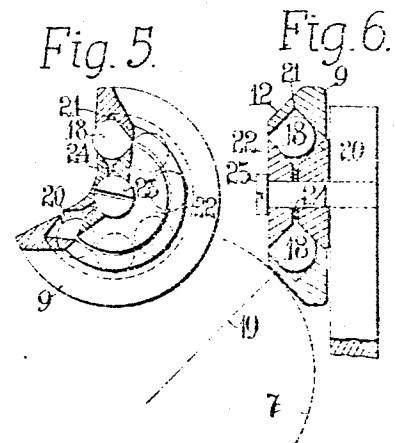
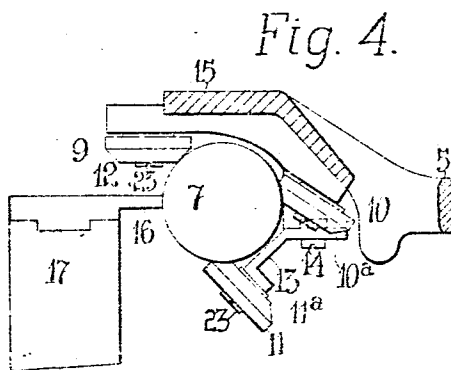
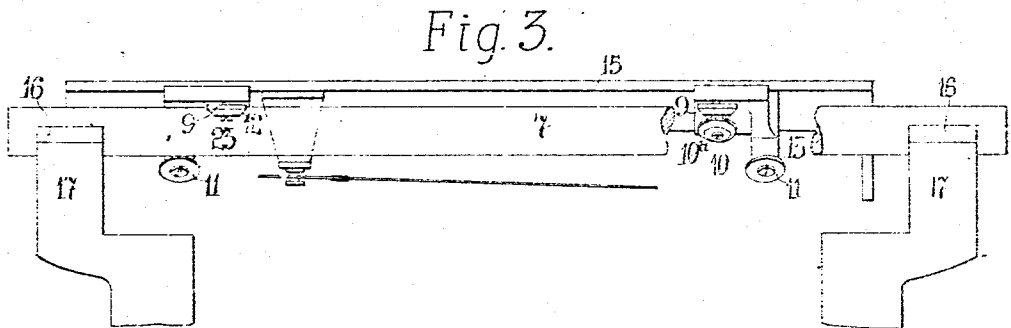
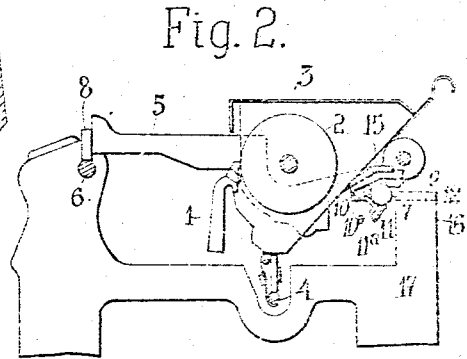
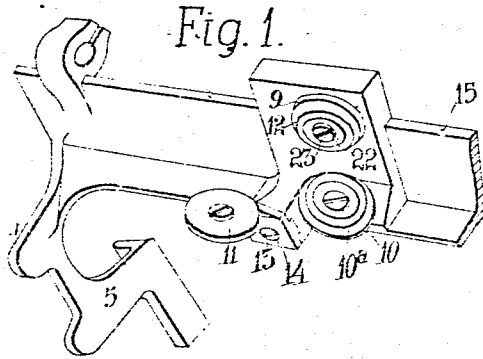


W. E. BARNARD.
TYPE WRITING MACHINE.
APPLICATION FILED OCT. 30, 1909.

949,723.

Patented Feb. 15, 1910.



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UNITED STATES PATENT OFFICE.

WALTER E. BARNARD, OF HARTFORD, CONNECTICUT, ASSIGNOR TO UNDERWOOD TYPEWRITER COMPANY, OF NEW YORK, N. Y., A CORPORATION OF NEW JERSEY.

TYPE-WRITING MACHINE.

949,723.

Specification of Letters Patent. Patented Feb. 15, 1910.

Application filed October 30, 1909. Serial No. 525,514.

I all whom it may concern:

Be it known that I, WALTER E. BARNARD, a citizen of the United States, residing in Hartford, in the county of Hartford and State of Connecticut, have invented certain new and useful Improvements in Type-Writing Machines, of which the following is a specification.

This invention relates to guides for carriages of typewriting machines.

The principal object of the invention is to provide simple, inexpensive, compact anti-friction devices to guide a typewriter carriage upon a cylindrical rail, particularly a rail which between its ends is attached to supporting brackets.

In certain typewriting machines, particularly the well known "Underwood" front strike machine, to which my improvements are shown as applied, the room is so limited as to apparently preclude the employment of suitable rolls to run upon the usual cylindrical rear guide rail; and it has been the practice in manufacturing said machine to provide yokes or collars upon the carriage to slide upon said rail.

I have devised a set of ball bearing rolls so compactly disposed that they may be applied to the rear rail or main guide rail of said Underwood and other machines, and not only enable the advantages of a cylindrical guide rail to be preserved, but also to cause the carriage to run with the utmost accuracy and freedom upon said rail, without liability of rattling of the carriage, arising from wear of the rolls. I dispose the rolls so that they engage the rail by their faces instead of by their rims or treads; the faces being preferably coned where they engage the rail. This accomplishes a twofold object: The first is that the rolls may be set very compactly around the rail; and the second is that the pressure upon the roll is so directly supported by its interior bearing balls as to give an effect equivalent to that produced if the carriage were to run directly upon the balls. The carriage guide rolls are further set with a view to cause the carriage always to cling tightly to the rail, so that vibration is avoided.

Other features and advantages will hereinafter appear.

In the accompanying drawings, Figure 1 is a perspective rear bottom view of a fragment of the carriage illustrating the ar-

rangment of the guide rolls thereon. Fig. 2 is a part sectional side elevation of the carriage of an Underwood typewriting machine, with the present improvements applied thereto. Fig. 3 is a rear view of a portion of the carriage and its main guide rail. Fig. 4 is an enlarged diagram to illustrate the disposition of the guide rolls upon the main guide rail. Figs. 5 and 6 are details of one of the guide rolls.

In said Underwood machine, type bars 1 strike rearwardly against a platen 2, journaled in a platen frame 3, which by means of a rail 4 is shifted up and down, to enable different types to print. Said platen frame 70 is mounted upon a carriage 5 having a front supporting rail 6, and a rear supporting rail 7. A roll 8, mounted on the carriage, runs upon the front rail 6.

The carriage has a rear pair of main guide rolls 9, a front pair of main guide rolls 10 and a bottom pair 11; each roll mounted upon the carriage independently of all the others. The rolls are arranged in groups or sets, one at each end of the carriage, each set comprising a rear, front and bottom roll. Each rear roll 9 rotates upon a substantially vertical axis, and has a beveled face 12 to engage the cylindrical main guide rail 7 at a point about midway between the top and rear thereof. These two rolls 9 form preferably the entire rear support of the weight of the carriage; the line of engagement of the cone 12 with the rail being about tangential to the circumference of the latter, as seen at Fig. 4, and said line being at an angle of about 45 degrees from a vertical line, so that the weight of the carriage tends to carry the same rearwardly. Such rearward movement of the carriage is prevented by the rolls 10, which, it will be seen, are mounted to turn upon axes which stand at an angle of about 45 degrees to a vertical line, said rolls having coned treads 10^a like the rolls 9, and said treads engaging the front of the guide rail 7: the line of contact between the cones 10^a and the guide rail being nearly or about vertical. The weight of the carriage, it will be seen, tends to carry it downwardly and rearwardly, by reason of the engagement of the rolls 9 with the upper rear side of the guide rail: while the rearward movement is prevented by the rolls 10. In other words, the rolls are so disposed that the weight of the carriage causes the rolls

10 to be pressed directly back against the front of the rails 7, so that a firm support for the blows of the type is insured. Moreover, little or no wear can be produced on the rolls 10^a, and any settling of the carriage will not appreciably vary the position of the platen forwardly or backwardly, which is a desideratum. If desired, the rolls 10^a may engage the rail 7 at a region a little above a horizontal plane passing through its center, so that the line of contact between the cone 10^a and the guide rail shall incline a little backwardly, as illustrated at Fig. 4, thus insuring that what little wear may occur cannot at all vary the position of the platen forwardly or backwardly. The bottom rolls 11 are mounted to turn upon axes which are also set at about 45 degrees from the perpendicular, and their cone faces 11^a engage the under side of the guide rail 7. The principal office of the bottom rolls 11 is to prevent the carriage from being tipped up at one end by downward pressure applied thereon at the other end. They also serve to hold or secure the carriage to the rail. The guide rolls 9, 10 are preferably placed between the rolls 11, as seen at Fig. 3; and the rolls 11 are preferably mounted upon brackets 13, which are detachably held by screws 14 upon the main rear longitudinal bar 15 of the carriage frame 5.

It will be seen that brackets or ears 16, projecting forwardly from posts 17 on the framework of the machine, are attached to the cylindrical guide rail 7 at its rear side between the rolls 9 and 11. The guide rolls 9 and 10 may be readily applied to said Underwood machine, since they lie compactly under said usual rear bar 15 of the carriage, and for practical purposes really take up no more room than the usual guide collars or yokes, which are usually formed upon said bar 15.

It will be seen that the rolls engage the guide rail at intervals of about 120 degrees, thus giving the carriage a secure grip upon the rail. It will also be seen that the pressure of the roll against the guide rail 7 is taken directly by balls 18 on which each of the rolls is mounted. This will be understood by reference to Fig. 6. A line 19 radial to the guide rail 7 is perpendicular to the surface of cone 12, and passes through the center of the ball 18 directly beneath said cone, and also is perpendicular to the surface of a fixed cone 20 upon which the balls run. The effect is therefore substantially the same as if the carriage ran directly upon bearing balls. The balls run in a V-groove 21 formed interiorly in the roll; and are held in place by a fixed cone 22. A screw 23 supports the fixed cones, and by varying the thickness of a washer 24 between the latter, an exact fit of the balls in the entire run-way may be secured. This fit will be

maintained for an indefinite length of time without further attention, because since the pressure upon the balls is along the line 19, that is, vertical to the bearing surfaces, the wear is negligible. Thus the carriage is tightly fitted upon the rail, and moves as freely therealong as though directly supported upon bearing balls, while preserving the advantages of a hardened cylindrical guide rail, due to its durability, and rigidity, and the ease and accuracy with which it may be manufactured. The rolls may be readily mounted upon Underwood carriages, without material change in their structure, and such carriages may be placed upon rails already in use, without change in the rails or their supports.

Having thus described my invention, I claim:

1. In a typewriting machine, the combination with a carriage, of tracks therefor, including a cylindrical rail, and ball-bearing rolls independently mounted on the carriage and having each a single coned face, said coned faces engaging said cylindrical rail at different points around the same, to hold the carriage thereto.

2. In a typewriting machine, the combination with a carriage, of tracks therefor, including a cylindrical rail, and ball-bearing rolls independently mounted on the carriage and having each a single coned face, said coned faces engaging said cylindrical rail at different points around the same, to hold the carriage thereto; one pair of said rolls being pivoted on a substantially vertical axis and engaging said rail about midway the top and rear thereof, and another pair of said rolls being pivoted on an inclined axis and engaging the front of said rail.

3. In a typewriting machine, the combination with a carriage, of tracks therefor, including a cylindrical rail, and ball-bearing rolls independently mounted on the carriage and having each a single coned face, said coned faces engaging said cylindrical rail at different points around the same, to hold the carriage thereto; one pair of said rolls being pivoted on a substantially vertical axis and engaging said rail about midway between the top and rear thereof, and another pair of said rolls being opposed to the first-mentioned pair.

4. In a typewriting machine, the combination with a carriage, of tracks therefor, including a cylindrical rail, and ball-bearing rolls independently mounted on the carriage and having each a single coned face, said coned faces engaging said cylindrical rail at different points around the same, to hold the carriage thereto; one pair of said rolls being pivoted on a substantially vertical axis and engaging said rail about midway between the top and rear thereof, and another pair of said rolls being pivoted on

an inclined axis and engaging the front of said rail, and a third pair of said rolls being pivoted on an inclined axis and engaging the bottom of said rail.

5 5. In a typewriting machine, the combination with a carriage, of tracks therefor, including a cylindrical rail, and ball-bearing rolls independently mounted on the carriage and having each a single coned face, said
10 coned faces engaging said cylindrical rail at different points around the same, to hold the carriage thereto; one pair of said rolls being pivoted on a substantially vertical axis and engaging said rail about midway between the top and rear thereof, and another
15 pair of said rolls being pivoted on an inclined axis and engaging the front of said rail, and a third pair of said rolls being pivoted on an inclined axis and engaging the
20 bottom of said rail, and supporting brackets attached to said rail between said first pair and said third pair of rolls.

6. In a typewriting machine, the combination with a carriage, of tracks therefor, including a cylindrical rail, and ball-bearing rolls independently mounted on the carriage and having each a single coned face, said
25 coned faces engaging said cylindrical rail at different points around the same, to hold the carriage thereto; one pair of said rolls being pivoted on a substantially vertical axis and engaging said rail about midway between the top and rear thereof, and another
30 pair of said rolls being pivoted on an inclined axis and engaging the front of said rail, and a third pair of said rolls being pivoted on an inclined axis and engaging the
35 bottom of said rail; said third pair of rolls being mounted on brackets which are detachably connected to the carriage.
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7. In a typewriting machine, the combination with a carriage, of tracks therefor including a cylindrical rail, and three pairs of coned rolls mounted upon the carriage with
45 their coned faces engaging said cylindrical rail at intervals of about 120 degrees, to hold the carriage thereto, each roll being mounted upon the carriage independently of the others.

8. In a typewriting machine, the combination with a carriage, of tracks therefor, including a cylindrical rail, and ball-bearing rolls independently mounted on the carriage and having each a single coned face, said
50 coned faces engaging said cylindrical rail at different points around the same, to hold the carriage thereto; one pair of said rolls being pivoted on a substantially vertical axis and engaging said rail about midway between
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the top and rear thereof, and another pair of
60 said rolls being pivoted on an inclined axis and engaging the front of said rail, and a third pair of said rolls being pivoted on an inclined axis and engaging the bottom of
65 said rail; the rolls in one of said pairs being mounted upon brackets which are detachably secured to the carriage.

9. In a typewriting machine, the combination with a carriage, of tracks therefor, including a cylindrical rail, and ball-bearing
70 rolls independently mounted on the carriage and having each a single coned face, said coned faces engaging said cylindrical rail at different points around the same, to hold the carriage thereto; one pair of said rolls being
75 pivoted on a substantially vertical axis and engaging said rail about midway between the top and rear thereof, and another pair of said rolls being pivoted on an inclined axis and engaging the front of said rail, and
80 a third pair of said rolls being pivoted on an inclined axis and engaging the bottom of said rail; the rolls in the third pair being mounted upon brackets and the rolls in the
85 first two pairs being disposed between the rolls in the third pair.

10. In a typewriting machine, the combination with a carriage, of tracks therefor including a main rail, a pair of ball-bearing
90 rolls independently mounted upon the carriage and having each a single coned face to bear upon an inclined surface of said rail, and a second pair of ball bearing rolls opposed to the first pair and also independently mounted on the carriage, and each
95 having a single coned face which is mounted to turn about an inclined axis and bear against a substantially vertical side of said rail.

11. In a typewriting machine, the combination with a carriage, of tracks therefor including a main rail, a pair of ball-bearing
100 rolls independently mounted upon the carriage and having each a single coned face to bear upon an inclined surface of said rail, a second pair of ball bearing rolls opposed to the first pair and also independently mounted on the carriage, and each having a single
105 coned face which is mounted to turn about an inclined axis and bear against a substantially vertical side of said rail, and means to prevent the carriage from lifting off from the rail.
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Witnesses:

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