This invention relates to typewriters and more particularly to typing machines which utilize a variety of type faces which are cast upon removable type fonts and which may be interchanged at will by the operator.

Heretofore machines of this nature were provided with a rotor upon which a cast type font unit was manually secured by the operator. The type fonts in question contained the entire upper and lower case of the alphabet plus many other characters needed for typing. In case the operator had to use a different type face he simply had to exchange the original type face upon the rotor with another one which contained the different characters. As for each type face a new type font is required and must be separately secured to the rotor it was necessary to supply each machine with a great number of type fonts each containing a different set of characters. In such a machine the removal and replacement of the type fonts necessitates careful handling and manipulation of the cast type fonts and accordingly slows down the work of the operator.

To overcome this disadvantage one of the main objects of the present invention is to eliminate the replaceable type fonts and to substitute instead a permanent type font made of a hardened steel ribbon upon which ten, twenty or more type faces are embossed. The ribbon in question is wound around a pair of spools provided with knobs. To replace the original type face with a new one, all that is required in this case will be to turn the knobs upon the spools on which the ribbon is wound. In short, this machine is equipped with a permanent ribbon font with many type faces embossed upon it while heretofore machines of this nature were provided with removable or replaceable cast type fonts with a single type face. The machine described in this invention is inexpensive to manufacture and will not cost more than a typewriter of standard make. It is easy and safe to operate and needs no experienced operator or any instructions to manipulate the type faces. The steel ribbon remains forever a permanent component of the machine and the type faces embossed upon the steel ribbon will outlast the machine itself. The type faces are changed by the operator by simply rotating the knob which turns the spool with the thin hardened steel ribbon wound upon it.

An object of this invention is to provide a compact typing machine which will contain a variety of type faces and a simple means for exchanging or replacing one type face with another.

Another object is to provide a hardened steel ribbon with various type faces embossed upon it.

Still another object is to provide a set of spools upon which the steel ribbon in question is wound and means to interchange the type faces embossed upon the ribbon.

Still another object is to provide a typewriter carriage and mechanism to facilitate the typing of characters by means of the vibrating motion of said carriage.

Still another object of this invention is to provide a carbon ribbon operating mechanism which will move the carbon ribbon vertically across the type faces upon the hardened steel ribbon.

A further object of this invention is to provide a paper roller which will contain a number of flat surfaces upon its periphery.

A still further object is to provide means for easy replacement of the paper roller.

Still another object is to provide a mechanism for operating the steel ribbon by means of a standard key board.

Further objects will be seen as the description of this specification will proceed.

Referring to the figures:

Fig. 1 is a top plan view of the typewriter showing the standard key board and the hardened steel ribbon font.

Fig. 2 is a side view of the machine shown in Fig. 1.

Fig. 3 is a section taken on the line 3—3 of Fig. 1, showing the key bars and the mechanism for operating the hardened ribbon font.

Fig. 4 is a cross-section through the machine similar to the one shown in Fig. 3. In this case the section was taken through the spool containing the hardened steel ribbon.

Fig. 5 is a section taken on the line 5—5 of Fig. 2 showing the electrically operated mechanism for operating the carriage.

Fig. 6 is a section taken on the line 6—6 of Fig. 2 showing the ribbon spool and the rotor for operating the ribbon.

Fig. 7 is a section taken on the line 7—7 of Fig. 3 showing the key bars and other details of the machine.

Fig. 8 is a section taken on the line 8—8 of Fig. 4 showing the manner in which the steel ribbon font is wound around the pair of spools and the manner in which the ribbon is operated by the rotor.

Fig. 9 is an enlarged view of one of the key bars showing the manner of operation.

Fig. 10 is another position of the key bar shown in Fig. 9.

Fig. 11 is a front view of the hardened steel ribbon font showing the manner in which the alphabetic characters are embossed upon it.

Fig. 12 is a perspective view of one of the ribbon spools with the ribbon wound upon it.

Fig. 13 is a section taken on the line 13—13 of Fig. 14 showing the manner in which the paper roller is secured upon the operating shaft.

Fig. 14 is a partial cross-sectional view of the paper roller shown in Fig. 13.

Fig. 15 is a modification embodying the use of the embossed steel ribbon in connection with a single typing key. It also shows the manner in which the paper is fed to the machine.

Fig. 16 is another modification of the machine shown in Figs. 1 to 14 inclusive embodying the use of an exchangeable embossed steel plate in place of an embossed steel ribbon. The embossed steel plate can be removed from the machine and be replaced by another plate.

Specification

Referring more particularly to Fig. 1, showing a top elevation of my multi-type typewriter, numeral 20 indicates the frame of the machine proper including a framed enclosure 21 which contains the typewriter keys and a housing 22 which holds the operating mechanism. Within the enclosure 21 there are located the keys 23 of a standard key-board and the space bar 24. In addition there are the keys 25 to operate the carriage return mechanism and the set of keys 26 for caps. The keys 27 of the first row are utilized for the numerals and other alphabetic signs such as the comma, the period, etc., while the keys 23 are used for the letters of the alphabet. Like any other standard typewriter the alphabetic letters
are etched or embossed upon the surfaces of the keys comprising a standard key-board.

The top portion of the housing 22 of the machine 20 has raised ring-shaped containers 27 and 28 equipped with circular cover plates 29 and 30. A pair of knobs 31 and 32 protrude beyond the covers 29 and 30. The housing 22 has in general a rectangular contour throughout outside the top portion thereof 33 which is shaped in a semicircle. Above the housing 22 there is the carriage 34 which contains a guide plate 35 and the paper roller 36. The roller 36 is held upon a pair of side frames 37 and 38 by means of the shaft studs 39. The shaft studs 39 extend beyond either side of the side frames 37 and 38. Knobs 40 and 41 are secured to the shaft studs projecting beyond the side frames 37 and 38 and a finger arm 42, hingely secured at 43 and having a ratchet arm and wheel 44, is used to rotate the paper roller to advance the paper for a new line.

A thin steel ribbon 45 is wound around the spools 46 and 47 which are located inside the ring-shaped containers 27 and 28 and a number of ribbon guiding rollers 48. The collars 50 and 51 are used to guide the steel ribbon in an upright position facing the paper roller 36. The steel ribbon 45 is studded with alphabetic letters 45x which are embossed upon it and a row of equidistant openings 45xx into which the teeth of the gear 52 mesh. The gear 52 is secured upon the upright shaft 53 and rotates with it. The ribbon 45 is of considerable length and can accommodate ten, twenty or more type faces of letters and other signs upon its surface.

The ribbon 45 is equipped with a tiny pointer 45xx which is located right above the exact center of the row of alphabetic letters and signs embossed upon the ribbon; one pointer for each type face. The pointer 45xx shows through a V slot 54 in the cover plate 55 facilitating the centering of the type face.

Referring to Fig. 2, which is a side view of the machine shown in Fig. 1, the carriage 35 is held upon a double pair of curved supporting arms 56 and 56a and 57 and 57x (see Fig. 5). The arms 56 and 56a are hingedly secured to a cross-shaft 58 while the arms 57 and 57x are hinged upon the screw studs 58 and 58x respectively.

In Fig. 3, which is a cross-section taken on the line 3—3 of Fig. 1, the arms 56 and 56a are equipped with extensions 59 and 59x which are secured by means of connections 60 and 60x to the armature arms 61 and 61x of the, motor or solenoids 62 and 62x respectively. The upright studs 63 and 63x, 64 and 64x are limit stops for the armature arms 61 and 61x. The armature arms 61 and 61x hinge at 65 and are both under the influence of the flat spring 66.

The keys 23 and 27 consist of flat curved key bars 23x and 27x which are hinged within the housing 22 upon a common shaft 67. A number of washers 68 on the shaft 67 separate one key bar from the other with a minimum of friction. Each end of the shaft 67 is held to the side frames 69 and 69x respectively. The key bars 23x and 27x freely hinge on the shaft 67 under the influence of the coil springs 78 held upon the cross member 79.

The key bars 23x carry a flat curved-shaped hard plastic member 70 which is secured by rivets 71 to the metallic key bars 23x. The bars 23x are equipped with extensions 23xx which protrude beyond the plastic member 70 (see Figs. 9 and 10). Each of the plastic members 70 contacts a flat elongated arm 72 which is hingely held at 73 and is under the influence of the coil spring 74. At approximately the center of the entire length of the arm 72 and upon the stud 75 there is held a gear track 76. The gear track 76 is freely hinged upon the shaft 67 and is under the influence of the flat spring 76x. The gear track 76 meshes with a spur gear 77 which is pinned upon the upright shaft 53.

An indicator dial 80 is located upon the portion or housing 22 of the machine 20 and it is operated by means of the shaft 81 and the train of light weight gears 82. The train of gears 82 is operated by means of the gear pinion 83 which is pinned upon the upright shaft 53 which is rotated by means of the spur gear 77 and the gear rack 76.

The bar 84 (see Fig. 8) contacts the gear rack 76 at 85 while its opposite end is secured to the little arm 86 which is pinned to the upright shaft 73. To rotate the shaft 73, it is equipped with a finger knob 87 (see Figs. 1 and 5). The operation of the shafts 53 and 75 will be described hereafter.

The entire ribbon mechanism is mounted upon a flat elongated plate support 88 which has two extensions, 89 and 89x, containing two upright studs 90 and 90x. The studs 90 and 90x support the ribbon spool gears 46 and 47 respectively. The spools 46 and 47 rotate freely upon the studs 90 and 90x and can be turned at will by the operator by simply rotating the knob 31 or 32.

The flat support 88 is moved upwards or downwards by means of the parallel arm mechanism 91 which is located on either side of the support 88 and adjacent to the side frames 69 and 69x. The parallel arm mechanism 91 is operated by the cap keys 26 (the keys used to change from the lower to the capitals of the alphabet). The mechanism 91 hinges upon a cross shaft 92 which goes across the entire width of the machine 20 from frame to frame. The cross shaft 92 is held upon the side frames 69 and 69x and the mechanism 91 is made to operate in unison with the hinging of the shaft when the latter is moved by means of the connecting bar 92x and the cap key bar 26x.

Referring more particularly to Figs. 13 and 14, the paper roller 36x is equipped with a plurality of flat sides or surfaces 36xx upon its entire periphery. The roller 36x is held by means of the flanges 93 upon the stud shaft 39. The flanges 93 are split open at 94 to permit the insertion of the stud shafts 39 when replacing the roller 36x in the machine. To hold the roller 36x permanently upon the stud shafts 39, the tapered screw 95 is screwed tight into the split flange 93.

A set of ratchets 96 is used for every different line spacing and for each new spacing a different roller 36x is used. The roller 36x is simply removed from the stud shaft 39 by unscrewing the tapered screw 95 and a new roller is placed in instead.

The thin steel ribbon 45 is wound around the spools 46 and 47 which are held upon the upright studs 90 and 90x. The ribbon is evenly wound around the spools 46 and 47 with one half of the type faces wound around one spool and the other half around the other.

The carbon ribbon C is wound around the spools 97 and 98 and runs vertically over the rollers 99, 100 and 101. It is operated by the standard ribbon mechanism used in other typewriters which is shown at 98x (not described).

The carriage 35 is supported upon the frame 103 which is made fast onto the side frames 104 and 104x. The carriage moves upon the horizontal support 102 secured to the frame 103.

While in the machine shown in Figs. 1 to 14 inclusive the typing operation is accomplished by means of the oscillating movement of the carriage 36, in Fig. 15 the typing operation is done by means of the oscillating movement of a single typing hammer 105. In this instance the paper roller 36x is located somewhat below the center of the rotor 52 and the paper P is fed into the machine vertically instead of around the circumference of the paper roller 36 which is held in the case 1 to 14 inclusive. The paper P is passed in the back of the carbon ribbon C. To make an impression upon the paper, the single typing hammer 105 is oscillated by means of an electric motor, by a solenoid or mechanically (mechanism for operating the hammer 105 not shown). The oscillating movement of the hammer 105 depresses the paper upon the carbon ribbon C and the embossed letters upon the steel ribbon 45.
transfer an impression of the letters embossed upon the steel ribbon 45 on to the paper P. Referring to Fig. 16, there is shown a further modification of the machine shown in Figs. 1 to 14 inclusive. In this case the machine is supplied with a thin embossed plate 45x instead of a steel ribbon 45. The plate 45x contains an entire type front. The plate 45x is exchangeable and can be replaced at will by the operator with another plate having a different type font.

Operation

The machine shown in Figs. 1 to 16 respectively is supplied with a standard key board and is operated like any other typing machine in present use. It greatly differentiates from other machines in the fact that it contains a variety of type faces instead of just one. These faces can be interchanged at will by the operator and to this effect the machine is provided with a thin steel ribbon 45 with the alphabetic letters and signs of various type faces embossed upon it. The ribbon 45 is wound around a pair of spools 46 and 47 and it is provided with a row of small holes 45x which mesh with the teeth of the rotor 52. By means of the mechanism which is operated by the keys of the key board, the ribbon 45 is oscillated horizontally in conjunction with the rotor 52. As the rotor 52 oscillates it exposes one letter at a time for each typing operation of the machine.

The typewriter paper is wound around the paper roller 36. The carbon ribbon C is located between the roller 36 and the type faces upon the steel ribbon. The paper roller 36 has also an oscillating movement so that as soon as one of the letters embossed upon the steel ribbon is brought into alignment for typing by the rotor 52, the roller 36 is forced against the type face transferring the letter's impression upon the typewriter paper. The typewriter keys 23 are depressed by the operator, this action operating the key bars 23x which are hingedly held upon the cross shaft 67. The depression of each key bar 23x in its turn moves the plastic member 70 (see Figs. 9 and 10) downwardly. Depending upon how far each plastic member of each individual key bar is away from the center 73 upon which the elongated bar 72 hinges, the latter will be displaced in accordance with the distance of each key from the center 73. By means of the gear rack segment 76 and the spur gear 77 the upright shaft 53 is rotated in an arc. To every new displacement of the rotor 52, there is a corresponding displacement of the embossed ribbon 45. This action is responsible for bringing forward a different letter of the alphabet embossed upon the steel ribbon 45.

When a key bar 23x is depressed all the way down, the plastic member 70 contacts the restraining plate 72x preventing the bar from further downward movement. Inasmuch as the key bar 23x moves downwardly, it contacts the metallic surface of the elongated arm 72 establishing as it does an electric contact closing an electric circuit. The solenoids 62 and 62x are connected to the circuit and are energized. The electric or magnetic action of the solenoids, by means of their armatures 61 and 61x, will operate the mechanism of the carriage 35 through the oscillating motion of the arms 56 and 56x and 57 and 57x. When the key bar 23x is released tending to return to its original resting position, the electric contact between its extension 23x and the broken and the solenoids become deenergized permitting the carriage mechanism to return back to its original position. After the typing operation has been completed the carriage mechanism skips one letter to be ready for the next typing operation. The machine shown may utilize any standard make skipping mechanism and any standard carbon ribbon advancing device. These are old to the art. Inasmuch as the present invention does not reside in the skipping or carbon advancing mechanism, any standard mechanism may be used with satisfactory results.

To exchange the original type face with a new one, the operator first turns the knob 87 to the left disconnecting the gear rack segment 76 from its engagement with the spur gear 77. This operation is accomplished by means of the little arm 86 which is secured to the knob shaft 73 and the bar 84 which is secured both to the little arm 86 and the gear segment 76. The disengagement of the rack 76 from the spur gear 77 leaves the shaft 53 free to rotate. Then the operator turns the knob 31 or 32 to change the type. The indicator dial 80, which is operated by the train of gears 82, indicates to the operator his type face selection. The dials 31 or 32 are turned until the pointer 55xxx appears in the proximity of the V-shaped opening upon the cover plate 55. Then the knob 87 is released and the machine is ready again for typing.

Having described my invention what I claim is:

1. In a typing machine including a keyboard, key bar means operated by said keyboard, an upright shaft, means operated by said key bar means for oscillating said shaft, ribbon means embossed with various type faces, a pair of spools upon which said ribbon means is wound, said shaft having a geared drum the teeth of which mesh with holes in said ribbon means to operate said ribbon means, said ribbon means being permanently contained in said typing machine, and means for interchanging one type face for another type face contained upon said ribbon means and wound upon said spools preliminary to typing.

2. In a typewriter including a keyboard, key bar means operated by said keyboard, an operating shaft, means operated by said key bar means for oscillating said shaft, ribbon means operated by said operating shaft and having various type faces embossed thereon, said embossed ribbon means being of a predetermined length with free ends, spool means into which said free ends are wound, said ribbon means being permanently contained within said typewriter, and knob means for rotating said spool means to interchange one type face for another preliminary to typing.

3. A narrow flexible ribbon means of predetermined length with free ends including alphabetic letters and signs permanently embossed upon it, said letters and signs being raised above the flat surface of said ribbon means in the process of embossing said letters and signs upon said means, said letters and signs being contained in groups upon said ribbon means, said ribbon means having several such groups of letters and signs embossed upon it, the type face of one group differing from the letters and signs of another group, holes upon the outer margin of said ribbon means, said holes being positioned in said ribbon means in a row one hole behind the other and in spaced formation, and a spool upon which said embossed ribbon means is wound.

4. A narrow flexible ribbon means of predetermined length with free ends including alphabetic letters and signs permanently embossed upon it, said letters and signs being raised above the flat surface of said ribbon means in the process of embossing said letters and signs upon said means, said letters and signs being contained in groups upon said ribbon means, said ribbon means having several such groups of letters and signs embossed upon it, the type face of one group of letters and signs embossed upon it substantially differing in character from the letters and signs of another group, holes upon the outer margin of said ribbon means, said holes being positioned in said ribbon means in a row one hole behind the other and in spaced formation, and a pair of spools on which the free ends of said embossed ribbon means are wound, one free end on each spool.

5. Substantially the same structure as set forth in claim 4: said spools being permanently contained in a typewriter including a standard keyboard, drum means
2,762,486

in said machine operated by said keyboard, said drum means having sprocket teeth engaging the holes in said ribbon means, and spool rotating means for rotating said spools to interchange one type face for another preliminary to typing.

6. In a typewriter including a keyboard, key bar means operated by said keyboard, an upright shaft, means operated by said key bar means for oscillating said shaft, ribbon means of a determined length with free ends operated by said shaft and having various type faces embossed thereon, spool means on which the free ends of said embossed ribbon means are wound, said embossed ribbon means being permanently contained within said typewriter and knob means for rotating said spool means to interchange one type face for another preliminary to typing.

7. In a typewriter including a keyboard, key bar means operated by said keyboard, an upright shaft oscillated by said key bar means, ribbon means having various type faces embossed upon it, a drum means on said oscillating shaft for operating said ribbon means, said ribbon means being of a determined length with free ends, spool means on which said free ends of said embossed ribbon means are wound, said ribbon means being permanently contained within said typewriter, and knob means for rotating said spool means to interchange one type face for another preliminary to typing.

8. In a typewriting machine including a keyboard and a pair of spools, a narrow flexible ribbon means of predetermined length wound at its free ends upon said spools and having various type faces embossed thereon, said ribbon means being provided with a series of holes along one outer margin thereof, means controlled by said keyboard and engaging the holes in said ribbon means to operate said ribbon means, and means for rotating said spools to interchange one type face for another preliminary to typing.

9. In a typewriter machine including a keyboard, key bar means operated by said keyboard, an upright shaft, means operated by said key bar means for oscillating said shaft, ribbon means provided with various type faces, a pair of spools upon which said ribbon means is wound, said shaft having a geared drum means having teeth, said teeth meshing with apertures in said ribbon means to operate said ribbon means, said ribbon means being permanently contained in said typewriter machine, and means to interchange one type face for another type face provided upon said ribbons means and wound upon said spools.

References Cited in the file of this patent

UNITED STATES PATENTS

580,014 Souder .......................... Apr. 6, 1897
825,968 Hammond ........................ July 17, 1906
2,109,729 Lee ............................. Mar. 1, 1938
2,409,237 Banks .......................... Oct. 15, 1946

FOREIGN PATENTS

239,999 Germany ........................ Oct. 28, 1911
509,940 Germany ........................ Nov. 5, 1931