

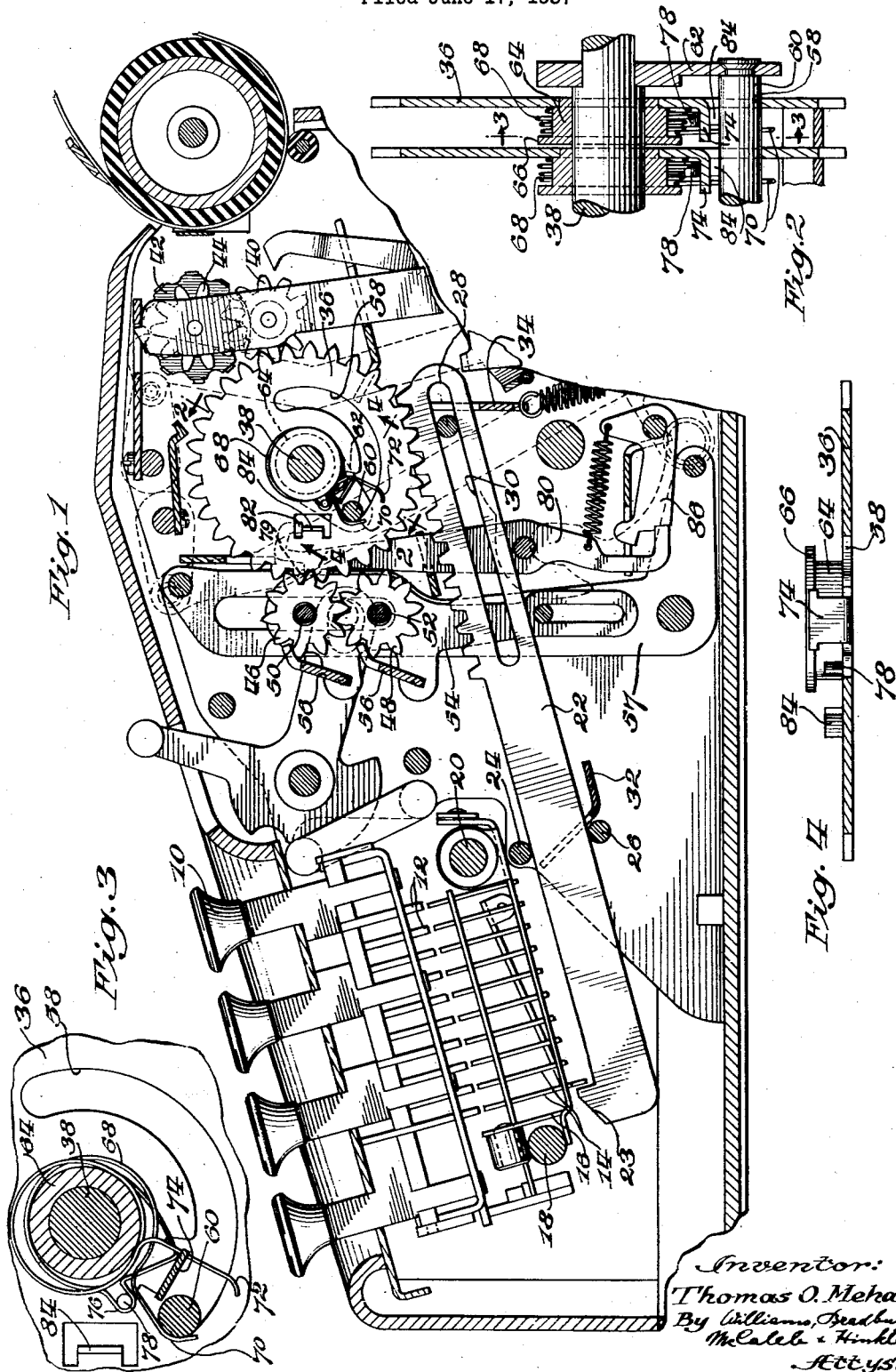
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ADDING MACHINE

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2,277,498

ADDING MACHINE

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4 Claims. (Cl. 235—60)

My invention relates generally to adding machines, and more particularly to improvements in accumulator actuating mechanisms.

It is an object of my invention to provide an improved mechanism for driving the accumulator pinions of adding machines, cash registers, and the like, which is simple in construction and may be economically manufactured.

A further object is to provide an improved resilient drive for the actuation of the accumulator pinions, in which a single spring performs the function of actuating the accumulator during the transfer or carry-over operation as well as during the amount entering operation.

A further object is to provide an improved accumulator actuating mechanism having few parts, which may be readily manufactured and assembled.

Other objects will appear from the following description, reference being had to the accompanying drawing, in which:

Figure 1 is a longitudinal sectional view of the adding machine, showing the set-up and actuating mechanisms;

Figure 2 is an enlarged transverse sectional view taken on the line 2—2 of Figure 1;

Figure 3 is a fragmentary sectional view taken on the line 3—3 of Figure 2; and

Figure 4 is an enlarged sectional view of the actuating gear (with its spring removed) taken on the line 4—4 of Figure 1.

In my copending application Serial No. 123,320, filed February 1, 1937, is disclosed an improved ten-key adding machine of the type to which my present invention pertains. Inasmuch as the present invention is concerned only with the accumulator actuating mechanism, only such parts which cooperate directly with this mechanism will be described herein.

The amounts to be added are set up by means of the usual keyboard having ten depressible, spring-retained digit keys 10, each having a depending stem 12. The stems 12 are in alignment and their lower ends normally lie above a row of stop pins 14 which are mounted in the usual manner in a stop pin carriage 16. The latter is transversely reciprocable, being carried by a pair of rails 18, 20.

A plurality of actuating racks 22, one for each denominational order of the machine, and each having a stop shoulder 23, are guided for longitudinal movement by rods 24, 26, and 28, the latter rod projecting through a slot 30 formed in each of the racks. The racks are maintained

in properly spaced relation by a pair of combs 32, 34.

Each of the racks 22 meshes with an accumulator and type wheel actuating gear 36, mounted for free rotation upon a fixed shaft 38. An idler pinion 40 is arranged to be meshed with the gear 36 to set the type carrying wheel 42 which has a pinion 44 fixed thereto and in mesh with the idler pinion 40.

The accumulator consists of a plurality of pinions 46 adapted to mesh with the actuating gear 36, and always in mesh with subtraction pinions 48. The accumulator pinions are rotatably mounted upon a shaft 50 while the subtraction pinions are similarly carried by a shaft 52. The shafts 50 and 52, together with a pair of plates 54, and aligner combs 56, form a frame which is vertically slidable upon a pair of swinging levers 57.

The accumulator actuating gear 36 is provided with an arcuate slot 58 to receive a bail rod 60 carried by bail arms 62, the latter being non-rotatably secured to shaft 38. Each of the gears 36 is staked to a hub 64 having a flange 66. A torsion spring 68 is wound about the hub 64 between the gear 36 and the flange 66, and has its ends 70, 72 held apart by a suitably notched lug 74 struck inwardly from the gear 36. The coil of the spring nearest the end 70 is bent to form a loop 76 which fits around a pin 78 riveted in the gear 36 and is thereby anchored to the gear. The end 70 will therefore be slightly less elastic than the end 72.

The transfer or carry-over is effected by the engagement of the usual transfer tooth (extending sidewardly from one of the teeth of the accumulator pinion 46) with the cam projection 79 of a transfer pawl 80. When a transfer is to be effected, the pawl 80 is swung clockwise to remove the stop portion 82 thereof from arresting position above the lug 84 which projects sidewardly from the gear 36 of next adjacent higher denominational order. After one of the pawls 80 has been tripped, it is held in tripped position by a spring operated latch 86. The transfer pawl may also be tripped by the transfer tooth on its associated subtraction wheel 48.

In operation, the amount to be added is set up in the pin carriage 16 in the usual manner by successive depression of the desired keys 10. Upon initiation of the operating cycle of the machine, the ball 60, 62 will commence swinging counter-clockwise and, after it has moved through about 15° from the position in which it is shown in Fig. 3, the ball rod 60 will engage

the end 12 of the spring 68 and through the spring 68 resiliently drive the gear 36 counterclockwise. The rack 22 will thus be drawn rearwardly (to the right in Fig. 1) until its stop tooth 23 abuts against a stop pin 14 which may have been set. After the rack is thus arrested by a stop pin, continued movement of the bail rod 60 is permitted by the flexure of the end 12 of the spring 68. During this portion of the operation, the accumulator pinions will have been held out of mesh, but the idler pinions will have been in mesh with the actuating gear 36, and the type wheels 42 thus properly positioned.

After the type wheels have been actuated to make a printing impression, their idler pinions 40 are again meshed with the gears 36 and at about the same time the accumulator pinions 46 (or subtraction pinions 48) are meshed with the gears 36. The bail 60, 62 then commences its clockwise (return) stroke, and upon engagement of the bail rod 60 with the ends 70 of the springs 68, the gears 36 are successively picked up and restored to normal position, as determined by the abutment of their lugs 84 with the stop portions 82 of the transfer pawls 80. However, if any transfer pawls 80 have been tripped, the gears 36 associated therewith will be permitted to move the additional angular distance represented by one tooth, because their lugs 84 will not be arrested until they strike the pawls 80 within the notches formed adjacent their stop portions 82. The bail rod 80 swings through a sufficiently great angle to provide for this additional transfer movement of the gears 36. The flexure of the end 70 of the spring 68 permits such additional movement of the bail rod 60 relative to the gears 36 which are not to effect a transfer operation.

From the above description it will be apparent that the springs 68 not only form the resilient means to actuate the racks, accumulator pinions and type wheels during the forward and return strokes of the latter, but also serve as the resilient means to move these parts in effecting a transfer operation. The spring 68, being mounted in the relatively enclosed space between the gear 36 and the flange of its hub, is substantially a part of the gear, thus facilitating assembly, and forming a construction which is less costly to manufacture and more reliable in operation than the relatively long coiled tension springs customarily employed to actuate the racks in similar machines.

While I have shown and described a particular embodiment of my invention, it will be readily understood by those skilled in the art that variations may be made in the construction disclosed

without departing from the basic features of my invention. I therefore do not wish to be limited to the precise construction disclosed, but wish to include within the scope of my invention all such modifications and variations which will readily suggest themselves.

What I claim as new and desire to secure by Letters Patent of the United States is:

1. In an adding machine, the combination of an accumulator, an amount set-up mechanism, and means to actuate said accumulator in accordance with the amount set up in said mechanism, said means comprising an actuating gear having a hub, a torsion spring surrounding said hub and having a part thereof anchored to said gear, and a member movable to and fro through a fixed distance and engageable with said spring to actuate said gear in either direction by a force transmitted through said spring.

2. In an adding machine, the combination of an accumulator, an amount set-up mechanism, and means to actuate said accumulator in accordance with the amount set up in said mechanism, said means comprising an actuating gear, a torsion spring having an intermediate part thereof anchored to said gear, and a member movable to and fro through a fixed distance for actuating said gear, said member engaging one end of said spring to rotate said gear in one direction and engaging the other end of said spring to rotate said gear in the opposite direction.

3. In an adding machine, the combination of an accumulator, an amount set-up mechanism, and means to actuate said accumulator in accordance with the amount set up in said mechanism, said means comprising an actuating gear having an arcuate slot formed therein, a torsion spring substantially coaxial with said gear, having an intermediate portion anchored to said gear, and having its end portions projecting outwardly across said arcuate slot, a bail rod extending through said slot between the ends of said spring, and means to oscillate said bail rod through a definite angular distance about the axis of said gear, thereby to oscillate said gear through an angle determined by the amount set up in said mechanism by a force transmitted to said gear solely through said spring.

4. An actuating mechanism for adding machines and the like, comprising a gear having a hub, a torsion spring wound around said hub and having a portion intermediate its ends anchored to said gear, and a lug on said gear forming a positive stop for the ends of said spring to hold said spring under tension.

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