Oct. 14, 1969 F. H. CANNY ET AL 3,472,353

REPEAT CARRIAGE SPACING MECHANISM FOR TYPEWRITERS

Filed Dec. 21, 1966 2 Sheets-Sheet 1

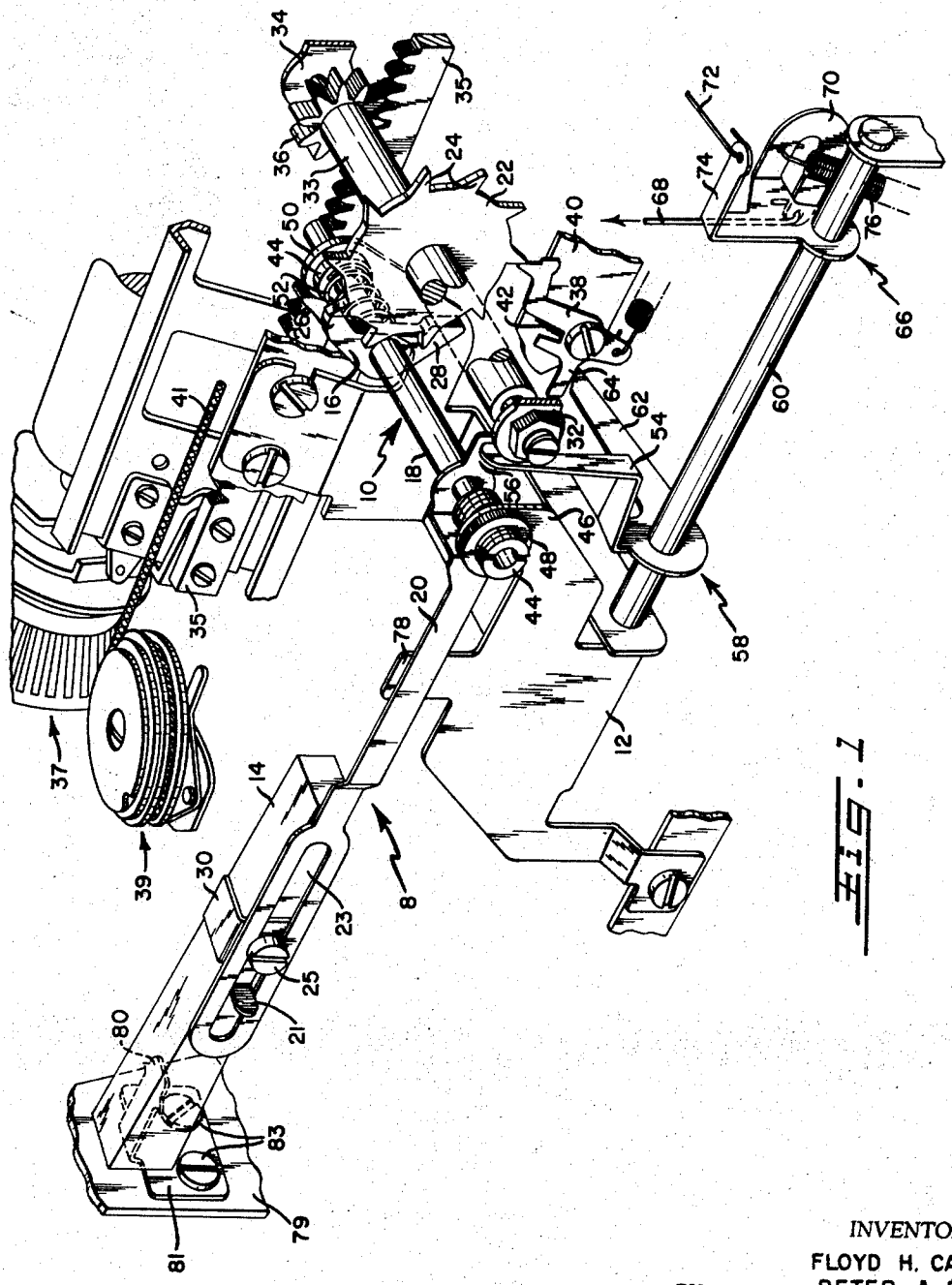


FIG. 1

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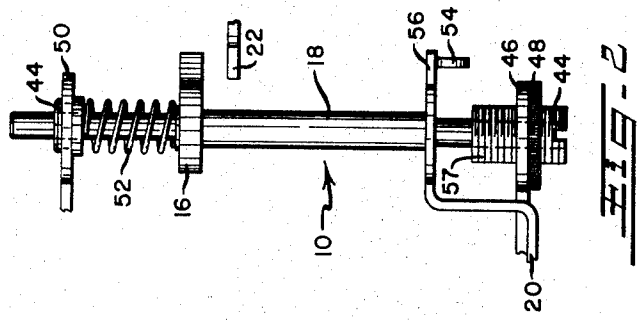


FIG. 2

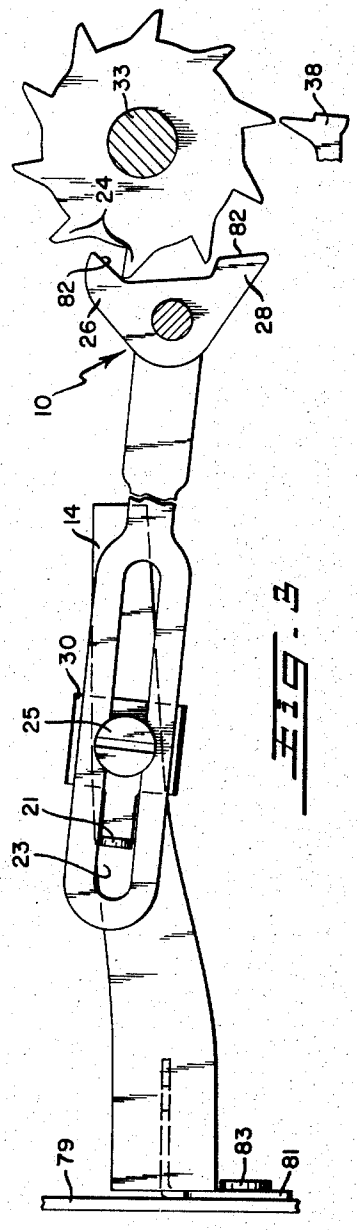


FIG. 3

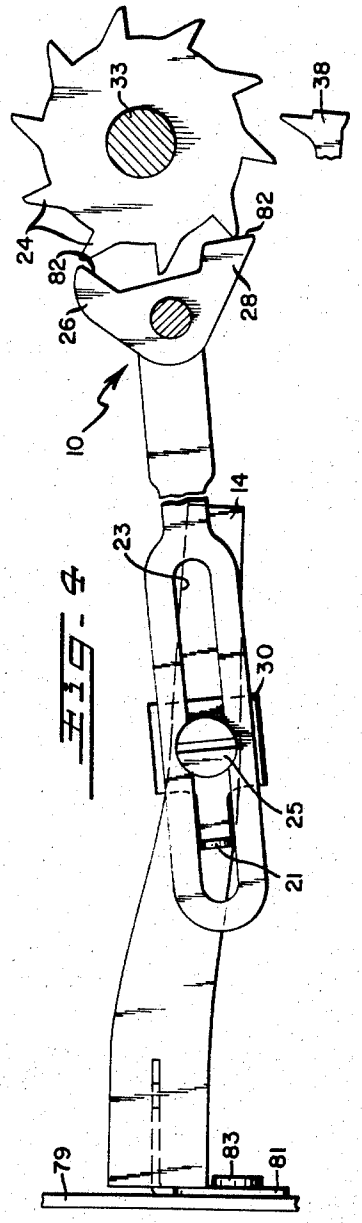


FIG. 4

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REPEAT CARRIAGE SPACING MECHANISM FOR TYPEWRITERS

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Int. Cl. B41j 19/00
U.S. Cl. 197—82 5 Claims

ABSTRACT OF THE DISCLOSURE

A repeat escapement mechanism for automatically incrementally stepping a carriage of a manual typewriter. This mechanism is additional to and operable independent of a conventional escapement. The mechanism includes a pendulum action that oscillates in a horizontal plane with a rubber member to control the rate of oscillation.

BACKGROUND OF THE INVENTION

This invention relates to manual typewriters and more particularly to escapement feed mechanisms therefor.

The closest known prior art related to this invention is disclosed in copending application Ser. No. 437,504, filed on Mar. 5, 1965 and titled "Escapement Mechanism for Typewriters," now Patent No. 3,312,322 issued Apr. 4, 1967 to Floyd H. Canny. The copending application discloses a typewriter carriage repeat spacing mechanism similar to the present invention but employing a vertical acting pendulum arm instead of a horizontal acting pendulum arm. The copending mechanism is designed for use in manual office machines which have vertical confines that allow use of a vertical acting pendulum type of repeat escapement, whereas the present invention is designed for manual compact machines which do not have the vertical confines that would allow use of the vertical mechanism.

SUMMARY OF THE INVENTION

The invention provides an automatic repetitive spacing mechanism for typewriters of the manual compact class which is efficient and low cost. It also provides a repeat mechanism wherein the operational noise and shock are greatly reduced.

These provisions are accomplished by employing an escapement mechanism that is of a pendulum operating type wherein the pendulum arm is oscillated in the horizontal plane under the influence of a rubber dampening member.

BRIEF DESCRIPTION OF THE DRAWING

FIGURE 1 is a bottom perspective view showing a portion of the conventional escapement mechanism operatively connected to a carriage rack and showing the repeat escapement mechanism in a normal non-carriage control condition;

FIGURE 2 is a front elevational view of a shaft assembly of the repeat escapement mechanism; and

FIGURES 3 and 4 are bottom plan views showing the extreme positions of the pendulum arm during a repeat spacing operation.

DESCRIPTION OF THE PREFERRED EMBODIMENT

The invention mainly consists of a repeat escapement mechanism **8** including a shaft assembly **10** that is mounted to a frame bracket **12** for pivotal and longitudinal movement and a frame mounted rubber member **14**. The shaft assembly **10** is comprised of a starwheel engageable actuator **16** which is rigidly assembled to the shaft proper **18** and a pendulum arm **20** which is also

rigidly assembled to the shaft **18** in substantially a horizontal plane but spaced from the actuator **16**. When the shaft assembly **10** is brought into engagement with a starwheel **22**, and the conventional escapement is disengaged, the starwheel teeth **24** alternately cooperate with two dogs **26** and **28** of the actuator **16** to pivotally oscillate the shaft assemby **10** about its axis. The rubber member **14** which is cradled by a U-shaped member **30** on the pendulum arm **20**, dampens the oscillating action for providing a smooth automatic repetitive stepping motion of the carriage **37**.

More specifically, the starwheel **22** is pivotally mounted between frame members **32** and **34** by a shaft **33** and is gear engaged with a normally biased carriage rack **35** by way of a pinion gear **36**. Rack **35** is carried by a carriage **37**. The starwheel **22** is held against the biasing effect of the carriage spring motor **39** and cord **41** by a holding dog **38** that is pivotally mounted on a conventional rocker type escapement bracket **40** and is limited against a stop member **42**.

Referring now to FIGURE 2, the shaft assembly **10** is mounted at its ends between two frame mounted bearings **44** for longitudinal and pivotal movement. The lower bearing **44** is threaded into its frame portion **46** and is retained by a circular jam nut **48** while the upper bearing **44** is snap-fit into its frame portion **50**. A compression spring **52** is disposed between the upper bearing **44** and the actuator **16** which tends to bias the shaft assembly **10** downward but is normally held ineffective by a heavier biased finger **54** which contacts an extension lip **56** of pendulum arm **20**.

The shaft assembly **10** lies in a plane that is parallel to and spaced from the starwheel shaft **33** whereupon the actuator **16** will be moved into the rotative path of the starwheel teeth **24** by compression spring **52** when the finger **54** is moved away from lip **56**. The shaft assembly **10** is limited as the lip **56** of arm **20** abuts the top surface **57** of the lower bearing **44**. This limit is adjustable as the lower bearing **44** is externally threaded its entire length.

Referring again to FIGURE 1, finger **54** is a formed extension of a bellcrank **58** that is rigidly assembled to a frame mounted pivotal shaft **60** so the end of its other finger **62** underlies a holding dog extension **64**. An actuating bellcrank **66** is also rigidly assembled to shaft **60** but toward its opposite end and has a keyboard operable pull link **68** connected to one of its fingers **70** while a margin release pull link **72** is connected to its other finger **74**. A tension spring **76** biases the shaft assembly **58, 60, 66** clockwise about its axis to a limited position determined by the pendulum arm **20** abutting a bendably adjustable frame member lip **78**.

It can be seen that when pull link **68** is moved in the direction of the arrow by depression of its associated key button, the holding dog **38** releases the starwheel **22** and the restrained shaft assembly **10** is released and spring **52** biases actuator **16** into the path of the biased starwheel **22**. The bellcrank **58** is so constructed that the actuator **16** is positioned in the starwheel path just before the holding dog **38** is released from the starwheel **22**.

The U-shaped member **30** is adjustably mounted on the pendulum arm **20** by having a guiding tab **21** formed from member **30** and extending through an elongated slot **23** in arm **20** and having an adjustable locking screw **25** extend through slot **23** and threaded into member **30** so that it may cradle the rubber member **14** at varied positions along its free end length. The rubber member **14** is of a dead rubber type and is slightly tapered toward its free end. The rubber member **14** is fixed to the frame **79** at its left end by a bracket **81** assembled by screws **83** and a frame bracket barbed extension **80** which is forced into a suitable rubber member **14** and has its free end

extending in a substantially horizontal plane. It can be seen that the dampening effect that the rubber member **14** has on the pendulum arm **20** regulates the rate of oscillation imparted thereto by varying the location of the U-shaped member **30**. The further the member **30** is adjusted toward the free end, the less the rubber member **14** resists deflection which causes a greater oscillation motion resulting in a slower rate of carriage stepping movements. In the other condition when the member **30** is adjusted toward the rigid end, the oscillation motion is less resulting in a faster rate of carriage stepping movements.

A portion of the noise and vibration introduced into arm **20** by the starwheel teeth **24** repeatedly contacting dogs **26** and **28** is dissipated into rubber member **14** resulting in a substantially guieter and smoother repetitive stepping action of the carriage **37** relative to like features on previous machines.

Referring now to FIGURES 3 and 4, the two actuator dogs **26** and **28** are so shaped that the rotating starwheel teeth **24** will alternately contact the dog cam surfaces **82**. The camming action causes the oscillation of the shaft assembly **10** while the U-shaped member **30** alternately contacts the opposite sides of the rubber member **14** and deflects the rubber member **14** which in turn offers resistance to the back and forth motion of the shaft assembly **10**. The rubber member **14**, because of its limited ability to restore to a relaxed condition, slows and cushions the oscillating action so a smooth automatic repetitive stepping action of the carriage **37** is achieved.

When the key button is released, spring **76** (FIG. 1) through bellcrank **66** biases the shaft **60** clockwise and the mechanism is returned to its normal inoperative position. The actuator **16** is of sufficient thickness, compared to the thickness of holding dog **38**, so the holding dog **38** is positioned in the starwheel path just before the actuator **16** is disengaged from the starwheel **22**. Also, the rubber member **14** has enough recovery ability to return the shaft assembly **10** back to its normal neutral position regardless of its pivotal disengaged position.

What is claimed and desired to be secured by Letters Patent is:

1. A typewriter or the like having a carriage (**37**) biased in a letter feed direction, comprising:

(a) a toothed starwheel (**22**) connected to the carriage for controlling movement of the carriage and rotatable in a predetermined direction by the biasing effect on the carriage;

(b) a shaft (**18**) mounted for movement longitudinally along its axis and for pivotal movement about its axis;

(c) a pair of dogs (**26, 28**) rigidly carried on said shaft;

(d) means (**52**) for moving said shaft longitudinally along its axis to move said pair of dogs from a starwheel disengaged position to a starwheel engaging position;

(e) an elongated elastomeric member (**14**) having a rigid end and a free end, said free end being flexibly oscillatable relative to said rigid end in a direction transverse to its length;

(f) an arm (**20**) having one end rigidly carried on said shaft (**18**) and oscillated thereby about its pivoted axis when said pair of dogs is in engaging position with said starwheel and when said starwheel is under the biasing effect of the carriage; and

(g) means (**30**) connecting said arm to said elastomeric member intermediate said rigid end and said free end thereof for dampening the rate of oscillation of said arm thereby regulating the automatic repetitive incremental stepping movements of the carriage.

2. A typewriter as defined in claim **1** wherein said last named means (**30**) includes a member (**30**) adjustable relative to said arm (**20**) for varying the location of the connection of said arm and said elastomeric member (**14**) to vary the dampening effect of the oscillation of said arm.

3. A typewriter as defined in claim **2** wherein said adjustable member (**30**) is supported on said arm (**20**).

4. A typewriter or the like having a carriage (**37**) based in a letter feed direction, comprising:

(a) a toothed member (**22**) connected to the carriage for controlling movement of the carriage and moveable in a predeterminal direction by the biasing effect on the carriage;

(b) a pair of dogs (**26, 28**) supported for movement from an ineffective position to an effective position and in said effective position being engageable with said toothed member for oscillatable movement by said toothed member when the toothed member is under the influence of the biased carriage;

(c) an elongated elastomeric member (**14**) supported in a manner having a rigid end and a free end, said free end being flexibly oscillatable relative to said rigid end in a direction transverse to its length;

(d) an arm (**20**) having one end rigidly connected to said pair of dogs and oscillated thereby when said pair of dogs are oscillated by said toothed member; and

(e) means (**30**) connecting said arm to said elastomeric member for oscillative movement in said transverse direction for dampening the rate of oscillation of said arm thereby regulating automatic repetitive incremental stepping movements of the carriage.

5. A typewriter as defined in claim **4** wherein said elastomeric member (**14**) is made from a non-metal material.

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U.S. Cl. X.R.

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