Dec. 17, 1957 W. G. STERZER 2,816,457

COMPENSATING CAM ROLLER

Filed Feb. 25, 1954

FIG. 1

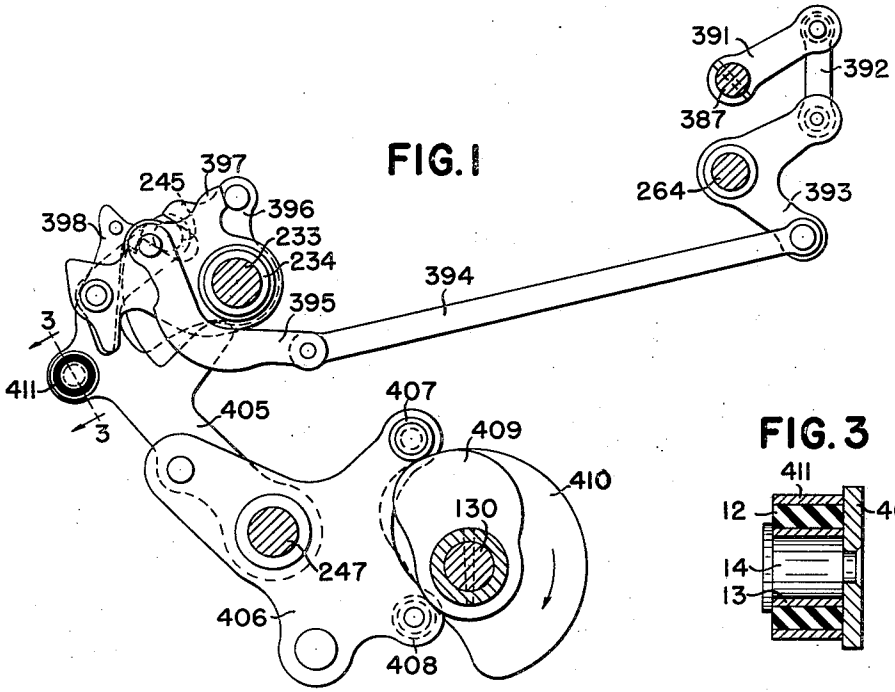
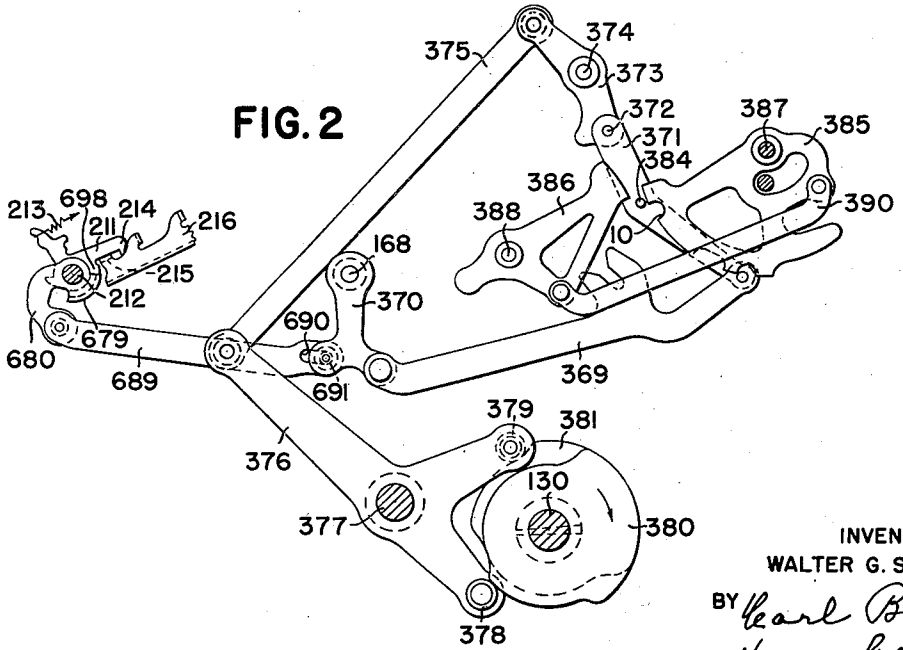


FIG. 3

FIG. 2



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COMPENSATING CAM ROLLER

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2 Claims. (Cl. 74—569)

This invention relates to a compensating cam roller.

The invention is shown applied to a differential drive mechanism for differentially adjusting the beam in a machine of the class illustrated in United States Patent No. 2,443,652, issued to Edward J. Carey and John B. Geers on June 22, 1948.

The principal object of the invention is to provide a compensating cam roller, resilient in construction, which, when brought into contact with a part to be moved thereby, receives a slight overthrow, to firmly move the latter into proper adjusted position.

With this and incidental objects in view, the invention includes certain novel features of construction and combinations of parts, a preferred form or embodiment of which is hereinafter described with reference to the drawing which accompanies and forms a part of this specification.

Of said drawing:

Fig. 1 is a side elevational view of a beam-operated mechanism controlled by a transaction bank of keys.

Fig. 2 is a side elevational view of mechanism adjusted under control of the beam-operated mechanism shown in Fig. 1.

Fig. 3 is an enlarged cross-sectional view of the compensating roller, taken on line 3—3 of Fig. 1, and looking in the direction of the arrows.

General description

The invention is illustrated applied to a beam-setting mechanism of the class shown in United States Patent No. 2,443,652. In this class of machine, a beam is differentially adjusted under control of manipulative devices, which devices are illustrated in said patent as depressible keys. As described in detail in said patent, one end of the beam is differentially adjusted under control of the keys and then locked in such adjusted position, whereupon the beam is contacted by a cam-operated lever, near the center of the beam, to adjust the free end of the beam in accordance with the adjusted position of the differentially-set end of the beam. The free end of the beam is connected to set a train of mechanism to control certain functions of the machine.

In such beam constructions, it is difficult to fabricate the beam with a high degree of accuracy, with the result that slight variations thereof may cause misoperation. This is due to the fact that the beam is impinged against a collar in any one of a plurality of positions of the beam, and due allowance must be made between the cam roller which contacts the beam and the collar against which the beam is impinged, so that the beam is forced home with a high degree of accuracy. If the beam is not moved firmly against the collar, the train of mechanism operated by the free end of the beam does not properly set the controlling elements set thereby. On the other hand, if the cam roller is set too close, certain parts may be damaged. To avoid these misoperations, the roller for camming the beam is made with a core of rubber, or other resilient material, and is given a slight overthrow, and, when the roller impinges the beam against the collar, its resilient core moves the beam firmly against the collar, with the result that the free end of the beam is always set accurately in any one of its plurality of differentially-set positions.

It is well known that such machines as cash registers and accounting machines are capable of adding amounts and printing totals of amounts. In such machines, the amount-entering differential mechanisms are controlled in their adding operation by differential elements controlled both by amount keys and by zero stops. In the printing of totals, it is necessary to render the zero stops ineffective to permit the differential actuators to be set under control of the various totalizer elements. The present invention is illustrated in connection with the disabling of the zero stops of the amount differential mechanisms in total-printing operations, and particularly with the total-printing controls of the machines illustrated in said patent.

Only so much of the mechanism of the patent has been illustrated herein as is necessary to understand the invention. To better point out the various old elements illustrated in the present application, reference numerals are used in the detailed description which correspond to parts of the patent, wherever this is practical.

Detailed description

Each amount bank of said Carey and Geers patent is provided with a slide **216** (Fig. 2), which is differentially adjusted under control of an associate totalizer wheel. Normally, the slide **216** is restrained in its home position by a zero stop **211**, pivoted on a shaft **212**, the pawl having a nose **214**, held in the path of a flange **215** by a spring **213**. As is well known, when an amount key is depressed, the zero stop pawl **211** is lifted to free the slide **216**. When the machine is controlled for total-printing operations, the zero stop pawls **211** must be lifted to free the slides **216**, so that they may be controlled by the totalizer element. The zero stop pawls **211** are lifted under control of a transaction differential mechanism during a total-printing operation by elements illustrated in Fig. 1.

Transaction differential

A shaft **387** (Figs. 1 and 2) has secured thereon a crank **391**, connected by a link **392** to a bell crank **393**, free on a shaft **264**. The link **394** connects the bell crank **393** to a transaction differential beam **395**, pivoted on a differential latch plate **397**, on which is pivoted a latch **398** to connect the latch plate **397** to a drive plate **396**. The differential drive plate **396** is provided with a notch engaged by a stud **245** on an arm **405**, free on the rod **247**, and said arm **405** is connected to a cam lever **406**, also free on the rod **247**. The lever **406** bears rollers **407** and **408**, which cooperate, respectively, with the peripheries of companion plate cams **409** and **410**.

The cam plates **409** and **410** are secured to a main shaft **130**, and clockwise rotation of the shaft **130** causes the cams **409** and **410** to rock the lever **406** and the arm **405** first clockwise to rock the transaction differential mechanism also clockwise until such movement is interrupted by a depressed transaction key (not shown), whereupon the latch **398** is disconnected from the drive plate **396** and locked in position in the manner well known in the art, as illustrated in the above-mentioned patent. This positions the latch plate **397** and the upper end of the beam **395** in accordance with the key depressed. Thereafter, the arm **405**, when it nears the end of initial, clockwise, movement, engages a roller **411**, carried thereby, with an arcuate surface on the beam **395** to force said beam into contact with a collar on the rod **233**, to position said beam and, through the linkage **394**, the bell crank **393**, the link **392**,

and the arm **391** to adjust the shaft **387** in accordance with the depressed transaction key. Also secured to the shaft **387** is a control segment **385** (Fig. 2), connected to a companion control segment **386** by a link **390**. The control plate **386** is pivotally mounted on a stud **388**. In this manner, both control plates **385** and **386** are positioned in accordance with the depressed transaction key.

As pointed out in the above-mentioned patent, the control segments **385** and **386** have thereon high spots and low spots in the form of notches, which are adjusted in relation to a stud **384** on a lever **371** to control the timing of the engagement and disengagement of the totalizer for adding or total printing.

After the control segments **385** and **386** have been positioned by the transaction differential mechanisms, cams **380** and **381** (Fig. 2) operate to rock a lever **376**, loosely mounted on a shaft **377**. The lever **376** is provided with rollers **378** and **379**, engaging the cam plates **380** and **381**, respectively. The upper end of the lever **376** is provided with a link **375**, connected to an arm **373**, pivoted on a stud **374**. The lower end of the arm is provided with a stud **372**, on which the beforementioned lever **371** is pivoted. The lower end of the lever **371** has connected thereto a link **369**, pivoted on an arm **370**, loose on a shaft **168**. The arm **370** is provided with a stud **691**, engaging a slot **690** on one end of a link **689**, the other end of which is pivoted to an arm **680** of a yoke **679**. The yoke **679** is engaged by a toe **698** of the beforementioned zero stop pawl **211**.

As explained in the above-mentioned patent, when the outer surface of the segment **386** is opposite the stud **384**, the machine is controlled in total- and sub-total-printing operations. Therefore, initial, clockwise, movement of the levers **376** and **373**, under influence of the cams **380** and **381**, rocks the lever **371** counter-clockwise, with the stud **384** as a pivot, to shift the link **369** rearwardly to cause the totalizer wheels (not shown) to be engaged with the amount actuators prior to initial movement of said actuators, as explained in said patent. Rearward movement of the link **369** rocks the arm **370** counter-clockwise to shift the link **689** rearwardly to in turn rock the yoke **679** and the zero stop pawls **211** for the amount banks counter-clockwise. Counter-clockwise movement of the pawls **211** disengages their teeth from the flanges **215** of the slides **216** to free said slides for movement under influence of the amount differential mechanisms, so that the said slides will be positioned by the totalizer, as is well known in the art.

As shown in Fig. 2, the control plate **385** is provided with a notch **10** to permit the stud **384** to enter therein when it is desired to rock the lever **371** on the pivot on the right-hand end of the link **369**. As pointed out in the above-mentioned patent, when a total key is depressed, the control plate **386** presents an obstruction in the path of the stud **384**, so that, during subsequent operation of the machine, when the cams **380** and **381** rock the levers **376** and **373** clockwise, the stud **384**, engaging the control segment **386**, acting as a pivot, causes the lever **371** to rock counter-clockwise (Fig. 2) to shift the link **369** toward the right. This, through the arm **370**, the link **689**, the arm **680**, and the yoke **679**, raises the zero stop pawl **211** out of the path of the flange **215** to permit the differential slide **216** to be positioned under control of the totalizer wheels.

If the control plate **386** is not accurately positioned, the stud **384** is permitted to pass beneath the control segment **386**, thus preventing the release of the zero stop pawls **211**. Such a condition exists when the beam **395** is not positioned accurately by the roller **411**. If any lost motion exists between the arc of the beam **395** and the collar **234**, the connections including the link **394**, the arm **393**, the link **392**, the arm **391**, the shaft **387**, the control element **385**, the link **390** does not position the control element **386** as far as necessary to block movement

of the stud **384**, and during the machine operation the stud **384** passes beneath the control surface of the control plate **386**. This condition has been found to exist in manufacturing a machine of the type shown in the above-mentioned patent. In order to overcome this difficulty, a roller **411** is constructed with a core **12** (Fig. 3) made of resilient material such as rubber. The core **12** is mounted on a sleeve **13**, and the rubber core is fused to the roller **411** and the inner sleeve **13**. The inner sleeve **13** is mounted on a stud **14**, carried by the before-mentioned lever **405**. The cams **409** and **410** are so developed that, in their operation of the levers **406** and **405**, the roller **411** is given a slight overthrow, and, when the roller **411** impinges the beam **395** against the collar **234**, the resilient core **12** is compressed to firmly impinge the inner arcuate surface of the beam **395** against the collar **234**.

Provision of the resilient core **12** in the roller **411**, therefore, provides the means by which the beam **395** is positioned accurately in relation to the collar **234** in any position of the beam, as adjusted by the transaction keys and its controlled differential mechanism, thus assuring that the free end of the beam **395**, through the linkage described, will positively and accurately adjust the control plate **386** to position the high spot of the control plate into the path of the stud **384**, so that the zero stop pawl will be withdrawn from the flange **215** of the differential slide **216**.

In this operation, where the stud **384** slides past the working surface of the control plate **386**, the zero stop pawl **211** is not fully withdrawn, and therefore, when the totalizer elements tend to adjust the slide **216**, the slide **216** cannot be positioned according to the amount standing on the totalizer wheels, and the parts are arrested in zero position, thus printing inaccurate totals.

While the present invention, which comprises the roller **411** with the resilient core, is shown applied to a mechanism for withdrawing a zero stop pawl, this is used only as an illustration of one application of the novel roller. The roller may be used in any application where accurate and firm positioning of any part is necessary.

While the form of mechanism shown and described herein is admirably adapted to fulfill the object primarily stated, it is to be understood that it is not intended to confine the invention to the one form or embodiment disclosed herein, for it is susceptible of embodiment in various other forms.

What is claimed is:

1. In a machine of the class described, the combination of a differentially settable member, a beam having one end thereof pivoted to the differentially settable member whereby said one end of the beam is differentially positioned by the settable member, a stopping surface on the beam intermediate its ends, a fixed stop against which the stopping surface of the beam is moved to limit its movement and to position the free end of the beam in accordance with the differential position of the pivoted end of the beam, an operating arm, a cam to operate the arm, a roller on the arm for engaging and moving the beam until the stopping surface on the beam engages the fixed stop to thereby position the free end of the beam in accordance with the setting of the pivoted end of the beam, said cam formed to move said arm an additional extent, a resilient core in the roller which is compressed during the said additional extent of movement of the arm, and control means connected to the free end of the beam so as to be differentially positioned by the beam.

2. In a machine of the class described, the combination of a differentially settable member, a beam having one end thereof pivoted to the differentially settable member whereby said one end of the beam is differentially positioned by the settable member, an arcuate stopping surface on the beam located intermediate the ends of the beam, a stationary sleeve of a diameter corresponding to the radius of the arcuate stopping surface against which the stopping surface of the beam is moved to limit its

movement and to position the free end of the beam in accordance with the differential position of the pivoted end of the beam, an operating arm, a cam to operate the arm, a roller on the arm for engaging and moving the beam until the stopping surface on the beam engages the stationary sleeve to thereby position the free end of the beam in accordance with the setting of the pivoted end of the beam, said cam formed to move said arm an additional extent, a rubber core in the roller which is compressed during the said additional extent of movement of the arm, and control means connected to the free end of

the beam so as to be differentially positioned by the beam.

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