Jan. 27, 1953 C. SCHRODER 2,626,695

CARBON SHEET RETRACTOR MECHANISM

Filed March 9, 1950 6 Sheets-Sheet 1

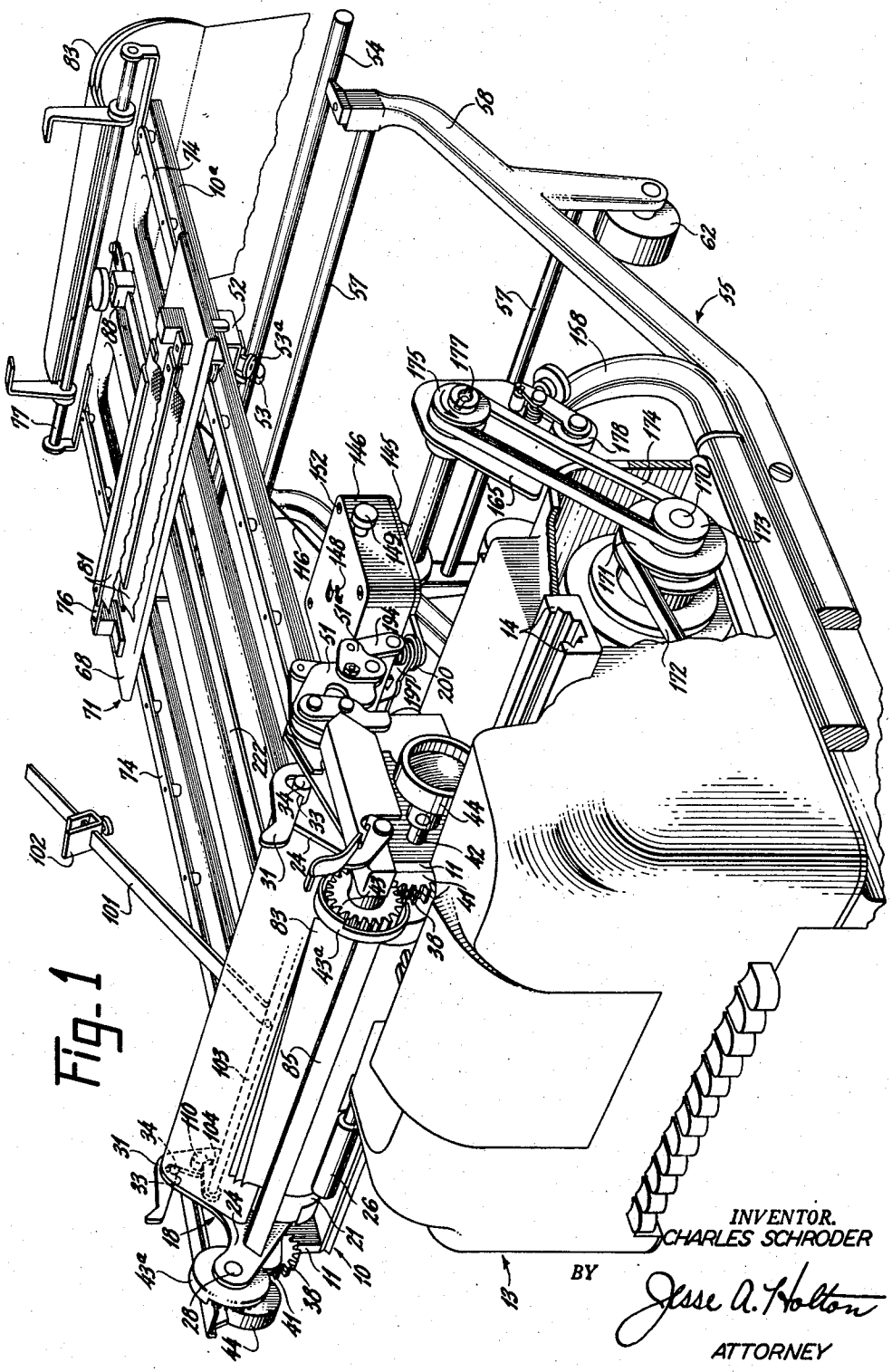

Fig. 1

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CARBON SHEET RETRACTOR MECHANISM

Filed March 9, 1950 6 Sheets-Sheet 2

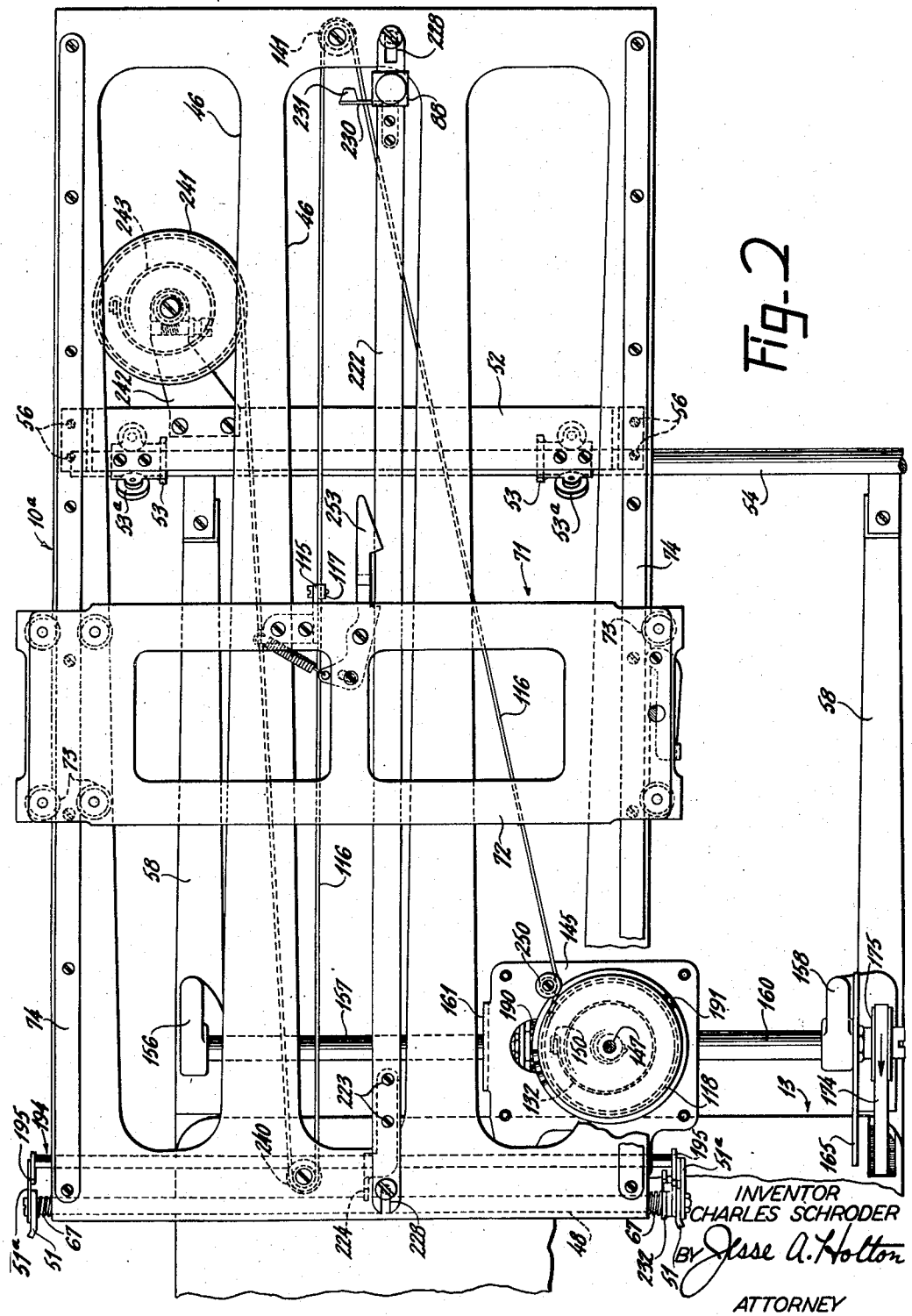

Fig. 2

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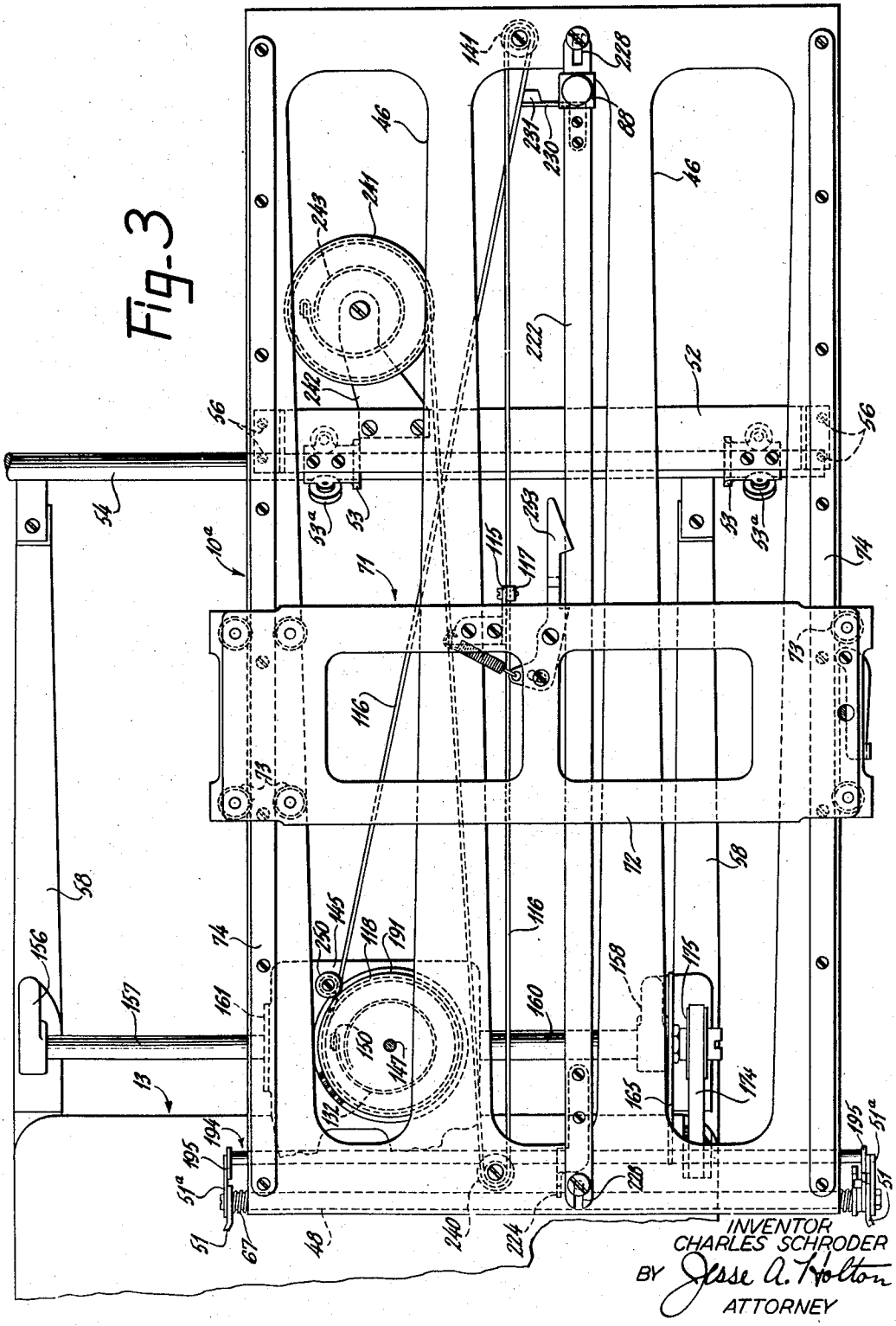
CARBON SHEET RETRACTOR MECHANISM

Filed March 9, 1950 6 Sheets-Sheet 3

Fig-3



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CARBON SHEET RETRACTOR MECHANISM

Filed March 9, 1950 6 Sheets-Sheet 4

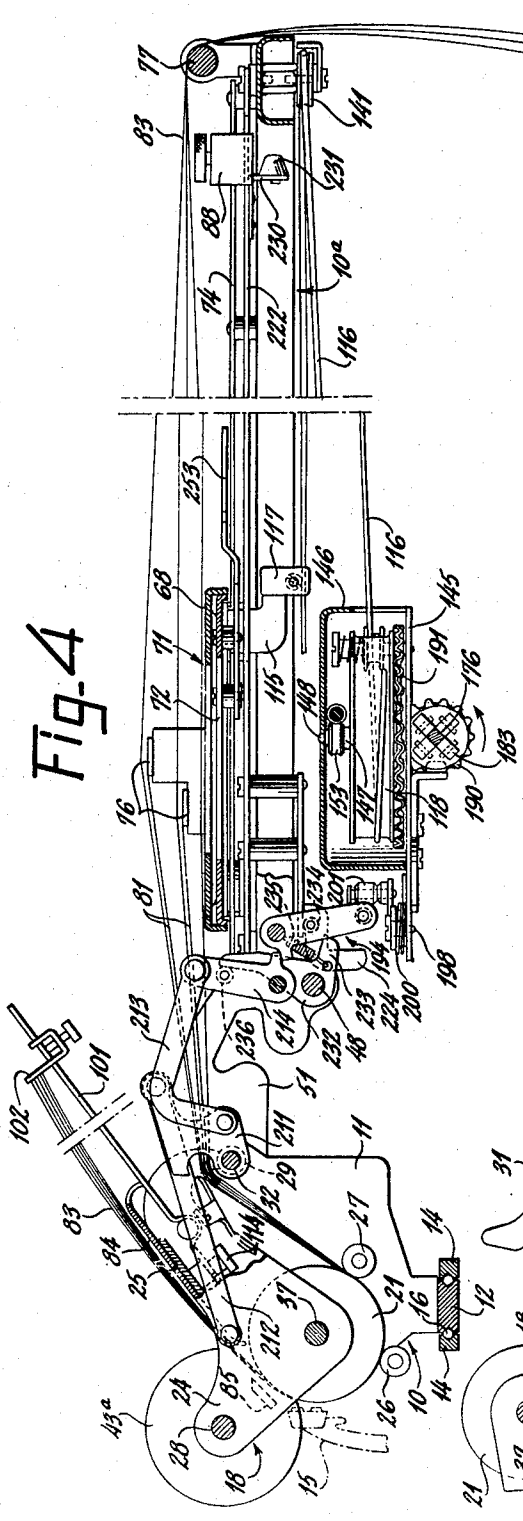

Fig. 4

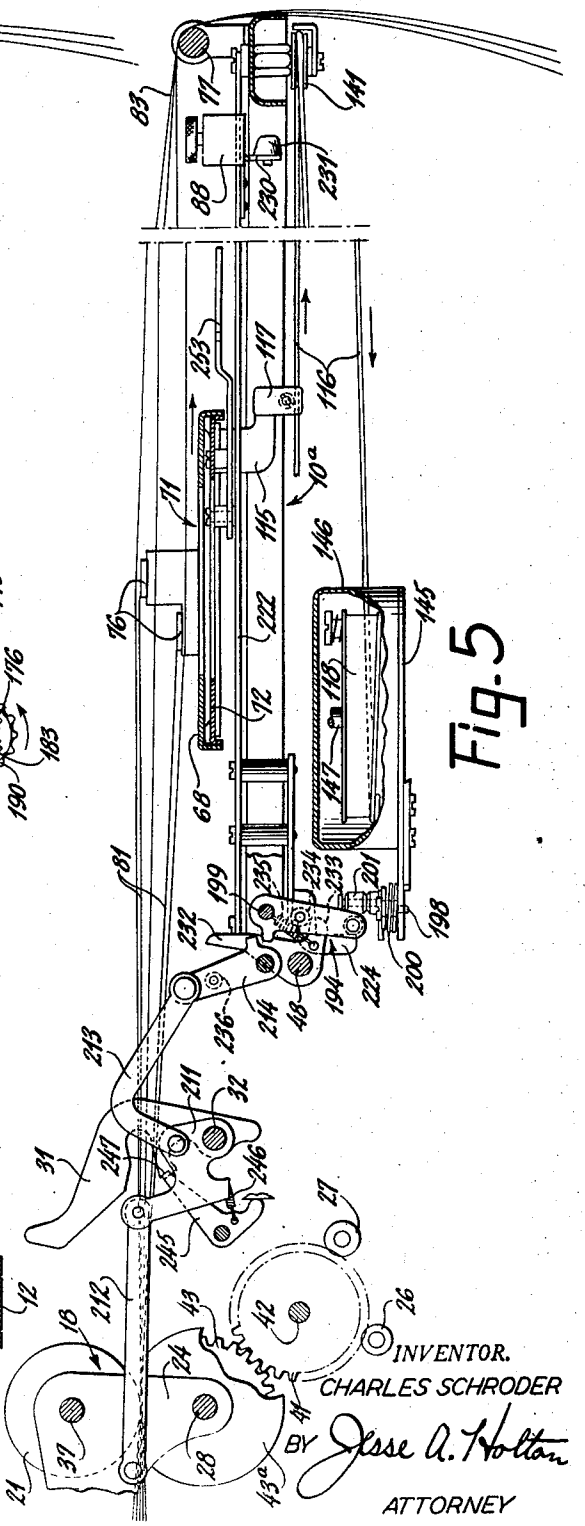

Fig. 5

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Jan. 27, 1953 C. SCHRODER 2,626,695

CARBON SHEET RETRACTOR MECHANISM

Filed March 9, 1950 6 Sheets-Sheet 5

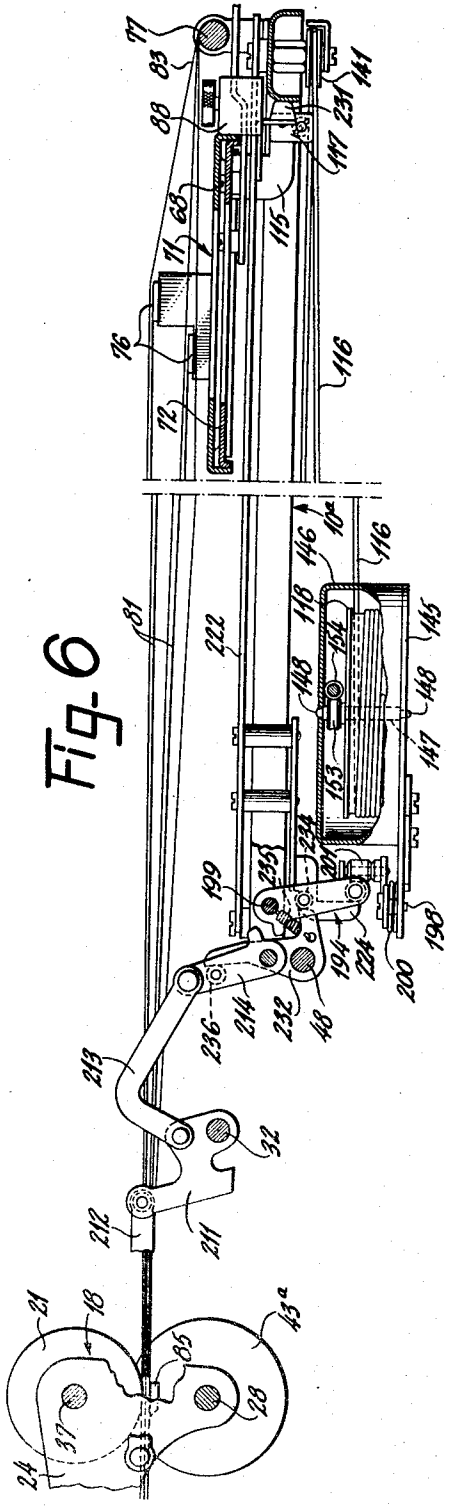

Fig. 6

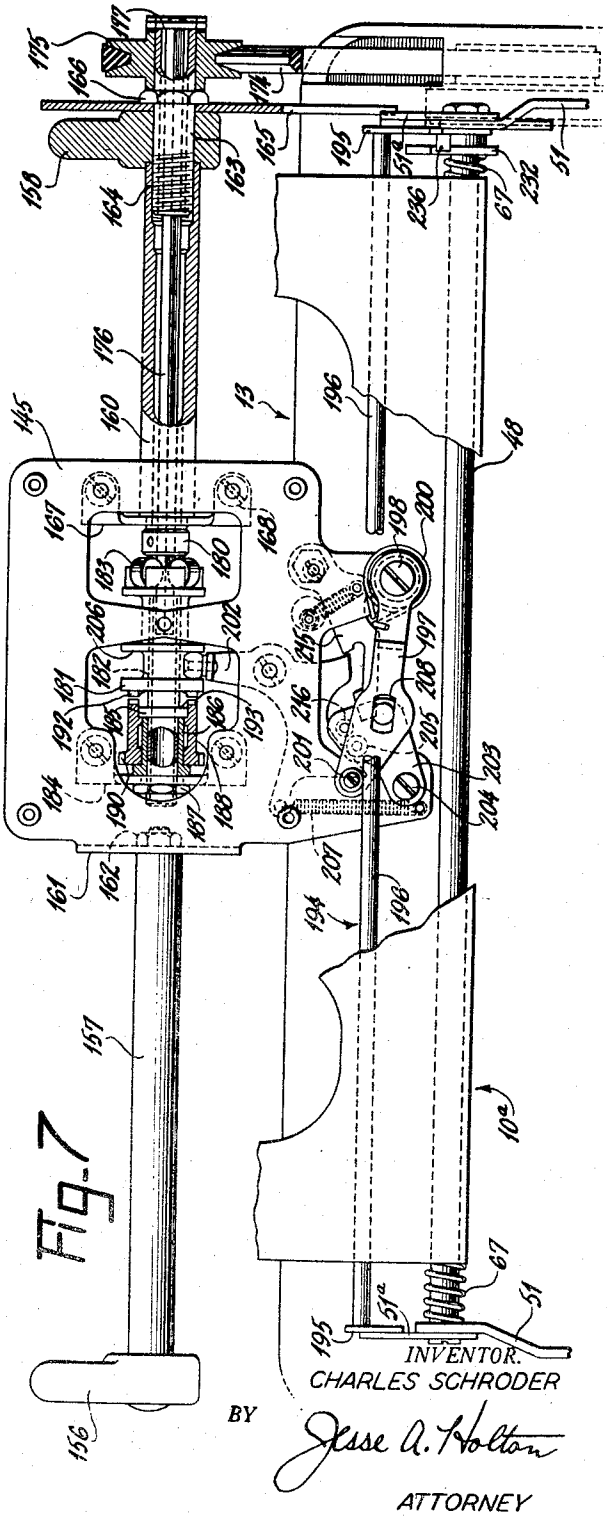

Fig. 7

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CARBON SHEET RETRACTOR MECHANISM

Filed March 9, 1950 6 Sheets-Sheet 6

Fig. 8

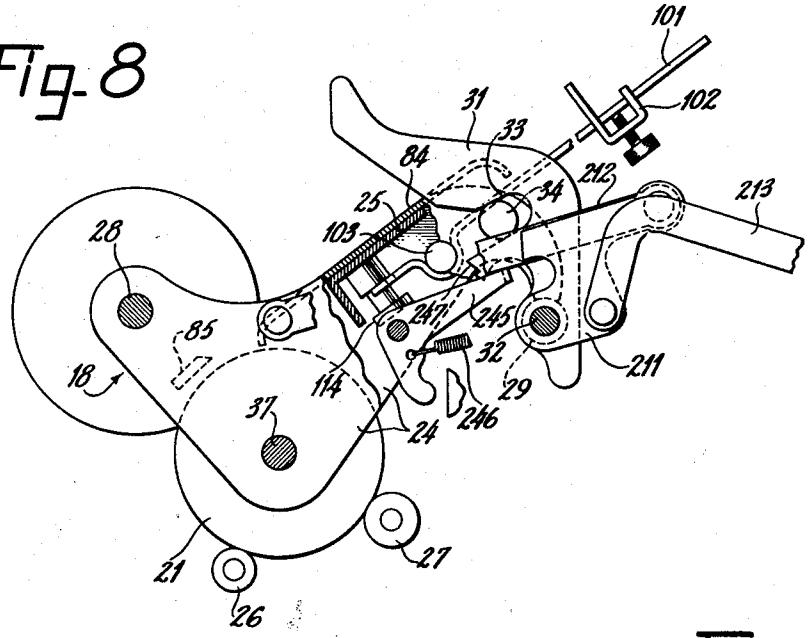


Fig. 9

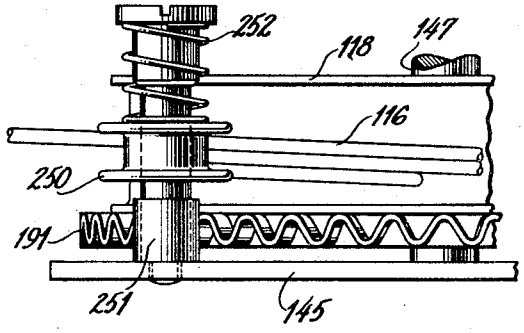
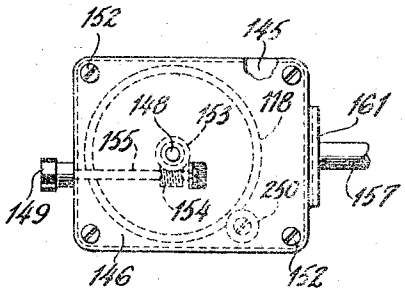


Fig. 10



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Patented Jan. 27, 1953 2,626,695

UNITED STATES PATENT OFFICE

2,626,695

CARBON SHEET RETRACTOR MECHANISM

Charles Schroder, West Hartford, Conn., assignor to Underwood Corporation, New York, N. Y., a corporation of Delaware

Application March 9, 1950, Serial No. 148,675

22 Claims. (Cl. 197—126)

1

This invention relates to typewriting machines and more particularly to machines known as fanfold or continuous billing machines, wherein carbon sheets are supported in interleaved relation between superposed continuous webs, or the plies of a fanfolded web, and are shiftable or retractable along the web for registration with succeeding web portions or forms. Still more particularly, the invention relates to power devices for retracting carbon sheets, and is an improvement over the patents to Mann, Nos. 2,275,782 and 2,370,478, respectively dated March 10, 1942 and February 27, 1945.

As in the machines of said prior patents, a carbon carrier is supported on a rear extension of a paper supporting carriage for movement toward and from a platen. Whenever the paper web is line-fed, the interleaved carbon sheets are drawn along with the paper web. After the typing of each form, the carbon sheets are required to be shifted out of the leading form into registration with the next form to be typed, this being in preparation of severing the typed, leading form. To effect the required shift of the carbon sheets, the invention provides for efficient power means to retract them.

It is broadly an object of the present invention to provide an improved means for power-retracting the carbon sheets.

It is also an object of the invention to provide for use with machines of the general class indicated, a power-operatable carbon retracting device which is of simple structure, efficient and reliable in operation, and places a minimum of encumbering load or weight on the paper supporting carriage.

It is a further object of the invention to devise a power-retracting means in which the operator is not subjected to danger from power operated elements.

A further object of the invention is to provide efficient power-retracting means having a stationarily mounted motor and including simple, efficient and inexpensive means to impart a carbon retracting motion from the motor to a carbon carrier which is supported on the paper supporting carriage.

Another object of the invention is to provide an economically manufacturable, efficient power-retracting device for a carriage-supported carbon carrier, the device comprising on a stationary part of the machine, a power operable drum, and a draw band or string operable by such drum to retract the carbon carrier in any position of the carriage, or even while the carriage may be moving.

2

The device of the invention embodies a retractor device which includes a closeable and openable drive connection on the frame for rendering the device respectively effective and ineffective. In connection with such frame-supported drive connection, it is a further object to provide efficient operable means to render said drive connection closed responsive to a control movement given a part on the carriage and regardless of the position in which the carriage may reside.

It is also an object to provide efficient, automatically operative means to render said frame-supported drive connection open at completion of the carbon retraction.

Other objects and features will in part be obvious and in part pointed out, particularly as the following description of a preferred embodiment of the invention proceeds.

Referring now to the drawings:

Figure 1 is a general perspective view of a billing machine comprising a typewriter and embodying the novel device for power-retracting a carbon carrier,

Figure 2 is a plan view showing a carbon carrier supporting shelf in an advanced letter-feed position, and illustrating also the power-retracting device for the carbon carrier on said shelf,

Figure 3 is a plan view similar to Figure 2 but the carbon carrier supporting shelf is shown moved to the right with respect to the frame,

Figure 4 is a sectional right-hand side view of the upper portion of the machine seen in Figure 1, particularly the typewriter carriage with its rearward extension, and certain elements of the power-retracting mechanism, the machine being in writing condition, the section taken just inside of the right carriage end,

In Figure 5, a displaceable platen supporting frame on the carriage is shown displaced, and the power-retracting mechanism for the carbon carrier is in action,

Figure 6 illustrates the carbon carrier as just having been power-retracted, and having inactivated the power-retracting mechanism,

Figure 7 is a fragmentary plan view of a frame-supported portion of the power drive of the carbon retracting mechanism, and shows also a portion of a control mechanism whereby the retracting mechanism is adapted to be rendered active,

Figure 8 is a side sectional view supplementing Figure 4 and shows in association with the displaceable platen supporting frame a lock-down device and related mechanism,

Figure 9 is an enlarged left-hand side eleva-

tion of a guide sheave and a portion of a draw-cable drum, and finally

Figure 10 is a plan view showing a drum unit of the carbon retracting device, including a cover therefor.

Referring now to Figure 1, there is mounted on a main body 13 of an Underwood All Electric Typewriter a paper-supporting carriage generally designated by the numeral 10 and including at each opposite end an end-plate 11 rising rigidly from a grooved rail 12. Said carriage 10, through its rail 12, is guided between two trackways 14 in the typewriter body 13, see Figure 4, usual anti-friction elements 16 being provided between said trackways 14 and said rail 12. In the carriage 10 there is mounted pivotally displaceable between the end plates 11 a sub-frame 18 carrying a platen 21. Said displaceable sub-frame 18 is shown to consist of opposite end pieces 24 and a bar 25 rigidly connecting them, see Figure 4, and is normally located so that the platen 21 bears upon front and rear feed rolls, respectively numbered 26 and 27. For pivotal support of said sub-frame 18, each carriage end 11 has a stud 28 extending inwardly therefrom, the two sub-frame end pieces 24 being pivotally carried on said studs. In the normal position of said sub-frame 18, each of the two end pieces 24 rests at the rear of the platen upon a collar 29 provided upon a shaft 32, see Figures 4 and 8. Said shaft 32 is pivotally supported in the opposite end plates 11 of the carriage and has near each carriage end an upreaching latch arm 31 secured to it. Each arm 31 includes a hook formation 33 which normally overlies a pin 34 in the adjacent end piece 24 of the sub-frame 18, thereby to lock the latter normally down and hold the platen 21 in feeding contact with the feed rolls 26 and 27. The structure comprising the rod or shaft 32 and the latch arms 31 is rearwardly swingable about the axis of said shaft for the hook formations 33 to clear the pins 34, and thereby to render the sub-frame 18 displaceable to the position seen in Figures 5 and 6. A spring, not shown, associated with one of the latch arms 31 biases both these arms 31 forwardly into the latching position seen in Figure 8.

The platen is rotatable in the displaceable sub-frame 18 by reason of a spindle 37 projecting oppositely into the end plates 24 of the sub-frame 18. In flanking relation with the end plates 24, the spindle 37 carries fast thereon, at each end, a gear 38. In the normal position of the platen supporting sub-frame seen in Figures 1 and 5, there is coaxially arranged closely adjacent to each gear 38 another gear 41, each of the latter gears carried fast on a stud-shaft 42 which is revolvably mounted on the adjacent carriage end 11, said stub-shafts having each a turning knob 44. Associated in constant mesh with said coaxially arranged gears 38 and 41, at each carriage end, see Figures 1 and 5, there is another gear 43 turnably mounted on the nearby stud 28. These gears 43 are covered by guards 43a. The stated stub-shafts 42 are turnable by the knobs 44, and turning motion is transmitted to the platen 21 from the gear 41 to the gear 43 and hence to the platen gear 38.

As indicated in Figure 4, types 15 strike against the front side of the platen 21, and, as is conventional in typewriters, the carriage 10 letter-feeds responsive to each typing impression, and is returnable at will in preparation of typing each line.

Loosely connected to move with the carriage 10 is a rectangular rearward extension or shelf 10a of light weight and having weight-reducing openings 46, see particularly Figures 1 to 4, inclusive. Said extension 10a supports a carbon carrier generally designated by the numeral 71, and is guided at a distance to the rear of the carriage 10 to run with the carriage 10, upon its own trackway 54. The latter may be in the form of a round bar rigidly carried on an extension framework 55 reaching rearwardly from the main typewriter body 13, see Figure 1. The carriage extension 10a, for running association on said bar 54, has secured to its underside, as at 56, an elongated bracket plate 52, the latter extending lengthwise of said bar 54 and having at two spaced points trucks or bearing elements 53, including anti-friction rolls 53a, associated with said bar 54. The bracket plate 52 is spaced from the table 10a between its points 56 of securement to provide working clearance for a draw-cable of the carbon retracting mechanism to be described. The extension framework 55 comprises a bracket 58 fastened to each side of the typewriter body 13, the brackets rigidly bridged by rods 57 and having table-rests in the form of caster rolls 62.

For connection with the carriage extension or table 10a, with the typewriter carriage 10, the end plates 11 of the latter have each a rearwardly reaching bracket 51 supporting a rod 48 extending parallel to the carriage. As seen in Figure 7, said extension 10a is yieldingly connected with said rod 48, by means of spacers in the form of compressible coil springs 67, arranged on the rod 48 between each side of the extension 10a and the adjacent bracket 51. The springs 67 urge the extension 10a to assume a definite lateral relation with respect to the carriage, but permit a momentary lag of the extension during each letter-feed movement of the typewriter carriage. The latter, therefore, letter-feeds substantially without interference by the mass of the extension 10a and the parts carried thereby, wherefore utmost typing speed is possible. Also, at the end of long carriage movements, such as tabulations and carriage returns, the springs 67 are instrumental to lessen shock.

A conventional Underwood carbon carrier 71 comprises a base plate 72 which at each lateral end thereof has circumferentially grooved rollers 73 engaging spaced parallel trackways 74 that extend along the left and right border of the carriage extension 10a. Said carbon carrier 71 comprises on the base plate 72 a detachably mounted, conventional plate 68 supporting blades 76 whereto carbon sheets 81 are attachable in a conventional manner. As seen in Figures 1 and 4, a work web 83 is placed in the machine to extend from the rear over a guide bar 77 forwardly over the carriage extension 10a, and downwardly around the bottom of the platen to the front thereof. The displaceable sub-frame 18 has a paper table 84 extending from the upper front portion of the platen 21, as seen in Figures 1 and 4, and a form severing knife 85 is also carried thereby. The work web 83 consists of several plies and, when the machine is in use, the carbon sheets 81 extend forwardly from their anchorage blades 76 in interleaved relation with the plies, the leading ends of the carbon sheets being normally about ½ inch short of the leading ends of the web 83. Figure 4, as is indicated by the type bar 15 striking the paper, shows the leading set of forms of the work web 83 being typed upon, and the leading end of the work web is shown as having been line

spaced well above the cutting edge of the knife 85. The carbon carrier 71 is shown advanced toward the platen, forwardly of a stop 88, and it will be evident from the description following hereinafter that this advance has been brought about partly by lowering the displaceable sub-frame 18, and partly by advancing the work web 83 by rotating the platen.

As already has been brought out, the platen is rotatable to advance the work web 83 by means of knobs 44, but it is understood that it may also be rotated in line-spacing steps in any known manner, either manually or by power.

After the typing on the leading set of forms is completed the carbon sheets are shifted to register with the next succeeding set of forms in preparation to typing thereon. This is preferably done with the web 83 in a straightened condition so that the web plies will not bind the carbon sheets. Accordingly, whenever it is desired to shift the carbon sheets 81 to register with a set of succeeding forms, the sub-frame 18 is first unlocked by a rearward displacement of the latch arms 31 clear of the pins 34, and is thereafter swung upwardly and forwardly to raise the platen 21 above the general plane of the carriage extension 10*a*. See Figure 5. This is preferably done by a single continuous motion of the operator's hand. To this end, see particularly Figures 1 and 8, a form measuring bar 101, supporting an adjustable paper gage 102, is pivotally displaceable to a limited extent toward the front of the machine on said subframe 18 and when so displaced, causes the latch arms 31 to be moved clear of the pins 34. Thereafter, continued forward movement of the gage bar 101 picks up the subframe 18 to move it about its pivot studs 28 to the position shown in Figure 5. As seen in Figure 1, the gage bar 101 is fastened to a shaft 103 which is pivoted in and extends between the ends 24 of the sub-frame 18. At the left end, the shaft 103 carries fixedly a cam arm 104 which in the initial tilting movement of the gage bar 101 toward Figure 7 position acts on a pin 110 on the adjacent latch arm 31, thereby to swing both latch arms 31 rearwardly clear of the pins 34 of the platen supporting sub-frame 18. After the stated initial tilting movement of the gage bar 101, the lower end thereof engages a head of a movement limiting pin 114 on said sub-frame 18, see Figure 8, and the latter will then move along with the gage bar to reach finally the position seen in Figure 5. Means, later to be described, stop the displaceable frame in the movement to the Figure 5 position. The form-measuring gage 102 on the gage bar 101 is adjusted thereon to stand a form length away from the edge of the knife 85. As has been stated, the carbon sheets 81 are shifted into cooperative relation with succeeding forms while the platen is in or near the raised position seen in Figure 5. However, before the carbon sheets are shifted, that is to say, retracted, the work web 83 is preferably advanced for the leading edge thereof to meet the gage 102. The stated advance of the work web 83 may be effected by turning the platen prior to effecting its displacement, but preferably the advance is effected concomitant to moving the gage bar 101 forwardly toward the extended position seen in Figure 5. Towards accomplishing this, the operator may lightly grip the leading end of the web plies 86 and the gage bar 101 between the thumb and index finger and may early in the platen displacement, by gliding these fingers along the bar 101, advance the leading end of the web 83 to meet the gage 102.

Power retraction of carbon sheets

According to the invention, the carbon carrier 71 is power-retracted by efficient, simple means, preferably as the platen-supporting sub-frame 18 approaches its fully displaced position seen in Figure 5, the leading edge of the form 83 having been brought against the gage 102 and being held by the operator's fingers or otherwise.

The power-retracting means comprises a retractor drum 118 supported to turn on a stationary pivot axis located closely to the rear of the typewriter body 13, preferably underneath the carriage extension 10*a*. A band or draw-cable 116 having one end attached to the drum 118, and capable of being wound thereon, is operatively in communication with the carbon carrier 71 in any position of the typewriter carriage, said draw-cable leading rearwardly from the drum 118, reversely over a sheave or guide 141 carried on the bottom of the rear portion of the carriage extension 10*a*, and forwardly for attachment to the carbon carrier 71. Said draw-cable 116 is attached to the base plate 72 of the carbon carrier 71, and to this end the base plate 72 has a downreaching bracket 115 to which the cable is clamped by an element 117. A clock-type spring 132 accommodated within said drum 118 very lightly urges the latter to turn anti-clockwise as viewed in Figures 2 and 3, and always causes sufficient cable 116 to be wound on the drum to keep slack from forming in the lead to the carbon carrier. However the tension of the spring 132 is insufficient to draw the carbon carrier 71 rearwardly. As each form is line-spaced in the course of typing it, the carrier 71 is drawn forwardly toward the platen by the carbon sheets, the drum 118 paying off the necessary cable to allow forward movement of the carbon carrier. In Figure 2, the carriage extension 10*a* is shown in a leftward position with respect to the typewriter body 13, whereas in Figure 3 said extension is shown moved to the right. From these two figures it will be perceived that the drum 118, by means of the cable 116, is operatively communicative with the carbon carrier 71 regardless of the position the carriage 10 may occupy, so that anti-clockwise rotation of the drum 118 by power will result in retraction of the carbon carrier 71. The drum 118 is located for the cable to lead, therefrom to the sheave 141 in an upwardly and rearwardly inclined plane, so that the stretch of cable leading from the sheave 141 to the carrier 71 passes freely and without conflict over said cable lead extending from the drum to the sheave at varying angles as viewed from the top. This may be seen from comparison of Figures 3 and 2. Moreover, it will be seen that due to the drum turning spring 132, cable will be drawn off or paid to the drum 118, as required.

Before describing the drum rotating mechanism it will be of advantage to state briefly the manner of support for the drum 118.

Referring to Figures 2, 3, 7 and 10, the retractor drum 118 is housed in a structure comprising a base plate 145 and a box-like cover 146. The drum 118 is provided on a pintle 147 whereon it is adapted to turn, and said pintle has reduced ends turnably accommodated as at 148 in opposite perforations provided in the base plate 145 and said cover 146. The aforestated clock-type spring 132, see Figure 2, has the outer end attached to the drum as at 150, and the inner end anchored on the pintle 147. The box-like cover 146 is secured to studs on the base plate 145 by screws 152. The clock-type spring 132 is

given the appropriate tension by rotatively adjusting the pintle 147 which for this purpose embodies a small worm gear 153 indicated in Figures 6 and 10, such gear turnably adjustable by a worm 154 provided on a shaft 155 turnably accommodated on the cover 146 and having externally of said cover a turning knob 149.

The structure comprising the base plate 145 and the cover 146 is rigidly supported behind the main body 13 of the typewriter, below the carriage extension 10a. For support of said structure 145, 146, see Figure 7, a stud 157 extends from an upreaching branch 156 of the left extension bracket 58 rigidly rightwardly therefrom. Similarly from an upreaching branch 158 of the right extension bracket 58 there extends a stud 160. The stated base plate 145 of the drum has a downreaching ear 161 for associating it fixedly with the stud 157, the latter having a reduced screw-end, and a nut 162 on said screw-end clamping the ear 161 fast to the stud 157. The stud 160 is tubular and is held to the bracket branch 158 by a bushing 163, the latter extending through the bracket branch 158 and being screwed into the tubular stud as at 164. The bushing 163 passes also through a plate 165 and has a hexagon enlargement 166 serving to draw it into a rigid structure with the branch 152, the plate 165, and the stud 160. The left end of the tubular stud 160 has united thereto, as by brazing, a bracket 167, the base plate 145 being secured to the bracket 167 by screws 168. This gives additional support to the drum base plate 145.

Referring to Figure 1, the Underwood All Electric Typewriter which the machine of the invention comprises, embodies a shaft 170 which is constantly motor driven while the machine is in use. On said shaft 170 is a pulley 171 driving a belt 172 of the conventional type action operating drive. Alongside of the pulley 171, also fast on the shaft 170 and constantly driven thereby, is a pulley 173 which by means of an endless V-belt 174 constantly drives a pulley 175 rotatively borne on a part of the bushing 163 which extends rightwardly from the hexagon enlargement 166. Extending through the tubular stud 160 and turnably accommodated in the bushing 163 is a square shaft 176 having at the outer end a disk 177 in loosely keyed association with the pulley 175, so that the pulley rotates the square shaft 176. The plate 165, see Figure 1, supports a belt tightener 178 of a generally well-known type. A collar 180, see Figure 7, fast on the shaft 176 just inside of the bracket 167, in cooperation with the disk 177 on the outer end of the shaft 176 locates the latter endwise. When the machine is in use, that is when the shaft 176 is motor-rotated, the latter continuously turns a shiftable clutch member 181 turnably accommodated on a stud 182 and having four rollers 183 in engagement with the four sides of the square shaft 176. The left end of the shaft 176 extends with clearance concentrically into a bore in the stud 182, and said turnable clutch member 181, by reason of the shaft 176 reaching between its four rollers 183, provides a rotative support for the left end of the shaft 176. The hollow stud 182 is borne rigidly on a bracket 184 reaching downwardly from the drum base plate 145, and to this end has an annular enlargement 185 and bears between said enlargement and the bracket a bushing 186, a nut 187 on the stud drawing the shoulder 185 tightly against the bushing 186. To turn on the bushing 186, and axially confined between the enlargement 185 and an enlargement on the bushing 186, there is a clutch member 188 in axial alignment with the clutch member 181. The clutch member 188 includes a gear 190 which is in constant mesh with a large gear 191 provided fast on the underside of the retractor drum 118, the gear 191 preferably pressed of sheet metal.

Normally, see Figure 7, the clutch member 181 is held axially in a position so that the clutch teeth 192 thereon are out of engagement with clutch teeth 193 on the member 188. The stated position of the clutch member 181 prevails always when the platen 13 is in normal writing position as seen in Figure 4. This is because a bail 194 pivotally supported at the rear of the carriage 10 is normally in a rearwardly swung position. Said bail 194 comprises spaced arms 195 pivotally mounted as at 199 on extensions 51a of the brackets 51 reaching rearwardly from the carriage ends 11, and comprises further a rod 196 extending parallel to the carriage 10. The rod 196 by contacting a roller 201 on an arm 197 holds the latter in a rearwardly swung position, a pivot stud 198 for said arm rising from the base plate 145 and a torsion spring 200 urging the arm 197 for the roller to contact the rod 196. The arm 197 is in control of a clutch shifter lever 202 through the intermediary of an arm 203 pivoted at 204 on the drum base plate 145 and having pin 205 bearing against the front side of an arm of the lever 202, said two arms having a pin and slot connection as at 208. The clutch shifting lever 202 bears a roller reaching into an annular groove 206 of the clutch member 181, and, under the tension of a spring 207, tends to move the said clutch member 181 to closed clutch position, such movement being blocked normally by the stated normal rearward position of the bail rod 196.

The displaceable sub-frame 18 exerts control over the position of the bail 194 through a mechanism comprising an arm 211 pivotally mounted on the shaft 32, a link 212 connecting the arm 211 with the right end-piece of the displaceable platen frame 18, and a link 213 extending rearwardly from the arm 211 and articulated to an upright arm 214 which by a rearwardly reaching nose is operatively associated with a forwardly reaching nose on the bail arm 195 at the right carriage end. Said arm 214 is pivotally carried on the bracket 51 at the right carriage end. In the normal position of the displaceable sub-frame 18, see Figure 4, the arm 214 is governed by said sub-frame 18 to occupy the shown position, the nose on the arm 214 bearing down on the nose of the arm 195 to hold the bail 194 rearwardly swung, thus holding the clutch member 181 in open-clutch position. Displacement of the sub-frame 18 as the latter nears the position seen in Figure 5, results in the movement of the control mechanism 212, 211, 213 and 214 as shown, with the effect that the bail 194 will be allowed to swing toward the front of the machine as illustrated, the tension of the spring 200 on the roll carrying arm 197 causing the roll 201 to swing the bail. However, in order that the clutch may close with an instantaneous action, substantially at the very end of the platen displacement, and regardless of slowly effected displacement of the platen, see Figure 7, a pawl 215 is associated with a shoulder on the clutch controlling lever 202 to delay clutch closing movement of the latter until the very end of the platen displacement. This pawl 215 is normally spring held in a blocking relation with respect to

the stated shoulder, and when the platen approaches its fully displaced position shown in Figure 5, a pin 216 on the arm 203 will engage the outer end of the pawl 215 to swing it clear of the stated shoulder, wherefore under the tension of the spring 207 only then the clutch controlling lever 202 snaps to closed clutch position. Incidentally, see Figure 7, the limit of displacement of the platen sub-frame 18 is established by engagement of the arm 211 with an abutment 217 on the adjacent carriage end 11.

As soon as resultant from platen displacement the driving connection across the clutch members 181, 188 is established, the gear 190 will drive the drum 118 forcibly anti-clockwise as viewed from the top, and the carbon carrier 71 will consequently be drawn rearwardly by the draw-cable 116. It matters not in what position the carriage 10 may reside, inasmuch as the cable 116 is always communicative with the carrier 71 for retracting action.

When the carbon carrier 71 nears the required retracted position, namely the position illustrated in Figure 6 wherein the leading ends of the carbon sheets 81 are slightly short of the cutting edge of the knife 85, the power drive to the retractor drum 118 is automatically interrupted. To this end, towards the end of its forced rearward movement the carrier 71 displaces a shut-off element in the form of the before-noted stop 88 which is carried for adjustment along bar 222 and for limited rearward displacement with the latter on the carriage extension 10*a*, said bar having attached thereto at the front end, by means of studs 223, an element ending in a finger 224 reaching in front of the bail bar 196, see Figures 2, 4 and 6. The effect is such that when the stop 88 is displaced rearwardly by the carbon carrier 71, the bail bar 196 is pulled rearwardly to impart a clutch opening operation to the arm 197, the motion imparted to the latter arm being translated into a clutch opening movement of lever 202. For slidably mounting the bar 222, see Figure 2, the latter has at each opposite end thereof a pin and slot association 228 with the table extension 10*a* of the carriage. The rearward movement of the bar 222 is limited by a fixture 230 fastened to the underside of the said bar and having a soft pad 231 for stopping engagement against the rear side of one of the openings 46 in the carriage extension 10*a*.

After the clutch member 181 at the automatic conclusion of a power retraction of the carbon carrier 71 is moved to open-clutch position, the retractor drive must remain inactive. To this end, see particularly Figures 4, 5 and 6, an element 232 is pivotally mounted on the rod 48 near the right end of the carriage, and includes a blocking nose 233 which, as illustrated in Figure 6, under the urge of a spring 235, swings in front of a pin 234 on the right arm 195 of the bail 194 whenever the latter arrives in a rearwardly rocked position incidental to the clutch opening movement imparted to the bar 222 at the end of a retracting movement. However, inasmuch as the bail 194 must be free to rock toward the front of the machine whenever the platen 10 is moved to displaced position, a pin 236 is provided on the arm 214 to give the element 232 normally the position seen in Figure 4, wherein its blocking nose 233 is below the pin 234 on the bail 194. At the beginning of each platen displacement, the clutch controlling bail 194 swings forwardly fast enough for the pin 234 to move idly above the blocking nose 233. Meanwhile the pin 236 on the arm 214 moves forwardly away from the element 232, giving the latter capacity for turning movement in anti-clockwise direction under the tension of the spring 235. Consequently, when at the end of each power-retracting operation, the bail 194 is rearwardly rocked by the finger 234, the element 232 will spring-move anti-clockwise, placing the blocking nose in front of the pin 234. Therefore at the end of each power-retraction of the carbon carrier 71, the bail 194 will be moved to and retained in rearward, open-clutch position against the tension of the spring 207 which is associated with the clutch shifter lever 202.

The control mechanism by which the power-retracting device is rendered active responsive to displacement of the platen supporting frame 18, is such that if said frame is prematurely thrown toward normal position before the power-retracting operation is concluded, there will ensue consequently a shut-off of the retractor drive. Namely, if the platen supporting frame 18 is thrown toward normal position while the carrier 71 is power-moved rearwardly as illustrated in Figure 5, then the movement of the control mechanism 212, 211, 213, 214 toward normal position will result in a restoration of the control bail 194 rearwardly on the carriage, which in turn will shift the clutch member 181 to open-clutch position, rendering the retractor drive inactive. This shut-off position provides that neither the retracting mechanism, nor the work web 83, nor carbon sheets 81 are subjected to abnormal strain in the event the operator restores the platen to writing position before the power-retracting operation is completed.

The retractor drum 118 and the clutch member 181 hereinbefore noted, are supported on the stationary part of the machine, but as has been brought out, the power-retractions are instituted and terminated under control of carriage supported mechanism. In this connection it should be noted that the bail 194 is operatively communicative with the roller 201 on the frame supported arm 197 regardless of the position of the carriage 10, wherefore clutch closing as well as clutch opening action is provided for by control motions emanating from parts on the carriage 10 or its extension 10*a*.

In the machine described the work web 83 is supplied upwardly from the rear of the machine and the weight thereof affords considerable resistance to the forward movement of the carbon carrier, particularly so if the web consists of many plies and is of heavy stock. Accordingly, there is associated with the carbon carrier a means which at least in part counterbalances the dragging weight of the work web. To this end the cable 116 leading from the retractor drum 118 to the clamp 117 on the carbon carrier 71 is extended forwardly of the latter over a sheave 240 at the forward end of the extension 10*a* and reversely rearwardly to wind on a drum 241 whereto the extended cable is attached. Said drum is supported on a bracket 242 reaching rearwardly from the bracket plate 52 carried by the carriage extension 10*a*. Said drum 241 is under constant influence of a spiral spring 243 to turn anti-clockwise as viewed from the top, and therefore to wind up the cable 116 leading thereto. The spring 243 in the drum 241 is relatively stronger than the spring 132 in the retractor drum 118, so that the carbon retractor 71 is favored to move toward the platen at all times, the weight of the work web 83 however exerting enough drag on the carbon carrier 71

to prevent the latter from moving forwardly on its own accord. So that the spiral spring 243 may supply the appropriate forward drawing action on the carbon carrier 71 suited to the drag of a particular work web 83, the spiral spring 132 in the retractor drum 118 is adjustable for strength in a manner explained hereinbefore, it being noted that if the spring 132 is given increased power, the effective power of the spring 243 is weakened.

The platen supporting frame 18 is shown in normal position in Figure 8 and accordingly the opposite latch arms 31 are in latching association with the pins 34. The initial forward motion given the gage bar 101 in the platen displacing operation, as before stated, will swing both latch arms 31 rearwardly, clear of the path which the pins 34 need to take ensuingly during the actual displacement of the platen, that is during continued forward movement of the gage bar 101. In the displacement of the frame 18, the pins 34 travel upwardly and forwardly, clear of the arms 31. To retain the arms 31 rearwardly moved pending the restoration of the platen, there is provided a dog 245 pivotally carried at the right end 11 of the carriage, which dog, under the constant urge of a spring 246, tends to swing limitedly upwardly However, the link 212 of the aforedescribed clutch controlling mechanism normally overlies and holds down the rear end of the dog 245. Incidental to the forward displacement of the gage bar 101, following the rearward displacement of the latch arms 31 and following some upward displacement of the platen supporting frame, the link 212, by moving upwardly, allows the dog 245 to move in front of a notched, forwardly reaching nose 247. The platen frame pins 34 meanwhile glide along the front faces of the latches 31. As the pins 34 clear the latches 31, the dog 245 will block the associated latch 31 against forward movement, the notched nose 247 seating itself against the end of the dog. Both the latches 31 stay therefore in rearward position. Subsequently when the platen frame 18 is restored and the pins 34 thereon glide down the front of the latches 31, said dog 245 is forced down to ineffective position below the nose 247, allowing the latches 31 to spring forwardly into holding position over the pins 34.

It is desirable that the draw-cable 116 be wound on the drum 118 in orderly adjacent turns. For assuring this, and also to prevent jumping of the cable 116 off the drum, there is provided closely adjacent to the latter, at the cable pay-off side, a grooved roller guide 250, see Figures 2, 4 and 9. This roller guide 250 is rotatively supported on a stud 251 with capacity to move axially therealong for the width of the drum 118. As the drum winds successive turns, the roll travels upwardly against the light opposition of a compression spring 252 arranged on the stud 251 between the roller and the stud head. The spring 252, by tending to resist upward movement of the roller 250, causes the draw-cable to wind in closely adjacent turns on the drum. As seen in Figure 2 the roller 250 is located very closely to the drum 118, and for the draw-cable 116 to lead in a bend from the drum, this being conducive to keep the cable from jumping the drum.

Having now special reference to Figures 2 and 6, the carbon carrier has pivotally mounted to the underside of the base plate 72 a spring-pressed detent arm 253 for catching impositively behind the adjustable retractor stop 88 whenever the carbon carrier reaches retracted position. In catching impositively behind the stop 88, said detent 253 prevents rebounding of the carbon carrier 71 toward the platen. However, the detent yields readily when following retraction, the carbon carrier is drawn forwardly resultant to platen restoration to normal position while the leading edge of the web 83 is held against the gage 102.

While only one embodiment of the invention has been shown and described, it is understood that many variations may be restorted to within the scope of the invention and that portions of improvements may be used without others.

What is claimed is:

1. In a writing machine having a carriage movable on a frame in letter-feed and return directions, and having a platen on the carriage relatively to which carbon sheets on the carriage are advanceable and retractable; power-retracting means for said carbon sheets, comprising, a motor-operatable cable winding drum supported on said frame, and means operatable by said frame-supported drum in any position of the carriage to effect carbon sheet retraction, said last means including a draw-cable windable on said frame-supported drum for carbon sheet retraction.

2. The invention set forth in claim 1, said drum located rearwardly of the platen, and said power-retracting means comprising beyond the range of carbon retraction, guide means for said draw-cable to lead thereto from said drum directionally away from the platen and thence reversely toward the platen, said guide means supported on the carriage substantially in a lateral location which is coincident with the drum when the carriage is in the middle of its traveling range.

3. In a writing machine having a carriage movable on a frame in letter-feed and return directions, and a platen on the carriage relatively to which carbon sheets on the carriage are advanceable and retractable; power-retracting means for said carbon sheets, comprising, a motor supported on said frame, a cable winding drum also supported laterally central on said frame and operable by said motor, a sheave laterally central on said carriage, said drum located nearer to the platen than the sheave, and a draw-cable windable on said frame-supported drum in any position of the carriage to effect carbon sheet retraction, said draw-cable leading rearwardly from said drum to said sheave and reversely thereover forwardly.

4. In a writing machine having a carriage movable on a frame in letter-feed and return directions, a platen on the carriage, and a carbon carrier supported on the carriage for advance movement toward and retracting movement from said platen; power-retracting means for said carrier, comprising, a motor supported on the frame, a cable winding drum supported on said frame and operatable by said motor, and means including a draw-cable windable on said frame-supported drum, and operatively connecting said drum with said carrier in any position of the carriage for carbon sheet retracting action.

5. In a writing machine having a carriage movable on a frame in letter-feed and return directions, a platen on the carriage, and a carbon carrier supported on the carriage for advance movement toward and retracting movement from said platen; a power-retracting means for the carrier, comprising, a motor-operatable drum supported on the frame, a draw-cable windable on said

drum and having a connection with said carrier, and draw-cable guide means located for said draw-cable to lead thereto from the carrier directionally away from the platen and associated with the carriage for movement directionally in accord therewith, said drum supported nearer to the platen than said draw-cable guide means, and the cable leading thereto from said carrier by way of said guide means.

6. In a writing machine having a carriage movable on a frame in letter-feed and return directions, a platen on the carriage and a carbon carrier supported on the carriage for advance movement toward and retracting movement from said platen; a power-retracting means for the carrier, comprising, a motor-operatable drum supported on the frame, a draw-cable windable on said drum and having a connection with said carrier, and draw-cable guide means on the carriage located for said draw-cable to lead thereto from the carrier directionally away from the platen, said drum supported nearer to the platen than said draw-cable guide means, and the cable leading thereto from said carrier by way of said guide means.

7. The invention defined in claim 6, said guide means supported on the carriage substantially in a location which is laterally coincident with the drum when the carriage is in the middle of its traveling range.

8. In a writing machine having a carriage movable on a frame in letter-feed and return directions, a platen on the carriage and a carbon carrier supported on the carriage for advance movement toward and retracting movement from said platen; power-retracting means for said carrier, comprising, a motor supported on the frame, a cable winding drum supported on said frame, a normally open clutch between said motor and said drum, and a draw-cable windable on said frame-supported drum and operatively connecting the latter with said carbon carrier in any position of the carriage for carbon sheet retracting action.

9. The machine set forth in claim 8, and lightly active means associated with said drum to keep said draw-cable taut while said clutch is open, irrespective of travel of the carriage or the carbon carrier.

10. The machine defined in claim 9, said lightly active means comprising spring means having a light cable-winding action on said drum.

11. The invention defined in claim 8, including spring means associated with said drum for said draw-cable to exert a retraction-favoring force on said carrier, and spring means exerting a light advancement-favoring force on said carrier, the favoring force of said first spring means in respect to the favoring force of the second spring means being smaller for any position of the carriage or the carrier.

12. The invention set forth in claim 11, said second spring means comprising, a second cable-winding drum, and a spring having a cable-winding action on said second drum.

13. The invention set forth in claim 12, said second cable-winding drum supported on the carriage.

14. In a writing machine having a carriage movable on a frame in letter-feed and return directions, and having a platen on the carriage relatively to which carbon sheets on the carriage are retractable to a certain position; normally ineffective power-retracting means for said carbon sheets, including, a motor on said frame, and means supported on said frame and operable by said motor for carbon-sheet retracting action, means including control means on the carriage, to cause operation of said frame-supported means by said motor in any position of the carriage, and means responsive to the retraction of the carbon sheets to the said position to interrupt the operation of said frame-supported means by said motor.

15. The invention set forth in claim 14, said control means comprising form-measuring means on the carriage displaceable from a normal to a form-measuring position to cause operation of said frame-supported means.

16. In a writing machine having a carriage movable on a frame in letter-feed and return directions to different positions, a platen on said carriage, and a carbon carrier on said carriage advanceable toward the platen; normally ineffective motor-operatable means adapted to retract said carrier in any position of the carriage and including a normally ineffectively conditioned drive connection on said frame, and means to effectively or ineffectively condition said drive connection, including, a control element on the carriage engageable by said carrier at the end of each retraction, and means responsive to said engagement of said control element irrespective of the position of the carriage to render automatically said drive connection ineffectively conditioned.

17. In a writing machine having a carriage movable on a frame in letter-feed and return directions, a platen displaceable on said carriage and a carbon carrier on said carriage movable toward the platen; an electric motor on the frame, normally ineffective motor-operatable means adapted to retract said carrier in any position of the carriage, including a normally open clutch supported on the frame; and means responsive to displacement of said platen to engage said frame-supported clutch, and thereby to render said motor-operatable means effective, said responsive means being further responsive to retraction of the carrier to a certain position to render said frame-supported clutch automatically disengaged.

18. The invention defined in claim 17, the machine including means to maintain the clutch disengaged after automatic disengagement until said platen is again displaced.

19. The invention defined in claim 17, said responsive means including a member on the carriage operatively communicative with a member on the frame in any position of the carriage.

20. The invention defined in claim 19, one of said members comprising a bail extending parallel to the carriage.

21. In a writing machine having a carriage movable on a frame to different writing positions, and having a platen on said carriage relatively to which carbon sheets are retractable to a certain position; means supporting said platen for displacement on the carriage to a web-freeing position, motor-drive means to retract said carbon sheets, including a drive connection adapted to be closed or opened respectively to render the motor-drive means effective or ineffective; and means to render said drive connection closed incidental to the displacement of the platen, and to render said drive connection open incidental to the retraction of the carbon sheets to the said position, said last means including a provision to render said drive connection also open if the platen after displacement is restored before the re-

traction of the carbon sheets has been concluded by the motor-drive means.

22. In a writing machine having a carriage movable on a frame to different writing positions, and having a platen on the carriage relatively to which carbon sheets are retractable to a certain position; means supporting said platen for displacement on the carriage to a web-freeing position, motor-drive means to retract said carbon sheets, including a drive connection on the frame adapted to be closed and opened respectively to render said motor-drive means effective or ineffective; means to render said drive connection closed by the displacement of the platen as such

displacement nears conclusion, and means to render said drive connection open either incidental to the retraction of the carbon sheets to the said position or by the restoration of the platen as the platen nears restored position.

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The following references are of record in the file of this patent:

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Number	Country	Date
224,973	Switzerland	Apr. 1, 1943