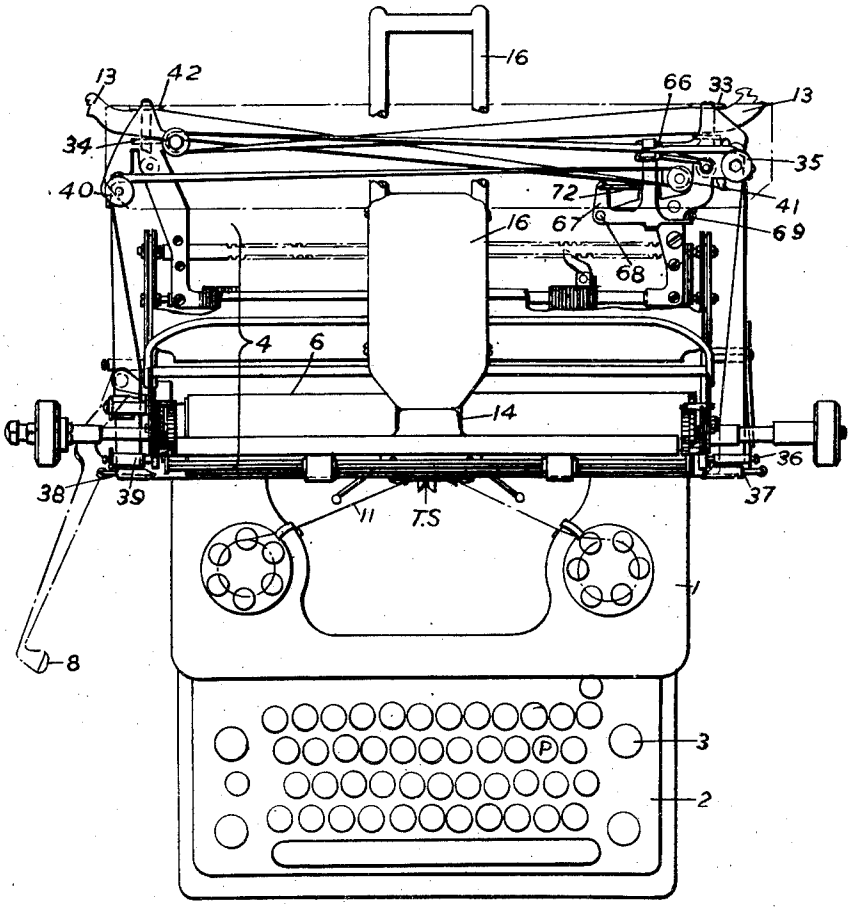
Aug. 23, 1949. C. W. BRUMHILL 2,479,669

RIBBON FEEDING MECHANISM FOR TYPEWRITERS

Filed Oct. 24, 1945 11 Sheets-Sheet 1

FIG. 1.



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BY

Michael Glazer

AGENT

Aug. 23, 1949. C. W. BRUMHILL 2,479,669

RIBBON FEEDING MECHANISM FOR TYPEWRITERS

Filed Oct. 24, 1945 11 Sheets-Sheet 2

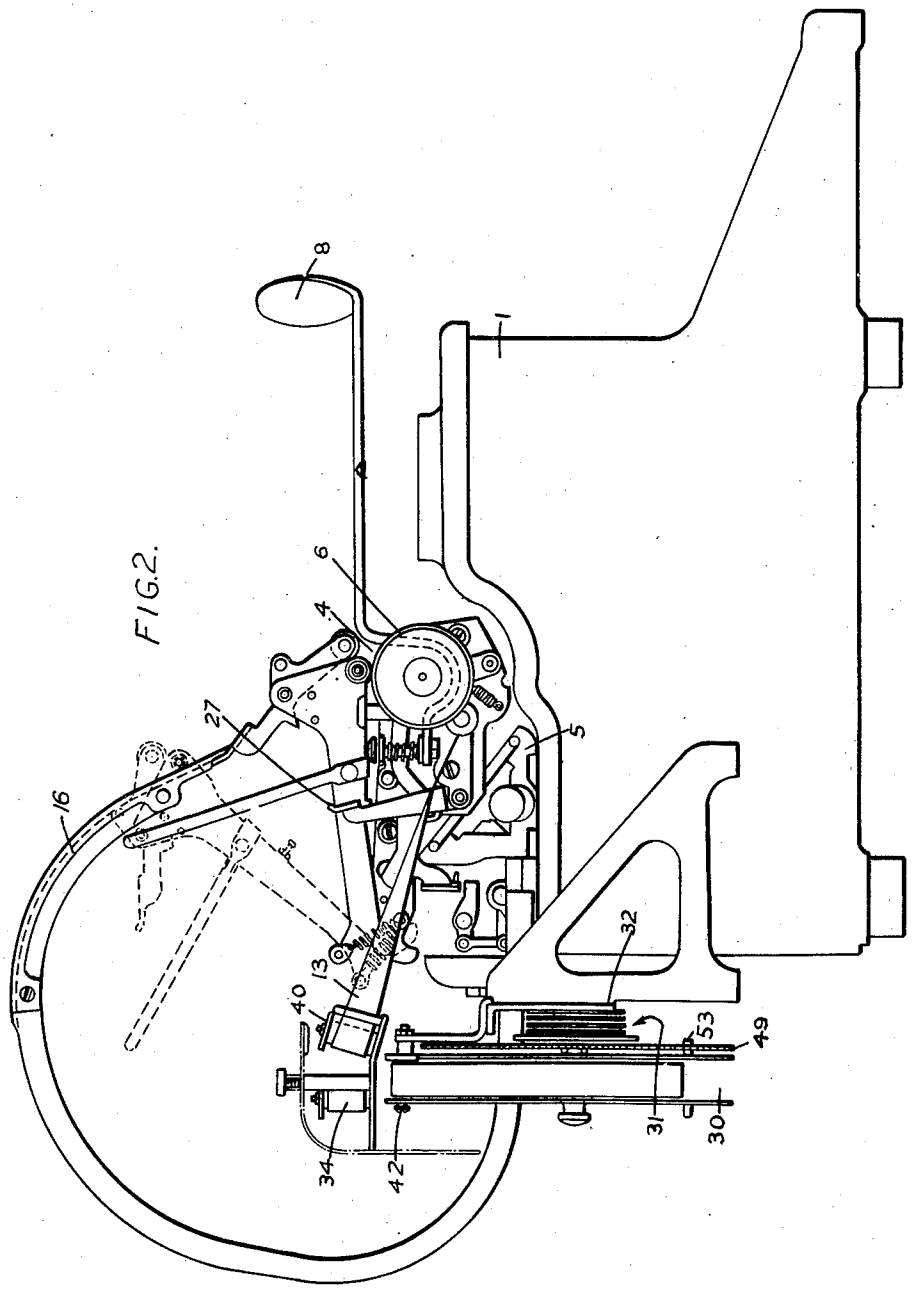

FIG.2.

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RIBBON FEEDING MECHANISM FOR TYPEWRITERS

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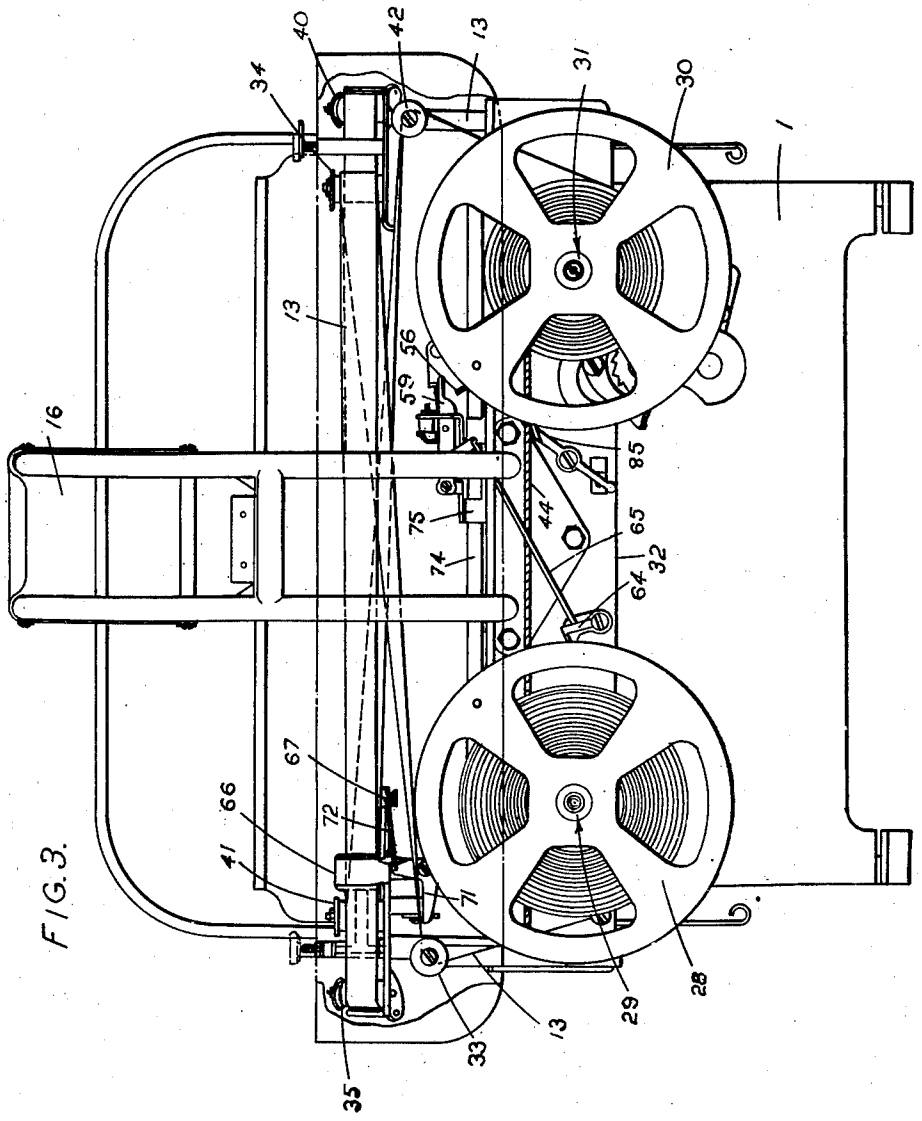

FIG. 3.

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RIBBON FEEDING MECHANISM FOR TYPEWRITERS

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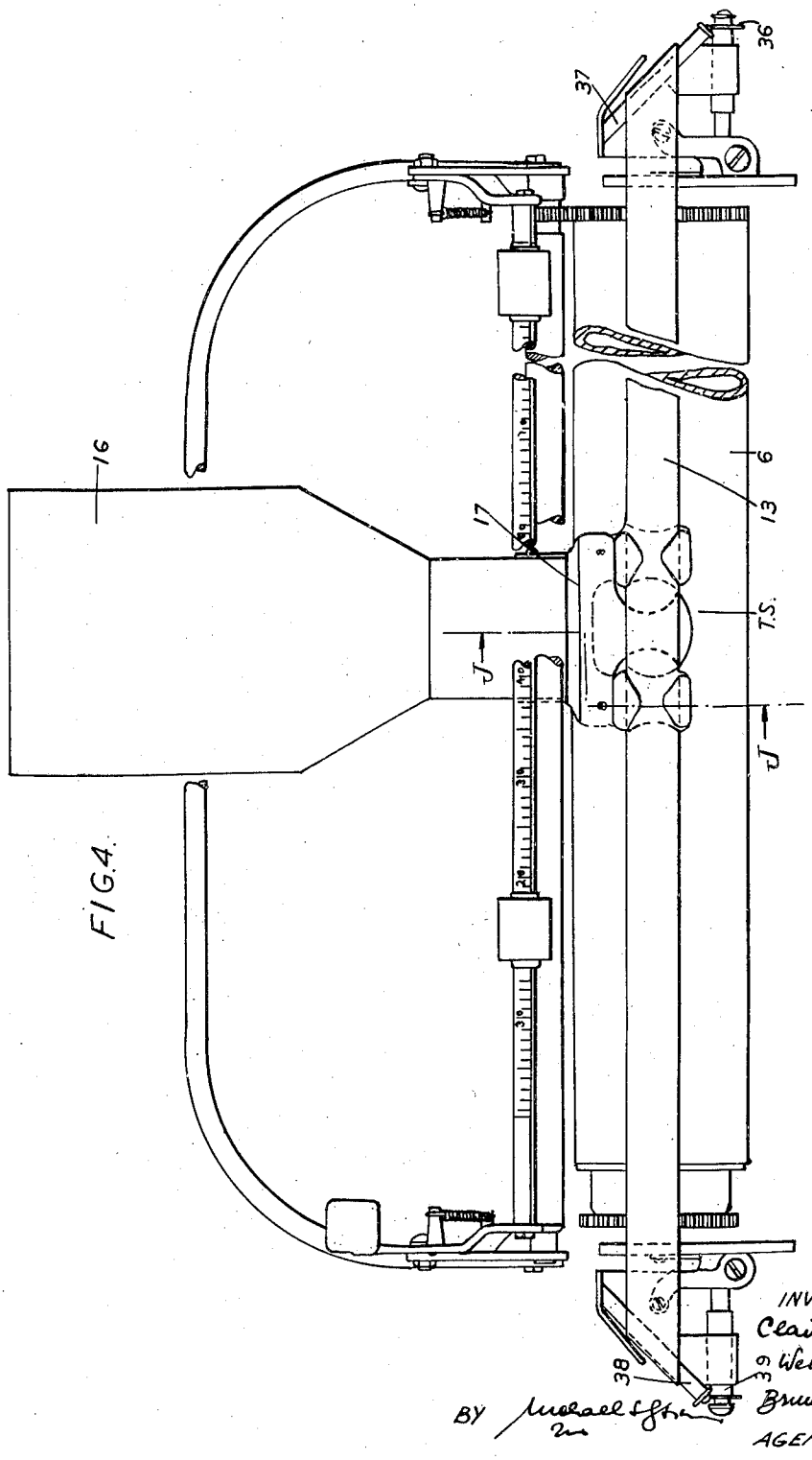

FIG.4.

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RIBBON FEEDING MECHANISM FOR TYPEWRITERS

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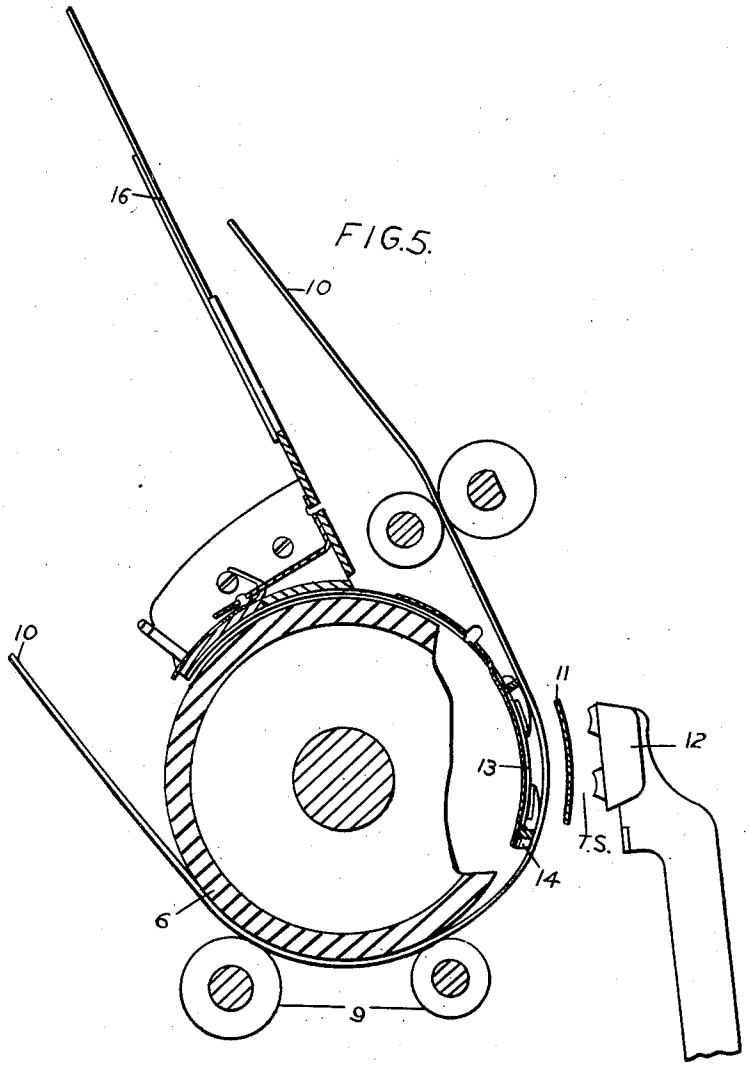
FIG.5.



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Aug. 23, 1949. C. W. BRUMHILL 2,479,669

RIBBON FEEDING MECHANISM FOR TYPEWRITERS

Filed Oct. 24, 1945 11 Sheets-Sheet 6

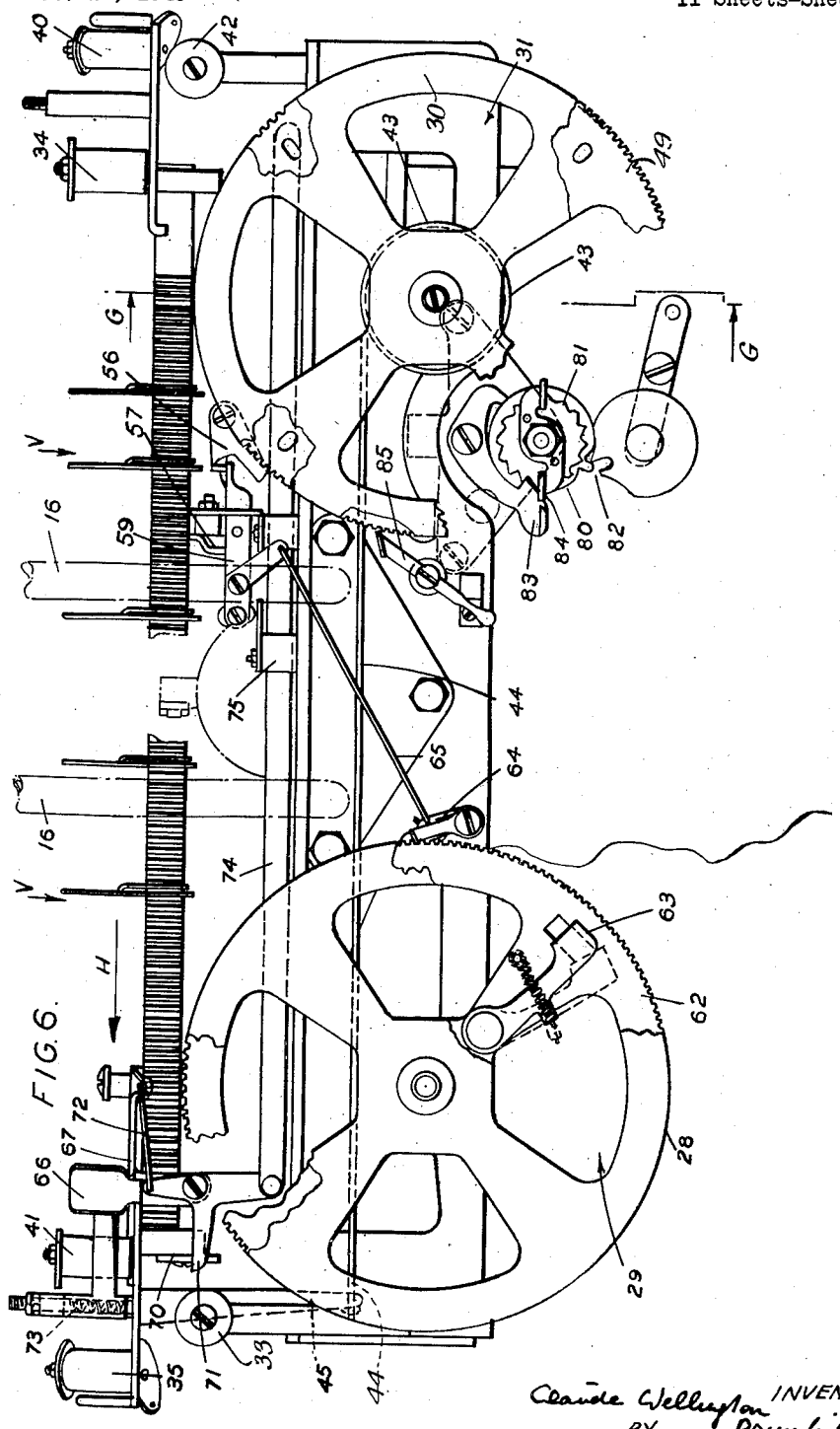

FIG. 6.

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RIBBON FEEDING MECHANISM FOR TYPEWRITERS

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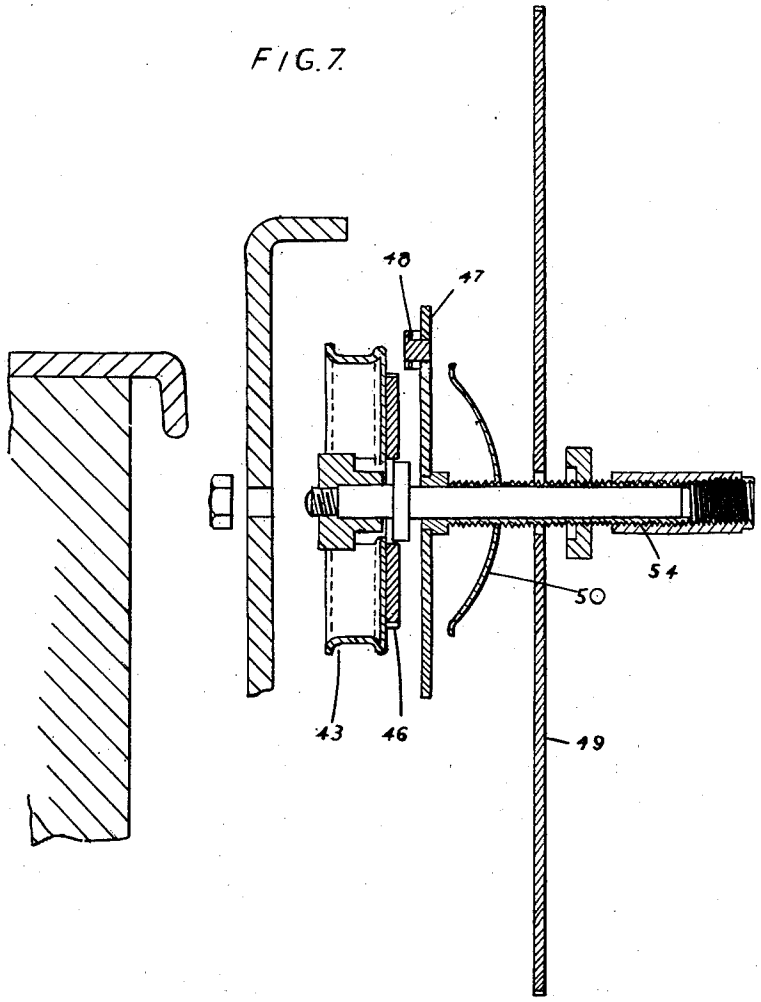
FIG. 7.



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RIBBON FEEDING MECHANISM FOR TYPEWRITERS

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FIG.8.

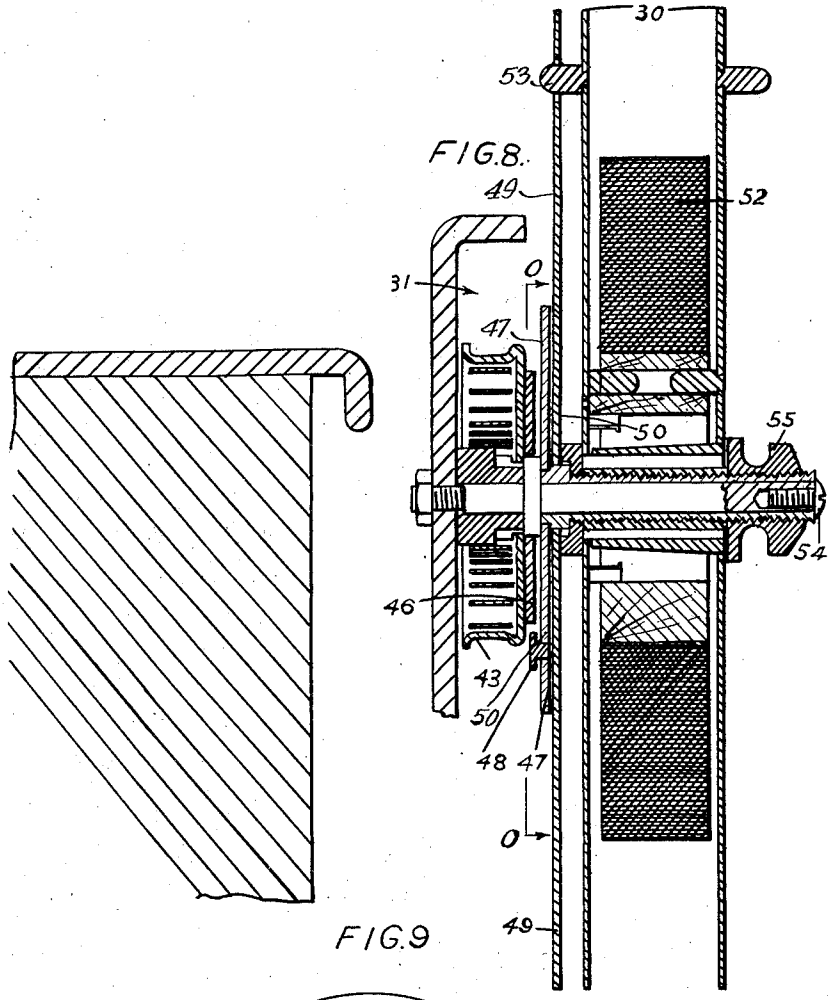
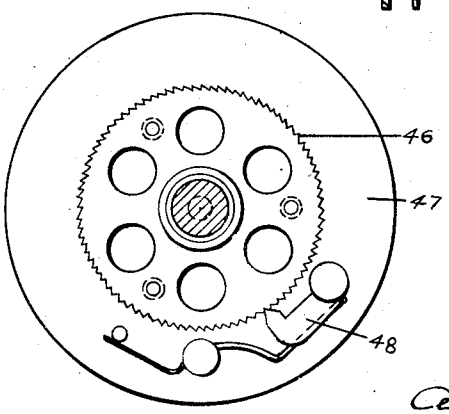


FIG.9



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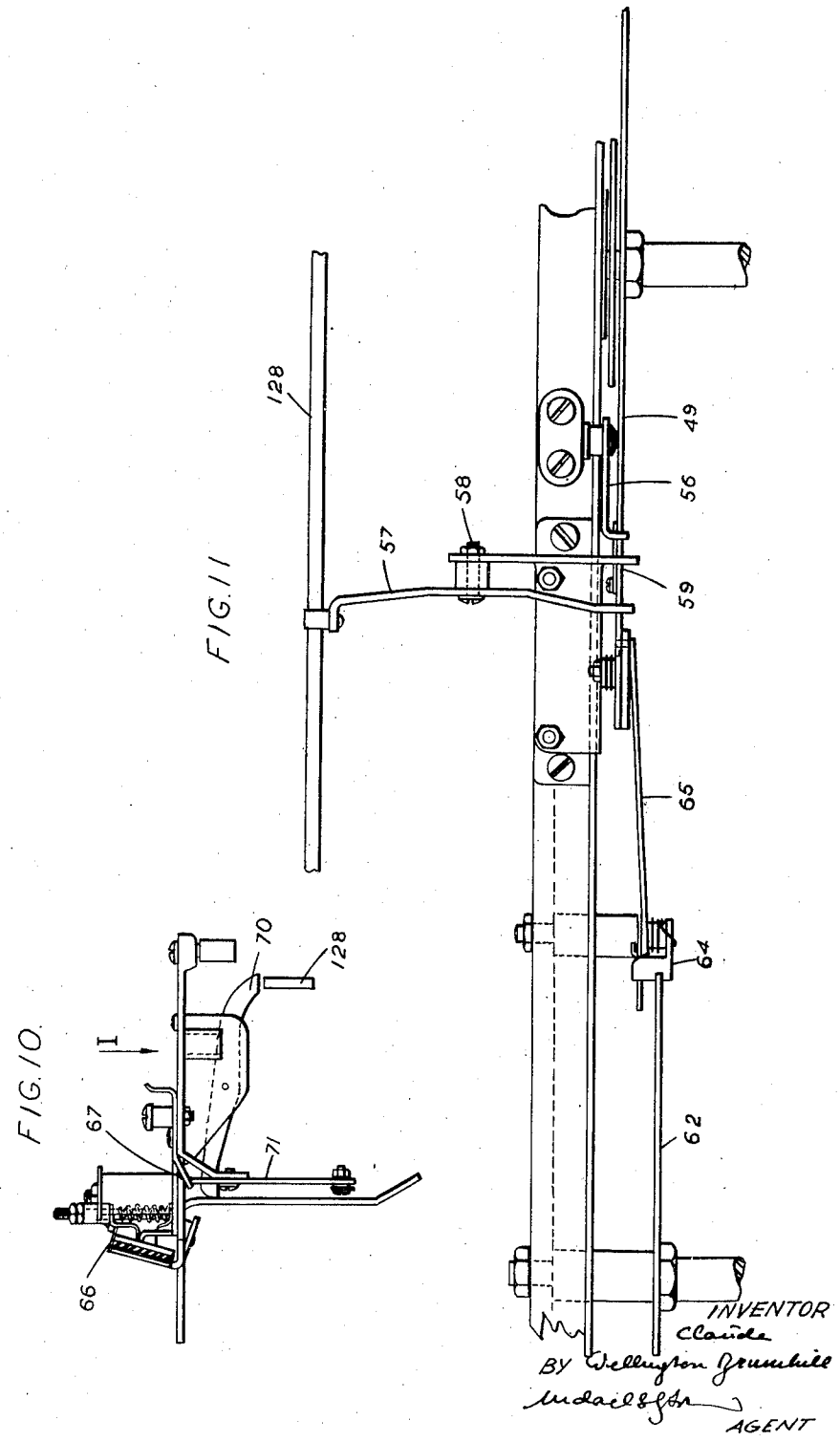
Aug. 23, 1949. C. W. BRUMHILL 2,479,669

RIBBON FEEDING MECHANISM FOR TYPEWRITERS

Filed Oct. 24, 1945 11 Sheets-Sheet 9



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RIBBON FEEDING MECHANISM FOR TYPEWRITERS

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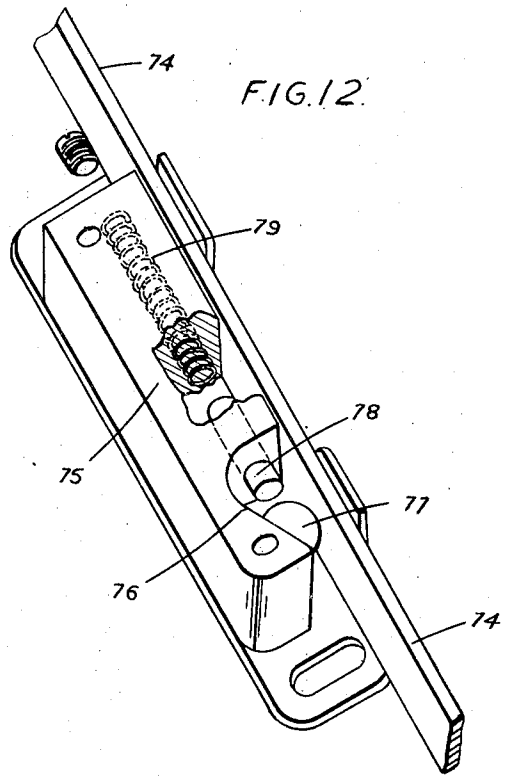
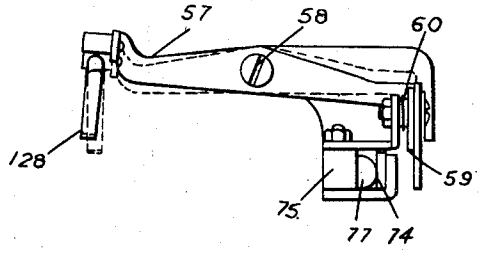


FIG. 12.

FIG. 13.



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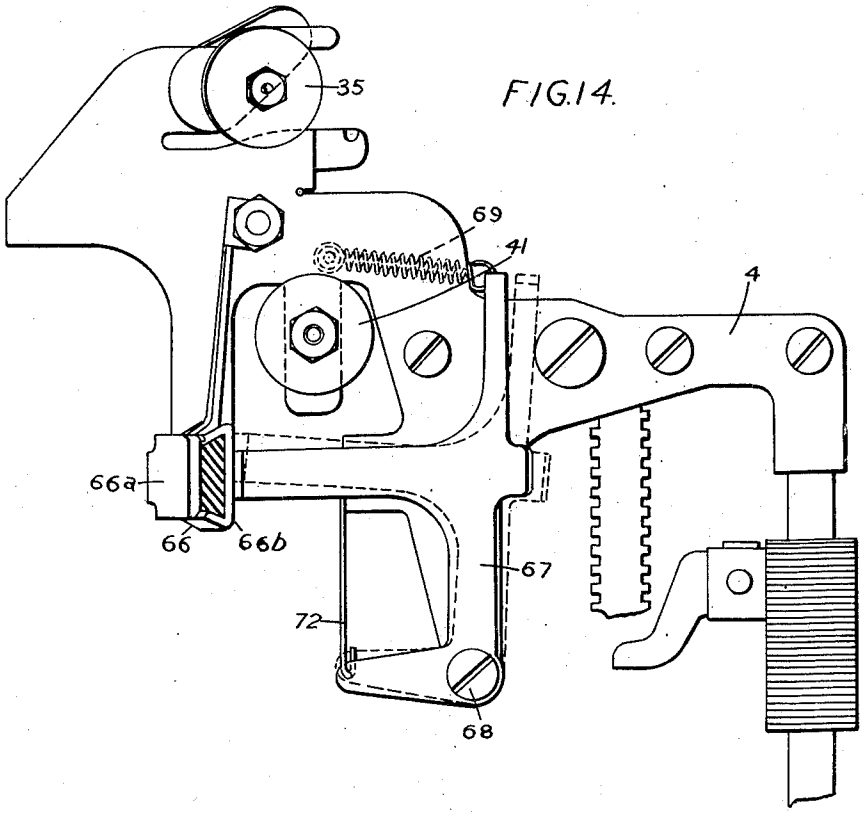
Aug. 23, 1949. C. W. BRUMHILL 2,479,669

RIBBON FEEDING MECHANISM FOR TYPEWRITERS

Filed Oct. 24, 1945 11 Sheets-Sheet 11

FIG.14.



Claude Wellington Brumhill INVENTOR
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Michael G. Adams
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Patented Aug. 23, 1949

2,479,669

UNITED STATES PATENT OFFICE

2,479,669

RIBBON FEEDING MECHANISM FOR TYPEWRITERS

Claude Wellington Brumhill, Leicester, England, assignor to The Imperial Typewriter Company Limited, Leicester, England

Application October 24, 1945, Serial No. 624,161
In Great Britain June 7, 1945

4 Claims. (Cl. 197—151)

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This invention concerns typewriting and like machines and is primarily but not exclusively concerned with machines of the kind (commonly known as hectograph machines) wherein type impressions are produced in reverse on the back of a master sheet, of paper or the like, by feeding the ribbon at the typing station at the back of the said sheet between it and a support surface, such as a platen, and having a carriage including said support surface which traverses as typing proceeds and is also movable idly in the reverse direction. This master sheet is subsequently employed for the production of a multiplicity of copies by a hectograph duplicating process. An object of the invention is to provide means whereby a substantially even take-up of the used ribbon is achieved.

As viewed from one aspect, the invention provides a typewriting or like machine, especially a machine of the kind specified, having ribbon guiding and feeding means for traversing the length of ribbon with the carriage during the typing or letter spacing traverse of the latter to present successive areas of the ribbon at the typing station but for holding a length of the ribbon stationary at the typing station during the reverse traverse of the carriage, including a rotary take-up device having a stationary location and means for driving it during the typing traverse of the carriage to accumulate the used ribbon discharged from the typing station during the said traverse and drawn past the station from the ribbon supply, and a ribbon clamp for clamping the ribbon to the carriage during the typing traverse but for releasing it during the reverse traverse.

As viewed from another aspect the invention also provides a typewriting or like machine, especially a machine of the kind specified, having ribbon guiding and feeding means for traversing a length of the ribbon with the carriage during the typing or letter spacing traverse of the latter so as to prevent successive areas of the ribbon at the typing station but for holding a length of the ribbon stationary at said station during the reverse traverse of the carriage, including a rotary take-up device at a stationary location for winding-up during said typing traverse the used ribbon drawn past the said station from a supply, a yielding drive for the take-up device, a clamp on the carriage for gripping the ribbon at the supply side of the typing station during the typing traverse of the carriage, and means for releasing the clamp during the reverse traverse of the carriage. Preferably there is an operator's

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control such for example as a rack release or a tabulating key for effecting an idle traverse of the carriage in the typing-traverse direction, and means operable by said control for releasing the clamp and for rendering the take-up device inoperative. It is further preferred that the machine shall have a rotary ribbon-supply device at a stationary location and there may be means operable by the said control for preventing rotation of said supply device.

An important subsidiary feature of the invention resides in clamp operating mechanism comprising a member traversing with the carriage but movable in relation to it to operate the clamp, and a friction device engaging said member to produce said relative movement during carriage traverse in one direction.

The foregoing and other features of the invention set out in the appended claims are incorporated in the machine which will now be described as an example with reference to the accompanying drawings in which—

Figure 1 is a plan of the machine;

Figure 2 is a side elevation of it;

Figure 3 is a rear elevation;

Figure 4 is a front elevation showing part of the carriage;

Figure 5 is a section on a larger scale looking in the direction of arrows J—J in Fig. 4;

Figure 6 is a rear view showing certain details of the supply and take-up device;

Figure 7 is an exploded part section on the line G—G in Fig. 6 showing details of the take-up device;

Figure 8 is a section through said device on a larger scale taken on line G—G in Fig. 6;

Figure 9 is a sectional view on the line O—O in Fig. 8;

Figure 10 is a view in the direction of arrow H in Fig. 6;

Figure 11 is a view in the direction of arrows V—V in Fig. 6;

Figure 12 is a perspective view of the friction device aforesaid;

Figure 13 shows further details thereof;

Figure 14 is an enlarged plan view of the ribbon clamp, looking in the direction of arrow I in Fig. 10.

The invention is shown as applied to a typewriter having a body 1 with a keyboard 2, incorporating a tabulating key 3, and a carriage 4 traversing on guides 5 which carriage incorporates a platen 6 with a line space lever 8 and rack release lever 27 for carriage rack 128, paper feed rollers 9 for feeding a master sheet 10 of

paper or the like round the platen, means for feeding the normal typewriter ribbon 11 in front of the master sheet 10 at the typing station TS so as to be struck by the type heads 12 and means for feeding hectograph paper ribbon 13 along the face of the platen at the back of the master sheet with its treated face forward. This ribbon 13 is positioned at the typing station by means of a guide 14 (forming the subject of co-pending U. S. patent application No. 624,159, now Patent No. 2,467,880, dated April 19, 1949) fixed to a stationary support 16 curving forwards and downwards over the platen.

The ribbon 13 is drawn from a supply spool 28 carried by a rotatable supply device 29 and the used ribbon is wound up on a take-up spool 30 carried by a rotatable take-up device 31. These two devices occupy stationary locations at the back of the machine (at the right and left hand ends thereof, respectively, as viewed from the front) and are carried by a stationary frame 32 applied to the machine. From the supply spool 28 the ribbon 13 passes over the stationary roller 33 (i. e. occupying a stationary location) on the right hand end of machine whence it goes to a roller 34 on the left hand end of the carriage, then to a roller 35 on the right hand end thereof, from the latter it runs forwards under a horizontal guide roll 36 on the front of the carriage, over an inclined guide 37, along the front of the platen 6 through the guide 14, over an inclined guide 38 and under a horizontal guide 39 at the left hand end of the carriage and rearwards to guide roller 40 also carried on the left hand end of the carriage. From the roller 40 it runs along the back of the carriage to roller 41 on the right hand end thereof and thence as a final lap to stationary roller 42 at the left hand end of the machine, whence it runs down to the take-up spool 30.

It will be seen that as the carriage traverses to the left in typing or letter spacing the final lap between rollers 41 and 42 is decreased so that the ribbon 13 is surrendered to the take-up device 31 whilst the initial lap between rollers 33 and 34 is increased so that the ribbon is drawn off the supply spool 28; as a result the ribbon 13 at the front of the platen travels with the carriage and successive areas thereof are presented at the typing station TS.

The rotary take-up device 31 consists of a spring drum 43 (Fig. 8) which is wound up during the reverse traverse of the carriage by means of a cord 44 (Fig. 6) anchored to the carriage at 45. One side of this drum 43 carries a ratchet wheel 46 which drives an adjacent disc 47 by means of a spring loaded pawl 48 carried by the latter, the drive being in the clockwise direction in Fig. 6. Disc 47 drives a larger disc 49 through the medium of a yielding driving device comprising spring washer 50 which in effect provides a slipping clutch, and the spool 30 in which the used ribbon is wound up as at 52 has a releasable drive engagement 53 with disc 49 and is detachably mounted on the spindle 54 of the take-up device 31 by means of a nut 55. The large disc 49 is provided with a toothed periphery and whenever the carriage rack bar 28 is lifted a spring loaded pawl 56, Fig. 6, moves under its spring loading to engage this disc to hold the take-up spool 30 stationary; that is to say, whenever the rack release lever 27 or the tabulator key is depressed the take-up spool is prevented from revolving. Whenever the take-up spool 30 is thus checked the slip action of the friction washer 50 allows the spring drum 43 to wind up its connecting cord 44. The take-up spool is therefore only free to rotate, and that in a clockwise direction as viewed from the rear, when the carriage 4 is travelling under the action of letter spacing. Thus, as the ribbon 13 is discharged from the carriage it is wound up on the take-up spool 30 and as the diameter of the wound package 52 increases slip takes place at the frictional spring washer 50 so that an approximately even wind-up is obtained. The disc 49 is also provided with a check pawl 85 preventing its reverse rotation.

The mechanism by which the pawl 56 is permitted to engage the disc 49 when the rack bar 28 is raised is shown in Figs. 6 and 13. It consists of a lever 57 (pivoted between its ends at 58 to the stationary frame 32) having one end overlying the rack bar 128 and the other end overlying lever 59 which normally holds the pawl 56 out of engagement under the influence of a spring 60.

The rotary supply device 29 and its spool 28 (Fig. 6) are substantially the same as the take-up device 31 and its spool 30 (except in that the supply device 29 does not incorporate a spring drum 43) and therefore no further illustration of the supply device and its spool is needed. It may be mentioned, however, that the supply spool 28 is connected to a toothed disc 62, which is the equivalent of disc 49, through a resilient coupling comprising a spring loaded lever 63 carried by the disc 62, and frictional resistance is applied to the disc 62 through a spring washer similar to 50, this resistance being sufficient to keep the ribbon 13 in contact with the guide rollers and to prevent any spinning of the loaded spool. The disc 62 is checked by a spring loaded pawl 64 connected by link 65 to the lever 59 so that when the rack bar 28 is raised both the spools are locked against rotation. As a result when the carriage 4 is moved in either direction without letter spacing taking place the area of ribbon presented at the typing station TS remains substantially stationary.

In the typing traverse of the carriage the ribbon 13 is wound off the supply spool 28 so that the diameter of the roll decreases and is wound on to the spool 30 of take-up device 31 so that the diameter of the roll 52 increases. Therefore the effort required to pull the ribbon 13 off the supply increases while the effort required from the spring drum to accumulate the used ribbon increases, so that the washer 50 of the take-up device must be set at a maximum frictional value. Unless precautions were taken, this variation in effort would be liable to cause an uncertain pitch of travel of the ribbon at the typing station and there would be the danger that the typing impressions would overlap, leading to poor duplicates of the master sheet.

In order to overcome this, the ribbon 13 passes through a ribbon clamp 66 located on the carriage between the supply and the guide 14, which clamps the ribbon to the carriage during letter spacing or typing traverse but releases it when the carriage is traversed in either direction by hand, and when the tabulator key 3 or the rack release lever 27 is depressed. This clamp 66 is best shown in Fig. 14 and consists of a fixed part 66*a* and a movable part 66*b* biased to the open position by spring 73 (Fig. 6) but urged together through the medium of the lever 67 pivoted at 68 and a spring 69 to grip the ribbon in its traverse between guide rolls 34 and 35. In order to release the clamp when the rack bar 28 is raised there is

a lever 70 (Fig. 10) having one end overlying said bar and the other end overlying an arm of a T-shaped lever 71 (Figs. 6 and 10) which has a further arm connected by link 72 to lever 67 to move the latter in the clamp-releasing direction.

The clamp 66 is also opened when the carriage is traversed in the reverse direction by pushing or pulling any part of it without depressing the rack release lever 27. For this purpose, the frictional device shown in Fig. 12 is employed. This comprises a rod 74 extending along the back of the carriage from the lower end of the three-armed lever 71 through a stationary block 75 which is cut with a pocket having a ramp or inclined face 76 housing a friction member constituted by a ball 77. This ball is pressed towards the right hand end (as viewed from the front) of the machine by plunger 78 and spring 79, so that it exerts a frictional grip on the rod 74. When the carriage is traversed to the right by pushing or pulling on any part of it, the ball grips the rod 74 lightly (but with a force insufficient to lock said rod to the block 75) so that the rod 74 lags slightly behind the carriage and rocks the lever 71 to release the clamp 66. Conversely when the carriage is moved in the typing direction, the drag of the rod 74 on the ball 77 tends to carry the latter away from the inclined face 76 so that the rod 74 travels comparatively freely. That is to say, whether the carriage be moved in the reverse direction either by the line space lever 8, or by pushing or pulling on any part, the clamp 66 remains open. As a result, the ribbon remains stationary at the typing station because it is held by the two locked spools 28 and 30, and the carriage virtually moves through a loop of the ribbon. When the carriage is moving in the letter-spacing direction, the ribbon 13 is clamped to it so that it cannot creep endwise and is moved in the exact letter-spacing pitch of the carriage past the typing station TS. The clamp 66 is so positioned that the ribbon 13 is gripped comparatively near the supply spool before it proceeds along the front of the platen 6 and through the stationary guide 14. Therefore the tension on the ribbon is reduced to a minimum.

It may be pointed out that nip rollers are not employed in the ribbon transport system. Nip rollers are commonly spring urged together to grip the hectograph ribbon, and they tend to destroy the treated surface of it. This is specially undesirable when more than one direct impression is required to be made on the ribbon. It is further pointed out that the guide rollers are so arranged that the untreated surface of the ribbon makes contact with them, which again is advantageous. Their length is somewhat greater than the width of the ribbon, and they are so disposed that the ribbon will arrange itself approximately in the middle of each roller. This avoids undue scraping of the edges of the ribbon and prevents the accumulation of hectograph dust which is very objectionable.

The ribbon mechanism described and illustrated is designed to suit a carriage which can be detached from the typewriter base 1. The spring drive of the take-up device 31 when added to the existing spring motor of the typewriter carriage would impose too great a resistance to the manual movement of the carriage in the non-typing direction. To avoid this difficulty there is provided a let-down mechanism 80, Fig. 6, by which the spring tension of the carriage motor can be reduced to a pre-determined amount when using the carriage with the aforesaid ribbon mechanism thereon.

When the usual typewriter carriage is used, this device 80 permits of an easy re-adjustment of the carriage motor to its original tension. It comprises an escapement wheel 81 with a Geneva stop mechanism 82, a manually-operable escapement pawl 83, and a winding-up key 84. The Geneva stop mechanism limits the extent to which the motor may be let down.

Although the invention has been described as applied to a manual typewriter, it is applicable to a motor-operated machine in which for example the carriage 4 is traversed and the ribbon 13 is wound up by power means.

Furthermore, the machine shown may be employed for ordinary typing by removing ribbon 13 and guide 14.

The ribbon guiding means disclosed in the drawing and specification of the present application is claimed in my copending U. S. patent application Serial No. 624,162, of even date, now Patent No. 2,467,881, dated April 19, 1949.

I claim:

1. A typewriting or like machine, having ribbon feeding means for traversing a length of ribbon with the carriage during the typing or letter-spacing traverse of the latter to present successive areas of the ribbon at the typing station but for holding a length of the ribbon stationary at the typing station during the reverse traverse of the carriage, including a rotary take-up device having a stationary location and means for driving it during the typing traverse of the carriage to draw off the used ribbon discharged from the typing station during said typing traverse and drawn past the typing station from a ribbon supply, a ribbon clamp for clamping the ribbon to the carriage during the typing traverse and mechanism operable by movement of the carriage in the reverse direction to open said clamp.

2. A machine according to claim 1, having clamp-operating mechanism comprising a member traversing with the carriage but movable in relation to it to operate the clamp, and a friction device engaging said member to produce said relative movement during carriage traverse in one direction.

3. A machine according to claim 1, having clamp operating mechanism comprising a member traversing with the carriage but movable in relation to it to operate the clamp, and a friction device engaging said member to produce said relative movement during carriage traverse in one direction, which friction device comprises a friction member for gripping the traversing member, and a stationary ramp for causing the friction member to grip upon traverse of said traversing member in one direction but for freeing said friction member upon traverse in the other direction.

4. In a typewriting machine having a carriage capable of traversing in one direction in typing or letter spacing and idly in the reverse direction which carriage is equipped with rack release means for permitting the carriage to be moved in the typing direction and with line space means for effecting movement of the carriage in the reverse direction, said carriage being also capable of being moved manually in said reverse direction without operation of the rack release means or the line space means; ribbon feeding means for traversing a length of ribbon with the carriage during the typing or letter spacing traverse thereof to present successive areas of the ribbon at the typing station but for holding a length of the

ribbon stationary at the typing station during the reverse traverse of the carriage irrespective of whether said reverse traverse is effected manually or by operation of the line space means, including a rotary take-up device having a stationary location, means for driving it during the typing traverse of the carriage for receiving used ribbon discharged from the typing station during said typing traverse and drawn past the typing station from a ribbon supply, a ribbon clamp for clamping the ribbon to the carriage during the typing traverse which clamp comprises two members relatively movable towards one another to grip the ribbon or to release it, mechanism operable by the rack release means for opening said clamp, mechanism operable by the line space means for opening said clamp, and mechanism

operable upon manual reverse traverse of the carriage without operation of the rack release or line space means, to open said clamp.

CLAUDE WELLINGTON BRUMHILL.

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