

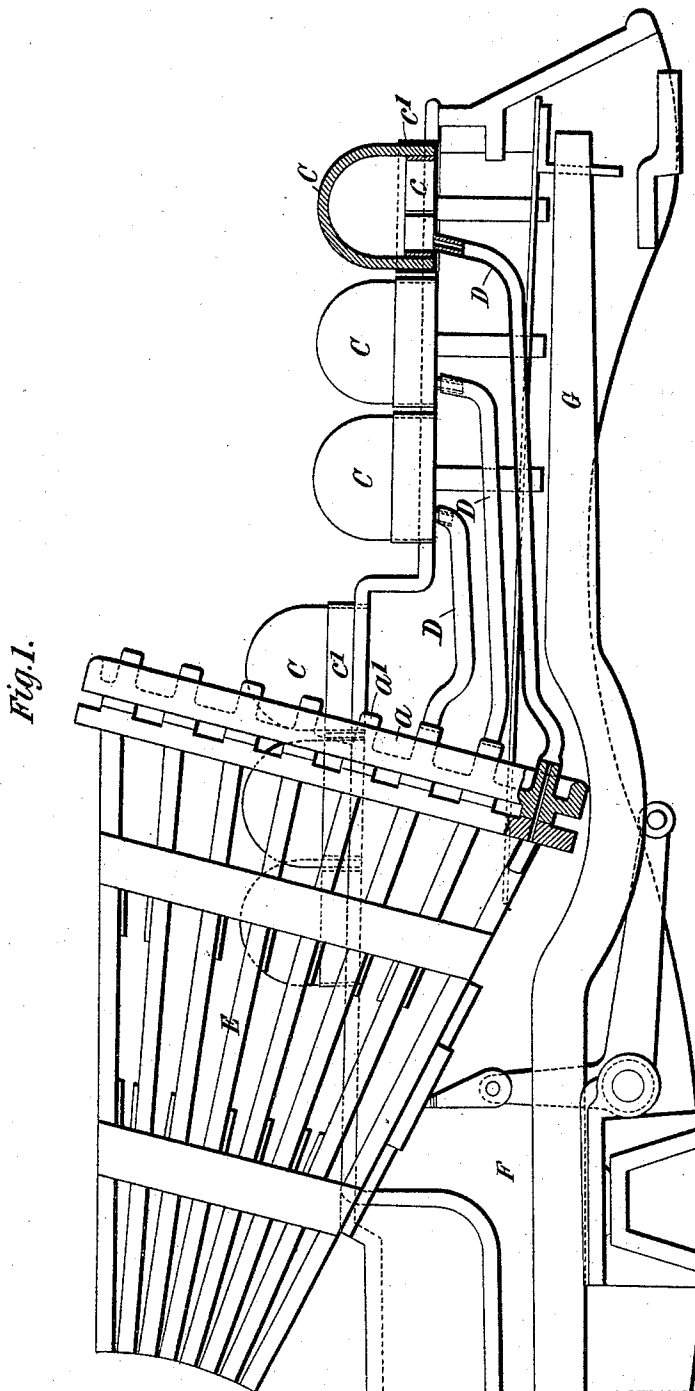
(No Model.)

5 Sheets—Sheet 1.

M. A. WIER.
TYPE WRITING MACHINE.

No. 584,491.

Patented June 15, 1897.



WITNESSES

Horris A. Clark,
John Taylor

Marshall Arthur Wier INVENTOR

BY HIS ATTORNEYS *Nyer & Seely*

(No Model.)

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Fig. 1a

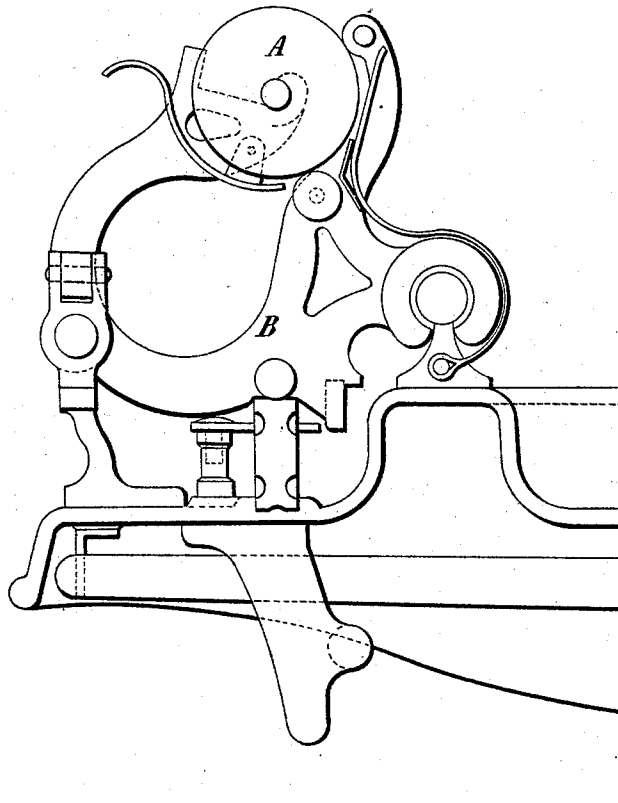
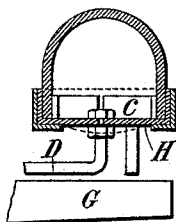


Fig. 3.



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(No Model.)

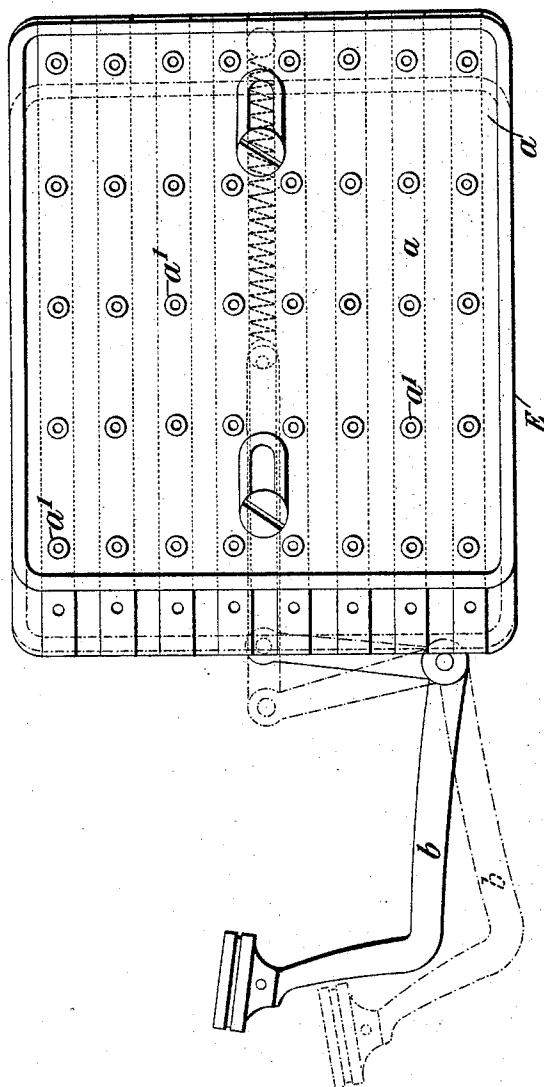
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Fig. 2.



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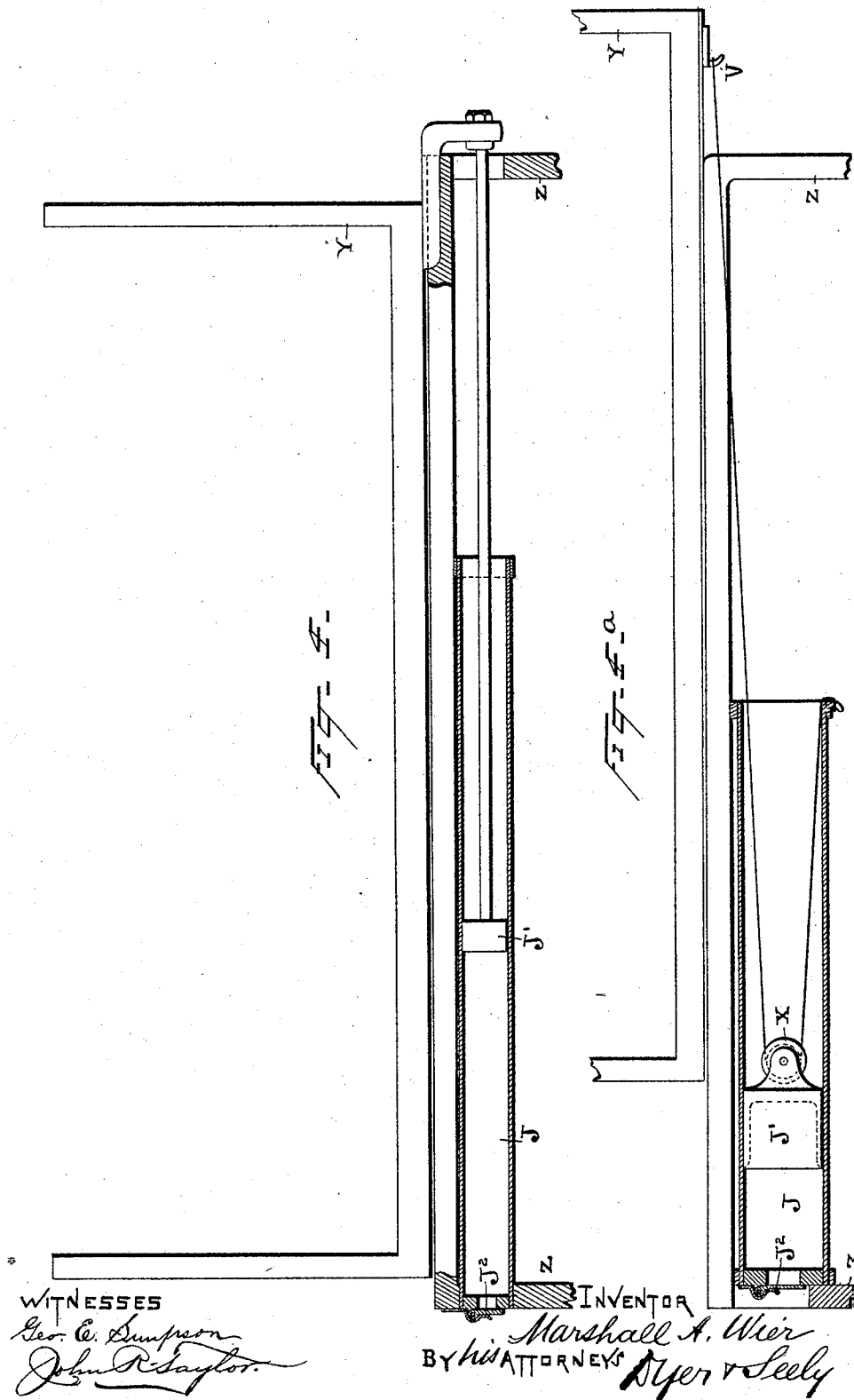
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M. A. WIER.
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(No Model.)

5 Sheets—Sheet 5.

M. A. WIER.
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Fig. 5.

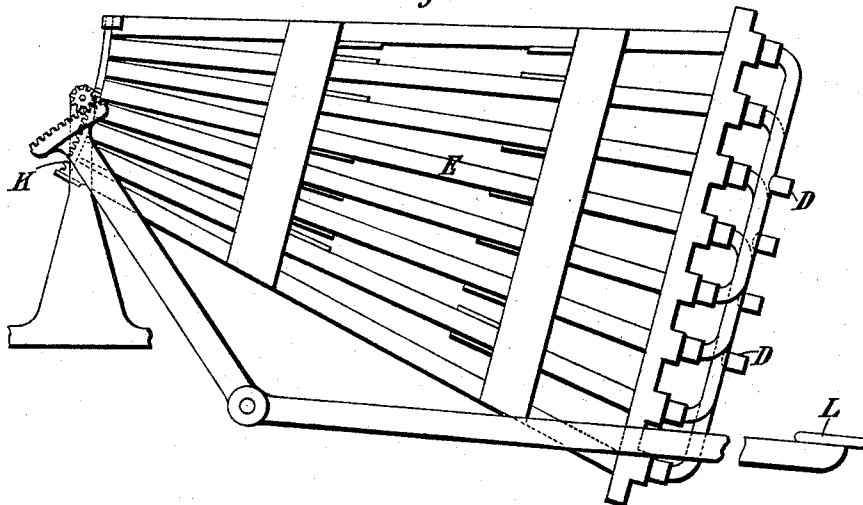


Fig. 7.

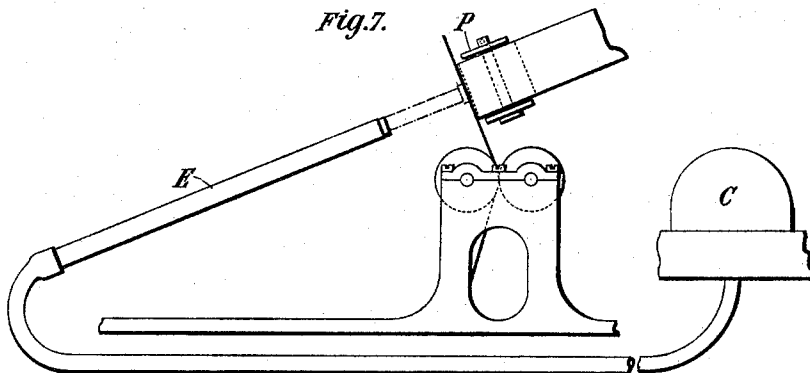
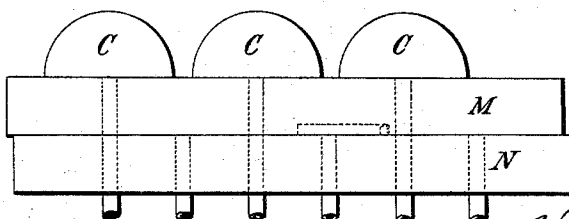


Fig. 6.



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UNITED STATES PATENT OFFICE.

MARSHALL ARTHUR WIER, OF KINGSTON-UPON-THAMES, ENGLAND,
ASSIGNOR TO THE PNEUMATIC PATENTS COMPANY, LIMITED, OF
LONDON, ENGLAND.

TYPE-WRITING MACHINE.

SPECIFICATION forming part of Letters Patent No. 584,491, dated June 15, 1897.

Application filed October 3, 1894. Serial No. 524,779. (No model.) Patented in England November 7, 1893, No. 21,184; in Germany July 4, 1894, No. 80,619; in France July 5, 1894, No. 239,822; in Belgium July 5, 1894, No. 110,827; in Austria July 5, 1894, No. 45,621; in Hungary July 18, 1894, No. 1,963; in Italy August 8, 1894, XXIX, 36,791, LXXII, 184; in Switzerland August 13, 1894, No. 9,055; in Sweden August 14, 1894, No. 6,126; in Denmark August 17, 1894, No. 293; in Canada August 20, 1894, No. 47,246; in India September 8, 1894, No. 263; in Spain October 1, 1894, No. 18,362, and in Norway October 13, 1894, No. 4,006.

To all whom it may concern:

Be it known that I, MARSHALL ARTHUR WIER, engineer, a subject of the Queen of Great Britain, residing at Elm Place, Kingston-upon-Thames, England, have invented certain new and useful Improvements in Type-Writing Machines, (for which I have obtained patents in Great Britain, No. 21,184, dated November 7, 1893; in France, No. 239,822, dated July 5, 1894; in Belgium, No. 110,827, dated July 5, 1894; in Germany, No. 80,619, dated July 4, 1894; in Austria, No. 45,621, dated July 5, 1894; in Hungary, No. 1,963, dated July 18, 1894; in Italy, application date July 6, 1894, issue date August 8, 1894, XXIX, 36,791, LXXII, 184; in Sweden, No. 6,126, dated August 14, 1894; in Denmark, No. 293, dated August 17, 1894; in Switzerland, No. 9,055, dated August 13, 1894; in India, No. 263, dated September 8, 1894; in Canada, No. 47,246, dated August 20, 1894; in Norway, No. 4,006, dated October 13, 1894, and in Spain, No. 18,362, dated October 1, 1894,) of which the following is a specification, reference being had to the accompanying drawings.

My invention relates to improvements in pneumatically-operated type-writing machines, and has for its object to simplify the construction and improve the working of such machines. Its most important feature is the provision of means whereby a single pneumatic push or piston is made to operate two or more types instead of one only, as heretofore. My said invention, however, comprises other improvements, as will be hereinafter described.

In the accompanying drawings, Figures 1 and 1^a are together a side elevation, partly in section, of my improved type-writing machine. Fig. 2 is a rear elevation of a part of Fig. 1. Fig. 3 illustrates in section a modified form of push hereinafter described. Fig. 4 shows the device for returning the carriage to its starting-point. Fig. 4^a shows a modified

form of returning device. Figs. 5, 6, and 7 illustrate modifications of my invention hereinafter described.

A is the paper-roller.

B is the traveling carriage.

C C are the pneumatic pushes. D D are the tubes connecting said pushes to the battery E, which contains the types.

F is the framework of the machine.

The tubes D are connected to perforated nipples *a'*, formed on a plate *a*, which is placed against the rear face of the battery E of type-holders. The plate *a* can slide upon said face of the battery and is adapted to be moved by means of a shift-key *b*, Fig. 2, pivoted to the battery E, so that the air-tube from each push can be brought into communication with more than one of the type-containing tubes of the battery E by suitably adjusting the said plate *a* on the rear face thereof. In the example illustrated each air-tube D may be put into alinement by suitably adjusting the plate *a* with either of a pair of the type-holders E, but it is obvious that by suitably spacing the nipples and suitably adjusting the plate on which they are carried each air-tube could, for instance, be connected to any one of three or more type-holders. For the said flat plate *a* (shown in the drawings) I may substitute a curved sliding plate, or a rotary plate, or a sheet or piece of flexible material, such as india-rubber and canvas, with short tubes or nipples molded thereon or otherwise secured thereto for connection to the tubes D. The flexible sheet may be drawn across the end of the type-block by winding it onto one roller and unwinding it from another.

In Fig. 1, *c* is a ring, preferably elastic and preferably divided at one side by which the cup of each push is retained securely in place in a flanged receiver *c'*, with which it makes a good joint. The cup can be quite easily put into place by pushing the ring thereinto well away from the edges, and when these

edges have been placed in the receiver *c'* the ring can readily be pushed down inside the cup from the outside into the position in which it is shown in the drawings.

5 Instead of applying the changing-plate *a* to the rear face of the battery *E* it is obvious that I may apply it to the pushes *C*, or that I may introduce it at any point intermediate of the pushes *C* and battery *E*.

10 I sometimes place the air-spaces of each push or piston in communication with the separate air-chambers of two or more types, as shown in Fig. 5, so that when the push or piston is depressed the air therein tends to
15 operate the two or more types simultaneously, and to insure that only one type shall issue I provide as follows—that is to say, I provide a suitable shutter *K* to move in front of the battery *E*, from which the whole of the types
20 issue. Said shutter is adapted to be operated by a shift-key *L*, and can be adjusted by the shift-key to move to the proper position to allow either or any one of the types controlled by one push to move as aforesaid while pre-
25 venting the other or others from issuing. The drawings show an instance where each push controls two types, one in the upper half of the battery and the other in the lower half. The shutter is normally in position to
30 prevent the exit of the types from the lower tubes while offering no obstruction to the upper types. When the shift-key is depressed, the shutter is raised to close the exits from the upper tubes while opening those from the
35 lower tubes. The normal position of the said shutter is that in which it keeps back the types which are only occasionally required, so that those which are frequently used will issue at any time without the necessity for a
40 preliminary movement of the shift-key.

As another alternative I sometimes connect the tubes leading from the rear end of each type to channels in the wall of a long box or shell, within which is a core or plug, also pro-
45 vided with air-channels therein, and I also connect to other channels in the said wall the tubes from the pushes or pistons. The core or plug is adapted to be moved by means of the shift-key to place the tubes from the
50 pushes or pistons into communication with those leading to one or other of the series of types in the type-block.

As a further alternative, the plate or board *M*, Fig. 6, carrying the pushes or pistons and
55 having an air-channel therethrough from each push or piston can be made to move upon another plate or board *N*, having therein separate tubes leading to each type, so as to bring each of the air-channels from the pis-
60 tons into communication with either of, say, two tubes leading to different types.

I cause each push or piston or a device in connection therewith to actuate spacing-levers instead of making the keyboard or push-
65 board movable for the purpose of effecting the spacing. In carrying out this part of my invention I place a series of levers *G* below

or otherwise in proximity to the pushes or pistons, and I arrange the pushes in series, so that each member of each series when oper- 70
ated will act upon the lever appropriated to that series and the lever in turn will operate the spacing mechanism.

Pneumatic spacing devices form a further part of my invention and consist of flexible 75
diaphragms *H*, Fig. 3, forming part of the lower ends of the pushes aforesaid or provided upon other closed chambers. The tubes *D* are connected to said diaphragms. When the push is operated, the air com- 80
pressed therein depresses the diaphragm and causes the same to operate the spacing-lever *G*, which is immediately under the push. This lever in turn acts upon the movable plate or the like which operates the spacing- 85
dogs.

For moving the carriage *B*, I provide as follows—that is to say: *J*, Fig. 4, is a cylinder secured to the frame *Z* of the machine and having one end closed. *J'* is a piston 90
closely fitting the interior of the said cylinder and the rod of which is secured to the carriage *Y*. When the piston is moved with the carriage, it travels away from the closed end of the cylinder, and a partial vacuum is 95
thereby formed within the cylinders. Thus it is seen that when the end of a line is reached—that is, when the carriage has reached its farthest position to the left—the pressure of the air upon the external face of 100
the piston forces it and the carriage connected with it back to the starting-point at the right again when released.

Fig. 4^a shows another method of attaching the piston to the frame. To the open end of 105
the cylinder *J* is attached the cord *Y'*, which thence passes around the pulley *X* on the piston *J'* and is secured to the stud *V* on the frame *Z* of the machine. The piston is moved with the carriage in this modification as in 110
the previously-described arrangement, and a partial vacuum is produced in the cylinder *J*, as before.

The cylinder is preferably furnished at its closed end with a valve *J*², opening outward 115
to prevent the possibility of accumulation of pressure in the cylinder when the piston moves inward.

Another improved arrangement of parts for effecting the imprinting of the charac- 120
ters may, for example, consist of an inking roller or ribbon *P*, Fig. 7, placed in front of the paper, so that the type-rods, which, according to this portion of my invention, I place at the rear thereof, impinge against the 125
back of the paper and force it against the inking roller or ribbon. The type-rods and the type-block can be as easily placed at the rear of the paper as at the front in machines of this class. 130

What I claim is—

1. In a pneumatically-operated type-writer, the combination with a battery of tubes from which the types issue, of air-tubes communi-

eating with the tubes of said battery, and means for changing the connections so that each air-tube may be placed in communication alternately with two or more tubes of the battery, substantially as set forth.

2. In a pneumatically-operated type-writer the combination with pneumatic pushes, of a battery of tubes E from which the types issue, air-tubes D communicating with the air-spaces of the pushes and with the tubes E, and means for changing the connections so that each push will serve more than one type, substantially as described.

3. In a pneumatically-operated type-writer, the combination with pneumatic pushes, of a battery of tubes E, air-tubes D communicating with the air-spaces of the pushes and with the tubes E, and means for changing the connections between the tubes E and the tubes D, which means consists of a movable plate *a* at the rear of the battery of tubes E said plate having openings in the same to correspond with the tubes and being so arranged that each of the openings in said plate can be put into communication with more than one of the said tubes E, substantially as described, and for the purpose specified.

4. In a pneumatically-operated type-writer the combination with pneumatic pushes, of a battery of tubes E, tubes D communicating with said pushes and tubes E, means for adjusting the connection between the tubes E and the tubes D so that each tube D may serve more than one type, and spacing-levers G placed below the pushes and operated by said pushes, substantially as described, for the purpose specified.

5. In a pneumatically-operated type-writer, the combination with pneumatic pushes of spacing-levers arranged below the pushes, and an elastic diaphragm placed at the base of each of the pneumatic pushes, by which the spacing-levers are operated, substantially as set forth.

6. In a pneumatically-operated type-writer the combination with pneumatic pushes of a battery of tubes E, tubes D communicating with said pushes and tubes E, means for adjusting the communication between the battery of tubes E and the tubes D so that each

tube D may serve more than one type, spacing-levers arranged below the pushes and an elastic diaphragm placed at the base of each of the pneumatic pushes by which the spacing-levers are operated, substantially as described.

7. In a pneumatically-operated type-writer the combination with pneumatic pushes, of a battery of tubes E, tubes D connecting each push to more than one of the said tubes E, a restraining-shutter in front of the mouths of the tubes E, and means for controlling said shutter, substantially as, and for the purpose, specified.

8. In a pneumatically-operated type-writer the combination with pneumatic pushes, of a battery of tubes E, a movable perforated plate or board carrying the pushes, and another perforated plate or board on which the former moves, and tubes D connecting the stationary plate or board to the battery of tubes E, substantially as described, for the purpose specified.

9. In a pneumatically-operated type-writer the combination with a push C of a receiver *c'* and a split elastic ring *c* within the push to retain the edge of the same, substantially as described.

10. In a type-writing machine, means for returning the carriage from printing position at the right of a page to printing position at the left of the page, which means consists of a cylinder open at one end and closed at the other, such cylinder being secured to the frame of the machine, a valve in the closed end of the cylinder, a piston in said cylinder so connected with the carriage that when the carriage is moved by the action of the type-writer keys in one direction, the piston will be drawn toward the open end of the cylinder, a vacuum being formed between it and the closed end of said cylinder, substantially as described.

In testimony whereof I have hereunto set my hand this 7th day of September, 1894.

MARSHALL ARTHUR WIER.

Witnesses:

GEORGE HARRISON,
ARTHUR ALFRED BERGIN.