

No. 879,159.

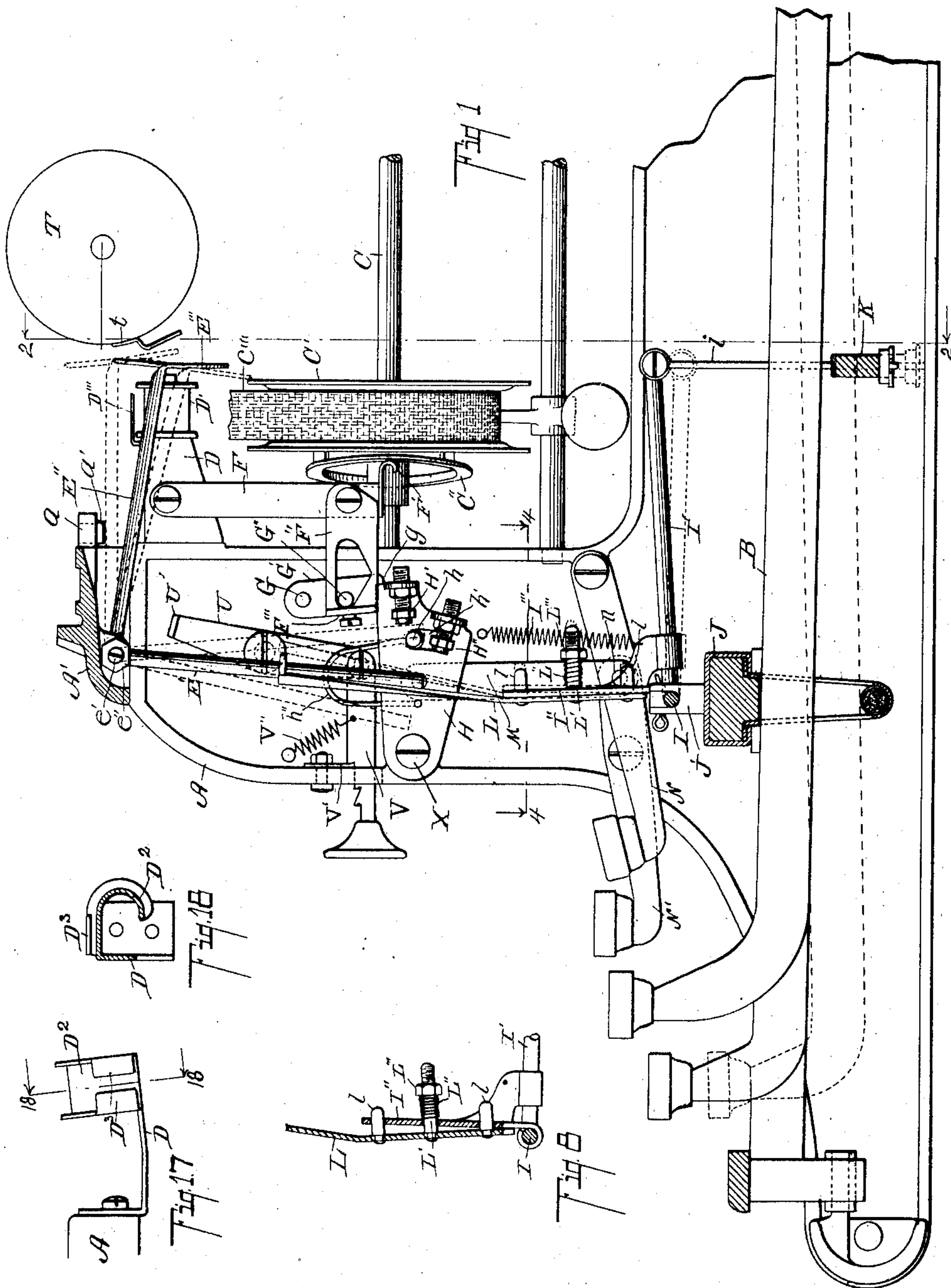
W. R. FOX.

PATENTED FEB. 18, 1908.

RIBBON MECHANISM FOR TYPE WRITING MACHINES.

APPLICATION FILED APR. 23, 1906.

5 SHEETS—SHEET 1.



Witnesses:

Clara A. Sabie
Lulu G. Greenfield

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William R. Fox
By Chappell & East
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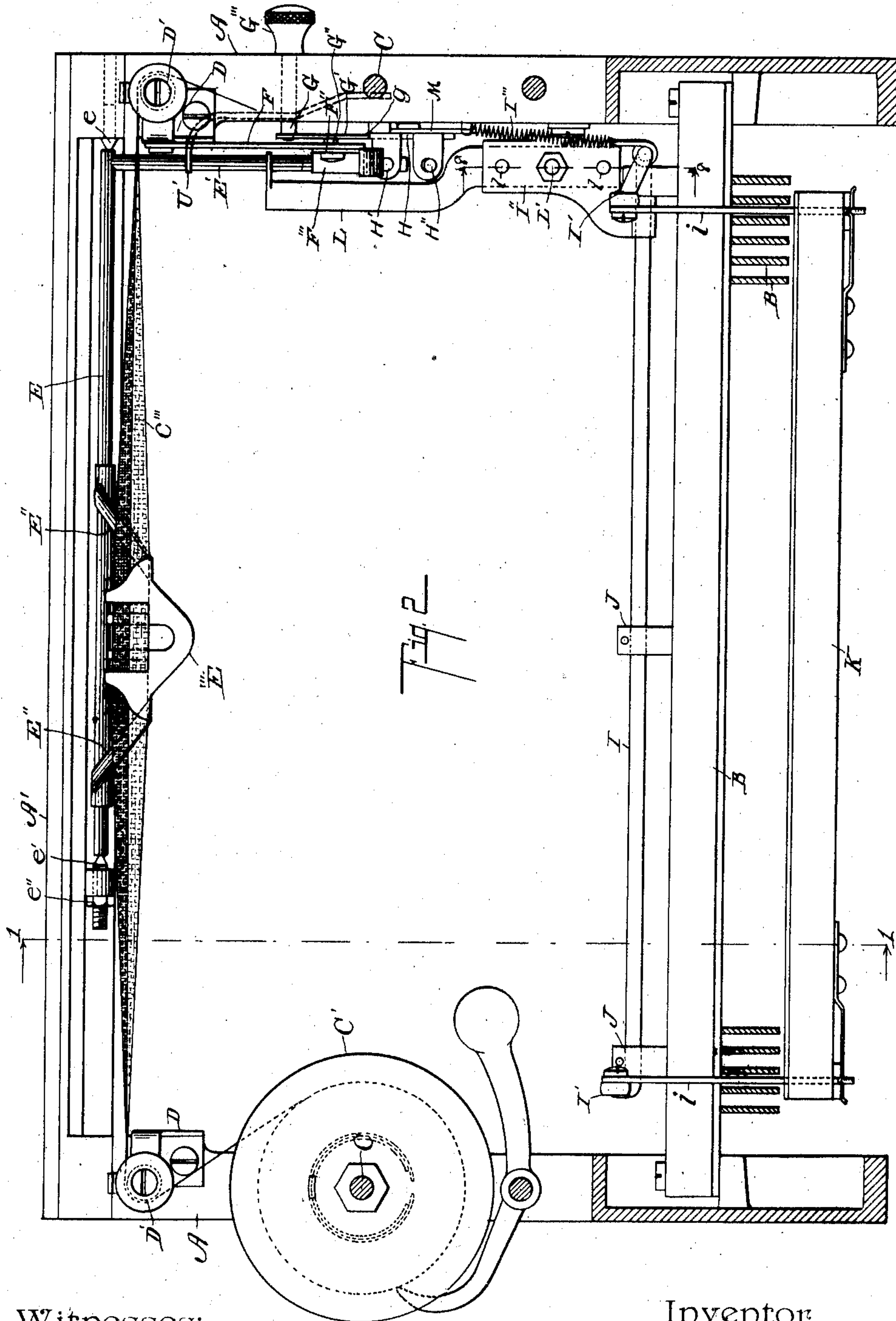
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5 SHEETS—SHEET 2.



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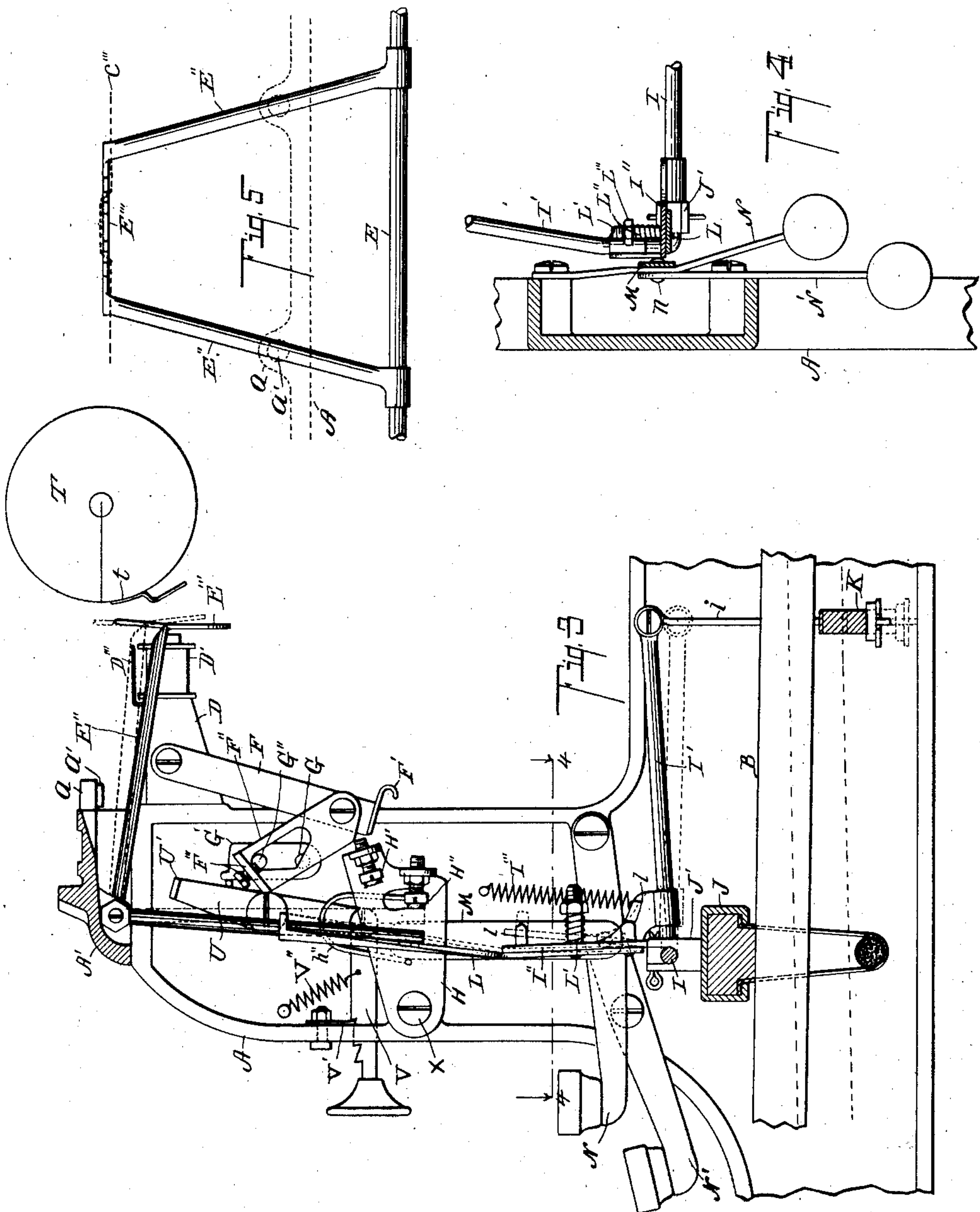
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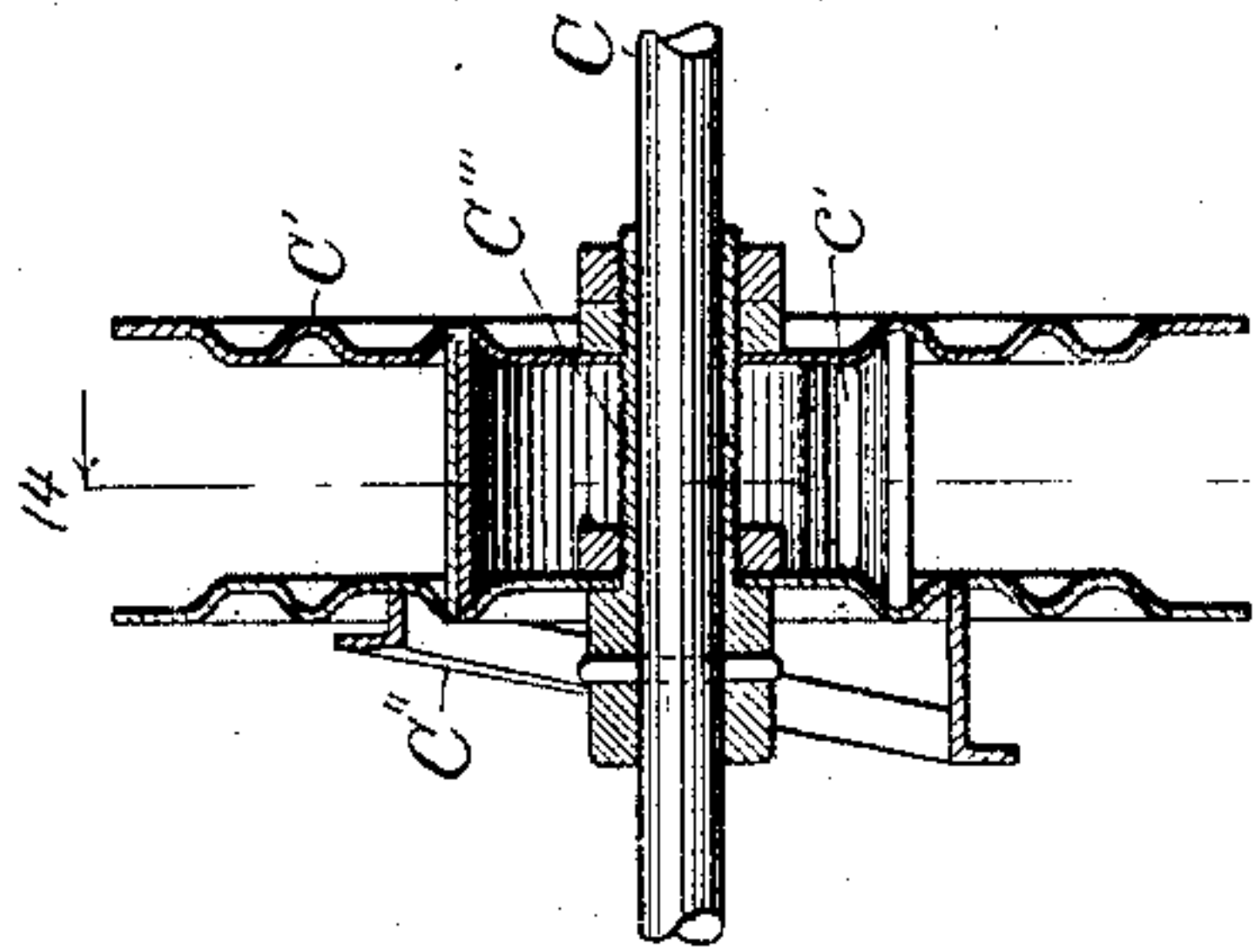


Fig. 14

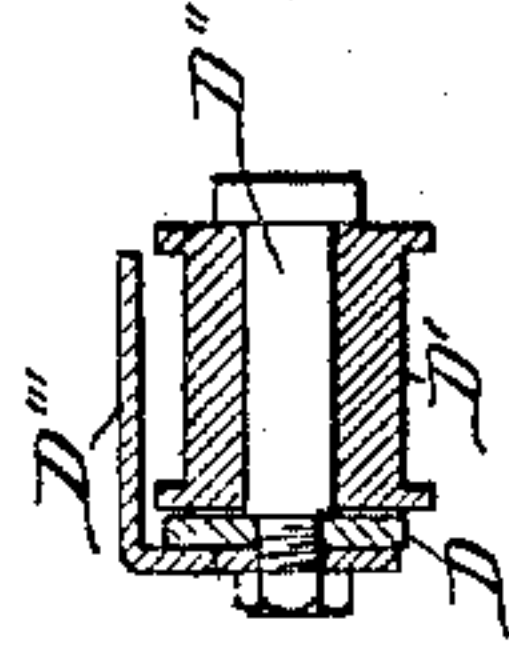


Fig. 15

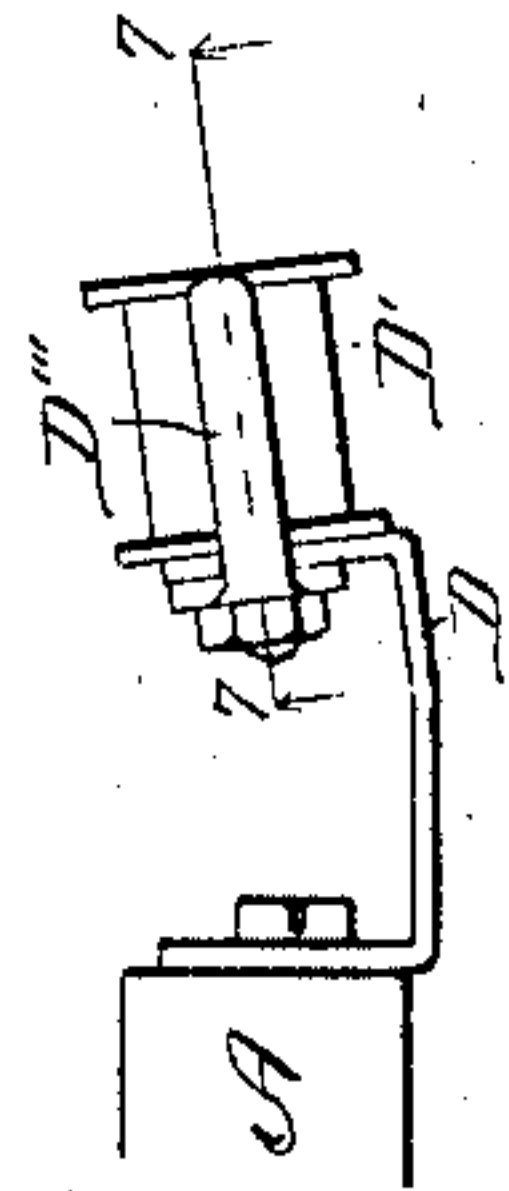


Fig. 16

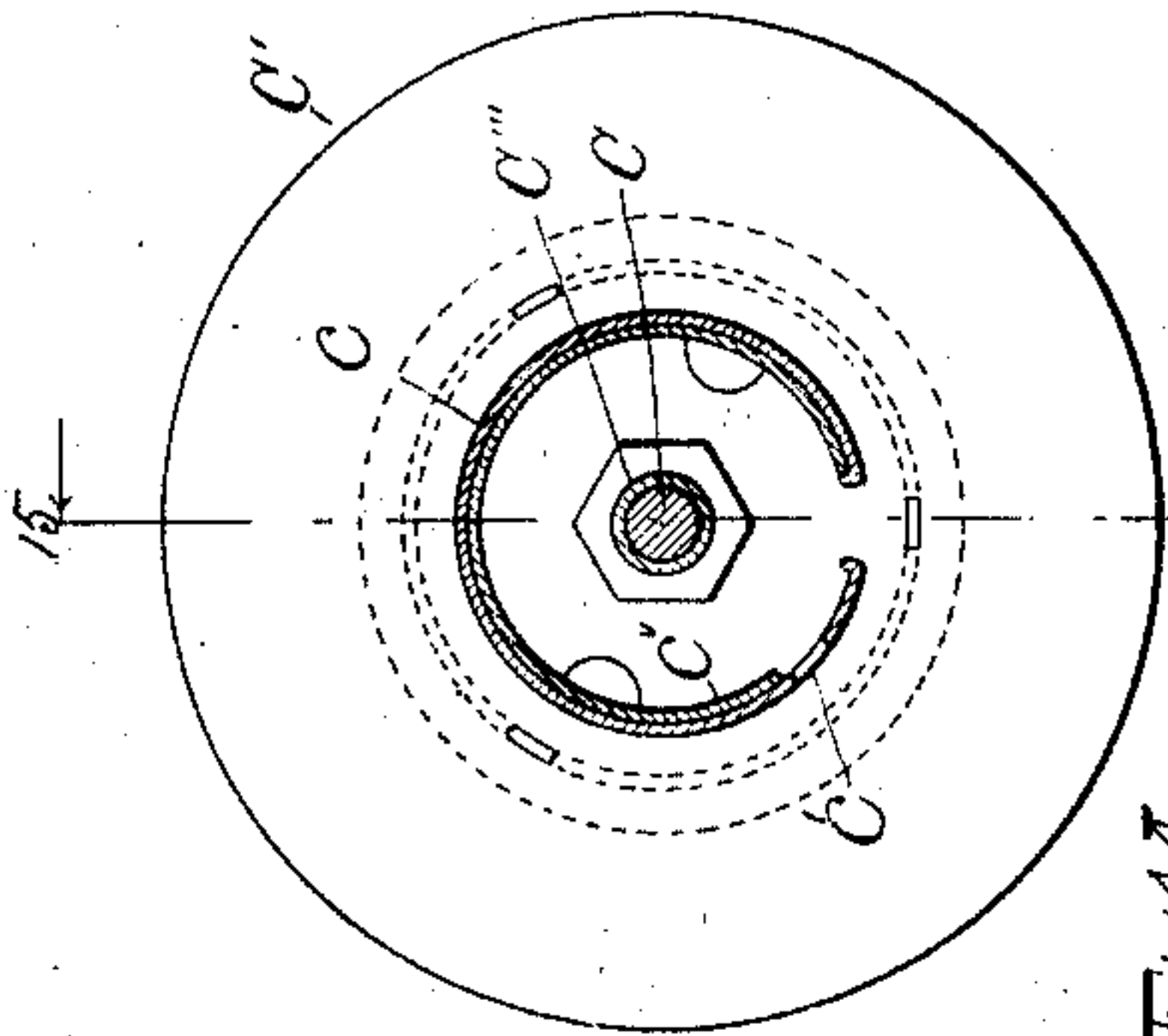


Fig. 17

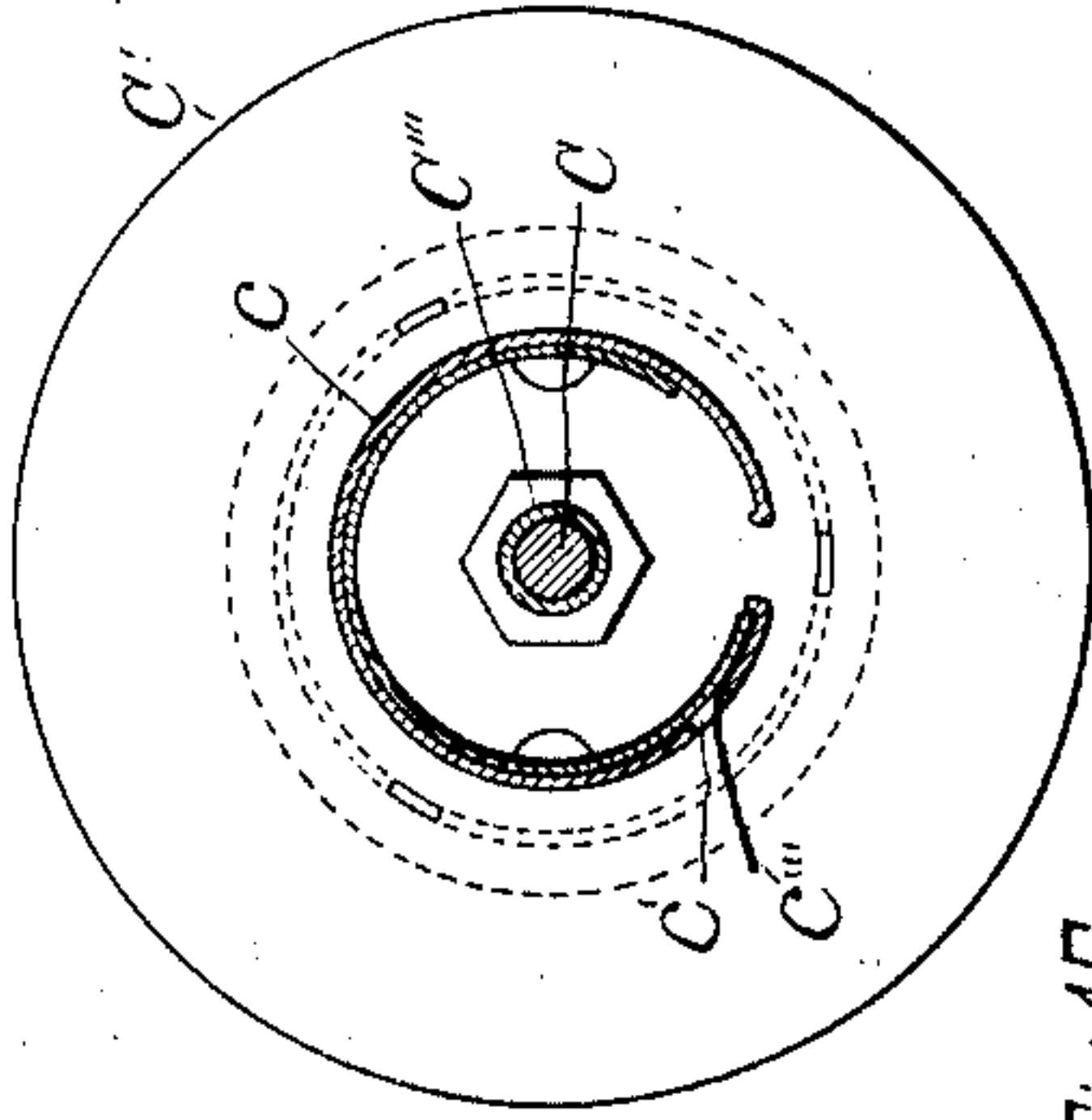


Fig. 18

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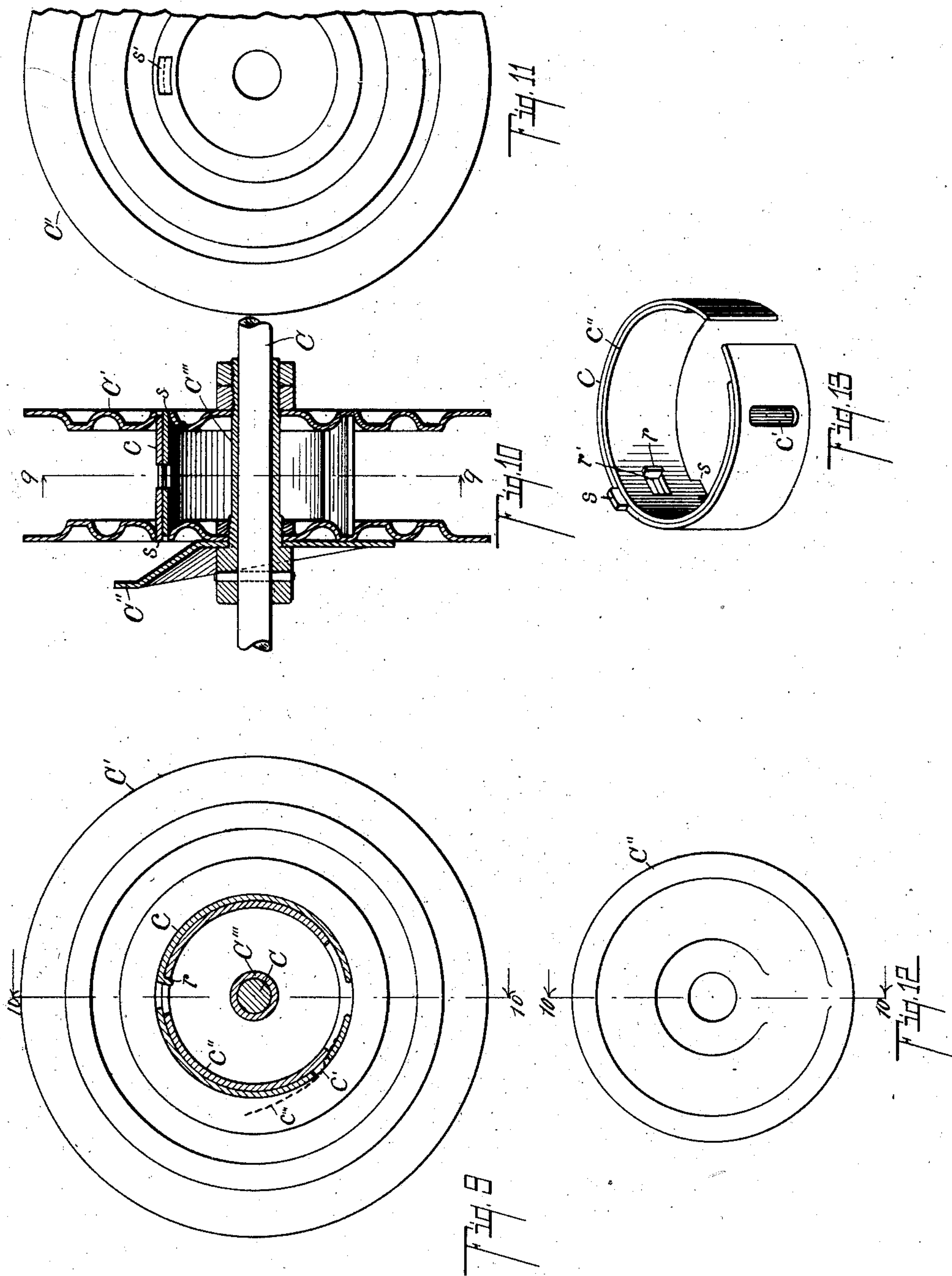
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UNITED STATES PATENT OFFICE.

WILLIAM R. FOX, OF GRAND RAPIDS, MICHIGAN.

RIBBON MECHANISM FOR TYPE-WRITING MACHINES.

No. 879,159.

Specification of Letters Patent.

Patented Feb. 18, 1908.

Application filed April 23, 1906. Serial No. 313,295.

To all whom it may concern:

Be it known that I, WILLIAM R. FOX, a citizen of the United States, residing at Grand Rapids, Kent county, State of Michigan, have invented certain new and useful Improvements in Ribbon Mechanisms for Type-Writing Machines, of which the following is a specification.

This invention relates to improvements in type-writing machines; particularly to the ribbon mechanism for use on front strike machines—or sight-writing machines.

The objects of this invention are:

First: to provide in such a mechanism improved means of shifting the ribbon laterally automatically while the machine is in operation, to utilize the full width of the ribbon;

Second: to provide means of shifting the ribbon laterally at the will of the operator, whereby multi-colored ribbons may be used so that the operator can vary the color of the printing or throw the ribbon out of use for stencil cutting.

Third: to provide an improved arrangement of support and operation for such ribbon mechanism toward the front of the machine;

Fourth: to provide improved means for guiding a narrow ribbon and deflecting it from a horizontal to a vertical plane;

Fifth: to provide improved means for guiding the ribbon in the vibrator;

Sixth: to provide in a ribbon mechanism of this class improved means of deflecting the same downward to expose the printing point to view without oscillating or moving the carriage.

Seventh: to provide in a ribbon mechanism of this class means for deflecting the ribbon downward below the printing line to expose the scale to view, and also to deflect it to a position below the printing point for the purpose of stencil work.

Eighth: to provide an improved spool construction; and

Ninth: to provide improved means of readily attaching and removing the ribbon.

Further objects, and objects relating to details of construction, will definitely appear from the detailed description to follow.

I accomplish the objects of my invention by the devices and means described in the following specification.

The invention is clearly defined and pointed out in the claims.

A structure embodying the features of my invention is clearly illustrated in the accompanying drawing forming a part of this specification, in which:

Figure 1 is a detail view of the front portion of a type-writer, in section, taken on a line corresponding to line 1—1 of Fig. 2; Fig. 2 is a sectional elevation view of a type-writer, taken on a line corresponding to line 2—2 of Fig. 1, looking from the rear toward the front of the machine; Fig. 3 is a detail view of the shifting connection appearing in Fig. 1, shifted for making use of a double-colored ribbon, the relation of the parts in making this shift clearly appearing in Fig. 3; Fig. 4 is a detail plan view taken on a line corresponding to line 4—4 of Figs. 1 and 3; Fig. 5 is a detail plan view of the forwardly projecting arms E'' with the ribbon support, showing the relation of the ribbon thereto; Fig. 6 is a detail elevation view of one of the ribbon supports at each end of the machine; Fig. 7 is a sectional view of the same, taken on line 7—7 of Fig. 6; Fig. 8 is a detail sectional view taken on line 8—8 of Fig. 2, showing the details of construction of the controlling spring mechanism for deflecting the ribbon after each stroke of a type-bar of the machine. Fig. 9 is an enlarged detail transverse sectional view through the ribbon spool, taken on a line corresponding to line 9—9 of Fig. 10, showing the relation of the movable parts in securing the ribbon. Fig. 10 is an enlarged detail sectional view through the longitudinal axis of the spool, taken on a line corresponding to line 10—10 of Fig. 9, showing the cam and the details of the parts. Fig. 11 is a detail fragmentary view of one of the spool heads C'. Fig. 12 is a detail elevation view of the cam disk C''. Fig. 13 is a detail perspective view of the adjustable shells forming the enlarged body or hub of the ribbon spool. Fig. 14 is a detail transverse sectional view of a modified form of the spool taken on a line corresponding to line 14—14 of Fig. 15. Fig. 15 is an axial sectional view through the spool taken on a line 15—15 of Fig. 14, showing the relation of the cam on the end of the spool as well as the arrangement of other parts. Fig. 16 is a detail sectional view similar to the view of Fig. 14 with the parts adjusted to secure the end of the ribbon to the spool body. Fig. 17 is an enlarged detail view of a modification of the ribbon guide. Fig. 18 is a detail sec-

tional view taken on a line corresponding to line 18—18 of Fig. 17.

In the drawing similar letters of reference refer to similar parts throughout the several views, and all of the sectional views are taken looking in the direction of the little arrows at the ends of the section lines

Referring to the lettered parts of the drawing, the frame A of the machine is of the usual general contour of that of Fox typewriters, the same being modified to conform to the front strike feature. A top plate A' is provided at the front of the machine for the attachment of the ribbon guide devices of the ribbon mechanism

The key levers B are of the usual form, being supported on pivots and guided by a front comb J. Transverse shafts C at each end of the machine support the ribbon spools C' which are of the proper dimensions for carrying a narrow ribbon c'''. The ribbon is supported toward the upper front part of the machine on suitable guides D', which are spool shaped in contour and are secured to the upper front part of the frame A by the brackets D, which are made of sheet metal, and are secured to the frame by suitable screws. The details of such structures appear in Figs. 6 and 7.

While the guides D' are spool shaped, they are rigidly clamped to the bracket D by the screw D'', and a guard finger D''' is also clamped to the bracket and projects over the top of the spool shaped guide to retain the ribbon in position when the ribbon becomes slack for any reason.

I have referred to the guide D' as spool shaped, and while that is the most convenient form of manufacturing the same, substantially the same arrangement of guiding parts can be secured by stampings of sheet metal, as appears in Figs. 17 and 18. The corresponding parts are lettered as follows, D''—D²; D'''—D³.

The spools for carrying the ribbon are rigidly attached to the shafts C, the spools being rotated by revolving the shafts by suitable means, many of which that work automatically are now in use. The spools consist of a central sleeve C'', having a collar at one end and screw threaded nuts holding one side tight with the sleeve, and at the opposite end under friction between which the various parts of the spool are clamped. The sleeve C'' is made larger in diameter where it passes through the left hand plate or head C', the enlarged part is threaded and a nut is screwed on to hold the plate against the shoulder.

The flanges of the spool are stamped from sheet metal perforated at the center to slip onto the sleeve C'', and the barrel or body of the spool is made up of concentric scrolls of sheet metal c c'', which are arranged to adjustably slip or partially rotate the one upon

the other. Lugs S S are provided one on each of these concentric scrolls, one of which projects into an aperture s' on one head to engage the flange of the spool, and the other of which projects into a similar slot or opening on the opposite head or flange of the spool, so that by taking hold of the flanges or heads of the spools and turning them, these central scroll pieces will be rotated and adjusted on each other. A lug r is struck inwardly from the outer scroll C into a slightly enlarged slot r' on the inner scroll c'', so that the movement of the two parts is limited by the lug r engaging the opposite side of the slot which serves as a stop means for limiting the relative movement of the two parts. A slot c' is through the outer scroll C toward one end at such a point that it is opened by the movements of the two scrolls or shells c c''. Fig. 9 shows the same in the closed position, and rotation of the parts to the limit in the opposite direction would obviously open the slot.

The ribbon c''' is attached by inserting its end into the slot C' when open, and then turning the opposite heads of the spool, which of course would close the slot C', thus clamping the ribbon. To detach the ribbon the heads of the spool are simply turned in the opposite direction. The scrolls do not form a complete circle, there is consequently a gap at one side for the end of the weighted reversing lever to enter and cause the reverse of the driving mechanism when the end of the ribbon is reached. This mechanism has been made the subject of an independent patent to myself and Glenn J. Barrett, No. 837,554 dated Dec. 4, 1906.

The movement of the ribbon laterally is effected by certain mechanism actuated from a cam C'' on the side of the spool. This cam is preferably made in a separate piece, and is clamped to the side of the spool with the spool head by the collar on the sleeve as indicated in Fig. 10. The cam itself is illustrated at Fig. 12, which is a face view. This cam C'' can of course be attached to the spool by other means, as is illustrated in Fig. 15, where the same is shown secured directly to one of the heads of the spool. In Figs. 14, 15 and 16 a slightly modified construction of the spool is illustrated, the lug r in the slot r' not being illustrated, but little stops being formed at the ends of the outer shell C to limit the relative movements of the shells c and c''

The central portion of the ribbon c''' at the printing point is supported in the vibrator E''' which is slotted and preferably formed integral with the supporting arms E''. The same is suitably slotted in from the top so that the ribbon is retained by upwardly projecting fingers with an open space at the center, the arms E'' connecting to the vibrator E''' at a point below the lower edge of the

ribbon c''' . This permits the ready insertion of the ribbon without threading. The arms E'' are secured to the rock shaft E .

The rock shaft E is supported on suitable pointed bearings e, e' at each end, the bearing e' being screw threaded and adjustable and retained in place by suitable lock nuts e'' . The said rock shaft E is arranged in a horizontal position and secured to suitable projection on the under part of the upper front bar A' of the frame.

A suitable buffer a of leather, rubber or felt is on the upper part of the frame A to limit the upward movement of the arm E'' . An arm E' extends downwardly from one end of the rock shaft E , and the mechanism for oscillating and controlling the ribbon guide is connected thereto, all the different mechanisms acting upon the said arm E' .

A rock shaft I is arranged transversely across the machine just above and back of the key board, and is supported on suitable brackets J , carried by the frame of the machine or supported on the front transverse comb bar J . This rock shaft is provided with a pair of arms I' extending toward the rear of the machine and connected by downwardly extending links i to an independent transverse adjustable common bar K beneath the key levers B , so that whenever any key lever is depressed it acts upon the bar K and through its compression upon the rock shaft I . Secured toward one end of the rock shaft I is an upwardly projecting plate I'' having a finger extending and wrapping around the arm I' at that point, so that it will be rocked whenever the rock shaft is oscillated. This plate I'' extends upwardly and there is yieldingly secured to it an upwardly projecting arm L made of sheet metal. The upper end of the arm L is turned at right angles and perforated, and engages the downwardly projecting arm E' on the rock shaft E with a loose fit, so that it readily acts upon the arm E to oscillate it, whenever a key of the type-writer is depressed through the connection of the arm L of the plate I'' . The yielding connection of the arm L to the plate I'' consists of laterally extending studs l from arm L which fit loosely in suitable apertures in the plate I'' , permitting it to oscillate freely. A central stud L' is between the studs l , extending also with a loose fit through an aperture in the plate I'' . A spring L'' is placed on the part of the stud L' which projects through the plate I'' , and is retained by the screw threaded nut L''' which are adjustable upon the end of the stud L' . This spring holds the lever or arm L yieldingly in position so that it can be tipped in either direction on the plate I'' and so it can be rocked also from depressing the key levers. When stops are adjusted for various purposes this permits the plate I'' to rock and the keys can be operated with-

out undue resistance. A spring I''' is connected to this plate I'' in such a manner as to throw the arms I' normally upward. It will thus be seen that there is a yielding connection between the plate I'' and the arm E' the purpose of which yielding connection will more fully appear from the description to follow.

An arm F depends from the upper portion of the frame of the machine, preferably the bracket D , and has a rounded projection F' at the bottom extending toward the rear of the machine and arranged to contact with the face of the cam C'' , so that when it is in position resting against the cam, it will be actuated thereby and reciprocate in the direction of the axis of the spool shaft. The position of this arm F is controlled by an arm G' on a rock shaft G which is controlled by a knurled head G''' on the left hand side of the machine, (see Fig. 2). This arm G' has a projecting pin G'' which is connected by a link F'' to the arm F . The link F'' has a slot therein which the pin G'' engages, the slot being oblong and somewhat triangular in form. A stop screw F''' is provided on this link F'' which is arranged to contact with the rock shaft arm E' when this device is in its operative position. It will be seen as a consequence that the relation of the stop to the arm constantly varies with the position of the cam C'' during the revolution of the ribbon C' , and that the upward throw of the ribbon vibrator E''' is constantly varied, and by this means the ribbon will be moved to varying heights and in effect oscillated so that the type will strike at different places laterally thereon and thereby the entire face of the ribbon will be used. When it is desired to deliver the ribbon to the type without lateral variation or oscillation, the arm G' is thrown by the knurl G''' into the upward position indicated in Fig. 3, when the arm F will be swung away from the ribbon spool, and the stop F''' will be thrown out of operative relation of the arm E' . As the connection between the plate I'' and the arm E is a yielding connection it will be seen that no adjustment or variation is necessary in connection with the key lever to accomplish this shifting of the ribbon.

Supported on the plate H , which is pivoted on a suitable screw, is a pair of stops $H' H''$ which are arranged at different distances from the pivot support of such plate H . A link M depends from this plate H and is connected by pivot n to two levers $N N'$. The lever N' is fulcrumed toward the front of the machine between the finger button and the pivot n ; and the lever N is fulcrumed at its inner end back of the pivot n , the pivot n being between its fulcrum and the finger button so that this link will act in both directions. By the depression of the lever N' the link will be thrown upward, and by

depression of the lever N it will be thrown downward, so that the same is readily adjustable by the said levers projecting outwardly over the key board of the machine. This shifts stop plate H up and down.

A U-shaped spring h'' engages a stud h on the side of the machine at one end, and the plate H at the opposite end, so that this spring retains the plate H yieldingly in its elevated or lowered position automatically. The stud h projects through a slot h' in the plate H to limit its movement up and down. The plate H is consequently held yieldingly in position, and can be adjusted merely by touching the keys N or N' depending on which adjustment may be desired.

The arm G' is rounded at its free end to come into engagement with the projecting portion of the plate H to throw the said plate downwardly should it happen to be in the elevated position when it is desired to throw the ribbon shifting mechanism into operation. A stop g on the said arm G' engages the plate H and the movement of the arm G' is limited thereby so that the stop pin G'' comes into the right relation to the slot in the link F''. It will thus be seen that when the arm G' is thrown downward the same movement throws the stop plate H into its lower position and permits the ribbon shifting mechanism to operate, so that the multi-colored ribbon apparatus is readily adjustable to secure the oscillating ribbon feature. The oscillating feature is used when a ribbon of a single color is on the spools, and the stop mechanism is made use of when a ribbon with two colors or two kinds is on the spools. For, when the ribbon mechanism is in the position indicated in Fig. 3 the stop plate H can be adjusted and when in the position indicated in Fig. 3 only the upper portion of the ribbon will be utilized, and when the plate H is dropped to the position indicated in Fig. 1 the oscillating mechanism being left in the position indicated in Fig. 3, only the lower portion of the ribbon will be utilized. The ribbon, it will be observed, is only elevated to the printing position when a type key is depressed.

In the making of the stencils for mimeograph work, it is desired of course not to use the ribbon. My improved mechanism lends itself especially well to this use, because the entire ribbon mechanism can be shifted into an inoperative position. This is accomplished by means of levers U pivoted inside the case, (see Figs. 1, 2, and 3), the said levers having a lateral projection U' arranged to be swung into contact with the rear side of the arm E'. The position of the lever is controlled by a rod V notched on its upper surface to engage a catch V'. The rod V is provided with a push button at its outer end, and is held normally upward by the coil spring V''. When it is desired to throw the

ribbon mechanism out of operation, the rod V is pushed in to the center notch, and the spring V'' throws it up into engagement with the catch V', and the projection U' on the lever U engages the arm E' of the rock shaft, holding the ribbon guide in the downward or deflected position, as indicated by the dotted lines of Fig. 1, the shifting of the lever U not being indicated. The ribbon mechanism is brought into work again by simply depressing the outer end of the lever V and drawing it out. When it is desired to make insertions it is necessary to expose the scale, or carry the ribbon away from below the line of vision. This is done by pushing the button on rod V to the last notch which carries the vibrator with the ribbon below the graduations on the scale making it possible to read the same clearly. A downward movement on the rod V releases the same and the vibrator returns to its normal position. I provide in this connection an improved form of paper scale and support t in connection with the platen T, as indicated in Figs. 1 and 3, which arrangement enters into combination with the vibrator and ribbon guide in that relation as it permits of close arrangement. I desire to remark that where the typewriter is not desired for use in the making of stencils, that this lever U and its connections could of course be dispensed with, but that it coacts with the remaining parts of my improved ribbon mechanism since it makes the machine very convenient for stencil work. Also this device readily exposes the scale.

Where it is not desired to use a two colored ribbon, the plate H and its connections along with the levers N N' may be omitted, but my improved mechanism is such that it is very readily associated and combined with the other parts to make the machine available for using the two colored ribbons, ribbons of two kinds, one of which kinds may be copying ribbon and the other a record ribbon.

Where it is not desired to bring the two colored ribbon into use, of course there should be no particular need of making the ribbon shifting device adjustable. It might be arranged to act over a fixed pin G'' in place of a pin on a swinging arm, for instance. Other variations, and variations of form, very readily suggest themselves to those skilled in the art to which my invention pertains.

Of course the vibrator E''' and ribbon guides could be used without the ribbon shifting and oscillating means.

I desire to claim the features of my improved ribbon mechanism specifically as well as broadly.

Having thus described my invention what I claim as new and desire to secure by Letters Patent is:

1. In a ribbon mechanism of a front-

strike typewriter, the combination of suitable ribbon spools C' with means for actuating the same; a cam plate C'' on the face of one of the said spools, with its face adapted to actuate a moving part in the direction of the ribbon spool shaft; a ribbon vibrator E''' slotted from the upper side to receive the ribbon; a rock shaft E, horizontally arranged in the upper front part of the machine, with an arm E'' connected to said ribbon vibrator; downwardly projecting arms E' from the rock shaft E; a transverse rock shaft I, arranged in the lower front part of the machine; arms I' projecting rearwardly therefrom; a common bar K under the key levers of the machine; links i connecting the said bar K to the arms I', whereby the said arms will be deflected on the depression of a key of the machine; an upwardly projecting plate I'' carried by the rock shaft studs l l, between which is a longer stud L' projecting through perforations in the plate I''; a coiled spring L'' embracing the stud L', and a nut L''' for applying the tension of the spring L'', whereby the plate L is held yieldingly in position on the plate I'', the upper end of said plate L being offset and perforated and embracing the downwardly-projecting rock shaft arm E' whereby there is a yielding connection between the key levers and the ribbon mechanism; a stop plate H with stops H' H'' arranged at different distances from the pivot thereof, to be adjustably thrown up in position to engage the arm E' for the purpose of controlling the movement of the ribbon vibrator to enable the use of a double colored ribbon; a spring h'' connected to a stud h at one end and engaging the plate H at the opposite end, whereby the plate is automatically and yieldingly retained in its adjusted positions; a downwardly depending link M secured to the plate H and connected by the pivot n to the levers N and N', the levers N and N' projecting toward the front of the machine with suitable push buttons thereon, the lever N' being fulcrumed in front of the pivot n' and the lever N being fulcrumed in the rear of the pivot n, whereby the depressing of the levers shifts and adjusts the plate H up and down; a downwardly-depending arm F pivotally supported on the upper part of the machine, the lower end of which is provided with a round projection F' to rest in contact with the cam C''; a link F''' secured to the lower end of the arm F, having an adjustable stop on its opposite end, adapted and arranged to limit the movement of the arm E, whereby the gradual shifting of the ribbon and the ribbon vibrator is secured to utilize the full face of the ribbon; an arm G' with a rounded end on the pivot G having a knurled end G'' for controlling the link F'' to throw the ribbon-shifting mechanism into and out of engagement and control the ribbon stops; and a

lever U with stops U' thereon, with means for adjusting the same to throw the ribbon and ribbon vibrator out of use for stenciling, all co-acting substantially as described and for the purpose specified.

2. In a ribbon mechanism of a front-strike typewriter, the combination of suitable ribbon spools C' with means for actuating the same; a cam plate C'' on the face of one of the said spools, with its face adapted to actuate a moving part in the direction of the ribbon spool shaft; a ribbon vibrator E''' slotted from the upper side to receive the ribbon; a rock shaft E, horizontally arranged in the upper front part of the machine, with an arm E'' connected to said ribbon vibrator; downwardly-projecting arms E' from the rock shaft E; a transverse rock-shaft I, arranged in the lower front part of the machine; arms I' projecting rearwardly therefrom; a common bar K under the key levers of the machine; links i connecting the said bar K to the arms I', whereby the said arms will be deflected on the depression of a key of the machine; an upwardly-projecting plate I'' carried by the rock shaft studs l l, between which is a longer stud L' projecting through perforations in the plate I''; a coiled spring L'' embracing the stud L', and a nut L''' for applying the tension of the spring L'', whereby the plate L is held yieldingly in position on the plate I'', the upper end of said plate L being offset and perforated and embracing the downwardly-projecting rock shaft arm E' whereby there is a yielding connection between the key levers and the ribbon mechanism; a stop plate H with stops H' H'' arranged at different distances from the pivot thereof, to be adjustably thrown up in position to engage the arm E' for the purpose of controlling the movement of the ribbon vibrator to enable the use of a double colored ribbon; a spring h'' connected to a stud h at one end and engaging the plate H at the opposite end, whereby the plate is automatically and yieldingly retained in its adjusted positions; a downwardly depending link M secured to the plate H and connected by the pivot n to the levers N and N', the levers N and N' projecting toward the front of the machine with suitable push buttons thereon, the lever N' being fulcrumed in front of the pivot n', and the lever N being fulcrumed in the rear of the pivot n, whereby the depressing of the levers shifts and adjusts the plate H up and down; a downwardly-depending arm F pivotally supported on the upper part of the machine, the lower end of which is provided with a round projection F' to rest in contact with the cam C''; a link F''' secured to the lower end of the arm F, having an adjustable stop on its opposite end, adapted and arranged to limit the movement of the arm E, whereby the gradual shifting of the ribbon and the ribbon vibrator is secured to utilize the full face of the

ribbon; an arm G' with a rounded end on the pivot G having a knurled end G'' for controlling the link F''' to throw the ribbon-shifting mechanism into and out of engagement and control the ribbon stops, all coacting substantially as described and for the purpose specified.

3. In a ribbon mechanism of a front-strike typewriter, the combination of suitable ribbon spools C' with means for actuating the same; a cam plate C'' on the face of one of the said spools, with its face adapted to actuate a moving part in the direction of the ribbon spool shaft; a ribbon vibrator E''' slotted from the upper side to receive the ribbon; a rock-shaft E, horizontally arranged in the upper front part of the machine, with an arm E'' connected to said ribbon vibrator; downwardly-projecting arms E' from the rock shaft E; a transverse rock-shaft I, arranged in the lower front part of the machine; arms I' projecting rearwardly therefrom; a common bar K under the key levers of the machine; links i connecting the said bar K to the arms I', whereby the said arms will be deflected on the depression of a key of the machine; an upwardly-projecting plate I'' carried by the rock shaft studs ll, between which is a longer stud L' projecting through perforations in the plate I''; a coiled spring L'' embracing the stud L', and a nut L''' for applying the tension of the spring L'', whereby the plate L is held yieldingly in position on the plate I'', the upper end of said plate L being offset and perforated and embracing the downwardly-projecting rock shaft arm E' whereby there is a yielding connection between the key levers and the ribbon mechanism; a downwardly-depending arm F pivotally supported on the upper part of the machine, the lower end of which is provided with a round projection F' to rest in contact with the cam C''; a link F''' secured to the lower end of the arm F, having an adjustable stop on its opposite end, adapted and arranged to limit the movement of the arm E, whereby the gradual shifting of the ribbon and the ribbon vibrator is secured to utilize the full face of the ribbon; an arm G' with a rounded end on the pivot G having a knurled end G'' for controlling the link F''' to throw the ribbon-shifting mechanism into and out of engagement and control the ribbon stops; and a lever U with stops U' thereon, with means for adjusting the same to throw the ribbon and ribbon vibrator out of use for stenciling, all co-acting substantially as described and for the purpose specified.

4. In a ribbon mechanism of a front-strike typewriter, the combination of suitable ribbon spools C' with means for actuating the same; a cam plate C'' on the face of one of the said spools, with its face adapted to actuate a moving part in the direction of the ribbon spool shaft; a ribbon vibrator E''' slotted

from the upper side to receive the ribbon; a rock shaft E, horizontally arranged in the upper front part of the machine, with an arm E'' connected to said ribbon vibrator; downwardly-projecting arms E' from the rock shaft E; a transverse rock shaft I arranged in the lower front part of the machine; arms I' projecting rearwardly therefrom; a common bar K under the key levers of the machine; links i connecting the said bar K to the arms I', whereby the said arms will be deflected on the depression of a key of the machine; an upwardly-projecting plate I'' carried by the rock shaft studs ll, between which is a longer stud L' projecting through perforations in the plate I''; a coiled spring L'' embracing the stud L', and a nut L''' for applying the tension of the spring L'', whereby the plate L is held yieldingly in position on the plate I'', the upper end of said plate L being offset and perforated and embracing the downwardly-projecting rock shaft arm E' whereby there is a yielding connection between the key levers and the ribbon mechanism; a downwardly-depending arm F pivotally supported on the upper part of the machine, the lower end of which is provided with a round projection F' to rest in contact with the cam C''; a link F''' secured to the lower end of the arm F, having an adjustable stop on its opposite end adapted and arranged to limit the movement of the arm E, whereby the gradual shifting of the ribbon and the ribbon vibrator is secured to utilize the full face of the ribbon; an arm G' with a rounded end G'' for controlling the link F''' to throw the ribbon-shifting mechanism into and out of engagement and control the ribbon stops, all co-acting substantially as described and for the purpose specified.

5. In a ribbon mechanism of a front-strike typewriter, the combination of suitable ribbon spools C' with means for actuating the same; a ribbon vibrator E''' slotted from the upper side to receive the ribbon; a rock shaft E, horizontally arranged in the upper front part of the machine, with an arm E'' connected to said ribbon vibrator; downwardly-projecting arms E' from the rock shaft E; a transverse rock shaft I, arranged in the lower front part of the machine; arms I' projecting rearwardly therefrom; a common bar K under the key levers of the machine; links i connecting the said bar K to the arms I', whereby the said arms will be deflected on the depression of a key of the machine; an upwardly-projecting plate I'' carried by the rock-shaft studs ll, between which is a longer stud L' projecting through perforations in the plate I''; a coiled spring L'' embracing the stud L', and a nut L''' for applying the tension of the spring L'', whereby the plate L is held yieldingly in position on the plate I'', the upper end of said plate L being offset and perforated and embracing the downwardly-

projecting rock shaft arm E' whereby there is a yielding connection between the key levers and the ribbon mechanism; a stop plate H with stops H' H'' arranged at different distances from the pivot thereof, to be adjustably thrown up in position to engage the arm E' for the purpose of controlling the movement of the ribbon vibrator to enable the use of a double colored ribbon; a spring h'' connected to a stud h at one end and engaging the plate H at the opposite end, whereby the plate is automatically and yieldingly retained in its adjusted positions; a downwardly-depending link M secured to the plate H and connected by the pivot n to the levers N and N', the levers N and N' projecting toward the front of the machine with suitable push buttons thereon, the lever N' being fulcrumed in front of the pivot n', and the lever N being fulcrumed in the rear of the pivot n, whereby the depressing of the levers shifts and adjusts the plate H up and down; and a lever U with stops U thereon, with means for adjusting the same to throw the ribbon and ribbon vibrator out of use for stenciling, all co-acting substantially as described and for the purpose specified.

6. In a ribbon mechanism of a front-strike typewriter, the combination of suitable ribbon spools C' with means for actuating the same; a ribbon vibrator E''' slotted from the upper side to receive the ribbon; a rock shaft E horizontally arranged in the upper front part of the machine, with an arm E'' connected to said ribbon vibrator; downwardly-projecting arms E' from the rock shaft E; a transverse rock-shaft I, arranged in the lower front part of the machine; arms I' projecting rearwardly therefrom; a common bar K under the key levers of the machine; links i connecting the said bar K to the arms I', whereby the said arms will be deflected on the depression of a key of the machine; an upwardly-projecting plate I'' carried by the rock shaft studs l l, between which is a longer stud L' projecting through perforations in the plate I''; a coiled spring L'' embracing the stud L', and a nut L''' for applying the tension of the spring L'', whereby the plate L is held yieldingly in position on the plate I'', the upper end of said plate L being offset and perforated and embracing the downwardly-projecting rock shaft arm E' whereby there is a yielding connection between the key levers and the ribbon mechanism; a stop plate H with stops H' H'' arranged at different distances from the pivot thereof, to be adjustably thrown up in position to engage the arm E' for the purpose of controlling the movement of the ribbon vibrator to enable the use of a double colored ribbon; a spring h'' connected to a stud h at one end and engaging the plate H at the opposite end, whereby the plate is automatically and yieldingly retained in its adjusted

positions; a downwardly-depending link M secured to the plate H and connected by the pivot n to the levers N and N', the levers N and N' projecting toward the front of the machine with suitable push buttons thereon, the lever N' being fulcrumed in front of the pivot n' and the lever N being fulcrumed in the rear of the pivot n, whereby the depressing of the levers shifts and adjusts the plate H up and down, all co-acting substantially as described and for the purpose specified.

7. In a ribbon mechanism of a front-strike typewriter, the combination of suitable ribbon spools C' with means for actuating the same; a ribbon vibrator E''' slotted from the upper side to receive the ribbon; a rock-shaft E, horizontally arranged in the upper front part of the machine, with an arm E'' connected to said ribbon vibrator; downwardly-projecting arms E' from the rock-shaft E; a transverse rock-shaft I, arranged in the lower front part of the machine; arms I' projecting rearwardly therefrom; a common bar K under the key levers of the machine; links i connecting the said bar K to the arms I', whereby the said arms will be deflected on the depression of a key of the machine; an upwardly projecting plate I'' carried by the rock-shaft studs l l, between which is a longer stud L' projecting through perforations in the plate I''; a coiled spring L'' embracing the stud L', and a nut L''' for applying the tension of the spring L'', whereby the plate L is held yieldingly in position on the plate I'', the upper end of said plate L being offset and perforated and embracing the downwardly-projecting rock-shaft arm E' whereby there is a yielding connection between the key levers and the ribbon mechanism; and a lever U with stops U' thereon, with means for adjusting the same to throw the ribbon and ribbon vibrator out of use for stenciling, all co-acting substantially as described and for the purpose specified.

8. In the ribbon mechanism of a front strike typewriter, the combination of suitable ribbon spools; a cam on the face of one of the spools; a ribbon vibrator; pivotal supports for the said vibrator to the upper front part of the frame of the machine; a common bar positioned and arranged to be actuated by the key-levers of the type-writer; a yielding connection from said ribbon vibrator to said common bar; a variable stop mechanism controlled by the cam on the face of the ribbon spool; a series of adjustable stops for limiting and varying the movement of said ribbon vibrator; and an independent adjustable stop for holding the said ribbon below the printing point, co-acting for the purpose specified.

9. In a ribbon mechanism of a front strike typewriter, the combination of suitable ribbon spools; a cam on the face of one of the spools; a ribbon vibrator; pivotal supports

for the said vibrator to the upper front part of the frame of the machine; a common bar positioned and arranged to be actuated by the key-levers of the type-writer; a yielding connection from said ribbon vibrator to said common bar; a variable stop mechanism controlled by the cam on the face of the ribbon spool; and a series of adjustable stops for limiting and varying the movement of said ribbon vibrator, co-acting for the purpose specified.

10. In the ribbon mechanism of a front-strike typewriter, the combination of suitable ribbon spools; a ribbon vibrator; pivotal supports for the said vibrator to the upper front part of the frame of the machine; a common bar positioned and arranged to be actuated by the key-levers of the type-writer; a yielding connection from said ribbon vibrator to said common bar; a series of adjustable stops for limiting and varying the movement of the said ribbon vibrator; and an independent adjustable stop for holding the said ribbon below the printing point, co-acting for the purpose specified.

11. In a ribbon mechanism of a front-strike typewriter, the combination of suitable ribbon spools; a ribbon vibrator; pivotal supports for the said vibrator to the upper front part of the frame of the machine; a common bar positioned and arranged to be actuated by the key-levers of the type-writer; a yielding connection from said ribbon vibrator to said common bar; and a series of adjustable stops for limiting and varying the movement of said ribbon vibrator, co-acting for the purpose specified.

12. In the ribbon mechanism of a front-strike typewriter, the combination of suitable ribbon spools; a cam on the face of one of the spools; a ribbon vibrator; pivotal supports for the said vibrator to the upper front part of the frame of the machine; a common bar positioned and arranged to be actuated by the key-levers of the type-writer; a yielding connection from said ribbon vibrator to said common bar; a variable stop mechanism controlled by the cam on the face of the ribbon spool; and an independent adjustable stop for holding the said ribbon below the printing point, co-acting for the purpose specified.

13. In the ribbon mechanism of a front-strike typewriter the combination of suit-

strike typewriter, the combination of suitable ribbon spools; a ribbon vibrator; pivotal supports for the said vibrator to the upper front part of the frame of the machine; a common bar positioned and arranged to be actuated by the key-levers of the type-writer; a yielding connection from said ribbon vibrator to said common bar; and an independent adjustable stop for holding the said ribbon below the printing point, co-acting for the purpose specified.

15. In the ribbon mechanism of a front-strike typewriter, the combination of suitable ribbon spools; a ribbon vibrator; pivotal supports for the said vibrator to the upper front part of the frame of the machine; a common bar positioned and arranged to be actuated by the key-levers of the typewriter; a yielding connection from said ribbon vibrator to said common bar; and an independent adjustable stop for holding the said ribbon below the printing point, co-acting for the purpose specified.

16. In the ribbon mechanism of a front-strike typewriter, the combination of suitable ribbon spools; a ribbon vibrator; pivotal supports for the said vibrator to the upper front part of the frame of the machine; a common bar positioned and arranged to be actuated by the key-levers of the typewriter; a yielding connection from said ribbon vibrator to said common bar; co-acting for the purpose specified.

17. In a ribbon mechanism for a front strike typewriter, the combination of suitable ribbon spools C' ; means for actuating the same; a ribbon vibrator; a cam plate C'' on the face of one of the spools, with its face adapted to actuate a moving part; pivoted supports for the said vibrator to the upper front part of the frame of the machine; a common bar positioned and arranged to be actuated by the key-levers of the type-writer; a yielding connection from said ribbon vibrator to said common bar; a variable stop mechanism controlled by the cam on the face of the ribbon spools, consisting of a downwardly depending arm F pivotally supported on the upper part of the machine, the lower end of which is provided with rounded projections F' to rest in contact with the cam C'' on the face of the ribbon spool; and a link F''' secured to the lower end of the arm F , having a stop on its opposite end adapted

supports for the said vibrator to the front part of the frame of the machine; a common bar positioned and arranged to be actuated by the key-levers of the type-writer; a yielding connection from said ribbon vibrator to said common bar; a variable stop mechanism controlled by the cam on the face of the ribbon spools, consisting of a downwardly depending arm F pivotally supported on the upper part of the machine, the lower end of which is provided with rounded projections F' to rest in contact with the cam C'' on the face of the ribbon spool; and a variable stop controlled thereby, co-acting for the purpose specified.

19. In a ribbon mechanism for a front-strike typewriter, the combination of suitable ribbon spools; a central ribbon vibrator E''' slotted on the upper side, to receive the ribbon at the printing point, with forwardly projecting arms E'' E'' pivotally supported in the upper front part of the typewriter; ribbon guides D' toward each side of the machine, substantially level with the typewriter and arranged at an angle to deliver the ribbon to and from the spools and direct it to the central guide of the vibrator ribbon; and means for elevating the central ribbon vibrator at each stroke of the key lever, co-acting for the purpose specified.

20. In a ribbon mechanism for a front-strike typewriter, the combination of suitable ribbon spools arranged beneath the platen; a central ribbon vibrator E''' to receive the ribbon at the printing point, with forwardly projecting arms E'' E'' pivotally supported in the upper front part of the typewriter; ribbon guides D' toward each side of the machine, substantially level with the typewriter platen and arranged at an angle to deliver the ribbon to and from the spools and direct it to the central guide of the ribbon vibrator; and means for elevating the central ribbon guide at each stroke of the key lever, co-acting for the purpose specified.

21. In the ribbon mechanism for a front-strike type-writing machine, the combination of suitable ribbon spools; a ribbon vibrator; a pivotal support for the said vibrator in the upper front part of the machine, consisting of the rock shaft E with arms E'' for supporting the ribbon guide, and with a downwardly projecting arm E' from the said rock shaft; a transverse rock shaft I arranged in the lower front part of the machine; arms I' projecting rearwardly therefrom; a common bar K under the key levers of the machine; links i connecting the arms I' to the bar K, whereby the said arms will be deflected on the depression of a key of the machine; an upwardly projecting plate I'' carried by the rock shaft I; a spring I''' for normally throwing the arms I' upwardly; an upwardly projecting arm L with laterally projecting studs ll between which is a longer stud L' project-

ing through perforations in the plate I''; a coiled spring L'' embracing the stud L' and a threaded nut L''' for adjusting the tension on the spring L'' whereby the plate L is yieldingly held in position on the plate I'', the upper end of said plate I'' being offset and perforated and embracing the downwardly projecting rock shaft arm E' whereby there is a yielding connection between the key levers and the ribbon mechanism; a stop device for limiting the movements of the said ribbon vibrator, independent of the yieldable actuating means co-acting for the purpose specified.

22. In the ribbon mechanism for a front-strike type-writing machine, the combination of a ribbon vibrator; means for retaining it normally out of the printing line; and yieldable connections to the key-levers, consisting of a rocking plate I'' and a yielding lever L retained on the rocking plate by studs extending therethrough, and a spring holding the parts yieldingly together, for the purpose specified.

23. In the ribbon mechanism of a front-strike type-writer, the combination of suitable ribbon spools; a ribbon vibrator; a pivoted support for the said vibrator; yielding connections to the said ribbon vibrator, arranged to be actuated by the key levers of the typewriter; a series of stops, adjustable for limiting and varying the movement of said ribbon vibrator, consisting of the plate H with a series of stops H' H'' arranged to stop the ribbon vibrator at different points and adapted to be adjustably thrown into position to engage said ribbon vibrator for the purpose of controlling the movement of the same to enable the use of a double colored ribbon; a spring h'' connected to a stud h at one end and engaging the plate H at the opposite end, whereby the plate is automatically and yieldingly retained in its adjusted positions, a downwardly depending link M secured to the plate H and connected by the pivot n to the levers N and N', the levers N and N' projecting toward the front of the machine with suitable push buttons thereon, the lever N' being fulcrumed in front of the pivot n', and the lever N being fulcrumed in front of the pivot n, whereby the depressing of the levers shifts and adjusts the plate H up and down, all co-acting for the purpose specified.

24. In the ribbon mechanism of a front-strike type-writer, the combination of suitable ribbon spools; a ribbon vibrator; a pivoted support for the said vibrator; yielding connections to the said ribbon vibrator, arranged to be actuated by the key levers of the typewriter; a series of stops, adjustable for limiting and varying the movement of said ribbon vibrator, consisting of the plate H with a series of stops H' H'' arranged to stop the ribbon vibrator at different points

and adapted to be adjustably thrown into position to engage the said ribbon vibrator for the purpose of controlling the movement of the same to enable the use of a double colored ribbon, a downwardly depending link M secured to the plate H and connected by the pivot *n* to the levers N and N', the levers N and N' projecting toward the front of the machine with suitable push buttons thereon, the lever N' being fulcrumed in front of the pivot *n'*, and the lever N being fulcrumed in front of the pivot *n*, whereby the depressing of the levers shifts and adjusts the plate H up and down, co-acting for the purpose specified.

25. In the ribbon mechanism of a front-strike typewriting machine, the combination of suitable ribbon spools; a ribbon vibrator; a pivoted support for the said vibrator; a common bar positioned and arranged to be actuated by the key levers of the typewriter; yielding connections from said ribbon vibrator to said common bar; a series of stops, adjustable, for limiting and varying the movement of said ribbon vibrator, consisting of the plate H with a series of stops H' H'' arranged to stop the ribbon vibrator at different points and adapted to be adjustably thrown into position to engage the ribbon vibrator for the purpose of controlling the movement of the same to enable the use of a double colored ribbon, co-acting for the purpose specified.

26. In the ribbon mechanism of a front-strike typewriting machine, the combination of a suitable ribbon spool; a ribbon vibrator; pivotal supports for the said vibrator; a common bar positioned and arranged to be actuated by the key levers of the typewriter; a yielding connection from said ribbon vibrator to the said common bar; and an adjustable stop for holding the said ribbon below the printing point, consisting of a lever U with a stop U' thereon to contact with the said ribbon vibrator, a push arm V notched at one side, with a spring V' for engaging said notches, and a spring *v* for retaining the same against the notches, co-acting for the purpose specified.

27. In a ribbon vibrator for a front-strike typewriting machine, the combination of ribbon spools arranged beneath the platen, a central guide arranged to oscillate, and guides at each side consisting of rounded bodies turned at a suitable angle to guide the ribbon from a horizontal to a vertical plane; and suitable guards D''' over the said guides co-acting for the purpose specified.

28. In a ribbon vibrator for a front-strike typewriting machine, the combination of ribbon spools arranged beneath the platen, a central guide arranged to oscillate, and guides at each side consisting of rounded bodies turned at a suitable angle to guide the

ribbon from a horizontal to a vertical plane, for the purpose specified.

29. In a typewriting machine, the combination of a rock shaft above the key levers; a ribbon vibrator connected thereto; rearwardly extending arms on the rock shaft arranged toward each side of the key levers; downwardly extending links; and an independent adjustable universal bar K on the lower end of said links, beneath the said key levers, co-acting for the purpose specified.

30. In a typewriting machine, the combination of the ribbon vibrator; lever connections thereto; downwardly depending links therefrom towards each side of the key levers; and an independent adjustable universal bar beneath the key levers connected to said links, co-acting for the purpose specified.

31. In a typewriting machine, the combination of the ribbon vibrator; lever connections thereto; downwardly-depending links therefrom toward each side of the key levers; and an independent universal bar beneath the key levers adjustably connected to said links, co-acting for the purpose specified.

32. In a typewriting machine, the combination of a ribbon-vibrator, stop means for arresting said vibrator in its travel toward the printing-point, and means operating automatically to adjust said stop means to arrest the vibrator at different points in its travel.

33. In a typewriting machine, the combination of a ribbon-vibrator, stop means for arresting said vibrator in its travel toward the printing-point, and means operating automatically to adjust said stop means to arrest the vibrator at progressively-varying points in its travel.

34. In a typewriting machine, the combination of a ribbon-vibrator, actuating means therefor comprising an operating-lever, a stop coöperative with said operating-lever to stop its movement, and means operating automatically to cause said stop and said lever to coöperate at different points in the travel of the lever.

35. In a typewriting machine, the combination of a ribbon-vibrator, actuating means therefor comprising an operating-lever, and a stop coöperative with said operating-lever and rotatable to progressively stop the extent of movement of said lever.

36. In a typewriting machine, the combination of a ribbon-vibrator, means for feeding the ribbon longitudinally and stop means for arresting the vibrator in its travel toward the printing-point, said stop means being actuated by said ribbon-feeding means to vary the extent of travel or throw of the vibrator.

37. In a typewriting machine, the combination of a ribbon-vibrator, means for

feeding the ribbon longitudinally, and stop means for arresting the vibrator in its travel toward the printing-point, said stop means being actuated by said ribbon-feeding means to vary progressively the extent of travel or throw of the vibrator.

38. In a typewriting machine, the combination of a ribbon-vibrator, actuating means therefor comprising an operating-lever, a key-actuated universal bar, a yielding connection between said universal bar and said lever, and a stop automatically operative to arrest said lever and automatically vary the throw of the vibrator.

39. In a typewriting machine, the combination of a ribbon-vibrator, stop means comprising a stop for arresting the vibrator at an unvarying point in its travel and a second stop for automatically varying the point of arrest of said vibrator and means for moving said stop means to bring one or another of said stops to operative position.

40. In a typewriting machine, the combination of a ribbon-vibrator, actuating means therefor, and means for arresting said actuating means variably and automatically, said arresting means being varied automatically during the operation of the writing-keys.

41. In a typewriting machine, the combination of a ribbon-vibrator, actuating means therefor, and constantly-varying stop means for stopping and changing the throw of the vibrator.

42. In a typewriting machine, the combination of a device for carrying the ribbon toward and away from the printing-point, means for actuating said device, and an automatically-varying device for stopping said actuating means.

43. In a typewriting machine, the combination of an inking-ribbon movable toward and away from the printing-point, operating means therefor, and an automatically-varying stop means for positively stopping said operating means.

44. In a typewriting machine, the combination of an inking-ribbon movable toward and away from the printing-point, operating means therefor, and a variable stop device for variably stopping said operating means connected to be operated by a given part of the machine when the keys are actuated.

45. In a typewriting machine, the combination of a ribbon normally removed from the printing-point, means for moving said ribbon to cover the printing-point at the printing operation, intercepting stop means against which said moving means strikes during the travel of the ribbon toward the printing-point, and means operating automatically to adjust said stop means and present different stopping-points thereon to the moving means during successive printing

movements of the ribbon, thus varying said printing movements of the ribbon.

46. In a typewriting machine, the combination of a ribbon-vibrator, actuating means for said vibrator, intercepting stop means against which said actuating means strikes during the travel of the vibrator toward the printing-point and whereby said vibrator is arrested, and means operating automatically to adjust said stop means to arrest the vibrator at different points in its travel.

47. In a typewriting machine, the combination of a ribbon normally removed from the printing-point, means for moving said ribbon to cover the printing-point at the printing operation, stop means for arresting said moving means during the travel of the ribbon toward the printing-point, and means operating automatically to adjust said stop means to vary the travel of the ribbon, said moving means and said stop means being disconnected or separated except at the time of arrest of said moving means by said stop means.

48. In a typewriting machine, the combination of a ribbon-vibrator, actuating means for said vibrator, stop means cooperative with said actuating means to arrest said vibrator in its travel toward the printing-point, and means operating automatically to adjust said stop means to cooperate with said actuating means at different points in the movement of the latter, said actuating means and said stop means being disconnected or separated except at the time of arrest of said actuating means by said stop means.

49. In a typewriting machine, the combination of a ribbon-vibrator, stop means operating to positively arrest said vibrator in its travel toward the printing-point, and means operating automatically to adjust said positive stop means to arrest the vibrator at different points in its travel.

50. In a typewriting machine, the combination of a ribbon normally removed from the printing-point, means for moving said ribbon to cover the printing-point in the printing operation, stop means normally detached from said moving means but cooperative with the latter to arrest the ribbon in its travel toward the printing-point, and means operating automatically to adjust said stop means to vary the travel of the ribbon.

51. In a typewriting machine, the combination of a ribbon-vibrator, actuating means for said vibrator, stop means normally detached from said actuating means but cooperative with the latter to arrest said vibrator in its travel toward the printing-point, and means operating automatically to adjust said stop means to arrest the vibrator at different points in its travel.

52. In a typewriting machine, the combination of a ribbon normally removed from the printing-point, means for moving said ribbon to cover the printing-point at the
5 printing operation, stop means interposed in the path of movement of said moving means and cooperating with the latter to arrest the ribbon in its travel toward the printing-point, and means operating automatically to ad-
10 just said stop means to vary the travel of the ribbon.

53. In a typewriting machine, the combination of a ribbon-vibrator, actuating means therefor, stop means interposed in the path
15 of movement of said actuating means and cooperating with the latter to arrest said vibrator in its travel toward the printing-point, and means operating automatically to adjust said stop means to arrest the vibrator
20 at different points in its travel.

54. In a typewriting machine, the combination of a ribbon normally removed from the printing-point, means for moving said

ribbon to cover the printing-point at the printing operation, stop means cooperative
25 with said moving means only during the ribbon-actuating movement of said moving means to arrest said ribbon in its travel toward the printing-point, and means operating automatically to adjust said stop means
30 to vary the travel of the ribbon.

55. In a typewriting machine, the combination of a ribbon-vibrator, actuating means therefor, stop means cooperative with said
35 actuating means only during the actuating movement of the latter, and means operating automatically to adjust said stop means to arrest the actuating means at different points so as to vary the extent of movement of the
40 vibrator.

In witness whereof, I have hereunto set my hand and seal, in the presence of two witnesses.

WILLIAM R. FOX. [L. s.]

Witnesses:

KATHARINE KUNZI,

CAROLINE D. WATERMAN.