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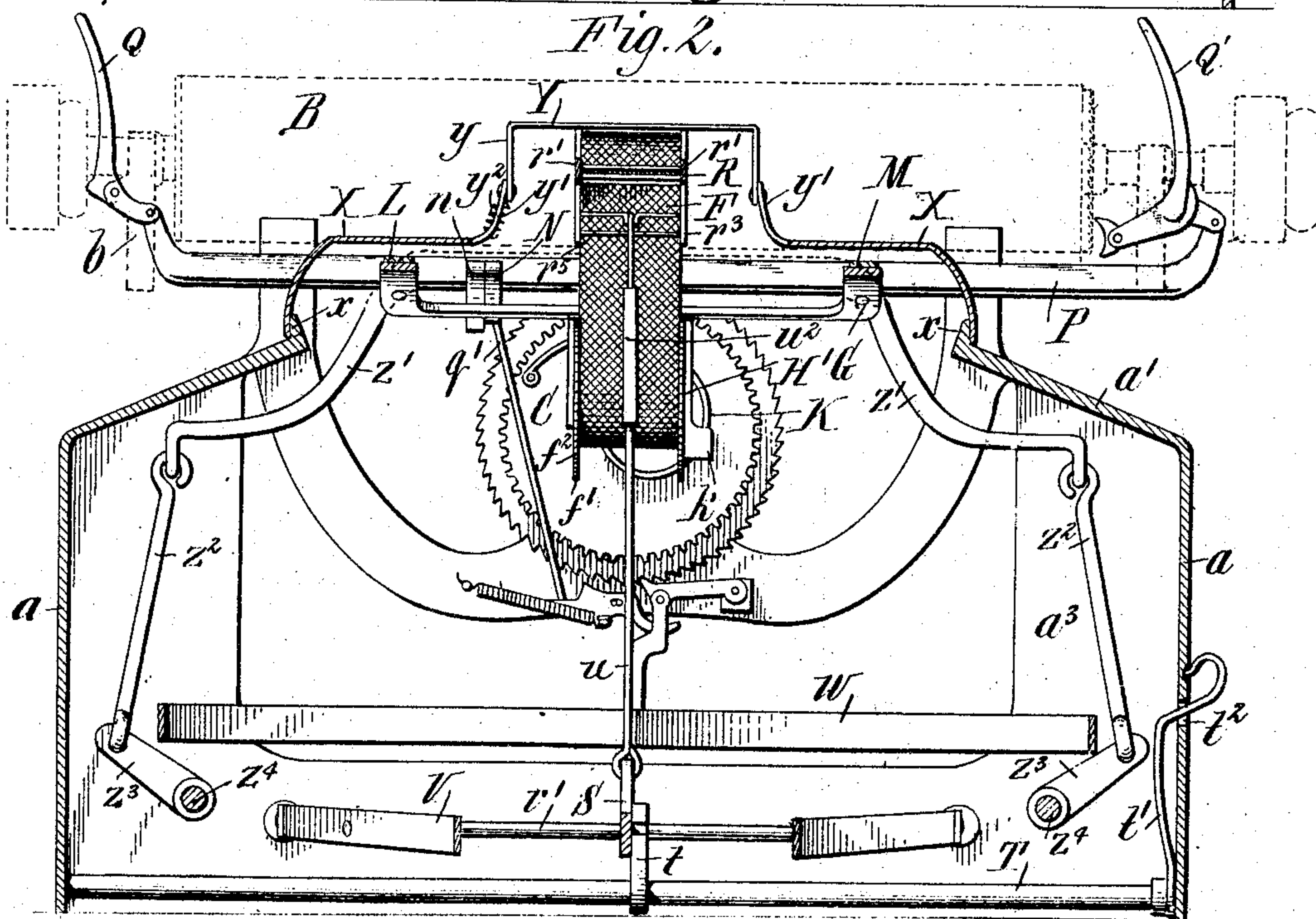
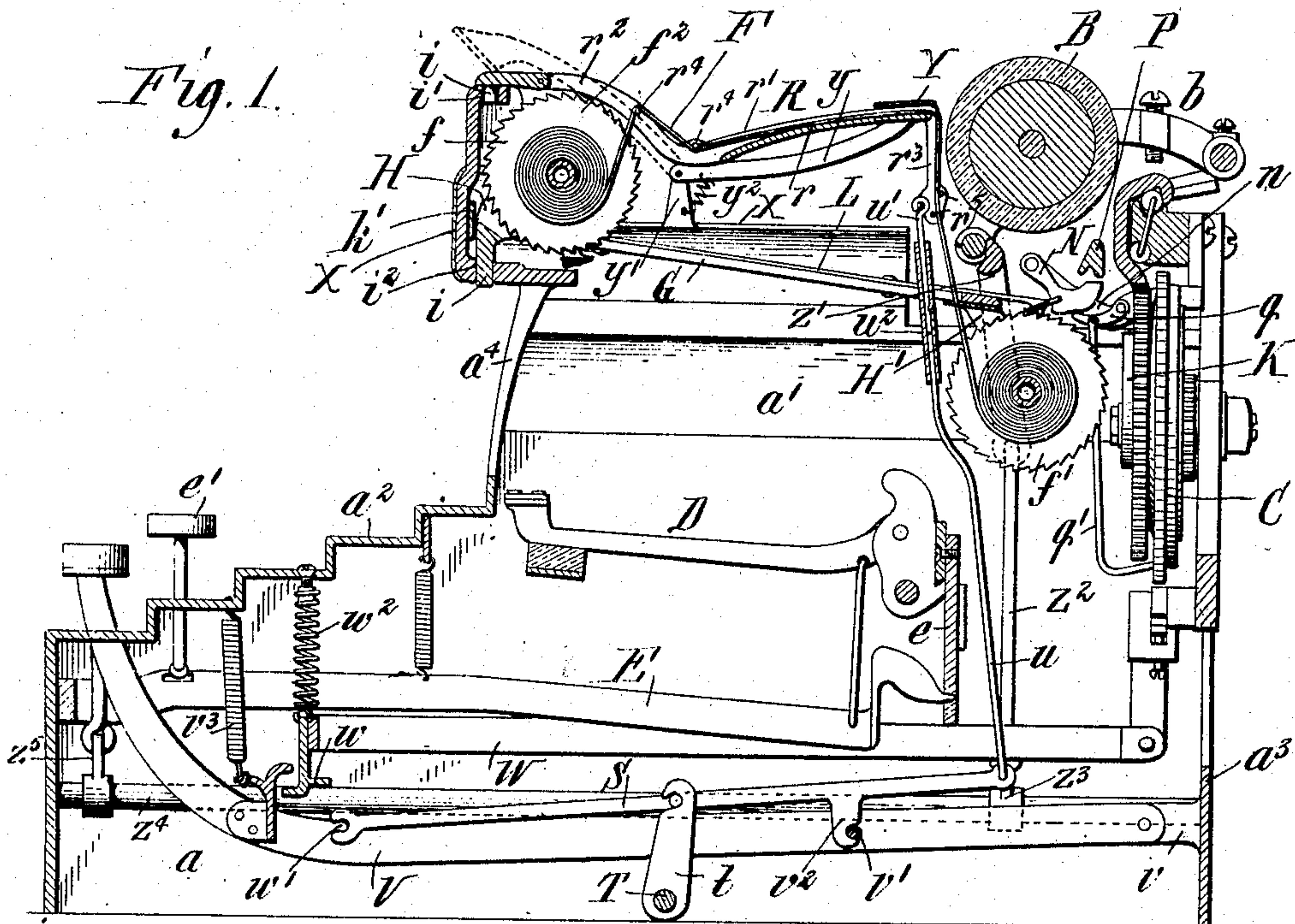
PATENTED FEB. 12, 1907.

E. G. LATTA.

RIBBON MECHANISM FOR TYPE WRITING MACHINES.

APPLICATION FILED MAR. 3, 1904.

3 SHEETS—SHEET 1.



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3 SHEETS—SHEET 2.

Fig. 3.

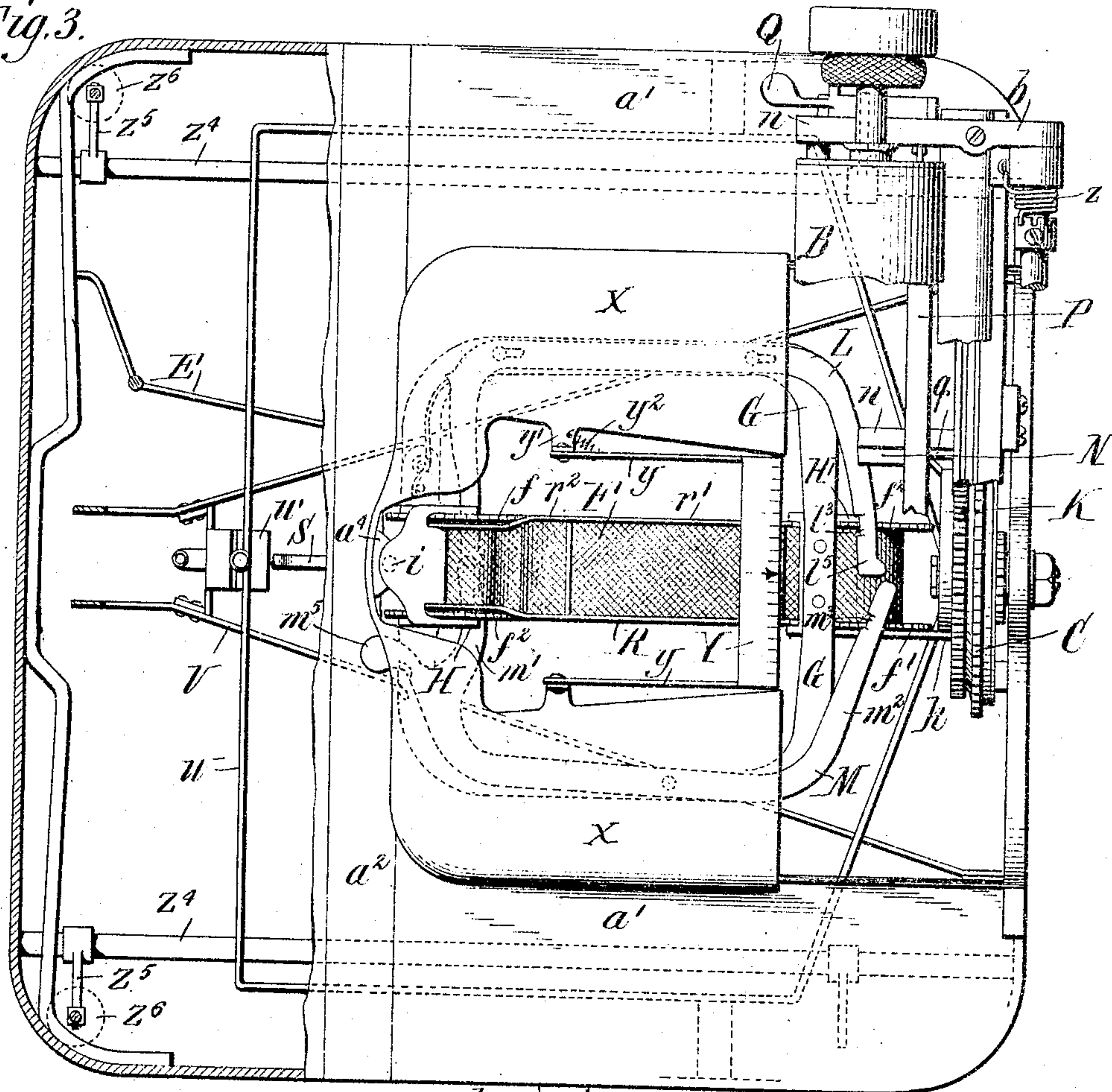
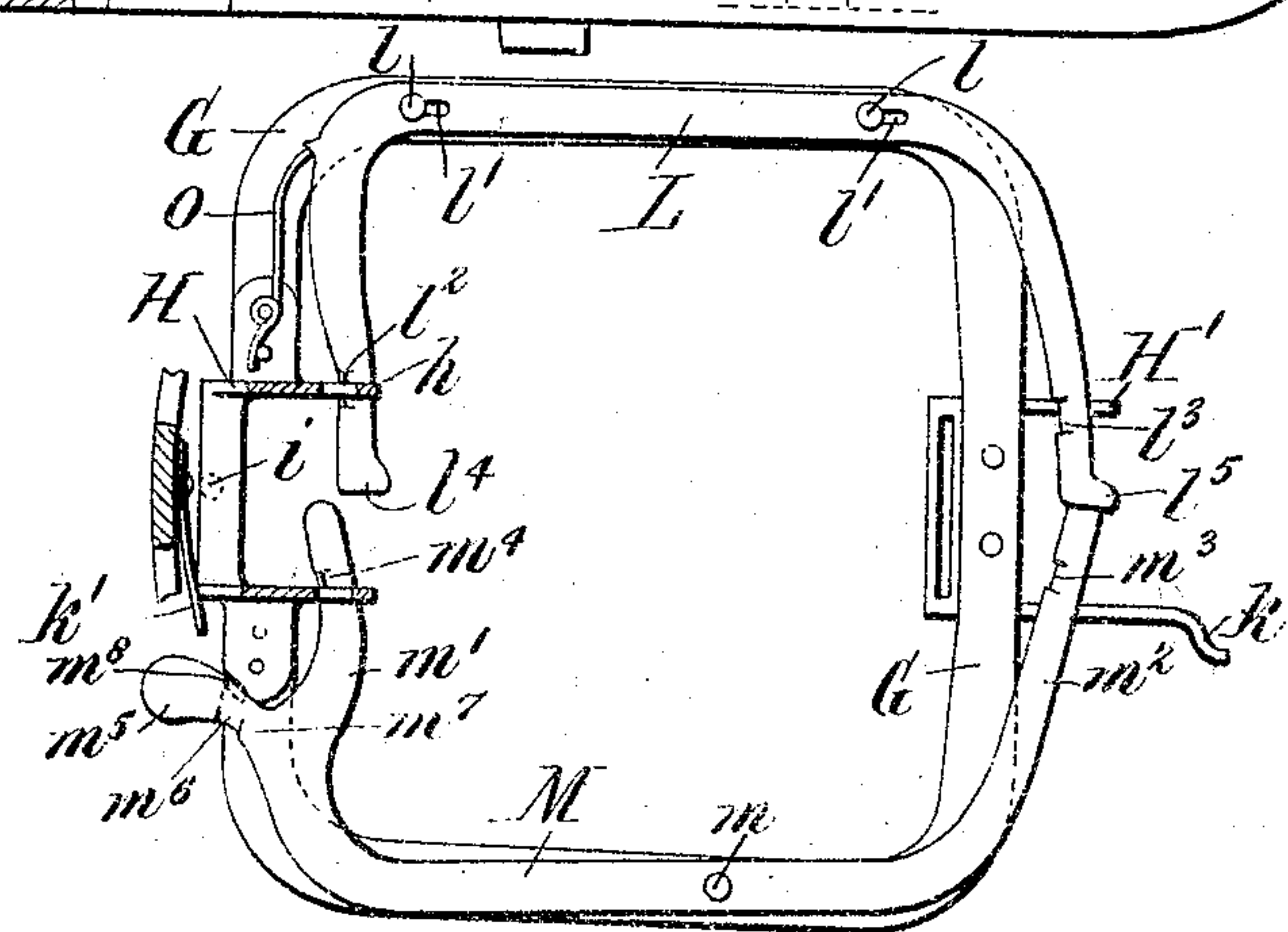


Fig. 4.



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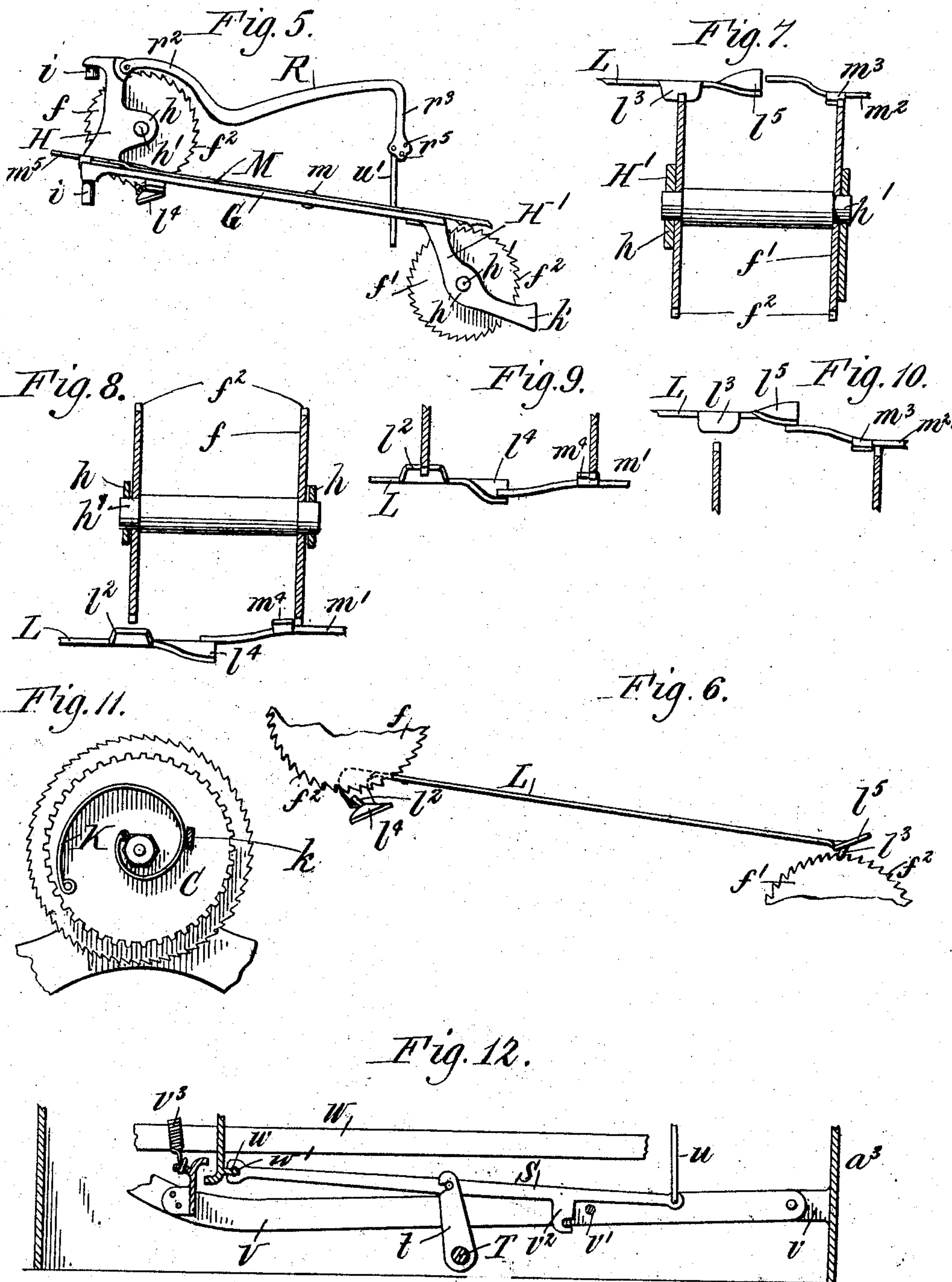
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RIBBON MECHANISM FOR TYPE-WRITING MACHINES.

No. 843,830.

Specification of Letters Patent.

Patented Feb. 12, 1907.

Application filed March 3, 1904. Serial No. 196,282.

To all whom it may concern:

Be it known that I, EMMIT G. LATTA, a citizen of the United States, residing at Friendship, in the county of Allegany and State of New York, have invented new and useful Improvements in Ribbon Mechanisms for Type-Writing Machines, of which the following is a specification.

This invention relates to ribbon mechanisms for front-strike or visible-writing type-writing machines, and is more particularly designed for front-strike machines of the character disclosed in my application for patents, Serial No. 168,190, filed August 4, 1903; Serial No. 169,134, filed August 11, 1903, and Serial No. 179,119, filed October 28, 1903.

The object of the invention is to provide an improved ribbon-operating mechanism whereby the ribbon is caused to feed lengthwise from one spool to the other and to move laterally or crosswise in front of the printing-point of the platen by means independent of the type-bar action or the universal bar, so as to relieve these parts of the work of operating the ribbon and insure a light easy touch, and having a ribbon guide or vibrator which may be set to move the ribbon to expose the printing-point after each impression or only upon the actuation of the space-key at the will of the operator.

Another object of the invention is to provide a vibrating index to show the location of the printing-point and also constituting a scale which can be readily turned back out of operative position and out of the way when not required.

In the accompanying drawings, consisting of three sheets, Figure 1 is a longitudinal sectional elevation of parts of a type-writing machine provided with a ribbon mechanism embodying the invention. Fig. 2 is a transverse sectional elevation thereof, showing the carriage by broken lines. Fig. 3 is a plan view thereof, partly in horizontal section. Fig. 4 is a plan view, partly in section, of the ribbon-spool support. Fig. 5 is an elevation of the spool-support detached. Fig. 6 is a fragmentary side elevation, partly in section, on an enlarged scale, of the spools and ribbon-feed device. Fig. 7 is a fragmentary sectional elevation, on an enlarged scale, of the rear ribbon-spool and feed device in position to

turn the same. Fig. 8 is a similar view of the front spool and feed device in inoperative position. Figs. 9 and 10 are fragmentary detail views of the front and rear spools, respectively, on an enlarged scale, showing the position of the feed device reversed. Fig. 11 is a front elevation, partly in section, of the device for shifting the ribbon laterally. Fig. 12 is a fragmentary sectional elevation showing the operating mechanism for the ribbon-vibrator in position to be actuated by the universal bar.

Like letters of reference refer to like parts in the several figures.

The main frame of the machine may be of any suitable construction, that shown comprising upright sides *a*, having inwardly-projecting upper portions *a'*, a transverse front stepped plate or portion *a''*, constituting the base of the keyboard, and an upright back or rear portion *a'''*. The stepped keyboard-plate is provided centrally at its rear or top with an upright support or standard *a''''* for the ribbon-spool support or carrier. *B* represents the platen, which, as usual, is journaled on a carriage *b*, arranged to move laterally or horizontally across the machine and moved intermittently or step by step to produce the letter-spacing by a power-driven drum *C*, controlled by an escapement mechanism. *D* represents one of the type-bars, which are arranged below and in front of the platen and are pivoted at their rear ends on a curved segment *e* to swing upwardly to make the impression at the front side of the platen, and *E* represents one of the key-levers, which are arranged below and connected at their rear ends to the type-bars and are provided at their front ends with finger-keys, one of which is shown at *e'*. These parts are all shown and more fully described in my said applications and are shown in the drawings and referred to briefly herein to enable a better understanding of the arrangement and operation of the ribbon mechanism.

F represents the ribbon, which extends forwardly and rearwardly of the machine above and to the rear of the path of the type-bars and is connected at its opposite ends to spools *f, f''*, arranged one in front of and the other below the platen in rear of the printing-point at the front side of the platen. The spools may be of any suitable construction and are

preferably provided at their opposite ends with ratchet-wheels f^2 , formed by the toothed flanges of the spools or secured to the spools in any suitable manner.

5 The spools are both rotatably mounted on a spool support or carrier, which has a vertical pivotal connection at its front end with the upright standard a^4 at the front part of the main frame, so that its rear end can swing
10 laterally back and forth in front of the platen. The spool support or carrier is preferably constructed as shown in the drawings, consisting of a substantially rectangular frame G, provided at its front central portion with
15 an upright spool-supporting bracket H and at its rear central portion with a depending spool-supporting bracket H'. Said spool-supporting brackets may be of any suitable form enabling the spools to be removably
20 and rotatably journaled therein. As shown, each bracket is provided with separated arms h , in which the journals h' at opposite ends of the spool bear. The pivot for the spool-support is preferably formed by depending pivot-
25 studs i , which are arranged in line one above the other on the front spool-bracket and removably engage and bear in vertical holes in horizontal portions i' i^2 of the upright stand-
30 ard a^4 . The spool support can be readily removed from the machine by lifting its pivot-studs out of their bearing-holes. The ribbon passes between the spools through a suitable
35 guide and vibrating device, to be hereinafter described, which holds the ribbon in a substantially vertical position in front of the printing-point in the path of the type. When
40 the rear end of the spool support or carrier is swung laterally, the vertical portion of the ribbon is moved laterally or transversely back and forth in front of the printing-point,
so that the entire available width of the ribbon is used, and the wear thereon is uniform throughout its width.

The spool support or carrier is swung on its
45 vertical pivot to thus carry the ribbon laterally across the printing-point of the platen by the following mechanism: K represents a scroll or volute shaped cam which is secured to or formed on the front side of the power-
50 driven drum or barrel C, which operates the carriage. One arm of the bearing for the rear ribbon-spool, preferably the right-hand arm, is provided with a rearwardly-projecting finger or portion k , which is held against
55 the peripheral face of the cam K by a suitable spring, preferably a curved leaf or flat spring k' , Fig. 4, secured to the upright standard a^4 and bearing at its free end against the right-hand side of the front bar or portion of
60 the spool-support. When the operator shifts the carriage to the right to commence a new line, the cam, acting against the finger on the spool-support, moves the rear end of the latter toward the right with the carriage, and as
65 the carriage is moved step by step or inter-

mittently toward the left in the operation of the machine by the power-driven drum the finger on the spool-support is held against the periphery of the cam K and is thus permitted to move gradually or slowly toward
70 the left. The proportion of the parts is such that the ribbon is moved crosswise a distance equal to its available width at each complete movement of the carriage. The lateral
75 movement of the ribbon toward the right is thus effected by the operator in moving the carriage to the right, and the ribbon is moved to the left by the spring k' , so that the type-bar action is not only relieved entirely of
80 this work, but the carriage-driving spring is also free from it, therefore permitting the use of a lighter carriage-driving spring and reducing the noise and wear of the carriage-es-
capement.

The spools are rotated to feed the ribbon
85 longitudinally by mechanism preferably constructed as follows: L represents a feed bar or device which is of substantially U shape and is slidably secured to one of the side bars
90 of the open frame of the spool-support in any suitable manner—for instance, by rivets or pins l passing through elongated slots l' in the bar. The front and rear arms of the feed-
95 bar extend inwardly or toward the ribbon-spools, the front arm projecting beneath the adjacent ratchet-wheel of the front spool, while the rear arm extends over the adjacent
100 ratchet-wheel of the rear spool. The front arm of the feed-bar is provided with an upwardly-projecting edge or portion l^2 , constituting a pawl to engage the teeth of the
105 wheel of the front spool and the rear arm of the feed-bar is provided with a downwardly-extending portion l^3 to engage the teeth of the ratchet-wheel of the rear spool. The
110 feed-bar is made of spring metal, and its arms are pressed yieldingly toward the spools to engage the teeth of their respective ratchet-wheels. The ends of the front and rear arms of the feed-bar are inclined or cam-shaped at
 l^4 l^5 , respectively, Figs. 5-10.

The feed-bar is reciprocated as hereinafter described, and the tooth of one arm is held
115 out of operative relation to its ratchet-wheel, while the tooth of the other arm is maintained in operative relation to its ratchet-wheel, so that only one spool is positively rotated at a time, and this relation of
120 the feed-arms is reversed when it is desired to positively turn the other spool and feed the ribbon in the opposite direction. A reversing device is employed for this purpose, preferably consisting of a bent or substantially
125 U-shaped lever M, pivoted at m in any suitable manner to the frame of the spool-support on the side opposite to the feed-bar and having front and rear arms m' m^2 , which project toward the inner ends of the front and rear arms of the feed-bar. In one position of
130 the reversing-lever M (see Figs. 3 and 6) its

front arm overhangs and bears on the inclined inner end of the front arm of the feed-bar and holds the latter out of engagement with its ratchet-wheel, while the plain face of the front arm of the reversing-lever is pressed against the ratchet-wheel at the other end of the front spool to act as a friction-brake and prevent the ribbon from unwinding too rapidly. At the same time the rear arm of the feed-bar is released and engages its ratchet-wheel and positively turns the rear spool, and a downturned tooth or portion m^3 on the rear arm of the reversing-lever engages the other ratchet-wheel of the rear spool, serving, as a detent to hold the spool from turning backwardly in the rearward movement of the feed-bar. By shifting or oscillating the reversing-lever on its pivot to the position shown in Figs. 9 and 10 the front arm of the lever is carried out of engagement with the front arm of the feed-bar, which springs into operative relation to its ratchet-wheel, while the rear arm of the reversing-lever engages the inclined inner end of the rear arm of the feed-bar and lifts the same to hold its tooth out of operative relation to the ratchet-wheel of the rear spool, while the rear arm of the reversing-lever is held yieldingly down against the ratchet-wheel at the opposite end of the rear spool and acts as a brake for the latter. In this position of the reversing-lever the front arm of the feed-bar engages and positively turns the front spool, while an upturned edge or tooth m^4 on the front arm of the reversing-lever engages the other ratchet-wheel of the front spool to hold the latter from turning rearwardly in the rearward movements of the feed-bar. The reversing-lever is provided with a forwardly-projecting handle or part m^5 for shifting it and is held stationary when shifted by a downturned tooth or portion m^6 on the handle, which engages in either of two notches m^7 m^8 in the front portion of the spool-supporting frame.

The feed-bar is reciprocated to rotate the ribbon-spools by the following mechanism: N, Figs. 1 and 3, represents a lever which is pivoted at its front end on a bracket n , projecting from the rear part of the main frame and hangs down in rear of and bears against the rear arm of the feed-bar. The rear edge of the latter is curved concentrically with the pivot of the spool-support to insure the same relation of the feed-bar and its operating-lever N in the different positions of the spool-support. The feed-bar is moved rearwardly and its rear arm held against the operating-lever N by a spring O, Fig. 4, secured to the front portion of the spool-support and bearing against the front arm of the feed-bar.

P, Figs. 1, 2, and 3, represents a rod or bar which is arranged below the platen and extends parallel therewith, being connected at its opposite ends by upturned arms or por-

tions to line-space levers Q Q', which are pivoted on the carriage at the opposite ends of the platen. These levers, which are more fully described and shown in my said application, Serial No. 168,190, are for rotating the platen to feed the paper to produce the line-spacing. When either of the line-space levers is oscillated, the connecting-bar P is lowered into contact with the rearwardly-projecting arm of the operating-lever N for the feed-bar and swings the latter forwardly, thereby pushing the feed-bar forwardly and turning one or the other of the ribbon-spools, according to the position of the reversing device. When the line-space lever is released, the feed-bar is returned by its spring O. The feed-bar-operating lever also engages and operates a lever q , which is pivoted on the bracket n and is connected by a rod q' with the carriage-escapement, as explained in my said application, to release the carriage. The arrangement and proportion of the parts is such that the first portion of the movement of either line-space-lever will release the carriage, and the continued movement of the line-space-lever will fully depress the connecting-bar P and move the operating-lever N and feed-bar sufficiently far to turn the ribbon-spool a distance equal to the length of one tooth of its ratchet-wheel.

R, Figs. 1 and 5, represents a vertically-oscillating ribbon guide or vibrator, which is preferably made of sheet metal and of the form shown. It consists of a ribbon-supporting plate or portion r , which is curved substantially concentric with the axes of the type-bars and holds the ribbon up out of the path of the type in swinging toward and from the printing-point of the platen. The opposite sides of the supporting-plate are bent upwardly to form guide-flanges r' , which are continued forwardly beyond the plate, forming separated arms r^2 , which are connected at their front ends by a horizontal pivot to a lug or portion at the upper end of the front spool-bracket. The ribbon guide and vibrator is provided at its rear end, in front of the platen, with depending separated arms r^3 , preferably formed by down-bent portions of the side flanges of the ribbon-supporting plate. The ribbon passes over separated cross wires or pins r^4 , connecting the front arms of the ribbon guide and vibrator and similar cross pins or wires r^5 , connecting the rear depending arms of the guide and vibrator.

The ribbon guide and vibrator in its normal position of rest is held up, as shown in Fig. 1, in such position that the vertical portion of the ribbon is held in front of or over the printing-point of the platen, so as to be engaged and moved in contact with the platen by the type. The ribbon-guide is oscillated vertically to lower the ribbon to expose the writing and return it to its normal printing position. Some operators prefer to

expose the writing after each impression, while others prefer to expose the writing only after the completion of each word or when it is desired to see the writing. The following operating mechanism is employed for this purpose: S, Figs. 1, 2, and 12, represents an operating-lever for the ribbon guide and vibrator, which is fulcrumed intermediate of its ends in any suitable manner at the upper end of a rock-arm t , which is secured to a transverse rock-shaft T, journaled at its opposite ends in suitable bearings in the sides of the main frame. The operating-lever can thus be shifted forwardly and rearwardly of the machine. The rock-shaft is provided at one end with an arm t' , Fig. 2, preferably of spring metal, having an upper portion projecting through an opening t^2 in the side of the main frame and forming a finger-piece for moving the arm to rock the shaft. The end of the spring-lever is bent inwardly and bears against the side of the main frame, which is preferably provided with two depressions or notches, into which the end of the arm springs to hold the rock-shaft in either of two different positions. The rear end of the operating-lever S is connected to the rear end of the ribbon guide and vibrator by an upright link, preferably made of upper and lower separable sections u u' , pivoted, respectively, to the depending arms of the ribbon guide and vibrator and the operating-lever. The link-sections may be detachably connected in any suitable manner. For instance, a tube u^2 is fixed to the upper end of the lower section of the link, and the upper section is inserted in said tube, in which it is held by the engagement of an inbent portion of the tube in a notch in the upper section of the link. This construction enables the upper section of the link to be detached from the lower section, so that the ribbon guide and vibrator can be removed from the machine with the spool support or carriage to change the ribbons.

V, Fig. 1, represents a space-lever for performing the well-known function of moving the carriage one step at each depression of the keys to produce the spaces in the writing. This lever in the construction shown (see Fig. 3) consists of two diverging bars which have upturned forward ends, to which the space-key is secured, and are pivoted at their rear ends to lugs v on the rear of the main frame. The two bars of the space-lever are connected by a cross-rod v' , and the operating-lever S for the ribbon guide and vibrator is provided with a depending hook v^2 , which in the position of the lever shown in Fig. 1 engages with said cross-rod. With the operating-lever in this position the ribbon guide and vibrator will be operated each time the space-lever is operated, so that the ribbon will be lowered to expose the writing after each word, or at the will of the operator only. When the space-key is released, it is retracted by the

spring v^3 , connected to it and the main frame, and the ribbon vibrator and guide is raised to its normal position.

If it is desired to lower the ribbon after each impression is made, the operating-lever S for the ribbon guide and vibrator is connected to the universal bar, which, as is well known, is operated upon each depression of a key. The universal bar W (shown in the drawings) has a transverse horizontal bar or portion which underlies the key-levers and rearwardly-projecting arms which are pivoted intermediate of their ends on the sides of the main frame and are connected at their rear ends to the escapement mechanism for producing the intermittent or step movement of the carriage, as explained in my said application Serial No. 168,190. The transverse portion of the universal bar, which is depressed upon the actuation of each finger-key, is provided with a rearwardly-extending lug or hook w . To connect the operating-lever for the ribbon guide and vibrator with the universal bar, the latter is depressed and the operating-lever shifted forwardly to the position shown in Fig. 12 by rocking the rock-shaft T, which supports the lever, thereby engaging the hook w on the universal bar in a crotch or notch w' at the front end of the operating-lever S. In this position of the operating-lever S its depending hook v^2 is moved out of engagement with the cross-rod of the space-lever, and it will be moved to lower the ribbon guide and vibrator at each upward movement of the universal bar by its retracting-spring w^2 , Fig. 1, thereby exposing the writing after each impression is made. The operating-lever S for the ribbon guide and vibrator is held in either of the positions shown in Figs. 1 and 12 by the engagement of the spring-arm of the rock-shaft T in the notches in the side of the main frame, as before explained.

X, Figs. 1, 2, and 3, represents a removable cover-plate, which is arranged over and conceals the frame of the spool-support and the ribbon-feed mechanism. It is preferably made of sheet metal and has downturned side portions which are sprung over lips x on the inwardly-extending upper portion of the sides of the main frame to detachably hold the cover-plate in place. The front spool-bracket, spool, and ribbon guide and vibrator project up through a central hole in the cover-plate large enough to permit the lateral movement of the guide and vibrator.

Y represents a graduated scale and index arranged in front of the printing-point and having forwardly and downwardly extending arms y pivoted to upwardly-projecting lugs y' on the cover-plate. The scale and index is held yieldingly down on the ribbon guide and vibrator by a coil-spring y^2 , connecting one of its arms to the cover-plate, and follows the vertical movements of the

guide and vibrator. When the latter is down to expose the printing-point, the plate rests just in front of and below the printing-point, and an arrow at its center indicates the exact point at which the next impression will be made. The scale and index does not swing laterally with the spool-support and ribbon guide and vibrator. When not desired, the scale can be turned back out of the way, as indicated in Fig. 1. It is carried by and removable from the machine with the cover-plate X, which may be left off of the machine when desired.

Each type-bar is provided with two characters, one of which strikes the platen when it is in its normal position, and the platen is shifted to place it in operative relation to the other character, commonly called the "upper-case" character. The ribbon-vibrator is lowered to expose the writing, and as it is desirable to make the necessary movement of the vibrator as little as possible the platen is normally held up in the position shown in Fig. 1 by springs (described in my said application Serial No. 179,119, and one of which is shown at z, Fig. 3) and is lowered by suitable means to receive the impression of the upper-case characters instead of being raised, as usual. The device shown for this purpose comprises a bent rod z' , which is hooked centrally on the front rod of the carriage and is connected at its opposite ends by links z^2 with rock-arms z^3 on the rear ends of rock-shafts z^4 , journaled at the opposite sides of the machine, and connected at their front ends by rock-arms z^5 with shifting-keys z^6 at opposite sides of the keyboard. By depressing either of these keys the platen is lowered for the impression and is raised to the normal position by its springs.

I claim as my invention—

1. In a type-writing machine having a power-driven carriage, the combination of a main frame, two spools connected by a ribbon, a single support on which both of said spools are carried and which is movable in the machine to shift the ribbon, a power device for moving said spool-support and spools to shift the ribbon relative to the printing-point, and means connected to the carriage-driving mechanism for controlling said movement of the spool-support, substantially as set forth.

2. In a type-writing machine, the combination of a power-driven carriage; a ribbon, a support for the ribbon which is movable to shift the ribbon relative to the printing-point, a power device independent of the carriage-driving mechanism for moving said support, and means connected with the carriage-driving mechanism for controlling said movement of said support, substantially as set forth.

3. In a type-writing machine having a power-driven carriage, the combination of a

movable spool-support, spools and a ribbon carried by said support, a spring for moving said support to shift the ribbon crosswise relative to the printing-point, and means movable in unison with the carriage to control said movement of the spool-support, substantially as set forth.

4. In a type-writing machine having a power-driven carriage, the combination of a movable spool-support, a ribbon and spools supported thereby, a spring for moving said support to shift the ribbon relative to the printing-point, and means connected with the carriage and acting to move the spool-support to shift the ribbon in the opposite direction when the carriage is returned by hand, substantially as set forth.

5. In a type-writing machine having a power-driven carriage, the combination of a pivoted ribbon-support, a spring acting to swing said support in one direction, and a rotary cam actuated by the carriage-driving power to control the swing of the ribbon-spool support in the opposite direction, substantially as set forth.

6. In a type-writing machine having a power-driven carriage, the combination of a pivoted ribbon-support, a spring acting to swing it in one direction, and a rotary cam actuated by the carriage-driving power for controlling the movement of said support by its spring and acting to compress said spring with the return movement of the carriage, substantially as set forth.

7. In a front-strike type-writing machine having a laterally-moving platen, the combination of a ribbon-support pivoted at its front end on a substantially vertical axis and extending rearwardly toward the platen, and means for swinging the rear end of the ribbon-support laterally to shift the ribbon crosswise relative to the printing-point, substantially as set forth.

8. In a front-strike type-writing machine having a laterally-moving carriage, the combination of a ribbon-spool support pivoted to the machine-frame in front of the platen, and connections with the carriage for swinging the rear end of the spool-support laterally with the carriage, substantially as set forth.

9. In a front-strike type-writing machine having a laterally-movable carriage, the combination of a ribbon-support pivoted in front of the platen and extending rearwardly, a spring connecting the ribbon-support to a stationary part of the machine and acting to swing the ribbon-support in one direction, and means connected with the carriage-driving mechanism to swing the support in the opposite direction and compress its spring, substantially as set forth.

10. In a front-strike type-writing machine having a laterally-movable carriage, the combination of a ribbon-support movable laterally therewith, two independent driving pow-

ers, one for the ribbon-support and one for the carriage, and means connected with the carriage-driving mechanism for moving the ribbon-support in one direction against the action of its driving power by the return of the carriage for a new line, and for controlling the movement of the ribbon-support in the opposite direction, substantially as set forth.

11. In a front-strike type-writing machine having a power-driven laterally-movable carriage and platen, the combination of a ribbon passing downwardly in the direction of its length in front of the platen, and a power device other than the carriage-driving power for moving the ribbon in the direction of its width relative to the printing-point, substantially as set forth.

12. In a front-strike type-writing machine having a power-driven carriage, the combination of a ribbon-spool support having a spool at each end, and a supporting-pivot at one end, a spring acting to turn said support on its pivot in one direction, and means connected with the carriage-driving mechanism for turning the support on its pivot in the opposite direction and compressing its spring when the carriage is set back, substantially as set forth.

13. In a front-strike type-writing machine, the combination of a pair of ribbon-spools arranged one in front and the other in rear of the printing-point, of a substantially horizontal connecting-support for the spools pivoted to swing laterally on a substantially vertical axis and having a central opening through which the type-bars vibrate to and from the printing-point, substantially as set forth.

14. In a front-strike type-writing machine, the combination of a pair of ribbon-spools arranged one in front and the other in rear of the printing-point, a support for said spools having a vertical pivot at its front end, and means to swing the rear end of said support from side to side so as to move the ribbon past the printing-point a distance equal to its available width with each full run of the carriage, substantially as set forth.

15. In a type-writing machine, the combination with a laterally-movable carriage, platen, and means for feeding the paper on the platen, of a ribbon-spool and ribbon supported independently of the carriage so that the relation of the carriage and ribbon changes with the movements of the carriage, and means actuated by the paper-feeding means for winding the ribbon on the spool, whereby the ribbon is wound on said spool simultaneously with the feeding of the paper, substantially as set forth.

16. In a type-writing machine, the combination of a carriage having a paper-platen, printing mechanism, means controlled by the printing mechanism to move the platen lengthwise, a hand-lever acting to feed the

paper on the platen, a ribbon-spool mounted on the frame of the machine independently of the carriage, and connections actuated by the paper-feed lever for winding the ribbon on its spool whenever the lever is manually moved to feed the paper, substantially as set forth.

17. In a type-writing machine, the combination with a movable carriage, a platen, means for feeding the paper thereon, printing mechanism, and driving mechanism controlled by the printing mechanism for moving the carriage endwise step by step, of a ribbon, means controlled by the carriage-driving mechanism for moving the ribbon crosswise, and connections actuated by said paper-feeding means for moving the ribbon lengthwise, substantially as set forth.

18. In a type-writing machine, the combination with a movable carriage, a platen, means for feeding the paper thereon, printing mechanism, and driving mechanism controlled by the printing mechanism for moving the carriage endwise step by step, of a ribbon, and spool for the same, means connected with the carriage-driving mechanism for moving the ribbon crosswise, and connections actuated by said paper-feeding means for rotating said spool to wind the ribbon thereon, substantially as set forth.

19. In a type-writing machine, the combination with a laterally-movable platen, type-bars working against the platen-actuating means for the type-bars, and means for feeding the paper on the platen, of a ribbon supported independently of the carriage so that the relation of the carriage and ribbon changes with the movements of the carriage, and connections actuated by said paper-feeding means independently of said type-bar-actuating means for feeding the ribbon lengthwise, substantially as set forth.

20. In a type-writing machine, the combination with a rotatable laterally-movable platen, of a rotatable ribbon-spool supported independently of the carriage, means for rotating the platen, a bar or rod moving laterally with the platen, and connections between the bar or rod and the spool and platen rotating means for rotating the spool by the actuation of said platen-rotating means regardless of the lateral position of the platen, substantially as set forth.

21. In a type-writing machine, the combination with a platen, and means for feeding the paper thereon, of a ribbon, a vibrator acting to move the ribbon to and from the printing-point, means for moving the ribbon crosswise, and connections between said paper-feeding means and the ribbon for feeding the latter lengthwise, substantially as set forth.

22. In a front-strike type-writing machine, the combination of a pair of ribbon-spools arranged one in front and the other in

rear of the printing-point, a spool-support having a vertical pivot at its front end on which it swings laterally, and a ribbon-guide pivoted to the spool-support at one end and adapted to vibrate the ribbon in a vertical direction, substantially as set forth.

23. In a front-strike type-writing machine, the combination of a pair of ribbon-spools arranged one in front and the other in rear of the printing-point, a spool-support hung on a vertical pivot at its front end and acting to swing the ribbon laterally, and a pivoted ribbon-carrier and means for vibrating the same vertically, substantially as set forth.

24. In a front-strike type-writing machine, the combination of a pair of ribbon-spools arranged one in front and one in rear of the printing-point, a pivoted support for said spools having a central opening for the passage of the type-bars, and a ribbon-guide pivoted on said support and holding the ribbon over the opening in the spool-support above the vibrating type-bars, substantially as set forth.

25. In a front-strike type-writing machine, the combination of a pair of ribbon-spools arranged one in front and one in rear of the printing-point, a spool-support pivoted to swing about a vertical axis at its front end, a ribbon-guide supported by a horizontal pivot at its front end and acting to lead the ribbon downwardly in front of the printing-point, and independent means for moving the spool-support and ribbon-guide on their pivots, substantially as set forth.

26. In a front-strike type-writing machine, the combination of a pair of opposable ribbon-spools arranged one in front and one in rear of the printing-point, a sliding bar, and means for operating the same to turn either of the spools to wind the ribbon thereon, substantially as set forth.

27. In a front-strike type-writing machine, the combination of opposable ribbon-spools arranged one in front and one in rear of the printing-point, an offset bar having its front end under the front spool, and its rear end over the rear spool, means for operatively connecting either of its ends with the spool adjacent thereto and means for operating said bar to turn one spool, substantially as set forth.

28. In a front-strike type-writing machine, the combination of a pair of opposable ribbon-spools arranged one in front and one in rear of the printing-point, a bent bar for turning the spools, and a bent lever acting to hold one end of said bar out of connection with its spool, substantially as set forth.

29. In a front-strike type-writing machine, the combination of a pair of opposable ribbon-spools arranged one in front and one in rear of the printing-point, a curved bar for turning the spools, and a curved lever acting

to hold one end of said bar out of connection with its spool and to release the other end and permit it to engage the other spool, substantially as set forth.

30. In a front-strike type-writing machine, the combination of a pair of opposable spools arranged one in front and one in rear of the printing-point, a curved bar for turning either of the spools, and a curved lever acting as a detent to guard against backward movement of the spool that is turned, substantially as set forth.

31. In a front-strike type-writing machine, the combination of a pair of opposable ribbon-spools arranged one in front and one in rear of the printing-point, a curved bar acting to turn one of the spools, and a curved lever acting as a positive detent on the spool that is turned, and as a friction-brake on the other spool, substantially as set forth.

32. In a front-strike type-writing machine, the combination of a pair of opposable ribbon-spools arranged one in front and one in rear of the printing-point, a ribbon-feed comprising a sliding curved bar acting to turn either one of the spools, and a pivoted curved lever acting to reverse the ribbon-feed by being turned on its pivot, and acting as a positive detent for either one of the spools and as a friction-brake for the other spool, substantially as set forth.

33. In a front-strike type-writing machine, the combination of opposable ribbon-spools arranged one in front and one in rear of the printing-point, a sliding curved bar acting to feed one of the ribbon-spools, and a ribbon-feed-reversing device consisting of a pivoted curved lever acting as a detent for one spool and a brake for the other, and means for holding the reversing-lever in either of two positions, substantially as set forth.

34. In a front-strike type-writing machine, the combination with a space-key, and a universal bar, of a ribbon, and means for connecting the ribbon with either the space-key or universal bar for vibrating the same, substantially as set forth.

35. In a front-strike type-writing machine, the combination with a space-key, and a universal bar, of a vibrating ribbon-carrier, and means for moving the vibrator to expose the printing-point with each movement of the space-key or with each movement of the universal bar as desired, substantially as set forth.

36. In a front-strike type-writing machine, the combination of a ribbon-vibrator, and a space-key arranged to move the ribbon-vibrator and expose the printing-point by its partial depression, and to release the carriage-escapement by its complete depression, substantially as set forth.

37. In a front-strike type-writing machine, the combination with a vertically and laterally movable ribbon-vibrator, of a piv-

oted indicator adapted to vibrate vertically with the ribbon, substantially as set forth.

38. In a front-strike type-writing machine, the combination with a laterally-movable ribbon-vibrator, of a scale bar or plate having pivots on each side of the ribbon-vibrator and arranged to vibrate up and down without lateral movement, substantially as set forth.

39. In a front-strike type-writing machine, the combination with a ribbon-vibrator, of a scale or center indicator which vibrates with said vibrator and is mounted to be moved independently of the vibrator away from the printing-point when so desired, substantially as set forth.

40. In a front-strike type-writing machine, the combination of a pair of opposable ribbon-spools arranged one in front and one in rear of and below the printing-point, a support for the spools, and a sheet-metal plate which has a central opening for the front spool and ribbon and covers and conceals the spool-support, substantially as set forth.

41. In a front-strike type-writing ma-

chine, the combination of a ribbon-spool support, ribbon-spools carried thereby one in front of the printing-point, a removable cover-plate which conceals the spool-support, and a scale or indicator pivoted on said removable cover-plate, substantially as set forth.

42. In a front-strike type-writing machine, the combination of a removable ribbon-spool support, ribbon-spools mounted thereon, and a removable cover-plate which conceals said spool-support and is removable therewith, substantially as set forth.

43. In a front-strike type-writing machine, the combination of a removable ribbon-spool support, ribbon-spools mounted thereon, a ribbon-vibrator mounted on said support, and a scale or indicator removably mounted on the machine independently of said spool-support, substantially as set forth.

Witness my hand this 26th day of February, 1904.

EMMIT G. LATTA.

Witnesses:

CHAS. J. RICE,
H. L. BLOSSOM.