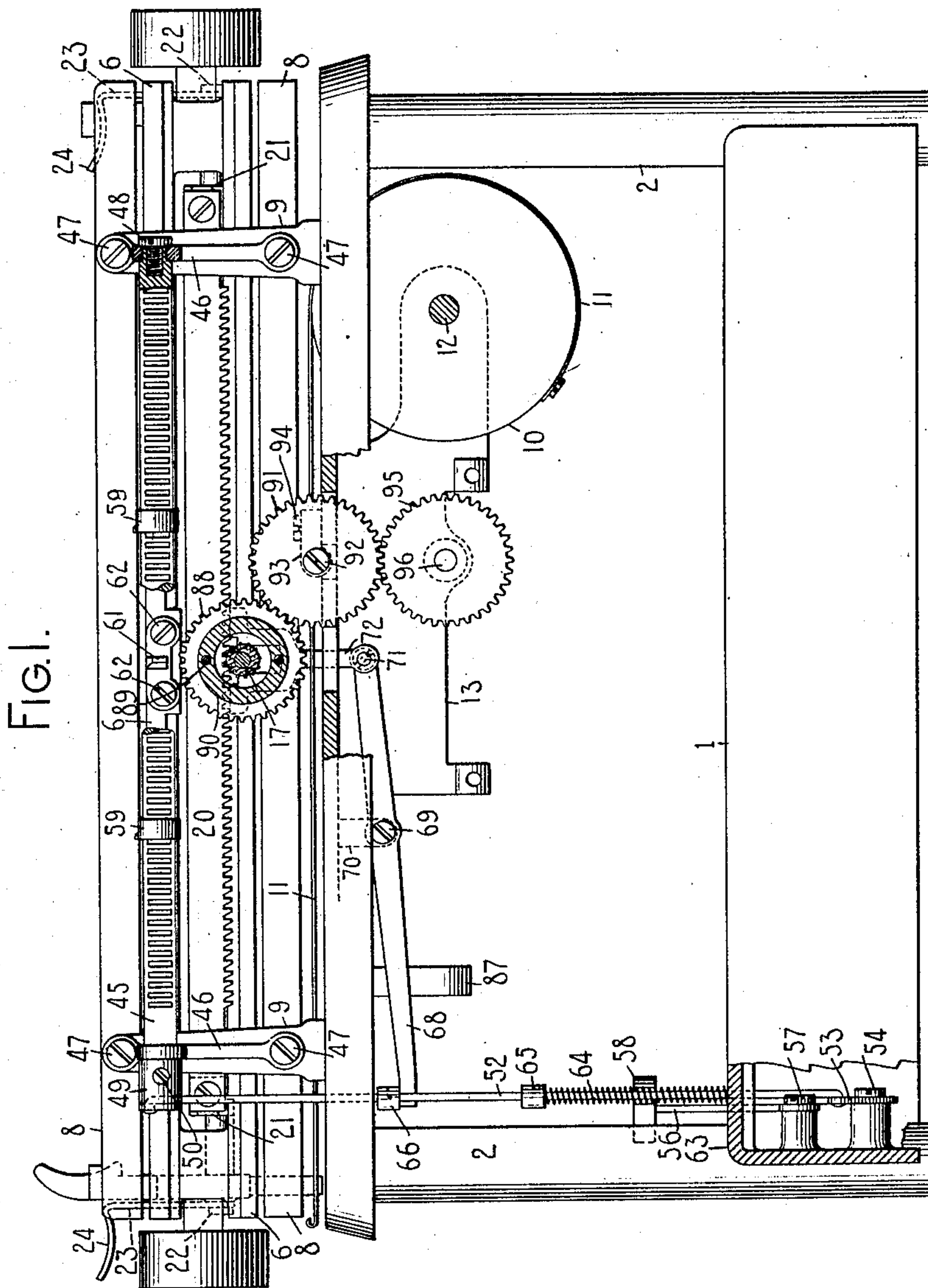


No. 860,265.

PATENTED JULY 16, 1907.

R. H. STROTHER.
TYPE WRITING MACHINE.
APPLICATION FILED JULY 27, 1906.

3 SHEETS—SHEET 1.



WITNESSES:

E. M. Wells.

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INVENTOR:

Robert H. Strother

By Jacob Feller

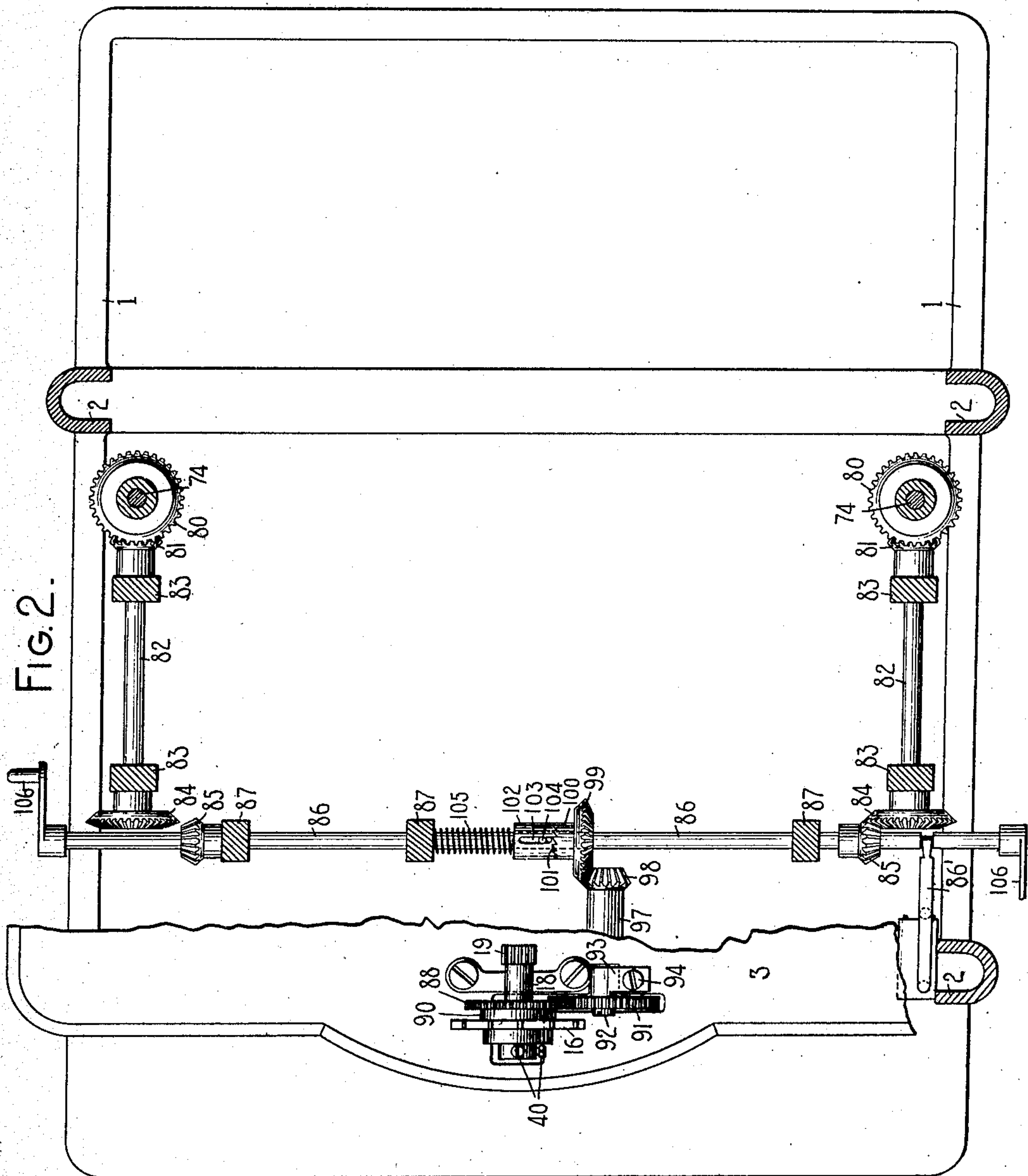
HIS ATTORNEY

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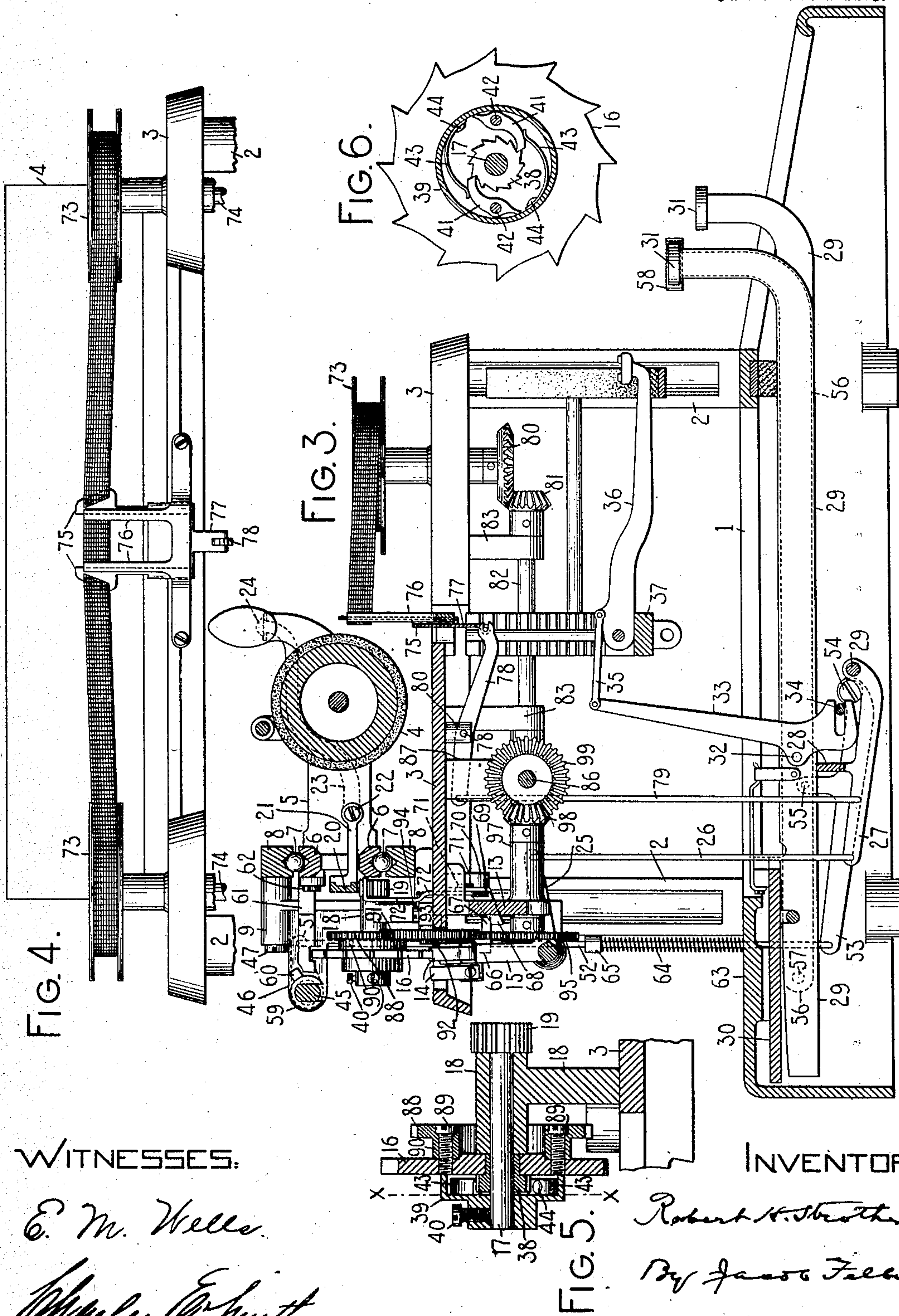
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WITNESSES:

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UNITED STATES PATENT OFFICE.

ROBERT H. STROTHER, OF NEW YORK, N. Y., ASSIGNOR TO UNION TYPEWRITER COMPANY,
OF JERSEY CITY, NEW JERSEY, A CORPORATION OF NEW JERSEY.

TYPE-WRITING MACHINE.

No. 860,265.

Specification of Letters Patent.

Patented July 16, 1907.

Application filed July 27, 1905. Serial No. 271,437

To all whom it may concern:

Be it known that I, ROBERT H. STROTHER, a citizen of the United States, and a resident of the borough of Manhattan, city of New York, in the county of New York and State of New York, have invented certain new and useful Improvements in Type-Writing Machines, of which the following is a specification.

My invention relates to typewriting machines and more especially to the feed mechanism for the ink ribbon.

The principal object of my invention is to actuate the ribbon feed from the carriage spring in such manner that the ribbon will not be fed when the carriage is released from its escapement mechanism, either by the ordinary release key or by a tabulator key or in any other way.

In most typewriting machines in which the feed of the ribbon is affected by power from the carriage spring, the ribbon is fed only when the carriage is moving in letter space direction; that is to say, toward the left. It is very common to move the carriage toward the left for a considerable distance either by the use of the carriage release key or a tabulating key, and when this is done, a section of the ribbon is fed past the printing point without being used. In some forms of tabulating work a large part of the leftwise motion of the carriage takes place without writing. The result is that the ribbon is used in spots, sections of it being fed past the printing point without being used. The ribbon thus becomes more worn in some places than in others, which shortens the life of the ribbon, as the latter has to be discarded and a new ribbon substituted when a number of patches thereof are too much worn or the ink therefrom too much exhausted. Moreover, after the ribbon has been used in this way for some time, the ink being more exhausted from some parts of the ribbon than from others, the writing becomes of irregular density, those parts of the ribbon that have been used little giving a heavier impression than those parts that have been used much. Moreover, it is common to feed the ribbon from one of two spools to the other and when the ribbon becomes exhausted from one of the spools to effect an automatic reversal of the direction of feed. In some forms of automatic ribbon reversing apparatus the reversal does not take place until the last turn of the ribbon about the spool has been partly unwound and the apparatus is of such a character that if, at this time, the ribbon driving mechanism is moving rapidly, the parts may fail to operate, with the result that the feed of the ribbon ceases, or else the ribbon is torn from the emptied spool. When a tabulator key is operated the carriage ordinarily moves to the left free of the escapement de-

vices, and consequently moves so rapidly that if one of the spools happens to be exhausted at this particular moment such a failure of the reversing apparatus is liable to occur. For the reasons stated, it is therefore desirable that the ribbon feed shall be operative only when the carriage is moving step-by-step under the control of the escapement mechanism as is the case when writing is being done, and that when the carriage is released from its escapement mechanism the ribbon feed shall be thrown out of operation.

To this and other ends my invention consists in certain features of construction and combinations and arrangements of parts which will be fully set forth herein and particularly pointed out in the claims.

My invention is illustrated in the accompanying drawings in which,

Figure 1 is a rear elevation of a typewriting machine; Fig. 2 is a top plan view of the ribbon driving mechanism of said machine, part of the framework being broken away and parts shown in section; Fig. 3 is a front to rear vertical section of said typewriting machine; Fig. 4 is a front elevation of a portion of the ribbon mechanism; Fig. 5 is a detail view in vertical section through the center of the escapement wheel shaft; and Fig. 6 is a view in section on a line $x-x$ of Fig. 5.

I have shown my invention applied to a Monarch visible typewriter, but it will, of course, be understood that it is also applicable to other styles of typewriting machines. The main frame of the machine shown in the drawings comprises a base portion 1 from which rise posts 2 that support a top plate 3. A platen 4 is mounted in a carriage 5 having grooved rails 6 which are supported by anti-friction balls or rollers 7 which run in the grooves in said rails and also in the grooves of rails 8 which are mounted by means of posts or brackets 9 on the top plate 3. The carriage is drawn across the machine by a spring drum 10 (Fig. 1) by means of a band 11, one end of which is secured to said drum and the other end of which is secured to the carriage in the usual manner. The drum 10 is journaled on a rod 12 which is secured in a bracket 13 depending from the top plate. The motion of the carriage is controlled by an escapement mechanism comprising feed dogs 14 mounted on an arm 15 of a dog rocker which is pivoted to the bracket 13 in the usual manner. The feed dogs cooperate with an escapement wheel 16 mounted on a shaft 17 which is journaled in a bracket or housing 18 secured to the top plate 3. A pinion 19 rigidly mounted on the forward end of the shaft 17 meshes with a feed rack 20 which is mounted near its ends on arms 21 pivoted at 22 to the carriage 5. Each of the arms 2 has rigidly connected therewith an up-

wardly and forwardly extending arm 23, the forward end of which is formed into a release key 24. The construction is such that the rack 20 normally engages the pinion 19, but said rack may be raised out of engagement with said pinion by depressing either of the release keys 24. The dog rocker 15 has a forwardly extending arm 25 which is connected by a link 26 with an arm 27 connected with a universal bar frame 28. Said universal bar frame comprises a rock shaft 29 which is pivoted at its ends to the side plates of the base portion 1 of the main frame. The universal bar 28 lies beneath a series of key levers 29 which are fulcrumed near their rear ends on a fulcrum plate 30 and which at their forward ends are provided with character keys 31. Each of the key levers 29 has pivoted thereto at 32 a sub-lever 33 which is slotted at its lower end to embrace a frame rod 34 in the manner usual in the Monarch machine. The sub-levers 33 are connected by links 35 with type bars 36 which are pivotally mounted in a type bar segment 37 in any suitable manner. The construction is such that when any key 31 is depressed the corresponding type bar will be thrown to the printing point on the front face of the platen 4, and the universal bar 28 will be depressed and the carriage be permitted to move a letter space distance.

The escapement wheel 16 is connected with the shaft 17 by the means best shown in Figs. 5 and 6. Said escapement wheel is rigidly mounted on the hub of a ratchet wheel 38 which is loosely mounted on the shaft 17. A wheel 39 is rigidly mounted on the shaft 17 back of the ratchet wheel 38 by means of a set screw or set screws 40 threaded through the hub of said wheel 39 and engaging said shaft. The front face of the wheel 39 is hollowed out in the usual manner, the ratchet wheel 38 being located within the hollowed out face of the wheel. A pawl or pawls 41 are pivoted to the wheel 39 on pivot pins or screws 42 passing through said pawls and threaded into the face of the wheel 39 within the hollowed portion thereof. The pawls 41 are pressed into engagement with the ratchet wheel 38 by springs 43 secured to the wheel at 44. The construction is such that when the carriage is moving toward the left, the escapement wheel is constrained to turn with the carriage, but said carriage may be drawn toward the right without turning the escapement wheel, the pawls 41 riding idly over the teeth of the ratchet wheel 38. When the carriage is drawn toward the right, the feed dogs prevent backward rotation of the escapement wheel, or any suitable means may be provided for this purpose.

The machine is equipped with a tabulator of known construction. A tabulator bar 45 is mounted at its ends in brackets 46 projecting toward the rear of the machine from the posts 9 to which said brackets are secured by screws 47. The tabulator bar is reduced at one end, as shown in Fig. 1, said reduced end being journaled in one of the brackets 46 and held in position by a headed screw 48 threaded into the end of the bar. Endwise motion of the tabulator bar in one direction is prevented by the head of the screw 48 and in the other direction by a collar or hub 49 secured on the other end of the tabulator bar outside of the bracket 46 by a set screw 50. An arm 51 (Fig. 3) projecting from the hub 49 is connected by a link 52 with a lever 53 which is pivoted to one of the side plates of the base 1

by a shouldered and headed screw 54. The lever 53 is pivoted at 55 to a tabulator key lever 56 which is pivoted at 57 to said side plate, and which at its forward end carries a tabulator key 58. The construction is such that when the tabulator key is depressed, the link 52 is drawn downwardly and the tabulator bar 45 is rocked toward the front of the machine. Said tabulator bar is formed with a series of slots spaced a letter space distance apart and one or more stop members 59 are adapted to be mounted on said tabulator bar, being held in position by the slots therein. Each of the tabulator stop pieces 59 is formed with a stop arm 60 which normally stands in the position shown in Fig. 3 a little above the rear end of a stop 61 which projects toward the rear of the machine from the carriage 5. The stop 61 is secured to the rear face of one of the rails 6 by screws 62. When the tabulator key is depressed, the stop 60 is moved into the path of the stop 61. The link 52 passes through the back shelf 63 of the base portion 1 of the main frame and above said shelf a spring 64 is coiled about said link and compressed between the shelf and a collar 65 rigidly secured to the link. This spring serves to return the parts to normal position when the tabulator key is released. A collar or hub 66 (Fig. 1) rigidly secured to the link 52 has projecting therefrom toward the front of the machine an arm 67 (Fig. 3) which stands above one end of a lever 68 which is pivoted at 69 to a bracket 70 depending from the top plate 3. The other end of the lever 68 has pivoted thereto at 71 the stem of a plate 72, the upper end of which is forked and embraces the housing 18 in which the shaft 17 is journaled. Each of the forks of the plate is bent forward, as shown in Fig. 3, said forwardly bent portions lying beneath the feed rack 20. The construction is such that when the tabulator key is depressed, the arm 67 depresses one end of the lever 68 which elevates the plate 72 and raises the feed rack 20 out of engagement with the pinion 19, thus releasing the carriage from its escapement mechanism.

Two ribbon spools 73 are mounted above the top plate 3 on vertical shafts 74 which extend through said top plate, in the well-known manner ordinarily employed in the Monarch machine. The ribbon spools are located in front of the platen on either side of the printing point and the ribbon is led from one spool to the other through a ribbon vibrator 75 which is mounted in a forked guide 76 secured to the top plate 3. Said vibrator has a depending arm 77 to which is pivoted the forward end of a lever 78 which is pivoted at 79 in a bracket 80 depending from the top plate 3. The rear end of the lever 78 is pivoted to a link 79, the lower end of which is pivoted to the arm 27 of the universal bar. On the lower ends of the shafts 74 there are rigidly mounted beveled gears 80 that mesh with beveled pinions 81, each of which is mounted on a horizontal shaft 82 journaled in brackets 83 depending from the top plate. Each of the shafts 82 has mounted on its rear end a beveled gear 84, that is adapted to mesh with a beveled pinion 85 rigidly mounted on a transverse horizontal driving shaft 86 that is journaled in brackets 87 depending from the top plate. The shaft 86 is adapted to slide in its bearings longitudinally in order to bring one or the other of the pinions 85 into mesh with its gear 84 in order to drive one or the other

of the ribbon spools, and a detent device 86', of well known construction, is provided for yieldingly holding said shaft in either of its two positions. The mechanism thus far described is old and may be of the construction ordinarily employed in the Monarch machine. In said machine, however, and in most other typewriting machines employing a similar mechanism, the driving shaft 86 is geared to the spring drum 10 with the result that the ribbon is fed whenever said spring drum turns toward the left. But in the present case, the shaft 86, although driven by power derived from said spring drum, is connected with said drum indirectly in such fashion that whenever the rack 20 is raised to release the carriage either by means of the release keys 24 or by the tabulator mechanism, the ribbon mechanism is not operated. In order to effect this result the shaft 86 is geared to the rack 20. This may be accomplished in a variety of ways but I prefer to gear the shaft 86 to the escapement wheel 16. To this end a gear wheel 88 (Fig. 5) is rigidly mounted on the escapement wheel 16 by screws 89 which pass through said gear wheel and are threaded into said escapement wheel. The gear wheel 88 is formed with a hub 90, the rear end of which fits over a shoulder formed on the escapement wheel as shown in Fig. 5. The gear wheel 88 meshes with a gear wheel 91 journaled on a shouldered and headed screw 92 which is threaded into a bracket 93 which is secured to the top plate 3 by a screw 94. The gear wheel 91 is not directly beneath the gear wheel 88 but stands at one side thereof, as shown in Fig. 1, so as not to interfere with the feed dogs. The gear wheel 91 meshes with a gear wheel 95 mounted on a shaft 96 journaled in a boss 97 (Fig. 3) of the bracket 13. The forward end of the shaft 96 has mounted thereon a beveled pinion 98 that meshes with a beveled gear 99 loosely mounted on the shaft 86. The beveled gear 99 has a hub 100 formed on its end with ratchet clutch teeth 101 which mesh with corresponding ratchet clutch teeth on a collar 102 that is slidably mounted on the shaft 86. Said collar 102 is formed with an elongated slot 103 into which a pin 104 projects from the shaft 86. The collar 102 is pressed into engagement with the hub 100 by a spring 105 coiled about the shaft 86 and compressed between said collar and one of the brackets 87. When the shaft 86 is moved lengthwise to move one of the pinions 85 out of engagement with its gear 84 and the other of said pinions into engagement with its gear, the collar 102 and the gear wheel 99 remain in their normal position, the shaft 86 sliding through them. This motion is permitted by the pin and slot connection 103, 104. The ribbon spools being geared to the carriage in the manner which has been described, it is obvious that such spools will not be turned when the carriage is drawn toward the right, nor will they be turned when the carriage is released from the escapement wheel. When the carriage is drawn toward the right, the shaft 17 is turned idly within the escapement wheel to which the ribbon spools are geared. The shaft 86 has mounted thereon one or more cranks 106 by which said shaft may be turned by hand in order to wind the ribbon on to one or the other of the spools. The ratchet teeth 101 permit this motion in the proper direction to wind the ribbon but prevent such motion in the other direction. When the driving shaft 86 is turned by hand, the train of gearing between it and

the escapement wheels is held against rotation by the feed dogs or by any separate device that may be provided for the purpose.

Various changes may be made in the details of construction and arrangement without departing from my invention.

What I claim as new and desire to secure by Letters Patent, is:—

1. In a typewriting machine, the combination of a carriage, spring means for driving said carriage; a feed rack mounted on said carriage; a feed pinion normally meshing with said feed rack; an escapement wheel controlling said feed pinion; a pawl and ratchet connection between said escapement wheel and said feed pinion; means for lifting said escapement rack out of engagement with said pinion to release the carriage; two spools for an ink ribbon; a transverse driving shaft shiftable axially to gear it to one or the other of said spools; and a gear wheel mounted on said transverse driving shaft and geared to said escapement wheel.

2. In a typewriting machine, the combination of a carriage; spring means for driving said carriage; an escapement mechanism including an escapement wheel for controlling the motion of said carriage; a ratchet connection between said carriage and said escapement wheel adapted to permit said carriage to move in one direction without turning said escapement wheel but not in the other direction; ribbon spools; gearing between said ribbon spools and said escapement wheel whereby one of said ribbon spools is rotated when said escapement wheel is turned; hand operated means for turning said ribbon spools; and ratchet mechanism comprised in the connections between said hand operated means and said escapement wheel to permit the operation of said hand operated means without turning said escapement wheel.

3. In a typewriting machine, the combination of a carriage; spring means for driving said carriage; a rack bar mounted on said carriage; a pinion normally engaged by said rack bar; ribbon spools driven by said pinion in one direction; and means for raising said rack bar out of engagement with said pinion, thus releasing the ribbon mechanism from said carriage.

4. In a typewriting machine, the combination of a carriage; spring means for driving said carriage; a feed rack mounted on said carriage; a feed pinion normally meshing with said feed rack; an escapement mechanism including an escapement wheel; a ratchet device between said escapement mechanism and said pinion adapted to cause said pinion to turn said wheel in one direction; a gear wheel rigidly connected with said escapement wheel; a shaft geared to said gear wheel; a transverse driving shaft geared to the first mentioned shaft; two ribbon spools; means whereby one or the other of said ribbon spools may be geared to said driving shaft; and means for raising said feed rack out of engagement with said pinion to release said carriage from said escapement wheel and said ribbon spool from said carriage.

5. In a typewriting machine, the combination of a carriage; an escapement wheel geared to said carriage; a gear wheel rigidly connected with said escapement wheel; a ratchet device between said escapement wheel and said carriage, whereby said escapement wheel is turned by said carriage in one direction but not in the other; spools for an ink ribbon; gearing connecting said spools and said gear wheel; hand operated means for turning said spools; and a ratchet device comprised in the connections between said hand operated means and said gear wheel.

6. In a typewriting machine, the combination of a carriage, spring means for driving said carriage, a rack bar on said carriage, an escapement mechanism comprising an escapement wheel geared to said rack bar, a pair of ribbon spools, a transverse driving shaft shiftable longitudinally to gear it to one or the other of said ribbon spools, a gear wheel mounted on said driving shaft, gearing between said gear wheel and said rack bar, and means for moving said rack bar out of gear with said escapement wheel and said ribbon driving shaft.

7. In a typewriting machine, the combination of a car-

riage, spring means for driving said carriage, a rack bar mounted on said carriage, a pinion meshing with said rack bar, a pair of ribbon spools, a transverse driving shaft for said ribbon spools shiftable longitudinally to gear it to one
5 or the other of said spools, a gear wheel on said driving shaft, said gear wheel being geared to said pinion, and means for moving said rack bar out of engagement with said pinion.

8. In a typewriting machine, the combination of a carriage; a rack bar on said carriage; a step-by-step feed device geared to said rack bar; a pair of ribbon spools; a transverse driving shaft for said spools; means whereby said driving shaft may be geared to either of said ribbon spools; gearing whereby said driving shaft is driven by
10 said rack bar; tabulator stops for said carriage; and a tabulator key adapted to control said tabulator stops and to raise said rack bar out of gear with said step-by-step feed device and said driving shaft.

9. In a typewriting machine, the combination of a carriage; means for driving said carriage; an escapement device including an escapement wheel; a gear wheel
15 mounted on one face of said escapement wheel; and ribbon mechanism driven by said gear wheel.

10. In a typewriting machine, the combination of a carriage, an escapement mechanism for said carriage including an escapement wheel; a toothed wheel rigidly connected with said escapement wheel; a pair of ribbon spools; a transverse driving shaft for said ribbon spools; means whereby said transverse driving shaft is driven by said toothed wheel; and means for allowing said driving
25 shaft to be turned by hand without turning said toothed wheel.

11. In a typewriting machine, the combination of a carriage, an escapement wheel; means whereby said carriage drives said escapement wheel in one direction but not in
30 the other; a ribbon mechanism driven by said escapement wheel; and means for affording a motion of said ribbon mechanism independently of said escapement wheel.

Signed at borough of Manhattan, city of New York, in the county of New York and State of New York, this
35 25th day of July, A. D. 1905:

R. H. STROTHER.

Witnesses:

E. M. WELLS,
J. B. DEEVES.