United States Patent [19]

Nowak et al.

[11] **3,888,339**

[45] **June 10, 1975**

[54] **IMPRESSION CONTROL MECHANISM FOR A TYPEWRITER OR SIMILAR MACHINE**

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[22] Filed: **Mar. 1, 1974**

[21] Appl. No.: **447,229**

Related U.S. Application Data

[63] Continuation of Ser. No. 277,591, Aug. 3, 1972, abandoned.

[30] **Foreign Application Priority Data**

Aug. 7, 1971 Germany 2139650

[52] **U.S. Cl.** **197/55**; 197/18

[51] **Int. Cl.** **B41j 1/60**

[58] **Field of Search** 74/53, 539; 197/16, 17, 197/55, 18

[56] **References Cited**

UNITED STATES PATENTS

213,553	3/1879	Eastwood	74/569
2,879,876	3/1959	Palmer et al.	197/16
2,926,768	3/1960	Becker et al.	197/55 X
3,263,511	8/1966	Wellstein	74/53
3,330,398	7/1967	Hylan	197/16

OTHER PUBLICATIONS

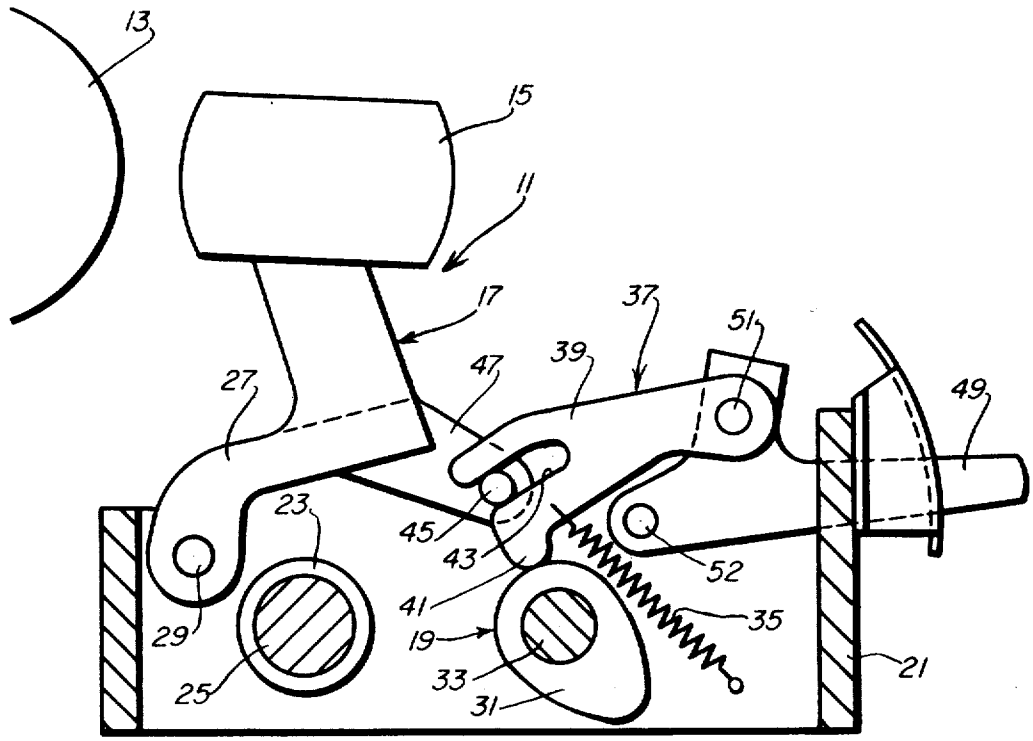
"IBM Customer Engineering Reference Manual" for Selectric I/O Keyboard Printer, pgs. (2–40 –2–42).

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[57] **ABSTRACT**

Impression control mechanism for regulating the impact velocity of a single element type carrier against a platen. The support for the type carrier is driven about a pivot by a cam to effect printing. The cam acts through one end of a control lever which end in turn supports and acts directly on a pin located on and spaced from the type carrier support pivot. The control lever is pivoted at its opposite end to an adjusting lever which is itself pivoted to move the control lever pivot and through its end acting on the pin to shift the type carrier support about its pivot establishing the rest position of the type carrier relative to the platen thereby determining the impact velocity of the type carrier.

3 Claims, 2 Drawing Figures



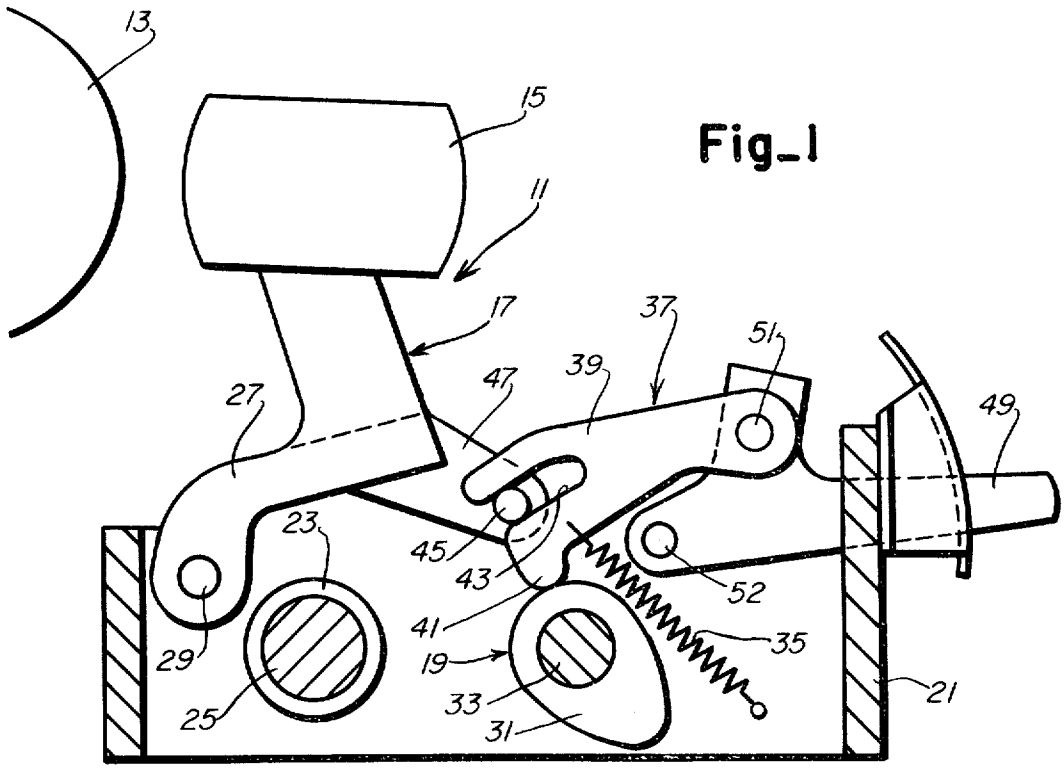

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Fig_1

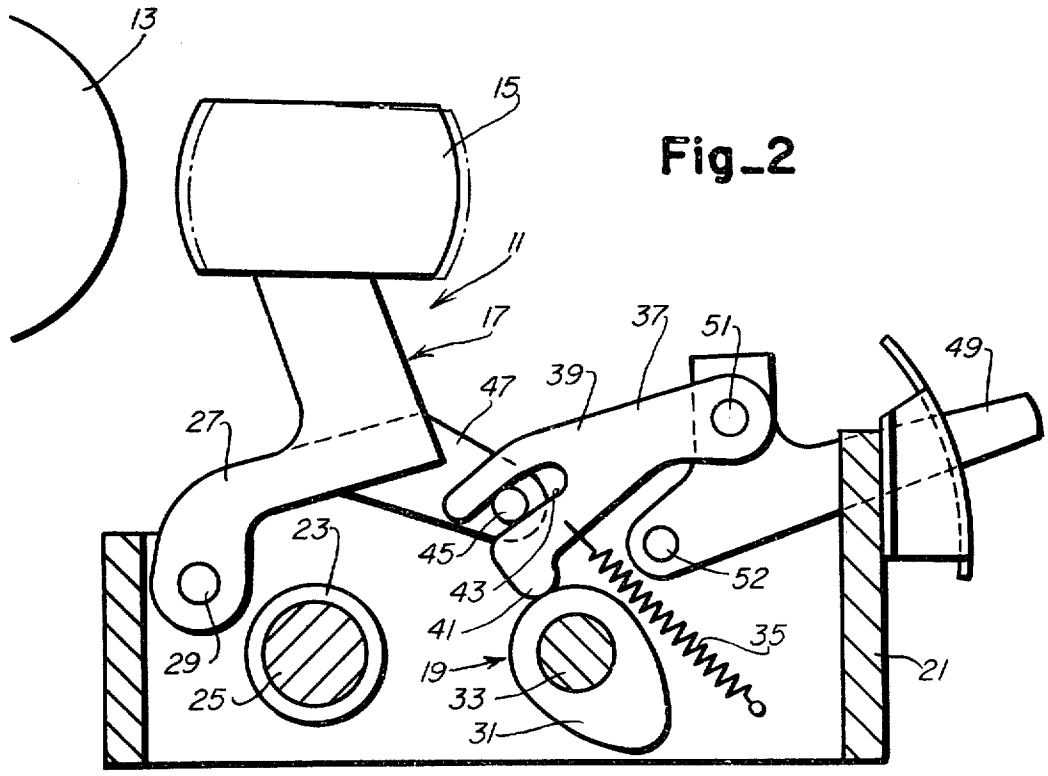

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Fig_2

IMPRESSION CONTROL MECHANISM FOR A TYPEWRITER OR SIMILAR MACHINE

This is a continuation of copending U.S. application Ser. No. 277,591, filed Aug. 3, 1972, now abandoned.

This invention relates to an impression control mechanism in a power driven typewriter or similar business machine for regulating the intensity with which a type element impacts against a recording medium, and more particularly to an impression control mechanism for regulating the impact intensity of a single element typewriter in which the type element or carrier is mounted on a carriage for movement past the recording medium.

In a typewriter or similar business machine in which printing is effected by a type element or type character impacting against the recording medium, an impression control mechanism is usually provided to control the intensity with which the type character strikes against the recording medium so as to control the density or outline of the character thus formed on the recording medium. In a conventional single element typewriter all of the type characters are carried on a generally sphere-like member which undergoes a common stroke for each character to be printed, and accordingly only a single impression control mechanism is necessary to vary the intensity of impact resulting from the single printing stroke. However, since the printing element is carried along a line of type by a carriage during successive printing operations, it is necessary for the impression control mechansim to likewise be mounted on the carriage for movement with the single element printer.

In the typical single element printer, the type element is mounted on a pivotally supported rocker, and printing is effected by pivoting the rocker to move the type element from a normal position to a printing position where it impacts against a paper platen. Usually, this is accomplished by means of a cam acting on the rocker through a cam follower which is pivotally supported with one end of the cam follower engaging the rotatably driven cam, and with the other end connected to the rocker for moving it to the printing position. Variation of the impacting intensity may be accomplished by shifting the pivot point of the cam follower, as shown for example in German Pat. No. 1,078,591, and U.S. Pat. Nos. 2,926,768 and 2,879,876. Alternatively, the point of engagement between the cam follower and the rocker member may be varied as shown, for example, on Page 38 of the IBM Selectric Instruction manual, January 1966. However, in the latter example the adjusting mechanism, which is in the form of a pivotally supported lever having a pin engaging the cam follower, is carried on the rocker with the printing element, and such an arrangement adds an undesirable amount of mass which must be moved during each printing stroke. In either instance, the mechanism for varying the impact intensity of a type character against the recording medium is usually difficult to adjust, and composed of an undesirable number of parts.

Accordingly, an object of the present invention is to provide an impression control mechanism for regulating the impact intensity of a type character against a recording element which is composed of a few parts which are easy to manufacture and require a minimum of space.

Another object of the invention is to provide an impression control mechanism in which the impact intensity of a type character striking a recording medium may be easily regulated.

A further object of the invention is to provide an impression control mechanism which minimizes the number of parts movable during a printing stroke so as to minimize the mass which must be moved and hence the inertia which must be overcome to impact a type character against a recording element.

Still other objects, features and advantages of the present invention will become apparent to those skilled in the art from a reading of the following detailed description of the preferred embodiment of the invention, taken in conjunction with the accompanying drawings, wherein:

FIG. 1 is a partial diagrammatic view of a printing arrangement having an impression control mechanism constructed in accordance with the present invention, and showing the relative position of the parts of the arrangement when the impression control mechanism is placed at one setting; and

FIG. 2 shows the printing arrangement of FIG. 1 with the impression control mechanism moved to another setting to show the change in the relative position of the parts.

Referring now in detail to the figures in the drawing, there is shown a typewriter printing arrangement, generally indicated **11**, for printing type characters or other symbols on a recording medium, not shown, which may desirably be located on a platen **13**. The type characters or other symbols to be printed, not shown, are formed on a generally spherical element **15** of a type carrier, generally indicated **17**, and the type carrier **17** is supported for a movement from a normal or rest position to a printing position at the platen **13**. As is conventional, printing is effected by impacting a selected type character against the recording medium and the type carrier **17** is driven in a printing movement to the printing position by a drive means, generally indicated **19**, which may desirably be power operated by a motor, not shown. The printing arrangement is supported on a carriage **21** for movement along a line of type past the platen **13**, and the carriage is mounted on a sleeve **23** which is slidably carried by a shaft **25** for movement past the platen **13**. The recording medium, the type characters, the motor for operating the drive means **19** as well as the other portions of the typewriter are not shown since they form no part of the present invention and may be desirably conventional.

As shown, the type carrier **17** includes a rocker or base element **27** which is supported for pivotal movement by bolts **29** or other conventional means which may be suitably secured to the carriage **21**. The drive means **19** is in the form of an eccentric cam **31** carried on a rotatably driven drive shaft **33** which undergoes a single revolution during each printing operation. As the cam **31** is rotatably driven through a single revolution, the type carrier **17** undergoes a printing movement from the normal position to the printing position to impact a type character against the recording medium to effect printing. After printing, the type carrier **17** is returned to the normal position by the urging of a resilient biasing means **35** as permitted by the rotational movement of the cam **31**.

To control the intensity with which a type character impacts against the paper platen **13**, and hence the impression on the recording medium, the printing arrangement **11** is provided with impact regulating means

in the form of an impression control mechanism, generally indicated by reference numeral **37**, for selectively controlling the force imparted to the type carrier **17** during a printing movement by the operation of the drive means **19**. As shown, the impression control mechanism **37** includes a pivotally supported control member **39** having a projecting portion **41** for engaging the camming surface of the eccentric cam **31** and having another portion **43** for engaging the type carrier **17**. The other portion **43** is in the form of a slot extending from adjacent the projection **41** toward the pivotal support of the control member **39**, and the slot receives a pin **45** which is suitably secured to an extension **47** from the rocker base **27** of the type carrier **17**. The projection **41** of the control member **39** is urged into engagement with the cam **31** by the resilient biasing means **35** which may be in the form of a spring stretched between the control member **39** and the carriage **21** and suitably secured thereto.

As the cam **31** rotates past the projection **41** during a printing operation, a driving movement is transmitted to the type carrier **17** through the projection **41** at the free end of the control member **39** whose upper portion **43** acts against pin **45** on the type carrier rocker element **27**, driving the type carrier **15** toward the platen **13**.

Inasmuch as the cam **31** imparts the same movement to projection **41** each printing cycle, the impact velocity of the type carrier **15** is determined by establishing a rest position of the type carrier **15** and its base or support **27** closer to or away from the platen **13**. The rest position is established by moving the drive pin **45** upwardly from FIG. **1** to FIG. **2** along portion **43** of the control member **39** and incident to its leftward movement. Thus, to selectively vary the impact velocity of the type carrier against the platen **13**. The impression control mechanism **37** includes means in the form of an adjusting member **49** for moving the control member **39** with portion **43** acting against pin **45** to pivot rocker **27** about its pivot **29**. As shown, the control member **39** is pivotally supported on the adjusting member **49** by suitable means, for example a pivot pin **51**, and the adjusting member **49** is pivotally supported on the carriage **21** by suitable means, for example a pin **52**. By pivotally moving the adjusting member **49** from one position to another position, as shown for example in FIGS. **1** and **2**, the control member **39** is moved to the left, reducing the distance between control member pivot **51** and pin **45**, and, its free end constrained by the cam **31**, causing portion **43** to act on pin **45** and rock the type carrier rocker **27** counterclockwise about its pivot **29** to vary the distance between the platen **13** and the type carrier **17** while in the normal position. Since very little force is exerted on the adjusting member **49** during a printing operation, the adjusting member **49** may be held in a selected position by suitable detents.

In a printing operation, the type carrier **17** is driven from the normal position to the printing position to impact the selected type character against a recording medium on the platen **13** by rotatably driving the eccentric cam **31** through a single revolution. As the lobe of the cam **31** passes the projection **41** of the control member **39**, the driving movement provided by the rotatably driven cam **31** imparts a printing movement to the type carrier **17**. The type carrier **17** is driven against the urging of the spring **35**, and after impact the spring **35** again urges the type carrier **17** to return to the normal position as permitted by the rotational movement of the cam **31**. The intensity with which the type carrier impacts against the platen **13** is determined by the position of the adjusting member **49** which may be pivotally moved to a selected position to shift the control member **39** to the left or right, shortening or lengthening the distance between pivot **51** and pin **45**, whereby its free end, constrained by cam **31**, will cause portion **43**, supporting pin **45**, either to raise or lower pin **45** about rocker pivot **29** thus adjusting the rest position of the type carrier **15** relative to the platen **13**. FIG. **2** shows the type carrier **15** initially positioned closer to the platen **13**. As the angle of drive imparted by the cam **31** is constant, the type carrier **15** will be driven closer to the platen and strike with a greater velocity.

While only a single preferred embodiment of the invention has been illustrated and described, it will be apparent to those skilled in the art that various improvements and modifications may be made. Accordingly, it is to be understood that this invention is not to be limited by the illustrative embodiment, but only by the scope and spirit of the appended claims.

What is claimed is:

1. A single element printing machine comprising

a frame,

a platen,

a type carrier having a plurality of type characters formed thereon,

means supporting said type carrier about a pivot axis on said frame whereby said type carrier can be driven from a rest position toward said platen to impact a selected character against said platen,

said support means having a pin thereon spaced from said pivot axis,

a drive cam rotatably mounted on said frame for driving said type carrier support means about its pivot axis,

a control member having one end located between said cam and said pin,

said one end supporting said pin and establishing a rest position of said type carrier support means,

and an operator controlled adjusting member for determining the impact velocity of said type carrier against said platen,

said control member being pivotally supported at its other end on said adjusting member at a point, said point and said pivot axis being on opposite sides of said pin,

said adjusting member being pivotally supported on said frame whereby pivotal movement thereof shifts said control member between said cam and said pin to rock said type carrier support means about its pivot axis to establish a rest position of said type carrier closer to or farther from said platen.

2. A printing machine as recited in claim **1**, including spring means biasing said control member into contact with said cam.

3. A printing machine as recited in claim **2**, wherein said one end of said control member is forked to receive said pin.

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