2 Sheets—Sheet 1.

B. ARNOLD.

TYPE WRITING MACHINE.

No. 175,584. Patented April 4, 1876.

Fig. 1.

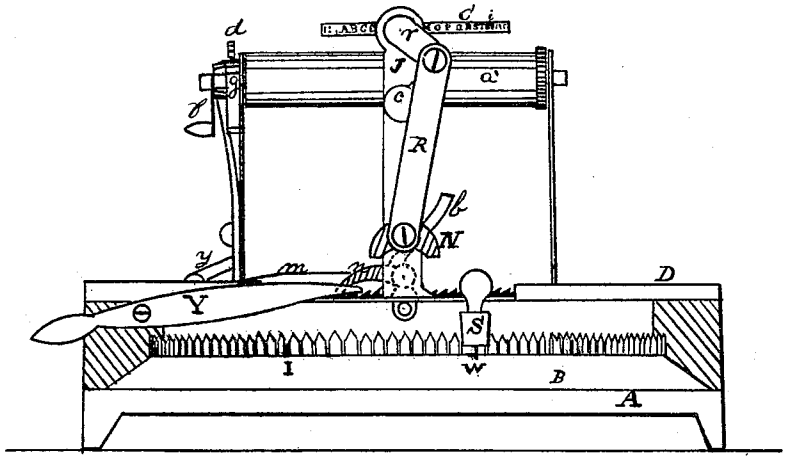
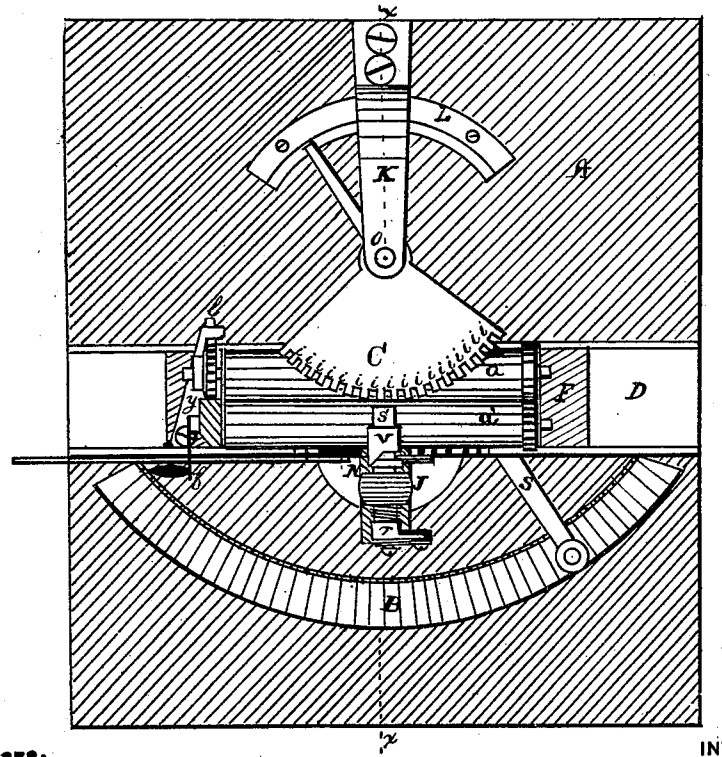


Fig. 2



WITNESSES:

James A. Arnold.

L. P. Arnold.

INVENTOR:

Benj. Arnold

2 Sheets—Sheet 2.

B. ARNOLD.

TYPE WRITING MACHINE.

No. 175,584. Patented April 4, 1876.

Fig. 3

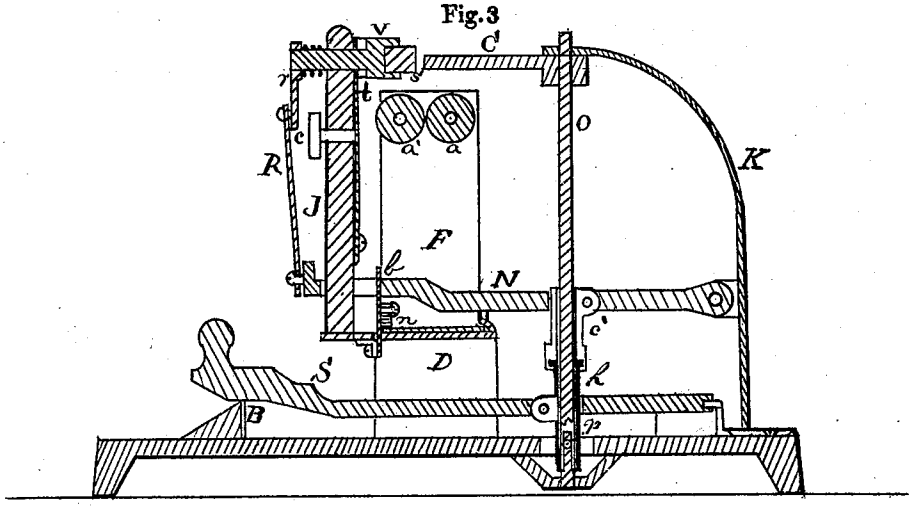
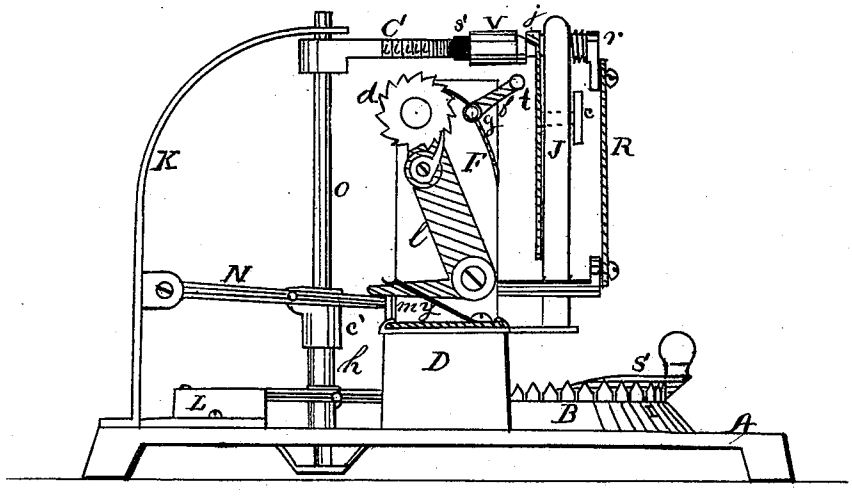


Fig. 4



WITNESSES:

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INVENTOR:

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UNITED STATES PATENT OFFICE.

BENJAMIN ARNOLD, OF EAST GREENWICH, RHODE ISLAND.

IMPROVEMENT IN TYPE-WRITING MACHINES.

Specification forming part of Letters Patent No. **175,584**, dated April 4, 1876; application filed October 15, 1875.

To all whom it may concern:

Be it known that I, BENJAMIN ARNOLD, of East Greenwich, in the county of Kent and State of Rhode Island, have invented certain Improvements in Typographers, of which the following is a specification:

This invention consists in a set of type arranged around a shaft controlled by a lever, that turns the shaft so as to present any one of the types or letters to the paper that is fed up between two rolls having a feed-motion endwise. A marker that is on the opposite side of the paper marks it by a downward movement of the lever that turns the shaft.

A plate in the form of a segment of a circle is in front of the rolls, with notches made in it, to correspond with the position of the type, so that when the lever is moved into a notch it will indicate what letter is presented before the marker. It also consists in certain feed-motions hereinafter explained.

Figure 1 is a front elevation. Fig. 2 shows a top view. Fig. 3 is a vertical section from front to back in line *x x*, Fig. 2. Fig. 4 is a view of left side of Fig. 1.

A is a bed or table, surmounted by a bridge, D, upon which the carriage F slides from one side to the other, and carries the feed-rolls *a a'*. An upright shaft, O, is held by the standard K back of the rolls, and the type or letters *i* are fastened or made on the plate C, which is fast to the shaft O.

A lever, S, pinned to a sleeve, *h*, sliding on the shaft, turns the shaft by means of a pin, *p*, passing through a slot in the sleeve. The back end of the lever S is notched onto a curved rim, L, which serves as a fulcrum for the lever, and allows it to swing around with the shaft O.

Another lever, N, also pinned to a sleeve, *c'*, which slides on the shaft O, but does not turn with it, is pivoted to the standard K, and moves the carriage F by the inclined lever *b*, pivoted to the bridge, a pawl, *n*, on the lever catching into ratchet-teeth on the carriage. The lever N also moves the marker *s* by the connecting-rod R. The two sleeves *c'* and *h* are connected together by a swivel-joint, that allows the lower one to turn with the shaft on which they slide, while the upper one does not, but is merely moved up and down by the lower one, to convey motion from one lever to the other.

A standard, J, holds in its upper end a short shaft, V, in the end of which is the marker *s*, which consists of a piece of type-metal, or other substance that will mark the paper by rubbing over a figure placed behind it. The marker is thrown forward against the paper by an incline or cam, *j*, on its shaft, and a corresponding one on a spring, *t*, through which the shaft passes. A set-screw, *c*, that bears against the spring *t*, increases or lessens the pressure upon the marker, as may be desired, and a light spring around the shaft V, between the standard and the arm *r*, draws the marker back from the paper.

The two rolls *a a'* are geared together, and are turned so as to feed the paper up between them by a knee-lever, *l*, see Fig. 4, working on a pivot in the end of the carriage, the lower end of the lever being pressed down by the spring *y* when it is not on the incline *m*. The upper arm of the lever carries a pawl, that catches into a ratchet-wheel, *d*, fast on one of the rolls. The pawl *g* catches into the same wheel and holds it from turning back.

A plate in the form of a segment of a circle, B, raised from the table, is notched to correspond with the letters on the plate C, and so placed that its center shall be at the shaft O, and letters marked under the notches to agree with those on the plate C.

The operation is as follows: The carriage F being at the right end of the bridge, the sheet of paper is fed up between the rolls by turning the crank *f* until it is above the plate C; then, by swinging the lever S, which is supposed to be raised, over the notch and letter on the circle B that is desired to print, the shaft O will be turned and the same letter on the plate C brought in front of the marker *s*. The lever is now pressed down into the notch. This draws down the lever N, and turns the marker by the connecting-rod R. The first part of the turning motion of the marker throws it forward against the paper by one of the inclines or cams before mentioned sliding upon the other; then the other part produces a rubbing motion of the marker on the paper over the type, so as to produce on the face of the paper a fac-simile of the letter

behind it. The lever S is now raised, pushing up the lever N. This moves the inclined lever *b* over to the left, and feeds the carriage in that direction the proper distance for the next letter by the pawl *n*, which was thrown back when the lever S was depressed. When a line is printed across the sheet by a succession of these motions, by pressing on the lever Y the pawl *n* will be raised, and the carriage may be pushed back to the right side again, and on its way the incline *m* will raise the lever *l*, and, by means of the pawl and ratchet-wheel *d*, turn the rolls and feed the paper up the proper distance for the next line of letters. To "justify" with regard to the different spaces required by different letters, the notches in the curved plate B are made more or less deep to alter the feed, and they (the notches or the letters on the plate C) are varied in distance between their centers. For instance, the letter "I," requiring less space, has its notch in the curved plate B made a little to the left, so that when the lever S is in that notch the center of the letter "I" on plate C shall be a little to the left of the center of the marker, so that it will be printed a little nearer the last letter; then, as the "I" notch is less in depth, the lever S will not go down so far, and the pawl *n* will not take back so many teeth in the ratchet, and when the lever S is raised the carriage F will not be moved so far for the next letter, so that it will be printed nearer to the "I;" or the "I" on the plate C may be placed to the left a little, instead of the notch in the curve B. For a wide letter, like "W," the notch in the curved plate B is made a little to the right, so that letter will be printed a little farther from the last letter, and the notch is also made a little deeper, so that the carriage F shall move a little farther for the next letter, and allow "W" more space on that side. This mode, only varied in degree, applies to the other letters.

The rolls *a a'* may be covered with rubber or other suitable substance to hold the paper securely, and two or more copies may be printed at the same time by putting two or more sheets of paper with sheets of carbonized or copying paper between them in the rolls. The front sheet, being printed by the marker, shows at any time up to the last letter, without stopping the work, what has been printed.

What I claim as my invention is—

1. In a type-writing machine, the feed-rolls *a a'*, in combination with the plate C and a marking device, the rolls being so placed as to feed the paper up to the type-plate and marker placed above them, substantially as and for the purpose set forth.

2. The letter-plate C, in combination with a marker that will color the paper without the intervention of any other substance, substantially as herein set forth, and for the purpose specified.

3. A marker working with a longitudinal reciprocating and a rotary reciprocating motion, in combination with type or raised letters, substantially as and for the purpose set forth.

4. The shaft V, pivoted with the cam *j*, in combination with the lever S, lever N, and connecting mechanism, substantially as and for the purpose specified.

5. The lever *b* and pawl *n*, in combination with lever N and carriage F, substantially as and for the purpose specified.

6. The adjusting-spring *t*, shaft V, screw *c*, and standard J, combined and operating substantially as specified.

7. In a type-writing machine, the notched curved plate B, with the spaces between the notches varying in width, according to the space required by the different letters represented by them, substantially as described, and for the purpose set forth.

BENJ. ARNOLD.

Witnesses:

H. A. ARNOLD,

L. P. ARNOLD.