

July 12, 1966

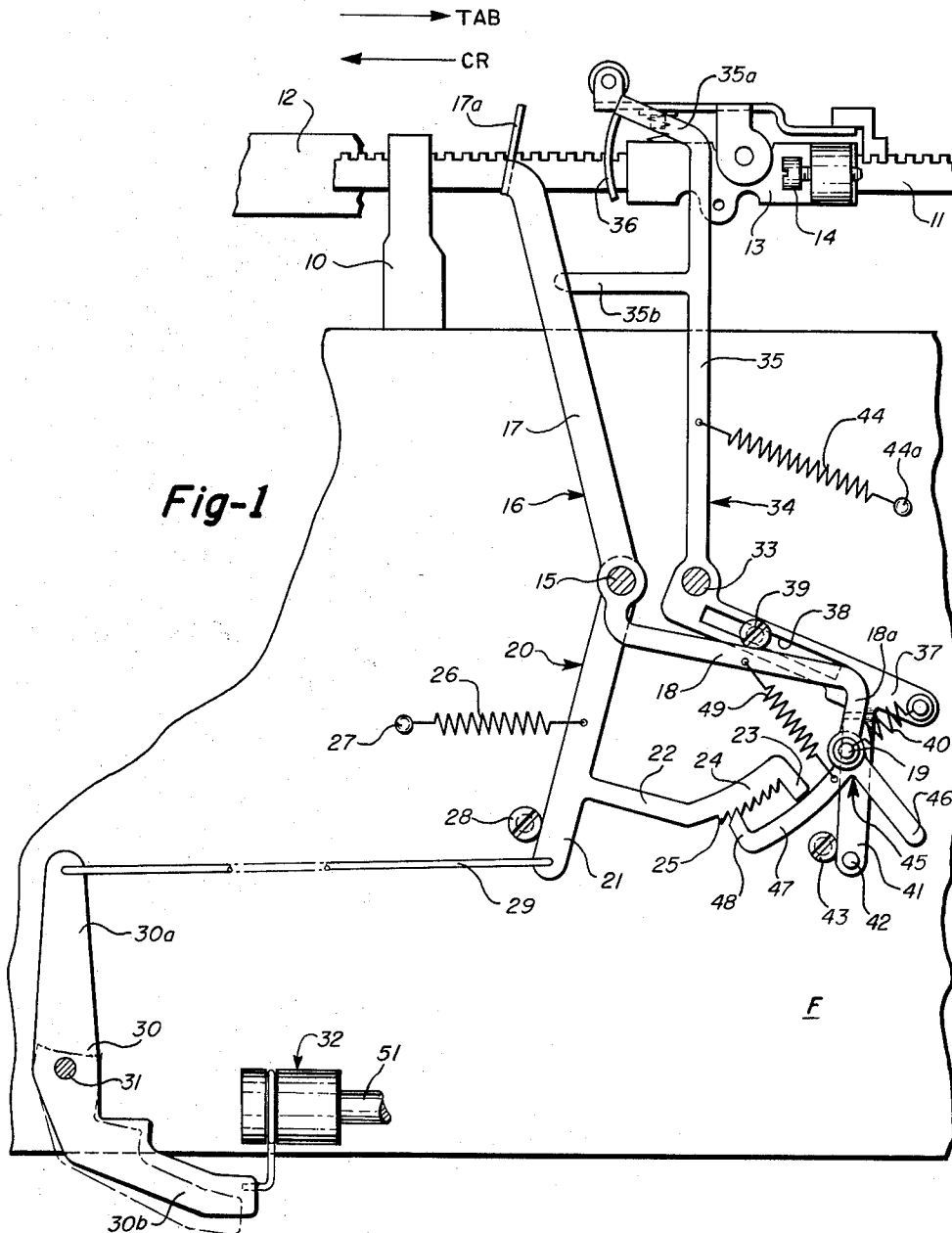
T. N. MADISON

3,260,342

CARRIAGE ARRESTING DEVICE

Filed Feb. 10, 1965

3 Sheets-Sheet 1



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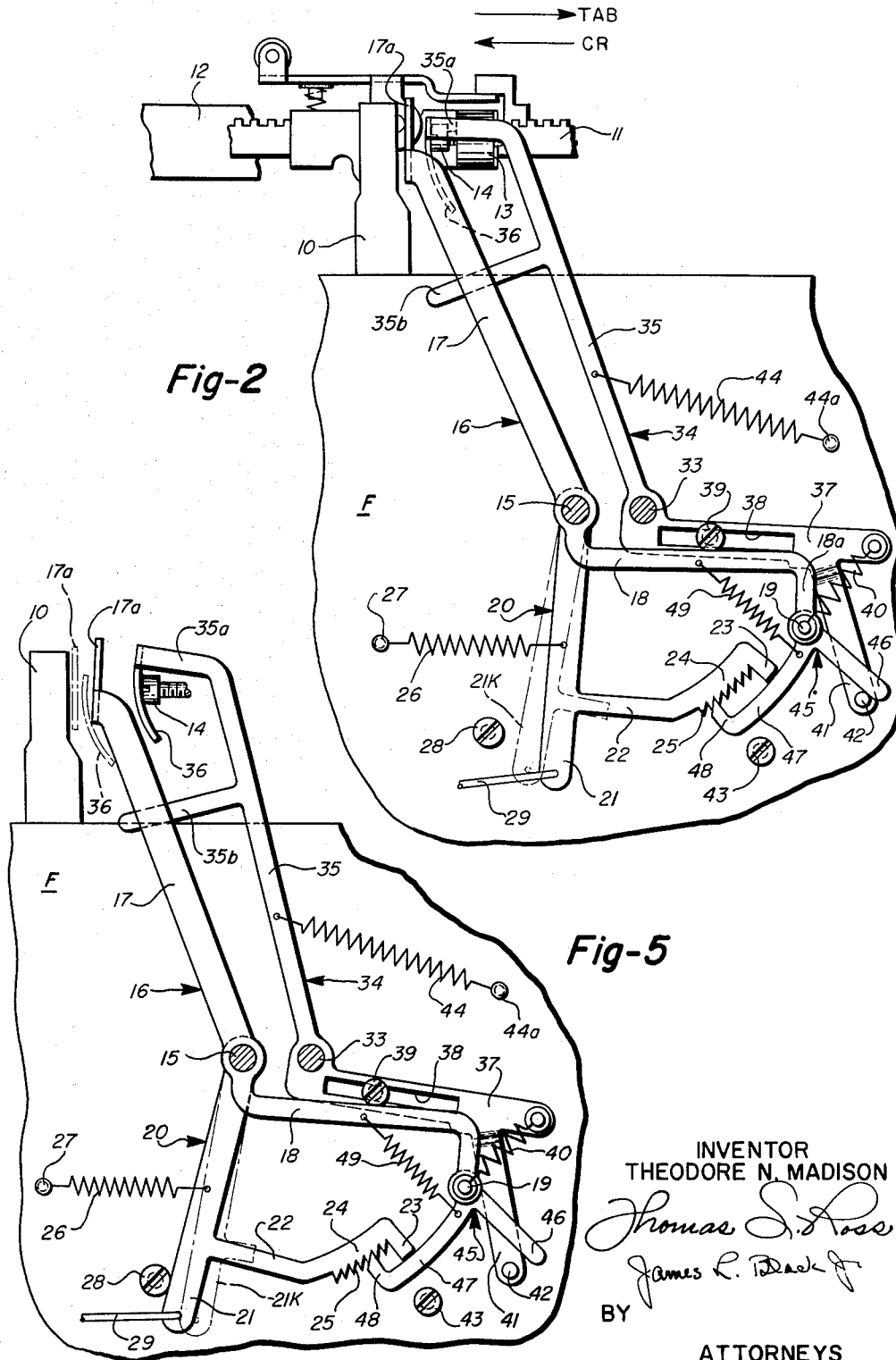
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3 Sheets-Sheet 2



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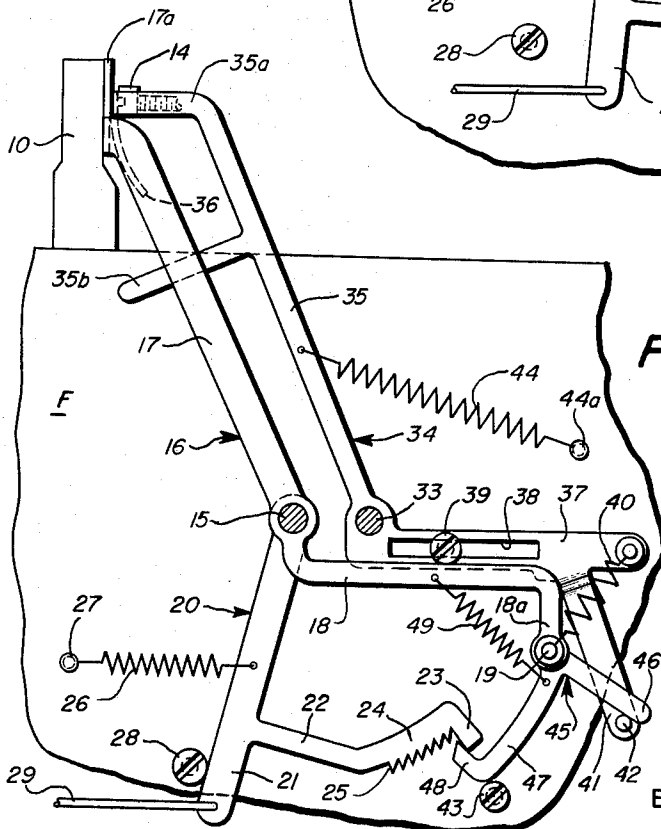
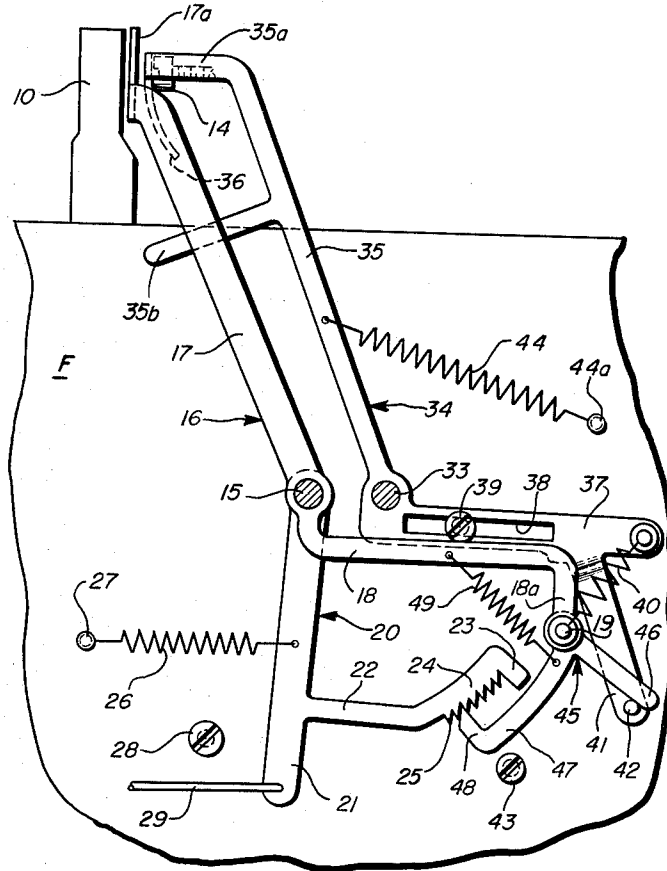
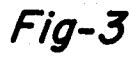
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3 Sheets-Sheet 3.



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3,260,342

CARRIAGE ARRESTING DEVICE

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by mesne assignments, to Royal Typewriter Company,
Inc., New York, N.Y., a corporation of Delaware
Filed Feb. 10, 1965, Ser. No. 431,631
6 Claims. (Cl. 197-65)

This invention relates to a carriage return clutch knock-off mechanism for use in a powered writing machine such as an electric typewriter.

One of the objects of the invention is to provide a structurally simple, inexpensive and durable mechanism for arresting a typewriter carriage at the end of its return travel, regardless of the distance of return travel and without resort to dashpot or equivalent dampening mechanisms. Other objects will be in part apparent and in part pointed out hereinafter.

In the drawing wherein there is shown a preferred embodiment of the invention and wherein similar reference characters refer to similar parts throughout the several views:

FIGURE 1 is a fragmentary rear elevation of the mechanism in normal position;

FIGURES 2-4 show sequential active views of the mechanism during the final portion of a normal carriage return; and

FIGURE 5 is a view showing normal (full line) and active (broken line) positions of the parts during a short, e.g., five pitch, carriage return.

With reference to FIGURE 1, a conventional center stop post 10 is suitably mounted on the machine frame F to the rear of a rack 11 secured to the typewriter carriage 12. Rack 11 slidably supports a conventional adjustable left-hand margin stop 13 in a portion of which is threaded a stop screw 14 which accordingly travels with carriage 12 toward post 10 during carriage return movement.

A fulcrum pin 15 carried by frame F pivotally supports a center stop lever, generally indicated at 16, comprising an upwardly extending arm 17 and a laterally extending L-shaped arm 18, the foot 18a of which has a fulcrum pin 19 secured thereto. The upper end of arm 17 carries an abutment plate 17a which is disposed between post 10 and stop screw 14 in the path of travel of the latter. Fulcrum pin 15 also pivotally supports a knock-off lever, generally indicated at 20, comprising a downwardly extending arm 21 from which a leg 22 extends laterally. The end 24 of leg 22 is preferably slightly inclined upwardly, has a depending stop finger 23 formed on the end thereof and is provided with a plurality, preferably six, of teeth 25 formed along the bottom edge thereof. A spring 26 has one end fastened to arm 21 and the other end fastened to an anchor pin 27 secured to frame F. Spring 26 accordingly biases knock-off lever 20 clockwise to the extent permitted by a stop pin 28 carried by frame F. A link 29 is pivotally connected at one end to the lower end of knock-off lever arm 21, the other end of this link being pivotally connected to the upper end of one arm 30a of a bell crank lever 30 pivotally mounted on a pin 31 extending from frame F.

The writing machine includes carriage return clutch mechanism which, comprising no part of my invention, is diagrammatically indicated at 32 in FIGURE 1 and

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which may be the same as that shown in the copending application of Fred W. Berg, Serial No. 396,990, filed September 16, 1964, which application is accordingly incorporated by reference herein. Generally speaking, the Berg mechanism comprises linked power assist and carriage return clutches of the wrap spring type, the former of which is engaged by depression of the carriage return key, such engagement effecting engagement of the carriage return clutch 32 to a constantly rotating power shaft 51. A clutch knock-off system including a bell crank identical to bell crank 30 operates to effect knock-off of the carriage return clutch from the power shaft at the end of return travel of the carriage.

Still referring to FIGURE 1, a fulcrum pin 33 is fastened to frame F and pivotally supports a sensor lever, generally indicated at 34. This lever includes an upwardly extending arm 35 having an inclined and 35a from which depends an arcuate abutment finger 36 which lies in the path of travel of margin stop screw 14 and is engageable thereby near the end of carriage return as will be more fully described hereinbelow. A guide arm 35b extends laterally from lever arm 35 and in front of stop lever arm 17 to maintain the stop and sensor levers properly oriented in relation to one another during relative movement therebetween. Sensor lever 35 further includes a laterally extending arm 37 in which an elongated slot 38 is formed, this slot receiving an abutment screw 39 which may be variously set between the ends of slot 38 for a purpose described below. Screw 39 overlies stop lever arm 18 and is in engagement therewith whereby when sensor lever 34 is rocked counterclockwise, as will be described, lever 16 is also rocked counterclockwise by virtue of a drive spring 40 which interconnects the end of sensor lever arm 37 and pin 19 on stop lever arm 18. A leg 41 extends downwardly from sensor arm 37, has a stud 42 extending from the lower end thereof and normally rests against a stop 43, fastened to frame F, under the bias of a spring 44 interconnecting sensor lever arm 35 and a pin 44a fastened to frame F.

Pin 19 on the end of stop lever arm 18 pivotally supports an L-shaped drive pawl, generally indicated at 45, comprising a pair of arms 46 and 47 the latter of which has an upstanding hook 48 formed on the end thereof and adapted to coact with ratchet teeth 25 on knock-off lever arm 22. A spring 49 interconnects drive pawl 45 and stop lever arm 18 thus biasing the pawl clockwise to normally hold hook 48 and one of ratchet teeth 25 in engagement. With screw 39 set in the position shown in FIGURE 1 hook 48 engages the fifth tooth 25 from the right on knock-off lever arm 22 which sets abutment finger 36 on sensor lever 34 ten increments equaling five pitches or letter spaces from post 10.

From the foregoing it will now appear that as carriage 12 travels to the left (FIGURE 1) margin stop screw 14 eventually engages abutment finger 36 on sensor lever 34, continuing travel of the carriage rocking the sensor lever counterclockwise against the bias of spring 44. This movement raises sensor lever arm 37 and accordingly abutment screw 39, drive spring 40 accordingly pulling stop lever 16 counterclockwise to the FIGURE 2 position where abutment plate 17a lies closely adjacent post 10. At the same time hook 48, pulling on one of teeth 25, rocks knock-off lever 21 counterclockwise against the bias of spring 26 to draw link 29 to the right and rock bell crank 30 clockwise. This action lowers bell crank

arm 30b to the broken line position (FIGURE 1) to effect disengagement of the carriage return clutch in clutch mechanism 32 as described in the above mentioned Berg application. Clutch knock-off occurs when knock-off arm 21 reaches position 21K (FIGURE 2). From this position of arm 21 to that shown in FIGURE 4 the carriage is in free flight, i.e., its inertia is continuing its return movement. Unimpeded, the carriage would be brought to an abrupt and noisy halt by center post 10. However, from the time of knock-off at position 21K, the carriage return movement is decelerated by springs 26, 44, 40 and 49 which are so designed so as to bring the carriage to a soft noiseless stop at the end (FIGURE 4) of its return movement.

As sensor lever 34 swings from its FIGURE 1 to its FIGURE 2 position its leg 41 swings stud 42 on the end thereof against arm 46 of drive pawl 45 whereby continued counterclockwise movement of the sensor lever causes stud 42 to rock the drive pawl 45 counterclockwise thus to withdraw hook 48 from the tooth 25 with which it had been engaged to drive the knock-off lever 20 (see FIGURE 3). At this point stop lever abutment plate 17a has been swung closely adjacent post 10 and sensor abutment finger 36 has been swung closely to plate 17a by screw 14. The differential in amount of movement of levers 16 and 34 results from the relationship between screw 39 and stop lever arm 18 and this differential can be varied by adjusting screw 39 along slot 38 thus to predetermine at will the normal position of lever 17 in relation to the fixed normal position of sensor lever 34 and accordingly adjust the knock-off time as desired within the limits of the adjustability of screw 39. With the screw 39 set at the position shown in FIGURE 1 the movement differential between levers 34 and 16 is about two to one.

As stop screw 14 moves from its FIGURE 3 to its FIGURE 4 position, hook 48 and its associated ratchet tooth 25 being disengaged, knock-off lever return spring 26 rocks knock-off lever arm 21 clockwise until the arm engages stop 28. This movement of the arm forces link 29 to the left which rocks bell crank 30 counterclockwise to its normal full line position (FIGURE 1). At the same time drive pawl hook 48 engages stop finger 23 to maintain the hook in proper position for restoration to its driving engagement with one of teeth 25.

As the carriage 12 moves from left to right (FIGURE 1) during tabulation to the desired new paragraph indent position, stop screw 14 moves with the carriage permitting sensor lever spring 44 to swing sensor lever 34 clockwise until its leg 41 engages stop 43 (FIGURE 1) thereby permitting return of the sensor lever to its normal position. During such sensor lever return movement, the screw 39 carried thereby drives stop lever arm 18 and accordingly stop lever 16 clockwise to its set normal FIGURE 1 position and causes pawl hook 48 to ratchet over teeth 25 ultimately to engage the tooth predetermined by the setting of screw 39 by virtue of the pull of spring 49. The mechanism is thus restored for the next carriage movement.

It may now be seen that sensor lever 34 senses the imminence of the the terminal portion of carriage return and upon engagement thereby with margin stop screw 14 effects actuation of knock-off lever 20 at a predetermined time to knock-off the carriage return clutch to permit the carriage to coast to a smooth, noiseless stop under the impedance of the several switches as described above.

Not infrequently a typed line will terminate two to five or six pitches or letter spaces from the left hand margin and will constitute the end of a paragraph thus requiring a predetermined tabulation indent for commencement of the next paragraph. Assume, for example that the final line of a paragraph terminates three pitches from the left hand margin. Under such a circumstance, and with reference to FIGURE 5, margin stop screw 14 would impede the full return of sensor lever 34 but rather would hold

it in the FIGURE 5 position where its leg 41 is well spaced from stop 43 which accordingly would prevent full return of stop lever 16. So, instead of drive pawl hook 48 resuming its FIGURE 1 position, it engages a ratchet tooth 25 corresponding to the three pitch position (full line, FIGURE 5) of stop screw 14. If now the carriage return key is depressed, stop screw 14 will immediately rock sensor 34 counterclockwise to the broken line position causing knock-off arm 21 to swing counterclockwise to its broken line position thus to knock off, i.e., disengage the carriage return movement hence the carriage will not have attained any substantial momentum. Accordingly, the remaining one pitch of travel is adequate for the several springs to bring the carriage to a soft noiseless stop.

It will now appear that I have provided a carriage return clutch knock-off mechanism that attains the several objects set forth above in a thoroughly practical and efficient manner.

As other embodiments of the invention are possible and as modifications of the one disclosed may be made, all without departing from the scope of the invention it is to be understood that the foregoing should be interpreted as illustrative and not in a limiting sense.

I claim:

1. A device for arresting the return movement of a typewriter carriage on a powered typewriter having an engageable and disengageable carriage return clutch mounted on a constantly rotating power shaft, in combination,

a frame,

a center stop mounted on said frame,

a fulcrum pin mounted on said frame,

a left hand margin stop mounted on said carriage, said center stop lying in the path of travel of said margin stop,

a center stop lever pivotally mounted on said fulcrum pin,

a clutch knock-off arm pivotally mounted on said pin,

a clutch knock-off link connected to said arm and said clutch and operable upon actuation of said lever to disengage said clutch,

a sensor lever pivotally mounted on said frame and including an abutment face lying in the path of travel of said margin stop and spring biased in opposition thereto,

a spring interconnecting said sensor lever and said frame to bias said sensor lever oppositely to the direction of carriage return movement,

means forming a resilient driving connection between said sensor lever and said stop lever,

and means forming a separable connection between said stop lever and said knock-off arm effective upon engagement of said abutment face by said margin stop during carriage return movement to cause said sensor lever to rock said center stop lever to move said knock-off arm and accordingly said clutch knock-off link in knock-off direction.

2. A device according to claim 1 including means to sever said separable connection means, and spring means effective upon operation of said severing means to return said knock-off arm and link to clutch engaging position.

3. A device according to claim 1 including means adjustably associated with said sensor and stop levers for predetermining the time of knock-off operation of said knock-off arm.

4. A device according to claim 1 including spring means connected to said knock-off arm and said frame and acting through said separable connection to yieldably resist carriage return movement of said margin stop when said margin stop engages said abutment face.

5. A device according to claim 1 wherein said separable connection comprises pawl and ratchet means associated with said stop lever and said knock-off arm, and means operated by said sensor lever for disconnecting said pawl and ratchet means.

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6. A device according to claim 1 wherein said sensor lever has an arm having an elongated slot formed therein, an abutment element adjustably mounted in said slot and securable therealong to said sensor lever arm in any predetermined position within the limits of said slot, 5
and an arm comprising an integral part of said stop lever and extending adjacent said sensor lever below and in engagement with said abutment element which engagement is effected by said resilient driving connection. 10

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