No. 860,835. PATENTED JULY 23, 1907.

A. W. SMITH.

TYPE WRITING MACHINE.

APPLICATION FILED OCT. 5, 1905.

2 SHEETS—SHEET 1.

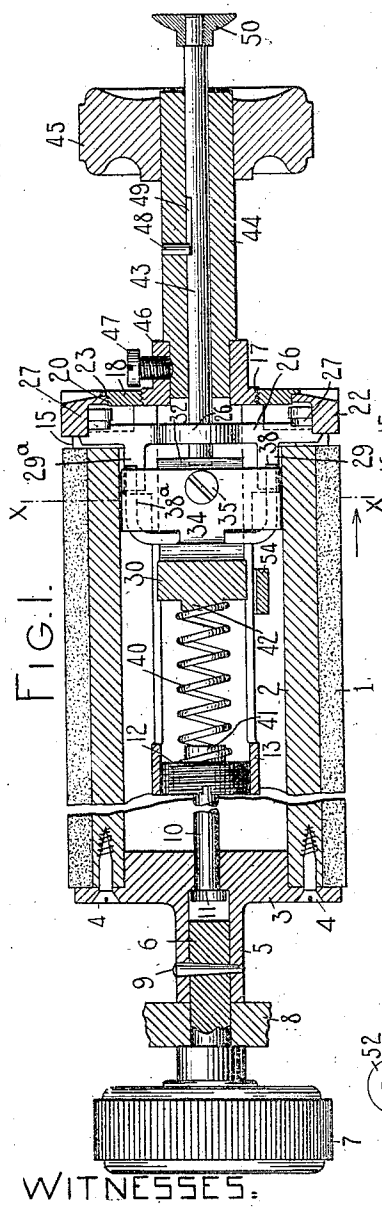

FIG. 1.

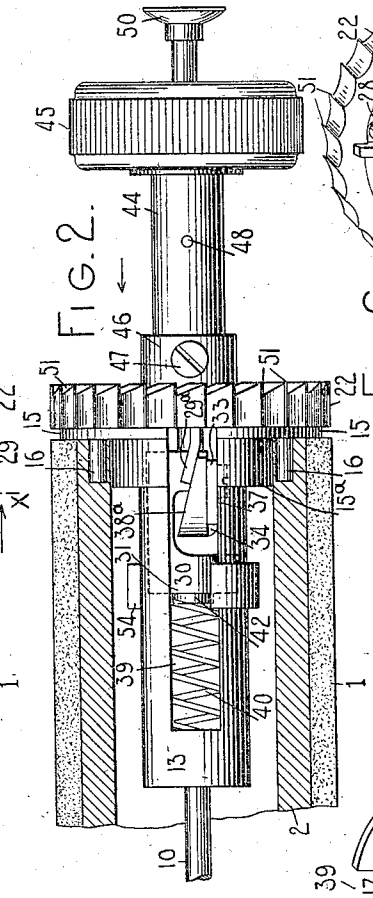

FIG. 2.

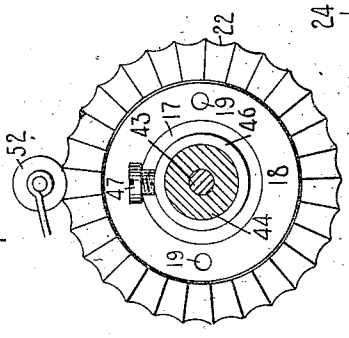

FIG. 3.

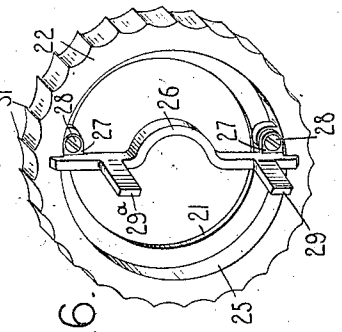

FIG. 6.

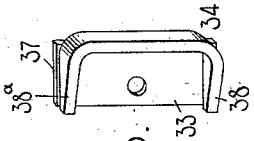

FIG. 5.

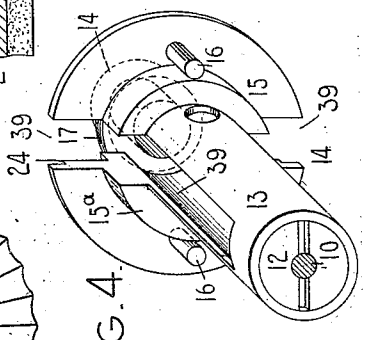

FIG. 4.

WITNESSES:

J. B. Neves.

Charles E. Smith

INVENTOR:

Arthur W. Smith

By Jacob Falbel

HIS ATTORNEY

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2 SHEETS—SHEET 2.

FIG. 8.

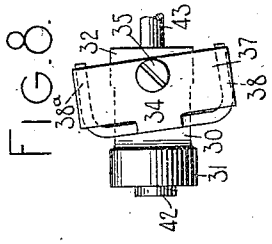


FIG. 11.

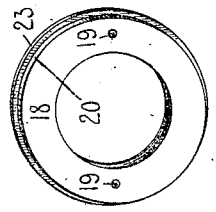


FIG. 9.

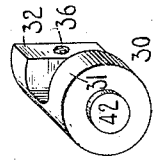


FIG. 7.

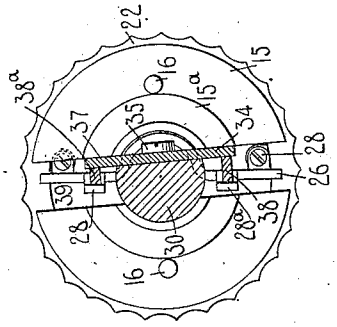
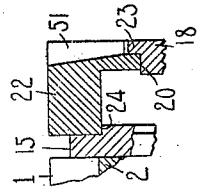


FIG. 10.



WITNESSES:

J. B. Weeks

Charles E. Smith

INVENTOR:

Arthur W. Smith

By Jacob Felbel

HIS ATTORNEY

UNITED STATES PATENT OFFICE.

ARTHUR W. SMITH, OF NEW YORK, N. Y., ASSIGNOR TO YOST WRITING MACHINE COMPANY, OF ILION, NEW YORK, A CORPORATION OF NEW YORK.

TYPE-WRITING MACHINE.

No. 860,835. Specification of Letters Patent. Patented July 23, 1907.

Application filed October 5, 1905. Serial No. 281,407.

To all whom it may concern:

Be it known that I, ARTHUR W. SMITH, 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 particularly to fractional line spacing mechanism therefor.

Heretofore great difficulty has been encountered in providing efficient fractional line spacing mechanism. It must be understood, in order to appreciate some of these difficulties, that a nice adjustment is required between the line spacing wheel and platen and that there must be absolutely no accidental relative displacement of the parts from this adjustment when once effected, as a thousandth of an inch displacement of a character out of a line of writing is quite perceptible in the printed matter. In devices where differential gearing was employed between the line spacing wheel and platen, there was almost invariably a "back lash" or lost motion in the gear connections which affected the results. Then again when frictional means were employed to connect the line spacing wheel and platen considerable power, say thirteen pounds in some devices, was necessary to maintain the connection and this power must be overcome in releasing the device. Even with this power the friction devices were unreliable as the line spacing wheel was often accidentally displaced relatively to the platen when the line spacing lever was violently actuated, as, for instance, when the carriage was being restored and a line spacing movement of the platen effected at a single operation. In devices which receive a rotary movement of a finger wheel or controlling piece to effect an engagement or disengagement between the line spacing wheel and platen, an accidental rotary displacement of the platen was often effected without the operator observing it and the work was apt to be ruined. In devices which employ interlocking teeth to effect a clutching engagement between the line spacing wheel and platen, it is necessary to have teeth of considerable size in order to bring about an effective interlocking engagement between the parts and a relative adjustment between the line spacing wheel and platen, or a fractional spacing of the platen for a distance less than the distance between two teeth of the engaging members cannot be effected, and the usefulness of the device is restricted. In any such construction heretofore devised, the teeth of the engaging members restricted the adjustment or fractional spacing of the platen. Furthermore, in this class of devices the platen was often accidentally displaced from its adjusted position while an engagement of the parts was being effected and often the displacement occurred without the operator's knowledge. Thus, if the platen happens to be adjusted to a point where the crowns of the teeth on both engaging members come into contact during the engagement of the parts, then the locking of the parts together will cause the platen to rotate until the teeth are brought into proper interlocking mesh and however slight the movement of the platen, it is sufficient to throw the work out of alinement and to render the written matter uneven and unsatisfactory. From the foregoing it will be understood that in prior devices where positive or interlocking means were employed to connect the line spacing wheel and platen, the platen could not be adjusted to any desired point relatively to the platen and connected to the wheel at the point of adjustment.

The object of my present invention is to overcome the above and other defects that have been encountered heretofore in fractional line spacing mechanism and to provide a fractional line spacing device which will be efficient in operation under all conditions of its use.

To the above and other ends which will hereinafter appear, my invention consists of the features of construction, arrangements of parts and combinations of devices to be hereinafter described and claimed.

In the accompanying drawings, wherein like reference characters indicate corresponding parts in the various views, Figure 1 is a detail central longitudinal sectional view of a platen with my devices shown applied thereto. Fig. 2 is a like fragmentary view of the same with the parts shown at right angles to the position illustrated in Fig. 1. Fig. 3 is an end view looking towards the line spacing wheel or in the direction of the arrow in Fig. 2 and with the finger wheel sectioned away. Fig. 4 is a detail perspective view of the right hand platen head. Fig. 5 is a detail perspective view of one of the interlocking engaging members. Fig. 6 is a detail perspective view of the line spacing wheel with one of the interlocking engaging members connected thereto. Fig. 7 is a detail transverse sectional view taken on the line $x-x$ of Fig. 1, and looking in the direction of the arrow at said line. Fig. 8 is a detail side elevation of one of the interlocking engaging members and the carrier therefor. Fig. 9 is a detail perspective view of the carrier for one of the interlocking engaging members. Fig. 10 is an enlarged detail fragmentary sectional view of the line spacing wheel and some of the associated parts; and Fig. 11 is a detail perspective view of the ring for maintaining the line spacing wheel in place.

The cylindrical platen comprises the usual sheath 1 and hollow core 2. The left-hand platen head 3 is secured to the platen by headed wood screws 4 which

pass through the platen head and take into the core of the platen. An outwardly-extending sleeve-like portion 5 is carried by the platen head and a spindle or stem 6 is received within the opening in said sleeve. A finger wheel 7 is connected to the outer end of the spindle which projects through a bearing opening in the platen frame 8, whereas the spindle and platen head are united by a conoidal pin 9 which passes through openings in the sleeve-like portion 5 of the platen head and through the spindle 6. A central opening extends through the platen head and a bolt 10 headed at 11 passes through this opening and is received at its inner threaded end in a nut 12, the peripheral threads on which coöperate with the internal threads on a sleeve-like extension 13 of the right hand platen head 14 which is shown in detail in Fig. 4. The platen head 14 has a flange 15 from which project pins 16 that extend longitudinally of the platen and are adapted to be seated in suitable holes in the end of the platen core 2 as indicated in Fig. 2, thus preventing the platen head 14 from turning relatively to the platen, whereas the bolt 10 secures the platen head 14 against withdrawal from the platen.

A cylindrical portion 15^a on the platen head 14 is adapted to be seated within the bore of the platen core 2 to form a bearing for the platen head and the parts carried thereby as shown in Fig. 2. The platen head 14 has a threaded neck 17 that extends beyond the flange 15 and has screwed onto it an internally threaded ring 18 which is provided with spanner openings 19 for turning the ring to secure it in place on the threaded extension of the platen head. This ring is stepped on its periphery to form a bearing portion 20 for the inner edge 21 (Fig. 6) of a line spacing wheel or ring 22, and a flange 23 on the outer side of the line spacing wheel or ring 22 for preventing movement of the line spacing wheel towards the right and longitudinally of the platen. A peripheral bearing portion 24 is provided on the flange 15 of the platen head and the inner bearing surface 25 of the line spacing wheel rests on said part 24 and the flange 15 prevents a movement of the line spacing wheel to the left and longitudinally of the platen. Thus, the line spacing wheel is mounted on the platen head and is held against longitudinal displacement though it is free to turn thereon for a limited distance, as will hereinafter more clearly appear. It will be seen that the platen head 14 comprises the threaded neck 17, the flange 15 that bears against the end of the platen core 2, the cylinder 15^a that fits inside the hollow in said core, and a tubular part 13 that extends some distance into said hollow. As best shown in Figs. 2 and 4, a longitudinal slot is formed in said platen head and said slot extends from a point near the inner end of the tubular part 13 and through the cylinder 15^a and flange 15, but it does not extend into the threaded neck 17. Into this slot there projects from the line space wheel a locking member 26 having two ears 27 that are apertured to receive threaded screws 28, the stems of which are threaded into tapped openings in the line spacing ring or wheel to rigidly connect the locking device to said wheel. This locking device has inwardly projecting fingers 29 and 29^a on opposite sides of the longitudinal axis of the platen and these fingers are bent slightly to form inclined or wedging surfaces as indicated in Fig. 2. These fingers are bent in the same direction—that is to say, they are substantially parallel. They both lie in a plane that is at a sharp acute angle to the longitudinal axis of the platen. A slide or carrier 30 is contained within the tubular sleeve-like extension 13 of the platen head 14 and is adapted to move therein longitudinally of the platen. This guide or carrier is shown in detail in Fig. 9 and comprises a cylindrical portion 31 that is received in the tubular extension and guides the carrier in its longitudinal movement therein. A flattened cut away portion 32 on the carrier constitutes a flat bearing surface against which the inner flat bearing face 33 of a pivoted wedging device 34 bears. This pivoted wedging device (shown in detail in Fig. 5) is pivotally connected to the carrier by a shouldered pivot screw 35, the threaded stem of which is received in a tapped opening 36 in the carrier, so that the pivotal axis of the pivotal wedging device extends transversely to the axis of the platen. The pivoted locking device 34 is preferably made of a single piece of sheet metal struck up into the form indicated in Fig. 5 with opposite flat faces 33 and 37 and wedge-like or inclined portions 38 and 38^a on opposite sides of its pivotal center. These inclined faces 38 and 38^a are adapted to cooperate with the inclined fingers 29 and 29^a to effect a wedging and interlocking engagement between the pivoted locking member 34 and the locking device 26 carried by the line spacing wheel to prevent a relative turning movement of one independently of the other.

As has been observed, the tubular extension 13 on the platen head 14 is slotted on opposite sides at 39, and the locking member 34 extends through these slots in the tubular extension and the flat bearing surface 37 bears against the edges or walls of the slots at one side thereof, as shown in Fig. 2, so that the locking member 34 and its carrier 30 are prevented from turning relatively to the platen head 14 though said locking member may receive a pivotal movement on its carrier around the pivot screw 35 and may likewise receive a bodily movement with its carrier longitudinally of the platen. The bodily movement of the carrier in one direction is effected by means of a compression spring 40 which bears at one end against the nut 12 and is prevented from lateral displacement at that end by a projection 41 on the nut and at its opposite end the spring bears against the carrier 30 and is prevented from lateral displacement at that end by a stud 42 which projects from the carrier and is received within the spring. The carrier 30 is moved in the opposite direction by a spindle 43 received within the hollow stem 44 for the finger wheel 45 at the right hand end of the platen. The stem 44 is seated within a sleeve-like extension 46 of the threaded neck 17 that projects from the platen head 14 and said stem is secured in place therein by a set screw 47, which is threaded into an opening in the extension 46 and bears at its inner end against the stem 44. A pin 48 extends through the hollow stem 44 and at its inner end is received in a cut out portion 49 in the spindle 43, in order to limit the movement of the spindle and prevent the withdrawal thereof from the hollow stem. A finger piece or button 50 is provided at the outer end of the spindle to facilitate an actuation thereof. As the locking fingers 29 and 29^a are received within the slots 39 adjacent to the

cylindrical portion 15ª, it will be seen that there is but a slight relative movement afforded between the line spacing wheel and platen, the distance corresponding, for instance, to the distance between two line spacing teeth 51 of the line spacing wheel.

In the normal disposition of the parts the spring 40 forces the carrier 30 to the right, thus carrying the wedge-shaped locking device 34 into interlocking engagement with the locking member 26, which is rigidly connected to the line spacing wheel, and the wedging action will produce a close fit and the device 34 will positively lock the line spacing wheel to rotate to the platen. The locking device 34 is thus wedged in between the arms 29 and 29ª on the one side and the wall of the slot 39 in the platen head 14, on the other side. The line space wheel being held by the detent roller 52, the platen is positively locked against rotation relatively to said line space wheel toward the back of the machine by the engagement of the wedge 38ª with the inclined arm 29ª; and it is positively locked against rotation in the other direction by the engagement of the wedge 38 with the arm 29. The platen is thus positively locked against rotation relatively to the line space wheel in either direction.

In order to effect a disengagement of the locking members, to afford fractional line spacing, it is merely necessary to move the spindle 43 towards the left thereby moving the carrier 30 against the tenison of its spring 40 when the wedging device 34 had been carried out of engagement with its coöperating engaging member 2[illegible]nd the platen will be free to be rotated independently of the line spacing wheel a distance corresponding substantially to the distance between two teeth 51 of the line spacing wheel or until one of the side walls of the slots 39 in the platen head are moved into contact with one of the fingers 29 and 29ª on the locking member 26, it being understood that at this time the line spacing wheel is held against rotation by the usual detent roller 52. When pressure is released on the finger piece 50 the tension of the spring 40 will move the carrier 30 longitudinally of the platen to the right and will again move the wedging device 34 into interlocking and wedging engagement with the fingers 29 and 29ª. During the engagement of the locking members the pivoted locking device 34 will automatically adjust itself around its pivot 35 to the adjustment effected between the line spacing wheel and platen and between the two wedge-like locking members. During the reëngagement of the ports in the manner stated the wedge-like portion 38 or 38ª will be [illegible]ght into coöperation with the fingers 29 and 29ª under different conditions depending upon the adjustment between the line spacing wheel and platen. If, for instance, the adjustment is such that the fingers 29 and 29ª are about centered in the slots 39 as shown in Fig. 2, then the inclined faces 38 and 38ª will approach their coöperating members 29 and 29ª simultaneously and will lock the parts together without necessarily affecting a movement of the engaging member 34 around its pivot 35. If, however, the relative adjustment between the line spacing wheel and platen is such that the fingers 29 and 29ª are near the side walls of the slots 39, as indicated in Fig. 7, then one of the inclined faces, say, for instance, 38ª will meet its coöperating finger 29ª before the other engaging surfaces 38 and 29 are brought into coöperation and the continual reengaging movements of the parts, by the sliding movement of the carrier 30, will merely turn the engaging member 34 around its pivot 35 while it is at the same time receiving a bodily movement with the carrier 30 and when the other wedge-like surfaces 38 and 29 are brought into engagement, no further movement of the carrier will be effected and the parts will be positively and securely locked in their adjusted positions without displacing or affecting the adjustment previously provided between the line spacing wheel and platen. When the pivoted locking member 34 is pressed inward by the operator, its left hand edge engages a ring 54 which partially surrounds the tube 13, and said ring limits the motion of the parts in that direction and also causes said member 34 to sit squarely across its carrier 30.

In operating the device, the platen is rotated by either of the finger wheels 7 or 45 to a position within a line space distance of the point where it is desired to print. The finger piece 50 is then pushed to the left, thus releasing the line spacing wheel, and the fractional spacing of the platen is effected in order to bring the exact point where the imprint is to be made at the printing point or line. Pressure on the finger piece is then released and the platen will be locked in position to receive the imprint, in accordance with the adjustment thus effected.

When I refer herein and in the accompanying claims to means for "positively connecting the line spacing wheel and platen", I mean to designate means for rigidly connecting the parts, as by effecting an interlocking connection between them, as distinguished from a mere fractional connection; and when I refer to means for connecting the platen and line spacing wheel "at any point in the relative adjustment between the two", I mean to include means for connecting the line spacing wheel and platen to rotate together, such means being effective to connect these parts together at any point where the parts can be located by a relative rotary adjustment between them and without affecting the adjustment, as distinguished from devices, for instance, having engaging teeth that may be thrown into or out of engagement, but in which an adjustment finer than the teeth employed to connect the clutch members cannot be effected.

From the foregoing description it will be seen that I have provided simple and efficient clutch mechanism for connecting the platen and line spacing wheel at any point in the relative adjustment of the two and that by actuating the hand operated controlling means a relative movement of the locking members towards and away from each other may be effected to bring about the connection or disconnection between the line space wheel and platen; that one of the wedge-like locking members is mounted to have a bodily reciprocating movement and an independent pivotal movement; that the pivotal reciprocating movement of the pivotal member is hand controlled, whereas the independent pivotal movement of said member is an automatic movement which is effected during the engagement of the locking members to automatically adjust the clutching means to the relative adjustment effected between the line spacing wheel and platen; and that by the provision of the clutch mechanism herein shown and de-

scribed I have overcome all of the disadvantages heretofore encountered in fractional line spacing mechanism.

Broad or generic claims covering the construction herein shown and described are made in my companion application Serial No. 281,406, filed Oct. 5, 1905; the claims in the present application being directed to that form or species of the invention which is disclosed herein.

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

1 In a typewriting machine, the combination of a line spacing wheel, a platen adapted to turn independently thereof, means adapted to limit the extent of motion of said platen relative to said line space wheel, and means for positively connecting the line spacing wheel and platen to turn together at any point in the relative adjustment between the line spacing wheel and platen.

2. In a typewriting machine, the combination of a line spacing wheel, a platen adapted to turn independently thereof, means adapted to limit the extent of motion of said platen relative to said line space wheel, and interlocking clutching means for positively connecting the line spacing wheel and platen, said clutching means including means for automatically adjusting the clutching means to the relative adjustment between the platen and line spacing wheel.

3. In a typewriting machine, the combination of a line spacing wheel, a platen adapted to turn independently of said line spacing wheel, a clutch member rigidly secured to one of said parts, and a second clutch member pivoted to turn on an axis that extends transversely of the axis of the platen and connected to the other of said parts and adapted to receive in addition to its pivotal movement a bodily movement into and out of positive locking and wedging engagement with said first mentioned clutch member.

4. In a typewriting machine, the combination of a line spacing wheel, a platen adapted to turn independently of said line spacing wheel, and interlocking clutching means for positively connecting said platen and line spacing wheel, said clutching means comprising two clutch members, one rigidly attached to the line spacing wheel and the other pivoted to turn on an axis that extends transversely of the axis of the platen and adapted to receive in addition to its pivotal movement, a bodily movement into and out of interlocking and wedging engagement with its clutch member on the line space wheel.

5. In a typewriting machine, the combination of a line spacing wheel, a platen adapted to turn independently of said line spacing wheel, and interlocking clutching means for positively connecting said platen and line spacing wheel, said clutching means comprising two clutch members, one rigidly attached to the line spacing wheel and the other fixed to turn with the platen but pivoted to turn on an axis that extends transversely of the axis of the platen and adapted to receive an additional bodily movement longitudinally of the platen into and out of interlocking and wedging engagement with the clutch member on the line spacing wheel.

6. In a typewriting machine, the combination of a line spacing wheel, a platen adapted to turn independently of said line spacing wheel, interlocking clutching means for positively connecting said platen and line spacing wheel, said clutching means comprising two clutch members, one rigidly attached to the line spacing wheel and the other pivoted to turn on an axis that extends transversely of the axis of the platen and adapted to receive in addition to its pivotal movement a bodily movement into and out of interlocking and wedging engagement with the coöperating clutch member on the line spacing wheel, a spring for forcing said clutch members into interlocking engagement, and a finger piece for forcing the clutch members out of clutching engagement.

7. In a typewriting machine, the combination of a line spacing wheel, a platen adapted to turn independently of said line spacing wheel, interlocking clutching means for positively connecting said platen and line spacing wheel, said clutching means comprising two clutch members, one rigidly attached to the line spacing wheel, a spring pressed carrier fixed against turning movement relatively to the platen but movable longitudinally thereof, the other clutch member being pivoted to said carrier to turn on an axis that extends transversely of the axis of the platen to move with the carrier longitudinally of the platen, and wedging faces between said clutch members.

8. In a typewriting machine, the combination of a line spacing wheel, a platen adapted to turn independently of said line spacing wheel, interlocking clutching means for positively connecting said platen and line spacing wheel, said clutching means comprising two clutch members, one rigidly attached to the line spacing wheel, a spring pressed carrier fixed against turning movement relatively to the platen but movable longitudinally thereof, the other clutch member being pivoted to said carrier to turn on an axis that extends transversely of the axis of the platen and to receive a bodily movement therewith longitudinally of the platen, wedging faces between said clutch members, and a finger piece for controlling the bodily movement of the pivoted clutch member.

9. In a typewriting machine, the combination of a line spacing wheel, a platen adapted to turn independently of the line spacing wheel, two interlocking clutch members for positively connecting the line spacing wheel and platen, one of said clutch members being connected to the platen and the other rigidly connected to the line spacing wheel and one of said clutch members being pivoted on an axis that extends transversely of the axis of the platen and having wedge-like engaging faces on opposite sides of the pivotal center thereof, and means for effecting a movement of one of the clutch members towards and away from the other and into and out of interlocking engagement.

10. In a typewriting machine, the combination of a line spacing wheel, a platen adapted to turn independently of the line spacing wheel, two interlocking clutch members for positively connecting the line spacing wheel and platen, one of said clutch members being connected to the platen and the other rigidly connected to the line spacing wheel, and one of said clutch members being pivoted on an axis that extends transversely of the axis of the platen and having wedge-like engaging faces on opposite sides of the pivotal center thereof, a spring for effecting a movement of one of the clutch members towards the other and into interlocking engagement, and a finger piece for disengaging said clutch members.

Signed at the borough of Manhattan, city of New York, in the county of New York and State of New York this 3d day of October, A. D. 1905.

ARTHUR W. SMITH.

Witnesses:
E. M. WELLS,
M. F. HANNWEBER.