M. H. LOCKWOOD.

TYPE WRITING MACHINE.

APPLICATION FILED JULY 1, 1911.

1,158,818.

Patented Nov. 2, 1915.

2 SHEETS—SHEET 1.

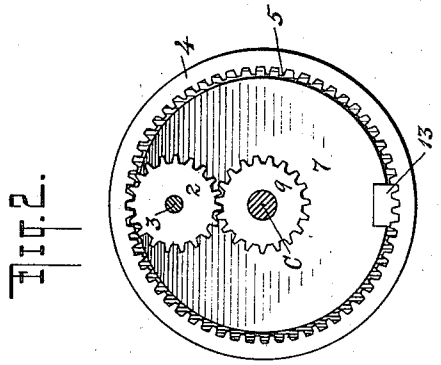


FIG. 2.

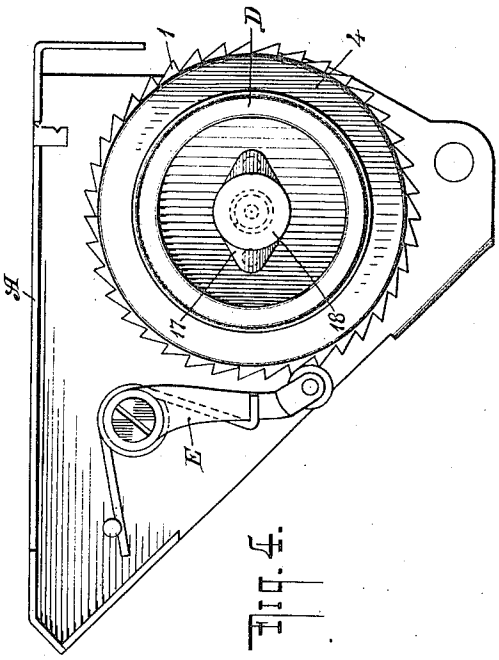


FIG. 4.

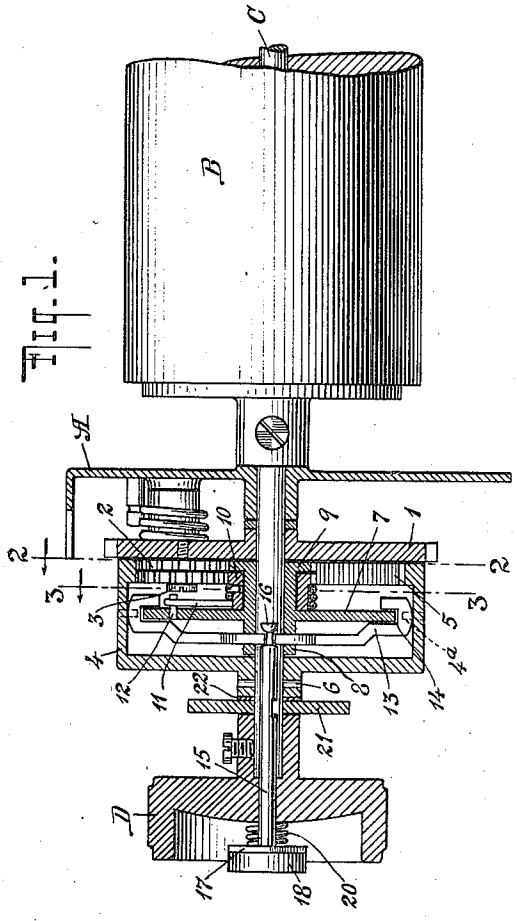


FIG. 1.

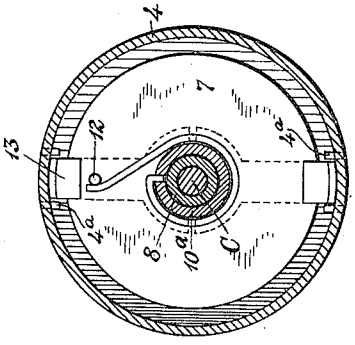


FIG. 3.

WITNESSES

G. V. Rasmussen

John A. Stellentreek

INVENTOR

MARQUIS H. LOCKWOOD

BY

Briesen & Knauth

ATTORNEYS

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FIG. 6.

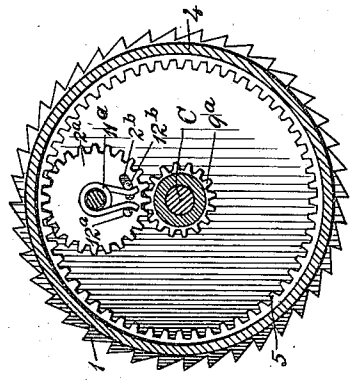


FIG. 9.

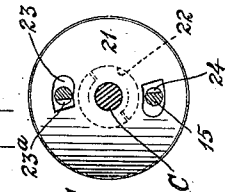


FIG. 8.

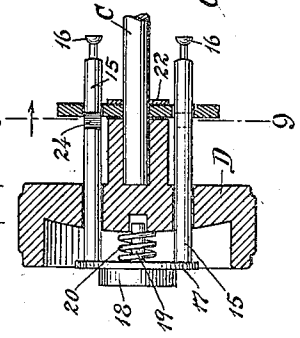


FIG. 5.

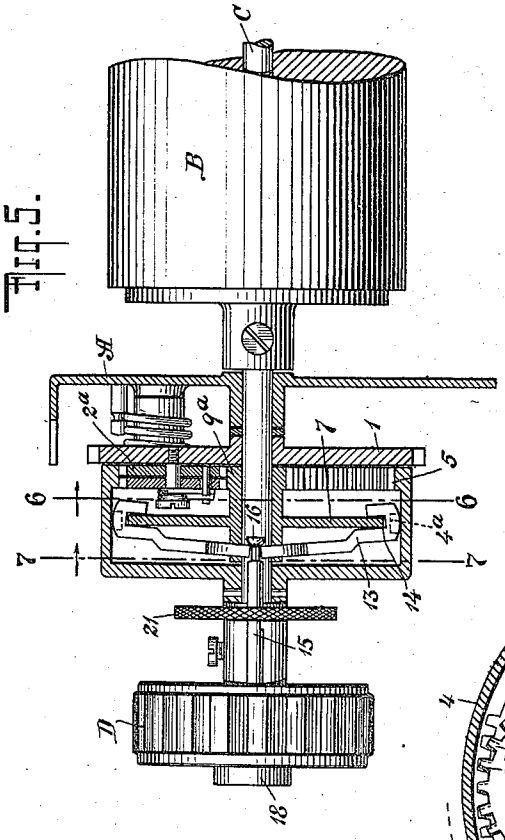


FIG. 7.

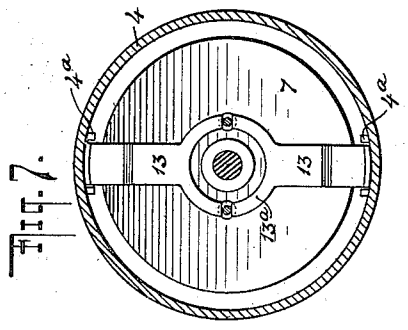
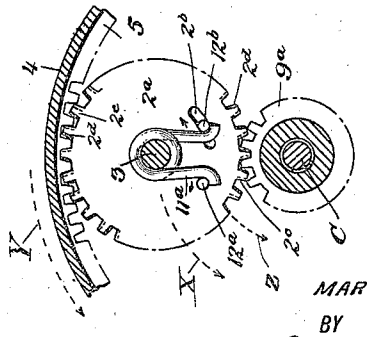


FIG. 10.



WITNESSES

G. V. Rasmussen

John A. Tekkenbrock

INVENTOR

MARQUIS H. LOCKWOOD

BY

Briesen & Knauth

ATTORNEYS

UNITED STATES PATENT OFFICE.

MARQUIS H. LOCKWOOD, OF NEW YORK, N. Y., ASSIGNOR TO UNDERWOOD TYPE-WRITER COMPANY, OF NEW YORK, N. Y., A CORPORATION OF DELAWARE.

TYPE-WRITING MACHINE.

1,158,818. Specification of Letters Patent. Patented Nov. 2, 1915.

Application filed July 1, 1911. Serial No. 636,367.

To all whom it may concern:

Be it known that I, MARQUIS H. LOCKWOOD, a citizen of the United States, residing in the borough of Manhattan, city, county, 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 more particularly to an improved typewriting machine platen release or fractional line space mechanism and to resilient cushioning means in the connections between the platen and line space wheel adapted to serve as a shock absorber. In platen releases employing a friction clutch and connected directly to the platen and to the line space wheel, it has been found that in some cases the clutch members will slip one upon the other when the line space wheel is started suddenly by slapping or operating the line space lever with a quick blow. When operated in this manner, even when the clutch does not slip, it has also been found that owing to the inertia of the paper and feed rollers, the sudden starting of the platen is liable to cause the paper to slip on the platen or not pick up the speed of the platen quick enough, and hence lag behind and thus cause a slight displacement of paper with relation to the printing line of the types. In some cases it has also been found that sudden stopping of the platen at the end of the line space stroke is apt to cause the paper to be thrown forward owing to its inertia of motion and cause it to slip over the platen beyond the normal printing line and thus produce irregularity in the lines. While the variation or irregularity in the feed from line to line may be small, the accumulated error in writing an entire page would in some cases be quite apparent. My improved platen release is intended to obviate these various difficulties and at the same time provide a clutch that can readily be released by an easy pressure upon the releasing button.

The likelihood of the clutch slipping is reduced to a minimum and practically eliminated by the introduction of intermediate gears whereby the force applied to the line space wheel by the line space lever is transmitted equally to the gears connected to the two members of the clutch and furthermore the resilient connection between the gears, adapted to take up lost motion between the teeth, serves as a shock absorber and must be compressed more or less before it is possible for the force to be directly applied to the gears connected to the clutch members. This with the multiplying effect of the gearing renders it possible to use comparatively light spring tension between the clutch members and yet avoid the possibility of their slipping, a very desirable feature since it requires less pressure on the finger button to open the clutch preparatory to turning the platen independent of the line space wheel. Again at all times when the clutch is closed the spring or other cushioning means in the connection between the platen and the line space wheel will be effective as a shock absorber and when the line space wheel is started with a sudden blow will permit the platen to lag behind until its inertia of rest is gradually overcome by the resilient connection. And also when the movement of the line space wheel is suddenly arrested, the resilient connection will be effective to gradually stop the platen and bring it back to register properly with the line space wheel and the printing line determined thereby.

My invention is illustrated in the accompanying drawings wherein corresponding parts are indicated by similar reference characters.

Figure 1 shows one form of the invention in vertical section; Fig. 2 is a cross section along the line 2—2 of Fig. 1 looking toward the left; Fig. 3 is a section along line 3—3 of Fig. 1; Fig. 4 is an end view of the platen finger wheel and platen release; Fig. 5 is another view partially in section wherein the cushion spring is applied in a different manner to take up the lost motion; Fig. 6 is a sectional view along the line 6—6 of Fig. 5; Fig. 7 is a sectional view along the line 7—7 of Fig. 5; Fig. 8 represents the finger wheel in section and shows the clutch releasing connection; Fig. 9 shows the locking disk and represents a section along the line 9—9 of Fig. 8 and Fig. 10 is an enlarged view of the gears in Fig. 6.

My invention is represented as attached to the platen of the well-known Underwood typewriter, but it will be understood that the device may be used in connection with any other style of typewriter.

In the drawings A represents a portion of the platen carriage of the Underwood machine. B represents the platen and C the axle or shaft upon which the platen is mounted and to which it is secured in this type of machine. D represents the finger wheel or knurled head which is secured to the end of the platen shaft or axle C. These parts are substantially the regular construction of the Underwood machine as is also the detent E which, as is well known, is intended to position the line space wheel 1. The line space wheel is revolubly mounted upon the axle shaft C and is provided with ratchet teeth in the usual manner to regulate the spaces between lines. In my invention I provide this line space wheel with a pair of planetary pinions 2 which are adapted to revolve on a screw 3 or other suitable bearing which is secured to the line space wheel. Secured to the axle C is a cylindrical boxing 4 which is provided upon its inner periphery with an internal gear 5 of sufficient width of face for the two pinions 2 to mesh therein. This cylindrical boxing 4 and hence the internal gear 5 is secured to the platen axle C in any desired manner as by the pin 6. Inclosed within the cylindrical casing 4, adjacent to the line space wheel 1, and mounted to revolve upon the axle C is a friction disk or other suitable clutch member 7 which is provided with a hub portion 8 to which it is secured. The hub portion is provided with a pinion 9, the teeth of which are adapted to mesh with the teeth of one of the planetary pinions 2. Loosely mounted upon the hub between the pinion 9 and the clutch member 7, as shown in Fig. 1 of the drawings, is another pinion 10 secured to a short collar 10^a. The teeth of this pinion 10 are adapted to mesh with the other planetary pinion 2. Surrounding the hub or collar 10^a of the pinion 10 is a spring 11; one end of which is secured to the hub while the other end is in engagement with a pin 12 projecting from the adjacent face of the clutch member 7. From this arrangement it will be seen that the spring 11 will tend to force the two planetary pinions 2 in opposite directions and thereby provide cushion means adapted to take up any lost motion in the gear connections between the line space wheel, the clutch members and the platen, and serve as a shock absorber.

A slightly different method of applying the cushion spring is shown in Figs. 5 and 6. In these figures the pinion 9^a is represented as having the same width of face as the gear 5 and the second pinion 10, as shown in Fig. 1, is eliminated, while the spring 11^a is connected directly to the pinions 2^a. The thrust of the ends of the spring 11^a being received by pins 12^a and 12^b, 12^a being secured to one of the pinions 2^a while 12^b is secured to the other pinion 2^1 and passes through an elongated slot 2^b in the first-named pinion 2^a. It will be seen that this arrangement is also adapted to serve as a shock absorber and take up the lost motion in the gear connections between the platen and the line space wheel.

It is well known that in order for gearing, having teeth cut in the ordinary way, to run or mesh properly there must be a certain amount of lost-motion or clearance between the meshing teeth. If the gears are always turned in the same direction such lost-motion will not be apparent, but if the gears are turned first in one direction and then in the opposite direction the lost-motion becomes apparent. The same is true when one gear is suddenly slowed up or stopped and the other is carried forward by inertia thus causing backlash of the gears as it is termed. Such lost motion while not objectionable in some mechanism is highly objectionable in others and particularly when it is desired that the driving and driven gears should turn in unison in either direction as in the forms of my device herein shown and described.

Backlash may be overcome by mounting two similar gears close together on a common axis both adapted to mesh in another gear which is made of double width to accommodate them, and connecting the two narrow gears by a spring which tends to rotate them in opposite directions. Thus the spring will keep the corresponding teeth of the two narrow gears spread apart circumferentially and constantly in contact with the teeth of the wide gear and prevent backlash or rattling of the gears. By reference to Figs. 6 and 10, this action of the spring 11^a in one form of the device may be explained as follows, and it will be understood that the spring 11 performs a similar function in the other form of device shown. The two pinions 2^a, mounted on the pin or screw 3 are carried upon the line space ratchet wheel 1 as shown in Fig. 6. The spring 11^a, it will be seen, tends to turn the two pinions 2^a in opposite directions by means of the pins 12^a and 12^b, as previously explained. Now this action of the spring, it will be seen, will force the upper teeth of the back pinion 2^a, as indicated by the shaded teeth 2^d, toward the left, and against the right hand faces of the teeth of the internal gear 5; while the upper teeth 2^c of the front pinion are forced against the left hand faces of the teeth of the internal gear 5.

The respective teeth on the lower side of the two pinions 2^a are forced by the spring in the opposite direction and hence teeth 2^d (shaded) at the bottom are forced against the left hand faces of the teeth of the pinion 9^a while the teeth 2^c of the front pinion 2^a are thrust against the right hand faces of the teeth of 9^a.

With the clutch closed (see Fig. 5) and the pinions in the position represented, which is the normal position force applied to the line space wheel to turn the platen will carry the pin 3 toward the left, as indicated by the arrow *x* and in doing so will exert pressure through the pinions 2^a to drive the internal gear 5 and the pinion 9^a in the same direction, as indicated by the arrows *y* and *z*. An examination of Fig. 10 will show that in this operation the upper teeth of the back pinion 2^a will drive the internal gear 5, while the lower teeth of the front pinion 2^a will drive the pinion 9^a. Now if the line space wheel is turned with a sudden start, before the heavy platen gets started, the teeth of the pinions 2^a move scissor-like against the resistance of the spring 11^a. In other words, the upper teeth of the front pinion 2^a tend to move into contact with the right hand faces of the teeth of the internal gear 5, while the lower teeth of the back pinions 2^a tend to move to contact with the right hand faces of the pinion 9^a, thus bringing into play the resilient action or cushioning effect of the spring 11^a.

Sudden stopping of the line space wheel and the pivot pin 3 will have the same effect in compressing the spring 11^a but the action will be reversed; that is, the upper teeth of the front pinion 2^a will tend to be forced toward the left by the teeth of the internal gear 5, while the lower teeth of the back pinion 2^a will tend to be forced toward the left by the teeth of 9^a, owing to the inertia of the platen. Thus the spring 11^a will act as a shock absorber or cushioning device in either starting or stopping the platen by means of the line space wheel.

Usually springs or other means for preventing backlash are only of sufficient strength to keep the gears from rattling and to keep the working faces of the teeth in contact, but in the present instance, I make the springs, such as 11 or 11^a or any other suitable device adapted for the purpose, of sufficient strength not only to prevent backlash of the gears, but to act as a shock absorber and restore the platen to its normal relation with the line space wheel when, owing to the lost motion between the gears, it has been displaced by sudden starting or stopping of the rotation of the line space wheel. This feature is of importance since it not only prevents the displacement of the paper on the platen, but also comes into play to prevent the shock of a sudden stroke received by the line space wheel from displacing the engagement between the clutch members. The clutch member 7 is here shown as a disk and is adapted to be engaged by or to coöperate with any suitable clutch member which is fixed relatively to the platen. Any suitable or preferred form of clutch may be employed but in the form of friction clutch here shown the clutch members 13 are provided with narrow slots 14 which are adapted to extend over the periphery of the clutch member 7, as will be seen in Figs. 1 and 5 of the drawings; and when the walls of the slots are parallel to the faces of the disk 7, the disk will be free to rotate in the slots 14, while if the inner ends of the arms 13 are moved or forced outward away from the surface of the disk 7, the slots 14 will cramp or clutch the periphery of the disk and hold the same from revolving. The arms 13 are prevented from revolving with the disk 7 by the pins or lugs 4^a which project inwardly from the cylindrical boxing 4 and are located, one on each side of the slotted portion 14 of the arms 13. Other suitable means may be employed to prevent the arms 13 from revolving with the disk 7 and at the same time pivotally secure them to the cylindrical box 4, which, as previously stated, is connected to revolve with the platen. The arms 13 extend radially inward substantially parallel to the disk 7 and are, in the present instance provided with forked or Y-shaped ends which extend partially around the hub of the disk 7. The forked ends of the inwardly extending arms 13 nearly meet and are located on opposite sides of the turned down or flattened portions of two rods 15, provided with knobs or enlarged ends 16, which are adapted to contact with the Y-shaped ends of the arms 13. These rods 15 extend through the circular end portion of the inclosing case 4, parallel to the axle C and pass loosely through corresponding holes in the finger wheel D. The rods 15, as here shown, are united at their outer ends by a cross piece 17 which is provided with a raised portion 18 which serves as a finger button to slide the rods lengthwise and release the clutch members. The raised portion 18 has extending inwardly therefrom a centrally located pin 19 which is surrounded by a compressed spring 20 which is of sufficient strength to force the finger piece 17 and rods 15 outward and cramp the clutch members 13 upon the disk 7, and thus hold the disk 7 from revolving independently of the platen. It is sometimes desirable to release the clutch members and maintain them released so that the platen may be turned independently of the line space wheel and the operator shall not be under the necessity of pressing on the finger piece 18 continuously. Various devices may be employed for this purpose, but in the present instance I have shown a circular disk 21 pivotally mounted upon the axle or shaft C between the hub of the cylindrical boxing 4 and the hub of the finger wheel D, being held frictionally by a friction spring 22. Elongated circumferential slots 23 are provided in the disk 21 through which the rods

15 pass freely. One end of each of the slots 23 is provided with a straight edge 23ª which is adapted to coöperate with one of the notches 24 cut in the corresponding sides of the rods 15, the arrangement being such that when the rods 15 are pushed in to release the clutch, and the disk 21 is turned by its knurled edge, the straight edges 23ª of the slots will be forced into the notches 24 and thus hold the rods 24 from being withdrawn by the spring 20, and therefore holding the clutch open until the knurled disk is turned in the opposite direction.

The operation of my invention as described is as follows. When the clutch is closed the parts will be as shown in Fig. 5, that is the spring 20 holds the rods 15 outward and they in turn hold the clutch arms 13 cramped upon the periphery of the disk 7, thus preventing independent motion of the clutch members. With the parts in this position it will be seen that when force is applied to the line space wheel to turn the same, such force can reach the platen only by acting through the pivot 3 of the planetary pinions 2, and through said pinions the thrust is applied equally to the pinion 9 or 9ª and to the internal gear 5, and will tend to turn the gear and pinion and the respective clutch members 7 and 13 in the same direction, thus the likelihood of one clutch member slipping with respect to the other is reduced to a minimum; and owing to the fact that the clutch members grip at the extremity of the diameter of the relatively large disk 7, a comparatively light spring 20 is sufficient to maintain the necessary friction to prevent relative movement of the clutch members, hence only an easy pressure of the finger upon the push button 18 is required to open the clutch. The clutch is shown in the open position in Fig. 1, and, as previously pointed out, may be held in this position by turning the knurled disk 21 into the notches 24 of the rods 15. In the open position of the clutch members it will be seen that by turning the finger wheel D, the axle C, platen B, gear 5 and clutch member 13, and connected parts will be rotated and since the gear 5 is several times the size of the pinion 9 or 9ª the latter, together with the disk 7, will be rotated a number of times for one revolution of the gear 5, and owing to the intermediate pinions 2, the disk 7 will revolve in the opposite direction from that of the platen. It will be understood that the detent E, acting on the teeth of the line space wheel 1, will hold the pinions 2 relatively fixed during the rotation of the clutch members as described when the clutch is open. With the clutch closed or in holding engagement it will be understood from the description that the double pinion construction and the cushion spring 11, 11ª is adapted to take up the lost motion and serve as a shock-absorbing device between the platen and line space wheel.

I do not wish to be limited to the precise structures shown, for various modifications of the shock-absorbing or clutch mechanism may be made or parts may be used without others, without departing from the spirit and scope of the claims.

I claim:

1. In a typewriting machine the combination with a platen having an axle, of a line space wheel mounted upon said axle, a clutch member adapted to revolve in unison with the platen, a clutch member mounted to revolve upon said axle and adapted to be normally engaged by the first-named clutch member, multiplying gears connecting said clutch members to said line space wheel, said first named clutch member being connected to revolve at greater speed than the axle when the clutch is open, whereby the force required to hold the clutch when closed is reduced to a minimum, and means for disengaging the clutch members when it is desired to turn the platen independently of said line space wheel.

2. In a typewriting machine the combination with a platen having an axle, of a line space wheel mounted upon said axle, a clutch member adapted to revolve in unison with the platen, a clutch member mounted to revolve upon said axle and adapted to be normally engaged by the first-named clutch member, a gear revoluble in unison with the platen and with said first-named clutch member, intermediate pinions between said gear and said second clutch member connecting said clutch members to said line space wheel and adapted to rotate the said revoluble clutch member at increased speed when the platen and said gear are revolved independently of said line space wheel, and means for disengaging said clutch members when it is desired to turn the platen independently of said line space wheel.

3. In a typewriting machine the combination with a platen having an axle to which it is secured, of a line space wheel loosely mounted upon said axle, a clutch member adapted to rotate with the platen, a clutch member mounted to revolve on said axle and adapted to be normally engaged by the first-named clutch member, intermediate multiplying gears connecting the clutch members to said line space wheel, said last named clutch member being connected to revolve at greater speed than the axle when the clutch is open, whereby the force required to hold the clutch when closed is reduced to a minimum, and means for disengaging said clutch members.

4. In a typewriting machine the combination with a platen having an axle to which it is secured of a line space wheel loosely mounted upon said axle, a clutch member

adapted to revolve with said axle, a clutch member mounted to revolve upon said axle, and adapted to be normally engaged by the first-named clutch member, intermediate multiplying gears connecting the clutch members to said line space wheel and adapted to rotate the second named clutch member when the clutch is open and the platen is turned and resilient shock absorbing means for taking up the lost motion in the connection between said clutch members and said line space wheel, adapted to be brought into action during engagement of said clutch members when force is suddenly applied to said line space wheel in starting or stopping rotation of the platen.

5. In a typewriting machine the combination with a platen having an axle to which it is secured of a line space wheel loosely mounted upon said axle, a clutch member adapted to revolve with said axle, a clutch member revolubly mounted upon said axle and adapted to be normally engaged by the first-named clutch member, a gear secured to said axle and to which said first named clutch member is connected, a pinion connected to said revoluble clutch member, a planetary pinion mounted to mesh with said gear and with the pinion connected to the revoluble clutch member whereby the force required to hold the closed clutch from slipping is reduced to a minimum, a pivot for said planetary pinion secured to said line space wheel and means for disengaging said clutch members.

6. In a typewriting machine the combination with a platen having an axle of a line space wheel mounted upon said axle, a clutch for connecting the platen and said line space wheel, multiplying gears in the connection between said clutch and said line space wheel and resilient means for taking up the lost motion in said gears.

7. In a typewriting machine the combination with a platen having an axle of a line space wheel mounted upon said axle, a clutch member connected to the platen, a coacting clutch member revolubly mounted upon said axle, multiplying gears connecting the last named clutch member and said line space wheel and resilient shock absorbing means adapted to take up the lost motion in said gears.

8. In a typewriting machine, the combination with a platen and line space wheel, of a friction clutch connecting the platen to the line space wheel, manually operable driving means connected to said friction clutch to turn the platen and yielding means connecting the clutch to the platen to prevent the application of undue stress to the friction clutch and to limit the initial speed of the platen regardless of the speed of the manually operable platen driving means.

9. In a typewriting machine the combination with a platen having an axle to which it is secured of a line space wheel loosely mounted upon said axle, clutch members for connecting the line space wheel to said axle, intermediate gears between said clutch members and said line space wheel and resilient means in the connections between said line space wheel and said axle adapted to take up the lost motion in said gears.

10. In a typewriting machine, the combination with a platen and line space wheel, of a friction clutch connecting the platen to the line space wheel, manually operable driving means for turning the platen through said clutch, and intermediate resilient means adapted to prevent undue stress to the friction clutch and to permit the initial and final speed of the platen to vary from that of the line space wheel.

11. In a typewriting machine, the combination with a platen and line space wheel, of a two membered friction clutch adapted to connect the platen and line space wheel together at any rotative position of one with respect to the other and resilient shock absorbing springs between said clutch members and said line space wheel adapted to prevent undue stress upon said clutch and to permit the platen to start and stop without shock when rotated by said line space wheel.

12. In a typewriting machine the combination with a platen having an axle, of a line space wheel mounted upon said axle, a two membered clutch adapted to be closed in any rotative position of the line space wheel relative to the platen for connecting the platen and said line space wheel and resilient shock absorbing means connecting the respective members of said clutch to the platen and to said line space wheel.

13. In a typewriting machine the combination with a platen having an axle, of a line space wheel mounted upon said axle and resilient shock absorbing means connecting the platen and said line space wheel adapted to be brought into action in either starting or stopping rotation of the platen by the line space wheel, the action being such as to gradually overcome the inertia of rest of the platen when the line space wheel is suddenly started and gradually overcome the inertia of motion of he platen when the line space wheel is suddenly stopped.

14. In a typewriting machine the combination with a platen having an axle, of a line space wheel mounted upon said axle, a pair of clutch members adapted when in engagement to connect the platen and said line space wheel to revolve in unison, and multiplying gear connections between said clutch members such that, when the clutch members are disengaged rotating one of said members will rotate the other at increased speed.

15. In a typewriting machine the combination with a platen having an axle, of a line space wheel mounted upon said axle, a clutch comprising a pair of clutch members adapted when in engagement to connect the platen and said line space wheel to revolve in unison, multiplying gear connections between said clutch members such that, when the clutch members are disengaged rotating one of said members will rotate the other at increased speed, means operative to open and close said clutch and means adapted to retain the clutch in the open position when desired.

16. In a typewriting machine, the combination with a platen and line space wheel of a friction clutch comprising two members, one of which is permanently connected to the platen, intermediate gears connecting each of said members to the line space wheel when the clutch is closed, said intermediate gears being adapted to divide any force applied to the line space wheel and transmit a part to each clutch member thereby reducing the tendency of the clutch to slip when force is applied to said line space wheel to turn the platen.

17. In a typewriting machine the combination with a platen and line space wheel of a clutch for securing the two together at any rotative position of one with respect to the other, a member extending in the direction of and parallel to the axis of the platen for opening the clutch at will, and means concentric with the axis of the platen and manually revoluble in a plane at right angles to said member and adapted, when said member has been moved to open said clutch, to be revolved into engagement with said member for maintaining the platen disconnected from and permit it to be revolved independently of said line space wheel.

In testimony wherof I have hereunto set my hand in the presence of two subscribing witnesses.

MARQUIS H. LOCKWOOD.

Witnesses:
FRANK F. KIRKPATRICK,
JOHN A. FERGUSON.