

R. L. BURD.
ADDING MACHINE.
APPLICATION FILED AUG. 8, 1913.

Patented Apr. 10, 1917.
2 SHEETS—SHEET 1.

1,221,829.

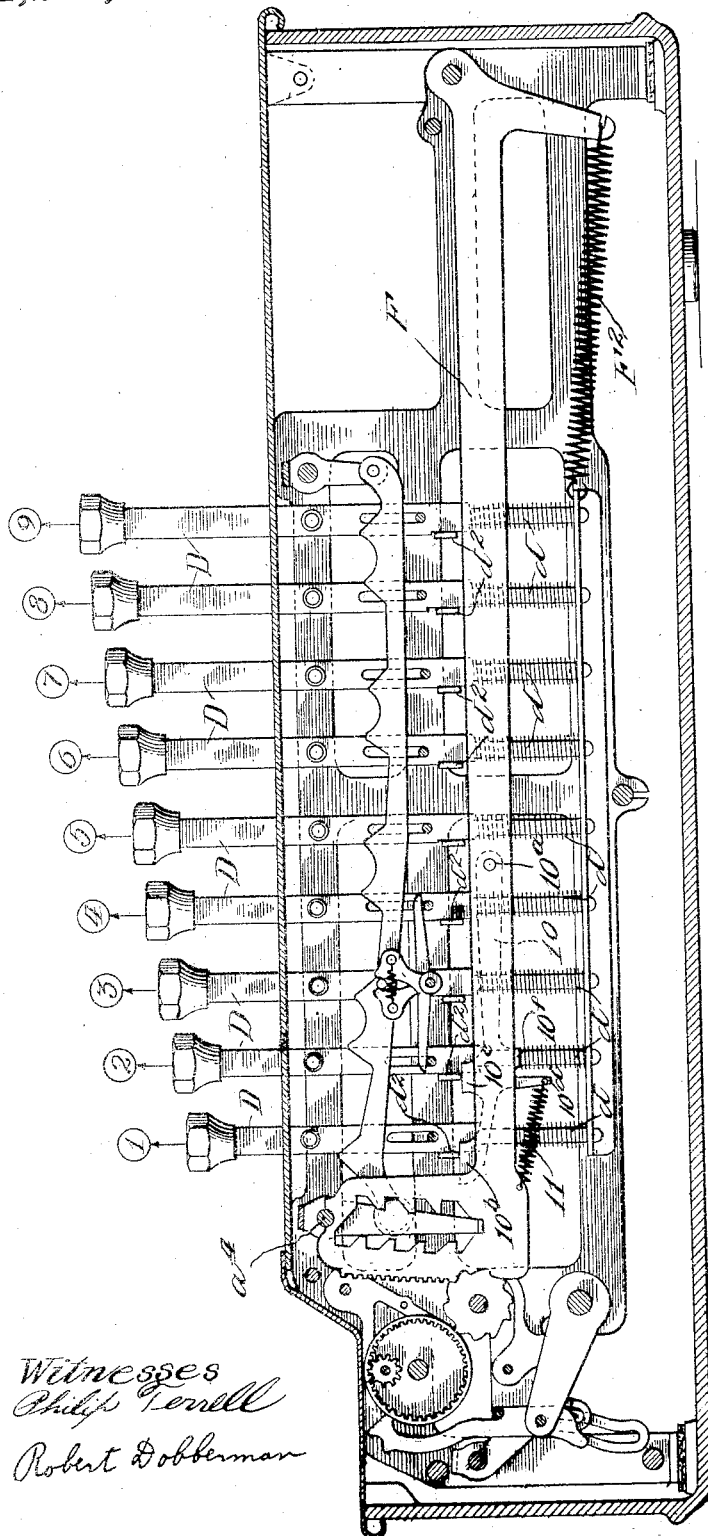


Fig. 1.

Witnesses
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Inventor
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 2 SHEETS—SHEET 2.

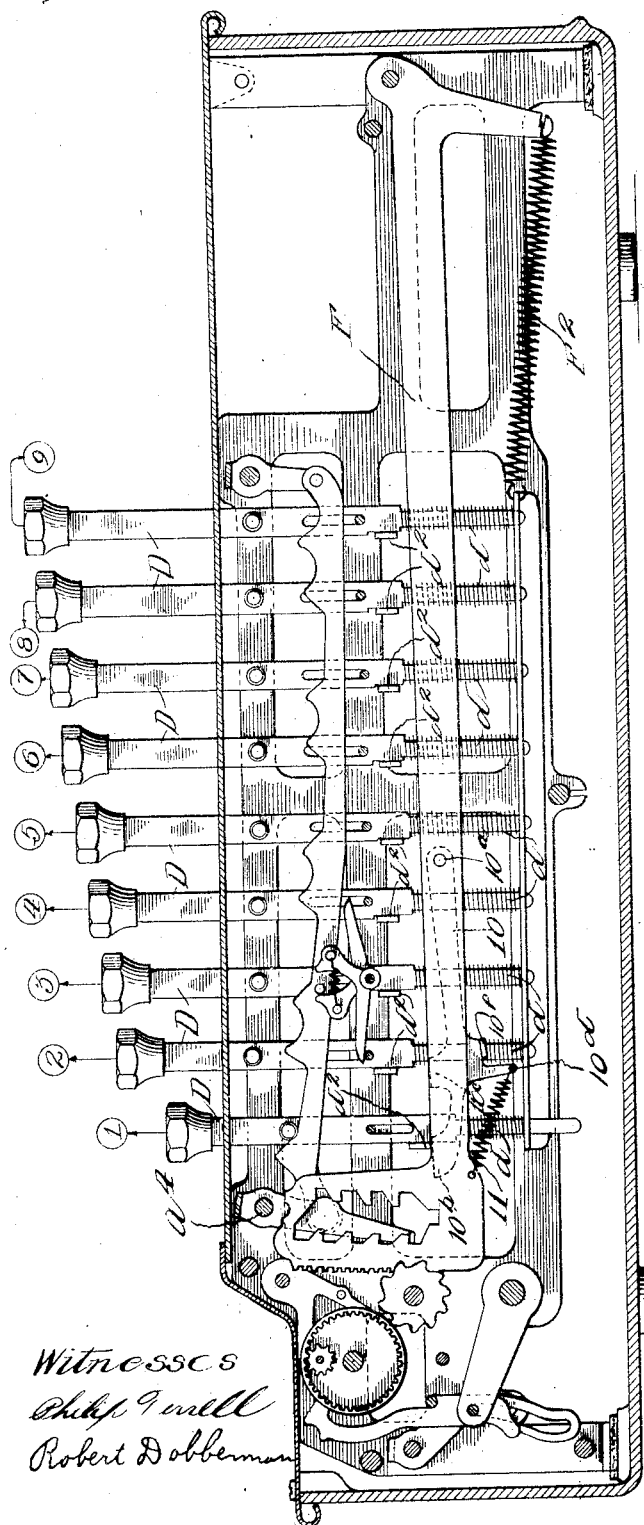


Fig. 2.

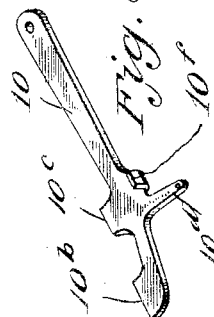


Fig. 3.

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UNITED STATES PATENT OFFICE.

ROY L. BURD, OF CHICAGO, ILLINOIS, ASSIGNOR TO BURROUGHS ADDING MACHINE COMPANY, OF DETROIT, MICHIGAN, A CORPORATION OF MICHIGAN.

ADDING-MACHINE.

1,221,829.

Specification of Letters Patent.

Patented Apr. 10, 1917.

Application filed August 8, 1913. Serial No. 783,701.

To all whom it may concern:

Be it known that I, ROY L. BURD, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Adding-Machines, of which the following is a specification.

This invention relates to the type of adding machines shown in prior Patents Nos. 1,016,501, and 1,023,168 issued February 6, 1912, and April 16, 1912, respectively. In these machines the turning of wheels to effect registration is done by return of spring-actuated levers after displacement thereof by depressible keys and release of the latter. The keys are arranged in rows each row made up of nine keys numbered from 1 to 9 and constructed and arranged to act upon the associated registering lever at varying distances from its pivot, the 9-key acting nearest the pivot, the 8-key a step farther away and so on. Upon reference to said prior patents it will be observed that the acting lugs of the keys are not normally in engagement with the lever, the latter being stopped in its return movement by contact of its forward end with a cross bar, and it will further be observed that the lugs of the lower denomination keys 1 and 2 are spaced farther from the lever than the lugs of other keys. This is so because of a purpose to arrange for uniform "dip" or extent of depression of all of the keys while at the same time preserving a compact arrangement of the keys with their tops spaced slightly and uniformly from each other from front to rear. The keys are normally upheld by comparatively light springs and it has been found that, owing to the relatively slight resistance to depression of the lower denomination keys prior to their striking the lever, there may be a failure to fully depress these keys against the considerably greater resistance offered by the relatively strong spring which upholds the lever. The lost motion between the lugs of the other keys and the lever is so slight that the variation in resistance to their depression does not have to be taken into account, the extent of their depression against the lighter resistance being so very short that the sensation is that of applying finger pressure against the heavier resistance from the beginning. In case of the lower denomination keys however the extent

of depression against the lighter resistance is of such extent as to be distinctly noticeable so that there is an inclination to relax the pressure when the heavier resistance is encountered.

The purpose of the present invention is to compensate for this greater extent of movement of the lower denomination keys against the light resistance so that there will be no noticeable increase in resistance such as to incline the operator to relax the finger pressure. It will of course be understood that failure to fully depress the key leads to erroneous registration.

In the particular form of embodiment of my invention here illustrated, I interpose resistance to the depression of the lower denomination keys which, added to the resistance offered by the light springs normally upholding the keys, substantially equals the resistance of the lever spring.

In the drawings which accompany and form part of this specification, Figure 1 represents in sectional right-side elevation a machine of the type shown in the aforesaid prior patents, having embodied therein means for carrying out the present invention; Fig. 2 is a similar view showing the lowest denomination key depressed; Fig. 3 is a perspective view of one of the special parts employed to carry out my invention.

The machine proper requires no detailed description on account of its being fully explained in said patents. It will therefore suffice to designate only such elements of said machine as are immediately associated with the new parts introduced for carrying out the present invention. D designates the stems of a row of keys and F the registering lever upon which these keys act through the medium of lugs d^2 struck out from said stems and extending over the upper edge of the lever. Said lever is normally upheld by a relatively strong spring F^2 with its front end against a frame cross rod a^4 as shown in Fig. 1. The relatively slight spacing from the lever of the lugs d^2 of seven of the key stems counting from the right of Fig. 1 will be noted and the greater spacing from said lever of the lugs d^2 of the other two keys which are ones bearing the numerals 1 and 2.

For the purpose of carrying out my present invention, I pivot upon the lever F another lever or arm 10 and form the latter with two raised portions or stepped shoulders

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ders 10^b and 10^c for engagement with the lugs of said 1 and 2-keys respectively as illustrated in Fig. 1. Said lever or arm 10 is pivoted at its rear end to the lever F as shown at 10^a and at a forward point has a depending finger 10^d whose lower extremity is connected by a spring 11 with a forward portion of the lever F, said spring obviously tending to lift the arm or lever 10. This action is limited by the encounter against the under edge of the lever F of the lug 10^c struck out from a portion of the lever or arm 10 adjacent the finger 10^d.

Normally the shoulders 10^b and 10^c are close up under the lugs of the 1 and 2-keys respectively as shown in Fig. 1, the stepped relation of said two shoulders being accommodated to the slightly greater spacing of the lug of the 1-key above the lever F as compared with the spacing of the lug of the 2-key above said lever.

The keys are normally upheld as usual by light spring *d* surrounding the narrowed lower portions of their stems, the resistance offered by these springs to depression of the keys being very slight as compared with the resistance offered by the spring F² which upholds the registering lever. However, as to the 1 and 2-keys it will be obvious that, with the new parts above described incorporated in the machine, their depression will be immediately resisted by the spring 11. The character and disposition of this spring 11 is such however and the relation of the lever 10 to the lever F of such character that said lever will move downwardly upon its pivot, the spring yielding, without any accompanying movement of the lever F. Obviously, therefore, depression of the 1 or 2-keys the distances necessary to bring its lug *d*² into engagement with the upper edge of the lever F,—what may be termed the “lost motion” of the key, is resisted by the spring 11. This adds appreciably to the resistance offered by the light key-spring *d* so that the sum total of the resistance approximates that encountered by the key when it strikes the lever F. Consequently there is no such sudden encounter of the key with the relatively heavy resistance of the registering lever as heretofore experienced and therefore no inclination on the part of the operator to relax finger pressure and so fail to completely depress the key. Of course when the lug of the key strikes the lever F there is no further movement of the arm or lever 10 about its pivot and no further stretching of the spring 11 so that the further depression of the key is against the resistance offered by the spring F² and the slight additional resistance offered by the spring *d*, the same as in the prior structures.

While it will be seen that the above-described structure accomplishes the desired result in an exceedingly simple and efficient

manner I wish it understood that my invention is not limited to embodiment in this particular form but may be embodied in a variety of forms.

I claim:

1. In a machine of the class described the combination of a registering lever; a series of keys with stems constructed and arranged to act upon said lever at increasing distances from the latter's pivot and with lost motion between the lever and certain of said key stems which act at the greater distances; and compensating means for the said certain key stems only, said means acting while said lost motion between said certain key stems and the lever is being taken up, whereby to create substantially uniform resistance to the depression of said certain key stems though displacement of the lever by them is less proportionately to the extent of their depression than is displacement of said lever by other key stems proportionate to similar extent of depression of the latter, such other key stems acting independently of said compensating means.

2. In a machine of the class described the combination of a registering lever; a series of keys with stems constructed and arranged to act upon said lever at increasing distances from the latter's pivot and with lost motion between the lever and certain of said key stems which act at the greater distances; and compensating means for the said certain key stems only, said means offering resistance thereto while said lost motion between the said certain key stems and the lever is being taken up, whereby to create substantially uniform resistance to the depression of said certain key stems though displacement of the lever by them is less proportionately to the extent of their depression than is displacement of said lever by other key stems proportionate to similar extent of depression of the latter, such other key stems acting independently of said compensating means.

3. In a machine of the class described, the combination of a spring-held registering lever, a series of depressible spring-upheld keys with stems constructed and arranged to act upon said lever in opposition to its spring at increasing distances from its pivot and with lost motion between the levers and certain of said key stems which act at the greater distances, and compensating spring-means applied to such key stems only and offering resistance to their depression while the lost motion between them and the lever is being taken up, whereby to create substantially uniform resistance to the depression of said certain key stems though displacement of the lever by them is less proportionately to the extent of their depression than is displacement of said lever by other key stems proportionate to similar

extent of depression of the latter, such other key stems acting independently of said compensating means.

4. In a machine of the class described, the
5 combination of a spring-held registering lever, a series of depressible spring-upheld keys with stems constructed and arranged to act upon said lever in opposition to its spring at increasing distances from its pivot
10 and with lost motion between the lever and

certain of said key stems which act at the greater distances, an arm pivoted on said lever, and a spring upholding said arm for engagement with the said certain key stems only.

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Witnesses:

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