

# UNITED STATES PATENT OFFICE.

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## TYPE-WRITING MACHINE.

SPECIFICATION forming part of Letters Patent No. 470,871, dated March 15, 1892.

Application filed November 17, 1890. Serial No. 371,862. (No model.) Patented in Switzerland April 29, 1890, No. 2,078, and in Germany May 6, 1890, No. 57,812.

### To all whom it may concern:

Be it known that I, CZESLAW RYMTOWTT-PRINCE, manufacturer, of Geneva, in Switzerland, have invented certain new and useful Improvements in Type-Writers, (for which Letters Patent have been granted me in Switzerland, dated April 29, 1890, No. 2,078, and in Germany, dated May 6, 1890, No. 57,812,) of which the following is a specification.

The main object of the invention is to allow officials and other governmental officers to exchange cipher-writings which are absolutely undecipherable to all except those who possess the "key" of the writing and a machine similar to that with which the cryptogram has been written. These cipher-writings have, moreover, the advantage of being of so small dimensions that they may very easily be dissembled by those who are commissioned with their transmission. The said cipher-writer prints the letters upon a very thin and narrow paper ribbon, which may be pasted upon a sheet of paper by the receiver of the writing, if desired. The machine is so small in size (about three and a half inches in diameter and an inch and a half in height) that it may easily be put, with a suitable inclosing case, into one's pocket, and, nevertheless, all its parts are constructed with such solidity and precision that its good working is insured, even if used by unskilled people. The machine may be further provided with mechanism for rolling up the paper ribbon into a very small compass for transmission.

In the accompanying drawings, Figure 1 is a vertical section of the machine at rest. Fig. 2 is a section of the machine at the moment when a letter or type is printed, and Fig. 2<sup>a</sup> shows an elevation of the mechanism for feeding and holding the paper ribbon. Fig. 3 is a plan view of the machine, in which the whole upper part, except the rollers bearing the inked ribbon, have been removed. Fig. 4 is an elevation of the machine facing the roller carrying the inking-ribbon; and Fig. 5, a plan view, partially in section, of the lettered ring and adjacent parts. Figs. 6, 7, 8, 8<sup>a</sup>, and 9 show details of the same machine. Fig. 10 is a section, and Fig. 11 a plan view, of a modification of the machine provided with a double range of types. Figs. 12 and

13 show detached parts of the machine shown in Figs. 10 and 11. Fig. 14 is a side elevation, and Fig. 15 a plan of the base of the machine and the mechanism connected therewith for holding and operating the paper ribbon. Fig. 16 is an inverted plan of the lettered ring, bridge-plate, and inking-ribbon roller. Fig. 17 is a cross-section through  $\alpha \alpha$  of Fig. 16 and  $y y$  of Fig. 15, showing the inking-ribbon rollers and their operating mechanism in elevation. Fig. 18 is a sectional elevation, Fig. 19 a sectional plan, and Fig. 20 a partial plan, of the mechanism for controlling the cipher-writing of the machine; and Fig. 21 is an elevation of the paper-ribbon holder at the section-line  $y y$ , Fig. 15. Figs. 14 to 21, inclusive, are shown on an enlarged scale.

A is the base of the machine.

C C are two pillars fixed to the base A, and to which is hinged the ring D, which sets down upon a third pillar E, having a spring-catch F, by means of which said ring is held upon the pillar E. Said catch may be moved to allow said ring to be lifted like a cover when it is desired to look at one of the inner parts of the machine.

The lettered ring D supports a lower fixed case or bridge-piece G, screwed or soldered thereto and beneath the same, and which bridge-piece G carries a movable ring or disk H bearing the type-ring. The disk H has a hub  $h$ , the lower portion of which is adjusted into a central hole of the bridge-piece G, and a plate  $h'$ , screwed to the under face of the hub  $h$ , prevents the raising and removal of the disk H out of the bridge-piece G. The bridge-piece G is provided with suitable openings to allow for the movement of the mechanism described below. The disk H, bearing the types which are engraved in a type-ring J, screwed beneath and to said disk H, is further provided with an internal range of teeth I, in which engages an arm K, sliding in a suitable recess of the bridge-piece G, and having a small roller at its extremity to engage the intervals between the teeth of the range I each time the said arm is pressed outwardly by the enlarged portion  $m'$  of the hand stem or key M, Figs. 2 and 5, against which it is constantly pressed by a spring L. The purpose of this disposition is to render the disk

H temporarily immovable while a letter is printed or impressed on the paper ribbon. The hub *h* of the disk II being movable in the bridge-piece G, the disk II may be turned in any direction when said arm K is at rest. The revolving of the disk II is caused by means of a square part of the hand-stem M, which engages into the ring N, screwed to the upper end of the hub *h* of the disk II, and into which it may be depressed axially from the position shown in Fig. 1 to that shown in Fig. 2. If one turns the hand-stem M, the disk II and type-ring J are also revolved. The said stem M may be withdrawn when the machine is not in use and when the machine is to be put in one's pocket. As shown in Fig. 9, said stem contains a screw-driver *n*, intended to be used after removal from the stem M to unscrew and disconnect the parts when the machine is to be unmounted. Around the hub *h* there is placed a toothed wheel *b* and a hand or pointer O, which are connected and are free to turn together, and said pointer is intended to determine, as it will be shown below, the letter or figure upon the ring-shaped indicator or dial D, Fig. 5, which will be printed, according to the position of the disk II when the stem M is depressed.

The hand or pointer O is combined with a mechanism which will be described farther on and which is especially intended to produce the cipher-writing.

The base-plate A is provided with three vertical walls Q<sup>1</sup>, Q<sup>2</sup>, and Q<sup>3</sup>, to which are pivoted the rollers which guide the paper ribbon upon which the impression is made in printing, and the levers R, S, and T are pivoted to these walls. These levers are acted upon by the cross-headed end of the hammer-lever U, and the movement of the lever R causes the advancing of said paper ribbon after each printing, as hereinafter more fully described. The platen-lever S is at one end depressed by the hammer-lever U when the stem M is forced down and at its other end is raised with the paper ribbon V against the lower surface of the types upon the ring J of the disk II. The lever T is intended to produce the advancing of the inking-ribbon, which passes between the paper ribbon and the types, as hereinafter described. These three levers are acted upon by suitable springs *r*<sup>2</sup>, *s*, and *t*. The hammer-lever U is pivoted at *u* to the base-plate A and is acted upon by the lower end of the stem M each time the latter is pressed into the machine. By such depression the almost simultaneous movement of the levers R, S, and T by the lever U is accomplished. The paper ribbon V is lifted against the types by means of the platen-lever S and the impression is given. The pawl *r* at the end of the lever R is raised, so as to engage and turn the toothed wheel *w* one tooth, when the stem M is released and the lever R is raised by its spring *r*<sup>2</sup>. The toothed wheel *w* turns the roller W, which is preferably covered with india-rubber,

and which presses the paper against the roller X, so that the paper ribbon V advances a given distance after each printing. From the drum Y or a holding-case which contains a quantity of paper ribbon for writing the paper ribbon V passes beneath a roller Z and over the head-piece of the lever S and over the roller W and then between the latter and the roller X, which it surrounds nearly entirely, and from which it leaves the machine, as shown in Fig. 2. Said paper ribbon case or drum Y is fixed to a sliding arm *y*, which moves in a suitable slot in the base-plate A.

When the machine is not used, one may turn over or lay down the drum or case Y by hand and retract or move the same in between the base-plate A and the top of the machine, as shown in Figs. 1, 3, 14, and 15. When one wishes to write with the machine, the sliding arm *y* is pulled outward and the drum Y raised upward, as shown in Fig. 2. A suitable spring-pawl *y*<sup>3</sup>, engaging notches in the sliding arm *y*, maintains the latter in either of these two positions. The drum or case Y, holding the paper ribbon, is connected to a support *y*<sup>2</sup>, and the sliding arm *y* has connected to it a post *y*<sup>1</sup>, and this support is pivoted to said post, so that the drum can be laid down or stood upright, and the parts move together either while being pushed or retracted within the machine or when pulled out for use. I prefer to have the spring-pawl *y*<sup>2</sup> engage a notch of the sliding arm *y* to hold the parts when distended or drawn out, because when retracted they are held by friction or a suitable inclosing case.

Fig. 2 shows a vertical section of the peculiar form of the base of the walls Q<sup>2</sup> Q<sup>3</sup>, supporting the rollers W, X, and Z, which form a channel for the paper ribbon to follow the path described above and shown in Fig. 2 under the roller Z, and then over between and around the rollers W and X.

The inking-ribbon is supported by two drums A<sup>1</sup> and A<sup>2</sup>, pivoted to bracket-arms 30 31, connected to the under side of the ring D. The drum A<sup>2</sup> is connected with a ratchet-wheel *a*<sup>12</sup>, acted upon by the above-mentioned lever T. The lever T is so placed that it comes beneath the inner end of click-lever A<sup>x</sup>. Each time the lever T is depressed by the hammer-lever U the lever A<sup>x</sup> is operated by a spring 5, secured to the bracket-arm 30, and is raised at the end opposite to the lever T and depressed with the said lever, whereby the pawl *a*<sup>10</sup> acts upon the ratchet *a*<sup>12</sup> of the drum A<sup>2</sup> through the spring *a*<sup>2</sup>, causing the pawl to take up a tooth of the ratchet-arm and the drum to be rotated by the upward movement of the lever T, operating the lever A<sup>x</sup>.

The machine is, moreover, provided with a cryptographical disposition, by means of which the hand or pointer O may be displaced from time to time with regard to the types of the disk II, either on the left or on the right, when the machine is printing. The mecha-

ism which effects this function is more particularly shown in Figs. 1, 2, 6, 7, 8, and 8<sup>a</sup>.

The hub *h* of the disk *H* is notched or provided with a notched collar at its upper end, and the cylindrical box *II'* has a central opening that fits upon said hub, and the ring *N* fits upon the top of the hub *h* over the box *H'*, and screws 40 pass down through the ring *N* into the hub to hold the box in place. A second cylindrical box *H<sup>2</sup>* is connected with the box *H'* by the small screws *h<sup>2</sup>*.

Fig. 6 shows by an inverted plan, and Fig. 7 by a plan view, the mechanism of the boxes *H'* and *H<sup>2</sup>*, and Figs. 18, 19, and 20 show the same mechanism more perfectly.

As will be understood from the above description, if one places the hand or pointer *O* upon a letter or figure of the ring *D* and depresses the stem *M* as far as it will go into the machine the bolt or slider *K* is pressed into the teeth *I* of the disk *H*, which is thereby arrested, and the lever *U* is operated and, as depressed, operates the lever *S* to throw the paper ribbon *V* against the type of the ring *H*, the inking-ribbon being interposed between the type and the paper, as in other type-writers. The above-mentioned hand or pointer *O*, which is free to turn about the hub *h* of the disk *H*, is fixed to a gear-wheel *b*, and I provide a shallow pinion *a* and a deep pinion *a'*, which are pivoted to a swing-bridge or rocker *k*, Figs. 6, 18, and 19, and either one or the other of said pinions is brought into gear with the wheel *b*. The rocker *k* is pivoted to the plate of the box *H<sup>2</sup>*, and it is connected to an arm or lever *k'*, having a pin *k<sup>2</sup>* at its outer end, and which pin *k<sup>2</sup>* projects through a slot in the plate of the box *II'*, and said pin is grasped and moved to swing the rocker *k* so as to bring either the pinion *a* or pinion *a'* into mesh with the gear-wheel *b*. The letters "R" and "L" are engraved at the end of the slot to indicate if the lever *K'* is placed for right or left hand motion of the wheel *b*. The deep pinion *a'* is constantly engaged with the pinion *a* and wheel *c*. In one position of the lever-arm *k'* the wheels and pinions *c*, *a'*, *a*, and *b* are in gear, and movement is communicated in the order named, and in the other position of the lever *k'* the wheels and pinions *c*, *a'*, and *b* are in gear and the pinion *a* runs free. The wheel *c*, which is pivoted between the boxes *II'* and *II<sup>2</sup>*, is double, Fig. 8, having above the teeth which are in gear with the pinion *a'* a narrower range of ratchet-teeth, acted upon by a pawl *g*, fixed to a lever *O'*, which lever is pivoted at *o'*, Fig. 7, to the box or case *II<sup>2</sup>*, and is acted upon by a spring *o<sup>2</sup>*. On the other hand, the wheel *c* is combined with a toothed wheel *d*, provided with a notched cylindrical rim or skirt *d'*, the latter surrounding and interruptedly covering or straddling the ratchet-teeth of *c* that are acted upon by the pawl *g*, and said rim or skirt *d'* is interrupted by irregular openings or notches, and the rim portion when between the pawl and the ratchet-wheel prevents the

pawl *g* engaging with the ratchet-teeth of *c*. The notches or openings are made so as to open up or uncover sometimes one and sometimes two or more of the ratchet-teeth of the wheel *c*. The ratchet-wheel *d* is acted upon by a second pawl *g'*, which is also pivoted to the lever *O'*, and the lever *O'* carries an arm *e*, having at its end a roller *e'*, which is pressed toward the center of the machine by the aforesaid spring *o<sup>2</sup>*. The toothed wheel *d* and its rim or skirt *d'* are connected to or formed with the arbor on which they turn, and the wheel *c* and its ratchet are loose upon the same arbor. Above the box-top *H'*, upon the arbor of the wheel *d*, is a pointer *d<sup>2</sup>*, and beneath its sweep a numbered dial is engraved upon the box-top.

The stem *M* is provided with a projection *m<sup>2</sup>*, which acts like a wedge and passes through a suitable groove *n'* (see Fig. 11) of the ring *N*. Said projection *m<sup>2</sup>* repulses or presses back the roller *e'* and arm *e* each time the stem *M* is depressed, as shown in Fig. 2, and thereby causes a backward oscillation of the lever *O'* and a consequent movement of the parts connected therewith. When the stem is lifted again, the lever *O'* is moved back into its normal position by the action of the spring *o<sup>2</sup>*. Each oscillation of the lever *O'* causes the ratchet-wheel *d* to be turned one tooth, and the notched rim or mantle *d'*, making part of *d*, is consequently correspondingly moved every oscillation of the lever *O'*—that is to say, with every depression of the stem *M*, which is simultaneous with each printing of a letter or figure. The pawl *g* is also moved each oscillation of the lever *O'*, and it sometimes acts upon a tooth of the ratchet *c* through the notches or openings in the rim or skirt *d'*; but it sometimes bears against or rides over upon a face part of the rim or skirt *d'*. In the first case it causes the wheel *c* to be turned one tooth and acts upon the pinion *a* or *a'*, and causes the wheel *b*, and also the pointer *O*, to be turned one tooth to the left or to the right, according to the position "L" or "R" of the pin *K<sup>2</sup>* and the pinion *a* or *a'* that is in gear with the wheel *b*. In the second case the ratchet *d* turns alone and the pointer *O* is not displaced with regard to the disk *H*. The displacing of the pointer *O* with regard to the disk *H* is therefore determined by the out-cuts or openings of the rim or skirt *d'*, which might be called the "irregulator," and which may be varied at will, provided those machines which are to correspond with one another (the machine of the sender and that of the receiver of cipher-writings) have one and the same irregulators. A spring 45, secured to the box *H<sup>2</sup>* and having a toothed end, engages the teeth of the wheel *b* and holds the same in place and insures the movement of the pointer with the boxes *II'* *II<sup>2</sup>* and disk *H*, except when operated, as described, by the pawl *g*, wheel *c*, and pinion *a* or *a'*.

The key of a cryptographical communication written with one of these machines con-

sists in the knowledge of the position into which the pointer  $O$ , the pin  $K^2$ , and the irregular  $d$  is to be placed at the printing of the first letter or figure in recopying the cryptogram into clear writing. To facilitate this, the boxes or cases  $H'$  and  $H^2$  are provided around their periphery with a double scale (see Figs. 4 and 10) having as many divisions as there are types in the machine. Those divisions are marked "R" and "L" and are numbered from left to right in one circle (the "R" circle) and from right to left in the other or "L" circle. The number of divisions in these peripheral scales agree with the number of divisions in the engraved dial beneath the pointer  $d^2$ , and the key of the machine is a number of each scale or dial and the "R" or "L" (right or left) position at which the ciphers were written.

The operation of the machine in writing the cryptogram is substantially as follows: An official, for instance, desiring to send a cryptogram sets the pin  $k^2$  to "L," the hand or pointer  $O$  to "10" upon the peripheral scale  $L$ , and sets the pointer  $d^2$  to "10" upon the circular dial, when the key will be "10 L 10." With the instrument thus set the official writes out a cryptogram, the first word of which, for illustration, is "Paris," and in so doing brings the pointer successively to the letters of this word on the disk  $H$  and depresses the hand-stem  $M$ , operating the mechanism, to give the impression upon the paper ribbon. The word "Paris" is not impressed on the ribbon, but the cryptogram "C L H D 3" is impressed, which is eminently unintelligible. This is sent with the key to its destination, and the receiver, who has a similar machine to the sender, sets his instrument upon the key "10 R 10," the same in numbers, but the opposite in position to the key on which these characters were made. With the instrument thus set the receiver uses the characters "C L H D 3" received, and the word "Paris" is written out on the paper. Thus, for instance, the sender may use the key "5 L 15" and print a message, beginning with "New York" with the characters "K Q Y U W E B," and send the same, and the receiver, knowing the key and setting his similar machine at "5 R 15" and using the characters sent, will print off "New York." Thus a message of any length can be written to form the cryptogram. During the writing out of a message by the successive depressions of the hand-stem and the operations effected thereby, the pointer  $d^2$  is moved a point for each depression of the hand-stem  $M$  by the movement of the lever  $O'$ , pawl  $g'$ , and wheel  $d$ . This movement also operates the pawl  $g$ , and the skirt or rim  $d'$  moves with the wheel  $d$  beneath the edge of the pawl  $g$ , at intervals covering up the upper and smaller row of teeth of the wheel  $c$  and at intervals uncovering them for the pawl  $g$  to fall upon, engage, and operate said teeth with each movement of the lever  $O'$  and in unison with the wheel  $d$  until the skirt  $d'$  again comes be-

neath the pawl  $g$  and lifts the same away from said teeth. The pawl  $g$  will then move idly over the face of the skirt until the next opening therein comes beneath the pawl. The movement by the pawl  $g$  of the teeth of the wheel  $c$  operates and shifts the pointer  $O$ , one letter for each tooth, in one direction through the intervention of the wheels  $a$  and  $b$  and in the other direction by the wheels  $a'$  and  $b'$ , and the wheels  $a$  and  $a'$ , being of equal size, will cause a like degree of movement in the pointer  $O$ . It will thus be seen that while writing out a cryptogram the pointer  $O$  will thus be irregularly and progressively shifted as the writing of the message proceeds, the pointer getting progressively farther away from the type representing the letter indicated by the pointer  $O$  upon the lettered ring  $D$ . Now, when the corresponding machine is set to the key to write off the cryptogram in readable characters the same irregular and progressive shifting of the pointer  $O$  takes place in a corresponding manner, but in the opposite direction, so that the proper letters are printed by following out the character of the cryptogram.

The above-described machine may be completed, as shown in Figs. 10 and 13, by means of the addition of a second series or range of types  $J'$ , placed concentrically to the first one and intended to render the cipher-writing of the machine still more undecipherable. The lever  $S$  being placed as indicated in Fig. 10, if one depresses the stem  $M$ , as above specified, the lever will press the paper ribbon against the two types, one of the series  $J$  and one of the series  $J'$ . The text thus produced will contain for each letter of the cipher-writing a second letter or figure, the purpose of which is merely to render the cryptogram still more undecipherable. According to the convention between the sender and receiver of the cryptogram, the deciphering will take place by first canceling either each first or each second letter or figure of the cryptogram, according as those letters forming the very text have been printed with the types  $J$  or with the types  $J'$ . The word "Paris" will be written either, for instance, "P I A K R U I T S W," and will be deciphered in canceling the second and each alternate letter P I A K R U I T S W; or it may be written "I P K A U R T I W S," and will be deciphered by canceling the first and each alternate letter I P K A U R T I W S. If one combines now this latter system of cryptography with the above-described one, which is quite the same for the machines with double range of types as for those with only one range of types, one obtains a cryptograph which offers the utmost degree of undecipherability. The indicator or ring dial  $D$  must of course be double when the machine comprises a double range of types; but in view of having only one range of letters or figures shown at a time upon said ring-dial those letters and figures are engraved or

painted upon a ring-slider  $P'$ , placed under-  
 neath a ring  $P$ , provided with suitable open-  
 ings in which appear the letters and figures  
 of the ring-slider  $P'$ . According to the posi-  
 5 tion into which the latter is placed by means  
 of the pin or bolt  $p$ , the openings of  $P$  will  
 show either the letters or figures correspond-  
 ing to the types  $J$  or the letters or figures cor-  
 responding to the types  $J'$ . The ring  $J$  is pro-  
 10 vided with a circular projection bearing upon  
 a corresponding recess of the disk  $H$ , and the  
 ring  $J'$  is provided with a circular projection  
 bearing upon a corresponding recess of the  
 ring  $J$ . It appears, therefore, that the ring  
 15  $J$  is free to be turned with regard to the disk  
 $H$  and that  $J'$  is free to be turned with regard  
 to the ring  $J$ . As shown in Figs. 10 and  
 11, those rings  $J$  and  $J'$  are provided with  
 holes or recesses  $j^2$  and  $j^3$ , corresponding to the  
 20 types, and to the disk  $H$  there are affixed two  
 springs  $j$  and  $j'$ , provided with suitable pro-  
 jections, which engage into the holes or re-  
 cesses  $j^2 j^3$ . The rings of types  $J$  and  $J'$  may  
 25 be displaced at will with regard to each other  
 and with regard to the disk  $H$ ; but the springs  
 $j$  and  $j'$  allow of maintaining the same into a  
 determined position with regard to said disk.  
 In view of having at will either only the types  
 of the ring  $J$  or only those of the ring  $J'$   
 30 printed the support or bearing of the paper-  
 rollers and of the levers  $R$ ,  $S$ , and  $T$  may be  
 displaced by hand upon the base  $A$ , so as to  
 assume either of the three positions shown  
 in Figs. 12, 10, and 13. In the first one,  
 35 the hammer  $S$  presses the paper ribbon only  
 against the types of the ring  $J$ , in the second  
 one the hammer  $S$  presses the paper ribbon  
 against the types of both rings  $J$  and  $J'$  at a  
 time, and in the third the hammer  $S$  presses  
 40 the paper ribbon only against the types of the  
 ring  $J'$ . When both types are printed to-  
 gether, the paper ribbon must be advanced  
 twice as much as when only one type is  
 printed. With that end in view the lever  $R$   
 45 is provided with a projection  $r'$ , upon which  
 the hammer-lever  $U$  strikes in the middle po-  
 sition of the paper-bearer, Fig. 10, and this  
 causes the pawl  $r$  to turn the ratchet-wheel  $w$   
 two teeth at a time, while it is only turned  
 50 one tooth when the hammer  $U$  strikes in front  
 of or behind the projection  $r'$ .

The machine, as shown in Figs. 10, 14, and  
 15, is provided with a small reeling device  
 located in the base  $A$  and intended to easily  
 55 wind up in the form of a very small roll the  
 printed cipher message. A knurled wheel  $x$   
 is located in the base  $A$  and projects slightly  
 beyond the circumference of the latter, so as  
 to be easily turned by the finger. Said wheel  
 60  $x$  carries a gear-wheel  $z$ , that acts upon a pin-  
 ion  $z'$ , the slotted stem  $z^2$  of which pinion pro-  
 jects out of the upper face of the base  $A$ . If  
 one end of the paper ribbon upon which the  
 cipher is printed is placed into the slot of the  
 65 stem  $z^2$  and if the knurled wheel  $x$  is then ro-  
 tated, the paper ribbon will be rapidly wound  
 up on the said stem  $z^2$  into a very small com-

pass and it is easily withdrawn, and in this  
 small compass transported in any desired  
 manner to its destination. 70

I claim as my invention—

1. The combination, in a type-writer, with  
 the hand-stem  $M$  and its projection  $m^2$ , of the  
 operating-lever  $O'$ , its spring  $o^2$ , the arm  $e$   
 and roller  $e'$ , connected to said lever, the pawls 75  
 $g g'$ , connected to one end of the lever, the  
 ratchet-wheel  $d$  and its rim  $d'$ , the wheel  $c$ ,  
 and the pointer  $O$ , and intermediate gear act-  
 uated thereby, substantially as set forth.

2. The combination, in a type-writer, with 80  
 the lettered ring  $D$ , the pointer  $O$ , and toothed  
 wheel  $b$ , connected with said pointer, of the  
 lever  $k'$  and pin  $k^2$  and rocker  $k$ , connected  
 therewith, the pinions  $a a'$ , pivoted in the  
 rocker, the wheel  $c$ , engaging the pinion  $a'$ , 85  
 and the ratchet-wheel  $d$  and its rim  $d'$ , and  
 mechanism, substantially as specified, for op-  
 erating said parts irregularly and in opposite  
 directions upon the shifting of the lever  $k$ ,  
 substantially as specified. 90

3. The combination, in a type-writer, with  
 the lettered ring, the pointer, and the hand-  
 operating stem, of mechanism operated by the  
 stem and adapted at intervals to move the  
 pointer in relation to the lettered ring, and a 95  
 shifting-lever and the pinions connected there-  
 with for moving the pointer one way or the  
 other, substantially as set forth.

4. In a type-writer, the combination, with 100  
 the disk  $H$ , the type-ring  $J$ , and range of  
 teeth  $I$ , formed or connected together, of the  
 hand-stem  $H$ , having an enlarged portion  $m'$ ,  
 the arm or lever  $K$ , and spring  $L$ , whereby the  
 arm or lever  $K$  is moved endwise by the por-  
 tion  $m'$  into engagement with the range of 105  
 teeth  $I$  and the type-ring is held during the  
 printing operation, substantially as set forth.

5. In a type-writer, the combination, with  
 the hand-stem  $M$ , having a square portion, of  
 the disk  $H$  and its hub  $h$ , the type-ring  $J$ , con- 110  
 nected to said disk, the notched ring  $N$ , hav-  
 ing a square opening and secured to the up-  
 per end of the hub  $h$ , and the boxes  $H'$  and  
 $H^2$ , connected to said hub, whereby the rota-  
 tion of the hand-stem causes all of the latter 115  
 parts to rotate with said hand-stem, substan-  
 tially as set forth.

6. In a type-writer, the combination, with  
 the hand-stem  $M$ , having a projection  $m^2$ , the  
 lever  $O'$ , its spring  $o^2$ , the arm  $e$  and its roller 120  
 $e'$ , and the pawls  $g g'$ , connected with said le-  
 ver  $O'$ , of the wheel-ratchet  $d$ , having a notched  
 rim or skirt  $d'$  moving with the axis or arbor,  
 the toothed wheel  $c$ , loose upon the said arbor  
 and having two rows of teeth, the one within 125  
 the rim  $d'$  and the other below said rim, where-  
 by the wheel  $d$  is operated by its pawl  $g'$  with  
 every movement of the lever  $O'$ , and the wheel  
 $c$  is operated at intervals by its pawl  $g$  simul-  
 taneously with the wheel  $d$ , substantially as 130  
 set forth.

7. In a type-writing machine, the combina-  
 tion, with the hand-stem  $M$ , having a projec-  
 tion  $m^2$ , the lever  $O'$ , its spring  $o^2$ , the arm  $e$ ,

its roller  $e'$ , and the pawls  $g$   $g'$ , connected with said lever, of the wheel-ratchet  $d$ , having a notched rim or skirt  $d'$  moving with the axis or arbor, and the pointer  $d^2$  on the same arbor, said wheel ratchet and pointer being operated by the pawl  $g'$  with every movement of the hand-stem, the toothed wheel  $c$  loose upon the same arbor and having two rows of teeth, the one within the notched rim  $d'$  and the other below the said rim, the pointer  $O$  and rocker, and gears connecting said pointer and the wheel  $c$ , whereby the wheel  $c$  is operated at intervals by the pawl  $g$  in unison with the wheel  $d$  to shift the pointer either progressively in one direction or the other, according as the shifting-gears are set, substantially as specified.

8. In a type-writing machine, the combination, with the hand-stem  $N$ , of the hammer-lever  $U$ , the levers  $R$   $S$   $T$ , and their springs  $r^2$ ,  $s$ , and  $t$ , and the types and paper-feeding roll and ribbon, whereby the downward movement of the hand-stem simultaneously operates said levers for giving the impression and for feeding the paper and ink ribbon, substantially as set forth.

9. In a type-writing machine, the combination, with the disk  $H$  and its hub  $h$ , and the boxes  $H'$   $H^2$ , connected to said hub, of the pointer  $O$ , its toothed wheel  $b$ , surrounding said hub, and the spring-pawl  $45$ , connected to the boxes for holding said pointer, substantially as set forth.

10. In a type-writing machine, the combination, with the hand-stem  $M$ , the disk  $H$ , its hub  $h$ , and type-ring  $J$ , through which the hand-stem passes, of the hammer-lever  $U$ , the lever  $S$ , and its spring  $s$  for giving the impression upon the paper ribbon with each operation of the hand-stem, substantially as set forth.

11. In a type-writing machine, the combination, with the hand-stem  $M$ , of the hammer-lever  $U$ , the lever  $R$ , its spring  $r^2$ , the toothed wheel  $w$ , and pawl  $r$  for feeding along the paper ribbon with each operation of the hand-stem, substantially as set forth.

12. In a type-writing machine, the combination, with the hand-stem  $M$ , of the hammer-lever  $U$ , the lever  $R$ , its spring  $r^2$ , the toothed wheel  $w$  and pawl  $r$ , and the rollers  $Z$ ,  $W$ , and  $X$  and the walls  $Q^2$   $Q^3$  for feeding along and guiding the paper ribbon with each movement of the hand-stem, substantially as set forth.

13. In a type-writing machine, the combination, with the base  $A$ , the levers  $R$ ,  $S$ , and  $T$ , the toothed wheel  $w$ , pawl  $r$ , and rollers  $Z$ ,  $W$ , and  $X$ , of the walls  $Q^2$ ,  $Q^3$ , and  $Q^4$ , connected to the base  $A$  for supporting and carrying the aforesaid parts and guiding the paper ribbon, substantially as set forth.

14. In a type-writing machine, the combination, with the hinged ring  $D$ , the brackets  $30$   $31$ , and drums  $A'$   $A^2$ , connected with said ring, of the hand-stem  $M$ , the hammer-lever  $U$ , the lever  $T$ , and its spring  $t$ , the click-lever  $A^x$ , and its spring  $5$ , connected to the bracket  $30$ , the pawl  $a^{10}$ , and its spring  $a^{11}$ , and the ratchet  $a^{12}$  for feeding along the inking-ribbon with each downward movement of the hand-stem, substantially as set forth.

15. In a type-writing machine, the combination, with the slotted base  $A$ , of the drum  $Y$  for the paper ribbon, the support  $y^2$  for said drum, the post  $y'$ , pivotally connected to said support, the sliding arm  $y$ , connected to the post and moving in the slot of the base and having a notch on one edge, and the spring-pawl  $y^3$ , connected to the base  $A$  and adapted to engage the notch of the sliding arm  $y$  to hold the same and the drum  $Y$  in position when distended, substantially as set forth.

16. In a type-writing machine, the combination, with the base  $A$ , of the knurled wheel  $x$ , the gear-wheel  $z$  upon the same shaft, the pinion  $z'$ , meshing therewith, and the slotted stem  $z^2$ , whereby the cryptogram can be rolled up into a small compass, substantially as set forth.

17. The combination, in a type-writing machine, of a circular range of types and a paper feeding and impressing mechanism, a dial with corresponding characters, a movable pointer, and mechanism for moving the pointer automatically and progressively in either direction to change its position in relation to the types, so as to print a cryptographic message or by the reverse movement produce the desired message from the cryptogram, substantially as specified.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

CZESLAW RYMTOWIT-PRINCE.

Witnesses:

E. IMER SCHNEIDER,  
S. PRENTICE NAYLOR.

(No Model.)

C. RYMTOWTT-PRINCE.  
TYPE WRITING MACHINE.

6 Sheets—Sheet 6.

No. 470,871.

Patented Mar. 15, 1892.

Fig. 18.

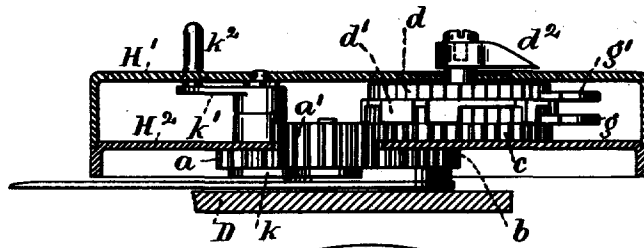


Fig. 19.

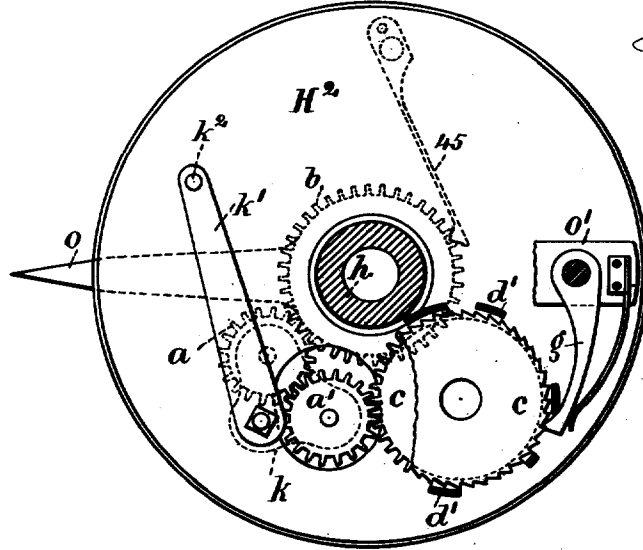
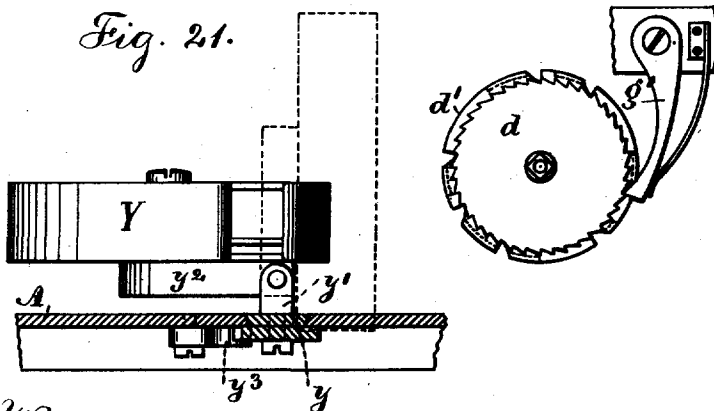


Fig. 20.

Fig. 21.



Witnesses:  
J. Stait  
Harold Serrell

Inventor:  
Czeslaw Rymtowitz-Prince  
per Samuel W. Serrell atty.

(No Model.)

C. RYMTOWTT-PRINCE.  
TYPE WRITING MACHINE.

6 Sheets—Sheet 5.

No. 470,871.

Patented Mar. 15, 1892.

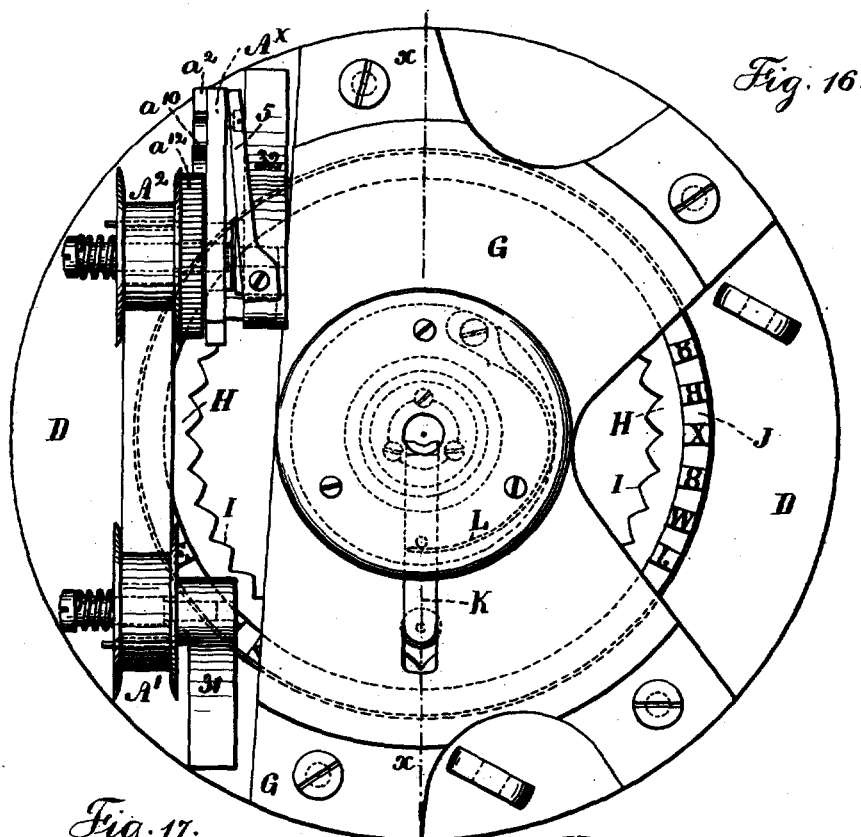
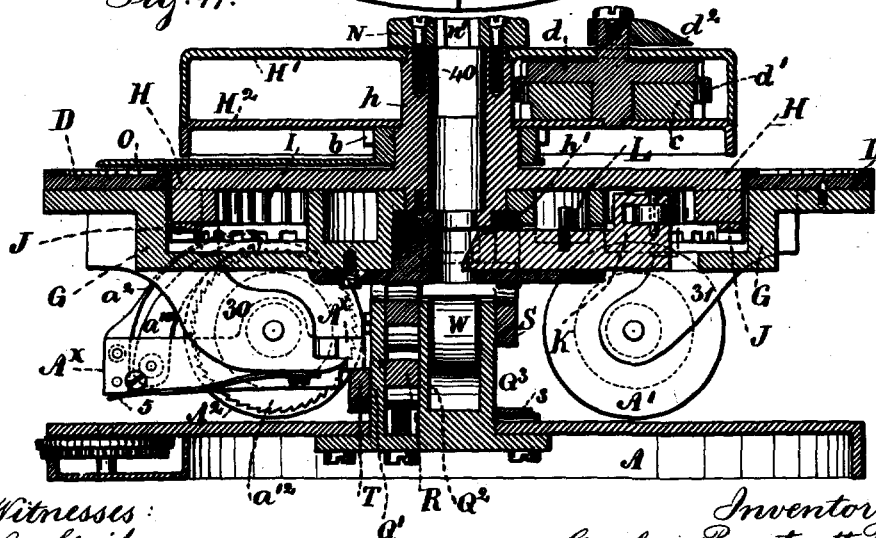


Fig. 16.

Fig. 17.



Witnesses:  
J. Stait,  
Harold Perrell

Inventor:  
Czeslaw Rymtowitz-Prince  
per Samuel W. Perrell atty.



(No Model.)

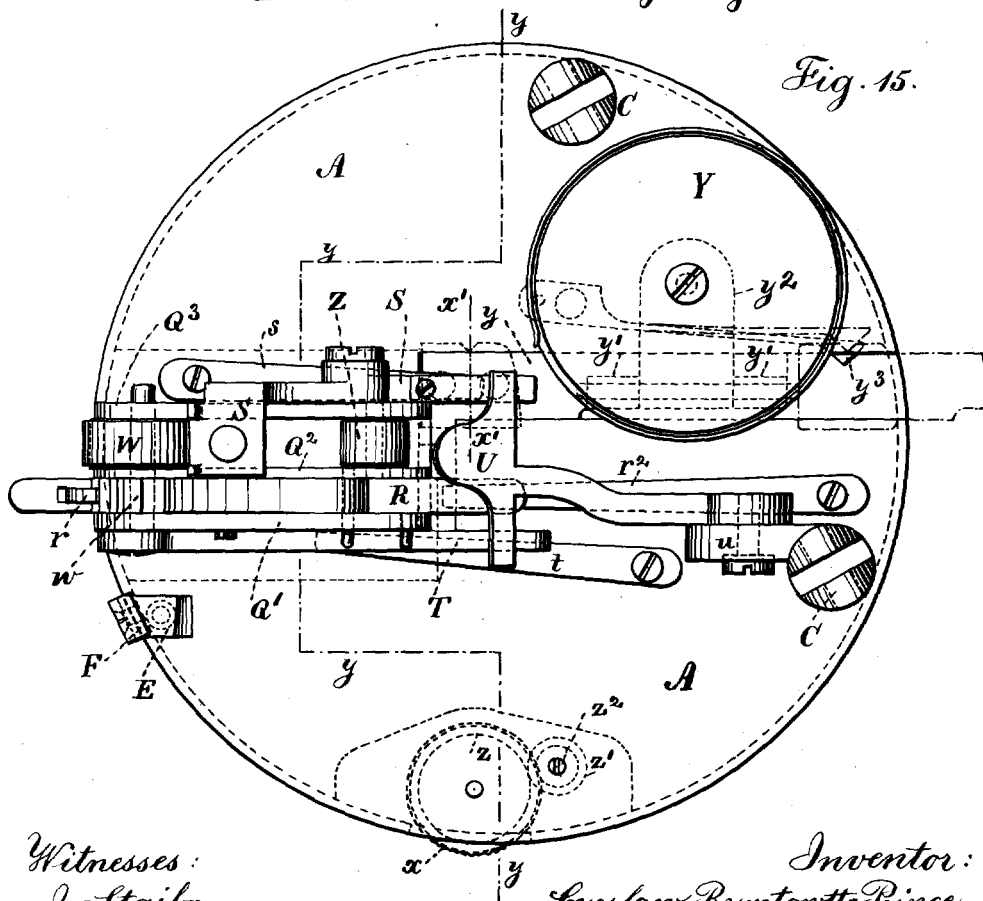
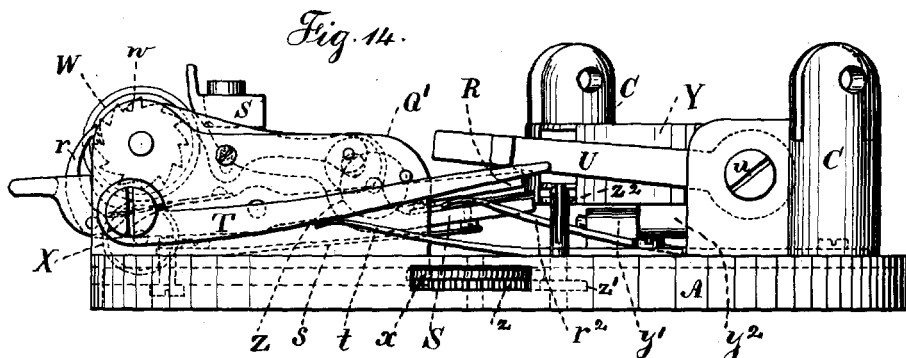
C. RYMTOWTT-PRINCE.

6 Sheets—Sheet 4.

TYPE WRITING MACHINE.

No. 470,871.

Patented Mar. 15, 1892.



Witnesses:  
*J. Stait.*  
*Harold Ferrell*

Inventor:  
*Czeslan Rymtowitz-Prince*  
 per *Lemuel W. Ferrell* atty

(No Model.)

6 Sheets—Sheet 3.

C. RYMTOWTT-PRINCE.  
TYPE WRITING MACHINE.

No. 470,871.

Patented Mar. 15, 1892.

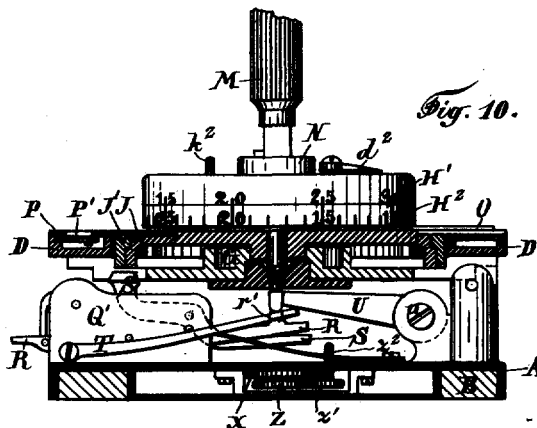


Fig. 10.

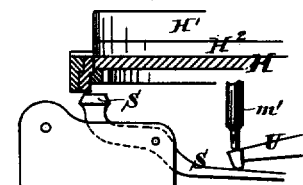


Fig. 12.

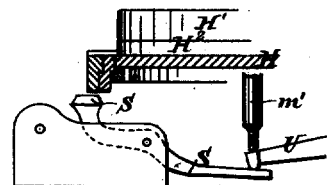


Fig. 13.

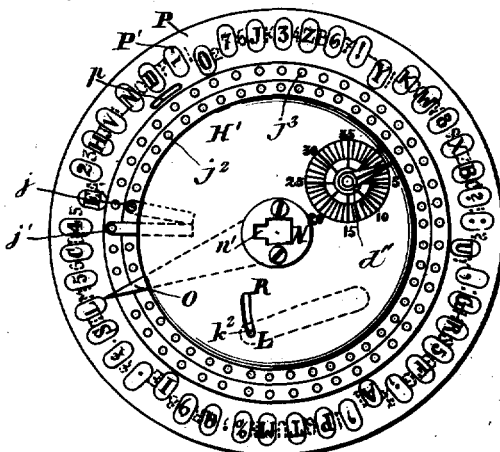


Fig. 11.

Inventor

Czeslaw Rymtowitz-Prince

for Lemuel W. Lovell

Witnesses  
Chas. H. Smith  
J. Stark

*(Signature)*

cut

(No Model.)

6 Sheets—Sheet 2.

C. RYMTOWTT-PRINCE.  
TYPE WRITING MACHINE.

No. 470,871.

Patented Mar. 15, 1892.

Fig. 5.

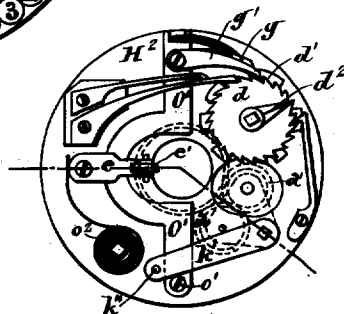
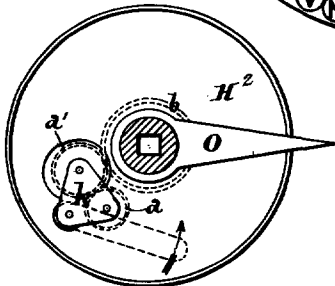
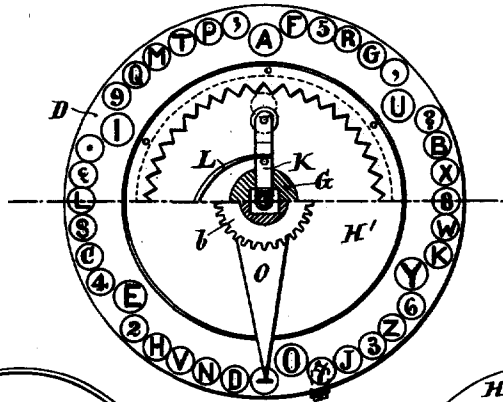


Fig. 6.

Fig. 7.

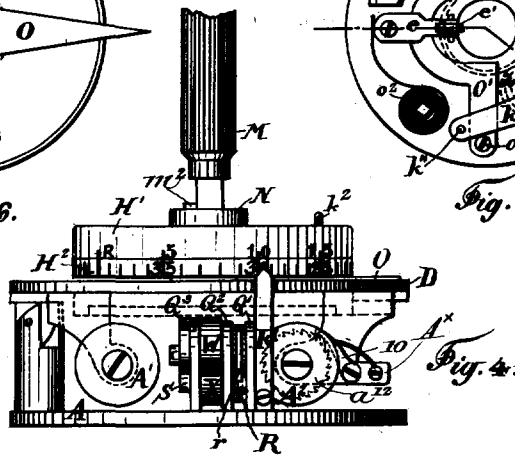


Fig. 4.

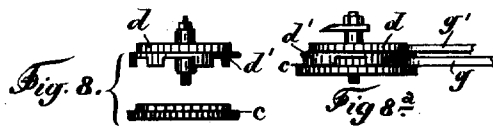


Fig. 8.

Fig. 8².



Fig. 9.

Witness

Chas. H. Smith  
J. H. H. H.

Inventor

Czeslaw Rymtowitz-Prince  
per Lemuel W. Lovell

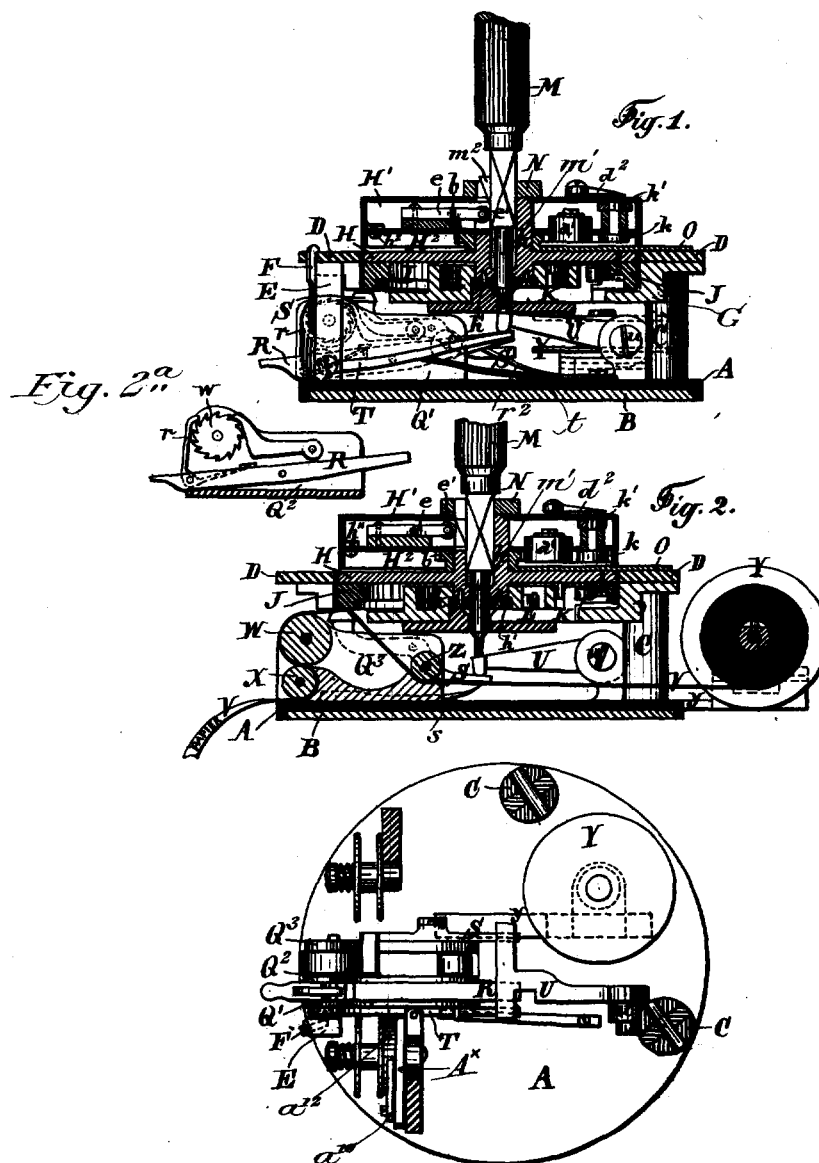
(No Model.)

6 Sheets—Sheet 1.

C. RYMTOWTT-PRINCE.  
TYPE WRITING MACHINE.

No. 470,871.

Patented Mar. 15, 1892.



Witness  
Chas. H. Smith  
J. Stait

Fig. 3.

Inventor  
Czeslaw Rymtowitz-Prince  
for Lemuel W. Sorell atty