

1,003,723.

2 SHEETS—SHEET 1.

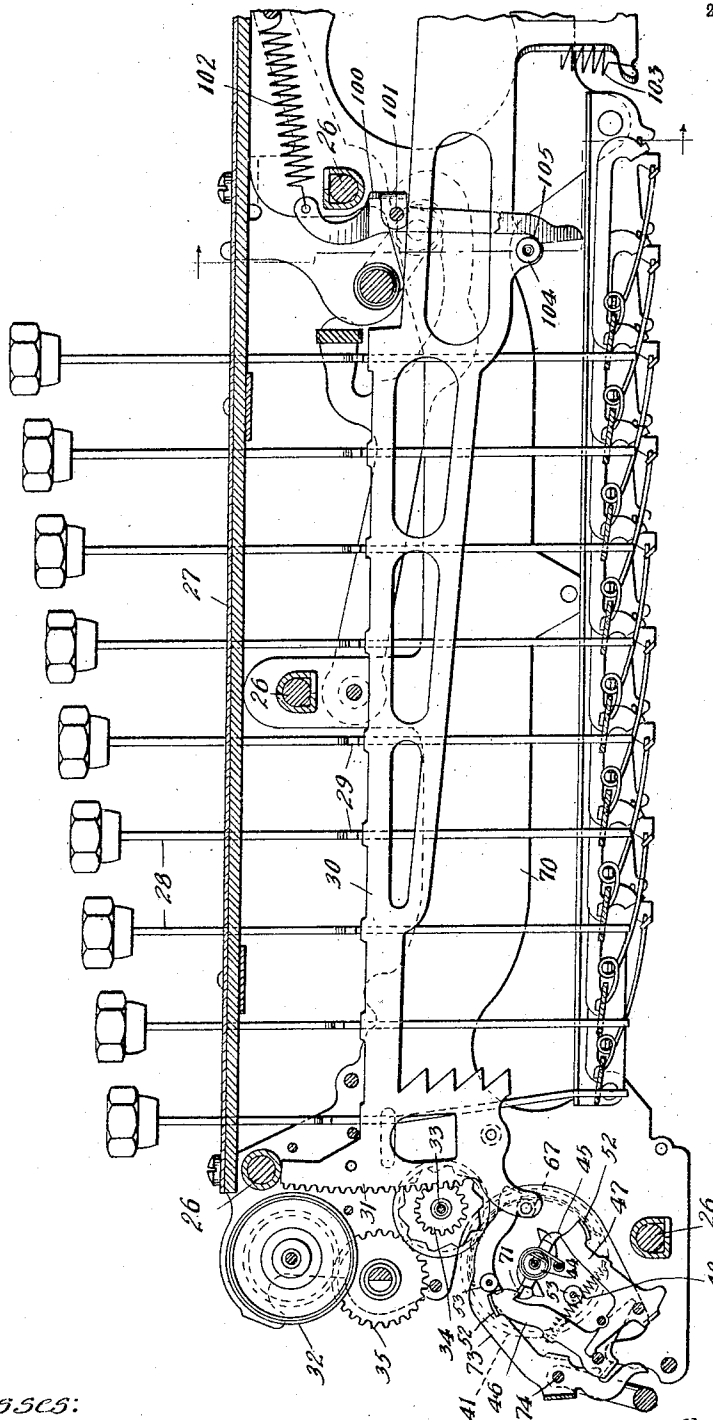


Fig. 1.

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 KEY ACTION FOR CALCULATING MACHINES.
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2 SHEETS-SHEET 2.

Fig. 2

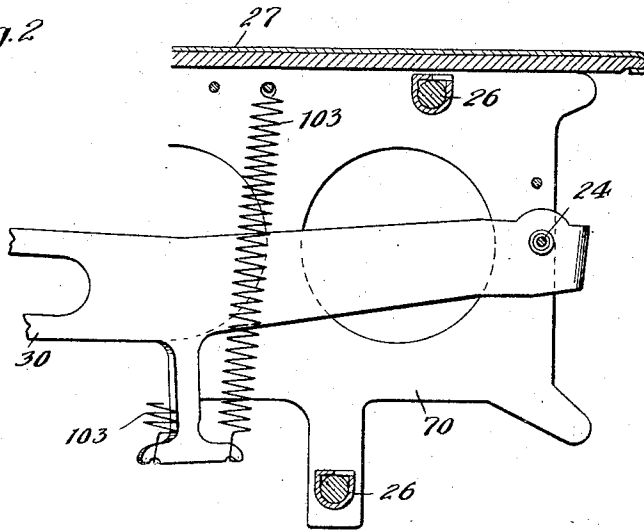


Fig. 3

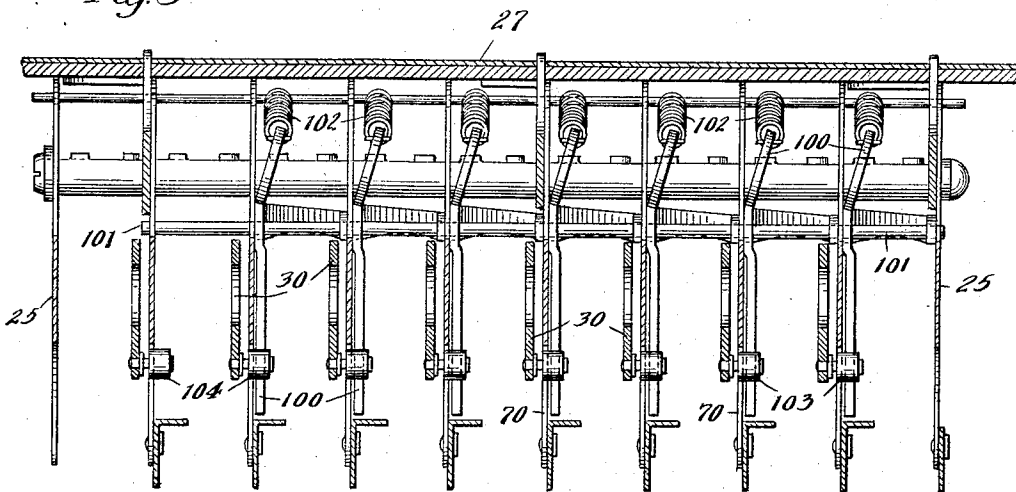
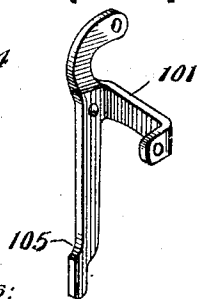


Fig. 4



Witnesses:

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UNITED STATES PATENT OFFICE.

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KEY-ACTION FOR CALCULATING-MACHINES.

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Specification of Letters Patent. Patented Sept. 19, 1911.

Application filed January 6, 1911. Serial No. 601,139.

To all whom it may concern:

Be it known that I, DORR E. FELT, a citizen of the United States, residing in Chicago, in the county of Cook and State of Illinois, have invented a new and useful Improvement in Key-Actions for Calculating-Machines, of which the following is a specification.

My invention relates to a multiple order key driven calculating machine, and more especially to a machine of the general type of the well known Duplex comptometer, in whose manufacture and sale I have been extensively engaged for many years, and whose general character is set forth in several United States patents issued to me, Nos. 762520 and 762521 of June 20, 1904, No. 767107 of August 9, 1904, and No. 960528 of June 7, 1910.

The main object of my invention has been to modify the key touch in such key driven machines, by imparting to the keys an increased resistance at the start of the stroke, but which is quickly overcome, leaving the balance of the stroke free and easy, and so light that the operator is naturally impelled to fully complete the stroke before moving his finger from the key. And the invention has for further objects the effecting of other improvements in the construction and function of the parts of the machine shown herein and which may be found in or effected by such mechanism.

In the accompanying drawing Figure 1 is a partial longitudinal vertical section of a comptometer. Fig. 2 is a similar section showing the portion of the mechanism not shown in Fig. 1. Fig. 3 is a transverse vertical section. Fig. 4 is a perspective of the resistance creating device detached.

In said drawing 25 represents one of the side frames of the machine, and 26 represents the cross bars by which the frames are united together.

The top of the machine is shown at 27, and the keys 28 extend upward through it as shown.

70 represents the divisional plates arranged between the different denominations. The keys are arranged together in the manner usual in machines of this kind, in denominational rows, and in such close order as to necessitate care on the part of the operator to avoid striking more than a single key at each stroke. The keys are also provided with side lugs 29 bearing on the cor-

responding column actuator 30, and acting to move the actuator when the key is depressed to the extent of the power of the key. The actuators are pivoted at their rear ends upon a pivot 24, and each carries a toothed segment 31 at its front end. The segments mesh with corresponding pinions 34 on the shaft 33 and such pinions are mechanically connected to corresponding numeral wheels 32 in such manner as turn said wheels only during the rising movements of the segments. By means of intermediate wheels 35 and accompanying gears the actuations of the pinions 34 are transferred to and recorded on the corresponding upper wheels 36 where the amount may be read by the operator. The actuators are each provided with lifting or motor springs 103.

In addition to the above features of the comptometer machine I show several features of the carrying mechanism, to-wit: at 67 is a dolly roll projecting laterally from the actuator 30, and supporting the free end of a latch 73 pivoted at 74. This latch controls a spring actuated sleeve 44 acting to actuate the next higher numeral wheel in carrying, the control being obtained by means of arms 71 projecting from the sleeve and adapted to engage the under surface of the latch, these features being fully shown and described in Patent No. 762520. There are also shown detents 46 and 47 at opposite sides of said sleeve 44 acting in conjunction with an arm 45 on the sleeve to limit the rotary movements of the sleeve. The detents each carry a laterally projecting ear 52, adapted to be engaged by a dolly roll 53 on the side of the carrying gear 41, and thereby to move the detents so that they release the arm 45. The detents are also drawn together by a spring 44 which returns them to normal position after each release of the arm 45. These features are also shown and described in said patent.

In the present invention I have added to the mechanism above described, the following: at 100 adjacent to each column actuator is a lever pivoted upon a stationary crossbar 101 and having its upper end attached to a spring 102 the tension of which forces the lower end of the lever against the dolly roll 104 projecting laterally from the bottom portion of the actuator. The lever has a bend 105 in the portion which comes against the roll, and such bend forms a rest

or seat normally for the roll, but the lever is adapted to yield whenever the actuator is depressed by the keys, and at such times moves back out of the way of the dolly, the operator being obliged to put a little more power upon the key at the start than would be required if the dolly or lever were not present. The resistance thus caused to the initial movement of the keys ceases as soon as the dolly has forced the lever back and freed itself from the seat so that the remainder of the key stroke is unaffected, and is more likely to be complete than it otherwise would be. Although the key action is hardened by these devices, yet the hardening, limited as it is to the start of the stroke, is beneficial rather than detrimental, because it is not desirable that the action be too free or easy at the start, as that is apt to result in depressing keys which it is not desired to operate with those which it is desired to operate.

By hardening the key action with the means described, I also accomplish a further very desirable result. In the operation of the machine, the motor springs 103 are forced to lift the actuators, and with them they must also lift the latches 73 and the detents 46 and 47 so as to liberate the carrying devices. These operations come upon said springs when they are at their weakest point, and in consequence they have in some cases failed to perform their whole duty. By the addition of the hardening means set forth however, the springs 103 are reinforced in lifting the actuators by the springs 102 so that there need never be any failure in the action.

While I have referred to my invention as effecting a hardening of the key action, I do not wish to have it inferred that the action embodying it is any harder to the touch than the Duplex comptometer actions previously made by me and described in said patents. In fact the present invention notwithstanding the additional spring 102 which it contains and which must be overcome by the pressure of the finger, is lighter than said previous actions.

I claim:—

1. The combination with a column actuator of a multiple order key-driven calculating machine, having a series of keys arranged closely together on the keyboard, of means for increasing the initial resistance to the movement of the actuator, said increase of resistance being automatically removable

during the latter part of the strokes of the keys.

2. In a multiple order key driven calculating machine, the combination with a column actuator, of a yielding member for providing an abnormal initial resistance to the movement of the actuator, the increase of resistance due to the abnormal initial resistance being subsequently removed during the latter part of the downward movement of the actuator, substantially as specified.

3. In a multiple order key driven calculating machine, the combination with a column actuator and motor spring, of a yielding member frictionally engaging said actuator, to resist the initial movement of the actuator, the amount of said initial friction being substantially decreased during the continued downward movement of the actuator, said yielding member further acting to reinforce the action of the motor spring.

4. The combination with the column actuator of a multiple order key driven calculating machine, of a yielding pivoted lever one end of which sets under the actuator and is adapted to frictionally resist the beginning of the actuator's stroke, and a spring acting to press the lever into acting position under the actuator.

5. The combination with the column actuator of a multiple order key driven machine, and the motor spring thereof, of a pivoted lever yieldingly resisting the beginning of the actuator's stroke, and a spring acting to press the lever into action with the actuator, said last mentioned spring reinforcing said motor spring in lifting the actuator.

6. The combination with the column actuator of a multiple order key driven machine, and the lifting spring thereof, of a pivoted lever frictionally resisting the depressing of the actuator, and a spring acting on such lever and causing it to exert a lifting force on the actuator when the latter is depressed.

7. The combination with the column actuator of a multiple order key driven machine, and the lifting spring thereof, of a pivoted lever frictionally resisting the depressing of the actuator, and a spring acting on such lever and also acting to reinforce such lifting spring.

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Witnesses:

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