2 Sheets--Sheet 1.

H. R. M. J. HANSEN.

Type-Writers.

No. 158,071. Patented Dec. 22, 1874.

FIG. 1.

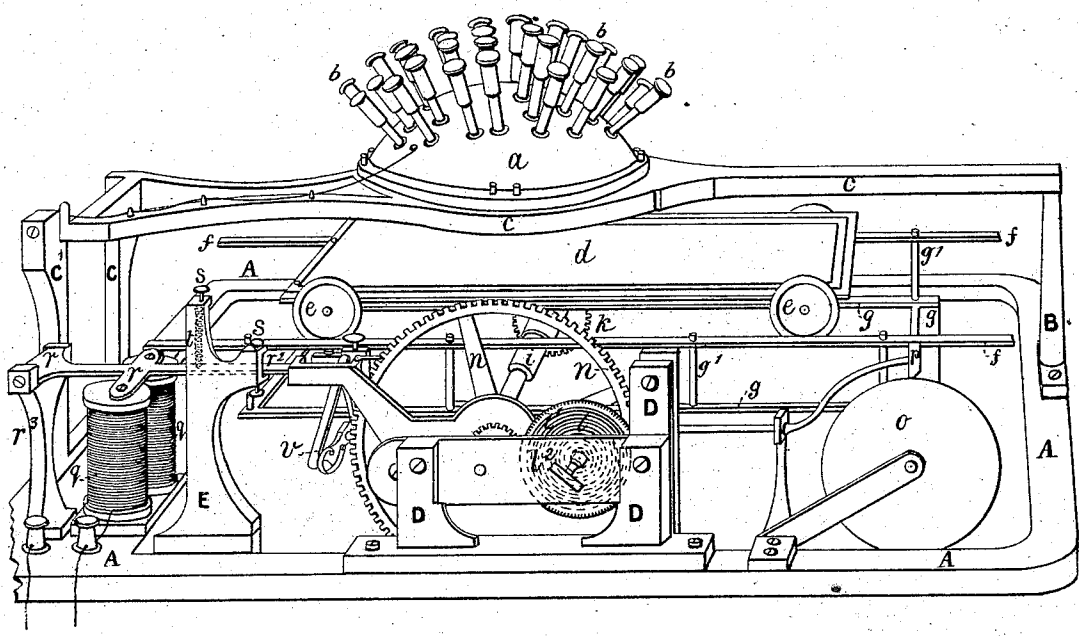


FIG. 3.

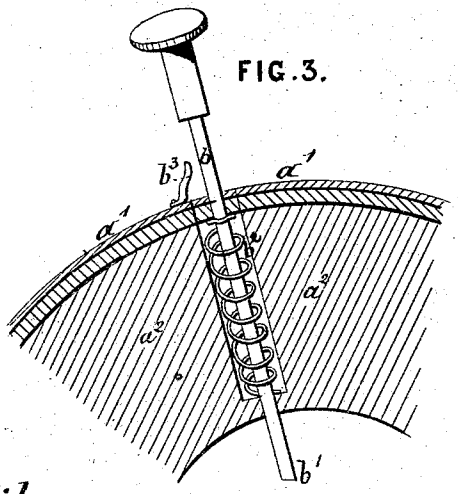
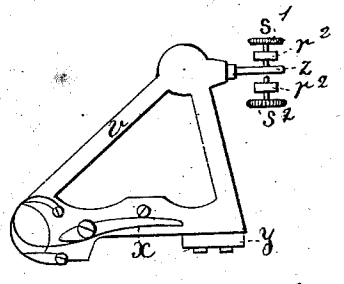


FIG. 4.



Witnesses
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Inventor.
for H. R. M. J. Hansen
per Colborne Brooks & Co.

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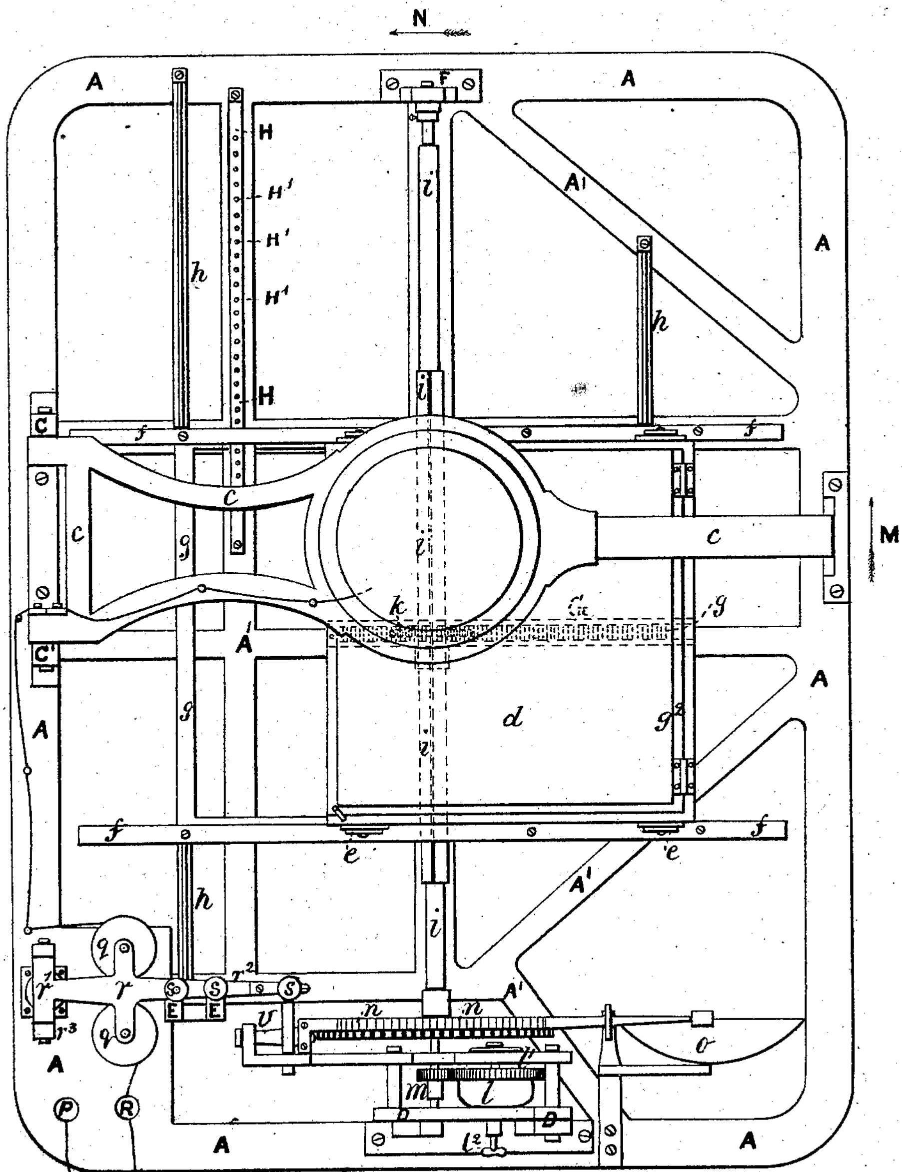
FIG. 2



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UNITED STATES PATENT OFFICE.

HANS RASMUS MALLING JOHAN HANSEN, OF COPENHAGEN, DENMARK.

IMPROVEMENT IN TYPE-WRITERS.

Specification forming part of Letters Patent No. **158,071**, dated December 22, 1874; application filed December 11, 1873.

To all whom it may concern:

Be it known that I, HANS RASMUS MALLING JOHAN HANSEN, of the city of Copenhagen, in the Kingdom of Denmark, have invented certain new Improvements in Typographical Machines, of which the following is a specification:

My invention relates to a certain improvement upon or addition to an invention in typographical machines for which I obtained Letters Patent in the United States under date of April 23, 1872, numbered 125,952.

The main feature distinguishing this invention from my former one is, that I have now worked out in detail what I have only alluded to in the last sentence preceding the claims of my former application, viz: "Instead of a drum for carrying the paper driven in the manner as set forth, a flat surface—for instance, a table—may be employed with the same result by moving it simultaneously in both a longitudinal and transverse direction."

To enable those skilled in the art to understand my invention, I will now proceed to describe the same in detail by aid of the accompanying drawings.

In the drawings, similar letters of reference are employed to indicate corresponding parts wherever they occur.

Figure 1 is a perspective view of apparatus constructed according to my invention; Fig. 2, a plan; Fig. 3, a section through part of the writing-ball; and Fig. 4 shows the construction of the escapement.

In this invention I will make use of the same key-board or writing-ball as shown in my former patent by Figs. 3 and 5.

A, Figs. 1 and 2, is a metal frame having cross-pieces A′, and upon this frame all the parts of the apparatus rest. The frame A is provided with standards B C C′, supporting the top frame *c*, which is fastened to the standards C C′ by regulating-screws, forming a pivotal support, in such manner as to enable the operator to raise the frame *c*, and cause it to stand upright upon the standards C C′, and to this frame *c* the writing-ball is fixed by means of regulating-screws. The writing-ball *a* is provided with a series of pistons, *b*. Each piston has engraved upon its lower extremity b^1 a type, (letter or number,) and a corresponding letter or number is engraved upon the knob of such piston *b*. The pistons *b* are arranged circularly in the writing-ball *a*, in such manner that their prolonged axes converge toward, and are caused to pass through, one and the same point of the writing-ball *a*—that is, through its center, as shown by Fig. 3. The pistons *b* are also provided with a spiral spring, b^2, Fig. 3, which, when the piston is depressed and the pressure removed, raises the piston *b* up in its normal position. The writing-ball *a* is formed in two sections, a^1 a^2. The outer section or spherical shell a^1 is insulated from the inner section a^2 by india-rubber. A series of small springs or pieces of flexible metal, b^3, affixed to the spherical shell a^1, one on each piston *b*, are caused to slide, when the piston *b* is depressed, along a socket under the knob of such piston *b*, thus closing the electric current, and breaking said current when the piston is released and brought back into its normal position by the spiral spring b^2, as will be more fully explained hereafter. *h h* are two rails, affixed transversely to the frame A—that is, in the direction of the arrow M—and these rails *h* support a square frame, *g*, in such manner as to allow the frame to slide back and forth in the direction indicated. A number of small columns, *g′*, are affixed to the sliding frame *g*, and these columns *g′* support another pair of rails, *f f*, on which the four wheels *e*, carrying a square table or plate, *d*, are caused to run. These rails *f f* are supported by the columns *g′*, in such manner as to lie across the rails *h h*—that is, longitudinally of the machine, in the direction of the arrow N—and thus enable the operator to move the table in the direction indicated, as presently more fully explained. The plate or table *d* has a fixed tooth-rack, G, (indicated by dotted lines, Fig. 2,) formed on its under side, gearing with a tooth-wheel, K. The wheel K is affixed to a hollow cylinder sliding in a groove on the shaft *i*, as indicated by dark lines on shaft *i*, Fig. 2. This shaft has its bearing in two standards, D F, affixed to the main frame A, Figs. 1 and 2, and carries on one end an escape-wheel, *n*, and a pinion, *m*, the latter gearing into the toothed wheel l^1, affixed to a fusee-box, *l*, containing a coiled spring, (not shown in the drawings,) or its equivalent.

The spring in the fusee-box l is so arranged that it can be wound up by a key, l^2, Figs. 1 and 2. q q are a pair of electro-magnets, provided with an armature, r, the prolongation r^1 of which is pivoted in bearings in the standard r^3. The prolongation r^2 of the armature r is carried by a spiral spring, t, affixed in the standard E, which keeps the armature r a short distance from the electro-magnets q, and the standards E are provided with screws s s, by means of which the movement of the armature is regulated. The prolongation r^2 of the armature r is provided at its extremity with two regulating-screws, s^1 s^2, the points of which act upon a fixed tooth or pallet, z, on the verge v. v is the verge, provided with two fixed teeth or pallets, z y, and movable tooth or pallet x, Fig. 4. When the armature r goes down, attracted by the electro-magnets q q, the point of the screw s^1 depresses the fixed tooth or pallet z, thereby moving the verge so that the tooth or pallet x, which, in the state of rest, fits in between two teeth of the crown-wheel n, is caused to slip out of its position, while at the same time tooth y is caused to slip in between the next two succeeding teeth on the crown-wheel n, and when the electro-magnets q release the armature r the spiral spring t raises the armature-arm r^2 up in its position of rest, and by this upward movement the point of the screw s^2, acting upon the fixed tooth z, raises the same, causing the fixed tooth y to slide from between the teeth of the crown-wheel n, and the movable tooth x is forced to slip in again between two teeth on the crown-wheel n, causing such crown-wheel n, impelled by the action of the coiled spring in the fusee-box l, to move one tooth forward, this movement being communicated, through the shaft i and wheel K, to the table d, causing the latter to move a corresponding distance in a direction opposite the arrow N, or toward the standard B. O, Figs. 1 and 2, is a small bell, the hammer of which is actuated by a tappet on the wheel n, and causes the hammer to strike the bell O the moment the table d has come so far toward the standard B that it has to be pushed back in order that a new line may be commenced. R is a screw, in which one of the insulated pole-wires of an electric battery is held fast, and which is insulated from the apparatus by india-rubber. This insulated wire goes from R to the electro-magnets q, winds around them, and from thence passes along the frame A, along the standard C′, and upper frame c, to the insulated spherical shell a^1 of the writing-ball a, and is connected to such spherical shell a^1 by means of a screw. The current passing through this wire does not, when the apparatus is at rest, enter into any other portion thereof except the spherical shell a^1 and small springs b^3, affixed to such shell a^1. The other pole-wire of the battery is, by means of the screw P, connected with the whole of the machine, except the spherical shell a^1 of the writing-ball a and spring b^3. Thus every time one of the pistons b is depressed the socket below the knob of the piston is placed into leading contact with its spring b^3, and thereby the current is closed and the armature r attracted by the electro-magnets q, causing the movement of the escapement, as above described. When the piston b is released and forced into its normal position of rest by the spring b^2 the socket below the knob of the piston b ceases to be in contact with the spring b^3, and thereby breaking the current, causing the electro-magnets q q to release the armature r, whereby the retrograde movement of the crown-wheel n is effected, and this movement being communicated through the shaft i and wheel K to the table d, causing the same to move a short distance. This movement of the table d, corresponding to the pitch of the teeth in the crown-wheel n, is so great as to space the letters on the paper equally.

In order to impart the lateral movement to the frame g and table d, by means of which lateral movement the spacing of the lines is determined, I use a beam, H, supported upon two standards, and provided on its upper surface with a series of pegs or pins, H′, the distance between each peg or pin H′ and the next succeeding one being equal to the distance between one printed line and the next succeeding one. A movable peg or tooth (not shown in the drawings) is affixed on the under side of the table d.

When a line has been printed, as indicated by the signal-bell O, and in order to print a new line, the table is pushed in the direction of the arrow N, and by this motion the fixed tooth on the under side of such table d engages between two teeth, H′, on the beam H, thereby forcing the frame g, and with it the table d, to slide on the rails h h laterally, or in the opposite direction of the arrow M, toward the standards D a distance equal to the distance between one peg or tooth, H′, and the next succeeding one on the beam H—that is to say, the required distance to space the line to be printed from the line already printed, or the distance between two lines; the toothed rack G, two edges of which take on the edge of the wheel K on the hollow cylinder on the shaft i, thus forcing the table d and rails f to slide laterally on such shaft i, and follow the movement of the frame g upon the rails h h, as above indicated.

The operation of the machine is as follows: The writer stands where the arrow M is shown, facing the writing-ball a, and swings the frame c with the writing-ball a back on the standards C C′, raising the covering-frame g', hinged to the table d, which serves to hold the paper upon the table d after placing the paper upon the table d, and fastening it to such table by the covering-frame g'. A sheet of carbonized paper, the printing side down, is laid loosely upon the paper. The frame c and writing-ball a are then swung back upon the standard B. The frame g, supporting the rails f f, and the table d, with the wheel K

sliding upon the shaft *i*, are then pushed along the rails *h h* quite up to or near the standard F, or in the direction of the arrow M. The table *d* is then pushed forward in the direction of the arrow N upon the rails *f f* until it stops against the standards C C′. This latter movement causes the wheel K (by means of the toothed rack G) to be turned back, and through the shaft *i*, crown-wheel *n*, (the teeth of which slip past the movable tooth *x* on the verge *v*,) and the pinion *m*. This retrograde movement is imparted to the wheel *l*¹ on the fusee-box *l*, causing the same to turn in an opposite direction to the tendency of the spring inclosed in such fusee-box *l*, and winds up the spring contained therein. When the table *d* stops against the standards C C′, the movable tooth or pallet *x* on the verge *v* slips in between two of the teeth on the crown-wheel *n*, thus stopping the movement of the table *d*, caused by the tendency of the coiled spring in the fusee-box *l*.

The apparatus is now ready for writing. The writer, using his ten fingers, depresses with one of them one piston after another onto the paper, the surface of which always lies in the center of the writing-ball *a*, and each time a letter is produced on the paper the table is caused to move one letter-space toward the writer, impelled by the double action of the verge *v*, caused by the closing of the current in the depression of the piston *b*, coming in contact with the spring *b*³, whereby the electro-magnets *q q* attract the armature *r*, causing the first movement of the verge *v*, and upon releasing the piston *b*, the socket of which ceases to be in contact with the spring *b*³, thereby breaking the current, causing the electro-magnets *q q* to release the armature *r*, bringing about the second movement of the verge *v*, communicated, through the crown-wheel *n*, shaft *i*, and wheel K, and toothed rack G, to the table *d*, as already explained. When a line has thus been printed, as indicated by the signal-bell O, the table is again pushed up to the standards C C′, and the movable tooth affixed under the table *d*, engaging between two pins, H′, on the beam H, causes the frame *g* and table *d* to move laterally in the opposite direction of the arrow M a distance equal to the distance between such pins, or the distance between two lines, and the apparatus is ready for the second line, and so on continuously. A few hours' practice will enable a person to write as quickly as with a pen, and by continuous practice a speed of five times that of ordinary writing may be acquired.

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

1. The combination of the converging types *b* with a flat paper-carrying surface or table, *d*, wheels *e*, rails *f*, frame *g*, toothed rack G, wheel K, and shaft *i*, substantially as and for the purpose described.

2. The combination of the types and a flat paper-carrying surface or table, *d*, which is operated by a coiled spring, with the insulated spherical shell *a*¹ of the writing-ball *a*, electro-magnets *q q*, and escapement *v*, all arranged and operating substantially as and for the purpose shown and described.

3. The combination of the converging types *b* with a flat paper-carrying surface or table, *d*, wheels *e*, rails *f*, frame *g*, toothed rack G, wheel K, shaft *i*, rails *h*, and toothed rack or beam H, arranged and operating substantially as and for the purposes specified.

HANS RASMUS MALLING JOHAN HANSEN.

Witnesses:
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F. PETERSEN.