

G. W. DUDLEY.
 ADDING AND RECORDING MACHINE.
 APPLICATION FILED JULY 2, 1906.

960,853.

Patented June 7, 1910.

3 SHEETS—SHEET 1.

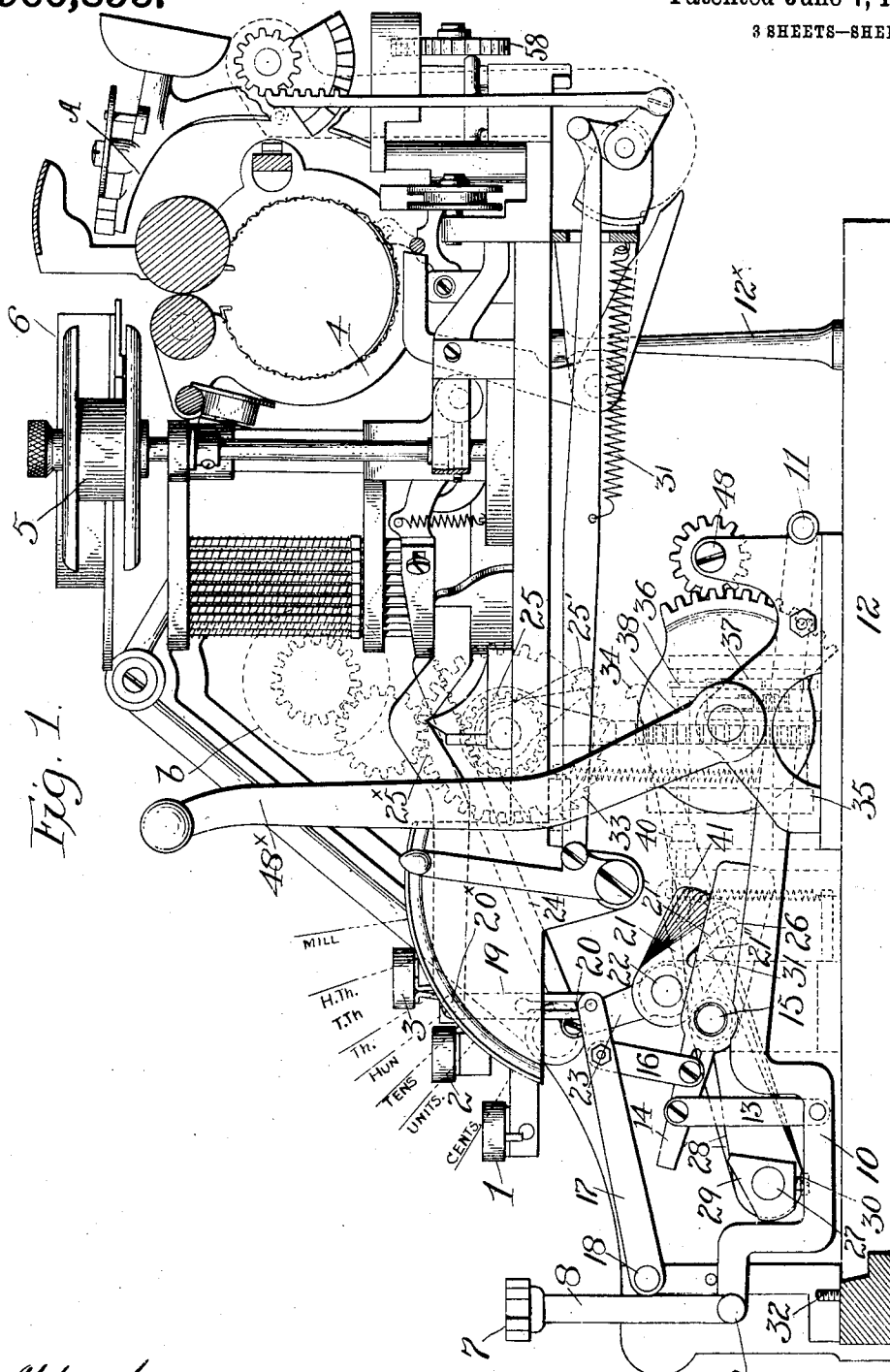


Fig. 1.

Attest
 C. S. Middleton
 Edward N. Sarton

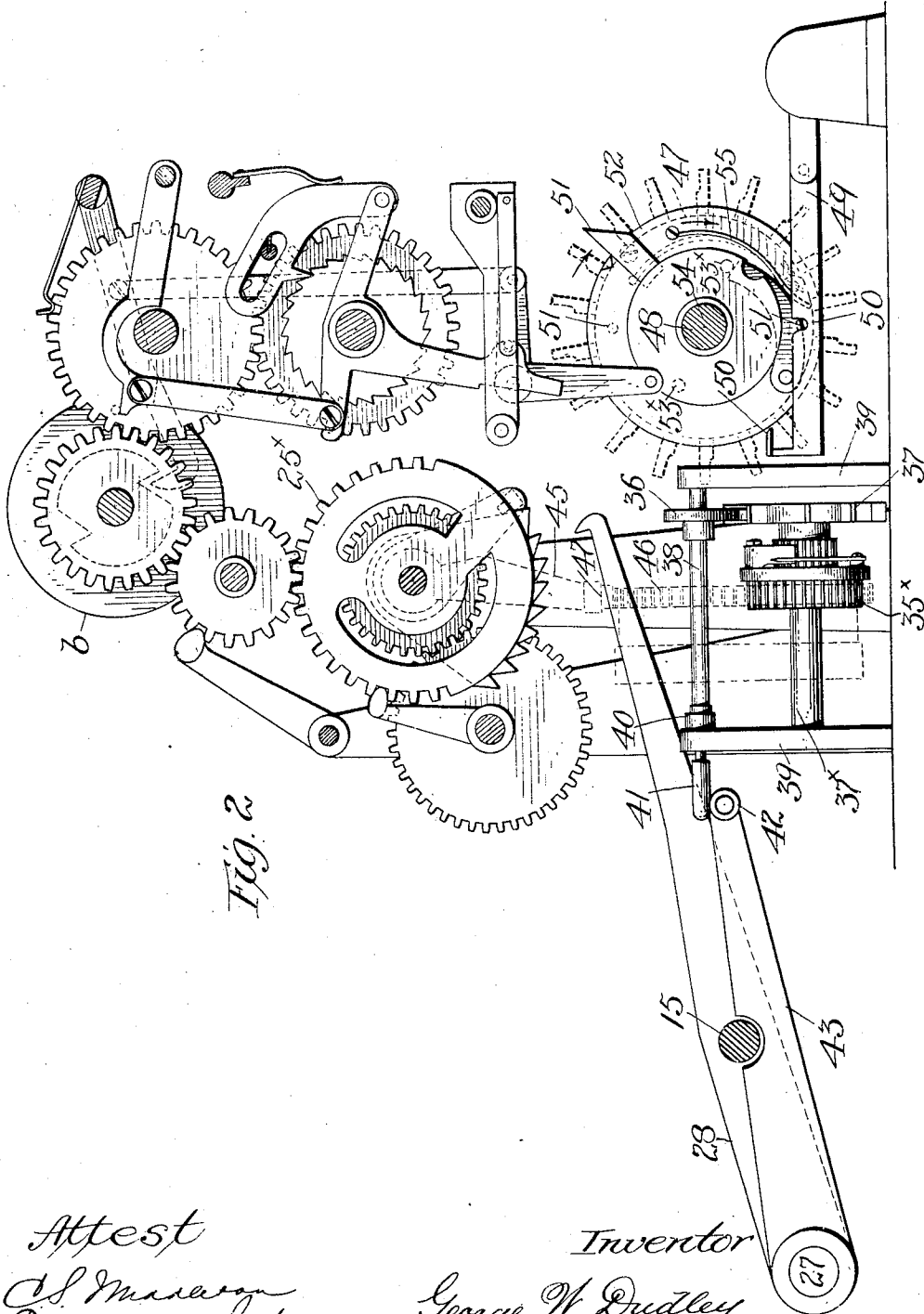
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3 SHEETS—SHEET 2



Attest
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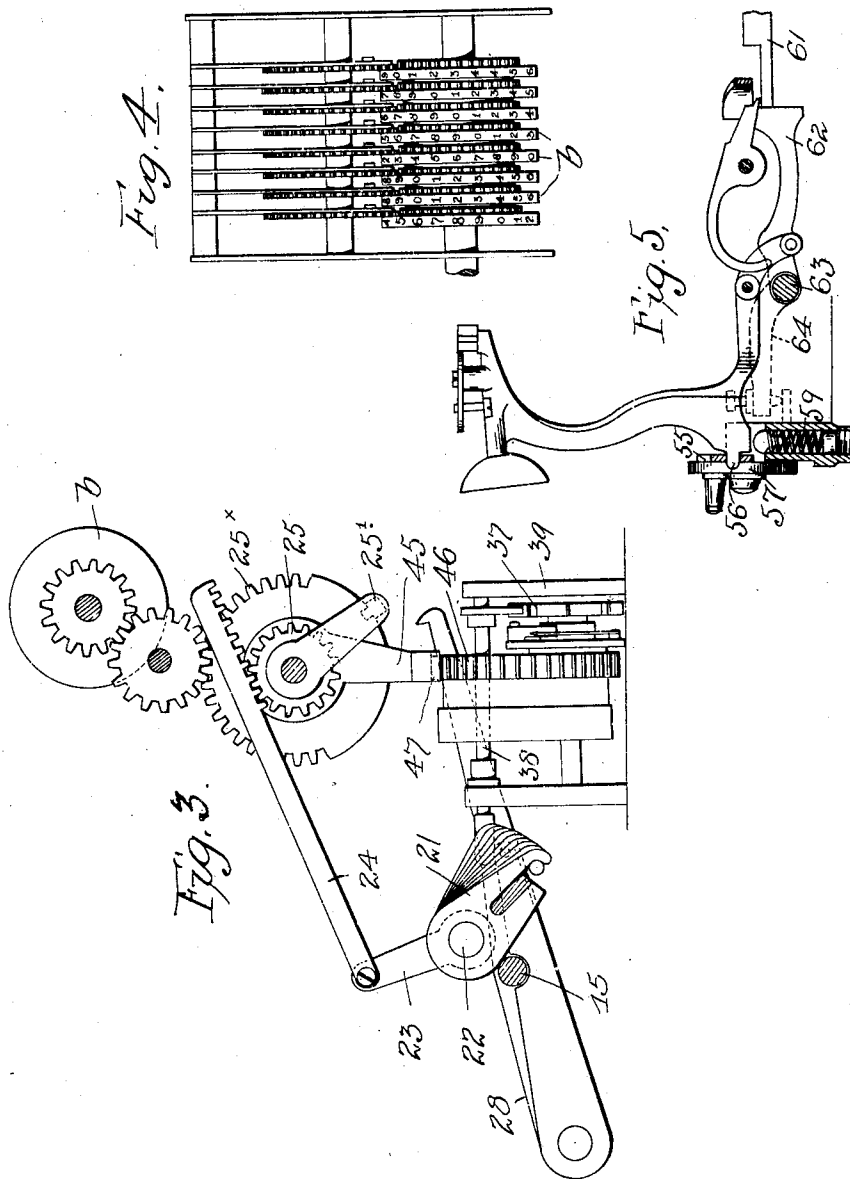
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3 SHEETS—SHEET 3.



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UNITED STATES PATENT OFFICE.

GEORGE WILSON DUDLEY, OF STAUNTON, VIRGINIA, ASSIGNOR TO NUMEROGRAPH MANUFACTURING COMPANY, OF CHARLESTON, WEST VIRGINIA, A CORPORATION OF WEST VIRGINIA.

ADDING AND RECORDING MACHINE.

960,853.

Specification of Letters Patent.

Patented June 7, 1910.

Application filed July 2, 1906. Serial No. 324,450.

To all whom it may concern:

Be it known that I, GEORGE W. DUDLEY, a citizen of the United States, residing at Staunton, Virginia, have invented certain new and useful Improvements in Adding and Recording Machines, of which the following is a specification.

My present invention relates to the general form of adding and recording machine disclosed in an application for Letters Patent of the United States filed by me Apr. 30, 1904, #205776, in which an adding mechanism is employed with typewriting or recording mechanism superimposed upon a portion of the adding mechanism, but with the adding disks exposed to view at one side of the machine while the hand operating lever belonging to the adding mechanism is located at the opposite side of the machine. In said machine also I disclose a series of keys for operating the printing mechanism including figure keys, and also a series of figure keys for operating the adding mechanism, said keys being connected in such a manner that when the keys of the adding mechanism are operated they will operate also those printing keys which effect the printing of the figures to record the figures added, but when the said figure keys of the printing mechanism are operated the keys of the adding mechanism are not operated and only ordinary printing is done.

My present invention relates particularly to the connections between the two sets of keys *i. e.* adding-keys and the printing-figure-keys, and also to the connections from the adding keys to the adding mechanism whereby overthrow of the adding mechanism will be prevented.

My invention also includes adding mechanism and printing mechanism with keys for operating the same, said keys having a similarity of touch, that is to say, the adding keys are operated by about the same degree of pressure or manipulation of the fingers as are the keys of the printing mechanism.

The invention further consists in the features, combination, and arrangement of parts hereinafter described and particularly pointed out in the claims.

In the accompanying drawings,—Figure 1 is a side elevation of the machine. Fig.

2 is a side view of the carrying mechanism belonging to the adding machine, the escapement for the adding machine and associated parts. Fig. 3 is a view similar to Fig. 1, showing a train of mechanism of the adding machine in elevation. Fig. 4 is a detail view showing in plan a series of adding wheels, these being similar to those disclosed in the United States Patent of G. W. and A. L. Dudley Nos. 4/02, 712777. Fig. 5 is a detail view of the hammer trip mechanism.

In carrying out my present invention, I employ in connection with my adding mechanism, printing mechanism of the well known Hammond type. This mechanism is superimposed upon a portion of the adding machine. This adding machine is substantially the same as that disclosed by me in Letters Patent of the United States 712777, November 4, 1902.

In the drawing, the Hammond typewriter will be recognized as consisting of the three rows of keys, 1, 2, 3, the latter of which are for printing the figures as well as certain letters; the paper carriage 4; the ribbon movement 5; and the shuttle mechanism and anvil at 6.

The keys 7 for operating the adding mechanism are connected to vertical stems 8, pivotally connected at 9 to the key levers 10 which are pivoted to the frame at 11. These key levers extend under the typewriting machine for which purpose said typewriting machine is elevated above the base frame 12 of the machine, being supported for instance by the posts 12*. The adding machine keys are connected with the keys 3 of the typewriting or recording mechanism through the following parts: the link 13, the lever 14, pivoted on the rod 15, the link 16 adjustably connected to said lever 14 and connected to the lever 17 which is pivoted to the frame at 18 and the link 19 having a pin and slot connection at 20 with said lever 17 and being pivotally connected at 20* with the lever of the printing or recording figure-key 3.

The connection for operating the adding machine from the adding keys consists of the key lever 10, the link 13 and lever 14 just mentioned above, and arm 21 fixed on the shaft 22, journaled in the frame, the arm

23 fixed on said shaft, and the rack 24 pivotally connected to said arm at one end and having its rack teeth meshing with a gear wheel 25 (corresponding to the gear marked 5 8 in said application) and the gear 15 in said patent which gear wheel is on a shaft carrying a spline bar 25' which passes through the selector wheels 25* and serves to turn them according to the value of the 10 adding keys which are struck.

The shaft 22 is turned through different degrees according to the value of the key operated for which purpose said shaft has nine of the arms 21 fixed thereon, one 15 for each of the digits one to nine, and there is a set of the connections 10, 13, 14, 16, 17 and 19 above described for each of the adding keys from 1 to 9 and also for the 0 key. The arms 21 are set on the shaft 22 at 20 different angles as clearly shown in Fig. 1, and they are operated each from a pin 26 on its companion lever 14. These pins on the several levers, however, are axially in line with each other so that they individually engage and move their corresponding 25 arms 21 sooner or later, according to the angular position of their arms 21. That is to say, for some of the levers 14 more lost motion takes place before its pin 26 strikes the companion arm 21 than in the case of 30 other of the arms. For instance, for the 1 key there will be a maximum amount of lost motion of its lever 14 before the pin 26 thereof strikes the arm 21 belonging to it, and consequently, the connection leading to 35 the adding mechanism will be moved to a minimum degree, while for the 9 key there will be a minimum amount of lost motion of its appropriate lever 14, and consequently 40 the pin 26 will engage the arm 21 early in its movement and actuate the selector or setting mechanism of the adding machine to the maximum extent.

The specific operation of the adding machine as a result of the operation of the gear wheel 25 need not be described, as it forms no part of my present invention. This action will however be clear from the application and the Letters Patent above referred to. 50

The escapement mechanism of the carriage of the adding machine proper is the same as in the above mentioned patent, and application, and it seems only necessary to 55 point out herein that the means for operating said escapement consists of the universal bar 27 carried in arms 28 pivoted on the rod or bar 15, one of which arms is shown in dotted lines in Fig. 1 and the other in full 60 lines. One of these arms is also shown in full lines in Fig. 2.

The universal bar carries a series of blocks, one of which is shown at 29 adjustably held thereon by the screws 30, said

blocks being in range of the levers 14, one 65 for each block so that when any one of said levers is operated it will strike its corresponding block on the universal rod 27 and through said rod the escapement of the adding machine will be operated. This escape- 70 ment mechanism consists generally of the pawl and ratchet 36, 37, the latter being fixed to the shaft 37 to which power is applied in any suitable manner through the gear wheel 35*. The pawl is fixed to a rod 75 or shaft 38 journaled in the posts 39, which shaft has an arm 40 bearing a pin 41 overlying a roller 42 on an arm 43 connected to the universal bar and arranged to raise the pin and through the arm partially rotate 80 the shaft when the universal bar or rod is depressed to thus release the escapement. The spring drum is geared to the carriage 45 of the selectors through the gear 46 and rack 47. 85

In order to prevent overthrow of the adding mechanism under the rapid operation of the machine, I provide the arms 21 with slots 31 for the pins 26 to work in, said pins working against the underside of 90 the portion 21' of said arm in order to operate it for operating the adding mechanism, while the portion 21'' of said arm by engaging the underside of said pin 26 forms a positive connection between the said arm 95 21 and its lever 14 so that the arm 21 if operated violently will not overthrow and move in advance of the movement of the pin 26 because the portion 21'' of said arm will immediately engage the pin 26 when 100 the movement begins.

It will be noticed that the portion or finger 21'' of the arm 21 is shorter than the finger or portion 21' of said arm. This is to allow each arm to swing freely with 105 the shaft 22 when said shaft is operated by any of the other arms 21. That is to say, if the shaft is operated by one of the arms 21 the fingers 21'' on all the other arms will swing past their corresponding pins 26 110 which at this time are at rest, but the arm which is effecting the operation of the shaft will be locked to its lever 14 by its finger 21'' and pin 26 so that the movement of the arm 21 to operate the adding mechanism 115 will correspond in degree or extent to that of the lever 14 and the movement of this lever obviously corresponds to the movement of the key with which it is connected by means of the link 13 and lever 10, 120 this being a permanent connection. The movement of the key lever is arrested accurately by the stop screw 32.

For the more accurate positioning of the adding selectors, I associate with the non- 125 overthrow mechanism just described, a detent mechanism such as is disclosed in the patent above referred to consisting of a

segment of a ratchet 33 (corresponding to that marked 27' in said patent) which is fixed on the selector shaft and this ratchet is engaged by a detent 34 forming an extension of one of the arms 28 above mentioned. This ratchet will engage the segment at once upon the selectors arriving at the correct position as a result of the operation of the said gear 25 through the rack and arm 21.

It will be seen that the touch necessary to be applied by the operator is the same throughout all the keys, *i. e.* those of the Hammond machine as well as those of the adding machine.

As is well known the keys of the Hammond machine need only to be depressed and not struck, as in the type-bar machines, because in this machine, the Hammond, the printing is done by releasing an escapement mechanism and setting free a printing hammer A. In my adding mechanism as described in the said patent above mentioned the keys are likewise simply depressed. In both cases the keys release escapement mechanism. In the one case for the stroke of the printing hammer and in the other for the movement of the selector carriage. There is thus similarity of touch throughout the key board, both as regards the keys for printing or recording, and as regards adding. In both cases the keys are operated by pressure and not by a blow. The operator can therefore use the same touch throughout the key board.

In Fig. 2 I show carrying mechanism for the number wheels *b* in all substantial respects like that shown in Fig. 4 of Letters Patent, granted to me Apr. 5, 1904, #765340. In my present machine like that therein shown, a pin drum 47 is arranged loosely on a shaft 48, said pin drum operating the connections shown in said figure for the carrying action when the hand lever 48* is returned in the direction of the arrow, Fig. 1 to normal position. In order to hold this pin drum accurately in position and prevent overthrow, a detent lever 49 is used similar to that shown in said last named patent and also in my Patent #712777 having a notch at 50 to engage pins 51 on the drum at each half revolution thereof. In the said patents, the detent lever was spring pressed and the holding effect was due to the frictional action of the pin against the wall of the notch which wall was slightly rounded so that when sufficient force was applied the detent would yield and allow the pin drum to turn. In my present construction I have sought to make the holding effect of the detent positive, for which purpose the notch therein is provided with a straight wall as a bearing for the pin of the drum, so that the detent lever

must be forced down by positive pressure away from the detent pin before the drum can be turned. For this purpose I provide the detent lever in my present machine with an extension forming a finger 50 adapted to be engaged by a pawl 51 pivoted to the disk 52 which is secured to the said shaft 48 and which carries the pawl 53 to engage the pins 53* on the disk or head 54 connected with pin drum, all as described in said patents. When the disk 52 rotates in the direction of the arrow the beveled side of the pawl 51 will strike the finger 50 and as it may yield in one direction, it will pass said finger but will immediately return to active position under the action of its spring 55 and then upon the rotation of the disk in the opposite direction to make the pawl 53 engage one of the pins 53*; the said pawl 51 with its other side will engage the finger 50 and depress the detent positively to release the pin drum and this action takes place just before the pawl 53 engages the pin 53* to turn the drum, but up to this time the pin drum has been accurately and firmly held.

It will be seen that as the operator at times strikes the adding keys and at times strikes the printing keys it is most desirable that the touch be uniform. This is also desirable because the adding keys are connected to the printing keys and the connections to the printing devices will thus be operated in a similar manner whether the adding keys be operated or the figure-printing keys.

The levers 14 act in a three fold capacity *i. e.*, to operate the arms 21, to operate the space frame, and also through said space frame to operate the overthrow detent.

In Fig. 5 I show the means by which the impression hammer is operated. This is precisely the same as is described in the patent of J. B. Hammond, #290,419 granted December 18, 1883. The hammer is held in retracted position by the spring tension of the carriage, and for this purpose a hammer returning arm or lever 55 engages the stud 56 on the hammer. The lever 55 carries a pawl 57 which engages with the escapement wheel 58 and as this escapement wheel is under tension of the carriage spring (not shown) the hammer will be held retracted as long as the pawl 57 remains in engagement with the ratchet wheel, but as soon as it is released therefrom then the hammer will be free to fly forward under the action of its spring 59. It is not thought necessary to go into the details of the means for releasing the pawl from the escapement wheel, and it is thought sufficient to say that this is done each time a character key is operated. One of these keys is indicated at 61, extending at its rear end under the

frame 62 which is pivoted at 63 and has an arm 64 shown in dotted lines which, through certain well known means, acts to free the pawl and the hammer lever from restraint of the escapement wheel and allow the hammer to fly forward under pressure of its own spring 59 to make the impression.

I claim as my invention:—

1. In an adding and recording machine, the adding keys adding mechanism, a shaft, a series of arms on said shaft arranged in different angular positions about the shaft, the typewriter keys, and connections between them comprising the links 13, 16 and 19, and the levers 10, 14 and 17, a pin and slot connection between the levers 14 and the arms, and connections between the shaft and the adding mechanism, substantially as described.

2. In combination in an adding machine, adding keys, adding mechanism, a rotary shaft, a series of arms thereon occupying different angular positions, a series of levers pivoted intermediate of their length and having their rear arms arranged to operate the angularly positioned arms, a detent and ratchet mechanism and a universal bar 27 under the forward ends of the intermediately pivoted arms, said universal bar being connected with the detent, substantially as described.

3. In combination in an adding machine, adding mechanism, adding keys, a shaft 22, connections between the same and the adding mechanism, arms on said shaft, a series of levers 14 intermediately pivoted and adapted at their rear ends to operate the said arms, an escapement mechanism for the

adding machine and a space frame or universal bar operated by the front portion of said levers, substantially as described.

4. In combination in an adding and recording machine, adding mechanism, printing mechanism, adding keys, figure printing-keys, a member having connections leading to the adding machine, a series of arms on said member, a series of intermediately pivoted levers having their rear ends arranged to operate the said arms, carriage escapement mechanism operated by the front portion of said levers, and connections between said levers and the figure-printing keys of the recording mechanism, substantially as described.

5. In combination in an adding machine, adding disks, carrying mechanism, means for operating the carrying mechanism, a detent for holding the operating means against overthrow, and means for positively releasing the said detent means, substantially as described.

6. In combination in an adding machine, adding disks, carrying mechanism, a pin drum for operating the carrying mechanism, a detent for the pin drum, a yielding pawl for engaging the detent, said pawl being rigid in one direction to operate the detent positively, and a rotary carrier for the said pawl, substantially as described.

In testimony whereof, I affix my signature in presence of two witnesses.

GEORGE WILSON DUDLEY.

Witnesses:

MICHAEL LUBER,
JOHN H. TRIMBLE.