B. C. STICKNEY.

TYPE WRITING MACHINE.

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1,092,230. Patented Apr. 7, 1914.

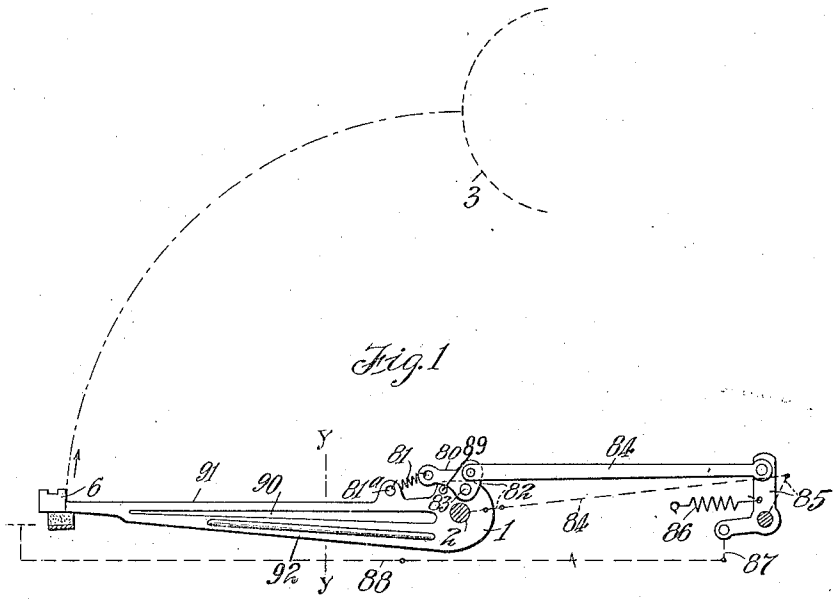


Fig. 1

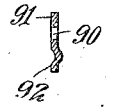


Fig. 2.

Witnesses,
F. E. Alexander
H. Frankfort

Inventor:
Burnham C. Stickney

UNITED STATES PATENT OFFICE.

BURNHAM C. STICKNEY, OF ELIZABETH, NEW JERSEY, ASSIGNOR TO UNDERWOOD TYPEWRITER COMPANY, OF NEW YORK, N. Y., A CORPORATION OF DELAWARE.

TYPE-WRITING MACHINE.

1,092,230. Specification of Letters Patent. Patented Apr. 7, 1914.

Original application filed December 31, 1903, Serial No. 187,362. Renewed July 12, 1909, Serial No. 507,086. Divided and this application filed October 21, 1910. Serial No. 588,256.

To all whom it may concern:

Be it known that I, BURNHAM C. STICKNEY, a citizen of the United States, residing in Elizabeth, in the county of Union and State of New Jersey, have invented certain new and useful Improvements in Type-Writing Machines, of which the following is a specification.

This invention relates to the type bars and type actions of writing machines, particularly those of the front strike variety.

One of the objects of the invention is to improve the touch of the keys, with a view to rendering it easier, without objectionable deepening of the stroke. Pivoted upon the type bar itself is an elbow-lever which is connected by a spring to the body of the type bar, and is also connected to the key. This spring yields during the first part of the printing stroke of the type bar, thereby cushioning the key action; while during the remainder of the stroke the spring recovers itself, so that the depth of the key stroke is not substantially increased.

Another object of the invention is to improve the structure of the type bar itself, with a view to giving it a maximum of stiffness and a minimum of weight. To this end, the type bar is made of two longitudinal members suitably connected, one member under tension, and the other under compression, thus making a very rigid structure.

Other objects and advantages will hereinafter appear.

In the accompanying drawings, Figure 1 is a diagrammatic sectional side elevation of the type action of a front strike writing machine, showing the type bar in full lines in normal positions, and also indicating by dotted lines the positions of certain of the connections when the type bar is in the printing position. Fig. 2 is a sectional view of the type bar taken on the line *y*—*y* of Fig. 1.

This application is a division of my application No. 187,362, filed December 31, 1903, which was renewed July 12, 1909, No. 507,086.

An elbow lever is pivoted upon the type bar 91 eccentrically to the fulcrum 2 of the latter; said elbow lever comprising a long forwardly extending arm 80 connected by a draw spring 81 to the body of the type bar at point 81ª, and a short arm 82 pivoted to the type bar at 83 and extending radially from the type bar pivot 2; said short arm being connected by a rearwardly extending pull link 84 to a key-operated lever 85. The latter may be in the form of an elbow lever, and provided with a returning spring 86, and connected by a vertical link 87 to the rear end of a key-bearing lever 88 of the first order. The elbow lever on the type bar is pressed by the spring 81 against a stop 89. Said spring is of such strength, that when the key is depressed at moderate speed, the type bar flies up to the platen 3 without any yield upon the part of the spring; but when the key is struck sharply, the resistance of the type bar to being started into motion at high speed is sufficient to result in the stretching or expansion of the spring, the elbow lever turning slightly upon the pivot 83, independently of the type bar, the latter however starting to move with moderate speed. The touch of the key is thus cushioned, making the operation of the machine far less fatiguing to the operator. During the remainder of the printing stroke, the spring recovers itself, thus conducing to high speed of the type bar as it nears the printing point, and improving the type impression. At the moment of printing, the link 84 may stand nearly or quite in line with the arm 82 and with the pivot 2, as indicated in dotted lines. It will be noted that the type at the moment of print is free from pressure, and that the printing stroke is due to impact alone, the impact of the type upon the paper. When the elbow lever turns upon the pivot 83, the leverage of the spring 81 increases, at the same time that its tension is increased by the expansion thereof; while the leverage of the link (and hence of the finger key) upon the elbow lever decreases, so that but a slight movement of the elbow lever takes place; while during the remainder of the printing stroke, the leverage of the key upon both the type bar and the elbow lever constantly decreases, thus tending to arrest the hand of the operator gradually and without shock, and at the same time speeding the type bar; while owing partly to this decreasing leverage of the link upon the elbow lever, the spring is given an advantage, so that it may recover itself during

the printing stroke; so that the dip of the key may not be increased materially, if at all, by reason of using a cushioning spring between the key and the type, which has been found to be an objection heretofore in using springs for this purpose. Normally the link 84 may stand nearly at right angles with the arm 82, and the link pivot may normally stand about in line with pivots 83 and 2, as shown; although the relations may be varied within the scope of my invention, and it is not always essential to mount the lever directly on the type bar, or to use an intervening spring lever between the key and type, so long as the spring may recover its normal condition during the printing stroke of the type.

The type bar is preferably formed of sheet metal, divided by a slot 90 into two portions, whereof one portion 91 is upon the edge of the bar that carries the type 6, and the other portion is broader, and fluted, for stiffness, as at 92. The fluted portion is hammered or otherwise submitted to pressure, during its manufacture, so as to lengthen it a trifle, whereby the portion 91 is stretched or tensioned, so that this portion is normally under tension. The type bar is thus stiffened, and a light bar may give an effective type impression. The portion 92 is under compression, owing to the tension of the member 91.

Having thus described my invention, I claim:

1. The combination of a key, a type bar, a lever pivoted on said type bar, connections between the lever and the key, and a spring connecting the lever to the type bar.

2. The combination of a key, a type bar, a lever upon the type bar, connections comprising a link for connecting the lever to the key, and a spring connecting the lever to the type bar; the link arm of said lever lying radially to the type bar pivot and at an angle to the link when in normal position, and lying substantially in line with said link when the type is in printing position.

3. The combination of a key, a type bar, an elbow lever pivoted on the type bar having a long arm and a short arm, connections comprising a link for connecting the short arm to the key, and a spring connecting the long arm to the type bar.

4. The combination of a key, a type bar, a lever pivoted on said type bar, a connection between the lever and the key, a spring connecting said lever to the type bar, and a stop for said lever upon said type bar.

5. The combination of a type bar, a lever pivoted thereon eccentrically to the pivot of the type bar, a key connected to said lever, and a spring connecting the lever to the type bar.

6. The combination of a key, a type-bar, an intervening spring to start the type-bar when an ordinary blow is given the key to operate the type action and to first yield and then to assist in starting the type-bar when the key is struck sharply, and means connecting the key to said spring to gradually diminish and to discontinue the leverage of the key upon the spring during the printing stroke.

7. In a front strike writing machine, the combination of a rearwardly striking type bar, an elbow lever pivoted to the type bar at a point above the fulcrum of the type bar, said elbow lever comprising a long forwardly-extending arm and a short upwardly-extending arm, a draw-spring connecting the long arm to the type bar to increase the leverage of the spring when said lever is moved upon its pivot, a stop for said lever, a rearwardly-extending link connected to said short arm, an elbow lever connected to the rear end of said link, and a key connected to said elbow lever.

8. A type bar comprising a broad metal body having a slot extending approximately its entire length, and dividing the bar into two portions, one of said portions being normally under tension.

9. A type bar comprising two portions joined at their ends, one portion being under tension, and the other under compression.

10. In a typewriting machine, the combination with a key, of a type-bar having an arm capable of yielding relatively to the rest of the type-bar at the key stroke, and draft means connecting the key through said arm to said type-bar to gradually diminish and to discontinue the leverage of the key upon the type-bar during the printing stroke.

11. In a typewriting machine, the combination with a key, of a type-carrying arm, an intervening pivoted arm capable of yielding relatively to the type-carrying arm at the key stroke, and a connection extending from the key to said arm to gradually diminish and to discontinue the leverage of the key upon the type-carrying arm during the printing stroke.

12. In a typewriting machine, the combination with a key, of a type-bar having an arm capable of yielding at the key stroke, and a key-operated device for actuating said arm to gradually diminish and to discontinue the leverage of the key upon the type-bar during the printing stroke.

13. In a typewriting machine, the combination with a key, of a type-bar having an arm capable of yielding relatively to the rest of the type-bar at the key stroke, and a key-operated link connected to said arm and normally extending transversely of the latter, to gradually diminish and to discontinue the leverage of the key upon the type-bar during the printing stroke.

14. In a typewriting machine, the combination with a key, of a type-bar having an

arm capable of yielding at the key stroke, and a key-operated link connected to said arm, the angle of connection between said link and arm changing during the printing stroke, in which key stroke the leverage of the key upon the type-bar is gradually diminished and finally discontinued.

15. In a typewriting machine, the combination with a key, of a type-bar having an arm capable of yielding relatively to the rest of the type-bar at the key stroke, and means connecting the key to said arm in such a manner as to actuate the same transversely at the beginning of the printing stroke, and lengthwise at the completion of the printing stroke, said means serving to gradually diminish and to discontinue the leverage of the key upon the type-bar during the printing stroke.

16. A type bar comprising a compression member, a tension member, an extension on said tension member and a type on said extension of said tension member.

17. The combination of a key, a type-bar, and elastic means connecting the key to said type-bar to gradually diminish and to discontinue the leverage of the key upon the type-bar during the printing stroke, and to positively control the position of the key at the completion of the printing stroke.

18. The combination of a type-bar, an operating element having a pivoted connection and a spring connection with said type-bar, and means to apply power to said element to operate the type-bar, the arrangement of said parts being such that the power transmitted to the type-bar is gradually diminished and discontinued during the printing stroke.

19. The combination with a type-bar, of a key, and an intervening train of connections, said train including a pivot member and a spring to hold the same in normal relation in said train, the spring permitting the key to have a yielding action at the beginning of a printing stroke, and a force being transmitted direct through the positive members of the train at the conclusion of the printing stroke independently of the spring.

20. In combination, a type-bar, a key, and operating connections comprising a spring transmitting operating power at the beginning of the printing stroke, the proportion of the power transmitted through the spring being reduced during the stroke by the change in the relative position of said parts.

21. The combination of a type-bar, a key, a lever, a spring between the lever and the type-bar, and means connecting the key to said lever for transmitting operating power through the spring to the type-bar, said means operating to gradually diminish and to discontinue the leverage of the key upon the spring during the printing stroke.

22. In combination, a type-bar, a key, and a connection between the type-bar and key comprising a lever and a stop for said lever, said connection being arranged to cause the leverage of the key upon the type-bar to gradually diminish and to discontinue during the printing stroke, the lever swinging away from and back to said stop in said printing stroke.

23. In combination, a type-bar, a key, a connection between the type-bar and key comprising a lever and a stop for said lever, said connection being arranged to cause the leverage of the key upon the type-bar to gradually diminish and to discontinue during the printing stroke, the lever swinging away from and back to said stop in said printing stroke, and a spring opposing the movement of the lever away from the stop.

24. The combination of a type-bar, a key, a lever pivoted to the type-bar, and operating connections between the lever and key comprising means to rotate said lever about its pivot during its printing stroke through an angle varying with the initial pressure on said key.

25. The combination of a key, a type-bar, and operating connections comprising a lever and a spring connected to the lever and exerting a tension on the lever tending to rotate it about its axis in one direction, the connections being such that operating power applied to the key gradually diminishes and discontinues the leverage of the key upon the spring during the printing stroke.

26. The combination of a key, a type-bar, and operating connections comprising a lever and a spring connected to the lever and exerting a turning movement on the lever tending to turn it about its axis in one direction throughout the printing stroke, the connections being such that pressure on the key opposes the spring at the beginning of the printing stroke, said opposition being gradually diminished and discontinued during the printing stroke.

27. The combination with a key and a type-bar, of an intervening lever pivoted on the type-bar, means including a spring for connecting said lever to the body of said type-bar, and operating connections from the key to the lever, said spring being so constructed and mounted that said connections are enabled to gradually diminish and to discontinue the leverage of the key upon the spring during the printing stroke.

28. A type-bar comprising a broad metal body slotted longitudinally for a considerable portion of its length to divide the bar into two longitudinally extending members, one of which members is longitudinally corrugated, thereby placing the other member under tension.

29. A type bar comprising a body having a portion along its length shaped to prevent buckling under compression, a tension mem-

ber adjacent said portion, and a type on the side of said bar carrying said tension member.

30. The combination of a key, a type-bar pivotally mounted and having a member mounted on said bar and resiliently held in position thereon, and a link operated by said key and arranged to start said member with diminishing leverage at right angles to a line extending from said pivot to said member, and to draw it to the end of its leverage substantially in a line between said link and said pivot.

31. The combination of a key, a type-bar pivotally mounted and having an extension, a member mounted on said extension and resiliently held in position thereon, and operating connections between said member and key, comprising a link arranged to start said member with diminishing leverage at right angles to a line extending from said pivot to said member, and to draw it to the end of its leverage substantially in a line between said link and said pivot.

32. The combination of a key, a type-bar, an intervening spring connected to the type-bar and of such strength as to start the type-bar at moderate speed when struck a moderate blow, but to first yield and then assist in starting the type-bar when the key is struck sharply, and means connecting said key to said spring in such a manner that the leverage or purchase of the key upon the spring is gradually diminished and discontinued during the printing stroke, to prevent the key from forcing the spring to yield while the type-bar is in contact with the platen, whereby the touch of the key is cushioned at the beginning of the stroke, without rendering the stroke unduly deep.

33. In a typewriting machine, the combination with a key, of a type-operating arm or lever, an intervening arm and connections between said arm and the key and type-operating lever to gradually diminish and to discontinue the leverage of the key upon the lever during the printing stroke, said arm being capable of yielding at the printing stroke to permit a relative yielding movement between the key and the type; the construction and arrangement being such that at the initial portion of the printing stroke the stress comes transversely of said arm, to cause the same to yield relatively to the type bar, while at the termination of the printing stroke the stress comes longitudinally of said arm, to prevent the key from forcing the arm to yield while the type bar is in contact with the platen, whereby the touch of the key is cushioned at the beginning of the stroke, without rendering the stroke unduly deep.

34. In a typewriting machine, the combination with a key, of a type-carrying arm, an arm capable of yielding at the key stroke, and a key-operated link connected to said second named arm to gradually diminish and to discontinue the leverage of the key upon the lever during the printing stroke, said link normally extending transversely of the yielding arm; the construction and arrangement being such that during the printing stroke the relation of the parts changes so that said link extends longitudinally of said arm, and in line with the fulcrum of the latter.

35. The combination with a key and a type-bar, of an intervening lever, a connection between the key and lever, and a spring connecting the lever to the type bar to permit yielding of the lever relatively to the type bar at the beginning of the stroke; the arrangement of the spring and lever being such that the leverage of the key upon the spring is gradually diminished and discontinued during the printing stroke, to prevent the key from forcing the spring to yield while the type bar is in contact with the platen, whereby the touch of the key is cushioned at the beginning of the stroke, without rendering the stroke unduly deep.

36. The combination with a key and a type bar, of an intervening lever, and a spring having a connection between the lever and the type bar to permit yielding of the lever relatively to the type bar at the beginning of the stroke; said key being connected to said lever by means which cause the leverage of the key upon said lever and the proportion of the operating power transmitted through the spring to gradually diminish and to discontinue during the printing stroke, to prevent the key from forcing the spring to yield while the type bar is in contact with the platen, whereby the touch of the key is cushioned at the beginning of the stroke, without rendering the stroke unduly deep.

37. The combination with a key and a type bar, of an intervening lever, and a spring having a connection between the lever and the type bar to permit yielding of the lever relatively to the type bar at the beginning of the stroke; said key being connected to said lever by means which cause the leverage of the key upon said lever to gradually diminish and to discontinue during the printing stroke and said spring connected to said lever at such a point and extending in such a direction that its leverage upon said lever increases during the printing stroke of the type bar sufficiently to make a positive connection between the key and type bar; to prevent the key from forcing the spring to yield while the type bar is in contact with the platen, whereby the touch of the key is cushioned at the beginning of the stroke, without rendering the stroke unduly deep.

38. The combination of a key, a type-bar,

and connecting means gradually changing from an elastic to an unyielding connection during a printing stroke, whereby the touch of the key is cushioned at the beginning of the stroke, without rendering the stroke unduly deep.

39. The combination of a key, a type bar, an intervening lever, connections between the key and lever, and a spring connecting the lever and type bar to permit yielding of the lever relatively to the type bar at the beginning of the stroke; the arrangement of parts being such that the draft of the lever upon the type bar at first increases during the printing stroke, and the leverage of the key upon the spring gradually diminishes and discontinues to positively control the position of the key at the completion of the printing stroke, to prevent the key from forcing the spring to yield while the type bar is in contact with the platen, whereby the touch of the key is cushioned at the beginning of the stroke, without rendering the stroke unduly deep.

40. The combination with a type bar and a key, of an operating train of connections including a spring which is yieldable at the beginning and unyieldable at the end of the printing stroke, to gradually diminish and to discontinue the leverage of the key upon the spring during the printing stroke, whereby the touch of the key is cushioned at the beginning of the stroke, without rendering the stroke unduly deep.

41. A type bar comprising a sheet metal member longitudinally slotted to form arms, one arm being under a stress of tension, and the other arm corrugated to produce a combined lateral stress and a stress of compression.

42. The combination with a key and a type bar, of an intervening lever, a connection between the key and lever, and means including a pivotally supported spring for connecting the lever to the body of said type bar to permit the key to yield relatively to the type bar at the beginning of the stroke; said connecting means and said spring being so mounted relatively to each other as to change their relative positions to cause the leverage of the key upon said spring to diminish and to discontinue during the printing stroke, whereby the touch of the key is cushioned at the beginning of the stroke, without rendering the stroke unduly deep.

43. The combination with a key and a type bar, of an intervening lever connected to the key, and a spring connecting the lever to the type bar; said spring being connected to said lever at such a point and extending in such a direction that its draft upon said lever increases during the printing stroke of the type bar sufficiently to make an unyieldable connection between the type bar and the key at the completion of the printing stroke, whereby the touch of the key is cushioned at the beginning of the stroke, without rendering the stroke unduly deep.

44. The combination with a key and a type bar, of an intervening lever, connections between the key and lever, and a spring connecting the lever to the type bar and permitting a substantial initial movement of the lever independently of the type bar, said connections comprising means which cause the leverage of the key upon said lever to decrease during the printing stroke, and said spring connected to said lever at such a point and extending in such a direction that its draft upon said lever increases during the printing stroke of the type bar sufficiently to make an unyieldable connection between the key and type bar, whereby the touch of the key is cushioned at the beginning of the stroke, without rendering the stroke unduly deep.

BURNHAM C. STICKNEY.

Witnesses:
K. FRANKFORT,
BESSIE GOLDBERG.