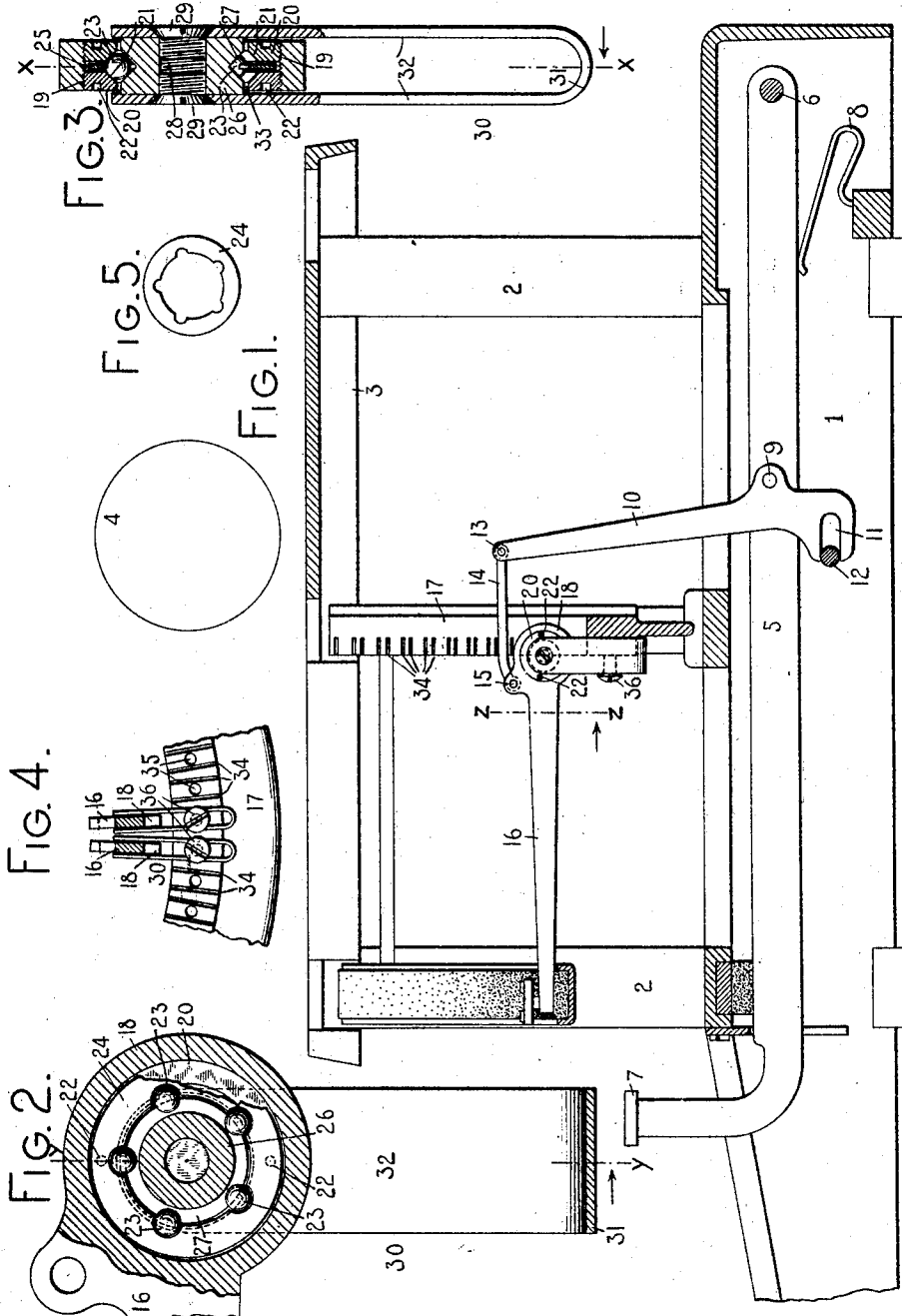


C. J. BOND.
TYPE WRITING MACHINE.
APPLICATION FILED OCT. 3, 1903.

Patented Feb. 6, 1912.

2 SHEETS—SHEET 1.

1,016,318.



WITNESSES.

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1,016,318.

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2 SHEETS—SHEET 2.

FIG. 6

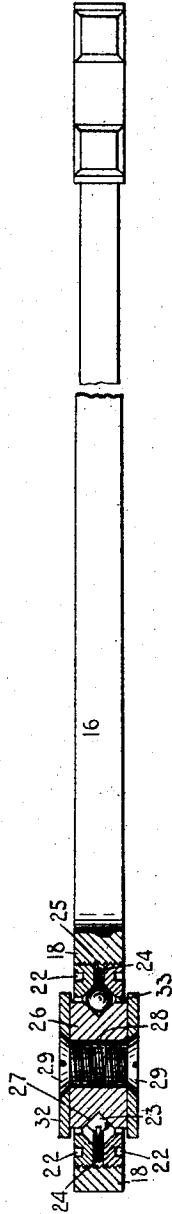


FIG. 9

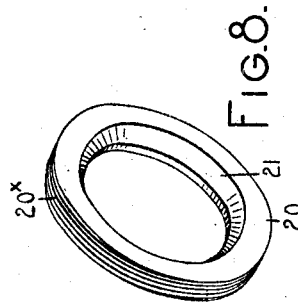
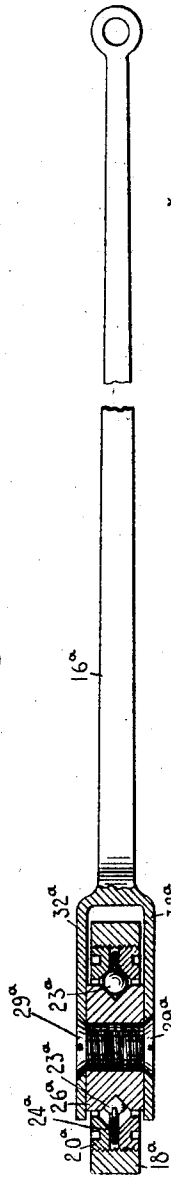


FIG. 8.

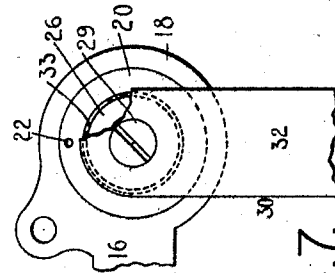


FIG. 7.

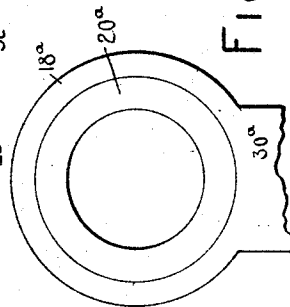


FIG. 10

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UNITED STATES PATENT OFFICE.

CHARLES J. BOND, OF SYRACUSE, NEW YORK, ASSIGNOR TO THE MONARCH TYPE-WRITER COMPANY, OF SYRACUSE, NEW YORK, A CORPORATION OF NEW YORK.

TYPE-WRITING MACHINE.

1,016,318.

Specification of Letters Patent.

Patented Feb. 6, 1912.

Application filed October 3, 1903. * Serial No. 175,570.

To all whom it may concern:

Be it known that I, CHARLES J. BOND, citizen of the United States, and resident of Syracuse, in the county of Onondaga and State of New York, have invented certain new and useful Improvements in Type-Writing Machines, of which the following is a specification.

My invention relates to typewriting machines and more particularly to type bars and hangers therefor.

One object of my invention is to provide a simple and efficient type bar and hanger construction which occupies but little space laterally, whereby a large number of type bars and hangers may be mounted in a comparatively small space without unduly crowding the parts or detracting from the strength or rigidity thereof.

A further object of the invention is to provide a type bar and hanger construction in which dust is excluded from the bearings of the type bar and an easy running ball bearing construction is afforded and wherein the parts may be readily assembled and an adjustment thereof afforded to compensate for wear and to properly position the type bar relatively to the hanger.

To the above and other ends, which will hereinafter appear, my invention consists in the features of construction, arrangements of parts and combinations of devices to be hereinafter described and particularly pointed out in the appended claims.

In the accompanying drawings, wherein like reference characters indicate corresponding parts in the various views, Figure 1 is a front to rear vertical sectional view of sufficient number of parts of one form of typewriting machines to illustrate my invention in its application thereto. Fig. 2 is a fragmentary enlarged detail sectional view of the type bar and hanger construction, the section being taken on the line $x-x$ of Fig. 3 and looking in the direction of the arrow at said line. Fig. 3 is a like view of the same, the section being taken on the line $y-y$ of Fig. 2 and looking in the direction of the arrow at said line. Fig. 4 is a fragmentary transverse sectional view of two of the type bars and hangers mounted in the segment, the section being taken on the line $z-z$ of Fig. 1, and looking in the direction of the arrow at said line. Fig. 5 is a detail face view of the ball separator.

Fig. 6 is a detail plan view, partly in section, of the type bar and hanger construction represented in the preceding figures. Fig. 7 is a fragmentary enlarged side elevation of the type bar and hanger construction represented in Figs. 1 to 6 of the drawings and with one of the side arms of the hangers broken away. Fig. 8 is a detail perspective view of one of the bearing rings. Fig. 9 is a view which corresponds to Fig. 6, the view showing a modified form of construction. Fig. 10 is an enlarged detail fragmentary side view of the hanger employed in the construction shown in Fig. 9.

I have shown my invention applied to a "Monarch" typewriting machine, and while the invention is particularly applicable to a "visible" writing machine wherein a large number of type bars are mounted in a comparatively small space or arc, it should be understood that the invention may be employed in various characters of writing machines.

The frame 1 of the machine is provided with corner posts 2 and a top plate 3 on which a suitable carriage (not shown) is adapted to travel. Said carriage carries a platen 4, diagrammatically illustrated in Fig. 1. Key levers 5 are pivoted at 6 in the base of the machine, and each key lever is provided with a finger key 7 and a restoring spring 8. Key levers are each pivoted at 9 to a sub-lever 10 that is slotted at its lower portion as indicated at 11 for cooperation with a fixed fulcrum bar 12. The upper end of each sub-lever is pivoted at 13 to one end of a link 14, the forward end of which is pivoted at 15 to a type bar 16 that is pivotally supported upon hangers secured to a type bar segment 17 so as to vibrate upwardly and rearwardly and impact with the front face of the platen 4. Each type bar has an eye 18 that is internally threaded at 19 for cooperation with the bearing rings or plates 20 externally threaded at 20*, each plate being provided with a ball bearing surface 21 and with spanner openings 22, by means of which the rings may be adjusted in the threaded bearing in the eye of the type bar. The ball bearing surfaces 21 of the bearing rings are beveled in opposite directions so as to form a substantially V-shaped raceway between them for cooperation with the anti-friction balls or rollers 23,

as illustrated in Fig. 3. These bearing rings or apertured plates are spaced apart and are adapted to receive a ball spacer or separator 24 within the space 25 between said rings or plates. Extending through the eye of the type bar and through the bearing rings is a hub 26 that is cylindrical in form and has a central or median ball race or groove 27 therein, said groove being substantially V-shaped in cross-section. This hub has a central threaded opening 28 that coöperates with the stems of headed screws 29 which extend in opposite directions through openings in the arms of the type bar hangers 30. Each hanger is preferably made of sheet metal and is of looped form and consists of the bent or looped portion 31 and side arms 32 which constitute a bifurcated portion that is adapted to receive the eye of the type bar. Upon reference to Fig. 3, it will be observed that the thickness of the hub is slightly greater than the width of the eye of the type bar and the distance between the outer extremities of the bearing rings which are received therein so that the bearing ring and type bar are free from contact with the hanger at all times; and that the type bar is wholly supported in place by the anti-friction balls 23. It will be understood that the heads of the screws 29 coöperate with the arms of the hanger to force them into contact with the hub and to cause them to bind against the hub and thus securely connect it to the arms of the hanger. From an examination of Figs. 3 and 7, it will be seen that the diameter of the hub is such that a bare clearance is left between the hub and bearing rings; that this small space 33 is the only opening to the ball bearings; that the arms of the type bar hanger break joint with and cover the openings 33 so as to prevent the admission of dust or grit to the bearings; that a simple and efficient ball bearing construction is provided wherein dust is excluded from the bearings of the type bar, and that access may be readily attained for adjusting the bearing rings 20 in order to properly center the type bar, so that it will occupy a median plane with reference to the hanger and the ball race formed between the eye of the type bar and its hanger.

There is no tendency for the hub or bearing rings to become dislodged in the operation of the type bars, inasmuch as the hub and rings do not bear at any point upon a relatively movable part other than the anti-friction balls. Furthermore, the bearing rings or plates are maintained wholly within the eye of the type bar and the means for adjusting the bearings do not therefore occupy any room in addition to the width of the type bar.

The bifurcated portion or arms 32 of each hanger are received within radial slots 34

in the type bar segment 17, and that the segment has a threaded opening 35 between each pair of slots 34 for the reception of a hanger. The stem of a headed screw 36 is received within an opening 35 in the type bar segment and the head of the screw bears against the face of the hanger 30, as represented in Fig. 1, and secures it in position. It will be understood that by this construction an individual adjustment of each type bar hanger in its bearing slots is afforded and that the associated screw 36 securely holds the hanger in its adjusted position. Furthermore, the heads of the screws 36 extend toward the front of the machine and are readily accessible in order to afford an adjustment of the type bar hangers.

In the construction represented in Figs. 9 and 10 of the drawings, a substantial reversal of the construction hereinbefore described is effected. That is to say, in this modified construction, the type bar hanger 30^a is formed with an eye 18^a that is internally threaded to receive externally threaded bearing plates or rings 20^a. These rings are constructed and adjusted in the same manner as the rings 20 in the construction hereinbefore described; they are spaced apart to receive a ball spacer or separator 24^a and coöperate with anti-friction balls 23^a which likewise coöperate with the hub 26^a, said hub being constructed in essentially the same manner as the hub 26 and secured by screws 29^a to the bifurcated portion or arms 32^a formed on the type bar 16^a.

The bearing rings 24 or 24^a or the hub 26 or 26^a may be hardened independently of the other parts of the construction and afterward connected thereto when the parts are assembled and afford an efficient bearing for the type bar and one in which the ordinary wear upon the parts is resisted. Furthermore, the extensive bearing afforded for the type bar upon the anti-friction balls tends to prevent any lateral vibration of the type bar on its hanger, thus assuring perfect alinement of the written characters.

It will also be observed that in both forms of the construction shown the parts constituting the ball bearing may be assembled and properly united before the type bar and hanger are connected together and that an adjustment of the ball bearing may be effected at any time independently of the means by which the type bar and hanger are connected together.

Various changes may be made in the construction without departing from the spirit of my invention.

What I claim as new and desire to secure by Letters Patent, is:—

1. In a type bar and hanger construction, the combination of a bifurcated hanger, a type bar, having an eye which is received within the bifurcated portion of the hanger,

a solid removable grooved hub that is received within said eye and which has threaded connections, a screw that cooperates with the threaded connection of the hub and connects the hub and bifurcated portion together, and anti-friction rollers between the eye and the grooved hub.

2. In a type bar and hanger construction, the combination of a hanger and a type bar, one of said parts having an eye and the other being bifurcated to receive the eye, a removable hub that is received within said eye, headed screws that pass from opposite directions and take into a threaded opening in the hub to connect the hub and bifurcated portion together, and anti-friction rollers between said eye and hub.

3. In a type bar and hanger construction, the combination of a hanger and a type bar, one of said parts having an eye and the other being bifurcated to receive the eye, said eye having a threaded portion, a roller bearing having a threaded connection with the eye, a single piece hub connected to the bifurcated portion and extending through said eye, and anti-friction rollers between said roller bearing and hub.

4. In a type bar and hanger construction, the combination of a hanger and a type bar, one of said parts having an eye and the other being bifurcated to receive the eye and embrace it on both sides, said eye having an internal threaded portion, threaded rings that cooperate with the internal threads in the eye and form a ball race, a single piece hub, anti-friction balls or rollers between said ball race on the rings and the hub, and means which pass axially through said rings and connect the said hub and bifurcated portion.

5. In a type bar and hanger construction, the combination of a hanger and a type bar, one of said parts having an eye and the other being bifurcated to receive the eye, said eye having an internal threaded portion, externally threaded rings that cooperate with the internal threads in the eye and which are adapted to be contained therein and to form a ball race, a single piece hub, anti-friction balls or rollers between said ball race on the rings and the hub, and means which pass axially through said rings and connect said hub and bifurcated portion.

6. In a type bar and hanger construction, the combination of a hanger and a type bar, one of said parts having an eye and the other being bifurcated to receive the eye, said eye having a threaded portion, bearing rings having threaded portions that are adapted to cooperate with the threaded portion of the eye, so that the bearing rings may be adjusted toward and away from each other, a hub that is detachably secured to the bifurcated portion, and anti-friction rollers that are confined between the bearing

rings and have a bearing on the rings and hub.

7. In a type bar and hanger construction, the combination of a type bar having an eye that has a screw-threaded portion, bearing rings that are threaded to cooperate with the threaded portion of the eye so as to afford an adjustment of said rings toward and away from each other, a fixed hanger that is bifurcated to embrace said eye, a single piece hub that is detachably connected to the bifurcated portion of said hanger and extends through said rings, and anti-friction balls interposed between said hub and bearing rings.

8. In a type bar and hanger construction, the combination of a type bar having an eye that has an internally screw-threaded portion, bearing rings that are externally threaded to cooperate with the internally threaded portion of the eye so as to afford a relative adjustment of said rings toward and away from each other and so as to be received within the eye, a hanger that is bifurcated to embrace said eye, a hub that is detachably secured to the bifurcated portion of said hanger and extends through said rings, and anti-friction balls interposed between said hub and bearing rings.

9. In a type bar and hanger construction, the combination of a type bar having an eye that has a screw-threaded portion, bearing rings that are threaded to cooperate with the threaded portion of the eye so as to afford a relative adjustment of said rings toward and away from each other, a hanger that is bifurcated to embrace said eye, a hub that has a threaded opening therein and which extends through said rings, headed screws that take into threaded openings in the hub and connect the hub to the bifurcated portion of the hanger, and anti-friction balls between the rings and hub.

10. In a type bar and hanger construction, the combination of a sheet metal looped hanger, a solid single-piece grooved hub that is independent of the type bar and hanger, a screw that connects said hub and hanger, a type bar having an eye with a ball bearing therein, and anti-friction balls between said hub and the ball bearing in the eye of the type bar.

11. In a type bar and hanger construction, the combination of a sheet metal looped hanger, a hub that is independent of the type bar and hanger, a screw that connects said hub and hanger, a type bar having an eye that has a threaded portion, bearing rings that are adapted to cooperate with the threaded portion of the eye to afford a relative adjustment of said rings, and anti-friction balls between said rings and hub.

12. In a type bar and hanger construction, the combination of a sheet metal looped hanger, a hub that is independent of the

type bar and hanger and having an internal threaded opening therein, screws that extend in opposite directions into said threaded opening in the hub and connect said hub and hanger, a type bar having an eye with a ball bearing therein; and anti-friction balls between said hub and the ball bearing in the eye of the type bar.

13. In a type bar and hanger construction, the combination of a sheet metal looped hanger, a hub that is independent to the type bar and hanger, and having an internal threaded opening therein, screws that extend in opposite directions into said threaded opening in the hub and connect said hub and hanger, a type bar having an eye, and anti-friction balls between said rings and hub.

14. In a typewriting machine, the combination of a solid one piece type bar support having a raceway formed therein, a type bar having an integral interiorly threaded eye encircling said support, two rings screwed into said eye and both wholly within the eye, said two rings constituting a raceway in the median plane of the type bar which raceway coöperates with the raceway in the support which is likewise in the median plane of the type bar, and a series of anti-friction rollers running in said coöperating raceways.

15. In a typewriting machine, the combination of a hanger, a hub detachably secured thereto and having a raceway, a type bar having an interiorly threaded eye encircling said hub, two rings screwed into said eye and both wholly within the eye, said two rings together constituting a raceway which coöperates with the raceway in said hub, and anti-friction rollers running in said coöperating raceways.

16. In a type bar and hanger construction, the combination of a hanger and a type bar, one of said members having an eye and the other being bifurcated to receive the eye, an independent hub having a peripheral ball groove and a threaded opening therein, headed screws that coöperate with the threaded opening in the hub and connect the hub to the bifurcated portion, adjustable plates carried by the eye and provided with ball bearings, and anti-friction balls between said ball bearings and groove.

17. In a type bar and hanger construction, the combination of a hanger having a bifurcated portion, an independent single piece hub having a central ball groove therein, a screw that connects the hub to the bifurcated portion, a type bar having an eye that surrounds the hub and has ball bearings therein, means for adjusting said bearings, and anti-friction balls between said bearings and grooves.

18. In a type bar and hanger construction, the combination of a hanger having a bi-

furcated portion, an independent single piece hub having a central ball groove and a threaded opening therein, headed screws that pass into said threaded opening and bind the hub to the arms of the bifurcated portion, a type bar having an eye that surrounds the hub and has ball bearings therein, threaded connections for affording an adjustment of said bearings, and anti-friction balls between said bearings and groove.

19. In a type bar and hanger construction, the combination of a fixed hanger and a type bar, one of said members having an eye and the other a bifurcated portion that receives the eye, a single piece ball bearing passing through the eye and detachably supported by the bifurcated portion, a ball bearing and ball-separator-groove formed in the eye, anti-friction balls coöperating with said bearings, and a ball separator that travels in the ball-separator-groove and surrounds said balls and coöperates therewith.

20. In a type bar and hanger construction, the combination of a fixed hanger and a type bar, one of said members having an eye and the other a bifurcated portion that receives the eye, a ball bearing detachably supported by the bifurcated portion, adjustable plates carried by said eye and having ball bearings thereon, said plates being spaced apart to receive a ball separator, a ball separator between said plates, and anti-friction balls that coöperate with said bearings and said separator.

21. In a type bar and hanger construction, the combination of a fixed hanger, and a type bar, one of said members having an internally threaded eye, and the other a bifurcated portion to receive said eye, a ball bearing detachably supported by the bifurcated portion, externally threaded bearing rings that coöperate with the internally threaded portion of the eye for adjustment toward and away from each other and which provide a space between them, a ball separator that is adapted to travel in said space between the rings, and anti-friction balls coöperating with the ball bearing, bearing rings and ball separator.

22. In a type bar and hanger construction, the combination of a hanger having a bifurcated portion, a type bar having an internally threaded eye, a single piece ball bearing hub detachably supported by the hanger, externally threaded bearing rings that coöperate with the internally threaded portion of the eye for adjustment toward and away from each other and which provides a space between them, a ball separator that is adapted to travel in said space between the rings, and anti-friction balls coöperating with the ball bearing hub, the bearing rings and the ball separator.

23. In a type bar and hanger construction, the combination of a hanger and a type

bar, one of said members having an internally threaded eye and the other a bifurcated portion to receive said eye, a single piece detachable ball bearing hub supported by the bifurcated portion, externally threaded bearing rings that cooperate with and are adapted to be received within the threaded portion of the eye and which provide a space between them; a ball separator that is adapted to travel in said space between the rings, and anti-friction balls cooperating with the ball bearing, bearing rings and ball separator.

24. In a type bar and hanger construction, the combination of a type bar having an eye, a hanger having a bifurcated portion adapted to receive said eye, a ball bearing hub in the median plane of the eye and detachably secured to the hanger, detachable bearing rings adjustably secured to the eye, the rings being relatively adjustable in planes parallel to the median plane of the eye, and anti-friction balls between the bearing rings and the bearing secured to the hanger.

25. In a type bar and hanger construction, the combination of a type bar having an eye, a hanger having a bifurcated portion adapted to receive said eye, a ball bearing hub detachably secured to the hanger, detachable bearing rings secured to the eye, said rings being spaced apart, a ball separator contained in the space between said rings, and anti-friction balls between the bearing rings and the hub and cooperating with the ball separator.

26. The combination of a fixed type bar support having a single piece member with a peripheral race-way therein, means for detachably connecting said member to said

type bar support, a type bar having an eye that surrounds said member, said eye having an internal screw thread, two rings surrounding said member and threaded into said eye and together forming a companion race-way for the peripheral race-way in said member, and a single set of anti-friction rollers running in said cooperating race-ways.

27. In a typewriting machine, the combination of a type bar support fixed to the frame of the machine and comprising a fixed ball bearing member formed of a single piece and having a peripheral ball bearing groove therein; a type bar having an eye which surrounds and turns around said bearing member and which is internally threaded; externally threaded bearing rings screwed within said eye from opposite sides and which are adjustable therein on the threads which connect the rings to the eye, said rings together forming a ball-race opposite the ball bearing groove in said bearing member, and the bearing member passing through both of said rings for connection with the support which holds the bearing in place; and a single set of circularly arranged balls received in said groove and race, the plane of movement of the type bar cutting the median plane of said eye and the median plane of said circularly arranged set of balls.

Signed at Syracuse, in the county of Onondaga, and State of New York, this 1st day of October, A. D. 1903.

CHAS. J. BOND.

Witnesses:

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JOHN H. WALRATH.