

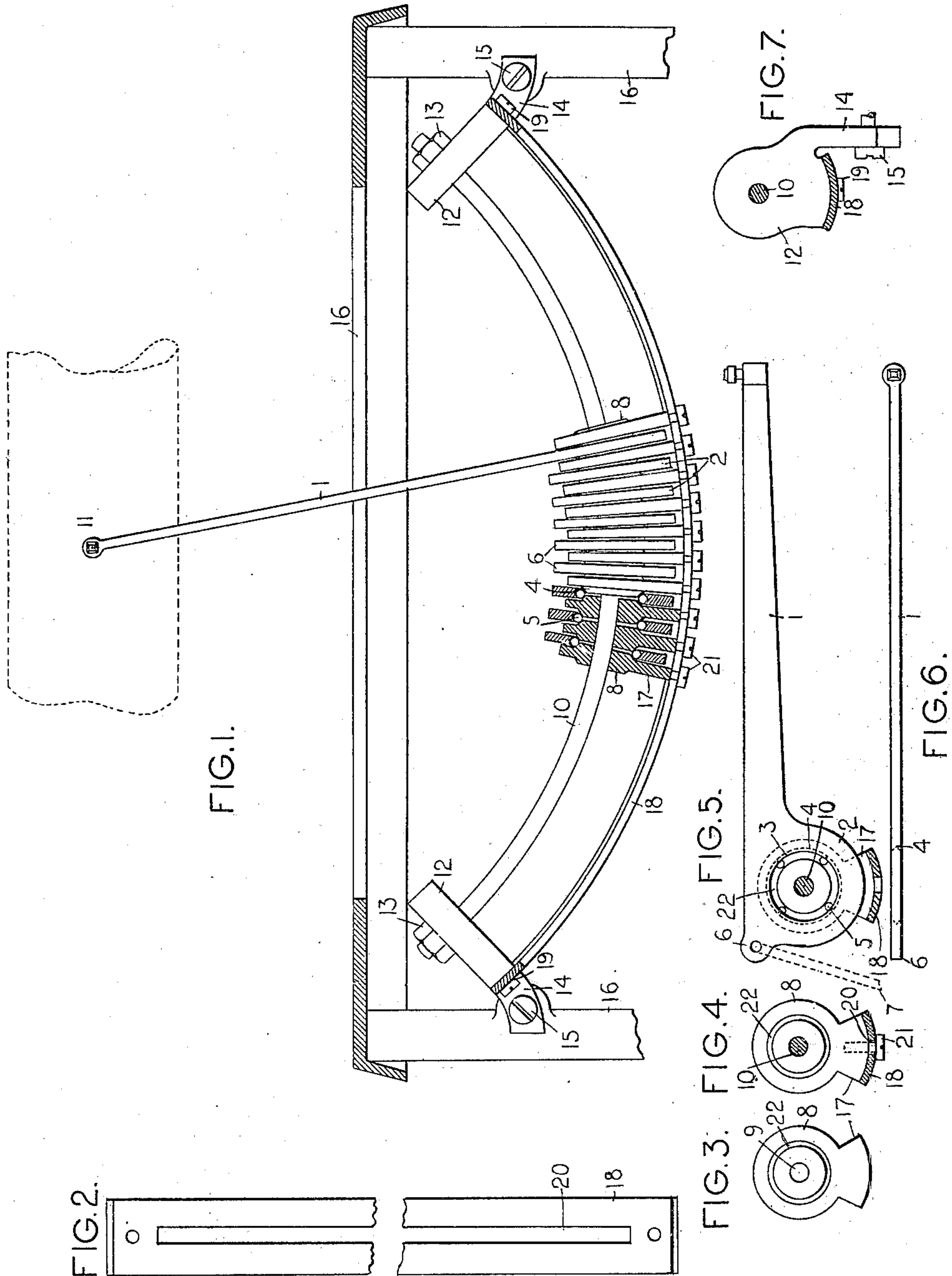
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Patented Dec. 10, 1901.

C. P. MOSHER.  
TYPE WRITING MACHINE.

(Application filed Feb. 11, 1901. Renewed Sept. 28, 1901.)

(No Model.)



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# UNITED STATES PATENT OFFICE.

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## TYPE-WRITING MACHINE.

SPECIFICATION forming part of Letters Patent No. 688,666, dated December 10, 1901.

Application filed February 11, 1901. Renewed September 28, 1901. Serial No. 76,952. (No model.)

*To all whom it may concern:*

Be it known that I, CHARLES P. MOSHER, a citizen of the United States, and a resident of Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Type-Writing Machines, of which the following is a specification.

This application relates to the type-bar bearings of writing-machines.

The main objects of my invention are to assemble a large number of type-bars in a small compass and to prevent lateral vibration of the bars while permitting them to swing freely to and from the printing-point.

To these and other ends my invention consists in certain combinations of devices, features of construction, and arrangements of parts, all as will be fully hereinafter set forth, and particularly pointed out in the concluding claims.

In the accompanying drawings, Figure 1 is a fragmentary sectional front elevation of a front-strike writing-machine, showing my improvements applied thereto. Fig. 2 is a plan view of a slotted curved bar forming part of the means for mounting the type-bar hangers. Fig. 3 is a face view of a type-bar hanger. Fig. 4 is a sectional view showing the method of mounting the hanger and securing the same after adjustment. Fig. 5 is a face view of a type-bar and its hanger. Fig. 6 is an edge view of a type-bar. Fig. 7 is a face view of a bracket, the bars attached thereto being shown in cross-section.

In the several views similar parts are designated by similar numerals of reference.

Portions of the machine not necessary to the invention are omitted for the sake of clearness.

The type-bar comprises a type-carrying arm or blade 1 and an enlarged thin hub 2, having a large eye 3, in which is cut an interior annular V-groove 4, forming bearing-surfaces for a circular row or series of anti-friction-balls 5. The hub is provided with a short perforated operating-arm 6, to which is attached the usual connecting-rod 7. The type-bars are mounted upon hanger-plates 8, which have central perforations 9, so that they

may be strung upon a rod or bar 10, which is curved concentrically with the printing-point 11 and is secured at its ends in opposite brackets 12 by means of nuts 13, which engage the threaded ends of the rod, said brackets having arms 14, which may be secured by screws 15 to any suitable part of the typewriter framework, which is designated as 16. Each hanger-plate has a radial portion or ear 17, which fits closely the concaved upper surface of a curved bar 18, which is parallel with the bar 10 and is secured at its ends by screws 19 to the brackets 14 and is also longitudinally slotted at 20 to receive the shanks of screws 21, which are tapped into the ears 17, whereby the hanger-plates may be adjusted to any position along the bars 10 and 18 and there secured, so that there will be no liability of either lateral displacement or rotation of the hanger-plates. The bearing edges of the ears are cut concentrically with the central perforations 9 in the hanger-plates, and the bar 18 is concaved to fit these rounded edges of the ears. Said ears may, however, be otherwise shaped and secured in position.

Upon each hanger-plate is formed opposite laterally-projecting tapering bosses or cones 22, each of which coöperates with a contiguous cone upon the adjoining hanger-plate, so as to form an annular V-shaped groove or bearing for coöperation with the interior annular V-groove 4, formed in the type-bar, the hub of said type-bar being of course disposed between the adjoining hanger-plates and surrounding the bar 10. When assembled, the V-grooves formed by each pair of adjacent cones lie in planes which are radial to the common printing-center, the contiguous cones being parallel, so as to form a uniform runway for the balls, and the cones upon the opposite sides of each hanger-plate slightly converging, as at Fig. 1. The axis of each cone is tangential to the curve of the segment, and hence the axes of the opposite cones upon a hanger would intersect, if produced.

In assembling the parts the hanger-plates and type-bars may be strung alternately upon the rod 10, the balls being placed in position, and then the mass of hangers may be crowded



together by any suitable means, so as to adjust the bearings of all the balls and cause the type-bars to be steadied against lateral vibration and at the same time enable the type-bars to vibrate freely to the printing-point. In order to secure the hangers and type-bars in their adjusted position, the screws 21 are tightened.

It will be seen that the series of hanger-plates 10 serve as struts connecting the bars 10 and 18, so that said bars are firmly secured together, and the whole forms an exceedingly rigid structure in which there is no liability of yielding during the vibration of any type-bar. It will also be seen that I have provided a hanger which is formed on opposite sides with type-bar bearings which are in the form of cones or tapering bosses and that two adjacent bearings of contiguous hangers cooperate together to support one type-bar, that these contiguous bearings form a circular V-shape groove which receives a set of antifriction balls that also run in the V-shape groove of the type-bar supported by said pair of contiguous bearings, that the type-bars supported on opposite sides of a single hanger vibrate in different radial planes to a common printing-center, that each type-bar is supported by a single series of bearing-balls which run in a race formed by the V-groove in the type-bar and by the V-groove formed by the pair of contiguous cones, that the series of hangers or supports alternate with the series of type-bars and that the adjacent sides of two independent hangers support one type-bar, that means are provided for laterally adjusting the cones or bearings and also for adjusting the hangers or supports, that the series of hangers and cones are arranged in a curve about the printing-center and are supported upon a curved device or rod upon which they may be adjusted laterally and then secured, that the hangers and cones are perforated centrally for stringing and adjustment on said curved rod, that there is provided a second curved rod or bar to which each plate or hanger is connected by screws, that one curved bar passes through the hubs of the type-bars and through the plates or hangers and through the cones or bearings, and that the other curved bar and fastening-screws prevent said plates from turning, while said screws also preserve the lateral adjustments of the plates.

If desired, the hangers may be of different formation and otherwise supported, and many other variations may be made in construction and arrangement within the scope of the invention. Parts of the invention may be used without others.

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

1. In a type-writing machine, a hanger having oppositely-projecting type-bar bearings, said bearings being so arranged as to enable the type-bars on the two sides of the hanger to vibrate in different radial planes to a common printing-center.

2. In a type-writing machine, the combination with a platen, of a series of contiguous hangers each having oppositely-projecting bearings, and a series of type-bars, a bearing upon each hanger cooperating with a contiguous bearing upon the next hanger to support a type-bar.

3. In a type-writing machine, the combination with a platen, of a series of hangers each having oppositely-projecting conical bearings, and type-bars arranged between the hangers and supported by the bearings of adjacent hangers.

4. In a type-writing machine, the combination with a platen, of a series of hangers each having opposite lateral cones, a series of type-bars having corresponding bearing-surfaces, and balls interposed between the type-bars and the cones, the cones of one hanger cooperating with those of adjacent hangers to support the type-bars.

5. In a type-writing machine, the combination with a platen, of a series of hangers, and a series of type-bars, each hanger having oppositely-disposed cones whose axes intersect and each of said cones acting as a support for a type-bar, said type-bars vibrating in different radial planes to a common printing-center.

6. In a type-writing machine, the combination with a platen, of a series of hangers, a series of type-bars, each hanger having oppositely-disposed cones whose axes intersect and each of said cones acting as a support for a type-bar, said type-bars vibrating in different radial planes to a common printing-center, and bearing-balls placed between the type-bars and the cones.

7. In a type-writing machine, the combination with a platen, of a series of hangers each having opposite bearings, and type-bars arranged between the hangers, each type-bar being supported upon the contiguous bearings of adjacent hangers by means of a single series of bearing-balls.

8. In a type-writing machine, the combination with a platen, of a series of hangers each having opposite lateral cones, and type-bars arranged between said hangers, each type-bar having an interior annular V-groove and being supported upon contiguous cones of adjacent hangers by means of a single series of bearing-balls, which run in a race formed by the cooperation of said contiguous cones and said V-groove.

9. In a type-writing machine, the combination with a platen, of a series of hangers each having opposite lateral cones, and type-bars arranged between said hangers, each type-bar having an interior annular V-groove, the contiguous cones upon adjoining hangers being parallel and cooperating to form V-grooves which are arranged radially about the common printing-center, and each type-bar being supported upon the contiguous cones of adjacent hangers by means of a single series of bearing-balls.



10. In a type-writing machine, the combination with a platen, of a series of type-bars, and a series of supports therefor, the supports alternating with the type-bars and each support having bearings for adjoining type-bars.

11. In a type-writing machine, the combination with a platen, of a series of type-bars, a series of supports therefor, and balls between the type-bars and the supports, said supports alternating with the type-bars and each support having bearings upon which the balls of adjoining type-bars work.

12. In a type-writing machine, the combination with a platen, of a series of hangers, each having laterally-arranged cones, a series of type-bars each supported upon the cones of adjacent hangers, and means for adjusting the cones.

13. In a type-writing machine, the combination with a platen, of a series of hangers each having integral laterally-arranged cones, a series of type-bars each supported upon the cones of adjacent hangers, and means for adjusting the hangers laterally.

14. In a type-writing machine, the combination with a platen, of a series of hangers each having laterally-arranged cones, a series of type-bars each supported upon balls which run upon cones of adjacent hangers, and means for adjusting the cones.

15. In a type-writing machine, the combination with a platen, of a series of hangers each having integral laterally-projecting cones, a series of type-bars each having balls which run upon the cones of adjacent hangers, and means for adjusting the hangers laterally.

16. In a type-writing machine, the combination with a platen, of a series of hangers each having laterally-arranged cones, a series of type-bars each having a single row of bearing-balls which run upon the cones of adjacent hangers, and means for adjusting the cones.

17. In a type-writing machine, the combination with a platen, of a series of hangers each having integral laterally-arranged cones, a series of type-bars each having a single circular series of bearing-balls, said balls working in an interior V-groove formed in the hub of the type-bar and also running upon the cooperating cones of adjacent hangers, and means for adjusting the hangers laterally.

18. In a type-writing machine, the combination with a platen, of a series of hangers arranged in a curve about the printing-center, a curved device upon which said hangers are mounted and along which they may be adjusted laterally, and type-bars arranged between the hangers, each type-bar being supported by adjoining hangers.

19. In a type-writing machine, the combination with a platen, of a series of hangers arranged in a curve about the printing-center, a curved device upon which said hangers are

mounted and along which they may be adjusted laterally, type-bars arranged between the hangers, each type-bar being supported by adjoining hangers, and means for securing the hangers in position after lateral adjustment thereof.

20. In a type-writing machine, the combination with a platen, of a series of radial hangers arranged in a curve about the printing-center, a curved device upon which said hangers are mounted and along which they may be adjusted laterally, and type-bars alternating with the hangers, each type-bar being supported by balls upon adjoining hangers.

21. In a type-writing machine, the combination with a platen, of a curved rod, a series of cones strung thereon, and a series of type-bars hung upon the cones.

22. In a type-writing machine, the combination with a platen, of a curved rod, a series of cones strung thereon and fixed in position, and a series of type-bars hung upon the cones.

23. In a type-writing machine, the combination with a platen, of a curved rod, a series of cones strung thereon, and a series of type-bars working upon balls which run upon the cones.

24. In a type-writing machine, the combination with a platen, of a centrally-perforated cone, a cooperating centrally-perforated cone, a support upon which said cones are strung, a type-bar having bearing-surfaces for cooperation with said cones, and balls interposed between said type-bar bearing-surfaces and said cones.

25. In a type-writing machine, the combination with a platen, of a centrally-perforated cone, a cooperating centrally-perforated cone, a fixed central support upon which each of said cones may be laterally adjusted, a type-bar having bearing-surfaces for cooperation with said cones, and balls interposed between said type-bar bearing-surfaces and said cones.

26. In a type-writing machine, the combination with a platen, of a curved rod, bearings strung upon said rod, a series of type-bars having bearing-surfaces, and balls disposed between the type-bar bearing-surfaces and the bearings upon said rod.

27. In a type-writing machine, the combination with a platen, of a curved rod, cones strung thereon in such a manner that V-grooves are formed by the cooperation of separate adjoining cones, balls working in said V-grooves, and type-bars hung upon the balls.

28. In a type-writing machine, the combination with a platen, of a curved rod, a series of type-bars having eyes which surround said rod, each eye having an interior V-groove, a circular series of balls arranged in each groove, said balls also running in an annular external V-groove formed by the cooperation of pairs of separable cones strung upon said curved rod.

29. In a type-writing machine, the combination with a platen, of a curved rod, a series



of bearing-cones strung upon and adjustable along said rod, and type-bars supported by balls upon said bearing-cones.

30. In a type-writing machine, the combination with a platen, of a curved rod, a series of bearing-cones adjustable along said rod, and type-bars supported by balls upon said bearing-cones, each type-bar having a single circular series of balls which run in a bearing-groove formed by adjoining cones upon said rod.

31. In a type-writing machine, the combination with a platen, of a curved rod or bar, a series of plates strung thereon, a second curved rod or bar to which each of said plates is connected, and a series of type-bars pivoted upon said plates.

32. In a type-writing machine, the combination with a platen, of a curved rod, a series of plates strung upon said rod and adjustable therealong, a second curved rod or bar, screws for clamping said plates to said second rod or bar, and type-bars pivoted upon said plates.

33. In a type-writing machine, the combination with a platen, of a curved bar, a series of plates strung thereon, a series of bearings formed upon said plates, a series of type-bars mounted upon said bearings, the hubs of the type-bars surrounding said bearings, and a second curved bar to which all of said plates are secured.

34. In a type-writing machine, the combination with a platen, of a curved bar, a series of plates strung thereon and each having oppositely-projecting bearings, a series of type-bars through the hubs of which said curved bar passes, a bearing upon each plate cooperating with the contiguous bearing upon the next plate for supporting the interposed type-bar, and a second curved bar affording a bearing for all of said plates.

35. In a type-writing machine, the combination with a platen, of a curved bar, a series of plates strung upon said bar and each having oppositely-projecting conical bearings, type-bars arranged between the plates and supported by the bearings upon adjoining plates, and means for securing said plates in position upon said bar.

36. In a type-writing machine, the combination with a platen, of a curved bar, a series of plates strung upon said bar and each having opposite lateral cones, a series of type-bars through whose hubs said curved bar passes, said type-bars having bearing-surfaces, balls interposed between the type-bars and the cones, the cones of one plate cooperating with those of adjacent plates to support the interposed type-bars, and a second curved bar affording a bearing for all of said plates.

37. In a type-writing machine, the combination with a platen, of a curved bar, a series of plates strung upon said bar and each having opposite bearings, type-bars arranged between the plates, said curved bar passing through the hubs of the type-bars and each

type-bar being supported upon contiguous bearings of adjacent plates by means of a single series of bearing-balls, and means for preventing said plates from turning upon said curved bar.

38. In a type-writing machine, the combination with a platen, of a curved bar, a series of plates strung upon said bar and each having opposite lateral cones, type-bars arranged between said plates, said curved rod passing through the hubs of the type-bars, and each type-bar having an interior annular V-groove and being supported upon contiguous cones of adjacent plates by means of a single series of balls which run in a race formed by the cooperation of said contiguous cones and said V-groove, a curved bar parallel with the first curved bar, and means for securing the plates separately to the second curved bar.

39. In a type-writing machine, the combination with a platen, of a curved bar, a series of plates strung upon said bar, a series of type-bars alternating with the plates, bearings upon opposite sides of each plate, bearing-surfaces formed upon the type-bars, balls disposed between the type-bars and the bearings upon the plates, a second curved bar, and screws for securing the plates after adjustment thereof along said bars.

40. In a type-writing machine, the combination with a platen, of a curved bar, a series of plates strung upon said bar and each having laterally-arranged cones, a series of type-bars each hanging upon the cones of adjacent hangers, a second curved bar, and screws for preserving the lateral adjustment of the plates.

41. In a type-writing machine, the combination with a platen, of a curved bar, a series of plates strung thereon and each having integral laterally-arranged cones, a series of type-bars through the hubs of which said curved bar passes, each type-bar hanging upon the cones of adjacent plates, a second curved bar parallel with the first and upon which each of said plates has a bearing, and screws for securing said plates to said second bar.

42. In a type-writing machine, the combination with a platen, of a curved bar, a series of plates strung upon said bar and each having laterally-arranged cones, a series of type-bars through the hubs of which said curved bar passes, each type-bar hanging upon balls which run upon cones of adjacent hangers, a second curved bar arranged parallel with the first, and having a longitudinal slot, and screws passing through said slot and tapped into said plates.

43. In a type-writing machine, the combination with a platen, of a pair of brackets, a curved bar supported at its ends in said brackets, a series of plates strung upon said bar and each having integral laterally-projecting cones, a series of type-bars through the hubs of which said bar passes, each type-



bar having balls which run upon the cones  
of adjacent hangers, a second curved bar also  
supported at its ends upon said bracket, and  
screws for clamping said plates upon said sec-  
5 ond bar.

Signed at the borough of Manhattan, in the  
city of New York, in the county of New York

and State of New York, this 7th day of Feb-  
ruary, A. D. 1901.

CHARLES P. MOSHER.

Witnesses:

K. V. DONOVAN,  
E. M. WELLS.