No. 718,505. PATENTED JAN. 13, 1903.

P. F. NILSON.

TYPE WRITING MACHINE.

APPLICATION FILED NOV. 2, 1899.

NO MODEL. 2 SHEETS—SHEET 1.

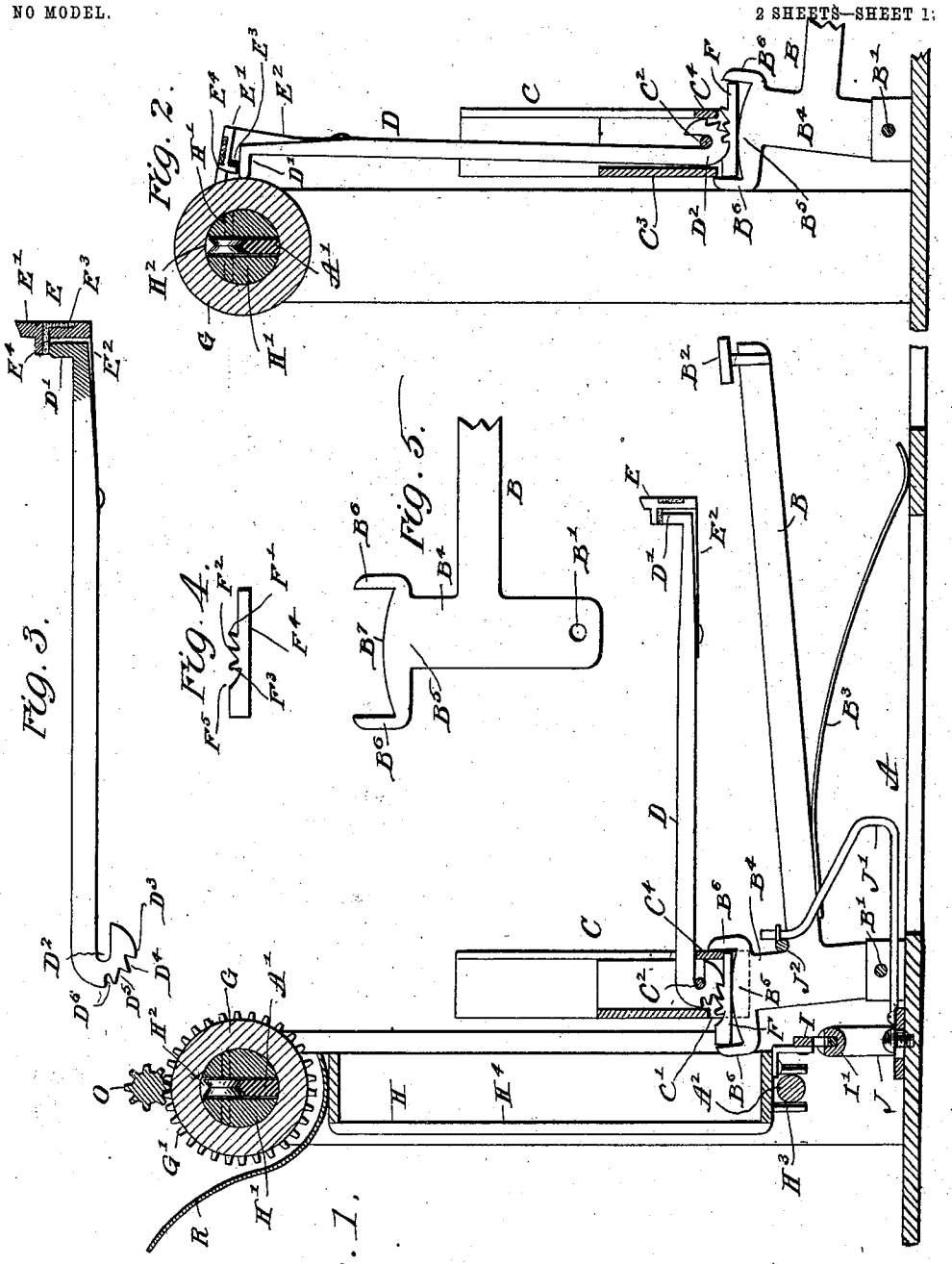

Fig. 1.

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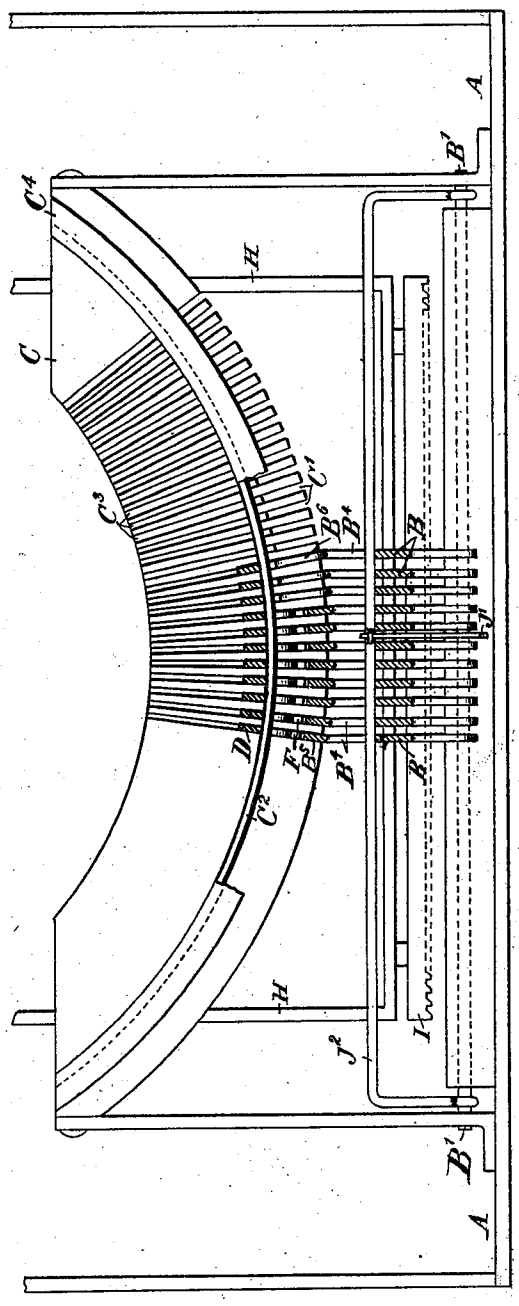
Fig. 6.



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TYPE-WRITING MACHINE.

SPECIFICATION forming part of Letters Patent No. 718,505, dated January 13, 1903.

Application filed November 2, 1899. Serial No. 735,640½. (No model.)

To all whom it may concern:

Be it known that I, PETER F. NILSON, a citizen of the United States, and a resident of Jerome, in the county of Yavapai and Territory of Arizona, have invented certain new and useful Improvements in Type-Writing Machines, of which the following is a specification.

The object of the invention is to provide a new and improved type-action for type-writing machines arranged to positively and accurately actuate the type-bars to insure proper printing visible to the operator.

The invention consists principally of a type-bar mounted to swing and formed at its fulcrum end with teeth engaged by a toothed rack fitted to slide and actuated from the corresponding key.

The invention also consists of certain parts and details and combinations of the same, as will be fully described hereinafter and then pointed out in the claims.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the figures.

Figure 1 is a vertical section through the middle of a type-writing machine, showing my improved type-action, the type-bar being in the normal position. Fig. 2 is a similar view of a portion of the same mechanism, the type-bar being seen in the striking position. Fig. 3 is an enlarged side view of one of the type-bars. Fig. 4 is a like view of the rack for moving the type-bar, and Fig. 5 is an enlarged side view of a part of the key-lever. Fig. 6 is a front sectional elevation taken just forward of the casing or segment C.

The improved type-writing machine is mounted on a suitably-constructed frame A, supporting a pivot B′ for the several parallel key-levers or keys B, arranged horizontally one alongside the other and each provided at its forward end with a finger-piece B^2, adapted to be pressed by the operator, each key being held normally in an uppermost position by a suitable spring B^3. (See Fig. 1.)

The rear or fulcrum end of each key B is provided with an upwardly-extending fork B^4, the middle portion B^5 of which passes loosely through a transverse slot C′, formed in the segmental basket or casing C, forming guideways for the type-bars D, the latter swinging from a pivot C^3, held in the vertically-arranged segment basket or casing C. The arms or upwardly-extending portions B^4 vary in length and are of gradually-increasing length from the center of the system outwardly in both directions.

The guideways in the casing C are arranged radially, so that the several bars D of the curved system swing with their types D′ upwardly and rearwardly to a common point to make the impression, as hereinafter more fully described.

On the outer end of each bar D is arranged an inking device E for supplying the necessary ink to the type D′ previous to making the impression. This device E is hereinafter more fully described in detail.

The fulcrum end of each type-bar D is made in the shape of a hook D^2, hooking onto the pivot-pin C^2 and formed at its periphery with a series of teeth D^3 D^4 D^5, irregular in shape, as indicated in Fig. 3. The said teeth of the type-bar D are adapted to be engaged by correspondingly-shaped teeth F′, F^2, and F^3, formed on the top of a rack F, fitted to slide in the upper portion of the transverse slot C′, the ends of the said rack F being engaged by the vertical members B^6 of the fork B^4, while the bottom of the rack rides on the segmental top surface B^7 of the middle portion B^5 of the fork, as plainly indicated in Figs. 1 and 2.

When the key B is in a normal uppermost position, as shown in Fig. 1, then the corresponding type-bar D extends horizontally with the teeth D^3 and F′ in mesh and with the flat under side of the tooth D^3 resting on the flat top surface F^4 of the rack F. The type-bar D also rests with its under side on a bearing-ring C^4, held on the front of the casing C, so as to support the said type-bar in a horizontal position, as will be readily understood by reference to Fig. 1.

It will be seen that the key-levers or bell-cranks B extend rearwardly beneath the type-bars D, the latter being horizontally arranged

and striking rearwardly. The finger keys or pieces B^2 are arranged in front of the type-bars. The upper ends of the upwardly-extending portions B^4 of the bell-cranks extend to points in proximity to the toothed hubs of the type-bars, and the racks F being loosely engaged or placed between the said hubs and said upper ends of the lever devices B^4. Now when the key B is pressed then the fork B^4 swings forward and by the rear member B^6 of the fork causes a forward shifting of the rack F, so that the tooth F′ by engaging the tooth D^3 imparts a swinging motion to the type-bar D, and then the next following teeth of the rack F move in engagement with the respective teeth D^4 D^5 on the type-bar D, so that the latter swings into a vertical position to finally make with its type D′ an impression on the paper held on the impression-roller G.

When the type-bar moves into an uppermost position, as shown in Fig. 2, then the segmental part D^6 on the fulcrum end of said type-bar moves into a corresponding notch F^5 on the rack F, so as to prevent further swinging of the said type-bar D. Thus the latter, both in its lowermost and uppermost position, is prevented from moving forward by the special construction of the fulcrum and of the type-bar and that of the rack F, as above described.

The engaging teeth F′ F^2 F^3 and D^3, D^4, and D^5 are made irregular in shape, so as to insure a proper pull on the fulcrum end of the type-bar when the key B is pressed and at the same time afford sufficient freedom between the contacting teeth to insure a proper swinging of the type-bar D without danger of its sticking in the guideways C^3 of the basket or casing C.

When the impression is made and the operator releases the pressure on the finger-piece B^2 of the key B, then the spring B^3 causes an upward and return movement of the key, so that the front member B^6 of the fork B^4 in swinging rearward shifts the rack F back to its previous position, and in doing so the teeth F^3, F^2, and F′ by engaging with the teeth D^5, D^4, and D^3 cause a return movement of the type-bar D, so that the latter swings back into its normal position. (Shown in Fig. 1.)

The downward movement of the type-bar D is aided by the weight of the latter; but it is evident that both the upward-swinging as well as the downward movement of the type-bar is fully controlled by the rack F, which is moved laterally forward and backward by the action of the key B. Thus the operator in pressing and releasing the key B has full control of the movement of the type-bar to insure an accurate and proper impression of the type D′ on the paper held on the impression-roller G.

The basket or casing C is formed on an arc of a circle, and the slots C′ for the sliding racks are in radial planes from the striking position on the front of the platen. The bell-cranks B^4 on the inner ends of the key-levers are accordingly bent toward the middle of the machine more and more as their position changes from the middle to the sides, so as to allow the planes of the racks to coincide with the planes of the radial type-bars.

The inking device E for each of the type-bars D is provided with a block E′, secured on the free end of a spring E^2, fastened to the under side of the type-bar, as plainly shown in the drawings. In the block E′ is arranged an inking-pad E^3, extending under a foot E^4, integral with and projecting from the block E′, so as to bring the pad E^3 directly over the type D′, and thus supply the latter with the ink for printing.

By reference to Figs. 2 and 3 it will be seen that the upper end of the block E′ extends a suitable distance beyond the face of the type D′, so that when the type-bar is swung upward then the upper end of the said block strikes the impression-roller G, so that the block E′ is caused to swing rearward with the spring E^2 as the fulcrum and move the pad E^3 from the type D′ to permit the latter to pass on to the paper to make the impression.

As soon as the type-bar D swings downward then the spring E^2 in moving back to its normal position brings the block E′ again to its former place, with the pad E^3 moving back onto the type D′ to again supply the latter with ink. It will be seen that in this form of my invention the roller or platen G serves as a common intercepting device for automatically arresting the inkers and separating them from their respective types as the latter successively complete their printing strokes. The pad E^3 remains in contact with the type D′ during a considerable portion of the stroke of the latter, thus insuring a full supply of ink to the type and a good impression thereof upon the paper.

The pad E^3 is kept moist with ink in any suitable manner. The impression-roller G is mounted to turn on a fixed shaft H′, forming an integral part of the carriage H, fitted to slide longitudinally in the frame A, the latter being provided for this purpose near its upper end with a rail A′, on which travel the grooved wheels H^2, journaled in the shaft H′.

The bottom of the carriage H is provided with downwardly-extending pins H^3, straddling a rod A^2, forming part of the frame A, so as to prevent the carriage from swinging transversely, but permitting the same to move longitudinally, the carriage being suspended on the rail A′, as above described.

On the lower part of the carriage H is secured the escapement-rack I, engaged by the escapement-pawl I′, mounted in the usual manner in the frame J, fulcrumed on the base of the frame A and connected by a link J′ with a longitudinally-extending lever J^2, made U-shaped and having its middle portion resting on top of the keys B, so that when one of

the latter is pressed a swinging motion is given to the frame J to permit the pawl I′ to release the rack I for shifting the impression-roller G from the right to the left on the return movement of the key B. The free lower ends of this U-shaped lever or bail J^2 may be pivoted upon the end portions of the key-lever fulcrum-rod B′, as shown in Fig. 6. As the construction of the escapement and the mode of its operation are the same as that of the ordinary type-writing machines, further description of the same is not deemed necessary.

A suitable guard R is secured to the carriage H, it being understood that the paper is passed around the front of the impression-roller G, which may be rotated by gear G′ and pinion O to produce a line-space movement of the paper.

Having described my invention, I claim—

1. In a front-strike writing-machine, the combination of a curved system of upwardly and rearwardly striking type-bars, and a system of parallel levers having keys at their forward ends and upwardly-extending arms of gradually-increasing length from the center of the system outwardly in both directions formed or fixed upon their rear pivoted ends, the upper ends of said arms being operatively connected to the type-bars.

2. In a front-strike writing-machine, the combination of a system of upwardly and rearwardly striking type-bars, a system of parallel levers extending rearwardly from the keyboard beneath said type-bars, and pivoted at their rear portions, and a series of upwardly-extending arms fixed or formed upon said levers, the upper free ends of said arms being bent and operatively connected to said type-bars.

3. In a front-strike writing-machine, the combination of a system of rearwardly-striking type-bars, and a system of pivoted bell-cranks comprising members extending forwardly from said pivots and members extending upwardly from said pivots, said upwardly-extending members having gears for engagement with said type-bars, and said forwardly-extending members having finger-keys.

4. In a front-strike writing-machine, the combination of a system of upwardly and rearwardly striking type-bars mounted in a vertically-arranged segment, a system of upright levers of varying lengths pivoted at their lower ends beneath said type-bars and carrying devices at their upper ends which engage said type-bars, and a system of forwardly-extending parallel key-bearing arms operatively connected to said levers.

5. In a front-strike writing-machine, the combination of a system of rearwardly-striking type-bars and a series of bell-cranks having a common fulcrum-rod, said bell-cranks comprising members extending forwardly and other members extending upwardly from said fulcrum-rod, said forwardly-extending members having keys at their front ends and said upwardly-extending members carrying devices for engaging said type-bars.

6. In a front-strike writing-machine, the combination of a series of rearwardly-swinging type-bars having toothed hubs, and a series of bell-cranks branching upwardly and forwardly from their pivots, the upper ends of said bell-cranks carrying gears for engaging said type-bar hubs and the forward ends of said bell-cranks being provided with finger-keys.

7. In a front-strike writing-machine, the combination of a bell-crank bearing at its forward end a key, a swinging type-bar, and a segment having a radial slot in which said type-bar is mounted, the upper end of said bell-crank working in said radial slot and being operatively connected to said type-bar, substantially as set forth.

8. In a front-strike writing-machine, the combination of a segment provided with a series of radial slots, a series of forwardly-extending type-bars having toothed hubs which work in said slots, a series of racks constructed to slide forwardly and rearwardly in said slots and engaging said toothed hubs, a series of finger-keys, and connections from said keys to said racks.

9. In a front-strike writing-machine, the combination of a series of rearwardly-striking radial type-bars having toothed hubs, a series of sliding racks engaging the hubs, and a series of bell-cranks comprising both horizontal members which extend forwardly below the type-bars and carry finger-pieces, and also upwardly-extending members which at their upper ends directly engage said racks.

10. In a front-strike writing-machine, the combination of a series of radially-arranged rearwardly-striking type-bars having toothed hubs, a series of horizontally-sliding racks engaging said hubs, a series of upright levers, as B^4, arranged below said racks and engaging therewith, a series of finger-keys, as B^2, arranged forwardly of said type-bars, and connections from said finger-keys to said upright levers.

11. In a front-strike writing-machine, the combination of a series of radially-arranged rearwardly-striking type-bars having toothed hubs, a series of sliding racks engaging said hubs, a series of upright levers, as B^4, arranged below said racks and engaging therewith, the upper portions of said levers being bent laterally toward the middle of the machine so that the planes of the upper ends of the levers may substantially coincide with the planes of the radial type-bars, a series of finger-keys, as B^2, arranged forwardly of said type-bars, and connections from said finger-keys to said upright levers.

12. A type-writing machine provided with a type-bar, and an inking device substantially as described, directly carried by the

said type-bar and constructed to remain in contact with the type during a portion of the type-bar stroke, as set forth.

13. A type-writing machine, provided with a type-bar, and an inking device held on the type end of the said bar, the said inking device comprising a spring attached to the type-bar, a block carried by the spring, an inking-pad carried by the block, and a foot on which extends a portion of the said pad, substantially as shown and described.

14. In a type-writing machine, the combination with an impression-roller of a type-bar adapted to swing to and from the said impression-roller, and an inking device carried by the said type-bar and normally in engagement with the type on the type-bar, the said inking device being thrown off the type on the bar as the bar moves into an uppermost position, by the inking device striking the said roller, substantially as shown and described.

15. A type-writing machine, comprising type-bars mounted to swing and formed at their fulcrum ends with teeth, a segmental casing formed with radial slots, being guideways for the said type-bars, racks fitted to slide loosely in the said casing and in mesh with the teeth on the said type-bars, and keys mounted to swing and each formed with a fork loosely engaging a corresponding rack so as to shift the latter laterally in the said casing to actuate the type-bars, substantially as shown and described.

16. A type-writing machine provided with a type-bar mounted to swing and formed at its fulcrumed end with teeth, a toothed rack fitted to slide and in mesh with the said teeth, and a key mounted to swing and formed with a fork, the end members of which engage the ends of the said rack, to shift the latter forward and backward to actuate the type-bar both for its up and down movement, substantially as shown and described.

17. In a type-writing machine, the combination of type-bar D, sliding rack F engaged thereto, and a pivoted lever B^4 having a segmental or a convex surface B^7 which contacts with said rack, and also having means for effecting a sliding movement of said rack.

18. A type-writing machine provided with a type-bar mounted to swing and formed at its fulcrum end with teeth, a toothed rack in mesh with said teeth, and a key mounted to swing and formed with a fork, the end members of which engage the ends of the rack, and the segmental bottom of the fork engages the under side of the rack, substantially as shown and described.

19. In a type-writing machine, the combination of a swinging type-bar having a toothed hub, a segment having a radial slot in which said type-bar hub works, a key-operated lever one of whose ends is arranged in proximity to said hub, and a rack placed loosely between said type-bar hub and said end of said lever.

20. In a type-writing machine, the combination of a swinging type-bar having a toothed hub, a segment having a radial slot in which said type-bar hub works, a key-operated lever one of whose ends works in said slot, and a rack loosely placed in said slot between said type-bar hub and said end of said lever.

21. A type-writing machine provided with a type-bar having a hook-shaped end and formed with teeth on the periphery of the hook member thereof, a rack having its teeth at the middle of its length and provided with a recess in its inner end adjacent to the teeth, the outer end of the rack being plain, and means for operating the rack, substantially as described.

22. A type-writing machine provided with a type-bar mounted to swing and formed with teeth on its fulcrumed end, a key provided with an upwardly-extending fork at its inner end, and a rack held within the fork of the key and in mesh with the teeth of the type-bar, substantially as described.

23. A type-writing machine having an inking device on the outer end of each of its type-bars, substantially as described.

24. In a type-writing machine a type-bar provided with an inking device yieldingly supported on its outer end, substantially as described.

25. In a type-writing machine, a key provided with an upwardly-projecting member having a forked end, the portion of the fork between its members being convex, in combination with a rack held within the fork of the key, and a type-bar provided with teeth meshing with the said rack-bar, substantially as described.

26. In a front-strike writing-machine, the combination of a series of rearwardly-striking radial pivotal type-bars, a series of upwardly-extending operating-levers pivoted below the hubs of said type-bars, and a series of racks engaging said type-bar hubs and loosely connected to said levers.

27. In a type-writing machine, the combination of a series of type-bars, an inking device arranged upon each type-bar and normally in contact with the type thereon, and a common intercepting device for separating said inking devices from said types, when the latter are making their printing strokes, substantially as set forth.

28. In a type-writing machine, the combination of a type-bar, an inking-pad, a spring tending to hold said pad in contact with the type upon said bar, and means for separating said pad from said type during the printing stroke of the latter, substantially as set forth.

29. In a type-writing machine, the combination of a type-bar, a spring mounted thereon, an inking-pad carried by said spring, and means for separating said pad from said type during the printing stroke of the latter, substantially as set forth.

30. In a front-strike writing-machine, the

combination of a series of type-bars, and a series of key-bearing bell-cranks fulcrumed at their rear portions and connected at their upper free ends to said type-bars, the upper portions of said bell-cranks being bent inwardly toward the middle of the machine.

Signed at Jerome, in the county of Yavapai and Territory of Arizona, this 25th day of October, A. D. 1899.

PETER F. NILSON.

Witnesses:
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ROBT. B. BAUMER.