

March 7, 1933.

H. BENZING

1,900,690

POWER DRIVEN TYPEWRITER

Filed Sept. 8, 1931

3 Sheets-Sheet 1

Fig. 1.

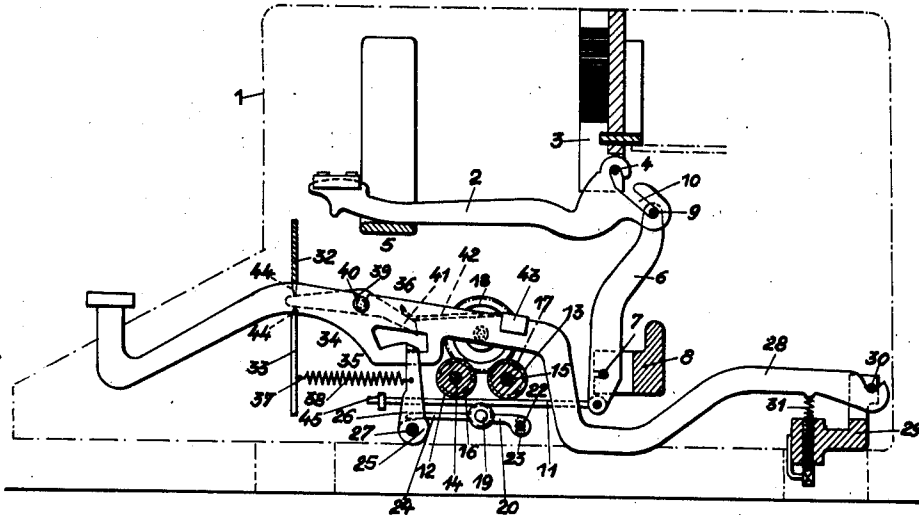
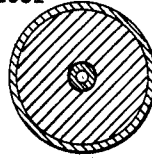
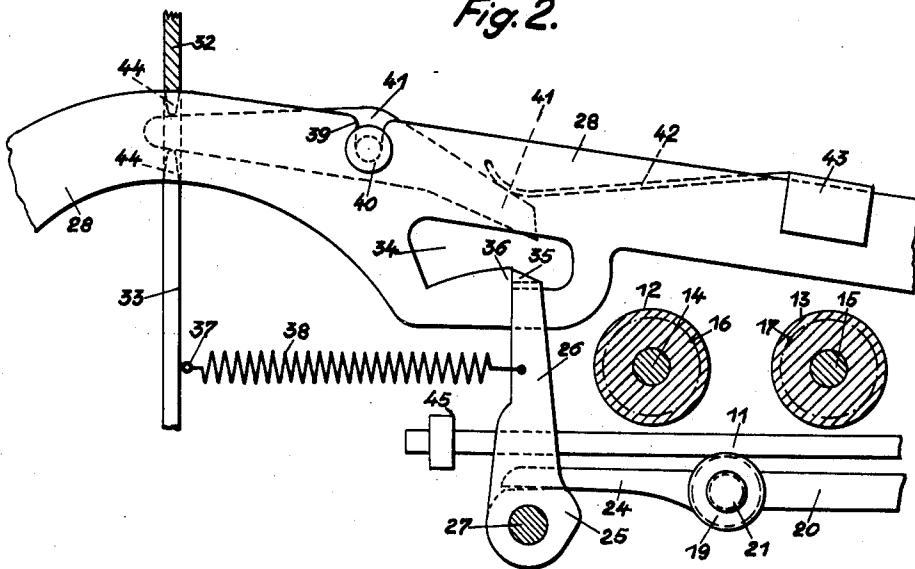


Fig. 2.



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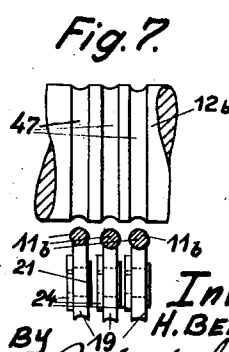
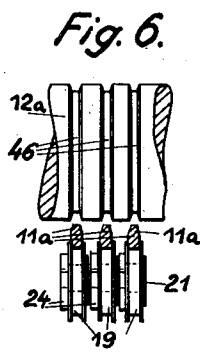
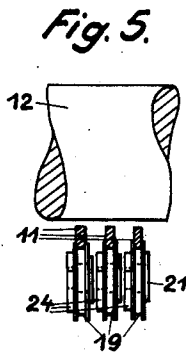
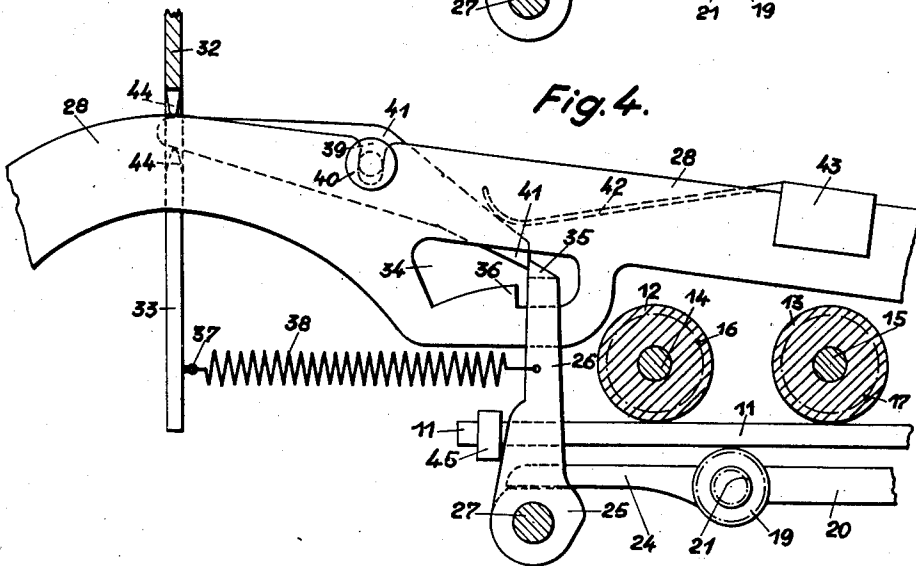
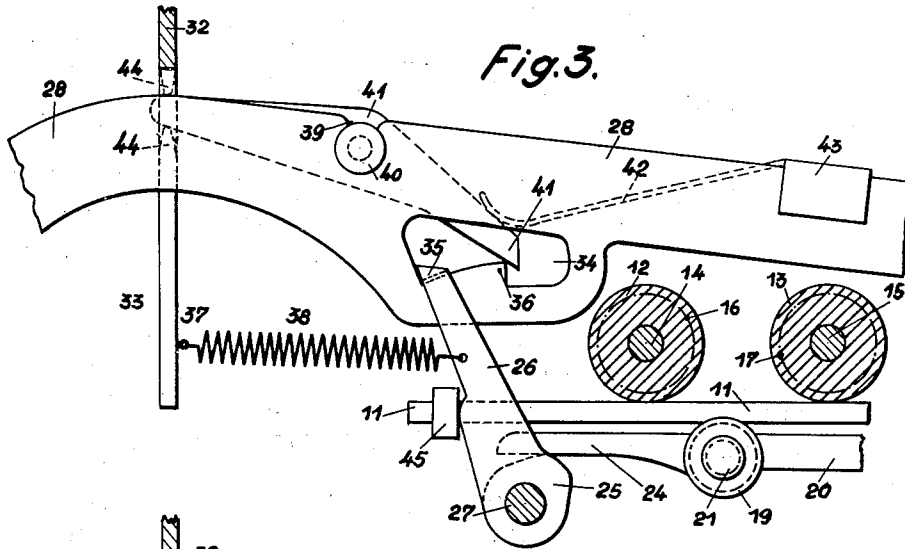
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POWER DRIVEN TYPEWRITER

Filed Sept. 8, 1931

3 Sheets-Sheet 2



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3 Sheets-Sheet 3

Fig. 8.

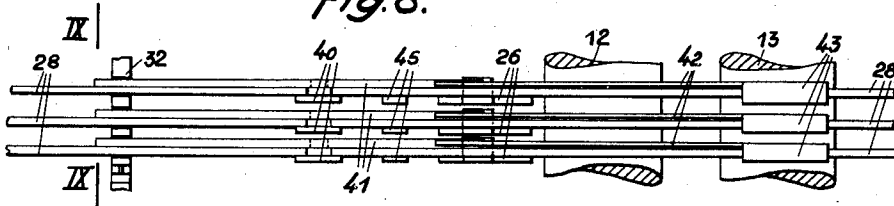


Fig. 9.

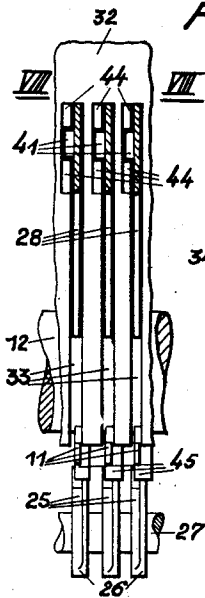


Fig. 10.

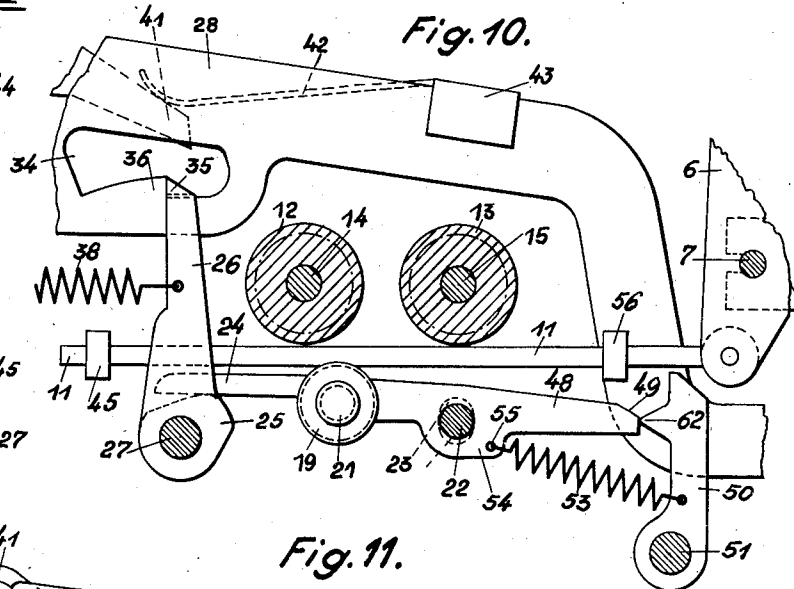
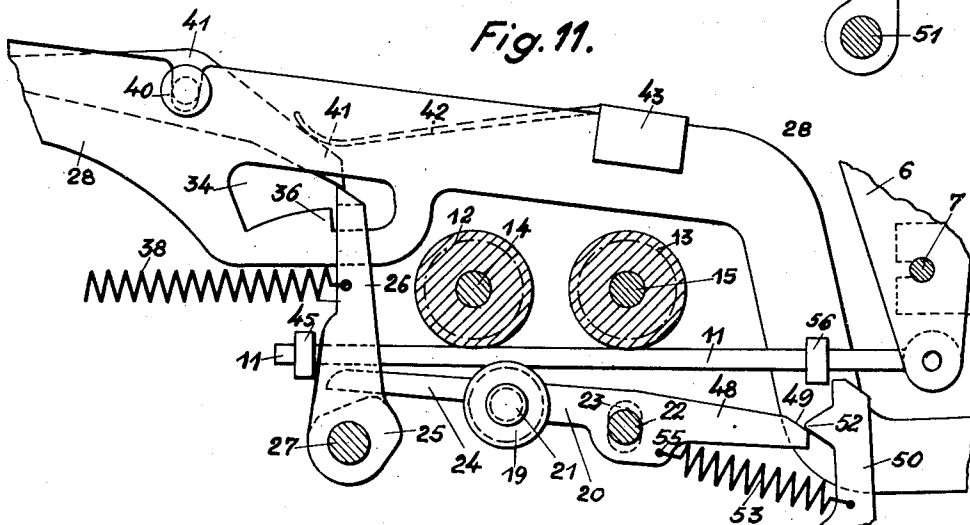


Fig. 11.



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UNITED STATES PATENT OFFICE

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POWER DRIVEN TYPEWRITER

Application filed September 8, 1931, Serial No. 561,706, and in Germany January 5, 1929.

The present invention relates to power-driven typewriters, computing machines, etc., in which the movement of the type levers is performed through the medium of friction rods, which are pressed by rolls against continuously revolving operating rollers.

In arrangements of this kind hitherto in use either considerable pressure on the keys has been required to press the friction rods against the operating rollers, or it has been found necessary to employ cams of a complicated nature, which cause the movement of the type lever upon depression of the key.

These known arrangements are accompanied by the disadvantage that the same fulfil the intended object only to an incomplete degree, or are so sensitive as to be quite unsuitable for permanent operation.

It is the object of the present invention to overcome the disadvantages in question, and this is accomplished by the fact that each of the friction rods moving the type levers rests through the medium of an adjustable intermediate lever on an eccentric, which is acted upon by a spring, or is held in its inoperative position by means of a stop, and which is actuated upon depression of the key and, acting under the influence of the spring, presses the rod against the continuously revolving operating rollers, which in turn, shortly prior to the striking of the type against the platen, return the eccentric lever into the initial position, in which the same is retained by the stop moved back in its path of movement by the upwardly moving key lever.

This arrangement is in so far advantageous, as the actuation of a key causes the movement of only one spring-controlled lever, said lever rotating a cam which raises another lever; the last-mentioned lever brings the tie rods of the type bars into engagement with the operating rollers, which revolve constantly. Said tie rods move the first-mentioned lever into its original position irrespective of their own positions and the end part of their motion is caused by the kinetic energy of the type bars.

In order to preclude possibility of a second striking action on the part of the type bar upon depression of the key bar there is pro-

vided on the latter a spring-controlled pawl, which, without consideration to the particular position of the key bar at that moment, locks the eccentric lever after its return into its initial position.

The arrangement according to the invention is not only extremely simple in form, but also offers the advantage of very small resistance on the part of the keys and absolute ensurity of one single, sharp impression.

The invention will now be described more fully with reference to the accompanying drawings, in which

Fig. 1 is a sectional view taken through a typewriter or computing machine of the usual kind fitted with the novel form of drive according to the invention.

Figs. 2-4 show the actuating means in three different positions.

Figs. 5-7 illustrate three different forms of embodiment of the rods and the operating rollers.

Fig. 8 is a section through a few key bars with actuating means according to the line VIII—VIII in Fig. 9.

Fig. 9 is a section along the line IX—IX in Fig. 8, and

Figs. 10 and 11 show, in two different positions, a device for ensuring proper engagement on the part of the rollers.

Although in order to facilitate comprehension the invention is described in the following in its application to typewriters, viz., for the operation of the type bars, it will be perfectly obvious that the same may also be adapted literally to computing machines, or in point of fact to any other type of machine, in which certain parts thereof are operated through the medium of key bars.

Accordingly, in the assumed instance of a typewriter, the type bars 2 are mounted in the frame 1 in a segment 3 oscillatory about a shaft 4. In the position of rest the type bars lie on the pad 5. Each type bar 2 is engaged by an intermediate lever 6, these levers 6 being oscillatory about the shaft 7 of a comb 8 extending transversely across the machine and engaging by means of a stud 9 in a slot 10 in the lever 2.

The intermediate lever 6 is engaged by a

tie-rod 11, which may be moved into engagement with two continuously revolving operating rollers 12 and 13 for the purpose of causing the impression of the type. The operating rollers 12 and 13 are mounted in the frame 1 by means of the shafts 14 and 15, which each carry at the one end a gear wheel 16 and 17, the latter being coupled by an intermediate wheel 18, so that these two wheels 16 and 17, and accordingly the rollers 12 and 13, revolve in the same direction. The rollers 12 and 13 may be driven by a motor, or in any other suitable fashion.

The tie-rods 11 each rest on a roll 19, which is rotatable about a bolt 21 on the lever 20. All of the levers 20 are mounted on a shaft 22, which extends transversely across the entire machine and is mounted in slots 23 in the frame 1 so as to be adjustable in height.

The levers 20 each rest with the front end 24 on an eccentric 25, these eccentrics being furnished on levers 26, which are mounted to be loosely rotatable on a shaft 27 also extending over the entire width of the machine. The levers 26 cooperate with the key bars 28, which are capable of oscillation about a shaft 30 on the beam 29, and are acted upon by springs 31, which have the tendency to retain the key bars 28 in their upper position of rest. The key bars 28 are guided with the front ends in the slots 33 of a comb 32.

The key bars 28 possess a recess 34, into which there extend, by means of projections 35, the levers 26. In the resting position of the key bars 28 the projection 35 thrusts firmly against an abutment 36 in the recess 34, a spring 38 connected with the comb 32 at 37 engaging the lever 26 and drawing the same against the abutment 36. On each key bar 28 there is mounted by means of a stud 40 in a slot 39, so as to be oscillatory and displaceable, a pawl 41, the one end of which is acted upon by a spring 42 secured at 43 to the key bar 28. The other end of the pawl 41 engages between two projections 44 arranged in the comb 32 and constituting an oscillatory bearing for this end of the pawl 41.

The tie rods 11 carry a stop 45, which may be adjustable, and is capable of cooperating with the lever 26. In accordance with Fig. 5, the tie rods 11 may be of rectangular cross-section, in which case they then cooperate with smooth rollers 12 and 13. In Fig. 6 the rods 11a are of prismatic cross-section on the upper side, and engage in corresponding channels 46 in the rollers 12a and 13a. According to Fig. 7 the rods 11b are of round cross-section, and engage in round grooves 47 in the rollers 12b and 13b.

The operation of the device as above described is as follows:

Upon depression of a key bar 28 out of the position according to Fig. 2 into that in Fig. 3 the corresponding lever 26 is rocked under

the action of the spring 38 towards the left (Fig. 3). In this manner the eccentric 25 lifts the end 24 of the lever 20, and the roll 19 raises the rod 11 to such extent that the continuously revolving rollers 12 and 13 are capable of moving into engagement therewith. The rollers 12 and 13 thrust the rod 11 towards the rear, so that the same, through the medium of the intermediate lever 6, causes the type bar to strike the platen. When thrusting back the rod 11 the stop 45 returns the lever 26 somewhat beyond its initial position (Fig. 4), so that the key bar 28 is able to return to the position of rest and can hold tightly the lever 26. At the same time the eccentric 25 releases the lever 20, 24, so that the rod 11 is also able to move downwards and out of engagement with the rollers 12 and 13.

This operation as described can only take place if the key bar 28 is depressed shortly and sharply. It is possible, however, that the key is held in the depressed position, or for some reason does not immediately return. In this case the type bar would unintentionally strike the platen a number of times. In a typewriter or computing machine it is obvious that the type should move into contact with the platen only once upon each depression of a key. To ensure that this condition does actually apply there is provided the safety pawl 41 on the key bar 28.

When the key bar 28 is depressed, the projection on the pawl 41 moves downwards (Fig. 3), close to the abutment 36, but this does not take place until the projection 35 on the lever 26 has moved beyond this abutment.

If now the key bar is held in the depressed position (Fig. 4), the projection 35, upon the return of the lever 26, lifts, by means of the rod 11, the pawl 41 in the slot 39 in opposition to the action of the spring 42, and the pawl 41 snaps behind the projection 35 on the lever 26, so that the same firmly holds this lever 26 despite depressed key bar 28. The tie rod 11 is consequently out of engagement with the rollers 12 and 13, so that a double striking action is wholly out of the question.

In the arrangement as described the rod 11 is held in engagement with the rollers 12 and 13 only for such length of time as the eccentric 25 locks the lever 20, 24. During the latter part of the striking action merely the kinetic energy of the tie rod 11 of the lever 6 and the type bar 2 becomes effective to complete the stroke of the latter. The time at which the kinetic energy takes effect is accordingly dependent on incidental conditions in the engagement between the eccentric 25 and the lever 24, so that the same varies when writing and will consequently cause uneven strokes.

To avoid this drawback the lever 20, in

accordance with Figs. 10 and 11, possesses a rearwardly disposed projection or extension 48 having an inclined face 49. The extensions 48 each cooperate with a pawl lever 50, which is mounted to be oscillatory on a shaft 51 extending transversely over the entire machine. The pawl lever 50 possesses a projection 52, and is connected with the boss 54 of the lever 20, 48 by means of a spring 53. The engagement point 55 of the spring 53 on the boss 54 is such that the spring 53 has the tendency to rotate the lever 20, 48 about the shaft 22. On the rod 11 there is a second operating member 56, which is capable of co-operation with the pawl lever 50.

The operation of this device is as follows: If the key bar 28 is depressed, and the roll 19 with the lever 20 lifted by the lever 26, the extension 48 moves downwards. Under the action of the spring 53 the projection 52 moves over the inclined face 49 of the extension 48, and has the tendency to press the roll 19 against the rod 11, to thus hold the latter in proper engagement with the rollers 12 and 13. When the movement of the type has practically been completed the operating member 56 thrusts against the pawl lever 50 and conjointly moves the same. The projection 52 releases the extension 48, and the pull of the spring 53 on the boss 54 causes the lever 20 to spring back into its initial position, so that the rod 11 is immediately moved out of engagement with the rollers 12 and 13. By reason of this arrangement the initiation of the release of the rods 11 is very exactly defined, even in such cases in which the eccentric 25 has already released the lever 20, 24, as illustrated in Fig. 11.

It will be understood that no restriction is made to the specific form of embodiment shown, that this embodiment is quoted merely to illustrate the possible adaptation of the invention to a typewriter, and that accordingly various modifications are quite possible within the meaning of the above description and the annexed claims without departing from the spirit of the invention.

What I claim as new and desire to secure by Letters Patent is:

1. In a device of the character described, in combination, a continuously rotating roller, a plurality of keys, a stop connected with one of said keys, a lever adapted to come in contact with said stop, a spring connected with said lever, a cam rigidly connected with said lever, another lever associated with said cam, means for adjusting the position of the second-mentioned lever, a roll connected with the second-mentioned lever and movable therewith, a friction rod adapted to be pressed by said roll against said rotating roller, a type bar, and means connecting said type bar with said friction rod.

2. In a device of the character described, in combination, a continuously rotating roller,

a plurality of keys, a projection forming a part of one of said keys, a lever adapted to come in contact with said projection, said projection holding said lever when the corresponding key is at rest, a pawl resiliently mounted on said key, a spring connected with said lever and adapted to move the same after its release from contact with said projection, said pawl being adapted to come in contact with said lever at a certain position of said key, a cam connected with said lever and movable therewith, another lever associated with and movable by said cam, a roll connected with the second-mentioned lever and movable therewith, a friction rod adapted to be pressed by said roll against said rotating roller, a type bar, and means connecting said type bar with said friction rod.

3. In a device of the character described, in combination, a machine frame, a continuously rotating roller within said frame, a plurality of keys, pawls resiliently mounted in slots formed in said keys, each key carrying one of said pawls, members forming a part of said frame and projecting between said pawls, springs pressing against said pawls, each spring being in contact with one of said pawls, a lever associated with one of said keys, a spring connected with said lever, a cam connected with said lever and movable therewith, another lever associated with and movable by said cam, a roll connected with the second-mentioned lever and movable therewith, a friction rod adapted to be pressed by said roll against rotating roller, a type bar, and means connecting said type bar with said friction rod.

4. In a device of the character described, in combination, a machine frame, an operating roller within said frame, a plurality of keys, pawls resiliently mounted in slots formed in said keys, each key carrying one of said pawls, members forming a part of said frame and projecting between said pawls, springs pressing against said pawls, each spring being in contact with one of said pawls, a lever associated with one of said keys, a spring connected with said lever, a cam connected with said lever and movable therewith, another lever associated with and movable by said cam, a roll connected with the second-mentioned lever and movable therewith, the second-mentioned lever being provided with an extension, a pawl lever supported by said frame, said pawl lever being adapted to come in contact with said extension, a spring connected with said pawl lever, a projection forming a part of said pawl lever, a friction rod adapted to be pressed by said roll against said rotating roller, a type bar, and means connecting said type bar with said friction rod.

5. In a device of the character described, in combination, a continuously rotating roller, a plurality of keys, a lever associated with

one of said keys, a cam connected with said lever and movable therewith, another lever associated with and movable by said cam, a roll connected with the second-mentioned lever, a friction rod adapted to be pressed by said roll against said rotating roller, a type bar, means connecting said type bar with said friction rod, a spring connected with the first-mentioned lever, a pawl resiliently mounted on said key, a member forming an extension of the second-mentioned lever, a pawl lever adapted to come in contact with said member, a projection forming a part of said pawl lever, and a spring connected with said pawl lever.

In testimony whereof I have affixed my signature.

HUGO BENZING.

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