G. O. DEGENER.

COMPUTING MACHINE.

APPLICATION FILED NOV. 5, 1910.

1,012,607.

Patented Dec. 26, 1911.

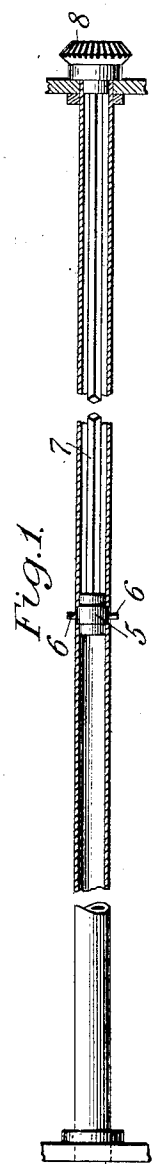

Fig. 1.

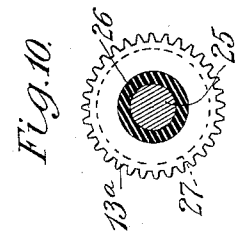

Fig. 10.

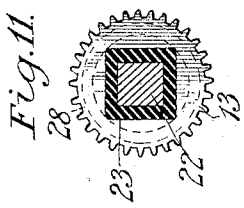

Fig. 11.

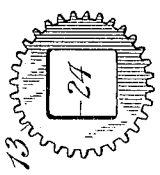

Fig. 12.

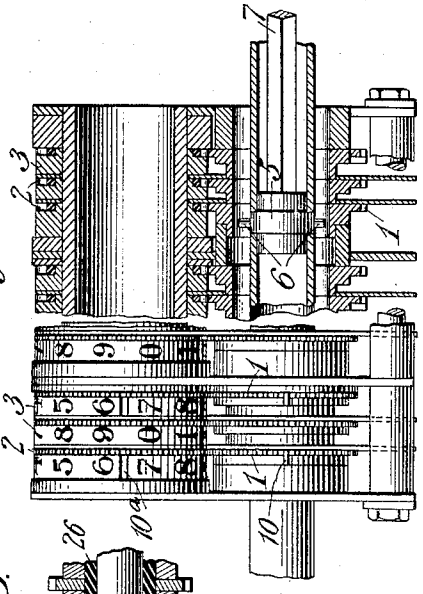

Fig. 4.

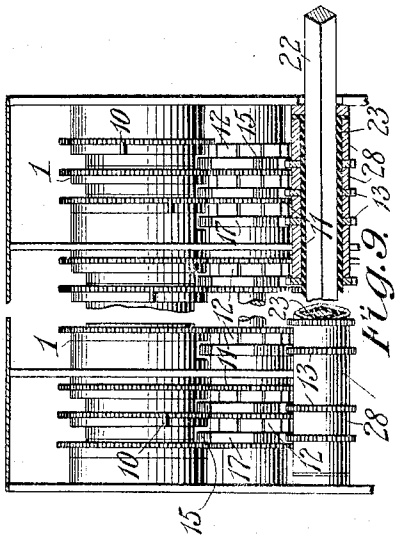

Fig. 9.

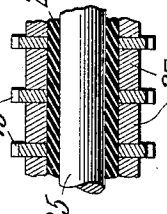

Fig. 3.

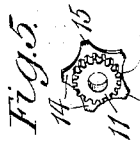

Fig. 5.

Fig. 7.

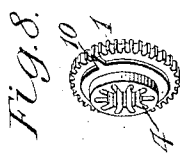

Fig. 8.

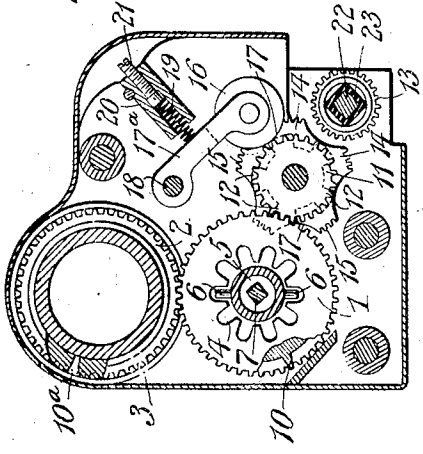

Fig. 2.

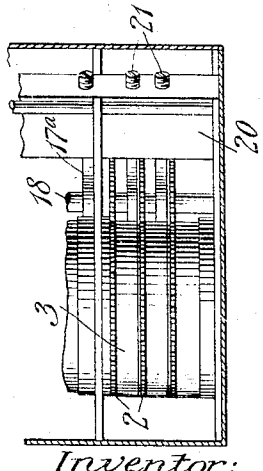

Fig. 6.

Witnesses:
John A. Rennie
Sigmund Schiff

Inventor:
Gustave O. Degener
By R. B. Stickney
Attorney.

UNITED STATES PATENT OFFICE.

GUSTAVE O. DEGENER, OF NEW YORK, N. Y., ASSIGNOR TO UNDERWOOD COMPUTING MACHINE COMPANY, OF NEW YORK, N. Y., A CORPORATION OF NEW YORK.

COMPUTING-MACHINE.

1,012,607. Specification of Letters Patent. Patented Dec. 26, 1911.

Application filed November 5, 1910. Serial No. 590,839.

To all whom it may concern:

Be it known that I, GUSTAVE O. DEGENER, a citizen of the United States, residing in New York city, in the county of New York and State of New York, have invented certain new and useful Improvements in Computing-Machines, of which the following is a specification.

This invention relates to the tens-carrying mechanism of computing devices, particularly those of the kind disclosed in the applications of Walter Wright, No. 485,046, filed March 22, 1909, and No. 543,603, filed February 12, 1910, in which a constantly revolving device is called upon intermittently to assist in carrying tens from one computing wheel to the next. As set forth in said applications, each main computing wheel is provided with a special tooth, which turns a pinion that is in mesh with the computing wheel of next higher denomination, to the end that said higher computing wheel may make one-tenth of a revolution. The movement of this tens-carrying pinion is assisted by a constantly revolving soft-rubber roll; the pinion having a set of points or lobes to engage said roll to be turned thereby, whereby sufficient assistance to the tens-carrying pinion is assured.

The object of the present invention is to improve the construction and operation of the tens-carrying devices, with a view to increase the speed and reliability of action, and prolong the life of the parts.

According to the present improvements, in place of the soft-rubber roll aforesaid, there is employed a set of yieldingly mounted pinions having fine teeth adapted to engage teeth provided upon the assisting lugs fixed to the aforesaid tens-carrying pinion. Normally, the constantly revolving pinion is out of mesh with the teeth on said assisting lugs; but at the proper time the movement of the main computing wheel will cause one of said assisting spurs or lugs to mesh with the constantly revolving pinion, whereby the latter is enabled to assist in the turning of the tens-carrying pinion. Since the constantly revolving pinions are yieldingly mounted, they are sure to mesh properly with the teeth of the aforesaid assisting lugs, since they will yield if the lug teeth are improperly presented to them.

Other objects and advantages will hereinafter appear.

In the accompanying drawings, Figure 1 is a part-sectional front elevation of the main intermittently operated drive-shaft of the computing mechanism. Fig. 2 is a sectional side elevation of the computing mechanism. Fig. 3 is a longitudinal section taken through the yieldingly mounted constantly revolving pinions of the tens-carrying mechanism. Fig. 4 is a part-sectional front elevation of the computing mechanism seen at Fig. 2. Fig. 5 is a perspective view of one side of the tens-carrying pinion showing the assisting points or spurs thereon. Fig. 6 is a plan of the devices seen at Fig. 2. Fig. 7 is a perspective view, showing the opposite side of the device seen at Fig. 5. Fig. 8 is a perspective view of a primary computing wheel. Fig. 9 is a part-sectional plan of the computing devices. Fig. 10 is an elevation of the constantly revolving tens-carrying pinion, showing in section the yielding support upon which it is mounted. Fig. 11 is a view similar to Fig. 10, but showing the pinion mounted upon a revolving support which is square in cross section; this being the preferred form of the invention. Fig. 12 is a separate view of the pinion seen at Fig. 11.

Each primary computing wheel 1 is in the form of a gear in mesh with a gear 2, the latter fixed upon a number wheel 3. Each computing wheel 1 has a series of ten interior notches 4, whereby it is rotated. The rotation is effected by an interior master wheel 5, having opposite teeth 6 working in the notches 4; said master wheel fixed upon a shaft 7 rotated by a gear 8. Intermittent variable rotation of the gear 8 is effected or controlled by keys in any suitable manner, as for instance in the manner illustrated in said applications. The gangs of computing and number wheels travel step-by-step, to enable the master wheel 5 to operate consecutively upon the primary computing wheels 1, as set forth in said applications.

Once in each revolution of each primary computing wheel 1, a special tooth 10 thereon, sets in motion a tens-carrying pinion 11, which is in mesh with the primary wheel 1 of next higher denomination, whose diameter is twice that of the pinion; said pinion being provided for this purpose with a set of five equally spaced projections 12, en-

gageable consecutively by said special tooth 10, at successive revolutions of the computing wheel 1. (A clearance is provided in wheel 3 at 10^a for the tooth 10.) The tooth 10 does not necessarily turn the pinion 11 through an entire one-fifth of a revolution, and hence does not necessarily turn the next computing wheel 1 through one-tenth of a revolution. The necessary movement of the pinion 11 and of the next higher computing wheel 1 is assisted or in part effected by one of a series of constantly revolving auxiliary pinions 13; the pinion 11 being provided, for this purpose, with a series of five spurs or lobes 14, forming an auxiliary wheel; the tips of the lobes or points 14 having teeth or serrations 15 to match those of the pinion 13. A detent roll 16 is seated in one of five notches 17 between the points or lobes 14. Said roll 16 is carried on an arm 17^a, pivoted at 18, and held by a compression spring 19, occupying a fixed tube or housing 20 and having a screw adjustment. The movement of the tens-carrying pinion 11 originally effected by the special tooth 10 of the computing wheel, is sufficient to bring a point or lobe 14 into mesh with the auxiliary pinion 13. Since the latter is in constant motion, it will operate to drive the pinion 11 positively in the same direction until the latter completes its movement through one-fifth of a revolution. The movement of the tens-carrying pinion 11 is completed by said detent roll 16, and the teeth 15 are carried out of mesh with 13, the latter normally occupying one of the recesses 17, as shown. The pinions 13 are spaced at intervals along a constantly revolving shaft 22, extending along the gang of tens-adding pinions 11, said shaft constantly rotated by any suitable source of power as set forth in said applications. The shaft 22 is preferably square or prismatic in cross section, and has a soft rubber covering 23 in the form of a tube, square in cross-section; the pinion 13 having a square central hole 24, to fit upon the cushion 23. This member 23 is of such consistency or thickness as to yield very easily, so that, when the first of the advancing teeth 15 on the star or mutilated wheel is struck by one of the teeth of the revolving pinion 13, the latter is enabled to yield, in order to prevent injury to the teeth, and also to prevent the teeth from becoming inter-locked, and to insure that the pinion 13 will mesh properly with the teeth 15. The square or prismatic form of the shaft and the cushion thereon, to which the square or non-circular central perforations 24 in the pinions are fitted, insures that the pinion will always be positively rotated by the shaft and its cushion, without liability of injury of the cushion and without interfering with the yielding action of the pinion.

In the form of the invention shown at Figs. 3 and 10, the pinion 13^a is mounted on a round shaft 25, corresponding with 22, and having a round tubular soft rubber tube 26 secured to the shaft and to the pinions, which have round bores to fit on said cushion. At Fig. 3, the pinions 13^a are separated by washers 27 at intervals to agree with the separation of the star wheels 14; and it will be understood that the pinions 13 may be similarly separated by ring washers 28, Fig. 11.

Having thus described my invention, I claim:

1. In a computing machine, the combination with main computing wheels of high and low denominations, of a revoluble tens-carrying device extending from one of said wheels to the other, and a power-driven revolving auxiliary pinion element; said tens-carrying device provided with an element consisting of auxiliary drive teeth normally out of mesh with said auxiliary pinion element, and movable by said computing wheel of low denomination into mesh with said auxiliary pinion element, to enable the latter to assist in the tens-carrying operation; one of said auxiliary elements having a yielding construction, for the purpose set forth.

2. In a computing machine, the combination with a gang of main computing wheels, of tens-carrying devices extending from wheels of lower denominations to wheels of higher denominations in said gang, and a series of power-driven revolving auxiliary yielding pinions; said tens-carrying devices provided with drive-teeth normally out of mesh with said yielding pinions, and including devices for moving said drive-teeth into mesh with said yielding pinions, to assist in the tens-carrying operations.

3. In a computing machine, the combination with a gang of main computing wheels, of tens-carrying devices extending from wheels of lower denominations to wheels of higher denominations in said gang, and a series of power-driven revolving auxiliary yielding pinions; said tens-carrying devices provided with drive-teeth normally out of mesh with said yielding pinions, and including devices for moving said drive-teeth into mesh with said yielding pinions, to assist in the tens-carrying operations; said pinions mounted upon a single constantly revolving yielding support.

4. In a computing machine, the combination with a gang of main computing wheels, of tens-carrying devices extending from wheels of lower denominations to wheels of higher denominations in said gang, and a series of auxiliary yielding pinions; said tens-carrying devices provided with drive-teeth normally out of mesh with said yielding pinions, and including devices for moving said drive-teeth into mesh with said

yielding pinions, to assist in the tens-carrying operations; said pinions mounted upon a single power-driven revolving yielding support comprising a shaft and a soft rubber cushion fixed thereon, said pinions fitted in said cushion.

5. In a computing machine, the combination with a gang of main computing wheels, of tens-carrying devices extending from wheels of lower denominations to wheels of higher denominations in said gang, and a series of auxiliary yielding pinions; said tens-carrying devices provided with drive-teeth normally out of mesh with said yielding pinions, and including devices for moving said drive-teeth into mesh with said yielding pinions, to assist in the tens-carrying operations; said pinions mounted upon a single power-driven revolving yielding support comprising a shaft and a soft rubber cushion fixed thereon, said pinions fitted on said cushion and separated from one another by washers.

6. In a computing machine, the combination with a gang of main computing wheels, of tens-carrying devices extending from wheels of lower denominations to wheels of higher denominations in said gang, and a series of auxiliary yielding pinions; said tens-carrying devices provided with drive-teeth normally out of mesh with said yielding pinions, and including devices for moving said drive-teeth into mesh with said yielding pinions, to assist in the tens-carrying operations; said pinions mounted upon a single power-driven revolving yielding support; said shaft prismatic in cross-section and said cushion fitting thereto and said pinions having non-circular perforations to fit said cushion.

7. In a computing machine, the combination with a gang of main computing wheels, of tens-carrying devices extending from wheels of lower denominations to wheels of higher denominations in said gang; and a series of power-driven revolving auxiliary yielding pinions; said tens-carrying devices each including a tooth on the main computing wheel, a pinion having a projecting device engageable by said tooth, said pinion in mesh with the main computing wheel of next higher denomination, said pinion also provided with a star or mutilated wheel normally out of mesh with said yielding pinions, but movable into mesh therewith at the rotation of said tens-carrying pinion, to be caused thereby to rotate said tens-carrying pinions farther in the same direction.

8. In a computing machine, the combination with a gang of main computing wheels, of tens-carrying devices extending from wheels of lower denominations to wheels of higher denominations in said gang; and a series of power-driven revolving auxiliary yielding pinions; said tens-carrying devices each including a tooth on the main computing wheel, a pinion having a projecting device engageable by said tooth, said pinion in mesh with the main computing wheel of next higher denomination, said pinion also provided with a star or mutilated wheel normally out of mesh with said yielding pinions, but movable into mesh therewith at the rotation of said tens-carrying pinion, to be caused thereby to rotate said tens-carrying pinions farther in the same direction; each of said points on said star wheel having a series of teeth or serrations to mesh with the yielding pinion.

9. In a computing machine, the combination with a gang of main computing wheels, of tens-carrying devices extending from wheels of lower denominations to wheels of higher denominations in said gang; and a series of power-driven revolving auxiliary yielding pinions; said tens-carrying devices each including a tooth on the main computing wheel, a pinion having a projecting device engageable by said tooth, said pinion in mesh with the main computing wheel of next higher denomination, said pinion also provided with a star or mutilated wheel normally out of mesh with said yielding pinions, but movable into mesh therewith at the rotation of said tens-carrying pinion, to be caused thereby to rotate said tens-carrying pinions farther in the same direction; each of said points on said star wheel having a series of teeth or serrations to mesh with the yielding pinion, and a spring detent engaging said star wheel and normally holding it out of engagement with said auxiliary pinions.

10. In a computing machine, the combination with a gang of main computing wheels, of tens-carrying devices extending from wheels of lower denominations to wheels of higher denominations in said gang, and a series of auxiliary yielding pinions; said tens-carrying devices provided with drive-teeth normally out of mesh with said yielding pinions, and including devices for moving said drive-teeth into mesh with said yielding pinions, to assist in the tens-carrying operations; said pinions mounted upon a single power-driven revolving yielding support; said shaft cylindrical in cross-section and said cushion fitting thereto and said pinions having circular perforations to fit said cushion.

11. In a computing machine, the combination with main computing wheels of high and low denominations, of a revoluble tens-carrying device extending from the wheel of low denomination to the wheel of high denomination, and a power-driven revolving auxiliary pinion element; said tens-carrying device including a tooth on the computing wheel of lower denomination, a pinion having a projecting device engageable by said

tooth, said pinion in mesh with the computing wheel of higher denomination, and said pinion also provided with an auxiliary star or mutilated wheel element normally out of mesh with said power-driven auxiliary pinion element, but movable into mesh therewith by said computing wheel of low denomination at the rotation of said tens-carrying pinion, to enable the auxiliary pinion to assist in the tens-carrying operation; one of said auxiliary star-wheel and auxiliary pinion elements having a yielding construction, for the purpose set forth.

GUSTAVE O. DEGENER.

Witnesses:
JOSHUA E. DAVIDSON,
K. FRANKFORT.