

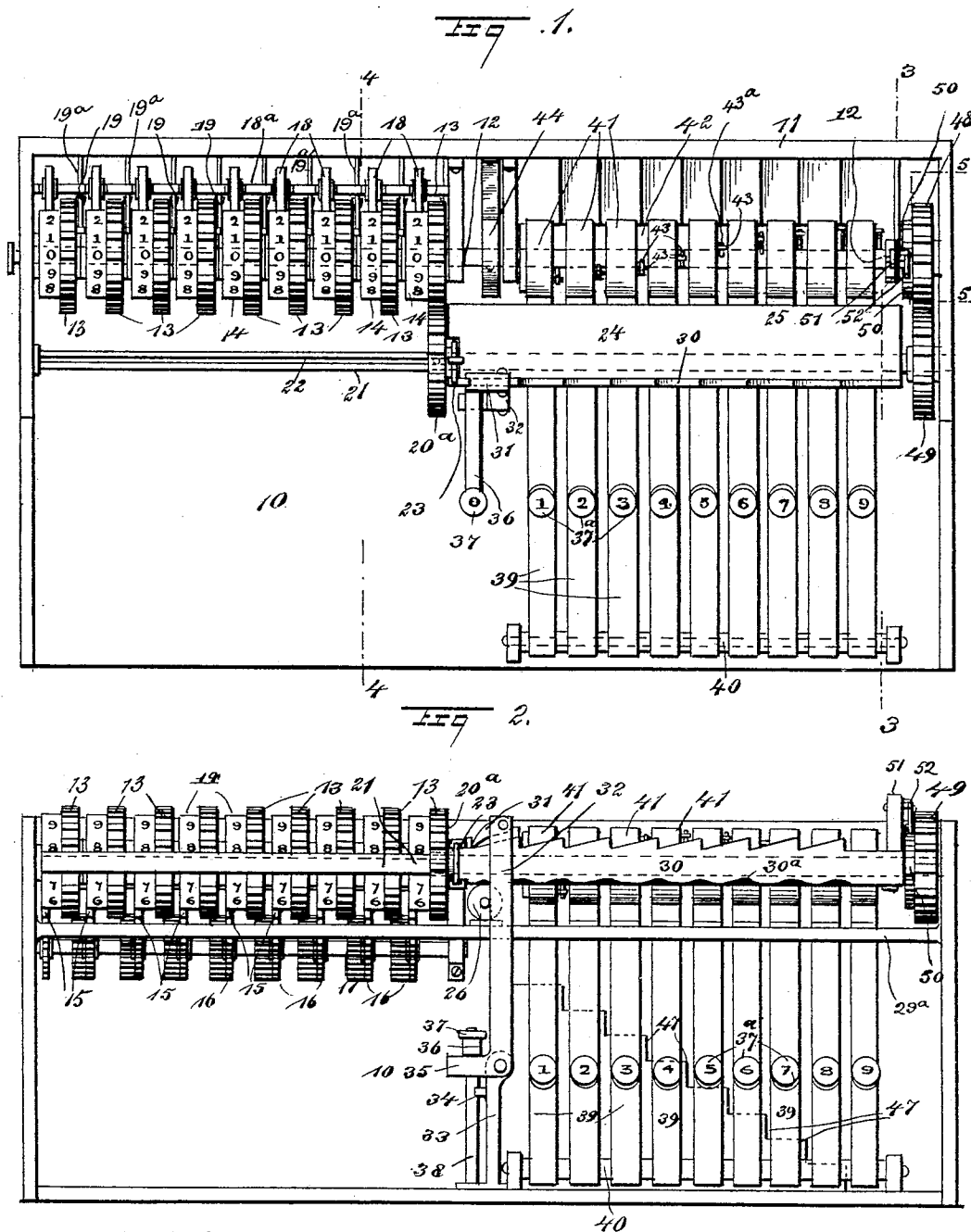
(No Model.)

2 Sheets—Sheet 1.

A. J. BROOKS.
ADDING MACHINE.

No. 493,971.

Patented Mar. 21, 1893.



WITNESSES:

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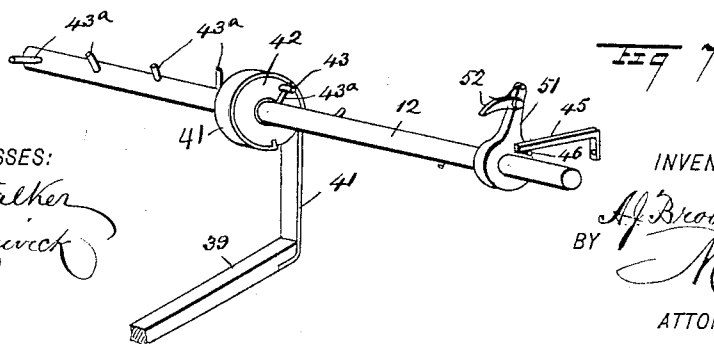
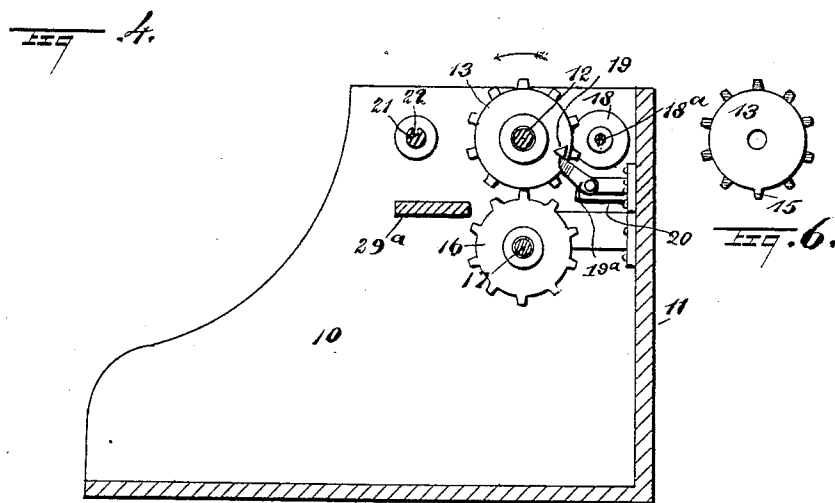
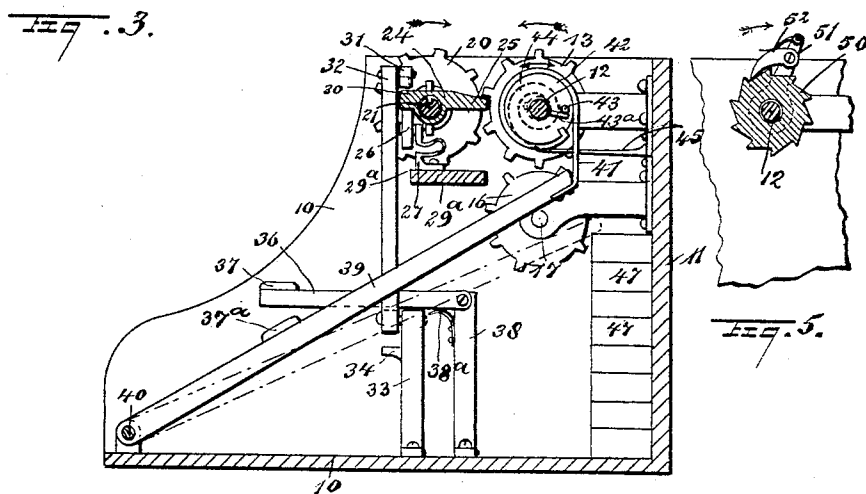
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2 Sheets—Sheet 2.

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UNITED STATES PATENT OFFICE.

AUGUSTUS J. BROOKS, OF WICHITA FALLS, TEXAS.

ADDING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 493,971, dated March 21, 1893.

Application filed June 21, 1892. Serial No. 437,457. (No model.)

To all whom it may concern:

Be it known, that I, AUGUSTUS J. BROOKS, of Wichita Falls, in the county of Wichita and State of Texas, have invented a new and Improved Adding-Machine, of which the following is a full, clear, and exact description.

My invention relates to improvements in adding or registering machines, and the object of my invention is to produce a very cheap and simple machine which may be easily operated and which will mechanically register the amounts of successive additions in such a way that there is no chance for mistake.

To this end my invention consists of certain features of construction, and combinations of parts, as will be hereinafter described and claimed.

Reference is to be had to the accompanying drawings forming a part of this specification, in which similar figures of reference indicate corresponding parts in all the views.

Figure 1 is a plan view of the machine embodying my invention. Fig. 2 is a front elevation of the same. Fig. 3 is a vertical cross section on the line 3—3 in Fig. 1. Fig. 4 is a cross section on the line 4—4 in Fig. 1. Fig. 5 is a detail sectional view of the ratchet mechanism for turning the key shaft, taken on the line 5—5 in Fig. 1. Fig. 6 is a detail side elevation of one of the numbered cog wheels; and Fig. 7 is a broken perspective view of a portion of the main shaft, showing one of the key belt drums thereon, the connection of the belt with its key, and the stopping mechanism for limiting the return movement of the shaft.

The machine is provided with a casing or frame 10, which may be of any approved form, but which has an open front and rigid back 11. Extending longitudinally through the upper part of the casing, near the rear, is a shaft 12, on which are loosely journaled a plurality of numbered cog wheels 13, these being arranged near one end of the shaft and any desired number may be used. Each cog wheel has at one side a plane circular surface 14 on which are produced the numerals from 0 to 9, and each cog wheel has also a single radially-extending tooth 15 which projects from the plane portion 14, as shown in Figs. 2 and 6, and these teeth 15, of the cog wheels, are adapted to engage cog wheels 16 which

turn loosely on a shaft 17 arranged beneath and parallel with the shaft 12. The cog wheels 16 are arranged so that the first one on the right engages the tooth 15 of the first or units wheel 13, and the cogs of the second or tens wheel 13; the second wheel 16 engages the tooth 15 of the tens wheel and the cogs of the hundreds wheel 13, and so on.

The numbered wheels are preferably covered with a suitable casing (not shown in the drawings) but which has the usual slots common to machines of this class, through which a horizontal row of numbers on the several wheels 13 may be seen. It will be seen that when the first wheel 13 to the right has been turned a distance of nine numerals, its next movement will bring the tooth 15 into engagement with one of the cog wheels 16, thus turning the said cog wheel and imparting a movement to the second or tens wheel 13 with which the first cog wheel meshes, moving it a distance of one tooth or number and carrying ten. In like manner one revolution of the tens wheel, or second wheel, 13 will cause the third or hundreds wheel 13 to be moved one space or number, and so on. The numbered wheels 13 are caused to have a steady movement by the friction rollers 18 which are carried by a shaft 18^a arranged parallel with the shaft 12, and which press upon the plane surfaces 14 of the numbered wheels. Each wheel 13 has on one side a stud 19 which is engaged by a pawl 19^a carried by a support 20 secured to the back of the casing 10, and this stud and pawl are arranged so that when the stud is turned back against the pawl the numbered wheel will be at 0; that is, 0 will be exhibited on that portion of the wheel which is read at the sight slots in the casing after an addition is made.

In front of and parallel with the shaft 12 is a shaft 21 which extends longitudinally across the casing 10, and this shaft has a key-way therein to receive a key which holds a cog wheel 20^a upon the shaft in the common and well known way, so that the wheel will turn with the shaft, but may slide upon it. The cog wheel 20^a is adapted to mesh with either of the cog wheels 13, and it connects by a coupling 23 of any usual kind with one end of a tilting locking plate 24, which plate is

also keyed to the shaft 21 see Fig. 3 so as to slide thereon, and the plate has its inner edge thinned, as shown at 25, in order that it may slip readily in its endwise movement between the cogs of the wheels 13, and lock the wheels in place, as shown clearly in Fig. 3. The outer edge of the plate is held from being tipped downward by a roller 26 which is an anti-friction roller acting as a bearing for the plate 24 and which is arranged beneath it and it is supported upon a spring arm 27 which fits in undulating notches 30^a on the under side of a rack 30 produced on the front edge of the locking plate. The arm 27 is secured to a support 29^a which extends longitudinally through the casing.

The rack 30 on the front edge of the plate 24, has ratchet teeth upon its upper edge, and these teeth are adapted to engage a pawl 31 which is carried at the upper end of the long arm 32 of a vertical elbow lever, which is pivoted on a support 33 and which has a stop 34 on one side to limit its swing. The short arm 35 of the elbow lever extends laterally and parallel with the several shafts of the machine into the path of a swinging key 36 which has at its free end a finger piece 37 numbered 0, and which at the other end is pivoted to a support 38 and pressed upward by a spring 38^a. It will be seen that by depressing the key the bell crank will be tilted, the pawl, locking plate 24, and rack 30 moved to the left the distance of one tooth of the rack, and the cog wheel 20^a moved from engagement with one wheel 13 to the next wheel to the left.

Near one end of the machine and at the right of the key 36 are a series of swinging keys 39 which have finger pieces 37^a numbered from 1 to 9, and which at their lower ends are pivoted on a shaft 40, the upper ends of the keys extending rearward into the casing and having tapes or belts 41 secured to them, these belts being each wound upon a drum 42 and each drum is journaled loosely on the shaft 12. It will be seen that by pressing down upon either of the keys 39 the drum 42, connected therewith, will be revolved. The movement is imparted from the drums to the shaft and in return from the shaft to the drums by means of the studs 43 which project from the ends of the drums, and the arms 43^a which project from the shaft 12 into the paths of the studs, and the arms are placed spirally around the shaft and in contact with the studs, so that the shaft will be moved only the necessary distance. The return movement of the shaft 12 is effected by a coil spring 44, which is shown clearly in Fig. 1, and in dotted lines in Fig. 3, the spring being coiled around the shaft and having one end fixed to the same and the other at the back of the casing. It will be seen then that the pressure upon one of the keys 39 will unwind the belt 41, turn the drum 42, and actuate the shaft 12, while the reaction of the spring will turn back the shaft and drum and wind up the belt. The spring is prevented from throwing

the shaft too far back by a stop 45 which is secured to the casing and which engages a stud 46 on an arm 51 secured to the shaft, as shown in Fig. 7. The downward movement of the keys 39 is limited by stops 47 which are arranged like a flight of steps, as shown in Figs. 2 and 3, the steps being of different heights and arranged in the paths of the keys. This provides for the proper movement of the keys. For instance, the lowest step is placed in the path of the rear end of the key numbered 9, the next lowest in the path of the key numbered 8, and so on.

Journaled loosely on one end of the shaft 12 is a cog wheel 48 which meshes with a cog wheel 49, and the latter is fixed to the shaft 21. On the inner side of the cog wheel 48 is a ratchet wheel 50 and fixed to the shaft 12, at one side of the ratchet wheel, is the arm 51 to which the stop 46 is secured, as described above, and this arm carries a pawl 52 at its free end which engages the ratchet wheel 50. It will thus be seen that the arm 51 and pawl 52 may move freely in one direction without turning the ratchet wheel 50 or the shaft 21, but when turned in the opposite direction both the said shaft and ratchet wheel will be turned.

The operation of the machine is as follows:—The successive additions are made by depressing the keys 39, that is, if nine is to be added the 9 key is depressed; if six, the 6 key, and so on. When one of the keys is depressed one of the drums 42 is moved, the shaft 12 is turned, the arm 51 is carried backward, and when the key is released the spring 44 effects the return of the shaft and causes the pawl 52 to engage the ratchet wheel and move the cog wheels 48 and 49 and the shaft 21, and the latter will turn the cog wheel 20^a and the number wheel 13 with which it is connected so as to advance the number wheel the required distance. When the first wheel 13 has been moved a distance of nine spaces or numbers, its next movement will actuate the second or tens wheel in the manner described through the medium of the cog wheels 16, thus carrying one to the tens column.

The above operation is adapted for successive additions where single units are added, but where columns of figures are added and the amount of successive additions is to be registered, the locking plate 24 comes into use.

When several columns of figures are to be added, the units column is added first by striking upon the several numbered keys in the manner already described, and we will suppose that the first column foots up "139." The units number "9" will be displayed on the units number wheel 13, as already described, and as every complete revolution of the first units wheel to the right causes the tens wheel to be turned, and every revolution of the tens wheel causes the hundreds wheel to be turned, the "13" will have been automatically carried in the manner clearly described above.

When the tens column is to be added, the

key 37 is depressed, which by means of the connection already described, causes the rack 30, the locking plate 24 and the wheel 20^a to be moved to the left, so that the wheel 20^a engages the second or tens wheel 13, and the locking plate 24 slips between the teeth of the first or units wheel 13, thus preventing the latter from being turned and displaced, and the tens column is then added as already described. After the tens column is added, the locking plate is slipped again to the left, thus locking the tens wheel and the hundreds column is then added and the plate again moved, and so on until the entire column is added, after which the sum of the addition is displayed on the number wheels and may be read at the sight slots of the machine.

From the foregoing description it will be understood that where the machine is to be used for simple addition merely, the locking plate may be dispensed with, and the ratchet wheel 50 secured directly to the first number wheel 13, the pawl 52 and arm 51 being connected with the wheel and shaft 12 in the manner described.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

1. An adding machine, comprising a series of revoluble number wheels held to turn upon a shaft and arranged so that the revolution of one wheel will turn the next wheel a distance of one number, a spring-returned shaft journaled parallel with the number wheel shaft, a series of drums journaled loosely on the spring returned shaft, projecting studs on the drums and arms on the shaft which are adapted to contact with each other, belts secured to the drums and adapted to be wound thereon, numbered depressible keys secured to the free ends of the belts and also to the main case of the machine, a series of stops of graduated height arranged beneath the keys and adapted to limit their movements, and an operative gear and ratchet connection between the spring returned shaft and the number wheels, whereby the turning of the spring shaft in one direction will actuate the number wheels, substantially as described.

2. An adding machine, comprising a series of numbered cog wheels journaled loosely on a shaft and geared together so that a revolution of one wheel will impart a tenth of a revolution to the adjacent wheel, a shaft journaled parallel to the number wheel shaft, a sliding locking plate and cog wheel keyed to

the shaft and adapted to engage the number wheels, the cog wheel to rotate and the plate to lock them a series of movable numbered keys held to swing adjacent to the locking plate, a revoluble spring-returned shaft operatively connected with the swinging keys, a ratchet connection between the key operated shaft and the shaft carrying the locking plate, and a key mechanism for sliding the locking plate and its cog wheel, substantially as described.

3. An adding machine, comprising a series of parallel numbered wheels journaled loosely on a shaft and geared together so that a revolution of one will impart a tenth of a revolution to the next, a key shaft arranged adjacent to the number wheel, a locking plate and cog wheel held to slide on the key shaft and adapted to engage the number wheels, the cog wheel to rotate and the plate to lock them a lever mechanism for sliding the locking plate and its cog wheel, a series of spring-returned drums journaled loosely on the number wheel shaft, a series of numbered keys held to swing beneath the drums and connected with them by belts, means, as the studs on the drums and the arms on the shaft, for connecting the arms and their shaft, the graduated series of stops to limit the movements of the keys, and a ratchet and gear connection between the drums and the key shaft, substantially as described.

4. The combination, with the numbered cog wheels arranged to represent units, tens, hundreds, &c., and constructed so that the revolution of one wheel turns the next higher wheel a distance of one number, of a locking plate held to slide opposite the wheels and adapted to engage the teeth thereof, substantially as described.

5. The combination of the revoluble number wheel having cogs thereon, a key mechanism for revolving the number wheels, the sliding locking plate and cog wheel held to move adjacent to the number wheels and to engage the cogs thereon, the cog wheel to rotate and the plate to lock the number wheels; a rack fixed to the locking plate, a bell crank pivoted beneath the rack and connected therewith by a pawl, and a swinging key held to operate the bell crank, substantially as described.

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Witnesses:

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A. R. HIGHTOWER.