

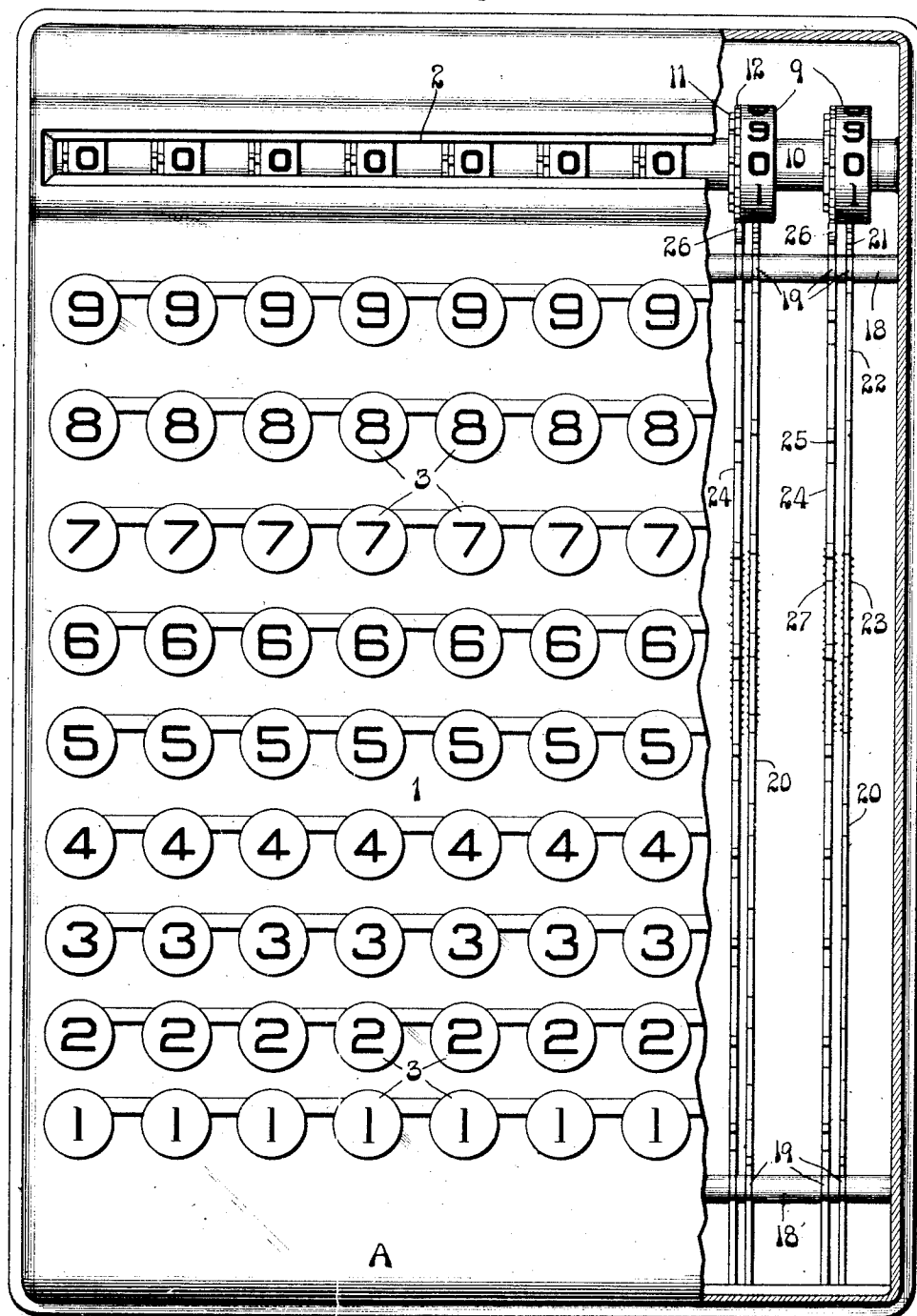
F. J. TILLMAN.
 ADDING MACHINE.
 APPLICATION FILED OCT. 28, 1910.

1,003,672.

Patented Sept. 19, 1911.

2 SHEETS—SHEET 1.

Fig. 1.



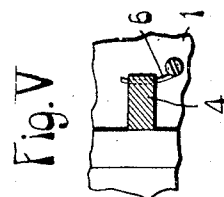
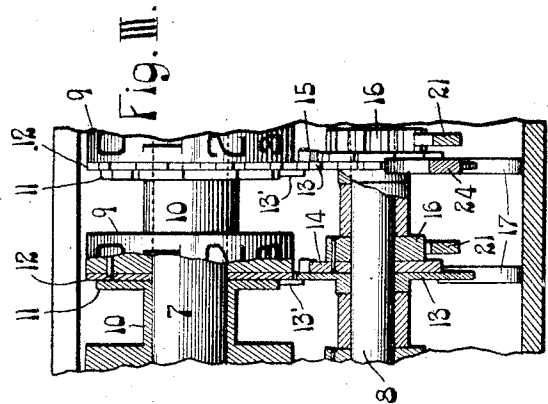
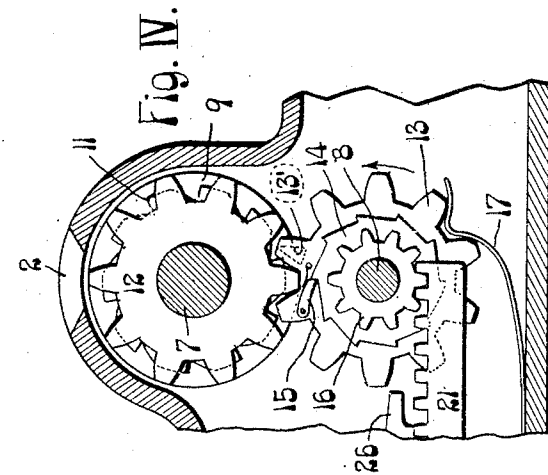
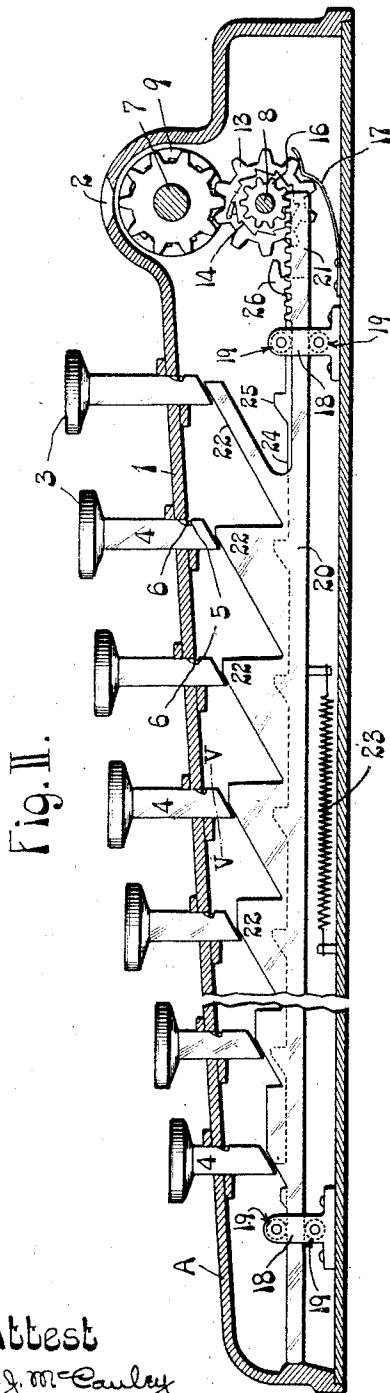
Attest
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2 SHEETS—SHEET 2.



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UNITED STATES PATENT OFFICE.

FERDINAND J. TILLMAN, OF ST. LOUIS, MISSOURI.

ADDING-MACHINE.

1,003,672.

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Application filed October 28, 1910. Serial No. 539,533.

To all whom it may concern:

Be it known that I, FERDINAND J. TILLMAN, a citizen of the United States of America, residing at the city of St. Louis and State of Missouri, have invented certain new and useful Improvements in Adding-Machines, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification.

My invention relates to an adding machine of a simple and inexpensive construction, the machine being of that type wherein there is a series of numeral wheel mechanisms and a separate actuating device for each numeral wheel mechanism, means being provided for carrying from one numeral wheel mechanism to the next adjacent numeral wheel mechanism.

Figure I is a top or plan view of my adding machine, with the casing partly in horizontal section. Fig. II is a vertical longitudinal section through the machine. Fig. III is an enlarged view partly in section and partly in elevation of two of the numeral wheel mechanisms, and the actuating devices therefor. Fig. IV is an enlarged elevation of one of the adding mechanisms, with the casing and shafts in section. Fig. V is a cross section taken on line V—V, Fig. II.

In the accompanying drawings: A designates the casing of my machine having a key-board 1. At the rear of the key-board is a sight opening 2, through which the numeral wheels may be viewed. The key-board is provided with a plurality of perforations in which the stems of the keys operate.

3 designates the keys arranged in rows extending longitudinally of the key-board and bearing numerals 1 to 9, inclusive, there being preferably nine of such rows of keys, providing eighty-one keys in all. Each key has a stem 4 operable in the key-board and in each key stem is a notch 5 that receives a yieldable detent 6 fastened to the under side of the key-board, (see Figs. II and V), which limits the upward movements of and supports the keys. The lower ends of the key stems are inclined and located in different horizontal planes.

7 designates a numeral wheel shaft ex-

tending transversely of the machine back of the key-board and beneath the sight opening 2 in the casing.

8 is a transmission wheel shaft beneath and parallel with the numeral wheel shaft.

9 designates numeral wheels loosely arranged on the numeral wheel shaft 7 and spaced apart by distance sleeves 10 integral with the wheels and provided with toothed circular flanges 11 facing the numeral wheels of lower numerical order adjacent to the ones of higher order by which said flanges are carried. Each numeral wheel has fixed to it a toothed wheel 12, located adjacent to the toothed flange 11 of the numeral wheel of next higher order.

13 designates transmission wheels loosely mounted on the transmission wheel shaft 8 in mesh with the toothed wheels 12 fixed to the numeral wheels above said transmission wheels.

14 are ratchet wheels alongside the transmission wheels on their shaft, driving engagement between these parts being furnished by pawls 15 carried by the transmission wheels and engaging the teeth of the ratchet wheels. Each ratchet wheel has fixed to it a pinion 16 that is operated by a numeral wheel mechanism actuating device about to be described.

17 are yieldable detents engaging the transmission wheels.

During the operation of the numeral wheel mechanisms carrying or transfer from a mechanism of a lower order to a mechanism of a higher is accomplished by teeth 13' at the sides of the transmission wheels 13 that engage the toothed wheels 11 fixed to the numeral wheels. There is only one tooth 13' on each transmission wheel, and therefore the numeral wheel of a higher order is moved one step at the completion of a rotation of a transmission wheel.

The several numeral wheels of my machine and the operating members associated with them as described are arranged substantially in alinement with the rows of keys 3 corresponding thereto.

On the base *a* of the casing of my machine are posts 18 supporting lower and upper guide rollers 19, between which the key operated devices for operating the numeral

wheel mechanisms ride backwardly and forwardly with reciprocating motion upon the operation of the keys of the machine.

20 designates slide bars loosely mounted between the lower and upper guide rollers 19 for backward and forward movements, and each of which is provided at its rear end with a rack 21 in mesh with the pinion 16 of the numeral wheel mechanism, corresponding thereto. Each slide bar is provided with nine upwardly projecting inclined cams 22 of gradually increasing height from one of the cams located beneath the stem of a numeral "1" key to the cam beneath a numeral "9" key in line with said numeral "1" key. As the upper ends of the cam 22 are located in different horizontal planes the slide bar may be moved rearwardly in response to a movement of a key stem without striking any of the other key stems.

23 are retracting springs connected to the slide bars 20 by which they are moved in a forward direction. While a slide bar is moving to normal position under the influence of a spring 23, the depressed key is automatically restored by the cam 22 which lies directly under it. After being restored, the keys are locked in their normal position, above the cams 22, by means of the detents 6.

It will be readily understood from the foregoing that when any particular key of the machine is depressed, its inclined lower end will ride downwardly upon the cam of the slide bar beneath it and, in so doing, cause said slide bar to move rearwardly. The cams of the slide bars are of such height and pitch as to provide for the slide bar rack 21 being moved to cause a member of its teeth corresponding to the integer of the key depressed to cooperate with the pinion 16 it meshes with and operate the numeral wheel mechanism. As a consequence, the result of the key depressed is shown upon the numeral wheel directly operated by the slide bar and intervening parts, and upon two or more of the numeral wheels if carrying action takes place, due to the carrying teeth 13' of the transmission wheels being brought into service.

To provide for positive stoppage of the transmission wheels 16 of my machine when a key has been depressed and the slide bar 20 has been moved thereby, I introduce into the machine movable locking bars 24 arranged alongside the slide bars, and having cams 25 that are engaged by the stems of the keys when they are depressed to operate the slide bars. These locking bars are moved rearwardly during the latter portions of the downward movements of the keys and each bar has a finger 26 at its rear end that enters between teeth of the trans-

mission wheel it approaches to serve as a lock for such wheel. The locking bars are returned to normal positions by retracting springs 27.

I claim:—

1. In an adding machine, numeral wheel mechanism, a slide bar for actuating said numeral wheel mechanism, said slide bar being provided with a row of cams the upper ends of which are located in different horizontal planes, and key stems adapted to operate said slide bar; the lower ends of said key stems being located in different horizontal planes above said cams and below the top edge of the slide bar.

2. In an adding machine, numeral wheel mechanism, a slide bar for actuating said numeral wheel mechanism, said slide bar being provided with a row of cams the upper ends of which are located in different horizontal planes, key stems adapted to operate said slide bar, the lower ends of said key stems being located in different horizontal planes above said cams and below the top edge of the slide bar, and a spring for restoring said slide bar to normal position, the key stems being engaged with the cams so as to move to normal position in unison with the slide bar.

3. In an adding machine, numeral wheel mechanism, a slide bar for actuating said numeral wheel mechanism, said slide bar being provided with a row of cams the upper ends of which are located in different horizontal planes, key stems adapted to operate said slide bar, the lower ends of said key stems being located in different horizontal planes above said cams and below the top edge of the slide bar, a spring for restoring said slide bar to normal position, the key stems being engaged with the cams so as to move to normal position in unison with the slide bar, and a detent for holding the key stems in their normal position.

4. In an adding machine, numeral wheel mechanism, a slide bar for actuating said numeral wheel mechanism, said slide bar being provided with a row of cams the upper ends of which are located in different horizontal planes, a locking bar arranged adjacent to said slide bar and provided with cams which lie opposite to the cams on said slide bar, said locking bar having a finger adapted to constitute a stop for the numeral wheel mechanism, and vertically movable key stems the lower ends of which lie directly above said cams, the lower ends of said key stems being located in different horizontal planes.

5. In an adding machine, numeral wheel mechanism comprising a numeral wheel, a transmission wheel meshing with the numeral wheel, a pawl carried by the transmission wheel, a ratchet wheel coöperable

with said pawl, a pinion fixed to the ratchet wheel, a slide bar having teeth which mesh with the pinion, said slide bar being provided with a row of cams, key stems operable on the cams to operate said slide bar, and a locking bar operable by the key stems to lock the numeral wheel mechanism after said slide bar has been actuated, said locking bar having a finger adapted to interlock with the transmission wheel to constitute a stop therefor.

FERDINAND J. TILLMAN.

In the presence of—

E. B. LINN,

A. J. McCAULEY.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."