(No Model.) 3 Sheets—Sheet 1.

E. HOWARD.

TYPE WRITING MACHINE.

No. 346,104. Patented July 27, 1886.

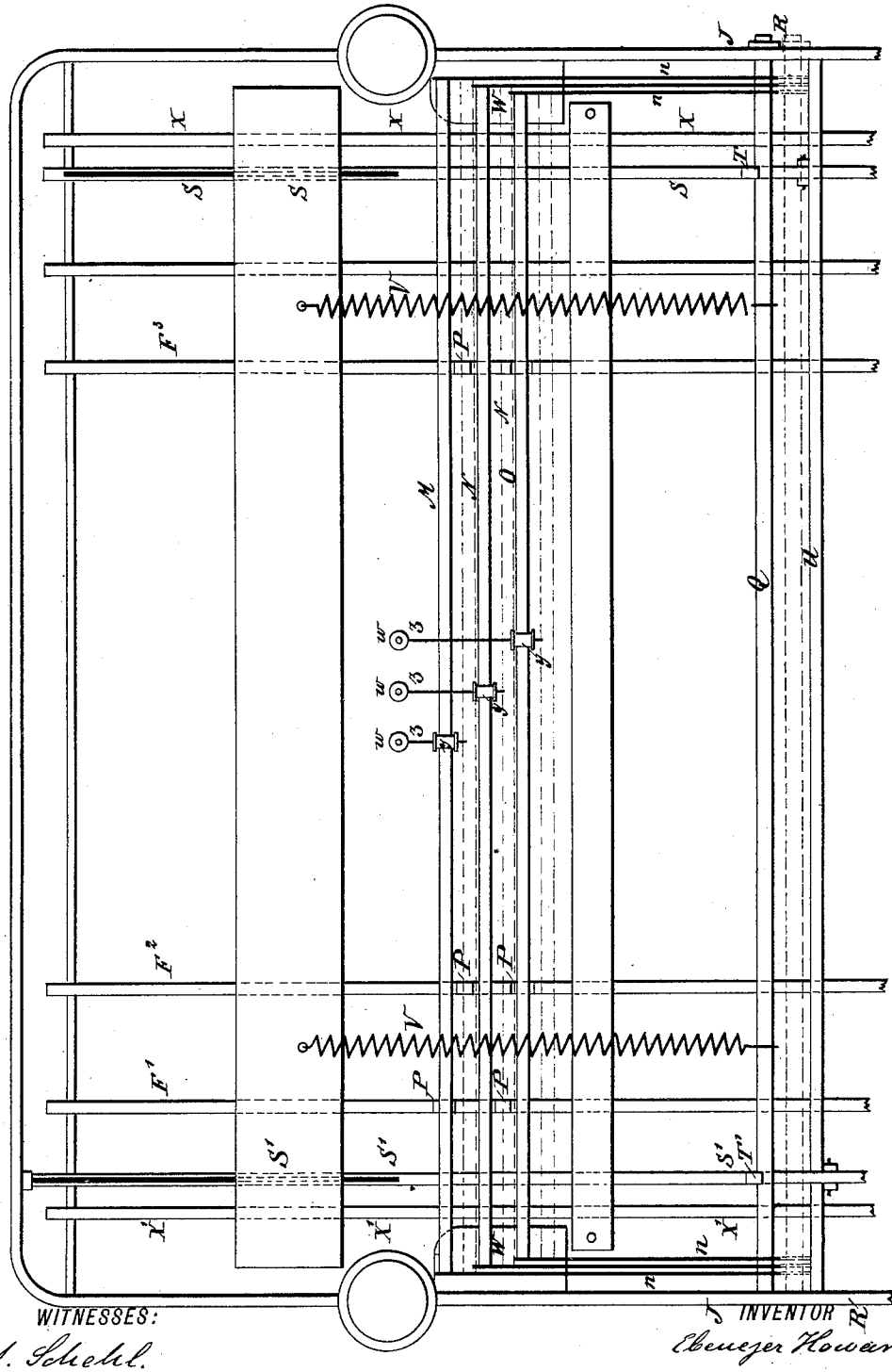


Fig. 1.

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(No Model.) 3 Sheets—Sheet 2.

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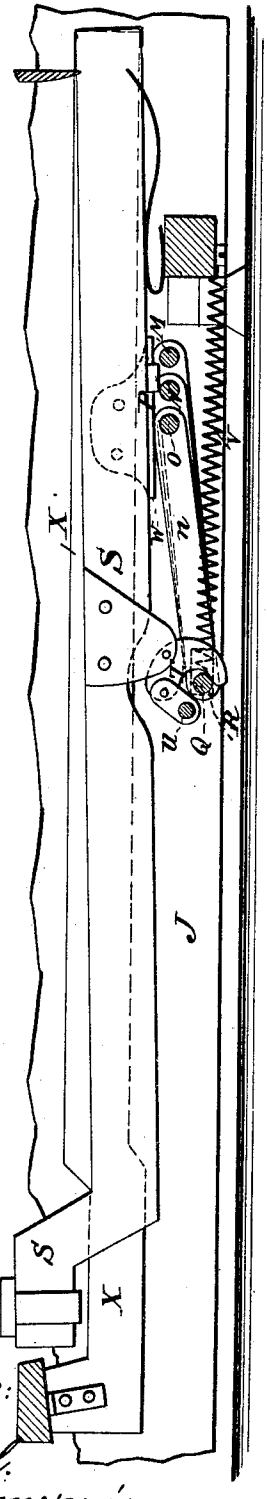


Fig: 3.

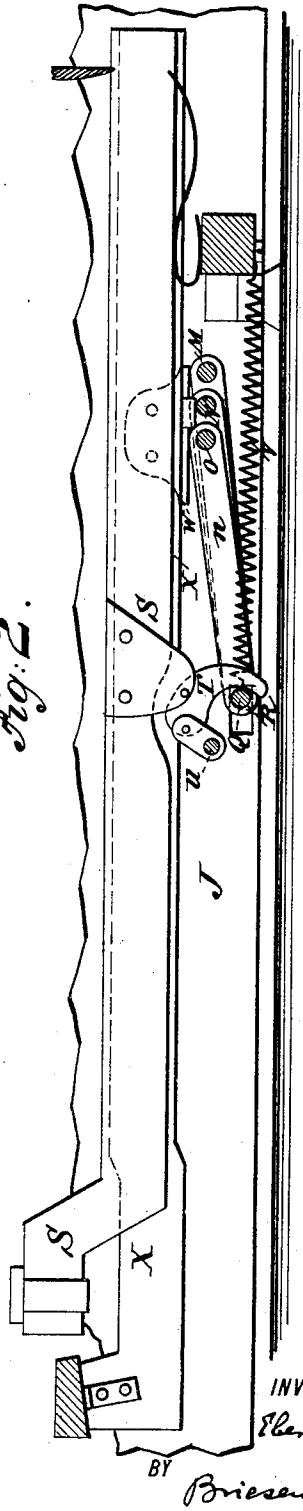


Fig: 2.

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(No Model.) 3 Sheets—Sheet 3.

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Fig: 5.

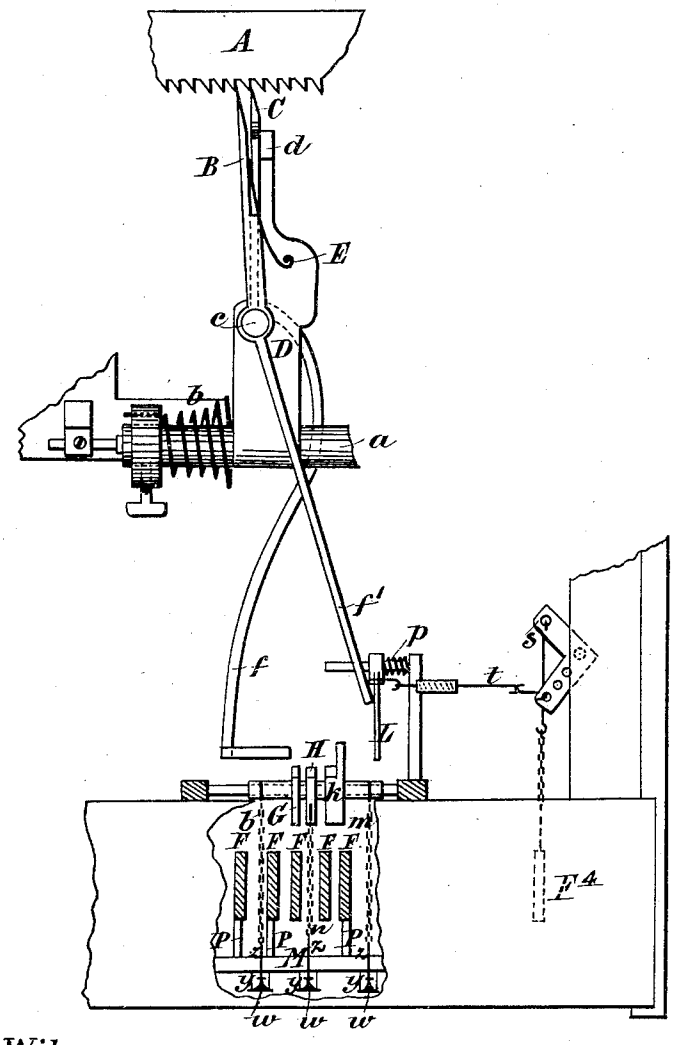
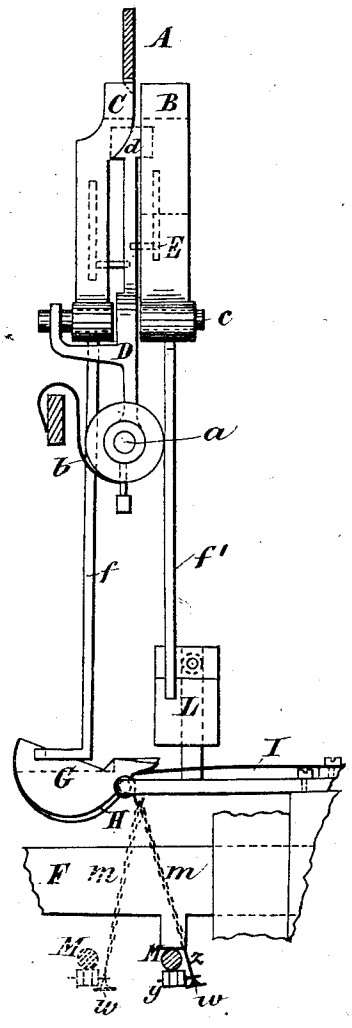


Fig: 4.



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UNITED STATES PATENT OFFICE.

EBENEZER HOWARD, OF LONDON, ENGLAND.

TYPE-WRITING MACHINE.

SPECIFICATION forming part of Letters Patent No. 346,104, dated July 27, 1886.

Application filed July 24, 1885. Serial No. 172,503. (No model.)

To all whom it may concern:

Be it known that I, EBENEZER HOWARD, a resident of London, England, have invented an Improved Type-Writing Machine, of which the following is a full, clear, and exact description, reference being made to the accompanying drawings.

The object of this invention is the further improvement of type-writing machines with reference to variable spacing. In a former application filed by me on the 8th day of October, 1884, Serial No. 144,979, I have described means whereby an extra movement was imparted to the carriage when the "upper-case" key was depressed. According to that invention the extra movement imparted was invariably the same. Thus, if small "n" caused two teeth and capital "N" caused three teeth of the rack to pass, then if small "m" caused three teeth capital "M" caused four teeth to pass. I now provide mechanism whereby when the upper-case key is depressed it does not necessarily occasion an increased movement of one tooth, and one tooth only, but may occasion in relation to one finger-key an increased movement of two or more teeth, and yet may occasion in relation to other finger keys a decreased movement of one or more teeth; or, further, the movement may be the same in the "upper" and "lower" case. In other words, the width of the letter in the upper case is not necessarily dependent upon the width of the lower-case letter. This arrangement possesses the great advantage of making it possible to use the existing key-board of the "Remington" or any other machine without change, (which would be inconvenient.) It enables such characters as small "l" and capital "L" to be printed with one and three teeth, respectively, instead of, as before, one and two, respectively, which was not in accordance with their proper width, and it permits of the wider compound characters, such as "the," being in the lower case, which assists greatly in rapidity of work.

The second improvement consists in causing the carriage to move one or more teeth on the depression of any of the finger-keys, a further movement, where required, taking place on the release of such key. Where a long movement is necessary, as in the case of compound characters, this is very useful, as preventing the sudden jerk and strain which would otherwise take place, besides insuring with more certainty that the movement of the carriage shall have been completed before another character is printed.

A third improvement provides for an additional key, which, when depressed, causes an extra space between every two letters, which is very useful where display is required. Such additional key may be held down, if desired, by any suitable catch.

The first-named improvement is effected in the following manner: I provide, as in my prior specification, (to which I pray reference,) a series of movable fingers, which serve to modify the play of the pivoted dog, and these fingers are, as therein described, brought into action by the movement of cross-bars placed underneath the key-levers, which bars are, as therein described, acted upon by protuberances upon the key-levers.

The improvement now about to be described will be rendered plain by reference to the drawings.

Figure 1 is a bottom view of the back part of a Remington type-writer with my improvements. Fig. 2 is a side view of the upper-case and space-bar keys with their connections. Fig. 3 is the same with the upper-case key depressed. Fig. 4 is a side view of the dogs and fingers, showing how the fingers are connected with the rods. Fig. 5 is a back view, partly in section, showing the dogs with the fingers for adjusting their distances from each other.

In Fig. 1, M N O are cross-bars, similar to those described in my prior specification, which are pivotally connected by their arms *n* to a rod, Q. This rod Q is capable of sliding in a slot, R, Figs. 1, 2, and 3, cut in the frame J of the machine, and as it slides it carries with it the series of cross-bars, so that they occupy the positions shown by the dotted lines in Fig. 1. (See also Figs. 2 and 3.) This motion is imparted to the rod Q whenever the upper-case key S is depressed. When such key S is depressed, a corresponding key-lever, S′, is (as in Remington No. 2 machine, where it is called "lower-case") raised; and I connect with these key-levers S and S′ two elbow-levers, T and T′, respectively, which are pivoted

to the rod U, which is fixed rigidly in the frame of the machine. These elbow-levers T and T′, whenever the upper-case key is depressed, move the rod Q into the position shown in dotted lines in Fig. 1 and by full lines in Fig. 3; and the said rod Q, when so moved, carries with it the series of cross-bars M N O into the positions shown in dotted lines in Fig. 1 and by full lines in Fig. 3. When the upper-case key is released, the springs V slide the cross-bars back into their normal position. It will now be seen that any of the key-levers F (of which keys only six are drawn, including the two space-bar levers X and X′, but of which there may be any number) may be made with a protuberance to act upon either of the cross-bars when such cross-bars are in their normal position, and with another protuberance to act upon any of the cross-bars in the positions shown in the dotted lines in Fig. 1. Thus the key-lever F′ may be made with a protuberance, P, over cross-bar M, and with another protuberance in such position that it will be over cross-bar N when that bar is in the position shown in dotted lines. Another key, F^2, may have a protuberance, P, over cross-bar O in its normal position, and over cross-bar M in the position shown in dotted lines; or, on the other hand, a key, F^3, may have no protuberance over either of the cross-bars when they are in their normal position, and yet when cross bar M is in the position shown by dotted lines it may be acted upon by the protuberance P. In other words, with three rods any one of four movements may be imparted to the carriage in the upper case, and also in the lower case, the degree of movement in the upper and in the lower case being quite independent. Ledges W are placed on the extremities of the cross-bars on either side of the machine, to prevent the cross-bars being drawn upward by the springs I, Fig. 4, when such bars are slid off the protuberances.

Figs. 2 and 3 are side views of the upper-case lever S. Fig. 2 shows the cross-bars in their normal position, and Fig. 3 shows them in the position they assume when the upper case key is depressed. It will be seen that the space-bar lever X is made with a single wide protuberance placed over cross-bar N. It therefore acts upon that cross-bar in both positions.

In order to prevent any movement of the fingers G H K, hereinafter referred to, when the lateral movement of the cross-bars takes place, consequent on the upper-case key being depressed, I connect the cross-bars to such fingers in the manner shown in Figs. 1, 4, and 5. Underneath and attached firmly to each cross-bar is a stud, *y*, which receives a pin, *z*. The pin *z* is furnished at one extremity with an eye, through which the connecting-chain *m*, with the finger, passes, and a suitable screw-nut, *w*, serves to adjust the height of the finger. It will be seen that if the rod M is moved into the position shown by the dotted lines, Fig. 4, the connecting-chain will occupy the position shown by the dotted lines at the left of that figure, and the result will be that no movement of the finger G there shown takes place, for the chain in the two positions forms, as it were, the two equal sides of an isosceles triangle.

For the purpose of the before-described improvement the dogs are precisely of the same character as those referred to in my former application; but to attain the second object above stated—namely, that of causing a movement of the carriage on the depression of a key, and before its release—I make the following change: The back dog, B, which before was rigid on its elbow, is now pivoted into the elbow-lever D by the pin *c*, Fig. 5. A spring, E, bears against the dog B; but the limit of separation from the stop *d* is felt by the foot *f′* in its contact with the movable stop L. The dog C, with its spring and its foot *f*, remains as in my former specification. At the period of rest the rack is held in the usual manner by the dog C, which is provided with the ordinary fixed stop, *d*, which serves as a stop for both the dogs B and C. On the depression of any key the dogs B and C are, in the usual manner, oscillated across the rack; but the dog B is not (as hitherto) in alignment with the dog C, but enters the rack, say one tooth farther forward of the dog C, as in Fig. 5. The dog B enters the rack before dog C leaves the same; but when, in the course of the oscillation, this latter motion takes place the dog B is at once drawn over by the main spring against the stop *d*. The dog C is of precisely the same character as described in my prior specification, and one or other of the fingers, of which three are shown in the drawings, are in a similar manner drawn up to regulate the play of such dog C.

In the drawings the finger K has two faces, and when no bar is depressed the thinner face is held normally in the position shown in Fig. 5, and causes a movement of three teeth, making, with the movement which has already taken place, four teeth. When finger G is drawn up, the lateral play of the dog C is prevented, and thus only one tooth is allowed to pass in the complete to-and-fro motion of the dogs. When the finger H is raised, the dog C lets fall one tooth, and when the finger K is drawn up and presents its thicker surface to contact with the foot *f* dog C lets fall two teeth.

The third improvement, that of causing, when required, an extra movement between every two letters, is effected by attaching an additional key, F^4, similar to the ordinary keys, to an elbow-lever, *s*, which connects by rods *t* with the movable finger L. When such key is depressed, the finger L is slid along on its pivot the desired distance, and on the release of such key a spring, *p*, returns the finger to its normal position.

It will now be obvious that this last-named improvement, instead of being superimposed

upon the first-named improvement, may be substituted for it. In other words, the horizontal bars may be, as in my prior specification, pivoted to rigid pivots, and the elbow-lever *s* may be connected with the upper-case key, causing one extra tooth to escape in the case of all capital letters. So used it affords an alternative method to that described in such prior specification. It will also be seen that the two last-named improvements may be used separately instead of conjointly. Thus, the finger or stop L may be rigid, and in such position as to cause a movement of, say, one tooth on the depression of a finger-key; or, on the other hand, the finger L may be so placed that only when it is slid on its pivot shall it have this effect. It will also be seen that the cross-bars may be connected with two keys. For example, an upper-case key and a key for figures, punctuation-marks, &c., and the two keys may be provided with elbow-levers, similar to T and T′, in such manner that on the depression of, say, the "figures" key the cross-bars shall be carried a greater distance than when the upper-case key is depressed, and the finger-keys may be made with additional protuberances to regulate the vertical movements of the cross-bars.

I claim—

1. A series of finger-keys, F, having sets of protuberances P and a series of cross-bars, M N O, placed thereunder and constructed, substantially as described, to be capable of moving in a horizontal plane on the depression of a special key or keys from under one set of protuberances into position under another set, in combination with the variable spacing mechanism and connections, substantially as described, between the latter and the cross-bars, so that each finger-key may actuate the variable spacing mechanism so as to cause, if required, two or more different degrees of movement.

2. In a type-writing machine, the combination of a rack, A, and pivoted dog C with a dog, B, which is also pivoted and provided with a spring, causing it to move in a direction opposite to the motion of the carriage, a prolongation, *f′*, and sliding stop L, for arresting the motion of the dog B and causing it to let fall one or more teeth on the depression of the finger-keys and before their release.

3. In a type-writing machine, the combination of a rack, A, and pivoted dog C with the dog B, which is also pivoted and provided with a spring, causing it to move in a direction opposite to the motion of the carriage, a prolongation, *f′*, and a sliding stop, L, connected by parts *t s* to any special key, substantially as described, so that when such special key is depressed the stop L is slid on its pivot and then on the depression, and before the release of any of the ordinary finger-keys the dog B lets fall one or more teeth.

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