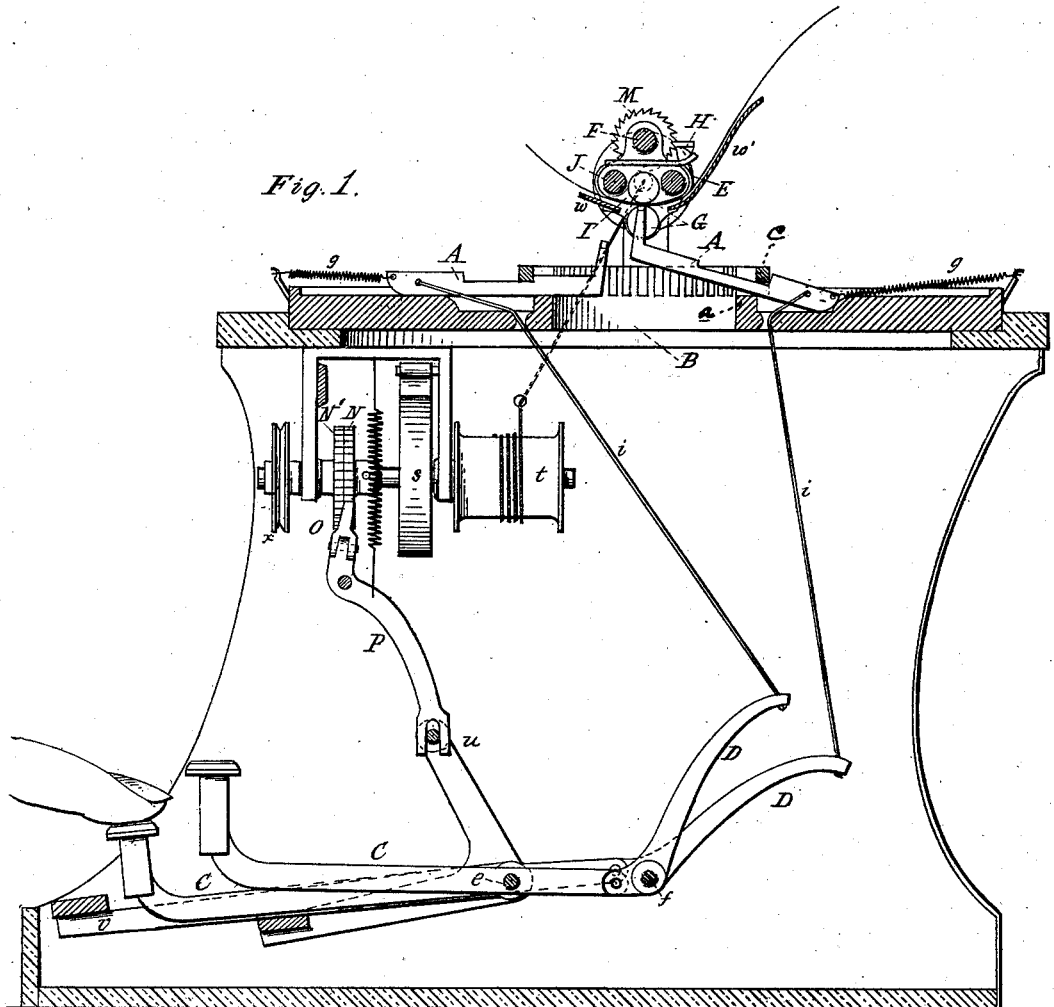


F. SHOLES & W. F. MILLER.
Type-Writing Machine.

No. 216,232.

Patented June 3, 1879.



Attest:

Chas. M. Higgins.
John B. Gavin

Inventors:

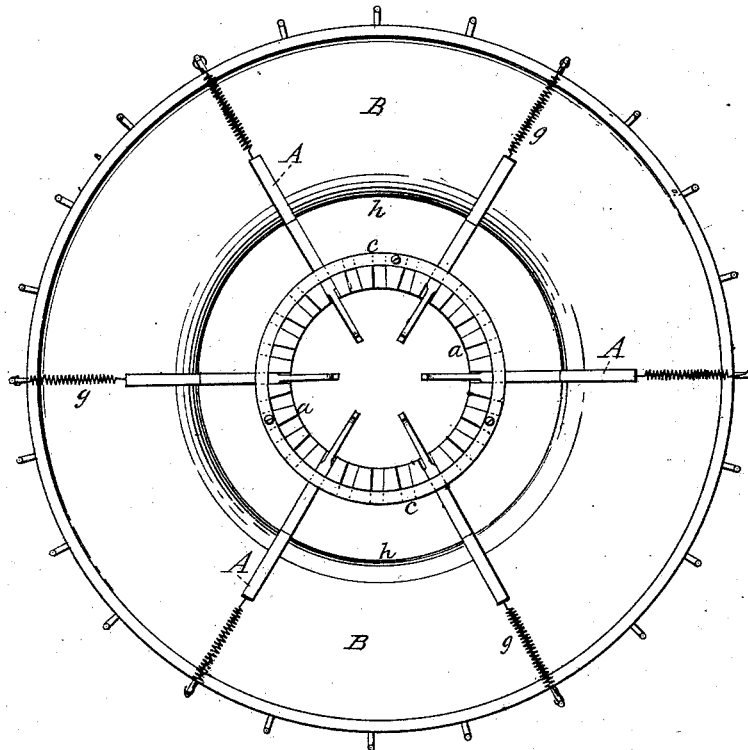
Frederick Sholes
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Fig. 2.



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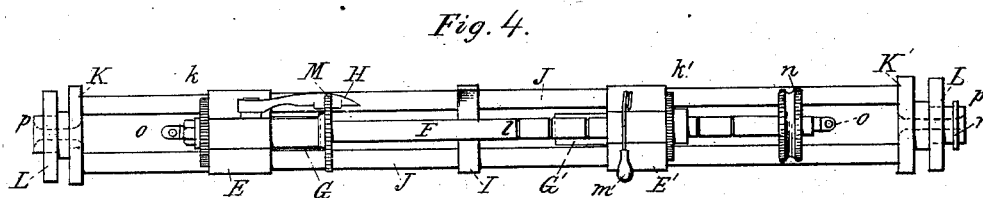
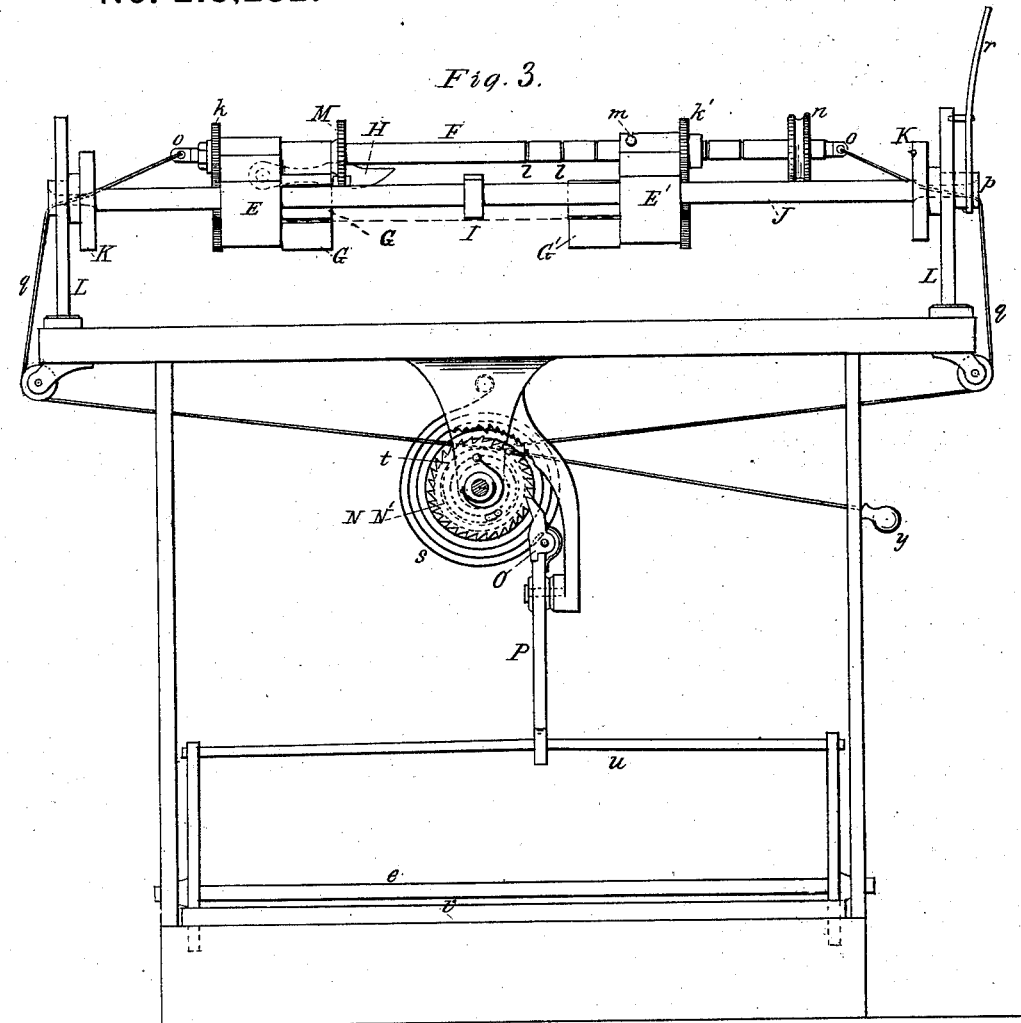
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UNITED STATES PATENT OFFICE.

FREDERICK SHOLES AND WILLIAM F. MILLER, OF NEW YORK, N. Y.

IMPROVEMENT IN TYPE-WRITING MACHINES.

Specification forming part of Letters Patent No. **216,232**, dated June 3, 1879; application filed February 11, 1879.

To all whom it may concern:

Be it known that we, FREDERICK SHOLES and WILLIAM F. MILLER, both of the city, county, and State of New York, have invented certain new and useful Improvements in Type-Writers, of which the following is a specification.

The present improvements aim to simplify and cheapen the mechanism of type-writers, and they have relation to the keys, the type-arms, the feed mechanism, and especially to the carriage, all of which embody novel constructions, as hereinafter fully set forth.

The drawings annexed present, in Figure 1, a central vertical section of the machine, the two type-arms on the plane of the section only being shown, with one key depressed and the corresponding type raised into the printing position. Fig. 2 is a plan view of the type-arms and their supporting-disk removed from the machine, a few only of the type-arms being shown in position. Fig. 3 is a front elevation of the machine, showing the carriage, the feed mechanism, and the spacing or feed bar, the keys and type-disk being removed for greater clearness. Fig. 4 is a plan view of the carriage removed.

One of the most novel features of our invention lies in the formation and arrangement of the type-arms. These, as shown best in Fig. 2, are mounted on a horizontal circular disk, B, the type-arms A A being arranged radially thereon in the same plane, like the spokes of a wheel.

The disk is formed with a central opening, as shown, over which the carriage is centrally arranged, as shown in Fig. 1, to receive the printing action of the type, which play through the said opening with a successive sliding and tilting movement. The opening is surrounded with a raised ring or annular hub, *a*, which is provided with a series of narrow radial slots, through which the inner ends of the type-arms slide, a removable ring, *c*, being fastened over the arms to retain them in proper position.

The bottom of the slots in the hub of the disk is level with the general or outer surface of the disk, as shown, and the lower edge of the type-arm, which is smooth and level, rests horizontally thereon when in repose, being free to slide back or forth.

Springs *g*, attached at opposite ends to the periphery of the disk and to the outer ends of the type-arms, serve to keep the type-arms constantly drawn out into a position of repose, while the ends of a recess in the upper edge of the arms, by striking against the ring *c* of the hub, form stops to limit the inward and outward movement of the arms, as shown in Fig. 1. The inner end of the type-arm is bent upwardly, as shown, at nearly a right angle, and the bent extremity is fitted with the type. The outer end of the arm has its under corner rounded off on a convex curve, which corresponds with the convex margin or periphery of the annular recess *h* surrounding the hub of the disk, and over and into which the arms slide, as shown in Figs. 1 and 2.

The type-arms are operatively connected with the keys, as usual, by flexible cords or fine wires *i i*, which pass through smooth perforations in the hub of the type-disk, and connect with the outer ends of the arms, as shown in Fig. 1.

It will now be seen that when the key is depressed the corresponding type-arm will be first slid inward with a horizontal radial movement, and as its outer end falls into the annular recess *h* the type end will finally tilt upward through the central opening of the disk into the correct printing position, as shown on the right of Fig. 1. This construction and arrangement of the type-arms thus accomplishes perfectly the desired action, causing all the types to strike at the same center, and it is of such a nature as can be constructed more cheaply than existing mechanism. It embodies a less number of parts, and is quick and easy in its movements.

The keys are also of novel form, adapted to the peculiar formation of type mechanism as shown in Fig. 1, the key consisting of two coupled or compound levers. The key proper is indicated by C, being a lever of the first kind, pivoted on the same axis, *e*, on which the spacing-bar *v* is mounted, while the short arm of the key-lever pivots to the short arm of an elbow-lever, D, pivoted on a separate axis, *f*, and having a long upwardly-curved arm, to which the type-cord is fastened, as shown. This form of key mechanism imparts, by the depression of the key, an ample and

quick movement to the type-arms, as their nature requires.

Important features of our invention are embodied in the construction of the carriage, which is shown more fully in Figs. 3 and 4. The carriage is mounted centrally over the type-disk, as shown in Fig. 1, and it is capable of the usual traversing movement back and forth over the same, being connected by cords with the winding-drum of the feed mechanism, as shown in Fig. 3. The carriage is mounted to swing on an axis which is central with its mass, or nearly so, and is disposed diametrically over the type-disk, as shown best in Fig. 1. The carriage proper consists of two sliding heads or stocks, *E E'*, which are fitted to slide on and between the guide rods or tracks *J J*, and each of which carries a pair of small feed-rollers, *G G'*, which project a short distance from the inner faces thereof. These rollers are geared together, as shown in Fig. 3, and each pair is coupled to act in unison by the connecting-gear shaft *F*, on which the stocks are also mounted, and which is fitted with the gear-wheels *k k'*, which mesh with the gears of the rollers, as shown. The stocks are relatively adjustable toward each other to suit any width of paper, the gear-shaft *F* being provided with a series of grooves, *l*, into which a spring-catch, *m*, on one of the stocks takes to maintain the desired adjustment.

The guide-rods *J*, on which the carriage slides, are fixed at each end to disks *K K'*, which are formed with hollow journals *b*, on which the carriage and its guides are thus mounted, as shown, in the upright bearings *L*, fixed on the top of the machine and diametrically on each side of the type-disk. The carriage is thus pivoted on the line of its own axis and centrally arranged over the type-disk, so that by means of a lever or handle, *r*, projecting from one of the journals, the carriage and its guides may be turned or tilted over to throw the under side in front, and thus enable the operator to observe the written line when desired, which, by this construction, as may be observed, is accomplished with great ease and convenience.

The guide-rods *J* are rigidly connected at the center by a fixed cross-bar, *I*, which comes directly over the center of the type-disk, and forms the contact bar or anvil against which the pressure of the type is received, as shown in Fig. 1, the paper passing under the same, as shown by full lines in Fig. 1 and by a dotted line in Fig. 3.

The feed-rollers are adapted to grasp the margin of the paper upon opposite sides, the paper being guided to and from the gripe of the rollers by flanges or plates *w w'*. (Shown in Fig. 1, but removed from Figs. 3 and 4.) An intermittent movement is imparted automatically to the rollers at each traverse of the carriage to feed the paper forward the proper space for the successive lines of writing. This feed-movement is imparted by means of the

gear-shaft *F*, which is fitted with a ratchet-wheel, *M*, into which a pawl, *H*, pivoted to one of the stocks, engages. The end of this pawl is formed with an inclined or cam surface, and is just in line with the fixed cross-bar *I*, which is formed with a corresponding incline or cam surface, as indicated in Figs. 4, 3, and 1.

It will be readily seen that when the carriage reaches the end of its return traverse the pawl will be raised by contact with the cross-bar *I*, thus partly rotating the ratchet and imparting the necessary feed-movement to the rollers, which, as will be seen, is effected automatically by the movement of the carriage.

The gear-shaft *F* is also fitted with a milled knob, *n*, by which the feed-rolls may be operated by the hand to feed in the paper to the proper position, or to make other adjustments thereof, as shown in Fig. 3.

It will be observed that this form of carriage is quite compact, light, and simple, and very convenient.

Each end of the gear-shaft of the carriage is fitted with a swiveled eye, *o*, to which the end of the feed-cord *q* is fastened, the cord extending therefrom through the bore of the hollow journals *p*, and thence over guide-pulleys to the winding-drum *t* of the feed mechanism, as shown best in Figs. 1 and 3.

The shaft of the feed-drum is provided, as usual, with a strong coiled spring, *s*, by which it is impelled, a pull, *y*, connecting with the winding-drum, being employed to rewind the spring and effect at the same time the return or back movement of the carriage, as will be understood.

The feed-escapement, which allows of the force of the spring being transmitted in intermittent impulses to the carriage, consists of two similar ratchet-wheels, *N N'*, mounted on the shaft of the feed-drum and engaged by a vibrating pawl, *O*. One of these ratchet-wheels is keyed immovably to the shaft, while the other ratchet, *N'*, is capable of a play thereon equal to one tooth, and is restrained from further relative movement by a pin projecting from one of the wheels into a short slot in the other, as shown in Fig. 3, while a spring tends to keep the loose wheel constantly turned in the direction of revolution to take up the play. The pawl *O* vibrates across the peripheries of the two ratchets, its face being equal only to the face of one of the ratchets, so that a vibration of the pawl back and forth from one ratchet to the other allows the escape of one tooth at a time, thus imparting the necessary intermittent impulses to the carriage, as will be readily understood.

The pawl *O* is carried on the short arm of a vertically-arranged lever, *P*, which is actuated at the end of its long arm by the cross-rod *u*, connecting the two arms of the spacing-bar, as shown in Figs. 1 and 3, the end of the lever being forked to straddle the bar, as shown.

The advantage of this form of feed mechanism over the usual rack and double-pawl ar-

rangent is that it is more compact, and may be disposed at any convenient position within the casing of the machine, while its action may be transmitted to the carriage in any direction through the cords *g*.

The ink-ribbon, which is not shown, is arranged in about the usual position, and may be driven by a cord from the wheel *x* on the feed-shaft.

The advantages of these combined features of construction are that, while they render the action of the machine simple and effective, they involve a less complicated and a cheaper construction, so that our improved machine will contain one-third the number of parts less than the present machines.

What we claim as our invention is—

1. A type-writer formed with a radial series of type-arms arranged in the same plane, or proximately so, and organized by means of mechanism, substantially as herein set forth, to effect the printing action by a successive inwardly-sliding and an upwardly-tilting movement, substantially as shown and described.

2. The combination, with a radial series of type-arms arranged in the same plane, or nearly so, of the supporting disk or plate *B*, provided at its center with guides for the type-arms and with a surrounding annular recess, which effects the upward tilting movement of the arms when slid over and into the same, substantially as shown and described.

3. In a type-writer, a feed-escapement controlling the movement of the carriage formed of the combination, with a spring-impelled winding-drum, of the double ratchet-wheels *N* *N'*, fixed on the shaft of the drum, one of which is capable of a limited play on the other, together with the scape-pawl *O*, arranged to vi-

brate from the periphery of one ratchet to the other, substantially as shown and described.

4. In a type-writer, a traversing carriage formed of two sliding heads or stocks, each carrying a pair of short feed-rollers adapted to feed the paper by a marginal grasp at opposite sides, and coupled to act in unison by a connecting-shaft, substantially as herein set forth.

5. In a type-writer, a traversing carriage fitted with feed-rollers geared to an impelling-shaft provided with a ratchet-wheel, in combination with an engaging feed-pawl having its free end arranged directly in the path of a fixed projection in the traverse of the carriage, whereby contact of the free end of the pawl with the said projection lifts the said pawl and imparts a feed-movement to the rollers, substantially as herein shown and described.

6. In a type-writer, a traversing carriage mounted on a guiding frame or track, which is provided with hollow journals arranged in fixed bearings, in combination with a winding feed-drum and connecting operating-cords extending from the said drum through the bore of the journals to the ends of the carriage, substantially as herein shown and described.

7. In a type-writer, a carriage formed of the combination, with the guides or frame *J J*, of the sliding heads *E E*, carrying feed-rollers, and the coupling-shaft *F*, on which the heads are relatively adjustable toward each other, substantially as herein shown and described.

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WILLIAM F. MILLER.

Witnesses:

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