Dec. 19, 1950 K. WONG 2,534,330

CHINESE TYPEWRITER

Filed March 26, 1948 4 Sheets-Sheet 1

FIG. 1.

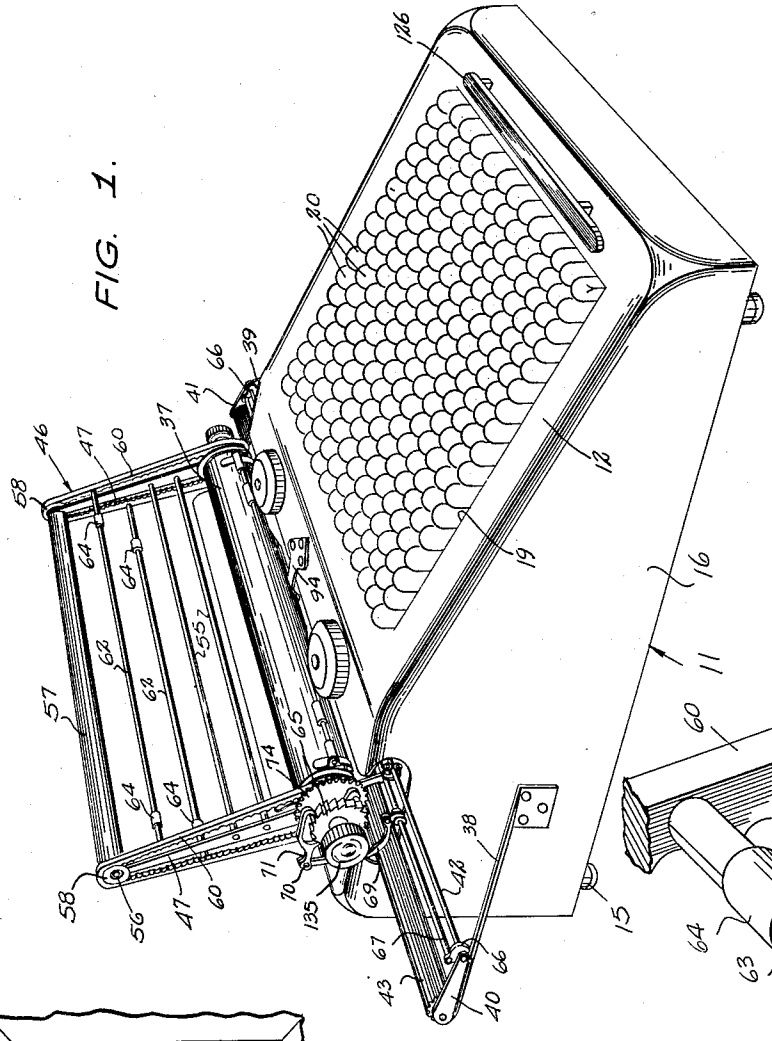
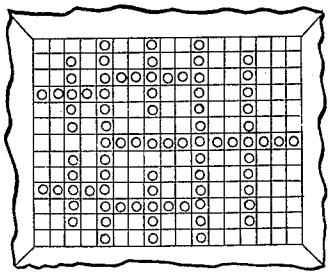


FIG. 15.

FIG. 14.



INVENTOR.

KUOYEE WONG,

BY

McMorrow, Berman & Davidson

ATTORNEYS.

Dec. 19, 1950 K. WONG 2,534,330

CHINESE TYPEWRITER

Filed March 26, 1948 4 Sheets-Sheet 2

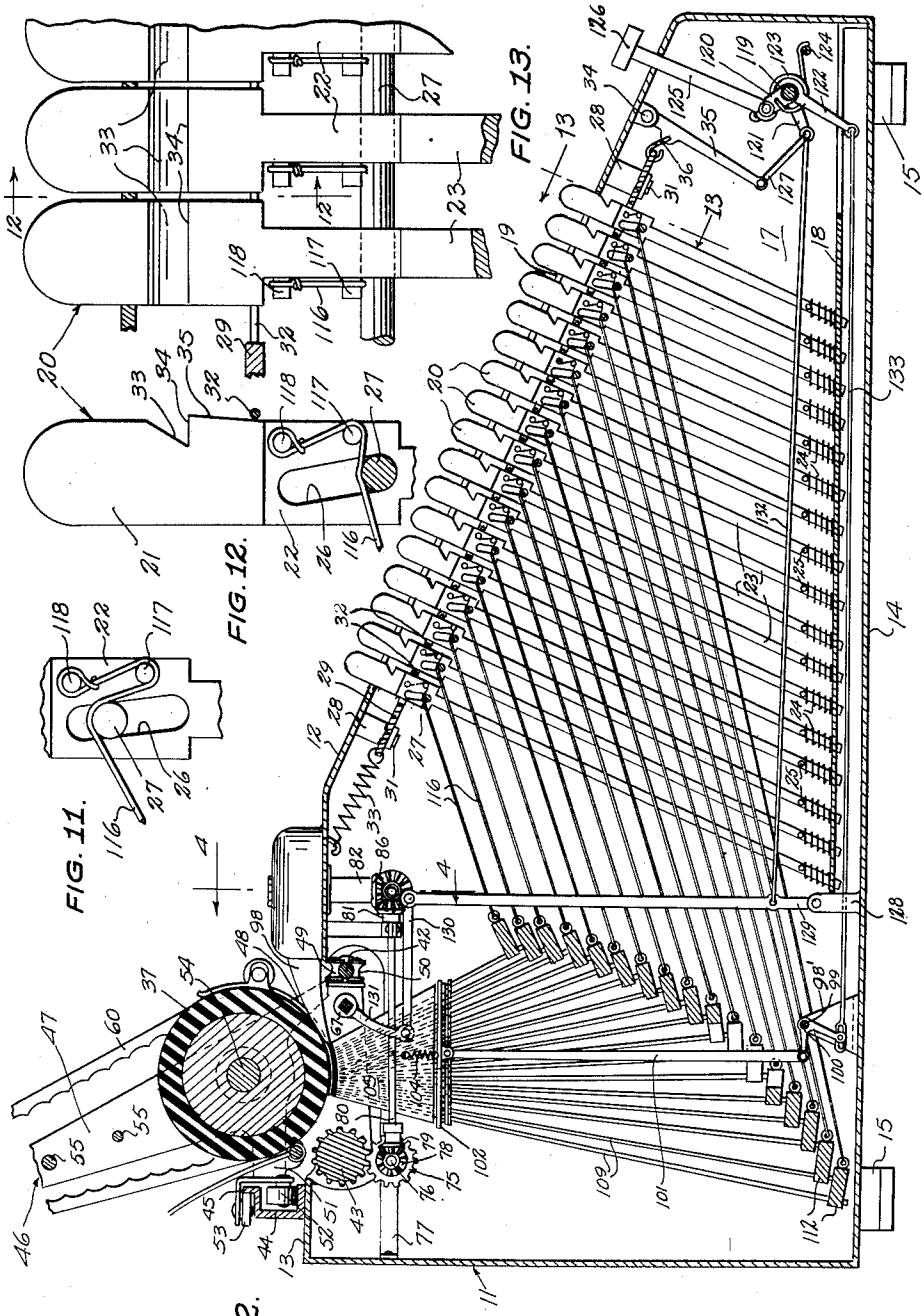


FIG. 2.

FIG. 13.

FIG. 12.

FIG. 11.

INVENTOR.
KUOYEE WONG,
BY
McMorrow, Berman & Davidson
ATTORNEYS.

Dec. 19, 1950 K. WONG 2,534,330

CHINESE TYPEWRITER

Filed March 26, 1948 4 Sheets-Sheet 3

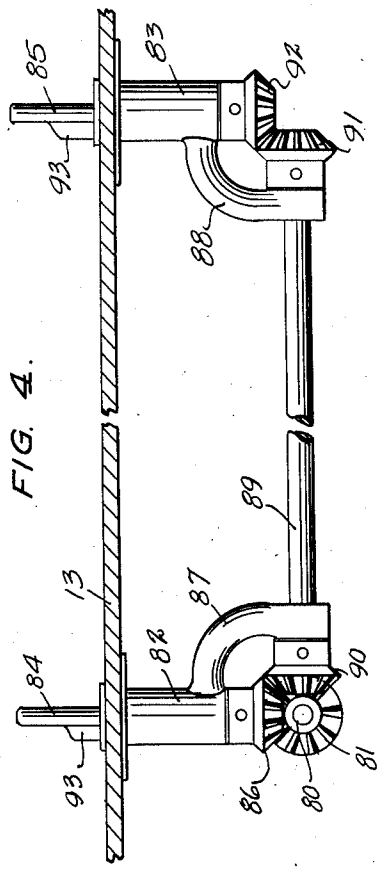


FIG. 4.

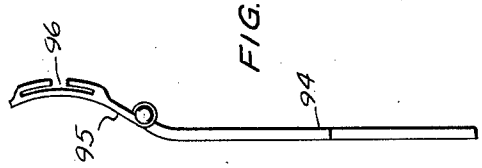


FIG. 6.

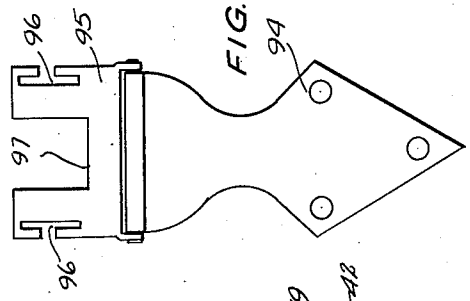


FIG. 5.

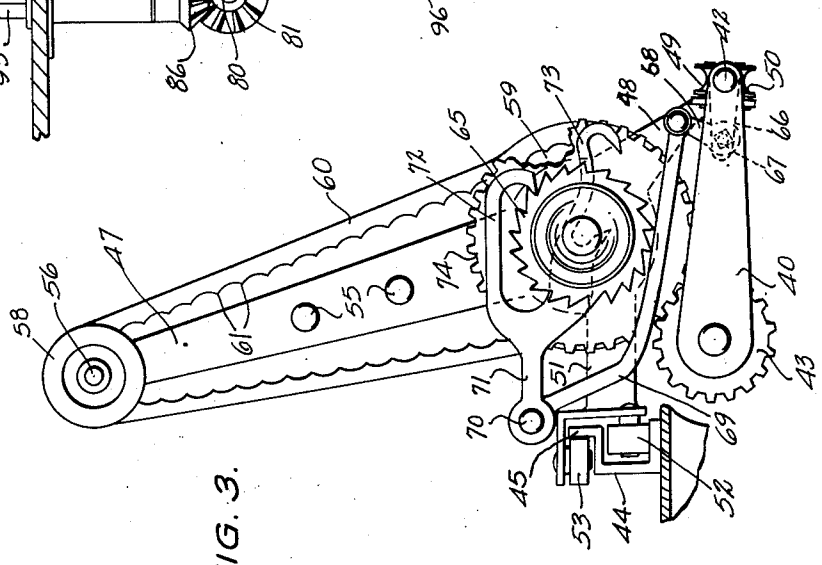


FIG. 3.

INVENTOR.
KUOYEE WONG,
BY
McMorrow, Berman & Davidson
ATTORNEYS.

Dec. 19, 1950 K. WONG 2,534,330

CHINESE TYPEWRITER

Filed March 26, 1948 4 Sheets-Sheet 4

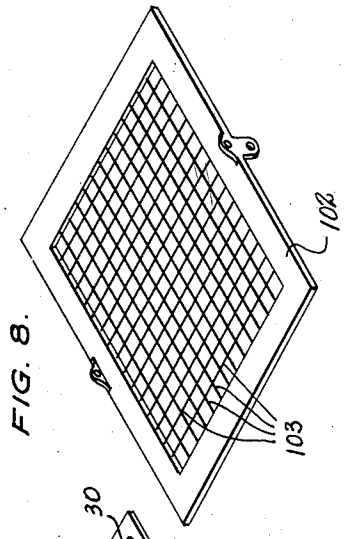


FIG. 8.

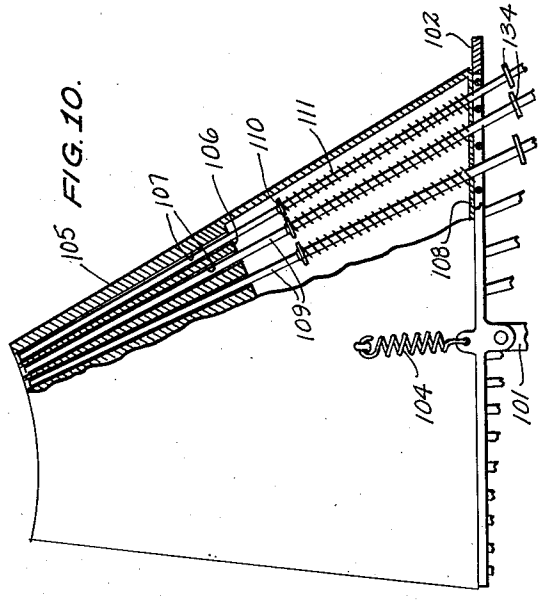


FIG. 10.

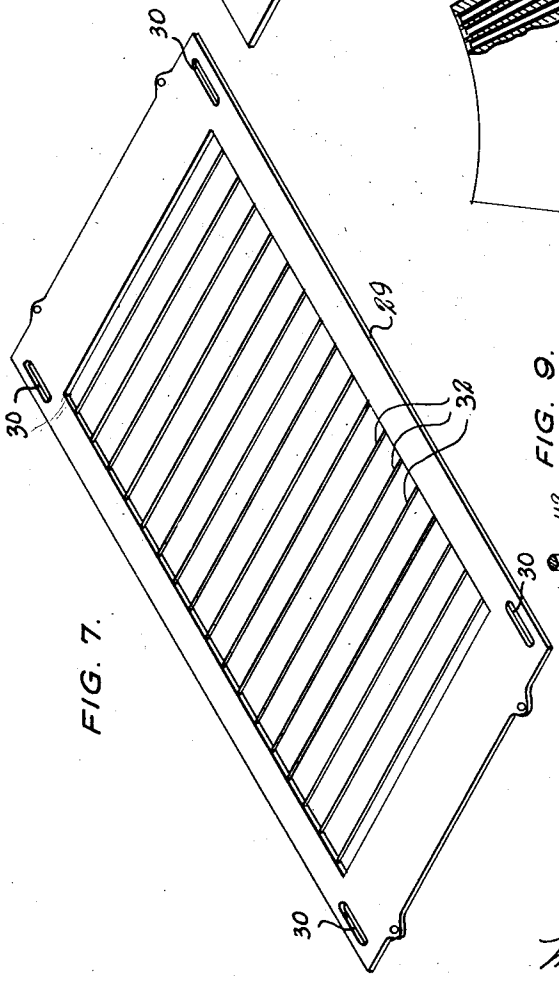


FIG. 7.

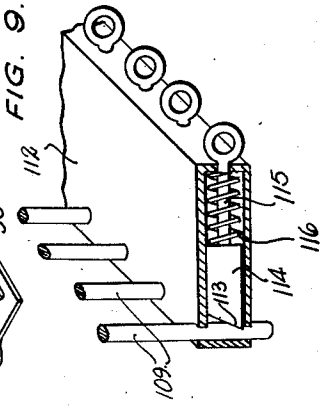


FIG. 9.

INVENTOR.
KUOYEE WONG,
BY
McMorrow, Berman & Davidson
ATTORNEYS.

Patented Dec. 19, 1950

2,534,330

UNITED STATES PATENT OFFICE

2,534,330

CHINESE TYPEWRITER

Kuoyee Wong, Hong Kong, China

Application March 26, 1948, Serial No. 17,135

5 Claims. (Cl. 197—1)

1

This invention relates to writing machines, and more particularly to a machine for writing Chinese characters.

A main object of the invention is to provide a novel and improved character-forming machine which is relatively simple in structure, easy to operate and which is able to produce composite groups of associated markings defining the characters of the Chinese language.

A further object of the invention is to provide an improved Chinese typewriter for printing Chinese characters at high speed, said typewriter being relatively light in weight, compact in size and involving a relatively small number of parts.

Further objects and advantages of the invention will become apparent from the following description and claims, and from the accompanying drawings, wherein:

Figure 1 is a perspective view of a Chinese character-printing typewriter constructed in accordance with the present invention.

Figure 2 is a vertical transverse cross-sectional view taken through the main portion of the typewriter of Figure 1.

Figure 3 is an enlarged side elevational view of the paper-feed mechanism and paper-supporting frame of the Chinese typewriter of Figure 1.

Figure 4 is an enlarged detail cross-sectional view taken on line 4—4 of Figure 2, showing the ribbon-feeding mechanism of the typewriter.

Figure 5 is an enlarged front elevational view of the ribbon guide bracket employed in the typewriter of Figure 1.

Figure 6 is a side elevational view of the ribbon guide bracket of Figure 5.

Figure 7 is an enlarged perspective view of the key-locking plate employed in the typewriter of Figure 1.

Figure 8 is an enlarged perspective view of the printing wire guide plate employed in the typewriter of Figure 1.

Figure 9 is an enlarged fragmentary detail perspective view of a printing wire retaining bar employed in the typewriter of Figure 1.

Figure 10 is an enlarged side elevational view, partly in cross-section, of the printing wire guide hood and associated mechanism employed in the typewriter of Figure 1.

Figure 11 is an enlarged fragmentary side elevational detail view taken through the lower portion of one of the character-forming operating keys of the typewriter of Figure 1, the key being shown in depressed position.

Figure 12 is a cross-sectional detail view similar to Figure 11 but showing an operating key in normal position, said view being taken on line 12—12 of Figure 13.

2

Figure 13 is an enlarged fragmentary detail view taken on line 13—13 of Figure 2.

Figure 14 is an enlarged detail view of a Chinese character printed on a sheet of paper by the typewriter of Figure 1.

Figure 15 is an enlarged fragmentary perspective view of the end portion of a paper clamping rod employed on the paper supporting frame of the typewriter of Figure 1, showing the connection of said rod to one of the flexible toothed conveyor belts employed for advancing the paper after a character has been printed thereon.

Referring to the drawings, 11 designates a housing, preferably of metal, which is rectangular in plan and which has a downwardly and forwardly inclined top wall portion, shown at 12, the rear portion of the top wall of the housing being horizontal, as shown at 13. The bottom wall of the housing is designated at 14 and is provided with depending supporting feet 15 adjacent its corners. The left side wall of the housing is designated at 16 and the right side wall thereof is designated at 17. Secured to side walls 16 and 17 in vertically-spaced relation to bottom wall 14 is a horizontal plate member 18, said plate member underlying the inclined forward portion 12 of the housing top wall.

The inclined forward portion 12 of the housing is formed with a large rectangular opening 19 extending over the major part of said inclined portion. Projecting through opening 19 are the character-forming operating keys 20. Each key 20 comprises an enlarged head portion 21 carried on a neck portion 22, each neck portion being carried on an elongated rod member 23, the lower ends of the rod members 23 being slidably received in apertures formed in plate member 18. The rod members are biased upwardly by coiled springs 24 encircling the lower portions of said rod members and bearing between plate member 18 and transverse laterally-projecting pins 25 secured to said rod members. Secured to the side walls 16 and 17 and extending through inclined slots 26 formed in the neck portions 22 of the keys 20 are respective horizontal bar elements 27, each bar element passing through the slots 26 in the neck portions of a horizontally-aligned row of keys, whereby the keys of the row are guided for up and down movement with respect to their associated bar element 27. In the embodiment illustrated, there are seventeen horizontally-aligned rows of keys, each row comprising thirteen keys. Each of the thirteen keys of a par-

ticular row engages one of the bar elements 27 at the slot 26 in its neck portion.

Depending from the inclined top wall portion 12 outwardly adjacent each corner of the rectangular opening 19 therein is a lug 28. Designated at 29 is a rectangular frame member formed with longitudinal slots 30 at its corner portions. Frame member 29 is movably secured to the depending lugs 28 by bolt members 31 passing through the slots 30 of the frame member and fastened to the lugs, whereby the frame member may be moved forwardly and rearwardly with respect to lugs 28. Secured transversely in the frame member are spaced stiff wire rods 32, each wire rod 32 being engageable with the forward surface of a key 20. Springs 33 connect the rear edge of frame member 29 to the top wall rear portion 13, to bias frame member 29 rearwardly and to thereby maintain the wire rods 32 in abutment with the forward surfaces of the keys 20. Each key is formed at its forward surface with a notch 33 having an upwardly facing shoulder 34, the forward surface of the key being inclined forwardly and upwardly sub-adjacent said shoulder, as shown at 35, so that when the key is depressed it will interlock at shoulder 34 with the associated wire rod 32 and be held in depressed position by said wire rod until the frame 29 is moved forwardly from its normal position to a position wherein the wire rod clears the shoulder.

Pivoted to the forward portion of inclined wall 12 is a horizontal shaft 34 carrying depending arms 35. The front edge of frame member 29 is connected to said arms 35 by hook links 36. When the arms 35 are rotated counter-clockwise, as viewed in Figure 2, frame 29 is moved by links 36 to a key-releasing position.

Designated at 37 is a cylindrical platen or roller. Secured to the side walls 16 and 17 of housing 11 are brackets 38 and 39 provided at their top portions with the respective vertical flanges 40 and 41. The forward end portions of flanges 40 and 41 are connected by a rod member 42. Journaled in the rear end portions of flanges 40 and 41 is a cylindrical gear roller 43, the gear teeth of roller 43 extending for the full axial length of said roller.

Secured to the rear portion of horizontal top wall 13 and extending parallel to rod member 42 is a forwardly-facing longitudinal channel member 44 formed with a vertical upwardly projecting front flange 45. Designated generally at 46 is a carriage having side elements 47, 47. Each side element 47 has a depending front arm 48 provided with top and bottom opposing rollers 49 and 50 engaging rod member 42, and a rearwardly extending arm 51 provided with respective rollers 52 and 53 engaging respectively the bottom flange of channel member 44 and the top vertically extending flange element 45 thereof, whereby the carriage 46 is supported and guided for longitudinal movement with respect to rod member 42 and the channel track 44. The platen 37 is carried on an axial shaft 54 which is journaled in the lower portions of the side bars 47, 47 of carriage 46. The intermediate portions of said side bars are rigidly connected by spaced horizontal rods 55, and journaled in the top ends of said side bars in a shaft 56 carrying a roller 57 which is parallel to the platen 37. At its outer ends shaft 56 carries pulleys 58, 58 secured thereto. At each end of platen 37 shaft 54 carries gears 59 shown in Figure 3, the gears 59 being in the same vertical transverse planes as the respective pulleys 58, 58. Connecting the gear 59 and the pulley 58 at each side of the frame 46 is a flexible endless belt 60 formed with inwardly facing gear teeth 61 meshing with the teeth of the gear 59. The belts 60 may be formed of molded rubber or other suitable flexible material. The belts 60 are connected by a plurality of spaced clamping rods 62, each rod 62 being split longitudinally so as to define opposing segments 63, 63. Slidably carried on each clamping rod are a pair of sleeves 64, 64. The segments 63, 63 are normally bowed outwardly with respect to each other so that when the sleeves 64, 64 associated therewith are positioned adjacent the respective belts 60, 60, a space is provided between the segments through which a sheet of paper may be passed. When the sleeves 64, 64 are moved inwardly, the segments are clamped together, whereby the paper is gripped therebetween. Since belts 60, 60 are moved simultaneously responsive to rotation of shaft 54 due to the meshing relationship of the gears 59 with said belts, the paper is also moved in response to the rotation of said shaft and the platen 37 carried thereby.

Shaft 54 carries adjacent one end thereof a ratchet wheel 65. Pivoted to the rod 42 inwardly adjacent the flanges 40, 41 are arms 66, 66 and rotatably connected to the ends of said arms is a rod 67 which extends parallel to rod 42. Rod 67 is square in cross-section except at its ends and slidably keyed thereto is an arm 68. Pivotally connected to the end of arm 68 is a rearwardly-extending upwardly-curved link bar 69. Pivotally connected to the rear end of bar 69 at 70 is a forwardly-extending pawl member 71. Pawl member 71 is formed with a relatively short upper hooked arm 72 and a longer lower hooked arm 73. The hooked ends of arms 72 and 73 are laterally offset with respect to the main portions thereof so as to lie in the same plane as ratchet wheel 65. The lower arm 73 is slidably supported on shaft 54 and is formed with a notch at its bottom edge interlocking with said shaft when the pawl member 71 is in the forward position thereof shown in Figure 3. In this position the hooked end of upper arm 72 engages one of the teeth of ratchet wheel 65 and the hooked end of the lower arm 73 is forwardly spaced with respect to said ratchet wheel. When arm 68 is rotated counter-clockwise from the position shown in Figure 3, pawl member 71 is moved rearwardly by link bar 69, whereby ratchet wheel 65 is rotated counter-clockwise by upper hooked arm 72, the shaft 54 being meanwhile released from the notch in lower arm 73 by the rearward movement of said lower arm. The rotation of ratchet wheel 65 is terminated when the hooked end of lower arm 73 comes into engagement with the periphery of the ratchet wheel. Each time pawl member 71 is moved rearwardly through a full stroke thereof, the shaft 54 is rotated through a predetermined counter-clockwise angle and the paper carried by the clamping bars 62 is fed upwardly a predetermined distance with respect to the front of the frame 46.

Shaft 54 carries a gear 74 which is in meshing engagement with the cylindrical gear 43. Meshing with gear 43 is a gear 75 carried on a shaft 76 parallel to gear 43 and journaled in a bracket 77 secured to the rear wall of housing 11. Shaft 76 carries a bevel gear 78 which meshes with a bevel gear 79 carried rearwardly on a shaft 80 journaled transversely in the housing 11. Shaft 80 carries at its forward end a bevel gear 81.

Designated at 82 and 83 are longitudinally-spaced vertical depending sleeve bearings car-

ried by the housing top wall 13 at opposite sides of the central transverse plane of the housing. Rotatively supported in the bearings 82 and 83 are the respective vertical ribbon reel shafts 84 and 85. At the lower end thereof ribbon shaft 74 carries a bevel gear 86 which meshes with bevel gear 81. Rotatively supported in respective arms 87 and 88 depending from sleeve bearings 82 and 83 is a shaft 89 carrying at one end a bevel gear 90 which meshes with bevel gear 86. At its opposite end, shaft 89 carries a bevel gear 91 which meshes with a bevel gear 92 carried at the lower end of ribbon reel shaft 85. The ribbon reel shafts 84 and 85 are simultaneously rotated in the same direction responsive to rotation of platen shaft 54 through the gear 74, cylindrical gear 43, gear 75, bevel gear 78, bevel gear 79, shaft 80, bevel gear 81, bevel gear 86, bevel gear 90, shaft 89, bevel gear 91 and bevel gear 92.

The ribbon reel shafts 84 and 85 are provided with reel-engaging keys 93 and a conventional typewriter ribbon reel is adapted to be releasably secured to each of said shafts by interlocking engagement with the key 93 thereof. Secured to the forward portion of top wall 13 between the ribbon shafts is a rearwardly-extending ribbon guide bracket 94 which has a pivotally connected rear portion 95 extending beneath the platen 37. Rear portion 95 is formed with opposed T-slots 96, 96 at its sides and with a central rectangular notch 97. The typewriter ribbon, designated at 98, extends through the T-slots 96, 96 and underlies the notch 97.

Designated at 98' are upstanding brackets projecting from the rear portion of bottom wall 14 and pivoted in said brackets is a horizontal longitudinally-extending shaft 99. Said shaft carries a bell crank lever 100 adjacent each end thereof. Pivotally connected to one arm of each bell crank lever 100 is an upwardly-extending link bar 101 and pivotally connected to the top ends of the link bars 101 is a rectangular frame member 102. Frame member 102 has secured therein transversely opposed wires 103 defining a screen. The number and arrangement of the mesh openings of the screen corresponds to the number and arrangement of the keys 20. Overlying the frame member 102 and yieldably secured thereto by springs 104 is an upwardly-tapering hood-like member 105 having a relatively thick top wall 106.

Wall 106 is formed with upwardly convergent bores 107 corresponding in number and arrangement with the mesh openings in the screen carried by frame member 102, each bore being aligned with one of said mesh openings. The bores converge upwardly toward the area defined within the rectangular notch 97 of the ribbon guide, the top end of the wall 106 being arcuately curved and being normally located immediately sub-adjacent to the pivoted ribbon guide member 95, said ribbon guide member being positioned sub-adjacent to the bottom surface of platen 37 and being also arcuately curved to conform to the curvature of said platen. The hood-like member 105 has a bottom wall 108, said bottom wall being formed with apertures corresponding in number and arrangement with the bores 107, each aperture being aligned with one of said bores and also with one of the mesh openings of the screen carried by frame member 102. Extending slidably through the screen openings, apertures and bores are rod members 109, the rod members normally terminating at their top ends slightly below the top surfaces of wall 106. Each rod member carries a collar 110 and encircling the rod member is a coiled spring 111 bearing between the collar 110 and bottom wall 108, whereby the rod member is biased upwardly.

The bottom ends of each longitudinal row of rod members 109 are slidably received in a longitudinally-extending hollow bar member 112. Said bottom ends are formed with forwardly facing notches 113 and normally engaged in each notch 113 is a bevelled detent bar 114. Each detent bar 114 is secured to an eye bolt 115 extending slidably through the forward wall of the hollow bar member 112, and encircling the shank of the eye bolt inside the bar member is a coiled spring 116 acting between the detent bar 114 and said forward wall to bias the detent bar into locking engagement with respect to the notch 113. When forward tension is exerted on the eye bolt, detent bar 114 is moved forwardly and releases the rod member 109. The biasing force of the associated spring 111 of said rod member causes it to move upwardly so that its top end strikes the ribbon within notch 97 and makes a mark on the paper overlying said notch on the platen 37. If eye bolt 115 is released and the rod member 109 is then moved downwardly it will be again engaged by the detent bar 114 at notch 113.

Each eye bolt 115 is connected by a cable 116 to one of the keys 20, the respective keys in each row thereof corresponding to the respective eye bolts in each hollow bar 112. The cables 116 pass over the bar elements 27 associated with the keys and are looped around pins 117 carried on the keys forwardly adjacent the lower portions of the slots 26 of said keys. The ends of the cables 116 are fastened to pins 118 located forwardly adjacent the upper ends of the slots 26. When a key is depressed, the key moves downwardly with respect to its associated bar element 27, causing tension to be exerted on its associated cable 116, whereby the rod member 109 associated therewith is released in the manner above described. When the key is thus depressed, it is locked in depressed position by the engagement of the forwardly adjacent wire 32 with its notch 33 as previously described.

Journaled in the forward portions of the side walls 16 and 17 of the housing 11 is a longitudinally-extending shaft 119 carrying respective pairs of arms shown at 120, 121 and 122 in Figure 2. Shaft 119 is biased in a clockwise direction, as viewed in Figure 2, by a spiral spring 123 encircling said shaft and acting at one end forwardly on an arm 120, the other end of the spring being anchored at 124. Pivotally connected to the arms 120 are the lower ends of arms 125 extending slidably through the inclined top wall portion 12, and secured to a horizontal spacer bar 126, whereby shaft 119 may be rotated counterclockwise by depressing spacer bar 126. The lower end of each arm 35 is connected by a link bar 127 to the end of an arm 121, whereby frame member 29 is moved forwardly by hook links 36 responsive to the depression of spacer bar 126.

Pivoted to a bracket 128 rising from the bottom wall 14 of the housing 11 is an upwardly-extending arm 129. The top end of arm 129 is connected by a link 130 to a depending arm 131 carried by shaft 97. Arm 129 is connected by a link rod 132 to the end of an arm 121. When spacer bar 126 is depressed, said arm 121 moves downwardly and acts through the link rod 132 to rotate arm 129 clockwise, as viewed in Figure 2. Arm 129 acts through link 130 to rotate arm 131

and shaft 67 counter-clockwise. This causes the arm 68 to rotate counter-clockwise and causes the pawl member 71 to rotate the platen 37 and to move the paper carried by the clamping bars 62 upwardly as above described.

The lower arms of bell crank levers 100 are connected by link rods 133 to the ends of arms 122.

In operation, a character is printed by depressing selected keys 20 on the keyboard to define the outlines of the character. The depression of the selected keys 20 releases the corresponding rod members 109, causing said rod members to move upwardly under the force exerted thereon by their associated biasing springs 111 acting on the collars 110 carried by said rod members. The keys are locked in depressed positions by the engagement of their notches 33 with the forwardly adjacent wires 32 of the frame member 29. When the character is entirely formed, for example, as shown in Figure 14, spacer key 126 is depressed. This rotates shaft 119 counterclockwise, as viewed in Figure 2, causing arms 122 to be rotated counterclockwise. Bell crank levers 100 are rotated counterclockwise by link rods 133 causing a downward force to be exerted by link bars 101 on the frame member 102. The rod members 109 are provided with stop collars 134 below the frame member 102. When said frame member moves downwardly as a result of said downward force, the previously released rod members 109 are engaged at their collars 134 by the mesh wires carried by the frame member. At the same time, the depressed keys 20 are released by the forward movement of frame member 29 resulting from the counterclockwise rotation of arms 35 which occurs when arms 121 rotate downwardly. This releases the detent bars 114 associated with the aforesaid previously released rod members 109. Downward movement of frame member 102 therefore returns the rod members 109 into locking engagement with the detent bars 114.

Simultaneously with the return of the rod members 109 and keys 20 to starting positions, the arm 129 is oscillated, as above described, to cause the pawl member 71 to advance the paper to a position on the platen 37 for the next character to be formed. At the same time, rotation of the platen shaft 54 is transmitted, as previously described, through gear 74 to the ribbon feeding mechanism, causing the ribbon 98 to be advanced to a position for forming the next character.

Upon release of the spacer bar 126 spring 123 returns shaft 119 to its original position and the various linkages connected to the respective arms 121 and 122 are likewise restored to their original positions. The machine is then ready for the printing of the next character.

At the end of a vertical row of characters, the carriage, including the frame 46 and platen 37 is moved laterally by means of a knob 135 provided on the end of the platen shaft 54 to the starting position for the next vertical row of characters. Said knob may also be employed for manual rotation of the platen shaft whenever required.

While a specific embodiment of a Chinese typewriter has been disclosed in the foregoing description, it will be understood that various modifications within the spirit of the invention may occur to those skilled in the art. Therefore, it is intended that no limitations be placed on the invention except as defined by the scope of the appended claims.

What is claimed is:

1. A Chinese typewriter comprising a housing, a platen rotatably supported on said housing, ribbon-supporting means on said housing, bracket means on said housing formed and arranged to guide a ribbon from said ribbon-supporting means past an under surface portion of said platen, a hood-like member carried in said housing beneath the platen, said hood-like member being formed with a plurality of guide bores converging upwardly toward said under surface portion, a movable rod member slidably positioned in each guide bore, a plurality of rows of depressible keys carried by said housing, means connecting said keys to said rod members, said connecting means being formed and arranged to advance a rod member upwardly through its bore responsive to the depression of the key associated therewith, means for maintaining said keys depressed, and means for simultaneously releasing all the depressed keys and returning the rod members to retracted positions in their bores.

2. A Chinese typewriter comprising a housing, a platen rotatably supported on said housing, ribbon-supporting means on said housing, bracket means on said housing formed and arranged to guide a ribbon from said ribbon-supporting means past an under surface portion of said platen, a hood-like member carried in said housing beneath the platen, said hood-like member being formed with a plurality of rows of guide bores converging upwardly toward said under surface portion, movable rod members slidably positioned in the bores, a plurality of rows of depressible keys carried by said housing, means connecting said keys to the respective rod members, said connecting means being formed and arranged to selectively advance the rod members upwardly through their bores responsive to the depression of the keys associated therewith, means for locking the keys in depressed positions, and means for simultaneously releasing said keys and for rotating said platen through a predetermined angle.

3. A Chinese typewriter comprising a housing, a carriage, means for supporting said carriage for longitudinal movement on said housing, a platen rotatably mounted on said carriage parallel to said supporting means, ribbon-supporting means on said housing, bracket means on said housing formed and arranged to guide a ribbon from said ribbon-supporting means past an under surface portion of said platen, a hood-like member carried in said housing beneath the platen, said hood-like member being formed with a plurality of rows of guide bores converging upwardly toward said under surface portion, movable rod members slidably positioned in said bores, means biasing the rod members upwardly, releasable locking means normally holding said rod members in depressed positions, a plurality of rows of depressible keys carried by said housing, each key being associated with a rod member, means connecting the keys to the respective locking means and formed and arranged to release the locking means responsive to the depression of the key associated therewith, and means for simultaneously returning the released rod members to depressed positions.

4. A Chinese typewriter comprising a housing, a carriage, means for supporting said carriage for longitudinal movement on said housing, a platen rotatably mounted on said carriage parallel to said supporting means, ribbon-supporting means on said housing, bracket means on said housing formed and arranged to guide a ribbon from said ribbon-supporting means past an under surface

portion of said platen, paper clamping means on said carriage coupled with said platen, said paper-clamping means including an upwardly-extending paper-supporting frame, a hood-like member carried in said housing beneath the platen, said hood-like member being formed with a plurality of rows of guide bores converging upwardly toward said under surface portion, movable rod members slidably positioned in said bores, means biasing the rod members upwardly, releasable locking means normally holding said rod members in depressed positions, selective key-operated means for releasing said locking means, and means for simultaneously returning the rod members to depressed positions and for rotating said platen through a predetermined angle.

5. A Chinese typewriter comprising a housing, a platen rotatably supported on said housing, ribbon-supporting means on said housing, means for guiding a ribbon from said ribbon-supporting means past a surface portion of said platen,

a hood-like member carried by said housing adjacent said platen and formed with a plurality of guide bores converging toward said surface portion, movable rod members slidably positioned in said guide bores, means biasing the rod members outwardly from said bores toward said surface portion, releasable locking means normally holding said rod members retracted, key-operated means for selectively releasing said locking means, and means for simultaneously returning the released rod members to retracted positions.

KUOYEE WONG.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
1,028,037	Lilleberg	May 28, 1912
2,129,065	Loop	Sept. 6, 1938