

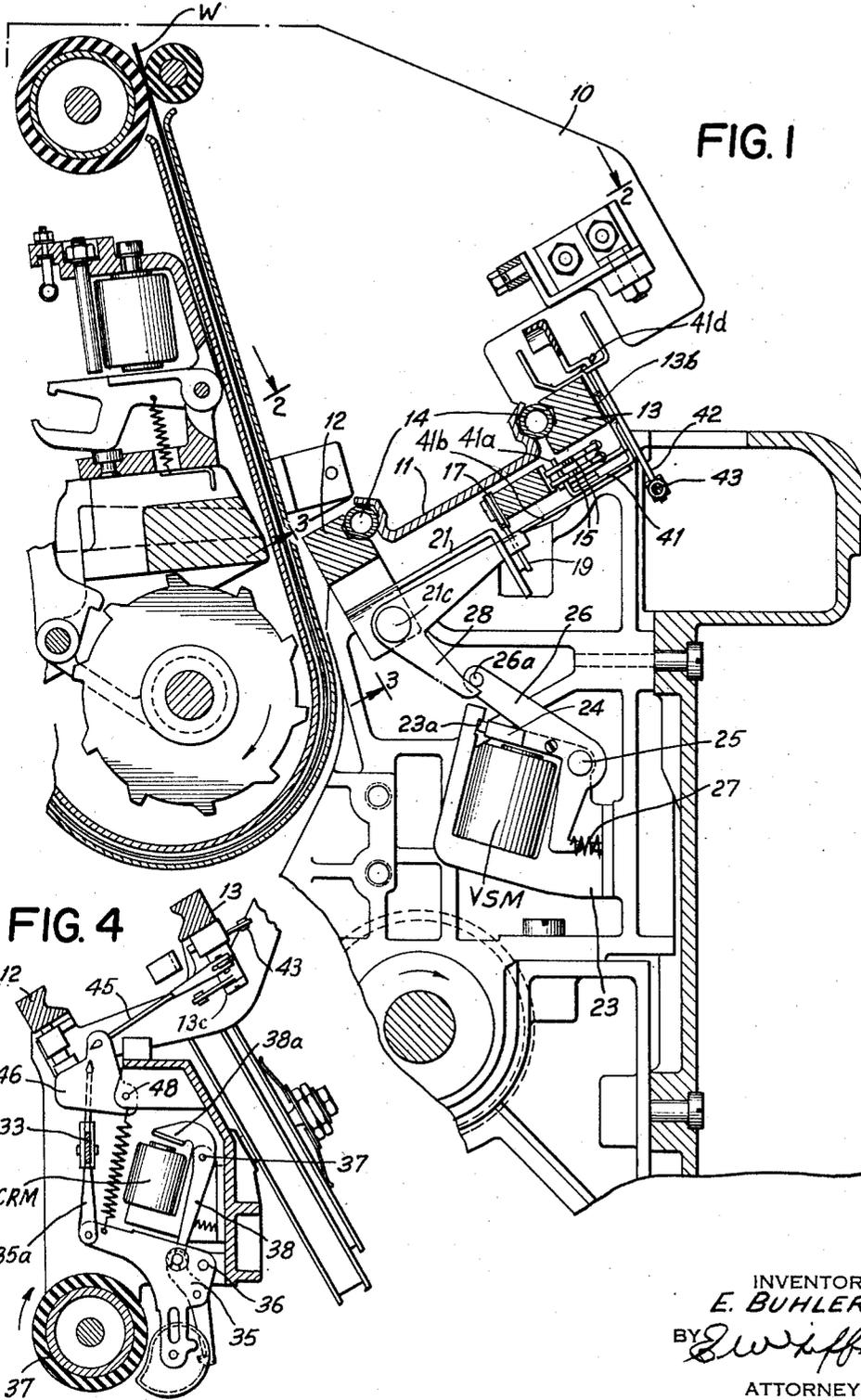
June 5, 1951

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HORIZONTAL AND VERTICAL SPACING MECHANISM
FOR CHINESE TYPEWRITERS

2,555,729

Filed June 16, 1948

2 Sheets-Sheet 1



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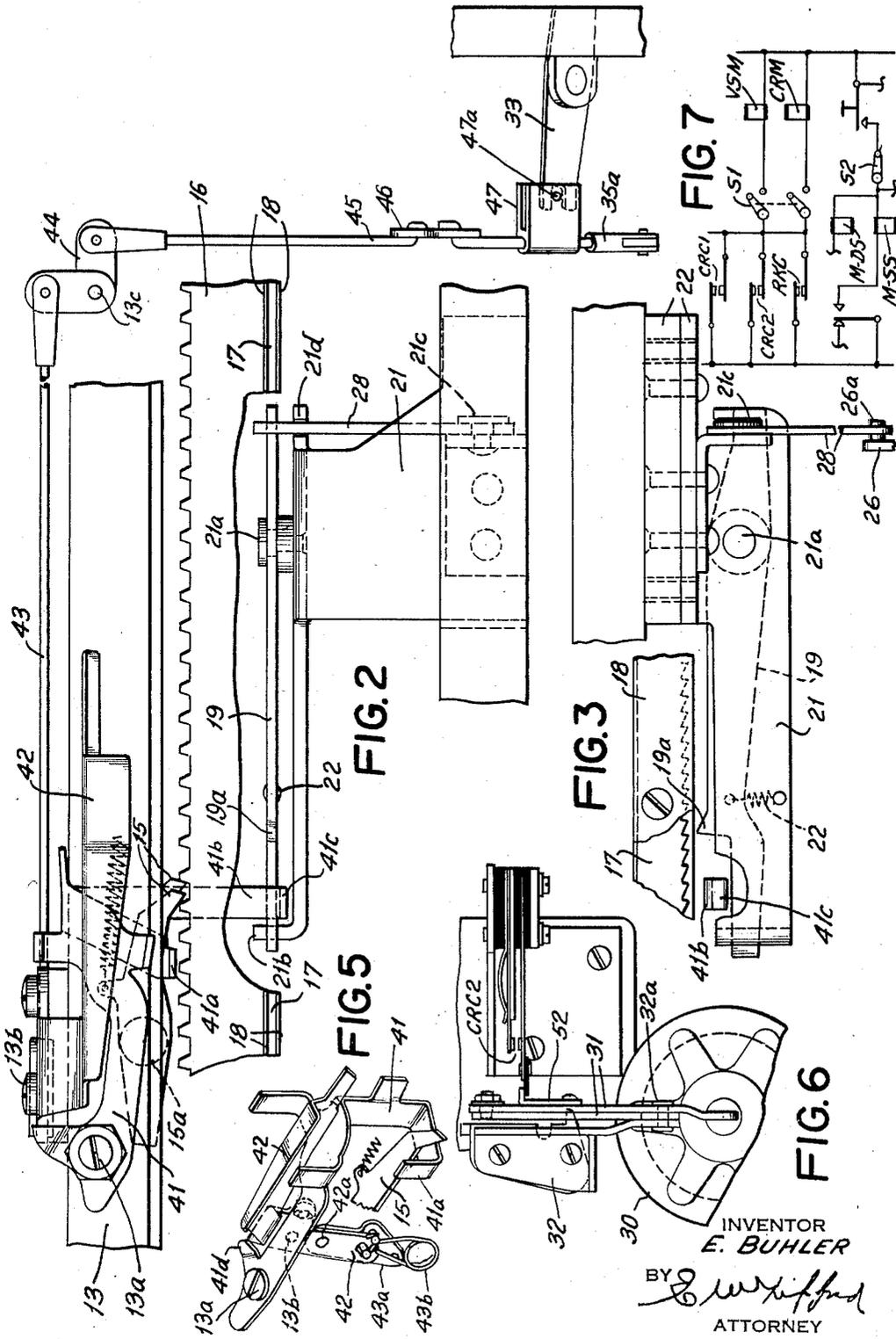
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HORIZONTAL AND VERTICAL SPACING MECHANISM FOR CHINESE TYPE- WRITERS

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7 Claims. (Cl. 197—1)

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This invention relates to ideographic printing machines, particularly machines for printing the Chinese language, and is an improvement upon the machine disclosed in application Serial No. 666,980, filed May 3, 1946, by E. Buhler and C. A. Berry, now Patent No. 2,458,339, granted January 4, 1949.

The primary object of the present invention is to provide for the printing of both modern and classical Chinese.

Modern Chinese, like the English language, has the characters spaced in a sequence from left to right in a horizontal line, whereas the classical Chinese has the characters spaced in a vertical row in a sequence from top to bottom.

The machine disclosed in the above application is designed to print only modern Chinese and in the practical use of this machine it has been discovered that there are a great many cases where it is desired to print classical Chinese and it is very desirable that it be possible to print either one at the operator's discretion. Accordingly, it is an object of the present invention to provide selective means enabling the operator to set the machine for printing of either modern or classical Chinese.

Other objects of the invention will be pointed out in the following description and claims and illustrated in the accompanying drawings, which disclose, by way of example, the principle of the invention and the best mode, which has been contemplated, of applying that principle.

In the drawings:

Fig. 1 is a vertical section through the carriage of the machine.

Fig. 2 is a view in the direction of the arrows 2—2 in Fig. 1.

Fig. 3 is a view in the direction of the arrows 3—3 in Fig. 1.

Fig. 4 is a vertical section showing the power mechanism for operating the carriage return clutch.

Fig. 5 is a detail view of the escapement pawl release mechanism.

Fig. 6 is a view of the carriage return clutch and the contacts associated therewith.

Fig. 7 is a wiring diagram.

In Fig. 1, the reference numeral 10 designates the carriage side plates which are joined together by a channel shaped track member 11 which is slidably mounted on the front rail 12 and the rear rail 13 by means of suitable anti-friction bearings 14. The carriage is provided with a character spacing mechanism which includes the spacing pawls 15 (Figs. 2 and 5). The

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specific manner of operation of these pawls is not of particular concern in the present application, but it will be understood that, after each character printing operation in printing modern Chinese, the pawls 15 are automatically operated to space the carriage the proper extent to cause successive characters to be written in a horizontal line from left to right on the work sheet W.

In order to write classical Chinese, it is necessary that the work sheet W (Fig. 1) be moved vertically the equivalent of a line space with reference to the operation of printing modern Chinese, and that the vertical columns or "lines" of characters be spaced horizontally by an operation of the pawls 15. This is exactly the reverse of spacing for the writing of modern Chinese. In order to effect this result, means are provided to hold the carriage 10 stationary and prevent normal spacing operations by means of pawls 15 from taking place when a character is printed and at the same time cause an operation of the line spacing mechanism to space the characters vertically.

For the purpose of holding the carriage stationary, there is provided an auxiliary rack 17 (Figs. 1, 2, and 3) which is secured to the edge of the escapement rack 16, the rack 17 being sandwiched between two shroud straps 18 which are wider than the rack 17. Cooperating with the rack 17, as best shown in Fig. 3, is a detent member 19 in the form of a lever pivoted at 21a in a frame 21 secured to the front rail 12 and spaced therefrom by means of spacing blocks 22. The longer end of the lever 19 is guided in a slot formed in a bent-over lug 21b (Fig. 2) formed in the frame 21. The lever 19 is provided with a tooth 19a adapted to engage the teeth of the rack 17 when the lever 19 is rocked clockwise (Fig. 3) and thereby hold the carriage 10 against movement counter to the normal character spacing movement in writing modern Chinese. The lever 19 is normally held in retracted position by a spring 22.

The lever 19 is operated by a vertical spacing magnet VSM (Fig. 1) mounted in a frame 23 secured to the main framework of the machine. Coacting with the magnet VSM is an armature 24 which is pivotally mounted at 25 on the frame 23 and is adjustably secured to a lever 26, also pivotally mounted at 25. The free end of the armature 24 extends into a slot 23a formed in the frame 23 which limits movement of the armature. Normally the armature is held against the upper wall of the slot by means of a com-

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pression spring 27 interposed between a pilot projection formed in the lever 26 and a pilot pin carried by the frame 23.

The lever 26 is provided with a pin 26a (Fig. 1) in the plane of one arm of a lever 28 pivoted at 21c on the frame 21. The other arm of the lever 28 is guided in a slot 21d (Fig. 2) formed in the frame 21 and extends over the right-hand end (Figs. 1 and 2) of the lever 19. It is clear that the energizing of the magnet VSM will cause the lever 26 to be rocked counterclockwise (Fig. 1) thereby rocking lever 28 clockwise and depressing the right-hand arm (Fig. 2) of the lever 19. This elevates the lug 19a (Fig. 3) of lever 19 into a tooth space in the rack 17, thereby preventing movement of the carriage to the right in Fig. 2; that is, in a carriage return direction.

The machine, as disclosed in application Serial No. 666,980, is equipped with a carriage return and line spacing mechanism which is similar in principle to the one disclosed in Patent 2,200,767. This mechanism includes a carriage return clutch 30 (Fig. 6) which is operated by the lever 31 which is pivoted at 32a to a bracket 32 carried by the framework of the machine. The lever 31 is composed of two members adjustably secured together and shifted by a toggle including a lever 33 (Figs. 2 and 6). When the lever 33 is rocked counterclockwise (Fig. 2), the toggle is straightened past the dead center position thereby actuating the upper end of the lever 31 in a direction to engage the clutch 30. This causes the carriage return tape to be placed under tension and operates the line space mechanism which causes feeding of the work sheet one or more line spaces, depending upon the setting of the lever which controls the line space mechanism.

As described in application Serial No. 666,980, the lever 33 is operated in the manner described by a cam unit 35 pivoted at 36 in the main framework and cooperating with a power roller 37 which rotates in the direction of the arrow while the machine is in use. This cam unit is of a type well known in the art and need not be described in detail herein. The cam unit is rendered operative by the power roller by means of a lever 38 pivoted at 39 and this lever includes an armature 38a cooperating with a magnet CRM herein-after called the carriage return magnet. In application Serial No. 666,980, the magnet CRM is energized under the control of the carriage return key whenever the carriage return contacts CRC1 (Fig. 7) are closed to energize the magnet CRM. This renders the cam unit 35 operable by the power roller 37 in a well known way and actuates the lever 33 in a counterclockwise direction (Fig. 2) by drawing down a link 35a pivotally connected to the cam unit 35. This, as explained in the foregoing application, renders the carriage return clutch operative to return the carriage and line space the work sheet W. In the present case, it is necessary to prevent the returning of the carriage, but to permit the line spacing operation to proceed. The lever 19 through the lug 19a prevents movement of the carriage under control of the carriage return tape and this result is accomplished by placing the magnets VSM, CRM in parallel by means of switch S1 which is closed whenever it is desired to print classical Chinese.

The escapement pawls 15 ordinarily are automatically released during a carriage return operation to silence the noise made by the pawls 15 which would occur if they were allowed to ride over the rack 16. This release of the pawls 15

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ordinarily is effected by means of a lever 41 (Figs. 1 and 2) pivoted at 13a on the rear rail 13. This lever is also used to effect release of the pawls 15 when it is desired to move the carriage by hand or to effect release of the carriage during a tabulating operation, as explained in the above application. In order to release the pawls 15, the lever 41 is provided with a lug 41a (Figs. 2 and 5) which extends into the planes of pawls 15 between the rack 16 and said pawls and to the right of the pivot 15a of the pawls.

It is clear in Fig. 2 that the rocking of the lever 41 in a counterclockwise direction will release the pawls 15 from the rack 16. For the purpose of effecting such movement during a normal carriage return operation, there is provided the carriage return-trip lever 42 which is pivoted at 13b to the rear rail and connected by a link 43 to one arm of the lever 44. This lever is pivoted at 13c to the rear rail 13 and its other arm has a link connection 45 with a lever 46. The link 35a is connected to the lever 33 by means of a slotted block 47 having a pin 47a engaging a slot in the end of the lever 33 and the link 35a is threaded into a hole in the block 47 and pivotally connected to the lever 46. The lever 46 is pivoted at 48 to the framework of the machine.

The lever 42 is a part customarily present in carriage return mechanisms for the purpose of releasing the carriage return clutch when the carriage reaches the left-hand marginal position. It is customarily made in two parts, the link 43 being connected to an arm 43a (Fig. 5) pivoted at 42a on lever 42. The two are connected by a stiff spring 43b which compels the parts 42, 43a, 43b to operate as a single lever unless lever 42 is blocked against counterclockwise movement (Fig. 5) as happens when the platen is line-spaced with the carriage in the left-hand marginal position. Under these conditions, lever 42 is blocked by the marginal stop in a well known way and spring 43b stretched. The tension in spring 43b prevents the toggle, of which lever 33 is part, from locking beyond the dead center position, and releases the clutch immediately after the platen has been line-spaced.

In order to line-space without returning the carriage and with the carriage held in a position preventing its return, it is necessary to prevent the toggle, of which lever 33 is a part, from locking beyond the dead center position. This result is effected by an extension arm 41b (Figs. 2 and 3) secured to the lever 41 and formed with a downwardly projecting lug 41c located slightly in front of the left-hand end of the lever 19 but clear thereof, as most clearly shown in Fig. 2. With the lever 19 retracted as in Fig. 3, the lug 41c is free to move across the top edge of the lever 19. If the lever 19 is elevated in the manner described above to hold the carriage stationary, the lever moves in front of lug 41c to block the counterclockwise releasing movement (Fig. 2) of the lever 41.

Lever 41 has a bent-over lug 41d (Figs. 2 and 5) extending into the plane of lever 42 above its pivot 13b. When lever 42 is actuated counterclockwise (Fig. 5) by link 43 during the carriage return operation, lever 41 will be rocked counterclockwise (Fig. 2) to release pawls 15 from the rack 16 to prevent the noise produced by the pawls idly wiping the teeth. If the magnet VSM has been energized along with magnet CRM to cause the carriage to be held in an intermediate columnar position during a vertical spacing operation, the extension 41b prevents

movement of lever 41 thereby also blocking movement of lever 42 owing to the presence of lug 41d. As a result, the platen will be rotated but spring 43b will function as described above to release the clutch 30. It will thus be seen that the release of the pawls 15 is prevented and the carriage remains stationary, but the line spacing mechanism will be operated.

The magnets VSM, CRM may be energized in two different ways. When the carriage return key is depressed, the contacts CRC1 close and energize both magnets CRM and VSM (Fig. 7) which have the effect of blocking the carriage against movement and at the same time initiating a carriage return operation, which, however, effects only a vertical spacing operation. As explained in application Serial No. 666,980, the release key is operated automatically after each character printing operation and causes the release key contacts, designated RKC in Fig. 7, to be closed. This has the effect of energizing both the magnets CRM and VSM and thus producing an automatic spacing operation after each character printing operation with the result that the work sheet W will be spaced vertically instead of horizontally after each character is printed. This result can be effected by depressing the release key manually.

In order to insure proper operation of the carriage blocking mechanism, there is provided the contacts CRC2 (Fig. 6), which are controlled by a bracket 52 which is secured to one of the toggle links operating the lever 31. These toggle links are swung upwardly, thereby raising the bracket 52 (Fig. 6) when the clutch lever 31 is operated to engage the clutch and permitting the contacts CRC2 to close. These contacts may be adjusted so that they close with a very small amount of initial movement of the bracket 52 thereby insuring that the magnet VSM will be energized early enough and held long enough to effect the blocking of the carriage before the clutch 30 has gripped sufficiently to operate the carriage return tape.

When printing classical Chinese it is necessary to prevent the normal operation of the escapement pawls 15 for the single or double space which ordinarily occurs automatically after each character is printed. A simple way of accomplishing this result is to place a switch S2 in series with both the single space magnet M-SS and the double space magnet M-DS of said application as shown in Fig. 7. Opening switch S2 prevents energization of magnets

While there have been shown and described and pointed out the fundamental novel features of the invention, as applied to a preferred embodiment, it will be understood that various omissions and substitutions and changes in the form and details of the device illustrated and in its operation may be made by those skilled in the art without departing from the spirit of the invention. It is the intention, therefore, to be limited only as indicated by the scope of the following claims.

What is claimed is:

1. In a machine for printing the Chinese language, a carriage for a work sheet, carriage return mechanism including a device operated as a preliminary to a carriage return operation to vertically space the work sheet, means to automatically initiate on operation of the carriage return mechanism as an accompaniment to the printing of a Chinese character, and means controlled by the initiating means for locking the

carriage against movement during operation of the carriage return mechanism.

2. In a machine of the class described, a carriage for the work sheet; means for returning the carriage from a columnar position including means initially operative to character space the work sheet vertically before the carriage is returned, normally ineffective means to prevent return of the carriage from a columnar position, means to initiate operation of the carriage return means and at the same time render effective the preventing means, means normally tending to character space the carriage, and means to render the initiating means effective and to prevent operation of the carriage character spacing means.

3. In a machine for printing the Chinese language having a carriage, spacing mechanism for the carriage for spacing a work sheet on the carriage horizontally in printing a line of modern Chinese characters, carriage return mechanism including means on the carriage to space vertically the work sheet when printing classical Chinese, and automatic means tending to cause an operation of the spacing mechanism automatically each time a Chinese character is printed; the combination of means rendered effective by the automatic means for preventing movement of the carriage but permitting operation of the vertical spacing means on the carriage so as to vertically space the work sheet after a Chinese character is printed, and means to prevent automatic operation of the carriage spacing mechanism when printing Chinese characters vertically.

4. In a machine for printing the Chinese language having a carriage, spacing mechanism for the carriage for spacing a work sheet on the carriage horizontally in printing a line of modern Chinese characters, carriage return mechanism including means on the carriage to space vertically the work sheet when printing classical Chinese, and automatic means tending to cause an operation of the spacing mechanism automatically each time a Chinese character is printed; the combination of a locking device for preventing movement of the carriage but permitting operation of the vertical spacing means, said device including a rack member and a detent member engageable with said rack member, one of said members being carried by the carriage and movable relative to the other when the carriage moves, said device also including means rendered effective by the automatic means to cause engagement between said rack member and detent member each time a Chinese character is printed; and means for disabling the carriage spacing mechanism when the movement of the carriage is prevented by said locking device.

5. In a machine for printing the Chinese language, a carriage for a work sheet, carriage return mechanism including a device operated as a preliminary to a carriage return operation to vertically space the work sheet, means to automatically initiate an operation of the carriage return mechanism as an accompaniment to the printing of a Chinese character, and means controlled by the initiating means for preventing returning of the carriage so as to space Chinese characters in a vertical line.

6. In a machine of the class described, a carriage for a work sheet, carriage return mechanism including a device for vertically spacing a work sheet, means for causing an automatic operation of the carriage return mechanism each time a character is printed, and means controlled

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by the last named means for limiting the effect of said mechanism to operating said device to vertical by space the characters.

7. In a machine of the class described, a carriage for a work sheet, carriage return mechanism including a device for vertically spacing a work sheet, means for causing an automatic operation of the carriage return mechanism each time a character is printed, means controlled by the last named means for limiting the effect of said mechanism to operating said device to vertically space the characters, means for spacing said carriage to space characters horizontally, and means for placing said horizontal spacing means under control of said causing means and suppress-

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ing operation of the limiting means when it is desired to horizontally space characters.

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