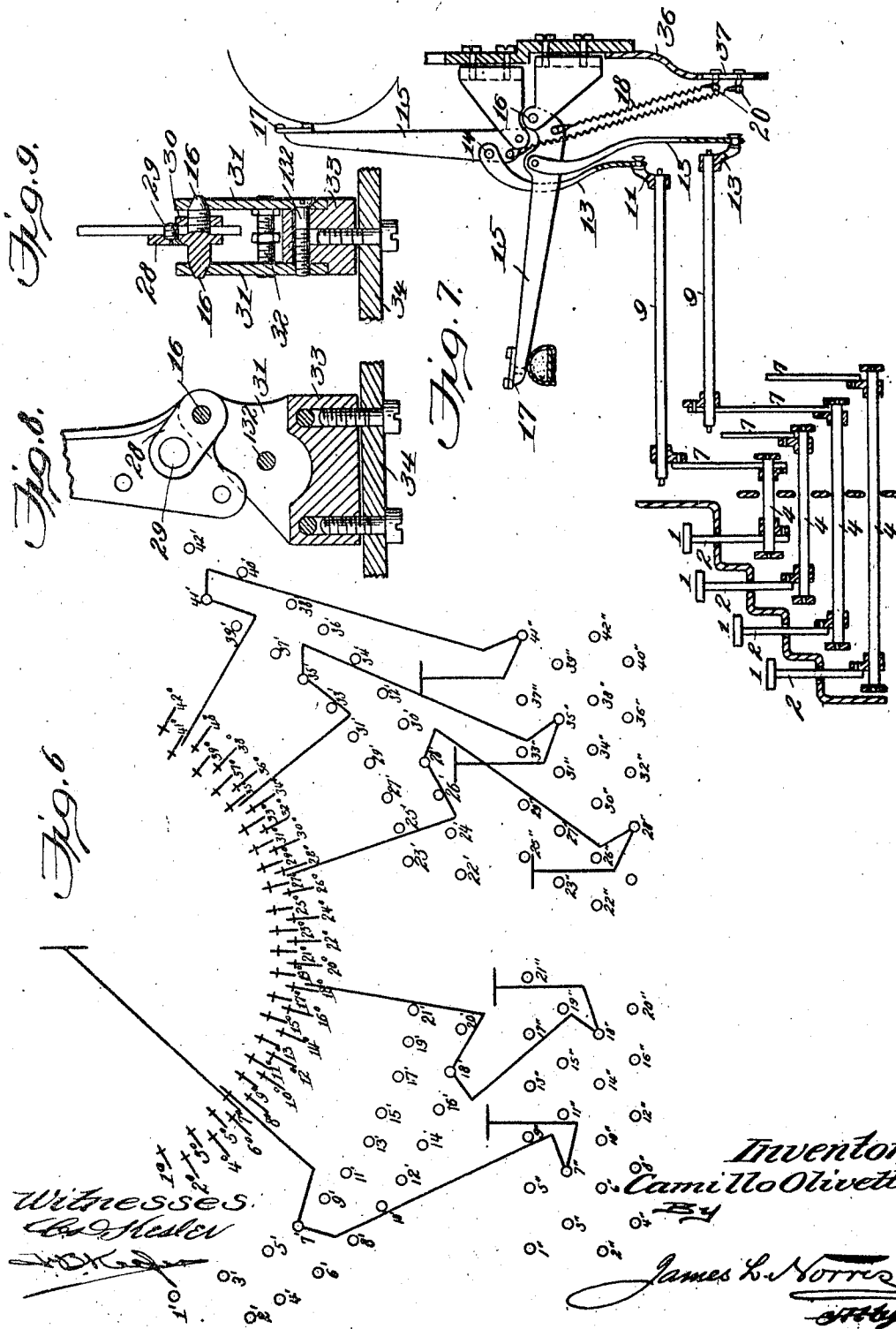
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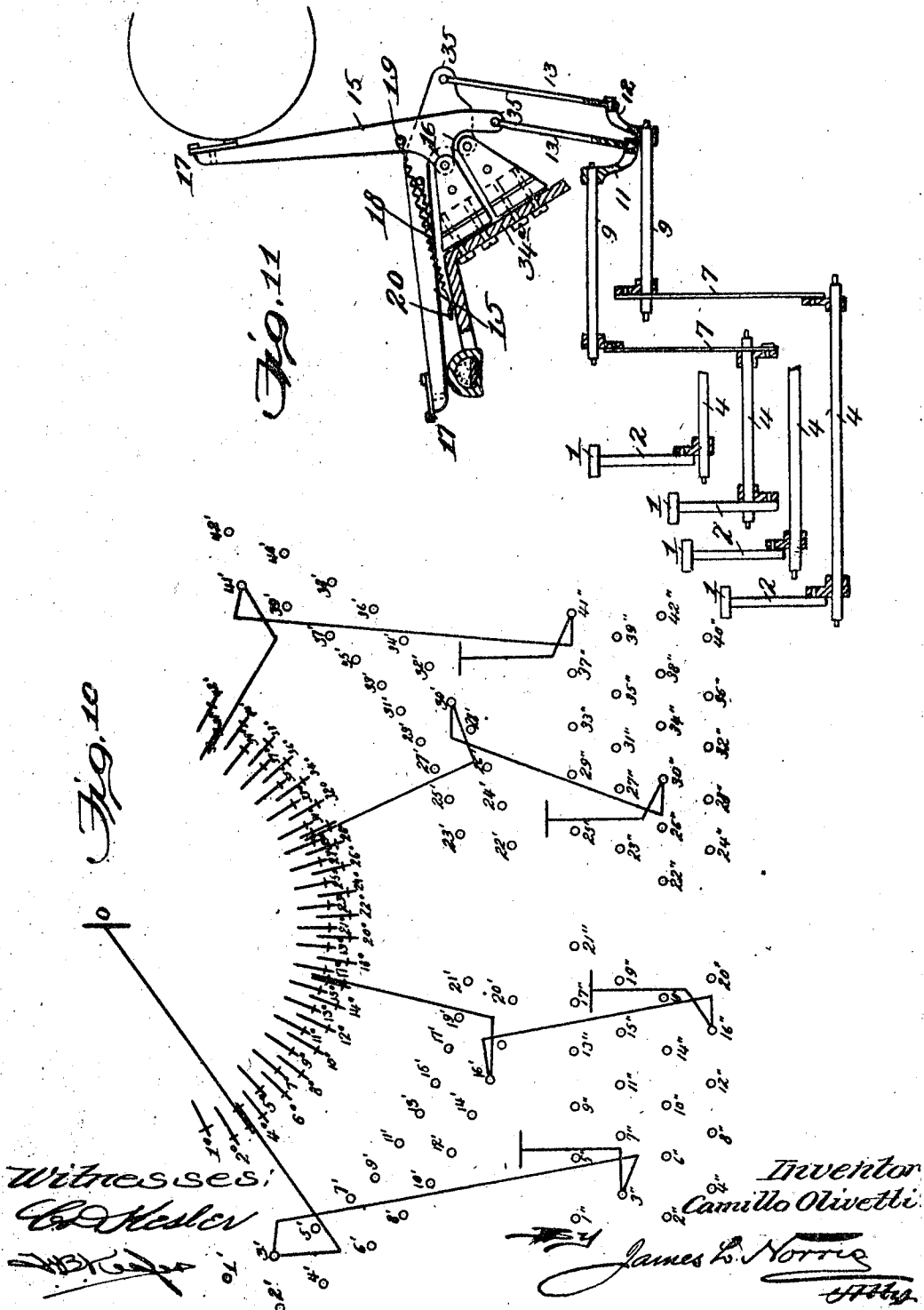
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4 SHEETS-SHEET 4.



UNITED STATES PATENT OFFICE.

CAMILLO OLIVETTI, OF IVREA, ITALY.

TYPE-WRITER.

993,189.

Specification of Letters Patent.

Patented May 23, 1911.

Application filed February 18, 1909. Serial No. 478,581.

To all whom it may concern:

Be it known that I, CAMILLO OLIVETTI, a subject of the King of Italy, residing at Ivrea, Italy, have invented certain new and useful Improvements in Type-Writers, of which the following is a specification.

My present invention relates to improvements in typewriters and more especially to the class wherein the type strike the front of the platen so as to render the writing visible, and it has for its object primarily to provide an improved mechanism for actuating the type-bars from the keys whereby a light, rapid, and uniform touch is secured and a good alinement of the type is maintained.

Another object of the invention is to provide springs for quickly restoring the type-bars to initial position without, however, appreciably increasing the initial blow requisite in throwing the type-bars into printing position, such springs being mounted in an improved manner whereby the results stated may be obtained and, moreover, the tension of such springs may be readily adjusted.

Further objects of the invention are to provide a yielding connection between the type-bars and their actuating keys whereby an elastic touch of the keys may be secured, a spring being preferably used a part of which serves as an operating crank, to provide an improved means for mounting the type rest whereby rebounding of the type-bars after returning to initial position is eliminated or reduced to a minimum and, furthermore, to provide a simple and improved bearing for the type-bar pivots whereby such bearings may be readily adjusted without the necessity of removing either the type-bars or their bearings from the machine.

With these and other objects in view, the invention consists in certain improvements in the construction of the parts and in the combinations and relative arrangements thereof, the novel features being pointed out particularly in the claim hereunto annexed.

In the accompanying drawing:—Figure 1 is a conventional view of a portion of a typewriter as viewed from the front showing the lever mechanism for transmitting motion from the key to the type-bar, one of the type-bars at the left hand side of the machine being shown in this figure and the type is shown in printing position; Fig. 2 is

a side elevation of the mechanism shown in Fig. 1; Fig. 3 is a detail view showing one of the countershafts provided with a spring which is interposed as a connection between the key and type-bar whereby a yielding touch may be obtained; Figs. 4 and 5 are views similar to Figs. 1 and 2, respectively, showing a modified form of the key action; Fig. 6 is a diagrammatic view showing the relative arrangement of the keys and their shafts, the countershafts and the type-bars that are actuated therefrom, the key actions in this figure corresponding to the construction shown in Figs. 1 and 2; Fig. 7 represents a vertical section of a typewriting machine embodying the present invention showing especially the bearings for the type-bar pivots and the retracting springs; Figs. 8 and 9 are detail sectional views of the bearings for the pivots of the type-bars; Fig. 10 is a diagrammatic view similar to Fig. 6, the relative arrangement of the key mechanism in this figure corresponding to that shown in Figs. 4 and 5; and Fig. 11 represents a vertical section through a typewriter wherein the key action is similar to that shown in Figs. 4 and 5 and the position of the bearings for the type-bars is reversed.

Similar parts are designated by the same reference characters in the several views.

In the accompanying drawing, I have shown certain embodiments of the invention. It will be understood, however, that these embodiments are shown merely as examples. I have also shown the key action as applied to the so called "Standard Key-Board" wherein each type-bar is provided with two characters, the proper character being brought into printing position by a vertical shifting movement of the platen. It will be understood, however, that the invention is not limited to a machine of this specific class as the invention is capable of use in connection with machines having key-boards of various kinds. As the platen carriage, the shifting mechanism therefor and the ribbon mechanism form no part of the present invention, they are not herein illustrated, it being necessary only to illustrate the platen, the operation of machines of the class illustrated being well understood by those skilled in the art.

In all of the figures wherein the platen appears, it is designated generally by the reference character P.

In that form of the invention shown in Figs. 1 and 2, I have illustrated one of the key actions which is arranged toward the left hand side of the machine, 1 indicating the finger key which has a stem 2 the lower end of which is pivotally connected to the outer end of a crank 3, the latter being fixed to a shaft 4 the axis of which extends in a direction from the front toward the back of the machine, and the ends of this shaft are provided with a pair of journals 5 by means of which such shafts may be mounted in appropriate bearings. A crank 6 is fixed also on the shaft 4 toward its rear end and to this latter crank is connected a rod 7, the upper end of this rod being pivotally attached to a crank 8 which is fixed toward the forward end of a countershaft 9, the latter having a pair of journals 10 on its opposite ends whereby it may be rotatably mounted in appropriate bearings. At the rear end of the countershaft 9 is fixed a lever 11 which is bent so as to extend not only radially of the shaft 9 but also projects longitudinally beyond its rear end so that the crank pin 12 which is formed on the end of this crank 11 may overhang and clear the bearing which supports the rear end of this shaft 9. A connecting rod 13 has a loose or universal connection at its lower end to the crank pin 12 and the upper end of this rod 13 is pivotally connected at 14 to the type-bar 15, the latter being mounted to turn about the pivot 16 as an axis as it swings to and from printing position. This type-bar carries a type-block 17 on its free end which bears appropriate characters, the printing operation being, of course, well understood. A tension spring 18 is attached at one end to the pin 19 on the type-bar and its opposite end is fixed at 20, the tension of the spring acting to restore the type-bar to its initial position.

Any suitable form of key-board may be used, the stem 2 of each key in the present instance being guided to operate through an aperture 21 formed in a plate 22 which is appropriately attached to the frame of the machine.

Normally, the key is in its upper position, the type-bar under the combined action of its own weight and the tension of the spring 18 occupying an approximately horizontal position toward the front of the machine, each type-bar being supported on a rest which, in the present instance, consists of a metal strip 24 which is covered by a cushion 25 which cushion is filled with sand or some other non-elastic substance. In order to eliminate or reduce to a minimum a rebounding of the type-bars, the ends of the strip 24 rest upon a pair of inwardly projecting brackets 26 which may be formed of integrally cast lugs on the frame of the machine. This strip 24 merely rests on the respective brackets so that the impact be-

tween the type-bars and the cushion may be absorbed. However, in order to prevent displacement of the rest, a shouldered screw 27 is tapped into each bracket 26 and extends loosely through an enlarged aperture which is formed in the end of the strip 24 so that the rest is free to vibrate or move in all directions. When a key is depressed, the stem 2 thereof transmits movement to the crank 3, causing a corresponding rotation of the shaft 4 and crank 6 thereon, a downward movement of the connecting rod 7, and a turning movement of the crank 8 and the countershaft 9. This shaft 9 is parallel to the shaft 4 but is placed in such a position that the pivot pin 12 on the crank 11 occupies such an angular position about the axis of the shaft 9 as to cause it to remain approximately in the same plane in which the type-bar 15 moves, or in a plane parallel thereto so that no appreciable side thrust is sustained by the type-bar while being swung about its pivot. To illustrate more clearly how this result is attained, let A represent the angle through which the cranks 3 and 6 swing as the shaft 4 is turned by a depression of the key, and let B represent the angle through which the shaft 9 rotates, C representing the angle through which the type-bar swings. The angle A is relatively small, preferably about 45° , and the angle B is of the same value or possibly smaller. In order to obtain the best results, the plane of movement of the center pivot 14 should be substantially perpendicular to the crank 11 while the latter is in its intermediate position, that is to say, rotating through half of the angle B and, moreover, the type-bar should swing in a plane substantially parallel to the axis of the shaft 9. Moreover, the axis of the pivot 14 should be offset from the axis of the shaft 9 a distance somewhat less than the length in perpendicular projection of the crank 11. The angle C through which the type-bar swings is approximately 90° , and the pivot 14 must be so placed that the chord of the arc described by it is approximately in line with the arc described by the center of the crank pin 12. The connecting rod 13 is preferably long as compared with the radii of the arcs described by the pivot 14 and the crank pin 12. Rotation of the shaft 9 will operate through the crank 11 and the pin 12 thereon to push the connecting rod 13 upwardly, but owing to the arcs through which its upper and lower ends move, it will have approximately a rectilinear movement. However, in order to permit this movement of the connecting rod 13, the crank pin 12 and the pivot 14 may be of spherical form or they may be loose, and the upward movement of this connecting rod pushes the type-bar 15 upwardly around its pivot 16 as a center and the appropriate character on the

type-block is thereby caused to strike the ribbon and produce the impression upon the paper lying against the platen.

In order to lighten the touch of the keys, one of the cranks 3, 6, 8 or 11, instead of being rigidly fixed to its shaft may be formed as the part of a spring which in turn is fixed to the respective shaft. In the present instance, a spring 8^a is shown in Fig. 3 which takes the place of the rigid crank 8 in Figs. 1 and 2. This spring has a body portion which loosely encircles the shaft 9, one end being adjustably fixed thereto by a collar 8^b and its opposite end extends radially of the shaft 9 and forms a crank which is pivotally connected to the rod 7. The collar 8^b is provided with a set-screw whereby the angular position of the spring around its shaft and the tension thereof may be adjusted as desired.

In Figs. 1 and 2, the crank 11 is so placed as to actuate the type-bar by a pushing action. The same result, however, can be obtained by reversing the position of the crank 8 with respect to the shaft 9 and also reversing the position of the pivot 14 with respect to the axis of rotation of the type-bar in which case the type-bar would be moved into printing position by a pulling action from the crank 11. Such a construction is shown in Figs. 4 and 5 of the drawing, the construction in this instance being identical with that shown in Figs. 1 and 2, except that the position of the crank 8 is reversed, the pivot 14 which connects the rod 13 to the type-bar is placed at the opposite side of the pivotal axis of the type-bar, and the position of the retracting spring 18 is correspondingly reversed. As the corresponding parts in the two constructions are illustrated by the same reference characters, it is thought that the rearrangement of the parts just mentioned can be readily understood.

Fig. 6 shows diagrammatically the relative arrangement of the type-bars, the countershafts which operate them, and the shafts which in turn are operated by the keys. In the drawing, the diagram corresponds to a machine having forty-two keys, the character 1° representing the type-bar at the extreme left hand side of the machine, the character 1' representing the countershaft from which this particular type-bar is actuated, and the character 1'' representing the shaft from which the countershaft 1' and the type-bar 1° are operated. By reference to the similar characters, the countershaft, the type-bar connected thereto, and their corresponding main operating shaft may all be determined. In this figure, certain of the connections between the type-bars, countershafts and the keys are shown diagrammatically and in the position they occupy

when the type-bars are in normal or inoperative position, and one of the type-bars is shown in its actuated or printing position.

In Fig. 7, I have shown a section of a machine wherein two complete actions are illustrated, and Figs. 8 and 9 show in detail an improved form of bearing wherein the pivots of the type-bars are mounted. The pivot 16 of each type-bar is conical at its ends in order to insure a proper centering thereof and adjustment in its bearing, and this pivot carries a flange 28 which is formed rigidly thereon. The type-bar is slipped over one end of the pivot 16 and bears against a side of the flange 28, a screw 29 serving to secure the type-bar to the flange. A nut 30 is also threaded on the pivot 16 and coöperates with the type-bar to lock it in fixed relation to this flange. The bearings for the type-bars each consists of a pair of plates 31 which are arranged in opposed relation and they are secured by screws, rivets or other appropriate means, screws 132 being shown in the present instance, to a block 33. The outer or free ends of the plates 31 are provided with conical recesses in which the cone-shaped ends of the pivot 16 of the type-bar are fitted, and a right and left hand screw 32 connects the plates 31 and a proper fitting of the cone-shaped ends of the pivot 16 in the two bearing plates may be obtained by an appropriate adjustment of the screw 32. The blocks 33 of the various type-bar bearings may be secured by screws or other appropriate means to a supporting plate 34, and by using a type-bar bearing such as that just described, it is possible to adjust the pivots of the various type-bars easily and without the necessity of removing the type-bars or the bearings from the machine. This supporting plate 34 is arc-shaped in order that the type-bars may be so arranged as to operate in radial planes to enable the type thereon to strike at the same point, and this supporting plate 34 also carries a depending plate 36 which is provided with a series of radial slots 37. Within these slots are slidably mounted screws or other appropriate devices 20 which carry hooks to which the lower ends of the springs 18 are attached. As one of these slots 37 is provided for each pair of type-bars and is arranged substantially parallel to the plane in which the type-bar swings, the tension of the springs of the various type-bars may be easily adjusted by sliding the respective spring attaching device 20 upwardly or downwardly within its appropriate slot.

In order to enable all of the type-bars to be accommodated in the limited space provided and in such a manner that the type-bars will not interfere with the bearings, I have arranged the bearings for the type-bars in two rows, the bearings in one row

being staggered or arranged alternately with respect to those in the other row, and in order to insure a proper positioning of the type-bars both with respect to the platen and the rail or rest upon which they lean while in a normal inoperative position, the axes about which the type-bars swing are arranged in rows which coincide with the periphery of an imaginary cone having an angle of approximately 45° , the axis of the cone near its base coinciding with the point upon which the type-bars strike the platen. Although the type-bars are of two different lengths, such a disposition of their axes will cause them both to strike the platen at the proper point and to engage the rest at the proper point.

In Fig. 11, the supporting plate 34* for the bearings of the type-bars is arranged toward the front of the machine instead of toward the rear as shown in Fig. 7, this support being of curved form and the axes 16 of the type-bars being arranged in substantially the same manner as those shown in Fig. 7. In Fig. 11, the type-bars are elevated by a pulling action from the cranks 11 and, in this construction, connecting rods 13 are shown. The retracting springs for the type-bars are so located and attached to the respective type-bars that while each type-bar is in its normal retracted position the tension of the spring acts approximately in line with the pivotal center of the bar, or somewhat below such line to counteract the action of gravity, and, consequently, the spring will not resist the initial movement of the type-bar toward printing position. After the type-bar has been moved into printing position, however, the spring acts most effectively to return it to normal retracted position so that a very quick action of the type-bars may be obtained without increasing appreciably the pressure required to operate the keys.

The present invention provides a key and type-bar mechanism for typewriters of the

front strike or visible writing type wherein the movement is transmitted uniformly between all the keys and the respective type-bars, irrespective of whether such bars are located at the center or toward either side of the machine and, moreover, no varying side motion is transmitted to any of the type-bars, but on the other hand, the motion is transmitted substantially in the plane in which the respective type-bar swings. The touch of all the keys is therefore uniform, light, and the type-bars remain in alignment. The improved form of bearing for type-bars, moreover, provides for an adjustment to compensate for wear which adjustment can be made easily and without removing either the type-bar or its bearing from the machine.

I claim as my invention:—

In a typewriter having a series of independent type levers, means for transmitting movement from each finger key to its corresponding type lever embodying two parallel shafts, the first shaft being operatively connected to the finger key and the second shaft being connected to the first shaft by cranks on said shafts and a connecting rod, the second shaft being operatively connected to the type lever through another crank on said shaft and a connecting rod, the arrangement being such that the second shaft is arranged parallel with the plane in which the type lever oscillates and at such a distance therefrom that the connecting rod which operates the type lever moves substantially in the plane of oscillation of the type lever, substantially as and for the purpose set forth.

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

CAMILLO OLIVETTI.

Witnesses:

GIACOMO LABRUNA,
GIACOMO PAGNANI.