Dec. 10, 1929. B. Z. GOLDENBERG 1,738,950

ESCAPEMENT MECHANISM FOR TYPEWRITERS

Filed Sept. 21, 1927 4 Sheets-Sheet 1

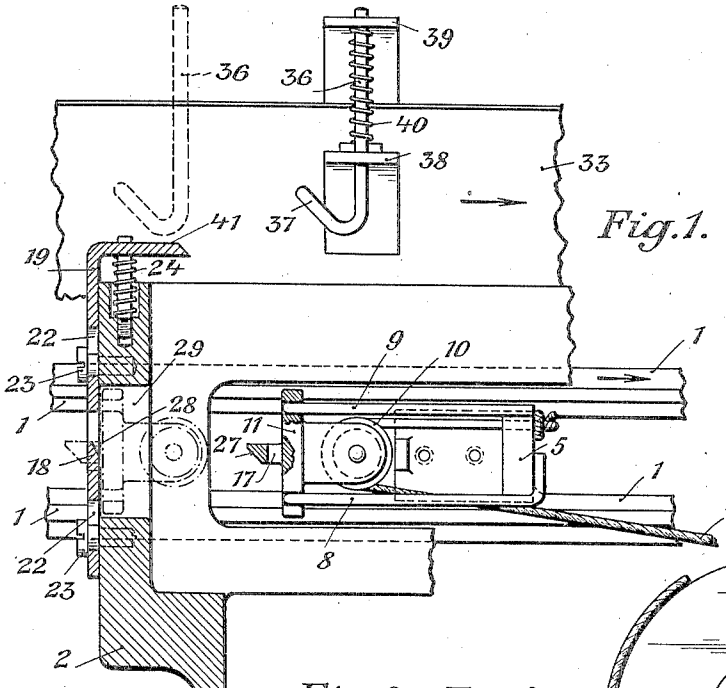



Fig. 1.

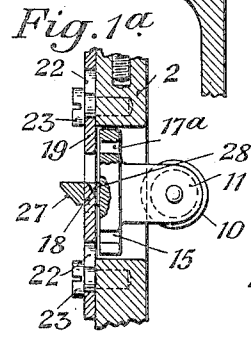



Fig. 1a.

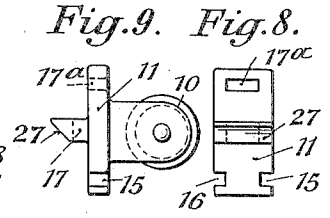



Fig. 9. Fig. 8.

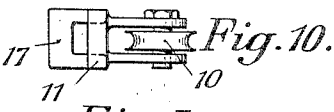



Fig. 10.

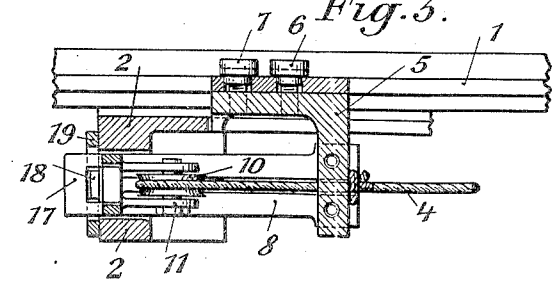



Fig. 3.

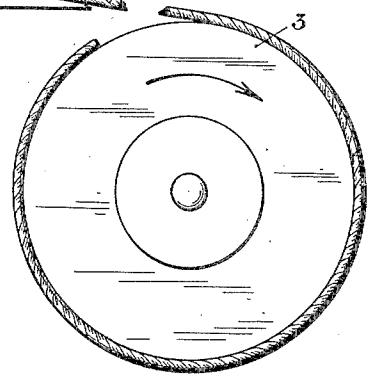



Fig. 7.

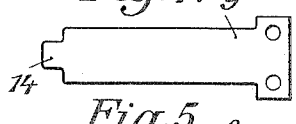



Fig. 5.

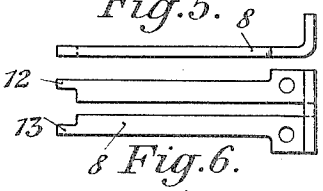



Fig. 6.

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ESCAPEMENT MECHANISM FOR TYPEWRITERS

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Fig. 2.

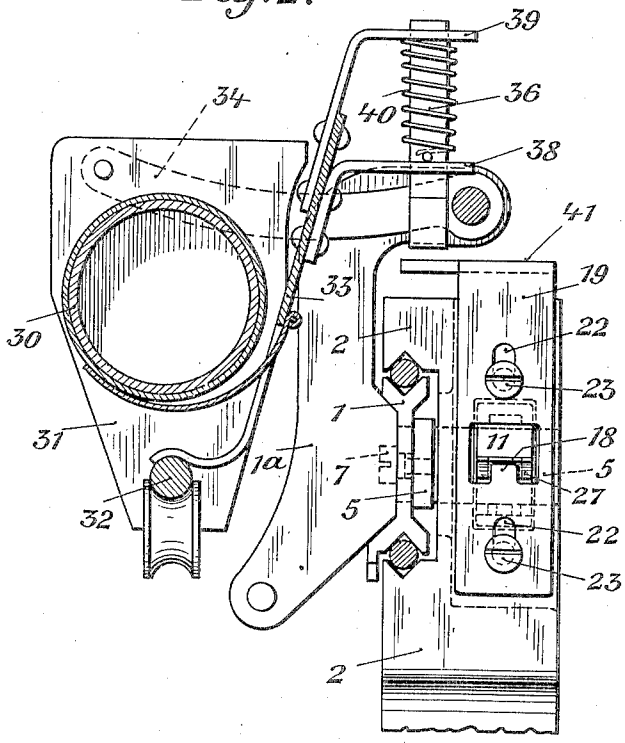
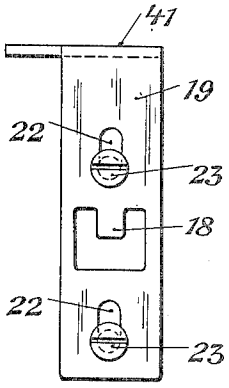



Fig. 4.



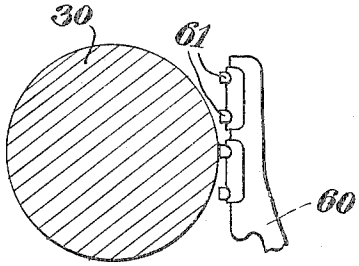




Fig. 17.

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ESCAPEMENT MECHANISM FOR TYPEWRITERS

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Fig. 11.

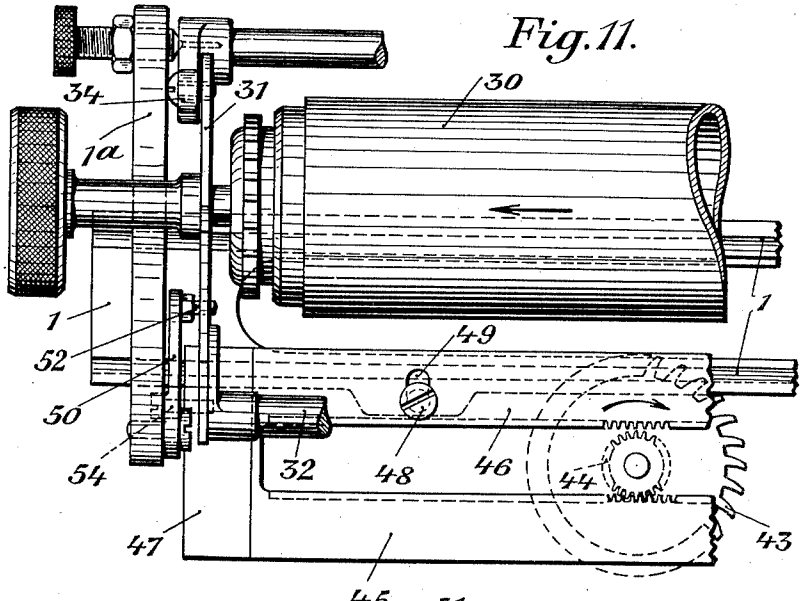
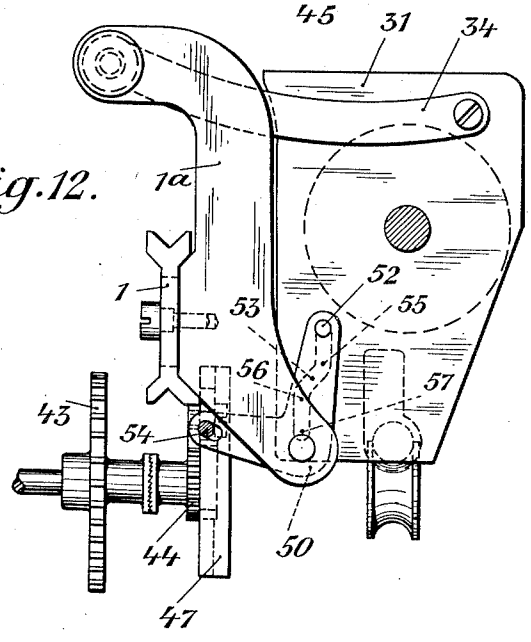



Fig. 12.




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Dec. 10, 1929. B. Z. GOLDENBERG 1,738,950

ESCAPEMENT MECHANISM FOR TYPEWRITERS

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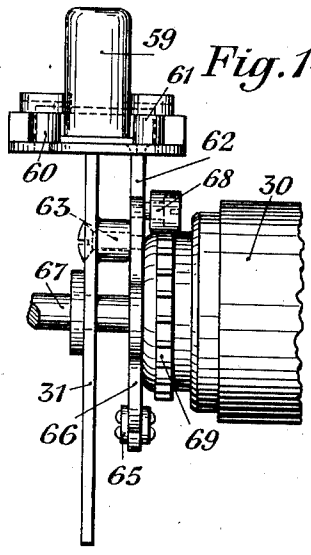



Fig. 14.

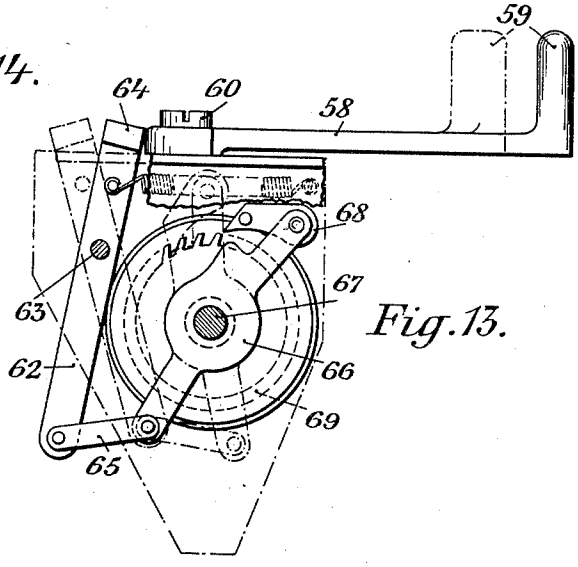



Fig. 13.

Fig. 15.

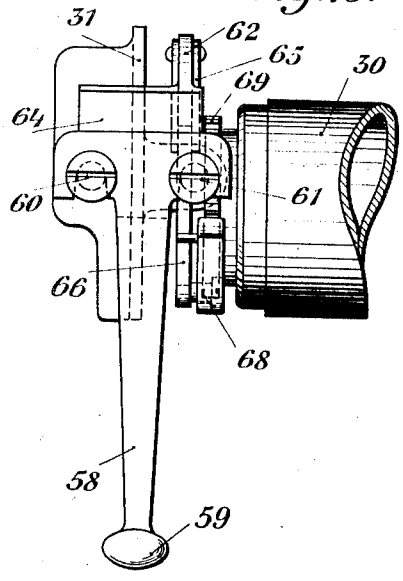
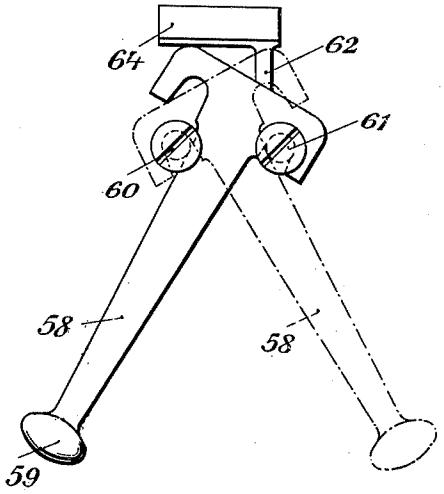



Fig. 16.




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Patented Dec. 10. 1929 1,738,950

# UNITED STATES PATENT OFFICE

BEN ZION GOLDENBERG, OF ALEXANDRIA, EGYPT, ASSIGNOR TO RHEINISCHE METALLWAAREN- UND MASCHINENFABRIK, OF DUSSELDORF-DERENDORF, GERMANY, A CORPORATION OF GERMANY

## ESCAPEMENT MECHANISM FOR TYPEWRITERS

Application filed September 21, 1927, Serial No. 220,987, and in Germany September 25, 1926.

The subject-matter the invention is to be employed in and adapted with, is a type writing machine of the kind in which the type carrying members carry several systems of types for different languages the writing directions of which are opposite to one another, as this is the case for instance with the characters of the English language and with those of certain oriental languages.

With type writing machines uniting on their type carriers such different systems of characters and with which at one time the system of one language is used and at another time that of the other language having an opposite writing direction, it is indispensable that also the stepwise feed motion of the paper roller and carriage, which is caused by the pull of the feed spring, takes place one time in one and at another time in the opposite direction.

Now my invention consists in certain novel features and devices on the machine which comply with these requirements in a simple manner, and, further, in the fact that certain stages and adjustments take place automatically and positively for the one or the other system of characters in dependence on the adjustment of the co-operating main elements of the machine, viz of the paper roller and the type bars.

In order to realize the object so outlined, the elements and gears in consideration, as they are present in the existing kinds of writing machines having one system of characters only, are not altered as to their number and operation, while the required supplemental elements and devices are attached organically to these existing elements.

With these leading points in view, my invention provides in the first instance that one and the same carriage feed spring constitutes the source of power to shift the carriage both from left to right and from right to left, without the direction of pull of this spring being changed. This is enabled by a reversing mechanism described hereinafter in detail and consisting, briefly, in a reversing pulley for the pull member attached to the feed spring the support of which pulley one time is fast on the carriage and thus takes part in the motions of the latter and does not act as a pulley, and at another time is fixed on the frame of the machine so that now the pulley becomes operative and reverses the direction of the pull acting upon the carriage.

A suitable construction of the individual parts in consideration results in the fact that when passing over from one to the other system of characters said pulley is automatically fixed to the machine frame and released again, respectively. Further, the configuration and dimensions of the elements operative in these stages are such as to cause the reversions and adjustments to take place only if a passage from the range of one system of characters is to be executed, but not if only a passage is made within one and the same system from one kind of characters to the other, for instance from small to capital characters.

Furthermore, in carrying out the idea of my invention one and the same locking device producing the stepwise release and stoppage of the feed motion of the carriage is used the locking wheel of which rotates always in the same direction as well for the system with the one and also for that with the opposite writing direction. This possibility is obtained for instance by arranging two locking rack bars interconnected at a fixed mutual distance and which are brought into mesh with said wheel selectively on one side or on the diametrically opposite side thereof. Means are further provided for causing the engagement of the one or other rack bar to take place automatically if—and only if—a passage from one to the other system of characters takes place.

With type writing machines of the kind

stated a return motion by hand of the carriage must be possible against the feed pull, as this is possible in every normal one system machine in one direction. With ordinary machines the device for returning the carriage by hand frequently has a hand lever which, to cause the return of the carriage, executes an angular rock motion, this motion being transmitted by the aid of an angle lever branching off from this hand lever to a member of the line spacing mechanism. In this manner thus a line spacing angular motion of the paper roller by an angle corresponding to the space of a line is effected automatically together with the return motion initiated by said hand lever. With type writing machines carrying two systems of characters and in which the return motion of the carriage has to be executed one time in one direction and at another time in the opposite one, the mentioned return and line spacing lever mechanism could be provided for on each side of the carirage, that means in duplicate. The invention hitherto pointed out in its two parts, however, is completed by its fundamental idea being extended also to the line spacing mechanism, in so far as one and the same member, namely a suitably constructed and operated line spacing lever is used in both cases, that is to return the carriage from left to right and vice-versa, which lever each time influences at the same time the line spacing gear of the paper roller in the same direction and in such a manner that the paper roller is rocked one line space.

The construction and function of the elements entering into consideration for my invention is described in the following on the sheets of drawings by way of example in connection with a type writing machine. This machine carries on the one hand a system of characters for which, as in the English writing, the carriage feed motion must take place from right to left, which characters are so arranged on the type bars in two rows (small and capital letters) that their types strike the paper in a lower or, more exactly, in two lower positions of the paper roller. On the other hand, the type bars of the machine hereinafter described carry another system of characters in two rows (small and capital characters) for which the opposite direction of feed motion of the carriage is required. If the characters of this second system are to strike the paper, the roller must be lifted with its support, so that it arrives in the range of these two rows of other characters.

This construction of the machine thus requires for the left to right-characters that the above-mentioned reversing pulley support positively abuts on its rest on the carriage, whilst for the right to left-characters this pulley support must be fixed on the frame of the machine. This condition also is the base for the construction and operation of the illustrated other devices and arrangements mentioned in the foregoing general explanations. Of course, the devices and operations may also be employed with machines based by kinematic inversion on the opposite fundamental condition, without deviating from the spirit of my invention.

The drawings which accompany and form part of this specification, show a preferred embodiment of the several subject-matters of my invention. In these drawings:

Fig. 1 is a fragmentary rear view of the mechanism reversing the feed motion of the carriage,

Fig. 1[a] is a detail thereof,

Fig. 2 is a side view of Fig. 1,

Fig. 3 is a fragmentary top view of Fig. 1,

Fig. 4 is a detail of a part also seen in Fig. 2,

Figs. 5 to 10 are further details,

Figs. 11 and 12 are fragmentary side and front views showing the means for reversing the carriage feed controlling device,

Figs. 13 to 16 show the main elements of the line spacing mechanism, in which:

Fig. 13 is a front view; Fig. 14 a side view; Fig. 15 a top view; and Fig. 16 a top view of a detail thereof.

Fig 17 is a cross-section of the platen in the first upper case position showing the superimposed types and a portion of its lever.

*Reversion of the carriage feed motion*

The carriage 1, Figs. 1 and 2, has lateral cheeks 1[a], and runs on balls or rollers in the frame 2 of the machine. The power required for the longitudinal feed motion of carriage 1 is delivered by an actuating spring lodged in the spring casing 3. This casing forms a drum on which one end of the pulling means, viz of a cord 4, is fixed and wound up. The other end of cord 4 is attached to the arm 5 of the carriage, see Figs. 1 and 3, this arm being integral with the carriage or fixed thereon for instance by screw pins 6 and 7. Besides arm 5 carries two horizontal legs 8 and 9, Figs. 5 and 6, the lower, 8, being slotted to allow of the cord 4 to pass through. The spring tends to rotate the casing 3 in the direction of the arrow, Fig. 1. The cord 4 is laid over a pulley 10 resting in a support 11. The latter is drawn by the pull of cord 4 against the free ends of the legs 8 and 9 and positively abuts in this manner on its abutment formed by arm 5, as illustrated, Fig. 1. The support 11 is secured in this position in lateral direction by lugs 12, 13, see Figs. 5, 6 and 7, of leg 8 and by lug 14 of leg 9, these lugs engaging corresponding recesses 15, 16 and 17[a] of the support 11, see Fig. 8.

When the parts assume the mutual position shown in Fig. 1, the pulley 10 takes part in the motion of the carriage 1, the cord acts on the latter as if no pulley at all were present.

The pull of the feed spring now produces a feed motion of the carriage 1 in a direction as required e. g. for the writing order of the German or Roman characters. As Fig. 1 is a rear view of the machine, the spring pull appears inversely, that is directed toward the right. Of course the actual pull, however, causes a feed motion of the carriage from right to left.

Characters of a writing direction opposite to that of the German or Roman writing, that is from right to left, such as the Turkish characters, require the pull exerted on the carriage 1 by cord 4 to take place inversely. To obtain the reversal of the pull required to this end, the support 11 with pulley 10 is now disconnected from carriage 1 and fixed on the machine frame 2. The pulley then acts as reversing pulley for the cord 4. The support 11 is fastened on the machine frame by means of its eye 17 co-operating with an edge 18 of a slide 19 arranged on the outer side of the frame. Slide 19 is secured on the frame by slot and pin connection 22, 23 so as to be shifted vertically within certain limits. The length of the legs 8 and 9 is so chosen that the hole of eye 17 is exactly above the edge 18 of slide 19, if the carriage 1 assumes its right-hand end position, see left-hand end position, as indicated by dash and dot lines in Fig. 1. If the carriage 1 is shifted from this position to right-hand end position, as this is the case in typing, when a new line is fed, then the eye has taken a position in which it is in the range of edge 18 of slide 19 so that edge 18 may engage eye 17. Slide 19 is under the lifting action of a spring 24, see Fig. 1. Eye 17 and edge 18 of slide 19 have co-operating sloped faces 27, 28, as shown, Fig. 1, the edge 18 thus engaging automatically eye 17, if the carriage 1 at the end of its motion towards slide 19 strikes the latter, in spite of its being lifted by spring 24, see Fig. 1a. The locking of the support 11 with the frame 2 and therewith the change of fixation of the reversing pulley 10 from carriage 1 to stationary frame 2, and the reversion of the spring pull acting upon carriage 1 thus take place automatically.

If, inversely, the pulley, now fixed on the machine frame 2 is to be assembled anew with the legs 8, 9 of the carriage, the locking members, viz edge 18 and eye 17, are disengaged by the carriage being shifted towards them into end position, whereby the lugs 12, 13, 14 of legs 8, 9 enter the recesses 15, 16, 17a of support 11. By depressing slide 19, the locking members 18, 19 are disengaged. The support 11 of pulley 10 now positively rests again on its abutment 5 and takes part in the motion of the carriage 1.

*Shifting the paper roller*

The paper roller 30 or platen is supported in a frame which has lateral end plates 31 on each end of the roller which are rigidly interconnected by the rail 32 and the cross plate 33. By means of rocking levers 34 arranged on both ends of the frame the latter is hinged to the cheeks 1a of the carriage 1.

The type levers 60 carry types 61 of different writing direction, as mentioned above, said types being in a vertical superimposed position when the type levers are in printing position. The types of the one or other system of characters come to print according to whether the paper roller 30 is raised or lowered.

If, as assumed in the following, the lowermost row of types has small Roman characters, the next row Roman capitals, the third row small characters of the opposite writing direction and the uppermost row has the corresponding capitals, the paper roller has to be brought into four levels relatively to the machine frame and to the type lever basket fixed therein. Each level of the paper roller must have allotted to it a determined direction of the feed motion of the paper roller and therewith a determined direction of the pull exerted by the carriage feed spring. In the case assumed for the lower pair of type rows this motion must be directed from right to left, as required for Roman characters, and for the upper pair of type rows from left to right. Now the above-described change of fixation of the pulley support 11 is caused to depend on said vertical shift of the paper roller in such a way that if paper roller 30 assumes one of its lower positions and is shifted into its right-hand end position, at the end of this motion, slide 19 is depressed and prevented from raising, as long as eye 17 of support 11 is in engaging position, that means above edge 18 of slide 19. To this end a lug is provided on the roller frame, in the embodiment shown a presser piece 36. This presser piece has an inclined lower end of the shape as illustrated, Figs. 1 and 2, and is rigidly fixed on the cross plate 33 by, but vertically shiftable on, arms 38 and 39. Under the action of an initially tensioned spring 40, the piece 36 is normally held in its lowermost position, this tension being greater than that of spring 24 of slide 19. On the other hand, spring 40 of pressed piece 36 is so tuned that it is unable to lift the paper roller 30 and its frame. The position of piece 36 relatively to the roller frame is so chosen that when at the end of the motion to the right of the roller frame the eye 17 of the support 11 engaged by the legs 8, 9 arrives in the range of edge 18 of slide 19, the presser piece 36 engages the upper face 41 of slide 19 and depresses the latter, if the paper roller and its frame take their lowermost position. Slide 19 perseveres in this depressed position even if the paper roller is in the next higher position (capital printing position). Then the spring 40 which was somewhat compressed with the lowermost po-

sition of paper roller 30, somewhat relaxes but continues to depress the slide 19 under the action of the weight of paper roller 30, so that edge 18 is not able to engage eye 17, even not, if the hole of eye 17 lies exactly above edge 18. The piece 36 together with the spring 40 constitutes the means for compensating for the influence of the companion level difference on the lug.

*Reversing the feed controlling mechanism of the carriage*

Figs. 11 and 12 show the mechanism provoking the stepwise feed motion of the paper roller carriage by the space of one letter. As mentioned above, this mechanism is to operate, according to my invention, in the present bilingual type writing machine by using one and the same controlling means and without reversing the direction of rotation of the actuating wheel.

The elements shown in Figs. 11 and 12 and refound in Figs. 1 to 10 are denoted by the same reference numbers. The feed controlling mechanism as used is of the usual construction and indicated in the figures only by the controlling wheel 43, that always rotates in the direction of the arrow, Fig. 11.

The feed controlling mechanism acts upon the carriage through the intermediary of a pinion 44. This is adapted to be brought into mesh selectively either with a lower or an upper rack bar 45, 46 respectively. These rack bars are interconnected at their ends by cross pieces 47 and thus form a rigid frame which is joined to the carriage 1 by several pin and slot connections 48, 49 as to shift vertically thereon. If frame 45, 46, 47 assumes upper position, pinion 44 engages the lower rack bar 45, whilst the upper rack bar 46 is engaged by it with said frame in lower position. The rack bars 45, 46 thus engage pinion 44 in diametrically opposite points. If the lower rack bar 45 is engaged, thus the carriage 1 executes its stepwise feed motion towards the left, and, inversely, if rack bar 46 is engaged, it is fed toward the right, in spite of the feed controlling mechanism rotating in one of these directions only.

Like the locking and releasing of the pulley 10, as described, the shifting of the rack bar frame of the feed controlling mechanism takes place in dependence of the different levels the paper roller frame may assume. Fig. 11 shows the left-hand end of the parts in consideration of the machine in elevation, Fig. 12 is the corresponding end view. The dependence of the position of the rack bars 45, 46 from the adjustment in elevation of the paper roller 30 is established by means of angle levers 50 pivoted on the lower ends of the cheeks $1^a$ of carriage 1. The cheeks $1^a$ have hinged to them at the same time the paper roller and its frame by means of rocking levers 34 and are rigidly connected to carriage 1. Consequently the cheeks $1^a$ take part in the feed motion of carriage 1, rack bars 45, 46 and roller frame, thus all these parts execute lateral shifting motions in common. Carriage 1 with its cheek $1^a$ is not shiftable vertically relatively to the frame of the machine, but the roller frame with its cheeks 31 and paper roller 30 may be shifted approximately vertically relatively to the carriage 1, rack bars 45, 46 and roller frame. Hence, if the level of the paper roller 30 is altered, the cheeks 31 of its frame are displaced vertically relatively to the cheeks $1^a$ of carriage 1 and therewith also relatively to the angle levers hinged to said cheeks 31.

One arm of the angle levers 50 carries a pin 52 which engages a curved slot 53 provided in each cheek 31 of the roller frame. The ends of the other arms of the angle levers 50 engage by slots pins 54 mounted on the cross pieces 47 that connect the rack bars 45, 46, as described.

The curved slots 53, Fig. 12, consist of three sections. Their lower and upper sections extend rectilinearly and in parallel with the raising direction of the paper roller and are joined by the inclined middle section.

If the paper roller and its frame assume their lower-most or initial position, the curved slot 53 is in the position as shown in Fig. 12. If now the paper roller is raised to its next higher position for printing capitals, point 55, Fig. 12, of the curve 53, that is the passage to the inclined slot section, moves into the centre of pin 52, no influence thus being exerted yet upon the angle lever 50 by this raise of the paper roller. If, however, the paper roller is lifted further so as to arrive in the range of the pair of rows of the other characters, point 56 moves into the centre of pin 52. Consequently pin 52 is urged to the left, Fig. 12, and the vertical arm of angle lever 50 rocks about its pin on the cheek $1^a$. As the other arm of lever 50 partakes of this rocking motion, it lowers the rack bars 45, 46 by means of pin 54 to such an extent that now the upper rack bar 46 engages pinion 44. If, further, the paper roller is raised still to print capitals of the second system, point 57 now moves into the centre of pin 52, the position of levers 50 and thus of rack bars 45, 46 remaining unaltered.

As will be seen from the foregoing, the rack bars 46, 46 of the carriage feed controlling mechanism are positively adjusted in dependance on the vertical adjustment of the paper roller by means of slot 53 and angle lever 50 in such a manner that the paper roller is fed stepwise from right to left as long as the two lower rows of characters are to be printed, and that if the paper roller is adjusted for the two upper rows of characters the inverse stepwise feed motion takes place.

As it is further to be seen, the means for reversing the carriage feed controlling

mechanism described act in the same sense and at the same time as the means for reversing the pull exerted on the carriage, that means those for changing the fixation of the reversing pulley 10.

Due to the dependence of the means for throwing over said pulley 10 and of those for changing the rack bar on the adjustment of the paper roller, and due to the mutual dependence of said two means, the passage from the characters just used to the other characters requiring the opposite writing direction becomes very simple. After the desired position of the paper roller has been adjusted and the carriage has been shifted into the end position causing the change of fixation of pulley 10, no further adjustment is required, and the machine is ready for writing with the second system of characters.

As already mentioned, by arranging certain parts of the reversing mechanisms inversely and by local or kinematic inversions the conditions may be so altered in the machine built according to my invention that, in contradistinction to the supposition of the embodiment described, instead of the two lower rows of characters the two upper ones have allotted to them the writing direction from left to right, whilst for the two lower rows of characters the right to left-order is provided for and becomes so to say the normal writing direction. This may be obtained by arranging the feed spring inversely so that it turns the spring casing or drum in the direction opposite to the arrow, Fig. 1, and by mounting the locking slide 19 on the opposite side of the machine. Of course then the cord is to be wound up inversely and the support of the reversing pulley is to be arranged on the opposite side of its abutment on arm 5. The carriage feed controlling mechanism and its effect is brought into accordance by inversing the direction of rotation and of the teeth of pinion 44 opposite to the arrow of Fig. 11. The carriage feed controlling mechanism may further be caused to operate to inverse sense, if, as shown in Fig. 4, edge 18 of slide 19 does not enter the eye 17 of support 11 from below but from above. The presser piece 36 engaging the upper face 41 of slide 19 then shifts edge 18 downward into eye 17, if the paper roller assumes its two lower positions, whilst, with the embodiment shown in Figs. 1 and 2, edge 18 enters eye 17 from below.

As long as support 11 is held fast by the edge 18, the pull of the cord 4 acting on pulley 11 urges slide 19 against the machine frame and the friction prevailing between slide and machine frame is sufficient to maintain slide 19 in its lower position against the action of spring 24 which tends to raise it. For sake of security, however, the lower end of edge 18 could be provided with a somewhat projecting rib acting like a hook, but automatically released if the other system of characters is to be made use of. The feed controlling mechanism could be brought into accordance therewith by a little alteration of one of its elements, for instance, by giving to the slots 53 of the cheeks 31 the inverse curvature.

*Line spacing mechanism*

Figs. 13 to 16 show the line spacing mechanism as applied to the machine according to my invention. With one system-machines the line feed manipulating lever is so arranged that it becomes operative, if the paper roller is returned by it towards the right. In contradistinction thereto, in my novel machine one and the same line feed lever, as shown in the drawing, is always operative, no matter whether the paper roller is returned by it to the right or to the left.

The line spacing mechanism illustrated consists of a line feed lever 58 which when grasped by handle 59 and rocked from the position shown in Fig. 15 to the left, swings about point 61, as shown in full lines in Fig. 16, whilst, when rocked in opposite direction, it swings about point 60, as shown in dash and dotted lines in Fig. 16. In both cases the swing motion of the lever 58 causes lever 62, Fig. 13, which is hinged on the paper roller frame 31 at 63 and carries a cross head 64, to be swung always in the same direction. Lever 62 transmits its motion to pawl 68 through the intermediary of rod 65 and lever 66 that rocks about the axle 67 of the paper roller. Pawl 68 engages the teeth of the ratchet wheel 69 rigid to the roller 31 and turns it together with the paper roller by an angular amount corresponding to the desired line space each time lever 58 is manipulated.

What I claim as my invention and desire to secure by Letters Patent, is:—

1. In a type writing machine having a plurality of type systems of opposite writing directions: a machine frame, a paper roller carriage adapted to run thereon, a carriage feed mechanism comprising a spring-actuated drum, a pull member one end of which is attached to said drum and the other end of which is attached to the carriage, a removable support laterally abutting on said carriage at a point beside the point of attachment of said pull member and remote from said drum, a pulley mounted on said support, said pull member leading over said pulley, a second abutment for said support arranged on the machine frame horizontally opposite to said first abutment, means for automatically attaching said support to said second abutment if the carriage is in its corresponding end position, and means for releasing this attachment.

2. In a type writing machine having a plurality of type systems of opposite writing

directions: a machine frame, a paper roller carriage adapted to run thereon, a carriage feed mechanism comprising a spring-actuated drum, a pull member one end of which is attached to said drum and the other end of which is attached to the carriage, a removable support laterally abutting on said carriage at a point beside the point of attachment of said pull member and remote from said drum, a pulley mounted on said support, said pull member leading over said pulley, a second abutment for said support arranged on the machine frame horizontally opposite to said first abutment, a bolt movably mounted on the machine frame, an inclined face on said bolt, a hook on said support adapted to co-operate with said inclined face, and a spring adapted to urge said bolt into locking position.

3. In a type writing machine having a plurality of type systems of opposite writing directions: a machine frame, type carriers mounted thereon and carrying the types of the different systems in superimposed order, a paper roller carriage adapted to run on said frame, means for adjusting said paper roller on said carriage in different levels according to the position of the types on said type carriers, a carriage feed mechanism comprising a source of power adapted to move always in one direction, means for supplying this motion to said carriage to feed it, and means for reversing said feed motion in correspondence with the required writing direction and in dependence on the level the paper roller is adjusted in.

4. In a type writing machine having a plurality of type systems of opposite writing directions: a machine frame, type carriers mounted thereon and carrying the types of the different systems in superimposed order, a paper roller carriage adapted to run on said frame, means for adjusting said paper roller on said carriage in different levels according to the position of the types on said type carriers, a carriage feed mechanism comprising a spring-actuated drum, a pull member one end of which is attached to said drum and the other end of which is attached to the carriage, a removable support laterally abutting on said carriage at a point beside the point of attachment of said pull member and remote from said drum, a pulley mounted on said support, said pull member leading over said pulley, a second abutment for said support arranged on the machine frame horizontally opposite to said first abutment, a bolt movably mounted on the machine frame, an inclined face on said bolt, a hook on said support adapted to co-operate with said inclined face, a spring adapted to urge said bolt into locking position, a lug on said carriage adapted to shift said bolt into releasing position against the action of said spring if the paper roller is at one of the levels required for one type system and to leave said bolt unacted upon if the paper roller is at the other levels.

5. In a type writing machine having a plurality of type systems of opposite writing directions: a machine frame, type carriers mounted thereon and carrying the types of the different systems in superimposed order, a paper roller carriage adapted to run on said frame, means for adjusting said paper roller on said carriage in different levels according to the position of the types on said type carriers, a carriage feed mechanism comprising a spring-actuated drum, a pull member one end of which is attached to said drum and the other end of which is attached to the carriage, a removable support laterally abutting on said carriage at a point beside the point of attachment of said pull member and remote from said drum, a pulley mounted on said support, said pull member leading over said pulley, a second abutment for said support arranged on the machine frame horizontally opposite to said first abutment, a bolt movably mounted on the machine frame, an inclined face on said bolt, a hook on said support adapted to co-operate with said inclined face, a spring adapted to urge said bolt into locking position, a lug on said carriage adapted to shift said bolt into releasing position against the action of said spring if the paper roller is at one of the two companion levels of one type system, and to leave said bolt unacted upon if the paper roller is at one of the other two companion levels, and means for compensating for the influence of the companion level difference on said lug.

6. In a type writing machine having a plurality of type systems of opposite writing directions: a machine frame, type carriers mounted thereon and carrying the types of the different systems in superimposed order, a paper roller carriage adapted to run on said frame, means for adjusting said paper roller on said carriage in different levels according to the position of the types on said type carriers, a carriage feed mechanism comprising a spring-actuated drum, a pull member one end of which is attached to said drum and the other end of which is attached to the carriage, a removable support laterally abutting on said carriage at a point beside the point of attachment of said pull member and remote from said drum, a pulley mounted on said support, said pull member leading over said pulley, a second abutment for said support arranged on the machine frame horizontally opposite to said first abutment, a bolt movably mounted on the machine frame, an inclined face on said bolt, a hook on said support adapted to co-operate with said inclined face, a spring adapted to urge said bolt into locking position, a vertically shiftable lug mounted on said carriage and adapted to shift said bolt into releasing position against the action of said spring if the paper roller is

at one of the two companion levels of one type system, and to leave said bolt unacted upon if the paper roller is at one of the other two companion levels, a spring adapted to urge said lug into its lowermost position and the power of which surpasses that of said bolt-actuating spring.

7. In a type writing machine having a plurality of type systems of opposite writing directions: a machine frame, type carriers mounted thereon and carrying the types of the different systems in superimposed order, a paper roller carriage adapted to run on said frame, means for adjusting said paper roller on said carriage in different levels according to the position of the types on said type carriers, means for feeding said carriage selectively in the direction required by the writing direction used, a carriage feed controlling mechanism comprising an escapement device adapted to act always in the same direction of rotation, means interposed between said carriage and said escapement device for reversing the stepwise motion of said carriage in accordance with the writing direction required and in dependence on the level imparted to said paper roller.

8. In a type writing machine having a plurality of type systems of opposite writing directions: a machine frame, type carriers mounted thereon and carrying the types of the different systems in superimposed order, a paper roller carriage adapted to run on said frame, means for feeding said carriage selectively in the direction required by the writing direction used, a carriage feed mechanism comprising an escapement device adapted to act always in the same direction of rotation, a pinion partaking in the stepwise motion caused by said device, a rack arranged at one side of said pinion, a second rack arranged diametrically opposite to said first-named rack, said racks extending in parallel with the direction of the feed motion of the carriage and being adapted to alternately be in mesh with said pinion, means rigidly interconnecting said racks, a connection between said racks and said carriage adapted to admit a motion of said racks perpendicularly to its feed motion, a frame carrying said paper roller and adapted to be shifted vertically relatively to said carriage, and means for transmitting the shifting motion of the roller frame to said racks.

9. In a type writing machine having a plurality of type systems of opposite writing directions: a machine frame, type carriers mounted thereon and carrying the types of the different systems in superimposed order, a paper roller carriage adapted to run on said frame, means for feeding said carriage selectively in the direction required by the writing direction used, a carriage feed mechanism comprising an escapement device adapted to act always in the same direction of rotation, a pinion partaking in the stepwise motion caused by said device, a rack arranged at one side of said pinion, a second rack arranged diametrically opposite to said first-named rack, said racks extending in parallel with the direction of the feed motion of the carriage and being adapted to alternately be in mesh with said pinion, means rigidly interconnecting said racks, a connection between said racks and said carriage adapted to admit a motion of said racks perpendicularly to its feed motion, a frame carrying said paper roller and adapted to be shifted vertically relatively to said carriage, angle levers mounted on said carriage, one arm of each of them engaging said racks, a pin and curved slot connection between each of the other arms and the roller frame.

10. In a type writing machine having a plurality of type systems of opposite writing directions: a machine frame, type carriers mounted thereon and carrying the types of the different systems in superimposed order, a paper roller carriage adapted to run on said frame, means for feeding said carriage selectively in the direction required by the writing direction used, a carriage feed mechanism comprising an escapement device adapted to act always in the same direction of rotation, a pinion partaking in the stepwise motion caused by said device, a rack arranged at one side of said pinion, a second rack arranged diametrically opposite to said first-named rack, said racks extending in parallel with the direction of the feed motion of the carriage and being adapted to alternately be in mesh with said pinion, means rigidly interconnecting said racks, a connection between said racks and said carriage adapted to admit a motion of said racks perpendicularly to its feed motion, a frame carrying said paper roller and adapted to be shifted vertically relatively to said carriage, angle levers mounted on said carriage, one arm of each of them engaging said racks, a pin and slot connection between each of the other arms and the roller frame, said slot having straight sections extending in parallel with the direction of the adjusting motion imparted to the roller, the length of said straight sections corresponding to the range occupied by the two types, carried by each type carrier, of the different systems of types, and inclined sections connecting each two straight sections.

11. In a type writing mechanism having a plurality of type systems of opposite writing directions: a frame, a paper roller carriage adapted to run thereon, means for selectively feeding said carriage in one or opposite direction, a three-armed rocking lever mounted on said carriage and comprising two arms of equal shape and a handle lever arranged between them, a line spacing mechanism comprising a line spacing gear and a

member adapted to rock it, said member being in the rocking range of both said arms of equal shape of said three-armed lever.

12. In a type writing mechanism having a plurality of type systems of opposite writing directions: a frame, a paper roller carriage adapted to run thereon, means for selectively feeding said carriage in one or opposite direction, a three-armed rocking lever mounted on said carriage and comprising two arms of equal shape and a handle lever arranged between them, a fulcrum for said three-armed lever being arranged for each of said two equally shaped arms and located in a common plane extending in parallel with said roller, a recess on each of said arms adapted to engage the respective fulcrum and open at the side of said handle lever, a line spacing mechanism comprising a line spacing gear and a member adapted to rock it, said member being in the rocking range of both said arms of equal shape of said three-armed lever.

In testimony whereof I have affixed my signature.

BEN ZION GOLDENBERG.