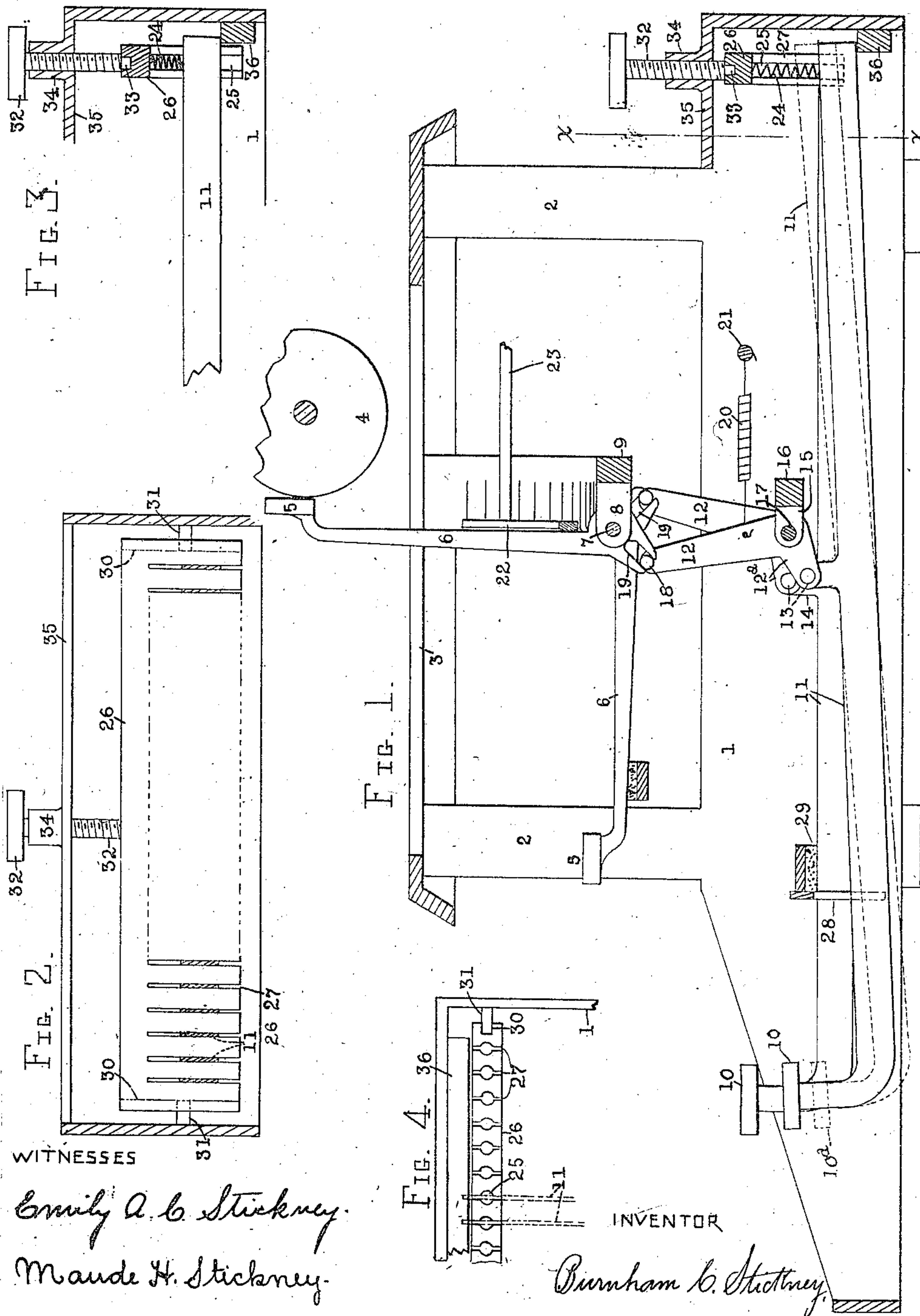


B. C. STICKNEY.
TYPE WRITING MACHINE.
APPLICATION FILED MAR. 12, 1902.

989,820.

Patented Apr. 18, 1911.



WITNESSES

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TYPE-WRITING MACHINE.

989,820.

Specification of Letters Patent.

Patented Apr. 18, 1911.

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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 a simple and desirable construction whereby the key touch may be rendered more agreeable and the operation of the machine less fatiguing, and also whereby the action of the keys may be varied from exceedingly stiff and resisting to very elastic.

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 drawing, Figure 1 is a vertical section taken longitudinally of a front strike writing machine embodying my present improvements, showing in full lines two key actions or type actions, one in normal position and the other in printing position, and also showing the parts adjusted for a yielding or elastic key touch. Fig. 2 is a cross section of the rear lower portion of the machine, taken at about the line $x-x$ of Fig. 1, but showing the parts adjusted as at Fig. 3. Fig. 3 is a fragmentary view of the touch-adjusting devices, corresponding to the rear lower portion of Fig. 1, but showing the parts adjusted for a very stiff, resisting touch. Fig. 4 is a fragmentary bottom view of the device arranged in the rear part of the machine base for guiding or supporting the key levers.

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 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 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, and bell cranks 12, whose forwardly extending short arms 12^a are pivoted directly at 13 to upwardly extending key lever ears 14. Said bell cranks work in slots 15 formed upon a transverse bar 16, which also carries a fulcrum rod 17 upon which said bell cranks vibrate in vertical planes. At their upper ends the arms 12 are provided with wrist pins 18, working in open slots 19 formed in the short arms of the type bars. The bell cranks and type bars may, if desired, be formed and arranged substantially as set forth in United States Letters Patent No. 559,345, in connection with the key levers shown herein; or other type systems may be otherwise connected to the keys.

In operation, a key is depressed, forcing down the key lever 11, and through the bell crank 12 swinging the type bar up to print. The parts may be returned to normal position by a draw spring 20, with which each bell crank is in this instance provided, the rear ends of the springs being hooked over a bar 21 extending across the base in rear of the bell cranks. The movements of the paper carriage may be controlled by a curved universal bar 22, actuable in a horizontal direction by the hub portion of any type bar, and having suitable connections, as indicated at 23, 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 cooperate with the spring 20 in returning the type bar and key to normal position; and both the universal bar spring and the spring 20 may be adjusted as required, to secure prompt return action of the type bar and carriage feeding mechanisms.

In the preferred manner of practicing my invention, each key lever is provided at its rear end with a yielding bearing, which in this instance is in the form of a compression spring 24. These springs may be housed in vertical holes 25 drilled in the under side of a transverse horizontal bar 26; and the bar may also be vertically slotted, as at 27, coincidentally with the axes

of said holes, thereby to guide the rear ends of the key levers. Thus the springs are compressed between their seats and the top edges of the key levers, and afford independent yielding bearings for the latter. The forward ends of the key levers work in a comb 28, and fore-and-aft displacement of the levers is prevented in this instance by their attachment at 13 to the sub-lever arms 12^a.
 10 The springs 20, acting through the bell cranks 12, tend normally to hold the key levers up at their front ends against a pad stop 29, and at their rear ends against the springs 24. Each of said springs 24, which are subjected to
 15 extra upward pressure when the keys are depressed, 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 perceptible flexing or compression of the spring,
 20 as illustrated in full lines at Fig. 1; but when the key is struck sharply, said spring yields, and gives an extra yielding action to the key, as illustrated in dotted lines at 10^a.
 25 in said figure, the extra yielding movement of the lever being made upon the pivot 13, the latter of course having the same range of movement whether the key be given a soft or sharp blow. Thus it will be per-
 30 ceived that the touch of the keys is rendered always soft and agreeable, and that there is no jar to the fingers when operating the keys rapidly.

The response of the mechanism may be
 35 made very prompt by putting suitable tension upon the springs 20 and the usual universal bar spring, without rendering the touch harsh, inasmuch as such spring adjustment does not affect the yielding prop-
 40 erty of the key lever.

One of the main features of my present improvements consists in providing bearings which are not only yielding but also adjust-
 45 able; this property being imparted thereto in this instance by providing for the vertical adjustment of the bar 26 in which the springs 24 are housed. In each end of the bar may be cut a vertical groove 30, enabling the bar to slide up and down upon guiding studs 31
 50 projecting inwardly from the opposite walls of the base; and the movements of the bar may be effected by turning up or down a vertical thumb screw 32, having a nipple 33 which works in a socket formed in the
 55 upper face of the bar midway of the length thereof, said screw being threaded down through a boss 34 provided upon the boxing 35 usually forming part of the rear end of the machine base. A guard 36 extends trans-
 60 versely across the machine beneath the rear tips of all of the key levers, to prevent accidental downward displacement of the levers by reason of the force exerted by the springs 24, said guard preferably being normally in
 65 contact with said levers.

At Fig. 3 the thumb screw 32 and the spring-carrying bar 26 are shown adjusted to a low position, so that the resistance of the key to the touch is maximum. By prop-
 70 erly proportioning the springs 24 and the spring-adjusting mechanism, and also proportioning the connections from the key to the type bar in such a way that the normal dip of the key is slight, the touch may be rendered much stiffer than is usually prac-
 75 ticable, and may also, at the pleasure of the operator, be rendered softer than is usually practicable, or adjusted to some intermediate point, and without the necessity of altering the tension of the usual key-lever returning
 80 springs (as 20) or the usual universal-bar spring, which after being once set to secure the proper action of the mechanism need not thereafter be disturbed when adjusting the touch of the keys; so that the machine
 85 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 deli-
 90 cate carriage-feeding mechanism in his attempts to adjust the key touch. It will be observed in this instance that each of the bearings 24 yields independently of the
 95 other bearings, so that the movement of one key lever does not produce movements of the others; that a bar 26 is adjustably mounted upon the framework above the key levers for carrying or supporting said springs 24. Preferably the latter are normally under
 100 tension or flexed, the guard 36 preventing downward displacement of the levers by reason of the tendency of the spring to re-
 105 gain its normal length or form, although said guard need not in all cases occupy a position beneath the key levers or in contact therewith, so long as the springs are pre-
 110 vented from displacing the levers. It will also be noted in this instance that by means of the thumb screw 32 the stiffness of the fulcrums and hence the yielding quality of the keys, may be regulated, said screw and the bar 26 being common to the bearings 24, whereby the tension of all thereof may be
 115 adjusted simultaneously.

I am aware that it has been proposed to
 120 employ a yielding construction between the key and type bar; but such devices have proven unsatisfactory in practice, and are not capable of performing the functions of my invention.

One of the leading features of my im-
 125 provements consists in the provision of means for securing a wide range of adjustment of the finger touch as herein set forth, especially where the adjustment is effected simultaneously for all the keys by means of
 130 a single finger-piece, requiring no mechanical skill upon the part of the operator, so that he may readily adjust the machine to suit his individual touch, or may vary it

from time to time to adapt the machine for particular kinds of work or conditions of operation.

My invention is not limited to the use in all cases of a yielding fulcrum for a key-bearing lever; and many variations in construction and arrangement may be resorted to within the scope of the invention, which is applicable also to other styles of writing machines. Portions of my improvements may be used without others.

Certain features herein described are set forth and claimed broadly in my pending application, Serial No. 93,698, filed Feb. 12, 1902.

What I claim as new is as follows:

1. In a typewriting machine, the combination with a series of type-operating levers of a bar having slots in which said levers work, and a series of springs also housed in said bar and forming fulcrums for said levers.

2. In a typewriting machine, the combination with a series of type bars of a series of key-bearing levers extending rearwardly beneath the type bars, connections between the key levers and the type bars, a bar supported upon the framework above said key levers, slots in said bar in which said key levers work at their rear ends, holes formed in said bar coincidently with said slots, and compression springs housed in said holes and forming fulcrums for said key levers.

3. In a front strike writing machine, the combination of a series of rearwardly striking type bars; a series of bell cranks pivoted below said type bars and swinging in vertical planes and at their upper ends provided with pins which engage open radial slots in said type bars; a straight fulcrum rod whereon said bell cranks are pivoted; a transverse bar supported at its ends upon the base of the machine and carrying said rod and also having slots for said bell cranks; rearwardly extending draw springs connected to the upright arms of said bell cranks; a transverse rod to which said springs are connected; a series of fore-and-aft key levers pivoted between their ends to forwardly extending arms of said bell cranks; guides for the forward ends of said key levers; a transverse bar supported upon the framework and slotted vertically to receive the rear ends of said key levers; holes in said bar coincident with said slots; and compression springs in said holes over said key levers and forming fulcrums therefor.

4. In a typewriting machine, the combination with a system of type bars, of a system of keys, a system of levers between said keys and type bars, a system of independently yielding bearings for said levers, and a finger-piece having means for regulating the stiffness of said bearings.

5. In a typewriting machine, the combina-

tion with a system of type bars of a system of keys, a system of key-levers, a system of sub-levers to which said key levers are pivoted, and a system of adjustable independently yielding individual fulcrums, whereon said key levers bear.

6. 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 springs which form fulcrums for the levers, and means common to said springs for adjusting the tension thereof.

7. In a typewriting machine, the combination with a series of type-operating levers and means for guiding them, of a series of adjustably mounted compression springs which form fulcrums for said levers.

8. In a typewriting machine, the combination with a series of type-operating levers of a series of springs bearing directly upon said levers and forming fulcrums therefor, and a bar adjustably mounted upon the framework for carrying or supporting said springs.

9. In a typewriting machine, the combination with a series of type-operating levers of a bar having slots in which said levers work, a series of springs also housed in said bar and forming fulcrums for said levers, and means for adjusting said bar.

10. In a typewriting machine, the combination with a series of type bars of a series of key-bearing levers extending rearwardly beneath the type bars, connections between the key levers and the type bars, a transverse bar mounted upon the framework for an up-and-down adjustment over said key levers, slots in said bar in which said key levers work at their rear ends, holes formed in said bar coincidently with said slots, and compression springs housed in said holes and forming fulcrums for said key levers.

11. In a typewriting machine, the combination with a type and a key, of a lever connected to said type and key, a fulcrum for said lever, means for enabling the fulcrum to have a yielding action, said means comprising a spring normally under tension, and means for varying said tension.

12. In a typewriting machine, the combination with a type and a key, of a lever connected to said type and key, a fulcrum for said lever, means for enabling the fulcrum to have a yielding action, said means comprising a spring normally under tension, means for adjusting said spring, and means for preventing said spring from displacing said lever.

13. In a typewriting machine, the combination with a series of type bars and a series of keys of a series of levers connected to the type-bars and keys, a series of springs which form fulcrums for said levers, said

springs being normally under tension, a bar (as 36) for limiting the movement of said springs, and means for adjusting said springs.

5 14. The combination of a series of types, a series of key levers connected thereto, a bar mounted transversely of said key levers, springs carried by or bearing upon said bar and forming yielding fulcrums for said le-
10 vers, and means for adjusting said bar.

15 15. The combination of a series of types, a series of keys, a series of levers connected to the types and keys, yielding fulcrums for said levers, means common to said fulcrums for varying their stiffness, and a finger piece connected to said regulating means.

20 16. In a typewriting machine, the combination of a series of type bars, a series of key-operated levers connected thereto, an individual fulcrum or support for each of said levers, each of said levers having an independent yielding action, due to the yielding construction of said support, and means controlled by a screw for regulating the yield-
25 ing action of all of said levers simultaneously.

30 17. The combination of a series of type-operating levers, a series of yielding devices, a bar mounted transversely of said levers, and means for adjusting said bar; said yielding devices forming fulcrums for said levers, and the position of said bar determining the stiffness of said yielding devices.

35 18. The combination of a series of type-operating levers, a series of yielding devices, a bar mounted transversely of said levers, means for adjusting said bar; said yielding devices forming fulcrums for said levers, and the position of said bar determining the stiffness of said yielding devices;
40 and a thumb-screw connected to said bar for effecting adjustment thereof.

45 19. The combination of a series of type-operating levers; a series of independently yielding devices; a bar mounted transversely of said levers; said yielding devices forming individual fulcrums for said levers, and the position of said bar determining the stiffness of said yielding devices; and a thumb-
50 screw engaging said bar about midway of the length thereof, for setting it to different positions; means being provided at the ends of said bar for guiding the same.

55 20. In a typewriting machine, the combination with a series of type bars, a series of keys, and a series of levers connected to the type-bars and keys, of adjustable means common to said levers and including a set of spring fulcrums normally under tension,
60 for enabling said levers to have a yielding action.

21. In a typewriting machine, the combination of a series of type operating levers, a bar extending transversely of said
65 levers, springs between said bar and said le-

vers, said springs forming fulcrums for said levers, and means, including a screw engaging the framework, for adjusting said bar.

22. In a typewriting machine, the combination with a series of type-operating le- 70 vers of the second order of a bar arranged transversely over the rear ends of said levers, compression springs between said bar and said levers, said springs forming fulcrums for said levers, a screw engaging said 75 bar midway of its ends, said screw being threaded into the framework over said bar, and means for guiding the ends of said bar.

23. In a typewriting machine, the combination with a series of type-operating le- 80 vers of the second order of a bar arranged transversely over the rear ends of said levers, compression springs between said bar and said levers, said springs forming fulcrums for said levers, a screw engaging said bar 85 midway of its ends, said screw being threaded into the framework over said bar, and means for guiding the ends of said bar, said guiding means including grooves formed in the ends of said bar and studs fixed upon the 90 framework.

24. In a typewriting machine, the combination with a series of type-operating levers of the second order of a bar arranged transversely of the rear ends of the key le- 95 vers and having slots in which said key levers work, holes in said bar coincident with said slots, compression springs in said holes over said key levers, said springs forming fulcrums for said levers, a screw engaging 100 said bar between its ends, said screw also engaging the framework over said bar, and means for guiding the ends of said bar, said guiding means including vertical grooves formed in the ends of said bar and studs 105 upon the framework.

25. In a typewriting machine, the combination with a series of type-operating levers of a series of springs forming fulcrums for said levers, and a guard or stop 110 with which said levers engage, to prevent displacement of the levers by the springs.

26. In a typewriting machine, the combination with a type and a key, of a lever connected to said type and key, a bearing for 115 said lever, means for enabling the bearing to have a yielding action, said means comprising a spring normally strained; and a separate returning spring for said lever.

27. In a typewriting machine, the combination with a series of type bars of a series of key-bearing levers extending rearwardly beneath the type bars, connections between the key levers and the type bars, a transverse bar mounted upon the framework for an up- 125 and-down adjustment over said key levers, slots in said bar in which said key levers work at their rear ends, holes formed in said bar coincidently with said slots, compression springs housed in said holes and forming 130

fulcrums for said key levers, said springs being normally under tension or compression, and a bar fixed upon the framework beneath said levers for preventing their displacement by said springs.

28. In a typewriting machine, the combination of a system of type carriers, a system of key levers operatively connected thereto, a system of yielding fulcrums for said key levers, and means for simultaneously regulating the resistance of the fulcrums.

29. In a typewriting machine, the combination of a system of type carriers, a system of key levers operatively connected thereto, each key-lever yielding independently of its type-bar, and means for regulating the extent of the yielding action of all of the key levers simultaneously.

30. In a typewriting machine, the combination of a series of type bars, a series of levers, a series of fulcrums therefor, and a series of connections; the individual members of one of said series having a yielding action; and means common to the series for regulating the extent of the yielding action.

31. In a typewriting machine, the combination with a series of type bars, of a series of keys, a series of levers connected to said keys and type bars, said levers having unyielding construction throughout, and a series of spring fulcrums provided upon the framework, with which said levers engage; said fulcrums being so constructed as to yield independently of one another by reason of the pressure of the levers thereagainst during the type-bar printing strokes.

32. In a typewriting machine, the combination with a type and a key, of a lever connected to said type and key, and means at the bearing of said lever upon the framework for enabling the bearing to have a yielding action; said means comprising a spring which constitutes the bearing of the lever and is normally under tension, and

said lever being vibratable independently of said spring.

33. In a typewriting machine, the combination with a type and a key, of a lever connected to said type and key, means at the bearing of said lever for enabling said bearing to have a yielding action, to permit the lever to yield independently of the type, said means comprising a spring mounted on the framework and distinct from said lever and capable of enabling heavy manifolding blows to be transmitted from the key to the type; and a returning spring for said lever.

34. In a typewriting machine, the combination with a series of type bars, of a series of keys, a series of key-levers, a series of sub-levers to which said key-levers are pivoted, and a series of adjustable yielding fulcrums whereon said key levers bear; said fulcrums at all points of regulation being capable of effecting full force blows of all the type bars.

35. In a typewriting machine, the combination with a series of type bars, of a series of keys, a series of levers connected to the keys and type bars, a series of springs mounted upon the framework and forming fulcrums for the levers, and means for regulating the tension of said springs within such limits that the keys may always cause full-power blows to be given by the type bars.

36. In a typewriting machine, the combination of a type carrier, a key lever, a connection between said lever and said carrier, and a fulcrum for said lever; said fulcrum in the form of an adjustable helical spring.

Signed at Elizabeth in the State of New Jersey this 24th day of February, 1902.

BURNHAM C. STICKNEY.

Witnesses:

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EMILY A. C. STICKNEY.