

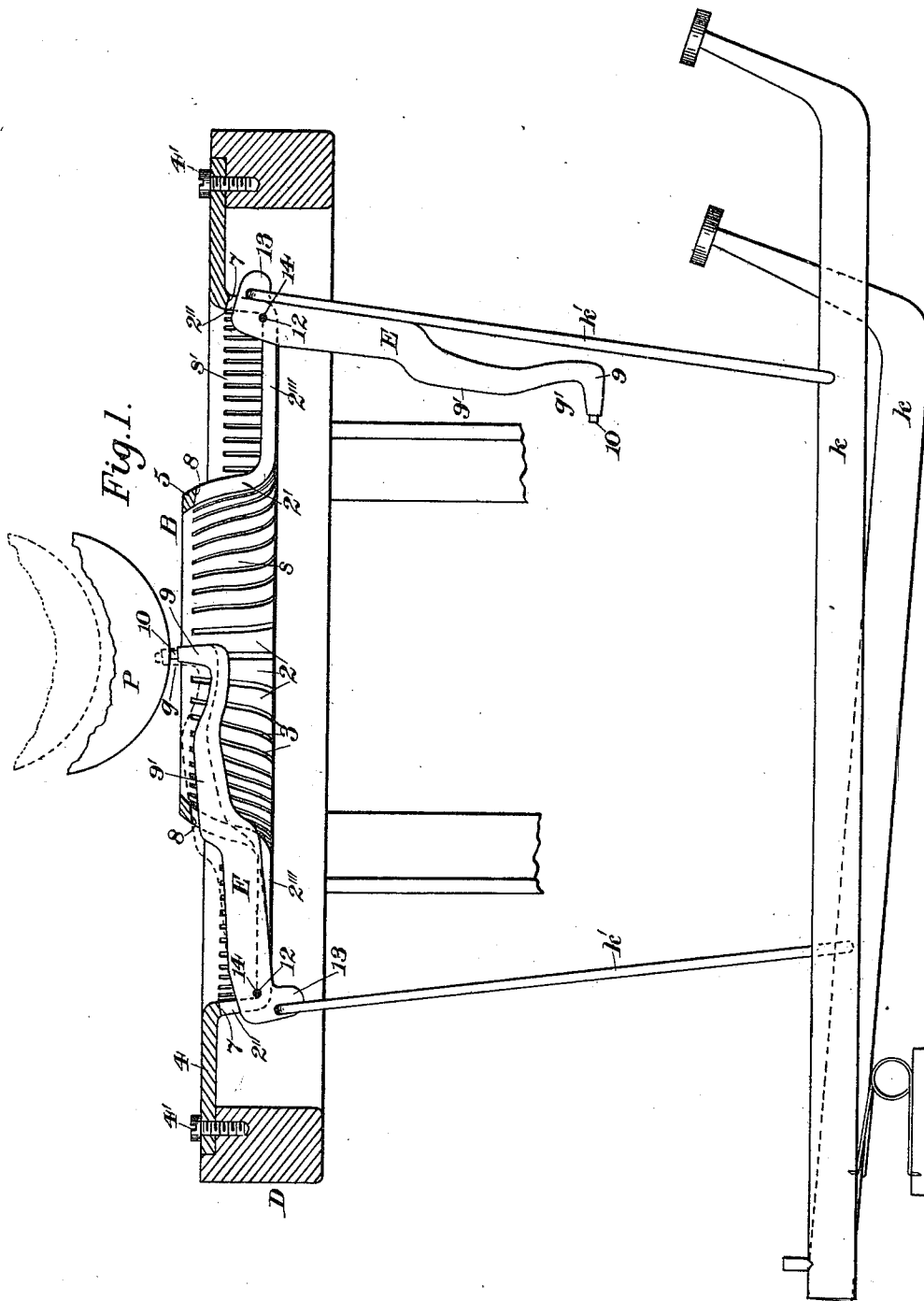
(No Model.)

J. M. FAIRFIELD.
WRITING MACHINE.

3 Sheets—Sheet 1.

No. 566,301.

Patented Aug. 25, 1896.



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(No Model.)

3 Sheets—Sheet 2.

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Fig. 2.

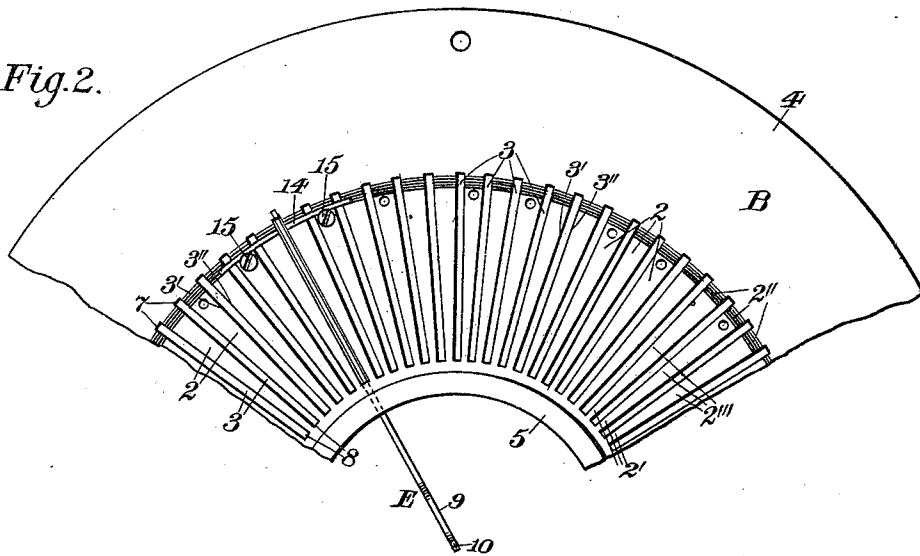


Fig. 3.

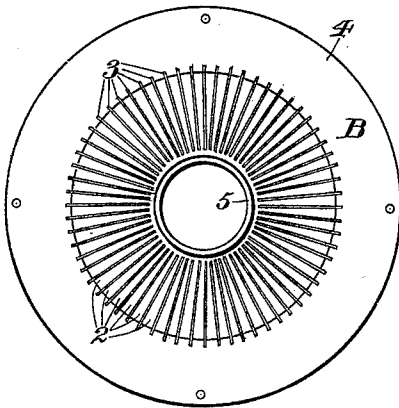


Fig. 5.

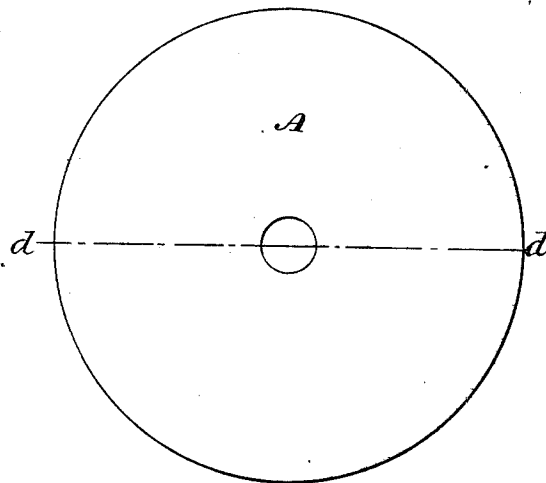


Fig. 4.

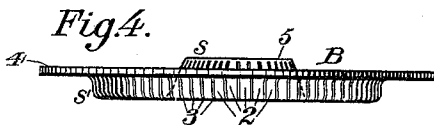


Fig. 6.



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WRITING MACHINE.

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Fig. 7.

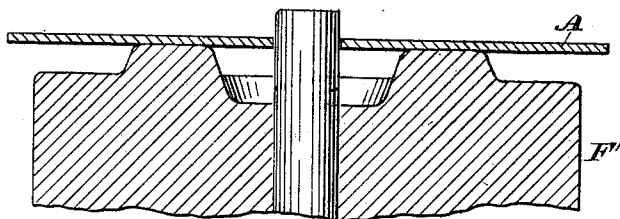
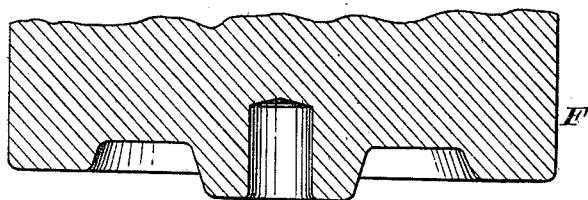


Fig. 8.

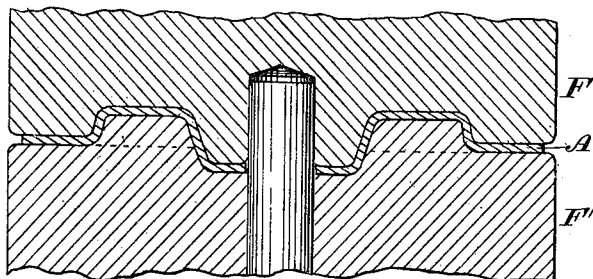
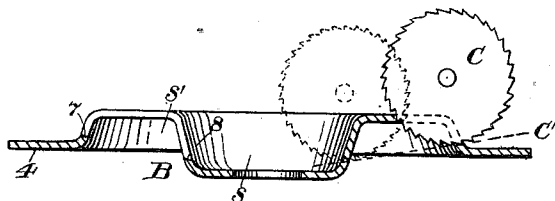


Fig. 9.



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UNITED STATES PATENT OFFICE.

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WRITING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 566,301, dated August 25, 1896.

Application filed June 5, 1895. Serial No. 551,742. (No model.)

To all whom it may concern:

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

This invention relates to improvements in that class of writing-machines in which the type-bars are supported to have a swinging movement toward a common center, as described, for instance, in Letters Patent of the United States No. 536,022, granted to me March 19, 1895, to which reference may be had, my present invention being somewhat in the nature of an improvement upon the writing-machine described and claimed in the aforesaid patent.

The primary object of my invention is to furnish a writing-machine of the class specified having an accurately-aligned type mechanism of improved construction and organization adapted to be made and assembled on the "interchangeable" method and embodying a combined type-bar guide and stop adapted for positively guiding and also for positively limiting the lateral play and the working stroke of the type-bar.

Another object of my invention is to furnish a writing-machine of the class specified having an organization of type-bars and a carrying-guide therefor so constructed that each type-bar will be positively held during the latter part of the working stroke thereof against rotation about an axis longitudinally of itself, and also against movement at an angle to the plane of the working stroke of said type-bar, to thereby establish such immutability in the working movements of the type bar as will positively insure precision and alinement during the printing operation.

In the drawings accompanying and forming part of this specification, Figure 1 is a sectional side elevation of a portion of the writing-machine embodying my present invention said figure simply showing a portion of the framework, the type-bar guide, two type-bars in relatively-different positions, actuating means for said type-bars, and a portion of the platen, said platen being shown in full and dotted lines in two positions, and one of said type-bars being also shown in full and

dotted lines in two positions. Fig. 2 is a plan view of a segment of the type-bar carrier-guide detached, said figure showing one type-bar in working connection therewith. Fig. 3 is a plan view, on a relatively small scale, of the type-bar guide detached. Fig. 4 is a side elevation of said type-bar guide, drawn in projection with Fig. 3. Fig. 5 is a plan view of the discous blank from which the type-bar guide-blank is made. Fig. 6 is a cross-sectional view of said blank, taken in dotted line *d d*, Fig. 5. Fig. 7 is a longitudinal section of a pair of swaging-dies adapted for swaging the blank shown in Fig. 5 into the form required for the type-bar guide, said figure showing the blank in position to be operated upon by the dies, and the dies being shown in their open positions. Fig. 8 is a similar view to Fig. 6, showing the dies closed upon the blank; and Fig. 9 is an inverted cross-sectional view of the partially-finished type-bar carrier-guide, and showing a milling-cutter in position and adapted to cut the radial guide-slots in said carrier-guide, the cutter being shown in two successive positions in full and dotted lines.

In the preferred embodiment thereof herein shown and described my invention consists, in part, of a type-bar carrier-guide embodying two concentric continuous rings connected together by a series of radially-disposed guide-bars separated transversely by intervening guide-slots, as will be hereinafter more fully described.

In the drawings only so much of a writing-machine is shown as is deemed necessary to illustrate the application and mode of operation of my present improvements.

According to my present improvements the type-bars of the writing-machine are side-guided, they being controlled as to their positions laterally of the plane of their swinging movements entirely by the side walls between which said bars are pivotally supported, and said bars are limited as to their working stroke in a manner hereinafter more fully set forth.

The type-bar carrier-guide (designated in a general way by B) consists in the form thereof herein shown of a multiplicity of radially-disposed guide-bars 2, separated transversely for the greater portion of their lengths by

the intervening guide slots or spaces 3 and connected together at their outer and inner ends by stop rings or rims 4 and 5, respectively, said rings 4 and 5 being preferably
5 formed integral with the guide-bars and being located in relatively-different horizontal planes.

As shown most clearly in Fig. 1 of the drawings, the guide-bars 2, which also constitute the connectors between the outer and inner rings 4 and 5, will preferably be of angular form in longitudinal section, so as to adapt them for guiding the type-bars (designated in a general way by E) during the working strokes thereof and for holding said type-bars, while approaching their effective printing positions, against rotary movement about axes longitudinally of themselves, said type-bars being pivotally supported at their outer
20 ends in the spaces between guide-bars, as shown most clearly in Figs. 1 and 2 of the drawings.

For the purpose of best adapting the guide-bars for holding the type-bars against transverse and rotary movements, as stated, said guide-bars are preferably made U-shaped in longitudinal section, the middle portion of said bars being in a horizontal plane and in parallelism with, but below, the under faces of the outer and inner rings 4 and 5, and the outer and inner ends of said bars are bent upward at an angle to the horizontal plane of the middle portions thereof and are connected with the outer and inner rings 4 and 5, respectively. These upwardly-extending inner and outer angular portions 2' and 2'', respectively, of the guide-bars form transverse guides for the inner and outer ends, respectively, of the type-bars, and the intermediate or middle portions of said guide-bars form longitudinal guides 2''' for said type-bars. The transverse guides 2' and 2'' hold the type-bars, when in their printing positions, against a rotary movement about axes longitudinally of themselves, and the intermediate longitudinal guides 2''' hold said type-bars against movement transversely of the planes of their working strokes. Thus, it will be seen, that a type-bar is positively
50 held during its working stroke against rotary and lateral movement, and is positively guided so as to prevent any misalignment in the printing.

The type-bar carrier-guide will in practice be preferably constructed from a flat sheet-metal disk A of proper thickness, as shown, for instance, in Figs. 5 and 6 of the drawings, which disk will preferably be centrally perforated, and will usually be swaged to the shape illustrated in Fig. 1 between a pair of swaging-dies, such as are shown in Figs. 7 and 8 of the drawings, although it will be obvious that the carrier-guide might be cast to the proper form, instead of being swaged, as illustrated.
65

In forming the carrier-guide from a sheet-metal disk said disk will be centrally dished,

as shown at s, to form a hollow cone at the middle portion of said plate, the smaller end of which cone lies in a plane above and parallel to the normal plane of the plate, and said disk is dished, as shown at s', on concentric lines around and in opposition to the central conical portion s to give a proper angular formation to that part of the plate which constitutes the guide-bars 2, this portion s' extending below the plane of the rim of said plate, as shown in Fig. 1. This operation of dishing adjacent portions of the plate in opposite directions forms a carrier-guide having a circular rim 4, a depressed annular guide-bar-forming portion s', contiguous to and concentric with said rim, and a central stop-ring-forming portion s, concentric to and remote from said rim 4.
85

As an instrumentality for forming the carrier-guide I have shown in Figs. 7 and 8 of the drawings a pair of complementary dies adapted for swaging the blank or disk a to the external form shown in Fig. 1.
90

In Fig. 7 the dies, which are designated in a general way by F and F', respectively, are shown in their open positions with a blank A in position between them to be swaged, and in Fig. 8 said dies are closed together upon said blank.
95

The working faces of the complementary dies F and F' are of a cross-sectional shape corresponding to the cross-sectional shape of the carrier-guide B, both of said dies having a plane horizontally-disposed rim-forming face contiguous to the periphery thereof and also having complementary projections and depressions corresponding in conformation to the conformation of and adapted for forming the concentrically-disposed guide-bar-forming and stop-ring-forming portions of the carrier-guide, as will be readily understood by a comparison of Figs. 1, 7, and 8 of the drawings.
100

After the blank A has been swaged to the form illustrated in Fig. 8 the radially-disposed guide-spaces 3 will be milled in the guide-bar-forming portion s', preferably by means of a milling-cutter, as C, which is run through successive guide-space-forming portions of said blank in a radial direction and in the plane represented by dotted line c', Fig. 9, which successive cutting operations cut the successive guide-spaces from a point contiguous to the rim 4 to a point contiguous to the stop-ring 5, leaving stop-abutments 7 and 8 at the outer and inner ends, respectively, of said guide-spaces, and forming the radially-disposed guide-bars 2 with intervening guide-spaces between them.
105

The type-bar carrier-guide will usually have the rim 4 thereof fixed by means of screws 4' to some suitable portion of the framework of the writing-machine—as, for instance, to the ring D, which constitutes a portion of said framework.
110

The abutments 7 and 8 of the carrier-guide constitute stop-abutments for limiting the ad-

vancing and retracting movements, respectively, of the type-bars.

In the form thereof herein shown and described the type-bars E are of angular form and side elevation, each type-bar consisting of the type-arm 9, which is furnished at the outer end thereof with the usual type 10 and has at the rearward end thereof pivot-bearing 12 and the angle-arm 13, which angle-arm extends from the type-arm at a point thereon adjacent to the pivot-bearing in a direction crosswise of said type-bars.

In practice the type-arm 9 will have an offset or a relatively wide transverse guide-face 9' near the middle portion thereof in position and adapted for registering with and for engaging the inner angular portion 2' of the guide-bars 2 during the latter part of the working stroke of the type-bar, said guide-face 9' being located upon said type-bar at a distance from the pivot-bearing corresponding to the distance of said inner angular portion of the guide-bar from said pivot-bearing, as will be readily understood by reference to Fig. 1 of the drawings. The type-bar is pivotally supported for swinging movements toward and from the platen P of the writing-machine within a guide-slot 3 between the opposing walls or guide-faces 3' and 3'' of adjacent guide-bars 2 of the type-bar carrier-guide, said type-bar being pivotally supported on a pivot or journal 14, which is suitably supported transversely of the type-bar slot 3, adjacent to the outer angular portions 2'' of the type-bars 2, by some suitable device, such as bevel-headed screws 15, as shown in Fig. 2 and as described in the patent hereinbefore referred to. Said pivot 14 is preferably located at considerable distance rearwardly from the forward or inner end of the guide-bars, so that when the type-bar is in its printing position, as shown at *g*, Fig. 1, said type-bar will be positively held as against any positive swinging movement in the plane of the axis of its working stroke.

Should the platen be lifted, as shown in dotted lines, Fig. 1, and the type-bar be operated through the medium of the key-lever *k* and connecting-rod *k'* (which are connected to the type-bars in the usual manner) the stroke thereof would be limited by the abutment 7 of the stop-ring 5, which abutment forms a convenient bearing for the type-bar when it is desired to hold the type-bars in fixed position for cleaning by hand.

When a rotary brush for cleaning the type of the several type-bars is used, the type-bars being in their idle positions, it will be seen that the transverse guides 2'', in connection with the angle-arm 13, hold said type-bars against rotative movement about their longi-

tudinal axes. By this means the type-bars are held against movement during the operation of cleaning the type, when said types are cleaned by a rotating brush, and each bar is maintained in a truly normal idle position ready for beginning its working stroke in the true plane of said stroke.

When the type-bars are in their normal idle positions, as shown at *g'*, Fig. 1, the operating-rod *k'* stands close behind the type-arm of said bar. The operating-rod, standing in the plane of the swinging movement of the type-bar, does not tend, either on its pulling or pushing movement, to deflect or draw the type-bar out of its true course.

By the terms "side-guided" as applied herein to the type-bar I refer to a type-bar of that class in which the control of the bar against lateral movement, or in a movement in a plane other than the working stroke, is effected by means of guide surfaces or walls parallel to said plane and operating in this respect independently of the pivot of the type-bar, said pivot being necessarily too freely fitted in the pivot-bearing of the type-bar to have, within the required limits, any control of the type-bar as against lateral movements.

Having thus described my invention, what I claim is—

In a type-writing machine, a type-bar carrier-guide comprising two horizontally-disposed concentric rings 4 and 5, located in parallelism and in different horizontal planes, and radially-disposed ring-connecting guide-bars having the intervening guide-slots 3, extending from end to end of said guide-bars, and having the horizontally-disposed longitudinal middle guide portions 2''', and the vertically-disposed transverse guide portions 2' and 2'' at the inner and outer ends, respectively thereof; combined with type-bars E, pivotally supported between adjacent guide-bars, and each having a laterally-disposed relatively wide transverse guide portion 9', located a distance from the pivot-point of said type-bar equal to the distance between said pivot-point and the vertically-disposed guide portion 2' of the carrier-guide, and adapted to coact with said transverse guide portion 2' during the working stroke of said type-bar, whereby said type-bar is held against rotative movement about its longitudinal axis; and pivots 12, located at the junction of the horizontal guide portion 2''' and the transverse guide portion 2'' of the carrier-guide, and pivotally supporting said type-bar, substantially as described.

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