

1,282,425.

Patented Oct. 22, 1918.

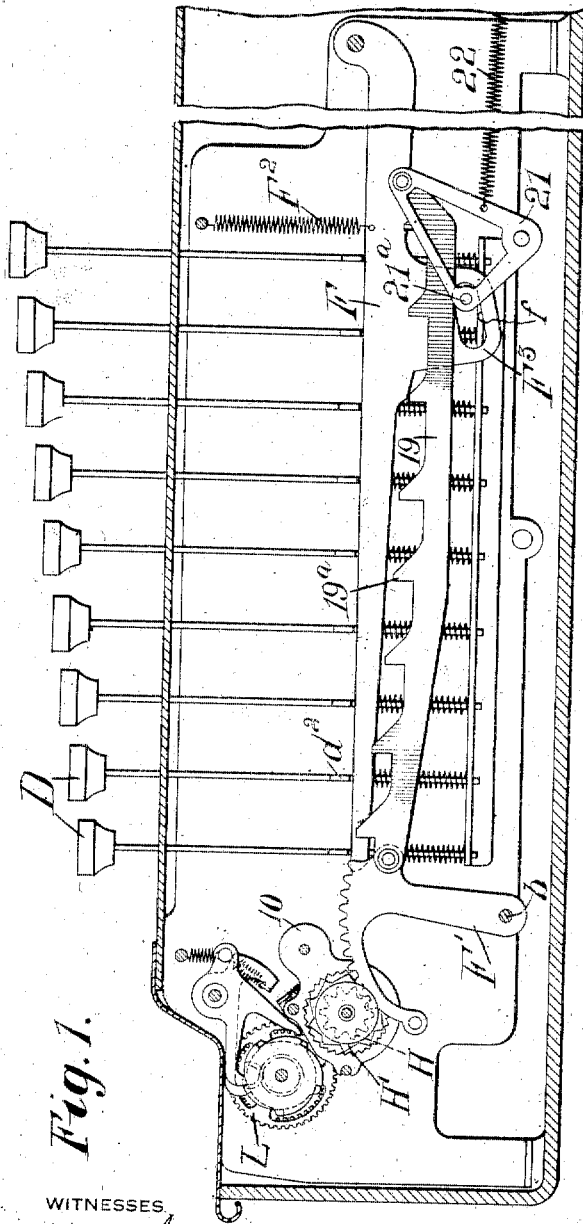


Fig. 1.

WITNESSES

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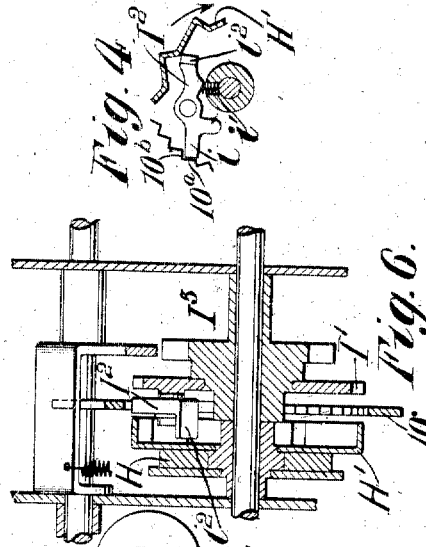


Fig. 4.

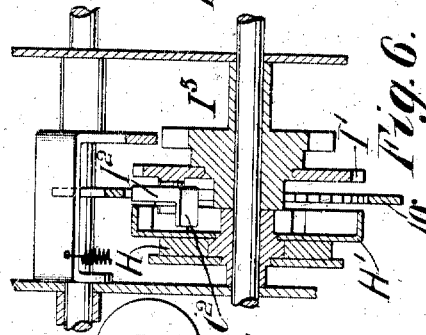


Fig. 6.

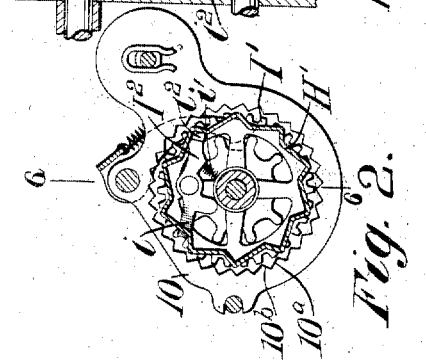


Fig. 2.

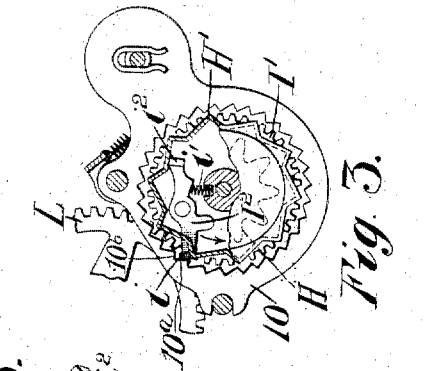


Fig. 3.

Fig. 5.



INVENTOR

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ADDING-MACHINE.

1,282,425.

Specification of Letters Patent.

Patented Oct. 22, 1916.

Original application filed May 19, 1914, Serial No. 839,563. Divided and this application filed September 24, 1915. Serial No. 52,338.

To all whom it may concern:

Be it known that I, ALLEN A. HORTON, a citizen of the United States, residing at Highland Park, in the county of Wayne and State of Michigan, have invented certain new and useful Improvements in Adding-Machines, of which the following is a specification.

The present invention relates to adding or calculating machines of the type shown in my prior Patent No. 1,016,501, issued February 6, 1912, and the Pasinski Patent No. 1,023,168, issued April 16, 1912, wherein levers are employed to turn forwardly a series of registering wheels, said levers being depressed varying degrees by keys arranged in rows and the keys of each row inscribed from "1" to "9", and the levers being normally upheld by springs, and the character of operating connections between them and the wheels being such that the wheels are turned forward when the levers are returned to normal position by their springs after having been depressed by the keys. The present application is a division of my prior application filed May 19, 1914, Serial No. 839,563, upon which Patent No. 1,180,398, issued April 25, 1915.

In the aforesaid Pasinski patent means are disclosed for preventing any overthrow of a higher order registering wheel by reason of its receiving a carrying impulse when a key of its own order is being held down, at which time the overthrow-preventing-pawl, normally effective upon said wheel, is withdrawn. An object of the present invention is to prevent the possibility of overthrow of the registering wheel under any and all circumstances whether the wheel is receiving a carrying or a primary impulse. Thus I provide for checking any tendency of a wheel to advance or forge ahead of its actuator under a primary impulse as well as to check any tendency of a higher order wheel to over-rotate under a carrying impulse when a key of its own order is out of normal whether fully or only partially depressed. In the machine here illustrated, as in the machine of said prior patents, there is a one-way driving connection between each lever and its registering wheel, comprising a ratchet wheel oscillated by the associated lever and a pawl carried by a gear wheel which con-

nects with the numeral wheel. In carrying out my invention in the form here shown I provide means for intercepting such movement of the pawl as must accompany advance of the numeral wheel, and consequent turning of the pawl-carrying wheel, ahead of the ratchet wheel or independently thereof, whether such ratchet wheel is in motion or dormant.

In the drawings which accompany and form part of this specification and illustrate a preferred form of embodiment of my invention, Figure 1 illustrates in right side elevation with casing in section and some interior parts removed, a machine in which my invention is embodied; Fig. 2 is a sectional elevation on an enlarged scale of the parts of my invention at normal; Fig. 3 is a similar view showing the overthrow-preventing action; Fig. 4 is a fragmentary view of some of the same parts under a different condition; Fig. 5 shows the specially constructed pawl in perspective; Fig. 6 is a section on line 6-6 of Fig. 2.

In view of the disclosures of the before mentioned prior patents it will be unnecessary to enter into a detailed description of the complete machine, though it should be noted that the keys D do not operate upon levers having segment gears as in the construction of said prior patents, but that the wheel driving segments F' are separately mounted upon a frame cross rod at the front part of the machine and operatively connected by bars or links 19 and bell cranks 21 with the levers F respectively (Fig. 1). The levers are pivoted at their rear ends and are upheld by springs F² and extend along the respective rows of key stems after the manner of the levers F of the aforesaid patents, but unlike the latter they simply terminate at their forward ends in plain extremities. At an intermediate point each lever has a depending portion F³ slotted as at f to embrace a roller stud 21^a upon one arm of a bell crank 21, which is here shown as in the form of a triangular frame. The rear arm or branch of the bell crank is pivotally connected to the rear end of a link or bar 19 whose forward end is pivotally connected to the segment F'. Obviously depression of the lever F rocks the bell crank, throws the bar 19 forward and

rocks the segment. The bar is formed with a series of lugs 19^a supplying vertical shoulders to abut against the rear sides of lugs d² upon the key stems which obviously has the effect of positively arresting the bar and the segment. Preferably springs 22 are applied to the bell cranks 21 to serve in conjunction with the springs F² for restoring the levers and driving the registering mechanism.

10 The segments F⁷ mesh with gear wheels or pinions H to which are secured internal ratchets H', and gear wheels I' (Figs. 2, 3, 6) are independently journaled alongside the latter respectively on the same frame 15 rod and are driven by said ratchet wheels through the medium of pawls presently to be identified, said gear wheels meshing with other gear wheels L which carry planet pinions in mesh with internal gears upon 20 the numeral wheels and with sun gears as in the constructions of said prior patents.

Next referring in detail to the overthrow preventing devices of my present invention, the pawls I² which are carried by the gears 25 I' have a special formation distinguishing them from the similarly lettered pawls of my aforesaid prior patent, for the purpose of coöperation with overthrow preventing means. Thus each pawl has an extension or 30 tail i on the side of the pawl-pivot opposite that where the acting end of the pawl projects for coöperation with the ratchet wheel, and this pawl-tail projects past the ratchet 35 shouldered edge of a plate or ring 10. In order to provide for this relation of pawl and ratchet, gear wheel I' is not mounted closely adjacent the open side of the ratchet wheel, as in the prior constructions, but is 40 formed or united with a spacing hub I³ so that the body of the pawl may lie outside the ratchet wheel as clearly shown in Fig. 6, that portion of the pawl which engages with the ratchet being in the form of a laterally 45 turned extremity i². The ring or plate 10 encircles the space between said gear wheel and the ratchet and has a continuous series of stop shoulders 10^a to provide for encounter with the tail of the pawl wherever 50 the latter may happen to be as a result of the turning of the gear wheel I'. It is of course essential that the ratchet shall not be interfered with during key depression when the ratchet wheel should run freely over the 55 pawl. Consequently said shoulders 10^a are cut at such an angle and so spaced apart and the intervening shoulders 10^b so cut, as to allow of unobstructed vibration of the pawl resultant from the passing of the ratchet 60 wheel over its acting end i². Thus as the inclined back of a ratchet tooth slides over the pawl-end i² (Fig. 4) the extremity of the pawl-tail i will swing over one of the shoulders 10^a, and back again when the 65 ratchet has passed. However, if the con-

nected registering wheel tends to over-rotate, which involves turning of the gear wheel I' independently of the ratchet wheel, the accompanying movement of the pawl 70 will cause its tail-end to strike against one of the shoulders 10^a, as illustrated in Fig. 3, whereby the movement of the wheel is arrested. This obviously will occur whether the ratchet wheel happens to be dormant at 75 the time or whether it is being rotated to drive the gear wheel I' and numeral wheel. In either case the riding of the end i² of the pawl over the inclined back of the ratchet tooth will tilt the pawl on its pivot and the 80 combined tilting and rotarial movement of the pawl will cause its tail-end to strike against one of the shoulders 10^a before the end i² can escape past the ratchet tooth. Of course the pawl might be at varying posi- 85 tions relative to a shoulder 10^a when this combined tilting and rotarial motion occurs, but the extent of the end-edge of the tail of the pawl is such, and the length of the shoulders 10^a is such, that whatever may be 90 the position of the pawl at the time, some part of the end edge of its tail will strike against some part of one of the shoulders 10^a and block the overthrow. In the case of 95 such action when the ratchet is in motion, the latter will immediately overtake the pawl and the pawl will disengage from the shoulder 10^a (under action of its spring i') so that the rotation of the gear wheel I' by the ratchet may continue.

While my invention is here illustrated as 100 applied to a known construction of adding machine, it is to be understood that the invention is not limited to this particular use but may be employed in a wide variety of connections. 105

I claim:

1. In a machine of the class described, the combination of driving and driven elements; an intervening ratchet and pawl connection; and a stop member for the pawl to 110 encounter under relative movement between it and the ratchet at any stage of advancing movement of the driven member.

2. In a machine of the class described, the combination of driving and driven elements; an internal ratchet geared to the driving element; a pawl carried by the driven element; and a shouldered stop member into engagement with which the pawl 115 is thrown when advancing independently of the ratchet. 120

3. In a machine of the class described, the combination of ratchet and pawl driving and driven wheels, and an encircling abutment device for the pawl to encounter when 125 relative advance movement occurs between its wheel and the ratchet wheel.

4. In a machine of the class described, the combination of ratchet and pawl driving and driven wheels, and an encircling in- 130

teriorly shouldered ring for the pawl to encounter when relative advance movement occurs between its wheel and the ratchet wheel.

5 The combination of an internal driving ratchet, a driven wheel laterally spaced therefrom, a pawl pivoted on said wheel and having a laterally-turned tooth projecting into the ratchet and a tail extending through the peripheral space between the
10 ratchet and the driven wheel, and a ring

encircling said space and having a series of internal stepped abutment shoulders for the end of the pawl-tail to encounter under movement of the driven wheel in advance of the driving ratchet.

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Witnesses:

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