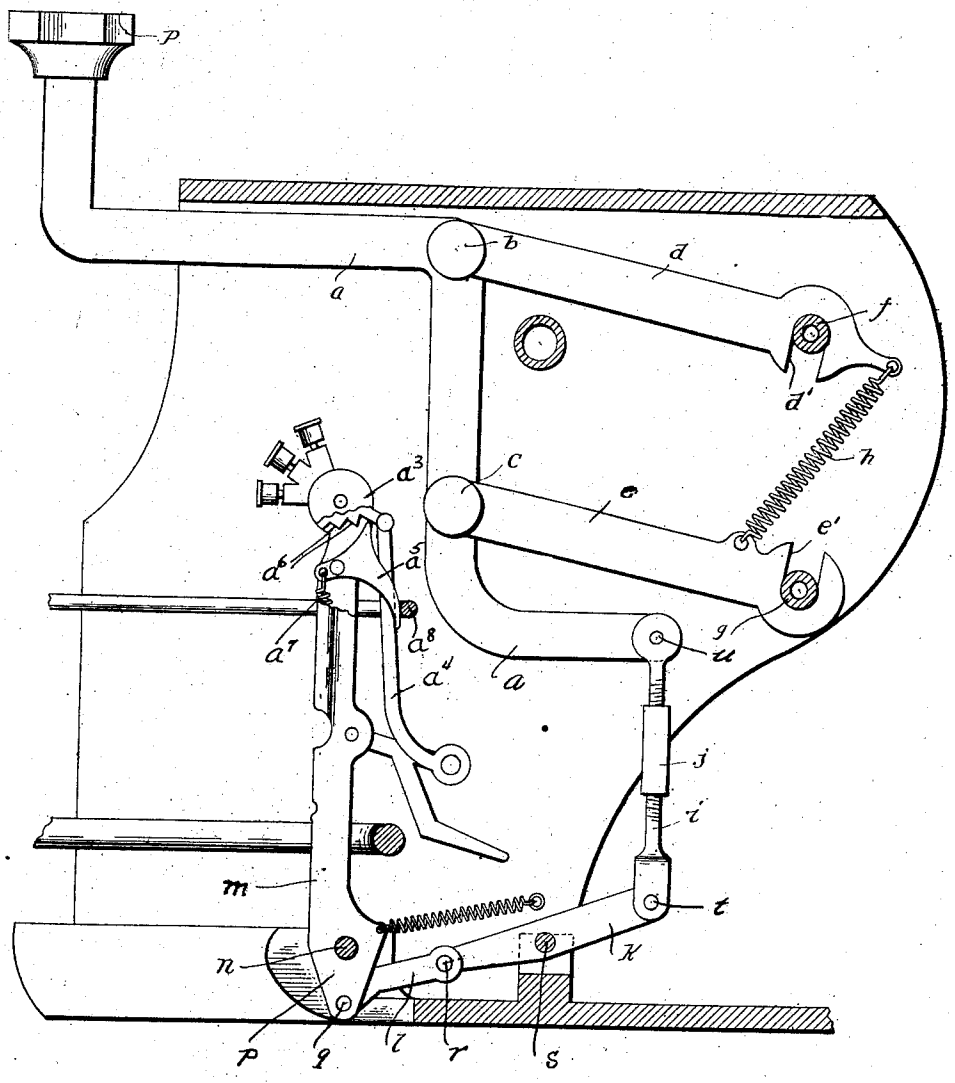
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G. W. DONNING.

TYPE WRITER.

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TYPE-WRITER.

No. 840,122. Specification of Letters Patent. Patented Jan. 1, 1907.

Original application filed May 1, 1902, Serial No. 105,548. Divided and this application filed October 26, 1903. Serial No. 178,603.

To all whom it may concern.

Be it known that I, GEORGE W. DONNING, a citizen of the United States, residing at East Orange, in the county of Essex and State of New Jersey, have invented certain new and useful Improvements in Type-Writers; and I do hereby declare the following to a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to improved constructions for writing mechanisms; and it consists in the constructions, combinations, and arrangements herein described and claimed.

The accompanying figure of drawing, forming a part of this application, is a sectional elevation embodying one form of my invention applied to a writing mechanism, illustrating especially the key member and its connections.

Referring to the drawing, the operating-key member *a* is pivotally connected at *b* and *c* with the two parallel links *d* and *e*, respectively. These links are provided with cut-out bearings *d'* and *e'*, formed to fit transverse rods *f* and *g*, whereby such links can be quickly and conveniently assembled on the supporting transverse rods *f* and *g*. A spring *h* shown connecting the parallel links acts to properly hold these links on the transverse rods and also to maintain the forward ends of the links in their elevated position, whereby the key member *a* will be normally held in its elevated position. This arrangement is greatly superior to the usual constructions in which a fixed point of attachment is necessary for the spring employed to return the key member to its normal elevated position. Preferably, as shown, the transverse rods *f* and *g*, constituting supports for the rear ends of said links *d* and *e*, are disposed, respectively, in a plane below the points at which said links are pivoted to the key member, whereby the said links normally lie in a plane at an angle to the horizontal—that is to say, they incline upward normally toward the points to which they are pivoted to the key member; but when said key-member is operated to actuate a type-bar said links are positioned in different planes respectively from those they normally occupy, but always parallel one with the other. Moreover, the plane in which said links normally lie is at an angle to the plane of the type-bar which normally occupies a plane approximately vertical. The key member *a* is formed, preferably, as shown and comprises a vertical portion which lies in a plane parallel with the type-bar and two horizontal portions. By this particular construction and arrangement of parts the striking-face of the key member is throughout its entire travel when depressed to actuate a type-bar maintained in a horizontal plane constantly parallel with that it occupies when in normal position.

A distinct advantage is involved in disposing the parallel links so that they incline upward from their rear pivots to their pivotal points of attachment to the key member, for it is obvious that while the parallel link mechanism prevents tilting of the key member during the act of printing, yet the striking-face of this member necessarily travels downward in a curved path, and were the parallel links initially to lie in horizontal planes the position of the striking-face would at the conclusion of the printing operation be considerably to the rear of its normal position. By normally inclining the links upward the striking-face travels outward and then inward as the links approach and then pass below the horizontal. In this way the position of the striking-face at the end of the printing stroke may be practically immediately below its initial position, and the movement of the striking-face forward or rearward is greatly reduced, all of which tends to enhance the certainty of the operator's stroke upon the key.

The type-bar *m* is preferably of the downwardly-acting class and has pivoted at its upper end a head a^3, which is designed to be shifted to any of its plurality of shiftable positions by a head-actuator a^4, and to lock the head in any of its said positions a pawl a^5 is disposed on the bar *m* contiguous to the head and adapted to engage the teeth a^6 in the same, constituting a head-locking device, the pawl being held by a spring a^7, connecting therewith and with the type-bar. Adjacent the head and directly to the rear of the pawl is a buffer a^8, designed to disengage the pawl from the head when the former abuts against the said buffer. When the head is in its normal upright position, the said pawl will abut

against said buffer and be held out of engagement with the head, and the moment the bar begins to descend the pawl is carried away from the buffer and permitted to engage said head.

It will be understood that upon depression of the key member *a* to bring the type-bar to writing position the parallel links *d* and *e* will swing on their supporting transverse rods and maintain the striking-face *p* of the key member constantly parallel to its initial position. This is especially advantageous in that it prevents the uncertainty of touch present in the existing forms of writing mechanism where the striking-face of the key member tilts during its operation and insures a clear and accurate impression of the type.

It will be noted that upon depression of the key member the spring *h*, employed for maintaining the parallel links on the transverse rods, becomes extended and upon release of the key member acts to return the links and key member to their normal elevated position. This provides a very simple, compact, and durable construction and one in which any of the plurality of key members and its connections can be readily removed without disturbing the others.

The type-bar *m* is operatively connected to the key member *a* by the following mechanism: A link *l* is pivoted to the toe *p* of the type-bar at *q* and has its other end pivoted at *r* to a sublever *k*, which latter is fulcrumed at *s* on the base. A link *i* is pivotally connected at *t* and *u* with said sublever *k* and key member *a*, respectively. The link *i* is shown provided with adjusting means, such as a turnbuckle *j*. The pivotal points *q*, *r*, and *s* are so arranged that upon depressing the key member *a* the early motion of the sublever *k* will tend to move the pivot *r* of the link *l* in a path approximately perpendicular to the length of said link. This motion will act to swing said link *l* about its pivotal connection *q* to the type-bar without materially rocking said type-bar, thus moving the link *l* and lever *k* from their initial locked position, in which their axis lay substantially in a common straight line. Upon further depression of the key member *a* the sublever *k* acts to move the pivot *r* on link *l* in an arc, (about the pivot *s*,) which more and more approaches a path at right angles to the axis of said link *l*, and thereby causes a progressive acceleration in the motion of the type-bar *m* about its pivot *n*. The link *l* and adjacent end of the lever *k* constitute a toggle-joint, and, as shown, the pivot *q* is located slightly below a straight line passing through the centers of pivots *r* and *s* of said toggle. Any force applied to the type-bar *m* to rock it from its normal upright position will be transmitted through the pivot *q* to the link *l*, and obviously the effectiveness of that component of such force which tends to bend the toggle varies directly with the perpendicular distance from the pivot *q* to a right line passing through the centers of the pivots *r* and *s*. In the construction shown this perpendicular distance is made so small that the force is expended mainly in causing pressure on the pivots *q*, *r*, and *s* and is ineffective to bend the toggle against the friction engendered by such pressure. Of course by locating all three pivotal points *q*, *r*, and *s* in a right line tangent to the path of the point *q* any force transmitted through the point *q* to the link *l* would be entirely expended in causing pressure on said pivots, or again by locating the pivot *q* approximately the same distance above the right line passing through the centers of the pivots *r* and *s*, as, in the drawing it is shown below, any force transmitted through the pivot *q* to the link would tend to maintain the toggle in its locked position. Thus the pivots *q*, *r*, and *s* are so arranged that the type-bar *m* is locked against any rebound from its upright position and can be rocked from such position only by depressing the key member *a*. The type-bar *m* carries a shifting mechanism a^4, which need not be further described herein, since it forms a part of the invention claimed in my application, Serial No. 105,548, filed May 1, 1902, of which this is a divisional application. As shown, the locking device disposed adjacent to said shifting mechanism is normally out of engagement with the type-carrying head which is pivoted on said bar. The toggle device above described serves to hold the bar against forward movement—that is, rebound—and thus maintains said locking device against the buffer-ring disposed to the rear of the type-head, whereby said locking device is normally held out of engagement with the type-head. This link mechanism, including the spring *h*, serves to hold the parts under stress throughout the entire movement thereof, and thus operates to take up all "lost motion" of such parts.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a writing mechanism, the combination of a key member provided with a striking-face, parallel supporting-links pivotally connected to said key member and inclined normally upward toward their points of connection therewith and constructed to maintain the striking-face of said key member in parallel planes during the entire movement thereof, a pivoted type-bar, and, between the type-bar and key member, an operating connection entirely distinct from said links.

2. In a writing mechanism, the combination of a key member provided with a striking-face, parallel supporting-links pivotally connected to said key member adjacent one

end and inclined normally upward toward such ends and constructed to maintain the striking-face of said key member in parallel planes during the entire movement thereof, pivotal supports for the other ends of the links, a pivoted type-bar, and, between said type-bar and key member, an operating connection entirely distinct from said links.

3. In a writing mechanism, the combination of a key member provided with a striking-face, parallel supporting-links inclined normally and pivoted toward their upper ends to the key member and constructed to maintain the striking-face of said member in parallel planes during the entire movement thereof, pivotal supports for the other ends of the links, a pivoted type-bar, between said type-bar and the key-member-operating connection entirely distinct from the links, and resilient means connected with said links and constructed to effect return of the parts to their normal position.

4. In a writing mechanism, the combination of a key member provided with a striking-face, link mechanism pivotally connected to said key member and provided with cut-out bearings, transverse rods constructed to fit in said cut-out bearings and constitute pivotal supports for said link mechanism, and means carried by said link mechanism for maintaining the same in position on the supporting transverse rods, substantially as described.

5. In a writing mechanism, the combination of a key member provided with a striking-face, link mechanism pivotally connected to said key member and provided with cut-out bearings, transverse rods constructed to fit in said cut-out bearings and constitute pivotal supports for said link mechanism, and a spring member carried by said link mechanism for maintaining the same in position on the supporting transverse rods, substantially as described.

6. In a writing mechanism, the combination of a key member provided with a striking-face, parallel links pivotally connected to said key member and provided with cut-out bearings, transverse rods constructed to fit in said cut-out bearings and constitute pivotal supports for said parallel links, and a spring member secured to said parallel links and constructed to maintain said cut-out bearings in position on their supporting transverse rods, substantially as described.

7. In a writing mechanism, the combination of a key member provided with a striking-face, parallel links pivotally connected to said key member and provided with cut-out bearings, transverse rods constructed to fit in said cut-out bearings and constitute pivotal supports for said parallel links, and a spring member connected to such parallel links at opposite sides of their pivotal supports, whereby said spring member will act to return the parts to their normal position upon release of the key member, substantially as described.

8. In a writing mechanism, the combination with an operating-key member having a striking-face, a plurality of links connecting with said operating member and constructed to maintain the striking-face of said member in parallel planes during the entire movement thereof, supporting members on which said links are pivoted and by which they are sustained, and a resilient member connecting with said links at opposite sides of their pivots.

9. In a writing mechanism, the combination with an operating-key member having a striking-face, a plurality of links connecting with said operating member and constructed to maintain the striking-face of said member in parallel planes during the entire movement thereof, supporting members on which said links are pivoted and by which they are sustained, and a resilient member connecting with said links at opposite sides of their pivots and independent of said link-supporting members.

10. In a writing mechanism, the combination with a type-bar, of an operating member having a striking-face and connecting therewith, a plurality of links arranged one parallel with another and each connecting with said operating member and constructed to maintain the striking-face of said member in parallel planes during the entire movement thereof, and resilient means connecting with each of said plurality of links and constructed to return the parts to their normal position upon release of said operating member.

11. In a writing mechanism, the combination with a type-bar, of an operating member having a striking-face and connecting therewith, a plurality of links arranged one parallel with another and each connecting with said operating member and constructed to maintain the striking-face of said member in parallel planes during the entire movement thereof, resilient means connecting with each of said plurality of links and constructed to return the parts to their normal position upon release of said operating member, and supporting means for said links disposed adjacent to the ends of said links.

12. In a writing mechanism, the combination with a type-bar, of an operating member having a striking-face and connecting therewith, a plurality of links arranged one parallel with another and each connecting with said operating member and constructed to maintain the striking-face of said member in parallel planes during the entire movement thereof, resilient means connecting with each of said plurality of links and constructed to return the parts to their normal position upon release of said operating member, and independent supports for each of said links.

13. In a writing mechanism, the combination with a type-bar, of an operating member having a striking-face and connecting therewith, a plurality of links arranged one parallel with another and each connecting with said operating member and constructed to maintain the striking-face of said member in parallel planes during the entire movement thereof, resilient means connecting with each of said plurality of links and constructed to return the parts to their normal position upon release of said operating member, and independent supports for each of said links, one end of said resilient means connecting with one end of one of said links, and the other end connecting intermediate of the ends of another of said links.

14. In a writing mechanism, the combination with a key member provided with a striking-face, a plurality of link members pivotally connected to said key member, and separate supports to which each of said link members is separately pivoted, the pivotal points of said link members adjacent the key member being normally in a plane above, but operable to a plane below, the plane of their pivotal points adjacent the supports, and a spring member connecting with said links at points at opposite sides, respectively, of their pivots adjacent said supports.

15. In writing mechanism, the combination with a type-bar, and a fulcrum-support therefor, of an operating member connecting with said bar, a plurality of links arranged one parallel with another and each connecting with said operating member, a spring element having one end connecting with one of said links adjacent its end and having its other end connecting with another of said links intermediate of its ends, and supporting means upon which said links rest.

16. In writing mechanism, the combination with a type-bar, of an operating member, an intermediate connecting element, said operating member being formed with a plurality of horizontally-extending sections and a vertical, connecting-section, one of said horizontally-extending sections carrying a striking-face and the other pivotally engaging said intermediate connecting element, of parallel links engaging the vertical, connecting-link of said operating member, and a resilient element connecting with said links.

17. In a writing-machine, the combination with an operating-key member, provided with a striking-face, of link mechanism constructed to support said key member and arranged to maintain the striking-face of said member in parallel planes during the entire movement thereof, a type-bar, and mechanism connecting said key member and type-bar for operating the bar upon actuation of the key member, said connecting mechanism constructed and arranged to prevent rebound of said type-bar from its normal position after return thereto following actuation of said link-supported key member.

18. In a writing-machine, the combination with an operating-key member, provided with a striking-face, of link mechanism constructed to support said key member and arranged to maintain the striking-face of said member in parallel planes during the entire movement thereof, a type-bar, and mechanism connecting said key member and type-bar for operating the bar upon actuation of the key member, said connecting mechanism constructed and arranged to effect automatic locking of the type-bar in its normal position and to prevent rebound of said bar until locked by depression of the link-supported key member.

19. In a writing-machine, the combination with an operating-key member, provided with a striking-face, of link mechanism constructed to support said key member and arranged to maintain the striking-face of said member in parallel planes during the entire movement thereof, a type-bar, a sublever, a link connecting said sublever and type-bar, and a link connecting said sublever and key member, the said sublever and its connecting link constructed and arranged to effect automatic locking of the type-bar in its normal, upright position and to prevent rebound of said type-bar until unlocked by depression of the link-supported key member.

20. In a writing-machine, the combination with an operating-key member, provided with a striking-face, of link mechanism constructed to support said key member and arranged to maintain the striking-face of said member in parallel planes during the entire movement thereof, means engaging said link mechanism and constructed to return the parts to normal position after actuation, a type-bar, a toggle element interposed between said key member and said type-bar and constructed automatically to lock the type-bar against rebound when said bar has been returned to its normal, upright position.

21. In a writing-machine, the combination with an operating-key member, provided with a striking-face, of link mechanism constructed to support said key member and arranged to maintain the striking-face of said member in parallel planes during the entire movement thereof, means engaging said link mechanism and constructed to return the parts to normal position, a type-bar, and a toggle element interposed between the type-bar and key member and constructed to operate said type-bar and accelerate movement of the same at points in its travel and, also, to effect locking of said bar against rebound after it has been returned to its normal, upright position.

22. In a type-writer, the combination with an operating-key member, provided with a striking-face, links connecting with said key

member and constructed to support and maintain the striking-face of the member constantly in parallel planes, a type-bar, a toggle device connecting therewith, and a resilient member engaging said links and constructed to hold the parts under stress and arranged to effect a taking up of "lost motion" of the parts.

23. In a writing mechanism, the combination with an operating-key member provided with a striking-face, parallel link mechanism connecting therewith and serving to support the same, a type-bar, a movable head thereon, a spring-operated head-locking member carried by the type-bar, a buffer disposed adjacent thereto and against which said head-locking member normally abuts, and a toggle device connecting with said type-bar and constructed to hold the same against rebound and, also, in position to abut the head-locking member against the buffer to hold said locking member normally out of engagement with the head.

24. In a writing mechanism, the combination with an operating-key member provided with a striking-face, parallel link mechanism connecting therewith and serving to support the same, a type-bar, a movable head thereon, a spring-operated head-locking member carried by the type-bar, a buffer disposed adjacent thereto and against which said head-locking member normally abuts, and a toggle device connecting with said type-bar and constructed to hold the same against rebound and, also, in position to abut the head-locking member against the buffer to hold said locking member normally out of engagement with the head, said link members normally, and when moving, occupying a plane parallel to each other, but normally at an angle to the plane of the type-bar.

25. In a writing mechanism, the combination with an operating-key member provided with a striking-face, said key member being formed of a substantially vertical portion, horizontal upper and lower portions, parallel link mechanism connecting with, and disposed at an angle to, said vertical portion, and serving to support the same, a type-bar, a movable head thereon, a spring-operated head-locking member carried by the type-bar, a buffer disposed adjacent thereto and against which said head-locking member normally abuts, and a toggle device connecting with said type-bar and constructed to hold the same against rebound and, also, in position to abut the head-locking member against the buffer to hold said locking member normally out of engagement with the head.

26. In a writing mechanism, the combination with an operating-key member provided with a striking-face, said key member being formed of a substantially vertical portion and horizontal upper and lower portions, parallel link mechanism connecting with, and disposed at an angle to, said vertical portion, and serving to support the same, a type-bar, a movable head thereon, a spring-operated head-locking member carried by the type-bar, a buffer disposed adjacent thereto and against which said head-locking member normally abuts, and a toggle device connecting with said type-bar and constructed to hold the same against rebound and, also, in position to abut the head-locking member against the buffer to hold said locking member normally out of engagement with the head, said type-bar normally lying in a substantially vertical plane and parallel with said vertical portion of the key member, and said links lying at an angle to the plane of said upper and lower portions of said key member.

In testimony whereof I affix my signature in the presence of two subscribing witnesses.

GEORGE W. DONNING.

Witnesses:

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