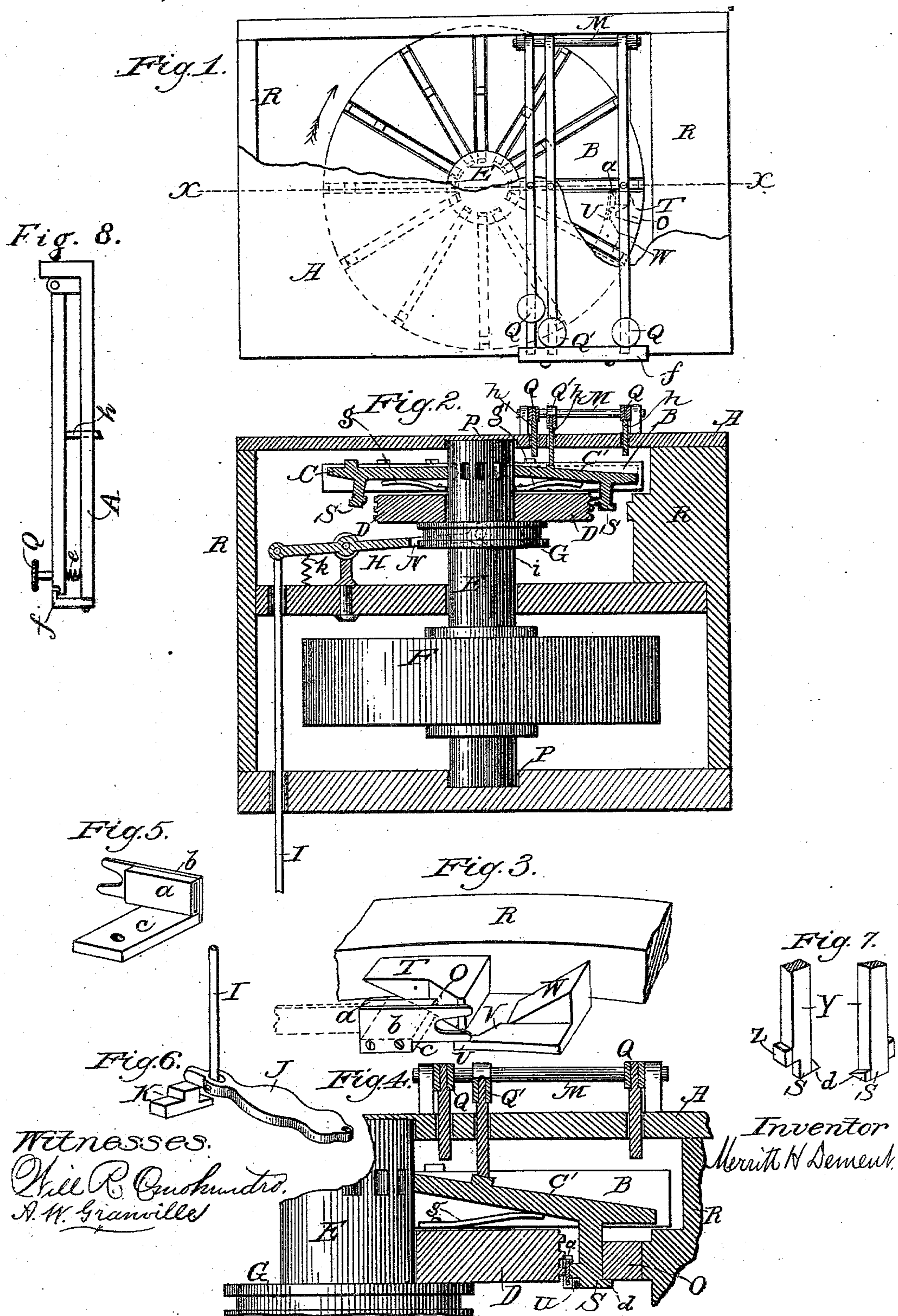


(No Model.)

M. H. DEMENT.  
TYPE WRITING MACHINE.

No. 301,488.

Patented July 8, 1884.





# UNITED STATES PATENT OFFICE.

MERRITT H. DEMENT, OF CHICAGO, ILLINOIS.

## TYPE-WRITING MACHINE.

SPECIFICATION forming part of Letters Patent No. 301,488, dated July 8, 1884.

Application filed August 24, 1882. (No model.)

*To all whom it may concern.*

Be it known that I, MERRITT H. DEMENT, of the city of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Type-Writing Machines, which improvements are fully set forth in the following specification, reference being had to the accompanying drawings, and to the letters of reference marked thereon, making a part of this specification.

My invention relates to the art of printing; and it consists of a new and improved type writing or printing machine, by means of which words, figures, &c., are printed or indented upon or in strips or sheets of paper, or other suitable material, as hereinafter described, and particularly pointed out in the claims.

In a former application I have applied certain cam devices to a machine containing a cylinder with sliding rods. For the purpose of making a lighter, more compact, and less expensive, as well as an easier-working machine, I now propose to use substantially the same cam devices in connection with a disk containing a series of radial bars, which, after being depressed by keys, are so manipulated by the cams as to press the paper on the type, give each type its proper space, and return to position.

The improved machine consists, first, of a key-board consisting of the desired number of keys upon a stationary plate, with small holes in the plate through which the key-pins penetrate and protrude below. Under this is a disk upon a perpendicular revolving shaft, containing a series of short bars arranged radially, the outer ends being capable of being depressed, and the inner ends resting in slots in the shaft, the slots being made deep enough to permit the bars to be slightly pressed inwardly. On the lower side of the bars are a series of arms or short perpendicular bars, which are affixed to the radial bars at a uniform distance from the shaft, and so that they will overhang the type-ring, which is placed upon the shaft underneath the disk, each bar, when depressed by the action of a key, covering the particular type designated by the key which actuated the bar. Each key operates a

particular bar, which in turn operates upon a particular type. The movements to be performed are, first, to depress the bar so as to bring the arm over the type; second, to press the arm on the type, (the paper to be printed upon being between;) third, to pull the paper each time the proper distance to give each letter its proper space; fourth, to remove the arm from the paper by a positive action, so that it may not drag the paper too far; fifth, to lift the bar to position again. I accomplish all these movements by a series of cams. The lower ends of the key-pins are beveled, and the radial bars are each provided with a cam-pin on their upper edges, the cam-pins being placed at different distances from the inner ends of the radial bars, to correspond with the different distances of the key-pins from the shaft, so that each key-pin can operate upon but one particular bar. When a key is depressed, as the disk revolves, the cam upon the corresponding radial bar will strike the cam upon the key-pin, and the radial bar will be depressed or crowded down. To avoid the necessity of depressing the keys very far, or of making the cams upon the key-pins very long or sharp, I provide the cam T, the position of which is under the disk immediately after the last point of contact between the key-pins and cams on the radial bars. I also place upon the outer lowermost edges of each arm the cam d, which, when the radial bar is depressed by the key-pin, catches under the cam T and further depresses the arm and brings it in position to pass upon the next cam, O, which is placed upon the support R in such a position that as the depressed bar revolves the arm will strike the cam and be crowded in upon the type, the paper being between the two. To give each letter its proper space the arms are made of different widths, corresponding to the different widths of the types. It is important that the widening should be upon the rear side of the arm. The wider the arm, of course the longer time it will be pressed upon and pull the paper. To lift the arms from the paper the instant the printing is accomplished and the letter given the proper space, the arms at the lower ends for a short distance, ordinarily about



one-eighth of an inch, are made of uniform width, but flush and true with the rear side of the arm as it revolves; and a cam is placed just as far past the crown or apex of the cam shown as O as the arms are wide at the point named, so that no matter how wide the arm may be it is lifted off the instant it has passed the cam O, and not before. Another cam lifts the bar to position again. The paper strip is kept in position by a suitable holder, the one shown being a simple grooved plate secured to the plate c, which is in turn secured to the support R. Above the paper-guide is a thin spring-plate with a fork upon one end. As a hammer presses the paper on a type the type strikes the paper between the prongs of the fork, and when the hammer is thrown off by the action of the cam V, the prongs of the spring react and throw the paper from the type. Underneath each of the radial bars is placed a small bent spring, g, which serves to hold the bars up in position when not printing.

When the machine is to be used for printing with ink, ink-rollers and milled rings for grasping and pulling the paper while printing will be necessary. A milled ring may be inserted by the side of each row of type, or the strip may pass between two small wheels, one or both being milled, they being made to grasp the paper at and for the proper time, by one of the wheels being placed upon a lever with a suitable fulcrum, the other end of the lever being operated by the bar-arm so as to squeeze the wheels together upon the paper and pull the paper different distances, according to the width of the arm, the lever being depressed during the time the arm passes over it, according to the width of the arm. When the types are used to make indentations, no ink-rollers or milled wheels are necessary. These cam devices and the bars may be operated with similar results by having the type-rings on a separate shaft connected with the main shaft by gear-wheels or other suitable mechanism, and the type-rings may be placed in an upright position while the bars lie in a horizontal position, the connection with main shaft being made by bevel-gearing. It will be necessary, in these different forms of using the cams and bars to modify their shapes and change their positions somewhat, in order to fit them to work on the type-rings in such positions; but the use of one or more of the cam devices herein described in connection with bars or arms of different widths, revolving in any suitable mechanism for the purpose of deflecting such bars or arms from their periphery, is within the spirit of my invention.

The type-rings are made to slide laterally on the shaft, the sliding action being regulated by the lever H, with yoke N and pins i, the pins running in the grooved ring beneath the type-wheel, the whole being operated by the pedal; but the lever may be connected with

the type-ring by any suitable mechanism. Where more than two rings of type are used, to enable the operator by the use of the foot alone to bring into position any desired ring of type, I place on the floor, underneath the toe of the pedal, a series of small stair-like steps, one for each row of type used except the first row, which is already in position, so that the toe of the pedal will be depressed various distances, according to the step it is depressed upon. One type-ring is in printing position, with the pedal elevated. To get the next row into position it is only necessary to press the pedal straight downward. To get the third row into position it will be necessary to turn the foot to one side, so that the toe of the pedal will hang over the next lower step and press downward with the foot. The next row is brought in position by operating upon the next lower step, which may be placed on the opposite side from the last step, and so on. A spring upon the shaft or under the pedal serves to return the first row of type to position, when the pressure on the pedal is removed.

Where several varieties of type are used, or where the capitals and lower-case types are not on the same ring, and thus operated upon by separate arms, it will be necessary that each arm or hammer shall be capable of giving two or more different spacings, and hence each arm or hammer must be widened at two or more places, so as to give the proper width for each letter operated upon by that arm or hammer, and the cam O must be made to slide in a groove or other mechanism and operated so as to be in position to operate upon the desired portion of the arm or hammer.

The cam-shifting mechanism may be constructed in various ways. The cam may be secured to a sliding bar, which will have an arm with a yoke operating upon the grooved ring G; or a sliding wheel connected with the lever H may be placed upon the shaft so as to operate upon a short arm or pins upon the sliding bar. The essential feature is the bringing of the cam O in position to operate upon any one of the widened spaces desired, and which corresponds with the row of type which is in printing position. If not connected with the grooved ring G, a spring will probably be necessary to return the cam to position; or the wheel may run between two arms, and thus carry the cam both ways as the wheel is moved upon the shaft.

In the annexed drawings, Figure 1 is a plan view of the machine, showing portion of top plate removed with twelve radial bars and three key-bars in position, the operating-cams being shown in dotted lines. It is intended in a full-sized machine to have sixty-two radial bars and the same number of keys; but any desired number may be used. Fig. 2 is a sectional view taken on line x x, Fig. 1, with grooved ring, pulley, and shaft, shown in elevation, and one key-bar depressed and operating upon the corresponding radial bar.



Fig. 3 is a perspective view of the four cams which operate the arms; and also shows in position the paper-guide and forked spring which serves to throw the paper from the type after printing and between the forks of which the type strikes the paper. Fig. 4 is a sectional view showing a radial bar in its lowest position and at the point of passing the crown of the cam O. Fig. 5 is a reverse view of the paper-guide and its support. Fig. 6 is a view of the pedal and stops for regulating the shifting of the type-ring. Fig. 7 are views of the hammer-arms. Fig. 8 is a view of a key, showing springs *e* for holding keys up in position against the plate *f* when not operating.

A is the top plate, upon which the keys rest, and which serves also as a bearing for the upper end of the shaft E.

B is the disk placed upon and revolving with the shaft.

C is a radial bar in position to be acted upon by the key-cam.

C' represents a bar in the position of being acted upon by a key-pin.

D is the type-ring, which is here made concentric and revolves with the disk.

E is the shaft operated by the pulley F and running in bearings P P, and intended to make about two hundred revolutions per minute.

Q Q are key-bars pivoted on the bar M, Q', showing one depressed.

R R are supports for the plate A and also for the operating-cams.

S is the point where the arms are of uniform width, and upon which the cam V operates.

T is the cam which operates, in connection with the cam *d*, to depress the bars into position to pass upon the operating-cam O, the plate U regulating the depth of pressure. The cam V serves to throw the arm from the paper after printing, and the cam W operates upon the lower end of the arm to lift the bar into position again.

Y is one of the arms, Z being the plate formed thereon which presses the paper upon the type.

The mechanism for shifting the type-ring consists of the grooved ring G, (which revolves and is connected with the type-ring,) lever H, and yoke N, an arm of which extends on each side of the shaft with pin *i* in each arm fitting and running in the groove in the ring G. The lever is operated by the pedal J and rod I, and thus raises or lowers the type-wheel. The spring *k* operates to lift the pedal after it shall have been depressed and released by pressing upward on the outer end of the lever H, and thus depressing the type-ring to its resting position, when the upper row of type will be at the printing-point.

K is a block with three surfaces or planes of different heights, upon any one of which the toe of the pedal may be depressed, thus

bringing into position the desired row of type by use of the pedal alone.

*a* is the paper-guide, and *b* the forked spring-plate, both being held in position by the plate *c*.

*e* is a spring to hold a key-bar up in position against the stop-bar *f* when not printing.

*g* is the spring for holding the radial bars up in position when not operating.

*g'* shows one of the springs partially depressed.

*h* is a key-pin.

Having thus fully described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. The combination of a revolving holder with movable radial bars provided with arms and keys for actuating the bars, with a type-wheel, substantially as shown and described.

2. A revolving holder with movable radial bars provided with arms of different widths, in combination with the cam O, substantially as shown and described.

3. The combination of a revolving disk with movable radial bars provided with arms, and the cam O, substantially as and for the purposes shown and described.

4. The combination of a revolving disk with movable radial bars provided with arms, the cam O, and the cam V, substantially as and for the purposes shown and described.

5. The combination of a revolving disk and movable radial bars provided with arms, with means, substantially as described, for pressing the arms upon the material operated upon, and the plate U, substantially as and for the purposes shown and described.

6. The combination of a revolving disk and movable radial bars provided with arms, with the cam O and type-wheel, substantially as shown and described.

7. A revolving disk and keys, and a series of bars provided with cams *d*, in combination with the cam T, substantially as and for the purposes shown and described.

8. The combination of the disk, radial bars provided with arms, keys, cams *d* and T, cam O, and cam W, substantially as and for the purposes shown and described.

9. The series of steps K, of different heights, in combination with a pedal and means for connecting the same with the type-ring, substantially as and for the purposes shown and described.

10. The combination of the steps K, pedal J, rod I, lever H, yoke N, and ring G, substantially as and for the purposes shown and described.

In testimony whereof I have hereunto set my hand this 16th day of August, 1882, in the presence of two subscribing witnesses.

MERRITT H. DEMENT.

Witnesses:

E. G. OSGOOD,

A. W. GRANVILLE.