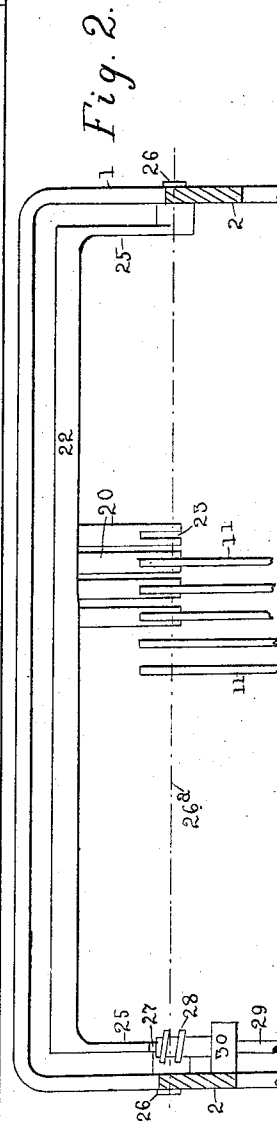
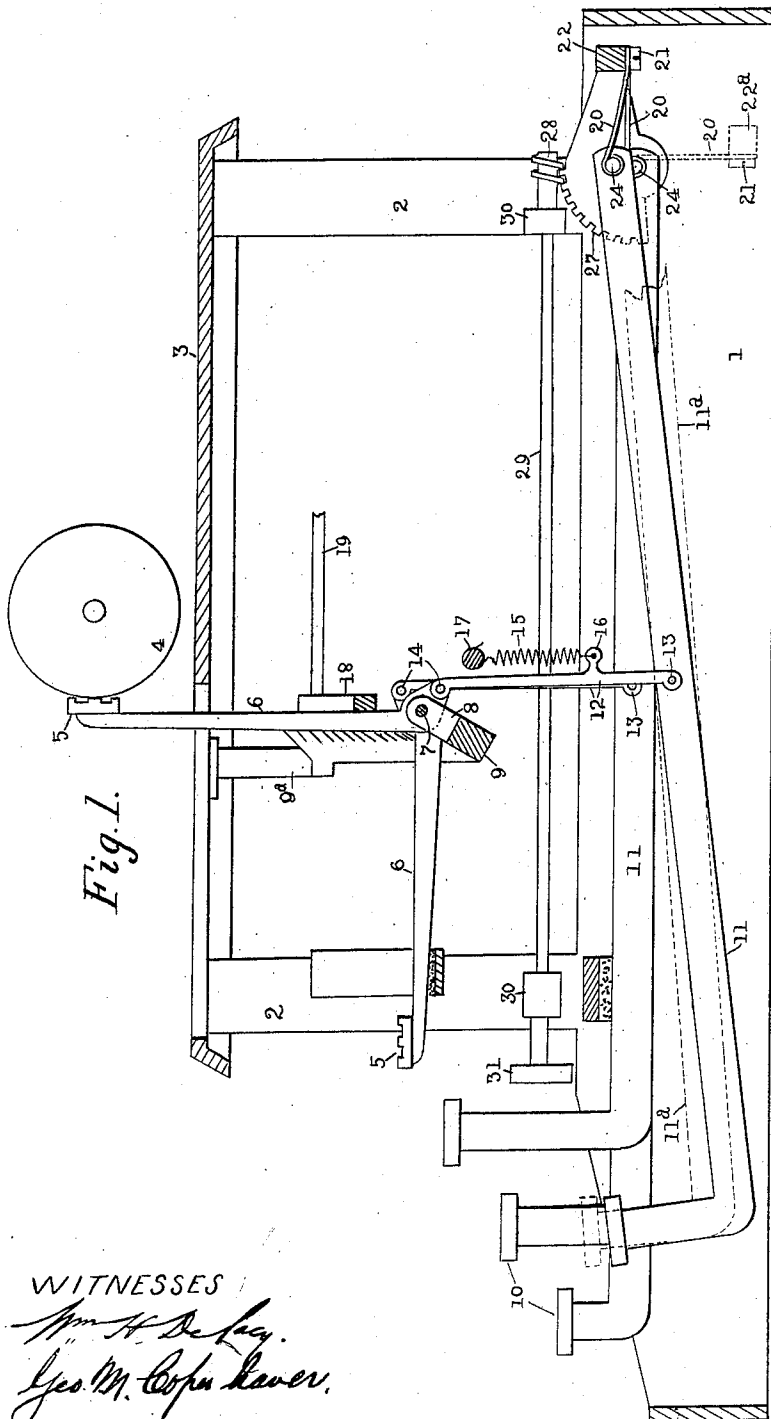


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B. C. STICKNEY.
TYPE WRITING MACHINE.
APPLICATION FILED APR. 23, 1902.



WITNESSES
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TYPE-WRITING MACHINE.

No. 887,976.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, BURNHAM C. STICKNEY, a citizen of the United States, and resident of the city of Elizabeth, 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 actions of writing machines, and especially those in which type bars strike upon the front side of a platen.

The object of the invention is to provide an improved construction whereby the touch of the keys may be rendered less fatiguing, and also whereby the touch may be regulated within wide limits.

My invention consists in certain combinations of devices, features of construction and organizations 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 vertical section taken longitudinally of a front strike writing machine embodying my present improvements. At this figure are shown in full lines two key actions or type actions, one in normal and the other in printing position, the parts being adjusted for a yielding or elastic key touch; while in dotted lines is shown the printing position of a key lever when given an easy stroke by the finger. There is also shown in dotted lines an adjustment whereby the touch of all of the keys is rendered hard, at which adjustment none of the keys can be pressed down to the position of the full-line depressed key. Fig. 2 is a plan showing the rear portion of the base, together with the major portion of the touch-adjusting mechanism, some of the key-levers being also indicated. The adjustment of the touch-regulating mechanism corresponds to that shown in full lines at Fig. 1.

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

The machine frame may consist of a rectangular base 1, corner posts 2, and top plate 3. Over the last may run a carriage (not shown), having a platen 4; and types 5 may be carried by a curved system of horizontal type bars 6, pivoted at their inner or rear ends upon a curved fulcrum wire 7, so as to strike rearwardly against the front side of the platen. The hubs of the type bars may work

in slots 8 cut radially in a segment 9, secured at its ends to brackets 9^a depending from the top plate 3. Keys 10 may be connected to the type bars by means of horizontal key levers 11 of the second order, extending rearwardly beneath the type bars, links 12 being connected at 13 to the key levers and extending directly up to the type bars, to which they are attached at 14. The types may be otherwise connected to the keys within the scope of my present improvements.

In operation, a key is depressed, forcing down the key lever 11, and through the link 12 swinging the type bar up to print. The parts may be returned to normal position by a draw spring 15, hooked at its lower end to an ear 16 formed on the link 12, and caught at its upper end over a horizontal bar 17 suitably supported upon the framework and arranged across the machine in rear of the links. The movements of the paper carriage may be controlled by a curved universal bar 18, actuatable in a horizontal direction by the hub or lower portion of any type bar, and having suitable connections, as indicated at 19, whereby it may operate the usual letter spacing dogs (not shown). Said universal bar may, as usual, be provided with a returning spring (not shown) to coöperate with the spring 15 in returning the type bar and key to normal position; and both the universal bar spring and the spring 15 may be adjusted as required, to secure prompt return action of the type bar and carriage feeding mechanisms.

In the present instance each key lever at its rear end bears up against a yielding fulcrum, which is preferably in the form of a spring finger or tongue 20, secured at its rear end by a screw 21 to the under side of a transverse bar 22, and at its forward end bifurcated at 23 to receive the rear end of the key lever, to which it is pivotally connected at 24. The spring fingers are secured side by side along the bar 22, one finger for each key lever, whereby when one fulcrum yields under the stress put upon the lever by the finger of the operator, the other levers are unaffected. Each of said spring fingers is preferably so stiff that at the depression of a key with moderate speed the type bar is carried to the platen and makes an impression thereon without appreciable flexure of said finger; but when the key is struck sharply, said finger yields, and gives an extra yielding action to the key,

as illustrated in full lines at Fig. 1, at which figure the movement of the lever when given an easy touch is indicated in dotted lines at 11^a. It will be seen that the extra yielding movement of the lever is made upon the pivot or load-point 13, which has the same range of movement whether the key be given a soft or a sharp blow. The touch of the keys is always soft and agreeable to the operator, and there is no jarring of the fingers when operating the keys rapidly.

The response, of the mechanism may be made very prompt by putting sufficient tension upon the springs 15 and the usual universal-bar spring, without however rendering the touch harsh, inasmuch as such adjustment does not affect the yielding action of the key-lever fulcrum.

One of the main features of my present improvements consists in providing spring fingers for this purpose which are adjustable so as to regulate the yielding action of the key levers. This adjustment is preferably effected by moving the spring fingers bodily, without however disturbing the key levers, so that the latter may have more or less purchase upon the fingers. To this end I mount the bar 22, which carries the spring fingers, upon a pair of arms 25, one at each end of the bar; and these arms are pivoted to the opposite side walls of the base at 26, whereby the bar 22 and the springs thereon may swing up and down about an axis 26^a which is coincident with the pivots 24 of the key levers, the latter hence remaining stationary during the adjustments of the bar and the spring fingers thereon. It will be observed that when the bar is swung to its lowermost position, as at 22^a, Fig. 1, the spring fingers or fulcrums stand vertically, that is, at right-angles or crosswise to the key levers, so that the latter exert stress lengthwise of the spring fingers, with no tendency to flex the latter, and hence there is practically no yielding action of the levers, and they can be depressed only to the dotted line position. The position of the bar 22 may be varied between the extremes illustrated, thereby enabling the machine to be adjusted to suit the requirements of different operators. This adjustment is preferably effected by means of a gear 27 formed upon the left-hand arm 25, which meshes with a worm 28 mounted upon the rear end of a forwardly extending horizontal shaft 29, mounted in lugs 30 and carrying at its forward end a knurl or finger-piece 31 at the keyboard of the machine. By this means very fine adjustment of the key touch may be effected.

By making the spring fingers of proper stiffness, and so proportioning the connections from the key to the type bar that the normal dip of the key is slight, the key-touch may be rendered much stiffer than is usually practicable, and may also, at the

pleasure of the operator, be rendered softer than is usually practicable, or the touch may be adjusted to some intermediate point, and without the necessity of altering the tension of the usual key-lever returning spring (as 15) or the usual universal-bar spring, which after being once set to secure the proper action of the mechanism, need not be disturbed when adjusting the touch of the keys; so that the machine may be originally set to act as promptly as desired for both hard and soft key strokes, without the least liability of the operator thereafter deranging the action of the delicate carriage-feeding mechanism in his attempts to adjust the key touch.

Certain features herein shown are described and claimed in my pending application No. 93,698, filed Feb. 12, 1902, and also in my application No. 97,837, filed March 12, 1902.

Having described my invention, I claim:

1. In a typewriting machine, the combination with a series of type bars of a series of keys, a series of levers between the keys and the type bars, a series of yielding fulcrums for said levers, and means for effecting a change in the relative positions of said levers and said fulcrums to vary the purchase of the levers upon the fulcrums to alter the resistance of the keys to the touch.

2. In a typewriting machine, the combination with a series of type bars of a series of keys, a series of levers between the keys and the type bars, a series of yielding fulcrums for said levers, and means for adjusting said fulcrums simultaneously to different positions so as to vary the purchase of the levers thereon.

3. In a typewriting machine, the combination with a series of types of a series of keys, a series of levers between the types and the keys, a series of yielding fulcrums to which said levers are attached, and a support whereon said yielding fulcrums are carried, said support being adjustable to different positions with reference to said levers so as to vary the direction in which the thrust of the levers is received by the fulcrums.

4. In a typewriting machine, the combination with a series of type bars of a series of keys, a series of levers between the keys and type bars, a series of adjustable spring fingers which form fulcrums for the levers, and a support for said spring fingers.

5. In a typewriting machine, the combination with a series of types of a series of keys, a series of levers between the keys and types, a series of spring fingers which form fulcrums for the levers, and means for varying the relative arrangement of said levers and said spring fingers in such a manner as to alter the resistance offered by the spring fingers to the thrust of the levers.

6. In a typewriting machine, the combina-

tion with a series of type bars of a series of keys, a series of levers between the keys and types, a series of spring fingers or tongues which form fulcrums for the levers, and means for adjusting said spring fingers to different positions so as to vary the purchase of the levers thereon.

7. In a typewriting machine, the combination with a series of type bars of a series of keys, a series of levers between the keys and type bars, a series of spring fingers which form fulcrums for the levers, and means for adjusting all of said spring fingers simultaneously about a point or axis substantially coincident with the points of contact between said levers and said fingers.

8. In a typewriting machine, the combination with a series of type bars of a series of keys, a series of levers between the keys and type bars, a series of spring fingers to which said levers are pivoted at their fulcrum points, a hinged support for said spring fingers, and means for adjusting said support.

9. In a typewriting machine, the combination with a series of type bars of a series of keys, a series of levers between the keys and type bars, a series of spring fingers to which said levers are pivoted at their fulcrum points, and a support for said spring fingers, said support being hinged upon the framework, and the axis of the hinge substantially coinciding with said lever pivots.

10. In a typewriting machine, the combination of a series of type bars, a series of levers connected thereto, a series of spring fingers upon which said levers bear at their fulcrum points, and a bar carrying said spring fingers and adjustably mounted upon the framework.

11. In a typewriting machine, the combination of a series of type bars, a series of key levers of the second order connected thereto, a series of springs to which the rear ends of said key levers are pivoted, said springs being forked to receive the ends of the levers, and extending rearwardly therefrom, and an adjustable transverse bar to which said springs are secured at their rear ends.

12. In a typewriting machine, the combination of a series of type bars, a series of key levers of the second order connected thereto, a series of springs to which the rear ends of said levers are pivoted, a transverse bar to which said springs are connected at their rear ends, and arms extending from the ends of said bar, said arms being pivoted upon the framework substantially in line with the pivots of said levers.

13. In a typewriting machine, the combination of a series of type bars, a series of levers connected thereto, a series of spring fingers to which said levers are connected at their fulcrum points, said fingers constituting fulcrums for the levers, and means for swinging

said spring fingers from a position longitudinal of said levers to a position crosswise thereof.

14. In a typewriting machine, the combination with a series of type bars, of a series of levers connected thereto, a series of spring fingers to which said levers are connected at their fulcrum points, said fingers constituting fulcrums for the levers, and means for adjusting said spring fingers from a position substantially parallel with said levers to a position substantially at right angles thereto, and for holding said fingers at intermediate positions.

15. In a typewriting machine, the combination of a series of type bars, a series of levers connected thereto, a series of spring fingers to which said levers are connected at their fulcrum points, said fingers constituting fulcrums for the levers, and means for adjusting said spring fingers from a position longitudinal of said levers to a position crosswise thereof such that during the printing strokes said levers exert only a pull upon said spring fingers without flexing the latter.

16. In a typewriting machine, the combination with a series of type bars of a series of rearwardly extending key-operated levers of the second order connected thereto, a series of spring fingers pivoted to the rear ends of said levers and extending rearwardly therefrom, a bar to which said spring fingers are connected at their rear ends, and means for swinging said bar downwardly and forwardly about an axis substantially coincident with the pivots of the levers.

17. In a front strike writing machine, the combination of a series of rearwardly striking type bars; a series of levers of the second order bearing keys at their forward ends and extending rearwardly beneath the type bars; a series of links extending upwardly from the key levers to the type bars; a series of draw springs attached to said links; a series of flat springs forked at their forward ends to receive the rear ends of the levers and pivoted thereto; a transverse bar to which the rear ends of said springs are secured; and forwardly extending arms at the ends of said bar, said arms being pivoted to the framework substantially in line with said key lever pivots.

18. In a typewriting machine, the combination with a series of type bars of a series of keys; a series of levers between the keys and the type bars, a series of yielding fulcrums for said levers, and means, including a worm or screw and a finger-piece connected thereto, for effecting such a change in the relative positions of said levers and said fulcrums as to vary the purchase of the levers upon the fulcrums and alter the resistance of the keys to the touch.

19. In a typewriting machine, the combination with a series of types of a series of

keys, a series of levers between the types and the keys, a series of springs to which said levers are pivoted, a support to which said springs are secured, and means, including a
 5 finger piece mounted at the keyboard of the machine, for adjusting said support to different positions with reference to said levers, so as to vary the direction in which the thrust of the levers is received by the fulcrums.

10 20. In a typewriting machine, the combination with a series of type bars of a series of keys, a series of levers between the keys and type bars, a series of spring fingers which form fulcrums for the levers, a support for
 15 said spring fingers; and means, including a worm or screw, for adjusting said support.

21. In a typewriting machine, the combination with a series of type bars of a series of keys, a series of levers between the keys
 20 and type bars, a series of springs to which said levers are pivoted at their fulcrum points, a hinged support for said springs, and means, including a finger piece, for adjusting said hinged support.

25 22. In a typewriting machine, the combination of a series of type bars, a series of key levers of the second order connected thereto, a series of springs fingers to which the rear ends of said levers are pivoted, a
 30 transverse bar to which said spring fingers are connected, arms extending from the ends of said bar and pivoted upon the framework, a worm wheel upon one of said arms, a worm in mesh with said worm wheel, and a finger
 35 piece connected to said worm.

23. In a typewriting machine, the combination of a series of type-bars, a series of key-levers connected thereto, a series of fulcrums in the form of spring fingers connected
 40 to the type actions, a supporting device to which said fulcrums are connected, and means for enabling said supporting device to be turned so as to vary the action of said fulcrums.

45 24. In a typewriting machine, the combination of a series of type-bars, a series of key-operated levers connected thereto, a series of fulcrums in the form of spring fingers having bearings upon said key levers, and
 50 a pivoted device whereon said fulcrums are mounted.

25. In a typewriting machine, the combination of a shaft mounted for a turning movement, a finger-piece thereon, a series of
 55 fulcrums in the form of springs adjustable by the turning movement of said shaft, a series

of levers bearing upon said fulcrums, and a series of types associated with said levers.

26. In a typewriting machine, the combination of a rocker member, a series of fulcrums in the form of springs adjustable thereby, a series of levers bearing upon said fulcrums, and a series of types associated with said levers.

27. In a typewriting machine, the combination of a series of types, a series of levers for operating the types, a series of spring-fingers attached to said levers and serving as fulcrums therefor, a bar upon which said spring-fingers are mounted, said bar being
 70 mounted to rock upon the framework, and means, including a revoluble fingerpiece, for rocking said bar and holding it in its adjusted position.

28. In a typewriting machine, the combination with types and levers which operate the types, of springs which serve as fulcrums for the levers, said springs adjustable to offer different resistance to the levers, and independent springs for returning the levers.

29. In a typewriting machine, the combination with a bar and a series of fulcrums in the form of springs mounted thereon, of a series of levers connected to the fulcrums, and type-bars operated by the levers.

30. The combination with type-bar levers of a rocker mounted on the framework, of springs projecting from the rocker and forming the sole fulcrums for the type-bar levers.

31. The combination with a series of type-bars and key-operated levers connected thereto, of a shaft extending rearwardly from the keyboard and having a button on its forward end, a worm on the rear end of the shaft, a gear engaged by said worm and
 95 fixed on a transverse bar, and springs secured at intervals upon said bar and extending to the key-levers, and adjustable by turning said button.

32. In combination, a bail having thereon a series of yielding fulcrums for key-levers, and means for adjusting the bail.

33. The combination with a set of key-operated type-operating levers, of a revoluble piece at the keyboard provided with
 105 means to vary the resistance of the keys to the touch.

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Witnesses:

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