H. H. STEELE.

TYPE WRITING MACHINE.

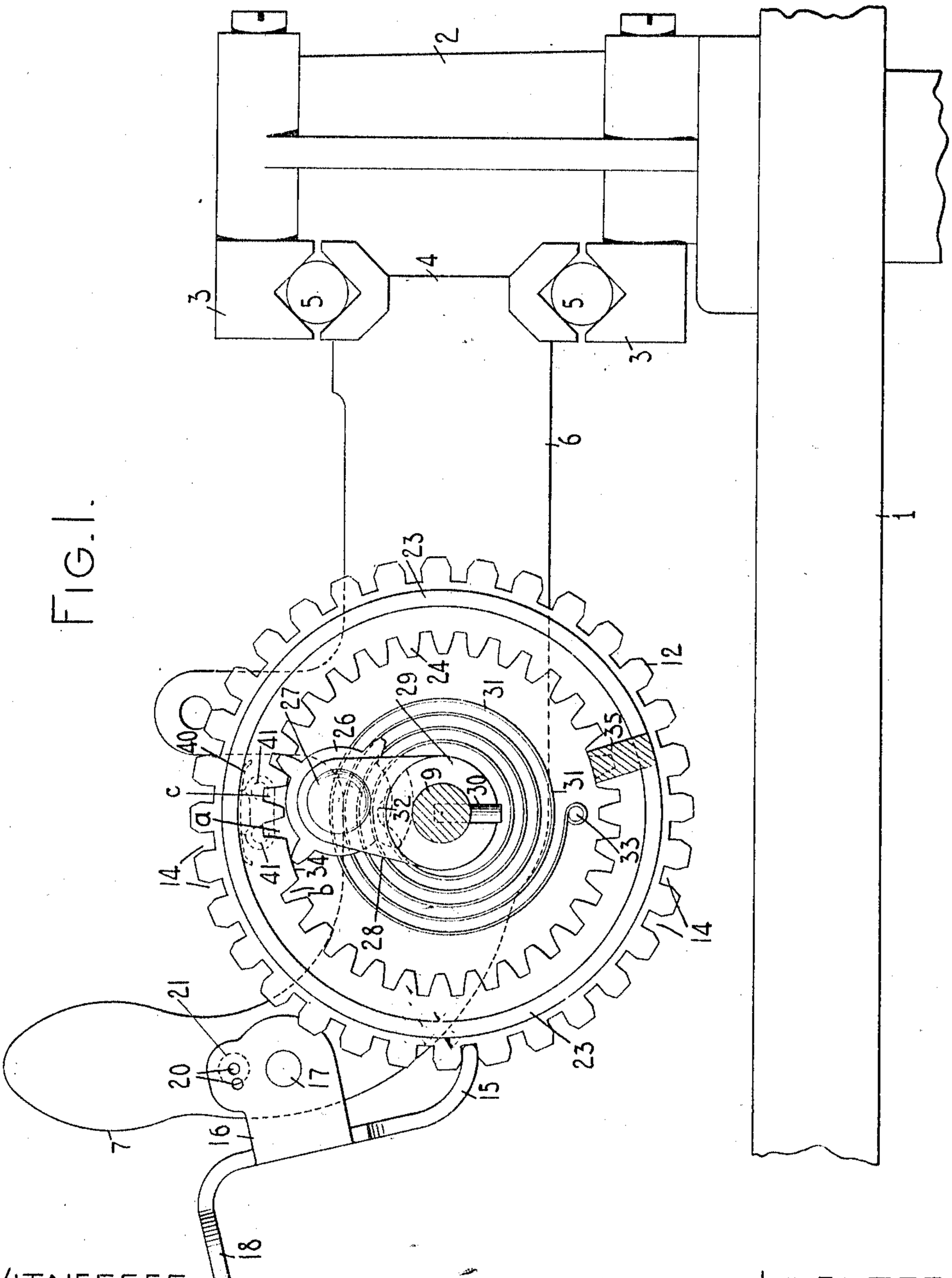
APPLICATION FILED JAN. 3, 1910.

989,308.

Patented Apr. 11, 1911.

2 SHEETS—SHEET 1.

FIG. 1.



WITNESSES:

J. B. Deeves.

R. H. Strother.

INVENTOR

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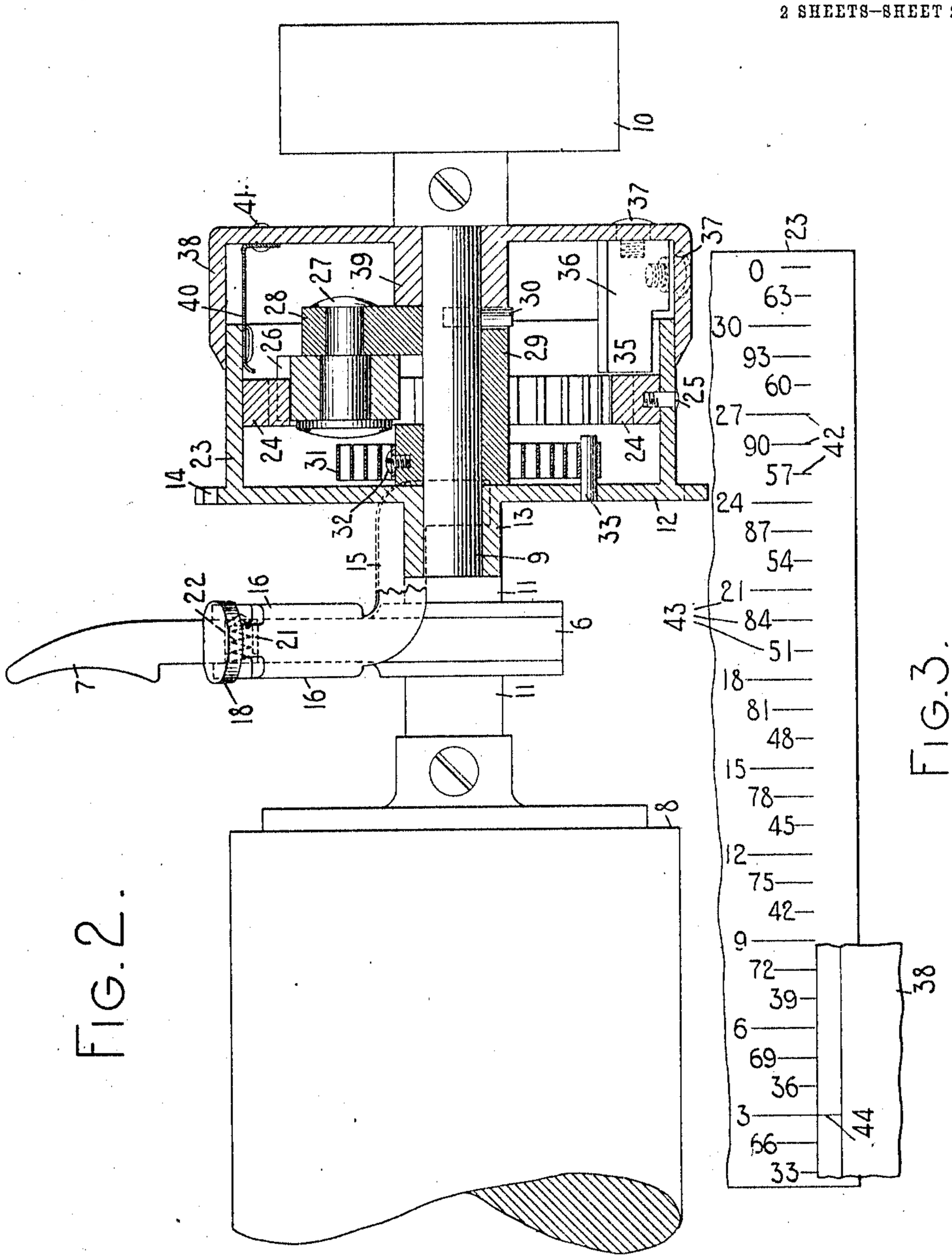

FIG. 2.

FIG. 3.

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UNITED STATES PATENT OFFICE.

HERBERT H. STEELE, OF MARCELLUS, NEW YORK, ASSIGNOR TO THE MONARCH TYPE-WRITER COMPANY, OF SYRACUSE, NEW YORK, A CORPORATION OF NEW YORK.

TYPE-WRITING MACHINE.

989,308. Specification of Letters Patent. Patented Apr. 11, 1911.

Application filed January 3, 1910. Serial No. 536,073.

To all whom it may concern:

Be it known that I, HERBERT H. STEELE, citizen of the United States, and resident of Marcellus, in the county of Onondaga 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 it has for its principal object to provide improved stop mechanism for arresting the paper feed at a predetermined point.

More specifically stated, an object of my invention is to produce page end stop mechanism for arresting the paper feed when the bottom of a sheet is approached, said mechanism being simple in construction, positive and convenient in operation and in the nature of an attachment to an ordinary typewriting machine.

Another object of the invention is to provide such a device with means for adjusting it for sheets of paper of different lengths.

Another object is to provide such a device with means whereby it can be instantly thrown into or out of operation at will.

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

In the drawings, Figure 1 is an end view on an enlarged scale of the upper part of a typewriting machine having my invention applied thereto, parts being sectioned away. Fig. 2 is a front view of the right-hand end of the carriage and platen and showing my invention in vertical central section. Fig. 3 is a diagrammatic view showing the development of a scale and pointer that are used in adjusting my stop mechanism for different lengths of paper.

My invention is applicable or adaptable to typewriting machines generally. I have here shown it applied to a machine in which the paper is mounted on a movable carriage and in which the line spacing means includes a roller platen. I have, in fact, shown my invention applied to a Monarch front-strike typewriter. This machine comprises a top plate 1 from which rise standards 2 carrying stationary grooved rails 3 which coöperate with the back bar 4 of the carriage, said bar being grooved on its upper and lower edges for coöperation with anti-friction balls or rollers 5 which run also in the grooved stationary rails 3. The carriage comprises end brackets 6 of well known construction, only the right-hand one of said brackets being shown in the present instance. Said right-hand bracket 6 is formed with a forward and upward extension 7 constituting a handle by which the carriage can be returned to the right to begin a new line. The platen 8 has a shaft 9 that is journaled in the brackets 6 and which on each of its ends is provided with a finger wheel 10. The shaft is not journaled directly in the bracket 6 but is journaled in a fixed sleeve 11 that passes through the said bracket where it is secured in place by a set screw. The platen 8 has the usual paper feed rollers and other paper feed devices associated therewith. These devices are not shown as they may be of any suitable sort and their particular construction forms no part of the present invention. The paper is fed through the machine by rotating the platen 8 by means of finger wheels 10 or by the usual line spacing lever and pawl which latter, however are not shown in the drawings.

My invention comprises a gear wheel and a pinion meshing with said gear wheel, one of these parts, when the stop mechanism is in operation, being connected with the platen and the other with the platen frame or carriage. I provide stop devices associated with the gear wheel and with the pinion respectively and so disposed that if it is desired to turn the platen through more than one rotation before arresting it, the stop device associated with the pinion can step over the stop devices associated with the gear wheel during the first rotation or rotations and be arrested on the second or third rotation. The several stop devices can be constructed in various ways. The simplest way known to me to produce one of the stop devices associated with the gear wheel, is to omit one of the cuts forming the interdental spaces or notches between the teeth of the wheel so that one of said teeth occupies the space corresponding

to two teeth; and the preferred way to produce the stop devices on the pinion, is to make a mutilated pinion by removing or omitting some of the teeth from said pinion and utilizing the remaining teeth, not only for the purpose of rotating the pinion, but also as the stop devices associated with said pinion. One of the elements of the stop mechanism is made so that it can be connected with or freed from the associated typewriter element. In the embodiment of my invention illustrated in the drawings one of the stop elements is rigid with the platen shaft and the other can be latched or otherwise coupled to the platen frame when it is desired to bring the stop mechanism into operation. When said element is uncoupled from the platen frame the entire stop mechanism rotates with the platen and does not in any way interfere with the rotation of the platen to any extent in either direction.

I also preferably provide means for automatically restoring the stop elements to normal relative position when they are uncoupled to throw them out of operation, this automatic means in the present instance consisting of a coiled spring.

In the embodiment of my invention shown in the drawings the pinion referred to is a planetary pinion although in other embodiments of my invention this pinion need not have a planetary motion.

In the present embodiment of my invention it is the planetary pinion whose carrier is fixed on the platen axle and it is the gear wheel that is connected with or disconnected from the platen frame.

My invention can be applied to the machine in various ways, but as here shown the greater part of it is mounted on the platen shaft 9 just to the right of the right-hand bracket 6.

The embodiment of my invention illustrated in the drawings, comprises a disk 12 having a hub 13 that is rotatably mounted on the shaft 9, said hub abutting the right-hand end of the bearing sleeve 11. The disk 12 is formed about its periphery with a series of notches 14 corresponding in number with the teeth of the line space wheel of the platen. In the present instance I have shown a disk formed with thirty-two notches 14 and it is contemplated that the line space wheel also have thirty-two teeth. This number of line space wheel teeth and notches 14, may be varied. The notches 14 are adapted to be engaged by a latch or detent 15 which is here shown as made of sheet metal and having two ears 16 that straddle the extension 7 of the bracket 6 to which extension said ears are pivoted at 17. The detent 15 has a handle or finger piece 18 by which it can be moved about its pivot 17 into or out of engagement with the notches 14. One of the ears 16 is formed with two holes 20 which are of conical form on the inner side of the ear and which are adapted to be engaged by a spring-pressed plunger 21 having a conical end as shown in dotted lines in Fig. 2 and seated in a suitable hole in the arm 7. As here shown this plunger is hollow and a spring 22 is compressed between the right-hand end of the plunger and the left-hand one of the ears 16, so that the conical end of the plunger is pressed into the conical holes 20 with sufficient force to retain the latch 15 in either of its two positions.

The disk 12 forms the end wall of a cylindrical barrel 23 which projects toward the right from said disk, and said barrel has a gear 24 mounted therein and secured in position by screws or rivets 25, said gear being preferably internally toothed, as shown. The gear 24 is engaged by a mutilated pinion 26 which is journaled on a shouldered and headed stud 27 which is mounted in an arm 28 projecting from a hub or sleeve 29 that is fixedly mounted on the shaft 9 within the barrel 23. As here shown the hub 29 is formed with a slot through which passes a pin 30 that is secured into the shaft 9, and said hub is cut away to make room for the pinion 26. The construction is such that whenever the shaft 9 is turned the pinion 26 revolves around it, carrying the gear 24 and the barrel 23 with it if the latch 15 is in released position, or revolving in mesh with said gear 24 as a planetary pinion in case the latch 15 holds the barrel 23 against rotation. Said barrel and planetary pinion are normally held in fixed relation with each other by means of a coiled spring 31 which is secured at its inner end to the sleeve 29 by means of a screw 32 and at its outer end to the disk 12 by means of a pin 33.

The gear 24 has associated therewith a stop which limits the motion of the parts under the impulse of the spring 31. As here shown this stop consists of a broad tooth 34 of the gear 24 which broad tooth is formed by omitting one of the cuts between the several teeth of the wheel. This gear is cut with the spacing of a thirty-two-tooth gear, but one of the cuts being omitted it has as a matter of fact only thirty-one teeth, one of them occupying the space of two teeth. The pinion 26, in the specific embodiment of my invention shown in the drawings, is in effect a twelve-tooth pinion with only every third tooth left on it, the two intermediate teeth being cut away. In other words, this pinion has the pitch diameter of a twelve-tooth pinion, but only four of the teeth are present, the other eight being omitted. Mutilated pinions of other sorts can be used but this one will serve to illustrate the principle of the invention. One of the teeth of the pinion 26 normally rests against the broad tooth 34 of the gear 24 which thus limits the mo-

tion of said gear 24 with relation to the pinion under the impulse of the spring 31.

In order to limit the relative motion of the gear 24 and the platen shaft in the other direction, an adjustable tooth 35 is provided which lies just to the right of the gear 24 as shown in Fig. 2. In Fig. 1 this tooth is shown in section. The tooth 35 consists of the projecting end of a block 36 which is secured by rivets or screws 37 to a cap 38 having a hub 39 rotatively mounted on the shaft 9 between the hub 29 and the hub of the finger wheel 10. This cap 38 at its left-hand edge overlaps the barrel 23 and preferably the fit between the cap and the barrel is tight enough to cause these two parts to maintain a fixed relation to each other by friction except when the cap is turned by hand to adjust the tooth 35. In order to increase the friction between these parts, or as an additional detent, I have here shown a T-shaped flat spring 40 which is secured to the cap 38 by rivets 41 and which bears against the inside of the barrel 23. If preferred, some more positive means can be employed for maintaining the barrel and cap in relative adjustment. The disk 12, barrel 23 and cap 38, together, constitute a housing inclosing all of the working parts of the mechanism except the latch 15.

It will be noted that the pinion 26 is wider than the gear 24 so that said pinion projects beyond the right-hand edge of said gear and in such position that one of its teeth can strike on top of the tooth 35 and prevent further planetary rotation of the pinion.

In the present embodiment of my invention the spacing of the teeth of the gear 24 corresponds with the spacing of the teeth of the line space wheel of the platen, but there is a tooth on the pinion 26 for only every third notch or interdental space of the gear 24. The gear 24 has thirty-two teeth and every third interdental space is engaged by a tooth of the pinion 26 and the first tooth engages the third interdental space to the right of the tooth 34. When the platen completes a rotation, therefore, a tooth of the pinion 26 will enter the thirty-third interdental space beyond the tooth 34; that is to say, it will enter the interdental space marked *a* in Fig. 1. At the completion of the second rotation the teeth of the pinion 26 will enter the thirtieth and thirty-third spaces beyond the one last mentioned; that is to say, they will enter the interdental spaces marked *b* and *c*. At the end of each of these revolutions, the pinion will step over the broad tooth 34. At the completion of the third rotation of the platen, however, one of the teeth of the pinion 26 will strike the tooth 34 and prevent further rotation. It will be seen therefore that, as far as the tooth 34 is concerned, this planetary pinion is capable of turning through a little less than three complete revolutions which correspond to a little less than three rotations of the platen. If the tooth 35 be adjusted opposite one of the interdental spaces of the gear 24, then it will also be seen that at some time prior to the completion of the three rotations referred to, one of the teeth of the pinion 26 will have struck the tooth 35 and have arrested the platen. This will occur during the first rotation of the platen or during the second rotation of the platen, or during the third rotation of the platen, according to which interdental space is covered by said tooth 35. One-third of said spaces are entered by the teeth of the pinion 26 upon the first rotation of the platen; another one-third during the second rotation and the remainder during the third rotation so that at one time or another every interdental space is entered by a tooth of said pinion. It is possible therefore by suitably adjusting the tooth 35, to arrest the platen at any third line spacing position in less than three complete rotations of the platen. The teeth of the pinion 26 constitute stops, and these have a cycloidal motion which enables them to step over the cooperating stops on one rotation and to engage said stops on another rotation of the platen. In the present instance, said teeth move in hypocycloids.

In order to facilitate the setting or adjusting of the tooth 35 the barrel 23 has engraved or imprinted about its periphery a scale 42, a development of which is shown in Fig. 3. This scale consists of a series of lines which are identified by a series of numerals 43 and which coöperate with an index mark or pointer 44, on the edge of the cap 38. It will be seen that beginning near the left-hand end of Fig. 3, one of the lines 42 is marked "3", the third line beyond is marked "6", the third line beyond that is marked "9", and so on. The second mark below the "3" is marked "33" and every third mark corresponds to "36", "39", "42" and so forth. This scale reading in this way goes up to 93 line spaces which is the limit of the capacity of the mechanism shown. If the sheet of paper were of a length of ninety-three line spaces, the index mark 44 on the cap 38 would be set opposite the "93" mark on the scale 42 and that would bring the tooth 35 opposite the broad tooth 34 of the gear 24 so that this broad tooth 34 and the tooth 35 would both arrest the platen at ninety-three line spaces, or three line spaces less than the three complete rotations of the platen. For convenience in reading, the numerals 43 are arranged in three circumferential rows, the numerals in one row representing less than one complete rotation of the platen, those in another row more than one complete rotation and less

than two, and those in the third row more than two complete rotations and less than three.

The operation of my page end lock or stop mechanism is as follows:—Supposing that paper is being used, the bottom line of which is desired to be at twenty-seven single line space distances from the top of the sheet, the cap 38 will be adjusted around the barrel 23 until the mark 44 thereon registers with the line of the scale 42 marked "27". The latch 15 is then thrown into whatever notch of the disk 12 happens to stand in front of the same and the paper is fed into the machine and written upon. After said paper has been fed twenty-seven single line space distances, a tooth of the pinion 26 will strike the tooth 35 and prevent further rotation of the platen. The operator, observing that the line space lever is locked against operation, is thereby notified that the bottom of the sheet has been reached. The latch 15 is then thrown out of the wheel 12, which wheel is immediately restored to normal position by the spring 31 and is arrested in normal position by a tooth of the pinion 26 engaging the broad tooth 34 as shown in Fig. 1. The paper can then be fed on out of the machine. It will be noted that the scale calls for only every third single line space distance. If it is desired to feed the paper twenty-nine line space distances instead of twenty-seven, then the pointer can be set at "27" and the paper fed until the platen is arrested, after which the latch can be thrown out of operation and the paper fed the additional two line space distances. After the latch 15 has been thrown out of the wheel 12 the platen can be rotated to any desired extent in either direction without interference by the stop mechanism, as the barrel 23 rotates with the platen and all of the parts of said stop mechanism preserve the same relative positions. When a new sheet of paper is put into the machine, however, the latch 15 is thrown in and the platen will be arrested when the bottom of the sheet has been reached.

While I have here shown the gear 24 as being spaced for thirty-two teeth and the pinion 26 for twelve teeth, it will, of course, be understood that this mathematical relation can be varied quite considerably. For example, many typewriting machines have line space wheels of thirty-three teeth. If preferred, the gear 24 may have the spacing of a thirty-three tooth gear and thirty-three notches 14 be cut in the disk 12. In this case the mutilated pinion 26 might have the spacing of a twelve-tooth pinion and every other tooth be removed. This combination would have a capacity for turning through a little less than two complete rotations of the platen which would be sufficient for most sorts of work. Various other combinations can also be provided as the arrangement is capable of considerable modification depending upon conditions. In all cases, where the platen is to turn through more than one rotation before being arrested, the spacing of the teeth or other stop devices of the pinion 26, should not be an exact division of the number of tooth spaces in the gear 24. For example, in the case shown in the drawing, every third tooth of the pinion is present and there is not an exact division of thirty-two, the number of tooth spaces in the gear 24.

It is to be noted that by this very simple device I am enabled to arrest the platen at any third single line space position for nearly three rotations of the platen without employing any multiplying gearing and that the whole device is small and very readily attached to the machine. Moreover, by simply throwing out the latch 15 the machine can be operated in every respect as if the attachment were not present.

Various other changes can 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 with line spacing means, of stop mechanism comprising a gear, a mutilated pinion meshing with said gear, and stop devices cooperating with the teeth of said mutilated pinion.

2. In a typewriting machine, the combination with line spacing means, of stop mechanism comprising a gear, a mutilated pinion meshing with said gear, stop devices cooperating with the teeth of said pinion, and means for adjusting one of said stop devices with relation to another.

3. In a typewriting machine, the combination with rotary line spacing means, of stop mechanism comprising a gear, a mutilated pinion meshing with said gear, and stop devices for said pinion associated with said gear and arranged so that, upon occasion, said pinion can step over said stop devices on one rotation of the line spacing means and can engage said stop devices on a succeeding rotation of said means.

4. In a typewriting machine, the combination with line spacing means, of stop mechanism comprising a gear and a mutilated pinion meshing with said gear and having the number of tooth spaces from one tooth of said pinion to the next not an exact divisor of the number of tooth-spaces in said gear, and stop devices coöperating with said pinion.

5. In a typewriting machine, the combination with line spacing means, of stop mechanism comprising a gear, a mutilated pinion meshing with said gear and projecting be-

yond one side of said gear, and a stop for said pinion by said side of said gear and in the path of the projecting part of said pinion.

6. In a typewriting machine, the combination with line spacing means, of stop mechanism comprising a gear, a mutilated pinion meshing with said gear and projecting beyond one side of said gear, and a stop for said pinion by said side of said gear and adjustable around the axis of said gear.

7. In a typewriting machine, the combination with a platen, of stop devices comprising a gear and a pinion, two stops for said pinion associated with said gear, one of said stops being adjustable around the axis of said gear, said pinion being adapted to step over said stops during one rotation of said platen and to be arrested by one of said stops during a subsequent rotation of said platen.

8. In a typewriting machine, the combination with a rotary part, of stop mechanism for arresting said rotary part, said stop mechanism comprising one or more stops connected with said rotary part, means for imparting a cycloidal motion to said stop or stops, and a coöperating stop arranged to be stepped over by the first mentioned stop or stops on one rotation of said rotary part, and to be engaged by said stop or stops on a subsequent rotation.

9. In a typewriting machine, the combination with a rotary part, of stop mechanism for arresting said rotary part, said stop mechanism comprising a gear and a pinion, stop devices associated with said gear, and coöperating stop devices associated with said pinion, said stop devices associated with said pinion being arranged to step over the stop devices associated with the gear upon one rotation of said rotary part and to engage said stop devices on a subsequent rotation.

10. In a typewriting machine, the combination of rotary line spacing means, and stop devices therefor, said stop devices comprising a gear having a wide tooth, a mutilated pinion meshing with said gear and projecting to one side of said gear, and an adjustable stop at said side of said gear.

11. In a typewriting machine, the combination with rotary line spacing means, of stop mechanism therefor, said stop mechanism including as parts thereof a gear and a pinion, said gear being co-axial with said rotary means, stop devices associated with said gear, stop devices associated with said pinion, and releasable means for holding one of said parts against turning, and leaving the other of said parts free to move about the axis of said rotary line spacing means.

12. In a typewriting machine, the combination with rotary line spacing means including a rotary shaft, of stop mechanism comprising a planetary pinion having its carrier fixed on said shaft, a gear wheel coaxial with said shaft and capable of turning with or independently of said shaft, coöperating stop devices associated respectively with said gear wheel and pinion, and releasable means for holding said gear wheel against turning.

13. In a typewriting machine, the combination with rotary line spacing means including a rotary shaft, of stop mechanism comprising a planetary pinion having its carrier fixed on said shaft, a gear wheel coaxial with said shaft and capable of turning with or independently of said shaft, coöperating stop devices associated respectively with said gear wheel and pinion, releasable means for holding said gear wheel against turning, and a spring for returning said gear wheel to normal position relative to said pinion when said holding means is released.

14. In a typewriting machine, the combination with rotary line spacing means including a shaft, of stop mechanism including a carrier fixed on said shaft, a planetary pinion on said carrier, a barrel journaled on said shaft and having a series of notches, an internally toothed gear in said barrel and engaging said pinion, a latch for engagement with said notches, two stops for said pinion associated with said gear, means for adjusting one of said stops, and a spring for restoring said gear to normal relation to said pinion.

15. In a typewriting machine, the combination of a plurality of coöperating stops, a two-part housing in which said stops are inclosed, said stops being adjustable by moving one of the parts of said housing relative to the other part.

16. In a typewriting machine, the combination with a rotary device, of stop mechanism for said rotary device comprising a housing having two parts one of which has a rotary adjustment with relation to the other, and stops for said rotary device inclosed within said housing, one of said stops being adjustable with the adjustable part of said housing.

17. In a typewriting machine, the combination of a cylindrical housing having two parts, one projecting into the other and one capable of being turned with relation to the other, a scale on one of said parts, a coöperating index on the other of said parts, and stop devices inclosed within said housing, one of said stop devices being adjustable by turning one of the parts of the housing with relation to the other.

18. In a typewriting machine, the combination of a platen having a shaft, a housing rotatably mounted on said shaft and comprising two relatively adjustable parts, stop mechanism inclosed in said housing and comprising a stop mounted to revolve with said shaft and two coöperating stops, one of said

coöperating stops being connected with one of said parts of said housing and the other with the other of said parts, and releasable means for holding said housing against turning with said shaft.

19. In a typewriting machine, the combination of a platen having a shaft, a housing rotatably mounted on said shaft and comprising two relatively adjustable parts, stop mechanism inclosed in said housing and comprising a stop mounted to revolve with said shaft and two coöperating stops, one of said coöperating stops being connected with one of said parts of said housing and the other with the other of said parts, releasable means for holding said housing against turning with said shaft, and a spring for restoring said stops to normal relative positions.

20. In a typewriting machine, the combination of rotary line spacing means including a shaft, a stop device fixed on said shaft, a housing rotatably mounted on said shaft and having notches formed therein, a second stop device connected with said housing, a releasable latch for engaging said notches to hold said housing against rotation, and means for restoring said stop devices to normal relative position, said stop devices being inclosed in said housing.

Signed at Syracuse, in the county of Onondaga, and State of New York this 30th day of December A. D. 1909.

HERBERT H. STEELE.

Witnesses:

GILES B. EVERSON,

J. CROSS, Jr.