T. OLIVER.

TYPE WRITING MACHINE.

APPLICATION FILED JAN. 21, 1907.

922,027. **Patented May 18, 1909.**

2 SHEETS—SHEET 1.

Fig. 1.

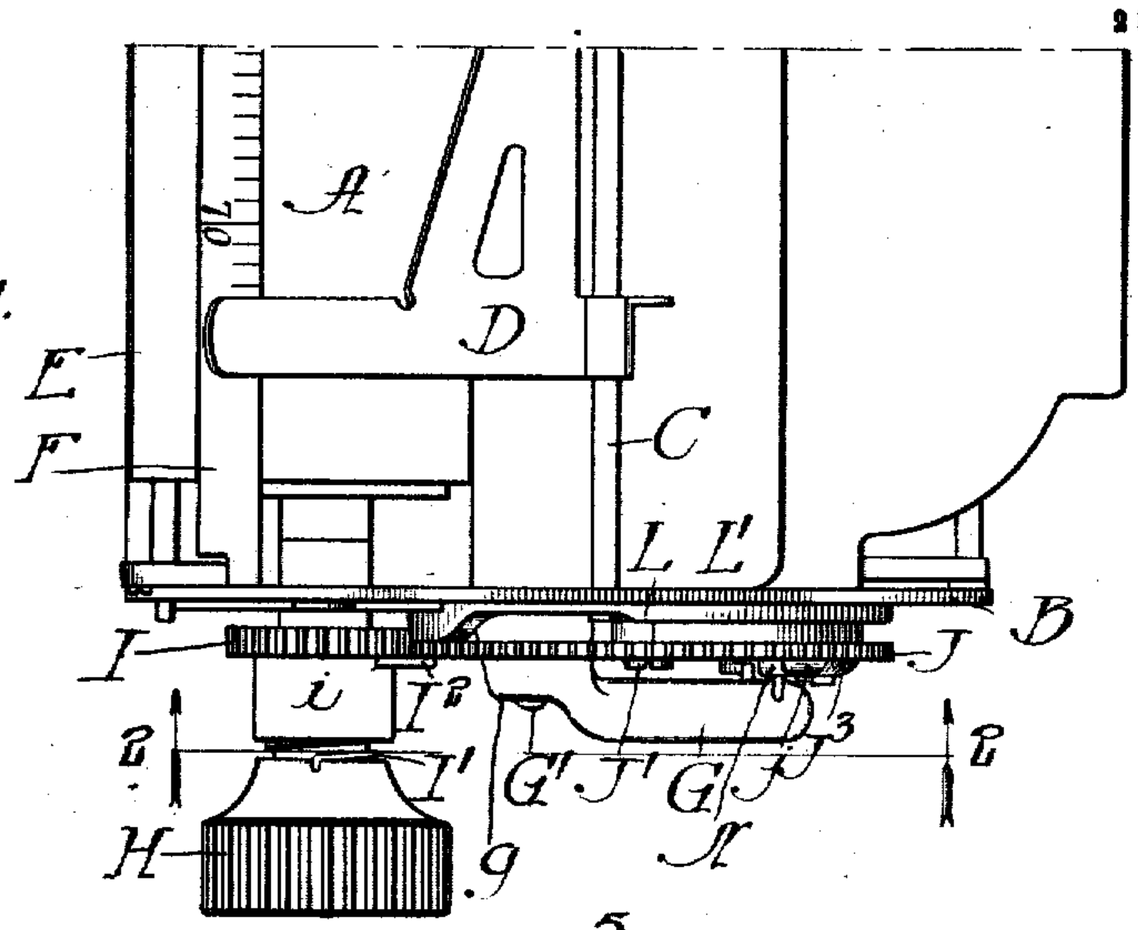
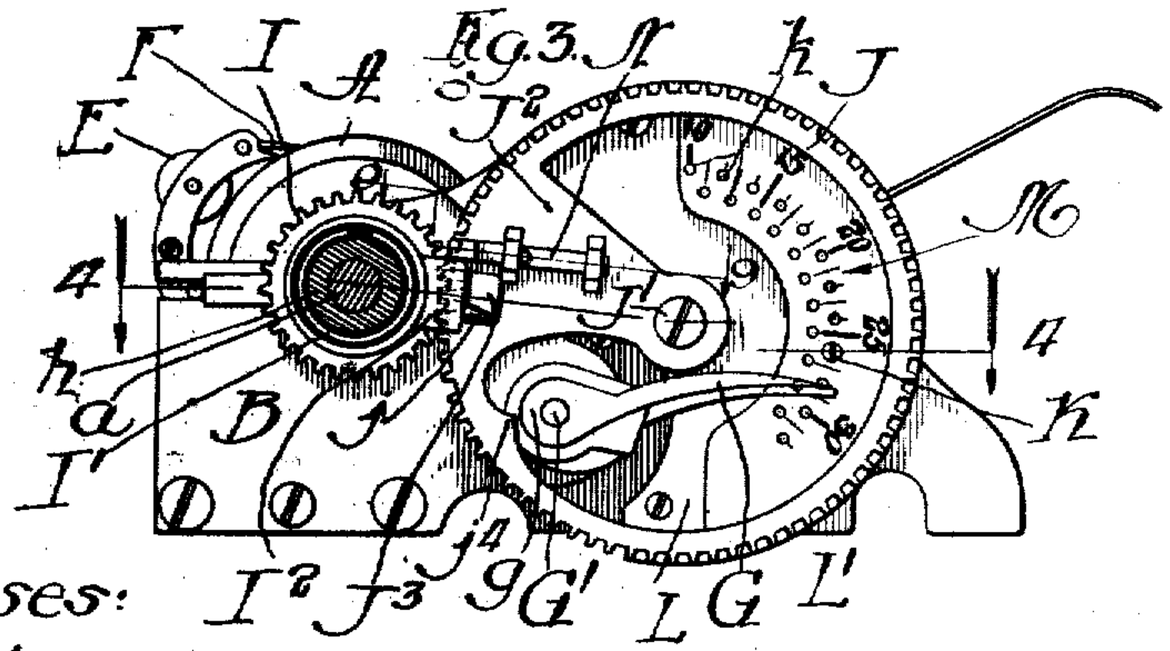


Fig. 2.

Fig. 3.



Witnesses:

H. Hyde

Harry N. Quimby.

Inventor:

Thomas Oliver

by Poole & Brown

Their Attys

T. OLIVER.

TYPE WRITING MACHINE.

APPLICATION FILED JAN. 21, 1907.

922,027. **Patented May 18, 1909.**

2 SHEETS—SHEET 2.

Fig. 4.

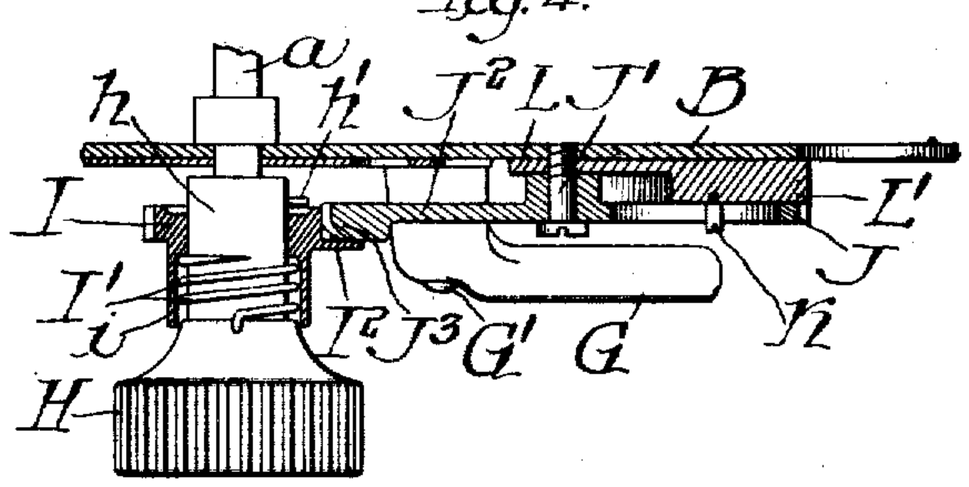


Fig. 5.

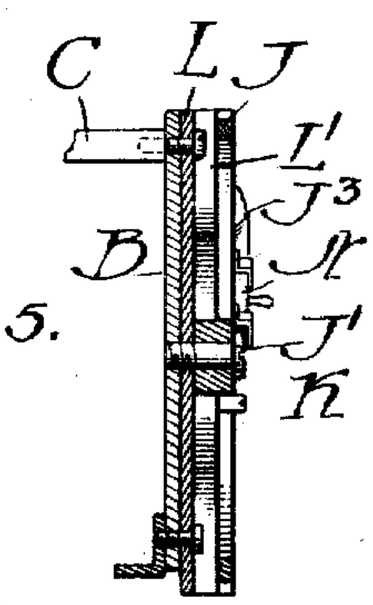


Fig. 6.

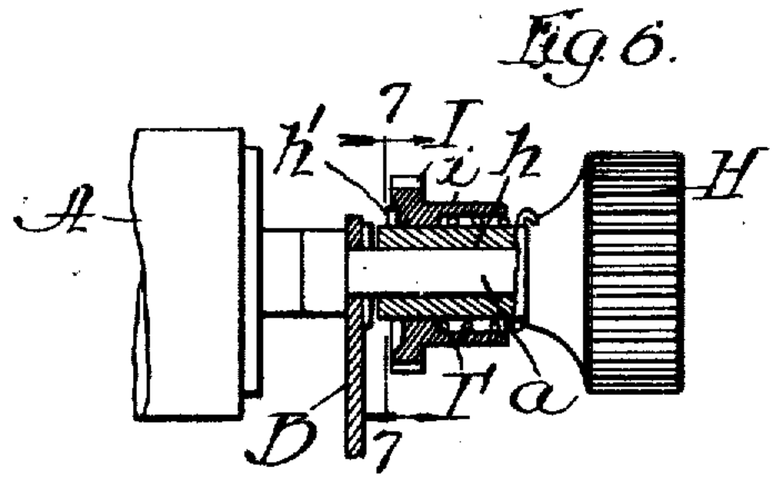


Fig. 8.

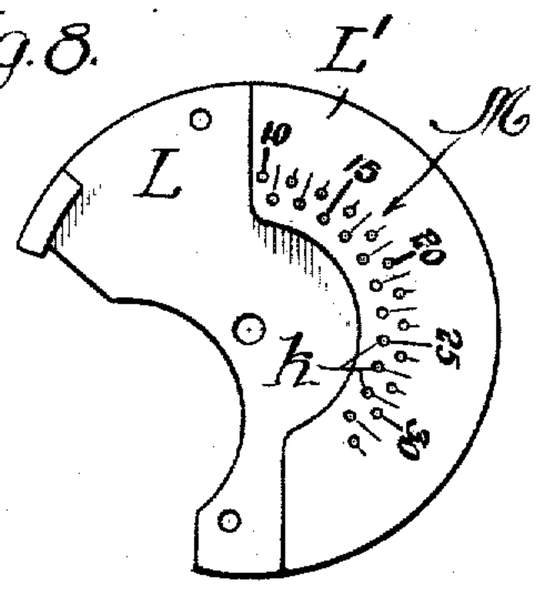


Fig. 7.

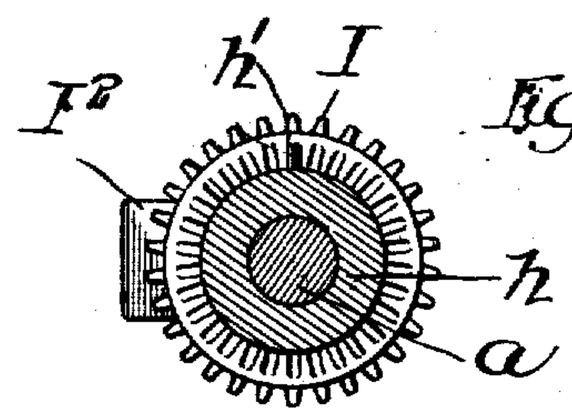
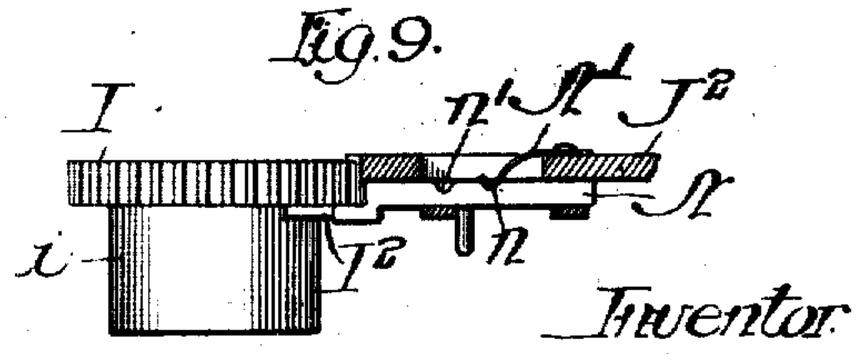


Fig. 9.



Witnesses:

F. A. Hyde

Harry H. Quinby

Inventor

Thomas Oliver

by Poole Moore

his Attys

UNITED STATES PATENT OFFICE.

THOMAS OLIVER, OF CHICAGO, ILLINOIS, ASSIGNOR TO THE OLIVER TYPEWRITER COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF ILLINOIS.

TYPE-WRITING MACHINE.

No. 922,027. Specification of Letters Patent. Patented May 18, 1909.

Application filed January 21, 1907. Serial No. 353,260.

To all whom it may concern:

Be it known that I, THOMAS OLIVER, a citizen of the United States, and a resident of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Type-Writing Machines; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

This invention relates to a line space indicating device for typewriting machines designed to indicate the extent to which the platen should be turned backwardly by hand for inserting new sheets when making carbon copies of a number of writings on a single record strip or sheet with uniform or predetermined spaces between such carbon copies.

The invention consists in the matters hereinafter described and pointed out in the appended claims.

As shown in the accompanying drawings:—Figure 1 is a plan view of the right-hand end of a paper-carriage of a typewriting machine of the kind known as the "Oliver." Fig. 2 is a sectional view taken on line 2—2 of Fig. 1, showing in elevation the right-hand end of the paper-carriage and parts thereon. Fig. 3 is a view similar to Fig. 2 showing the parts in changed position. Fig. 4 is a plan section taken upon line 4—4 of Fig. 3. Fig. 5 is a detail vertical section taken upon line 5—5 of Fig. 2. Fig. 6 is a detail vertical section taken upon line 6—6 of Fig. 2. Fig. 7 is a detail section taken upon line 7—7 of Fig. 6. Fig. 8 is a detail face view of the base-plate of the indicating device. Fig. 9 is a detail section taken upon line 9—9 of Fig. 3.

As shown in the said drawings, A designates the platen or paper roller, B the right-hand end plate of the paper-carriage, in which the shaft *a* of the platen has bearing, C the upper longitudinal frame bar of the carriage, D one of the paper guides mounted on said frame bar, E the upper guide roller of the carriage and F the scale-strip located above the platen and adjacent to said guide roller.

G indicates a lever located at the right-hand end of the carriage and having a hub *g* by which it is secured to the end of a rock-shaft G¹ which projects through the end plate B, and through which is operated the devices for moving or shifting the guide roller toward and from the platen and thereby releasing the paper from the platen when desired.

H designates the right-hand end of the platen shaft which is affixed to said shaft by a short sleeve *h* that fits over and is attached to the end of said shaft.

The parts above described correspond with those of the paper-carriage of an Oliver typewriter machine in which the type-bars are located above the platen and the types strike downwardly upon the top surface thereof.

Now referring to the parts constituting the device embodying my invention, the same, as illustrated in the said drawings, are constructed as follows:

I indicates a gear pinion mounted on the platen shaft outside of the end plate B of the carriage frame and arranged either to turn with or to turn on said platen shaft by means of a clutch device operated through the endwise movement of the pinion on the shaft. In the particular construction shown, said pinion is mounted on the sleeve *h* of the turning knob in such manner as to have both endwise and rotative movement thereon. Said pinion is provided on its inner or left-hand face with a series of radial notches, as clearly seen in Fig. 7, and the sleeve *h* is provided with a radial pin *h*¹ adapted to engage any one of said notches and to be brought into engagement therewith or disengaged therefrom by the endwise movement of the pinion. A spring I¹ is applied to throw the pinion endwise of the shaft toward the pin *h*¹, said spring also acting as a means for producing frictional engagement between the pinion and the shaft. In the construction shown, the spring I¹ has the form of a spirally coiled spring surrounding the sleeve *h* and attached at its outer end to the latter. The inner end of said spring bears against an annular outwardly facing bearing surface or shoulder on said pinion. Said pinion is shown as provided with a tubular extension or sleeve *i* which surrounds and covers the spring I¹.

J indicates a gear wheel mounted on the carriage frame, by means of a pivot stud J¹, and which intermeshes with the pinion I. The pivot stud J¹ is located at the rear of

the platen shaft and above and at the rear of the rock-shaft G^1; the parts being so arranged that the rim of the wheel is located radially outside of the hub of the lever G. Said rim of the wheel is, moreover, connected with the pivot J^1 by a single, radial arm J^2, so that the wheel is adapted to swing to a desired distance without contact with the said hub *g* of the lever G.

Devices are provided by which the gear pinion I is automatically disengaged from the platen shaft in the forward turning movement of the platen and is thrown into engagement with said platen shaft by the backward turning movement of the platen, as follows: Attached to the pinion I is a radial arm I^2 which overlaps the rim of the wheel J at the outer or right-hand face of the same. The said gear wheel J is provided on the outer or right-hand face of its rim with a cam projection J^3 having a beveled or inclined surface *j* on the side thereof which comes in contact with the arm I^2 when, in the forward turning movement of the platen, the pinion I turns the wheel J into position to bring the said cam projections J^3 into engagement with said arm I^2, as seen in Fig. 3. The pinion I intermeshes with the gear-wheel J in such manner that the arm I^2 will coincide with the cam projection J^3 when in the turning movement of the pinion the arm I^2 is directed toward the center of said wheel J. The cam surface *j* of said cam projection J is adapted to enter behind the arm I^2 in such manner as to press or force said arm toward the right, and to thereby move the arm and gear pinion outwardly on the platen shaft far enough to release the gear pinion from the pin h^1 and to thereby hold said pinion disconnected from said platen shaft. The said cam projection J^3 is located on the rim of the wheel J at a point adjacent to the supporting arm I^2 of said wheel, so that said cam projection will be engaged with the arm I^2 at a time when the gear wheel J is turned to bring the said arm J^2 in a position in which it extends forwardly from the pivot J^1, or toward the platen shaft; this being the limit of the turning movement of the said wheel J in the direction in which it is turned in the forward turning movement of the platen. Preferably the rotation of the wheel J in this direction is limited by means of a stop projection j^4 adapted to strike the hub *g* of the lever G, as seen in Fig. 3. As hereinbefore stated, the spring I^1 is adapted to produce frictional engagement between the platen shaft and the pinion I and it follows that when the said pinion is held in a position free from engagement with the pin h^1 by the action of the cam projection J^3 on the arm I^2, in the manner above described, if the platen shaft be turned backwardly the frictional engagement between the said shaft and the pinion I will effect the turning of the latter with the shaft. It follows that when the cam projection I^3 is engaged with the arm I^2 and the parts are in the position shown in Fig. 3, backward turning of the platen shaft will result in the said pinion I and the arm I^2 thereon being turned backwardly, producing a reverse rotation of the gear wheel J and carrying the said cam projection J^3 out of engagement with the arm I^2, thus permitting the gear pinion to become reëngaged with the pin h^1 and the pinion to be thereby locked to the platen shaft. It follows that soon after the beginning of the backward turning movement of the platen shaft, when the parts are in the position shown in Fig. 3, the pinion will be locked to said platen shaft and will then positively turn the gear wheel J. It follows from the above that the cam projection J^3 and the arm I^2 on the pinion constitute in effect a clutch operating device by which the pinion I is automatically disengaged from the platen shaft by the forward turning movement of the platen and is reëngaged with or locked to said platen shaft in any backward turning movement of the platen. It will be apparent, moreover, that the platen will be free to turn forward, or in the paper feeding direction, at any time and that after the forward turning movement of the platen has brought the cam projection J^3 in position to act on the arm I^2 and thus disengage the pinion from the platen shaft, further forward turning movement of the platen may continue indefinitely without effecting any movement of the wheel J, but, upon any backward turning movement of the platen shaft, the pinion will be immediately locked to said shaft and such backward turning movement will be transmitted to the wheel J, which latter will turn in a direction to carry its top portion backwardly or toward the rear of the carriage. In the operation of my device, such backward turning movement of the wheel J is employed to indicate or measure the extent to which the platen is required to be turned backwardly in the operation of making carbon copies of a series of bills or invoices upon a record strip or sheet.

As shown in the drawings, the pivot stud J^1 of the wheel J is mounted on a base-plate L which is detachably secured to the end frame plate B of the carriage, in order to facilitate the attachment of the indicating device to and its removal from the machine.

In connection with the gear wheel J, arranged to be turned by its geared connection with the platen in the backward turning movement of the latter as described, means are provided for indicating to the operator when the platen has been turned backwardly the desired extent, or, in other words, when

the backward turning movement of the platen should be arrested before inserting a new invoice sheet in the machine. Such device may consist of a stop adapted to arrest the movement of the wheel J and which is adjustable to give variable movement to the wheel, or it may consist of a scale marked to correspond with line space intervals of the platen and operating in connection with a pointer adapted to indicate to the eye the distance through which the platen is turned backwardly.

As shown in the accompanying drawings, the base-plate L is provided with a curved elevated part or rib L^1, the outer face of which is located closely adjacent to the inner face of the wheel J and in which are formed a series of holes *k* arranged at line space distances apart and adapted to receive a stop pin K located in position for contact therewith of the arm J^2 of the wheel J when said arm swings rearwardly in the backward turning movement of the platen. Said elevated parts L^1 of the plate L is also provided with a scale M marked to correspond with line space intervals of the platen. Said scale M may be used in connection with the adjustable stop pin K to facilitate the placing of said stop pin or, if an adjustable stop be not employed, the operator may determine the distance through which the platen is turned backwardly by observing the movement of the arm J^2 along or over said scale.

N indicates a movable stop or catch mounted on the gear wheel J and adapted to be moved into position for engagement with the top surface of the arm I^2 at the time the cam projection J^3 is engaged with the said arm I^2 and the pinion is held in disengaged or unlocked position, as shown in Fig. 3. Said movable stop or catch is shown as having the form of a sliding bolt or bar mounted in guides on the outer face of the arm J^2 of the wheel J and which is movable endwise or in a radial direction so that its outer end may be engaged with or withdrawn from the arm I^2. In the particular construction shown, and as seen in detail in Fig. 9, the sliding stop N is provided on its inner face with two notches *n* n^1 adapted to be engaged by a leaf spring N^1 which is secured at one end to the inner face of the wheel J and extends through a slot or opening in the same with its free end in position to bear against the inner face of said stop and to engage either one of said notches *n* n^1. Said notches are made of V-shape so that the spring will be readily engaged therewith and disengaged therefrom when the stop is moved endwise by pressure of the finger. Said spring holds the stop yieldingly from shifting or moving endwise. When said stop N is advanced to its forward position and engages the top surface of the arm I^2, as shown in Fig. 3, said arm and the gear pinion I will be held from turning with the platen shaft in the backward turning movement of said shaft, through the frictional connection of the pinion with the shaft afforded by the spring I^3, and the disengagement of the arm I^2 from the cam projection J^3 in such backward turning of the platen shaft will thereby be prevented. The movable stop N, therefore, constitutes a means by which the pinion may be held or locked out of engagement with the shaft, thereby throwing the indicating device entirely out of action leaving the shaft and platen to be turned freely in either direction without producing any operation of said indicating device.

The purpose of the paper movement indicating device above described is to indicate to the operator the extent of backward turning movement of the platen required when inserting sheets on which bills or invoices are to be printed where it is desired to make out a number of bills or invoices and to make carbon copies of the same on a single strip or long sheet of paper. In a case of this kind it is desirable that the carbon copies on the record sheet should be spaced as closely together as possible, but at uniform distances apart or with equal spaces between the several carbon copies. The line space indicating device herein shown is employed to enable the operator to readily insert new sheets for each separate bill or invoice in such manner that the first printed line of each carbon copy shall be located a desired distance of one, two or more line spaces from the last printed line of the preceding copy. Assuming that the record strip and a sheet of paper for the original bill or invoice has been inserted into the machine together with a carbon sheet between them, the first bill or invoice may be printed and carbon copy will be made in the usual manner on the record sheet. The printing of the bill or invoice having been completed, the same may be removed from the machine by releasing the guide rollers from the platen by the lever G, or otherwise, and this will be done without disturbing the position of the record and carbon sheets. The platen will then be turned backwardly, carrying with it the record and carbon sheets, for the insertion of the new invoice sheet, and the point to which the platen is so turned backwardly must be such that when the new invoice sheet is inserted the part of the new sheet on which the first line is to be printed will be located at such distance from the last line of the carbon copy as to leave the desired space between the copies. In using the indicating device described, after the first bill or invoice has been printed and removed from the machine, without disturbing the record and carbon sheets, the printing of the first invoice will be accomplished

usually when the gear pinion I is locked in its disengaged position by the use of the movable stop N, as shown in Fig. 3, and said stop will be shifted backwardly to free it from the arm I^2 after the completion of the first invoice. The platen will then be turned backwardly, the first part of the backward turning movement resulting in the pinion I being rotated with the platen shaft, by means of its frictional engagement with the same, until the arm I^2 is disengaged from the cam projection J^3 when the pinion will become locked to the platen shaft. As the backward turning movement of the platen continues, the gear wheel J will be turned until its arm J^2 strikes the stop pin K which is located in position to stop the backward turning movement of the stop at the desired point, or if the scale M alone be relied upon, the platen will be turned backwardly until the said arm reaches the desired position upon the scale. Upon the completion of the backward turning movement of the platen, the new invoice sheet will be inserted and the platen will be turned in a forward direction to feed the invoice sheet, together with the record and carbon sheets, into position for printing the first line upon the new invoice sheet. As the platen is turned forwardly the gear pinion I will turn with the platen shaft until the invoice sheet is brought into position for the printing of the first line thereon, at which time the cam projection J^3 will come into contact with the arm I^2 and the pinion I will be thrown out of engagement with the platen shaft. The printing of the second invoice sheet may then be proceeded with without any movement being given to the gear wheel J. As soon, however, as the printed invoice sheet has been removed, and backward turning movement given to the platen, the gear pinion will be again thrown into engagement with the platen shaft, and a distance through which the platen must be turned backwardly before the next new invoice sheet is inserted will be measured or indicated as before.

The distance to which the platen must, in any particular instance, be turned backward before inserting an invoice sheet varies according to the distance necessary to be left on the invoice sheet from the top of the sheet to the first printed line thereon, and the distance to be left between the carbon copies on the record sheet. This distance must be determined when changing from one style of invoice sheet to another either by experiment or by noting the line space distance that the platen must be turned backward before a new sheet is inserted in order that the new sheet, when fed forward in position for printing the first line thereon, will have such relation to the record sheet that said first line will be at a desired number of line space intervals below the last line of the preceding carbon copy on said record sheet. The operator having ascertained the number of line space intervals through which the platen must be turned backward for an invoice sheet having a certain width of heading, places the stop pin K in the desired hole *k*, in case the backward movement of the platen is to be arrested automatically at the desired point, or if an adjustable stop be not used, the operator turns the platen backward until the edge of the arm J^2 reaches the mark on the scale corresponding with the predetermined number of line spaces through which the platen is to be turned backward. He then inserts the new invoice sheet and turns the platen forward until such invoice sheet is brought into position for printing the first line thereon.

While the gear wheel K is shown as having gear teeth extending around the entire circumference, yet the said wheel, in fact, is not adapted for making a complete revolution so that it in effect constitutes a gear segment or curved rack member which may be of any desired length according to the maximum distance through which it may be desired to turn the platen backward.

The pinion I is shown as mounted on the platen shaft, but the same result will be produced if the said pinion be mounted on another shaft which has turning movement to correspond with that of the platen or platen shaft.

While the rack member heretofore referred to is shown as having the form of a curved rack or gear segment having oscillatory movement about a pivotal axis, yet it is to be understood that the rack member may be of other form and otherwise movably mounted so as to have endwise movement in such manner that it may be moved backward and forward by the action of a gear pinion thereon, and my invention includes such a movable rack member constructed and arranged as shown or otherwise. It is also to be understood that my invention, in its broader aspect, includes a line space indicating device which is operated by the turning movements of the platen, and which includes means operated by the turning movement of said platen in one direction for throwing the indicating device out of action, so as to leave the platen free to turn or rotate in the usual operation of the machine, and I desire to cover a device embodying these general features, without limitation to the specific features of construction illustrated and hereinbefore described.

I claim as my invention:—

1. A line space indicating device for typewriters embracing a movable member which has positive engagement with the platen during the entire backward movement thereof and also during the forward turning

movement of said platen required to return the same to the starting point of said backward turning movement, means for effecting engagement of said movable member with the platen upon any backward turning movement of said platen, and for throwing said movable member out of engagement with the platen upon any forward turning movement of the platen after the latter reaches said starting point operating to maintain said movable member in frictional engagement with the platen after it has been so thrown out of positive engagement therewith.

2. A line space indicating device for typewriters embracing a movable member which has constant frictional connection with the platen and has positive engagement with said platen during the backward turning movement of the latter, and also during the forward turning movement of said platen required to restore the same to the starting point of its backward movement, means for throwing said movable member into positive engagement with said platen operated by any backward turning movement of the platen and means for throwing said movable member out of engagement with said platen after said platen reaches the said starting point in its forward turning movement operated by the said forward turning movement of the platen.

3. A line space indicating device for typewriters embracing a movable member, a clutch maintaining positive engagement of said member with the platen during the backward turning movement of said platen and also during the forward turning movement of the platen required to return the same to the starting point of its backward movement, and means connected with the platen and actuated by the turning movement thereof in a forward direction acting on said clutch to throw said movable member out of engagement with the platen.

4. A line space indicating device for typewriters embracing a movable member which has positive engagement with the platen during the backward turning movement of the same and also during the forward turning movement of said platen required to return the same to the starting point of its backward movement, means operated by the backward and forward turning movement of the platen for positively connecting said member with the platen at the beginning of the backward turning movement of the latter, and for disconnecting said member from the platen upon its return to the starting point of its backward movement.

5. The combination with a shaft which turns with the platen, of a pinion mounted on said shaft, a clutch for connecting the pinion with said shaft, a movable rack member having geared connection with said pinion, and means operated by ... ward turning movement of said shaft for operating said clutch to throw the pinion out of engagement with said shaft.

6. The combination with a shaft which turns with the platen, of a gear pinion adapted to turn with or separately from said shaft, a rack member intermeshing with the said pinion and which is given backward and forward movement by said pinion, and means operated by the movement of said rack member for connecting said gear pinion with and disconnecting it from said platen shaft.

7. The combination with a shaft which turns with the platen, of a gear pinion adapted to turn with or separately from said shaft, a clutch device for connecting said gear pinion with the said shaft, a rack member having gear teeth intermeshing with said pinion, and means operated by the movement of said rack member for actuating said clutch device.

8. The combination with a shaft which turns with the platen, of a gear pinion adapted to turn with or separately from said shaft, a clutch device for connecting said gear pinion with said shaft, a rack member having gear teeth intermeshing with said pinion, means operated by the movement of said rack member for actuating said clutch device, and an adjustable stop for limiting the movement of said rack member in the backward turning movement of the platen.

9. The combination with a shaft which turns with the platen, of a gear pinion mounted and having endwise movement on said shaft, a clutch for connecting the gear pinion with said shaft, operated by the endwise movement of the said pinion, a spring applied to hold the gear pinion clutched to the shaft, a rack member intermeshing with the pinion, and means operated by the rack member and acting on the gear pinion to shift the said pinion on said shaft against the action of said spring in a direction to effect its disconnection from the shaft.

10. The combination with a shaft which turns with the platen, of a gear pinion mounted and having endwise movement on said shaft, a clutch device operated by the endwise movement of the pinion on said shaft, a spring acting on the said pinion to move it endwise on the shaft in one direction, and a rack member intermeshing with said pinion, said rack member being provided with a lateral projection and the gear pinion having an arm adapted for engagement with said projection, one of said parts having a cam surface by which endwise movement is given to the pinion when the said projection and arm come into engagement with each other.

11. The combination with a shaft which

turns with the platen, of a gear pinion mounted and having endwise movement on said shaft, a clutch device operated by the endwise movement of the pinion on the shaft, a spring acting on said pinion to move the same endwise on the shaft, means affording frictional engagement between said pinion and the shaft, and a rack member intermeshing with said pinion, said rack member having a lateral projection and the gear pinion having an arm adapted for engagement with said projection, one of said parts having a cam surface by which endwise movement is given to said pinion when said arm and projection come into engagement with each other.

12. The combination with a shaft which turns with the platen, of a gear pinion mounted and having endwise movement on said shaft, a clutch device operated by the endwise movement of the pinion on the shaft, a spring acting on said pinion to move the same endwise on the shaft, means affording frictional engagement between said pinion and the shaft, a rack member intermeshing with said pinion, said rack member having a lateral projection and the gear pinion having an arm adapted for engagement with said projection, one of said parts having a cam surface by which endwise movement is given to said pinion when said arm and projection come into engagement with each other, and a movable stop on the rack member adapted to engage the arm on said gear pinion to hold said arm and projection in engaged position.

In testimony, that I claim the foregoing as my invention I affix my signature in the presence of two witnesses, this 16th day of January A. D. 1907.

THOMAS OLIVER.

Witnesses:

C. CLARENCE POOLE,

GEORGE R. WILKINS.