

No. 676,208.

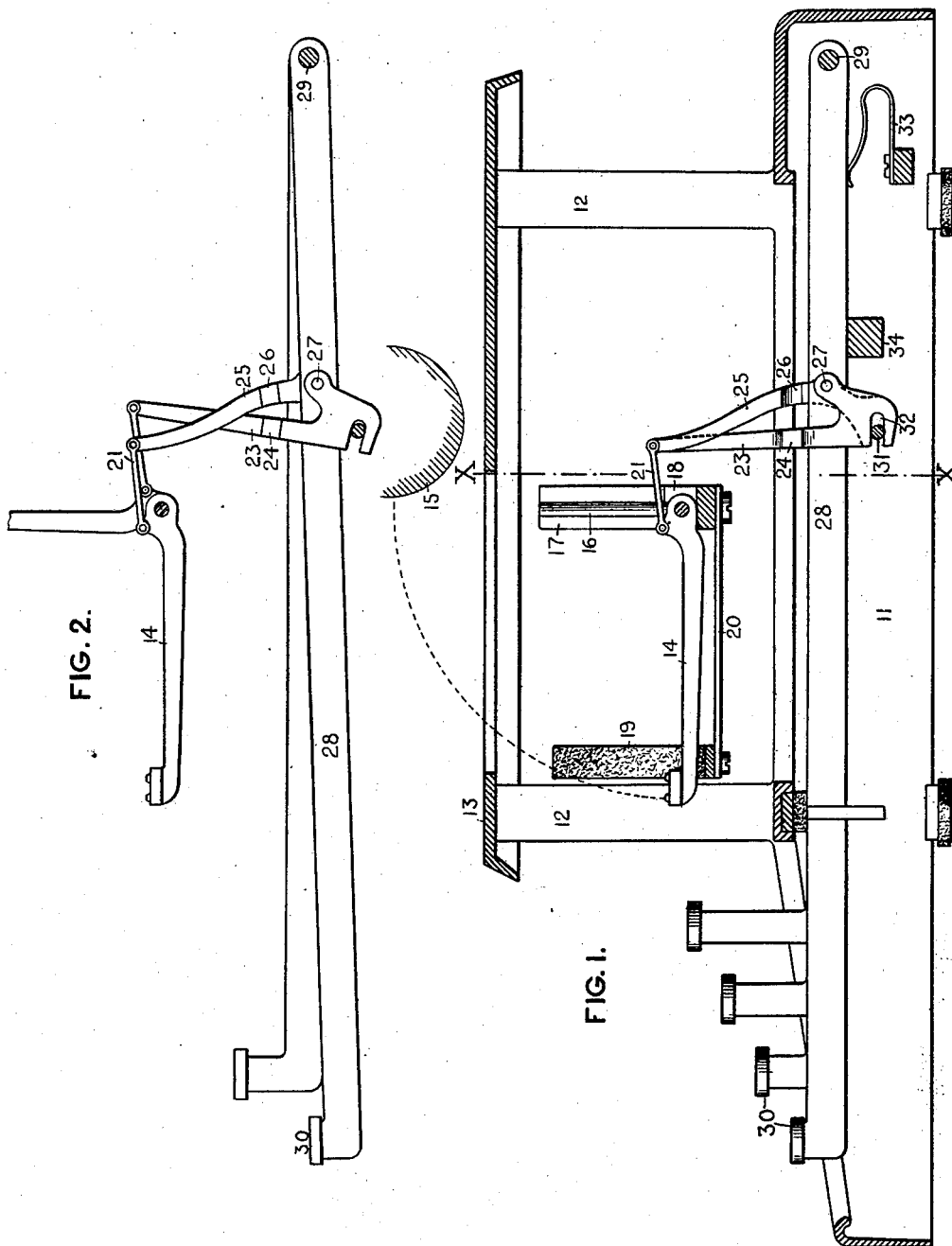
Patented June 11, 1901.

B. C. STICKNEY.
TYPE WRITING MACHINE.

(Application filed Dec. 29, 1900.)

6 Sheets—Sheet 1.

(No Model.)



WITNESSES:

S. Nielsen

E. M. Wells.

INVENTOR:

Burham & Stickney

by Jacob Felber

HIS ATTORNEY

No. 676,208.

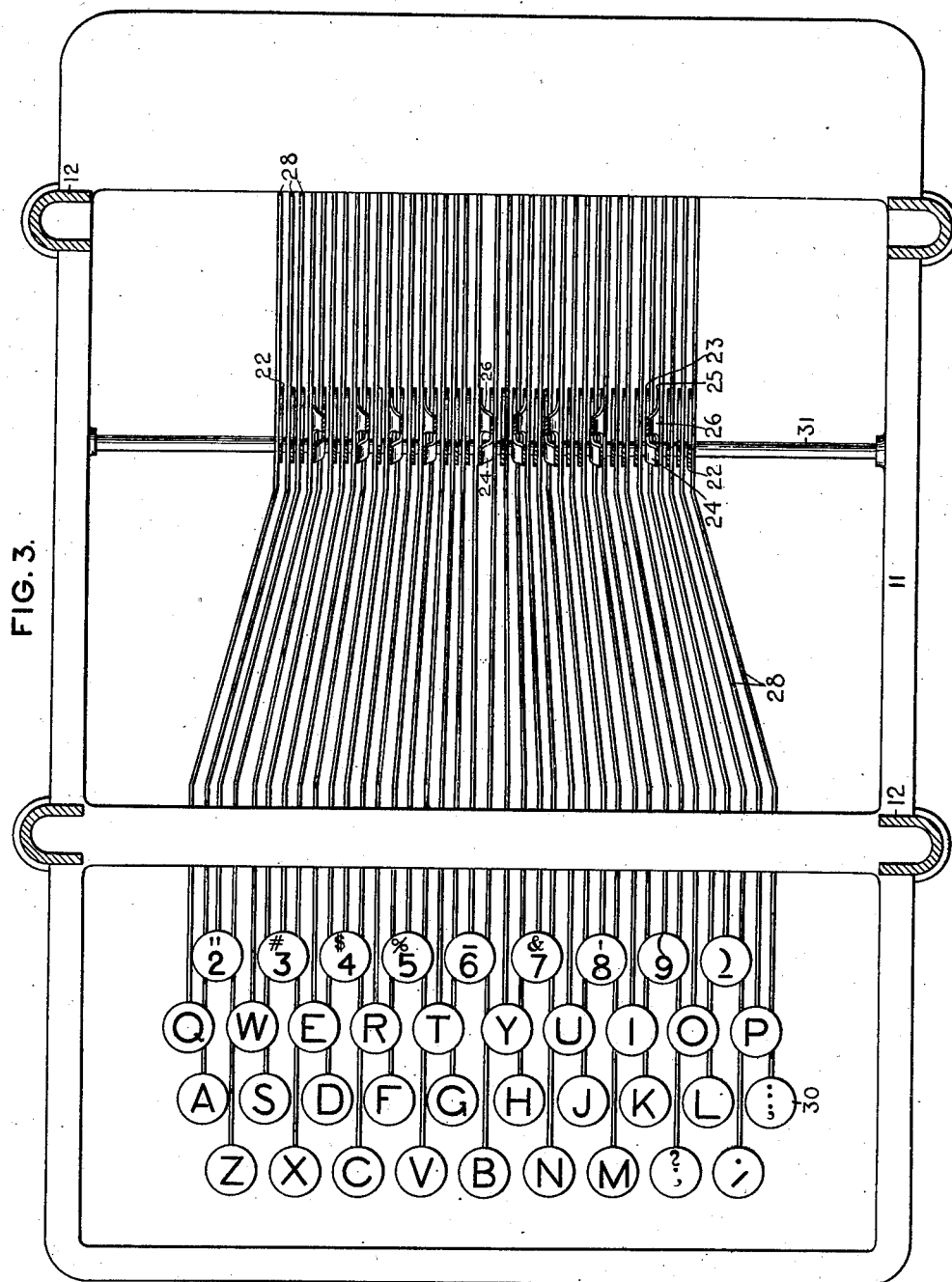
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6 Sheets—Sheet 2.



WITNESSES,

S. Nielsen

E. M. Wells.

INVENTOR:

Burnham C. Stickney

by *James Falbel*

HIS ATTORNEY

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6 Sheets—Sheet 3.

FIG. 6.

TYPES....QA2WZS3EXDC4R5FVTGB6Y7HNJU8MKI9,O-L.P:
CONNECTIONS...
KEYS....QA2ZWS3XED4CRF5VTG6BYH7NUJ8MIK9,OL-L.P:

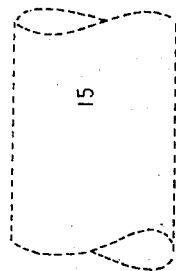


FIG. 4

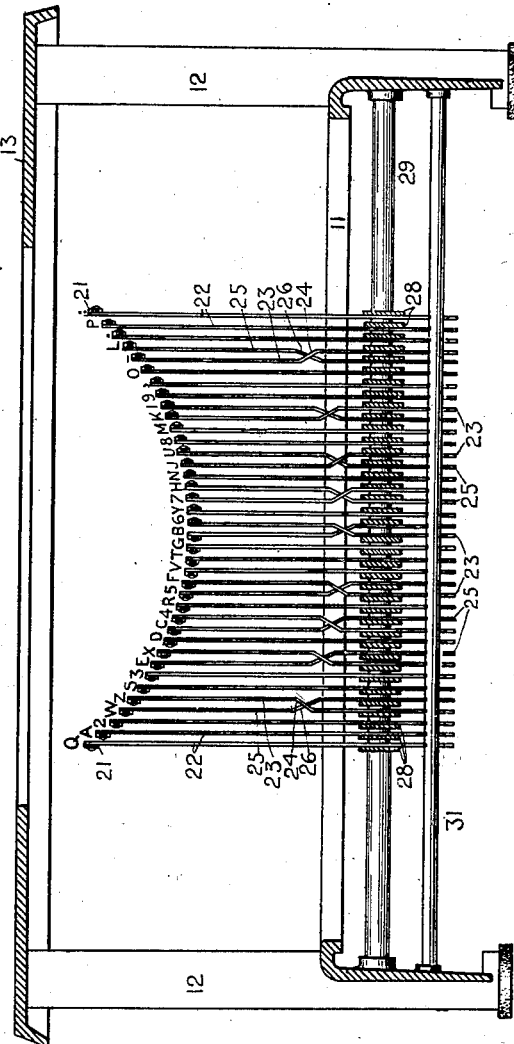
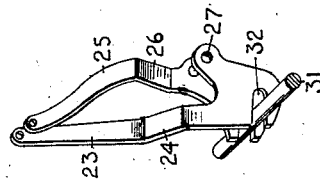


FIG. 5.



WITNESSES:

S. Nielsen

E. M. Wells

INVENTOR.

Burvenham C. Stickney

by *Jacob Felbel*

HIS ATTORNEY

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(No Model.)

6 Sheets—Sheet 4.

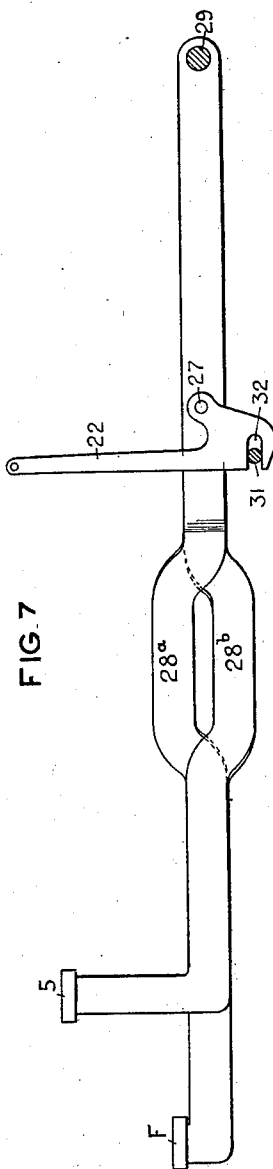


FIG. 7

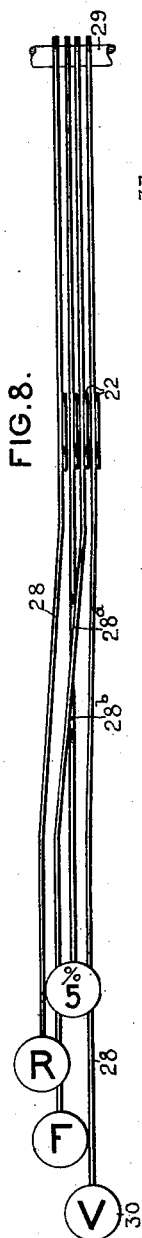


FIG. 8.

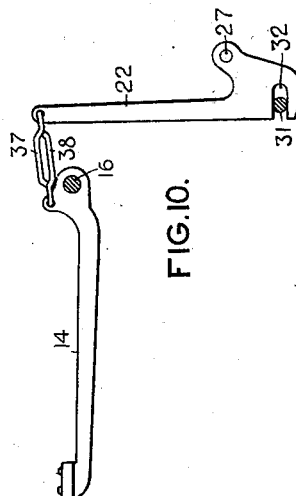


FIG. 10.

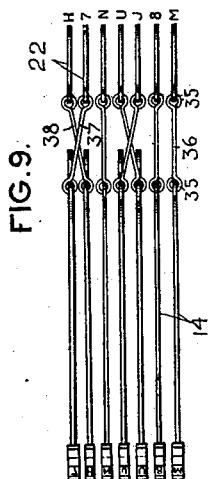


FIG. 9.

WITNESSES:

S. Kilham
E. M. Wells.

INVENTOR:

Burnham C. Stickney

by *Jacob Felner*

HIS ATTORNEY

B. C. STICKNEY.
TYPE WRITING MACHINE.

(Application filed Dec. 20, 1900.)

(No Model.)

6 Sheets—Sheet 5.

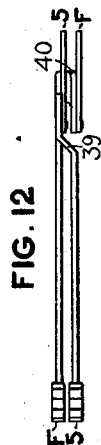
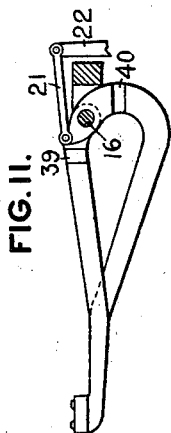


FIG. 14.

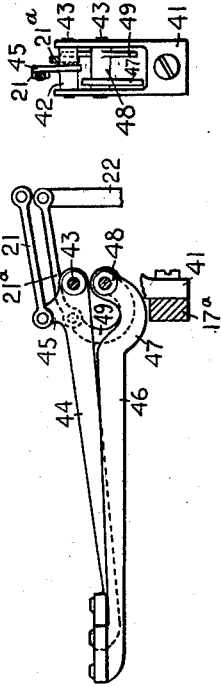


FIG. 13.

FIG. 16.

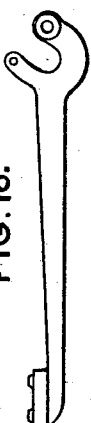


FIG. 15.

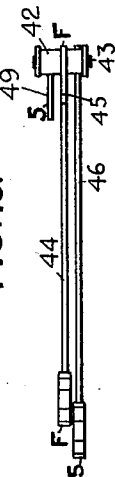
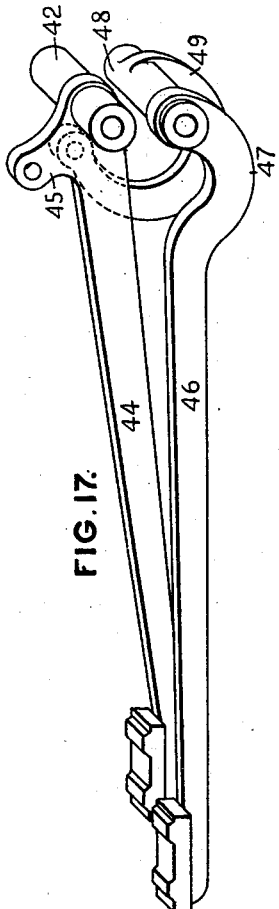


FIG. 17.



WITNESSES:

J. Nelson
E. M. Wells

INVENTOR:

Burham C. Stickney

by *Jacob F. Felt*

HIS ATTORNEY

No. 676,208.

Patented June 11, 1901.

B. C. STICKNEY.
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(Application filed Dec. 29, 1900.)

(No Model.)

6 Sheets—Sheet 6.

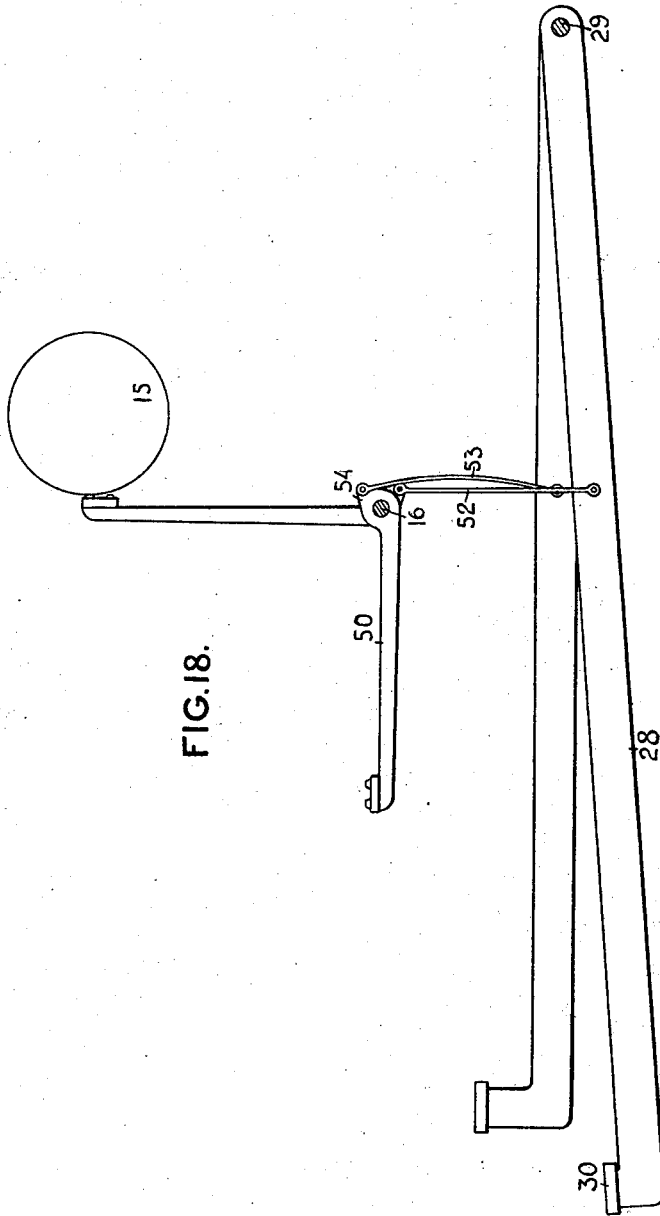


FIG. 18.

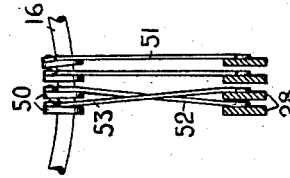


FIG. 19.

WITNESSES.

S. Wilson
E. M. Wells

INVENTOR:

Burnham C. Stickney

by *Jacob Felsch*

HIS ATTORNEY

UNITED STATES PATENT OFFICE.

BURNHAM C. STICKNEY, OF ELIZABETH, NEW JERSEY, ASSIGNOR TO THE UNION TYPEWRITER COMPANY, OF JERSEY CITY, NEW JERSEY.

TYPE-WRITING MACHINE.

SPECIFICATION forming part of Letters Patent No. 676,208, dated June 11, 1901.

Application filed December 29, 1900. Serial No. 41,475. (No model.)

To all whom it may concern:

Be it known that I, BURNHAM C. STICKNEY, a citizen of the United States, and a resident of 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 application relates to the type-actions of writing-machines.

Owing to the necessity of moving the type-bars of writing-machines through the smallest practicable space during their printing strokes, it has been customary to make the type-bars of small dimensions and to pack them as closely as practicable in the type-basket at the nearest possible point to the printing-center. In order to reduce the consequent liability of the types to collide when operated at high speed, it has been customary in making under-strike machines, in which the types occupy a complete circle, to arrange some of the frequently-operated types at one side of the circle and other frequently-operated types at the opposite side of the circle. In other words, the types have been given a staggering arrangement, one key-lever being connected to a type at the forward part of the basket, the next key-lever having its type at the rear part of the basket, the next lever a type at the forward part, the next lever a type at the rear part, and so on. In machines of the front-strike or top-strike class, however, in which only one-half or less of a circle is occupied by the type-bars, such a staggering arrangement obviously cannot be adopted, and hence it has been customary simply to place the types in the basket in the same order that the key-levers or keys occupy at the keyboard, and in consequence the objection has been made to this class of machines that the types are prone to clash, this defect being all the more noticeable because the types have to be crowded even more closely than customary in under-strike machines.

The main object of my invention is to reduce the liability of the types to collide when operated at high speed, and to this end I effect a rearrangement of the order in which the types are placed in the basket without corresponding rearrangement of the order of

the keys or key-levers at the keyboard. I provide between the keys arranged in one order and the types arranged in a different order one or more groups of transposed connections, so that each key is connected to its type and is enabled to operate the same whether or not said type has a natural or unnatural location in the basket. The transposition of the connections is preferably secured by crossing them at some point or points between the types and the keys. By this means I am enabled to separate types which are frequently operated in direct succession—that is, I am enabled to place between two of such types a third type, which is infrequently operated, thereby greatly reducing the liability of clashing, and hence enabling a higher speed of operation than heretofore. It is not necessary to transpose all of the connections, since some of the types may remain in their natural order in the basket without incurring the liability of collision.

In the preferred form of my invention I cross certain of the sublevers which are placed between the type-bars and the key-levers; but the crossing need not necessarily occur at this specific point, as my invention may be carried out in numerous ways, some of which are illustrated.

In the accompanying drawings, Figure 1 is a vertical section taken longitudinally of a type-writing machine and showing my improvements applied thereto, the parts being in normal position. Fig. 2 is a skeleton view showing one of the keys in a depressed position. Fig. 3 is a sectional plan of the lower portion of the machine. Fig. 4 is a front sectional elevation taken at about the line X X of Fig. 1. Fig. 5 is a perspective view of a pair of crossed sublevers. Fig. 6 is a diagram showing one variation between the arrangement or order of the types and the order of the keys. Fig. 7 is an elevation, and Fig. 8 a plan, of a modification. Fig. 9 is a plan, and Fig. 10 an elevation, of another modification. Fig. 11 is an elevation, and Fig. 12 a plan, of another modification. Fig. 13 is a side elevation, Fig. 14 a rear elevation, and Fig. 15 a plan, of another modification. Fig. 16 is a view of a plain type-bar which may

be used in connection with groups of type-bars, such as shown at Figs. 13, 14, and 15. Fig. 17 is an enlarged perspective view of the group of type-bars shown at Fig. 13. Fig. 18 is a side elevation, and Fig. 19 a rear sectional elevation, of still another modification.

In the several views similar parts are designated by similar numerals of reference and certain parts of the machine are omitted for the sake of clearness.

Referring to Figs. 1 to 5, inclusive, in which my improvements are shown as applied to a machine patented by Jacob Felbel, September 18, 1900, No. 657,927, the base is designated as 11, the corner-posts thereon as 12, and the top plate as 13. Type-bars 14 are arranged horizontally in a curve and strike upwardly and rearwardly against a platen 15, said type-bars being pivoted upon a wire 16, which is fixed in a segment 17, the latter having hub-slots 18. The type ends of the bars rest upon a pad 19, supported upon a horizontal bar 20, extending forwardly from the segment. The type-bars are connected by means of rearwardly-extending links 21 to the upper ends of a system of sublevers, some of which are straight and unbent, as at 22, others of which, as 23, are straight, but bent laterally or offset, as 24, and still others of which (designated as 25) are both curved rearwardly and offset at 26, all of said sublevers, however, being pivoted at their lower portions at 27 to a system of horizontally-extending levers 28, which are pivoted in rear upon a transverse rod 29 and bear at their forward ends keys 30. A transverse fulcrum-rod 31 is engaged by slots 32, formed in the sublevers below the key-levers, said rod being arranged forwardly of the pivots 27, so that a downward movement of the lever may cause the sublevers both to turn and slide upon said fulcrum-rod. The purpose of curving or arching rearwardly certain of the sublevers or bell-cranks 25 is to afford a clearance for the crossing-levers 23, so that the latter may swing rearwardly without striking the former, as illustrated at Fig. 2.

In operation the depression of a key 30 swings the key-lever downwardly about the fulcrum 29, and the upright stems of the sublevers or bell-cranks are thereby caused to swing rearwardly, thus pulling the type-bars against the platen. Upon relief of the key from pressure the parts return to normal position, assisted by a key-lever spring 33. A universal bar 34 is shown beneath the key-levers and may be connected to any suitable carriage-escapement devices. (Not shown.)

In the arrangement shown at Fig. 3 the key-levers for E and D are adjacent, and since these letters frequently occur in succession the types are very liable to collide in this class of machines. The same is true of the key-levers B and Y, H and Y, C and R, and others, as will be understood upon inspection of Fig. 3 or of the lower line of characters at Fig. 6. By crossing the connections between

the keys and the types a different order of the latter is secured—that is, E is separated from D, F is separated from R, and Y is separated from both B and H, and so on, and hence these types are no longer likely to clash even at high speed of operation.

It will be seen at Fig. 4 that the bell-cranks for the first group of three characters Q, A, and 2 are straight, these types being unlikely to collide, so that their order in the type-basket may correspond with their order at the keyboard. The two bell-cranks forming the next group are crossed, one of them (connected to the key Z) being offset to the right and the other (connected to the key W) being offset to the left, so that the link and type-bar for Z occupy the position that would have been taken by the link and type-bar for W if the bell-cranks had not been crossed. The object of crossing these bell-cranks is not to separate the type Z from the type 2, but, rather, to separate the type W from the type S, since otherwise these latter types lie in juxtaposition in the type-basket and are liable to frequent collisions. The bell-cranks in the next group S and 3 are straight, since neither these two types nor the types S and Z are ever operated consecutively in ordinary work. The next group of key-levers includes X, E, and D, and in order to separate the type E from the type D, I cross the bell-cranks E and X, the bell-crank for D being straight, so that the type X falls between the types D and E. The next group of three key-levers is made up of 4, C, and R, and as it is undesirable for the types C and R to lie next each other in the basket I cross the bell-cranks 4 and C, so that the type 4 may fall between the types C and R. Although this brings the type C next to the type D, both being frequently-operated letters, still no harm comes from this juxtaposition, because they are seldom operated in direct succession, and hence are not likely to clash. In this manner many of the types may be rearranged or reordered, preferably as indicated in the upper row of characters shown at Fig. 6, the connections being crossed only in instances where it is found necessary to secure a proper separation of frequently-operated types. It will be understood that other rearrangements of the types may be resorted to than the one designated at Fig. 6, and it will be further understood that any of the sublevers may cross more than one of the other sublevers, if desired.

Referring now to the construction shown at Figs. 7 and 8, the key-lever F crosses the key-lever 5, the former being arched at 28^a and the latter dipping at 28^b to secure the necessary clearance between the levers, so that the lever F when depressed may not strike the lever 5. It will be seen at Fig. 8 that the lever 5 is substantially straight and that the lever F is offset, as well as arched, at 28^a. The bell-cranks 22, however, may all be straight, since the desired order of the types may be secured by merely crossing the

key-levers. The crosses may occur throughout the key-lever system either in accordance with the diagram shown at Fig. 6 or otherwise, and any key-lever may, if desired, cross two or more key-levers.

In the construction shown at Figs. 9 and 10 the crossing occurs at the link system. The links are here constructed of wire, eyes 35 being formed at the ends of the link by bending the wire and engaging holes formed in the type-bars and bell-cranks. Some of these links (designated as 36) are straight and extend directly in line with their type-bars and bell-cranks; but others are crossed, as indicated at H and 7, the latter being arched at 37 and the former dipping at 38, where they cross. In this modification neither the bell-cranks nor the key-levers need to be crossed. If desired, any link may cross two or more other links.

In the construction shown at Figs. 11 and 12 a group or pair of crossed type-bars is shown, the type-bar 5 being offset and slightly arched at 39 and the type-bar F being both curved downwardly and offset at 40, the curved portion of the type-bar forming a J, whereby clearance is secured, so that this type-bar may be swung upwardly to a vertical position without colliding with the type-bar 5. Although only two of the bars are shown, it will be understood that wherever required any pair or larger group of type-bars may be crossed. In this modification it is not necessary to cross either the links, bell-cranks, or key-levers, although if it is desired to place the types at great distances from their natural positions not only the type-bars, but also the links, bell-cranks, and key-levers may be crossed in the same machine.

In the modification shown at Figs. 13 to 17 a pair of type-bars is pivoted in a single radially-arranged hanger 41, screwed to a segment 17'. The upper type-bar 44 is provided with an integral hub 42, which fills the space between the prongs of the hanger and is journaled upon a pin 43, the type-bar extending forwardly from the middle of the hub. An ear or arm 45, rising from the type-bar, is connected by a pull rod or link 21 to its bell-crank 22. The lower type-bar (designated as 46) is curved at 47, so as to enable it when vibrated to clear the hub 42 of the upper type-bar. The lower type-bar is formed upon one end of a hub 48, which is journaled upon another pin 43. Owing to the greater distance of its hub 48 from the platen, the type-bar 46 is made longer than the bar 44. A U-shaped arm 49 is formed upon the other end of the hub 48 and connected by a link 21^a to its bell-crank 22, said link being, however, slightly arched, so as to clear the hub 42. From an inspection of Fig. 15 it will be seen that owing to the arrangement of the arm 45 of the type-bar 44 at a point between the type-bar 46 and the operating-arm 49 of the latter the types upon the bars fall in reverse order to that of the operating-arms and

hence to that of the finger-keys—that is, at Fig. 13 the upper operating-arm is 5 and the lower is F, whereas the upper type is F and the lower is 5. In this way the crossing may be effected between the two type-bars mounted in a single hanger, the laterally-extended hub of the lower type-bar crossing the blade of the upper type-bar. In other words, the arm 49 is offset from the type-bar and is hence an equivalent construction to that shown at F, Fig. 11. It will also be understood that in a machine of this kind many of the lower type-bars may be formed as indicated at Fig. 16, since it may not be desired to have all of them cross the upper type-bars.

In Figs. 18 and 19 no sublevers are used, some of the type-bars 50 being connected by vertically-arranged links 51 directly to their key-levers 28, while the transposed type-bars are connected to their levers by means of crossed links 52 and 53, the latter being bowed rearwardly, so as to clear the former. In this construction a depression of the key-lever causes its link to exert a downward pull upon the short arm 54 of the type-bar, whereby the latter is swung up to print.

Thus it will be seen that in some forms of my invention sublevers cross sublevers, in other forms key-levers cross key-levers, in others links cross links, in others type-bars cross type-bars, and in still others hubs cross type-bars. These are only examples of various constructions in which the invention may be embodied, and it will be noted that in all of them there are transposed connections between the finger-keys and the types, some of the types being placed out of their natural order, so that types which are liable to be frequently operated in direct succession may not abut in the type-basket, whereby liability of clashing of the types in rapid operation is greatly reduced.

Heretofore it has been the custom in front-strike writing-machines to connect the first key-lever directly to the first type, the second key-lever directly to the second type, the third lever directly to the third type, and so on throughout the system of forty or more levers and their corresponding types, the number of each lever, counting from either side of the lever system, being the same as the number of its type in the basket. In said machines the fifteenth lever is connected to the fifteenth type, the thirtieth lever to the thirtieth type, and so on, whereas in my machine the first key-lever may be connected to the second type, the fifteenth lever may be connected to either the fourteenth or the sixteenth type, and the thirtieth lever may be connected to the twenty-ninth or thirty-first type, and so on; or, if desired, a still greater displacement of the types may be arranged, and the first key-lever may be connected to the third or fourth type, the fifteenth lever may be connected to the thirteenth or seventeenth type, and so on. By means of this invention the frequently-recurring types may be given any

desired separation in the basket, for the purpose set forth.

Various other changes in details of construction and arrangement may be resorted to within the scope of the invention, the gist of which resides in combining with a keyboard in which the keys are arranged in any desired order a type system in which the types are arranged in a different order and transposed connections between the types and the keys.

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

1. In a type-writing machine, the combination of a system of keys arranged in one order, a system of types arranged in a different order, and transposed connections extending from at least some of the keys to their respective types.

2. In a type-writing machine, the combination of a system of keys arranged in one order, a system of independently-movable type-bars arranged in a different order, and crossed connections extending from at least some of the keys to their respective type-bars.

3. In a type-writing machine, the combination of a pair of keys arranged in one order, a pair of independently-movable types arranged in the reverse order, and crossed connections between the keys and the types.

4. In a type-writing machine, the combination of a system of keys, a type system having pairs of independently-movable types arranged in a reverse order from that occupied by their corresponding keys, and pairs of transposed connections from said pairs of types to their keys.

5. In a type-writing machine, the combination of a system of keys, groups of types arranged in an unnatural order, transposed connections extending from said types to their respective keys, groups of types arranged in a natural order, and untransposed connections from the last-mentioned types to their respective keys.

6. In a type-writing machine, the combination of a plurality of independently-movable pivoted type-bars lying side by side in one order, a plurality of keys having a different order, and crossed levers operated by said keys and operatively connected to said type-bars.

7. In a type-writing machine, the combination of a group of type-bars arranged in one order, a group of keys arranged in a different order, crossed levers operatively connected to said keys, and links connecting said levers to said type-bars.

8. In a type-writing machine, the combination of a group of types arranged in one order, a group of keys arranged in a different order, levers operated by said keys, and crossed sublevers operated by said key-levers and connected to said type-bars.

9. In a keyboard type-writing machine, the combination of a plurality of types arranged in one order, a plurality of keys arranged in

a different order, crossed levers operated by said keys and connected to said types, and a plurality of types having uncrossed connections to their keys.

10. In a type-writing machine, the combination of a system of independently-movable types occupying less than half of a circle, a system of keys therefor having a different order from the types, and suitable connections from the types to the keys.

11. In a front-strike writing-machine, the combination of a system of horizontal key-levers, a system of upright levers operatively connected thereto, and a system of rearwardly-striking type-bars connected to said upright levers, said type-bars having a different order from that of said key-levers, and said upright levers being crossed where required.

12. In a front-strike writing-machine, the combination of a set of key-levers, a set of sublevers, and a set of type-bars, said type-bars having a different order from said keys, and the levers in one of said sets being crossed where required.

13. In a front-strike writing-machine, the combination of a set of key-levers of the second order, a set of bell-cranks connected thereto, and a set of type-bars connected to the bell-cranks, said type-bars having a different order from said keys, and said bell-cranks being crossed where required.

14. In a type-writing machine, the combination of a set of key-levers, a set of sublevers pivoted thereto, and a set of type-bars connected to the sublevers, the set of type-bars having a different order from said key-levers, and said sublevers being crossed where required.

15. In a front-strike writing-machine, the combination of type-bars 14, links 21, sublevers 22, 23 and 25, and key-levers 28, having a different order from that of the type-bars.

16. In a front-strike writing-machine, the combination of type-bars 14, links 21, slotted sublevers 22, 23 and 25, fulcrum-rod 31, and key-levers 28, having a different order from that of the type-bars.

17. In a type-writing machine, the combination with a plurality of types having one order and a plurality of keys having a different order, of a plurality of crossed levers, at least one of said levers being arched or curved to form a clearance.

18. In a type-writing machine, the combination of a group of types having one order, a group of keys having a different order, and a group of crossing levers, at least one of said levers being offset.

19. In a type-writing machine, the combination of a plurality of types having one order, a plurality of keys having a different order, and a plurality of crossing levers, at least one of which levers is offset and arched at the point of intersection with another lever.

20. In a type-writing machine, the combination of a system of keys arranged substan-

tially in the order of: "Q A 2 Z W S 3 X E
D 4 C R F 5 V T G 6 B Y H 7 N U J 8 M I K
9, O L - . P," a system of types arranged sub-
stantially in the order of: "Q A 2 W Z S 3 E
5 X D C 4 R 5 F V T G B 6 Y 7 H N J U 8 M
K I 9, O - L . P," and suitable connections
from said keys to said types.

Signed at the borough of Manhattan, city

of New York, in the county of New York and
State of New York, this 28th day of Decem- 10
ber, A. D. 1900.

BURNHAM C. STICKNEY.

Witnesses:

CARL GABRIELSON,
WM. E. COOK.