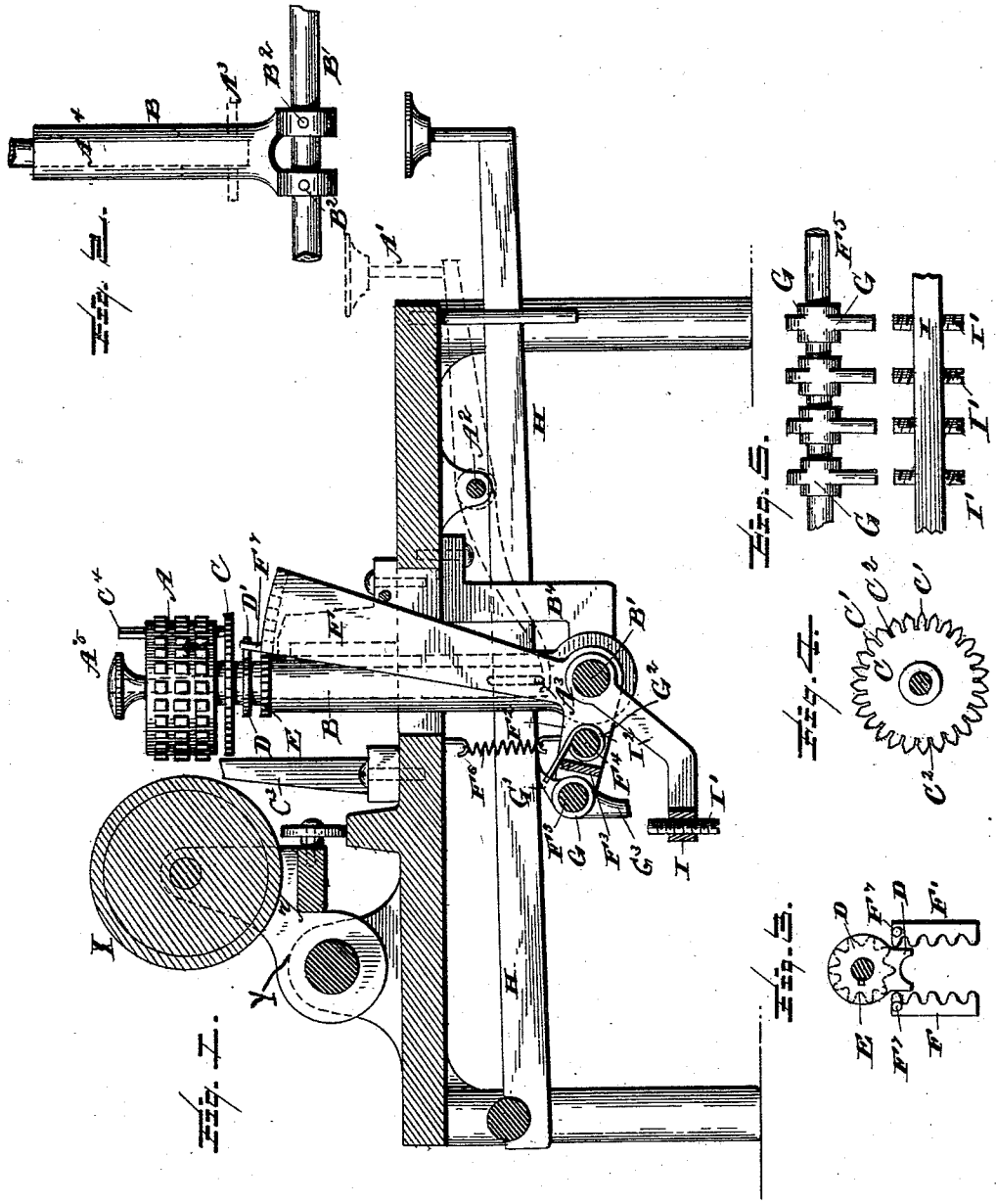
(No Model.)

C. SPIRO.

TYPE WRITING MACHINE.

No. 458,241. Patented Aug. 25, 1891.



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TYPE-WRITING MACHINE.

SPECIFICATION forming part of Letters Patent No. 458,241, dated August 25, 1891.

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To all whom it may concern:

Be it known that I, CHARLES SPIRO, a citizen of the United States, residing at New York, in the county of New York, State of New York, have invented certain new and useful Improvements in Type-Writers, of which the following is a specification, reference being had therein to the accompanying drawings.

The invention has relation to that class of type-writers in which the printing characters are arranged on a sector or wheel, and the objects and advantages of the invention will appear in the following description, and the novel features thereof will be particularly pointed out in the claims.

Referring to the drawings, Figure 1 is a substantially central vertical section of a type-writer constructed in accordance with my invention with parts in elevation. Fig. 2 is a detail of the type-wheel carrier. Fig. 3 is a plan of the type-wheel carrier with the type-wheel and locking-wheel removed and showing the normalizing-wheel and end views of the type-wheel-operating segments. Fig. 4 is a plan of the locking-wheel. Fig. 5 is an elevation of the trip-lever bail, showing the series of trips arranged thereon together with the segment-bail, and its adjusting-screws arranged in their relative operative position.

Like letters refer to like parts in all the figures of the drawings.

A is the type-wheel, having in this instance three rows of printing characters thereon, either one of which rows may be brought into the printing plane by means of a key-lever A′, pivoted to the base, as at A^2, and extending under a pin A^3, passing through and projecting from the shaft A^4, on which the type-wheel A is mounted, and secured by means of the thumb-screw A^5. The spindle or shaft A^4 is mounted in a carrier or sleeve B, which is bifurcated at its lower end, and each of the bifurcations is perforated for the passage of a shaft B′, to which the carrier is rigidly attached by pins B^2, or other suitable means. Between the bifurcations the shaft is supported by means of a bracket B^4, secured to the base at about its center.

C, D, and E are wheels formed as a part of or rigidly connected to a sleeve mounted on the type-wheel spindle A^4, so as to rotate as one piece thereon. The wheel C has teeth C′, separated by slots C^2, which are adapted to receive a locking blade or post C^3, rigidly mounted on the base and serving to lock the type-wheel against rotation after the desired printing character thereon has been brought opposite the printing-point of the platen X, mounted on the carriage Y of the machine. As post C^4 projects from the wheel C through a hole in the type-wheel to rotate the latter when elevated to bring different rows into the printing-plane. The wheel D is a normalizing-wheel, and consists simply of a disk having a single broad tooth or projection D′, adapted to enter between the projection F^7 on the wheel-operating segments, hereinafter described, when the type-wheel is at rest and at its farthest distance from the platen. The wheel E is an ordinary gear-wheel, having in this instance ten teeth, although the number of teeth may be increased or decreased, as desired.

F F′ represent segments, each having in this instance five teeth, which number may be increased or diminished, as desired, but preferably maintained at exactly or about one-half of the number of teeth in the wheel E. These segments are arranged on the shaft B′, one on each side of the carrier C, and unlike the carrier are mounted to oscillate on the shaft. The carrier B is rigidly secured to the shaft and oscillates with it. The oscillations of the segments F F′ are produced by means of the bails F^2, each of which extends along under one-half of the series of key-levers of the machine. These bails comprise a bar F^3 and two rods F^4 and F^5. On the bar F^5 of each of these bails are suspended a series of trip-levers G, having two arms G′ and G^3, the short arms G′ of which are, by coiled springs G^2, mounted on the rod F^4 of the bail, held normally in contact with the lower edge or other suitable part of a key-lever H of the machine.

I represents a bail extending the complete length of the machine and under the entire series of key-levers thereof. It is provided with adjusting-screws I′, one for each trip-lever G. The bail I has arms I^2, which are rigidly connected with the shaft B′, so that when the bail I is depressed the shaft is oscillated, and with it the carrier and type-wheel, and

the latter is thrown against the platen to make an impression. The bails F^2 are connected with the base by coiled springs F^6, which bring them to their normal position after having been depressed, as hereinafter described.

The operation of the invention is as follows: Upon depressing a key-lever H the shorter arm G′ of a trip-lever G is depressed against the tension of its coiled spring G^2 until said short arm is brought into contact with the bar F^3 of the bail F^2. In this movement the longer arm G^3 of the trip-lever is thrown opposite or into line with but not into contact with that adjusting-screw I′ of the bail I which is arranged in the path of the trip-lever, which it takes when carried down by further depressing the bail F^2. The movement of the key-lever as thus far described gives motion to the segment F or F′ and rotates the type-wheel to bring the desired type thereon opposite the printing-point, the type-wheel and its carrier being not tilted toward the platen until by a further depression of the key the long arm of the trip-lever is brought into contact with the adjusting-screw I′. The locking-wheel C contacts with the locking blade or standard C^3, from which time the cylinder is carried toward the platen with a type at the printing-point. To determine which type shall be brought to the printing-point, all that it is necessary to do is to simply adjust the screw I′, when the key-lever for that type is depressed, so as to bring it to the desired point. One of the segments F F′ gives the type-wheel a half-revolution in one direction and the other in the opposite direction, and on the return movement of the segments the type-wheel is brought to its normal position, and is stopped in that position by means of the extension or lug F^7 on each of the segments which comes into contact with the tooth D′ of the normalizing-wheel D.

By the construction and mode of operation above described I utilize to an advantage that which has heretofore been a great obstacle in type-wheel, cylinder, or segment-machines—that is to say, the momentum of the wheel has been an obstacle in the production of rapid printing. The moment the trip-lever G makes contact with the adjusting-pin I′ of the segment-operating bail and the segment has shifted with the gear-wheel E the momentum of the bail expedites the movement of the segment and the momentum of the segment expedites the rotation of the wheel, and the aggregate momentum of both expedites the oscillation of the parts to produce an impression on the platen. Momentum also aids in bringing the segment-bail in contact with the oscillating bail after the segment has meshed with the gear. It will be noticed that during the first portion of a depression of a key-lever the segment rotates the type-wheel and engenders therein momentum, and that as soon as the trip-lever comes into contact with the adjusting-screw the engendered momentum of the type-wheel is utilized as so much force applied to the work of tipping the wheel toward the platen. This follows because the type-wheel is locked against further rotation when the trip-lever is in contact with the adjusting-screw. The means whereby it is locked consists in the rigid connection of the arm i^2 and the carrier B with the shaft or rod B′ and the loose or pivotal connection of the segment F of the bail F^3 and its extension F^2 constituting a part of the bail. In other words, the segment-bail F^2, arm I^2, and carrier B all become practically parts rigidly connected with the shaft or rod B′, and any momentum of the type-wheel must be expended in carrying these parts toward the platen. Of course this momentum is utilizable only in the operation which takes place at each separate depression of a key-lever. If the character to be selected employs in this machine an adjusting-screw I′ which projects but a slight distance above the bar or bail I, then the momentum engendered in the rotation of the wheel assists in a more marked degree in bringing the trip-lever into contact with said adjusting-screw than when said screw projects to normally reach said lever. This characteristic of the mode of operation of the mechanism shown and described has reference to features which are extremely delicate in action and which must be capable of extremely-rapid movement. The problem involved has reference to the operation and effect of the momentum engendered in a body, which, though extremely light, is given an extremely rapid movement. The combination and arrangement which I have adopted, shown, and described have in actual use demonstrated successfully their capability of utilizing a hitherto objectionable characteristic of machines of this class.

Certain features of my invention are applicable to other classes of type-writing machines than wheel-machines. I therefore do not confine the invention to a use of the same in connection with type-wheel or segment machines, but reserve the right to embody the same in type-writing machines generally, and in which said mode of operation may be embodied.

It will be noted that in the operation of this invention the segments are first oscillated for a time which is determined by the adjustment of the screws I′ nearer to or farther from the trip-levers, whereby a greater or less rotation of the printing device is produced before it and the segments are simultaneously oscillated. In this manner any desired type may be brought to the printing-point.

The reciprocating mechanism of the printing device in this invention consists of the projecting pin or pins A^3 and the lever A′. The rotating mechanisms consist of the gear E, segment F, and bail F^2, or any ordinary bail connected with the segment. The oscillating mechanism comprises a carrier or sleeve B, in which the spindle of the printing

device is mounted, and any ordinary bail I—that is, a bail without the screws I′.

Heretofore in this class of machines, the oscillating mechanism began to act immediately upon the commencement of a depression of a key-lever; but in this instance the printing device is not oscillated until after the commencement and until near the end of the stroke or depression of the key-lever. This is a very important feature of construction and mode of operation in that the momentum of the parts put into operation at the commencement of a stroke is utilized for, in part, making the impression, and thereby not only relieving the touch of the machine and entire labor of oscillation during the commencement of the stroke, but also reducing the labor when actually performed to the extent that the momentum of the parts first operated acts on those subsequently brought into action. The tipping or oscillation of the printing device does not occur until after the rotation of that device is completed.

The rotating mechanism can operate only when the oscillating mechanism is at rest, or, in other words, when the carrier of the printing device is at rest. As soon as the carrier moves the rotation of the printing device ceases and the parts are capable of advancement to accomplish the final function—viz., imprinting the selected character on the platen.

In the construction and mode of operation herein disclosed use is made of the momentum of the wheel and of the printing-device carrier to aid in the easy depression or touch and to increase the speed of the machine. This it does, for the printing device being operatively connected with the segment and the latter with the rotating bail any momentum of the parts mentioned will only try or serve to make the printing device turn faster in the direction it is impelled by the finger-stroke, which will urge the segment forward so much quicker, and through that the trip-lever will be so much quicker to touch the adjusting-pins in the oscillating bail, and through it tip, tilt, or oscillate the carrier and the printing device and print. The locking-standard is set so near the wheel that the moment the carrier starts forward, as described, the form is locked for the particular letter. This is another advantage, because no matter how perfect the mechanism when one has to contend with momentum it is necessary to insure against tremor at the moment of entering the lock, because the failure to do so will offset the speed secured from momentum or otherwise, and the tremor of the form will show in the writing. In my arrangement of the locking devices the printing wheel or device is under the influence of the locking-blade C^3 a trifle before it stops rotating—that is, when the blade is in the wider space between the teeth of the locking-wheel, so that it cannot fail to enter the locking-slots between the teeth just previous to the instant of impression.

As to the interposition of tripping-levers between the rotating and oscillating mechanisms or bails, I would state that in their absence, and in bringing the key-lever directly in contact with both bails successively and in the substitution for the tripping-lever any particular conformation of the bails themselves or of the key-levers for the purpose of timing the contact of the latter with the former, so as to produce successive operation of the rotating and oscillating mechanisms, the impulse given to the two bails would absolutely and materially vary, as I have found by experience, and so create a momentum that would send the first bail so far forward that it would be in advance of the position wanted when the key-lever touches the second bail for printing. This has been the trouble with all previous constructions of which I have a knowledge. I therefore provide and interpose the trip-levers, so that the key-lever touches only one bail, and that is set for a certain rotation of the printing device when it touches the second or tilting bail, communicating with it whatever of momentum it has acquired, and beyond that making the running away of one bail from the other mechanically impossible.

Having described my invention and its operation, what I claim is—

1. In a type-writing machine, the combination of a printing cylinder, wheel, or segment, a gear-wheel operatively connected therewith, a segment for operating the gear-wheel connected with a bail carrying a trip-lever, a bail for operating the segment, and a key-lever arranged to operate the trip-lever, substantially as specified.

2. In a type-writing machine of the class described, and in combination with the type-carrier-operating gear, a segment connected with a bail, a type-carrier-oscillating bail, interposed trip-levers, and the key-levers, substantially as specified.

3. The combination, with the gear of a rotative type-carrier, of a rock-shaft having a rigidly-connected arm or part for supporting said rotative type-carrier and having a loosely-mounted segment for rotating the type-carrier, and a bail carrying trip-levers and rigidly connected with the segment, substantially as specified.

4. In a type-writing machine of the class described, and in combination with its key-levers, a bail carrying trip-levers and connected with a segment, a bail arranged below the trip-levers and mounted on a rock-shaft supporting a type-carrier, a locking-wheel mounted to rotate with the type-carrier, and a locking blade or standard, substantially as specified.

5. In a type-writing machine, the combination of a rock-shaft carrying an oscillating type-carrier, a bail carrying trip-levers, and

a bail arranged below the trip-levers and rigidly secured to the rock-shaft, substantially as specified.

6. The combination, with a key-lever and an oscillating type-carrier, of a rock-shaft rigidly connected with said carrier, a bail rigidly connected with the rock-shaft, and an intermediate bail provided with trip-levers arranged beneath the key-levers, substantially as specified.

7. In a type-writing machine, the combination, with a key-lever and a rock-shaft carrying an oscillating printing device and having a rigidly-connected bail, of an intermediate loosely-connected bail carrying trip-levers, substantially as specified.

8. In a type-writing machine, the combination of a rock-shaft, a rigidly-connected slotted sleeve, the type-wheel spindle having a pin projecting through the sleeve, and a key-lever arranged to contact with the pin, substantially as specified.

9. In a type-writing machine, a sleeve provided with a wheel having locking-slots, a wheel having peripheral projection, and a gear, substantially as specified.

10. In a type-writing machine, the combination, with a rotatable type-carrier, a sleeve having a locking-wheel, a normalizing-wheel and a gear, of a locking-standard and a segment provided with a normalizing projection, substantially as specified.

11. The combination, in a type-writing machine, of a key-lever, a rock-shaft arranged below it, a rigidly-connected oscillating arm adapted to support a rotative type-carrier, an operatively-connected locking-wheel, a normalizing-wheel, geared segments arranged on opposite sides of said gear and provided with normalizing projections, a locking blade or standard, bails loosely mounted on said rock-shaft and connected with said segments and carrying trip-levers, and a bail rigidly connected with said shaft and provided with adjusting-screws, substantially as specified.

12. In a type-writing machine of the class described, a rotative printing device operatively connected with a gear, segments arranged at opposite sides of said gear, bails provided with trip-levers operatively connected with said segments, key-levers arranged above said trip-levers, and a bail for oscillating the printing device, substantially as specified.

13. The combination, with an oscillatory rotative printing device, of a gear operatively connected therewith, a normalizing-wheel operatively connected with said gear and having a projection or tooth arranged normally between projections on segments for operating said gears, a rock-shaft for supporting and oscillating said printing device, a rigidly-connected bail, and a loosely-connected bail provided with tripping-levers, substantially as specified.

14. In a type-writing machine involving a rotative oscillatory printing device, tripping-levers arranged to be depressed by key-levers and to be thrown into the path of the printing-device-oscillating mechanism, substantially as specified.

15. In a type-writing machine involving a rotatable, oscillatory, and vertically-reciprocative printing device, the combination of said device, its rotating, oscillating, and reciprocating mechanisms, and a series of trip-levers interposed between the rotating and oscillating mechanisms, substantially as specified.

16. In a type-writing machine involving an oscillatory rotative printing device and its rotating mechanism and its oscillating mechanism, a series of trip-levers arranged on the bail of the rotary mechanism and above the bail of the oscillating mechanism, substantially as specified.

17. In a type-writing machine involving a rotative oscillatory printing device, the combination, with said device and with the rotating and oscillating mechanisms, of key-levers and connecting devices having independent movement and arranged between the rotating and oscillating mechanisms for communicating motion caused by pressing a key-lever to said rotating and oscillating mechanisms in the order specified, for the purpose set forth.

18. In a type-writing machine, the combination, with the printing device, rotating mechanism, and with a key-lever, of tripping-levers yieldingly held in connection with the key-lever and movable for contact with a secondary bail to be operated by said key-lever, substantially as specified.

19. In a type-writing machine, the combination, with a key-lever and bail, of pivoted tripping-levers mounted on a bail, springs for maintaining the levers in one position, and a secondary bail constructed and arranged to be contacted by the depressed tripping-levers of the primary bail, substantially as set forth.

20. In a type-writing machine, the combination of a rotative oscillatory printing device, oscillating and rotating mechanisms, key-levers, and tripping-levers mounted on the rotating mechanism and adapted to make contact with the oscillating mechanism, whereby the said mechanisms may be operated in the order specified, substantially as and for the purpose specified.

21. In a type-writing machine, an oscillating printing-device carrier, a rotating printing device mounted thereon and having a suitable gear connected therewith, a gear-rotating device having a movement independent of that of the carrier, a key-lever, and an interposed trip-lever arranged to have movement independent of the carrier-oscillating mechanism, whereby the printing device is rotated to a desired extent before the carrier and its mechanisms are oscillated, substantially as specified.

22. The combination of the printing-wheel A, its carrier B, rocking shaft B′, rigidly-connected bail I, the key-lever H, and a bail car-

rying segments and trip-levers, substantially as specified.

23. The combination, with the printing-wheel A, of the wheels C, D, and E, formed on a sleeve mounted on the printing-wheel spindle, and a sleeve-rotating device, substantially as specified.

24. In a type-writing machine, a locking-wheel C, normalizing-wheel D, and rotating gear E, formed in one piece and bored for the reception of and in combination with a type-wheel spindle, substantially as specified.

25. In a type-writing machine, the combination, with the rock-shaft B′, of the carrier B, bifurcated, as shown, and the bracket B^4 for supporting the rock-shaft, substantially as specified.

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

CHARLES SPIRO.

Witnesses:
I. FREUDENTHAL,
JULIUS E. LEVY.