

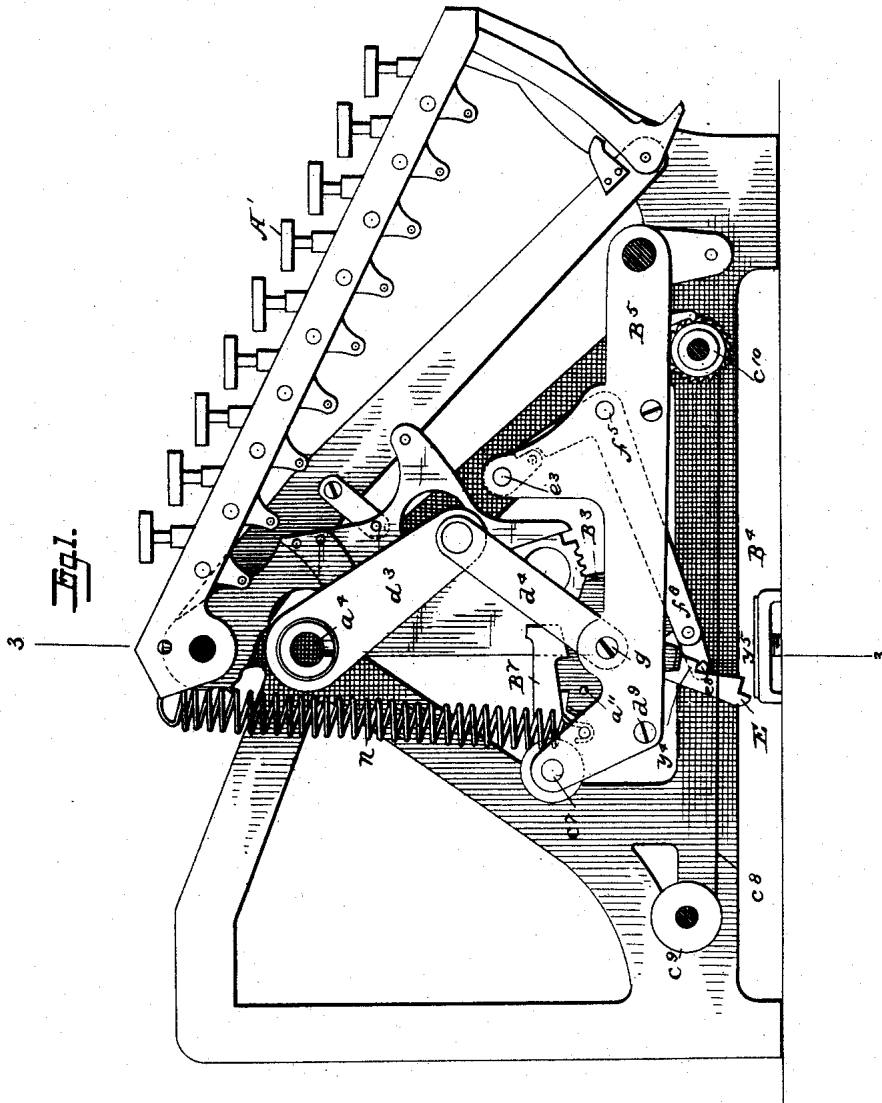
(No Model.)

4 Sheets—Sheet 1.

W. S. BURROUGHS.
DEVICE FOR RECORDING NUMBERS.

No. 420,618.

Patented Feb. 4, 1890.



Witnesses
Geo. H. Hinkley Jr.
W. S. McArthur

W. S. Burroughs
Inventor
My. Weston & Leaman

Attorney

(No Model.)

4 Sheets—Sheet 2.

W. S. BURROUGHS. DEVICE FOR RECORDING NUMBERS.

No. 420,618.

Patented Feb. 4, 1890.

Fig. 2.

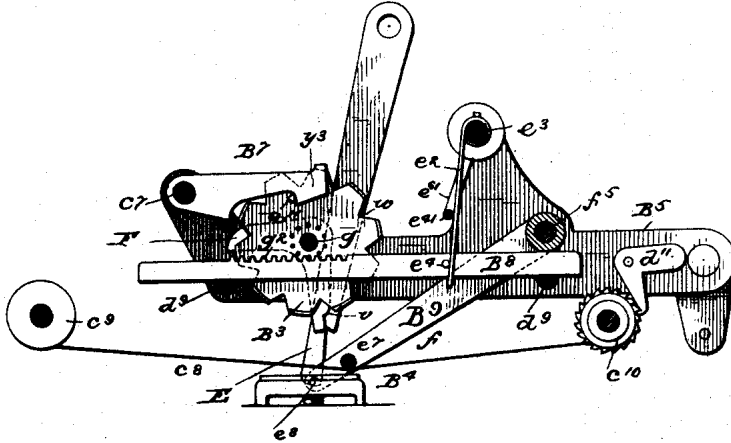
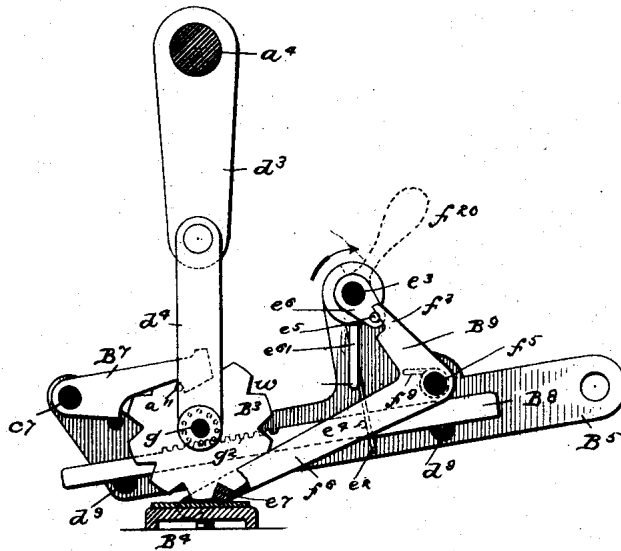


Fig. 4.



Witnesses
Judy Hinkel for
W. S. Burroughs

W. S. Burroughs
 Inventor
By Foster & Leaman
 Attorneys

(No Model.)

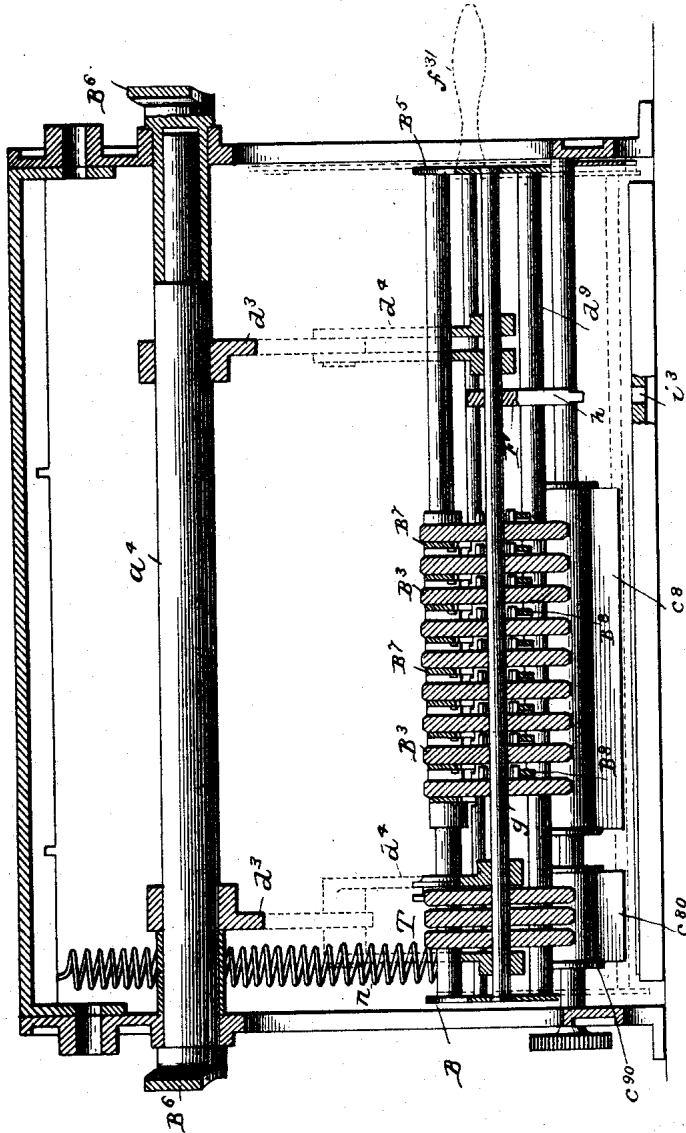
4 Sheets—Sheet 3.

W. S. BURROUGHS.
DEVICE FOR RECORDING NUMBERS.

No. 420,618.

Patented Feb. 4, 1890.

Fig. 3.



Witnesses
 Prof. Hinkel for
 W. S. McArthur

W. S. Burroughs
 Inventor
 By Foster & Freeman
 Attorneys

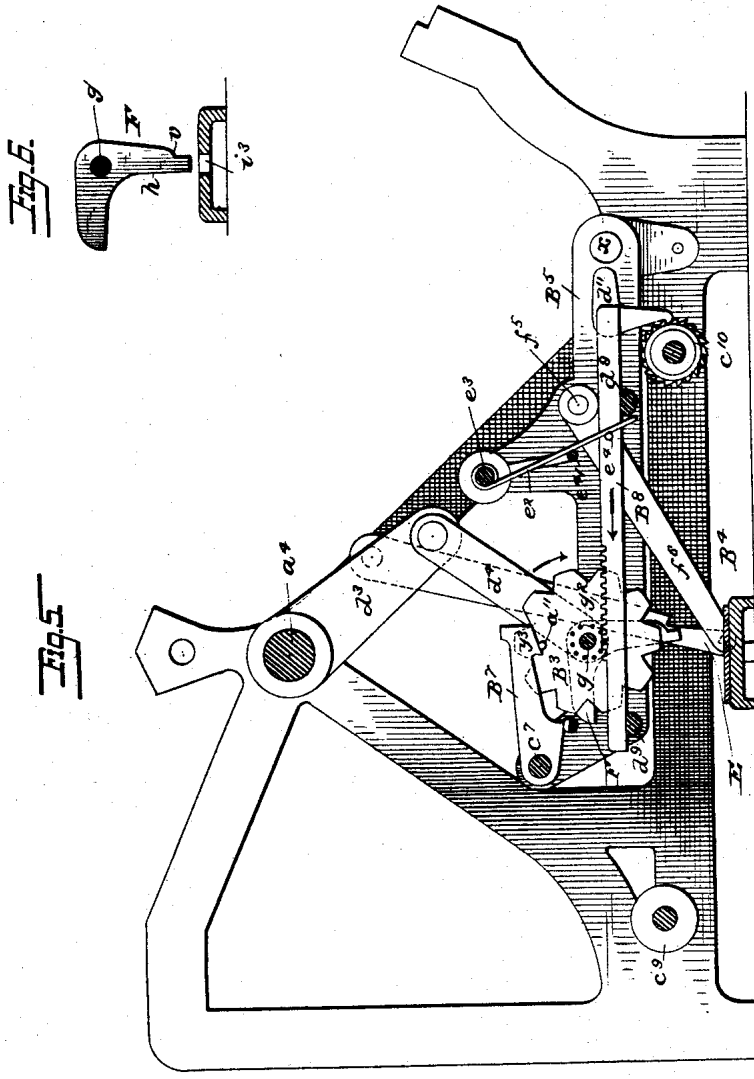
(No Model.)

4 Sheets—Sheet 4.

W. S. BURROUGHS.
DEVICE FOR RECORDING NUMBERS.

No. 420,618.

Patented Feb. 4, 1890.



Witnesses
Jno. G. Hinke for
W. S. Burroughs

W. S. Burroughs
Inventor
By Foster & Freeman

Attorneys

UNITED STATES PATENT OFFICE.

WILLIAM S. BURROUGHS, OF ST. LOUIS, MISSOURI, ASSIGNOR TO THE
AMERICAN ARITHMOMETER COMPANY, OF SAME PLACE.

DEVICE FOR RECORDING NUMBERS.

SPECIFICATION forming part of Letters Patent No. 420,618, dated February 4, 1890.

Application filed July 11, 1888. Serial No. 279,609. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM S. BURROUGHS, a citizen of the United States, residing in St. Louis, in the State of Missouri, have invented certain new and useful Improvements in Devices for Recording Numbers, of which the following is a specification.

My invention relates to that class of recorders in which a series of printing-wheels are turned to positions to bring the type formed thereon into alignment to record by printing the numbers indicated by such type, and more especially to that class of recorders connected with the mechanical calculators in which the wheels are set in position by the operation of keys; and my invention consists in constructing said wheels and combining therewith certain appliances, as fully set forth hereinafter, so as to prevent the wheels from getting out of alignment, preserve the faces of the type, and restore the wheels to zero after printing, without interfering with their free movement by their actuating devices, and otherwise to increase the efficiency of the recording device.

In the accompanying drawings, Figure 1 is a side view of sufficient of a mechanical calculator, one side frame being removed, to illustrate my improvement in recorders connected with said calculator. Fig. 2 is a one-part sectional elevation showing the parts in a different position. Fig. 3 is a transverse section on the lines 3 3, Fig. 1. Fig. 4 is a detached view of the recorder in side elevation. Fig. 5 is a sectional elevation of parts of the device, showing the same in a different position from that illustrated in Fig. 4. Fig. 6 is a view of the dog and platen.

The recorder, upon which different numbers are set up, and from which they are printed, consists, as shown, of a series of notched type-wheels B^3 , each turning freely upon a shaft g , carried between and by two links d^4 , each jointed to an arm d^3 , connected with a shaft a^4 , having its bearings in the side frames of the machine. The shaft g is also carried by a frame B^5 , pivoted at the ends to a cross-bar x , and beneath the recorder is a platen B^4 , to and from which the recorder is carried by the rocking of the

shaft a^4 , bringing the parts to different positions. (Shown in Figs. 2 and 4.)

The adjustment of the different type-wheels to bring the required figures in line with each other above the platen is effected by means of devices operated from a series of keys A' , which devices need not be here described, as they constitute no part of this invention, and as they are fully set forth in an application for Letters Patent for a mechanical accountant, No. 388,116, dated August 21, 1888.

The frame B^5 may be depressed by the rocking of the shaft a^4 , as before described, or by means of a handle or arm f^{31} , Fig. 3, extending from the frame and adapted to be operated directly by hand, the frame being elevated, when the handle is released, by a spring n . When the shaft a^4 is used as the operating medium, it may be rocked by means of a handle B^6 . In either case the frame B^5 is raised or depressed, and the printing is effected by the depressing of the frame by bringing the properly-adjusted recorder against an ink-ribbon c^8 , supported by spools c^9 c^{10} , and forcing the ribbon against a sheet lying upon the platen B^4 .

A pawl d^{11} , carried by the frame B^5 , engages with a ratchet upon the spool c^{10} and turns the latter slightly at each vibration, carrying with it the ink-ribbon with a step-by-step motion.

It is generally desirable that the printing-wheels shall be restored to zero—that is, with the cipher of each wheel directly above the platen—after any number has been printed from the recorder, in order that it may be in position to be properly reset to print any other number. To effect this I combine with each wheel a rack-bar B^8 , sliding in bearings d^9 d^9 upon the frame B^5 , and each gearing with a pinion g^2 at the side of one of the wheels, and a spring-blade e^2 , secured to a cross-bar e^3 , bears upon a pin or shoulder e^4 upon each rack-bar B^8 , so as to throw it in the direction of the arrow, Fig. 5, until a pin a^{11} , at the side of the type-wheel B^3 , contacts with a shoulder y^3 of one of a series of pawls B^7 hung to a cross-bar c^7 . When the wheels are to be set by the operation of the keys, it is

necessary that they should be left to turn perfectly free without resistance, and the shaft e^3 , which carries the spring e^2 , is therefore hung in the frame B^5 , so as to swing freely during the adjustment of the wheels. When the wheels, after printing, are to be restored to position, the shaft e^3 is turned in the direction of its arrow, Fig. 4, allowing all the springs e^2 to bear against the pins e^4 , when each bar B^8 will slide in the direction of the arrow, Fig. 5, until the pins a^{11} of all the wheels are in contact with the shoulders y^3 of the pawls B^7 , as shown in Fig. 4.

The movement of the shaft e^3 requisite to bring the springs to bear upon the pins e^4 results from the rocking of a crank-lever B^9 , pivoted upon the shaft f^5 , carried by the frame B^5 , and one arm f^3 of this lever bears upon the pin e^5 , projecting from an arm e^6 upon the shaft e^3 . The long arm f^6 of the lever B^9 extends downward and forward, and, in conjunction with a similar arm at the opposite side of the machine, carries a cross-bar e^7 .

A spring f^9 (shown in dotted lines, Fig. 4) is connected with the lever B^9 , and tends to raise slightly the lower end of the arm f^6 , and a lug e^8 , Figs. 1 and 2, at the end of said arm, is arranged to engage with shoulders y^4 upon a stop-arm E, hung from one of the side frames of the machine to swing freely.

Arms e^{61} , Fig. 4, projecting from the shaft e^3 , carry a cross-bar e^{41} , upon which the springs e^2 may be brought to bear.

When the frame B^5 is depressed to effect the printing, the lug e^8 is carried beneath the shoulder y^5 of the stop-arm E, so that when the frame B^5 again rises the lever B^9 will be held in its position shown in Fig. 2, when the arm f^3 will be brought to bear upon the lug e^5 to swing the shaft e^3 in the direction of its arrow, Fig. 4, and thereby carry the cross-bar e^{41} away from the springs e^2 , when they will spring inward and carry the bars B^8 with them and restore all of the printing-wheels to zero. The parts remain in the position described until the frame B^5 is about horizontal; but as it rises higher the lever B^9 will be slightly retracted, withdrawing the lug e^8 from the shoulder y^5 , when the spring f^9 will lift the lever until the lug e^8 strikes the shoulder y^4 , as shown in Fig. 1. This upward movement of the lever B^9 carries the arm f^3 away from the pin e^5 and leaves the shaft e^3 free from all restraint, so that the spring e^2 can swing without resistance, leaving the bars B^8 and their connected wheels B^3 free to move under the action of the wheel-operating devices.

In order to secure the proper alignment of the numbers upon all the wheels, I make use of the cross-bar e^7 in connection with the V-shaped notches w in the printing-wheels. Thus as the recorder descends the cross-bar e^7 is received into the notches of the wheels and all are brought to bear upon the cross-bar until turned with the lower numbers in

line with each other and the faces parallel with the face of the platen, the bar e^7 preventing any independent movement of any of the wheels. As the recorder rises, the bar e^7 remains in its place until the wheels are above the latter, when they are free to turn under the action of their operating devices.

An L-shaped dog F, Figs. 2, 3, and 6, is hung loosely to the shaft g of the recorder, so that one arm may extend over one of the bars d^9 , which acts as a stop, while the other pendent arm h is provided with an inclined edge v , so arranged as to be struck by the cross-bar e^7 when it enters the notches w .

In the platen B^4 is a notch v^3 , so arranged that when the cross-bar e^7 is in the lower row of notches to its greatest depth, as shown in Fig. 4, it will contact with the dog F, and the latter will enter the notch v^3 and the printing will be effected. When, however, the cross-bar e^7 is in the position shown in Fig. 1, the dog F will swing to such a position that its lower end will in descending strike the face of the platen and prevent the full descent of the frame B^5 and the battering of the type, which results if any of the wheels strike the platen before the face of the type is brought parallel with the latter. Thus if one of the wheels was out of adjustment the cross-bar e^7 could not enter to the full depth of the notches w , and the dog F would not therefore be moved by the cross-bar sufficiently to permit its end to enter the opening v^3 .

Other means than those described may be employed for bringing the springs e^2 to bear at the proper time upon the bars B^8 and leave them free at other times—as, for instance, a handle f^{20} , connected with the shaft e^3 , as shown in dotted lines Fig. 4, the said handle being operated by hand.

In some instances it is desirable to print the date upon each slip upon which the number is printed. This I effect by arranging dating-wheels T upon the shaft g , as shown in Fig. 3, the said wheels being set by hand or otherwise, and a separate ink-ribbon c^{80} , extends from spools c^{90} beneath the said dating-wheels.

Without limiting myself to the precise construction and arrangement of parts shown, I claim—

1. The combination, with the independent type-wheels of a recorder, of springs for moving said wheels in one direction, a detent to prevent the movement of each wheel after it is at zero, and devices for throwing the springs into and out of action on the wheels, substantially as set forth.

2. The combination of a vibrating frame, a platen, a recorder having independent printing-wheels carried by the frame, detents limiting the movements of the wheels in one direction, springs for turning the wheels in said direction, and means, substantially as described, for throwing the springs into and out of action upon the wheels, substantially as set forth.

3. The combination of the frame carrying a recorder having a series of printing-wheels, a platen, springs connected to move the said wheels, an arm extending from the frame connected with said springs, and a stop arranged to contact with the arm as the frame ascends to swing and put the springs under tension, substantially as and for the purpose set forth.
4. The combination, with the series of printing-wheels carried by a frame, and with a platen, of a series of bars gearing with pinions connected with said wheels, a series of springs suspended from a rock-shaft to contact with bearings upon said bars, and a lever carried by said frame and bearing against an arm upon said shaft to rock the latter and carry the springs against their bearings as the frame ascends, substantially as set forth.
5. The combination, with the series of printing-disks carried by a vibrating frame, of an aligning-bar and stop device F, arranged

in position to engage said bar when the latter is in position to hold the disks in alignment, substantially as set forth.

6. The combination, with the series of printing-disks carried by a frame, of an aligning-bar carried by arms, one of which is provided with a lug, and a stop-arm provided with shoulders arranged to engage the said lug, substantially as and for the purpose set forth.

7. The combination, with the independent wheels of a printing-recorder, of rack-bars, actuating-springs, and spring-operating devices for bringing the springs to bear on and for throwing them out of action on the bars, substantially as set forth.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

WILLIAM S. BURROUGHS.

Witnesses:

EMIL WENGER,
JAMES WEST.