

957,481.

2 SHEETS—SHEET 1.



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Attorney,

957,481.

Patented May 10, 1910.

2 SHEETS—SHEET 2.

Fig. 2.

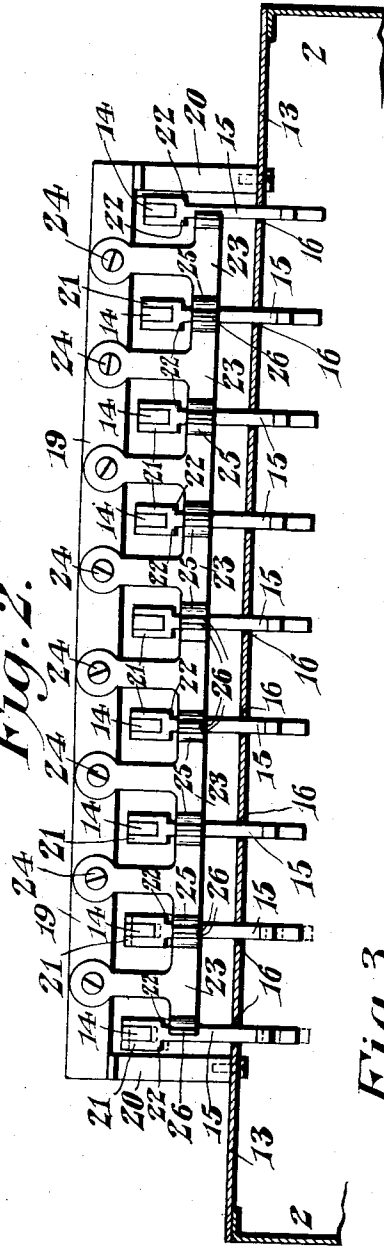


Fig. 3.

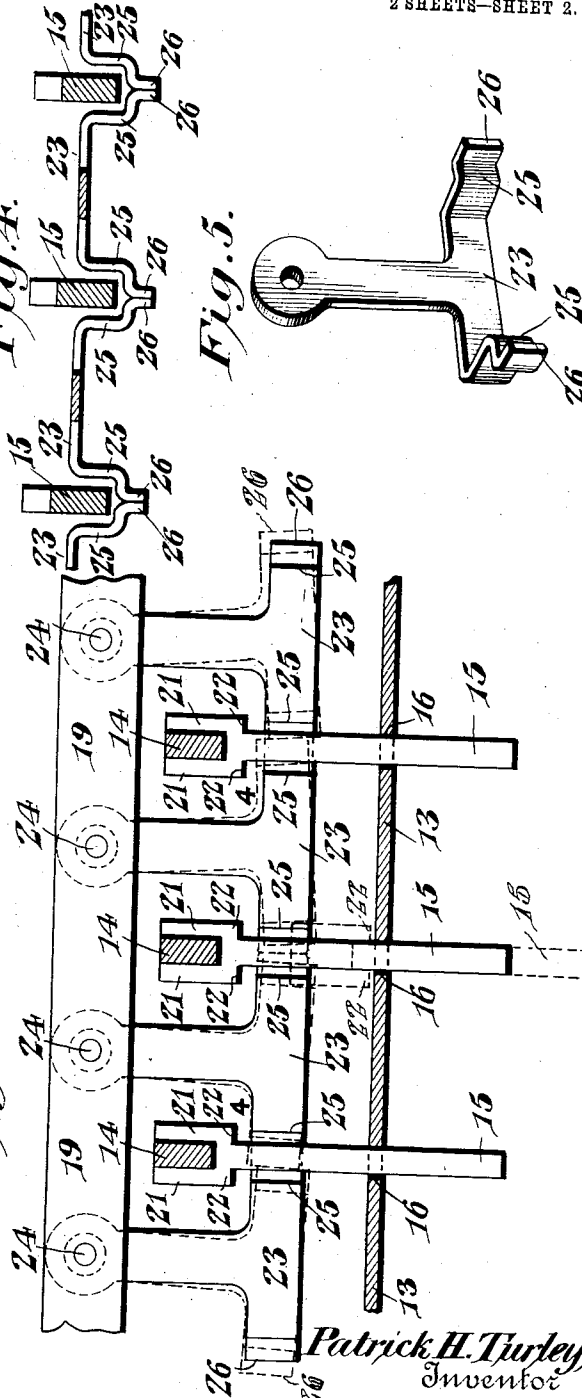


Fig. 4.

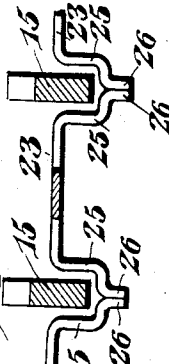
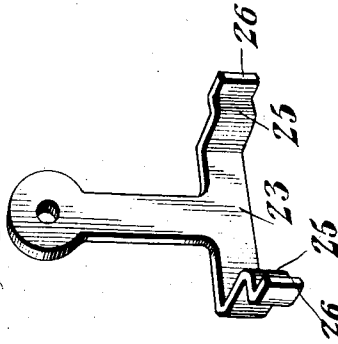


Fig. 5.



Witnesses
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UNITED STATES PATENT OFFICE.

PATRICK H. TURLEY, OF HARRISBURG, PENNSYLVANIA, ASSIGNOR TO ELLIOTT-FISHER COMPANY, OF NEW YORK, N. Y., A CORPORATION OF DELAWARE.

KEY-LOCKING MECHANISM.

957,481.

Specification of Letters Patent.

Patented May 10, 1910.

Application filed July 24, 1907. Serial No. 385,326.

To all whom it may concern:

Be it known that I, PATRICK H. TURLEY, a citizen of the United States, residing at Harrisburg, in the county of Dauphin and State of Pennsylvania, have invented a new and useful Key-Locking Mechanism, of which the following is a specification.

This invention relates to key locking mechanism for key-operated machines, for instance combined typewriting and adding machines, wherein the keys of one row or bank serve to operate printing and adding mechanisms.

The object of the invention is to associate with the keys, of a particular bank or row, a locking mechanism which will prevent two or more keys from being simultaneously operated, and which, upon the initial depression of a single key, will automatically lock all of the other keys and hold the same locked until all danger of interference is past.

To the accomplishment of the stated object and others subordinate thereto, as will hereinafter appear, the preferred embodiment of the invention comprehends that construction and arrangement of parts to be hereinafter described, illustrated in the accompanying drawings, and defined in the appended claims.

In said drawings—Figure 1 is a sectional elevation of so much of an Elliott-Fisher billing and adding machine as is necessary to illustrate the application of the invention. Fig. 2 is a sectional view of a portion of the carriage casing showing the key-operated links and the cooperating locking mechanism in front elevation. Fig. 3 is a sectional view of a portion of the same structure viewed from the rear and on an exaggerated scale, the depressed position of one of the links and the shifted positions of the locking devices being illustrated in dotted lines. Fig. 4 is a horizontal section on the line 4—4 of Fig. 3, and Fig. 5 is a detail perspective view of one of the locking devices detached.

Each part is indicated by its appropriate reference character wherever shown.

The Elliott-Fisher billing and adding machine, to which my locking mechanism is shown applied, includes a machine frame 1 mounted to travel longitudinally of a flat platen 1^a for line spacing and a carriage 2

which travels transversely of the platen on the frame 1 for letter spacing.

Supported by and moving with the carriage 2 is the downwardly acting recording mechanism including type bars 3 operatively connected to keys 4 by suitable intermediate connections. The carriage is power propelled and is controlled from the keys in a manner well understood in the art to cause the step-by-step advance of the carriage in the direction of letter spacing as the keys are retracted.

Supported in rear of the carriage 2 from the frame 1 is an adding device or register 5 including a series of number wheels 6 and certain other mechanism which cooperate with the wheels in order to cause the value accumulated upon any wheel to be transferred to the wheel of next higher order, as is usual in devices of this character. Supported by and moving with the carriage 2 engage successive number wheels of the register is a master wheel 7 fixed to a master wheel shaft 8 operated from the numeral keys 4 through a series of operating connections each designed to impart to the master wheel 7 a rotary movement corresponding in extent to the value of one of the keys. One only of these connections is shown in Fig. 1, it being understood that the other connections are similar to the one shown, except as to such variation as is necessitated to cause each connection to transmit a different degree of movement to the master wheel from a key. The connection shown includes a ratchet wheel 9 fixed to the shaft 8, a driving arm 10 mounted to swing loosely on the shaft, a pawl 11 carried by the driving arm to engage and rotate the ratchet, a lever 12 of the third-class geared to the driving arm and fulcrumed on the cover-plate 13 of the carriage 2, a lever 14 of the second class arranged to operate the lever 12, and a link 15 suspended from the front end of the lever 14 and extended downwardly through a slot 16 in the cover-plate of the carriage below which plate the link has a separable connection 17 with the stem 18 of one of the numeral keys 4. The several links 15 are arranged in alinement, as shown in Fig. 2, and across their upper ends is disposed a bar 19 supported from the cover-plate 13 of the carriage by supports 20.

The machine as thus far described is the

ordinary Elliott-Fisher machine of commerce, and it will be understood that in operation the depression of a numeral key 4 throws down a type arm to print a numeral and simultaneously moves the connected link 15 downwardly and thus through the intermediate lever connections causes the master wheel 7 to operate the register 5 for the purpose of adding the value of the printed digit to the amount already accumulated upon the register. It will be noted that each link 15 is provided with a widened bifurcated upper end 21 to facilitate the connection of the link with one of the levers 14. This widened end of the lever produces at opposite sides of the link shoulders or projections 22 which, in accordance with my invention, serve as locking faces.

Intermediate of each pair of links 15 is one of a series of locking devices or members 23 constituting the primary elements of my present invention. Each of these locking devices is pivoted at its upper end to the bar 19, as indicated at 24, as by a headed screw or other suitable pintle, and is provided at its lower end with oppositely extending horizontally disposed angular arms 25 which normally underlie the locking faces 22 of adjacent links, as best shown in Figs. 3 and 4, and have their extremities 26 bent around in front of said links and into contact with the similar extremities of the two adjacent links. As the locking members 23 are pendant from the bar 19, they normally hang vertically and are centered between the links. In this, the normal position of the parts, the arms 25 of each locking device underlie the locking faces of the two adjacent links, but sufficient clearance is afforded between the links and the arms 25 to allow one of the arms to be removed from under the locking face of one link, provided said device is swung to the limit of its movement toward the opposite link. In other words, the total clearance between a locking member and the two adjacent links is only sufficient to accommodate one of the locking faces 22 and then only when the member is swung against the other link. As a consequence of this relation, two adjacent keys cannot be depressed simultaneously, because both links will strike the arms of an intermediate member 23, thus holding the member in its central position and preventing more than very slight initial movement of the two links simultaneously, see for instance dotted positions of the two links at the left hand end of Fig. 2. If, however, a single key is operated, the initial movement of the link 15 connected thereto will bring the locking faces 22 at the opposite sides of said link into contact with the two adjacent arms of the locking members 23 intermediate of which the link is located. Continued depression of the key will thus cause the two

locking members to be swung in opposite directions, thus permitting the link to continue its downward movement, as shown by the dotted position of the middle link in Fig. 3.

It is apparent from what has been said that the locking members 23 prevent the simultaneous depression of two adjacent keys, while they permit the operation of one key at a time. It is desired, however, to prevent not only the simultaneous depression of the two adjacent keys, but to also prevent the simultaneous depression of any two keys of a given row or bank, whether such keys are adjacent or remote. It is for this reason that the several locking members 24 are disposed with the ends of their arms in contact, as shown in Fig. 4, so that the clearance afforded by the entire series of locking devices is no greater than the clearance afforded by the movement of a single locking device. This will be clear from a consideration of Figs. 3 and 4. If a link, as for instance the middle link of Fig. 3, is depressed, as shown in dotted lines, the adjacent locking devices will be moved in opposite directions and held in position to lock the two links at opposite sides of the one depressed, and the two locking devices thus swung will swing all of the remaining locking devices in a similar manner, so that all of the links and keys will be locked as long as the depressed key remains in depressed position and thus prevents the locking devices from being swung in a manner to afford the necessary clearance for the depression of any other link. In other words, the locking devices are so related that no movement thereof can afford sufficient clearance for the depression of more than a single link, and when a single link has been operated and has moved the locking devices to produce sufficient clearance for its operation, every locking device will be held in position to lock a link and no key, of the row or bank which includes the key depressed, can be operated until said key has been retracted sufficiently to bring the enlarged upper end of the link above the arms of the locking members and thus afford an opportunity for the latter to be swung for the purpose of affording clearance for the depression of another link.

Attention is directed to the fact that while I have shown the locking members 23 associated with the key-operated links 15 of an Elliott-Fisher billing and adding machine, this structure is merely intended as a disclosure of one practical application of the invention. It is obvious that the locking devices may be employed in connection with any key-operated members or in fact with the keys themselves, regardless of the particular character of the mechanism which is operated by the keys, the essential characteristic of the invention being the provision of

means for preventing the simultaneous operation of more than one key of a given row or bank of keys or the operation of the second key before the first has approached the completion of its operation sufficiently to avoid the possibility of interference or error due to the fact that the two keys are in action at the same time.

It is thought that from the foregoing, the construction and operation of my key locking mechanism will be clearly comprehended, but I wish to be understood as reserving the right to effect such changes, modifications and variations of the illustrated structure as may come fairly within the scope of the protection prayed.

What I claim is:—

1. The combination with a row or bank of key-operated members, having enlarged upper ends or heads, of a series of locking devices loosely mounted in alternation with the key-operated members and having angular locking arms normally contacting with each other and disposed below and in the line of movement of the enlarged ends or heads of the key-operated members, said members serving to limit the lateral movement of the locking devices, and said heads serving to operate the locking devices and to hold the same in predetermined positions during continued movement of the member operated.

2. The combination with a row or bank

of key operated members having enlargements, of a series of locking devices mounted in alternation with the key operated members and movable into and out of coacting relation with the enlargements thereof, said locking members being arranged to engage one another and the movement of each locking member being limited by the key operated members at opposite sides thereof.

3. The combination with a row or bank of key operated members having enlarged upper ends or heads, of a series of pendent oscillatory locking devices loosely mounted in alternation with the key operated members, each locking device having oppositely extending locking arms having annular extremities passed around the adjacent key operated members to contact with the adjacent locking devices, the movement of each locking device being limited by engagement with the two adjacent key operated members and each pair of locking devices being operated by the head of the intermediate key operated member.

In testimony, that I claim the foregoing as my own, I have hereto affixed my signature in the presence of two witnesses.

PATRICK H. TURLEY.

Witnesses:

JOHN A. SMITH,
JORAM ZIEGLER.