Sept. 30, 1958 R. D. DODGE ET AL 2,854,124

TYPEWRITER CARRIAGE DECELERATOR

Filed Dec. 30, 1955 3 Sheets-Sheet 1

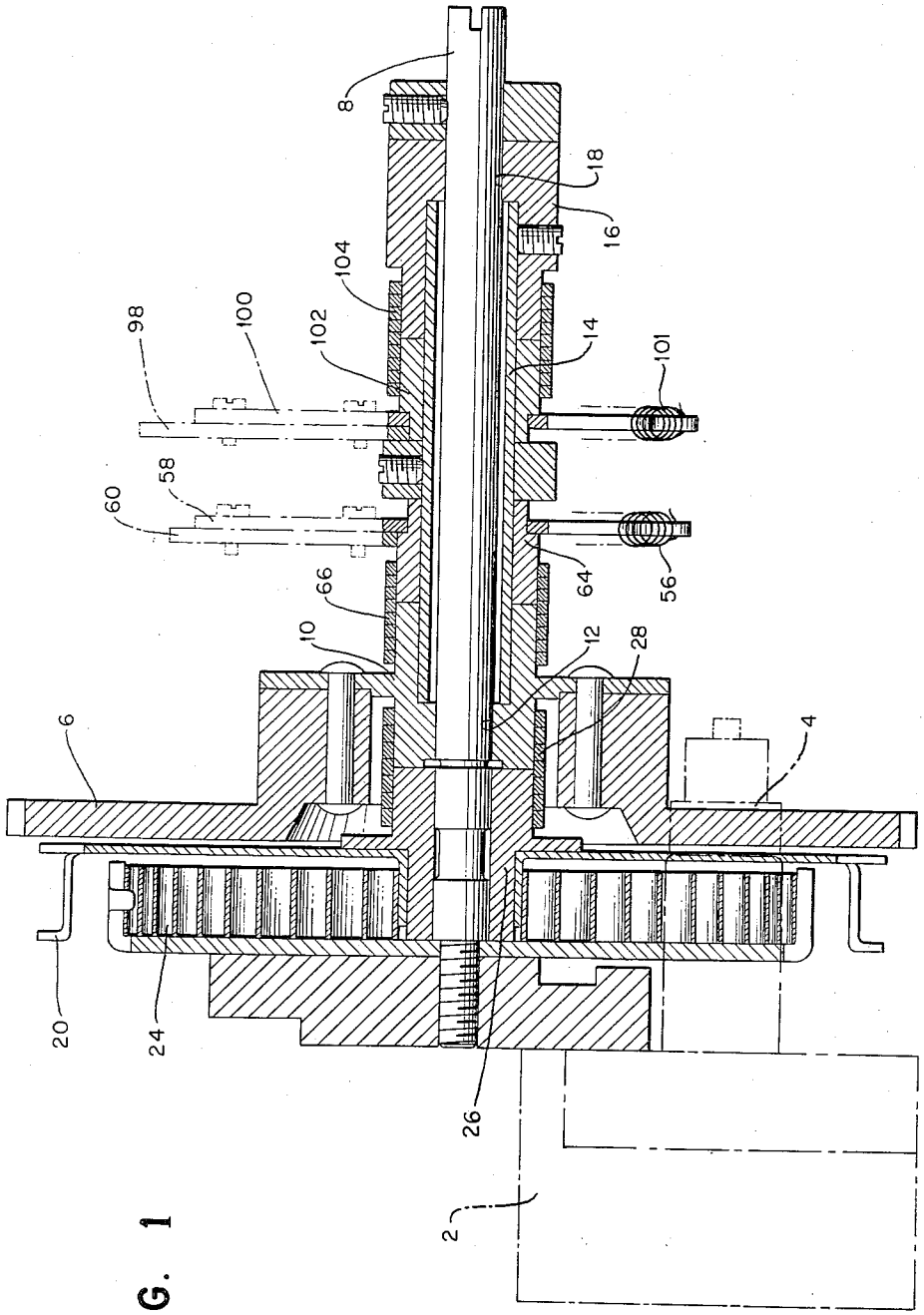


FIG. 1

INVENTORS
RONALD D. DODGE
JOHN H. NORCROSS

BY

ATTORNEY

Sept. 30, 1958 R. D. DODGE ET AL 2,854,124

TYPEWRITER CARRIAGE DECELERATOR

Filed Dec. 30, 1955 3 Sheets-Sheet 2

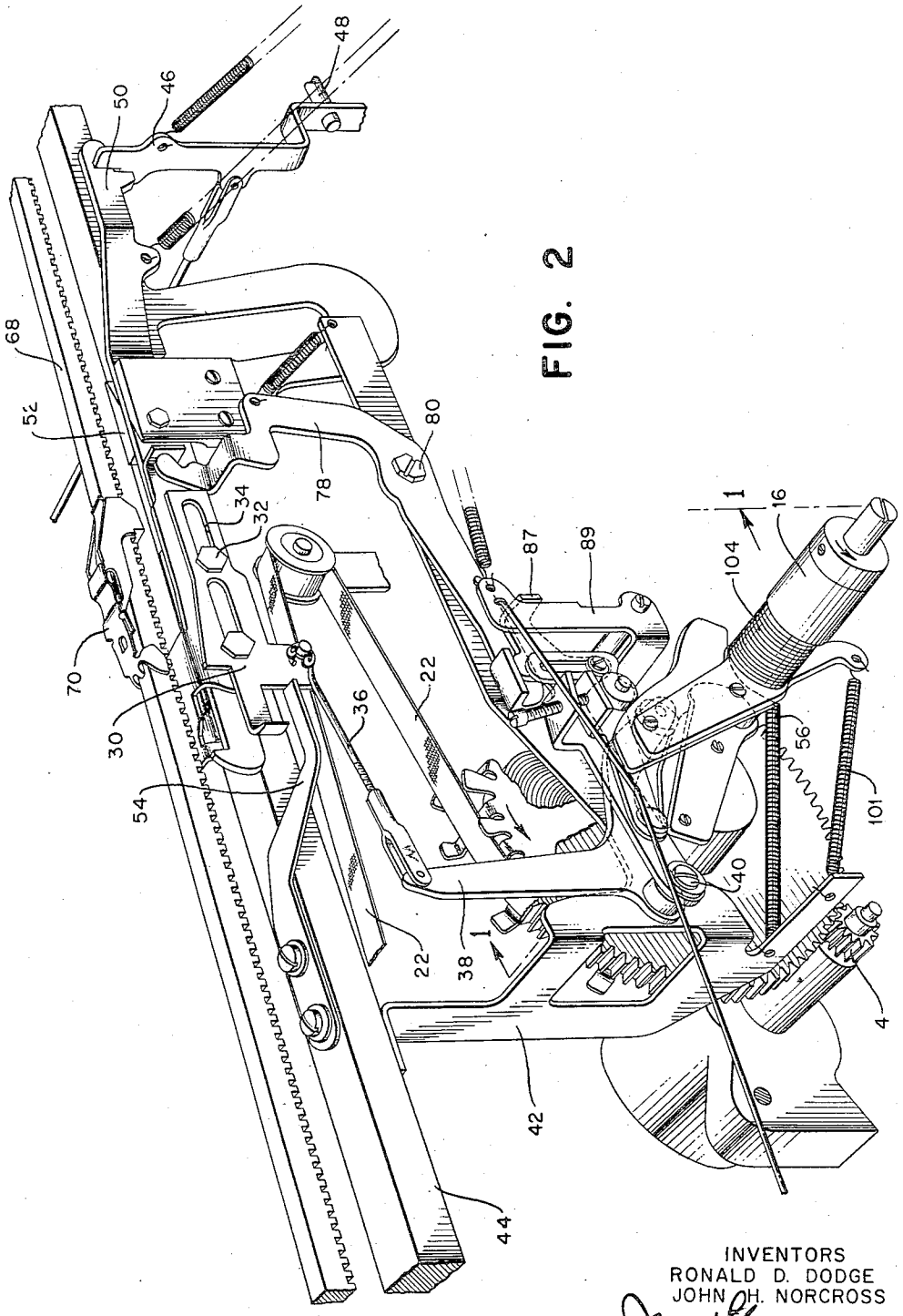


FIG. 2

INVENTORS
RONALD D. DODGE
JOHN H. NORCROSS
BY
ATTORNEY

Sept. 30, 1958 R. D. DODGE ET AL 2,854,124

TYPEWRITER CARRIAGE DECELERATOR

Filed Dec. 30, 1955 3 Sheets-Sheet 3

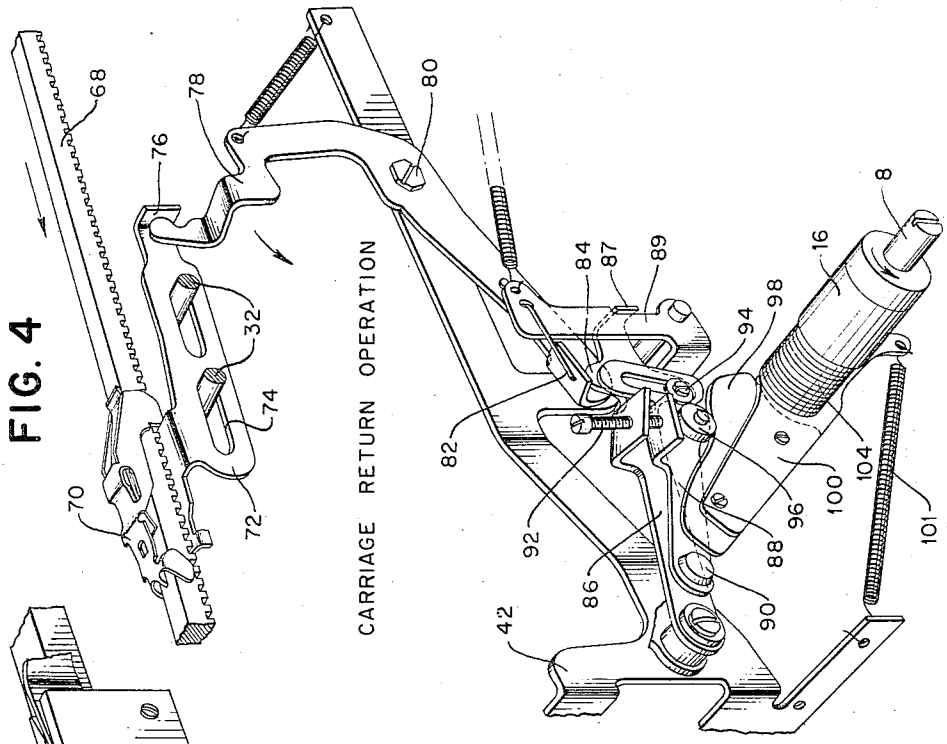


FIG. 4

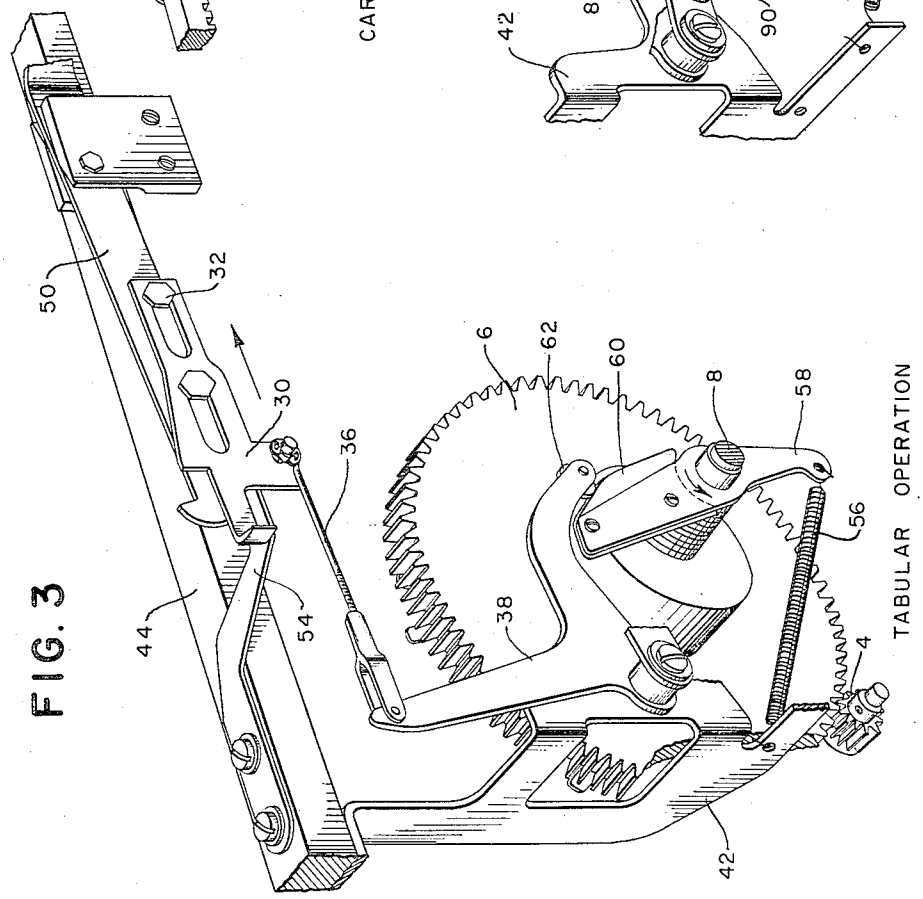


FIG. 3

United States Patent Office 2,854,124
Patented Sept. 30, 1958

2,854,124

TYPEWRITER CARRIAGE DECELERATOR

Ronald D. Dodge and John H. Norcross, Poughkeepsie, N. Y., assignors to International Business Machines Corporation, New York, N. Y., a corporation of New York

Application December 30, 1955, Serial No. 556,630

9 Claims. (Cl. 197—183)

This invention relates to typewriters and more particularly to an improved governor and control mechanism combination for regulating the speed of the typewriter carriage.

One of the problems of typewriter carriage travel lies in the noise and shock resulting from stopping it—as for example, at the end of a tabulation or carriage return operation. Accordingly, it is a first object of this invention to provide an improved typewriter carriage decelerator.

It is a further object of this invention to provide an improved carriage governor and control mechanism therefor whereby an improved decelerator action is provided for interrupting carriage travel at the end of a tabulation run.

It is a further object of this invention to provide an improved carriage governor and control mechanism therefor whereby an improved decelerator action is provided for interrupting carriage travel at the end of a carriage return operation.

It is a still further object of this invention to provide an improved governor control mechanism for effecting a decelerator action.

Other objects of the invention will be pointed out in the following description and claims and illustrated in the accompanying drawings, which disclose, by way of example, the principle of the invention and the best mode, which has been contemplated, of applying that principle.

In the drawings:

Fig. 1 is a section through the escapement motor showing the improved governor control mechanism.

Fig. 2 is a perspective view of the governor control mechanism in normal position.

Fig. 3 is a perspective view of tabulation control mechanism in its active position.

Fig. 4 is a perspective view of carriage return mechanism in its active position.

This invention relates then to the use of a centrifugal governor in combination with mechanism for controlling its operation during tabulation and carriage return run, thereby accomplishing these results, namely: (1) controlling the speed of a typewriter carriage during a tabulation run; (2) decelerating the carriage during the last portion of the tab run travel; and (3) decelerating the carriage during the last portion of a carriage return travel.

With reference to the drawings, these objects are accomplished through the use of a centrifugal governor 2, of the type shown in copending United States application Serial No. 478,224, filed December 29, 1954, wherein any increase in centrifugal force increases the braking effect of the governor.

The governor 2 is equipped with a driving pinion 4 which, in turn, is in mesh with a drum gear 6 that is rotatably mounted about a stud 8. The stud 8 is fixedly supported between the power frame and the rear frame of the typewriter. The drum gear 6 is mounted on a

drum gear hub 10 which has a central bore 12 acting as a bearing about the stud 8. Hub 10 carries a sleeve 14 which is pressed into the hub for rotation therewith while the sleeve 14 at its opposite end is pressed into a supporting hub 16 so that hubs 10, 16 and sleeve 14 rotate in unison. Hub 16 has a central bore 18 which acts as a bearing on stud 8.

It is well known that typewriters are equipped with tape drums such as the drum 20, which is connected via a tape 22, shown in Fig. 2, to a typewriter carriage. The tape drum is powered by a spring motor 24, and accordingly any time the carriage is released for travel, the spring motor drives the tape drum 20 thereby exerting a pull on tape 22 and moving the carriage across the print position.

Tabulation speed control

One of the objectives of this invention is to control the speed of the carriage during a tabulation run, e. g. when the carriage is free to be driven by spring motor 24. In this respect, tape drum 20 is mounted on a tape drum hub 26 which is connected via a spring clutch 28 (or any other conventional one way clutch) to the drum gear hub 10. The clutch connection is such that when the tape drum rotates counterclockwise as viewed in Fig. 2, its hub 26 will drive the drum gear hub 10, and consequently, the drum gear 6 which drives a pinion 4 to control the operation of the governor 2. It is obvious that the governor responds to the speed of the carriage and acts to limit the speed through its centrifugal control.

Tab deceleration

While the carriage is running freely during a tab run under control of the governor, it can be appreciated that it is further desirable to slow down the carriage during the last portion of the tab run so as to avoid shock and noise. In order to accomplish this result, the conventional tab check lever 30, which is shown in Fig. 2 as being slidably supported on studs 32 within the limits of slots 34, is connected via a link 36 to a tab decelerator bell crank 38 which in turn is pivotally supported about a stud 40 carried by a bracket 42 mounted on carriage rail 44.

It will be understood that in a normal and tabulation operation, a tab actuating lever 46 is pivoted about a supporting stud 48 to act on a tab lever 50, rocking the same about a fulcrum 52 thereby moving the tab check lever 30 out from behind a tab check retainer 54 whereupon (with reference to Fig. 3) a tab cam spring 56, which is interconnected between the bracket 42 and a tab cam 58 pulls on the tab cam to rotate it clockwise about stud 8. The tab cam 58 carries an interchangeable cam surface 60 which acts on a cam follower 62 carried by bell crank 38. Therefore, the spring 56 will rock the bell crank 38 counterclockwise about its supporting pivot 40 to move the tab check lever to the Fig. 3 position.

It is well understood in the typewriter art that in the operation of the tab mechanism, the tab check lever engages a pre-set tab stop to interrupt the carriage travel after the tab check lever 30 has been driven back to its Fig. 2 position from its actuated position shown in Fig. 3.

The tab check lever 30 is driven back to its Fig. 2 position during the last portion of the tabulation travel, and it is this motion of the tab check lever which is utilized to decelerate the carriage and avoid the undesirable shock and noise. That is, as the tab check lever is driven to the right, as viewed in Fig. 3, it pulls on link 36 to rock bell crank 38 thereby driving follower 62 into engagement with the cam surface 60. This action drives the tab decelerator cam 58 counterclockwise about the stud 8 (the speed of rotation of the tab decelerator cam

58 naturally depends upon the shape of the cam surface 60).

Reference is again made to Fig. 1 of the drawing wherein the tab decelerator cam 58 is shown mounted on tab cam hub 64 which in turn is mounted for rotation about the sleeve 14. The hub 64 is connected via a one way spring clutch 66 to drum gear hub 10 which in turn drives the drum gear 6 and therefore, the pinion 4 to increase the centrifugal force on governor 2, and thereby increase the braking force on the carriage. It is interesting to note that the braking force is proportional to the speed of the carriage, and accordingly the decelerator acts to supply just enough force to slow down the carriage, irrespective of the carriage speed at the time the decelerating action occurs.

Carriage return decelerator

Reference is now made to Fig. 4 of the drawings wherein a margin rack 68 is shown equipped with a conventional margin stop 70. It will be understood that during a carriage return operation the margin rack 68 travels as an integral part of the carriage in the direction of the arrow. During the last portion of the carriage return operation, the margin stop 70 is engageable with an ear of the margin control slide 72 which in turn is slidably mounted within limits of slots 74 on the same pins 32 which carry the tab check lever 30.

The margin control slide 72 is equipped with a shoulder 76 that is engageable with a margin control bell crank 78, which in turn is pivotally supported on a stud 80 carried by bracket 42. With this structure, when the carriage moves through the last portion of a carriage return motion, the margin control slide will act to rock the bell crank 78 about the stud 80. Margin control bell crank 78 is equipped at its other end with a bent over ear 82 engageable with a projection 84 on the carriage return decelerator lever 86. The latter is pivotally supported about the stud 40 which also carries the tab decelerator bell crank 38. In order to provide for adjustment of the decelerating force, the carriage return decelerator lever is equipped with an adjustable arm 88 which is pivotally supported on a stud 90 for movement relative to the carriage return decelerator lever 86 by turning the screw 92. Then the position of the parts can be locked by means of the locking screw 94. The adjustable arm 88 carries a cam follower 96 which is engageable with a cam surface 98 of the carriage return decelerating cam 100. Decelerating cam 100 is biased clockwise by a spring 101.

Reference is now made to Fig. 1 wherein the carriage return decelerator cam 100 is shown mounted on the carriage return decelerating hub 102 which is pivotally supported about the sleeve 14. Hub 102 is connected via a one way drive spring clutch 104 to the supporting hub 16 which, as heretofore mentioned, is driven integrally with the drum gear hub 10 thereby turning the hub gear 6 to drive pinion 4 to actuate the governor 2.

With this structure then, it can be appreciated (with reference to Fig. 4) that when the margin control bell crank 78 is rocked counterclockwise about its stud 80, the bent over ear 82 will act on the projection 84 to rock the carriage return decelerator lever 86 about its supporting stud 40 thereby forcing cam follower 96 into engagement with the carriagee return decelerating cam 100 to drive the latter counterclockwise as viewed in Fig. 4, thereby rotating its support hub 102, hub 16, and drum gear 6 to drive the pinion 4 of the governor 2. This force on the governor will act as a brake to slow down the carriage and minimize shock and noise in the carriage return. Once again the force applied to the governor is proportional to the speed of the carriage during deceleration.

All of the spring clutches 28, 66 and 104 are so mounted with respect to drum gear hub 10 and supporting hub 16 respectively, that when actuated they always drive the hub 10 in the same direction, and therefore, the drum gear 6 will always drive the pinion 4 in the same direction to effect the braking force of the governor. Furthermore, the tab decelerator cam 58 and the carriage return decelerator cam 100 can be driven only as fast as the governor 2 will permit them to be driven.

It has been found through the use of this mechanism that an inexpensive and vastly improved governor and decelerating mechanism is provided wherein the governor serves the dual function of limiting the speed of the carriage during a tabulation run and acting as a brake to halt the movement of the carriage during the last portion of the tab run and during the last portion of the carriage return travel thereby materially reducing shock and noise during the latter two carriage operations.

While there have been shown and described and pointed out the fundamental novel features of the invention as applied to a preferred embodiment, it will be understood that various omissions and substitutions and changes in the form and details of the device illustrated and in its operation may be made by those skilled in the art without departing from the spirit of the invention. It is the intention therefore, to be limited only as indicated by the scope of the following claims.

What is claimed is:

1. In a typewriter having a power driven carriage mounted for movement across a printing position, a device for decelerating said carriage as it travels through a predetermined portion of its power driven movement comprising a bell crank pivotally supported for rocking movement in response to said predetermined carriage movement, a shaft, a decelerating cam, one way clutch means for driving said shaft in response to the turning of said cam, means interconnecting said cam and bell crank to provide for the turning of said cam in response to the rocking of said bell crank, a governor, and driving means interconnecting said shaft and said governor to drive the latter in response to rotation of said shaft whereby said governor acts to decelerate said carriage through said predetermined portion of its power driven movement.

2. In a typewriter having a power driven carriage mounted for movement across a printing position, a device for decelerating said carriage as it travels through a predetermined portion of its power driven movement comprising a bell crank, means for effecting a rocking movement of said bell crank in response to said predetermined carriage movement, a shaft, a decelerating cam having connections to provide for its rotation in response to the rocking of said bell crank, said cam further having one way clutch means positively interconnecting said cam and said shaft for driving the latter in response to the rocking of said bell crank, a governor and driving means interconnecting said shaft and said governor to drive the latter in response to rotation of said shaft whereby said governor acts to decelerate said carriage by limiting the rate of rotation of said shaft and hence of said cam.

3. In a typewriter having a power driven carriage mounted for movement across a printing position, a device for decelerating said carriage as it travels through a predetermined distance of its power driven movement comprising a shaft, a decelerating cam mounted for cyclic movement through an inactive and an active portion, one way clutch means interconnecting said cam and said shaft for driving the latter as said decelerating cam moves through its active portion, means driving said cam through its active portion as said carriage is being driven through said predetermined distance, a governor, and driving means interconnecting said shaft and said governor to drive the latter in response to rotation of said shaft whereby said governor acts to decelerate said carriage through said predetermined distance.

4. In a typewriter having a power driven carriage mounted for movement across a printing position, and tabulating means for releasing said carriage for power

driven movement, a device for decelerating said carriage as it travels through a predetermined portion of its tabulation movement comprising a bell crank pivotally supported for rocking movement in response to said predetermined portion of tabulation movement of said carriage, a shaft, a decelerating cam having means moving the same through an operative range in response to the rocking of said bell crank, spring means operable in response to said tabulating means for moving said cam through an inoperative range and hence said bell crank to a position to engage said carriage at one limit of its movement through said predetermined tabulation portion, one way clutch drive means interconnecting said shaft and said decelerating cam for positive interconnection as said cam moves through its operative range, and governor means responsive to the rotation of said shaft as it is driven by said decelerating cam for limiting the rate of rotation of said shaft and hence the rate of travel of said carriage through said predetermined tabulation portion.

5. A typewriter having a power driven carriage mounted for movement across a printing position, and carriage return means for power restoring said carriage to a left hand margin position, in combination with a device for decelerating said carriage as it travels through a predetermined portion of its carriage return movement comprising a shaft, a decelerating cam movable through an inoperative and an operative range with means responsive to said carriage moving through said predetermined portion for driving said decelerating cam through its operative range, one way clutch means for driving said shaft in response to the movement of said cam through its operative range, and governor means for limiting the rate of rotation of said shaft while it is driven by said decelerating cam thereby limiting the rate of movement of said carriage through said predetermined portion.

6. In a typewriter having a power driven carriage mounted for movement across a printing position, a device for decelerating said carriage as it travels through a predetermined portion of its power driven movement comprising a shaft, a decelerating cam mounted for cyclic rocking movement through an inoperative and an operative range, means interconnecting said decelerating cam and said carriage for driving said cam through its operative range as said carriage passes through said predetermined portion of its power driven movement, one way clutch means interconnecting said decelerating cam and said shaft for driving the latter as the decelerating cam is driven through its operative range, and governor means for limiting the rate of rotation of said shaft and hence limiting the rate of movement of said carriage through said predetermined portion of its power driven movement.

7. In a typewriter having a power driven carriage mounted for movement across a printing position, a device for decelerating said carriage as it travels through a predetermined portion of its power driven movement

comprising a decelerating cam, means mounting the same for cyclic movement through an inoperative and an operative range, means interconnecting said decelerating cam and said carriage for effecting movement of the cam through its operative range as said carriage moves through said predetermined portion of its power driven movement, a governor, and one way clutch means interconnecting said cam and said governor during the movement of said cam through its operative range thereby limiting the rate of rotation of said cam and consequently the rate of travel of said carriage through said predetermined portion of its power driven movement.

8. A typewriter having a power driven carriage mounted for movement across a printing position, and a tabulating mechanism for releasing said carriage for power driven movement, in combination with a device for decelerating said carriage as it travels through a predetermined portion of its tabulation movement comprising a decelerating cam, means mounting the same for rocking movement through an inoperative and an operative range, driving means interconnecting said carriage and said cam to drive the latter through its operative range as said carriage is moved through said predetermined portion of its tabulation movement, spring means responsive to said tabulating mechanism for moving said cam through its inoperative range, and governor means limiting the rate of rotation of said cam through its operative range and thereby limiting the rate of travel of said carriage through said predetermined tabulation portion.

9. A typewriter having a carriage mounted for movement across a printing position, and a power driven carriage return mechanism for restoring the carriage to a left hand margin position, in combination with means limiting the rate of travel of said carriage through a predetermined portion of its carriage return movement comprising a decelerating cam, means mounting the same for rocking movement cyclically through an inoperative and an operative range, means responsive to the carriage return mechanism for moving said cam through its inactive range so that the cam can be driven through its operative range as said carriage moves through the predetermined portion of carriage return movement, means operable by said carriage as it moves through said predetermined carriage return portion for driving said cam through its operative range, and a governor means for limiting the rotation of said cam through its operative range thereby limiting the rate of movement of said carriage through said predetermined carriage return portion.

References Cited in the file of this patent

UNITED STATES PATENTS

871,280	Kidder	Nov. 19, 1907
1,516,685	Rinsche	Nov. 25, 1924
2,209,512	Crosman	July 30, 1940