C. H. VOGEL.

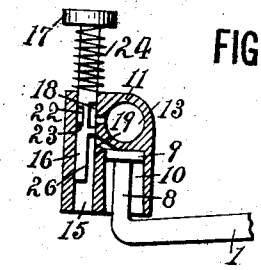
TYPE WRITING MACHINE.

APPLICATION FILED JUNE 21, 1911.

1,100,410.

Patented June 16, 1914.

FIG. 3.



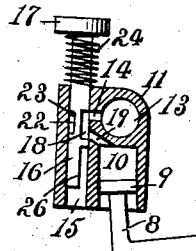
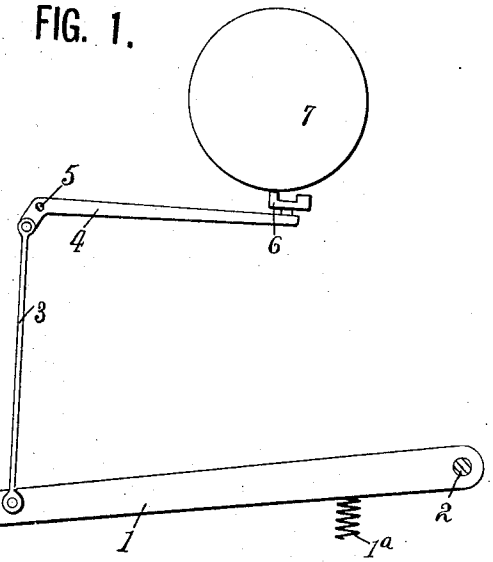


FIG. 1.



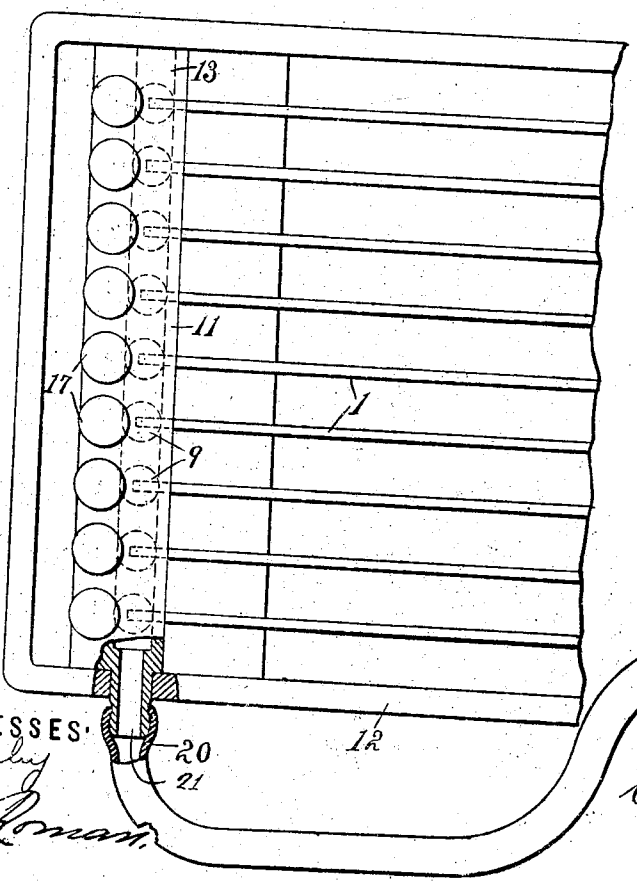
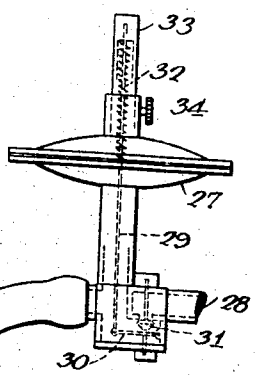


FIG. 2.



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UNITED STATES PATENT OFFICE.

CHARLES H. VOGEL, OF VANCOUVER, BRITISH COLUMBIA, CANADA, ASSIGNOR TO UNDERWOOD TYPEWRITER COMPANY, OF NEW YORK, N. Y., A CORPORATION OF DELAWARE.

TYPE-WRITING MACHINE.

1,100,410. Specification of Letters Patent. Patented June 16, 1914.

Original application filed August 22, 1910, Serial No. 578,457. Divided and this application filed June 21, 1911. Serial No. 634,628.

To all whom it may concern:

Be it known that I, CHARLES H. VOGEL, a British subject, residing in Vancouver, in the county of Vancouver, Province of British Columbia, Dominion of Canada, have invented certain new and useful Improvements in Type-Writing Machines, of which the following is a specification.

This invention relates to the key-actions of typewriting machines.

The object of this invention is to provide means which will enable the type to be actuated by a very light touch of the operator's fingers on the keys, the depression of the key lever being effected by a primary source of power controlled by the operator.

This application is a division of my application No. 578,457, filed August 22, 1910.

In carrying out my invention, I preferably provide the ends of the key levers with heads which operate like pistons in inverted pneumatic chambers or cylinders. Adjacent to each cylinder, a valve is provided with a cap forming a type key, and when this valve is depressed, compressed air is admitted to the chamber of the corresponding key lever. The key lever is thereby depressed and actuates the type to strike the platen.

In the accompanying drawings,

Figure 1 is a diagrammatic view, showing a key lever in side elevation, and showing an actuating key and its cylinder in vertical section. This view shows the finger key and the type-operating lever both depressed. Fig. 2 is a diagrammatic plan of the keyboard, certain parts broken away. Fig. 3 is a vertical section, taken through one of the cylinders and representing the parts in normal elevated positions.

Levers 1 are mounted to swing upon a fulcrum bar 2, and each lever is connected by a link 3, with a type bar 4 pivoted at 5, so that when the key lever is depressed, the corresponding type bar swings the type 6 as used against the face of a platen 7.

The ends of the key levers 1 are provided with upwardly extending shanks 8, the ends of which are provided with disks or heads 9, constituting pistons working in chambers or cylinders 10. These cylinders are preferably formed in multiple in the under side of a horizontal cross bar 11 mounted in the main frame 12. The upper portion of this bar has an elongated compressed-air chamber 13, with which ports 14 communicate, said ports extending respectively to the cylinders or chambers 10 to supply compressed air thereto.

Vertical guide-ways or openings 15 are formed in the bar 11 for slide valves or key-valves 16 in the form of stems, which extend upwardly and are surmounted by caps or finger-keys 17, the upper faces of said caps bearing the characters printed by the corresponding types. When one of these keys 17 is depressed, a passage 18 formed in its side and communicating with the port 14, opens communication from the port 14 to a corresponding port 19, which leads into the upper part of chamber 10, as indicated in Fig. 1. Compressed air or a similar operating medium, is admitted to the chamber 13 by a flexible hose, the end 20 of which is attached to a nipple 21, Fig. 2. From the general chamber 13 all of the individual chambers 10 may be instantly supplied with compressed air, or a similar operating fluid, when the corresponding key 17 is struck.

A slot 22 on the back of each valve cooperates with a cross pin 23, to limit the downward and upward movement of the key, and each key is returned by a coiled spring 24 disposed between cap 17 and bar 11.

The walls of the chambers 10 may be possibly inclined or curved slightly about the axis 2, as indicated. Each key lever 1 is provided with a returning spring 1^a.

The lower end of each slide valve is cut away as at 26, so that when the key is released, the chamber 10 communicates directly with the guide-way 15 through the port 19; as the lower end of the guide-way 15 is open, the compressed air escapes into the atmosphere and permits the spring 1^a to return the key.

While I prefer to form the chambers 10 all in a single cross bar or piece, as set forth, I may provide independent cylinders, forming distinct pieces.

The cylinders 10 may be varied in diameter according to the surface of the type, and a suitable pressure regulating device may be attached for regulating the pressure of the air to vary the force of the type according to the requirements of the work in the machine. A common example of such suitable

pressure-regulating device is shown in *Knight's Mechanical Dictionary* of 1876, vol. 2, page 954, Fig. 2187, and is illustrated in Fig. 2 of the accompanying drawing. It comprises a chamber 27 containing a flexible diaphragm, and wherein fluid pressure entering at inlet 28 raises the wire 29 and with it the lever 30 which controls valve 31. The diaphragm usually is held by a spring 32 which, by means of a sliding regulator 33 and thumb screw 34, can be adjusted as to the degree of tension which it exerts upon said diaphragm. Thus the extent of pressure in the chamber 27 determines the position of the valve 31 relatively to its seat; and this graduates the area of opening for the pressure inlet, thereby regulating the pressure of air supplied through the flexible hose to the chamber 13.

Having thus described my invention, I claim:

1. In a typewriting machine, in combination, a member disposed transversely and having a duct formed therein, a plurality of chambers in said member adjacent to said duct, a plurality of key-valves controlling the admission to said chambers from said duct, and means including a member moving in a chamber to actuate the type.

2. In a typewriting machine, in combination, a plurality of key levers, a transverse bar disposed thereabove and having a plurality of chambers in the under side thereof, said key levers having pistons working in said chambers respectively, said bar having a duct or chamber formed therein, and a plurality of key valves controlling admission from said duct to said chambers.

3. In a typewriting machine, the combination with types and keys, of pneumatic devices controlled by said keys for operating said types, and a pressure-regulating device for regulating the pressure of the air, to vary the force of the blows of the types according to the requirements of the work in the machine.

CHARLES H. VOGEL.

Witnesses:
G. C. WOODWARD,
A. S. WISMER.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."